Design, Build and Operate of Mwache Water Treatment Plant (CWWDA/AFD/W3/2022-2023)

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
1.	PART 1 – Biddings Procedures Section 2 – Bid Data Sheet ITB 17.4	ITB 17.4	It is stated that "*Bidders shall note that the equipment and mandatory Spare Parts included in Schedule Nos. 2 above exclude materials used for civil, building, and other construction works. All such materials shall be included and priced under Schedule No. 2*." This seems contradictory. Can you please clarify?	*Bid Data Sheet, ITB 17.4 is deleted (clause 17.4 of ITB is applicable).*
2.	Part 1 – Bidding Procedures Section 2 – Bid Data Sheet	ITB 17.5	It is stated that "a) Schedules No. 1 & 5 & 6 & 7: Preliminary Items (i) Prices shall include all taxes, duties, levies and Charges payable in the Employer's country up to twenty-eight (28) days prior to the deadline for Bid submission except for VAT which will be quoted separately." Could you please confirm if the Contractor will invoice VAT to the Client?	*VAT is included in Schedule No.9 - Grand Summary.* *Yes, the Contractor will invoice VAT to the Client.*
3.	Part 1 – Bidding Procedures Section 2 – Bid Data Sheet	ITB 17.5	It is stated that "b) Schedules No. 2 & 3: Equipment, Materials and Tools and mandatory spare parts: (ii) All customs duties and VAT paid or payable in the Employer's country, up to twenty-eight (28) days prior to the deadline for Bid submission shall be quoted separately." Could you please confirm if the Contractor will invoice VAT to the Client?	*Refer to response no. 2.*
4.	Part 1 – Bidding Procedures Section 2 – Bid Data Sheet	ITB 17.5	It is stated that "c) Schedule No. 4: Civil Engineering and Building Works: (i) Prices shall include prices for transportation, insurance and other services incidental to the installation of the Works, all labour, Contractor's equipment, construction works, materials, consumables and all matters and things of whatsoever nature, training, etc., where identified in the Bidding Documents, as necessary for the proper execution of the installation and other services, including all taxes, duties, levies and charges payable in the Employer's country as of twenty-eight (28) days prior to the deadline for submission of bids to the exception of VAT which will be quoted separately" Could you please confirm whether imported material are exonerated from VAT for this Project? If so, could you please provide us with the official document indicating such exoneration?	*Refer to response no. 2.* *Equipment imported from abroad is not exempted from VAT.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
5.	Part 1 – Bidding Procedures Section 2 – Bid Data Sheet	ITB 17.5	It is stated that "d) Schedules No. 8: Operation Service: (i) Prices shall include operation, maintenance & knowledge transfer, as well as all taxes, duties, levies and other charges payable in the Employer's country as of twenty-eight (28) days prior to the deadline for submission of bids to the exception of VAT which will quoted separately." Could you please confirm if the Contractor will invoice VAT to the Client? Could you please confirm if the Contractor will pay VAT to its supplier or if the project beneficiates from an exoneration procedure?	*The Project is NOT VAT exempted. Refer to the local legislation on VAT.* *VAT is included in Schedule No.9 - Grand Summary and the Contractor will invoice VAT to the Client.*
6.	PART 1 – Biddings Procedures Section 2 – Bid Data Sheet ITB 37.3	ITB 37.3	It is stated that "*The Employer's evaluation of the Financial Bid shall exclude and not take into account:* *a) In the case of equipment, materials and mandatory spare parts (Schedule No. 2), all taxes and duties, applicable in the Employer's country and payable on the equipment and mandatory spare parts if the Contract is awarded to the Bidder;*" Can you please clarify?	*Bid Data Sheet, ITB 37.3 is deleted (clause 37.3 of ITB is applicable).* *Based on the ITB 37.3, the financial bid evaluation will be done by subtracting all taxes amounts on schedules 2 & 3.*
7.	Part 1 – Bidding Procedures Section 3 - Evaluation and Qualification Criteria 2.3. OPERATION AND/OR MAINTENANCE COSTS	Page 10	Can you please clarify the evaluation of Asset Replacement (AR) costs? In particular if the Contractor or the Engineer will perform such evaluation, and based on which criteria?	*Evaluation of AR is detailed in Section 3 (Evaluation and Qualification Criteria), Sub Section 2.3 and 2.4.* *Costs priced in schedule 4 is added to the cost of replacement to be evaluated under "EM", "EL" and "IT" values. See updated Evaluation and Qualification Criteria (**Annex A**).* *For the sake of clarity of calculation, if for example the life span expectancy of the facility is defined at 30 years, then the cost of EM equipment (replacement every 10 years) will be 3 times the corresponding costs of schedules 2, 3 and 4; the cost of EL equipment (replacement*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
				every 15 years) will be 2 times the corresponding costs of schedules 2, 3 and 4, etc. *The Client will evaluate the AR during the Bid Evaluation Process as per the criteria outlined in Sub Section 2.3 and 2.4.*
8.	Part 1 – Bidding Procedures Section 3 - Evaluation and Qualification Criteria 2.3. OPERATION AND/OR MAINTENANCE COSTS	Page 10	The calculation of Operation and Maintenance Costs is calculated using the variable "M" which is defined by " The life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements;". Can you please specify the life span expectancy of the facility, and therefore the total amount of years the operation and maintenance cost will taken into account for the evaluation of the bids?	*The life span expectancy of the facility to be adopted for the value "M" for calculation of OMEP is 30 years.*
9.	Part 1 – Bidding Procedures Section 3 - Evaluation and Qualification Criteria 2.3. OPERATION AND/OR MAINTENANCE COSTS	Page 10	The calculation of Operation and Maintenance Costs will be highly dependent of the available water level in the Mwache Dam that will influence the electrical consumption of Raw Water Pumps. In order to allow for fair comparison of the Operation and Maintenance Costs between the Bidders, can you please provide us with the water levels to be considered in the Dam for the Operation and Maintenance Costs period considered for Bid Evaluations?	*The energy consumption of the RWPS calculated and proposed by bidders shall be based on the following assumptions:* - *For 20% of the time: operation level of the dam of 50.0 masl* - *For 50% of the time: operation Level of the dam of 70.0 masl* - *For 30% of the time: operational level of the dam of 80.0 masl*
10.	Part 1-Biddings Procedures Section 3-Evaluation and Qualification Criteria Part 2-Employer's Requirements	Page 41 Page 64	In part 1, the number of Construction Site Engineers is not defined. And in Part 2, it is precise, 3 Construction Site Engineer. Can you please confirm the number of **Construction Site Engineer**.	*Refer to **Annex B (revised requirements for Key Personnel in section 33.2 of Part 2, S7.1).*** *Section 1.4 of Part 1 – Section 3 – Evaluation and Qualification criteria is replaced by the following: The Bidder must demonstrate that it has the personnel for the key positions that meet the following requirements: refer to Section 33.2 of Part 2 – S7.1 – General requirements.* *[bullets in Section 33.2 deleted and replaced with Table]*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
				The Bidder shall provide details of the proposed personnel and their experience records using Forms PER-1 and PER-2 included in Section IV - Bidding Forms and Schedules. In particular, diploma and evidence of fluency in English language shall be provided. The Employer reserves the right to proceed with interviews of proposed staff during the bid evaluation process. *The Employer is willing to promote employment and fight social exclusion, and as such requires per Article 1.1.84 of the Particular Conditions that social inclusion measures be implemented as described in Section VII – Works Requirements, the Bidder must demonstrate that it can mobilize specialists in technical trainings and social inclusion and employment as specified in the table above.* *The Employer reserves the right to reject a bid or request the replacement of any of the Key Personnel of the successful Bidder during Contract negotiations if the minimum requirements are not achieved.*
11.	Part 1-Biddings Procedures Section 3-Evaluation and Qualification Criteria Part 2-Employer's Requirements	Page 41 Page 63	In part 1, 15 Key Personnel are described, while in part 2 there is 12 Key Personnel (without the second Construction Site Manager, cf question above). In part 2, the Technical trainings manager and the Employment and social inclusion expert, are missing. Can you please clarify the number and position of **each Key Personnel**.	*Refer to response no. 10.*
12.	Part 1-Biddings Procedures	Page 42	Can you please clarify the kind of work experience necessary for the	*Refer to response no. 10*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
	Section 3-Evaluation and Qualification Criteria Part 2-Employer's Requirements	Page 64	**Electromechanical expert**. Part 1: "Total work experience (years) 15" Part 2: "At least 15 years' experience in WTP and pumping stations design and operation."	
13.	Part 1-Biddings Procedures Section 3-Evaluation and Qualification Criteria Part 2-Employer's Requirements	Page 42 Page 64	Can you please clarify the number of project necessary for the **Structural engineer**. Part 1: "3 no. WTP construction projects with one project having a capacity > 4,500m^3/h" Part 2: "Experience as structural engineer for at least 3 WTP having a capacity > 4,500m^3/h"	*Refer to response no. 10*
14.	Part 1-Biddings Procedures Section 3-Evaluation and Qualification Criteria Part 2-Employer's Requirements	Page 42 Page 64	Can you please confirm the kind of work experience necessary for: **ESHS manager/expert, Environmental and social officer, Health and safety officer and Architect**. Part 2, for ESHS manager/expert, Environmental and social officer and Health and safety officer: "experience in construction site management" Part 2, for Architect: "experience in industrial architectural design" While for all of them in Part 1 it is described as "Total work experience".	*Refer to response no. 10*
15.	Part 1 – Bidding Procedures Section IV – Bidding Forms	Price Schedule - Schedule No.9	We understand that in Schedule No. 9: Grand Summary of Schedule Prices, "*15% Contingencies (Provisional)* " shall be added to Sub- total 1 to calculate Sub-total 2, meaning that [Subtotal 2] = 1,15 x [Subtotal 1]. Can you please confirm our understanding?	*"10% Contingencies (Provisional) " shall be added to Sub- total 1 to calculate Sub-total 2, meaning that [Subtotal 2] = 1,10 x [Subtotal 1].* *Refer to Annex C (revised Price Schedules).*
16.	Part 1 – Bidding Procedures Section IV – Bidding Forms	Price Schedule - Schedule No.9	We understand that in Schedule No. 9: Grand Summary of Schedule Prices, the amount to be reported to the BID SUBMISSION FORM – BID PRICE for the Operation Service is the Total Amount of Schedule No. 8. That means that the total amount of Schedule 5B ""Environmental, Social, Health and Safety (ESHS) for Operation part"" is not reported in the BID SUBMISSION FORM – BID PRICE, which seems incorrect.	*What goes to the Bid submission Form is the Grand Total in Schedule 9.* *Refer to **Annex C** (revised Price Schedules).*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
			Can you please modify the Schedule No. 9: Grand Summary of Schedule Prices so that the amount to be reported to BID SUBMISSION FORM – BID PRICE for the Operation Service includes the total amount of Schedule 5B "Environmental, Social, Health and Safety (ESHS) for Operation part"?	
17.	Part 1 – Bidding Procedures Section IV – Bidding Forms	Price Schedule - Schedule No.9	In Schedule No. 9: Grand Summary of Schedule Prices, we understand that the GRAND TOTAL **(INCL.OFALLTAXES)** to be included in the Letter of Bid is the sum of TOTAL (Sub-total 2 + 5B + 8) + the Value Added Tax 16%. However, in the BID SUBMISSION FORM – BID PRICE, the amount to be reported is mentioned as '"**excluding VAT**"'. This seems contradictory. Can you please clarify?	*It is not Contradicting but to be shown separately as below* *(i) For the Design-Build of the Works, the lump sum amount of _____ (excluding VAT);* *(ii) For the Operation Service, the amount of _____ (excluding VAT);* *(iii) The total amount of VAT is: _____.*
18.	Part 1 – Bidding Procedures Section IV – Bidding Forms	Price Schedule - Schedule No.2	In Schedule No. 2: Equipment, Materials, Tools and Mandatory Spare Parts Supplied from Abroad, can you please confirm that the amount to be reported to Schedule No. 9: Grand Summary of Schedule Prices is the Total Price (Excl. VAT) which includes Custom Duties & Levies	*This is correct.* *The amount in Schedule No.2 to be carried forward to Schedule No. 9 (Grand Summary of Schedule Prices) is exclusive of VAT but inclusive of Custom Duties & Levies*
19.	Part 1 – Bidding Procedures Section IV – Bidding Forms Price Schedules		"Potable water system / facilities for the base camp, police station and clinic (constructed under the Dam Contract) " is included in our scope of works. Can you please provide us with the daily production to be considered? What is the battery limit to be considered (potable water production / potable water transfer pipeline / potable water distribution pipelines? service connections, etc?)	*The scope of the potable water system for the base camp, police station and clinic, to be quoted as per item 1.4.3 of Schedule 2, is described in the revised Part 2, section 7.2, 3.15.3.* *See **Annex D** – Revised Part 2, section 7.2, 3.15.3*
20.	Part 1- Bidding procedures Section IV – Bidding Forms SCHEDULE OF GUARANTEES	Page 23	For "4 Guarantees concerning noise levels", it is not possible at bid stage to get enough information to be able to run a full and reliable noise study. As a consequence, we can only guaranty maximum noise level. Is it possible to modify the Schedule of Guarantee by removing the guaranty values per octave band in equipment room and site boundaries at proposal stage?	*The table of guaranteed values per octave band of chapter 4 – "Guarantee concerning noise levels" of the Schedule of performance Guarantees in section IV – Bidding Forms, is deleted.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
				However, the guaranteed maximum noise levels at the edge of the property (chapter 4.2) are maintained and shall comply with section 7.2, chapter 2.1.4 of Part 2 – Employer's Requirements. Bidders can perform a specific noise study at bid stage, considering the requirements of the Bidding Documents. In the absence of measures of the initial noise level at the edge of the property, bidders can adopt the tentative following assumptions: - *During the day: L50 = 40 dB(A)* - *During the night: L50 = 30 dB(A)*
21.	Part 1 – Bidding Procedures Section IV – Bidding Forms Form EXP–EIWP: Experience with Employment-Intensive Work Programs (EIWP) & Form EXP – TRAIN: Technical Training Program Experience	Pages 38 to 41	"Form EXP–EIWP: Experience with Employment-Intensive Work Programs (EIWP)" and "Form EXP – TRAIN: Technical Training Program Experience" can be found in the Bidding Form although they are neither listed in the Section IV - Bidding Forms Table of Form, nor in the content of the Technical Proposal page 21. Does the Contractor have to complete and include these forms in its proposal? If yes, can you please provide us with the associated Evaluation and Qualification Criteria?	*The Bidder must demonstrate that it can mobilize specialists in technical trainings and social inclusion and employment as specified the Evaluation and Qualification Criteria, Section 1.4 by using Forms PER-1 and PER-2. Filling of Form EXP–EIWP and Form EXP – TRAIN is not mandatory.*
22.	Site Visit		Can you please confirm that the existing bridge over the railway on the access road to the WTP Site has the capacity to bear important truck traffic during design & build and operation services periods?	*Ascertaining the bridge load bearing capacity and getting approval of using the bridge by the relevant road authorities for a given load and traffic will be the Contractor's responsibility.*
23.	Permits/Statutory Approvals/Project Licenses		Can you please provide us with the Permits Responsibility Matrix between Employer and Contractor that shall be applicable for the project?	*The Contractor shall obtain all permits, licenses and approvals, as required by the Kenyan Laws in relation to the execution and completion of the Works, remedying of any defects and operation service.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
24.	Interfacing with Dam Contractor		Can you please provide us with an Interfacing Plan between the Contractor and the Dam Contractor to ease the understanding of the full scope of works?	*There is currently no such interfacing plan.* *Traffic arrangements within the Dam area but outside the WTP site shall be made in close liaison with the Dam Contractor. Any associated costs of liaison with the Dam Contractor, especially relating to heavy traffic and associated mitigation of damage to the road infrastructure constructed by the Dam Contractor shall be deemed to be covered in the Contractor's financial proposal.*
25.	Part 1 – Bidding Procedures Section IV - Bidding Forms Price Schedules - FIRM PART	Price Schedule No.4	Item 1.3.14 of Price Schedule is "WTP Access Road connecting WTP to Dam Access Road (refer to Drawings for Information Drg. No. ART-8773361-PD-DWG-401". There is no legend on this drawing showing explicitly the scope of works for that particular item. Can you please specify the scope of works for the WTP Access Road? Are the section of roads in gray named "ACCESS ROAD TO TREATMENT PLANT" and "ACCESS ROAD TO PUMPING STATION" included in the scope of works?	*The access road detailed in item 1.3.14 of the Price Schedules is labelled "Access Road to Treatment Plant" in Drg. No. ART-8773361-PD-DWG-401. All other access roads outside the WTP will be constructed by the Dam Contractor, included the access road to the pumping station (refer to Part 2 – Employer's Requirements).*
26.	Part 2 – Employer's Requirements		Could you please provide us with native files of the topography and any other native drawings files useful for the preparation of the design (P&ID, 3D Model, 2D if any....)?	*Please see **Annex E** - Mwache WTP – Topo in native format (dwg)* *The native topographical survey drawing is provided for information only. Detailed topographical survey / verification is the Contractor's responsibility and is covered in the Price Schedule 1, item 1.7.*
27.	Part 2 – Employer's Requirements		Can you please provide us with the precise Site boundaries (coordinates) to be considered for the Raw Water Pumping Station, Raw Water Pumping Mains and Water Treatment Plant as well as any other area available for the erection of temporary facilities under native format? Could you please confirm if these sites have been acquired by the Client?	*Coordinates of boundaries of the WTP site and the RWPS site are given in **Annex F.*** *Yes, the Client has acquired all sites for the permanent works.*
28.	Part 2 – Employer's Requirements		Is there an applicable List of Approved Manufacturers or Vendors for equipment to be provided? If yes, can you please provide it?	*None.* *The Contractor is to provide all Project materials and equipment from reputable manufacturers that conform to the Technical Specifications.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
				Equipment makes and types installed in similar existing installations with over 10 years proven durability will be an advantage.
29.	Part 2 – Employer's Requirements Section 7.1 – General Requirements 2.5. TRAFFIC ARRANGEMENTS	Page 16	"The Dam Contractor is responsible for the construction works of the access roads outside the WTP site. " "Traffic arrangements within the Dam area but outside the WTP site shall be made in close liaison with the Dam Contractor. Any associated costs of liaison with the Dam Contractor, especially relating to heavy traffic and associated mitigation of damage to the road infrastructure constructed by the Dam Contractor shall be deemed to be covered in the Contractor's proposal. " We understand that the Contractor's shall be responsible for "costs of liaison with the Dam Contractor, especially relating to heavy traffic and associated mitigation of damage to the road infrastructure" only for its own use of the access roads and that the Contractor will not be responsible for mitigation of damages to access roads outside the RWPS, RWPM and WTP sites cause by others. Can you please confirm?	*This is correct.*
30.	Part 2 – Employer's Requirements Section 7.1 – General Requirements	Page 21	It is stated that "Implementation Works to be carried out by the Contractor include but are not limited to the following: Adopting mitigating measures provided in the ESIA Reports already agreed with the AFD. In addition, if need be, these documents (ESIA, IEE, EMP, DDR) should be updated and/or preparation of renewal plan." Could you please provide us with these documents, namely ESIA, IEE, EMP and DDR?	*The ESIA Report is provided as **Annex G.***
31.	Part 2 – Employer's Requirements Section 7.1 – General Requirements 6.3. DISPOSAL OF SURPLUS EXCAVATED MATERIALS	Page 30	It is stated that "Surplus excavated material and debris arising from the Works shall be: "dumped on agreed disposal sites at the expenses of the Contractor as agreed with the local authorities" Could you please advise us on the agreed disposal landfill sites with their locations, names and cost for disposal per m^3?	*The Bidder is responsible for identification of landfill sites and the associated costs for dumping the surplus excavated materials.* *It may be possible for the WTP Contractor to liaise with the Dam Contractor and use existing dump sites in close proximity to the WTP Site.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
32.	Part 2 – Employer's Requirements Section 7.1 – General Requirements 8.5. SUBMISSION AND APPROVAL	Page 34	It is stated that "The Contractor shall submit in three (3) hard copies and a digital copy to the Engineer, for review, information or approval, all documents and drawings which he prepares under this Clause (except for "As-Built"). The Engineer will analyse all such designs and drawings, will appraise them as to whether they are reasonable and consistent with the Construction Drawings, will approve if requested and will order changes when deemed necessary. " Would it be possible to use ecopy only with an adequate EDMS and 3d model review platform, at least until the document is approved, to avoid unnecessary numerous hard copy prints?	*Hard copies must be submitted for review and approval. Other ecopy submission options may be considered during the Project implementation stage.*
33.	Part 2 – Employer's Requirements Section 7.1 – General Requirements 21.2. HAUL AND ACCESS ROADS	Page 50	It is stated that "The Contractor shall maintain the existing roads to different site works, as are necessary for the conduct of the work under the contract." Can you please detail the scope of works of the Contractor regarding the maintenance of existing roads as they will be used by others? And which of the roads are concerned?	*Refer to query and response No. 29*
34.	Part 2 – Employer's Requirements Section 7.1 – General Requirements 21.3. ELECTRICITY AND POWER SUPPLIES	Page 50	It is stated that "The Contractor shall also install on his own expenses all the equipment necessary for the permanent power supply of the plant and raw water pumping station in accordance with the Specifications and approved drawings. F. The Contractor shall provide at the date of the completion, all approvals and clearance for connection of the permanent works as issued by the Kenya Power and Lighting Company (KPLC). Could you please confirm if KPLC has confirmed the feasibility of 5 or 6MVA power line capacity to the RWPS? What is the route foreseen?	*Under the Dam Contract, Kenya Power has constructed 33kV overhead power line approx. 11Km from Rabai and terminates at a KPLC sub-station / metering switchyard which is within 1.0Km from the Raw Water Pumping Station. The 33kV overhead power line has been constructed along the proposed Dam access road passing adjacent to the proposed site for the Water Treatment Plant (see **Annex H**).* *Kenya power has confirmed that the 33kV Line is adequate to meet the power requirements for the RWPS and the WTP.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
				All the components within the new Sub-station (implemented under the Dam Contract), which includes Current and Voltage Transformers, Protection Switches, 33kV Meter are specifically designed for the temporary loads of the Dam Contractor. *In this WTP Contract, the WTP Contractor is required to make application to Kenya Power for a power connection for both the WTP and the RWPS. The envisaged power connection works to be done by the Kenya Power (under the WTP Contract) for the RWPS power connection includes extension of the 33kV powerline from the newly built Dam Sub-station to the RWPS (approx. 1Km), an end-of-the-line H structure, Switchroom including the KPLC metering cabinet. The power connection for the WTP may either be a line from the Dam sub-station or a tap-off from the main 33kV line from Rabai extending up to the Switchroom and KPLC metering cabinet. The final decision on this issue will be made by Kenya Power.* *In summary, Kenya Power will extend the 33kV power lines to both the RWPS and WTP including installing the end-of the line H structure and the indoor metering cabinets (Contractor to provide the KPLC Metering Rooms). The work to be carried out by Kenya Power (excludes construction of KPLC metering rooms) will be covered under the Provisional Sum (item 10.11 of schedule no.10).*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
				All other associated works after the KPLC metering, related to the power supply for the RWPS and WTP including but not limited to the 33/3.3 kV & 3.3/0.433 kV Transformers, Switchgears, Switchboards, civil works for the Switchroom / KPLC Metering Room will be carried out by the WTP Contractor as per the Contractor's approved design and their cost will be covered in the respective item in the Price Schedule.
35.	Part 2 – Employer's Requirements Section 7.1 – General Requirements 21.6. WATER SUPPLY	Page 52	It is stated that "The site for the WTP and raw water pumping station has no existing water supply facilities. The Contractor shall make all provisions for the supply of water required for the execution of the Works as well as adequate quantities of potable water for all personnel (...) The Contractor shall supply water to sub-contractors or other contractors for all their requirements. " Could you please indicate what has been foreseen so far for water supply? How far is the closest water source and what is the associated capacity? It is expected that the production of concrete and its curing would require several hundreds of m3 per day. Please advise on the availability of water at the site.	*The Client has clearly indicated that the site for the WTP and raw water pumping station has no existing water supply facilities.* *It is the Contractor's responsibility to make all provisions for the supply of water required for the execution of the Works as well as adequate quantities of potable water for all personnel.* *The bidders should carry out their own investigation on the closest water sources and their adequacy, and define themselves if a temporary water retaining structure is required for implementation of the works.*
36.	Part 2 – Employer's Requirements Section 7.1 – General Requirements 24. STORAGE AND USE OF EXPLOSIVES	Page 53	It is stated that "Except if specifically approved by the Engineer in writing, the Contractor will not use explosives." Can you please confirm if explosives can be used upon approval of the relevant authorities and Engineer, for excavation purposes of rock?	*The use of explosives is strictly prohibited because the WTP is in close proximity to the Dam unless specifically approved by the Engineer in writing and after a deep geotechnical analysis assessing the effects on the dam and other nearby infrastructures.*
37.	Part 2 – Employer's Requirements Section 7.2 – Performances Specifications 1.2. LIMITS OF SERVICES	Page 7	It is stated that "The limits of the works covered by this contract are as follows: […]	*Refer to response No. 19.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
			Water supply facilities (includes a pumping system and an elevated reinforced concrete tank) for the base camp, clinic, police station (implemented under the Dam Contract). [...]" Can you please provide us with some details about the water supply facilities to be provided: detailed scope of works with battery limits, required capacity and elevation of the reinforced concrete tank, etc.?	
38.	Part 2 – Employer's Requirements Section 7.2 – Performances Specifications 1.2. LIMITS OF SERVICES	Page 7	It is stated that "The limits of the works covered by this contract are as follows: "Upstream limit: connection to the new incoming raw water gravity main from Mwache Dam just outside the RWPS. The diameter of the raw water gravity main has not been finalised. Tentatively, the diameter will be 1600 – 2000mm. The Contractor will be required to liaise with the Dam Contractor to obtain the final pipe diameter and other design parameters which will be essential for design of the RWPS. As a minimum, the WTP Contractor is expected to include Flow Measurement Equipment and Flow Regulation Valves at the connection to the incoming raw water gravity main within the scope of this Contract." Flow Regulation Valves located at the upstream of RWPS (raw water gravity main) might damage the system. Can you please confirm that the supply and installation of Flow Regulation Valves at the upstream of RWPS (raw water gravity main) is not mandatory and will depend on Contractor's design?	*Under the Dam Contract, no provisions have been made for raw water flow regulation. In the WTP Contractor's design, it is mandatory that the aspect of raw water flow regulation be adequately addressed.* *Flow Regulation Valves at the upstream of RWPS is not mandatory and will depend on Contractor's design. However, a sectional valve (to isolate the raw water pipe from the pumping station) and Flow Meter on the raw water gravity main is a mandatory requirement.*
39.	Part 2 – Employer's Requirements Section 7.2 – Performances Specifications 1.5. DESTINATION OF BY-PRODUCTS	Page 9	It is stated that "The Dam Contractor will implement the following works/components: (ii) An access road from the WTP to the pumping station (bitumen surfacing, 8m wide) on completion of the Dam. In the interim, a temporary all-weather road shall be constructed." Could you please kindly confirm whether the temporary all weather road shall be constructed by the Dam Contractor?	*A temporary all weather access road from the WTP to RWPS has already been made by the Dam Contractor and will be available for use by the WTP Contractor at Commencement Date.*
40.	Part 2 – Employer's Requirements Section 7.2 – Performances Specifications 3.3.2. Footprint for the RWPS	Page 22	Can you please confirm that the temporary all weather access road from the WTP to the pumping station will be ready at the Commencement Date, or how many months after the CD?	*Refer to response No. 39.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
41.	Part 2 – Employer's Requirements Section 7.2 – Performances Specifications 3.3.2. Footprint for the RWPS	Page 22	It is stated that: "The Dam Contractor will implement the following works/components: (ii) Earthworks for the proposed pumping station footprint to a general reduced level of 41m amsl. (...)" Can you please confirm that the platform built by the Dam Contractor for the proposed pumping station footprint to a general reduced level of 41m amsl will be ready at the Commencement Date? Can you please provide us with the dimensions of the platform for the RWPS?	*The footprint for the RWPS at a general reduced level of **42m amsl** will be ready and available to the WTP Contractor at Commencement Date.* *Dimensions and coordinates of the platform are given in response to query no. 27.*
42.	Part 2 – Employer's Requirements Section 7.2 – Performances Specifications 3.3.2. Footprint for the RWPS	Page 22	It is stated that: "The Dam Contractor will implement the following works/components: (...) (i) An access road from the WTP to the pumping station (bitumen surfacing, 8m wide) on completion of the Dam. In the interim, a temporary all-weather road shall be constructed (...)" Can you please confirm that the temporary all weather access road from the WTP to the pumping station will be ready at the Commencement Date?	*Please refer to query and response no. 39.*
43.	Part 2 – Employer's Requirements Section 7.2 – Performances Specifications 3.3.2. Footprint for the RWPS	Page 22	It is stated that: "The Dam Contractor will implement the following works/components: (...) (i) Raw water gravity main from the Dam draw-off tower to the RWPS (DN1800, PN10)." The raw water gravity main from the Dam to the RWPS is shown on section "3.3.3.2. Raw Water Abstraction from Mwache Dam " with a diameter of DN1600. Can you please clarify the diameter to be considered? Can you please confirm if the pipes shall be a twin pipe arrangement or single pipe arrangement?	*The raw water gravity main from the Dam to the RWPS is a ferrous DN1800 single pipe arrangement. The Raw Water Gravity Main from the Dam laid by the Dam Contractor will terminate within the Pumping Station Boundary to which the WTP Contractor will connect. Refer to **Annex I.***
44.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications	Page 23	Could you provide us the simulation of the Dam reservoir over 54 years if available in the Update of the Dam Design Report (NK, MIBP, AF, 2017)?	*The simulation of the Mwache Dam reservoir over 54 years is presented in Figures 2 & 3 on Page 24 (Part 2 – Employer's Requirements*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
				Section 7.2 – Design Requirements and Performances Specifications).
45.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.3.3.3. Design Data - (v) Type of Pumps and Standby Requirement & 3.1.12. Pumping stations	Page 20 & 26	It is stated that "Standby pumping units to be provided shall be in compliance with the provisions of the local design manual for water supply services (Ministry of Water and Irrigation Practice for Water Supply Services in Kenya October 2005).". In this "local design manual for water supply services", at Chapter A148 - 10.8 STANDBY UNITS - 10.8.1 Raw Water and Clear Water Pumps it is stated that "Pumping stations should have one stand-by pump with the same capacity as the pumps which are normally in operation. Hence if the station is designed for one pump, then two similar pumps should be installed. If the station is designed for two pumps running in parallel, then three similar pumps should be installed etc.". In 3.1.12. Pumping stations, it is stated that "Unless otherwise specified and whatever the number of pumps, 50% stand-by pump shall be enable on the spot and shall start up automatically of another pump breaks down (...)". Those two requirements seem contradictory. Can you please specify the required number of stand-by pumps for the Raw Water Pumping Stations?	*A 50% Stand-By must be provided for all pumps in both the RWPS and WTP (and for both the firm part and the conditional part).*
46.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.5. WATER TREATMENT LINE	Page 32	In Figure 5: Suggested waterline for Mwache WTP, the flow of the WTP is noted as "Water Treatment Plant – Waterline Bidding part: 4,500m^3/hr Conditional part: Additional 4,500m^3/hr Final Treatment capacity: 8,900 m^3/hr" Whereas in other parts of the Bidding Document, the nominal capacity of the WTP is 4450m^3/h for both Firm and Conditional Parts. Can you please confirm the 4450m^3/h nominal capacity for each Part?	*Regarding minimum and maximum daily capacity, bidders shall refer to Part 2, Section 7.2, Chapter 1.3.2.* *Figure 5 was provided for information only, to avoid misunderstanding, figure 5 is deleted.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
47.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.5.5.1. Filters characteristics	Page 37	It is stated that: "The wash water supply tank shall be part of the Treated Water Tank and shall have the capacity for at least 2 backwashes" whereas in "Figure 5: Suggested waterline for Mwache WTP" the wash water is supplied from the Filtered Water Reservoir which also appears on the drawings and in chapter 3.1.5. Ease and optimization of operation: "Number of filtered water tanks: Minimum 2 ". Can you please clarify?	*The Contractor shall provide a wash water supply tank to be used for the filters backwash and it shall have the capacity of minimum 2 backwashes.*
48.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications	Page 38	"The hypochlorite solution shall be produced on the site by electro chlorination or calcium hypochlorite solution. The residual chlorine can also be provided by use of gaseous chlorine. The Contractor shall provide for all three options for residual chlorine. " What is the typical hypochlorite solution production in Kenya? Can you please confirm that we have only to detail and price in our proposal only one solution, the one used in Kenya?	*Refer to Annex J - Revised Part 2, section 7.2, 3.5.6.2*
49.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.11. ELECTRICITY SUPPLY	Page 52	It is stated that: "The electric sub-station will be fed by a MV line (33kV) constructed by Kenya Power from the existing network. The connection line from the HV/MV electric sub-station to the plant is included in this contract as a provisional sum. It will be carried out by a Kenya Power approved contractor and under Kenya Power's supervision, as a part of this contract". We understand that the full cost of the construction of the MV line (33kV) constructed by Kenya Power from the existing network to feed the electric sub-station (meaning between the existing networks and the sub-station, at the upstream of the substation) is neither included in the Contractor's price nor in the Provisional Sums. Can you please confirm our understanding?	*Refer to response No. 34.*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
			Similarly, we understand that the full cost of the construction of the connection line from the HV/MV electric sub-station to the plant (meaning between the sub-station and the WTP, at the downstream of the substation) is included in the Provisional Sums. Can you please confirm our understanding?	
50.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.11. ELECTRICITY SUPPLY	Page 52	It is stated that: "The Contractor shall also be responsible for the following: (…) The extension of the existing medium voltage line in the vicinity to the proposed transformer station. " This seems in contradiction with the previous chapter stating that "The electric sub-station will be fed by a MV line (33kV) constructed by Kenya Power from the existing network. The connection line from the HV/MV electric sub-station to the plant is included in this contract as a provisional sum. It will be carried out by a Kenya Power approved contractor and under Kenya Power's supervision, as a part of this contract." Can you please clarify?	*Refer to response No. 34.*
51.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.11. ELECTRICITY SUPPLY	Page 52	It is stated that: "The supply of the site will be made by the creation of an electric sub-station MV/LV (33Kv/3.3kV/400V). The power requirement of the sub-station shall be determined by the Contractor according to the installations and the equipment to be installed by him." Can you please clarify if the supply of the equipment for the electric sub-station MV/LV (33Kv/3.3kV/400V) is included in the Contractor's Scope of Works?	*Refer to response No. 34.*
52.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.11. ELECTRICITY SUPPLY	Page 54	It is stated that: "The electrical power distribution shall be made through three distributed divisional electric cupboards installed in the electrical room of the followings buildings: -Pre-treatment building. -Blower Aeration building. -Biological Treatment building." Can you please clarify?	*The question is not clear.* *In order to optimize the power supply equipment and lengths and sections of electrical cables, it is generally preferable to have a distributed electrical distribution architecture from the transformer substation, with an electrical distribution cabinet integrated into a building*

Responses to requests for Clarifications (Set No. 01)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
				(electrical room) for each of the major process phases: pre-treatment, aeration and biological treatment. *Bidders are however free to propose a different architecture provided they meet the electrical standards and the Employer's Requirements.*
53.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.13. CIVIL WORKS	Page 56	It is stated that: "All buildings within the WTP and the Raw Water Pumping Station shall be **double volume buildings**." Can you please clarify?	*The "double volume building" means that all electromechanical buildings within the WTP and the Raw Water Pumping Station shall have a minimum head room of **7.0 m**, to allow for adequate circulation of air. All other buildings must have a clear headroom of **3.2 m** minimum.* *In addition, a specific ventilation study shall be performed for each room having electrical motors, in order to properly assess the adequate volume of the building.*
54.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.15.3. Potable water system (other facilities within the Dam area)	Page 61	"Under this Contract, the Contractor shall design and implement a pumping system from the clear water tank to an elevated 100m3 reinforced concrete tank. The tank will be located with the Dam operation area of distance not exceeding 3 Km. The height of the elevated reinforced concrete tank is approximately 15m. However, final designs for these works will be finalised by the Dam Contractor in close liaison with the Dam Contractor." There is a repetition of "Dam contractor" which cause the clause to be barely comprehensible. Can you please clarify?	*Refer to Response No. 19.* *Typo corrected in the last sentence, please read: "final designs for these works will be finalized by the **WTP** Contractor in close liaison with the Dam Contractor."*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	**Responses**
1.	Part 1 – Bidding Procedures Section 1 – Instructions to bidders 17 Bid Prices and Discounts	Pages 12 & 13 / 103	Could you please confirm whether the Client will pay the entire VAT to the Contractor or if the Client is a VAT Withholding agent?	*The Client is a VAT Withholding agent for KRA. Based on the present legislation, the Withholding Agent retains 2% and pays 14% to the Contractor.* *Regarding VAT refer to responses #2, 4, 5, 17 and 18 of set-001 above.*
2.	Part 1 – Bidding Procedures Section 1 – Instructions to bidders 17 Bid Prices and Discounts	Pages 12 & 13 / 103	Could you please confirm whether the contract is subject to stamp duties and, if so, the rate applicable?	*The Project is NOT tax exempted. Bidders are required to familiarize themselves with local legislation pertaining to all applicable taxes.*
3.	PART 1 – BIDDING PROCEDURES – Section IV Bidding Forms - SCHEDULE OF PERFORMANCE GUARANTEES - 7 Key Performance Indicators (KPI)	Page 74/103	Some KPIs seem related to a wastewater treatment plant project whereas the DBO Mwache WTP project in a potable water treatment plant. For example: - KPI No. 5 related to Odor Treatment - KPI No. 6 related to Treated effluent quality ("The effluent quality of treated wastewater at the outlet of the plant (...)) - KPI No. 8 related to Dried sludge quality - KPI No. 10 related to Air quality after treatment - KPI No. 11 related to Washed grit quality (dryness and organic matter) We understand that those KPIs are not applicable and shall not be considered: can you please confirm our understanding?	*Part 1, Section IV (Bidding Forms) – Sub section 7 (Key Performance Indicators) is not applicable. These KPIs were redundant with other chapters of schedule of performance guarantees or not applicable to the project. .*
4.	PART 1 – BIDDING PROCEDURES - Section IV Bidding Forms – Price Schedules for Conditional Part - Schedule No. 6: Security Cost Schedule	Prices "Security 2" to "Security 5	The prices are noted as "Included in Firm Part" although they shall be applicable during the execution of the Conditional. Then, we understand that the mention "Included in Firm Part" is not applicable and that the Contractor shall quoted those prices: can you please confirm our understanding?	*Security Schedule No. 6, Item 2 to 5 for the conditional part is applicable and should be priced in the Price Schedules.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	**Responses**
5.	PART 1 – BIDDING PROCEDURES - Section IV Bidding Forms – Price Schedules for Firm Part and Conditional Part - Schedule No. 8: Security Cost Schedule	Schedule 8	Prices Schedules for Operation Service of Firm Part and Conditional Part both include items to be paid for a 24 months duration. However, considering the maximum delay of notification of the Conditional Part of 365 days, some items will be redundant between the Firm Part and Conditional Part (for example: the Plant Manager). Can you please describe the way the Contractor shall fill the Price Schedule to take into account this redundancy?	*Please refer to the revised schedule of prices (firm and conditional parts).*
6.	PART 1 – BIDDING PROCEDURES - Section IV Bidding Forms – Price Schedules for Firm Part and Conditional Part - Schedule No. 8: Operation Service	Schedule 8	Can you please provide us with the Water Level to be considered in the Dam for the Operation Service pricing?	*Please refer to Answer to Clarifications Set n°01, No 9*
7.	PART 1 – BIDDING PROCEDURES - Section IV Bidding Forms – Price Schedules for Firm Part and Conditional Part - Schedule No. 8: Operation Service	Schedule 8	Can you please provide us with the Raw Water Turbidity to be considered for the Operation Service pricing?	*The water quality to be adopted for Operation Service pricing (Schedule no. 8) is provided in Part 2, Section 7.2 – Sub section 1.3.3, Table 1 (page 8 & 9).* *As a range is provided for Raw Water Turbidity, in the table, bidders shall consider the average value of 20 NTU for calculation of quantities of chemicals, other consumables and electricity for the Operation Service pricing.*
8.	PART 1 – BIDDING PROCEDURES - Section IV Bidding Forms – Price Schedules for Firm Part and Conditional Part - Schedule No. 8: Operation Service	Schedule 8	We understand that for the pricing of the Operation Service, the Contractor shall consider the Water Level in the Dam and the Raw Water turbidity to be provided as answers to the above questions and that during the Operation Service Period, the Contractor will be paid from the effective remeasured quantities for electrical consumption, chemicals consumption, etc. Is our understanding correct?	*This is correct.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	**Responses**
9.	PART 1 – BIDDING PROCEDURES - Section IV Bidding Forms - WORK PROGRAMME, ORGANIZATION CHART AND CONSTRUCTION MANAGEMENT STRATEGY - FOR DESIGN-BUILD	Page 77/103	It is stated that "The bidder shall prepare this section for the Firm Part only and for the Firm Part and the Conditional Part together." For the preparation of the Work Programme for the Firm Part and the Conditional Part together, we need the delay to be considered between the beginning of the Firm Part and the notification of Conditional Part: can you please provide us with the delay to be considered?	*The Work Programme, for the firm part and conditional part together, should consider a maximum delay of 365 days i.e the commencement date for the conditional part will be maximum 365 days after the commencement date for the firm part.*
10.	Part 2 – Employer's Requirements - Section 7.1 – General Requirements - 10. STANDARDS, CODES AND REGULATIONS	Pages 38 and 39/848	Kenyan Standards are not mentioned in this chapter: are they applicable for that project? If yes, do they prevail over the Standards listed in this chapter?	*The list of applicable standards listed in Part 2, Section 7.1, item 10.1 is not exhaustive. The Contractor has an option to use standards provided or approved equivalent. Refer to provisions of S7.1, item 10.4 - Standards Other Than Those Specified.*
11.	Part 3 – Conditions of Contract - Section 10 – Contract Forms - Appendix 3 – Performance damages	Pages 64 and 65/69	Performance damages for Failure to pass Tests Prior to Contract Completion are calculated from, among others, "RLE = Residual Life Expectancy of the facility, being the difference in between the life span expectancy of the facility, as defined in the Schedule of Performance Guarantees, and the Operation Service Period". However, in the Schedule of Performance Guarantees, there is no life span expectancy of the facility. Can you please specify the Life Span Expectancy?	*Please refer to Answer to Clarifications Set n°01, No 8.*
12.	PART 2 – EMPLOYER'S REQUIREMENTS - Section 7.2 – Performances Specifications - 1.2. LIMITS OF SERVICES	Page 72/848	Can you please provide us with the following information regarding the Raw Water Gravity Main to be installed by the Dam Contractor: - Nominal Diameter, - Material of the pipe, - Coordinates of the extremity of the pipe (battery	*Please refer to Answer to Clarifications Set n°01, No 43.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	**Responses**
			limit) - Invert level to be considered	
13.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications - 1.3.2. Treatment capacity	Page 74/848	It is stated that "As a safe design, water production will be designed on 22 hours of operation". We understand that the Contractor shall consider 22 hours of operation per day for the whole system (i.e. Raw Water Pumping Station + Raw Water Pumping Mains + Water Treatment Plant) for the Operation Service pricing. Can you please confirm our understanding?	*Please refer to Annex M – Revised Part 2, 7.2, 1.3.2.*
14.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 2.1. TREATMENT QUALITY and 3.5.5.1. Filters characteristics	Pages 76 & 103 / 848	Treated Water turbidity requirements are not consistent: 0,5 NTU are required in chapter "2.1. TREATMENT QUALITY" and 0,4 NTU are required in chapter "3.5.5.1. Filters characteristics". We understand that the only requirement to be considered is 0,5 NTU and that the requirement in chapter "3.5.5.1? Filters characteristics" shall be removed: can you please confirm our understanding.	*Correct, Table 2 in chapter 2.1 shall be considered as the reference (0.5 NTU).*
15.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 2.1.4. Noise & 2.3. RAW WATER PUMPING STATION	Page 78 /848	Concerning the noise level limitations, what is the acceptable noise level for the RWPS? What is the required noise level inside the RWPS? What is the required noise level outside the RWPS? We find 2 different texts "In the equipment rooms, the sound power emitted by all of the equipment in normal operating conditions must not exceed the following values: Total value: 80 dBA " and "The required key performance levels for the RWPS shall be as follows Noise Level – max. 70dB (A)" Is the 70 dB(A) a noise level for only one machine in	*In ALL the equipment rooms, excluding the RWPS, the sound power emitted by ALL of the equipment in normal operating conditions must not exceed a Total value of 80 dBA.* *For the RWPS, the sound power emitted by ALL of the equipment in normal operating conditions must not exceed a Total value of 90 dBA.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	**Responses**
			operation or all of them? Do you confirm that 80 dB()A is the maximum acceptable noise level with all machines in operation? this value seems low and difficult to attain.	
16.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications, sections 3.1.8.4. "lifting and handling equipment" & 3.1.11 "protection and safety of operating staff"	Pages 84 and 85/848	Section 3.1.8.4. lifting and handling equipment states that: "Lifting equipment (movable if necessary) must be provided for handling stoplogs, trapdoors, inspection hole covers and any items exceeding 15 kg in weight." Section 3.1.11 "protection and safety of operating staff" states that: "The Contractor shall provide ... assisted handling for all loads over 50 kg." Those requirements seem contradictory, can you please clarify?	*The Contractor shall provide assisted handling for all loads over 15 kg.*
17.	Part 2 – Employer's Requirements - Section 7.2 – Design Requirements and Performances Specifications - 3.3.3.3. Design Data Part 2 – Employer's Requirements	Page 90/848	Can you please provide us with additional data from 2012 to 2024 for the Water level in the Dam to take into account climate change?	*A simulation of the Dam reservoir over 54 years (up to 2012) is provided in Part 2, S7.2, item 3.3.3.3 and is deemed adequate for the Bidders to prepare the Technical and Financial proposal. No other more recent data is available.*
18.	Part 2 – Employer's Requirements - Section 7.2 – Design Requirements and Performances Specifications - 3.3.3.3. Design Data Part 2 – Employer's Requirements	Page 90/848	Can you please provide us with additional data for level variation within a year for the Water level in the Dam to take into account the dry season / wet season?	*Refer to response No. 17.*
19.	Section 7.2 – Design Requirements and Performances Specifications 3.5.2. Aeration	Page 99/848	Can you please provide us with some details and specific requirements for the Aeration?	*No specific requirements requested for the Aeration. The Contractor shall propose a proven solution used in other water treatment plant that seems most suitable for the project's context.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	**Responses**
20.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 3.5.6.2. Chlorine disinfection	Page 104/848	"The hypochlorite solution shall be produced on the site by electro chlorination or calcium hypochlorite solution. The residual chlorine can also be provided by use of gaseous chlorine. The Contractor shall provide for all three options for residual chlorine. " The requirement to provide the 3 chlorination systems seems excessive. Can you please relax this requirement?	*Design requirements regarding Chlorine disinfection is modified in the Answers to Clarifications Set n°01, Annex H- Revised Part 2, Section 7.2, 3.5.6.2.*
21.	Part 2 – Employer's Requirements - Section 7.6 – Specifications for Environmental, Social, Health and Safety (ESHS) Management of the Works - 2.4. SOCIAL INCLUSION REQUIREMENTS	Page 682/848	Can you please specify if the required 18 000 hours of social inclusion shall be considered during the Design & Build phase, of during the Operation Service phase or both?	*The specified targeted number of hours of social inclusion is as follows:* • *Design – Build: 10,800 hours (Bidders to price under Schedule **5A** - item, ESHS-5).* • *Operation Service: 10,800 hours (Bidders to price under Schedule **5B** - item, ESHS-5)*
22.	Part 2 – Employer's Requirements - Section 7.6 – Specifications for Environmental, Social, Health and Safety (ESHS) Management of the Works - 2.4. SOCIAL INCLUSION REQUIREMENTS	Page 682/848	What are the non process buildings that shall be accessible to the persons with reduced mobility?	*All the ancillary buildings within the WTP and RWPS (refer to Part 2, S7.2 item 3.18 – 3.19) shall be accessible to persons with reduced mobility.*
23.	PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS - Section 9 – Particular Conditions of Contract - Sub-clause 8.1	Page 23/69	It is stated that "The maximum time period for the Employer to notify the Conditional Part is: 365 days. " We understand that this time period of 365 days to notify the Conditional Part starts at Commencement Date of Firm Part: can you please confirm our understanding?	*Refer to response No. 09.*
24.	Part 1 – Bidding Procedures Section 1 – Instructions to Bidders Clause 20.3	Page 15/103	"If the unconditional guarantee is issued by a financial institution located outside the Employer's Country, the issuing financial institution shall have a correspondent financial institution located in the Employer's Country to make it enforceable unless the Employer has agreed in	*Not Acceptable.* *If the unconditional guarantee is issued by a financial institution/bank located outside the Employer's Country, it is a **mandatory requirement** the issuing financial institution/bank shall have a correspondent*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	**Responses**
			writing, prior to Bid submission, that a correspondent financial institution is not required." Is the issuance of the bid security by a financial institution located outside Kenya and without a correspondent bank is accepted by the Employer?	*financial institution/bank located in Kenya and approved by the Central Bank of Kenya.*
25.	Part 1 – Bidding Procedures Section 3 - Evaluation and Qualification Criteria 2.3. OPERATION AND/OR MAINTENANCE COSTS	Page 44/103	In order to allow for fair comparison of the Operation and Maintenance Costs between the Bidders, can you please provide us with the unit price for electricity from Kenya Power and Lighting Company to be considered?	*All the unit prices for all variable costs (chemicals, electricity etc.) for operation and maintenance in schedule 8 includes the Contractor's overheads and profit and are to be competitively priced by all the Bidders.* *It is Bidder's responsibility to obtain the unit prices for all consumables.*
26.	Part 1 – Bidding Procedures Section 3 - Evaluation and Qualification Criteria 2.3. OPERATION AND/OR MAINTENANCE COSTS	Page 44/103	In order to allow for fair comparison of the Operation and Maintenance Costs between the Bidders, can you please provide us with the unit prices for chemicals to be considered?	
27.	Part 1 – Bidding Procedures Section 3 - Evaluation and Qualification Criteria 2.3. OPERATION AND/OR MAINTENANCE COSTS	Page 44/103	In order to allow for fair comparison of the Operation and Maintenance Costs between the Bidders, can you please provide us with a Operation and Maintenance costs calculation Excel file to be used by all Bidders for the computation of the prices for personnel, electricity, chemical, etc.?	*Calculation Excel file will not be provided.*
28.	Part 2 – Employer's Requirements		Can you please specify the grade to be considered for Hydraulic performance acceptance tests of the pumps according to ISO 9906?	*The grade to be considered is ISO 9906, Grade 1B.*
29.	Part 2 – Employer's Requirements		Can you please specify for each fluid the accepted materials for internal and buried pipes within the RWPS and WTP?	*Details of pipes and fittings materials are contained in Part 2, Section VII, Sub-section 14100 – Pipes, Fittings and Appurtenances.*
30.	Part 2 – Employer's Requirements Section 7.2 – Design Requirements and Performances Specifications 1.3.3. Raw water quality and 2.1.1. Drinking water quality	Pages 74&75/848 and Page 76&77/848	The values included in *Table 1 – Final proposed water quality design input values* and the ones included in the column "Raw Water Quality" of *Table 2 – Drinking Water quality standards for Mwache WTP* are not consistent. For example, in the first one, the pH range is 6,3 - 8,4 whereas it is 6,5 - 8,4 in the second one. Can you please clarify?	*Table 1 shall be considered as the reference for Raw water quality.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	**Responses**
31.	Part 3 - Conditions of Contract Section 9 - Particular Conditions of Contract Part A - Contract Data - Sub-clause 6.12 and Part B - Specific Provisions - Sub- clause 6.12	Page 23/69 & 39/69	Sub-clauses 6.12 as described respectively in Part A - Contract Data and in Part B - Specific Provisions seem inconsistent. Can you please clarify?	*Refer to Annex A (1) and A (2) – revised PCC (Part A and B)*
32.	Part 3 - Conditions of Contract Section 9 - Particular Conditions of Contract Part A - Contract Data - Sub-clause 14.19 and Part B - Specific Provisions - Sub- clause 14.19	Page 25/69 & 50/69	In Part A - Contract Data - Sub-clause 14.19, the Maintenance Retention Fund is described whereas in Part B - Specific Provisions - Sub- clause 14.19, the sub-clause is mentioned as "not applicable, to be deleted." Can you please clarify whether the Maintenance Retention Fund is applicable or not?	*Maintenance Retention Fund is applicable as detailed in Part A, which supersedes Part B*
33.	Part 3 - Conditions of Contract / Section IX	Clause 4.2	FIDIC Gold: "The Performance Security shall be issued […] from within a country (or other jurisdiction) approved by the Employer". Can the Employer confirm if the issuance of the Performance Security by an international bank located outside the Employer's Country is accepted?	*The security performance must be issued by a financial institution located within the Employer's Country.* *If the performance guarantee is issued by a financial institution located outside the Employer's Country, it is a **mandatory requirement** the issuing financial institution shall have a correspondent financial institution located in Kenya.*
34.	Part 3 - Conditions of Contract / Section IX	Clause 14.2	"This guarantee shall be issued by a reputable bank or financial institution and from within a country (or other jurisdiction), as selected by the Contractor and approved by the Employer". Can the Employer confirm if the issuance of the Advance Payment Security by an international bank located outside the Employer's Country is accepted?	

