

ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
ACCU	AIR COOLED CONDENSING UNIT
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AMPS	AMPERES
APD	AIR PRESSURE DROP
BD	BACKDRAFT DAMPER
BFF	BELOW FINISHED FLOOR
BLDG	BUILDING
BOD	BOTTOM OF DUCT
BTU	BRITISH THERMAL UNIT
CD	CONDENSATE DRAIN
CFM	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CR	CONDENSATE RETURN
CW	COLD WATER
DB	DRY BULB
dB	DECIBEL
DC	DIRECT CURRENT
DEG	DEGREES
DIA	DIAMETER
DIM	DIMENSION
DISC	DISCONNECT
DN	DOWN
DWG(S)	DRAWING(S)
DX	DIRECT EXPANSION
EA	EXHAUST AIR, EACH
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB
EF	EXHAUST FAN
EFF	EFFICIENCY
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB
EXH	EXHAUST
EXIST, (E)	EXISTING
FC	FAN COIL
FD	FIRE DAMPER
FPI	FINS PER INCH
FT	FOOT, FEET
° F	DEGREES FAHRENHEIT
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
HD	HEAD, HUB DRAIN
HP	HORSEPOWER, HEAT PUMP
HTG	HEATING
HZ	HERTZ
ID	INSIDE DIAMETER
IN	INCH
IN WG	INCHES WATER GAUGE
IN WC	INCHES OF WATER COLUMN
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LB(S),#	POUND(S)
LDB	LEAVING DRY BULB
LF	LINEAR FEET
LRA	LOCKED ROTOR AMPS
LWB	LEAVING WET BULB
MAX	MAXIMUM
MBH	1000 BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MD	MOTORIZED DAMPER
MFR	MANUFACTURER
MIN	MINIMUM
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OD	OUTSIDE DIAMETER
POC	POINT OF CONNECTION
PSI	POUNDS PER SQUARE INCH
QTY	QUANTITY
RA	RETURN AIR
RCP	REFLECTED CEILING PLAN, REINFORCED CONCRETE PIPE REQUIRED
REOD	RELATIVE HUMIDITY
RHG	REFRIGERANT HOT GAS
RL	REFRIGERANT LIQUID
RLA	RUNNING LOAD AMPS
RPM, M	REVOLUTIONS PER MINUTE MOTOR
RPM, F	REVOLUTIONS PER MINUTE FAN
RS	REFRIGERANT SUCTION
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SF	SQUARE FEET / SUPPLY FAN
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SO	SQUARE
SS	STAINLESS STEEL
SER	SERVICE SINK
T	TEMPERATURE, THERMOSTAT
TDH	TOTAL DYNAMIC HEAD
THRU	THROUGH
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
U/C	UNDERCUT
V	VOLT
VA	VOLT-AMPERE
VD	VOLUME DAMPER
W	WATT, WIDTH
WI	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN
XFMR	TRANSFORMER

LEGEND	
SYMBOL	ABBREVIATION / DESCRIPTION
	ARROW INDICATES DIRECTION OF FLOW
	ARROW INDICATES DIRECTION OF PIPE SLOPING DOWN
	CAPPED PIPE
	PIPE DOWN
	PIPE UP
	TEE DOWN
	VALVE IN RISER
	BALL VALVE
	CV CHECK VALVE
	GV GATE VALVE
	GLV GLOBE VALVE
	PRV PRESSURE REDUCING VALVE
	MOTORIZED 2-WAY ELECTRIC VALVE
	MOTORIZED 3-WAY ELECTRIC VALVE
	PNEUMATIC 2-WAY CONTROL VALVE
	PNEUMATIC 3-WAY CONTROL VALVE
	"Y" STRAINER
	"Y" STRAINER WITH SHUTOFF VALVE
	RELIEF VALVE (R) OR SAFETY VALVE (S)
	ANGLE VALVE
	FLOW CONTROL VALVE
	FLOW METER
	GAS COCK
	BUTTERFLY VALVE
	ELECTRONIC CONTROL VALVE
	UNION
	FLANGE
	PG PRESSURE GAGE
	THERMOMETER IN WELL
	AUTOMATIC AIR VENT
	PIPE SIZE INCREASER
	BACKFLOW PREVENTER
	TEMPERATURE GAUGE
	CHILLED WATER SUPPLY
	CHILLED WATER RETURN
	HEATING WATER SUPPLY
	HEATING WATER RETURN
	CW COLD WATER
	HW HOT WATER
	HWR HOT WATER RETURN

