

EMPLOYER'S RESPONSE TO BIDDER'S QUERIES ON BIDDING DOCUMENT FOR SCADA

Query No	Reference Clause	Query	Response
1	Section 1. Instruction to Bidders, ITB-7.2 and BDS-ITB-7.4	<p>In the section 1. Instruction to Bidders, ITB -7.2, and in section 2. Bid Data Sheet, ITB 7.4, we understand that the bidder is advised and responsible for visiting and examining the site to obtain all data and information that may be necessary for preparing the bid. We understand also that the Employer will conduct a site visit on September 20th 2018 at 11.00 hrs before the pre-bid meeting et 14.00 hrs.</p> <p>The site visit seems to last a very short time, probably too limited for conducting a detailed examination of all the sites where Permanent works will be executed with the installation of equipment under the Project.</p> <p>Is it possible to arrange another appointment allowing bidders to visit the sites in an in-depth and exhaustive manner to prepare the most relevant offer?</p>	Site Visit has been already organized on 20 th September 2018. However, bidders can visit sites any time after pre-bid meeting also to gain more information.
2	Section 4. Bidding forms, Schedule 1	<p>In the section 4. Bidding forms, Schedule 1, Item 1, it is mentioned that the Contractor shall supply "inclusive of all supply costs of related Pressure Flow Control Metering Device (PFCMD), valve [...]" for the Reservoir Management System (RMS).</p> <p>Please confirm that the Contractor has or not to supply air valves (ARV's) for the RMS and in the case the supply of ARV's is required, please confirm which diameter of air valves is required.</p>	It is confirmed that the contractor does not have to supply air-release valves for the RMS.
3		<p>In the section 4. Bidding forms, Schedule 1, Item 3, it is mentioned that the Contractor shall supply "[...] Inclusive of all supply costs of related Pressure Flow Control Metering Device (PFCMD), valve transmitter [...]" for the Outlet Management System (OMS).</p> <p>Please confirm that the Contractor has or not to supply air valves (ARV's) for the OMS and in the case the supply of ARV's is required, please confirm which diameter of air valves is required.</p>	It is confirmed that the contractor does not have to supply air-release valves & level transmitter for the OMS.

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		Please also confirm that the contractor has not to provide level transmitters for OMS.	
4	Section 4. Bidding forms, Schedule 1, Item 1, 2, 3, 4, 5 and 6	<p>In the section 4. Bidding forms, Schedule 1, Item 1, 2, 3, 4, 5 and 6, we understand that the Contractor shall provide an "enclosure cabinet" for each RMU, AMU and OMU.</p> <p>We understand that "enclosure cabinet" means "electric board". Please confirm.</p> <p>We also understand that the Contractor shall provide a small technical room where the electric board will be installed for each RMU, AMU and OMU for protection against tampering as mentioned in the Employer' Requirements document section 5.8.1 "[...] tamper proof enclosure [...]". Please confirm</p>	Both assumptions are confirmed.
5	section 4. Bidding forms, Schedule 1, Item 13 & Item 14	In the section 4. Bidding forms, Schedule 1, Item 13 & Item 14, we understand that the Contractor shall supply 2 No. of GIS Software Licenses and 2 No. of Hydraulic Analysis Software Licenses. We understand it is referring to 2-user per-seat license for GIS software and to 2-user per-seat license for Hydraulic Analysis Software. Please confirm.	It refers to 2 licenses that allow running the software independently (and possibly simultaneously) in 2 different computers.
6	section 6 and subsection 5.2.2	In the section 6. Employer's requirements, subsection 5.2.2 "Description of the DNIs, Primary and Secondary Networks", some of the main features of the secondary and tertiary network are mentioned, including Woltmann Type Class "B" bulk flow meters (BFM) and SCADA compatible data loggers for DMA meters only (not pressure or door switch data input). We understand that the Contractor won't use these existing devices for OMS. Please confirm the Contractor shall replace these existing BFM by Electromagnetic or Ultrasonic new flow meters with new FCU suitable for the different mentioned Data Entry for all locations.	The contractor may replace the existing flowmeters to make them compatible with data-loggers.
7	section 6 and subsection 5.9	In the section 6. Employer's requirements, subsection 5.9 "Contractor Documents and Samples Submissions", we understand that the Contractor shall deliver samples of the	The contractor will not have to deliver samples, and Factory

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		materials to the Employer's office if required. Please clarify the type, the size and the number of samples per type you may require.	Acceptance Test (FAT) will provide the quality control needed.
8	section 6 and subsection 5.9	In the section 6. Employer's requirements, subsection 5.9 "Contractor's Documents and Samples Submissions", we understand that the Quality Plan shall be delivered at the end of the fourth week after the Commencement Date. In the section 6. Employer's requirements, subsection 5.11 "Quality Assurance and Control Requirements", it is mentioned that the Contractor shall submit, within 21 days of the Commencement Date, the Quality Program including the Quality Planning and quality plans. Please confirm that Quality Program, including the Quality Planning, shall be delivered at the end of the fourth week after the Commencement Date.	The provisions in the bidding document remain unchanged.
9	section 6 and subsection 5.10.2	In the section 6. Employer's requirements, subsection 5.10.2 "Testing and Commissioning", we understand that the Employer can request the Contractor to test any major component of the project and in particular the PFCMV and the RTUS. Please provide a comprehensive list of the major components, in addition to PFCMV and RTUs which must be tested.	It will be decided during approval process.
10	section 6 and subsection 5.10.2	In the section 6. Employer's requirements, subsection 5.10.2 "Testing and Commissioning", we understand that the Employer can request the Contractor to test any major component of the project at the manufacturer's premise (FAT). Please clarify who will test the major components of the system (Contractor, TPIA...).	The contractor is responsible for FAT which will be performed by the manufacturer during manufacturing process.
11	section 6 and subsection 5.10.2	In the section 6. Employer's requirements, subsection 5.10.2 "Testing and Commissioning", we understand that test certificates shall be provided for any newly installed air release valves in the BDS. However, in the section 6. Employer's requirements, subsection 3 "Scope of the Design, Build and Operate Contract", we understand that all the air valves required for the AMS are already installed. Please	Air-release valves are already installed at the BDS. Please also refer response to Q.N. 10 above.



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		clarify if the Contractor shall install new air valves and on which systems the new air valves would be installed. In the case the Contractor is requested to supply ARV's, please confirm also that the tests mentioned in Employer Requirements section 5.10.2 shall be done by the manufacturers in their factories or accredited labs.	
12	section 6 and subsection 5.13.1	In the section 6. Employer's requirements, subsection 5.13.1 "Technical specifications for the hydraulic valves", we understand that Employer's representatives could attend factory inspections. Please clarify the number of Employer's representatives who might be present for factory inspections and the number of inspections required per type of major equipment (please see also point 9 above).	Please see addendum # 3
13	section 6 and subsection 5.13.2	In the section 6. Employer's requirements, subsection 5.13.2 "Technical specifications for sensors and metering devices", we understand that the Contractor shall install "conductivity sensors" which will include temperature sensor. But there is no mention of such measurement devices elsewhere in the description of the works. Please indicate in which systems (RMS, AMS, OMS) the Contractor shall supply and install conductivity sensors.	The contractor shall NOT supply conductivity sensor. The reference to them will be removed from the Bidding Document. Please refer addendum # 3 (addendum to be issued and Edwardo to advise on the addendum)
14	section 6 and subsection 5.13.2	In the section 6. Employer's requirements, subsection 5.13.2 "Technical specifications for sensors and metering devices", it is mentioned that the pressure probes to be installed will comply at least with the following technical specifications: stainless steel housing, graphic display with 4 push buttons for easy local configuration, design pressure up to 16 bar, and IP55 protection standard. Please confirm that the "Graphic display with 4 push buttons" is only required during the build phase for installation and configuration purposes.	It is confirmed.
15	section 6 and subsection 6.1	In the section 6. Employer's requirements, subsection 6.1 "Operation management requirements", we understand that the Contractor shall provide security of the	The Contractor's commitment in terms of security is restricted to

