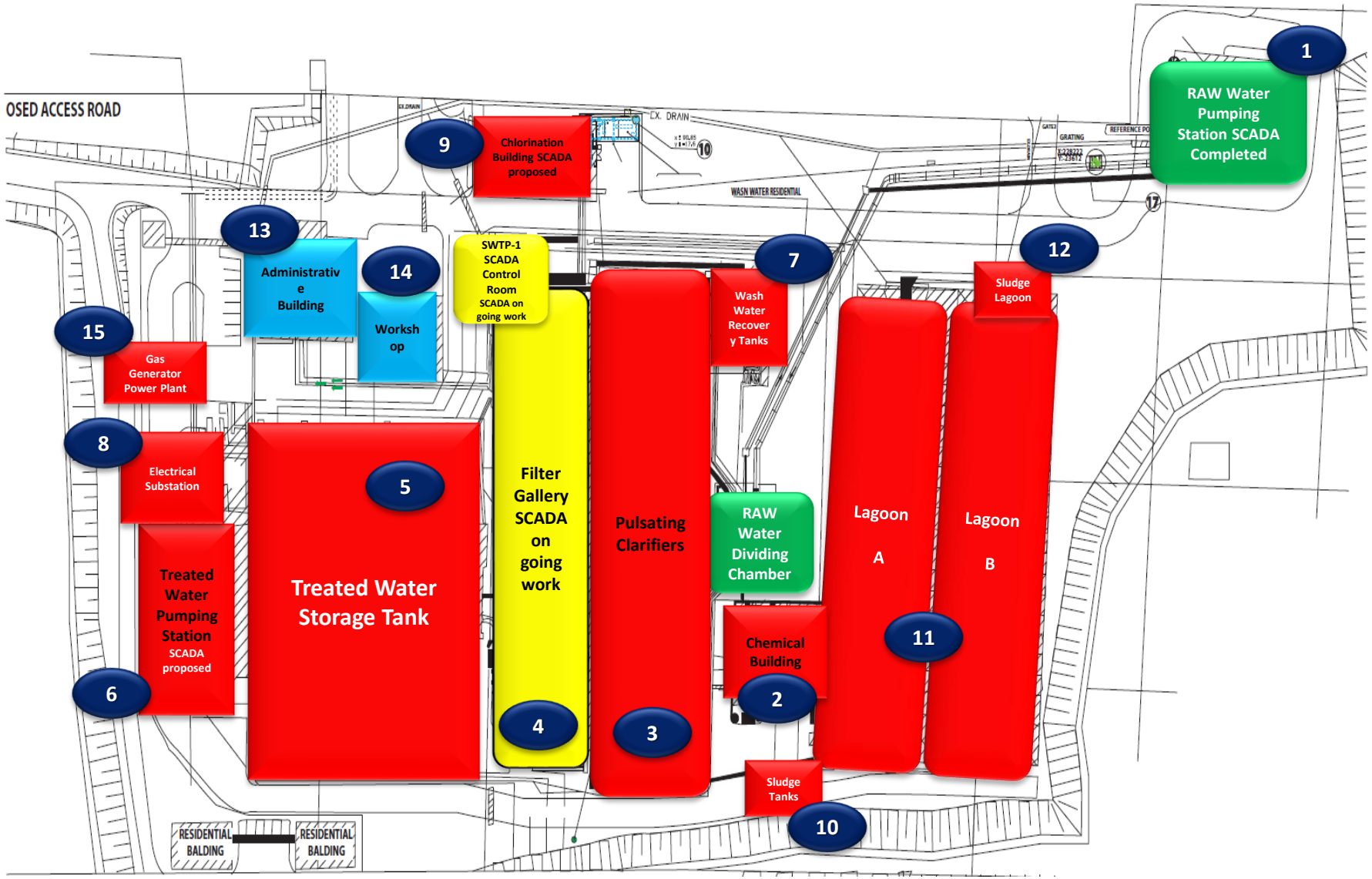
Implementation of Automation, SCADA & PLC based control System and related services for Treated water pumping station & Power management system for Saidabad Water Treatment Plant Phase-1