**BUILDING DEPARTMENT INFORMATION**

1. AUTHORITY HAVING JURISDICTION:  
CITY OF WEST COVINA, PUBLIC WORKS, BUILDING AND SAFETY,  
1444 WEST GARVEY AVENUE  
WEST COVINA, CALIFORNIA 91790  
626.939.8759 LONG TANG

**SEISMIC NOTES**

- ANCHORAGE AND/OR SEISMIC RESTRAINTS SHALL BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA.
- THE ANCHORAGE AND/OR SEISMIC RESTRAINT OF PERMANENT EQUIPMENT AND ASSOCIATED SYSTEMS LISTED SHALL BE DESIGNED TO RESIST THE TOTAL DESIGN SEISMIC FORCES PRESCRIBED IN SECTION 1632.2 OF THE 2010 CALIFORNIA BUILDING CODE.
- SEISMIC RESTRAINTS ARE REQUIRED FOR THE FOLLOWING INSTALLATIONS. REFER TO THE SMACNA GUIDELINES FOR SEISMIC RESTRAINTS FOR ADDITIONAL REQUIREMENTS:
  - FLOOR OR ROOF MOUNTED EQUIPMENT WEIGHING 400 LBS. OR GREATER.
  - SUSPENDED OR WALL MOUNTED EQUIPMENT WEIGHING 20 LBS. OR GREATER.
  - VIBRATION ISOLATION EQUIPMENT WEIGHING 20 LBS. OR GREATER.
  - PIPES AND DUCTS SUPPORTED BY A TRAPEZE WHERE NONE OF THOSE ELEMENTS WOULD INDIVIDUALLY REQUIRE BRACING NEED NOT BE BRACED IF CONNECTIONS TO THE PIPE/DUCT OR DIRECTIONAL CHANGES DO NOT RESTRICT MOVEMENT OF THE TRAPEZE. IF THIS FLEXIBILITY IS NOT PROVIDED, BRACING IS REQUIRED WHEN THE COMBINED OPERATING WEIGHT OF ALL ELEMENTS SUPPORTED BY THE TRAPEZE IS 10 LBS/FT OR GREATER.

**APPLICABLE CODES**

- 2016 CALIFORNIA PLUMBING CODE
- 2016 CALIFORNIA MECHANICAL CODE
- 2017 COUNTY OF LOS ANGELES BUILDING CODE
- 2017 COUNTY OF LOS ANGELES MECHANICAL CODE
- 2017 COUNTY OF LOS ANGELES PLUMBING CODE

**DRAWING/DETAIL REFERENCE KEY**

SYMBOL	DESCRIPTION
	PLAN REFERENCE / KEY NOTE
	REVISION
	AIR DEVICE CALLOUT
	POINT OF CONNECTION
	POINT OF DISCONNECTION/DEMOLITION REFER TO
	DRAWING/DETAIL NUMBER
	SHEET NUMBER OF DRAWING/DETAIL
	EQUIPMENT TAG
	EQUIPMENT I.D.

**SCOPE OF WORK**

THE SCOPE OF WORK INCLUDES REPLACING THE EXISTING STEAM BOILER AND SUPPORTING COMPONENTS WITH NEW. THE EXISTING SYSTEM IS OLD AND FAILING AND NEEDS TO BE REPLACED AND UPGRADED.