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
35.	Contract: Part B Specific Provision	Sub Clause 1.1.24 Cost Plus Profit	Provisions including the expression "Cost plus profit" require this profit to be one-twentieth (5%) of this Cost." **Please adjust the percentage of the profit to be 10 % including the profit with overhead**	*The provisions of Part B, Sub-clause 1.1.24 are retained – "profit to be one-twentieth (5%) of this Cost ".*
36.	Part B Specific Provision	Sub-Clause 1.5 Priority of Documents	Please consent to the addition of documents to this clause; it is assumed that the employer's responses and the addendums must be given precedence.	*Yes, the responses to clarification requests will prevail on the other contract documents.*
37.	Part B Specific Provision	Sub-Clause 2.4 & Sub-Clause 8.1	The commencement dates of both firm and conditional parts are tied to the letter of award, access to the site, and proof of finance, **Please Accepting additional receipt for Advance Payment and Constitution DAB.**	*The Constitution DAB shall be inline with the provision of GCC and PCC 20.3.*
38.	Part B Specific Provision	Sub-clause 3.3 Instructions of the Employer's Representative	"These instructions shall be given in writing." is replaced with: "Whenever practicable, their instructions shall be given in writing. If the Employer's Representative or a delegated assistant: (a) Gives an oral instruction, **For the purpose of maintaining correct records and preventing future disagreements, written instructions ought to be required**. **Please Confirm**	*The issue of issuance of oral instructions by the Employer's Representative or delegated assistant is adequately covered in PCC Sub-clause 3.3 (b & c) of Part B. The Contractor is required to issue a written confirmation of the instruction within two working days.*
39.	Part B Specific Provision	Sub-clause 4.12 Unforeseeable Physical Conditions	The Employer's Representative shall take account of any evidence of the physical conditions foreseen by the Contractor when submitting the Tender, which shall be made available by the Contractor, but shall not be bound by the Contractor's interpretation of any such evidence." **Could you please clarify the typical physical conditions expected in Kenya?**	*Available relevant information regarding the Project Site in the Employer's possession is provided under the Employer's Requirements, S7.1, Sub-section 2.*

Design, Build and Operate of Mwache Water Treatment Plant (CWWDA/AFD/W3/2022-2023)

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
40.	Part B Specific Provision	New Sub-clause 4.27 Existing Facility	The Contractor shall take over, rehabilitate, upgrade, operate and maintain the Existing Facilities to the extent specified in the Employer's Requirements. **Please clarify what the existing facilities are. According to the site visit, the plant is located empty and has no facilities.**	*New Sub-clause 4.27 in Part B – Specific Provisions is deleted.*
41.	Part B Specific Provision	Sub-Clause 14.1 Contract Price	Please Clarify all the taxes, duties & fess exemptions?	*The Project is NOT tax exempted. All applicable taxes are applicable and should be included in the format provided in Bidders Financial Proposal.*
42.	Section 9 – Particular Conditions of Contract	Clause 14.2 Advance Payment	10 % of the Accepted Design and Built Component **The Scope and requirements of the project, an increased advance payment of [20]% would greatly assist in covering initial costs and securing the necessary resource** - Please Confirm	*Advance Payment remains **10 %** of the Accepted Design and Built Component.*
43.			Percentage deductions for the repayment of the Advance Payment: 20% of each IPC until complete repayment. **Kindly accept to add Amortization shall start after 30% progress and not form the first IPC**	*Sub clause 14.2 is added in PCC, Part A: Deductions shall commence in the Interim Payment Certificate in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds twenty percent (20%) of the Accepted Contract Amount for the Design-Build less Provisional Sums*
44.	Section 9 Particular Condition of Contract	Clause 9.3 Extension of Time	Extension of time (EOT) of completion of Design -build/ exceptional advises climatic condition is not applicable. **What was the reason behind removing EOT from the Exceptional Advertising Condition? Please consider that the weather must require an extension of time**.	*Sub clause 9.3 in PCC (Part A – Contract Data) is deleted. Provisions of Sub clause 9.3 in the GCC remains applicable.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
45.	Section 9 Particular Condition of Contract	Sub Clause 14.19 Maintenance Retention Fund	The maintenance retention fund percentage of 5% is stated in the contract data (Part A) and clause 14.19 was removed from the (Part B Specific Provision) on page no 31. **Would you kindly explain the process for the Notification, Deduction the percentage and Release of funds**	*Please refer to response to query 32.* *Sub clause 14.19 of Part A – Contract Data superseded sub clause 14.19 of Part B – Specific Provisions.* *The process for maintenance retention fund is adequately detailed in the GCC 14.19.*
46.			Please provide a one-month time extension for the submission.	*See the cover letter*
47.			Please provide plant and RWPS layout showing boundaries and coordinates.	*Please refer to Answer to clarifications Set n°01 - Annex C (2) – Contractual boundaries coordinates for the WTP and RWPS sites*
48.			Please confirm that the feeding cable 33Kv up to outside RWPS fence is out of this project scope	*Please refer to Answer to clarifications Set n°01 – n°34.*
49.			Please clarify whether the connection pipeline and feeding cable between WTP and RWPS is in this project scope.	*The Raw Water Pumping Main of approx. length 1.9Km and design capacity of 2.47m3 /s is part of the project scope. Refer to Part 2, S 7.1, Sub section 4.*
50.			It is mentioned in part 2 section 7.2 item 2.1.3 that the required sludge dryness is 40%, while this percentage is not achievable by traditional drying beds or mechanical dewatering equipment, please confirm that 20% dryness is accepted.	*The required sludge dryness is 40%.*
51.			Please confirm that mechanical dewatering is accepted instead of drying beds.	*The dewatering step shall be made by drying beds according to the Works requirements.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
52.			It is mentioned in part 2 that disinfection will be done by UV followed by a small dose of chlorine to achieve 0.5 ppm residual chlorine, while the common practice for WTP is to introduce pre-disinfection at the plant inlet to avoid algae and pathogen growth in tanks in addition to a final dose at the outlet, also as UV is not recommended in this application; therefore, please confirm utilizing sodium hypochlorite only (pre + Post) for disinfection.	*Please refer to Answer to clarifications Set n°01 – n°48.*
53.			Please confirm that other clarifiers technologies are accepted instead of DAF	*The sole acceptable technology for Clarifiers shall be Dissolved Air Flotation. This stipulation supersedes any conflicting requirements stated in the Employer's requirements.*
54.			Please clarify whether the cost of chemicals, power consumption and sludge disposal during commissioning is included in this project scope	*The cost of chemicals, power consumption and sludge disposal during the commissioning and the operation service is included in the project scope. Bidder are to price appropriately for these items in Schedule 01 for the commissioning and in Schedule no.8 for the Operation Service.*
55.			Please clarify whether the cost of chemicals, power consumption and sludge disposal during O&M is included in this project scope	*The cost of chemicals, power consumption and sludge disposal during the operation service is included in the project scope. Bidders are to price appropriately for these items in Schedule no.8 – Operation Service.*
56.			It is mentioned in part 2 section 7.2 item 1.4 that "All the wastewater resulting from the water treatment such as: thickeners overflow and water drainage from the drying beds shall be discharged into the dam" please clarify if the pipeline conveying this wastewater outside WTP to the DAM is included in this project scope.	*All the required facilities for handling and disposal of the backwash water and sludge treatment (including the pipe to the Dam) are part of the Project scope.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
57.			kindly specify the location of the **electric power source** to use in construction	*33kV KPLC power supply is available within close proximity of the project site. The Contractor shall be responsible for application and payment of any temporary power supply for construction.*
58.			please confirm that it is possible to withdraw and store **water from Mwache River** to use in the construction works.	*The Client has clearly indicated that the site for the WTP and raw water pumping station has no existing water supply facilities.* *It is the Contractor's responsibility to make all provisions for the supply of water required for the execution of the Works as well as adequate quantities of potable water for all personnel.* *The bidders should carry out their own investigation on the closest water sources and their adequacy, and define themselves if a temporary water retaining structure is required for implementation of the works.* *If the Contractor wants to withdraw water from Mwache River, it shall get the approval from the relevant authority.*
59.			Please confirm that the RWPS Site will be levelled and handed over by the engineer to the WTP Contractor as mentioned during the site visit and specify the **site level.**	*Please refer to Answer to clarifications Set n°01 – n°41.*
60.			please confirm that the use of explosives for excavation is allowed inside the site boundaries as mentioned during the site visit	*Please refer to Answer to clarifications Set n°01 – n°36.*
61.			please specify the **available area** solely for the WTP contractor to use for the mobilization	*There is land available (approx. 2.5 Acres) within 2.5Km radius of the WTP that can be used by the Contractor for the temporary facilities (camp, yards etc.)*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
62.	Scope of works - Firm Part - WTP "Key Units" The general requirements item 7.1, chapter 4.1.2 WTP key units include "barrack for the staff and families".	4.1.2	Please clarify whether "barrack for the staff and families" should be included and the corresponding area.	*"Barracks for staff and families" is not part of the project scope of this Contract.*
63.	PART 2 - Section 7.1 General Requirements - 2.3 Project Location PART 2 - Section 7.9 Drawings for Information	2.3	The preliminary design WTP layout plan for information in Section 7.9 seems very difference from the proposed Mwache WTP Site shown in the Figure 1 of Chapter 2.3 / Section 7.1 / Part 2. Furthermore, it does not correspond to the site inspection at the pre-bid conference. Please clarify is there any restrict on the footprint or specific land use available of the proposed WTP.	*Please refer to Answer to clarifications Set n°01 – n°27.*
64.	**Motor and Pump Efficiencies** RWPS Efficiency of motors: min 94% Efficiency of pumps: min 89%	2.3	We consulted with different suppliers and found that the motor efficiency can meet the requirements, but the water pump efficiency is generally below 83% due to the large range of water pump head. We suggest adjusting the efficiency to this range.	*The requirement is modified as follows:* • *Motor Efficiency class IE3 acc. to IEC60034-30-1* • *Minimum pump efficiency – 85% for the full range of the variable pumping head.* *In the Bid Proposal, the Contractor is required to provide pump performance curve and the efficiency simulation of the selected / proposed pump for the full range of the variable pumping head.*
65.	**Air Conditioning and Ventilation** The system shall have a centralised system of hot and chilled water and thermostatically controlled fan coil units in each room	3.16.15.2	It is not clear which system is to be installed. The first statement suggest the installation of a chiller while the second is for a split unit. For a small building a chiller is not normally specified, Split units are better as they are more flexible. If 1 breaks down, it does not affect the whole system.	*All Air Conditioning systems to be installed by the Contractor shall be split AC Systems.*
66.	The air conditioning system shall be divided into different split units			

Design, Build and Operate of Mwache Water Treatment Plant (CWWDA/AFD/W3/2022-2023)

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
67.	**Drinking Water Quality** Table 2 - Drinking Water quality standards for Mwache WTP provides the raw water quality and effluent water standard of the proposed WTP.	2.1.1	The values of Organic Matter by KMnO4 and Chl-a in raw water seem abnormal (15 mg/l and 650mg/l, quite high, especially that of Chl-a). Please check and confirm these two values and explain the reference or derivation.	*Organic Matter by KMnO4 and Chl-a are deleted from the water quality parameters in Part 2, Section 7.2, Table 1 – Final proposed water quality design input values and Table 2 – Drinking water quality standards for Mwache WTP*
68.	The Tender does not give effluent water standard on Organic Matter by KMnO4 and Chl-a. Related requirement concerning these two items cannot be found in KS 05-459 as well. However, the removal of these two contaminant items will significantly influence the selection of treatment process and water line design.	2.1.1	For the purpose of evaluation. Please clarify the removal requirement and effluent standard of Organic Matter by KMnO4 and Chl-a for the proposed Mwache WTP.	*Refer to response n° 67.*
69.	**Water Treatment Line** "Contractor is free to adapt the suggested waterline due to its experience in water treatment as long as the proposed treatment is compliant with clauses 2 - Required performance levels, 3.1 - General and 3.2 - Project description."	3.5.3~3.5.7	Please clarify if the process design and design parameters provided in Chapter 3.5.3~3.5.7 can be adjusted according to Contractor's experience and capability	*The water treatment line presented in Part 2, section 7.2, chapter 3.5, table 3 define the minimum units to be included. It is compulsory to include all the described treatment units and the design requirements for each unit is defined in the chapter 3.5.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
70.	The minimum design requirement for flocculation retention time is 20min. The flocculation tank shall be equipped with shaft mixers.	3.5.4.2	According to previous experience and references, hydraulic flocculation with less retention time is introduced to instead the design of long retention mechanical flocculation in the flotation unit. This is an optimized hydraulic flocculation system with plug flow that enables the best possible use of the available volume without any risk of by-pass, being more efficient than conventional mechanical flocculation. Thus the flocculation time is shorter and the floc is of a more homogenous quality. It is a energy friendly way and easy to operate. Moreover, we think a flocculation retention time of 20min is too long because over-flocculation will result to "big flocs" that intend to settle down instead of float up. This might cause failure of the performance of the flotation unit. Please clarify: if an optimized hydraulic flocculation system with less retention time can be applied.	*The Contractor is free to propose the retention time in the flocculation time. The Contractor shall respect the design requirements indicated in the Section 3.5.4.2.* *For clarifications purposes and to avoid misunderstanding between Employer's requirements and suggested water line, Part 2, section 7.2, chapter 3.5, figure 5 is deleted.*
71.	**Chemical reagents injection & building** "All chemical injection devices at each point of application must be duplicated to allow one to be taken out of service for cleaning, without interrupting chemical dosing."	3.7.2	Please clarify if all the chemical dosing pumps should with 100% standby (i.e. N on duty plus N in stand-by)	*Confirmed.*
72.	"The capacity of the reagent storage shall be at least three months at the final design capacity."	3.7.3	Sulfuric acid will be applied in the proposed WTP. According to Section 7.10 of Employer's requirements, the TAC in raw water is high. So the designed dosage of sulfuric acid is not low in this project. Based on the current design base and process calculation, the 3 months of reagent storage capacity is too large for liquid reagent - sulfuric acid. It is recommended to adjust the storage capacity of liquid sulfuric acid to 30 days. Please clarify.	*Agreed, reagent storage capacity is modified to 45 days.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
73.	**Potable Water Systems** ER Item No. 3.15.2: Potable Water System (WTP and RWPS): The water shall be abstracted from the treated water tank and pumped to an elevated tank. The capacity of the tank shall be at least equal to 2 days storage for the WTP demand. ER Item No. 3.15.3: Potable Water System (other facilities within the Dam area): The water shall be abstracted from the treated water tank and pumped to an elevated tank. The capacity of the tank shall be at least equal to 2 days storage for the WTP demand.	3.15.2~3.15.3	Please clarify whether these two Potable Water System can be shared, whether the 100m^3 reinforced concrete tank is already included in the dam contract and specify the water demand and pressure requirements for the facilities within the Dam area.	*The scope for the potable water supply system for other facilities within the Dam area (base camp, clinic, police post etc.) has been clarified in Answers to clarifications Set n°01, Response No. 19. The elevated RC tank under this scope will be constructed by the WTP Contractor at approx. 3km from the WTP.* *The Contractor will design and construct an independent potable water supply system for the facilities within the WTP and RWPS. This system will include elevated storage tanks within the WTP and RWPS with a storage capacity of at least 2 days storage.*
74.	**UV disinfection** 2 lines of 6 UV reactor（5+1UV by line） 4450m^3/h per line	3.5	The number of UV lamp with medium pressure lamps is relatively fewer, and maintenance only requires replacing the lamps damaged，which takes less time. Therefore, only 3 UV reactors are needed. If the configuration is set according to the tender document with 5 +1 UV by line, more expenses will be incurred. Meanwhile, the civil work costs will also be higher. Please clarify whether 3 UV reactors for 4450m^3/h per line meets the requirements specified in the tender document.	*The Contractor shall design the UV disinfection unit with 2 lines. The Contractor shall propose his own design based on this consideration.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
75.	**11100 - 2.1.3 Motors** "The motor and the cable are capable of continuous submergence underwater without loss of watertight integrity acc. To protection class IP68 (20m), the rated power shall be adequate so that the pump is not overloaded throughout the entire indicated pump performance curve. " **11110 - 2.1.3 Motors** The motor and the cable are capable of continuous submergence underwater without loss of watertight integrity acc. To protection class IP68 (20m), the rated power shall be adequate so that the pump is not overloaded throughout the entire indicated pump performance curve. **11220 - 2.1.2 Motor and gear head** "The gear reducer motor shall fit with: · Working outdoors, · Working hours: 24 hours per day · Protection grade IP68, · Isolation class E, · 230V or 400 V, · 3 phases, · 50Hz, · Rated power 20% higher than maximum actual power. " **11710 - 2.1.2.3 Motors** " To protection class IP68 (20m), the rated power shall be adequate so that the pump is not overloaded throughout the entire indicated pump performance curve. "	11100 CENTRIFUGAL PUMPS & 11110 PROGRESSIVE CAVITY PUMPS & 11220 VERTICAL SHAFTMIXERS & 11710 POLYMER PREPARATION	IP68 is normally required for submergence equipment. If dry centrifugal pump is selected, it will be dry-mounted and there are no cables installed underwater. Progressive cavity pumps are not suitable to be installed submergence underwater. Similarly, motors for vertical shaft mixers and polymer preparation unit will not installed underwater under any circumstances and there are no cables installed underwater either. After consulting with mainstream suppliers, it is hard to find appropriate motor products with IP68 protection class for those dry-mounted equipment. According to previous experience and feedbacks from suppliers, protection class of IP55 is normally applied and enough for motors of dry centrifugal pump, progressive cavity pumps, vertical shaft mixers and polymer preparation units. Please clairfy: Whether motors of dry centrifugal pump, progressive cavity pumps, vertical shaft mixers and polymer preparation units can apply IP55 protection class.	*IP55 protection class for motors of dry centrifugal pump, progressive cavity pumps, vertical shaft mixers and polymer preparation units is acceptable.*
76.	**2.1.3 Motors** "The pump will have a minimum efficiency of 94% with an IE3 Motor Class";	11100 Centrifugal pump	After consulting with mainstream suppliers, it is found that the motor efficiency of centrifugal pumps installed in the WTP is generally between 88% and 93%. It is recommended to adjust the efficiency to this range. Please clarify.	*Refer to response no. 64.*

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
77.	2 "In order to cater for communications failures, the PLC shall be capable of holding 8 days' worth of data as follows a) Analogue, totalised and derived signals - on significant change/15 minute intervals. b) Digital signals on change of state."	17010-Scada System Requirements	In general engineering design, PLC plays a role of control rather than data storage. Data storage is usually undertaken by SCADA. We have improved the overall performance and safety of the PLC by configuring redundant CPU communicating with SCADA through fiber optic ring network. The probability of communication failures is very low. Therefore, PLC does not need to store data for 8 days. Based on the above optimized configuration we provided, it is recommended to cancel the requirement of 8 days' data storage for PLC. Please clarify.	*In the proposed configuration with redundant PLCs and fiber optic ring links to the scada system, data storage for 8 days is not necessary, but information and status must be retained by the PLC in the event of loss of the communication network, until it is restored.*
78.	5.8 "A serial RS 232 port shall be available to enable interfacing to local PC's for MMI purposes to allow local database and control sequence loading, interrogation or modification. The port shall cater for communication with a suitable encoding device."	17010-Scada System Requirements	According to inquiry with mainstream suppliers, RS232 is not standard configuration in most PLCs on market. Ethernet communication is better than RS232 because Ethernet is faster and stabler. If Ethernet interface for communication is configured, there is no need to reserve RS232. Please clarify: Whether RS232 can be replaced by a better Ethernet interface.	*This chapter does not deal with PLCs, but with local PCs that can be used as HMIs.*
79.	5.5 "The preferred input signal is 4-20mA; continuous; linear supporting a fully floating max 250 ohm input impedance load. Analogue/Digital conversion shall have a minimum 8 bit resolution, linear to ±1%, accepting signals in the range 0-10mA and 0-20mA and voltages 1-5V, 0-1V and 0-100mV as required"	17010-Scada System Requirements	According to inquiry with mainstream suppliers, it is hard to find an analogue input module that accepts all the current and voltage signals including the ranges of 0-10mA and 0-20mA and voltages 1-5V, 0-1V and 0-100mV. Since the preferred input signal is 4-20mAC, we will choose a product that accepts 4-20mA/0-20mA signals only. Please clarify.	The preferred input signal is 4-20mA; continuous; linear supporting a fully floating max 250 ohms input impedance load. The Analogue/Digital conversion shall have a minimum 8 bits resolution, linear to ±1%, accepting signals in the range 0-10mA and 0-20mA and voltages 1-5V, 0-1V and 0-100mV as required.

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
80.	In section 7.5.2, various lists of spare parts are required in the corresponding specifications for different equipment including progressive cavity pump, dosing pumps, air blowers, polymer preparation, valves, stop logs, and air compressor. After consulting with suppliers, it is found that some of these "spare parts" are not applicable or beyond the defination of spare parts. And in some place, 3-year spare parts are required. These requirements seem unreasonable and contradictory to the requirements of spare parts specified in Section 7.1 of ER.	11110、11120、11400、11710、15150、15200、15600	Please clarify: besides the 2-year and 5-year spare parts recommended by the manufacturers/suppliers, are those spare parts listed in 7.5.2 are mandatory？ How to deal with those inapplicable ones？	*The Contractor shall provide spare parts for the WTP and RWPS as follows:* *a) Manufacturers recommended spare parts:* • *Spare parts for the **2-year** Contractor's Operation Service – to be provided before issuance of Commissioning Certificate.* • *Spare parts for **5-year** Operation Period for the Employer i.e. beyond the Contractor's Operation Service – to be provided 6 months before completion of the Operation Service.* *b) Additional spare parts for key equipments which are clearly listed in the Technical Specifications (Part 2, S7.5.1).* *In cases where Part 2, S7.5.1 has not listed any specific spare parts for the installed equipments, the Contractor will only supply the 2-year and 5-year spare parts recommended by the Manufacturer.*
81.	3.2.2. DRY TESTS "2. Machine must run for two hours without water and without any noticeable problem (noise,axial position…)."	11220 Vertical Shaft Mixers	After consulting with suppliers, it is found that only the vertical mixers with VSD can be allowed to run without water. It is recommended to cancel this requirement for fixed frequency vertical mixers. Please clarify.	*We don't understand why vertical shaft mixers can't be tested at no load if they're not controlled by frequency variation.*
82.	1.3 SYSTEM DESCRIPTION, CHARACTERISTICS AND OPERATING CONDITIONS "Compressors shall be electrically driven, piston, type."	15600 AIR COMPRESSORS	Piston type compressors have gradually been eliminated from the market due to their disadvantages such as vibration, high noise, and low efficiency. It is recommended to select mainstream and high-efficiency type - screw compressor. Please clarify.	*Compressors can be of the screw or turbo type.*

Design, Build and Operate of Mwache Water Treatment Plant (CWWDA/AFD/W3/2022-2023)

Responses to requests for Clarifications (Set No. 02)				
No.	**Reference Document / Section**	**Clause or Page**	**Request for Clarification**	***Responses***
83.	The Contractor shall ensure that the Works comply with the handback requirements specified in the Employer's Requirements prior to the issue of the Contract Completion Certificate.	GCC 8.7	What are the hand back requirements? Please specify.	*The Contractor shall fully comply with the Employer's Requirements and hand over the works to the Employer upon completion and commissioning.*
84.	How long of the warranty period for the supplied equipment? The bidding document only mentions Design Service Life, which is not the same concept as the warranty period.		Please specify the warranty period for the supplied equipment	*To be defined.*
85.	The deadline for bid submission is: Date: 11th November 2024 Time: 12:00 PM (Local Time)	ITB 22.3 & ITB 23.1	About the deadline for bid submission, we request extend 28 days.	*Please refer to response to query no. 46.*

ANNEXES TO CLARIFICATION NO.1

- Annex A- Revised Part 1, Section 3, 2.3
- Annex B - Revised Requirements for Key Personnel
- Annex C (1) Prices Schedules_Firm_Part
- Annex C (2) - Prices Schedules_Conditional_Part
- Annex D - Revised Part 2, section 7.2, 3.15.3
- Annex E - Mwache WTP - Topo
- Annex F - Contractual boundaries coordinates
- Annex G - ESIA Report
- Annex H - Mwache Dam Power Line
- Annex I - Mwache Raw Water Gravity Main
- Annex J - Revised Part 2, section 7.2, 3.5.6.2
- Annex K (1) - Revised PCC Part A
- Annex K (2)- Revised PCC Part B
- Annex L - Commencement Date
- Annex M - Revised Part 2, 7.2, 1.3.2

Annex A- Revised Part 1, Section 3, 2.3

2.3. OPERATION AND/OR MAINTENANCE COSTS

An adjustment to take into account the extended operating and/or maintenance costs of the Works will be added to the Bid Price, for evaluation purposes only. The adjustment will be calculated by determining the total Operation & Maintenance Evaluated Price (OMEP) using the following formula:

$$OMEP = \sum_{x=1}^{N} OM_x + \sum_{x=1+N}^{M} \frac{OM_N}{(1+I)^{x-N}}$$

Where:

N	=	Number of years of Operation Service already included in the Contract (Sub-Clause 8.2 of PCC);
M	=	The life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements;
x	=	An index number 1, 2, 3, ... M representing the total number of years to be taken into account in the bid evaluation with regards to operation and/or maintenance costs;
OM(*)	=	Operation Service cost for year "x," as provided by the Bidder in the specific Operation Service Price Schedule (Schedule 5) of Price Schedules of Section IV, Bidding Forms. The rate for the last year priced under the Contract shall be applied for each subsequent year;
I	=	Discount rate to be used for the Net Present Value calculation.
	(*)	This cost includes electricity cost even if the electricity payments are made by the Employer.

Asset Replacement (AR) is calculated as follows:

AR = EM + EL + IT

Where:

EM	=	Cost of replacement of Electromechanical Equipment, as listed and priced by the Bidder in Schedules 2, 3 and 4, for a replacement period set at ten (10) years during the life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements;
EL	=	Cost of replacement of Electrical Equipment, as listed and priced by the Bidder in Schedules 2, 3 and 4, for a replacement period set at fifteen (15) years during the life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements;
IT	=	Cost of replacement of IT and automatic devices, as listed and priced by the Bidder in Schedules 2, 3 and 4, for a replacement period set at five (5) years during the life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements.

The Operation and Maintenance costs and Asset replacement will be estimated separately for both **Phase 1** (Firm Part, 50% WTP capacity) and **Phase 2** (Conditional Part).

Annex B - Revised Requirements for Key Personnel

Revised section 33.2 of Part 2 – Employer's Requirements / Section 7.1 – General Requirements:

33.2. MINIMUM QUALIFICATIONS OF KEY PERSONNEL

The key personnel qualifications are evaluated according to section 1.3 "Scoring of the Technical bid" of "Part 1 – Section 3_Evaluation Criteria". The key personnel shall meet the following minimum requirements:

No.	Position	Quantity / Nr.	Minimum qualifications and works experience
KP 1	Project Manager	1Nr.	• At least 15 years' experience in project management • Experience as project manager from at least 3 WTP construction projects with capacity > 4,500 m^3/h • Be fluent in English language • Hold University Engineering Degree in civil engineering or in any other relevant discipline.
KP 2	Process Expert	1Nr.	• At least 15 years' experience in WTP process design • Experience as process designer from at least 3 WTP construction projects with one project having a capacity > 4,500 m^3/h • Be fluent in English language • Hold University Engineering Degree in civil / water process engineering or in any other relevant discipline.
KP 3	Construction Site Manager	1Nr.	• At least 15 years' experience in construction site management • Experience as construction site manager from at least 3 WTP construction projects with one project having a capacity > 4,500 m3/h • Be fluent in English language • Hold University Degree in civil engineering or in any other relevant discipline.
KP 4	Construction Site Engineer	3Nr.	• At least 10 years' experience in construction site works • Experience as construction site engineer from at least 3 WTP construction projects with one project having a capacity > 4,500 m^3/h • Be fluent in English language • Hold University Degree in civil engineering or in any other relevant discipline.
KP 5	*Engineering Surveyor*	1Nr.	• At least 15 years' experience in engineering surveying • Experience as a surveyor from at least 3 similar projects (WTP, WWTP, industrial plant) having a capacity > 4,500 m^3/h.

No.	Position	Quantity / Nr.	Minimum qualifications and works experience
			• Hold University Degree in engineering surveying or in any other relevant discipline.
KP 6	*Operation and Maintenance Manager*	1Nr.	• At least 10 years' experience in WTP operation and management • Experience as O&M manager on at least 3 WTP construction projects with one project having a capacity > 4,500 m3/h and managed for a minimum duration of two years • Be fluent in English language • Hold University Degree in civil engineering or in any other relevant discipline.
KP 7	*Electromechanical expert*	1Nr.	• At least 15 years' experience in WTP and pumping stations design and operation • Experience as Electromechanical expert from at least 3 WTP construction projects with one project having a capacity > 4,500 m3/h • Experience as Electromechanical expert from at least 3 large pumping stations with at least one project having a pumping station capacity > 4,500 m^3/h • Be fluent in English language • Hold University Degree in mechanical / electrical engineering or in any other relevant discipline.
KP 8	*Structural Engineer*	1Nr.	• At least 15 years' experience in structural design of WTPs or WWTPs • Experience as structural engineer for at least 3 WTP or WWTP having a capacity > 4,500 m3/h • Be fluent in English language • Hold University Degree in structural / civil engineering or in any other relevant discipline.
KP 9	*Electricity and SCADA expert*	1Nr.	• At least 15 years' experience in Electrical and SCADA industrial design • Experience as Electricity and SCADA expert from at least 3 industrial plants with one of which is a WTP construction projects with capacity > 4,500 m3/h • Be fluent in English language • Hold University Degree in electrical/electronics engineering, instrumentation and controls engineering or in any other relevant discipline.
KP 10	*ESHS manager/expert*	1Nr.	• At least 10 years' experience in managing ESHS aspects in construction sites and 5 years' specific experience as an ESHS Expert in large water infrastructure projects. • Be fluent in English language • Hold University Engineering Degree in environmental studies or in any other relevant discipline.
KP 11	*Environmental and social Officer*	1Nr.	• At least 5 years' experience in managing ESHS aspects in construction sites and 2 years' experience as an EHS Officer in water infrastructure projects • Be fluent in English language

No.	Position	Quantity / Nr.	Minimum qualifications and works experience
			• Hold University Engineering Degree in environmental studies or in any other relevant discipline.
KP 12	*Health and Safety Officer*	1Nr.	• At least 5 years' experience in managing health and safety aspects of construction sites and 2 years' experience as a H&S Officer in water infrastructure projects • Be fluent in English language • Hold University Engineering Degree in social/safety studies or in any other relevant discipline.
KP 13	*Architect*	1Nr.	• At least 5 years' experience in industrial architectural design and 2 years specific experience in designing water infrastructure projects. • Be fluent in English language • Hold University Engineering Degree in architecture or in any other relevant discipline.
KP 14	*Technical Trainings Manager*	1Nr.	• At least 10 years' experience in operation and maintenance of water infrastructure and 5 years' experience in technical training in WTP with at least one WTP >4500m^3/d. • Be fluent in English language • Hold University Degree in civil engineering or in any other relevant discipline.
KP 15	*Employment and Social Inclusion Expert*	1Nr.	• At least 10 years' experience in employment and social inclusion and 5 years' experience as an employment and social inclusion expert in water infrastructure Projects. • Be fluent in English language • Hold University Degree in social sciences or in any other relevant discipline.

Annex C (1) Prices Schedules_Firm_Part

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Preamble

1 The Price Schedules shall be read in conjunction with the other documents forming part of this Contract in particular with the priced Activity Schedule prepared by the Bidder. The Price Schedules shall be submitted also on electronic format.

2 The total amount of the Price Schedules shall be carried to the Letter of Bid.

3 Notwithstanding any limits which may be implied by the wording of the individual activities and/or the explanations in this Preamble, it is to be clearly understood that the amounts entered in the Price Schedules are to be for the work finished, complete in every respect; and will be deemed to have taken full account of all requirements and obligations, whether expressed or implied, covered by all parts of this Contract and to have priced the activities herein accordingly. The amounts must therefore include for temporary works, all incidental and contingent expenses and risks of every kind necessary to design, construct, complete and maintain the whole of the Works in accordance with the Contract. Unless separate items are provided in the Price Schedules, full allowance shall be made in the sums stated for all works and costs involved. The prices shown in the price schedules will include all taxes and customs, import duties, levies but exclusive of VAT for a proper evaluation. However, the bidder to clearly indicate the VAT amounts in the summary.

4 It will be assumed that any activity or item left without a price entered against it, has the price of that activity or item included elsewhere in the Price Schedules. After the award of contract no alteration will be made to the Price Schedules to rectify any "un-priced" activities or items.

5 The following abbreviations are used:

hr= Hour
L.S = Lump Sum
P.S. = Provisional Sum
T = tonne
Kg = Kilogramme
kWh = Kilowatt Hour
L=Litres
mg = milligram
mm = millimetre
Nr. = Number
Nm^3=Normal Cubic Meter
h or hr = hour
m^3 = cubic metre
m^2 = square metre
d or day = day
Nm3 = Normal cubic meter

6 The prices stated in the Price Schedules shall exclude VAT and shall include all customs duties, import taxes, business taxes, income and other taxes that may be levied on Goods and services according to the laws and regulations being in force in Kenya on the date 28 days prior to the date of submission of the Bids.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 1: Preliminary Items

Item	Description	Unit	Specify Currency [1]		Price (excluding VAT)	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7
1.1	Mobilisation cost including site preparation	L.S				
1.2	Establishment and maintenance of Contractor's office and accommodation	L.S				
1.3	Establishment and maintenance of fully furnished and equiped Offices for the Engineer including provision of all utilities.	L.S				
1.4	Engineer's Support Staff including including basic pay, overtime, house allowance, per diems and other allowances.	L.S				
1.5	Guarantees	L.S				
1.6	Insurances	L.S				
1.7	Topographical survey	L.S				
1.8	Geotechnical investigations including additional studies for soil native characteristics	L.S				
1.9	Obtaining of approvals and permissions prior to the commencement of construction.	L.S				
1.10	Design of All the Project Works (includes the conditional part)	L.S				
1.11	Preparation and submission of “As-built” Drawings	L.S				
1.12	Preparation of Quality Assurance and Quality Control Plan and compliance with the QC/QA requirements	L.S				
1.13	Preparation and submission of Operation and Maintenance documents and manuals	L.S				
1.14	Pre-commissioning tests	L.S				
1.15	Commissioning Tests	L.S				
1.16	Tests on completion	L.S				
1.17	Demobilisation and removal of Contractor’s Camps	L.S				
	Provisional Sums					
1,18	Provisional Sums (fixed price) - Refer to **Schedule No. 10**					
1,19	Any other items not described above, but deemed necessary for the satisfactory completion of the works.					
	Tenderer to detail:					
	a)	L.S				
	b)	L.S				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)						

[1] Specify currency in accordance with ITB 18.1 of the BDS.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 2: Equipment, Materials, Tools and Mandatory Spare Parts Supplied From Abroad

Item	Description	Country of Origin	Unit	Foreign Currency [1]	CIP Price	Custom Duties & Levies	Total Price (Excl. VAT)
1	2	3	4	5	6	7	8
1.1	**Mechanical Works**						
1.1.1	**Raw Water Pumping Station**						
1.1.1.1	*Pumps*		*L.S*				
1.1.1.2	*Valves and Accessories*		*L.S*				
1.1.1.3	*Pipes and Fittings*		*L.S*				
1.1.1.4	*Any other necessary items required to complete the works (to detail)*		*L.S*				
1.1.2	**Raw Water Pumping Mains**						
1.1.2.1	Pipes and Fittings		L.S				
1.1.2.2	Valves and Accessories		L.S				
1.1.2.3	*Any other necessary items required to complete the works (to detail)*		L.S				
1.1.3	**Water Treatment Plant**						
1.1.3.1	*Pre-treatment (if necessary)*		*L.S*				
1.1.3.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*		*L.S*				
1.1.3.3	*Coagulation, Flocculation, Clarification*		*L.S*				
1.1.3.4	*Filtration*		*L.S*				
1.1.3.5	*Calco-carbonic balance and final disinfection*		*L.S*				
1.1.3.6	*Treated Water Tank*		*L.S*				
1.1.3.7	*Backwash Tank*		*L.S*				
1.1.3.8	*Sludge thickening and recycling system*		*L.S*				
1.1.3.9	*Chemical storage, preparation and dosing*		*L.S*				
1.1.3.10	*Conveying system*		*L.S*				
1.1.3.11	*Auxiliary standby diesel engine generator to serve both the WTP and RWPS*		*L.S*				
1.1.3.12	*All other necessary items required to complete the works (to detail)*		*L.S*				
1.1.3	**Ancillary Buildings within the WTP (Administration Building, Workshop, Laboratory, Gatehouse etc.)**		L.S				
1.2	**Electrical Works**						
1.2.1	**Raw Water Pumping Station**						
1.2.1.1	*Main power supply (high voltage or Medium Voltage) and transformers*		*L.S*				
1.2.1.2	*Electrical room, main low voltage board, LV boards*		*L.S*				
1.2.1.3	*LV equipment connection*		*L.S*				
1.2.2	**Water Treatment Plant**						
1.2.2.1	*Fine screening*		*L.S*				
1.2.2.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*		*L.S*				
1.2.2.3	*Coagulation, Flocculation, Clarification*		*L.S*				
1.2.2.4	*Filtration*		*L.S*				
1.2.2.5	*Calco-carbonic balance and final disinfection*		*L.S*				
1.2.2.6	*Treated Water Tank*		*L.S*				
1.2.2.7	*Backwash Tank*		*L.S*				
1.2.2.8	*Sludge thickening and recycling system*		*L.S*				
1.2.2.9	*Chemical storage, preparation and dosing*		*L.S*				
1.2.2.10	*Main power supply (high voltage or Medium Voltage) and transformers*		*L.S*				
1.2.2.11	*Electrical room, main low voltage board, LV boards*		*L.S*				
1.2.2.12	*All other necessary items required to complete the works (to detail)*		*L.S*				
1.2.3	**Ancillary Buildings within the WTP (Administration Building, Workshop, Laboratory & Gatehouse)**		**L.S**				
1.3	**Control / Command Works**						
1.3.1	Instrumentation		L.S				
1.3.2	Automation System		L.S				
1.3.3	Data network		L.S				
1.3.4	SCADA system		L.S				
1.3.5	All other necessary items required to complete the works (to detail)		L.S				

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 2: Equipment, Materials, Tools and Mandatory Spare Parts Supplied From Abroad

Item	Description	Country of Origin	Unit	Foreign Currency [1]	CIP Price	Custom Duties & Levies	Total Price (Excl. VAT)
1	2	3	4	5	6	7	8
1.4	**Auxiliary Works**						
1.4.1	Fire detection , alarm system and fire fighting system		L.S				
1.4.2	Water supply system within WTP and RWPS		L.S				
1.4.3	Potable water system / facilities for the base camp, police station and clinic (constructed under the Dam Contract)		L.S				
1.4.4	Wastewater collection & treatment systems within WTP and RWPS		L.S				
1.4.5	Rain water Collection and Storage System		L.S				
1.4.6	Workshop Equipments		L.S				
1.4.7	Laboratory Equipments		L.S				
1.4.8	Handling equipments		L.S				
1.4.9	Ventilation systems		L.S				
1.4.10	Air-conditioning systems		L.S				
1.4.11	Telephone/ Communication systems		L.S				
1.4.12	Lightning protection systems		L.S				
1.4.13	Anti-intrusion security alarm system (WTP and RWPS)		L.S				
1.4.14	CCTV security System (WTP and RWPS)		L.S				
1.4.15	General works (fencing, landscaping and street lighting, etc.)		L.S				
1.4.16	All other necessary items required to complete the works (to detail)		L.S				
1,5	**Mandatory Spare Parts**						
1.5.1	Raw Water Pumping Station		L.S				
1.5.2	Raw Water Pumping Mains		L.S				
1.5.3	Water Treatment Plant		L.S				
1,6	**Any other items not described above, but deemed necessary for the satisfactory completion of the works.**						
	Tenderer to detail:						
	a)		L.S				
	b)		L.S				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS

The amount quoted in this price schedule includes delivery to site, Contractor's overheads and profits.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 3: Equipment, Materials, Tools and Mandatory Spare Parts Supplied Within Employer's Country (Kenya)

Item	Description	Unit	Price (Kshs.) Exc. VAT
1	2	3	4
1.1	**Mechanical Works**		
1.1.1	**Raw Water Pumping Station**		
1.1.1.1	*Pumps*	*L.S*	
1.1.1.2	*Valves and Accessories*	*L.S*	
1.1.1.3	*Pipes and Fittings*	*L.S*	
1.1.1.4	*Any other necessary items required to complete the works (to detail)*	*L.S*	
1.1.2	**Raw Water Pumping Mains**		
1.1.2.1	Pipes and Fittings	L.S	
1.1.2.2	Valves and Accessories	L.S	
1.1.2.3	*Any other necessary items required to complete the works (to detail)*	L.S	
1.1.3	**Water Treatment Plant**		
1.1.3.1	*Pre-treatment (if necessary)*	*L.S*	
1.1.3.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*	*L.S*	
1.1.3.3	*Coagulation, Flocculation, Clarification*	*L.S*	
1.1.3.4	*Filtration*	*L.S*	
1.1.3.5	*Calco-carbonic balance and final disinfection*	*L.S*	
1.1.3.6	*Treated Water Tank*	*L.S*	
1.1.3.7	*Backwash Tank*	*L.S*	
1.1.3.8	*Sludge thickening and recycling system*	*L.S*	
1.1.3.9	*Chemical storage, preparation and dosing*	*L.S*	
1.1.3.10	*Conveying system*	*L.S*	
1.1.3.11	*Auxiliary standby diesel engine generator to serve both the WTP and RWPS*	*L.S*	
1.1.3.12	*All other necessary items required to complete the works (to detail)*	*L.S*	
1.1.3	**Ancillary Buildings within the WTP (Administration Building, Workshop, Laboratory, Gatehouse etc.)**	**L.S**	
1.2	**Electrical Works**		
1.2.1	**Raw Water Pumping Station**		
1.2.1.1	*Main power supply (high voltage or Medium Voltage) and transformers*	*L.S*	
1.2.1.2	*Electrical room, main low voltage board, LV boards*	*L.S*	
1.2.1.3	*LV equipment connection*	*L.S*	
1.2.2	**Water Treatment Plant**		
1.2.2.1	*Fine screening*	*L.S*	
1.2.2.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*	*L.S*	
1.2.2.3	*Coagulation, Flocculation, Clarification*	*L.S*	
1.2.2.4	*Filtration*	*L.S*	
1.2.2.5	*Calco-carbonic balance and final disinfection*	*L.S*	
1.2.2.6	*Treated Water Tank*	*L.S*	
1.2.2.7	*Backwash Tank*	*L.S*	
1.2.2.8	*Sludge thickening and recycling system*	*L.S*	
1.2.2.9	*Chemical storage, preparation and dosing*	*L.S*	
1.2.2.10	*Main power supply (high voltage or Medium Voltage) and transformers*	*L.S*	
1.2.2.11	*Electrical room, main low voltage board, LV boards*	*L.S*	
1.2.2.12	*All other necessary items required to complete the works (to detail)*	*L.S*	
1.2.3	**Ancillary Buildings within the WTP (Administration Building, Workshop, Laboratory & Gatehouse)**	**L.S**	
1.3	**Control / Command Works**		
1.3.1	Instrumentation	L.S	
1.3.2	Automation System	L.S	
1.3.3	Data network	L.S	
1.3.4	SCADA system	L.S	
1.3.5	All other necessary items required to complete the works (to detail)	L.S	

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 3: Equipment, Materials, Tools and Mandatory Spare Parts Supplied Within Employer's Country (Kenya)

Item	Description	Unit	Price (Kshs.) Exc. VAT
1	2	3	4
1.4	**Auxiliary Works**		
1.4.1	Fire detection , alarm system and fire fighting system	L.S	
1.4.2	Water supply system within WTP and RWPS	L.S	
1.4.3	Potable water system / facilities for the base camp, police station and clinic (constructed under the Dam Contract)	L.S	
1.4.4	Wastewater collection & treatment systems within WTP and RWPS	L.S	
1.4.5	Rain water Collection and Storage System	L.S	
1.4.6	Workshop Equipments	L.S	
1.4.7	Laboratory Equipments	L.S	
1.4.8	Handling equipments	L.S	
1.4.9	Ventilation systems	L.S	
1.4.10	Air-conditioning systems	L.S	
1.4.11	Telephone/ Communication systems	L.S	
1.4.12	Lightning protection systems	L.S	
1.4.13	Anti-intrusion security alarm system (WTP and RWPS)	L.S	
1.4.14	CCTV security System (WTP and RWPS)	L.S	
1.4.15	General works (fencing, landscaping and street lighting, etc.)	L.S	
1.4.16	All other necessary items required to complete the works (to detail)	L.S	
1,5	**Mandatory Spare Parts**		
1.5.1	Raw Water Pumping Station	L.S	
1.5.2	Raw Water Pumping Mains	L.S	
1.5.3	Water Treatment Plant	L.S	
1,6	**Any other items not described above, but deemed necessary for the satisfactory completion of the works.**		
	Tenderer to detail:		
	a)	L.S	
	b)	L.S	
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)			