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		installed systems, in particular at the AMS, RMS, OMS and RCC locations. Please confirm that the Contractor commitments in terms of security are limited to tamper proof enclosures (please refer to point 4 above) and anti-intrusion alarm (door switch).	tamper proof enclosures and intrusion alarms.
16	section 6 and Appendix 1, subsection 5	<p>In the section 6. Employer's requirements, Appendix 1, subsection 5 "Inputs and expenses for the Services", it is indicated that:</p> <ul style="list-style-type: none"> - "15 man-days of work are allocated per year for the Auditing Body Routine duties detailed in chapter 2 above." - "Over the total duration of the Services, a total of 15 man-days of work are allocated on Routine duties of the Auditing Body." - "The estimated duration of the Services shall be 2 years with total input of 2 months from the date of commencement of the Operation Service. <p>Please clarify the total of man-days of work allocated for the Auditing Body Routine for the whole Project.</p>	The allocation for the Auditing Body is 15 man-days per year of project duration. That yields around 26 man-days for the total project duration of 21 months (excluding the operation period).
17	section 6 and Appendix 1, subsection 5 & subsection 6.1	<p>In the section 6. Employer's requirements, Appendix 1, subsection 5 "Inputs and expenses for the Services", it is indicated that: -</p> <p>"The Auditing Body should be composed of 1 member</p> <p>However, in the section 6. Employer's requirements, subsection 6.1 "Operation management requirements", it is indicated that:</p> <ul style="list-style-type: none"> - "An Auditing Body composed by three qualified members will be designated for the operation service phase of the contract." <p>Please clarify whether the Auditing Body should be composed of one member or three members. Please confirm also that the Auditing Body is independent from the Employer.</p>	<p>The Auditing Body is independent from the Contractor and will be composed of 1 member.</p> <p>Please also refer addendum # 3</p>

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18		What is the existing communication mode for the existing SCADA system and remote communication? Does the new SCADA system need to connect with the existing system?	There is no existing SCADA system. Data are manually retrieved on-site. The new SCADA only has to connect with the old reservoirs of the existing system and with the new network (RMS, BDS and OMS)
19		There is existing Hydraulic Modeling Software (EPANET) and GIS system, do the Employer accept other Hydraulic Modeling Software such as Aquis of Schneider and other GIS such as Arc Gis of Schneider? If the Employer accept other software brands, What is the requirement for the other brand Hydraulic Modeling Software connect with existing Hydraulic Modeling Software (EPANET)?	Other hydraulic models (as the ones mentioned) are accepted. The proposed hydraulic tool should be able to allow exporting the network configuration to EPANET format (*.net).
20		There are 12. RMUs in RMS, including 6 existing RMUs and 6 new RMUS. How many PFCVs, Pressure flow control metering devices, controllers, pressure transmitters, level transmitters and other related devices and appearances need to be supplied for each RMU? How many points are connected with Civil Water Supply Network for each Reservoir? Do the existing devices that needed to connect with new RMS have controllers?	One Pressure flow control metering device, one controller, one pressure transmitters and one level transmitter for each RMU. Only 12 Reservoirs (6 new and 6 old) are connected with the BDS SCADA . Another 3 reservoirs (Kirtipur/Katunje/Tigini) will remain (for the time being) separated from the BDS Scada installation. There are not controllers installed now.
21		Can you describe in details the environment of power supply and communication	Six reservoirs (the new ones) are

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		<p>system?</p> <p>Please confirm the IO point of RMS is 10 and 10 points of OMS is 5 points as described in the bidding document.</p>	<p>connected to the power supply network, while the other 6 (old ones) are not connected. Power is not available at the OMS, and valves must be hydraulically actuated.</p>
22		<p>How many 10 points need to be connected for each RMUs? Can we refer to the typical SCADA configuration for RMU and AMU that described in the Bidding Document?</p>	<p>Yes, you can refer to the configurations described in the Bidding Document.</p>
23		<p>We know there are some general requirements for other devices, such as control valves, air valves, flow meters and smart meters. But please confirm the parameters such as diameters, pressures and quantities if the devices need to be supplied by the Contractor.</p>	<p>Pressure requirement is above 16 bar and the diameters can be found in section 5.2.1 of the bidding document.</p>
24		<p>Page 300-331 and Page 267-298 in the PDF version bidding document are repeated. We would like to remind the employer to check the bidding document again and confirm that no information is missing in the provided bidding document.</p>	<p>Not repeated</p>
25		<p>As indicated in the bidding documents, the location for OMS, AMS and RMS are selected, and the remote control centre has been constructed, so that we request the employer to provide us the arrangement diagram drawing in AutoCAD version including the location of RAM, OMS, AMS as well as the remote control center. And also indicate the PN rating and diameter for the OMS.</p>	<p>A general map with the reservoir locations (RMS) and DNIs (OMS) can be found in Figures 5.1.1-5.1.4 of the Bidding documents. Air-valves in the BDS composing the AMS are evenly located along the BDS pipes.</p> <p>PN is 16 bar and diameters can be found in section 5.2.1 if the Bidding Document.</p>

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26		<p>As the bidders are required to supply and install the Pressure Flow Control Metering Device, while during the installation, pipe cuttings and additional pipe fittings are necessary for the connections. Shall we include these related pipe fittings are necessary for the connections. Shall we include these related pipe fittings in our price quotation or the Employer will provide those fitting? And it is also mentioned that BFM are under installation, what about isolated valves, will the Pressure Flow Control Metering valves be installed next to existing isolated valves or not, shall we include the cost of isolated valves for each OMS?</p>	<p>The contractor must quote and supply all the elements required to install the RMS, which include the pressure and flow control metering devices and associated fittings.</p> <p>The cost of isolating valves for the RMS and OMS must also be quoted and included in the bidding price.</p>
27		<p>Regarding the Pressure Flow Control Metering Device, we had sent the technical requirements of the Pressure Flow Control Metering Device to some international reputed manufactures, they had responded that their products cannot meet the requirement as some technical requirements seem specialized and some vendors doubt that the Specification will make all bidders to choose the same manufacture which will result in harming your good office's interest.</p> <p>And also as stated in the bidding documents, both valves and sensors will be selected among high-quality international brands and approved by PID. So that can your office provide us the PID approved brand list, especially for Pressure Flow Control Metering Device and sensors, for our reference so that we can provide better service for your office?</p>	<p>There are several manufacturers offering automatic valves that comply with the project specifications: ARI, AVK, Bayard-Belgicast, Bermad, Cla-Val, C-Valves, VAG, etc. Some of them may not produce equipment for the larger diameters of some RMUs or may not have subsidiaries in ADB member countries, but nonetheless there are several options.</p> <p>Furthermore, bidders are encouraged to provide their preferred choice of a technological layout (combination of different valves and sensors) to cater for the functionalities described in the bidding document. Accordingly, the Pressure and Flow Control</p>