PREPARED AND PRESENTED BY
SWTP TEAM

OBJECTIVE

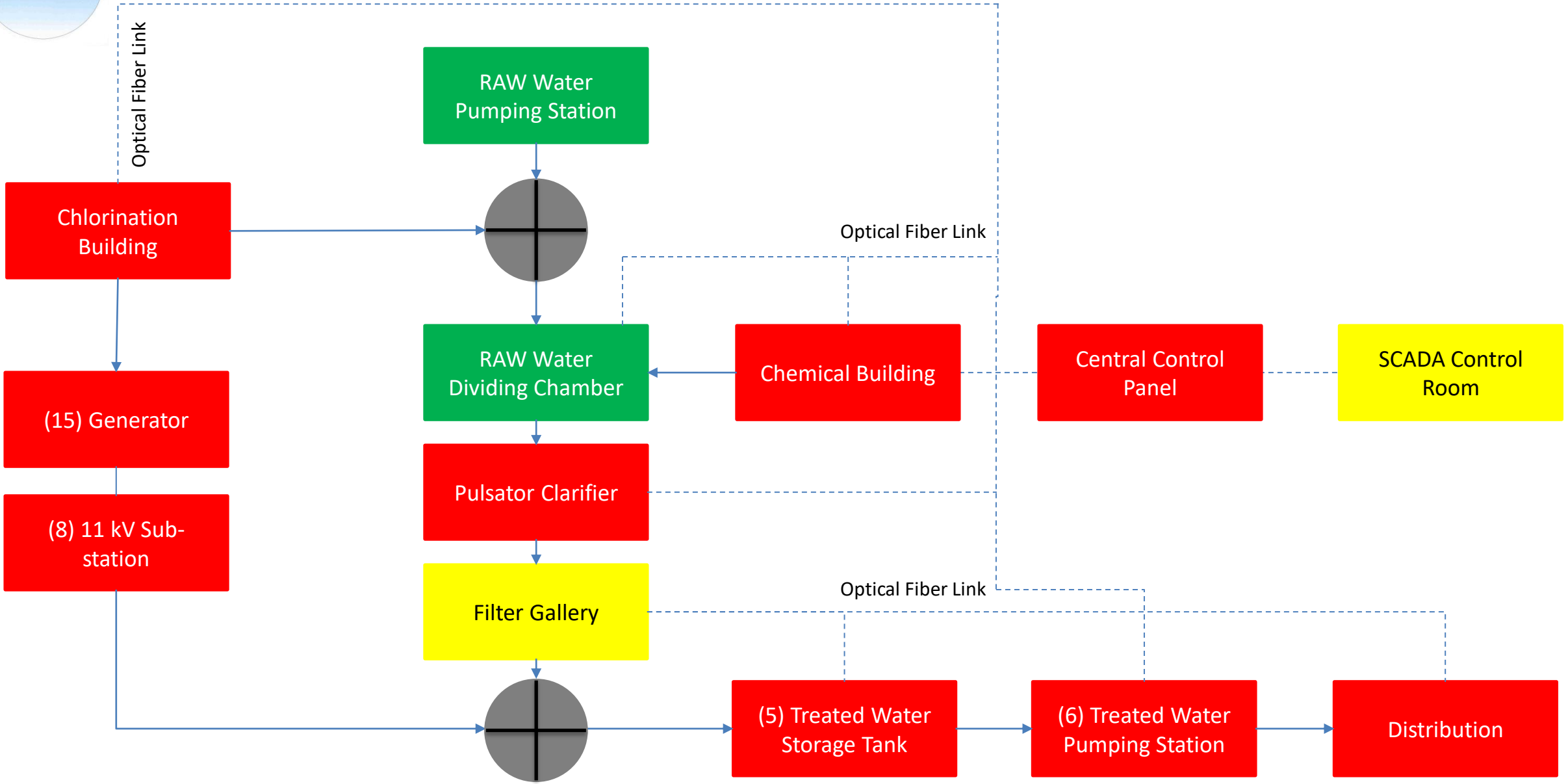
- Implementation of Automation System by integrating PLC, Modules, HMI, Sensors, Actuators and SCADA based Monitoring System at SWTP Phase-1.
- Increasing plant operation efficiency by implementing Automation System similar to SWTP-2, PJWTP, SKWP.
- Reduced the operational downtime by implementing the proper maintained through Automation system.