[1] Specify currency in accordance with ITB 18.1 of the BDS

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 4: Construction Works and Installation Services

Item	Description	Unit	Specify Curreny [1]		Price (excluding VAT)	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7
1. Civil Engineering and Building Works						
1.1	**Raw Water Pumping Station**					
1.1.1	Pump house	L.S				
1.1.2	Kenya Power metering room	L.S				
1.1.3	Workshop and Store	L.S				
1.1.4	Administration building (includes reception, plant manager's office, operator's office etc)	L.S				
1.1.5	Gate house	L.S				
1.1.6	Internal access roads including parking & drainage works	L.S				
1.1.7	Landscaping works including earthworks,drainage works, irrigation network,plating of trees, lawns & flowers, fencing and gates	L.S				
1.1.8	Any other necessary items required to complete the works (to detail)	L.S				
1.2	**Raw Water Pumping Mains. Item covers all pipeline construction works which includes but not limited to the following: earthworks, pipelaying and jointing, installation of pipeline fittings & appurtenances, inspection chambers,anchors, road crossings, testing & Commissioning etc.**	**L.S**				
1.3	**Water treatment plant**					
1.3.1	Head works (screening, Aeration, pre-oxidation, shock chlorination, pH Adjustment)	L.S				
1.3.2	Coagulation, Flocculation, Clarification	L.S				
1.3.3	Filters	L.S				
1.3.4	UV Building	L.S				
1.3.5	Treated Water Tank	L.S				
1.3.6	Backwash water Tank	L.S				
1.3.7	Sludge thickening	L.S				
1.3.8	Sludge drying beds	L.S				
1.3.9	Chemical storage and chlorination building	L.S				
1.3.10	Adminstration building,Including Laboratory	L.S				
1.3.11	Workshop and store	L.S				
1.3.12	Gate house	L.S				
1.3.13	Internal access roads including parking & drainage works	L.S				
1.3.14	WTP Access Road connecting WTP to Dam Access Road (refer to Drawings for Information Drg. No. ART-8773361-PD-DWG-401	L.S				
1.3.15	Landscaping works including earthworks,drainage works, irrigation network,plating of trees, lawns & flowers, fencing and gates	L.S				
1.3.16	Any other necessary items required to complete the works (to detail)	L.S				
1,4	**Water supply facilities from the WTP to the base camp, police station and clinic. Includes a pumping system and elevated RC tank as detailed in the Employer's requirements**	**L.S**				
2. Installation Services						
2,1	**Mechanical Works**					
2.1.1	**Raw Water Pumping Station**					
2.1.1.1	*Pumps*	*L.S*				
2.1.1.2	*Valves and Accessories*	*L.S*				
2.1.1.3	*Pipes and Fittings*	*L.S*				
2.1.1.4	*Any other necessary items required to complete the works (to detail)*	*L.S*				
2.1.2	**Water Treatment Plant**					
2.1.2.1	*Pre-treatment (if necessary)*	*L.S*				
2.1.2.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*	*L.S*				
2.1.2.3	*Coagulation, Flocculation, Clarification*	*L.S*				
2.1.2.4	*Filtration*	*L.S*				
2.1.2.5	*Calco-carbonic balance and final disinfection*	*L.S*				
2.1.2.6	*Treated Water Tank*	*L.S*				
2.1.2.7	*Backwash Tank*	*L.S*				
2.1.2.8	*Sludge thickening and recycling system*	*L.S*				
2.1.2.9	*Chemical storage, preparation and dosing*	*L.S*				
2.1.2.10	*Conveying system*	*L.S*				

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 4: Construction Works and Installation Services

Item	Description	Unit	Specify Curreny [1]		Price (excluding VAT)	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7
2.1.2.11	*All other necessary items required to complete the works (to detail)*	*L.S*				
2.1.3	**Ancillary Buildings within the WTP & RWPS - Includes Installation of Gantry Cranes in Workshops and other Mechanical Components in Ancillary Buildings**	**L.S**				

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 4: Construction Works and Installation Services

Item	Description	Unit	Specify Curreny [1]		Price (excluding VAT)	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7
2,2	**Electrical and Instrumentation Works**					
2.2.1	Raw Water Pumping Station	L.S				
2.2.2	Water Treatment Plant	L.S				
2.2.3	Ancillary Buildings within the WTP	L.S				
2.2.4	Ancillary Buildings within the RWPS	L.S				
2.2.5	Installation of the Auxiliary standby diesel engine generator	L.S				
2.2.6	All other necessary items required to complete the works (to detail)	L.S				
2,3	**SCADA Control / Command Works**					
2.3.1	Instrumentation	L.S				
2.3.2	Automation System	L.S				
2.3.3	Data network includes optic fibre from the RWPS to WTP	L.S				
2.3.4	SCADA system	L.S				
2.3.5	All other necessary items required to complete the works (to detail)	L.S				
2,4	**Auxiliary Works**					
2.4.1	Fire detection , alarm system and fire fighting system	L.S				
2.4.2	Water supply system within WTP and RWPS	L.S				
2.4.3	Potable water system / facilities for the base camp, police station and clinic (constructed under the Dam Contract)	L.S				
2.4.4	Wastewater collection & treatment systems within WTP and RWPS	L.S				
2.4.5	Rain water Collection and Storage System	L.S				
2.4.6	Workshop Equipments	L.S				
2.4.7	Handling equipments	L.S				
2.4.8	Ventilation systems	L.S				
2.4.9	Air-conditioning systems	L.S				
2.4.10	Telephone/ Communication systems	L.S				
2.4.11	Lightning protection systems	L.S				
2.4.12	Anti-intrusion security alarm system (WTP and RWPS)	L.S				
2.4.13	CCTV security System (WTP and RWPS)	L.S				
2.4.14	All other necessary items required to complete the works (to detail)	L.S				
1,7	**Any other items not described above, but deemed necessary for the satisfactory completion of the works.**					
	Tenderer to detail:					
	a)	L.S				
	b)	L.S				
	Sub-Total - 2					
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)						

[1] Specify currency in accordance with ITB 18.1 of the BDS.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 5A: Environmental, Social, Health and Safety (ESHS) Cost Schedule for Design and Build Part

Item N°	Description	ESHS Specifications Clause N°	Unit	Specify Currency[1]		Price (exc. VAT)	
				Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7	8
ESHS 1	Resources allocated to ESHS management	Clause 4	L.S				
ESHS 2	Drafting and updating the ESHS documentation, reporting, inspections	Clauses 1, 2, 3, 5, 6, 7, 9	L.S				
ESHS 3	Implementation of the Health and Safety Plan:Meetings, health care centre, medical check-ups, emergencies and evacuations, safety protective equipment, hygiene	Clauses 1, 9, 21 to 25, 27 to 35, 37, 38	L.S				
ESHS 4	Accommodation, drinking water, meals and transportation of staff (The Bidder shall detail the financial conditions of the supply of accommodation, meals and transport to its staff):	Clauses 36, 40, 41					
	- Accommodation		L.S				
	- Meals		L.S				
	- Transport		L.S				
ESHS 5	Training and local recruitment management costs (Includes Social Inclusion - Subclause 39.12)	Clauses 8, 39	L.S				
ESHS 6	Protection of adjacent areas, biodiversity, prevention of erosion and wastewater management	Clauses 10, 11, 12, 17, 18	L.S				
ESHS 7	Traffic, noise and atmospheric emissions management, land take	Clauses 13, 14, 42, 43, 44	L.S				
ESHS 8	Waste and hazardous products management	Clauses 15, 26	L.S				
ESHS 9	Vegetation clearing and Site rehabilitation	Clauses 16, 19, 20	L.S				
Any other items not described above, but deemed necessary for ensuring full commpliance (contractual and statutory) with Project ESHS Requirements.							
Tenderer to detail:							
a)							
b)							
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

ESHS costs are deemed to cover operations on all Sites (as defined in Clause 1.3 of ESHS Specifications).

Interim Payment Certificates shall include the portion of each ESHS cost amounting to the percentage of the actual progress achieved in executing the ESHS measures in compliance with the ESHS Specifications and approved by the Employer's Representative.

The Bidder should refer to the ESHS Specifications - **Part 2, Section 7.6 of the Bidding Documents**

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 5B: Environmental, Social, Health and Safety (ESHS) Cost Schedule for Operation Service

Item N°	Description	ESHS Specifications Clause N°	Unit	Specify Currency[1]		Amount (exc. VAT) Local Currency	Amount (exc. VAT) Foreign Currency
				Local Currency	Foreign Currency		
1	2	3	4	5	6	7	8
ESHS 1	Resources allocated to ESHS management	Clause 4	L.S				
ESHS 2	Drafting and updating the ESHS documentation, reporting, inspections	Clauses 1, 2, 3, 5, 6, 7, 9	L.S				
ESHS 3	Implementation of the Health and Safety Plan:Meetings, health care centre, medical check-ups, emergencies and evacuations, safety protective equipment, hygiene	Clauses 1, 9, 21 to 25, 27 to 35, 37, 38	L.S				
ESHS 4	Accommodation, drinking water, meals and transportation of staff (The Bidder shall detail the financial conditions of the supply of accommodation, meals and transport to its staff):	Clauses 36, 40, 41					
	- Accommodation		L.S				
	- Meals		L.S				
	- Transport		L.S				
ESHS 5	Training and local recruitment management costs (Includes Social Inclusion - Subclause 39.12)	Clauses 8, 39	L.S				
ESHS 6	Protection of adjacent areas, biodiversity, prevention of erosion and wastewater management	Clauses 10, 11, 12, 17, 18	L.S				
ESHS 7	Waste and hazardous products management	Clauses 15, 26	L.S				
Any other items not described above, but deemed necessary for ensuring full commpliance (contractual and statutory) with Project ESHS Requirements.							
Tenderer to detail:							
a)							
b)							
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

ESHS costs are deemed to cover operations on all Sites (as defined in Clause 1.3 of ESHS Specifications).

Interim Payment Certificates shall include the portion of each ESHS cost amounting to the percentage of the actual progress achieved in executing the ESHS measures in compliance with the ESHS Specifications and approved by the Employer's Representative.

The Bidder should refer to the ESHS Specifications - **Part 2, Section 7.6 of the Bidding Documents**

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 6: Security Cost Schedule

Price N°	Category Title	Reference of Security Specifications	Unit	Specify Currency[1]		Price (exc. VAT) Local Currency	Price (exc. VAT) Foreign Currency
				Local Currency	Foreign Currency		
1	2	3	4	5	6	7	8
Security 1	Security organisation	Article 4.1	L.S				
Security 2	Travel within the country and to the relevant area	Article 4.2	L.S				
Security 3	Accommodation during assignments	Article 4.3	L.S				
Security 4	Accommodation and security on project sites and worksites	Article 4.4	L.S				
Security 5	Communication	Article 4.5	L.S				
Other	This price may remunerate all the other services described in Articles 1 to 3 of the Security Specifications.	Articles 1 to 3, 5 to 6	L.S				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

[1] Specify currency in accordance with ITB 18.1 of the BDS.

The prices include all activities and measures defined in the security specifications and correspond to additional costs compared to an environment without security risk.

A breakdown of security price items shall be included in the Bid.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 7: Dayworks

Schedule A - Labor

Item N°	Description	Unit	Provisional Quantity	Specify Currency[1]		Price (excluding VAT)	
				Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7	8
Civil Engineering							
A.1	Working Gang	hr	200				
A.2	Craftsman (joiner/steel fixer etc)	hr	400				
A.3	Semi-skilled workman (Plant operator/pipelayer etc.)	hr	1000				
A.4	Unskilled labourer	hr	1000				
Mechanical / Electrical							
A.5	Technical Staff / Engineer	hr	200				
A.6	Electrician	hr	100				
A.7	Unskilled labourer	hr	400				
Technical Assistance							
A.8	Short term expert	day	60				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

The rates inserted herein should include for all costs such as insurance, travelling time, overtime, accomondation, use and maintenance of small tools of trade, supervisions, overheads and profit. Ony time engaged upon work will be paid.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 7: Dayworks

Schedule B - Materials

Item N°	Description	Unit	Provisional Quantity	Specify Currency[1]		Price (excluding VAT)	
				Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7	8
B.1	Ordinary Portland Cement	Tonne	2				
B.2	Mild steel (any size from 8mm to 25mm dia.)	Kg	400				
B.3	High tensile steel (8mm to 25mm dia.)	Kg	100				
B.4	Fine aggregate for concrete	Tonne	2				
B.5	Coarse aggregate for concrete	Tonne	2				
B.6	Use of shuttering timber	m^2	20				
B.7	Murram / Gravel	m^3	40				
B.8	Concrete Class 15/20	m^3	50				
B.9	Concrete Class 20/25	m^3	50				
B.10	Concrete Class 30/37	m^3	50				
B.11	150mm thick stone/concrete Blocks	Nr.	400				
B.12	225mm thick stone/concrete Blocks	Nr.	400				
B.13	Formwork Class F3 (fair face)	m^2	150				
B.14	Formwork Class F1 (rough)	m^2	150				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

All materials are to comply with the specifications. The rates inserted herein are to include for delivery to site, storage, handling, overheads and profits.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 7: Dayworks

Schedule C - Contractor's Equipment

Item N°	Description	Unit	Provisional Quantity	Specify Currency		Total Price - exc. VAT	
				Local Currency	Foreign Currency	Local Currency KES	Foreign Currency [1].....
1	2	3	4	5	6	7	8
C.1	Air Compressor up to 14m3/min including hoses free air delivery 7kg/cm2	hr	80				
C.2	Concrete mixer, closed drum with hopper wet capacity up to 200 litres	hr	40				
C.3	Vibrator poker air (excluding compressor)	hr	60				
C.4	Crane, crawler mounted, maximum safe working load:						
C.4a	up to 36 tonnes	hr	40				
C.4b	Up to 75 tonnes	hr	20				
C.5	Concrete skip for crane, struck capacity:						
C.5a	Upto 0.6m^3	hr	20				
C.5b	Up to 1.2m^3	hr	20				
C.6	Dumper two wheel drive, makers rated payload:						
C.6a	Up to 1500Kg	hr	100				
C.6b	Up to 5,000Kg	hr	100				
C.7	Rear dump truck, makers rated payload up to 17 tonnes	hr	20				
C.8	Articluated dump truck, makers rated payload up to 18.5 tonnes	hr	20				
C.9	Excavator mounted percussion breaker, unit weight less cradle:						
C.9a	Up to 100Kg	hr	20				
C.9b	Up to 1000Kg	hr	20				
C.10	Excavator, hydraullic full circle slew crawler or wheel mounted with single equipment, makers raed nominal weight:						
C.10a	Up to 2 tonnes	hr	20				
C.10b	Up to 14 tonnes	hr	20				
C.10c	Up to 21 tonnes	hr	60				
C.10d	Up to 30 tonnes	hr	20				
C.10e	Up to 55 tonnes	hr	20				
C.11	Excavator, hydraullic, offset or centre post, half circle slew, wheeled dual purpose back hoe/loader,makers rated loader bucket capacity up to 1.1m^3	hr	100				
C.12	Generator set, nomial rating:						
C.12a	Up to 10kVA	hr	30				
C.12b	Up to 25kVA	hr	30				
C.13	Transformer, (air cooled nominal rating):	hr	30				
C.13a	Up to 10kVA	hr	30				
C.13b	Up to 25kVA	hr	30				
C.14	Lorry maximum gross vehicle weight:						
C.14a	Up to 12 tonnes	hr	20				
C.14b	Up to 17 tonnes	hr	20				
C.14c	Up to 30 tonnes	hr	20				
C.15	Lorry, tipper, maximum gross vehicle weight:						
C.15a	Up to 12 tonnes	hr	40				
C.15b	Up to 17 tonnes	hr	20				
C.15c	Up to 30 tonnes	hr	20				
C.16	Van or pick-up, carrying capacity:						
C.16a	Up to 1 tonne	hr	40				
C.16b	Up to 2 tonne	hr	40				
C.17	Vibrating rammer, nominal weight up to 60Kg	hr	20				
C.18	Vibrating plate compactor, nominal weight :						
C.18a	Up to 80 Kg	hr	40				
C.18b	Up to 150 Kg	hr	40				
C.19	Pneumatic tools: breaker including steel	hr	60				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

The rates inserted herein should include for all operational and maintenance costs, fuel, oil, grease, operators, turnboys, supervision, overheads and profits. Only the time actually employed on works will be paid for and the rates should include for idle, travelling and overtime.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 8: Operation Service [1] [2]

Item No	Description	Unit	Qty	Unit price exc. VAT in foreign Currency [1]……		Unit price exc. VAT in local Currency KES		Total price exc. VAT in foreign Currency [1]……		Total price exc. VAT in local Currency [1]……	
				Civil works	Equipment	Civil works	Equipment	Civil works	Equipment	Civil works	Equipment
1	2	3	4	5	6	7	8	9=5*4	10=6*4	11=7*4	12=8*4
1.1	**Fixed costs**										
1.1.1	Operation & Maintenance staff										
1.1.1.1	*Plant Manager*	man-month	12								
1.1.1.2	*Water Treatment Process Engineer*	man-month	12								
1.1.1.3	*Mechanical Engineer*	man-month	12								
1.1.1.4	*Electrical Engineer*	man-month	12								
1.1.1.5	*Lab technician*	man-month	12								
1.1.1.6	Any other Staff not described above, but deemed necessary to operate and maintain the works. Tenderer to detail:										
1.1.2	Maintenance & Repair										
1.1.2.1	*Civil works*	month	12								
1.1.2.2	*Equipment*	month	12								
1.1.3	Cost for electrical power provision	month	12								
1.1.4	Cost for gas provision	month	12								
1.1.5	Cost for fuel provision	month	12								
1.1.6	Cost for chemical provision	month	12								
1.1.7	Water analyses, laboratory	month	12								
1.1.8	Utilities and other costs	month	12								
1.1.9	Any other O&M item not described above, but deemed necessary to operate and maintain the works. Tenderer to detail:										
1.2	**Variables costs (for 12 months)**										
1.2.1	Chemical consumption										
1.2.1.1	*Potassium permanganate*	tonnes									
1.2.1.2	*Aluminium slufate*	tonnes									
1.2.1.3	*Polyelectrolyte*	tonnes									
1.2.1.4	*Acid*	tonnes									
1.2.1.5	*NaOH*	tonnes									
1.2.1.6	*NaOCl*	tonnes									
1.2.1.7	*Other chemicals not described above, but deemed necessary to operate and maintain the works. Tenderer to detail:*										
1.2.2	Other consumables										
1.2.2.1	*Lubricants*	month	12								
1.2.2.2	*Laboratory reagents*	month	12								
1.2.2.3	*Laboratory Glasswere*	month	12								
1.2.2.4	*Activated carbon*	month	12								
1.2.2.5	*Other consumables*	month	12								
1.2.3	Electricity power consumption										
1.2.3.1	Electricity power consumption for the RWPS [3]	kWh									
1.2.3.2	Electricity power consumption for the WTP	kWh									
1.2.4	Gas power consumption	Nm3									
1.2.5	Fuel power consumption	Liters									
1.2.7	Utilities and other costs	month	12								
1.2.8	Any other O&M item not described above, but deemed necessary to operate and maintain the works. Tenderer to detail:										
Sub-Total											
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)											

Notes:

[1] Financial evaluation will be done based on theoretical raw water quality and water level at Mwache dam as mentioned in the Employer's requirements and answers to clarifications. Bidders shall provide details of calculation for variable costs consumption.

[2] During the O&M period, Contractor shall be paid based on the actual chemical and electrical consumption

[3] Electrical consumption at the RWPS shall be calculated based on the following assumptions:

- For 20% of the time: operation level of the dam of 50.0 masl

- For 50% of the time: operation Level of the dam of 70.0 masl

- For 30% of the time: operational level of the dam of 80.0 masl

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 9: Grand Summary

Schedule No.	Title	Amounts - exc. VAT	
		Local Currency KES	Foreign Currency [1].....
1	Preliminary Items		
2	Equipment, Materials, Tools and Mandatory Spare Parts Supplied From Abroad		
3	Equipment, Materials, Tools and mandatory Spare Parts supplied from within the Employer's country (Kenya)		
4	Construction Works and Installation Services		
5A	Environmental, Social, Health and Safety (ESHS) for Design and Build part		
6	Security Cost		
7	Dayworks		
7A	Labor		
7B	Materials		
7C	Contractor's Equipment		
Sum of (1) to (7)	***Sub-total 1***		
	10% Contingencies (Provisional) (10% of Sub-total 1 above)		
	Sub-total 2 (for the Design-Build of the Works, to be also included in the Bid Submission Form - Bid Price): Sub-total 1 + Contingencies		
5B	Environmental, Social, Health and Safety (ESHS) for Operation part		
8	Operation Service		
	Sub-total 3 for the Operation Service, to be also included in the Bid Submission Form - Bid Price (Sub-total 3 = 5B+8)		
	TOTAL (Sub-total 2 + Sub-total 3) to be also included in the Bid Submission Form - Bid Price		
Value Added Tax (VAT) - 16%, to be also included in the Bid Submission Form - Bid Price			
GRAND TOTAL (INCL. OF ALL TAXES)			

[1] Specify currency in accordance with ITB 18.1 of the BDS.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - FIRM PART

Schedule No. 10: Provisional Sums

No.	Item Description	Unit	Amount (Kshs.)
10,1	Provisional Sum for the Employer's share of the **Dispute Board**	P.S	10 000 000,00
10,2	Provisional sum for procurement of **Vehicles** for the Engineer / Employer	P.S	95 000 000,00
10,3	Provisional sum for **Operation and Maintenance of Vehicles** for the Engineer / Employer including cost for fueling, insurance etc.	P.S	65 000 000,00
10,4	Provisional sum for **Accommodation, Office Consumables / Expenses and Telephone** for the Supervision Staff	P.S	30 000 000,00
10,5	Provisional sum for **Inspection and Witness Testing** of Pipes, Fittings, Valves and Other Equipment at manufacturer's premises	P.S	20 000 000,00
10,6	Provisional Sum to cover costs of the **Employer's Counterpart Staff** assigned to the Project including transport, communication, allowances,	P.S	20 000 000,00
10,7	Provisional Sum to cover costs of **Interns and Attachees** assigned to the Project.	P.S	15 000 000,00
10,8	Provisional Sum to be used **as directed by the Employer / Engineer**	P.S	40 000 000,00
10,9	Provisional Sum to cover costs of **On-site and Off-site Training of Employer's Staff**	P.S	130 000 000,00
10,10	Provisional Sum to cover costs for procurement of **specialised tools** for Operation of the Treatment Plant and Raw Water Pumping Station	P.S	75 000 000,00
10,11	Provisional Sum to cover costs for the **electric connection line** from the HV/MV electric Sub-station (within Dam Area) to the WTP and RWPS.	P.S	15 000 000,00
10,12	Provisional Sum to cover the cost for procurement of computers, including 3-year licenses for requisite engineering softwares, for the Engineer's Staff -	P.S	10 000 000,00
	Sub-Total		**525 000 000,00**
10,13	Tenderer's **Overheads and Profits** for Provisonal costs above	**10%**	52 500 000,00
TOTAL CARRIED FORWARD TO SCHEDULE No. 1, ITEM 1.18			**577 500 000,00**

Annex C (2) - Prices Schedules_Conditional_Part

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Preamble

1 The Price Schedules shall be read in conjunction with the other documents forming part of this Contract in particular with the priced Activity Schedule prepared by the Bidder. The Price Schedules shall be submitted also on electronic format.

2 The total amount of the Price Schedules shall be carried to the Letter of Bid.

3 Notwithstanding any limits which may be implied by the wording of the individual activities and/or the explanations in this Preamble, it is to be clearly understood that the amounts entered in the Price Schedules are to be for the work finished, complete in every respect; and will be deemed to have taken full account of all requirements and obligations, whether expressed or implied, covered by all parts of this Contract and to have priced the activities herein accordingly. The amounts must therefore include for temporary works, all incidental and contingent expenses and risks of every kind necessary to design, construct, complete and maintain the whole of the Works in accordance with the Contract. Unless separate items are provided in the Price Schedules, full allowance shall be made in the sums stated for all works and costs involved. The prices shown in the price schedules will include all taxes and customs, import duties, levies but exclusive of VAT for a proper evaluation. However, the bidder to clearly indicate the VAT amounts in the summary.

4 It will be assumed that any activity or item left without a price entered against it, has the price of that activity or item included elsewhere in the Price Schedules. After the award of contract no alteration will be made to the Price Schedules to rectify any "un-priced" activities or items.

5 The following abbreviations are used:

hr= Hour
L.S = Lump Sum
P.S. = Provisional Sum
T = tonne
Kg = Kilogramme
kWh = Kilowatt Hour
L=Litres
mg = milligram
mm = millimetre
Nr. = Number
Nm^3=Normal Cubic Meter
h or hr = hour
m^3 = cubic metre
m^2 = square metre
d or day = day
Nm3 = Normal cubic meter

6 The prices stated in the Price Schedules shall exclude VAT and shall include all customs duties, import taxes, business taxes, income and other taxes that may be levied on Goods and services according to the laws and regulations being in force in Kenya on the date 28 days prior to the date of submission of the Bids.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 1: Preliminary Items

Item	Description	Unit	Specify Curreny[1]		Price [1] (excluding VAT)	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7
1.1	Mobilisation cost including site preparation	L.S				
1.2	Establishment and maintenance of Contractor's office and accommodation	L.S				
1.3	Establishment and maintenance of fully furnished and equiped Offices for the Engineer including provision of all utilities.	L.S				
1.4	Engineer's Support Staff including basic pay, overtime, house allowance, per diems and other allowances.	L.S				
1.5	Guarantees	L.S				
1.6	Insurances	L.S				
1.7	Topographical survey	Included in Firm Part				
1.8	Geotechnical investigations including additional studies for soil native characteristics	Included in Firm Part				
1.9	Obtaining of approvals and permissions prior to the commencement of construction.	Included in Firm Part				
1.10	Design of All the Project Works	Included in Firm Part				
1.11	Preparation and submission of "As-built" Drawings	L.S				
1.12	Preparation of Quality Assurance and Quality Control Plan and compliance with the QC/QA requirements	L.S				
1.13	Preparation and submission of Operation and Maintenance documents and manuals	L.S				
1.14	Pre-commissioning tests	L.S				
1.15	Commissioning Tests	L.S				
1.16	Tests on completion	L.S				
1.17	Demobilisation and removal of Contractor's Camps	L.S				
	Provisional Sums					
1,18	Provisional Sums (fixed price) - Refer to **Schedule No. 10**					
1,19	Any other items not described above, but deemed necessary for the satisfactory completion of the works.					
	Tenderer to detail:					
	a)	L.S				
	b)	L.S				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)						

[1] Specify currency in accordance with ITB 18.1 of the BDS.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 2: Equipment, Materials, Tools and Mandatory Spare Parts Supplied From Abroad

Item	Description	Country of Origin	Unit	Foreign Currency [1]	CIP Price	Custom Duties & Levies	Total Price (Excl. VAT)
1	2	3	4	5	6	7	8
1.1	**Mechanical Works**						
1.1.1	**Raw Water Pumping Station**						
1.1.1.1	*Pumps*		L.S				
1.1.1.2	*Valves and Accessories*		L.S				
1.1.1.3	*Pipes and Fittings*		L.S				
1.1.1.4	*Any other necessary items required to complete the works (to detail)*		L.S				
1.1.2	**Raw Water Pumping Mains**	**Included in Firm Part**					
1.1.2.1	Pipes and Fittings						
1.1.2.2	Valves and Accessories						
1.1.2.3	*Any other necessary items required to complete the works (to detail)*						
1.1.3	**Water Treatment Plant**						
1.1.3.1	*Pre-treatment (if necessary)*		L.S				
1.1.3.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*		L.S				
1.1.3.3	*Coagulation, Flocculation, Clarification*		L.S				
1.1.3.4	*Filtration*		L.S				
1.1.3.5	*Calco-carbonic balance and final disinfection*		L.S				
1.1.3.6	*Treated Water Tank*	**Included in Firm Part**					
1.1.3.7	*Backwash Tank*		L.S				
1.1.3.8	*Sludge thickening and recycling system*		L.S				
1.1.3.9	*Chemical storage, preparation and dosing*		L.S				
1.1.3.10	*Conveying system*		L.S				
1.1.3.11	*All other necessary items required to complete the works (to detail)*		L.S				
1.1.3	**Ancillary Buildings within the WTP (Administration Building, Workshop, Laboratory, Gatehouse etc.)**	**Included in Firm Part**					
1.2	**Electrical Works**						
1.2.1	**Raw Water Pumping Station**						
1.2.1.1	*Main power supply (high voltage or Medium Voltage) and transformers*	**Included in Firm Part**					
1.2.1.2	*Electrical room, main low voltage board, LV boards*		L.S				
1.2.1.3	*LV equipment connection*		L.S				
1.2.2	**Water Treatment Plant**						
1.2.2.1	*Pre-treatment (if necessary)*		L.S				
1.2.2.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*		L.S				
1.2.2.3	*Coagulation, Flocculation, Clarification*		L.S				
1.2.2.4	*Filtration*		L.S				
1.2.2.5	*Calco-carbonic balance and final disinfection*		L.S				
1.2.2.6	*Treated Water Tank*	**Included in Firm Part**					
1.2.2.7	*Backwash Tank*		L.S				
1.2.2.8	*Sludge thickening and recycling system*		L.S				
1.2.2.9	*Chemical storage, preparation and dosing*		L.S				
1.2.2.10	*Main power supply (high voltage or Medium Voltage) and transformers*	**Included in Firm Part**					
1.2.2.11	*Electrical room, main low voltage board, LV boards*		L.S				
1.2.2.12	*All other necessary items required to complete the works (to detail)*		L.S				
1.2.3	**Ancillary Buildings within the WTP (Administration Building, Workshop, Laboratory & Gatehouse)**	**Included in Firm Part**					
1.3	**Control / Command Works**						
1.3.1	Instrumentation		L.S				
1.3.2	Automation System		L.S				
1.3.3	Data network		L.S				
1.3.4	SCADA system	**Included in Firm Part**					
1.3.5	All other necessary items required to complete the works (to detail)		L.S				

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 2: Equipment, Materials, Tools and Mandatory Spare Parts Supplied From Abroad

Item	Description	Country of Origin	Unit	Foreign Currency [1]	CIP Price	Custom Duties & Levies	Total Price (Excl. VAT)
1	2	3	4	5	6	7	8
1.4	**Auxiliary Works**						
1.4.1	Fire detection , alarm system and fire fighting system		L.S				
1.4.2	Water supply system within WTP and RWPS		L.S				
1.4.3	Potable water system / facilities for the base camp, police station and clinic (constructed under the Dam Contract)	**Included in Firm Part**					
1.4.4	Wastewater collection & treatment systems within WTP and RWPS		L.S				
1.4.5	Rain water Collection and Storage System		L.S				
1.4.6	Workshop Equipments	**Included in Firm Part**					
1.4.7	Laboratory Equipments	**Included in Firm Part**					
1.4.8	Handling equipments	**Included in Firm Part**					
1.4.9	Ventilation systems		L.S				
1.4.10	Air-conditioning systems		L.S				
1.4.11	Telephone/ Communication systems		L.S				
1.4.12	Lightning protection systems		L.S				
1.4.13	Anti-intrusion security alarm system (WTP and RWPS)		L.S				
1.4.14	CCTV security System (WTP and RWPS)		L.S				
1.4.15	General works (fencing, landscaping and street lighting, etc.)		L.S				
1.4.16	All other necessary items required to complete the works (to detail)		L.S				
1,5	**Mandatory Spare Parts**						
1.5.1	Raw Water Pumping Station		L.S				
1.5.2	Raw Water Pumping Mains	**Included in Firm Part**					
1.5.3	Water Treatment Plant		L.S				
1,6	**Any other items not described above, but deemed necessary for the satisfactory completion of the works.**						
	Tenderer to detail:						
	a)		L.S				
	b)		L.S				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS

The amount quoted in this price schedule includes delivery to site, Contractor's overheads and profits.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 3: Equipment, Materials, Tools and Mandatory Spare Parts Supplied Within Employer's Country (Kenya)

Item	Description	Unit	Price (Kshs) Exc. VAT
1	2	3	4
1.1	**Mechanical Works**		
1.1.1	**Raw Water Pumping Station**		
1.1.1.1	*Pumps*	L.S	
1.1.1.2	*Valves and Accessories*	L.S	
1.1.1.3	*Pipes and Fittings*	L.S	
1.1.1.4	*Any other necessary items required to complete the works (to detail)*	L.S	
1.1.2	**Raw Water Pumping Mains**	**Included in Firm Part**	
1.1.2.1	Pipes and Fittings		
1.1.2.2	Valves and Accessories		
1.1.2.3	*Any other necessary items required to complete the works (to detail)*		
1.1.3	**Water Treatment Plant**		
1.1.3.1	*Pre-treatment (if necessary)*	L.S	
1.1.3.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*	L.S	
1.1.3.3	*Coagulation, Flocculation, Clarification*	L.S	
1.1.3.4	*Filtration*	L.S	
1.1.3.5	*Calco-carbonic balance and final disinfection*	L.S	
1.1.3.6	*Treated Water Tank*	**Included in Firm Part**	
1.1.3.7	*Backwash Tank*	L.S	
1.1.3.8	*Sludge thickening and recycling system*	L.S	
1.1.3.9	*Chemical storage, preparation and dosing*	L.S	
1.1.3.10	*Conveying system*	L.S	
1.1.3.11	*All other necessary items required to complete the works (to detail)*	L.S	
1.1.3	**Ancillary Buildings within the WTP (Administration Building, Workshop, Laboratory, Gatehouse etc.)**	**Included in Firm Part**	
1.2	**Electrical Works**		
1.2.1	**Raw Water Pumping Station**		
1.2.1.1	*Main power supply (high voltage or Medium Voltage) and transformers*	**Included in Firm Part**	
1.2.1.2	*Electrical room, main low voltage board, LV boards*	L.S	
1.2.1.3	*LV equipment connection*	L.S	
1.2.2	**Water Treatment Plant**		
1.2.2.1	*Pre-treatment (if necessary)*	L.S	
1.2.2.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*	L.S	
1.2.2.3	*Coagulation, Flocculation, Clarification*	L.S	
1.2.2.4	*Filtration*	L.S	
1.2.2.5	*Calco-carbonic balance and final disinfection*	L.S	
1.2.2.6	*Treated Water Tank*	**Included in Firm Part**	
1.2.2.7	*Backwash Tank*	L.S	
1.2.2.8	*Sludge thickening and recycling system*	L.S	
1.2.2.9	*Chemical storage, preparation and dosing*	L.S	
1.2.2.10	*Main power supply (high voltage or Medium Voltage) and transformers*	**Included in Firm Part**	
1.2.2.11	*Electrical room, main low voltage board, LV boards*	L.S	
1.2.2.12	*All other necessary items required to complete the works (to detail)*	L.S	
1.2.3	**Ancillary Buildings within the WTP (Administration Building, Workshop, Laboratory & Gatehouse)**	**Included in Firm Part**	
1.3	**Control / Command Works**		
1.3.1	Instrumentation	L.S	
1.3.2	Automation System	L.S	
1.3.3	Data network	L.S	
1.3.4	SCADA system	**Included in Firm Part**	
1.3.5	All other necessary items required to complete the works (to detail)	L.S	

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 3: Equipment, Materials, Tools and Mandatory Spare Parts Supplied Within Employer's Country (Kenya)

Item	Description	Unit	Price (Kshs) Exc. VAT
1	2	3	4
1.4	**Auxiliary Works**		
1.4.1	Fire detection , alarm system and fire fighting system	L.S	
1.4.2	Water supply system within WTP and RWPS	L.S	
1.4.3	Potable water system / facilities for the base camp, police station and clinic (constructed under the Dam Contract)	**Included in Firm Part**	
1.4.4	Wastewater collection & treatment systems within WTP and RWPS	L.S	
1.4.5	Rain water Collection and Storage System	L.S	
1.4.6	Workshop Equipments	**Included in Firm Part**	
1.4.7	Laboratory Equipments	**Included in Firm Part**	
1.4.8	Handling equipments	**Included in Firm Part**	
1.4.9	Ventilation systems	L.S	
1.4.10	Air-conditioning systems	L.S	
1.4.11	Telephone/ Communication systems	L.S	
1.4.12	Lightning protection systems	L.S	
1.4.13	Anti-intrusion security alarm system (WTP and RWPS)	L.S	
1.4.14	CCTV security System (WTP and RWPS)	L.S	
1.4.15	General works (fencing, landscaping and street lighting, etc.)	L.S	
1.4.16	All other necessary items required to complete the works (to detail)	L.S	
1,5	**Mandatory Spare Parts**		
1.5.1	Raw Water Pumping Station	L.S	
1.5.2	Raw Water Pumping Mains	**Included in Firm Part**	
1.5.3	Water Treatment Plant	L.S	
1,6	**Any other items not described above, but deemed necessary for the satisfactory completion of the works.**		
	Tenderer to detail:		
	a)		
	b)		
	TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)		

[1] Specify currency in accordance with ITB 18.1 of the BDS

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 4: Construction Works and Installation Services

Item	Description	Unit	Specify Currency[1]		Price (excluding VAT)	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7
1. Civil Engineering and Building Works						
1.1	**Raw Water Pumping Station**	**Included in Firm Part**				
1.1.1	Pump house					
1.1.2	Kenya Power metering room					
1.1.3	Workshop and Store					
1.1.4	Administration building (includes reception, plant manager's office, operator's office etc)					
1.1.5	Gate house					
1.1.6	Internal access roads including parking & drainage works					
1.1.7	Landscaping works including earthworks,drainage works, irrigation network,plating of trees, lawns & flowers, fencing and gates					
1.1.8	Any other necessary items required to complete the works (to detail)					
1.2	**Raw Water Pumping Mains. Item covers all pipeline construction works which includes but not limited to the following: earthworks, pipelaying and jointing, installation of pipeline fittings & appurtenances, inspection chambers,anchors, road crossings, testing & Commissioning etc.**	**Included in Firm Part**				
1.3	**Water treatment plant**					
1.3.1	Head works (screening, Aeration, pre-oxidation, shock chlorination, pH Adjustment)	L.S				
1.3.2	Coagulation, Flocculation, Clarification	L.S				
1.3.3	Filters	L.S				
1.3.4	UV Building	L.S				
1.3.5	Treated Water Tank	**Included in Firm Part**				
1.3.6	Backwash water Tank	L.S				
1.3.7	Sludge thickening	L.S				
1.3.8	Sludge drying beds	L.S				
1.3.9	Chemical storage and chlorination building	**Included in Firm Part**				
1.3.10	Adminstration building,Including Laboratory	**Included in Firm Part**				
1.3.11	Workshop and store	**Included in Firm Part**				
1.3.12	Gate house	**Included in Firm Part**				
1.3.13	Internal access roads including parking & drainage works	L.S				
1.3.14	Landscaping works including earthworks,drainage works, irrigation network,plating of trees, lawns & flowers, fencing and gates	**Included in Firm Part**				
1.3.15	Any other necessary items required to complete the works (to detail)	L.S				
1,4	**Water supply facilities from the WTP to the base camp, police station and clinic. Includes a pumping system and elevated RC tank as detailed in the Employer's requirements**	**Included in Firm Part**				
2. Installation Services						
2,1	**Mechanical Works**					
2.1.1	**Raw Water Pumping Station**	**Included in Firm Part**				
2.1.1.1	*Pumps*					
2.1.1.2	*Valves and Accessories*					
2.1.1.3	*Pipes and Fittings*					
2.1.1.4	*Any other necessary items required to complete the works (to detail)*					
2.1.2	**Water Treatment Plant**					
2.1.2.1	*Pre-treatment (if necessary)*	L.S				
2.1.2.2	*Aeration, pre-oxidation, shock chlorination, pH Adjustment*	L.S				
2.1.2.3	*Coagulation, Flocculation, Clarification*	L.S				
2.1.2.4	*Filtration*	L.S				
2.1.2.5	*Calco-carbonic balance and final disinfection*	L.S				
2.1.2.6	*Treated Water Tank*	**Included in Firm Part**				
2.1.2.7	*Backwash Tank*	L.S				
2.1.2.8	*Sludge thickening and recycling system*	L.S				
2.1.2.9	*Chemical storage, preparation and dosing*	L.S				
2.1.2.10	*Conveying system*	L.S				
2.1.2.11	*All other necessary items required to complete the works (to detail)*	L.S				

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 4: Construction Works and Installation Services

Item	Description	Unit	Specify Currency[1]		Price (excluding VAT)	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency
1	2	3	4	5	6	7
2.1.3	**Ancillary Buildings within the WTP & RWPS - Includes Installation of Gantry Cranes in Workshops and other Mechanical Components in Ancillary Buildings**	**Included in Firm Part**				
2,2	**Electrical and Instrumentation Works**					
2.2.1	Raw Water Pumping Station	L.S				
2.2.2	Water Treatment Plant	L.S				
2.2.3	Ancillary Buildings within the WTP	**Included in Firm Part**				
2.2.4	Ancillary Buildings within the RWPS	**Included in Firm Part**				
2.2.5	All other necessary items required to complete the works (to detail)	L.S				
2,3	**SCADA Control / Command Works**					
2.3.1	Instrumentation	L.S				
2.3.2	Automation System	L.S				
2.3.3	Data network	L.S				
2.3.4	SCADA system	L.S				
2.3.5	All other necessary items required to complete the works (to detail)	L.S				
2,4	**Auxiliary Works**					
2.4.1	Fire detection , alarm system and fire fighting system	L.S				
2.4.2	Water supply system within WTP and RWPS	L.S				
2.4.3	Potable water system / facilities for the base camp, police station and clinic (constructed under the Dam Contract)	L.S				
2.4.4	Wastewater collection & treatment systems within WTP and RWPS	L.S				
2.4.5	Rain water Collection and Storage System	L.S				
2.4.6	Workshop Equipments	**Included in Firm Part**				
2.4.7	Handling equipments	**Included in Firm Part**				
2.4.8	Ventilation systems	L.S				
2.4.9	Air-conditioning systems	L.S				
2.4.10	Telephone/ Communication systems	**Included in Firm Part**				
2.4.11	Lightning protection systems	L.S				
2.4.12	Anti-intrusion security alarm system (WTP and RWPS)	L.S				
2.4.13	CCTV security System (WTP and RWPS)	L.S				
2.4.14	All other necessary items required to complete the works (to detail)	L.S				
1,7	**Any other items not described above, but deemed necessary for the satisfactory completion of the works.**					
	Tenderer to detail:					
	a)					
	b)					
	Sub-Total - 2					
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)						

[1] Specify currency in accordance with ITB 18.1 of the BDS.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 5A: Environmental, Social, Health and Safety (ESHS) Cost Schedule for Design and Build Part

Item N°	Description	ESHS Specifications Clause N°	Unit	Specify Currency[1]		Price (exc. VAT) Local Currency	Price (exc. VAT) Foreign Currency
				Local Currency	Foreign Currency		
1	2	3	4	5	6	7	8
ESHS 1	Resources allocated to ESHS management	Clause 4	L.S				
ESHS 2	Drafting and updating the ESHS documentation, reporting, inspections	Clauses 1, 2, 3, 5, 6, 7, 9	L.S				
ESHS 3	Implementation of the Health and Safety Plan:Meetings, health care centre, medical check-ups, emergencies and evacuations, safety protective equipment, hygiene	Clauses 1, 9, 21 to 25, 27 to 35, 37, 38	L.S				
ESHS 4	Accommodation, drinking water, meals and transportation of staff (The Bidder shall detail the financial conditions of the supply of accommodation, meals and transport to its staff):	Clauses 36, 40, 41					
	- Accommodation		L.S				
	- Meals		L.S				
	- Transport		L.S				
ESHS 5	Training and local recruitment management costs (Includes Social Inclusion - Subclause 39.12)	Clauses 8, 39	L.S				
ESHS 6	Protection of adjacent areas, biodiversity, prevention of erosion and wastewater management	Clauses 10, 11, 12, 17, 18	L.S				
ESHS 7	Traffic, noise and atmospheric emissions management, land take	Clauses 13, 14, 42, 43, 44	L.S				
ESHS 8	Waste and hazardous products management	Clauses 15, 26	L.S				
ESHS 9	Vegetation clearing and Site rehabilitation	Clauses 16, 19, 20	L.S				
Any other items not described above, but deemed necessary for ensuring full commpliance (contractual and statutory) with Project ESHS Requirements.							
Tenderer to detail:							
a)							
b)							
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

ESHS costs are deemed to cover operations on all Sites (as defined in Clause 1.3 of ESHS Specifications).

Interim Payment Certificates shall include the portion of each ESHS cost amounting to the percentage of the actual progress achieved in executing the ESHS measures in compliance with the ESHS Specifications and approved by the Employer's Representative.

The Bidder should refer to the ESHS Specifications - **Part 2, Section 7.6 of the Bidding Documents**

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 5B: Environmental, Social, Health and Safety (ESHS) Cost Schedule for Operation Service

Item N°	Description	ESHS Specifications Clause N°	Unit	Specify Currency[1]		Price (exc. VAT) Local Currency	Price (exc. VAT) Foreign Currency
				Local Currency	Foreign Currency		
1	2	3	4	5	6	7	8
ESHS 1	Resources allocated to ESHS management	Clause 4	L.S				
ESHS 2	Drafting and updating the ESHS documentation, reporting, inspections	Clauses 1, 2, 3, 5, 6, 7, 9	L.S				
ESHS 3	Implementation of the Health and Safety Plan:Meetings, health care centre, medical check-ups, emergencies and evacuations, safety protective equipment, hygiene	Clauses 1, 9, 21 to 25, 27 to 35, 37, 38	L.S				
ESHS 4	Accommodation, drinking water, meals and transportation of staff (The Bidder shall detail the financial conditions of the supply of accommodation, meals and transport to its staff):	Clauses 36, 40, 41					
	- Accommodation		L.S				
	- Meals		L.S				
	- Transport		L.S				
ESHS 5	Training and local recruitment management costs (Includes Social Inclusion - Subclause 39.12)	Clauses 8, 39	L.S				
ESHS 6	Protection of adjacent areas, biodiversity, prevention of erosion and wastewater management	Clauses 10, 11, 12, 17, 18	L.S				
ESHS 7	Waste and hazardous products management	Clauses 15, 26	L.S				
Any other items not described above, but deemed necessary for ensuring full commpliance (contractual and statutory) with Project ESHS Requirements.							
Tenderer to detail:							
a)							
b)							
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

ESHS costs are deemed to cover operations on all Sites (as defined in Clause 1.3 of ESHS Specifications).

Interim Payment Certificates shall include the portion of each ESHS cost amounting to the percentage of the actual progress achieved in executing the ESHS measures in compliance with the ESHS Specifications and approved by the Employer's Representative.

The Bidder should refer to the ESHS Specifications - **Part 2, Section 7.6 of the Bidding Documents**

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 6: Security Cost Schedule

Price N°	Category Title	Reference of Security Specifications	Unit	Specify Currency[1]		Price (exc. VAT) Local Currency	Price (exc. VAT) Foreign Currency
				Local Currency	Foreign Currency		
1	2	3	4			5	6
Security 1	Security organisation	Article 4.1	L.S				
Security 2	Travel within the country and to the relevant area	Article 4.2	L.S				
Security 3	Accommodation during assignments	Article 4.3	L.S				
Security 4	Accommodation and security on project sites and worksites	Article 4.4	L.S				
Security 5	Communication	Article 4.5	L.S				
Other	This price may remunerate all the other services described in Articles 1 to 3 of the Security Specifications.	Articles 1 to 3, 5 to 6	L.S				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

[1] Specify currency in accordance with ITB 18.1 of the BDS.

The prices include all activities and measures defined in the security specifications and correspond to additional costs compared to an environment without security risk.

