काठमाण्डौ उपत्यका खानेपानी लिमिटेड
मुख्य कार्यालय
सूचना

मितिः२०८३/०१/३१
ने.सं. ११४६, बुधवार।

बिषयः- दररेट उपलब्ध गरिदिने बारे ।

उपरोक्त बिषयमा यस कम्पनीको लागि तपशिल बमोजिमको सामग्री/सेवा आवश्यक भएकोले मौजुदा सूचीमा सूचिकृत आपूर्तिकर्ताहरु/सेवाप्रदायकहरुले के कति दर भाउमा सामग्री/सेवा उपलब्ध गराउने हो ? सो ईकाइको दर भाउ यो सूचना प्रकाशित भएको मितिले ३ (तीन) दिन भित्र उपलब्ध गराईदिनु हुन यो सूचना सूचना पाटीमा टाँस गरिएको छ।

तपशिलः

S.N.	Particulars	Quantity	Unit	Remarks
1.	Turbidity Sensor	1	Pc	Without Vat
2.	Automated Gate Valve (Electrically Actuated Butterfly Valve DN250)	1	Pc	
3.	Automated Gate Valve (Electrically Actuated Butterfly Valve DN200)	1	Pc	
4.	Automated Gate Valve (Electrically Actuated Butterfly Valve DN100)	1	Pc	
5.	Remote Terminal Unit (RTU) and Communication Devices	1	Pc	
6.	SCADA and Mobile App Services	1	Service	
7.	Support and AMC Service	1	Job	

(कविता त्रिताल)
स. प्रशासन अधिकृत

त्रिपुरेश्वर मार्ग
काठमाडौं, नेपाल
Email:- info@kathmanduwater.org
www.kathmanduwater.org
फोन नं.: ४११७३५६, ४११७३५७,
४११७३५८, ४११७३५९

Kathmandu Upatyaka Khanepani Limited
Main Office, Tripureshwor, Kathmandu

Document Name: Technical Specification

Project Scope: The scope of this project includes procurement, supply, installation, configuration and commissioning of Automatic High Turbidity Bypass System for Muhanpokhari Intake Bhaktapur for high turbidity bypass operations. The system aims to enhance real-time monitoring, operational efficiency, and decision-making through integration of field instruments, Remote Terminal Units (RTU), and centralized Supervisory Control and Data Acquisition (SCADA) platform. The supplier should configure the devices as instructed by KUKL.

S.N	Particulars	Specification
1	Turbidity Sensor	**Product Type:** Laser Turbidity Sensor or better **Measuring Range:** 0.00 – 100 NTU (Nephelometric Turbidity Unit) **Resolution:** ≤0.01 NTU **Accuracy:** ±2% of full scale or ±0.02 NTU (whichever is greater) **Measurement Principle:** Laser-based 90° scattered light **Temperature Range:** 0°C – 60°C **Output Signal:** RS485 (Modbus RTU) + 4–20 mA **Power Supply:** DC 12V – 24V **Inlet Pressure:** < 1 bar **Flow Rate:** 15 – 30 L/h **Shell Material:** ABS or equivalent **Ingress Protection:** IP68 **Cable Length:** Minimum 5 m or as required for installation **Calibration Standard:** Formazin standard solution **Calibration Frequency:** Every 3 months or as per manufacturer recommendation **Temperature Compensation:** Automatic **Installation Method:** Flow-through type with flow shell **Communication Protocol:** Modbus RTU **Special Features:** Real-time measurement; magnetic interference detection; long-term stability **Manufacturer Certification:** ISO 9001, ISO 14001, ISO 45001 **Product Certification:** CE or equivalent **Warranty:** Minimum 1 Year

2	Automated Gate Valve-Electrically Actuated Butterfly Valve DN100	**Item Description:** Electrically Actuated Flanged Butterfly Valve **Valve Type**: Soft Sealing Butterfly Valve **Size Range:** DN100 **Pressure Rating:** 1.6 MPa (PN16) **Temperature Rating:** Up to 120°C **End Connection:** Flanged **Flage Standard:** DIN PN16 **Body Material:** Ductile Cast Iron **Disc Material:** SS304 (Stainless Steel) **Seat Material:** PTFE (Polytetrafluoroethylene) **Stem Material:** WCB (Cast Carbon Steel) **Actuator Type:** ON/OFF & Throttle **Operating Voltage:** DC 24V or AC 220V **Position Indication:** Local display / mechanical indicator **Application:** Water, air, oil, gas, and chemical service **Warranty:** Minimum 1 Year
3	Automated Gate Valve-Electrically Actuated Butterfly Valve DN200	**Item Description:** Electrically Actuated Flanged Butterfly Valve **Valve Type**: Soft Sealing Butterfly Valve **Size Range:** DN200 **Pressure Rating:** 1.6 MPa (PN16) **Temperature Rating:** Up to 120°C **End Connection:** Flanged **Flange Standard:** DIN PN16 **Body Material:** Ductile Cast Iron **Disc Material:** SS304 (Stainless Steel) **Seat Material:** PTFE (Polytetrafluoroethylene) **Stem Material:** WCB (Cast Carbon Steel) **Actuator Type:** ON/OFF & Throttle **Operating Voltage:** DC 24V or AC 220V **Position Indication:** Local display / mechanical indicator **Application:** Water, air, oil, gas, and chemical service **Warranty:** Minimum 1 Year
4	Automated Gate Valve-Electrically Actuated Butterfly Valve DN250	**Item Description:** Electrically Actuated Flanged Butterfly Valve **Valve Type**: Soft Sealing Butterfly Valve **Size Range:** DN250 **Pressure Rating:** 1.6 MPa (PN16) **Temperature Rating:** Up to 120°C **End Connection:** Flanged **Flange Standard:** DIN PN16 **Body Material:** Ductile Cast Iron **Disc Material:** SS304 (Stainless Steel) **Seat Material:** PTFE (Polytetrafluoroethylene) **Stem Material:** WCB (Cast Carbon Steel) **Actuator Type:** ON/OFF & Throttle **Operating Voltage:** DC 24V or AC 220V **Position Indication:** Local display / mechanical indicator **Application:** Water, air, oil, gas, and chemical service **Warranty:** Minimum 1 Year