LAYOUT OF PROPOSED TOTAL AUTOMATION SWTP PHASE-1

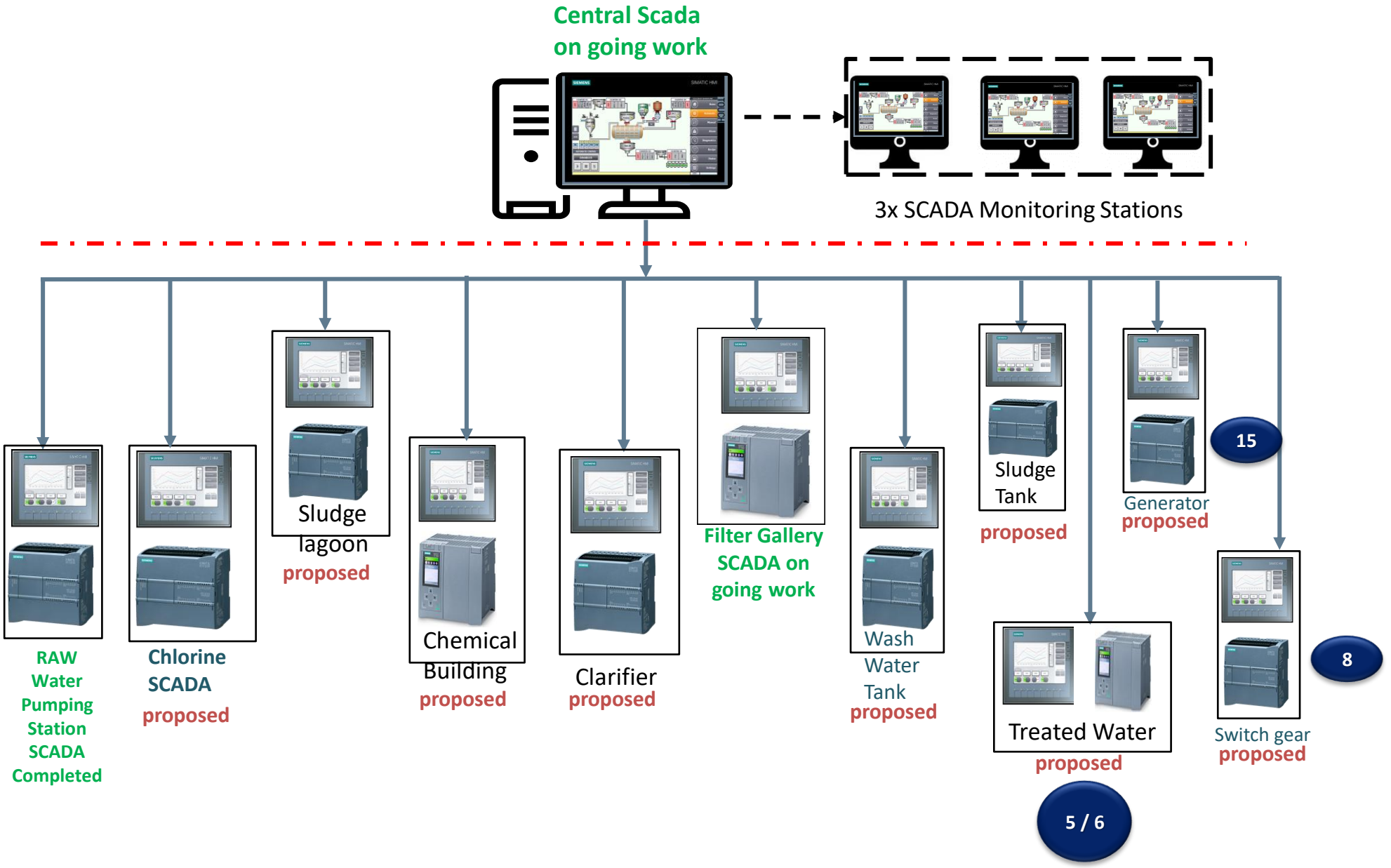


- Implementation
- Under Implementation
- Proposed

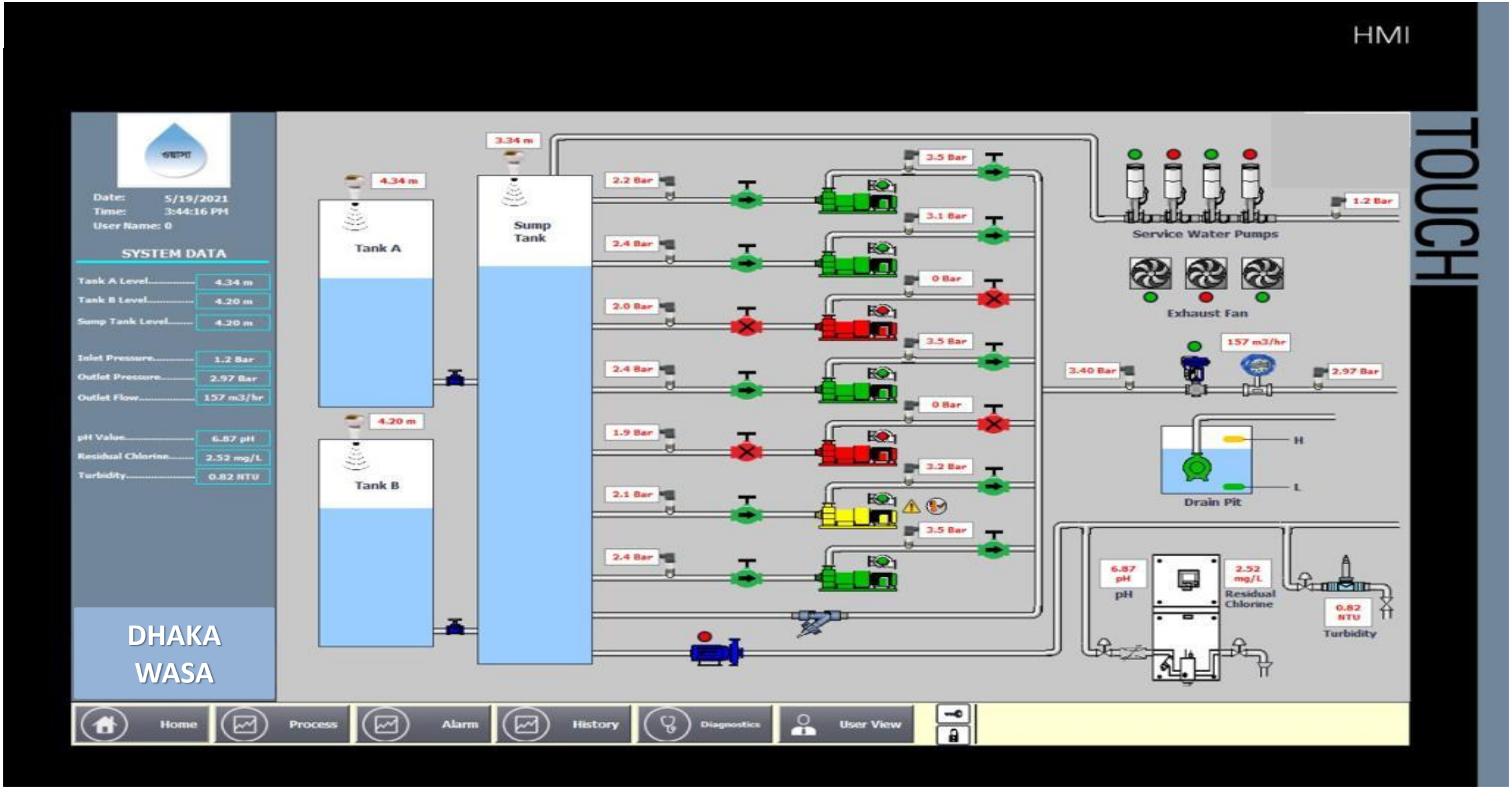
COMMUNICATION FLOW DIAGRAM OF CENTRAL SCADA SYSTEM