A breakdown of security price items shall be included in the Bid.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 7: Dayworks

Schedule A - Labor

Item N°	Description	Unit	Provisional Quantity	Specify Currency[1]		Price - exc. VAT	
				Local Currency	Foreign Currency	Local Currency	Foreign Currency
Civil Engineering							
A.1	Working Gang	hr	200	**Included in Firm Part**			
A.2	Craftsman (joiner/steel fixer etc)	hr	400				
A.3	Semi-skilled workman (Plant operator/pipelayer etc.)	hr	1000				
A.4	Unskilled labourer	hr	1000				
Mechanical / Electrical							
A.5	Technical Staff / Engineer	hr	200				
A.6	Electrician	hr	100				
A.7	Unskilled labourer	hr	400				
Technical Assistance							
A.8	Short term expert	day	60				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

The rates inserted herein should include for all costs such as insurance, travelling time, overtime, accomondation, use and maintenance of small tools of trade, supervisions, overheads and profit. Ony time engaged upon work will be paid.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 7: Dayworks

Schedule B - Materials

Item N°	Description	Unit	Provisional Quantity	Specify Currency[1]		Price (excluding VAT)	
				Local Currency	Foreign Currency	Local Currency	Foreign Currency
B.1	Ordinary Portland Cement	Tonne	2	Included in Firm Part			
B.2	Mild steel (any size from 8mm to 25mm dia.)	Kg	400				
B.3	High tensile steel (8mm to 25mm dia.)	Kg	100				
B.4	Fine aggregate for concrete	Tonne	2				
B.5	Coarse aggregate for concrete	Tonne	2				
B.6	Use of shuttering timber	m^2	20				
B.7	Murram / Gravel	m^3	40				
B.8	Concrete Class 15/20	m^3	50				
B.9	Concrete Class 20/25	m^3	50				
B.10	Concrete Class 30/37	m^3	50				
B.11	150mm thick stone/concrete Blocks	Nr.	400				
B.12	225mm thick stone/concrete Blocks	Nr.	400				
B.13	Formwork Class F3 (fair face)	m^2	150				
B.14	Formwork Class F1 (rough)	m^2	150				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

All materials are to comply with the specifications. The rates inserted herein are to include for delivery to site, storage, handling, overheads and profits.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 7: Dayworks

Schedule C - Contractor's Equipment

Item N°	Description	Unit	Provisional Quantity	Specify Currency[1]		Price - exc. VAT	
				Local Currency	Foreign Currency	Local Currency	Foreign Currency
C.1	Air Compressor up to 14m3/min including hoses free air delivery 7kg/cm2	hr	80	Included in Firm Part			
C.2	Concrete mixer, closed drum with hopper wet capacity up to 200 litres	hr	40				
C.3	Vibrator poker air (excluding compressor)	hr	60				
C.4	Crane, crawler mounted, maximum safe working load:						
C.4a	up to 36 tonnes	hr	40				
C.4b	Up to 75 tonnes	hr	20				
C.5	Concrete skip for crane, struck capacity:						
C.5a	Upto 0.6m^3	hr	20				
C.5b	Up to 1.2m^3	hr	20				
C.6	Dumper two wheel drive, makers rated payload:						
C.6a	Up to 1500Kg	hr	100				
C.6b	Up to 5,000Kg	hr	100				
C.7	Rear dump truck, makers rated payload up to 17 tonnes	hr	20				
C.8	Articluated dump truck, makers rated payload up to 18.5 tonnes	hr	20				
C.9	Excavator mounted percussion breaker, unit weight less cradle:						
C.9a	Up to 100Kg	hr	20				
C.9b	Up to 1000Kg	hr	20				
C.10	Excavator, hydraullic full circle slew crawler or wheel mounted with single equipment, makers raed nominal weight:						
C.10a	Up to 2 tonnes	hr	20				
C.10b	Up to 14 tonnes	hr	20				
C.10c	Up to 21 tonnes	hr	60				
C.10d	Up to 30 tonnes	hr	20				
C.10e	Up to 55 tonnes	hr	20				
C.11	Excavator, hydraullic, offset or centre post, half circle slew, wheeled dual purpose back hoe/loader,makers rated loader bucket capacity up to 1.1m^3	hr	100				
C.12	Generator set, nomial rating:						
C.12a	Up to 10kVA	hr	30				
C.12b	Up to 25kVA	hr	30				
C.13	Transformer, (air cooled nominal rating):	hr	30				
C.13a	Up to 10kVA	hr	30				
C.13b	Up to 25kVA	hr	30				
C.14	Lorry maximum gross vehicle weight:						
C.14a	Up to 12 tonnes	hr	20				
C.14b	Up to 17 tonnes	hr	20				
C.14c	Up to 30 tonnes	hr	20				
C.15	Lorry, tipper, maximum gross vehicle weight:						
C.15a	Up to 12 tonnes	hr	40				
C.15b	Up to 17 tonnes	hr	20				
C.15c	Up to 30 tonnes	hr	20				
C.16	Van or pick-up, carrying capacity:						
C.16a	Up to 1 tonne	hr	40				
C.16b	Up to 2 tonne	hr	40				
C.17	Vibrating rammer, nominal weight up to 60Kg	hr	20				
C.18	Vibrating plate compactor, nominal weight :						
C.18a	Up to 80 Kg	hr	40				
C.18b	Up to 150 Kg	hr	40				
C.19	Pneumatic tools: breaker including steel	hr	60				
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)							

Notes:

[1] Specify currency in accordance with ITB 18.1 of the BDS.

The rates inserted herein should include for all operational and maintenance costs, fuel, oil, grease, operators, turnboys, supervision, overheads and profits. Only the time actually employed on works will be paid for and the rates should include for idle, travelling and overtime.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 8: Operation Service [1] [2] - Shall correspond to the final capacity of the plant (firm + conditional parts)

Item No	Description	Unit	Qty	Unit price exc. VAT in foreign Currency [1].....		Unit price exc. VAT in local Currency KES		Total price exc. VAT in foreign Currency [1].....		Total price exc. VAT in local Currency [1].....	
				Civil works	Equipment	Civil works	Equipment	Civil works	Equipment	Civil works	Equipment
1	2	3	4	5	6	7	8	9=5*4	10=6*4	11=7*4	12=8*4
1.1	**Fixed costs**										
1.1.1	Operation & Maintenance staff										
1.1.1.1	*Plant Manager*	man-month	24								
1.1.1.2	*Water Treatment Process Engineer*	man-month	24								
1.1.1.3	*Mechanical Engineer*	man-month	24								
1.1.1.4	*Electrical Engineer*	man-month	24								
1.1.1.5	*Lab technician*	man-month	24								
1.1.1.6	Any other Staff not described above, but deemed necessary to operate and maintain the works. Tenderer to detail:										
1.1.2	Maintenance & Repair										
1.1.2.1	*Civil works*	month	24								
1.1.2.2	*Equipment*	month	24								
1.1.3	Cost for electrical power provision	month	24								
1.1.4	Cost for gas provision	month	24								
1.1.5	Cost for fuel provision	month	24								
1.1.6	Cost for chemical provision	month	24								
1.1.7	Water analyses, laboratory	month	24								
1.1.8	Utilities and other costs	month	24								
1.1.9	Any other O&M item not described above, but deemed necessary to operate and maintain the works. Tenderer to detail:										
1.2	**Variables costs (for 24 months)**										
1.2.1	Chemical consumption										
1.2.1.1	*Potassium permanganate*	tonnes									
1.2.1.2	*Aluminium slufate*	tonnes									
1.2.1.3	*Polyelectrolyte*	tonnes									
1.2.1.4	*Acid*	tonnes									
1.2.1.5	*NaOH*	tonnes									
1.2.1.6	*NaOCl*	tonnes									
1.2.1.7	*Other chemicals not described above, but deemed necessary to operate and maintain the works. Tenderer to detail:*										
1.2.2	Other consumables										
1.2.2.1	*Lubricants*	month	24								
1.2.2.2	*Laboratory reagents*	month	24								
1.2.2.3	*Laboratory Glasswere*	month	24								
1.2.2.4	*Activated carbon*	month	24								
1.2.2.5	*Other consumables*	month	24								
1.2.3	Electricity power consumption										
1.2.3.1	Electricity power consumption for the RWPS [3]	kWh									
1.2.3.2	Electricity power consumption for the WTP	kWh									
1.2.4	Gas power consumption	Nm3									
1.2.5	Fuel power consumption	Liters									
1.2.7	Utilities and other costs	month	24								
1.2.8	Any other O&M item not described above, but deemed necessary to operate and maintain the works. Tenderer to detail:										
Sub-Total											
TOTAL CARRIED FORWARD TO THE GRAND SUMMARY (SCHEDULE No. 9)											

Notes:

[1] Financial evaluation will be done based on theoretical raw water quality and water level at Mwache dam as mentioned in the Employer's requirements and answers to clarifications. Bidders shall provide details of calculation for variable costs consumption.

[2] During the O&M period, Contractor shall be paid based on the actual chemical and electrical consumption

[3] Electrical consumption at the RWPS shall be calculated based on the following assumptions:

- For 20% of the time: operation level of the dam of 50.0 masl

- For 50% of the time: operation Level of the dam of 70.0 masl

- For 30% of the time: operational level of the dam of 80.0 masl

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 9: Grand Summary

Schedule No.	Title	Amounts - exc. VAT	
		Local Currency KES	Foreign Currency [1].....
1	Preliminary Items		
2	Equipment, Materials, Tools and Mandatory Spare Parts Supplied From Abroad		
3	Equipment, Materials, Tools and mandatory Spare Parts supplied from within the Employer's country (Kenya)		
4	Construction Works and Installation Services		
5A	Environmental, Social, Health and Safety (ESHS) for Design and Build part		
6	Security Cost		
7	Dayworks		
7A	Labor		
7B	Materials		
7C	Contractor's Equipment		
Sum of (1) to (7)	***Sub-total 1***		
	10% Contingencies (Provisional) (10% of Sub-total 1 above)		
	Sub-total 2 (for the Design-Build of the Works, to be also included in the Bid Submission Form - Bid Price): Sub-total 1 + Contingencies		
5B	Environmental, Social, Health and Safety (ESHS) for Operation part		
8	Operation Service		
	Sub-total 3 for the Operation Service, to be also included in the Bid Submission Form - Bid Price (Sub-total 3 = 5B+8)		
	TOTAL (Sub-total 2 + Sub-total 3) to be also included in the Bid Submission Form - Bid Price		
Value Added Tax (VAT) - 16%, to be also included in the Bid Submission Form - Bid Price			
GRAND TOTAL (INCL. OF ALL TAXES)			

[1] Specify currency in accordance with ITB 18.1 of the BDS.

IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA

Design, Build and Operate of MWACHE Water Treatment Plant

Price Schedules - CONDITIONAL PART

Schedule No. 10: Provisional Sums

No.	Item Description	Unit	Amount (Kshs.)
10,1	Provisional Sum for the Employer's share of the **Dispute Board**	P.S	**Included in Firm Part**
10,2	Provisional Sum for procurement of **Vehicles** for the Engineer / Employer	P.S	**Included in Firm Part**
10,3	Provisional Sum for **Operation and Maintenance of Vehicles** for the Engineer / Employer including cost for fueling, insurance etc.	P.S	19 500 000,00
10,4	Provisional Sum for **Accommodation, Office Consumables / Expenses and Telephone** for the Supervision Staff	P.S	9 000 000,00
10,5	Provisional Sum for **Inspection and Witness Testing** of Pipes, Fittings, Valves and Other Equipment at manufacturer's premises	P.S	**Included in Firm Part**
10,6	Provisional Sum to cover costs of the **Employer's Counterpart Staff** assigned to the Project including transport, communication, allowances,	P.S	6 000 000,00
10,7	Provisional Sum to cover costs of **Interns and Attachees** assigned to the Project.	P.S	**Included in Firm Part**
10,8	Provisional Sum to be used **as directed by the Employer / Engineer**	P.S	**Included in Firm Part**
10,9	Provisional Sum to cover costs of **On-site and Off-site Training of Employer's Staff**	P.S	**Included in Firm Part**
10,10	Provisional Sum to cover costs for procurement of **specialised tools** for Operation of the Treatment Plant and Raw Water Pumping Station	P.S	**Included in Firm Part**
10,10	Provisional Sum to cover costs for the **electric connection line** from the HV/MV electric Sub-station (within Dam Area) to the WTP and RWPS.	P.S	**Included in Firm Part**
	Sub-Total		**34 500 000,00**
10,11	Tenderer's **Overheads and Profits** for Provisonal costs above	**10%**	3 450 000,00
TOTAL CARRIED FORWARD TO SCHEDULE No. 1, ITEM 1.18			**37 950 000,00**

Annex D - Revised Part 2, section 7.2, 3.15.3

3.15.3. Potable water system (other facilities within the Dam area)

The scope of the potable water system for the base camp, police station and clinic is as follows:

- Elevated 100m3 Reinforced Concrete Tank located within 3kms of the WTP. Tank to be built at a height of 15m (at the highest elevation near the police station).
- Pumping station within WTP (Q=12.0 m3/hr, static lift=approx. 35m, to be determined by the Contractor). Estimated pumping duration per day is 8-10 hours.
- Treated water pumping mains – approx. 3.0 Km (exact length and diameters to be determined by Contractor) from WTP to elevated tank and from elevated tank to the base camp, police station, clinic and school.
- Individual water connections (including water meters) to the base camp, police station, clinic and school.
- Ancillary Works which includes interconnection to existing tanks (if any) at the base camp, police station, clinic and school (plumbing and connections within the premises are not included in the scope of works).

Annex E - Mwache WTP – Topo

(The map file in DWG format has been uploaded to the portal.)

Annex F - Contractual boundaries coordinates

RAW WATER PUMPING STATION COORDINATES

Station Range: Start: 0+000.00, End: 0+450.07

PI Station	Northing	Easting	Distance	Direction
0+000.00	9,558,814.3609m	558,099.0941m		
			54.193m	S0° 30' 39"E
0+054.19	9,558,760.1702m	558,099.5772m		
			12.705m	S38° 36' 45"W
0+066.90	9,558,750.2430m	558,091.6489m		
			22.894m	S77° 35' 20"W
0+089.79	9,558,745.3224m	558,069.2896m		
			14.933m	N61° 39' 31"W
0+104.72	9,558,752.4115m	558,056.1465m		
			44.614m	N70° 17' 33"W
0+149.34	9,558,767.4560m	558,014.1459m		
			53.165m	N43° 43' 48"W
0+202.50	9,558,805.8733m	557,977.3949m		
			25.876m	N57° 32' 34"W
0+228.38	9,558,819.7601m	557,955.5611m		
			31.555m	N47° 20' 28"W
0+259.93	9,558,841.1427m	557,932.3556m		
			24.000m	N50° 42' 24"E
0+283.93	9,558,856.3418m	557,950.9296m		
			7.223m	N73° 42' 06"E
0+291.16	9,558,858.3688m	557,957.8622m		
			30.081m	S79° 34' 51"E
0+321.24	9,558,852.9287m	557,987.4474m		
			29.369m	S81° 19' 54"E
0+350.61	9,558,848.5023m	558,016.4808m		
			8.000m	N15° 11' 08"E
0+358.61	9,558,856.2230m	558,018.5764m		
			15.004m	S78° 45' 28"E
0+373.61	9,558,853.2978m	558,033.2924m		
			76.459m	S59° 23' 09"E
0+450.07	9,558,814.3609m	558,099.0941m		

WATER TREATMENT PLANT COORDINATES

Station Range: Start: 0+000.00, End: 1+842.44

PI Station	Northing	Easting	Distance	Direction

0+000.00	9,559,542.0278m	558,418.9833m		
			234.356m	N35° 59' 06"E
0+234.36	9,559,731.6620m	558,556.6846m		
			141.519m	N41° 30' 51"E
0+375.88	9,559,837.6309m	558,650.4843m		
			188.954m	N47° 34' 40"E
0+564.83	9,559,965.0972m	558,789.9690m		
			112.517m	N47° 07' 31"E
0+677.35	9,560,041.6534m	558,872.4262m		
			28.775m	N38° 36' 21"E
0+706.12	9,560,064.1400m	558,890.3807m		
			58.533m	N56° 50' 27"W
0+764.65	9,560,096.1556m	558,841.3796m		
			250.702m	N56° 21' 23"W
1+015.36	9,560,235.0505m	558,632.6698m		
			354.846m	S37° 53' 30"W
1+370.20	9,559,955.0151m	558,414.7341m		
			372.573m	S12° 44' 42"W
1+742.78	9,559,591.6221m	558,332.5393m		
			99.660m	S60° 09' 23"E
1+842.44	9,559,542.0278m	558,418.9833m		

NOTE:

Local Datum	Arc 1960
Ellipsoid	Clarke 1880
Projection	UTM

RAW WATER PUMPING STATION BOUNDARY COORDINATES

Northing	Easting
9,558,814.3609m	558,099.0941m
9,558,760.1702m	558,099.5772m
9,558,750.2430m	558,091.6489m
9,558,745.3224m	558,069.2896m
9,558,752.4115m	558,056.1465m
9,558,767.4560m	558,014.1459m
9,558,805.8733m	557,977.3949m
9,558,819.7601m	557,955.5611m
9,558,841.1427m	557,932.3556m
9,558,856.3418m	557,950.9296m
9,558,858.3688m	557,957.8622m
9,558,852.9287m	557,987.4474m
9,558,848.5023m	558,016.4808m
9,558,856.2230m	558,018.5764m
9,558,853.2978m	558,033.2924m
9,558,814.3609m	558,099.0941m

WATER TREATMENT PLANT BOUNDARY COORDINATES

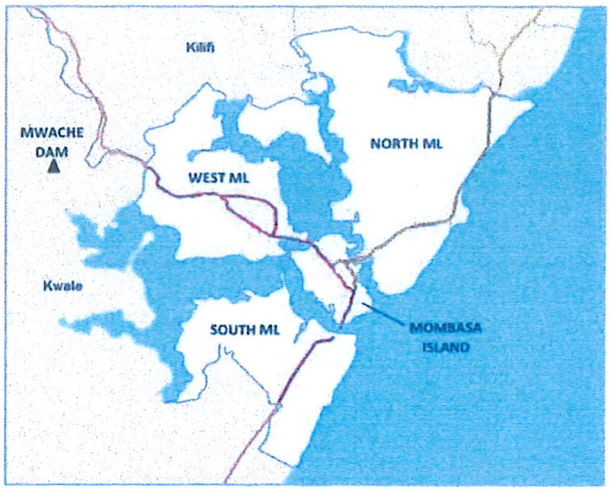
Northing	Easting
9,559,542.0278m	558,418.9833m
9,559,731.6620m	558,556.6846m
9,559,837.6309m	558,650.4843m
9,559,965.0972m	558,789.9690m
9,560,041.6534m	558,872.4262m
9,560,064.1400m	558,890.3807m
9,560,096.1556m	558,841.3796m
9,560,235.0505m	558,632.6698m
9,559,955.0151m	558,414.7341m
9,559,591.6221m	558,332.5393m
9,559,542.0278m	558,418.9833m

NOTE:

Local Datum	Arc 1960
Ellipsoid	Clarke 1880
Projection	UTM

Annex G - ESIA Report

Republic of Kenya
Coast Water Works Development Agency



IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA: MWACHE CKE 1103

Preliminary Design, Tender Documents, Safeguards (ESIA and RAP) Reports and Construction Supervision of Mwache Water Treatment Plant

Contract No : CWSB/AFD/MWCE/C/4/2017

ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) PROJECT REPORT (ESIA)

ADDENDUM (1) TO THE MWACHE DAM ESIA LICENCE NO NEMA/EIA/PSL/5204 TO INCLUDE WATER TREATMENT PLANT (WTP) AND BASE CAMP

APRIL 2022

ARTELIA

MIBP
CONSULTING ENGINEERS

APRIL 2022 / 877 3335

Preliminary Design, Tender Documents, Safeguards (ESIA and RAP) Reports and Construction Supervision of Mwache Water Treatment Plant

REPUBLIC OF KENYA - COAST WATER WORKS DEVELOPMENT AGENCY

VERSION	DESCRIPTION	PREPARED BY	APPROVED BY	DATE
01	Environment and Social Impact Assessment (ESIA) Project Report – Addendum (1) to Mwache Dam ESIA	Godwin L Sakwa, Ranjit S. Rupra	Bernard Danthon	28.06.2022

ARTELIA - Water, Climate and Solid Waste
6 rue de Lorraine – 38130 Echirolles – FRANCE – TEL : +33 (0)4 76 33 40 00

MANGAT, I.B.PATEL LIMITED – Consulting Engineers
P.O. Box 48674, 00100 - GPO - Nairobi, KENYA – TEL : +254 20 2710500

FORM 9 (r. 25)

Application reference No .

Licence No .

FOR OFFICIAL USE

THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT APPLICATION FOR VARIATION OF ENVIRONMENTAL IMPACT ASSESSMENT LICENCE

PART A: PREVIOUS APPLICATIONS

No previous application for variation of an environmental impact assessment licence. *
The environmental impact assessment licence was previously amended.*

PART B: DETAILS OF APPLICANT

B I. Name (Individual or Firm) MINISTRY OF WATER & SANITATION & IRRIGATION ON BEHALF OF KENYA WATER SECURITY & CLIMATE RESILIENCE PROJECT (KWSCRP)

B2. Business Registration No.....

B3. Address: P.O. BOX 49720 NAIROBI

B4. Name of contact person: ENG SIMON MWANGI

B5. Position of contact person PROJECT MANAGER

B6. Address of contact person P.O BOX 49720 NAIROBI

Telephone No: +254 20 2716103 Fax No.....

E-mail: info@kwscrp.org

PART C: DETAILS OF CURRENT ENVIRONMENTAL IMPACT ASSESSEMENT LICENCE

C I. Name of the current Environmental Impact Assessment licence holder: MINISTY OF WATER SANITATION AND IRRIGATION

C2. Application No. of the current Environmental Impact Assessment Licence NEMA/EIA/SR/760

C3. Date of issue of the current Environmental Impact Assessment Licence 18TH September 2018

PART D: PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL IMPACT ASSESSMENT LICENCE

D1: Conditions in the current Environmental Impact Assessment licence

CONDITION 1.1 AND 1.2

D2: Proposed variation(s)

(1) VARY SCOPE TO INCLUDE MWACHE WATER TREATMENT PLANT (WTP) AND BASE CAMP

(2) VARY LICENCE TO RENEW VALIDITY

D3: Reason for variation(s)

(1) PREVIOUS LICENCE DID NOT INCLUDE WATER TREATMENT COMPONENT AND BASE CAMP

(2) CURRENT LICENCE IS EXPIRED.

D4: Describe the environmental changes arising from the proposed variations

DETAILED IN ATTACHED ADDENDUM

D5: Describe how the environment and the community might be affected by the proposed variations

DETAILED IN ATTACHED ADDENDUM

D6: Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected

DETAILED IN ATTACHED ADDENDUM

D7: Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process

DETAILED IN ATTACHED ADDENDUM

PART E: DECLARATION BY APPLICANT

I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental impact assessment licence may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.

.....

PROJECT MANAGER
KENYA WATER SECURITY AND
CLIMATE RESILIANCE
P. O. Box 49720 - 00100,
NAIROBI

Name Position Signature
on behalf of .
Company name and seal Date

PART F: OFFICIAL USE

Approved/ Not approved.....

.....

Comments.....

.....

.....

Officer..... Signature..... Date.....

Important Notes
Please submit-
(a) 3 copies of this completed Form; and
(b) The prescribed fee, to:
Director-General,
The National Environment Management Authority,
Kapiti Road, South C,
P.O. Box 47146,
NAIROBI.
Tel254-02-609013/27/79 or 608999 Fax 254-02-608997
E-mail.....

CERTIFICATION

Compiled By:

Signed ..... Date 28-06-2022

Godwin Lidahuli Sakwa
NEMA Registered Lead Expert NEMA Reg No. 2492

Checked By:

Authorized Representative:

Signed ..... Date 29/6/2022

Eng. Ranjit S. Rupra

ARTELIA - Water, Climate and Solid Waste
6 rue de Lorraine – 38130 Echirolles – FRANCE – TEL : +33 (0)4 76 33 40 00

MANGAT, I.B.PATEL LIMITED – Consulting Engineers
P.O. Box 48674, 00100 - GPO - Nairobi, KENYA – TEL : +254 20 2710500

PROJECT MANAGER
KENYA WATER SECURITY AND
CLIMATE RESILIENCE
P.O. Box 49720 - 00100,
NAIROBI

Proponent

Signed ..... Date 14.07.22

Project Manager
Kenya Water Security Climate Resilience Project (KWSCRP)
Po BoX 49720-00100
Nairobi

Signed ..... Date 21/8/2022

Chief Executive Officer (CEO)
Coast Water Works Development Agency
Mikindani Street, Off Nkurumah Road, P.O. Box 90417-80100, Mombasa, Kenya. Tel: +254 041 231 5230

COAST WATER WORKS
DEVELOPMENT AGENCY
P. O. Box 90417-80100
MOMBASA
TEL: +254(41)2315230

TABLE OF CONTENTS

ABREVIATIONS AND ACRONYMS ..... **D**

EXECUTIVE SUMMARY **1**

E.3 LEGAL AND POLICY REGULATORY INSTRUMENTS 3
E.4 ASSESSMENT PROJECT CONSTRUCTION IMPACTS RELATED TO WTP COMPONENTS 5
E.4 STATUTORY REQUIREMENTS PRE-COMMISSIONING OF THE WTP 9
E.5: ESMP DURING OPERATION OF THE WTP 10
E.7 CONCLUSION 11
E.8 PROVISIONS 12

MAIN REPORT1

1. INTRODUCTION **0**
1.1. GENERAL 0
1.2. ENVIRONMENT LICENSE VARIATION 0

2. PROJECT DESCRIPTION **1**
2.1 WATER DEMAND AND CAPACITY OF THE WTP 1
2.1.1WATER DEMAND 1
2.1.2CAPACITY OF PROJECT COMPONENTS 1
2.2 RAW WATER PUMPING STATION (RWPS) 2
2.3 RAW WATER PUMPING MAIN (RWPM) 4
2.4 WATER TREATMENT PLANT 4
2.4.1DESIGN DATA 4
2.4.2WATER TREATMENT LINE 6
2.4.3SLUDGE LINE 7
2.4.4WATER DISCHARGE 7
2.5 COST ESTIMATES 7
2.5.1CAPITAL EXPENDITURE (CAPEX) 7
2.5.2OPERATIONAL EXPENDITURE (OPEX) 8
2.6 SUMMARY OF SCOPE OF WORK – EMPLOYER'S REQUIREMENTS 8

3. BASELINE INFORMATION FOR WTP SITE **10**
3.1 LOCATION AND LAND OWNERSHIP 10
3.2 CLIMATIC CONDITIONS 12
3.3 DRAINAGE AND HYDROLOGY 12
3.4 GEOLOGY AND SOILS 13
3.5 TOPOGRAPHY 14
3.6 BIODIVERSITY 14
3.7 RECEPTORS WITHIN PROJECT AREA 15

4. POLICY AND LEGAL FRAMEWORK **16**
4.1 POLICY AND LEGAL PROVISIONS 16
4.1.1KENYA CONSTITUTION 2010 16
4.1.2ENVIRONMENT MANAGEMENT AND COORDINATION ACT 1999 CAP 386 16
4.1.3WATER ACT 2016 AND APPLICABLE WATER RULES OF 2007 18
4.1.4.... OCCUPATIONAL HEALTH AND SAFETY ACT (OSHA) 2007AND PUBLIC HEALTH ACT 2017 19

4.1.5REGULATIONS AND RULES 21
4.1.6NATIONAL WATER QUALITY STANDARDS 22
4.1 ENVIRONMENT AND SOCIAL STANDARDS (ESS) OF THE WORLD BANK 23
4.2 ENVIRONMENTAL AND SOCIAL RISK MANAGEMENT POLICY FOR AFD-FUNDED OPERATIONS 25

5. ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS POSED BY THE WATER TREATMENT PLANT (WTP) 26

5.1 INTRODUCTION 26
5.2 CONSTRUCTION PHASE POSITIVE IMPACTS 26
5.3 OPERATION PHASE POSITIVE IMPACTS 26
5.4 WATER TREATMENT PLANT CONSTRUCTION PHASE NEGATIVE IMPACTS 27
5.4.1IMPACT ON PHYSICAL RESOURCES AND RECEPTORS 27
5.4.2IMPACT ON BIOLOGICAL RESOURCES AND RECEPTORS 32
5.4.3IMPACT ON SOCIAL RESOURCES AND RECEPTORS 32
5.5 OPERATION PHASE NEGATIVE IMPACTS 36
5.5.1PERMITS AND LICENSES REQUIRED FOR THE WTP 36
5.5.2MANAGEMENT OF BACKWASH WATER FROM THE WTP 36
5.5.3EROSION CONTROL AT WASHOUTS 36
5.5.4SLUDGE MANAGEMENT 37
5.5.5MANAGEMENT OF REAGENTS AT THE WTP 37
5.5.6SEWERAGE MANAGEMENT FROM WTP AND BASE CAMP 38
5.5.7FENCING OF THE WATER TREATMENT PLANT AND BASE CAMP 38
5.5.8AESTHETIC AND HYGIENE WITHIN THE WTP AND BASE CAMP 38
5.5.9AFFORESTATION PROGRAM WITHIN THE WTP AND BASE CAMP 38

6. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMP) 39

6.1 PURPOSE AND OBJECTIVES OF ESMP 39
6.2 ESMP DURING CONSTRUCTION OF THE WTP AND BASE CAMP 39
6.3 STATUTORY REQUIREMENTS PRE-COMMISSIONING OF THE WTP 50
6.4 ESMP DURING OPERATION OF THE WTP 52

7. FINDINGS AND PROVISIONS 54

7.1 FINDINGS 54
7.2 ADDENDUM PROVISIONS 55

APPENDIX 1 57

MWACHE DAM ENVIRONMENT LICENSE NEMA/EIA/PSL/5204 57

APPENDIX 2 63

APPLICATION FOR VARIATION OF MWACHE DAM ENVIRONMENT LICENSE NEMA/EIA/PSL/5204 63

APPENDIX 3 65

DESCRIPTION OF BASE CAMP FACILITIES AND OTHER BULDINGS 65

APPENDIX 4 66

LEAD EXPERT'S YEAR 2022 66

TABLES

Table E.1: Capacity of Project component 3
Table E.2: Applicable Policy, Standards and Legal Statutes 4
Table E.3: Environment and Social Impacts and Mitigation at Project Construction Phase 5
Table E.4: Statutory Requirements Prior to Pre-commissioning of the Project Components..... 9
Table E.5: Environment and Social Impacts and Mitigation at Project Operation Phase 10
Table 2.1: Adopted Water Demand and the Proposed Re-Allocation of Water Supply for Mombasa City .. 1
Table 2.2: Capacity of Project Component..... 1
Table 2.3: Final Proposed Water Quality Design Input Values 4
Table 2.4: Selected Water Treatment Process Units 6
Table 2.5: CAPEX Summary..... 7
Table 2.6: OPEX Summary 8
Table 3.1: Water Quality Parameters 12
Table 3.2: Environmental Receptors 15
Table 4.1: EMCA Regulations Applicable to the Mwache Water Treatment Plant (WTP) 17
Table 4.2: EMCA Regulations Applicable to the Mwache Water Treatment Plant (WTP) 18
Table 4.3: Provisions of OSHA Act 2007 and Public Health Act 2017 (Applicable At Operation Stage)..... 19
Table 4.4: Regulations and Polices 21
Table 4.5: National Drinking Water Quality Standards..... 22
Table 4.6: Microbiological Limits for Drinking Water 23
Table 4.7: World Bank Environment and Social Standards 23
Table 5.1: WHO Ambient Air Quality Guidelines..... 29
Table 5.2: Ambient Air Quality Tolerance Limits..... 29
Table 5.3: World Bank Group Noise Level Guidelines..... 31
Table 5.4: NEMA Noise Level Guidelines 31
Table 5.5.1.1: Permits and Licenses Required..... 36
Table 5.6: Management of Reagents on Site 37
Table 6.1: Environment and Social Management Monitoring Plan during Construction of WTP 40
Table 6.2: OSHA 2007 Statutory Provisions Pre-Commissioning of the WTP. 51
Table 6.3: Environment and Social Management Monitoring Plan during Operation of the WTP 53

Figures

Figure 1-1: A Location Plan of the Proposed Components of the Mwache Dam Water Supply System..... 0
Figure 1-2: Components of the Mwache Dam Project and respective Financing Agencies 0
Figure 2-1: Location of Proposed Site for Raw Water Pumping Station..... 2
Figure 2-2: Mwache Dam Raw Water Abstraction and Pumping System 3
Figure 2-3: Water Treatment Line..... 6
Figure 2-4: Sludge treatment line 7
Figure 3-1: Map of Kinango Sub County (Project is sited in Kasemeni Ward) 10
Figure 3-2: Layout Plan of proposed Raw Water Pumping Main Alignment Options and WTP Location ... 11

ABREVIATIONS AND ACRONYMS

AFD	Agence Francaise de Développement
ASALs	Arid and Semi-Arid Lands
AoI	Area of Influence
BoD	Biological Oxygen Demand
CWWDA	Coast Water Works Development Agency
C-ESMP -	Construction – Environment and Social management Plan
CoC	Code of Conduct
CHSMP	Construction Health and Safety Management Plan
DMP	Dust Management Plan
ESAAP	Environment and Social Audit Action Plan
EHS	Environment Health and Safety
EA	Environmental Assessment
EIA	Environment Impact Assessment
EMCA	Environment Management & Coordination Act
ESMP	Environment and Social Management Plan
IFC	International Finance Cooperation
ILO	International Labour Organization
KFS	Kenya Forest Service
H&S	Health and Safety
NEMA	National Environmental Management Authority
NOx	Nitrogen Oxides
Sox	Sulphur Oxides
SGR	Standard Gauge Railway
SML	South Mainland
OSHA	Occupational Health & Safety Act
PDR	Preliminary Design Report
Pm	Particulate Matter
PPE	Personal Protective Equipment
MOWASSCO	Mombasa Water and Sanitation Services Company
NMP	North Mainland
TMP	Traffic Management Plan
VOC	Volatile Organic Compounds
WML	West Mainland
WTP	Water Treatment Plant
WBG	World Bank Group
WRA	Water Resources Authority
WMP	Waste Management Plan

EXECUTIVE SUMMARY

E.1 BACKGROUND & OBJECTIVES

The Mwache Dam Water Supply Project entails:

- A 84m RCC dam on the Mwache river, crest length 526.1m
- A Raw Water Pumping Station, Raw Water Pumping Main, Water Treatment Plant (WTP) with a clear water tank and associated facilities within the vicinity of the Dam with a proposed production capacity of 186,000 m^3/d
- Four Terminal Reservoirs; one for each of the target supply areas (NML, WML, SML and Island); namely
  - Nguu Tatu terminal reservoir, proposed within the existing Nguu Tatu Reservoir Site, serving the North Mainland
  - Changamwe Reservoir, proposed at the existing Changamwe Reservoir Site, serving Mombasa Island
  - Dongo Kundu Reservoir, proposed to be constructed within Dongo Kundu area in Mtongwe, serving the South Mainland
  - West Mainland reservoir, proposed to be located at a100 masl site within the West Mainland, to serve the West Mainland area
- A system of Treated Water Transmission Pipelines, transmitting treated water from the Mwache WTP to the proposed Reservoirs

The MWS&I has secured funds from the Word Bank (WB) and from the Agence Francaise de Développement (AFD), for financing implementation of the various component of the Mwache Dam Water Supply Project. The WB component is scheduled to finance the Dam and possibly the Nguu Tatu, Changamwe and WML reservoirs and their corresponding transmission pipelines. The AFD component is scheduled to finance the WTP & associated facilities, the Dongo Kundu reservoir, the trunk transmission pipeline (common to all the reservoirs) and the pipeline to Dongo Kundu.

The present design and supervision contract consists of the following components: raw water pumping station, raw water pumping main, the water treatment plant and the clear water tank.

E.2 ENVIRONMENT LICENSE VARIATION

The Ministry of Water and Sanitation and Irrigation through the Kenya Water Security and Climate Resilience Project (KWSCRP) (2016) commissioned an Environmental and Social Impact Assessment (ESIA). The assessment main focus was on environment and social impacts associated with the Dam and the Lower Check dam. Further an **Environment License NEMA/EIA/PSL/5204 on 18th September 2018** with a validly of 24 months from date of issuance was issued by the National Environment Management Authority (NEMA).

This Report presents an Addendum to the ESIA prepared for Mwache Dam and Lower Check Dam. The addendum seeks to include the proposed Water Treatment Plant (WTP) and associated works including Raw Water Pumping Station and the Raw Water Pumping main.

The Environmental Impact Assessment Regulation as outlined under the Gazette Notice No. 56 of 2003 provides for variation of Environmental Impact Assessment Licenses to include additional scope of works or to renew expired Licenses. Clause 25. (1) provides that where a proponent wishes to vary the terms and conditions on which an Environmental Impact Assessment License has been issued, the holder of the License has to apply for a Variation in Form 9 set out in the First Schedule of the EIA Regulations 2003.

Therefore, this addendum will be used to apply for variation of Mwache Dam Environment License NEMA/EIA/PSL/5204 to include additional scope of the Water Treatment Plant (WTP) and Base Camp facilities and other buildings including Police Post and Administration Blocks (see Appendix 3)

E.3 PROJECT DESCRIPTION

Table E.1 below present the design capacity of the Project components as outlined in the Preliminary Design Report (Artelia/MIBP Nov. 2021):

Table E.1: Capacity of Project component

PROJECT COMPONENT		UNIT	CAPACITY
WTP (2035)	Output production	m^3/day	186,000
	Production losses (backwashing requirements): 5%	m^3/day	9,300
	Input supply capacity	m^3/day	195,300
Storage Tank (2035)	Storage capacity	m^3	15,000
Raw Water Intake	Design Capacity (excluding the component for irrigation and environmental flows)	m^3/d	195,300
Pumping Stations	Design Capacity	m^3/hr	8,900

For Base Camp facilities and other buildings including Police Post and Administration Blocks (see Appendix 3)

E.3 LEGAL AND POLICY REGULATORY INSTRUMENTS

The project is listed under the Second Schedule of the EMCA 1999 cap 387 (and 2015 Amendments) Section 4 (a) and (c), and Section 7 (b), (d) and (e) all of which require that an EIA be carried out to identify the environmental impacts, their significance and mitigation measures be proposed. Also, World Bank OP 4.01 on Environmental Assessment requires that such projects be subjected to an environment impact assessment. Further, Environmental and Social Risk Management Policy for AFD-funded Operations was also reviewed.

At ESIA stage detailed analysis of the applicable Acts of parliament was discussed, under this addendum the focus was on statutes discussed on **Table E.2 on Page 4.**

Table E.2: Applicable Policy, Standards and Legal Statutes

STATUTE	REGULATIONS / RULES/ STANDARD/POLICY
Environment Management and Coordination Act (EMCA) 1999 Cap 387	• Legal Notice No 101: The Environmental (Impact Assessment and Audit) Regulations, 2003. • Legal Notice No. 19: Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009. • Legal Notice no 120: Water Quality Regulations, 2006. • Legal Notice no 121: Waste Management Regulation 2006 • The Environmental (Impact Assessment and Audit) Regulations, 2003 • Environmental Management and Coordination (Water Quality) Regulations, 2006 • (Waste Management Regulations, 2006 • Noise and Excessive Vibration Pollution (Control) Regulations, 2009 • The Environmental Management and Coordination (Air Quality Regulations 2014) • National Water Quality Standards
Water Act 2016	• Water Rules of 2007
Occupational Health and Safety Act (OSHA) 2007	Fire Risk Reduction Rules, 2007 Medical Examination Rules, 2005 Safety and Health Committee Rules of 2004 First-Aid Rules, 1977
World Bank Environment and Social Standards (ESS)	• (ESS1) Assessment and Management of Environmental and Social Risks and Impacts • (ESS2) Labor and Working Conditions • (ESS3) Resource Efficiency Pollution prevention and Management • (ESS4) Community Health and Safety • (ESS5) Land Acquisition, Restrictions on land Use and Involuntary Resettlement • (ESS6) Biodiversity Conservation and Sustainable Management of Living Natural Resources • (ESS7) Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities • (ESS8) Cultural Heritage • (ESS10) Stakeholder Engagement and Information Disclosure
AFD Safeguards Policy	Environmental and Social Risk Management Policy for AFD-funded Operations

E.4 ASSESSMENT PROJECT CONSTRUCTION IMPACTS RELATED TO WTP AND BASE CAMP COMPONENTS

A summary of Environment and Social Impacts discussed in this report summarized in **Table E.3** below.

Table E.3: Environment and Social Impacts and Mitigation at Project Construction Phase

RISK	MITIGATION
Impacts on Water Resource	• All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate Waste Management Plan (WMP). • No hydrocarbon-contaminated water may be discharged to the environment. • At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.
Impacts on Soil Resource	• Vegetation clearing and topsoil disturbance will be minimized. • Contour temporary and permanent access roads / laydown areas so as to minimize surface water runoff and erosion. • Sheet and rill erosion of soil shall be prevented where necessary through the use of sand bags, diversion berms, culverts, or other physical means. • Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. • Wherever possible construction work will take place during the dry season. • Topsoil shall be evenly spread across the cleared areas when reinstated. • Accelerated erosion from storm events during construction shall be minimized through managing storm water runoff (e.g., velocity control measures). • Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. • Spread mulch generated from indigenous cleared vegetation across exposed soils after construction • At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.
Impacts on Air Quality	**As general measures for all locations:** • Develop a Dust Management Plan (DMP); • Record all dust and air quality complaints, identify cause(s), take appropriate measures; • Liaise with local communities to forewarn of potentially dusty activities; • Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring as parameter • Undertake inspections to ensure compliance with the Dust Management Plan; • Plan potentially dusty activities so that these are located as far from receptors as feasible; • Erect solid screens if feasible around stockpiles and concrete batching; • Avoid run off of mud and water and maintain drains in a clean state; • Remove dusty materials form site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible; • Impose speed limits on haul routes and in construction compounds to reduce dust generation; • Minimize drop heights when loading stockpiles or transferring materials; and • Avoid waste or vegetation burning. **For traffic on unpaved roads:** • Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and • On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due

RISK	MITIGATION
	to low environmental toxicity. **For excavations and levelling** • Revegetate exposed areas as soon as feasible; • Revegetate or cover stockpiles if feasible; • Expose the minimum area required for the works, and undertake; and exposure on a staged basis to minimize dust blow.
Noise and Vibrations Impacts	• Siting noisy plant and equipment as far away as possible from human settlement, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable; • Where practicable noisy equipment will be orientated to face away from the nearest Human settlement and other receptors; • Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only; • Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable; • Where practicable, stationary equipment will be located in an acoustically treated enclosure; • For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals; • Throttle settings will be reduced and equipment and plant turned off, when not being used; • Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and fitting of mufflers or silencers of the type recommended by manufacturers.
Impacts on vegetation cover	• Avoidance of impacts should be prioritized. However, if not possible then compensatory planting of trees that will be cut by the contractor during works will be undertaken. • Vegetation shall only be within the well field's only if the vegetation and will interfere with Project construction and/or present a hazard. • Areas to be cleared shall be agreed and demarcated before the start of the clearing operations to minimize exposure. • The use of existing cleared or disturbed areas for the Contractor's office, stockpiling of materials etc. shall be encouraged. • Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible. • Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants
Community Health Safety and Security Impacts	• Contractor will develop and monitor the implementation of a Community Health and Safety Management Plan (CHSMP) • Contractor will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals. • Contractor will extend the Worker Code of Conduct to include guidelines on worker – community interactions and will provide training on the worker code of conduct to all employees including drivers as part of the induction process. • Contractor will provide primary health care and first aid at construction office sites to avoid pressure on local healthcare infrastructures. • Contractor will implement a Community Grievance Mechanism. • Contractor will develop and implement a Traffic Management Plan covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations.
Worker Health and Safety and Workers Management impacts	• Contractor will develop a Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc. contractor will require its subcontractors to put in place policies in line with national legislation and applicable international legislation and contractor Code of Conduct and Policies.

RISK	MITIGATION
	• Contractor will establish contractual clauses (signed code of conduct) to be embedded in the contracts of the workers and sub-contractors that require adherence to Kenyan law and international standards to be upheld related to worker rights. • Contractor will prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment. • Contractor and self-employed contractors will assess the H&S risks related with the tasks to be performed during the construction phase. • Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting pre-employment medical assessments include a safer working environment, reduction in workplace injuries, minimized downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction. • Contractor will ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities. • Contractor will implement regular health and safety checks and audits of workers, and subcontractors and implementing sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards. • Contractor will develop and implement a Workers Grievance Mechanism for the Project workforce including workers and subcontractors. • Contractor will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks. • Contractor will ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents. • Contractor will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE. • Contractor will ensure that IFC/World Bank Health and Safety guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker accommodation are followed. • Contractor will ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation. • Contractor will develop and implement a Traffic Management Plan covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations. • Contractor will develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.
	• Ensure clear human resources policy against sexual harassment that is aligned with national law • Integrate provisions related to sexual harassment in the employee COC • Ensure appointed human resources personnel to manage reports of sexual harassment according to policy • The Contractor shall require his employees, sub-contractors, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse • The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including: - effective and on-going community engagement and consultation, particularly with

RISK	MITIGATION
	women and girls; - Review of specific project components that are known to heighten GBV risk at the community level, e.g., compensation schemes; employment schemes for women; etc. • the contractor shall develop specific plan for mitigating these known risks, e.g., sensitization around gender-equitable approaches to compensation and employment; etc. • The contractor will ensure adequate referral mechanisms are in place if a case of GBV at the community level
	• Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). • The SEA action plan will include how the project will ensure necessary steps are in place for: - Prevention of SEA: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials; - Response to SEA: including survivor-centered coordinated multi-sectoral referral and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management; - Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights; • Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.
HIV/AIDs	• Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS and sexual health and rights through staff training, awareness campaigns, multimedia and workshops or during community Barazas. • Use existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members • Ensure safety of women and girls in provision of VCT services. • Work to minimize or altogether eliminate mosquito-breeding sites.
COVID 19	• The Contractors will develop a SOPs for managing the spread of Covid-19 during project execution and submit them for the approval of the Supervision Engineer and the Client before mobilization. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions; • Mandatory provision and use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including • Avoid concentrating of more than 100 workers at one location. Where there are two or more people gathered, maintain social distancing at least 2 meters. All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs; • Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including consultation venues and meetings and ensure they are used; • Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, door knobs, hand rails etc;

E.4 STATUTORY REQUIREMENTS PRE-COMMISSIONING OF THE WTP AND BASE CAMP

A summary of the statutory requirements that Coast Water Works Development Agency (CWWDA) will confirm priori to pre-commissioning of Project Components are listed in **Table E.4** below.

Table E.4: Statutory Requirements Prior to Pre-commissioning of the Project Components

ACTIVITY	REQUIREMENT	CONFORMITY MEASURE
Registration of the Water Treatment Plant as Works Place with DOSH	OSHA 2007 requires that any workplace with more than 7 employees should be registered as a workplace	*Register the Proposed Mwache Water Treatment Plant as Workplace with DOSH*
Duties Of Occupiers (Legal Requirements)	• Risk Assessment • Safety and Health Audit • Fire Safety Audit • Initial Environment Audit	*Undertake Risk Assessment, Safety and Health Audit and Fire Safety Audit for Mwache Water Treatment Plant.*
Management of Polices required at the Water Works	Policies Required: • Safety & Health Policy • Fire Safety Policy • Environment Policy	*Prepare Safety & Health Policy, Fire Safety Policy and Environment Policy Mwache Water Treatment Plant.*
Water Works Personnel Trainings Required	Training required: • Statutory: Fire marshal training	*Establish of Health and Safety Committee for Mwache Water Treatment Plant and train them on;* • *Statutory Fire marshal training* • *Statutory First Aid Training* • *Statutory Safety and Health Committee training on Occupational Health and Safety (OSH)* • *Regular provision of personnel at the T/Works with Appropriate (PPEs)*
	Training required: • Statutory: First Aid Training	
	Training required: • Statutory: Safety and Health Committee	

E.5: ESMP DURING OPERATION OF THE WTP

A summary of statutory Environment and Social Impacts and Mitigation at Project Operation Phase is given in **Table E.5** below.

Table E.5: Environment and Social Impacts and Mitigation at Project Operation Phase

ACTIVITY FIELDS	REQUIREMENT	RELEVANT ACT (CLAUSES)
Approval, Authorization and Permits	CWWDA should apply and renew water Abstraction permit for Mwache Water Treatment Plant from WRA, activities under in are listed under the Six Schedule of the Rules.	Water Rules 2007: Part II - Approval, Authorization and Permits
Control of Pollution and Water Quality Requirements	**Management of Reagents** For Mwache Water Treatment Plant, the design provides well ventilated and proper lighting chemical storage house. Further, personnel handling the reagents will be provided with appropriate PPEs such as gloves, nose masks and googles to protect them from the chemical. Also, procurement of reagent will be done in batches with enough doses to eliminate the risk of some of the reagent expiring therefore requiring disposal. **Management of Sludge** The design provides for sludge drying beds, the beds provided allow for sludge dewatering and allow for easy handling and evacuation	Water Rules 2007: Part V Water Quality Monitoring and Effluent Discharge
Water Use Charges	A master meter has been installed at the raw water inlet chamber to measure the water abstraction volume for the purpose of calculating amount due for payment of water services to Water Resources Authority (WRA)	PART VIII – Water Use Charges
Conservation of Riparian	The Water Rules 2007, Part (ix) on Conservation of Riparian and Catchment Areas regulation 120. (1) provides that for the purposes of conserving the catchments and riparian areas, the authority may by order or state as a condition on an authorization or permit, require a person to prepare and conform to a Soil and Water Conservation Plan (SWCP). In compliance with this regulation, a forestation program in liaison with Kenya Forest Services (KFS) will be initiated within the WTP and dam peripheries. Plant Operator will upscale this initiative after commissioning of the Plant.	PART IX - Conservation of Riparian and Catchment Areas

E.7 CONCLUSION

A summary of ESIA Addendum conclusion is presented below.