**GENERAL NOTES**

- THESE DOCUMENTS WERE PREPARED WITHOUT AS-BUILT DOCUMENTS AS NONE WERE AVAILABLE. FIELD VERIFY ALL EXISTING CONDITIONS (SIZE, LOCATION, ETC.) PRIOR TO BEGINNING CONSTRUCTION. NOTIFY ARCHITECT / ENGINEER OF ANY DISCREPANCIES BETWEEN CONTRACT DOCUMENTS AND EXISTING CONDITIONS.
- COORDINATE THE LOCATION AND ELEVATION OF EQUIPMENT, DUCTWORK AND PIPING WITH OTHER TRADES, TO AVOID INTERFERENCES.
- PROVIDE ADEQUATE SUPPORT (THRUOUT RESTRAINTS, ETC.) FOR PIPING AT POINTS WHERE EQUIPMENT IS DISCONNECTED FROM THE SYSTEM.
- CONNECTION, DEMOLITION OR INTERRUPTION TO EXISTING SERVICES SHALL BE MINIMIZED AND COORDINATED WITH THE OWNER'S REPRESENTATIVE.
- EQUIPMENT SHALL BE INSTALLED, DUCTED AND/OR PIPED IN ACCORDANCE APPLICABLE CODES AND MANUFACTURERS RECOMMENDATIONS.
- EQUIPMENT DESIGNED TO BE FIXED IN POSITION SHALL BE SECURELY FASTENED IN PLACE. SEE SEISMIC NOTES.
- INSTALL PIPING OUT OF NATURAL WALKWAYS AND IN COMPLIANCE WITH CAL-OSHA SAFETY STANDARDS.
- PROVIDE (7) FOOT MINIMUM HEAD CLEARANCE AT OVERHEAD PIPING AND EQUIPMENT UNLESS OTHERWISE NOTED ON ARCHITECTURAL OR STRUCTURAL PLANS.
- THE LOCATION OF ACCESS PANELS FOR CONCEALED VALVES, FUSIBLE LINKS, DAMPER OPERATORS AND EQUIPMENT SHALL BE COORDINATED WITH THE ARCHITECTURAL TRADES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING AND REPAIRING AREAS, PIPING, DUCTWORK, ETC., EXISTING OR NEW, DAMAGED AS A RESULT OF THE WORK. REPAIR TO MATCH EXISTING CONDITIONS.
- HORIZONTAL PIPING AND TUBING SHALL BE SUPPORTED AT SUFFICIENTLY CLOSE INTERVALS TO KEEP IT IN ALIGNMENT AND PREVENT EXCESSIVE SAGGINGS. SUPPORT EACH PIPE INDEPENDENTLY FROM OTHER PIPES. DO NOT USE WIRE OR PLUMBERS TAPE FOR HANGING OR STRAPPING PIPES.
- UNIONS SHALL BE PROVIDED AND INSTALLED PRIOR TO EQUIPMENT CONNECTIONS. PROVIDE DIELECTRIC UNIONS, GASKETS AND FASTENERS AT DISSIMILAR METAL CONNECTIONS OR CONTACT POINTS.
- PROVIDE 1/2" HIGH STENCIL LETTERING PAINTED ON MECHANICAL EQUIPMENT WITH PERMANENT PAINT, OR A SHEET METAL PLAQUE WITH ENLARGED LETTERING MOUNTED ON THE SIDE OF THE UNIT WITH SHEET METAL SCREWS IDENTIFYING UNIT NUMBER AND AREA SERVED BY SUCH UNIT.
- LABEL INSIDE THERMOSTAT HOUSING WITH A PERMANENT MARK TO CORRESPONDING UNIT OR ZONE TERMINAL AS SHOWN ON PLANS. MOUNT THERMOSTATS WHERE INDICATED ON PLAN 48" A.F.F.
- INTERCONNECT A/C UNITS TO DUCT SMOKE DETECTION SYSTEM COMPLYING TO CODE TO ACCOMPLISH UNIT SHUT DOWN UPON DETECTION OF ANY SMOKE DETECTOR. COORDINATE WIRING WITH ELECTRICAL CONTRACTOR.
- ACCURATE "AS-BUILT" DRAWINGS SHALL BE MAINTAINED DURING CONSTRUCTION AND SUBMITTED FOR APPROVAL UPON COMPLETION OF INSTALLATION. CONTRACTOR TO PROVIDE FINAL AS-BUILT PLANS IN HARD COPY AND ELECTRONIC (CAD) FORMAT.
- MECHANICAL SYSTEMS SHALL BE TESTED, BALANCED AND OPERATED TO DEMONSTRATE TO THE OWNER OR DESIGNATED REPRESENTATIVE THAT THE INSTALLATION AND PERFORMANCE OF THE SYSTEMS CONFORM TO THE DESIGN INTENT. ALL TESTING AND BALANCING SHALL BE PERFORMED BY A QUALIFIED INDEPENDENT AGENCY CERTIFIED BY THE ASSOCIATION AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TEST RESULTS SHALL BE DOCUMENTED AND SUBMITTED FOR APPROVAL.
- REFRIGERANT PIPING SHALL COMPLY WITH CHAPTER 11 OF THE MECHANICAL CODE.
- CONTRACTOR TO REPAIR ALL EXISTING WALL, FLOOR, CEILING, AND ROOF CONDITIONS TO MATCH EXISTING FOR EQUIPMENT REMOVED. COORDINATE WITH GC.