LAYOUT OF SCADA & AUTOMATION OVERVIEW SWTP PHASE-1



DASHBOARD OF PROPOSED TREATED WATER PUMPING STATION

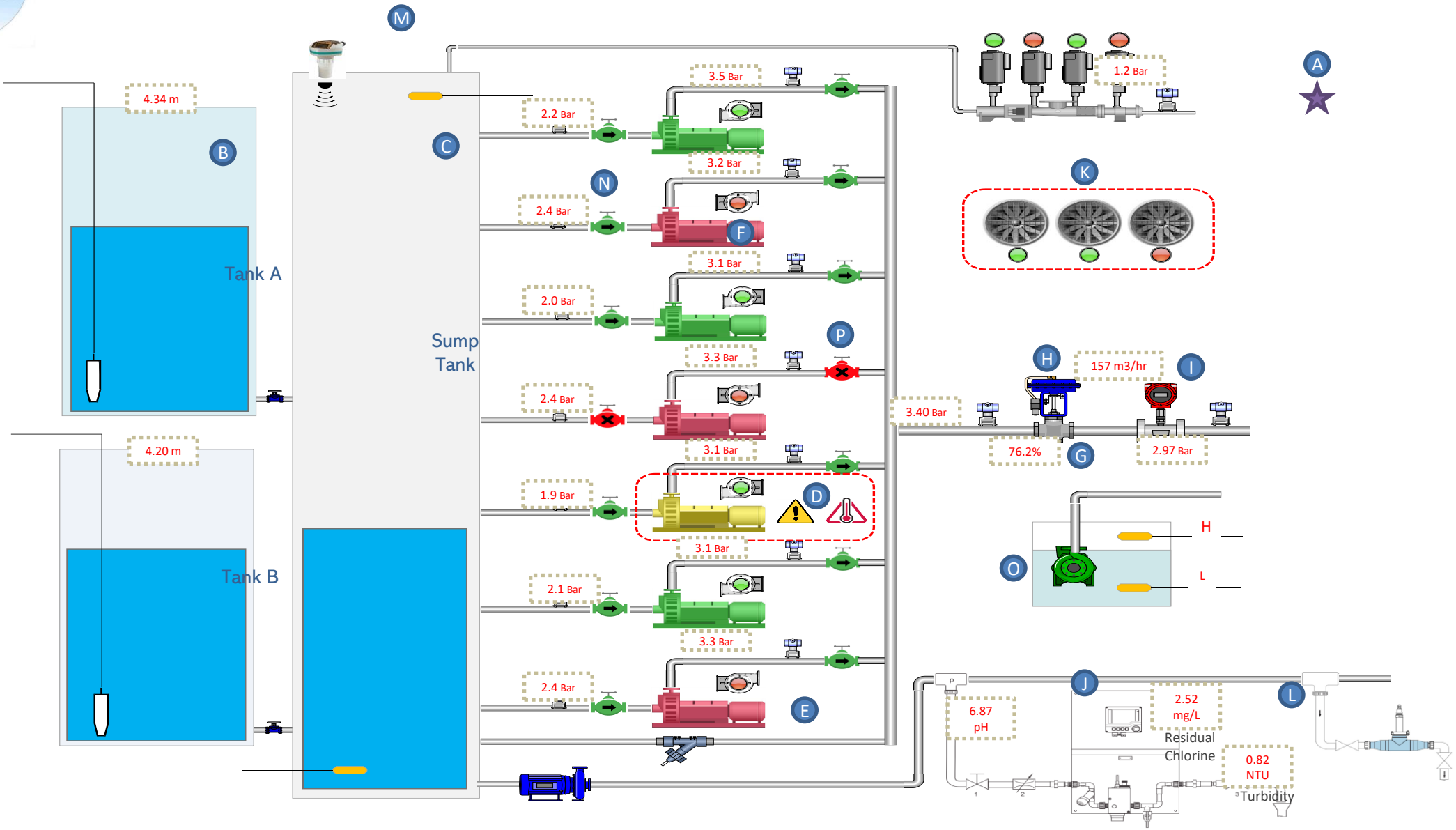


SCOPE OF WORK

- ***Implementation of Automation, SCADA system for Treated Water Pumping Station***
  - Treated Water Storage Tank- A & B
  - Treated Water Pumping Station- 5 Fixed (355 KW) & 2 Variable speed (375 KW) Horizontal Pump-motor & others equipment.
  - Online analyzer (Treated Water)

