BOILER SEQUENCE OF OPERATION

PART 1 – TEMPERATURE CONTROL SEQUENCES

A. SEE SCHEMATICS FOR LOCATIONS OF ALL TEMPERATURE SENSORS, PANELS, DAMPERS, VALVES, AND EQUIPMENT; WHERE SUCH DEVICES ARE NOT INDICATED, HOWEVER REQUIRED BY THE SEQUENCES, THEY SHALL BE PROVIDED BY THE CONTRACTOR AND LOCATED IN THE FIELD BY THE ENGINEER.

B. A FULL COMMUNICATIONS INTERFACE AND COMPLETE INTEROPERABILITY WITH THE EXISTING CAMPUS ALC DDC AUTOMATIC TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED TO PERFORM THE FUNCTIONS HEREIN DESCRIBED OR INDICATED IN THE CONTRACT DOCUMENTS. ALL TEMPERATURE, PRESSURE AND TIME SET POINTS SHALL BE FULLY ADJUSTABLE FROM THE BAS.

PART 2 – TEMPERATURE CONTROL SEQUENCES

A. THE BOILER MANUFACTURER SHALL SUPPLY AS PART OF THE BOILER PACKAGE A COMPLETELY INTEGRATED BOILER MANAGEMENT SYSTEM (BMS) TO CONTROL ALL OPERATION AND ENERGY INPUT OF THE MULTIPLE BOILER HEATING PLANT.

B. THE CONTROL MANUFACTURER SHALL PREPARE AND SUBMIT FOR APPROVAL A COMPOSITE CONTROL AND INTERLOCK WIRING DIAGRAM DEPICTING THE HEATING WATER SYSTEM PROVIDED. THE MANUFACTURER SHALL BE RESPONSIBLE FOR AND SHALL PROVIDE ALL CONTROL AND INTERLOCK WIRING FOR THE ENTIRE SYSTEM INCLUDING THE BOILER CONTROL SYSTEM AND COMMUNICATION MODULE PROVIDED BY THE BOILER MANUFACTURER. DIAGRAMS SHALL CLEARLY SHOW HOW BOILER MANUFACTURER CONTROLS AND OTHER DEVICES WILL INTERFACE WITH THE BUILDING CONTROL SYSTEM.

C. START/STOP CONTROL OF THE BOILERS SHALL BE PROVIDED THROUGH THE BAS PROVIDED BY THE CONTROL MANUFACTURER. BOILER MANAGEMENT SYSTEM (BMS) SHALL CONTROL THE BOILERS AND ITS INTEGRAL START/STOP/SAFETY FUNCTIONS. THE BMS AND THE BAS SHALL PROVIDE ALL STATUS AND ALARM MONITORING FOR EACH SYSTEM COMPONENT AND ALSO INDICATE BOILER DIAGNOSTIC. START/STOP SETTINGS FOR VARIOUS COMPONENTS SHALL BE PERFORMED MANUALLY THROUGH A HAND, OFF, AUTO (H-O-A) SWITCH OR BY THE BMS AND BAS AS OUTLINED IN THE CONTRACT DOCUMENTS.

D. ALL BOILERS SHALL BE INITIALLY MANUALLY INDEXED TO THE AUTOMATIC POSITION VIA THE H-O-A SWITCH ON THE BOILER CONTROL PANEL (BCP). ALL HEATING WATER PUMPS SHALL BE INITIALLY MANUALLY INDEXED TO THE AUTOMATIC POSITION VIA THE H-O-A SWITCH ON THE PUMP VARIABLE FREQUENCY DRIVE (VFD).

E. THE BOILER HEATING PLANT SHALL BE ENERGIZED WHEN THE HEATING WATER SYSTEM IS INDEXED ON THROUGH THE BAS.

F. BOILER CONTROL

1. CONTROL OF THE BOILERS SHALL BE BY THE BAS. THE BAS SHALL BE AUTOMATICALLY CYCLED TO MAINTAIN THE INITIAL HEATING WATER SUPPLY TEMPERATURE SET POINT (TS-HS-1) OF 180°F (ADJUSTABLE).

2. THE BMS SHALL HAVE THE ABILITY TO VARY THE FIRING RATE AND ENERGY INPUT OF EACH INDIVIDUAL BOILER THROUGHOUT ITS FULL MODULATING RANGE TO MAXIMIZE THE [illegible] CAPABILITY AND THERMAL EFFICIENCY OUTPUT OF THE ENTIRE HEATING PLANT.

3. THE BMS SHALL CONTROL THE BOILER OUTLET HEADER TEMPERATURE TO SETPOINT +/- 2°F.

4. THE HEATING WATER SUPPLY SET POINT SHALL BE RESET BY EMS VIA HARD WIRE.

G. HEATING WATER PUMP CONTROL

1. THE HEATING WATER PUMP SHALL BE SOFT STARTED BY THE BAS TO THE MINIMUM VFD SPEED AFTER HEATING WATER FLOW HAS BEEN CONFIRMED FOR AT LEAST ONE (1) BOILER. REDUCED STARTING SPEED SHALL BE THE MINIMUM FLOW REQUIRED THROUGH THE BOILER PLANT SYSTEM (PROVIDED BY MANUFACTURER) AND SHALL BE FULLY ADJUSTABLE THROUGHOUT THE RANGE OF THE DRIVE.

2. ON A DROP IN THE SYSTEM DIFFERENTIAL PRESSURE BELOW THE SET POINT, AS SEEN BY THE BUILDING DIFFERENTIAL PRESSURE TRANSMITTER DPT-1, THE HEATING WATER PUMP SPEED WILL BE INCRASED VIA THE PUMP VFD TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE SET POINT.