Anil K. Tikhatri
Civil Engineer, Branch Manager, Bhaktapur Branch

5	Remote Terminal Unit(RTU) and Communication Devices	**Power Supply**: DC 9V – 24V; also 220VAC–12VDC adapter with internal battery backup with minimum 6-8 hours of operations **Communication Protocols:** MQTT, Modbus RTU, RS485, TCP/IP, HTTP/HTTPS, SMTP **Cellular Modem:** Integrated cellular modem supporting 2G/3G/4G LTE with automatic network selection and failover **SIM Slots:** Dual SIM support with automatic failover **WiFi:** Supported **Antenna:** Quad-band antenna for wide coverage **Data Upload Interval:** Configurable data upload interval (≤60 seconds preferred) **Simultaneous Servers**: Support redundant data transmission to primary and backup servers **Local Storage:** 8GB or higher **Display**: Local indication display for data and alerts **Digital Outputs:** Minimum 4 digital outputs (expandable preferred) **Power Monitoring:** Real-time line voltage and power status monitoring **Protection:** ESD, UV/OV, phase failure, phase reversal protection **Supported Sensors:** Water level (radar, ultrasonic), water quality (pH, turbidity, chlorine, pressure), valve automation **Software Integration:** Web-based SCADA dashboard + mobile application **Remote Configuration:** Supported (remote parameter setting) Operating Temperature-40°C to +70°C **Time Synchronization**: NTP/GPS-based clock synchronization **Communication Module Cert.:** CE or equivalent **Installation:** Shall support easy field configuration and commissioning **SIM card:** Supplier should provide Data sim card (under KUKL ownership) card with 1 year of package included. **Accessories:** Accessories for RTU- cables, tray, connection terminal, wire connectors, heat sink tube accessories for valve- nuts and volts and wires for connection accessories for turbidity sensor- GI nipple, Plastic pipe for sensor connection **Warranty:** Minimum 1 Year **<u>Communication/Integration and accessories</u>** **IoT Protocol**: MQTT (primary), Modbus RTU, Modbus TCP **Cloud Integration:** Cloud-based server deployment with API support **Multi-Site:** Multi-site data aggregation on single dashboard **RTU Compatibility:** Compatible with all RTU/IoT devices specified herein **Data Refresh**: Configurable ≤ 30 seconds **Data Storage:** Minimum 5 years; cloud with backup facility

6	SCADA and Mobile App Services	**Real-Time Dashboard:** Live graphical overview of all system parameters with auto-refresh (≤60 seconds preferred) **Graphical Dashboard:** Interactive visualization using charts, gauges, and dashboards **Graphical Dashboard Slider:** Easy-to-use navigation interface for rapid switching and monitoring across multiple geographic sites **Water Level Monitoring:** OHT, underground reservoir, and borewell graphical visualization **Flow Meter Monitoring:** Inlet/outlet flow rate, totalizer, and daily consumption graphs **Pump Monitoring:** ON/OFF status, auto/manual mode, runtime analytics, fault indication **Valve Monitoring:** Open/close status, remote control, position feedback visualization **Pressure Sensor Module:** Line pressure graphs, trend visualization, high/low alarms **Water Quality Dashboard:** pH, turbidity, residual chlorine, and temperature visualization **Water Quality Report:** Exportable water quality trend reports with threshold compliance view **Automation Status:** Overview of automated control actions and system states **Communication log Monitoring:** Monitoring of communication logs (e.g., MQTT or equivalent protocols) for diagnostics **Multichannel alarm Monitoring:** Monitoring of alert delivery across multiple channels (SMS, email, mobile notifications, etc.) **Set-point Configuration:** User interface for remote configuration of thresholds (e.g., level, pressure, water quality parameters) **Device Dashboard:** Device online/offline status, last-seen time, communication health **Alarm & Notification:** High/low tank level, Pump trim, Phase failure, Communication loss, Flow abnormality, Pressure high/low, Water quality Out of Range **Reporting and Analytics:** Water level reports, flow reports, pump runtime report, pressure report, Water quality reports, Daily/weekly/monthly consumption report, scheduled reports and its export formats (Microsoft Excel (.xlsx) , PDF, CSV, etc) **Role-Based Access Control (RBAC):** System shall support defined user roles (Administrator, Operator, Viewer) with controlled access permissions and multi-user concurrent login capability. **Authentication & Session Management:** Secure login using username/password with optional multi-factor authentication (MFA), along with configurable session timeout (e.g., 5–15 minutes). **Audit Trail & Activity Logging:** System shall maintain a complete, non-editable audit trail of all user actions, control commands, and configuration changes with timestamp, User ID, and action details. **Data Security & Encryption:** All data communication shall be encrypted using secure protocols (HTTPS/TLS) to ensure data integrity and confidentiality.