- ***Implementation of Automation, SCADA system for Energy Monitoring System for DPDC & Generator***
  - Electrical Substation [2x1600 KVA & 1x1250 KVA] & HT – LT Panel
  - Energy Monitoring system for SWTP Phase-1 Generator [1x1.4 MW & 3x1.0 MW] 4.4 MW Power Plant.

TREATED WATER PUMP STATION (SCADA VIEW)



AUTOMATION CONCEPT

AUTOMATION OF TREATED WATER PUMPING STATION

A. Full automation of existing 5 auto transformer starter pumps and 2 VFD starter pumps along with all other utilities in treated water pumping station with all required safety interlocking. Automatic /Semi-auto selection of pump service or standby mode.

B. Tank A and Tank B new ultrasonic level sensors (3x) feedback

- Control Logic:
- Tank Level < 1.5m : All Pumps off
- Tank Level 1.5m to 4.5m : All service pumps ON
- Tank Level > 4.5m : All service pumps ON and Turn off Raw Water

C. Sump tank existing float switch interlock for High Level and Low Level

- Control Logic:
- Tank C above High Level: Turn off Raw Water
- Tank C below Low Level: Turn off all treated water output pumps

D. Pump speed control using existing ABB VFD to maintain desired discharge pressure setpoint (3.1 to 3.5 bar)

- Control Logic:
- Closed Loop PID control of pump speed using pressure sensor feedback (point F)

E. Feedback from existing pressure sensors for discharge pressure and network pressure.

F. Motor Temperature, Vibration and Sound combo sensor installed on each pump (3x per pump, 21 in total)

AUTOMATION CONCEPT

AUTOMATION OF TREATED WATER PUMPING STATION

G. Control of existing (1200mm dia) motorized valve position from HMI and SCADA

H. Feedback of actual valve position to HMI and SCADA

I. Output flow rate feedback from existing flow meter. Automatic alarm in case of low flow (blockage). Feedback to chlorination PLC.