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			Metering Devices do not necessarily refer to a closed manufactured product, but to a combination of them.
28		Regarding Schedule of Performance Guarantees, Section 4- Bidding forms, the bidders are required to response the KPI while the tables are not applicable, so we would like to confirm with the employer that whether the bidder has to response the KPI or not? What about schedule of Performance Guarantees?	The first table (Inputs-based KPI) does not apply, but the second one (Outputs-based KPI) is fully applicable. Therefore, the contractor must respond to these KPIs and follow the schedule of Performance Guarantees.
29		<p>Page. 119 paragraph 4. Manually/SCADA compatible Electrically actuator Operated Ball Valves at New Reservoir sites except at Arubari/Mahankalchour & Bansbari where they must be designed/ supplied and installed by the bidder and whose cost of supply and installation shall be included while quoting rates for RMU in New Reservoirs.</p> <ul style="list-style-type: none"> - Electromagnetic Flow Meters - Manually/SCADA Compatible <p>Electrically Actuator Operated Butterfly Valve at junctions</p> <ul style="list-style-type: none"> - Level Sensors with SCADA Support. <p>1. Please kindly provide the specification of the ball valves, electromagnetic Flow meter, Butterfly and Level sensors.</p> <p>2. Could you kindly provide the quantity of RTU system need to be installed on the ball valves, flow meter, butterfly and level sensors for the new reservoir and the same</p>	<p>1. The information available regarding the existing equipment can be found in the bidding document.</p> <p>2. One RTU is expected to gather all the information from all sensors and valves at each reservoir.</p> <p>3. Loads on the valves will depend on the working conditions of the system, which must be analyzed within the contract. However, note that hydraulic valves are preferred, so that flow modulation is not energy-intensive. Please also refer the Detail specification in the last paragraph of</p>

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		<p>type RTU and device need to be installed on the old reservoir.</p> <p>3. In reservoir, flow modulation, cut-off are also needed. Can it indicate the load of flow valve? then we can estimate the power supply requirements by solar panel, for without guaranteed electric supply.</p>	this response.
		<p>Page 99, paragraph 2, Outlet management units (OMU). They are placed at selected points in distribution networks i.e. DMA and Sub DMA, controlling the incoming pressures and discharges.</p> <p>Page 133 paragraph 2, OMS like RMS comes with some type of hydraulic control valves; electro-magnetic or ultrasonic flow meters and appurtenances that are capable of multiple functions including flow control, pressure control, and volumetric metering. It also comes with remote on/off features including the ability bypass the control loop in case larger flows need to be delivered at designated times.</p>	<p>The final location of the OMU is already defined. They can be quoted as standard District Metered Area (DMA) /Sub DMA control points, with a pressure reducing valve, a flow and pressure meter, the associated check valves and appurtenances.</p>
30		<p>1. Could we get the schedule of DMA design? And DMA design is out of this contract work scope?</p> <p>2. Could it be listed the layout of AMS unit position, and outlet management unit position? Then it could be helpful to choose appropriate communication mode, by radio or by GPRS.</p>	<p>DMA's have already been designed in previous contracts, but they must be checked and installed within this one.</p> <p>The preferred communication mode is radio.</p>
31		<p>For the Air release valve</p> <p>1. Please kindly provide the specification of the air release valve installed on the BDS and DNI system.</p>	<p>The main characteristics of the air release valves placed in the BDS can be found in section 5.2.1 of the Bidding Document. Please also refer the Detail specification in the last paragraph of this response.</p>

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32		<p>Implementation of an Automated Meter Reading (AMR) System for a pilot sector to be defined by KUKL, with around 1000 smart meters.</p> <p>1. Could it be listed the position of meter, or draft layout of meter mounting point?</p>	<p>The area for the pilot AMD system is defined and the smart meters are already installed. However, the AMS including communications, software and data analysis is part of this contract.</p>
33		<p>Other information may affect the bidding price</p> <p>1. Are there any pump stations in current distribution network? If have, is it needed to integrate data into SCADA?</p> <p>2. Are there any water treatment plant and waste water treatment plants? If have, is it needed to integrate data into SCADA</p> <p>3. P&ID drawings of the existing reservoirs, existing DNIs</p>	<p>There are no pumping stations.</p> <p>There are treatment plants, but do not have to be integrated into the SCADA (it is only a SCADA for the network).</p> <p>The standard reservoir layout can be found in Figures 5.8.2 and 5.8.3.</p> <p>Three typical DNIs are presented in Figures 5.1.3-5.1.6.</p>
34	<p>Section-1</p> <p>Clause No. 7.5</p>	<p>The Bidder is requested to submit any questions in writing, to reach the Employer not later than 1 week before the pre-Bid meeting. We request Employer to provide additional time for submitting the questions.</p> <p>We would require at least 2 weeks more time from the pre-bid meeting considering the scale and complexity of the bid. Most of the queries will be generated after pre-bid meeting.</p>	<p>Please, refer to Addendum # 2 with regard to time extension for submission of bids which has been extended up to October 29, 2018</p>
35	<p>Section-3</p> <p>Clause No. 1.4.2</p>	<p>Experience in Key Activities</p> <p>Bidder requests Employer to consider projects implemented by worldwide subsidiaries in case of a multinational company even if the said subsidiary is not the</p>	<p>The provisions in the bidding document remain unchanged.</p>

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		same subsidiary that is bidding for the project. This is prevalent in most of the multinationals where in there exchange of knowledge and experience based on the project requirements	
36	Section-3 Clause No. 1.4.2	Experience in Key Activities Please confirm if pre-nominated sub-contractors experience will be acceptable even if the bidder does not have the relevant experiences. Also clarify if both Bidder (1.4.2) and sub-contractor 1.5 should meet the requirements to qualify. We understand that a sub-contractors experience reference with an authorisation to support the bidder will be accepted.	The provisions in the bidding document remain unchanged.
37	Price Sched. n°1 Clause n°1	Taxes and duties Please clarify whether the price to be indicated in the column 6 & 7 is including taxes and duties or excluding taxes and duties.	All the taxes applied outside the country of Employer will be included in the price schedule in column 6 & 7 of schedule 1.
38	Price Sched. n°1 Clause n°1	Taxes and duties Please confirm whether the taxes and duties to be indicated in the column 8 are only local VAT at employer's country. Do we have to include the customs duty at employer's country in this column 8.	All the taxes applied in the country of Employer will be included in the column 8 of schedule 1. Prevailing VAT is applicable for the total contract amount and it will be indicated at the end of schedule No. 8: Grand Summary
39	Price Sched. n°1 Clause n°1	Taxes and duties Please confirm whether tax at source shall be deducted from the price indicated in column 6. In case yes, please let us know the rates of these taxes.	Tax at source shall be deducted at the time of interim payment certificates
40	Price	Taxes and duties	Please refer to response to Q.N. 38

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	Sched. nº1 Clause nº1	Please clarify whether all taxes and duties (Example VAT) shall be paid to the contractor over and above the Value mentioned in column 6.	
41	Price Sched. nº1 Clause nº1	Taxes and duties Please confirm that VAT is Currently @13%.	Yes, the current VAT is 13%
42	Schedule of rates and Price Schedule no. 3	Taxes and duties Please confirm that all taxes and duties are required to be included in the prices quoted in this schedule.	Please refer to response to Q.N. 37 and Q.N.38
43	Schedule of rates and Price Schedule no. 3	Taxes and duties Please confirm that all taxes and duties are required to be included in the prices quoted in this schedule.	Please refer to response to Q.N. 37 and Q.N.38
44	Price schedule 8	Taxes and duties We understand that the bidder can quote for foreign currency and/or local currency and that can be carry forward to schedule 8. However, bidder need not indicate or include taxes and duties for these services. Please confirm.	The provisions in the bidding document are self-explanatory
45	Price schedule 8	Taxes and duties Please confirm that the taxes and duties indicated separately in Price Schedule -1 need not be brought to this schedule.	The provisions in the bidding document are self-explanatory
46	Price schedule 8	Taxes and duties Please confirm if the value indicated in the price schedule will be paid 100% to the bidder without any deduction of taxes.	The provisions in the bidding document are self-explanatory