**PIPE SCHEDULE**

SERVICE	LOCATION	MATERIALS				FITTINGS
		TYPE 'L' COPPER	TYPE 'M' COPPER	SCHEDULE 40 BLACK STEEL	POLYETHYLENE	
WATER	INSIDE	●				LEAD FREE SOLDERED FITTINGS
	OUTSIDE	●				LEAD FREE SOLDERED FITTINGS
WASTE (SANITARY)	ABV. FLR.		●			PVC SCHEDULE 40 PIPE AND FITTINGS
	BEL. FLR.		●			ABS SCHEDULE 40 PIPE AND FITTINGS
WASTE (SODA MACHINES)	BEL. FLR.			●		ABS SCHEDULE 40 PIPE AND FITTINGS
STORM DRAIN OVERFLOW DRAIN	ABV. FLR.		●			ABS SCHEDULE 40 PIPE AND FITTINGS
	BEL. FLR.		●			ABS SCHEDULE 40 PIPE AND FITTINGS
VENT (SANITARY)	ABV. FLR.		●			ABS SCHEDULE 40 PIPE AND FITTINGS
	BEL. FLR.		●			ABS SCHEDULE 40 PIPE AND FITTINGS
INDIRECT WASTE	INSIDE	●				LEAD FREE SOLDERED FITTINGS
	OUTSIDE	●				LEAD FREE SOLDERED FITTINGS
CONDENSATE DRAIN	INSIDE	●				LEAD FREE SOLDERED FITTINGS, INSULATED
	OUTSIDE	●				LEAD FREE SOLDERED FITTINGS, INSULATED
GAS	INSIDE		●			SCH. 40 PIPE AND MALLEABLE IRON FITTINGS
	BEL. GRADE		●			P.E. PIPE AND FITTINGS W/ ELEC. FUSION JOINTS
STEAM	INSIDE		●			SCHEDULE 40 CI OR BLACK STEEL PIPE AND FITTINGS
	BEL. GRADE		●			SCHEDULE 40 CI OR BLACK STEEL PIPE AND FITTINGS

\*SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION

**SHEET INDEX**

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M1.2	MECHANICAL DEMOLITION ISOMETRIC PLAN BOILER ROOM
M2.1	MECHANICAL PLAN BOILER ROOM
M2.2	MECHANICAL ISOMETRIC PLAN BOILER ROOM
M3.0	MECHANICAL SPECIFICATIONS

**TREK ENGINEERING, INC.**  
MECHANICAL • PLUMBING • ENGINEERING  
321 Rampart Street, Suite 203  
Orange, CA 92668  
TEL: 714.769.9700  
WNeal@TrekEngineering.com

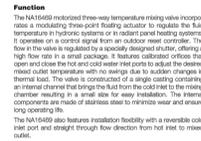
ROWLAND UNIFIED SCHOOL DISTRICT  
RUTH RICHARD FOOD CENTER  
4032 S. ELLESFORD AVENUE  
WEST COVINA, CALIFORNIA 91792

STEAM SYSTEM BOILER  
REPLACEMENT PROJECT

DATE	REVISIONS
04/04/17	50% PROGRESS SET
06/05/17	80% PROGRESS SET
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MECHANICAL  
GENERAL NOTES,  
SYMBOLS AND  
ABBREVIATIONS

**3-way motorized temperature mixing valve**  
NA16469



**Function:**  
The NA16469 motorized three-way temperature mixing valve incorporates a modulating three-point floating actuator to regulate the fluid temperature in hydronic systems or in radiant panel heating systems. It operates on a control signal from an outdoor reset controller. The flow in the valve is regulated by a specially designed piston offering a high flow rate in a small package. It features calibrated orifices that open and close the hot and cold water inlet ports to adjust the desired mixed outlet temperature with no leakage due to sudden changes in thermal loads. The valve is constructed of a single casting containing an internal chamber that brings the fluid from the cold inlet to the mixing chamber, resulting in a small size for easy installation. The internal components are made of stainless steel to minimize wear and ensure long operating life.  
The NA16469 also features insulation flexibility with a reversible cold trap port and straight through flow direction from the tank to the mixed outlet.