		Data Ownership & Export: KUKL shall retain full ownership of all system data. The platform must support bulk data export in open formats (CSV/JSON) for audit, reporting, or migration purposes. **Platform:** Android (minimum Android 7.0) or IOS **Availability**: Google Play Store, App store or direct APK distribution **Real-Time Monitoring:** Live sensor data with configurable refresh intervals **Alarm Notifications:** Push notifications for all alarm events **Dashboard View:** Responsive dashboard compatible with smartphones and tablets **Device Status:** Online/offline status and communication health **Historical Data View:** Historical trends and data logs **User Authentication:** Secure login with role-based access **Remote Control:** Remote valve and pump control (permission-based) **Multi-Site Support:** Monitor mentioned of sites of KUKL from single application login **Action Confirmation:** Two-Step Verification for Control Actions **Responsive UI:** Responsive dashboard (mobile/tablet) **Web Interface:** System shall be compatible with major web browser as Chrome, Edge, Firefox, or other equivalent browsers. **Operating System (Server):** Linux or Windows Server (as per system compatibility and performance requirements) **Database:** Relational/NoSQL with automated backup **Uptime Target:** 99% system availability or higher **Remote Access:** Accessible from any location via internet browser. **Data Portability and Local Transfer:** Upon termination or expiration of the contract, the Service Provider is legally bound to return all KUKL data. The Service Provider must transfer a complete and verified copy of the entire historical database to a local server or storage media at KUKL specified premises. **Database Backup and Recovery:** Automated scheduled backups (daily minimum) with redundant off-site storage. Must include a documented Disaster Recovery Plan (DRP) ensuring a Recovery Time Objective (RTO) < 4 hours and a Recovery Point Objective (RPO) < 24 hours.
7	Support and AMC	**Support SLA and warranty:** The supplier shall provide a minimum of 1-year comprehensive support and warranty from the date of commissioning, covering system maintenance, troubleshooting, software updates, and defect resolution. **Hosting:** Hosting infrastructure shall support real-time data processing with minimal latency and configurable refresh rates. Should provide at least 1 year of web hosting for Automatic High Turbidity bypass system for Muhanpokhari Intake Bhaktapur. All system data shall be securely hosted in approved data centers, within Nepal. The supplier shall disclose all hosting locations and ensure compliance with applicable data protection regulations. All data shall remain the sole property of KUKL, and any transfer or access outside the approved environment shall require prior authorization.

		AMC (Annual Maintenance Contract): AMC structure covers all hardware, software, and communication components and support provided by supplier as per need of KUKL. **SCADA Software Platform**: Software updates, bug fixes, dashboard modifications, user support, server health monitoring **Mobile Application:** App updates, compatibility patches, feature enhancements, user account management **RTU / Communication Devices:** Preventive maintenance (2 visits/year), SIM management, firmware updates, fault rectification **Water Quality Sensors:** Bi-annual calibration verification, membrane/electrode replacement (consumables extra), cleaning **Automated Gate Valves:** Annual inspection, actuator check, limit switch calibration, lubrication **Helpdesk Support:** The supplier should provide phone/email support; remote diagnostics as required by KUKL. **AMC Duration:** 1 year, commencing after warranty expiry **Warranty Period:** 1 year from date of successful commissioning for electronic devices; **Training**: Minimum 2 working days training for **SCADA operation** on Dashboard navigation, alarm management, report generation, user management Minimum 1 working day training **Mobile application** training on Remote monitoring, alarm acknowledgment, status viewing on Android devices Minimum 1 working day training on device and **field instrument training on sensor calibration** procedures, valve operation, RTU configuration basis Minimum 1 working day training on **System administration** on User management, server backup, system configuration, basic troubleshooting **Training Participants & Documentation**: Operators training should be conducted on site and Minimum 5 KUKL personnel per module; comprehensive training materials to be provided, including a training manual, quick reference guide, and video recordings.

Prepared By	Checked By	Recommend By	Approved By
Er. Neha Adhikari	Er. Purna Bahadur Kuwar	Er. Manish Dhungana	Er. Ramesh KC
Computer Officer	Chief, IT Section	Chief, Support Division	Chief, Planning and Support Department