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47	Price schedule 8	Taxes and duties Please confirm that all applicable taxes shall be paid extra to contractor over and above the prices indicated in Price Schedule 8.	The provisions in the bidding document are self-explanatory
48	Section-6 Clause No. 5.10.1	It is indicated that " All major materials in the Contract, in particular the PFCMV valves used in the RMS of the BDS, shall have a Pre-shipment inspection at the approved manufacturer's place and according to approved quality assurance plan(QAP)." All major materials in the Contract, in particular the PFCMV valves used in the RMS of the BDS, shall have a Pre-shipment inspection at the approved Manufacturer's/Dealers place and according to approved quality assurance plan (QAP).	All major materials in the Contract shall have a Pre-shipment inspection at the approved Manufacturer's place according to approved quality assurance plan (QAP).
49	Clause No. 5.10.1	It is indicated that " The Employer can request the Contractor to test any major component of the project (and in particular the PFCMV and the RTUs) at the manufacturer's premises, as detailed in the following conditions and in accordance with all relevant clauses within the General Specification We request the above clause to change to " The Employer can request the Contractor to test any major component of the project (and in particular the PFCMV and the RTUs) at the manufacturer's / Dealers premises, as detailed in the following conditions and in accordance with all relevant clauses within the General Specification These are two generic clauses introduced in employers' requirements. Deletion of this specs will invite more number of manufacturer and bidders to participate in the tendering process of the client, and in turn the client shall have an opportunity to select the best Equipment's Manufacturer as part of the project. There are Very few, say 8-10 manufacturers for control valves. MOC is being selected,	The provisions in the bidding document remain unchanged. All equipment must be tested at the place of origin. See also response to Q.N. 48 and Q.N. 50.

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		Keeping in mind about the pressure class, allowable head loss and type of requirement.	
		<p>Technical specifications for the hydraulic valves</p> <p>1. Valves shall be in ductile iron with NBR vulcanized liner or similar - Delete and Replace with "Valves shall be of precision moulded composite construction (Nylon 12 + 50% glass fibre reinforced) or any other suitable material."</p> <p>2. Valves shall be double-chambered without internal springs for drip-tight closure, even when command pressure is low" – Delete.</p>	<p>Specifications for the hydraulic valves are illustrative and bidders must give their best offer according to the required functionalities and working conditions (See response to Q.N. 27).</p> <p>1. "Valves shall be in ductile iron with NBR vulcanized liner or similar".</p>
50	Section-6 Clause No. 5.13.1	<p>As said above there are various type of valves with manufacturers own design and MOC, type of arrangement and technology adopted. Each manufacturer is having his design methodology patented and their control valves cannot be compared with other manufacturers. whereas given in tender spec is Ductile Iron and control valves shall be of Double Chambered, which is favoring one or two manufacturers, looks like., and we feel the same shall not be considered competitive.</p> <p>Hence Competitive bidding for Controls Valves shall be open to</p> <p>1. Type of materials, 2. Construction of Valves, 3. Working Methodology of Valves. 4. FAT can be done at Dealers / Manufacturers Place.</p>	<p>Please, interpret the wording "or similar" as a possibility to replace the proposed materials with alternative ones with the same or improved functionalities.</p> <p>2. "double-chambered valves without internal springs for drip-tight closure", could only be waived if the proposed technology guarantees a similar or better functionality.</p> <p>3. Regarding the removal of the clause of alternative supply arrangements during Valve replacement, it is not accepted.</p> <p>4. FAT can only be done at the manufacture's place</p>

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51	Clause No. 5.6.2	EMP We request KUKL to remove the clause of alternative supply arrangements during Valve replacement, Leak repair, New pipelines or extensions and provision of appropriate water meters.	The provisions in the bidding document remain unchanged.
52	Clause No. 5.8.3	OMS Please confirm if Additional air valves needs to be provided for OMUs and RMUs.	Please refer to response to Q.N. 2 and Q.N.3
53	Clause No. 5.8.2	RMU We understand that RMUs required for without Grid locations like Balaju, Mahankal, and Bhansbari & Panipokhri are very close to new reservoirs which has grid connectivity. Is it possible for the bidder to take grid connection by laying suitable cable from the existing electrical facility available in the site location? If yes, will the required feeders be provided by Employer?	The provisions in the bidding document remain unchanged.
54	Clause No. 5.13.1	Technical specification of hydraulic valves Expenses of inspection of visit by Employer's representative shall be borne by the Contractor. Kindly specify exact number of employer's representative who participate in the inspection. Similarly confirm if this is applicable to all Inspections where employer will participate. It is better to provide List of Items that Employer will participate in Inspection and number employer representatives.	Please refer response to Q.N.12
55	Clause No. 5.13.3	Technical Specifications for the Hardware Components PLCs/RTUs Shall run on 12V solar power or long-life battery. Please confirm if any study is	Such study is not available and must be carried out before the installation phase. The choice of equipment (solar



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		conducted to analyse the availability of adequate sunlight all through the year. In case of loss of signals due to lack of sunlight, we understand that there will not be enforcement of KPIs.	panels and batteries) will be based on the analysis of the existing conditions. KPI will be enforced in any case.
56		Bid Submission Date Considering the fact that bid documents were issued late and the Job Being Large and complex and involves extensive site survey, we request to extend the bid submission date by at least 4 weeks.	Please refer response to Q.N.34
57	1.4 Bidders Experience, Contracts of Similar Size and Nature; Clause 1.4.1 (i)	We request to kindly consider that bidder should have experience "Successful Completion of at least two (2) contracts within the last seven (7) years that are similar to the proposed contract (water supply, wastewater or energy), where the value of the Applicant's participation exceeds USD 6.00 Million or equivalent NRs". Please confirm. Or this PQ should be met jointly by all JV partners?. Please confirm.	The provisions in the bidding document are self-explanatory
58	1.4 Bidders Experience, Contracts of Similar Size and Nature; Clause 1.4.1 (ii)	We request kindly consider that bidder should have experience of "Successful Completion of at least one (01) contract of operation and maintenance of SCADA for urban water supply system in cities with more than 80,000 connections with minimum duration of 1 year within the last seven (7) years". Please confirm.	The provisions in the bidding document remain unchanged.
59		We request kindly consider that bidder should have "Participation as consultant, contractor, management contractor, or subcontractor, in at least one (1) project of design and implementation of District Metering Areas (DMAs) on water supply networks", within last seven years. Please confirm.	The provisions in the bidding document remain unchanged.
60		We request you to kindly extend the bid submission due date at least 3 weeks for a	Please refer response to Q.N.34



Query No.	Reference Clause	Query	Response
		qualitative and competitive bid.	
61	Page No 49 of 79, Item No. 5.8.3 of Employers Requirements,	<p>Kindly Clarify whether the Electro-Magnetic or Ultra Sonic Flow meters are additional requirements for the project?</p> <p>Contradicting with "RMS and OMS specifications of Employers Requirements".</p> <p>Whole purpose of this control system was to replace the flow meters, which will not able to control the flow and Pressure as expected.</p> <p>Also, along with OMS system we may not require any such flow meters because OMS will measure flow.</p>	<p>The Reservoir Management Units require flow measurement to perform the pressure and flow control, and must be installed within the scope of this contract. The OMS have already helicoidal flow meters (Woltmann turbines) but they may not be suitable to connect to the SCADA and may be replaced.</p> <p>Please also see Response to Q.N. 6.</p> <p>Grid connection is only available for new reservoirs RMS & Main Control Center/ Network Analysis Centre</p>
62	Page No 52 of 79, Item No. 5.10.1 of Empl. Req.	<p>Please be noted that, with additional flow meter the hydraulic loss will be created and this will affect in maintaining the minimum pressures at critical point.</p> <p>With proposed flow meters, un-interrupted electric power supply is required at all the proposed locations and this is cost to the project.</p>	Please refer response to Q.N.48
63	Page No 53 of 79, Item No. 5.10.2 of Empl. Req.	<p>The Employer can request the Contractor to test any major component of the project (and in particular the PFCMV and the RTUs) at the Manufacturer's / Dealers premises, as detailed in the following conditions and in accordance with all relevant clauses within the General Specification. – Please confirm to carry out tests at Dealers / Manufacturers Place.</p>	Please refer response to Q.N.48