- The Ministry of Water and Sanitation and Irrigation through the Kenya Water Security and Climate Resilience Project (KWSCRP) (2016) commissioned an Environmental and Social Impact Assessment (ESIA).
- The assessment main focus was on environment and social impacts associated with Mwache Dam and the Lower Check dam.
- Further an Environment License NEMA/EIA/PSL/5204 on 18th September 2018 with a validly of 24 months from date of issuance.
- CWWDA has secured funds from AFD towards the cost of constructing Proposed Mwache Water Treatment Plant (WTP) designed to have an output of 186,000 m^3/d. The Environment License NEMA/EIA/PSL/5204 secured for Mwache Dam did not include the proposed Mwache WTP and associated components including Base Camp and other facilities.
- CWWDA has therefore instructed us to prepare and Addendum to the ESIA that was done for proposed Mwache Dam and further apply for variation of Environment License to include the WTP and associated Components.
- The addendum discusses the environment and social impacts related to the proposed Water Treatment Plant (WTP) and associated components including Base Camp and other facilities.
- Therefore, this addendum will be used to apply for variation of Mwache Dam Environment License NEMA/EIA/PSL/5204 to include additional scope of the WTP and including Base Camp and other facilities.
- The proposed Water Treatment Plant (WTP) is located within Kasemeni Location of Kinango Sub-County in Kwale County. The site is located within Land already acquired under Mwache Dam at GPS Coordinates -3.970346^0 and 39.508029^0. The Land has been acquired under ongoing Mwache Dam Resettlement Program undertaken by National Lands Commission (NLC) on behalf of Project Management Unit (PMU) of the Kenya Water Security and Climate Resilient Project (KWSCRP)
- This implies that Land Acquisition as an impact will not be triggered by proposed Water Treatment Plant (WTP)
- Through government resettlement program under Mache Dam Project, all Project Affected Persons (PAPs) have been relocated from the site, this implies that no direct socio economic negative impacts will be triggered to community as a result of construction of the WTP. However, indirect and cumulative impacts to villages outside the WTP site will be triggered as discussed in Chapter 5 of this addendum, such villages include; Mwatate, Mataa, Gandini, Mwavumbo, Fulugani and Mazeras
- The addendum has discussed WTP construction impacts on Physical Resources and Receptors including, Impacts on water resources, Impacts on Soil Resources, Impacts on Air Quality, Impacts related to noise and excessive vibrations. Further the addendum has discussed impacts on biological resources including fauna and Flora and finally discussed impacts on health and safety to workers and community members including; SEA/SH, GBV and spread of communicable diseases such as HIV and Covid 19.
- At operation phase the addendum has discussed pre-commissioning statutory requirements to be complied with by CWWDA including; Approval, Authorization and Permits by WRA, need for Control of Pollution and Water Quality Requirements, Water Use Charges and Conservation of Riparian, Registration of the Water Treatment Plant as Works Place with DOSH, Duties Of Occupiers (Legal Requirements), Management of Polices required at the Water Works and Water Works Personnel Trainings Required
- Finally operation impacts and mitigation measures have been discussed in relation to Management of Backwash Water, Reagents and Sludge from the WTP, management of and domestic sewerage, Erosion Control at Washouts, fencing of the WTP, maintaining Aesthetic And Hygiene and commissioning Afforestation Program.

E.8 PROVISIONS

The ESIA addendum makes below listed provisions.

- The Environment and Social Management Plan (ESMP) prepared under this ESIA assessment provides a budget of Kenya Shillings Four Million, Six Hundred and Fifty Thousand (**Kshs 4,650,000**) for mitigation of environment and social impacts identified in this Report. The Bid Documents to be prepared for the project should incorporates the Environment, Social provisions discussed under Chapter 8 (Environment and Social Impact Assessment and Mitigation Measures).
- Project Contract Document to include provisions for the Contractor for preparing and implementing Construction Environment and Social Management Plan (C-EMSP), annexes to the C-EMSP will include but not limited to: Soil and Sedimentation Control Plan, Spoil Management Control Plan, Dust Management Plan, Health, Hygiene and Safety Plan, Labour Management Plan, Child Protection Strategy, Gender-based Violence Action Plan, Waste Management Plan, Contractors Code of Conduct, Gender Inclusivity Strategy , HIV/Aid Prevention Strategy. The contractors will be required to engage services of a qualified Environment, Health and Safety Officers and Social Safeguards Officer at the time of Project implementation.
- At Project implementation stage, the contractor with approval of the supervising engineer will prepare periodic Environmental and Social Implementation Reports. The reports will provide status of implementation of risks & impacts management measures to date from the project start to the end of the reporting period. From an occupational Health and Safety approach, the Contractor will ensure they undergo the following; OSH risk assessment, Registration of workplaces, Safety and Health (OSH) Audit, Fitness to work assessment of employees, Training of all workers or workers' representatives in basic Occupational Safety and Health, Accident and incident reporting, Compensation of injured workers who die or get injured and disabled and Examination of Safety Plants and Equipment.
- At Project completion stage, within the Defects Liability Period, Coast Water Works Development Agency (CCWDA) will initiate an Initial Environment and Social Audit for the Project as required by EIA/EA Audit Regulations of the year 2003 and subsequent annual self-audits. The Audit will develop an Environment and Social Audit Action Plan (ESAAP) that will be used to track Project Environment and Social Compliance during Project implementation stage.

MAIN REPORT

1. INTRODUCTION

1.1. GENERAL

Mombasa is the second largest city in Kenya, after Nairobi, which is the Capital City of Kenya. Based on the 2019 Population Census, Mombasa has a population of 1,208,000 people. The city acts as a major gateway to the Country and the larger Eastern African region, hosting a major port and an International Airport. Mombasa is also a major tourist hub, key to the coastal tourism industry.

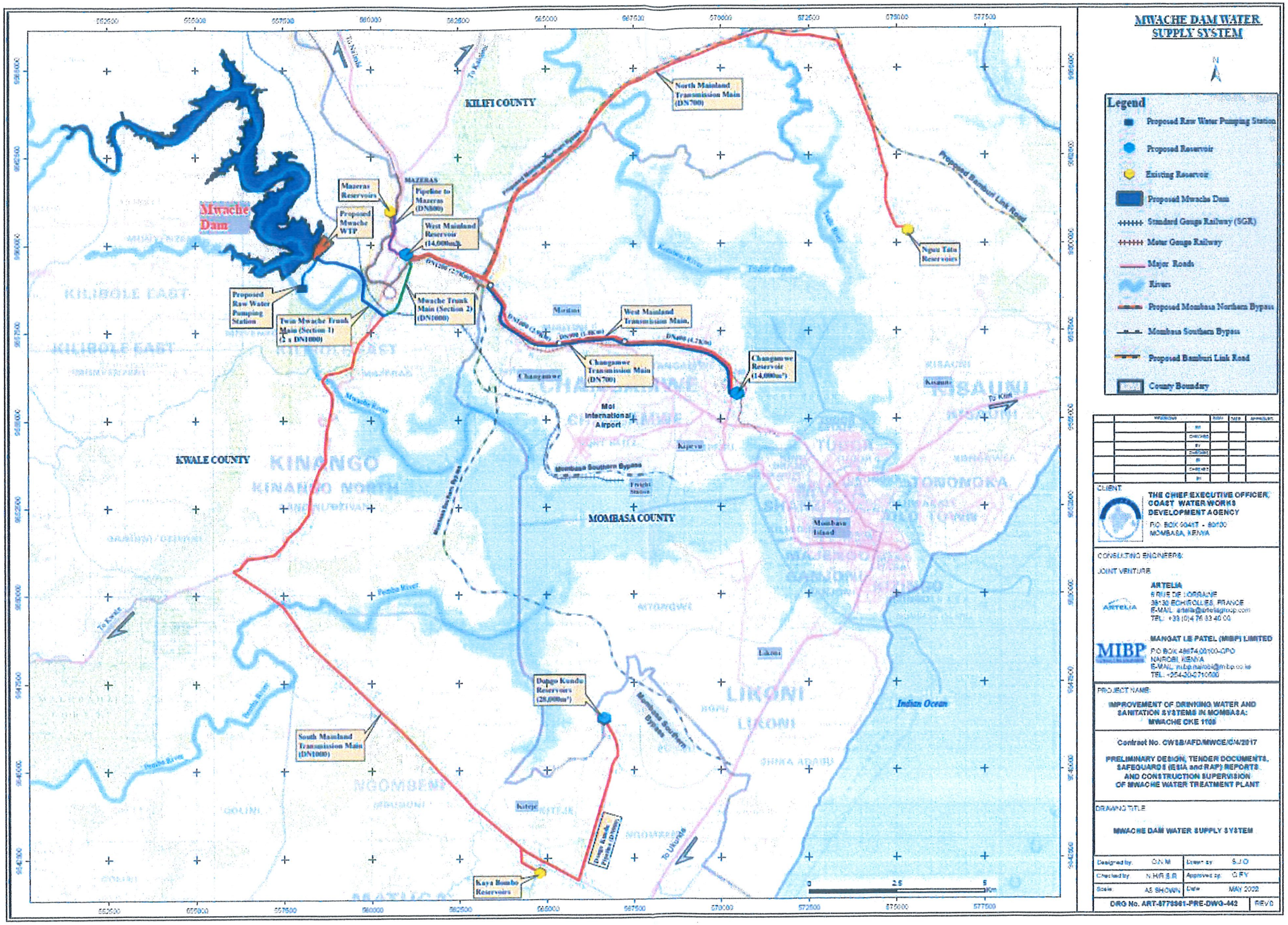
The Mwache Dam Water Supply Project entails the following components:

- A 84m RCC dam on the Mwache river, crest length 526.1m
- A Raw Water Pumping Station, Raw Water Pumping Main, Water Treatment Plant (WTP) with a clear water tank and associated facilities within the vicinity of the Dam with a proposed production capacity of 186,000 m^3/d
- Four Terminal Reservoirs; one for each of the target supply areas (NML, WML, SML and Island); namely
  - Nguu Tatu terminal reservoir, proposed within the existing Nguu Tatu Reservoir Site, serving the North Mainland
  - Changamwe Reservoir, proposed at the existing Changamwe Reservoir Site, serving Mombasa Island
  - Dongo Kundu Reservoir, proposed to be constructed within Dongo Kundu area in Mtongwe, serving the South Mainland
  - West Mainland reservoir, proposed to be located at a100 masl site within the West Mainland, to serve the West Mainland area
- A system of Treated Water Transmission Pipelines, transmitting treated water from the Mwache WTP to the proposed Reservoirs, including Trunk Main, Transmission Main to Dongo Kundu Reservoir in South Mainland, Transmission to Nguu Tatu Reservoirs in the North mainland and Transmission Main to the West Mainland service area and Changamwe Reservoirs.
- Sanitation for SML
- Capacity building for Mombasa Water Supply and Sanitation Company (MOWASSCO)

A Location Plan of the proposed components of the Mwache Dam Water Supply System is shown in **Figure 1-1 on Page 3.**

CWWDA and MWS&I have secured funds from the Word Bank (WB) and from the Agence Francaise de Développement (AFD), for financing implementation of the various component of the Mwache Dam Water Supply Project. The WB component is scheduled to finance the Dam and possibly part of the Trunk Main, West Mainland Reservoir as well as Nguu Tatu and Changamwe transmission pipelines and their corresponding reservoirs. The AFD component is scheduled to finance the WTP & associated facilities, a section of the trunk main up to the Dongo Kundu Pipeline Offtake, the transmission pipeline to Dongo Lundu and the Dongo Kundu reservoir. A Schematic Diagram showing the proposed project components of the Mwache Dam Water Supply System and their respective financing agencies is given in **Figure 1-2 on Page 4.**

Figure 1-1: A Location Plan of the Proposed Components of the Mwache Dam Water Supply System



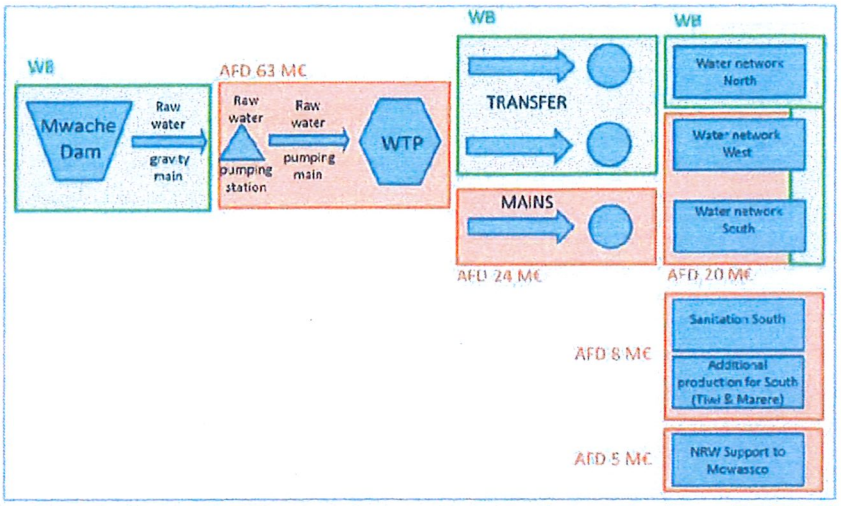


Figure 1-2: Components of the Mwache Dam Project and respective Financing Agencies

Source: AFD Mission Aide-Memoire, June 2021

Although the construction of part of the trunk main and the North Mainland and West Mainland Water Transmission Pipelines and their corresponding reservoirs is likely to be financed by the WB, their Design and Construction Supervision is included in the Mwache Transmission Lines Consultancy Contract funded by the AFD.

The overall Mwache Dam Project as planned by Coast Water Works Development Agency (CWWDA) also includes a Water Distribution component, to be financed by both the WB and the AFD. This component will ensure that water produced under the Mwache Dam Project will reach the end consumers within Mombasa County and partially in Kwale County.

The Dam Construction Contract was signed on 14th August 2019 between the Ministry of Water and Sanitation and Irrigation (MWSI) Kenya Water Security and Climate Resilience Project (KWSCRP) and the successful bidder. Pre-construction activities are in progress. The RAP implementation is ongoing, at advanced stages. Preparations to commence construction works are ongoing.

1.2. ENVIRONMENT LICENSE VARIATION

The Ministry of Water and Sanitation and Irrigation through the Kenya Water Security and Climate Resilience Project (KWSCRP) (2016) commissioned an Environmental and Social Impact Assessment (ESIA). The assessment main focus was on environment and social impacts associated with the Dam and the Lower Check dam. Further an **Environment License NEMA/EIA/PSL/5204 on 18th September 2018** with a validly of 24 months from date of issuance was issued by NEMA.

This Report presents an Addendum to the ESIA prepared for Mwache Dam and Lower Check Dam. The addendum seeks to include the proposed Mwache Water Treatment Plant (WTP) and associated Components.

The Environmental Impact Assessment Regulation as outlined under the Gazette Notice No. 56 of 2003 provides for variation of Environmental Impact Assessment Licenses to include additional scope of works or to renew expired Licenses. Clause 25. (1) Provides that where a proponent wishes to vary the terms and conditions on which an Environmental Impact Assessment License has been issued, the holder of the License has to apply for a Variation in Form 9 set out in the First Schedule of the EIA Regulations 2003. Therefore, this addendum will be used to apply for variation of Mwache Dam Environment License **NEMA/EIA/PSL/5204** to include additional scope of the WTP and extend license validity for an additional 24 months.

2. PROJECT DESCRIPTION

2.1 WATER DEMAND AND CAPACITY OF THE WTP

2.1.1 Water Demand

Analysis and updating of the projected water demand for Mombasa city has been carried out under the "Mwache Water Transmission Pipelines and Terminal Reservoirs" contract and presented in the Design Criteria report under that contract. The summary of the results of this update are presented here below:

Table 2.1: Adopted Water Demand and the Proposed Re-Allocation of Water Supply for Mombasa City

	UNIT	SUPPLY AREA				TOTAL
		WEST MAINLAND	MOMBASA ISLAND	SOUTH MAINLAND	NORTH MAINLAND	
Updated demand, Year 2035	**m^3/day**	**82,675**	**38,974**	**67,921**	**127,965**	**317,535**
Source of Water		Mwache Dam/ Mzima Springs	Mwache Dam	Mwache Dam	Mwache Dam/ Baricho Wellfields	
Terminal Reservoir		West ML Tank / Mazeras Tanks	Changamwe Tanks	Dongo Kundu Tank	Nguu Tatu Tanks	
Supply from Mwache Requirements	m^3/day	31,176	38,974	67,921	43,929	182,000
Supply from Mwache Design basis	**m^3/day**	**31,200**	**39,000**	**67,900**	**43,900**	**182,000**
Supply from Mzima	m^3/day	51,499	-	-	-	51,499
Supply from Baricho	m^3/day	-	-	-	84,036	84,036
Total Daily Supply	**m^3/day**	**82,675**	**38,974**	**67,921**	**127,965**	**317,535**

**Note: Proposed Water Supply component to the South Coast (Kwale County) from the Mwache Dam (4,000 m^3/d according to Kwale Water Supply Master Plan, EGIS, 2018) has been excluded from the above table.*

2.1.2 Capacity of Project Components

The Table below present the design capacity of the different project component under the Mwache WTP:

Table 2.2: Capacity of Project Component

PROJECT COMPONENT		UNIT	CAPACITY
WTP (2035)	Output production	m^3/day	186,000
	Production losses (backwashing requirements): 5%	m^3/day	9,300
	Input supply capacity	m^3/day	195,300
Storage Tank	Storage capacity	m^3	15,000
Raw Water Intake	Design Capacity (excluding the component for irrigation and environmental flows)	m^3/d	195,300
Pumping Stations	Design Capacity	m^3/hr	8,900

2.2 RAW WATER PUMPING STATION (RWPS)

The RWPS will be located along Mwache river, downstream of the proposed Mwache Dam (approx. 0.5Km) as illustrated in **Figure 2-1** below.

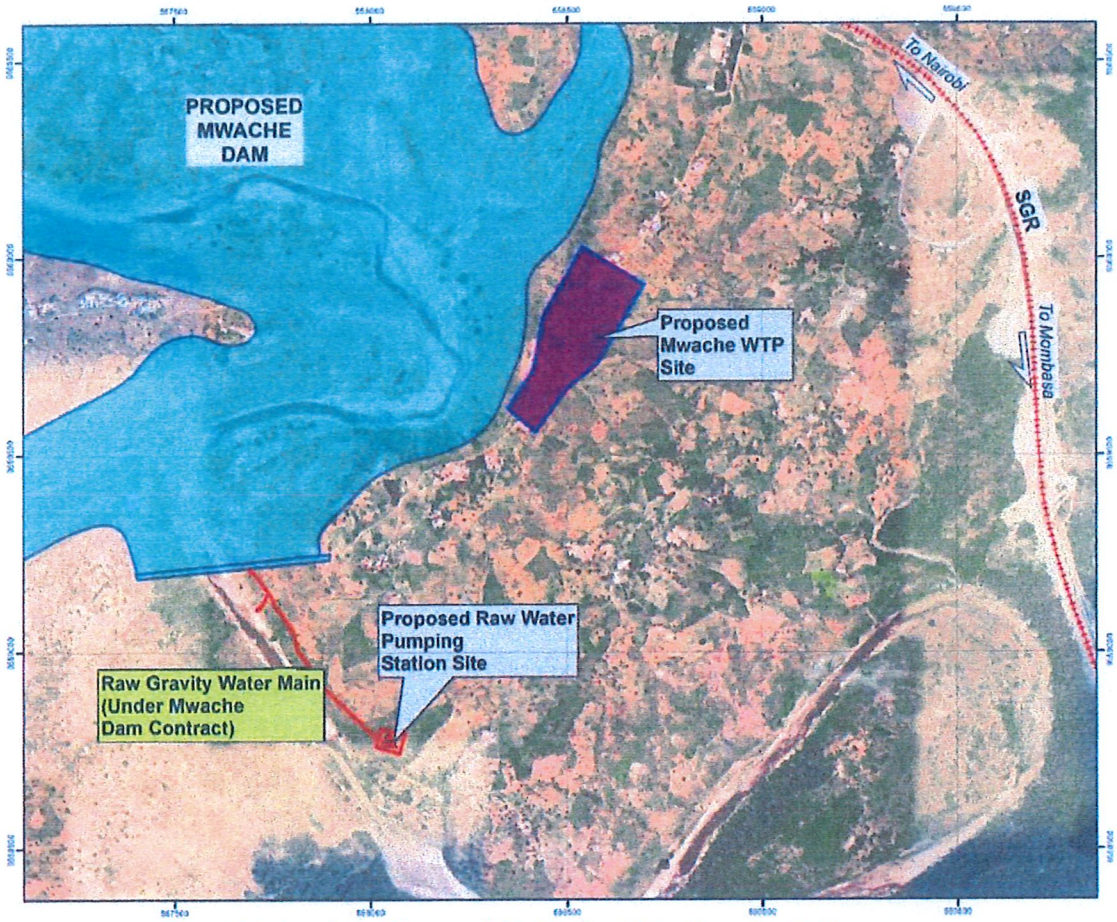


Figure 2-1: Location of Proposed Site for Raw Water Pumping Station

The scope of works for the Mwache WTP Contract commences at the pumping station inlet. The Dam Contractor shall construct the raw water gravity main from the Dam to the boundary of the site of the Raw Water Pumping Station (RWPS) and shall install a blank flange at the pipeline end.

The proposed arrangement for the raw water abstraction, pumping system to Mwache WTP including the limitation of scope for each of the adjoining Contracts is illustrated in the **Figure 2-2**.

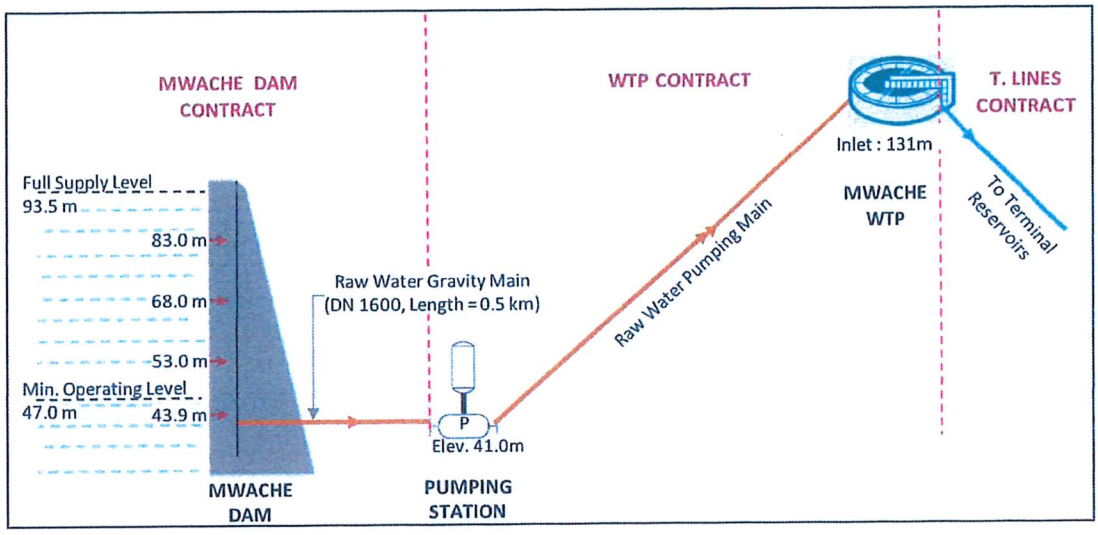


Figure 2-2: Mwache Dam Raw Water Abstraction and Pumping System

The design of the RWPS shall be finalised by the Contractor. Based on Preliminary designs prepared in the current consultancy assignment, the RWPS design parameters are summarized as follows:

Discharge: The design capacity is 8900 m^3/h. To meet the variable raw water needs of the WTP, the RWPS must also be able to supply 25%, 50% and 75% of the full capacity.

Total Dynamic Head (TDH): Varies:

- From the minimum TDH (frequent): 44 m
- To the maximum TDH (exceptional): 90 m

Number of Pumps: Six (6) pumps each of 2,225 m^3/h, the maximum discharge of 8,900 m^3/h being provided by four pumps and the minimum discharge of 2,225 m^3/h by one pump.

Type of Pumps: Single Stage - Axially Horizontal Split Case - Double Suction Pumps with a double Volute Casing.

Pump operation: To use variable speed drives

Pumping set efficiency:

- Pump: 80% minimum
- Motor: IE3 class

Footprint requirements: 100m wide by 120m length

Other facilities to be provided:

- Transformer Area
- Plant Manager Office
- Operators' office
- Kitchenette
- Store
- Car parking area
- Washroom facilities & changing rooms
- Guard house

2.3 RAW WATER PUMPING MAIN (RWPM)

The raw water pumping main route will majorly be along an access road which will be constructed by the Dam Contractor. The distance from the RWPS to the WTP is short (less than 2Km) and there is nothing strategic in the selection of the pipeline alignment. The final alignment will be determined by the Contractor.

Hydraulic design of the RWPM shall be finalised by the Contractor. Based on Preliminary designs prepared in the current consultancy assignment, the RWPM design parameters are summarized as follows:

- Discharge - 2.50 m^3/s
- Number of Pipelines - two (twin)
- Pipe material - Steel or Ductile Iron
- Design Equation - Colebrook-White
- Roughness coefficient - 0.5 mm
- Max. Velocity - 1.5m/s

2.4 WATER TREATMENT PLANT

2.4.1 Design Data

Capacity design of the WTP is as follows:

- Outlet capacity (total production): 186,000 m^3/day
- Inlet capacity (Raw water inflow): 195,000 m^3/day

As a safe design, water production will be designed on 22 hours of operation which is an equivalent of an hourly flow of raw water of 8,877 m^3/h **rounded to 8,900 m^3/h.**

The plant will be designed with 4 treatment lines. Each line will thus have a capacity of 2,225 m^3/h.

The table below summarizes the raw water quality and treated water quality inputs for WTP design:

Table 2.3: Final Proposed Water Quality Design Input Values

PARAMETER	UNIT	PROPOSED RAW WATER QUALITY VALUES	PROPOSED TREATED WATER QUALITY VALUES
Colour	True Color Units	10	**15**
Taste and odour		-	**Acceptable to users**
Suspended matter		15	**Nil**
Oil & Grease	mg/L	7	-
Physico-chemical limits			
Turbidity	NTU	30 average 100 peak	**0,5**
Conductivity	µS/cm	1500	**1500**
Total Dissolved Solids (TDS)	mg/l	750	**1500**
Total Suspended Solids	mg/l	35	-
Hardness as $CaCO_3$	mg/l	400	**500**
Salinity	mg/l	600	-

PARAMETER	UNIT	PROPOSED RAW WATER QUALITY VALUES	PROPOSED TREATED WATER QUALITY VALUES
Dissolved oxygen	mg/l	6	-
Aluminium (Al)	mg/l	-	0,1
Chloride (Cl)	mg/l	250	250
Copper (Cu)	mg/l	-	0,1
Iron (Fe)	mg/l	1,5	0,3
Manganese (Mn)	mg/l	0,05	0,1
Sodium (Na)	mg/l	-	200
Sulphate (SO_4)	mg/l	40	400
Zinc (Zn)	mg/l	-	5
pH		6,5 – 8,4	6,5 – 8,5
Magnesium (Mg)	mg/l	50	100
Chlorine	mg/l	0	0,2 – 0,5
Calcium (Ca)	mg/l	90	250
Ammonia (N)	mg/l	1	0,5
Phosphate (P)	mg/l	0,11	-
Fluoride (F)	mg/l	-	1,5
Arsenic (As)	mg/l	-	0,01
Cadmium (Cd)	mg/l	-	0,003
Lead (Pb)	mg/l	-	0,01
Mercury (Total Hg)	mg/l	-	0,001
Selenium (Se)	mg/l	-	0,01
Chromium (Cr)	mg/l	-	0,05
Cyanide (CN)	mg/l	-	0,01
Phenolic substances	mg/l	-	0,002
Barium (Ba)	mg/l	-	1,3
Nitrates (NO_3)	mg/l	2	10
Limits for organic constituents			
Organic Matter by KMnO4	mg/l	15	-
Chl-a	mg/l	650	-
Benzene	µg/l	-	10
Chlorophenols	µg/l	-	10
Polynuclear aromatic hydrocarbons	µg/l	-	0,01
Trihalomethanes Chloroform	µg/l	-	300
Limits for radioactive materials			
Gross alpha activity	Bq/l	-	0,1
Gross beta activity	Bq/l	-	1
Microbiological limits			
Total Viable counts at 37°C	MPN/ml	2000	100
Coliform	MPN/250 ml	1000	Nil
E.Coli	MPN/250 ml	1000	Nil
Staphylococcus aureus	MPN/250 ml		Nil
Sulphite reducing anaerobes	MPN/50 ml		Nil
Pseudomonas aeruginosa fluorescence	MPN/250 ml		Nil
Streptococuus faecalis	MPN/250 ml		Nil
Shigella	MPN/250 ml		Nil
Salmonella	MPN/250 ml		Nil

2.4.2 Water Treatment Line

Figure 2-3 below summarizes the recommended waterline for Mwache WTP Project

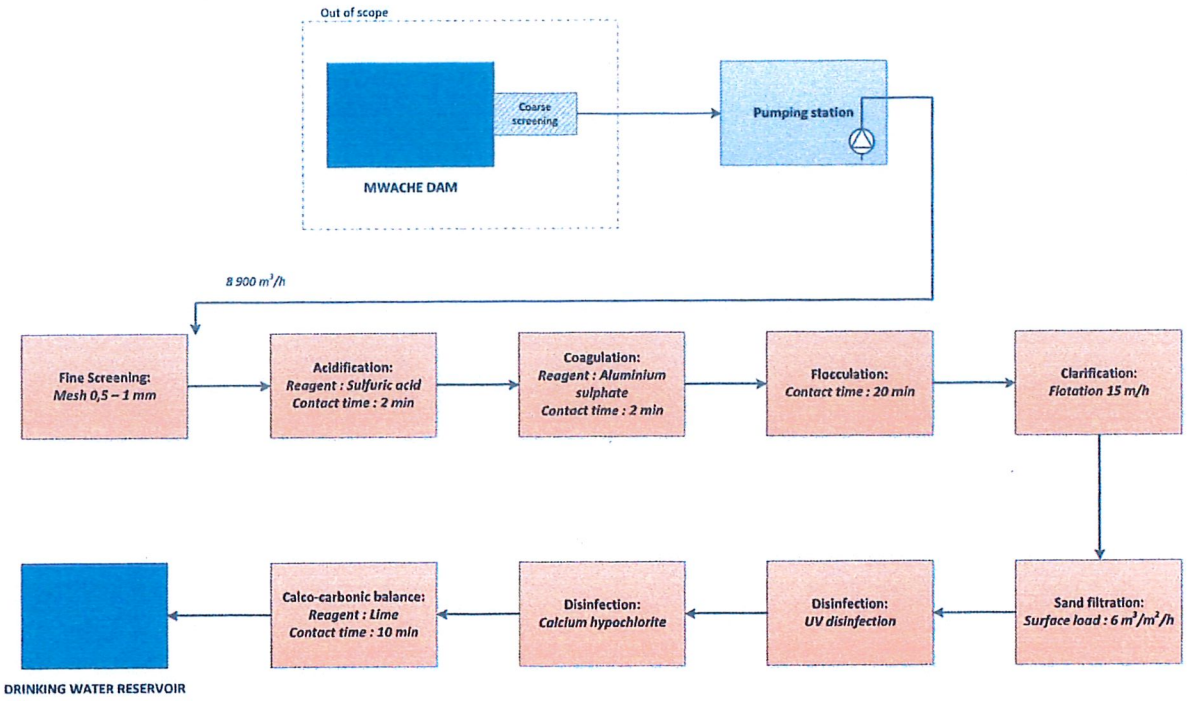


Figure 2-3: Water Treatment Line

The proposed water treatment process is briefly discussed as follows:

Table 2.4: Selected Water Treatment Process Units

PROCESS UNIT	*FUNCTION*
Pumping station	to raise water from DAM to WTP
Fine screening	to remove small particles before clarification
Acidification with sulfuric acid	to adjust pH prior to clarification in order to improve its efficiency
Chlorine (shock chlorination)	Only for intermittent use
Flocculation with polymer	Coagulant aid: Gather solidly between the particles that can be eliminated by the clarifier
Flotation	Eliminate by flotation flocs formed by the flocculation and produce a clarified water whose turbidity is lower to 5 NTU
Rapid Sand Filtration	It will reduce the residual turbidity below 0.5 NTU.
UV disinfection	Elimination of the pathogen germs and cysts (Giardia and cryptosporidium)
Calco-carbonic balance - Soda	Correct the pH of water distributed. Slightly over the saturation pH it provides a protective layer on networks and facilities
Final chlorination:	The residual chlorine content in the treated water will keep a permanent disinfecting agent in the distribution network.

2.4.3 Sludge Line

Figure 2-4 below summarizes the proposed sludge line for Mwache WTP .

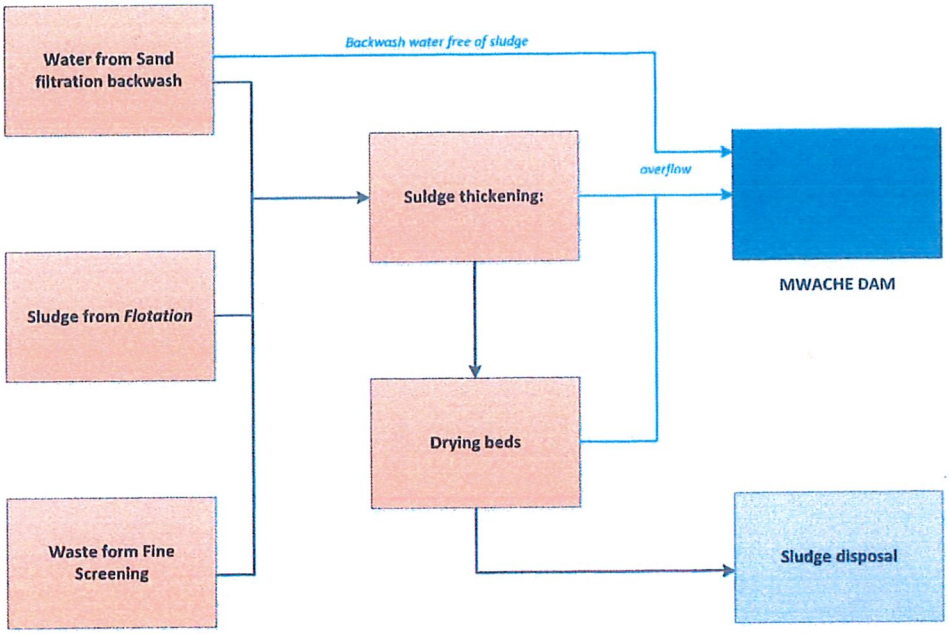


Figure 2-4: Sludge Treatment Line

2.4.4 Water Discharge

Artelia/MIBP recommends designing the discharge for return into the Mwache Dam for by-pass and treated backwash water. This discharge pipe should then allow for the total Water Treatment plant design flow: 195,000 m^3/d and 8 900 m^3/h.

2.5 COST ESTIMATES

2.5.1 Capital Expenditure (CAPEX)

Capital cost estimates for the water treatment plant and associated components are summarized in the **Table 2.5** below.

Table 2.5: CAPEX Summary

COMPONENTS	DETAILED DESCRIPTION	ESTIMATES 2021 (EURO)
	Raw water pumping station	7 660 000 €
	Raw water pumping main	3 014 000 €
	Water Treatment Plant	43 280 200 €
	Treated water main & clear water tank	4 185 100 €
	Provisional sums	9 517 185 €
	TOTAL	**67 656 485 €**

2.5.2 Operational Expenditure (OPEX)

Table 2.6 below summarizes the estimated operational costs for the water treatment plant and associated components.

Table 2.6: OPEX Summary

ITEMS	ANNUAL OPERATING COST KSHS/YEAR	ANNUAL OPERATING COST €/YEAR
Energy	424 798 025 KES	3 293 008 €
Chemicals	325 646 336 KES	2 524 390 €
Sludge disposal	3 224 993 KES	25 000 €
Staff	26 220 000 KES	235 814 €
Maintenance	58 660 728 KES	454 734 €
Renewal	166 735 798 KES	1 292 526 €
TOTAL	**1 005 285 880 KES**	**7 825 472 €**

2.6 SUMMARY OF SCOPE OF WORK – EMPLOYER'S REQUIREMENTS

The scope of works under the WTP Contract includes but not limited to the following :

- Design and additional studies
- Execution of additional studies (geophysical investigations, soil studies, assessment of structures, plans defined by the ESIA, water analyses, etc.) that Contractor considers necessary
- Additional topographical survey
- Geotechnical survey
- Preparation of a design report of the installations answering the program fixed by the Employer's Requirements.
- Documents forming the application for building permit (English language), including the architect's drawings and layouts, and in particular the landscaping aspects, so that the Employer has only to file this application to the concerned authorities.
- The preparation of guide drawings, working design drawings for the civil engineering structures, reinforced concrete drawings and calculation notes, drawings and calculation notes for the roads and utilities networks, drawings and diagrams of equipment, erection and dismantling drawings, in compliance with the detailed design accepted by the Employer.
- Implementation: Works to be carried out by the Contractor include but are not limited to the following:
  - Adopting mitigating measures provided in the IEE or ESIA and Social DDR Reports. In addition, if need be, these documents (IEE, EMP, DDR) should be updated and/or preparation of renewal plan.
  - Preparation and adopting different management plans, such as: Site Specific Waste Management Plan, Site Specific Dust Management Plan, Site Specific Surface Water Management Plan, Site

Specific Excavated Material Management Plan, Site Specific Biodiversity Management Plan, Site Specific Traffic Management Plan, Site Specific Health and Safety Management Plan, Community Health and Safety Plan

- Installation of the site and preparatory works, connection to telecoms, water, electricity and other networks.
- Implementation of civil works in accordance with the accepted detailed design, including in particular:
  - preliminary drillings and investigations for the existing facilities and networks, if necessary,
  - earthworks and final backfilling, drainage (including removal and storage of materials and earth),
  - special foundations, if necessary
  - All shell construction (concrete, reinforced concrete, masonry, framework, roofing, sealing, cladding, etc.),
  - all finishing and fitting works for the plant,
  - fences, roads and utilities networks,
  - demolition of existing structures to be removed, if any, including pipes and the reuse or removal and dumping of the corresponding materials in locations authorized by local legislation, and levelling of the land thus freed,
  - Connection of the new installations with existing structures (pipes).
- Implementation of the treatment process in conformity with process flow diagram including:
  - Pumping station
  - Fine screening
  - Acidification tank
  - Clarification tanks
  - Sand filtration
  - Disinfection
  - Reservoirs
  - Associated pipes and connections
  - And all other treatment required to achieve performances specifications
- Implementation of the "electricity and electromechanical and hydromechanical equipment" section in conformity with the performances specifications and technical specifications, including the supply, testing and transportation on site of all necessary materials and equipment and their implementation or erection and adjustment, namely:
  - hydraulic, mechanical and electrical treatment equipment, including driving equipment and control, monitoring, measurement, protection and safety devices
  - Miscellaneous equipment required for the proper operation and maintenance of the installations, (lighting, heating, telephone, etc.),
  - the remote surveillance system, if any
- The commissioning of the installation and performance of the tests defined in the Employer's requirements.
- The provision of maintenance and operating manuals and as-built drawings of the structures and networks including cadastral measuring/planning drawings in UTM coordinate systems to deliver them to National Agency of Public Registry for registration.
- Services for the Employer and the Engineer, as defined below and/or in this tender documents.
- All necessary works required to complete the construction of the WWTP.
- Training

■ Operation and Maintenance

- The contractor shall be in charge of the operation of the new treatment plant for 2 years

3. BASELINE INFORMATION FOR WTP SITE

3.1 LOCATION AND LAND OWNERSHIP

The proposed Water Treatment Plant (WTP) is located within Kasemeni Location of Kinango Sub-County in Kwale County. The site is located within Land acquired under Mwache Dam at GPS Coordinates -3.970346^0 and 39.508029^0 as indicated in **Figure 3-1 .**

Land ownership of the proposed site for WTP has been acquired by the government under the ongoing land acquisition by National Lands Commission (NLC) on behalf of Ministry of Water and Sanitation. This implies that Land Acquisition as an impact will not be triggered. Also, through government resettlement program under Mache Dam Project, all Project Affected Persons (PAPs) have been relocated from the site, this implies that no direct socio-economic negative impacts will be triggered to community as a result of construction of the WTP. However, indirect and cumulative impacts to villages outside the WTP site will be triggered as discussed in **Chapter 5** of this addendum, such villages include; Mwatate, Mataa, Gandini, Mwavumbo, Fulugani and Mazeras.

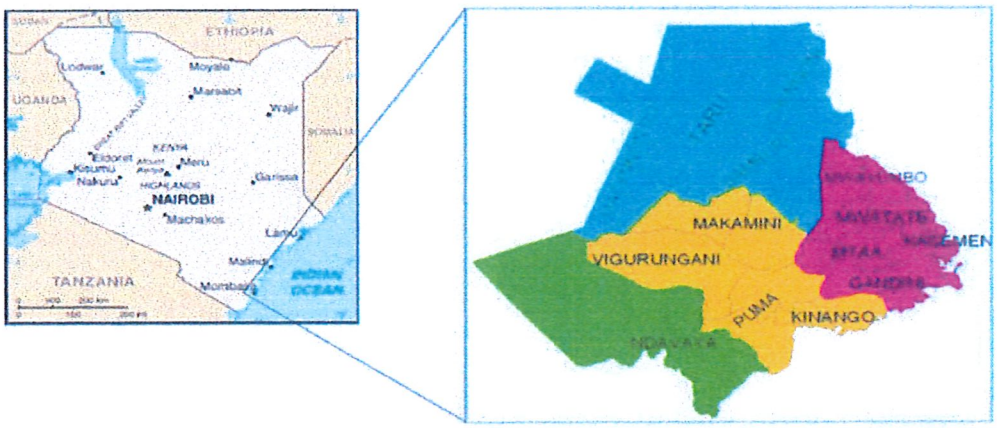
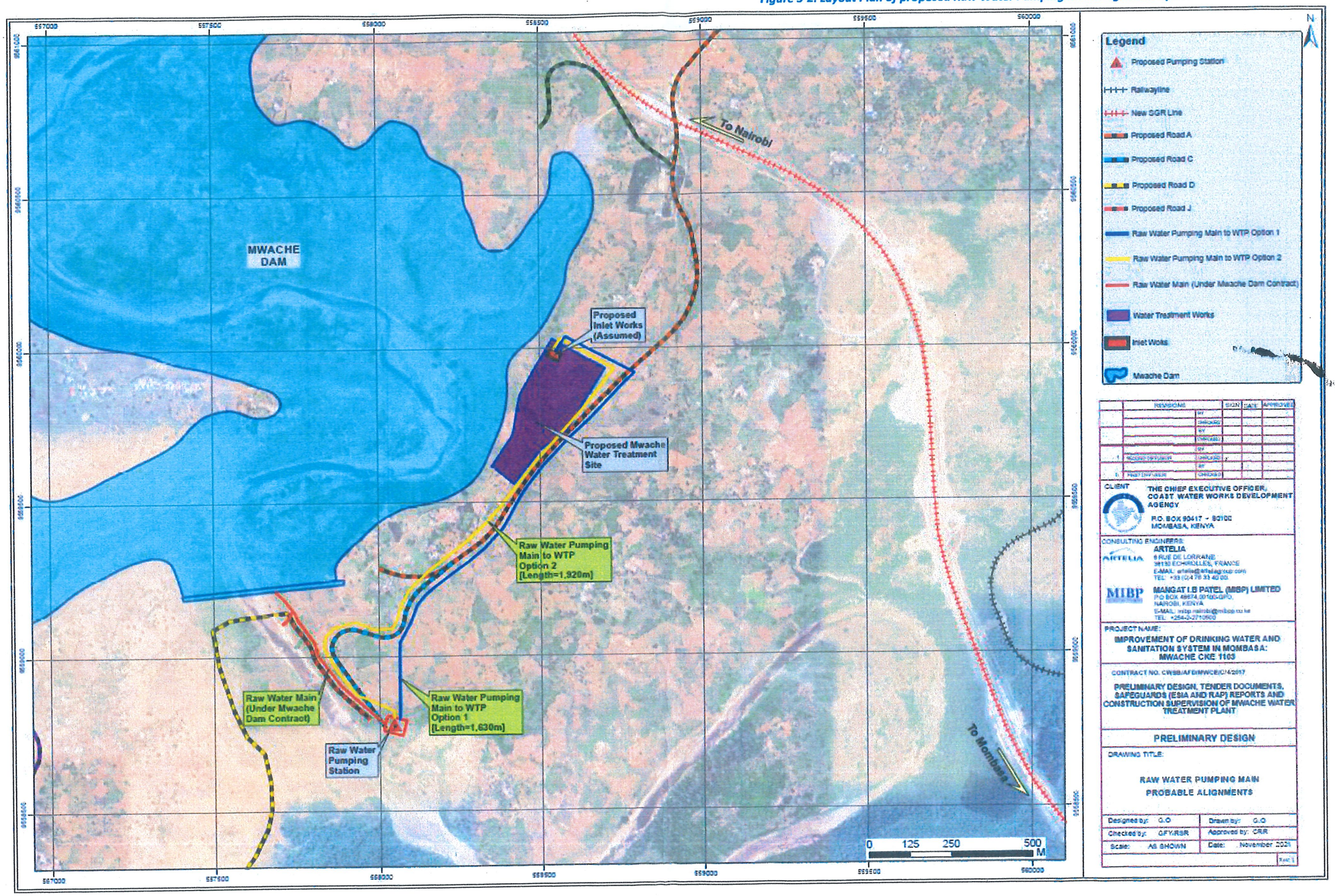


Figure 3-1: Map of Kinango Sub County (Project is sited in Kasemeni Ward)

Photograph illustrating an overview of proposed site for the Water Treatment Plant (WTP)

Figure 3-2: Layout Plan of proposed Raw Water Pumping Main Alignment Options and WTP Location



3.2 CLIMATIC CONDITIONS

The annual minimum temperatures in the area (Kasemeni Location) range between 22.5˚C and 24.5˚C while the maximum temperatures vary between 27˚C and 32˚C along the coastal belt. The Location is generally hot and humid all the year round, with a relative humidity of about 60% along the coastal belt due to the high evaporation rate and availability of surface water.

The precipitation is highest in the months of April and May while no or little precipitation occurs from December to March. Annual Average precipitation is about 900mm against an average1,860mm evapo-transpiration in the region, with 75% Dependable Annual rainfall equivalent to 610 mm. Evaporation rates recorded at the Moi International Airport in Mombasa provide the appropriate parameter to describe evaporation variation in the project area. The results indicate that the mean daily evaporation rates vary from 3.5 mm in July to 6.3 mm in February. The Relative humidity data shows the Coastal nature of climate. Relative humidity varies between 70% - 75% from January to March and 65% – 67% from April to December.

3.3 DRAINAGE AND HYDROLOGY

The drainage of Kasemeni within Kinanango Sub County of Kwale County where the WTP is located is influenced by the ocean, which determines the easterly surface slope. While there are no permanent rivers and streams, the main river is the Mwache River which collects surface runoff discharging from numerous drains from the immediate catchment and watershed resulting into soil erosion that has left notable gullies, especially on steep sloppy areas. Additionally, apart from some sections of the larger riverbeds that tend to retain water after floods, there are no possibilities of flooding around the project areas. This implies a well-drained area in both surface as well as the largely porous geological formations.

Mwache River is the main water body (though it is seasonal by nature) in the project area with its source in the Taita hills. The main tributaries (also seasonal) discharging into the river include Bome river from the south immediately downstream of the proposed dam axis lines and Mnyenzeni river also from the southwest immediately upstream of the dam axis. There are also numerous dry surface drains into Mwache River that seemingly flows with water only during rainy seasons. The general water quality could be summarized as indicated in **Table 3.1**.

Table 3.1: Water Quality Parameters

PARAMETER	DESCRIPTION
pH	Water generally neutral in river and the creek (6.0 –9.0)
Colour	Surface water is highly coloured compared to ground water (<25mgPt/l)
Electrical Conductivity	Ground water and creek brackish (<2,000mg/l)
Turbidity	Surface water is highly turbid compared to ground water (<5NTU)
Dissolved Oxygen	Surface water and ground water is fresh (>5mg/l)
Total Dissolved Solids	Ground water and creek saline. Mwache pools are fresh (<1,500mg/l)
Suspended Solids	High suspended matter clear due to settlements) <30mg/l

Photograph Illustrating Dry River Bed for a Tributary of Mwache River near the Proposed Site of WTP

3.4 GEOLOGY AND SOILS

The soils type at the Water Treatment Plant (WTP) is sandy clayey gravel at depths of 2 – 2.5m deep. The soil types have a strong correlation with the geology and topography of the region and differ widely in depth, texture, physical and chemical properties with variations running parallel to the coastal line due to sedimentation process. The significance of this geological and soil characteristics is the porosity associated with the sedimentary type of soils. Infiltration to the groundwater aquifers of polluting substances from the ground surface is also highly likely. Kasemeni Locations falls within the Cainozoic rocks that occur on the coastal strip of land bordering Indian Ocean and include stratigraphic units belonging to Pliocene, Pleistocene and Recent periods. These are composed of sands, dune sands, raised coral reef, crags, red wind-blown sands and raised alluvial deposits.

Photograph Illustrating Nature of Soils near the Proposed Site of WTP

3.5 TOPOGRAPHY

The topography of Kasemeni Location gently rises from Mombasa Island near Indian Ocean coast of Kenya and from EL 0.0m (mean sea level), rising steadily towards Kinango Sub County. The general topography of the area is generally characterized by a hilly terrain, with steep slopes along and across the alignment, with numerous seasonal water courses including streams and gulleys, and a seasonal river. At the specific site for the WTP, the topography is given as 131m a.s.l.