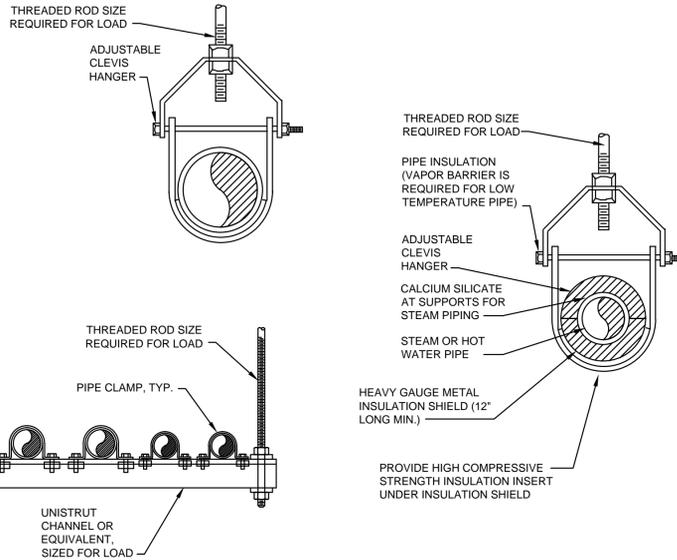
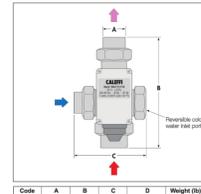
**Product range:**  
NA16469 3-way floating point 24V temperature mixing valve, 7.7 Cv

**Technical specifications:**

**Materials:**  
Body: brass  
Bonnet: brass  
Shaft: stainless steel  
Seals: EPDM

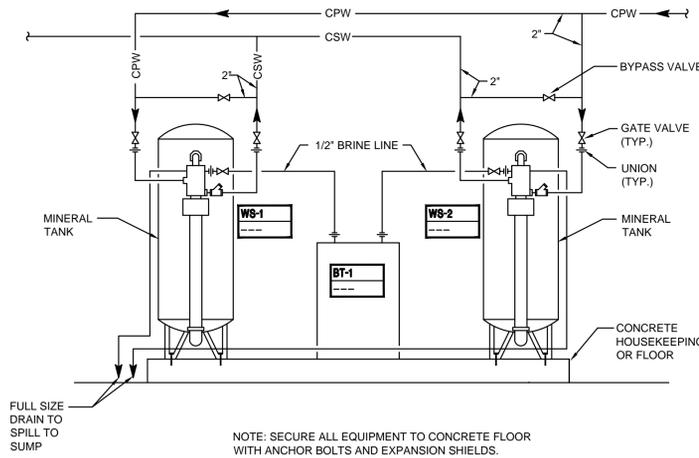
**Actuator (three-point floating type with auxiliary switch):**  
Supply voltage: 24 VAC (50-60 Hz)  
Full stroke time: 30 s (position 1/2/3)  
Power consumption: 8 VA  
Current draw: 0.35 A  
Auxiliary switch capacity: 0.8 A, 24 V  
Protection class: IP 44  
Max. ambient temperature: 130°F (55°C)  
Protective cover: self-extinguishing V0

**Performance:**  
Substrate fluids: water, glycol solutions  
Max. percentage of glycol: 30%  
Temperature range: 40-210°F (-100°C)  
Max. working pressure: 200 psi (14 bar)  
Cv: 7.7  
Connections: 1" sweat union



**THERMOSTATIC MIXING VALVE DETAIL**

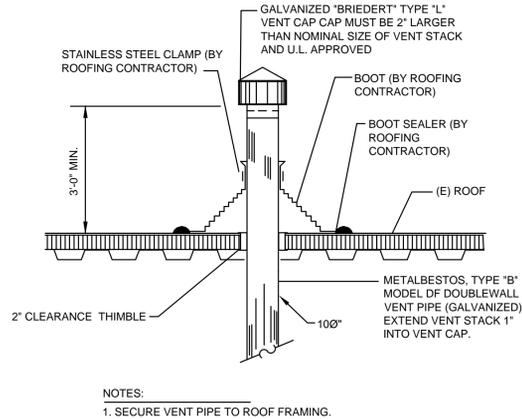
SCALE: NONE **2**



NOTE: SECURE ALL EQUIPMENT TO CONCRETE FLOOR WITH ANCHOR BOLTS AND EXPANSION SHIELDS.

**PIPE SUPPORT DETAILS**

SCALE: NONE **1**



NOTES:  
1. SECURE VENT PIPE TO ROOF FRAMING.

**BOILER SCHEDULE**

MARK	B-1
INPUT (BTUH)	2,000,000 EACH
OUTPUT (BTUH)	1,600,000 EACH
VENT SIZE (INCHES)	10"Ø
MODEL NUMBER	BRYAN MODEL AB200
MIN THERMAL EFFICIENCY	80%
STEAM OUTPUT	1649 LBS/HR
FLOW RATE	94.7 GPM
OPERATING PRESSURE	60 PSI
PRESSURE DROP	3 FT HD MAX
GAS PRESSURE	5 PSI MIN / 14 PSI MAX
OPERATING WEIGHT	900 LBS
ELECTRICAL	120/1/60 28 AMPS

NOTES:  
1. PROVIDE STAND ALONE CONTROLLER WITH BMS PORTS, GAS TRAIN, VALVES AND FITTINGS.  
2. PROVIDE AUTO BLOWDOWN OPTION.  
3. CONTACT JEFF DISCOUNT AT DB SALES, 714.620.9555.