J. Endress+Hauser residual chlorine monitoring and pH monitoring sensors. Feedback to chlorination PLC.

K. Interlocks for automatic blower control and Axial fans along with status monitoring.

L. Endress+Hauser turbidity sensor

M. Ultra-Sonic level sensor for Sump Tank continuous level measurement

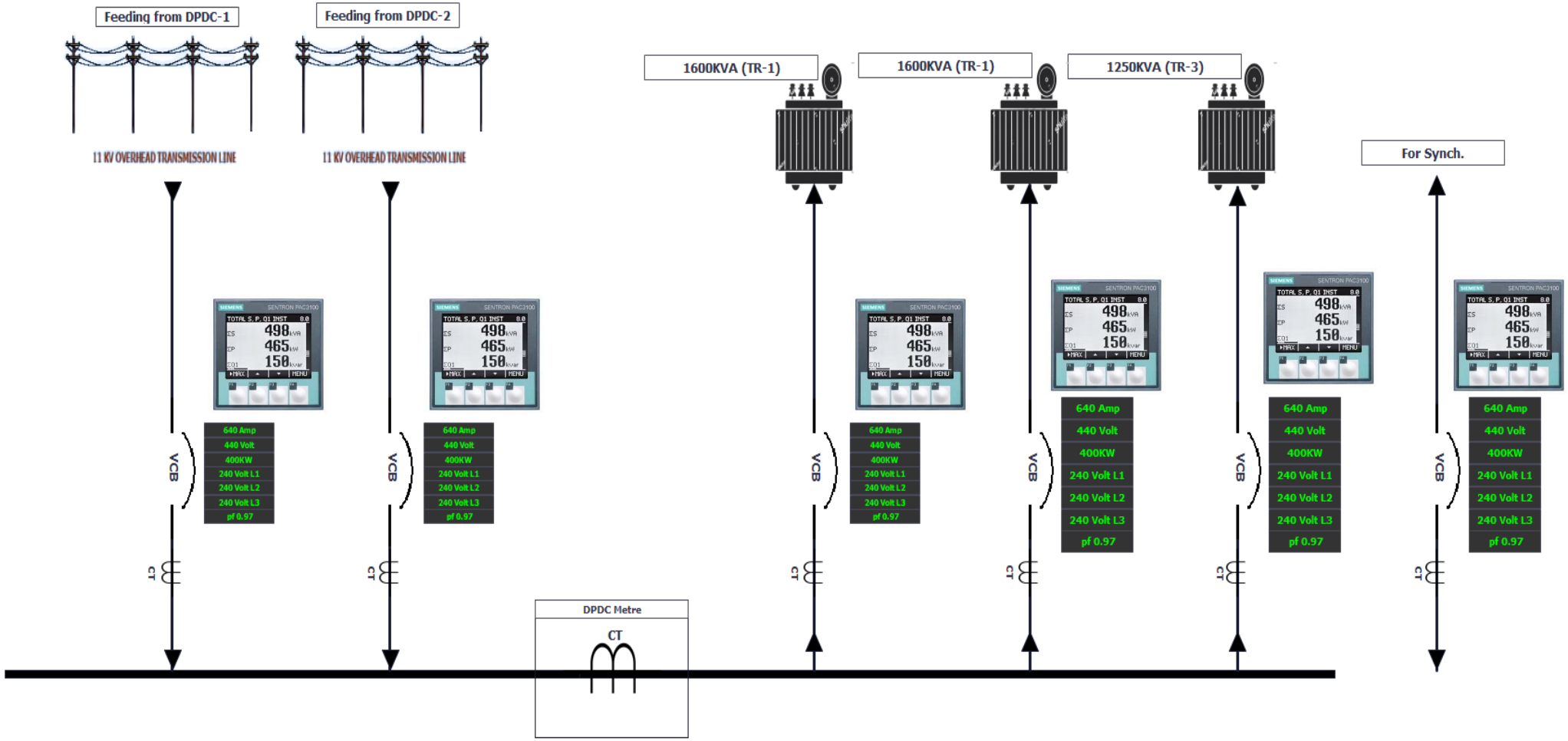
N. Pressure sensors before and after each pump