3.6 BIODIVERSITY

Flora

Flora of the Water Treatment Plant (WTP) Site is influenced by the Mwache Forest which is adjacent to the site. However, specific site exhibits Arid and Semi-Arid (ASAL) characteristics. In terms of Agro-ecological zone classification, the site is located within Agro Ecological Zones (AEZ) three. Vegetation cover observed include include various species of *acacia Sp. Acacia ssp, Diospyros ssp, Cynometra-Manilkara type and Euphorbia bushland,* other exotic trees include *Tamarind tree, Neem tree, Flame Tree.*

Within the valleys in the either side of the Water Treatment Plant (WTP) ridge riverine plants observed are; reeds, grasses / sedges among others which form part of Mwache Creek Mangroove Vegetation. Specific Mangroove sp include *Rhizophora mucronata, Avicennia marina, Ceriops tagal, Lumnitzera racemosa, Bruguiera gymnorrhiza, Sonneratia alba, Xylocarpus granatum, Xylocarpus moluccensis and Heritiera littoralis. R. mucronata, C. tagal and A. marina* are the dominant species within forest.

The following plant species are domesticated and grown within the Kasemeni Location; *Maize (green), Maize, Cow peas, Cassava, Sisal, Water melon, Banana, Sukuma wiki (Kalas), Tomato, Groundnut, Coconut, Cashew nut. (others in local languages Mwawa, Mwanga, Mkanju (Cashew nuts), Mporojo, Kikwata, Mkone, Mnyubu, Mkilifi (neem tree), Mbuyu (Boabab), Mfune, Mchonge Mahana and Mkwakwa* among others).

However, it is important to note that at the WTP site Project Affected Persons (PAPs) have been resettled by Government and land vested into Kenyan Government. Therefore, socio economic Impacts to the PAPs in relation to loss of agricultural Land has been fully addressed by the government through compensation

Photograph Illustrating Vegetation Cover at the Proposed Site of WTP

Fauna

Avian population recorded in Mwache forest and adjoining ecosystem like Shimba hills, etc. can be listed as; Southern Banded Snake-eagle Circaetus fasciolatus (Near Threatened); Brown-headed Parrot Poicephalus cryptoxanthus (least concern), Fischer's TuracoTauraco fischeri (Near Threatened), African Green-tinkerbird Pogoniulus simplex (Least Concern), Mombasa *Woodpecker* Campethera mombassica (Least Concern), Chestnut-fronted Helmet-shrike Prionops scopifrons (Least Concern), Black-bellied Glossy-starling Lamprotornis corruscus (Least Concern), Spotted Ground-thrush Zoothera guttata (Endangered),Plain-backed Sunbird Anthreptes reichenowi (Near Threatened) Sokoke Pipit Anthus sokokensis (Endangered).

An inventory of fish species within Mwache River and seasonal streams along the Water transmission line show that there are 4 common fish species in the main river trunk, 5 prawn species and 1 crab species. These species are distributed in various ecological habitats that include brackish water, riverine and tributaries. The main commercial species are the prawn species. Other species are *tilapia, catfish and barbus*. The proposed Mwache Dam Reservoir will help establish a vibrant fishery because water temperature ranges are conducive from a minimum of 25^0 C in the morning to a maximum of 35^0 C at 3.00 p.m.

Mangroves, intertidal mudflats and shallow brackish water creeks are well known feeding and nursery areas not only for fish but also for crustaceans (crabs and prawns) on which many fish species in the coastal area are found. The fishery in brackish water environment is dominated by Prawns (Kamba). Occasional catches are realized from Rabbit fish (Tafi), Redfin robber (English), Nkwakwa (Pokomo), Milkfish (English), scavengers (Tangu), Mullets (Mkizi), Sardines (Simu), Snappers (Pali). Artisanal fishers use crafts consisting of Dug out (Mtumbwi), Foot fishers, Pointed crafts (Mashua) and Hori with gears such as gillnets, seine nets, hand lines, beach seines, traps and fences. Trawling also takes place in the deep areas (> 5 m) also targeting prawns. The main prawn species targeted are Penaeus indicus, Metapeneaus monoceros, P. semisulcatus, P. monodon and P. japonicas. Images of Redfin robber (English), Nkwakwa (Pokomo), Milkfish (English) found within Mwache creek is presented in the photos below.

However, it is important to note that works at the WTP will not directly interact with such identified fauna, this is because the site is bare and does not provide habitat for such listed species. The works also will not involve large scale excavation that might cause significant sedimentation in Mwache Stream nor require extensive clearance of vegetation cover. Hence impacts to fauna and flora is assessed as minor.

3.7 RECEPTORS WITHIN PROJECT AREA

The assessment identified relevant social baseline receptors that might be exposed to degradation risks associated with the construction of the proposed water line. The receptors are indicated in **Table 3.2**.

Table 3.2: Environmental Receptors

NAME	LOCATION	GPS CORDINATE
Mwache (Bonje) Creek	Gandini	0558734, 9555844
Mwache Forest	Kasemeni	'0560398, 9558200

4. POLICY AND LEGAL FRAMEWORK

At ESIA Stage detailed analysis of the policy, legal and institutional framework governing environmental issues in Kenya for development Projects was discussed with specific focus on Construction of Mwache Dam. This addendum therefore provides additional status that are applicable to Water Treatment Plant with specific focus on impacts that might be triggered during WTP operations. Further, Environmental and Social Risk Management Policy for AFD-funded Operations is also discussed.

4.1 POLICY AND LEGAL PROVISIONS

4.1.1 Kenya Constitution 2010

Kenyan Constitution 2010 in the preamble recognizes the role of environment in sustaining Kenya's heritage for the benefit of future generations. The relevant section of the constitution to the WTP is Chapter 5 that discusses Land and Environment. Part 2 of the chapter defines environment and natural resources, obligations in respect of the environment, enforcement of environmental rights, agreements relating to natural resources and legislation relating to the environment. Section 69 explains each and every citizen's obligations in respect of the environment in subsection (1) it states the following. The State shall:

- ✓ *Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits.*
- ✓ *Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya.*
- ✓ *Encourage public participation in the management, protection and conservation of the environment.*
- ✓ *Establish systems of environmental impact assessment, environmental audit and monitoring of the environment.*
- ✓ *Eliminate processes and activities that are likely to endanger the environment.*
- ✓ *Utilize the environment and natural resources for the benefit of the people of Kenya.*

Part 'iv' is of relevance to these Addendum.

Subsection (2) states:

Every person has a duty to cooperate with state organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

4.1.2 Environment Management And Coordination Act 1999 Cap 386

The Act of parliament that provided for the establishment of a legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto. Just as in the constitution, Part II of EMCA confers to every person the right to a clean and healthy environment and to its judicial enforcement. The Constitution and EMCA therefore obligate Mwache Water Treatment Plant (WTP) to operate in a clean environment and not to contravene the right of any person within its zone of influence to this entitlement.

EMCA has provided for the development of several subsidiary legislations and guidelines which govern environmental management and are relevant to the operations of Mwache Water Treatment Plant. In line with EMCA of 1999 and EIA/EA regulations guidelines, NEMA issued a License .

Applicable EMCA regulations are listed below;

- ✓ *Legal Notice No 101: The Environmental (Impact Assessment and Audit) Regulations, 2003.*
- ✓ *Legal Notice No. 19: Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009.*
- ✓ *Legal Notice no 120: Water Quality Regulations, 2006.*
- ✓ *Legal Notice no 121: Waste Management Regulation 2006.*

Table 4.1 below analyses provision of the above listed EMCA regulations applicable to the Mwache WTP.

Table 4.1: EMCA Regulations Applicable to the Mwache Water Treatment Plant (WTP)

NO	REGULATION	RELEVANCE	APPLICABILITY TO THE PROJECT
1	Legal Notice No. 101: The Environmental (Impact Assessment and Audit) Regulations, 2003	The regulation provides a framework under which environment audit for the Water Works is prepared. Part V of the Regulations outlines requirements for undertaking an environmental audit, projects that should undertake an audit (Regulation 31), procedures for environmental auditing (Regulation 35) details of an environmental audit (Regulation 36) and issuance of improvement orders (Regulation 37).	Coast Water Works Development Agency (CWWDA) is therefore mandated by law to undertake an environmental audit for Mwache Treatment Plant (WTP) after Commissioning and submit the reports to NEMA of its operations as stipulated in these Regulations
2	Legal Notice No. 19: Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009	The regulation provides that wetland resources shall be utilized in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services; and Environmental Impact Assessment and Environmental Audits as required under the Act shall be mandatory for all activities likely to have an adverse impact on the wetland.	in compliance with this regulation, a forestation program has been recommended within the WTP area to be financed under the Project. This initiative will be aimed at conserving Mwache River as provided by the regulation. Also, a Master Meter will be installed at the raw water inlet chamber to measure the water abstraction volume required for calculation of payment for water services to Water Resources Authority (WRA)
3	Legal Notice No 120 Water Quality Regulations, 2006	Regulation 9 of these regulations provides for water quality monitoring. It states that the "Authority in consultation with the relevant lead agency, shall maintain water quality monitoring for sources of domestic water at least twice every calendar year and such monitoring records shall be in the prescribed form as set out in the second schedule to the regulations".	The regulation provides that the operator shall not carry out any activity near rivers, streams and lakes without an EIA license in accordance with the Environmental (Impact Assessment and Audit) Regulations, 2003; Abstract water from rivers, lakes and streams without a valid license from the Water Resource Authority in accordance with the Water Act, 2016.
4	Legal Notice No 121 Waste Management Regulation 2006	Regulation 4 (1) states that "no person shall dispose of any waste on a public highway, street, road, recreational area or in any place except in a designated receptacle". Regulation 4 (2) further states that "a waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations".	In compliance with this regulation, Mwache Water Treatment Plant has included sludge drying beds for both disinfection of sludge by use of UV before disposal

4.1.3 Water Act 2016 and Applicable Water Rules of 2007

At operation stage for Mwache Water works, applicable legal and policy statutes will be guided by the Water Resources Management Rules of 2007 of the Water Act 2016 as detailed in **Table 4.2** below.

Table 4.2: EMCA Regulations Applicable to the Mwache Water Treatment Plant (WTP)

NO	REGULATION	RELEVANCE	APPLICABILITY TO THE PROJECT
1	Approval, Authorization And Permits	Mombasa Water Supply and Sanitation Company (MOWSSCO) should apply and renew water Abstraction permit for Mwache Treatment Works from Water Resources Authority WRA, activities under the Project are listed under the Six Schedule of the Water Rules 2007. Water Rules 2007: Part II - Approval, Authorization And Permits	The regulations provides that no water works approval, authorization and permit shall be issued or renewed for the purposes of supplying water for domestic, public, commercial or industrial use within the limits of supply of a water service provider without the applicant having received consent of the licensed water service provider for the area.
2	Control of Pollution and Water Quality Requirements	Regulation 81 provides that no person shall discharge or apply any poisonous, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit any person to dump or discharge such matter into any water resource unless the discharge of such poisonous, toxic, noxious or obstructing matter, radioactive waste or pollutant is treated to permissible standards as authorized by the Authority	Mwache Treatment Works Preliminary Design Report (PDR) has provided for construction of Sludge drying beds to handle sludge disposal. Further the addendum that ALUM used for coagulation will be procured in enough stocks therefore no wastage and expiry will not be anticipated. Water Rules 2007: Part V Water Quality Monitoring And Effluent Discharge
3	Easement and Compliance with the Environmental Management and Coordination Act	Water Rules 2007: Part VII Conditions Of Authorization, Permits And Approved Water Uses Section 96 provides that subject to the provisions of the Act, every application for an easement shall be in Form WRMA 002 shown in the Thirteenth Schedule.	CWWDA will apply for the easement permit from WRA during construction of 1.6km raw water section of the Pipeline and also abstraction from Mwache River. At operations stage MOWSSACO will be regularly inspect the water pipeline corridor for encroachment and maintain the perimeter fence around the WTP including the dam.
4	Water Use Charges	PART VIII - Water Use Charges 104.(1) Any person in possession of a valid permit or who is required to have a valid permit for water use, shall be required to pay to the Authority water use charges on the basis of the water abstracted, diverted, obstructed or used including energy derived from a water resource at the appropriate rate as set out in the First Schedule	A master meter will be installed at the raw water inlet chamber to measure the water abstraction volume for the purpose of calculating amount due for payment of water services to Water Resources Authority (WRA)
5	Conservation of Riparian	PART IX - Conservation of Riparian And Catchment Areas 120.(1) For the purposes of conserving the catchments and riparian areas, the Authority may by order or state as a condition on an Authorization or Permit, require a person to prepare and conform to a Soil and Water Conservation Plan.	in compliance with this regulation, a forestation program has been recommended within the WTP area to be financed under the Project. This initiative will be aimed at conserving Mwache River as provided by the regulation.

4.1.4 Occupational Health and Safety Act (OSHA) 2007and Public Health Act 2017

At operation stage of the Water works, applicable legal and policy statutes will be guided by the Occupational Health and Safety Act (OSHA 2007) and subsequent regulations. Also the Public Health Act (Cap.242) will apply as detailed in **Table 4.3** below.

Table 4.3: Provisions of OSHA Act 2007 and Public Health Act 2017 (Applicable At Operation Stage)

ACTIVITY FIELDS	REQUIREMENT	RELEVANT ACT (CLAUSES)
Duties Of Occupiers (Legal Requirements)	Risk Assessment Safety and Health Audit Fire Safety Audit Initial Environment Audit	Section 6 (3) of OSHA 2007 *Every occupier shall carry out appropriate risk assessments in relation to the safety and health of persons employed...* Section 11 of OSHA 2007; *The occupier of a workplace shall cause thorough safety and health audit of his workplace to be carried out at least once in every period of twelve months by a safety and health advisor* Section 36 of Fire risk Reduction Rules; 2007 *(1) Every occupier shall cause a fire safety audit of the work place to* *be taken at least once every*
Management of Polices required at the Water Works	Policies Required: • Safety & Health Policy • Fire Safety Policy • Environment Policy	Section 7(1) (b) of OSHA 2007 It is the duty of occupier to bring the statement and any revision of the policy to the notice of all of his employees. Section 7(2) of OSHA 2007 giving implementation obligations
Water Works Personnel Trainings Required	Training required: • Statutory: Fire marshal training Training required: • Statutory: First Aid Training Training required: • Statutory: Safety and Health Committee	Rule 22 of Fire risk reduction rules,2007 *(A firefighting team should be formed and provided fire safety training to enable them effectively discharge their functions)* Rule 7 of First-Aid Rules, 1977 *(No person shall be placed in charge of a first aid unless he has received adequate training and holds a certificate of competence which shall be valid for a period of one year.)* Section 9 (2) b, of OSHA 2007 *The occupier shall be responsible for the training of the members of safety and health committees and safety and health representatives* *Section 12 (1) & (2) of Safety & Health Committee rules, 2004. (All Committee members are to undertake prescribed course).*
Occupational Health Programmes within the Water Works	Statutory Medical Examinations. • Pre-employment • Periodical • Post-employment	Section 21(1) and 21(5), Section 122 of OSHA, 2007 *notification of accident and entering the details in the general register*
	Provision of First Aid Kit – the Water Works was well equipped with First Aid Kits	Section 95 of OSHA 2007 *provision of a first aid box or cupboard of a prescribed standard*
	Documents required: • General register • Accident notification forms	Section 21(1) and 21(5), Section 122 of OSHA, 2007 *notification of accident and entering the details in the general register*

ACTIVITY FIELDS	REQUIREMENT	RELEVANT ACT (CLAUSES)
	Examinations required: All plants, lifting equipment and machinery (as per OSHA 2007) that will be used during construction	Part VII of OSHA 2007 *As the case may apply*
Water Works Operations Safety	Required: Risk assessment Inspection of ladders / scaffoldings	The Factories and other places of Work Act, (Building and Works of engineering construction rules, 1984) Requirement for inspection of ladders/scaffoldings
Permits To Work (PTW)	Permit to Works are required for non-routine hazardous work.	***Section 96(1) & (2) of OSHA, 2007*** *(Employers to issue permits to work to employees likely to be exposed to hazardous work processes. PTW sets out work to be done, hazards involved & precautions to be taken)*
Fire Safety at the Water Works	Requirements: • Fire drill • firefighting equipment • Fire escapes	**Rule 22 of Fire risk reduction rules,2007** *A firefighting team should ensure that fire drills and regular workplace inspections are conducted for purposes of identifying fire risks and recommending remedial measures.* Section 78-82 of OSHA 2007
Emergency Response Plan	Required: • Injury emergency response; • Non entry rescue mission to persons in confined space; • Fire emergency response; • Accidental spill management;	Section 82(1)-(4) of OSHA 2007 *Designing of evacuation procedures for emergency, including accident and fire*
Ergonomics At The Workplace	Requirement: Ergonomic survey	Section 76 of OSHA 2007 *(4)An employer shall not require or permit any of his employees to engage in the manual handling or transportation of a load which by reason of its weight is likely to cause the employee to suffer bodily injury.*
Contractors And Suppliers	Duties of an occupier of place of work to persons other than his employees.	Section 18(01and (2) *Responsibility of a person by virtue of contract*
Personal Protective Equipment	Requirements: • Head, body eye, ear, respiratory tract, hand and foot protection as needed. • Protection from fall from height	Section 101 & 102 of OSHA 2007 *Every employer shall provide and maintain for the use of employees in any workplace where employees are employed in any process involving exposure to wet or to any injurious or offensive substance, adequate, effective and suitable protective clothing and appliances, including, where necessary, suitable gloves, footwear, goggles and head coverings.*

4.1.5 Regulations and Rules

Applicable Regulations and Rules are summarized in **Table 4.4** below were reviewed.

Table 4.4: Regulations and Polices

REGULATION	RELEVANCE	APPLICABILITY TO THE PROJECT
The Environmental (Impact Assessment and Audit) Regulations, 2003	The regulation provides a framework under which Environment Impact Assessment for the Factory is prepared, Regulation 4(1) further states that: (a)"...no Proponent shall implement a project: likely to have a negative environmental impact. (b) for which an environmental impact assessment is required under the Act or these Regulations, unless an environmental impact assessment has been concluded and approved in accordance with these Regulations..."	Provisions of the regulations apply during preparation of this addendum.
Environmental Management and Coordination (Water Quality) Regulations, 2006	Regulation 9 of these regulations provides for water quality monitoring. It states that the "Authority in consultation with the relevant lead agency, shall maintain water quality monitoring for sources of domestic water at least twice every calendar year and such monitoring records shall be in the prescribed form as set out in the second schedule to these regulations". The regulations provides for sustainable management of water resources including prevention of water pollution and protection of water sources (lakes, rivers, streams,' springs, wells and other water sources). Construction of the dam provides for sustainable management of such water resources.	Provisions of the regulations apply during preparation of this addendum.
(Waste Management Regulations, 2006	Regulation 4 (1) states that "no person shall dispose of any waste on a public highway, street, road, recreational area or in any place except in a designated receptacle". Regulation 4 (2) further states that "a waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations".	Contractor will use provisions of this regulation to ensure that waste is handled, stored, transported and disposed as per this regulation.
Noise and Excessive Vibration Pollution (Control) Regulations, 2009	The Contractor will be required to ensure compliance with the above regulations in order to promote a healthy and safe working environment throughout the Construction Phase. This shall include regular inspection and maintenance of equipment and prohibition of unnecessary hooting by vehicles. The regulations provides for a maximum of 60 dBA during the day and 35 dBA during the night for a construction site.	Provisions of the regulations apply during preparation of this addendum.
The Environmental Management and Coordination (Air Quality Regulations 2014)	These regulations provide a framework for management of plant and equipment emissions of hydrocarbons on site. The regulations require that all plant and equipment on site should be well serviced to manufacturers specifications to avoid air pollution, the regulation also require monitoring of baseline air quality within construction site and implementation of correction action where the standards are not complied to.	Water spray will be used at all times when working in dry areas to avoid risks associated with dust menace. Particulate matter (PM_{10}), equipment's will be operated as provided by manufacturers specification to eliminate cases of Oxides (SOx), Nitrogen Oxides (NOx)) and Volatile Organic Compounds (VOC).
Fire Risk Reduction Rules, 2007	The rules require electrical equipment be installed in accordance with the respective hazardous area classification system, flammable materials are stored in appropriately designed receptacles, electrical equipment is inspected after six months by a competent person and the Proponent is required to keep records of such inspections, installation and maintenance of firefighting systems in workplaces, fire drills at least once a year, assembly points be marked, undertake	The contractor will be required to store all flammable materials and liquids safely to avoid risk of fire.

	annual fire safety audits etc.	
Medical Examination Rules, 2005	It requires workers on site to undergo regular medical examination to identify the symptoms of hazardous exposures on the body, especially those who handle food or food products. This is with a sole purpose of monitoring exposure for remedial action.	The contractor will institute and implement regular medical examinations for its staff at the facility. These will include COVID 19 temperature checkup and drug abuse (at least alcohol on daily basis).
Safety and Health Committee Rules of 2004	These rules require the proponent and contractor (once they employ a more than twenty persons) to establish a committee to address the health, safety and welfare of workers. The Proponent and by extension the contractor, are required to provide space for meetings for the committee, training of the S&H Committee, appoint a S&H management representative, as well as allowing all staff to attend these meetings with no risk of loss of earnings, opportunities for promotion or advancement. They should also make legislation on occupational safety and health available to the Committee.	The contractor will develop a clearly defined safety and health policy, bring it to the notice of all employees at the workplace. They are also required to implement and review the policy when need arises. If construction workers exceed 20, the contractor will facilitate the formation of a S&H Committee and its operations.
First-Aid Rules, 1977	Rule 7 of First-Aid Rules, 1977 require that (No person shall be placed in charge of a first aid unless he has received adequate training and holds a certificate of competence	The contractor will conduct first aiders' training for the first time and a refresher training Bi-annually.

4.1.6 National Water Quality Standards

The PDR report provides that the WTP will conform to provisions of national regulatory drinking water quality standards and WHO water quality guidelines, whichever is stringent. Regular monitoring to determine compliance will be done by CWWDA and corrective/ mitigation measures applied where necessary. The standards are provided in **Table 4.5** below.

Table 4.5: National Drinking Water Quality Standards

PARAMETER	UNITS	GUIDELINE VALUE
Aluminium	mg/L	0.05 - 0.2
Chloride	mg/L	<250
Color	Hazen	<15
Copper	mg/L	<1.0
Corrosivity	-	Non – corrosive
Fluoride	mg/L	<2.0
Foaming Agents	mg/L	<0.5
Iron	mg/L	<0.3
Manganese	mg/L	<0.05
Odour	Odour threshold level	<3
Ph	Sorensen scale	6.5-8.5
Silver	mg/L	<0.10
Sulphate	mg/L	<250
Total Dissolved Solids	mg/L	<500
Zinc	mg/L	<5
Sodium	mg/L	<200
Chlorine	mg/L	0.2+ -0.5
Magnesium	mg/L	<100
Ammonia	mg/L	<0.5
Mercury	mg/L	<0.001
Nitrate	mg/L	<10
Fluoride	mg/L	<1.5
Arsenic	mg/L	<0.05
Cadmium	mg/L	<0.05

Source-NEMA

Table 4.6: Microbiological Limits for Drinking Water

TYPE OF MICROBES	PRESENT/ABSENT
Total viable counts at 37^0C per ml, Max	100% Present
Coliforms in 250 ml	Absent
E. Coli in 250 ml	Absent
Staphylococcus aureus in 250 ml	Absent
Sulphite reducing anaerobes in 50 ml	Absent
Pseudomonas aeruginosa Fluorescence in 250 ml	Absent
Steptococuus faecalis	Absent
Shingella in 250 ml	Absent
Salmonella in 250 ml	Absent

Source-NEMA

4.1 ENVIRONMENT AND SOCIAL STANDARDS (ESS) OF THE WORLD BANK

At the time of preparation of the ESIA 2016, Environment and Social Standards (ESS) published in 2017 was not assessed. The ESIA adopted the use of Operational Policies (OP). Therefore, under this addendum review of Environment and Social Standards (ESS) of the World Bank is presented in **Table 4.7 below.**

Table 4.7: World Bank Environment and Social Standards

STANDARD	PROVISION	RELEVANCE TO THE PROJECT
(ESS1) Assessment and Management of Environmental and Social Risks and Impacts	(ESS1) Assessment and management of environmental and social risks and impacts which provides for (i) Environment Assessment (ii) Development of Environmental and Social Commitment Plan (ESCP), (iii) Project monitoring and reporting (iv) Stakeholder engagement and information disclosure. The main focus of the standard is to promote environmental and social sustainability in the Program design; avoid, minimize, or mitigate adverse impacts, and promote informed decision-making relating to the Program's environmental and social impacts;	An addendum to the Environmental and Social Impact Assessment prepared for the Mwche Dam is required, the Addendum details Environment and Social Risks Associated with the proposed Water Treatment Plant.
(ESS2) Labor and Working Conditions	ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. The standard objectives include among others; To promote safety and health at work, To promote the fair treatment, non-discrimination and equal opportunity of project workers, To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with the (ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate among others	The addendum discusses Project Social Impacts, appropriate provisions have been provided to mitigate impacts related to Worker and Community Health and Safety and Workers Management
(ESS3) Resource Efficiency Pollution	ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources	The addendum discusses possible impacts to Biophysical

STANDARD	PROVISION	RELEVANCE TO THE PROJECT
prevention and Management	that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The policy objective among other include; to promote the sustainable use of resources, including energy, water and raw materials and; To avoid or minimize adverse impacts on human Health and the environment by avoiding or minimizing pollution from project activities among others.	resources ranging from Water, Soil and Air and Biological resources including Fauna and Flora.
(ESS4) Community Health and Safety	ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities. The policy objectives among others include; to anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstances and to promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure.	Appropriate provisions have been provided to mitigate impacts related to Worker and Community Health and Safety and Workers Management
(ESS5) land Acquisition, restrictions on land Use and involuntary resettlement.	ESS5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons .Project-related land acquisition or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income Sources or other means of livelihood), or both.	In line with the Standard, Land Acquisition has been undertaken by the National Lands Commission (NLC) on behalf of the Ministry of Water and Sanitation
(ESS6) Biodiversity Conservation and Sustainable Management of Living Natural Resources	ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. The policy recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. The policy objectives include among others include; to protect and conserve biodiversity and habitats and to apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity	The addendum discusses possible impacts to Biophysical resources ranging from Water, Soil and Air and Biological resources including Fauna and Flora.
(ESS8) Cultural Heritage	ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. The policy objectives include; to protect cultural heritage from the adverse impacts of Project activities and support its preservation; to address cultural heritage as an integral aspect of sustainable	Chance find procedures to be adopted in the event such resources are encountered during Project construction phase.

STANDARD	PROVISION	RELEVANCE TO THE PROJECT
	development; to promote meaningful consultation with stakeholders regarding cultural heritage; to promote the equitable sharing of benefits from the use of cultural heritage.	
(ESS10) Stakeholder Engagement and Information Disclosure	This ESS recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.	Appropriate stakeholder consultations were done during preparation of the ESIA report and during ESIA review stage by NEMA

4.2 ENVIRONMENTAL AND SOCIAL RISK MANAGEMENT POLICY FOR AFD-FUNDED OPERATIONS

The policy provides that any development operation may involve potentially adverse risks, particularly in terms of environmental and social impacts.

Consequently, AFD's financing is conditional upon the implementation by the client of continuous and systematic environmental and social assessment procedures to (i) assess the environmental and social impacts of operations, (ii) propose appropriate measures to avoid the negative impacts or, when they are unavoidable, reduce or offset them in an appropriate manner, (iii) monitor the application of such measures during the implementation phase of the operation, and (iv) conduct an ex post evaluation of the effectiveness of the proposed measures.

The systematic environmental and social assessment of operations aims to ensure that they are environmentally and socially sustainable, contribute to integrating environmental and social considerations into the decision-making process of all the stakeholders, and provide a strong framework to manage financial and reputational risks run by AFD.

Further, the policy provides under ADF principles that the client is responsible for conducting the environmental and social assessment of its project. It mobilizes the expertise and environmental and social resources required at the various stages of the project implementation (feasibility, detailed design preparation, construction, operation, decommissioning) and contractually commits to respect the environmental and social performance targets agreed during the appraisal of the financing and set out in the financing agreement with AFD. The client monitors and documents the application of the environmental and social management measures during the implementation of the project activities. It also implements the preventive actions required to remove the potential causes of a failure and the remedial actions required when a failure is identified. It regularly informs AFD about this through periodic progress reports.

AFD assists the client in defining its environmental and social objectives and verifies their implementation throughout the project cycle. The addendum to the Environmental and social impact assessment (ESIA) prepared for Mwache Dam has been prepared to conform to this principle.

5. ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS POSED BY THE WATER TREATMENT PLANT (WTP)

5.1 INTRODUCTION

This section discusses assessment of Environment and Social Impacts associated with Construction and Operation of Water Treatment Plants of Similar Nature. These impacts were identified after review of (i) Background biophysical information, legal and regulatory issues associated with the prosed Mwache Dam Water Treatment Plant (WTP) (ii) field visit to proposed WTP site and (iii) Study of documents and Reports related to the Project, these included; Environment Impact Assessment Study Report (ESIA 2016), Environmental License Conditions (**NEMA/EIA/PSL/5204)**

5.2 CONSTRUCTION PHASE POSITIVE IMPACTS

Project positive impacts during construction phase are summarized below.

- **Employment Creation**: At construction stage workers will be deployed to help in construction and land preparation activities. This will include both skilled and unskilled personnel especially from the *local population with approximately 200 direct and indirect jobs.*
- **Income/Revenue to Government**: Income to government will be realized in terms of taxes generated during the acquisition of relevant statutory licenses. Materials to be used during construction will also be taxable (16% VAT). Through revenues generated, the government will be capable of financing its responsibility to her citizens.
- **Income to Other Businesses**: During implementation of the project, there will be need for transporters, suppliers of raw materials and other service providers, who will benefit from the proposed development.

5.3 OPERATION PHASE POSITIVE IMPACTS

Positive project impacts during operation phase are summarized below.

- Availability of water for domestic use, the project will ensure a reduction in the distance between the various households and the water collection points as compared to the long distances initially covered from the homesteads to water points.
- Reduction in poverty levels of many households, this will be as a result of the availability of reliable water for domestic use, households will therefore engage more time in other income streams.
- Employment opportunities will be created both to those working directly in the WTP under WTP Operator
- Improved public hygiene and sanitation and at home because of water availability.

5.4 WATER TREATMENT PLANT CONSTRUCTION PHASE NEGATIVE IMPACTS

5.4.1 Impact On Physical Resources And Receptors

Water Resources

Baseline Situation

Mwache River is the main water body (though it is seasonal by nature) in the project area with its source in the Taita hills. The main tributaries (also seasonal) discharging into the river include Bome river from the south immediately downstream of the proposed dam axis lines and Mnyenzeni river also from the southwest immediately upstream of the dam axis. There are also numerous dry surface drains into Mwache River that seemingly flows with water only during rainy seasons. Mwache River Catchment forms the main receptor at risks related to sedimentation and pollution from project related activities

Impact

There will be indirect or direct interaction in the case of erosion of soils into seasonal streams that drain runoff from the WTP. Further, site activities such as excavations during trench excavation and levelling at reservoir sites could result to loosening of soils that could result to sedimentation and siltation of storm water drainage channels and eventually flowing into seasonal streams. There will be direct interaction from the abstraction of water from seasonal stream for construction activities (e.g., for dust control), equipment on site could result to oil and fuel leaks that could contaminate seasonal streams altering the chemical composition of the water bodies and affecting aquatic organisms in the seasonal streams.

Mitigation

- Discharge of Grey water or uncontrolled discharges from the site/working areas (including wash down areas) to adjacent rivers shall not be permitted
- Water containing pollutants such as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for planned removal from site
- The drainage system will be developed to prevent silt-laden runoff from entering surface water drains and streams without treatment (e.g. earth bunds, silt fences, straw bales, or proprietary treatment) under any circumstances
- Earth stockpiles will be seeded as soon as possible, covered with geotextile mats or surrounded by a bund to minimise the risk of sediment-rich runoff
- Tools and plant will be cleaned in designated areas within the site where runoff can be isolated for treatment before discharge to the river
- Debris and other material will be prevented from entering watercourses; Construction sites (such as settlement lagoons or other temporary attenuation) to be used during construction if necessary; Diversion of minor watercourses will be carefully managed to prevent suspension of silt (or contamination by other pollutants)
- Discharge into watercourses and water bodies will only be carried out under consent of the relevant governing bodies such as WRA
- All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate Waste Management Plan (WMP)
- At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among others: Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.

Soil Resources

Baseline Information

The soils type at the Water Treatment Plant (WTP) is sandy clayey gravel at depths of 2 – 2.5m deep. The soil types have a strong correlation with the geology and topography of the region and differ widely in depth, texture, physical and chemical properties with variations running parallel to the coastal line due to sedimentation process

Potential Impacts

Soil excavation for construction of the proposed WTP will disrupt the soil cohesion and also may result in surplus soil due to installation of the gabions within the same excavated areas. If not properly restored or managed, such soils may erode and wash into nearby seasonal streams thereby increasing the sediment load.

Mitigation

The following mitigation measures will be implemented to minimize the potential for soil erosion:

- Vegetation clearing and topsoil disturbance will be confined and minimized.
- Contour temporary and permanent access roads / laydown areas so as to minimize surface water runoff and erosion.
- Sheet and rill erosion of soil shall be prevented where necessary through the use of sand bags, diversion berms, culverts, or other physical means.
- Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated.
- Wherever possible construction work will take place during the dry season.
- Topsoil shall be evenly spread across the cleared areas when reinstated.
- Accelerated erosion from storm events during construction shall be minimized through managing storm water runoff (e.g., velocity control measures).
- Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile.
- Spread mulch generated from indigenous cleared vegetation across exposed soils after construction
- At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.

Air Quality Impacts

Baseline Information

The settlements adjacent to Mwache Dam have been compensated and relocated away from the Project area. Therefore, not settlement is anticipated to be impacted by air quality pollution associated with dust and particulate matter. However, construction workers during Project construction phase might be impacted is air quality impacts are not well mitigated. Indirect impact could associated with dust and particulate matter caused by trucks driving on murrum roads in the villages supplying construction materials to the WTP. The villages include among others; Mwatate, Mataa, Gandini, Mwavumbo, Fulugani and Mazeras. **Table 5.1 and 5.2** presents WHO Ambient Air Quality Guidelines and Ambient Air Quality Tolerance Limits respectively.

Table 5.1: WHO Ambient Air Quality Guidelines

WHO AMBIENT AIR QUALITY GUIDELINES 7,8		
	AVERAGING PERIOD	GUIDELINE VALUE IN MG/M³
Sulfur dioxide (SO2)	24-hour 10 minutes	125 (Interim target-1) 50 (Interim target-2) 20 (guideline) 500 (guideline)
Nitrogen dioxide (NO2)	1-year 1-hour	40 (guideline) 200 (guideline)
Particulate Matter PM10	1-year 24-hour	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline) 150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter PM2.5	1-year 24-hour	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline) 75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

Source: IFC/WBG

Table 5.2: Ambient Air Quality Tolerance Limits

POLLUTANT	TIME WEIGHTED AVERAGE			
		Industrial Area	**Residential, Rural & Other Area**	**Controlled Areas**
Sulphur oxides (SOX);	Annual Average	80 ug/m³	60 ug/m³	15 ug/m³
	24 hours	125 ug/m³	80 ug/m³	30 ug/m³
	Annual Average		0.019 ppm/50ug/m³	
	Month Average			
	24 Hours		0.048ppm /125ug/m³	
	Instant Peak		500 ug/m³	
	Instant Peak (10 min)		0.191 ppm	
Oxides of Nitrogen (NOX);	Annual Average	80 ug/m³	60 ug/m³	15 ug/m³
	24 hours	150 ug/m³	80 ug/m³	30 ug/m³
	Annual Average		0.2 ppm	
	Month Average		0.3 ppm	
	24 Hours		0.4 ppm	
	One Hour		0.8 ppm	
	Instant Peak		1.4 ppm	
Nitrogen Dioxide	Annual Average	150 ug/m³	0.05 ppm	
	Month Average		0.08 ppm	
	24 Hours	100 ug/m³	0.1 ppm	
	One Hour		0.2 ppm	
	Instant Peak		0.5 ppm	

POLLUTANT	TIME WEIGHTED AVERAGE			
Suspended Particulate Matter	Annual Average	360 ug/m³	140 ug/m³	70 ug/m³
	24 hours	500 ug/m³	200 ug/m³	100 ug/m³
	Annual Average		100 ug/m³	
	24 hours		180 ug/m³	
Respirable Particulate Matter (<10□m) (RPM)	Annual Average	70 ug/m³	50 ug/m³	50 ug/m³
	24 hours	150 ug/Nm³	100 ug/Nm³	75 ug/Nm³
PM2.5	Annual Average	35 ug/m³		
	24 hours	75 ug/m³		
Lead (Pb)	Annual Average	1.0 ug/Nm³	0.75 ug/Nm³	0.50 ug/m³
	24 hours	1.5 ug/m³	1.00 ug/m³	0.75 ug/m³
	Month Average		2.5	
Carbon monoxide (CO)/ carbon dioxide (CO_2)	8 hours	5.0 mg/m³	2.0 mg/m³	1.0 mg/m³
	1 hour	10.0 mg/m³	4.0 mg/m³	2.0 mg/m³
Hydrogen Sulphide	24 hours	150ug/m³		
	instant Peak	700ppb		
Total VOC	24 hours	600 ug/m³		
Ozone	1-Hour	200 ug/m³	0.12 ppm	
	8 hour (instant Peak)	120 ug/m³	1.25 ppm	

Source-IFC/WBG

Potential Impacts

Project activities that have potential to impact air quality would be associated with emissions of air pollutants from temporary power generators, construction equipment, and vehicles. Construction activities will also create dust. The following would be expected during construction. Emissions of oxides of nitrogen (NO_2 in particular) mainly from construction-related vehicles (and to a lesser degree from construction generators and other hydrocarbon powered equipment); and Dust and particulate matter (as PM_{10}) created by construction-related vehicle traffic on unpaved roads. However, once the WTP is built and operational and the site is reinstated, no significant effects on air quality are anticipated.

Mitigation

- Develop and implement a Dust Management Plan (DMP) and Undertake inspections to ensure compliance with the Dust Management Plan;
- Record all dust and air quality complaints, identify cause(s), take appropriate
- Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring as parameter
- Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible;
- Impose speed limits on haul routes and in construction compounds to reduce dust generation;
- Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and
- Revegetate exposed areas as soon as feasible;
- Revegetate or cover stockpiles if feasible;
- Expose the minimum area required for the works, and undertake; and exposure on a staged basis to minimise dust blow.

Noise and Vibration

Standard

The World Bank Group General EHS Guidelines provide guidance on acceptable noise levels based on WHO standards and these are set out in **Table 5.3**.

Table 5.3: World Bank Group Noise Level Guidelines

	MAXIMUM ALLOWABLE AMBIENT NOISE LEVELS, LAEQ,1HR, DBA FREE FIELD	
	DAYTIME	NIGHT-TIME
	07:00 – 22:00	22:00 – 07:00
Residential, institutional, educational	55	45
Industrial, commercial	70	70

National Environment Management Authority (NEMA) noise levels, maximum permissible noise levels for construction sites (Measurement taken within the facility) are shown **Table 5.4**.

Table 5.4: NEMA Noise Level Guidelines

SITE	DAY	NIGHT
Health facilities, educational institutions, homes for disabled	60dBA	35dBA
Residential	60dBA	35dBA
Other areas	75dBA	65dBA

Impacts

The equipment and plant used during construction will generate noise during construction activities that might affect communities living and working near to the works. However, this impact will not be significant.

Mitigation

- Siting noisy plant and equipment as far away as possible from human settlement, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable;
- Where practicable noisy equipment will be orientated to face away from the nearest human settlement and other receptors;
- Working hours for significant noise generating construction work (including works required to upgrade existing access roads), will be daytime only;
- Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable;
- Where practicable, stationary equipment will be located in an acoustically treated enclosure;
- For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals;
- Throttle settings will be reduced and equipment and plant turned off, when not being used;
- Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and fitting of mufflers or silencers of the type recommended by manufacturers.

5.4.2 Impact on Biological Resources and Receptors

Flora and Fauna

Baseline

Flora of the Water Treatment Plant (WTP) Site is influenced by the Mwache Forest which is adjacent to the site. However, specific site exhibits Arid and Semi-Arid (ASAL) characteristics. In terms of Agro-ecological zone classification, the site is located within Agro Ecological Zones (AEZ) three. Vegetation cover observed include include various species of *acacia Sp. Acacia ssp, Diospyros ssp, Cynometra-Manilkara type and Euphorbia bushland,* other exotic trees include *Tamarind tree, Neem tree, Flame Tree.*

Impact

The Project activities will not directly interphase with the above discussed Flora and Fauna and therefore the impact is assessed to be minimal, occasionally triggered by invasion by non-native plant species. Loss of plant communities may also result in soil erosion or compaction. The loose soil material may also be washed down into the lower areas (streams and valleys).

Mitigation

The following standard mitigation measures will be employed

- Ensure proper demarcation and delineation of the project area to be affected by construction works;
- It is recommended that indigenous trees or other fast-growing trees be planted in strategic locations where the vegetation cover will be cleared as part of landscaping initiatives;
- Compensatory planting of trees i.e. plant at least twice the number of affected trees
- The use of existing cleared or disturbed areas for the Contractor's Camp, stockpiling of materials etc. shall be encouraged.
- Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible.
- Reinstatement of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants

5.4.3 Impact on Social Resources and Receptors

Workers and Community Health Safety

Baseline

The settlements adjacent to Mwache Dam have been compensated and relocated away from the Project area. Therefore not settlement is anticipated to be impacted by air quality pollution associated with dust and particulate matter. However, construction workers and Community members living in adjacent villages (Mwatate, Mataa, Gandini, Mwavumbo, Fulugani and Mazeras) during Project construction phase might be impacted by risks related to Health and Safety

Impact Assessment

During construction there will be an increase in traffic movements of heavy machinery and light vehicles on roads within the project area. This will include, pipe delivery trucks, cement trucks, transport of construction material, excavation machinery, etc. which is expected to increase the risk of road traffic accidents and potential injuries or fatalities to other road users. Also, open un-barricaded trenches or

without warning tapes could fill up with water during rainy seasons and expose the community to the risk of drowning as well as trip and fall.

Mitigation

The following mitigation measures will be implemented during the construction phase to reduce any impacts on community health and safety.

- To reduce on the workers accidents and hazards, Contractor will develop and monitor implementation of a Community Health and Safety Management Plan (CHSMP) which will include the following measures:
- Workers will be provided with suitable PPEs to avoid cuts on the feet, hands and head during the course of duty. These include helmets, gloves, safety boots overalls, face masks and ear plugs in dusty and noise activities;
- Provision of adequate sanitary facilities to workers, separate for either gender.
- Train all workers on Safety Health and Environment (SHE) with an aim of improving awareness;
- The workers or their representatives will be trained on first aid and provided with first aid kits
- Trenches over 1.5m deep will be secured against accidental entry by workers and the public using barriers and warning tapes.
- The contractor will install appropriate safety signage along the work areas;
- Emergencies: the workers should be provided with emergency telephone numbers to request for assistance at any time of accident
- Where construction activities interfere with the movement of traffic, appropriate signage will be installed and controlled by trained flagmen/flag women and lit by night.
- Public awareness/Training for first aid providers/divers

Gender Based violence and Sexual Harassment

GBV constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. All forms of GBV including grooming are unacceptable be it on the work site, the work site surroundings, or at workers' camps. Prosecution of those who commit the offence to be pursued.

This impact triggered during Project Construction Phase is likely to occur. Therefore, below listed provisions are provided in order to mitigate against such GBV related Project induced impacts.

Mitigation Measures

- The contractor will mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 Gender Rule.
- The existing community structures headed by location chiefs should be involved in local labour hire, emphasize the requirement of hiring women, youth and people with disability and VMGs.
- Protecting Human Risk Areas Associated with Disadvantaged Groups, Interfering with Participation Rights and interfering with Labour Rights:
- Treat women and children (persons under the age of 18) with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
- Do not use language or behaviour towards women or children that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
- Sexual activity with children under 18—including through digital media is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense.
- Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behaviour is prohibited.

- Sexual interactions between contractor's and consultant's employees at any level and member of the communities surrounding the workplace that are not agreed to with full consent by all parties involved in the sexual act are prohibited. This includes relationships involving the withholding, promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex – such sexual activity is considered "non-consensual" within the scope of this Code.
- Where an employee develops concerns or suspicions regarding acts of GBV by a fellow worker, whether in the same contracting firm or not, he or she must report such concerns in accordance with Standard Reporting Procedures.
- All employees are required to attend an induction-training course prior to commencing work on site to ensure they are familiar with the GBV Code of Conduct.
- All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV Code of Conduct.

Sexual Exploitation and Abuse (SEA)

This impact refers to sexual exploitation and abuse committed by Project staff against communities and represents a risk at all stages of the Project, especially when employees and community members are not clear about prohibitions against SEA in the Project.

Mitigation Measures

- Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018).
- Prevention of SEA: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials;
- Response to SEA: *including survivor-centered coordinated multi-sectoral referral* and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management;
- Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of Sexual Exploitation and Abuse (SEA) awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their SEA-related rights;
- Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle-blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.

COVID19 Among Construction Workers

During project execution (civil works), large numbers of workers will be required to assemble together in meetings, toolbox talks and even at work sites; varied number of workforce including suppliers of material and services are also expected to come in from various places in the country which may be COVID-19 hot spots; and interaction of workers with the project host community will happen as workers find accommodation close to work sites, and/or return to their homes after works. The potential for the spread of any infectious disease like COVID-19 by projects is high. There is also the risk that the project may experience large numbers of its workforce becoming ill and will need to consider how they will receive treatment, and whether this will impact on local healthcare services including the project host community. The presence of international workers, especially if they come from countries with high infection rates, may also cause social tension between the foreign workers and the local populations.

COVID-19 – Mitigation Measures against spread of COVID-19 amongst Workers:

- The Contractors will develop SOPs for managing the spread of Covid-19 during project execution and submit them for the approval of the Supervision Engineer and the Client before mobilizing to site. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions;
- Mandatory provision and use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including workers and visitors;
- Avoid concentration of more than 15 workers at one location. Where there are two or more people gathered, maintain social distancing of at least 2 meters;
- All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening, which may include temperature check and other vital signs;
- The project shall put in place means to support rapid testing of suspected workers for covid-19;
- Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including consultation venues and meetings and ensure they are used;
- Ensure routine sanitization of shared social facilities and other communal places routinely including disinfection of workstations, door knobs, hand rails etc.;

5.5 OPERATION PHASE NEGATIVE IMPACTS

5.5.1 Permits and Licenses Required for the WTP

The Plant Operator will apply and secure below listed permits in **Table 5.5** before commissioning of the Water Treatment Plant

Table 5.5: Permits and Licenses Required

PERMIT	REQUIREMENT	RELEVANT REGULATION / RULE
Approval, Authorization and Permits	WTP Operator will apply and renew water Abstraction permit for Mwache Water Treatment (WTP) Plant from Water Resources Authority (WRA), activities under in are listed under the Six Schedule of the Rules.	Water Rules 2007: Part II - Approval, Authorization and Permits
Control of Pollution and Water Quality Requirements	Mwache Water Treatment Plant PDR has provided for appropriate handling of sludge as summarized in sub section 5.5.3 below. Additionally, procurement of reagent will be done in batches with enough doses to eliminate the risk of some of the reagent expiring therefore requiring disposal.	Water Rules 2007: Part V Water Quality Monitoring and Effluent Discharge
Water Use Charges	A master meter will be installed at the raw water inlet chamber to measure the water abstraction volume for the purpose of calculating amount due for payment of water services to Water Resources Authority (WRA	PART VIII - Water Use Charges

5.5.2 Management of Backwash Water from the WTP

Filtration acts as the final step in the removal of suspended matter and protozoa in Water Treatment Plant. The accumulated residue is removed during the backwash process and any subsequent recycling of filter backwash water could potentially re-introduce these contaminants into the main treatment process.

By separating the filter backwash water from the main treatment process, factors that could interfere with the integrity of the primary treatment barriers, will be eliminated. Treatment and recovery of the filter backwash water would be beneficial in terms of water reuse, by replacing a proportion of the freshwater demand.

For Mwache Water Treatment Plant (WTP) the PDR provides for; filter backwash, Wash water pumps and air blowers and Wash Water Supply Tank. The PDR provides that this tank is part of the treated water tank, separated from it by a wall. The UV disinfected water goes first to the wash water supply tank and when it is full, the overflow goes to the rest of the tank. The injection of chlorine occurs after this tank. In this way the water used for the filter washing is disinfected only by UV.

5.5.3 Erosion Control at Washouts

The PDR provides that in order to control erosion of soils at the outfalls of the washout valves along the raw water transmission pipeline from the dam outlet to the WTP. The Project design provides for construction of a concrete chamber filled with stone. The outlet for the washout valve water before the water drains into the storm water channels. This measure will significantly reduce back wash water pressure ultimately eliminating corrosion impact of the back wash outfall that would have otherwise eroded soil.