Query No.	Reference Clause	Query	Response
		<p>1. Valves shall be in ductile iron with NBR vulcanized liner or similar - Delete and Replace with "Valves shall be of precision moulded composite construction (Nylon 12 + 50% glass fibre reinforced) or any other suitable material."</p> <p>2. Valves shall be double-chambered without internal springs for drip-tight closure, even when command pressure is low" – Delete.</p> <p>Hence to conclude, we request you to consider the request and delete the above highlighted two clauses to invite the best manufacturer of the control valves best in industry. These are two generic clauses introduced in employers' requirements.</p>	Please refer response to Q.N.27 and Q.N 50.
64	<p>Page No 53 of 79, Item No. 5.10.2 of Empl. Req.</p> <p>5.13.1 Technical specifications for the hydraulic valves</p>	<p>Deletion of this specs will invite a greater number of manufacturer and bidders to participate in the tendering process of the client, and in turn the client shall have an opportunity to select the best Equipment's Manufacturer as part of the project.</p> <p>There are Very few, say 8-10 manufacturers for control valves. MOC is being selected, Keeping in mind about the pressure class, allowable head loss and type of requirement.</p> <p>As said above there are various type of valves with manufacturers own design and MOC, type of arrangement and technology adopted. Each manufacturer is having his design methodology patented and their control valves cannot be compared with other manufacturers. whereas given in tender spec is Ductile Iron and control valves shall be of Double Chambered, which is favoring one or two manufacturers, looks like., and we feel the same shall not be considered competitive.</p> <p>Hence Competitive bidding for Controls Valves shall be open to</p> <ol style="list-style-type: none"> 1. Type of materials, 2. Construction of Valves, 3. Working Methodology of Valves. 	



Query No.	Reference Clause	Query	Response
		4. FAT can be done at Dealers / Manufacturers Place.	
65	Clause: 1.4.1.(ii)	We request to change the requirement to 44 MLD as it is same as the water demand for 80,000 connections. Otherwise, we request to change the requirement as 80,000 connections or 44MLD.	The provisions in the bidding document remain unchanged
66	1.4.1 (ii)	In Nepal and other countries, also the water requirement is calculated on the basis of 100 LPCD (Litre per Capita Demand). As per this, the current requirement of 80,000 connections is as same as $(80,000 \times 100 \text{ LPCD} \times 5 \text{ Person}) = 40 \text{ MLD}$. Based on this calculation we request you to modify/change the current requirement as 80,000 connections/ or 40 MLD supply system.	The provisions in the bidding document remain unchanged
67	Section 2	The water management system shall not require electric power supply for operations and the communication terminal units shall be based on batteries and solar panels Rating of Batteries (Backup time) & Solar Panel	The provisions in the bidding document are self-explanatory
68		All the components shall be robust and suitable for the climatic conditions of Kathmandu. The Contractor shall make a survey of the ambient average and extreme conditions, and take design precautions with respect to temperature, dampness, dust etc. All metallic components shall be provided with suitable paintings to prevent corrosion. What will be the ambient average and extreme conditions in terms of temperature and dampness? Protection for the Panel?	Please refer to any reputable source to obtain such data, for Example https://www.worldweatheronline.com Protection required can range from IP65 to IP68 in some specific (flood prone) places.
69		All facilities in the field must be tamper-proof and, when possible, issue vandalism alerts. How the security of the field installed devices will be maintained. Proper fencing /	Fences or other physical barriers will be in place. The contractor shall ensure that all the facilities are

Query No	Reference Clause	Query	Response
		security cameras.	tamper-proof and issue vandalism alerts.
70	Section A3	<p>The majority of the valves and measurement equipment in KUKL's network has been already installed under the construction packages of the BDS and DNIs, so that this contract is mainly focused on the ICT components. However, this contract also includes some advanced valves (designated as pressure and flow control valves in the RMUs and OMUs)</p> <p>Qty to be listed for supply along with size and specification?</p>	<p>For the number of elements, please refer to the schedules in Section 4 of the Bidding Documents. For the sizes and specifications of the RMS and OMS, see 5.2.2 and 5.13 in Section 6 of the BD. The exact location for the OMUs are already defined i.e at DMA/Sub DMA entry point.</p>
71		<p>Reservoir Management Unit (RMU). It includes the valves (pressure and flow control), sensors (reservoir level, inflow discharge, pressure, chlorine and turbidity), actuators and all types of civil, mechanical, electrical panels, works, communication accessories and appurtenances needed to manage the inflows and/or outflows at a particular reservoir. All the RMUs are connected to the BDS.</p> <p>Qty to be listed for supply along with size and specification?</p>	<ul style="list-style-type: none"> - Please refer to response to Q.N.70. - Size of RMU Unit shall be as per bidder's design to perform scope of work.
72		<p>All air release valves are already installed, but need to be connected to the SCADA system. Detailed specifications for such units are described in section B.1. (Site Data). Section B.1 document is missing. Do we have to control the air Valve? As per the typical AMS it does not show any controlling of the same?</p>	<p>Task B.1 is described in 3.2.1 of Section 6 of the BD. The air-release in the BDS valves are installed but do not have a RTU and are not connected to any SCADA system.</p>
73	Section 3.1.2	Review and update of the existing water supply master plan of KV. Please clarify.	The scope of the revised master plan is detailed in 3.1.2 of Section 6 of the BD.



Query No	Reference Clause	Query	Response
74	Section 3.1.3	According to the quantities defined for task (A.3), the number of points connected to the SCADA, for bidding purposes, will be 251. Based on the mentioned clause we assume that there are 251 RTU?	It is correct.
75		A main network control center (NCC), including hardware, software and the refurbishment of the physical space provided by KUKL in its headquarters. Please elaborate, it is not clear.	The Contractor will install the NCC in KUKL's premises, but will have to provide all the required furniture, appliances, computers, etc. Basically, only an empty room will be provided by the Employer, to be converted into the NCC.
76		A satellite network control center (SNCC), including hardware, software and the refurbishment of the physical space provided by KUKL in some dependencies outside the headquarters (for instance, at Panipokhari Office Complex). Please elaborate it is not clear? Only one SNCC	Apart from the main NCC (see previous response to Q.N.75), another (one) smaller control room will be equipped outside KUKL's headquarters.
77		SCADA Database & Mimic Displays Assuming we have to design for 30K points. MIMIC display we understand is the alarm signal in the HMI station? Separate MIMIC display?	Mimic displays for similar points can be grouped. The configuration will be discussed during the initial stages of the contract.
78		The data communication between the field control units and the central control centre shall be a combination of GSM, GPRS and license free radio waves. GSM or GPRS shall be used only to cover areas that cannot be linked with radio waves. It is mentioned that we have to use mix of radio wave and GSM modem. But Radio link survey who will do this? Which area and all will be using Radio Link and	The Radio link survey shall be conducted by contractor, based on the actual installations during execution. The employer is committed to reduce



Query No.	Reference Clause	Query	Response
		which area GSM modem?	maintenance and operation expenses, using radio frequency as the preferred communication technology. However, the full system must be able to work with GSM/GPRS; and will probably end up working on those more reliable technologies. For bidding purposes, both communication methods should be considered, prioritizing radio frequency, and using GSM/GPRS when the former is not possible). In case that radio communications require costly towers with antennas, a simple cost-benefit analysis will be performed to assess whether it is more effective to use GSM/GPRS.
79		Design the Network Analysis System (NAS) As per the SCADA hardware quantity mentioned in the Section-4 of the document. Assuming we have to propose separate dedicated hardware for NAS and SCADA system?	Separate dedicated hardware is usually preferable, but bidders can propose shared hardware via virtualization if deemed appropriate.
80		Refurbishment of a total office area of around 100 m2 distributed in two different locations. Do we have to do the Civil work?	No, or minor ones (non-structural).
81		Supply and installation of valves Is the scope only for the supply of valve?, How about for the other instruments in the	All the equipment and instrument, not only the valves, must be supplied.