O. Existing Drain Pit pump control using feedback from existing float switches

P. Sensor box installed on each valve for open/closed position feedback

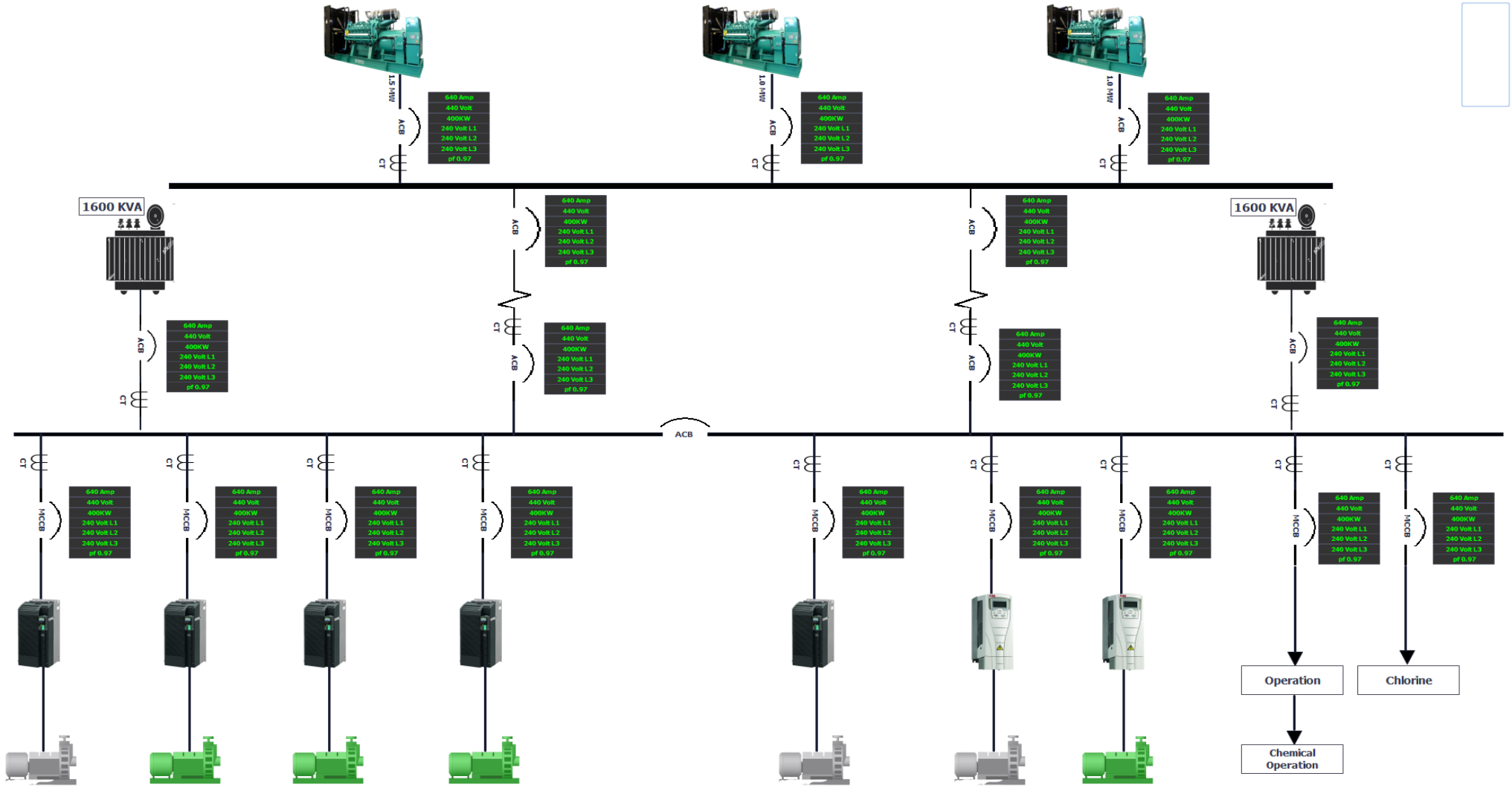
AUTOMATION CONCEPT

Energy Monitoring System for 11kv sub station & Generator



AUTOMATION CONCEPT

Energy Monitoring System for 11kv sub station & Generator



ENERGY MONITORING SYSTEM (DASHBOARD)

ENERGY MONITORING SYSTEM (DASHBOARD)

TREATED WATER PUMPING STATION & MCC ROOM

HT SWITCH GEAR PANEL

GENERATOR CONTROL PANEL

GAS GENERATOR A1, A2, A3

PRICES PROPOSAL DIFFERENT SUPPLIER

Sl. No.	Description of item	Qty	Rate by Contractors		
			M/S Nasco power Engineering(TK.)	M./S Active International (TK)	M./S Faisal Enterprise (TK)
			total tk.	total tk.	total tk.
1	Treated water pumping station & energy monitoring system	31	41482548.80	42320580.08	41901564.44
	Total Taka		41482548.80	42320580.08	41901564.44
	Rank		1st lowest	3rd lowest	2nd lowest

Attached Technical Specification of Treated Water & Energy Monitoring Automation System Details

RECOMMENDATION

It is recommended for implement of automation system of Treated Water Pumping Station and Energy Monitoring System of DPDC & Generator for smooth operation of the pump motor and avoid unwanted breakdown of the pump motor.

OUTCOME

- Improved operational efficiency of the treatment plant.
- Synchronization among different stations (i.e.: raw water, filter gallery, treated water etc. and phase-2) for smooth operation of the plant.
- With Improved automation system, SWTP-1 can exceed the designed production capacity of the plant.

CHALLENGES

- Budget & Tender procedure.
- Spare parts not available in local market.
- Upgrading existing system without shutdown of the plant.

THANK YOU

DISCUSSION & DECISION