5.5.4 Sludge Management

Surface water treatment for potable supplies typically involves coagulation, flocculation, sedimentation, and filtration processes for removing colloidal as well as suspended solids from raw water. All Water Treatment Plants (WTPs) produce waste/residue known as Water Treatment Sludge (WTS) during the purification of raw water.

The PDR provides that for Mwache Water Treatment Plant (WTP), sludge will be generated mainly from flotation and filters backwash. The PDR provides that sludge coming from fine screening has been considered as negligible.

The sludge from the clarifiers is sent to two conventional static thickeners. The extracted sludge, at the average concentration of 3 g/l of SS is thickened up to 15 g/l, using a polymer as flocculant. Thickeners are circular in shape, fitted with a rotary mechanism with scrapers in the bottom and a picket fence. The very slow rotation helps for the releasing of the interstitial water of the sludge and pushes the sludge down into the sludge hopper for the extraction pumping. The overflow is discharged to the dam.

The drying beds achieve the dewatering of the sludge, allowing an easy handling and evacuation. The drying beds are made of:

- ✓ A first layer of gravel including the drains, 15 cm.
- ✓ A second layer of sand for the filtration, 20 cm.

The operation comprises:

- ✓ A first phase of filling, about 20 days, meanwhile part of the volume is eliminated by overflow, after settling of the sludge. At this end of this period, the filling is stopped. Others beds are required to continue the treatment.
- ✓ A second phase, with a variable duration, depending on the weather conditions, for the atmospheric drying of the sludge. After the drying period, the dry solid content can reach 40% with good conditions.

5.5.5 Management of Reagents at the WTP

Analysis of Reagent on Site During operation of the WTP is summarized in **Table 5.6** below.

Table 5.6: Management of Reagents on Site

Reagent	Details
Aluminium sulphate	Aluminium sulphate is used to remove organic compounds from wastewater and potable water, the chemical encourages small particles to cling to larger particles in water. When the large particles are filtered out, much of the aluminium sulphate goes with them. While aluminium sulphate can't remove pathogens or bacteria, the coagulation process reduces the presence of dissolved substances in water, which means less chlorine is needed for disinfection. The product is used in its powder form and stored in big bags. The product is dissolved in a tank by stirring. The tank is made of HDPE or PP because of the acidity of the solution. All injection pipes will be double-skined.
Sulphuric Acid	The product is used in its liquid form and delivered by tanker on site. The acid is store in a tank made of HDPE or PP because of the acidity of the solution. All injection pipes will be double-skined.

Polyelectrolyte or Polymer	Polymer is required for sludge thickening. The product is used in its powdered form and stored with bags. The preparation is done by automatic unit. The preparation will be made in continuous. The injection will be at the entrance of flocculators.
Calcium hypochlorite	The calcium hypochlorite is stored in the form of powder. It is prepared when needed by dissolution in a tank with agitator
Hydrated Lime	Hydrated lime will be stored in the form of powder. It is prepared when needed by dissolution in a tank with agitator

All the reagent listed above can be harmful to humans, causing severe burns if it touches bare skin and irritation and coughing if inhaled

For Mwache Water Treatment Plant, PDR has provided for a well ventilated and proper lighting chemical storage house. Further, personnel handling the reagents will be provided with appropriate PPEs such as gloves, nose masks and googles to protect them from the chemical. Also, procurement of reagent will be done in batches with enough doses to eliminate the risk of some of the reagent expiring therefore requiring disposal.

5.5.6 Sewerage Management from WTP and Base Camp

The Environment License issued for the Project provided that the Proponent shall ensure that all wastewater is disposed as provided by Water Quality Regulation of 2006. The PDR has provided construction of a septic tank which will collect sewage from toilet facilities at that staff houses and toilets within the water treatment plant for treatment and Base Camp and safe disposal.

5.5.7 Fencing of the Water Treatment Plant and Base Camp

Securing the Water Treatment Plant and Base Camp is an important measure of ensuring safety of the water supplied to the community and elimination of incidences related to livestock and human drowning in the sedimentation tanks. For Mwache Water Treatment Plant and Base Camp, fencing of the facilities is among the site Auxiliary activities of the Project provided in the PDR.

5.5.8 Aesthetic and Hygiene within the WTP and Base Camp

The assessment provides that the WTP and Base Camp shall be well maintained, the lawns will be well moored and foot path within the Treatment Plant kept free from dead plant biomass. Further, the Plant Operator will contract a cleaning firm that ensures that the Water Treatment Facilities are well maintained in terms of Aesthetics and Hygiene

5.5.9 Afforestation Program within the WTP and Base Camp

The Water Rules 2007, Part (ix) on Conservation of Riparian and Catchment Areas regulation 120.(1) provides that for the purposes of conserving the catchments and riparian areas, the authority may by order or state as a condition on an authorization or permit, require a person to prepare and conform to a Soil and Water Conservation Plan (SWCP). In compliance with this regulation, a forestation program in liaison with Kenya Forest Services (KFS) will be initiated within the WTP and dam peripheries.

6. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMP)

6.1 PURPOSE AND OBJECTIVES OF ESMP

The specific objectives of the ESMP are to:

- Serve as a commitment and reference for the Contractor to implement the ESMP including conditions of approval by NEMA.
- Serve as a guiding document for the environmental and social monitoring activities during construction and operation of the Water Treatment Plant (WTP).
- Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment, health and safety of workers and community.
- Provide instructions to relevant project personnel regarding procedures for protecting the environment and minimizing environmental effects, thereby supporting the operator's goal of minimal or zero incidents.
- Document environmental concerns and appropriate protection measures while ensuring that appropriate actions are completed promptly.

6.2 ESMP DURING CONSTRUCTION OF THE WTP AND BASE CAMP

The Environmental, Social Management and Monitoring Plan (ESMP) prepared for proposed Mwache Water Treatment Plant (WTP) and Base Camp is presented in **Tables 6.1**.

Table 6.1: Environment and Social Management Monitoring Plan during Construction of WTP and Base Camp

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
Impacts on Water Resource	• Site activities such as excavations and levelling could result to loosening of soils that could result to sedimentation and siltation of storm water drainage channels and eventually into seasonal Streams the drain runoff from the WTP • Un-serviced plant and equipment on site could result to oils and fuels leaks that could contaminate water resources rising the BoD and adversely affecting aquatic organism in seasonal Streams.	• All waste water which may be contaminated with oily substances must be managed in accordance with an appropriate Waste Management Plan (WMP). • No hydrocarbon-contaminated water may be discharged to the environment. • At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.	Contractor	• State of natural storm water drainage channels • Quality of water flowing within seasonal Streams that drain runoff from the WTP the monitoring frequency shall be quarterly	Preliminary Sum of Ksh 500,000 to be allowed for water pollution control
Impacts on Soil Resource	• Soil include erosion resulting from activities such as excavation and levelling, clearing of vegetation for infrastructure such as access roads, laydown areas and construction zones • Soil contamination as a result of possible oil and fuel leaks from un services plant and equipment on site.	• Vegetation clearing and topsoil disturbance will be minimized. • Contour temporary and permanent access roads / laydown areas so as to minimize surface water runoff and erosion. • Sheet and rill erosion of soil shall be prevented where necessary through the use of sand bags, diversion berms, culverts, or other physical means. • Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. • Wherever possible construction work will take place during the dry season. • Topsoil shall be evenly spread across the cleared areas when reinstated. • Accelerated erosion from storm events during construction shall be minimized through managing	Contractor	• State of natural storm water drainage channels • Quality of water flowing within seasonal Streams	Preliminary Sum of Ksh 500,000 to be allowed for soil erosion control

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		storm water runoff (e.g., velocity control measures). • Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. • Spread mulch generated from indigenous cleared vegetation across exposed soils after construction • At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.			
Impacts on Air Quality	• Emissions of oxides of nitrogen (NO_2 in particular) mainly from construction-related vehicles (and to a lesser degree from construction generators and other hydrocarbon powered equipment); and • Dust and particulate matter (as PM10) created by construction-related vehicle traffic on unpaved roads.	**As general measures for all locations:** • Develop a Dust Management Plan (DMP); • Record all dust and air quality complaints, identify cause(s), take appropriate measures; • Liaise with local communities to forewarn of potentially dusty activities; • Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring as parameter • Undertake inspections to ensure compliance with the Dust Management Plan; • Plan potentially dusty activities so that these are located as far from receptors as feasible; • Erect solid screens if feasible around stockpiles and concrete batching; • Avoid run off of mud and water and maintain drains in a clean state; • Remove dusty materials form site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible; • Impose speed limits on haul routes and in construction compounds to reduce dust generation; • Minimize drop heights when loading stockpiles or	Contractor	• Compliance level Dust Management Plan • Services and inspection reports of plant and equipment • Air quality monitoring report findings • Number of complaints from community related to dust menace	Preliminary Sum of Ksh 500,000 to be allowed for air pollution control

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		transferring materials; and • Avoid waste or vegetation burning. **For traffic on unpaved roads:** • Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and • On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity. **For excavations and levelling** • Revegetate exposed areas as soon as feasible; • Revegetate or cover stockpiles if feasible; • Expose the minimum area required for the works, and undertake; and exposure on a staged basis to minimize dust blow.			
Noise and Vibrations Impacts	Construction activities and equipment are not expected to result in significant levels of vibration. Equipment that might high levels of vibration (such as impact piling or vibratory compaction) will not be used	• Siting noisy plant and equipment as far away as possible from human settlement, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable; • Where practicable noisy equipment will be orientated to face away from the nearest Human settlement and other receptors; • Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only; • Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable; • Where practicable, stationary equipment will be located in an acoustically treated enclosure; • For machines with fitted enclosures, doors and door	Contractor	Serviced plant and equipment to manufacturers specification	Preliminary Sum of Ksh 250,000 to be allowed for air pollution control

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals; • Throttle settings will be reduced and equipment and plant turned off, when not being used; • Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and fitting of mufflers or silencers of the type recommended by manufacturers.			
Impacts on vegetation cover	Stripping of vegetation cover will be on isolated cases only limited the trees and will have minimal impact to soil structure.	• Avoidance of impacts should be prioritized. However, if not possible then compensatory planting of trees that will be cut by the contractor during works will be undertaken. • Vegetation shall only be within the well field's only if the vegetation and will interfere with Project construction and/or present a hazard. • Areas to be cleared shall be agreed and demarcated before the start of the clearing operations to minimize exposure. • The use of existing cleared or disturbed areas for the Contractor's office, stockpiling of materials etc. shall be encouraged. • Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible. • Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants	Contractor in liaison with KFS	• Number of trees replanted as compensatory trees • Status of reinstatement of completed sites	Preliminary Sum of Ksh 200,000 to allowed for procurement and planting of compensatory tree seedling
Community Health Safety and Security Impacts	Increased Project-related traffic, civil works for site preparation including site clearance and excavation and levelling, change to the environment due to	• Contractor will develop and monitor the implementation of a Community Health and Safety Management Plan (CHSMP) • Contractor will develop Emergency Response Plans	Contractor	• Number of incidences recorded on site and within communities • Community	Preliminary Sum of Ksh 1,000,000 to allowed for

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
	increased noise, decreased air quality, inappropriate waste handling or disposal, and accidental leaks and spills, and the presence of the Project workforce all present potential hazards for the health and safety of local communities	(ERPs) in cooperation with local emergency authorities and hospitals. • Contractor will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including drivers as part of the induction process. • Contractor will provide primary health care and first aid at construction office sites to avoid pressure on local healthcare infrastructures. • Contractor will implement a Community Grievance Mechanism. • Contractor will develop and implement a Traffic Management Plan covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations.		satisfactory reports with regards to health and safety • Reported and addressed grievances on site and from communities	addressing Community health and security impacts
Worker Health and Safety and Workers Management impacts	Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working conditions. These issues should be considered not only for those who are directly employed on the Project. The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Kenyan law or international best practice.	• Contractor will develop a Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc. contractor will require its subcontractors to put in place policies in line with national legislation and applicable international legislation and contractor Code of Conduct and Policies. • Contractor will establish contractual clauses (signed code of conduct) to be embedded in the contracts of the workers and sub-contractors that require adherence to Kenyan law and international standards to be upheld related to worker rights. • Contractor will prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health	Contractor	• Number of incidences recorded on site and within workers • Workers satisfactory reports with regards to health and safety • Reported and addressed grievances on site and from workers • Signed code of conduct	Preliminary Sum of Ksh 1,000,000 to allowed for addressing Worker's health and security impacts

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		and safety of other employees, community members or the environment. • Contractor and self-employed contractors will assess the H&S risks related with the tasks to be performed during the construction phase. • Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting pre-employment medical assessments include a safer working environment, reduction in workplace injuries, minimized downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction. • Contractor will ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities. • Contractor will implement regular health and safety checks and audits of workers, and subcontractors and implementing sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards. • Contractor will develop and implement a Workers Grievance Mechanism for the Project workforce including workers and subcontractors. • Contractor will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks. • Contractor will ensure that facilities and work sites are designed and maintained such that robust barriers are in			

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		place to prevent accidents. • Contractor will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE. • Contractor will ensure that IFC/World Bank Health and Safety guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker accommodation are followed. • Contractor will ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation. • Contractor will develop and implement a Traffic Management Plan covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations. • Contractor will develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.			
	Gender-based violence and Sexual Harassment	• Ensure clear human resources policy against sexual harassment that is aligned with national law • Integrate provisions related to sexual harassment in the employee COC • Ensure appointed human resources personnel to manage reports of sexual harassment according to policy • The Contractor shall require his employees, sub-contractors, and any personnel thereof engaged in construction works to individually sign and comply with	Contractor	• Mitigation plan for GBV occurring at the community level as a result of project implementation • Number of GBV cases happening at the community level that receive survivor-centered referral and	Budget as presented above

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		a Code of Conduct with specific provisions on protection from sexual exploitation and abuse • The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including: - effective and on-going community engagement and consultation, particularly with women and girls; - Review of specific project components that are known to heighten GBV risk at the community level, e.g., compensation schemes; employment schemes for women; etc. • the contractor shall develop specific plan for mitigating these known risks, e.g., sensitization around gender-equitable approaches to compensation and employment; etc. • The contractor will ensure adequate referral mechanisms are in place if a case of GBV at the community level		care	
	Sexual Exploitation and Abuse by project workers against community members	• Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). • The SEA action plan will include how the project will ensure necessary steps are in place for: - Prevention of SEA: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials; - Response to SEA: including survivor-centered coordinated multi-sectoral referral and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written		• SEA Action Plan • Code of Conduct • Number of staff trainings • SEA FP • Community Liaison trained in PSEA • IEC materials for workers sites and community • Discrete SEA reporting pathway • Relevant policies, e.g., investigations and discipline and whistle blower protection	Budget as presented above

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management; - Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights; • Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.		• Monthly minutes from SEA coordination meetings	
HIV/AIDs	Spread of communicable diseases and HIV/AIDS	• Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDS and sexual health and rights through staff training, awareness campaigns, multimedia and workshops or during community Barazas. • Use existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members • Ensure safety of women and girls in provision of VCT services. • Work to minimize or altogether eliminate mosquito-breeding sites.	Contractor and CWWDA	• Number of cases of diseases reported • Rate of absenteeism due to diseases • No of workers trained on HIV/ AIDS • Number of gender-disaggregated toilets constructed	Preliminary and General Sum of Ksh 200,000 for awareness and purchase of condoms

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
COVID 19	Spread of COVID -19 amongst workers	• The Contractors will develop a SOPs for managing the spread of Covid-19 during project execution and submit them for the approval of the Supervision Engineer and the Client before mobilization. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions; • Mandatory provision and use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including • Avoid concentrating of more than 100 workers at one location. Where there are two or more people gathered, maintain social distancing at least 2 meters. All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs; • Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including consultation venues and meetings and ensure they are used; • Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, door knobs, hand rails etc;	Contractor and CWWDA	• Availability of SOP(s), Training material, PPE, sanitizing facilities • No of workers sensitized on COVID-19 • No of hand-washing facilities installed; facemasks and temperature monitors secured, etc.	Preliminary and General Sum of Ksh 200,000 for awareness and purchase of soap, sanitizers, temperature screening gadgets and face masks for workers.
				Sub Total ESMP	**4,650,000.00**

6.3 STATUTORY REQUIREMENTS PRE-COMMISSIONING OF THE WTP

Occupational health and Safety Ach (OSHA 2007) provides below detailed statutory provisions before commission operation of the WTP. The measures are listed below.

(i) Register the Mwache Water Treatment Plant (WTP) as Workplace with DOSH as required by OSHA 2007
(ii) Undertake risk assessment, safety and health audit and fire safety audit for the WTP
(iii) Prepare safety & health policy, fire safety policy and environment policy for the WTP
(iv) Establish Health and Safety Committee (HSC) for WTP and train members of the committee on;

- *Statutory fire marshal training*
- *Statutory first aid training*
- *Statutory safety and health committee training on Occupational Health and Safety (OSH)*
- *Regular provision of personnel at the Treatment Works with Appropriate Personal Protective Equipment's (PPEs)*

The plan presented under **Table 6.2** will guide the Plant Operator to conform to the provisions of OSHA pre- commissioning of the WTP.

Table 6.2: OSHA 2007 Statutory Provisions Pre-Commissioning of the WTP.

Activity	Requirement	Conformity Measure	Monitoring Indicator	Responsibility	Timelines	Budget (Ksh)
Registration of the Water Treatment Plant as Works Place with DOSH	OSHA 2007 requires that any workplace with more than 7 employees should be registered as a workplace	*Register the Proposed Mwache Water Treatment Plant as Workplace with DOSH*	Availability of Valid Registration Certificate from DOSH	*WTP Operator*	Immediate	*50,000*
Duties Of Occupiers (Legal Requirements)	• Risk Assessment • Safety and Health Audit • Fire Safety Audit • Initial Environment Audit	*Undertake Risk Assessment, Safety and Health Audit and Fire Safety Audit for Mwache Water Treatment Plant.*	*Risk assessment, Health and Safety and Fire Safety Reports*	*WTP Operator Management*	Immediate	*100,000*
Management of Polices required at the Water Works	Policies Required: • Safety & Health Policy • Fire Safety Policy • Environment Policy	*Prepare Safety & Health Policy, Fire Safety Policy and Environment Policy Mwache Water Treatment Plant.*	*Safety & Health Policy, Fire Safety Policy and Environment Policy displayed at the T/Works*	*WTP Operator Management*	Immediate	*Can be done internally*
Water Works Personnel Trainings Required	Training required: • Statutory: Fire marshal training Training required: • Statutory: First Aid Training Training required: • Statutory: Safety and Health Committee	*Establish of Health and Safety Committee for Mwache Water Treatment Plant and train them on;* • *Statutory Fire marshal training* • *Statutory First Aid Training* • *Statutory Safety and Health Committee training on Occupational Health and Safety (OSH)* • *Regular provision of personnel at the T/Works with Appropriate (PPEs)*	*Existing and Trained Health and Safety Committee*	*WTP Operator Management*	Immediate	*100,000*

6.4 ESMP DURING OPERATION OF THE WTP

At operation stage, the WTP Operator will ensure the following measures are implemented during operation of the WTP.

(i) Ensure at any given time that the Water Use Rights Permits required by Water Resources Authority (WRA) for such facilities are annually renewed and valid.
(ii) The Water Treatment Operators will continuously maintain the sludge drying beds and back wash water system and ensure no blockages
(iii) The Water Treatment Operators will ensure the master meter is functioning and flow measurements are collected on a daily basis.
(iv) WTP Operator Management will continuously promote reforestation programs with company operations
(v) WTP Operator Management will regular inspection of the Water Pipeline wayleave, WTP and Dam peripheries and ensure the way leave is free from encroachment at market centres.

Table 6.3 presents the ESMP proposed during operation phase of the WTP.

Table 6.3: Environment and Social Management Monitoring Plan during Operation of the WTP

Activity Fields	Requirement	Relevant Act (Clauses)	Continuous Improvement Measure	Responsibility	Timelines	Budget (Ksh)
Approval, Authorization And Permits	WTP Operator should apply and renew water Abstraction permit for Mwache Water Treatment Plant from WRA, activities under in are listed under the Six Schedule of the Rules.	Water Rules 2007: Part II - Approval, Authorization And Permits	Ensure at any given time that the Water Use Rights Permits from WRA are valid	*WTP Operator* Management	Annually	Operation funds
Control of Pollution and Water Quality Requirements	**Management of Reagents** For Mwache Water Treatment Plant, PDR has provided for a well ventilated and proper lighting chemical storage house. Further, personnel handling the reagents will be provided with appropriate PPEs such as gloves, nose masks and googles to protect them from the chemical. Also procurement of reagent will be done in batches with enough doses to eliminate the risk of some of the reagent expiring therefore requiring disposal.	Water Rules 2007: Part V Water Quality Monitoring And Effluent Discharge	Continuously maintain the sludge drying beds and back was lagoons / continuously unblock blockages	*WTP Operator* Management	Weekly	Operation funds
	Management of Sludge PDR provides for sludge drying beds, the beds provide allow for sludge dewatering and allow for easy handling and evacuation	Water Rules 2007: Part V Water Quality Monitoring And Effluent Discharge	Continuously maintain the sludge drying beds and back was lagoons / continuously unblock blockages	*WTP Operator* Management	Weekly	Operation funds
Water Use Charges	A master meter has been installed at the raw water inlet chamber to measure the water abstraction volume for the purpose of calculating amount due for payment of water services to Water Resources Authority (WRA)	PART VIII - Water Use Charges	Ensure the master meter is functioning and flow measurements are collected	*WTP Operator* Management	Daily	Operation funds
Conservation of Riparian	The Water Rules 2007, Part ix on Conservation of Riparian and Catchment Areas regulation 120.(1) provides that for the purposes of conserving the catchments and riparian areas, the authority may by order or state as a condition on an authorization or permit, require a person to prepare and conform to a Soil and Water Conservation Plan (SWCP). In compliance with this regulation, a forestation program in liaison with Kenya Forest Services (KFS) will be initiated within the WTP and dam peripheries. WTP Operator will upscale this initiative after commissioning of the Plant.	PART IX - Conservation Of Riparian And Catchment Areas	Continuously promote reforestation programs with company operations	*WTP Operator* Management	Annually	Operation funds

7. FINDINGS AND PROVISIONS

7.1 FINDINGS

A summary of ESIA Addendum conclusion is presented below.

- The Ministry of Water and Sanitation and Irrigation through the Kenya Water Security and Climate Resilience Project (KWSCRP) (2016) commissioned an Environmental and Social Impact Assessment (ESIA).
- The assessment main focus was on environment and social impacts associated with Mwache Dam and the Lower Check dam.
- Further an Environment License NEMA/EIA/PSL/5204 on 18th September 2018 with a validly of 24 months from date of issuance.
- CWWDA has secured funds from AFD towards the cost of constructing Proposed Mwache Water Treatment Plant (WTP) designed to have an output of 186,000 m^3/d. The Environment License NEMA/EIA/PSL/5204 secured for Mwache Dam did not include the proposed Mwache WTP and associated components including Base Camp and other facilities.
- CWWDA has therefore instructed us to prepare and Addendum to the ESIA that was done for proposed Mwache Dam and further apply for variation of Environment License to include the WTP and associated Components.
- The addendum discusses the environment and social impacts related to the proposed Water Treatment Plant (WTP) and associated components including Base Camp and other facilities.
- Therefore, this addendum will be used to apply for variation of Mwache Dam Environment License NEMA/EIA/PSL/5204 to include additional scope of the WTP and including Base Camp and other facilities.
- The proposed Water Treatment Plant (WTP) is located within Kasemeni Location of Kinango Sub-County in Kwale County. The site is located within Land already acquired under Mwache Dam at GPS Coordinates -3.970346^0 and 39.508029^0. The Land has been acquired under ongoing Mwache Dam Resettlement Program undertaken by National Lands Commission (NLC) on behalf of Project Management Unit (PMU) of the Kenya Water Security and Climate Resilient Project (KWSCRP)
- This implies that Land Acquisition as an impact will not be triggered by proposed Water Treatment Plant (WTP)
- Through government resettlement program under Mache Dam Project, all Project Affected Persons (PAPs) have been relocated from the site, this implies that no direct socio economic negative impacts will be triggered to community as a result of construction of the WTP. However, indirect and cumulative impacts to villages outside the WTP site will be triggered as discussed in Chapter 5 of this addendum, such villages include; Mwatate, Mataa, Gandini, Mwavumbo, Fulugani and Mazeras
- The addendum has discussed WTP construction impacts on Physical Resources and Receptors including, Impacts on water resources, Impacts on Soil Resources, Impacts on Air Quality, Impacts related to noise and excessive vibrations. Further the addendum has discussed impacts on biological resources including fauna and Flora and finally discussed impacts on health and safety to workers and community members including; SEA/SH, GBV and spread of communicable diseases such as HIV and Covid 19.
- At operation phase the addendum has discussed pre-commissioning statutory requirements to be complied with by CWWDA including; Approval, Authorization and Permits by WRA, need for Control of Pollution and Water Quality Requirements, Water Use Charges and Conservation of Riparian, Registration of the Water Treatment Plant as Works Place with DOSH, Duties Of Occupiers (Legal Requirements), Management of Polices required at the Water Works and Water Works Personnel Trainings Required

- Finally operation impacts and mitigation measures have been discussed in relation to Management of Backwash Water, Reagents and Sludge from the WTP, management of and domestic sewerage, Erosion Control at Washouts, fencing of the WTP, maintaining Aesthetic And Hygiene and commissioning Afforestation Program.

7.2 ADDENDUM PROVISIONS

The ESIA addendum makes below listed provisions:

- The Environment and Social Management Plan (ESMP) prepared under this ESIA assessment recommends provision of a budget of **Kenya Shillings Four Million, Six Hundred and Fifty Thousand (Kshs 4,650,000)** *for mitigation of environment and social impacts identified in this Report.* The Bid Documents to be prepared for the project should incorporates the Environment, Social provisions discussed herein (Environment and Social Impact Assessment and Mitigation Measures).
- Project Contract Document to include provisions for the Contractor for preparing and implementing Construction Environment and Social Management Plan (C-EMSP), annexes to the C-EMSP will include but not limited to: Soil and Sedimentation Control Plan, Spoil Management Control Plan, Dust Management Plan, Health, Hygiene and Safety Plan, Labour Management Plan, Child Protection Strategy, Gender-based Violence Action Plan, Waste Management Plan, Contractors Code of Conduct, Gender Inclusivity Strategy , HIV/Aid Prevention Strategy. The contractors will be required to engage services of a qualified Environment, Health and Safety Officers and Social Safeguards Officer at the time of Project implementation.
- At Project implementation stage, the contractor with approval of the supervising engineer will prepare periodic Environmental and Social Implementation Report. The reports will provide status of implementation of risks & impacts management measures to date from the project start to the end of the reporting period. From an occupational Health and Safety approach, the contractors will ensure they undergo the following; OSH risk assessment, Registration of workplaces, Safety and Health (OSH) Audit, Fitness to work assessment of employees, Training of all workers or workers' representatives in basic Occupational Safety and Health, Accident and incident reporting, Compensation of injured workers who die or get injured and disabled and Examination of Safety Plants and Equipment.
- At Project completion stage, within the Defects Liability Period, Coast Water Works Development Agency (CWWDA) will initiate an Initial Environment and Social Audit for the Project as required by EIA/EA Audit Regulations of the year 2003 and subsequent annual self-audits. The Audit will develop an Environment and Social Audit Action Plan (ESAAP) that will be used to track Project Environment and Social Compliance during Project implementation stage.

APPENDICES

APPENDIX 1

MWACHE DAM ENVIRONMENT LICENSE NEMA/EIA/PSL/5204

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESMENT LICENSE

License No: NEMA/EIA/PSL/5204
Application Reference No: NEMA/EIA/SR/760

This is to certify that the Environmental Impact Assessment Study Report received from

Ministry of Water and Irrigation.

P.O. Box 49720, Nairobi.

submitted to the National Environment Management Authority in accordance with the Environmental Impact Assessment & Audit Regulations, 2003 regarding the:

Proposed Construction of Mwache Dam.

whose objective is to carry on

Consruction of Mwache Dam comprising pilot irrigation component, water supply and sanitation infrastructure, associated facilities and amenities.

located at

Kwale and Mombasa Counties.

has been reviewed and a license is hereby issued for the implementation of the project, subject to attached conditions.

Issue Date : **18 September, 2018**

Signature

(Seal)

Director-General
The National Environment Management Authority.

P.T.O.

1.0 General Conditions

1.1 This project is for the construction of Mwache Dam comprising pilot irrigation component, water supply and Sanitation infrastructure associated facilities and amenities located in Kwale and Mombasa Counties at an estimated project cost of Kshs.17 billion.

1.2 The license shall be valid for 24 months (time within which the project shall commence from the date hereof.

1.3 The Director General shall be notified of any transfer, variation or surrender of this license.

1.4 Without prejudice to the other conditions of this license, the proponent shall implement and maintain an environmental management system, organizational structure and allocate resources that are sufficient to achieve compliance with the requirements and conditions of this license.

1.5 The Authority shall take appropriate action against the proponent in the event of breach of any of the conditions stated herein or any contravention to the Environmental Management and Coordination Act, Cap 387 and regulations therein.

1.6 This license shall not be taken as statutory defence against charges of environmental degradation or pollution in respect of any manner of degradation/pollution not specified herein.

1.7 The proponent shall ensure that records on conditions of licenses/approval and project monitoring and evaluation shall be kept on the project site for inspection by NEMA's Environmental Inspectors.

1.8 The proponent shall submit an Environmental Audit report in the first year of occupation/operations/commissioning to confirm the efficacy and adequacy of the Environmental Management Plan.

1.9 The proponent shall provide the final project accounts (final project costs) on completion of construction phase. This should be done prior to project commissioning/operation/occupation.

1.10 The proponent shall comply with NEMA's improvement orders throughout the project cycle.

2.0 Construction Conditions

2.1 The proponent shall obtain the requisite approvals from the County Government of Kwale, County Government of Mombasa and all other relevant Authorities prior to commencement of works.

2.2 The proponent shall put up a project signboard as per the Ministry of Transport and Infrastructure standards showing the NEMA EIA license number among other details.

2.3 The proponent shall seek authorization from the Water Resources Authority for the proposed in-water works and for water abstraction, prior to commencement of works.

2.4 The proponent shall periodically monitor the structural integrity and reliability of the Dam to avoid any damage or risks associated with a collapsing dam.

2.5 The proponent shall ensure strict adherence to the provisions of Environmental Management and Coordination (Noise and Excessive Vibrations Pollution Control) Regulations of 2009.

2.6 The proponent shall ensure strict adherence to the Occupational Safety and Health Act (OSHA), 2007.

2.7 The proponent shall ensure relocation, compensation and restoration of livelihoods for any project affected persons (PAPs) and develop a consultative plan for emerging issues and grievance redress mechanisms (GRM) as shall be prescribed in the Resettlement Action Plan (RAP).

2.8 The proponent shall continually consult with the County Government of Kwale and Mombasa to ensure that pertinent issues relating to equitable sharing of the abstracted water are resolved amicably to ensure project sustainability.

2.9 The proponent shall ensure that workers are provided with adequate personal protection equipment (PPE), sanitary facilities as well as adequate training.

2.10 The Proponent shall ensure strict adherence to International guidelines on Dam Safety such as World Bank Policy on Dam Safety (OP 4.37). throughout the project life cycle

2.11 The proponent shall ensure strict adherence to the provisions of the National Construction Act of 2011.

2.12 The proponent shall ensure that no excavated debris or other forms of wastes are disposed off or deposited in the rivers.

2.13 The proponent shall ensure that all excavated material and debris is collected, re-used and where need be, disposed off as per the Environmental Management and Coordination (Waste Management) Regulations of 2006.

2.14 The proponent shall in consultation with Kenya Wildlife Service (KWS) put in place measures that mitigate human wildlife conflict and shall avoid encroachment to sensitive wildlife areas such as migratory corridors or breeding areas.

2.15 The proponent shall in consultation with the National Museums of Kenya, undertake a Heritage Impact Assessment to ensure the protection and conservation of any archaeological and cultural sites within the project area.

2.16 The proponent shall ensure that construction activities are undertaken during the day (and not at night) - between 0800 hrs and 1800 hrs; and on Saturdays between 0800 hrs to 1300 hrs. No work shall be undertaken on Sundays; and that transportation of construction materials to and from site is undertaken during weekdays and Saturdays only during the hours specified herein.

2.17 The proponent shall ensure that the development adheres to zoning specifications issued for development of such a project within the jurisdiction of the County of Kwale and Mombasa with emphasis on approved land use for the area.

2.18 The proponent shall ensure strict adherence to the Environmental Management Plan (EMP) developed throughout the project cycle.

3.0 Operational Conditions

3.1 The proponent shall adhere to the conditions issued by the Water Resource Authority for in-water works and water use permits.

3.2 The proponent shall ensure that sanitary facilities are constructed at suitable places so as to avoid contamination of water bodies and the subsequent water-borne diseases/vectors.

3.3 The proponent shall periodically monitor the structural integrity and reliability of the Dam to avoid any damage or risks associated with a collapsing dam.

3.4 The proponent shall ensure that the chemicals used for water treatment (such as Alum) are appropriately handled and disposed off as provided for in their respective Material Safety Data Sheets.

3.5 The proponent shall ensure that all waste water is disposed as per the standards set out in the Environmental Management and Coordination (Water Quality) Regulations of 2006.

3.6 The proponent shall ensure strict adherence to the provisions of the Environmental Management and Coordination (Air Quality) Regulations of 2014.

3.7 The proponent shall ensure that appropriate and functional efficient air pollution control mechanisms are installed to control all air emissions.

3.8 The proponent shall ensure that all drainage facilities are fitted with adequate functional oil water separators and silt traps.

3.9 The proponent shall ensure that rain water harvesting facilities are provided to supplement surface and ground water.

3.10 The proponent shall develop a consultative plan for emerging issues and grievance redress mechanisms (GRM) as shall be prescribed with the project affected persons

3.11 The proponent shall ensure that all equipment used are well maintained in accordance with the Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations of 2009.

3.12 The proponent shall ensure that all solid waste is handled in accordance with the Environmental Management and Coordination (Waste Management) Regulations of 2006.

3.13 The proponent shall ensure that all workers are well protected and trained as per the Occupational Safety and Health Act (OSHA) of 2007.

3.14 The proponent shall comply with the relevant principal laws, by-laws and guidelines issued for development of such a project within the jurisdiction of the County Government of Kwale and Mombasa, Kenya Forest Service, Ministry of Health, Kenya Rural Roads Authority, Ministry of Land, Housing and Urban Development, Water Resources Authority, and other relevant Authorities.

3.15 The proponent shall ensure that environmental protection facilities or measures to prevent pollution and ecological deterioration such as soil erosion control, functional storm drainage, catchment protection, river pollution prevention, and equitable water supply mechanisms are designed, constructed and employed simultaneously with the proposed project.

4.0 Notification Conditions

4.1 The proponent shall seek written approval from the Authority for any operational changes under this license.

4.2 The proponent shall ensure that the Authority is notified of any malfunction of any system within 12 hours on the NEMA hotline No. **0786101100** and mitigation measures put in place.

4.3 The proponent shall keep records of all pollution incidences and notify the Authority within 24 hours.

4.4 The proponent shall notify the Authority in writing of its intent to decommission the facility **three (3) months** in advance.

5.0 Decommissioning Conditions

5.1 The proponent shall ensure that a decommissioning plan is submitted to the Authority for approval at least three (3) months prior to decommissioning.

5.2 The proponent shall ensure that all pollutants and polluted material is contained and adequate mitigation measures provided during the phase.

The above conditions will ensure environmentally sustainable development and must be complied with.

APPENDIX 2

APPLICATION FOR VARIATION OF MWACHE DAM ENVIRONMENT LICENSE NEMA/EIA/PSL/5204

APPENDIX 3

DESCRIPTION OF BASE CAMP FACILITIES AND OTHER BULDINGS

CHAPTER 6 BASE CAMP AND OTHER BUILDINGS

6.1 General

The sustainable management of a water supply source that serves over 2 million people such as Mwache Dam requires significant permanent facilities. The needs are dependent on the type of dam and the amenities available in the local community within a reasonable travel distance and time.

The project site is approximately 4km from Mazeras, a suburban town in Kilifi County with a well-established growing community. It is expected that the construction of the dam coupled with the recently completed standard gauge railway and proximity of the heavily trafficked Mombasa-Nairobi (A109) road will generate considerable development activity in the surrounding area.

The reservoir is designed to provide multipurpose use. It will supply raw water for treatment and distribution as well as irrigation. The irrigation component will change the character of the environs from the pre-construction rural, low potential agriculture to urban with high potential agriculture.

The Base Camp facilities (residential buildings and utility facilities) have been designed to accommodate a population of about 250 persons consisting of the supervisory staff and their families during construction and Client's management and operation staff and families after construction.

The Mwache Dam project is scheduled to take three years, where the works will be focused on the construction of the Base Camp Facilities for one year (preparatory works), to be continued by the implementation of the main works such as Dam construction and associated civil work (main works), mechanical work, electrical work (main work), etc. for about 2 years.

6.2 Site Selection

The site for the Base Camp was selected considering ease of access during construction of the works and convenience for operation and maintenance after completion of the Project. To find the best site for the base camp, suitable sites were identified using a set of selection criteria.

The set of criteria developed to identify a suitable land for development into a base camp were as follows:

- General slope <1:20
- Area > 8 ha with a potential for expansion
- Least disruption to existing community
- Time of travel to dam < 10 minutes
- Accessible to local community
- Potential for a pleasing viewshade

Using the site selection criteria, five potential sites for the Base Camp were identified as shown in **Figure 6.1.**

Each of the sites met the criteria in varying degrees as follows:

Site 1 Meets all the criteria (Selected site)
Site 2 Will cause disruption to the existing community
Site 3 Has steep gradient therefore expensive to develop
Site 4 Does not have a view shed over the dam and has steeper gradients to manage
Site 5 The dam has to be crossed to access the camp and thus connectivity to the urban areas is poor

Site 1 having met all the criteria was selected as the Base Camp Site.

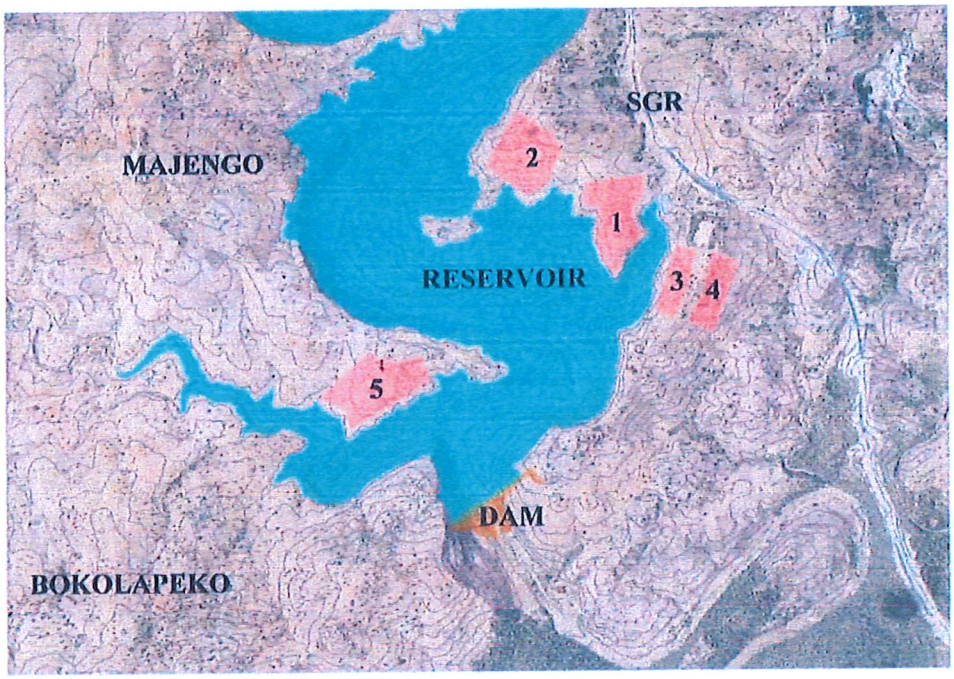


Figure 6.1 Potential Sites for the Base Camp

6.3 Design of Base Camp Facilities

The concept of the development of facilities is that the facilities would be used by the project supervisory staff during construction. Post construction the facilities will be used by client management and operations staff. Although it is expected that over time the population density in the environs of the dam will increase substantially, there are no facilities at present and the rate of development is uncertain. As such the needs assessment is based on a facility that operates independently from the surrounding community. This provides for a degree of security and resilience during extreme conditions.

Sites for the facilities have been identified and concepts developed for their operational arrangement. Conceptual designs for the building have been prepared.

6.4 Base Camp Facilities and Other Buildings

The base camp and associated buildings are spread over three sites as follows:

- Base Camp
- Clinic/Police Post
- Administration Building

Layout plan showing the three sites is shown in **Figure 6.2.**

Following a needs assessment, the following facilities were identified for the Base camp:

a) Residential housing

- 12 Nr Senior Staff Houses (Single storey, three - bedroom units, average internal floor area 132m^2)
- 23 Nr Junior Staff Houses (Single storey, three - bedroom units, average internal floor area 110m^2

The layout of the development has been designed to allow for extension of the residential housing facilities after construction, projected to be double the numbers above.

Layout Plan of the Base Camp site is shown in **Figure 6.3.**

b) Resident community facilities

- Club house with all ancillary facilities
- Tennis court
- Swimming pool and pool house
- Football pitch
- Guest houses – two senior staff house type and two junior staff house type
- Visitor Accommodation (Single ensuite rooms)

c) Public community facilities

- Social hall (enough for 250 people). This can also accommodate some indoor recreational facilities – sited at the edge of the camp so that they can be shared with the local community and also the contractor's staff during construction.
- Shops
- Kindergarten – sited within the base camp
- Clinic – The proposed clinic has been sited along the dam access road approximately 300 m from the the Standard Gauge Railway Line near Fulugani Primary School.

Layout Plan of the Clinic is as shown in **Figure 6.4.**

d) Administrative Facilities

(i) Administration Building

The proposed administration building will be sited along the dam access road near the dam. The building will provide offices for supervisory staff during construction and the operation staff after construction.

The building will be single storey with an approximate floor area of 856 m^2 enough to accommodate over 50 staff members.

Apart from the office spaces, it will also have two meeting board rooms, two breakout areas, kitchen, documents archives etc.

Layout Plan of the Administration Building is as shown in **Figure 6.5.**

(ii) Dam Control House

The proposed building will be located adjacent to the dam and will be used as the Control and Monitoring Centre for all activities within the dam after construction. It will contain all the monitoring equipment for the dam facilities.

e) Security Facilities

(i) Police post

The proposed police post is sited next to the Clinic. It will consist of a cell block and administration block, changing room and mess, residential units (2 Nr. 3-bedroom units and 8 Nr. 2-bedroom units), assembly courtyard, children's playground, driveway, parking and a perimeter fence and gate.

Site Layout Plan of the Police Post is as shown in **Figure 6.6.**

(ii) Guard Houses

Guard houses will be provided on all the sites to foresee day to day security and screening of all personnel entering the sites.

6.5 Water Supply and Sewerage

6.5.1 Projected Water Demand

The total water demand for the base camp can be expressed as follows;

Total Water demand = (Domestic demand + Institutional demand + Commercial demand)

For a more accurate determination of the Total Water Demand, it is important to adopt accurate water consumption rates for each of the water demand categories. The Design Manual for Water Supply in Kenya (MWI, 2005) gives guiding values of water consumption rates for the various categories of Water Demand. Reference has been made to the manual in adoption of the water consumption rates for the base camp. The required quantity of water supply is estimated considering a maximum capacity for each site as shown in **Table 6.1** below:

Table 6.1 Water Consumption Rates for Mwache Dam

Building	Number of Units	Population per Unit	Total Population	Per Capita Consumption Rate (l/d)	Daily Demand (m^3)
BASE CAMP					
Senior staff houses	12	6	72	250	18.0
Junior staff houses	23	6	138	150	20.7
Kindergarten	1	100	100	25	2.5
Shops	1	100	100	7	0.7
Club House	1	N/A	N/A	500	0.5
Swimming Pool	1	N/A	N/A	500	0.5
Visitor Accomodation	7	1	7	300	2.1
				Total	**45.0**
				Miscellaneous (25%)	11.25
				Total Daily Demand	**56.25m^3**
CLINIC/ POLICE POST					
Clinic	1	N/A	N/A	5000	5.0
Police Residence -3Br	2	6	12	150	1.8
Police Residence -2Br	8	6	48	150	7.2
Police Post	1	10	10	25	0.25
				Total	**14.25**
				Miscellaneous (25%)	3.56
				Total Daily Demand	**17.81 m^3**
ADMINISTRATION BUILDING					
Administration Building	1	60	60	25	1.50
				Miscellaneous (25%)	0.375
				Total Daily Demand	**1.875 m^3**

The total estimated water demand for the facilities in the dam site will be **75.94m^3/d**

6.5.2 Water Supply Facilities

Due to the scarcity of water supply within the project area, the water supply facilities are proposed to meet a minimum of a week's demand for all the sites to ensure uninterrupted supply. Based on the demands above, the weekly demands for the sites is as follows:

- Base Camp Site – 350m^3
- Police post and clinic – 110m^3
- Administration block – 12m^3

To meet the requirements above, the following facilities are proposed.

- Base Camp Site – a 100m^3 elevated steel tank and a 200m^3 ground level reinforced concrete tank.
- Police post and clinic – 100m^3 elevated steel tank
- Administration block – 20m^3 elevated steel tank

It will be responsibility of the Contractor to ensure continuous supply of clean portable water to the sites.

6.5.3 Sewerage and Domestic Waste Disposal

1. Sewage Generation

In the design of sewerage systems, sewage generation is taken as 80% of the total water demand. Based on this, the projected daily sewage and waste water generation for the sites is as follows:

- Base Camp Site – 40m^3/d
- Police post and clinic – 13m^3/d
- Administration block – 1.32m^3/d

2. Sewage Treatment and Disposal

Base Camp

Due to the proximity of the base camp to the reservoir, disposal of wastewater should be done in such a manner that it does not flow back into the reservoir. Wastewater disposal will therefore be downstream of the dam. To achieve this, a gravity sewer line will be laid from the Base Camp to a septic tank/pumping station that will be located adjacent to the dam access road, Screening and primary treatment of sewage/ waste water will be done at this point by means of a 98m^3 septic tank. The partially treated effluent is then pumped to the highest point of the ridge between the reservoir area and Mwache River valley downstream of the dam.

The waste water will be discharged into a manhole and conveyed through a gravity sewerline to a secondary treatment facility located downstream of the dam next to the river.

Layout of the proposed system is as shown in **Figure 6.7.**

Police Post/Clinic

A Septic tank capacity 31.8m^3 Septic tank will be provided for at least a two-day retention time. Effluent from the septic tank will be discharged to the same manhole receiving pumped effluent from the Base Camp above.

Administration Block

A $5m^3$ plastic septic tank with a 2.5m dia. Soak Pit will be constructed to serve the administration building.

6.6 Site Works

6.6.1 Internal Roads and Footpaths

The Base Camp will be accessed through a proposed bitumen surface road (Road H) approximately 0.8 km long. The road branches off the proposed dam access road (Road A) and runs besides the Standard Gauge Railway for approximately 500 meters before turning towards the base camp. Other facilities (Police post, clinic and the administration building) are sited along the proposed dam access road (Road A).

Internal roads and footpaths within the Base Camp and other sites will be constructed using concrete cabro paving blocks.

6.6.2 Fencing and Gates

Chainlink fencing with razor wire at the top will be constructed around the perimeter of the Base Camp and other sites. Three gates with Guard Houses will be provided at the Base Camp site for Main access to Site and one each leading to the Senior and Junior staff houses. Each of the other sites will have a gate and Guard House at the entrances.

6.6.3 Electricity Supply

1. **Incoming Electricity Supply**

   The Existing power supply to the Base Camp and other sites will be derived from the Kenya Power & Lighting Company Limited (KPLC) through an existing 11 kV overhead power line.

2. **Standby Generator Sets**

   Standby generator sets will be provided in the Base Camp, Police Post/Clinic and Administration Building sites within the electricity house.

3. **Main Switchboards**

   The main switchboards will be cubicle type, floor mounted housed in the electricity house / KPLC metering room. The busbars will be split into essential and non-essential supplies i.e. KPLC and Generator Supplies.

   In the event of a normal (KPLC) power supply failure, the automatic change-over contactors in the main switchboard will break the connections of the normal (KPLC) incoming mains supply and make the connections to the diesel generating plant. When the normal (KPLC) supply is restored the reverse action will take place. The generators will also operate if there is loss of one or more phases on the normal (KPLC) supply cable.

4. **Electrical Distribution**

   All the buildings within the sites will be supplied by underground cables from the Main Switchboard. The underground cables (PVCSWAPVC) will have copper conductors of 600/1000 volts grade to B.S. 6346. Termination of cables will be carried out by means of brass compression type glands of the correct size which will secure the cable inner sheath and ensure effective electrical continuity between the cable armouring wires and the metal enclosure on which the cable is terminated.

5. **Lighting and Power Installation**

Wiring for lighting and power installation in buildings will be carried in black rigid super high impact heavy gauge Class 'A' PVC conduit (non-metallic conduits and accessories). The Contractor will supply, install, connect, test and commission the lighting fittings and electrical accessories as shown on the drawings and set out in the schedule.