Query No.	Reference Clause	Query	Response
		AMS,OMS & RMS?	
82		The present scope shall be inclusive of all costs for supply and installation of civil, mechanical, electronics, electrical system as specified. Assuming what electrical system do we have to consider?	<p>Yes, the scope includes all costs for supply and installation of civil, mechanical, electronic, electrical system as specified.</p> <p>All the new control points to be connected to the SCADA system (251) must have power supply, by connecting to the main grid (RMS for New Reservoirs and Main Control Center /Network Analysis Center), and using batteries with solar panels for existing RMS & for OMS,AMS.</p>
83		<p>Implementation and commissioning of the full SCADA and Network Analysis System (task B.2).</p> <p>Field distance to consider field cable in our scope from the instrument to Panel Location? Location of the panel?</p>	<p>Panels will be generally in the street, except for specific places, where ad hoc chambers can be required. Field cable can be assumed below 100 m long.</p>
84		<p>All necessary earthing, lightning and surge protection equipment at all locations.</p> <p>Do we have to consider for all equipment lighting and Surge Protection?</p>	<p>Such equipment is only for the elements in the Bulk Distribution System (RMS and AMS of the BDS). Not required for the equipment in the secondary network.</p>
85		Field instrumentation shall be connected as required, this shall include connection of existing operational instrumentation, the re-establishment of existing site	Details are illustrative and It may vary, especially in the smaller pipes



Query No.	Reference Clause	Query	Response
		instrumentation which may be out of service, or installation of new instrumentation to measure system flows, pressures, levels and site specific voltage/current. Details regarding the existing field instruments? Please confirm the IO list provided in the typical architecture of AMS/RMS/OMS is final?	(OMS)
86	Section 3.2.3	Installation of an Automatic Meter Reading (AMR) System. Assuming that the current scope is only installation of 1000 nos?	AMR compatible meters except the probe are already in place. The rest of the components of the AMR system has to be installed by the contractor.
87	Section 5.2.1	The Bulk Distribution System (BDS) connects the WTP at Sundarikal (delivery point of the Melamchi project) to several existing and new service reservoirs, under 4 BDS building contracts that are under development. The total length of the BDS (ductile iron pipes) is 77.8 km, with the following size distribution, which may be considered for the design: It mentions about the under 4 BDS building contract, Kindly please clarify what is the limitation of the scope?	The 4 BDS contracts (BDS0/BDS1/BDS2/BDS3) underway have already supplied and installed the pipes, some check valves and the air-release valves. This contract deals with the installation of more advanced control and measurement systems, together with the SCADA linking them in BDS contracts except BDS4 which is excluded at the moment
88		Also included in the ongoing works are 9 New Ground Level Reservoirs with a total capacity of 65000 m3: Please, specify the list of Instrument can we go as per the typical architecture. Please, specify the list of Instrument and type of valves to be included in our scope.	Yes, the bidder can assume the typical architecture (Figure 5.8.3 of Section 6) of the bidding document or can be taken as illustrative. The list of instruments are the ones included in the Schedules in Section 4

Query No.	Reference Clause	Query	Response
			of the bidding document.
89		Full integration with control systems and a wide range of protocols and drivers to interface with field devices. Any not standard communication may be accomplished developing a new driver, using API. What protocol required kindly specify?	Bidders can advise on the preferred protocols. Initially, IEC 60870-5 is envisaged, but others (i.e. DNP3) are not rejected.
90	Section 4, Schedule 1 and Appendix 1, subsection 5	<i>In the section 4. Bidding forms, Schedule 1, Item 13, it is indicated that a Provisional Sum of 2,000,000, NRs. is priced for Auditing Body fees. In the section 6. Employer's requirements, Appendix 1, subsection 5 "Inputs and expenses for the Services", it is indicated that "Travel, accommodation and miscellaneous expenses necessarily incurred by the Auditing Body in the execution of its Services shall be paid by the Contractor." Please confirm that the Provisional Sum (PS) of 2,000,000 NRs includes all cost and expenses for all the members of the Auditing Body during the entire project and the Contractor will not be charged of additional expenses.</i>	The provisions in the bidding document are self-explanatory
91		Importer on record Who will be the Importer on Record for offshore supply of goods as the same is not clear in GCC. We request KUKL to be the importer on record for goods supplied from outside Nepal. Please confirm.	Contractor will open Letter of Credit for importation of all the equipment/goods from outside the Employer's country.
92		Importer on record Who will pay Customs duty for offshore supply of goods. We request that KUKL should pay the import duties as applicable on goods imported by KUKL in Nepal.	The provisions in the bidding document are self-explanatory
93	7.7	Transfer of ownership in case of offshore supply of plant and material to KUKL. We request that the ownership in goods which will be supplied from outside Nepal should be transferred to KUKL outside Nepal. Please confirm.	After the accomplishment of the contract it will be handed over to the Employer in accordance with the contract provisions

Query No.	Reference Clause	Query	Response
94		Tax related Whether TDS will be deducted for offshore supply of Goods? If TDS is applicable what is the rate of TDS?. Please confirm	Please refer to response to Q.N. 37-42
95		Tax related Whether TDS will be deducted for offshore supply of Services? If TDS is applicable what is the rate of TDS?. Please confirm	Please refer to response to Q.N. 37-42
	1.4.1(ii)	Bidders experience related	The provisions in the bidding document remain unchanged
96		We request you to modify the requirement as 80,000 connections or 35MLD distribution system.	
97	5.13.1	Technical specifications Remove specific materials such as DI material made/NBR Vulcanized/ double chambered. We enquired the international market to find out if such a control valve is being manufactured in any part of the world; we found out that there is none. Therefore this requirement be amended with alternative of standard requirement such as "the material should be able to withstand the pressure of 1.5 times the design pressure of the Hydraulic Valves.	Please refer to response to Q.N. 27 and Q.N. 50

Detail specification of the valves regarding the query no 29 and 31

5.13.1.1 Valves

Vales supplied shall be as per internationally recognized standards suitable for ISO 2531 ductile Iron Pipes. All materials of manufacture shall be suitable for use with water at temperatures up to 45 deg. C.Valves shall be suitable for frequent operation as well as operation after long



periods of idleness in either open or closed position. The valve stem, thrust washers, screws, nuts and all other components exposed to drinking water shall be of corrosion resistant grade of stainless steel. Sluice valves and butterfly valves shall be suitable for flow in either direction. The gate, sluice/butterfly valves shall have full clear bore to nominal diameter to achieve optimum flow. The operating torque shall minimum according to relevant standards of valves. For sluice/gate valves back seating arrangement shall be provided. Unless otherwise specified, all standard valves shall be flanged type where flanges shall be of PN 16 and complying with ISO 7005-2, EN 1092-2. Pressure testing shall be according to ISO 5208. Test certificates shall be supplied with each valve. The Engineer shall have the right to reject any casting, forging, bearing etc and the Supplier shall replace any such defective parts at his own expense. The following records and drawings of all types of valves shall be made available by the Contractor for inspection. Drawings showing overall dimensions, valve construction and settings. Data related to pressure ratings, weights and materials of manufacture (each component) Test certificates of works tests. Performance data of air valves. Seating design and the seating materials of butterfly valves