3. ON A RISE IN SYSTEM DIFFERENTIAL PRESSURE WITH THE HEATING WATER PUMP OPERATING, THE PUMP SPEED SHALL BE DECREASED TO MAINTAIN THE SYSTEM DIFFERENTIAL.

4. THE SYSTEM DIFFERENDIAL PRESSURE SETPOINT FOR DPT-1 SHALL BE DETERMINED BY THE MTC AND TAB CONTRACTORS AS REQUIRED TO MATCH INSTALLED SYSTEM PERFORMANCE REQUIREMENTS.

H. PROGRAMS

1. CONTROLS SHALL PROVIDE FOR BOILER PLANT OPTIMIZATION.

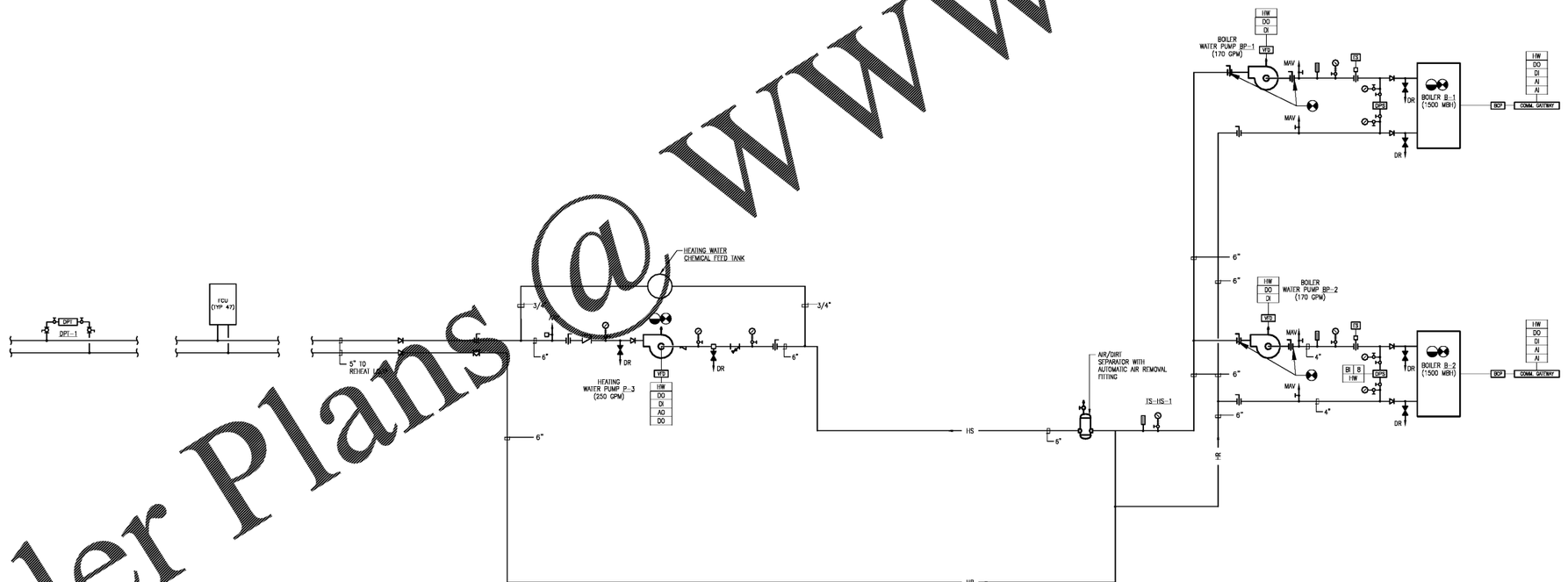
I. ALARMS & FAILURE MODES

1. UPON A FAILURE OF THE LEAD HEATING WATER BOILER TO OPERATE, AN ALARM SHALL BE ANNUNCIATED AT THE BAS. THE FAILED LEAD HEATING WATER BOILER SHALL DE-ENERGIZE AND THE LAG HEATING WATER BOILER SHALL ENERGIZE.

2. UPON A FAILURE OF A HEATING WATER PUMP TO OPERATE (AS SENSED BY ITS CURRENT TRANSDUCER), AN ALARM SHALL BE ANNUNCIATED AT THE BAS. THE FAILED HEATING WATER PUMP SHALL DEENERGIZE.

J. BAS INTERFACE

1. THE BMS SHALL BE PROVIDED WITH A BACnet COMPLIANT DIGITAL GATEWAY. THE BMS SHALL BE CONNECTED TO THE BMS VIA NUMERIC AND GRAPHIC DISPLAY OF ALL POSSIBLE BOILER PARAMETERS.



HEATING WATER SYSTEM SCHEMATIC AND CONTROL DIAGRAM

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FULTON COUNTY SCHOOL SYSTEM

RIVER EVES ELEMENTARY SCHOOL - RENOVATION

9000 EVES ROAD
ROSWELL, GA 30076

PROJECT NO: 18046.00

	50% CD'S	08/07/2018
	PERMIT SET	09/20/2018
	95% CD'S	11/08/2018
	BID SET	12/03/2018

GEORGIA REGISTERED PROFESSIONAL ENGINEER DANIEL NOTO

No. 32264 [illegible]

CONTRACT DOCUMENT ISSUED FOR CONSTRUCTION

SHEET TITLE
MECHANICAL CONTROLS DIAGRAMS

SHEET NUMBER
M303