6. **Lightning Protection**

Lightning protection is provided at designated areas within the sites. The lightning protection will be carried out in accordance with British Standard / C.P. 326 1965 / MOW Technical Instruction No. 58.

7. **Security Lighting**

125-watt MBF/U post top lanterns mounted on 5.0 metres columns are provided for security lighting. Control of security lighting will be automatic by photocell with a manual over-ride switch fixed on the panel of the Main Switchboard.

8. **Sewage Pumping Station**

Power supply to the Sewage Pumping Station will be from the existing 11Kv overhead powerline that will also connect the Base Camp. Essential and non-essential control panels for the pumps in the Sewage Pumping Station are connected from the essential and non-essential busbars of the Switchboard within. Both control panels for pumps in the Pumping Station are connected on the normal (KPLC) supply.

9. **Testing and Commissioning**

After installation, each part of the system will be tested in accordance with the relevant B.S. and I.E.E. Standards and the requirements of the KPLC. In addition to these tests, the whole of the installation shall be subjected to complete functional tests to the satisfaction of the Engineer/Client.

6.6.4 Communication System

A communication system is established to attain and maintain close communication and information exchange necessary for satisfactory execution of the project construction works as well as permanent use.

1. **Telephone System**

For communication between Employer's permanent camp and outside camp during construction period of Mwache Dam project, it is recommended to prepare 1 (one) set of radio Link high quality equipment complete with accessories.

2. **Internet System**

High speed Internet access within the Base Camp and other sites will be provided through fibre optic cables or wireless system.

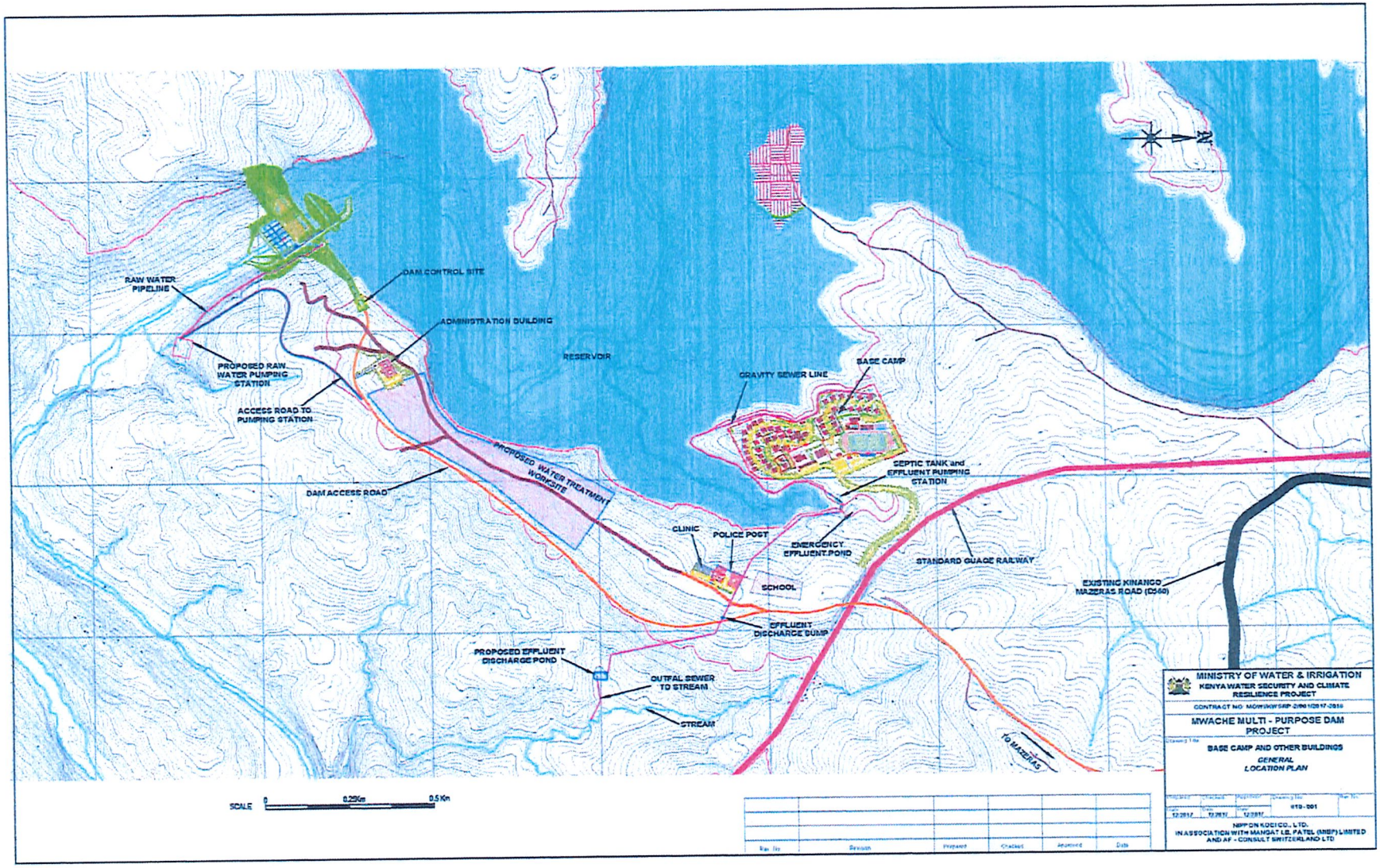


Figure 6.2 Location Plan of Base Camp and Other Sites

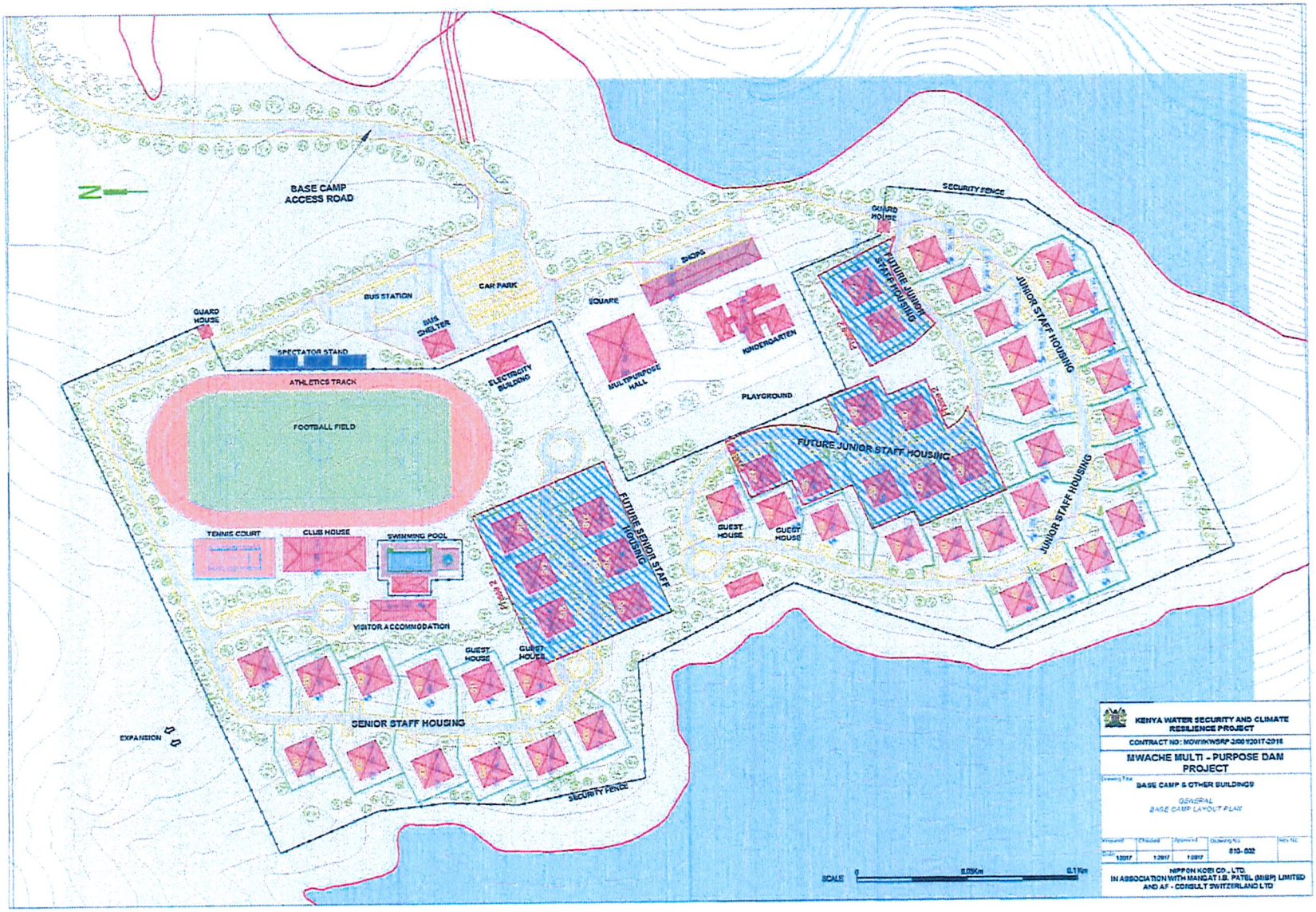
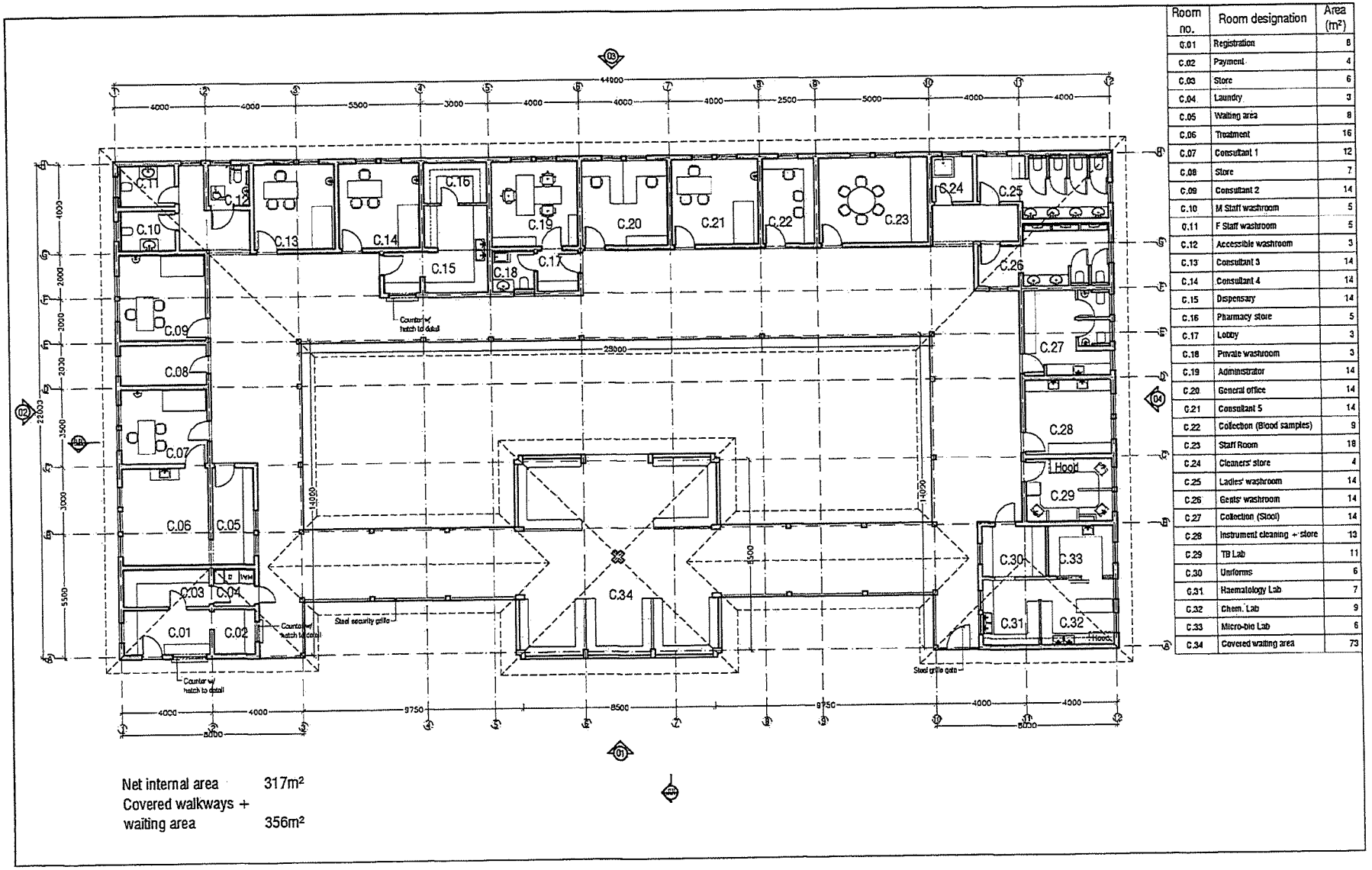
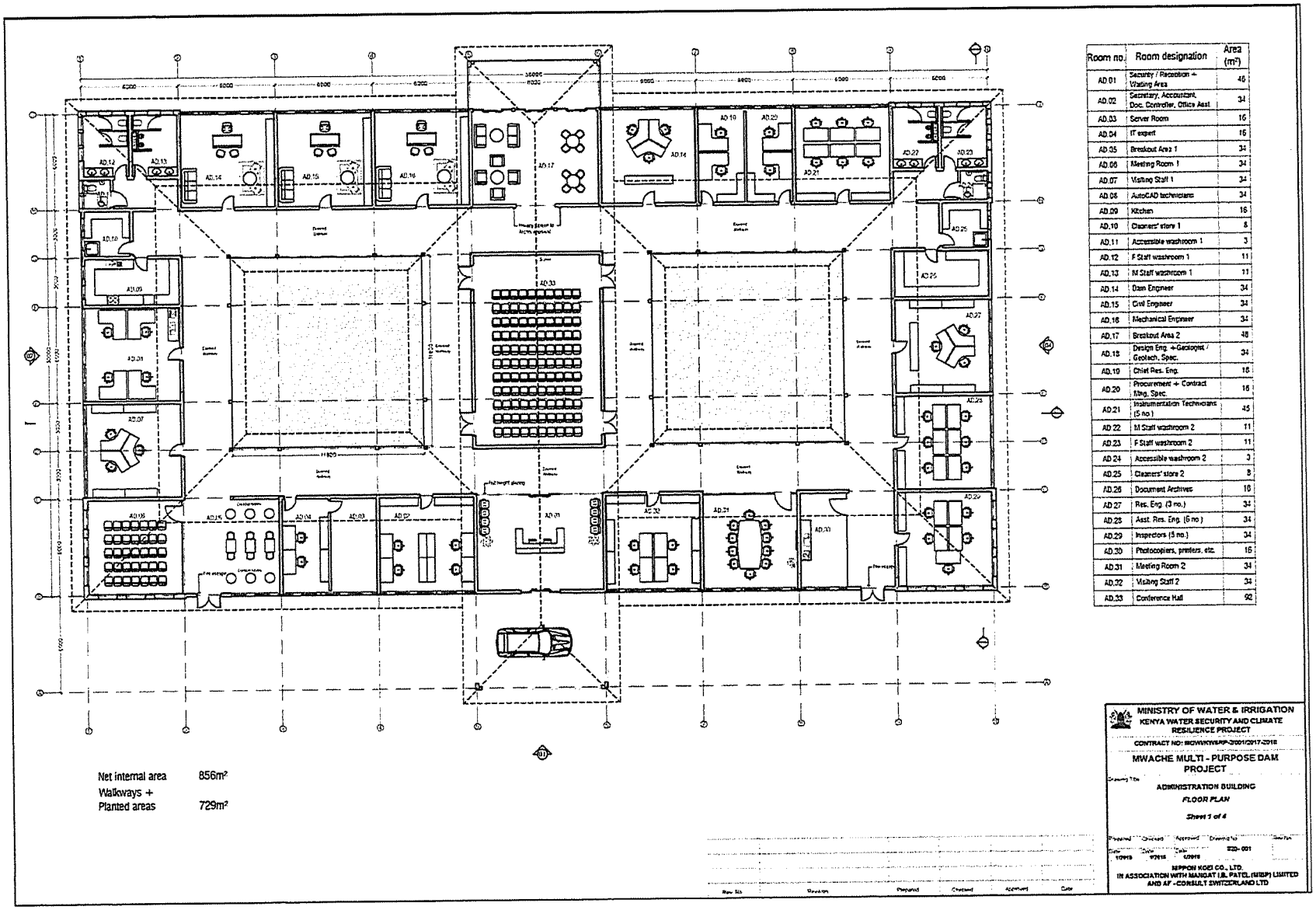


Figure 6.3 Layout Plan of Base Camp



Room no.	Room designation	Area (m²)
C.01	Registration	8
C.02	Payment	4
C.03	Store	6
C.04	Laundry	3
C.05	Waiting area	8
C.06	Treatment	16
C.07	Consultant 1	12
C.08	Store	7
C.09	Consultant 2	14
C.10	M Staff washroom	5
C.11	F Staff washroom	5
C.12	Accessible washroom	3
C.13	Consultant 3	14
C.14	Consultant 4	14
C.15	Dispensary	14
C.16	Pharmacy store	5
C.17	Lobby	3
C.18	Private washroom	3
C.19	Administrator	14
C.20	General office	14
C.21	Consultant 5	14
C.22	Collection (Blood samples)	9
C.23	Staff Room	18
C.24	Cleaners' store	4
C.25	Ladies' washroom	14
C.26	Gents' washroom	14
C.27	Collection (Stool)	14
C.28	Instrument cleaning + store	13
C.29	TB Lab	11
C.30	Uniforms	6
C.31	Haematology Lab	7
C.32	Chem. Lab	9
C.33	Micro-bio Lab	6
C.34	Covered waiting area	73

Figure 6.4 ayout Plan of Proposed Clinic



Room no.	Room designation	Area (m²)
AD.01	Security / Reception + Waiting Area	46
AD.02	Secretary, Accountant, Doc. Controller, Office Asst.	34
AD.03	Server Room	16
AD.04	IT expert	16
AD.05	Breakout Area 1	34
AD.06	Meeting Room 1	34
AD.07	Visiting Staff 1	34
AD.08	AutoCAD technicians	34
AD.09	Kitchen	16
AD.10	Cleaners' store 1	8
AD.11	Accessible washroom 1	3
AD.12	F Staff washroom 1	11
AD.13	M Staff washroom 1	11
AD.14	Dam Engineer	34
AD.15	Civil Engineer	34
AD.16	Mechanical Engineer	34
AD.17	Breakout Area 2	48
AD.18	Design Eng. +Geologist / Geotech. Spec.	34
AD.19	Chief Res. Eng.	16
AD.20	Procurement + Contract Mng. Spec.	16
AD.21	Instrumentation Technicians (5 no.)	45
AD.22	M Staff washroom 2	11
AD.23	F Staff washroom 2	11
AD.24	Accessible washroom 2	3
AD.25	Cleaners' store 2	8
AD.26	Document Archives	16
AD.27	Res. Eng. (3 no.)	34
AD.28	Asst. Res. Eng. (6 no.)	34
AD.29	Inspectors (5 no.)	34
AD.30	Photocopiers, printers, etc.	16
AD.31	Meeting Room 2	34
AD.32	Visiting Staff 2	34
AD.33	Conference Hall	92

Net internal area 856m²
Walkways + Planted areas 729m²

MINISTRY OF WATER & IRRIGATION
KENYA WATER SECURITY AND CLIMATE RESILIENCE PROJECT
CONTRACT NO: IEGW/KWSRP-2001/2017-2018
MWACHE MULTI - PURPOSE DAM PROJECT
ADMINISTRATION BUILDING
FLOOR PLAN
Sheet 1 of 4
NIPPON KOEI CO., LTD.
IN ASSOCIATION WITH MANGAT I.B. PATEL (NIBP) LIMITED AND AF - CONSULT SWITZERLAND LTD

Figure 6.5 Plan of Administration Building

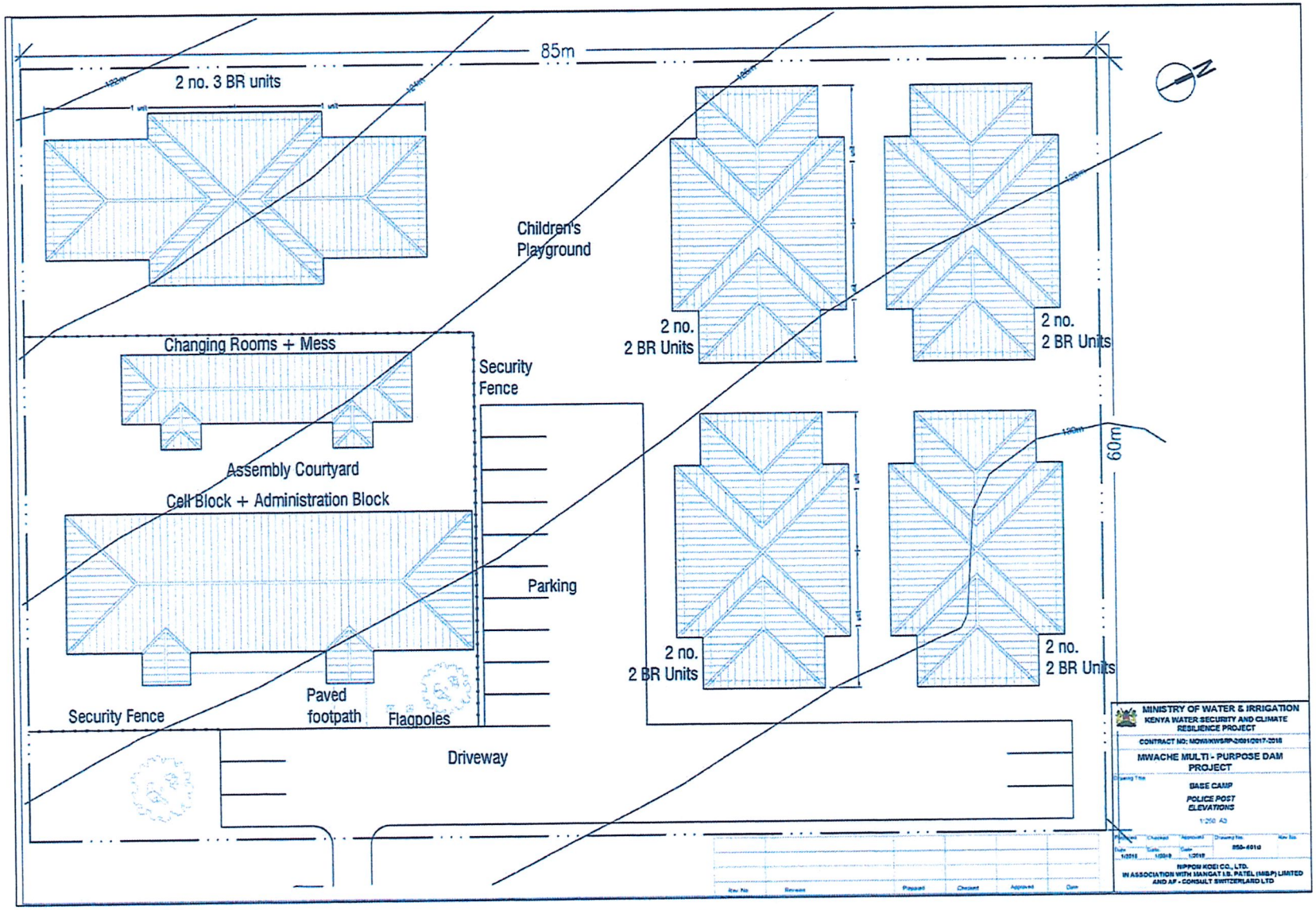


Figure 6.6 Layout Plan of Police Post

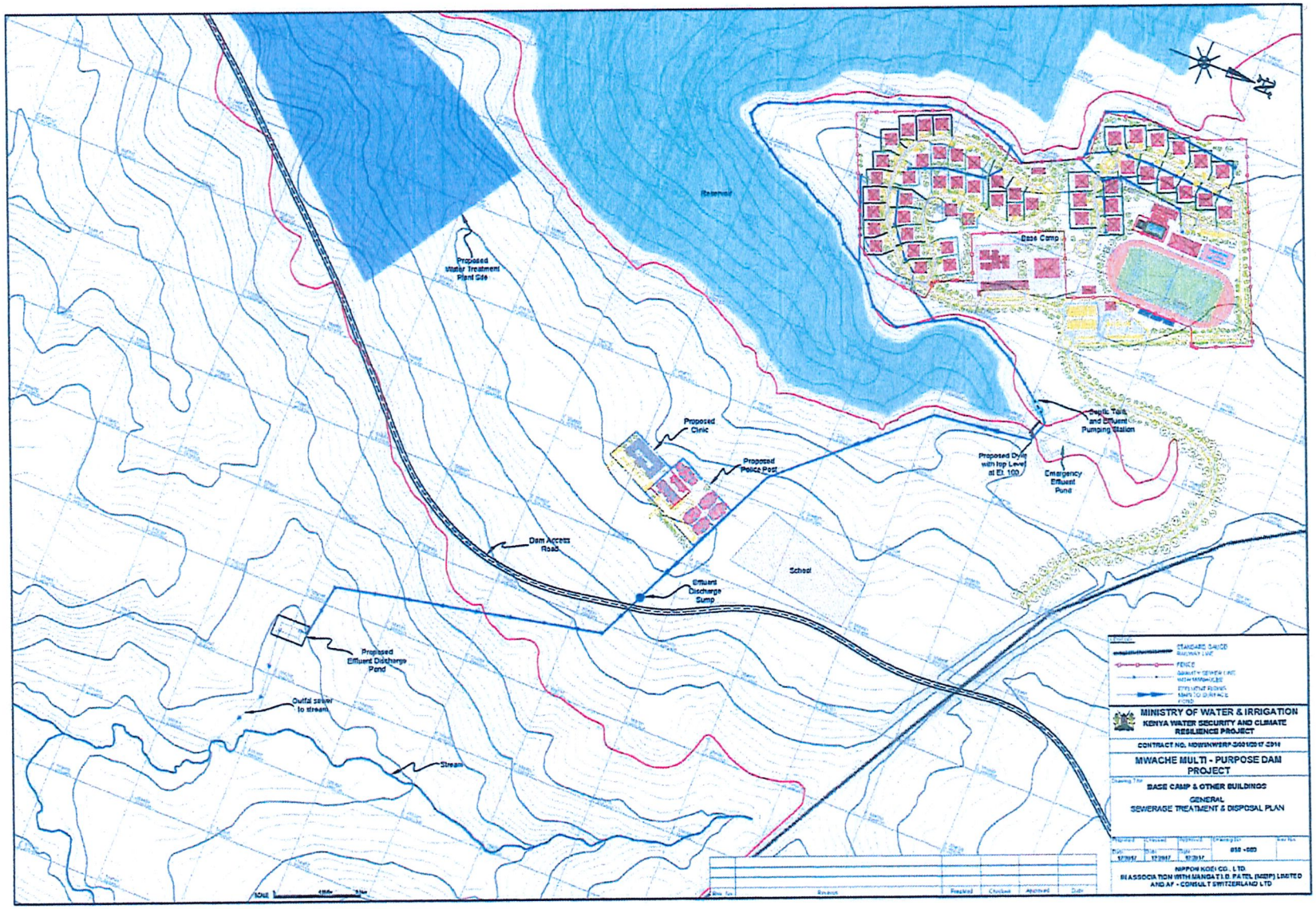


Figure 6.7 Layout Plan of the Sewerage System

APPENDIX 4

LEAD EXPERT'S YEAR 2022

FORM 7 (r.15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/16936

Application Reference No: NEMA/EIA/EL/21830

M/S **Godwin Lidahuli Sakwa**
(individual or firm) of address

P.O. Box 18075-00500 NAIROBI

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **2492**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **3/25/2022** Expiry Date: **12/31/2022**

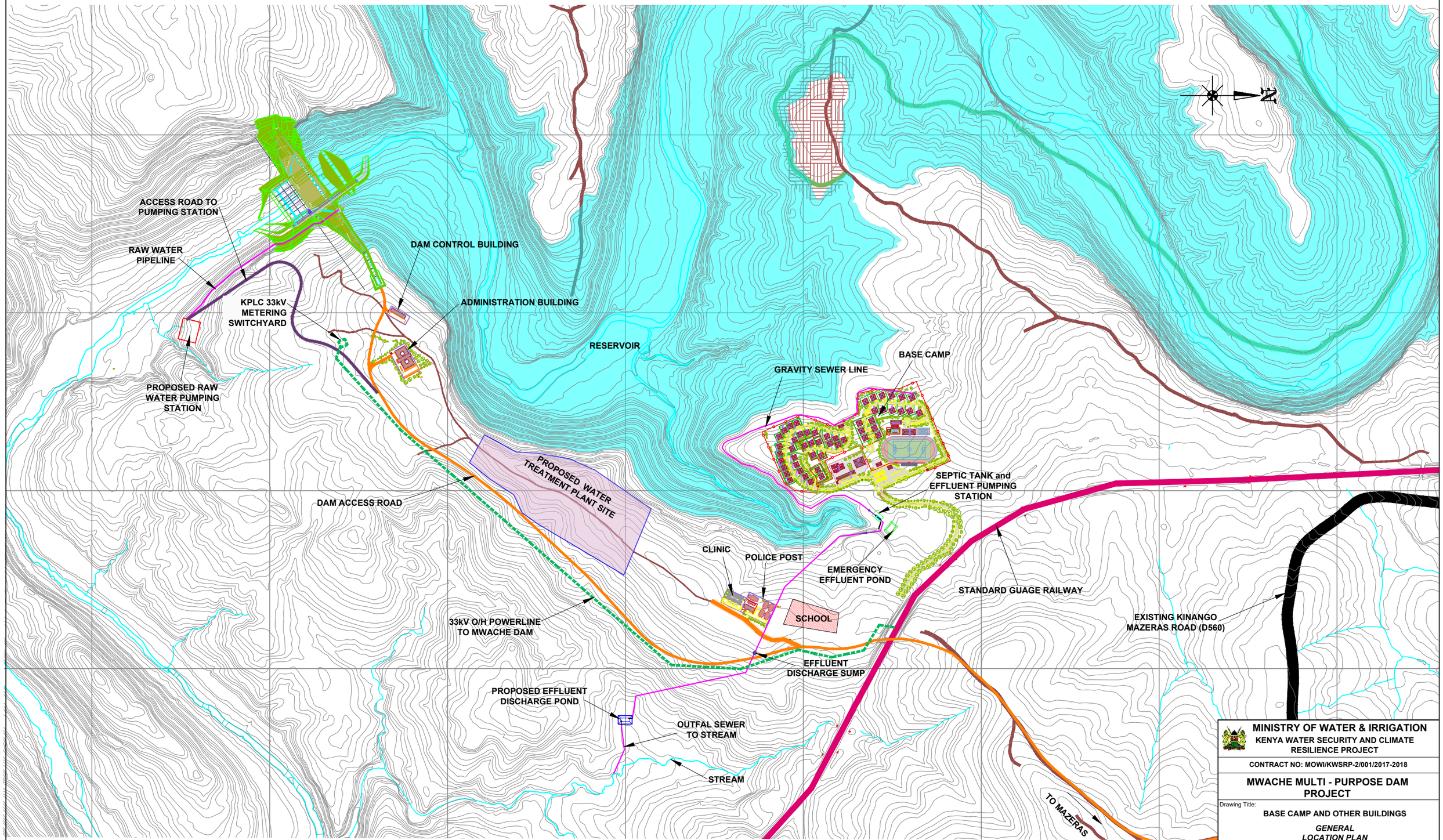
Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified

Annex H - Mwache Dam Power Line



SCALE 0 0.25Km 0.5 Km

NOTE:
For Information Only

Rev. No.	Revision	Prepared	Checked	Approved	Date

MINISTRY OF WATER & IRRIGATION
KENYA WATER SECURITY AND CLIMATE RESILIENCE PROJECT

CONTRACT NO: MOWI/KWSRP-2/001/2017-2018

MWACHE MULTI - PURPOSE DAM PROJECT

Drawing Title:

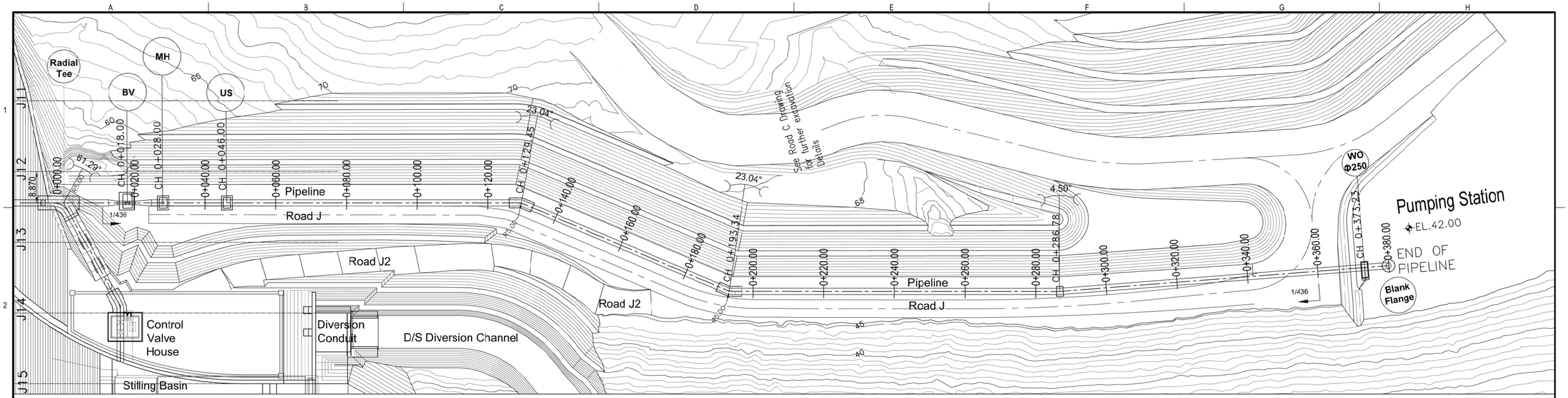
BASE CAMP AND OTHER BUILDINGS

GENERAL LOCATION PLAN

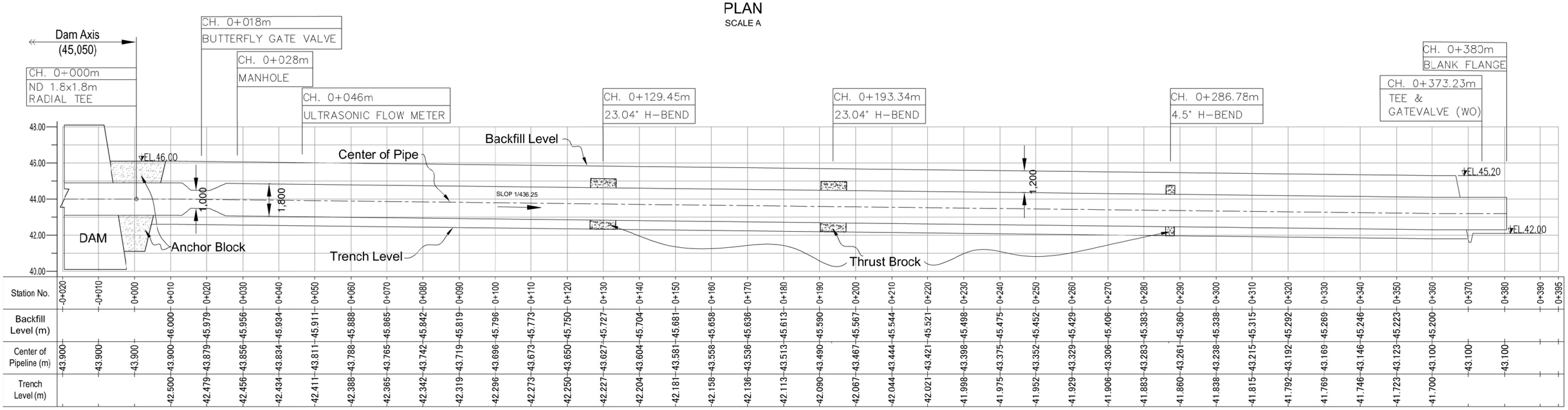
Prepared:	Checked:	Approved:	Drawing No:	Rev No:
Date:	Date:	Date:	810- 001	

NIPPON KOEI CO., LTD.
IN ASSOCIATION WITH MANGAT I.B. PATEL (MIBP) LIMITED AND AF - CONSULT SWITZERLAND LTD

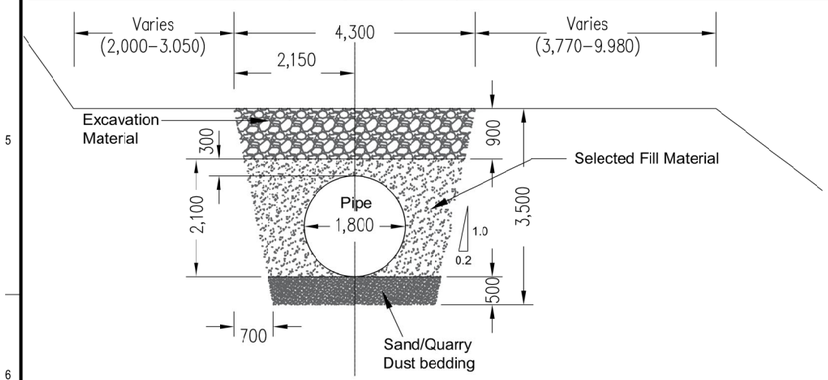
Annex I - Mwache Raw Water Gravity Main



PLAN
SCALE A



LONGITUDINAL PROFILE
H: SCALE A
V: SCALE B



TYPICAL TRENCH CROSS-SECTION
SCALE C

Coordinates		
Station	X (m)	Y (m)
0+000	557,740.653	9,559,152.083
0+129.45	557,816.481	9,559,047.174
0+193.34	557,830.656	9,558,984.875
0+286.78	557,885.368	9,558,909.125
0+380	557,945.719	9,558,838.080

NOTES:
1) All dimensions are expressed in millimeters.
2) All elevations are expressed in meters.
3) The drawing to be read in conjunction with C360–002 to C360–006

SCALE A 0 10.0 20.0 50.0 m
SCALE B 0 2.0 4.0 10.0 m
SCALE C 0 1.0 2.0 5.0 m

Rev. No.	Revision	Prepared	Checked	Approved	Date
03	Pipeline alignment was updated				23-April-2024
02	Pipeline alignment and typical trench section was updated				13-April-2024
01	Pipeline alignment and excavation shape was updated				20-June-2022

Drawing For Information

MINISTRY OF WATER & IRRIGATION

KENYA WATER SECURITY AND CLIMATE RESILIENCE PROJECT

CONTRACT NO: MOWI/KWSCRP-2/001/2017-2018

MWACHE MULTI - PURPOSE DAM PROJECT

Drawing Title:
DAMS AND APPURTENANT STRUCTURES
MAIN DAM
INTAKE FACILITIES
RAW WATER PIPELINE
GENERAL PLAN, PROFILE AND TYPICAL SECTION

Prepared:	Checked:	Approved:	Drawing No:	Rev No:
Date:	Date:	Date:	C360 - 001	R03

NIPPON KOEI CO., LTD.
IN ASSOCIATION WITH MANGAT I.B. PATEL (MIBP) LIMITED AND AF - CONSULT SWITZERLAND LTD

Annex J - Revised Part 2, section 7.2, 3.5.6.2

3.5.6.2. Chlorine disinfection

After the UV treatment, addition of hypochlorite solution shall maintain a residual of chlorine, with an objective of 0.5 mg/l, at the exit of the treated water reservoir. The hypochlorite solution shall be produced on the site by electro chlorination.

The sizing of the electro chlorination shall be defined by the contractor to comply with objective of 0.5 mg/l as residual of chlorine. However, the minimal capacity of the equipment shall allow the average dosage of 1 mg/l of chlorine. For reliability reason the electro chlorination system shall comprise at least two electrolysers.

In case the UV reactor is not working, the minimum chlorine dosage should be 2 mg/l. In this situation, injection of Calcium Hypochlorite solution shall complete the chlorination. Calcium Hypochlorite solution can also be used in case of maintenance or breakdown of the electro chlorination equipment.

Annex K (1) - Revised PCC Part A

Conditions	Sub-Clause	Data
		✓ Specifying t h e amount payable in each of the applicable currencies under Sub-clause 13.4; ✓ Acting under Sub-Clause 10.4; ✓ Instruction for use of Provisional Sums under Sub-Clause 13.5.
Performance Security:	4.2	The Performance Security will be in the form of a demand guarantee in the amount(s) of 10 percent of the Accepted Contract Amount for the Design Build and in the same currency(ies) of the Accepted Contract Amount.
Reduction in Performance Security at the end of the Retention Period:	4.2	*50%*
Subcontractors:	4.4	Direct payment of Subcontractors is allowed
Nominated Subcontractors	4.5	None
Period for notification of errors, faults and other defects in the Employer's Requirements:	5.1	90 days after the Commencement Date.
Contractor's Documents requiring approval.	5.2	In addition to the documents listed in the Employer's Requirements, the Contractor shall provide the following documents as part of the Contract: a) Shop drawings to be approved by the Employer's Representative prior to starting the Works; b) As-built drawings to be approved by the Employer's Representative prior to completion of the Works; and c) Operation and maintenance manuals.
Normal working hours on the Site:	6.5	8:00 a.m. to 5:00 p.m. from Monday to Friday 8:00 a.m to 1:00 p.m on Saturdays
Locally recognized days of rest	6.5	Saturdays afternoon and Sundays
Commencement date	8.1	The Commencement Date of the Firm Part shall be within 60 days after the Contractor receives the Letter of Acceptance. The maximum time period for the Employer to notify the Conditional Part is: 365 days. The Conditional Part (if decided by the Employer) will be notified by a Commencement Order and the Employer is not bound to notify the Conditional Part.

Annex K (2)- Revised PCC Part B

Part B – Specific Provisions

CLAUSE 1: GENERAL PROVISIONS	
Sub-Clause 1.1 - Definitions	
Sub-Clause 1.1.1: Accepted Contract Amount	*Delete reference to* "Asset Replacement Fund".
Sub-Clause 1.1.2: Asset Replacement Fund	*This Sub-Clause is not applicable, to be deleted.*
Sub-Clause 1.1.3: Asset Replacement Schedule	*This Sub-Clause is not applicable, to be deleted.*
Sub-Clause 1.1.4: Auditing Body	*This Sub-Clause is not applicable, to be deleted.*
Sub-Clause 1.1.11: Contract Agreement	*Delete* "(if any)" *from the definition.*
Sub-Clause 1.1.21: Key Personnel	*The following is added at the end of the sub-clause:* "Contractor's Personnel includes Key Personnel as named in Part A - Contract Data."
Sub-Clause 1.1.24: Cost Plus Profit	*Add the following new paragraph to the end of the Sub-Clause:* "In these Conditions, provisions including the expression "Cost plus profit" require this profit to be one-twentieth (5%) of this Cost."
Sub-Clause 1.1.27: DAB	*The whole Sub-Clause is replaced with:* "DB means the person or three persons appointed under Sub-Clause 20.3 *[Appointment of the Dispute Board]* or Sub-Clause 20.4 *[Failure to Agree on the Composition of the Dispute Board]* or Sub-Clause 20.10 *[Disputes Arising under the Operation Service Period]*".
Sub-Clause 1.1.33: Employer's Equipment	*Delete* "Employer's Requirements" *and replace with* "Particular Conditions of Contract".
Sub-Clause 1.1.49: Letter of Tender	*Insert* "or Letter of Bid" *after* "Letter of Tender".
Sub-Clause 1.1.62: Plant	*Add to the end:* "…including vehicles purchased for the Employer and relating to the construction or operation of the Works."
Sub-Clause 1.1.66: Retention Period	*The following Sub-Clause is modified as follows:* "**Retention Period**" means the period of 1 year after the date stated in the Commissioning Certificate.
Sub-Clause 1.1.72: Site	*After* "are to be executed", ", including storage and working areas," *is added.*
New Sub-Clause 1.1.86: Ownership of the equipments that will be donated as specified in the social inclusion requirements	*The following is added as a new Sub-Clause:* "1.1.86 **"**The equipment listed in the ESHS Specifications for donation as per the social inclusion requirements shall be donated to the beneficiaries selected by the Contractor and confirmed in accordance with ESHS Specifications – Article 39.12.1. These equipment will be donated at the latest at the time Performance Certificate is issued by the Engineer, in exchange of a donation receipt signed by each targeted beneficiary;"
New Sub-Clause 1.1.87: Accepted Contract Amount for the Design Build	*The following is added as a new Sub-Clause:* "1.1.87 **"Accepted Contract Amount for the Design Build"** means the amount accepted in the Letter of Acceptance for the Design-Build of the Works;"
New Sub-Clause 1.1.88: Accepted Contract Amount for the Operation Service	*The following is added as a new Sub-Clause:* "1.1.88 **"Accepted Contract Amount for the Operation Service"** means the amount accepted in the Letter of Acceptance for the provision of the Operation Service;"

New Sub-Clause 1.1.89: AFD	*The following is added as a new Sub-Clause:* "1.1.89 **"AFD"** means *Agence Française de Développement*, being specified that, according to French laws and regulations, AFD is not a bank but a Specialized Financial institution ("Institution Financière Spécialisée")".
New Sub-Clause 1.1.90: EPP	*The following is added as a new Sub-Clause:* "1.1.90 **"EPP"** stands for stands for Environmental Protection Plan, and has the meaning defined in the ESHS Specifications."
New Sub-Clause 1.1.91: ESHS Specifications	*The following is added as a new Sub-Clause:* "1.1.91 **"ESHS Specifications"** means the document entitled environmental, social, health and safety specifications, as included in the Employer's Requirements, and any additions and modifications to it in accordance with the Contract. Such document specifies the environmental, social, health and safety obligations of the Contractor."
New Sub-Clause 1.1.92: Existing Facilities	*The following is added as a new Sub-Clause:* "1.1.92 **"Existing Facilities"** means the existing plant, equipment, buildings and other assets at the Site to be taken oven and operated by the Contractor as further described in the Employer's Requirements."
New Sub-Clause 1.1.93: Influent	*The following is added as a new Sub-Clause:* "1.1.93 **"Influent"** means the untreated water/ wastewater entering the Works at the delivery point to the Works)."
New Sub-Clause 1.1.94: Influent Baseline	*The following is added as a new Sub-Clause:* "1.1.94 **"Influent Baseline"** means the quality characteristics of the untreated Influent as set out in the Employer's Requirements, used as the baseline for the design of the Works;"
New Sub-Clause 1.1.95: Performance Guarantees	*The following is added as a new Sub-Clause:* "1.1.95 **"Performance Guarantees"** means the standards to be achieved by the Contractor during the Operation Service Period and includes the standards specified in the Schedule of Performance Guarantees."
New Sub-Clause 1.1.96: Project Area	*The following is added as a new Sub-Clause:* "1.1.96 **"Project Area"** has the meaning defined in the ESHS Specifications."
New Sub-Clause 1.1.97: Schedule of Performance Guarantees	*The following is added as a new Sub-Clause:* "1.1.97 **"Schedule of Performance Guarantees"** means the schedule set out in Appendix 2 to the Contract Agreement specifying the core Performance Guarantees to be met by the Works and achieved by the Contractor at commissioning and throughout the whole Operation Service Period;"
New Sub-Clause 1.1.98: Worksite - ESMP	*The following is added as a new Sub-Clause:* "1.1.98 **"Worksite - ESMP"** stands for Worksite Environmental and Social Management Plan, and has the meaning defined in the ESHS Specifications."
Sub-Clause 1.2: Interpretation	*The following is added at the beginning of the Sub-Clause:* "Unless inconsistent with any provision of the Contract, the meaning of any trade term and the rights and obligations of the Parties thereunder shall be prescribed by Incoterms. Incoterms means international rules for interpreting

Annex L - Commencement Date

CLAUSE 8: COMMENCEMENT DATE, COMPLETION AND PROGRAMME	
Sub-Clause 8.1: Commencement Date	*Delete the text of the whole Sub-Clause and replace with the following:* "Except as otherwise specified in the Contract, the Commencement Date shall be the date at which the following conditions precedent have all been fulfilled and the Employer's Representative's notification recording the agreement of both Parties on such fulfilment and instructing to commence the Work is received by the Contractor: (a) signature of the Contract Agreement by both Parties, and if required, approval of the Contract by relevant authorities of the Country; (b) effective access to and possession of the Site given to the Contractor together with such permission(s) under (a) of Sub-Clause 1.14 *[Compliance with Laws]* as required for the commencement of the Works. (c) Receipt by the Contractor of the Advance Payment under Sub-Clause 14.2 provided that the corresponding bank guarantee has been delivered by the Contractor. If the said Employer's Representative's notification is not received by the Contractor within 180 days from his receipt of the Letter of Acceptance, the Contractor shall be entitled to terminate the Contract under Sub-Clause 16.2 *[Termination by Contractor],* unless the Contractor has caused, or contributed in any respect to, any non-fulfilment of one or all of these conditions precedent.

Annex M - Revised Part 2, 7.2, 1.3.2

1.3.2. Treatment capacity

The Water Treatment Plant shall be designed for a minimum daily treated water capacity of 93,000 m^3/day for Firm Part and 93,000 m^3/day for Conditional Part. The total capacity of the Water Treatment Plant shall be a minimum of 186,000 m^3/day.