5.13.1.2 Types of Control Valves

A. Butterfly Valves

All butterfly valves shall be double flanged eccentric butterfly valve designed according latest version of EN 593 and should have integral standing feet. All butterfly valves shall be operated by manual and motorized actuator. The manual actuators can be replaced by motorized actuator. The motorized actuator shall be suitable for operation by SCADA system. All valves shall have nominal pressure rating PN16 unless indicated otherwise in the Drawings or Bill of Quantities. Valves shall be bubble-tight at rated pressures in either direction, and shall be satisfactory for applications involving throttling service and for applications requiring valve actuation after long periods of inactivity. Valve discs shall rotate 90° from the full open position to the tight shut position. Regardless of valve size, angular misposition of disc can be up to 1° off center without leakage. Flange drilling of each butterfly valve shall be according to ISO 7005-2, EN 1092-2 and face to face dimension shall be according to ISO 5752, BS 5155 . Materials of component of all butterfly valves shall be as follows:

- a) Body: Ductile iron SG 400-15 to BS 2789
- b) Body sealing ring: gunmetal LG2C to BS 1400
- c) Disc: SG 400-15 ductile iron to BS 2789
- d) Seal retaining ring: bronze
- e) Shaft: stainless steel 304 in self lubricants bushes
- f) Internal bolts, nuts and set screws: stainless steel
- g) Body and disc painted with epoxy 250 micron thick
- h) Marking: each butterfly valves shall have following marking On the Body like EN19
 - Nominal diameter in mm (DN)
 - Nominal pressure in bar (PN)
 - Type of ductile iron;



- Manufacturer's logo;
- Model code;
- Fusion date.
- On the label like EN19:
- Nominal diameter in mm (DN);
- Nominal pressure in bar (PN);
- Maximum operating pressure (PFA);
- Closing direction;
- Model code;
- Manufacturing order, Order confirmation;
- Manufacturer's logo.
- On the disc:
- Nominal diameter in mm (DN);
- Nominal pressure in bar (PN);
- Type of ductile iron;
- Manufacturer's logo;
- Model code.

The Contractor shall provide a test certificate confirming that the valves have been tested in accordance with BS 5150 and stating the actual pressures and medium used in the test. In addition the Contractor shall ensure that the Employer has access to the manufacturer's works at all reasonable times for the purposes of inspecting the assembled valves and witnessing testing.

B. Gate Valves

All Gate valves shall be double flanged valve designed according latest version of ISO 5208, BS 5150. All Gate valves shall be operated by manual and motorized actuator valves. The manual actuators can be replaced by motorized actuator. The motorized actuator shall be suitable for operation by SCADA system. All valves shall have nominal pressure rating PN16 unless indicated otherwise in the Drawings or Bill of Quantities

Gate valves shall comply with BS EN 1171, BS 5150, ISO 7259. All valves shall be suitable for use with potable water. Valves complying with BS 5163 are acceptable provided that they also comply with BS EN 1171.

Specific Clauses of BS EN 1171 are amplified as follows:

- a) Types of valves: Solid with non-rising stem.
- b) Body: Ductile Iron as per BS EN 1563
- c) Wedge: Ductile Iron as per BS En 1563



- d) Face to face dimension: Shall be as per ISO 5752 series 14, BS 5163, EN 558 Series 3
- e) Flanged and drilled to BS EN 1092-2, ISO 7502-2 PN-16
- f) Nominal Pressure: PN 16 unless otherwise indicated in the Price Schedule. g) Bypasses: Gate valves shall not be fitted with bypasses.
- h) Body Tapping: As specified to BS 21 (ISO 7/1) fitted with bronze or gunmetal plug.
- i) Marking: each gate valves shall have following marking
- j) Nominal sizes: All valves shall be flanged end PN designated non-clamp type valves. Sizes as indicated in the BOQ
- k) The valve Body and other uncoated ferrous part shall be painted with epoxy paint 250 micron thick.
- l) Marking On body:
 - Nominal diameter in mm (DN),
 - Nominal pressure in bar (PN).
 - On identification label:
 - Reference of valve
 - Closing direction (FSH / FAH)-nominal diameter (DN)-flange drilling
 - Year and month of manufacture-number,
 - Number of the norm

The Contractor shall provide a test certificate confirming that the valves have been tested in accordance with ISO 5208, BS 5150 and stating the actual pressures and medium used in the test. In addition the Contractor shall ensure that the Employer has access to the manufacturer's works at all reasonable times for the purposes of inspecting the assembled valves and witnessing testing.

C. Ball Valves

All Gate valves shall be double flanged valve. Suitable for manual as well as electrical actuators. The manual actuators can be replaced by motorized actuator. The motorized actuator shall be suitable for operation by SCADA system. The valves shall be designed, manufactured and tested in accordance with American Water Works Association Standard ANSI/AWWA C507. The valves shall be certified to be Lead-Free in accordance with NSF/ANSI 61, Annex G. Manufacturer shall have a quality management system that is certified to ISO 9001 by an accredited, certifying body.

The valve shall be constructed with a two-piece body rated for 150 psi and with end flanges in full conformance with ANSI B16.1 Class 125 or Class 250. The main body section and end piece shall contain integrally cast support feet and lifting lugs. The valve port shall be a 100% clear bore equal to the nominal valve size with no seat hardware in the flow stream when fully open. Double (or single) resilient seats shall provide drop-tight service and shall be located on the ball and mechanically retained with a stainless steel retaining ring and stainless steel nylok cap screws, which shall pass through both the resilient seat and the retaining ring. The retaining ring shall be continuous or investment cast with overlapping sections, serrated grooves and shoulders. The resilient seat shall be field adjustable and replaceable without removing the valve from the pipeline and mate to a continuous 316 stainless steel body seat ring. Valve shafts shall be inserted into blind hubs in the ball and



locked to the ball with taper pins retained with stainless steel jam bolts. The shaft shall be sealed with resilient grit seals in the body bores. Teflon-lined, fiberglass-backed sleeve bearings shall be located in the body hubs. An adjustable thrust bearing shall be provided to center the ball in the body.

Shaft seals shall be of the V-type and shall be replaceable without removal of the valve from the line or the shaft from the valve. Valve interiors and exteriors shall be coated with an NSF/ANSI 61 certified fusion bonded epoxy in accordance with AWWA C550.

Manual actuators shall be of the traveling nut design with characterized closure per AWWA C507 and equipped with externally adjustable closed position stops capable of withstanding 450 ft-lbs. Actuators shall be lubricated with EP-2 grease and fully enclosed in an iron housing sealed against the entry of water. Cylinder actuators shall be traveling nut design with characterized closure sized to position the valve with an air, water or oil supply pressure of 80-150 psi and built in accordance with AWWA C541. The rotating mechanism will consist of a lever and traveling nut directly connected to the cylinder rod. The cylinder rod, heads and barrel shall be constructed of stainless steel or non-metallic material for water service. Rod and piston seals shall be of the self-adjustable, wear-compensating type. The piston shall be one-piece with a wear strip. Motor actuators shall be furnished in accordance with AWWA C542 for Power Actuators and factory tested on the production ball valve. The motor unit shall be mounted to a self-locking traveling nut actuator with characterized closure and externally adjustable closed stop. The motor actuator assembly shall be designed for open/close service with a minimum operating time of 60 sec. The Contractor shall provide a test certificate confirming that the valves have been tested in accordance with American Water Works Association Standard ANSI/AWWA C507. In addition the Contractor shall ensure that the Employer has access to the manufacturer's works at all reasonable times for the purposes of inspecting the assembled valves and witnessing testing.

D. Extension Spindles, Tee - Keys and Caps

The depths of installation of all valves are as indicated in the BOQ descriptions (or as shown on the drawings) and a Tee - Key for the operation of valves shall be supplied in the following manner.

Four Tee - Keys for each size of valves to be supplied. The maximum length of Tee key shall be limited to 1m and Valves shall be provided with extended spindle to the Valve. The material of Tee - Keys shall be galvanized mild steel. In case extension spindles are necessary, extension spindles shall be provided with suitable bearings, which are rigidly held on brackets or stays. Bearings and extension spindles shall be suitably protected against corrosion. Where a valve does not require an operating or extension spindle, the valve spindle shall be protected with a properly fitting cap as per BS 5163: 2004.

E. Automatic Air Relief Valves

Design of Air Valves

Automatic air relief valves shall be designed to meet the following conditions:

- a) Discharge air during charging of the pipeline



- b) Admit air during emptying of the pipeline, or when the pipeline pressure falls below atmospheric pressure during a surge event
 - c) Discharge air accumulated at local peaks along the pipeline under normal operating condition.
- Conditions (a) and (b) shall be met by the employment of a large orifice capable of handling large volumes of air at a high flow rate, and condition (c) by a small orifice capable of discharging small quantities of air as they accumulate. Valves with air intakes or exhaust facilities shall have approved screening arrangements to prevent the ingress of air borne sand.

F. Types of Air Valves

a) Double Acting Air Valves

These shall combine both large and small orifices within one valve. The large orifice shall be sealed by a rigid float and the chamber housing shall be designed to avoid premature closing of the valve by the air whilst being discharged. The small orifice shall be sealed by a float at all pressures above atmospheric except when air accumulates in the valve chamber.

- b) Single Air Valves: These include a small orifice only operating in a manner identical with the small orifice in a double acting valve.

General Specification

The nominal pressure range shall be PN 10 unless indicated otherwise in the price schedule.

Body ends shall be flanged with raised faces and drilled according to latest version of BS EN 1092-2 (ISO 2531). The materials for the valves shall be as follows:

- | | | |
|---------------------|---|---|
| Body cover and cowl | - | Ductile Iron SG 400-15 to latest version of BS 2789 |
| Small orifice | - | Ductile iron with gunmetal seat Small orifice float. Rubber covered or other approved |
| Large orifice | - | Ductile iron with rubber seat |
| Large float | - | Vulcanite covered or other approved |

Body and other uncoated ferrous parts painted with epoxy 250 micron thick

Tests

Test certificates shall be provided with each valve showing.

- a) Hydraulic testing to at least 1.5 x working (rated) pressure or high pressure strength test
- b) Low head leakage tests
- c) Small orifice testing
- d) Large orifice discharge test

During the tests the air flow rates shall be measured by orifice plates in accordance with latest version of BS 1042. Pressures (positive and vacuum) shall be measured by Bourdon tube gauges in accordance with latest version of BS 1780, or by means of mercury-in-glass manometers. The temperature of the flowing air shall be measured in accordance with latest version of BS 1041: Part 1 and Part 2. The barometric pressure shall also be measured.



G. Ball Float Valves: Ball float valves shall be designed for installation on the inlet pipe of a storage tank to shut the water off automatically when it reaches a predetermined level. They shall be of the single or double beat type or pilot operated with direct float and lever operation. The valve shall be either full open or full closed and the design characteristic of the valve controls causes the main valve piston to modulate (close slowly) over the last few inches of filling. Valves shall be designed for the working pressure specified and shall be tested for leakage at that pressure, when they should be drop tight. They shall be tested for body and valve element strength with the valve closed and a test pressure 1.5 times the working pressure applied to the inlet end. The body end shall be flanged, faced and drilled to BS EN 1092 – 1: 2007. Valves shall not contain brasses containing more than 5% zinc. Gunmetal (to BS EN 1982:2008 Grade LG 2), aluminum bronze or nickel copper alloy may be used for internal components. The body or stopper shall be of ductile iron. Floats shall be copper or glass fibre. The lever and links shall be of mild steel with bronze pins. Where a stilling tank arrangement is required it shall accommodate a cheese type float mounted on a central tube connected to the valve operating lever and sliding vertically on a guide rod secured to the base of a galvanized wrought iron cylindrical tank perforated at the base.

H. Flowmeter: To provide full flow indication/information electromagnetic type flowmeters are required to monitor the reservoir inlet and outlet flows. The flowmeters shall be suitable for indicating and measuring both forward and reverse flow. Each flowmeter shall comprise a stainless steel tube lined with elastomer, shall be fitted with non-removable 316 stainless steel electrodes and shall have a degree of protection of not less than IP68. The flowmeter shall be suitable for use in direct contact with potable water and have an accuracy of measurement of not greater than plus or minus 0.2%. The flowmeter shall be the same diameter as the pipeline into which it is to be fitted unless the range of flow velocities precludes this option. In this case suitable concentric pipework reducers shall be provided on either side of the flowmeter. The flowmeter flanges shall be suitable for the pressure rating determined for the pipelines concerned and drilled for PN10 to BS EN 1092-2. The flowmeter installation shall provide a 4 - 20 mA output proportional to flow and a pulsed voltage free digital output proportional to quantity passed. The flowmeter installation shall have an in built diagnostic capability and provide a voltage free digital output in the event of a fault being detected. The final setting derived during commissioning shall be stored in an EPROM. The flowmeter shall be installed in accordance with the manufacturers instructions in order to ensure the stated accuracy of measurement is achieved and shall be positioned to ensure that it remains full in all normal operational circumstances. The flowmeter shall be mounted within a covered ground chamber (details of a typical chamber are given in the drawings) and provided with a dismantling joint to permit removal of the flowmeter. Cabling used to interconnect the primary device or sensor to any secondary device or transmitter shall be specified in accordance with the flowmeter manufacturer's recommendations. One spool piece shall be provided for each flowmeter size provided for the Contract to permit the removal of one flowmeter and replacement with the spool piece.

I. Reservoir Level Sensors: Provide and install one submersible hydrostatic level sensor in a chamber of each reservoir. Each sensor shall be of stainless steel construction and compensated for variations in temperature and atmospheric pressure and provide an accuracy of approximately 0.25%. The sensor shall incorporate in built transient protection to limit the effects of lightning damage.



The sensor shall be suspended within the reservoir in a non metallic stilling tube in such a way that its mounted height may be adjusted from one of the reservoir access points without physically entering the reservoir. The sensor shall be mounted in a position or in a manner which prevents the sensor being disturbed by any normal turbulence within the reservoir. It shall be suitable for use in potable water. Alternatively, the level measuring system may be an ultrasonic type. The sensor shall be protected to IP68 and mounted above the highest water level in a position accessible from one of the reservoir access points without physically entering the reservoir. The measuring system shall provide temperature compensation and provide an accuracy of approximately 0.25%.

All brackets and junction boxes mounted within the reservoir for either system shall be of stainless steel or some other none corrosive material suitable for contact with potable water. The level measuring system shall output a 4 – 20 mA signal proportional to level. In the case of ultrasonic measurement the system shall provide a volt free output to indicate system fault (loss of echo, etc).