**CONDENSATE TANK**

MARK	CT-1
MANUFACTURER	BRYAN
MODEL	HFS-50
GALLONS	50
SIZE	34"x35"x52" (LxWxH)
PUMPS	DUPLEX, 1 HP EACH
FLOW RATE	6.9 GPM
OPERATING WEIGHT	900 LBS
ELECTRICAL	208/3/60
OPERATING PRESSURE	60 PSI

NOTES: PROVIDE CONTROL PANEL WITH BOILER COMMUNICATION CAPABILITY.

**BLOWDOWN SEPERATOR**

MARK	BD-1
MANUFACTURER AND MODEL	BURNHAM B230
DIMENSION	10"Ø x 20", 3"Ø VENT
OPERATING PRESSURE (MAX)	200 PSI

NOTES: PROVIDE AUTOMATIC AFTER COOLER WITH MODULATING TEMP CONTROLLER.

**PUMP SCHEDULE**

UNIT TAG	SYSTEM SERVED	MFR & MODEL NO. (OR APPROVED EQUAL)	TYPE	GPM	HEAD (FT.WTR)	HP	VOLTS/PH/Hz	RPM	WEIGHT LBS	REMARKS
WP-2 7.5 GPM	DOMESTIC WATER RECIRC PUMP	WILO STAR S 21 ZFX	IN LINE	7.5	5	0.25	115/1/60	1750	100	1

NOTES:  
1. PROVIDE CEILING SUPPORTS, PIPE TEMP SENSOR CONTROL AND DISCONNECT. PUMP TO HAVE ALL BRONZE/S.S. CONSTRUCTION.

**THERMOSTATIC MIXING VALVE**

UNIT TAG	ITEM	MFR & MODEL NO. (OR APPROVED EQUAL)	TYPE	CONNECTIONS	LWT	MAX PRESSURE	MAX GPM	WEIGHT LBS	REMARKS
TMV-1	THERMOSTATIC MIXING VALVE	CALEFFI NA16469	3-WAY	1"	140°F	200 PSI	7.5	6	1

NOTES:  
1. PROVIDE ADJUSTABLE, MOTORIZED MODEL WITH ALL BRONZE OR STAINLESS STEEL CONSTRUCTION. PROVIDE OUTDOOR RESET CONTROLLER. PROVIDE CHECK VALVES.

**WATER SOFTENER SYSTEM**

UNIT TAG	ITEM	SOFTENER TANK MFR & MODEL NO. (OR APPROVED EQUAL)	CONTROL VALVE MFR & MODEL NO. (OR APPROVED EQUAL)	CONN	FLOW	BACKWASH	MAX PRESSURE	MAX TEMP	POWER	REMARKS
WS-1	WATER SOFTENER	WAVE CYBER 186 GALLON 21"Ø x 62"	CLACK WS2EE	2"	66 GPM	12 GPM	100 PSI	110°F	120/1/60	1, 2
WS-2	WATER SOFTENER	WAVE CYBER 186 GALLON 21"Ø x 62"	CLACK WS2EE	2"	66 GPM	12 GPM	100 PSI	110°F	120/1/60	1, 2

NOTES:  
1. PROVIDE MICROPROCESSOR, METER, 2" MOTORIZED ALTERNATING VALVE  
2. EACH TANK SYSTEM IS SIZED FOR 50% CAPACITY FOR 100% TOTAL CAPACITY.  
3. PROVIDE 70 GALLON, 24" DIA BRINE TANK BT-1.  
4. CONTACT CHRIS MACKNIGHT WITH CUSTOM H2O AT 949.484.3200 OFFICE, 714.305.9015 CELL.

**WATER TREATMENT SYSTEM**

WT-1	MANUFACTURER & MODEL NO.	SERVICE	ELECTRICAL		OPER. WT. (LBS.)	REMARKS
			H.P.	V/PH/Hz		
BOILER CONTROLLER	WALCHEM W100W	STEAM BOILER	---	120/1/60	---	3 POWERED RELAYS, PIGTAILS, BOILER SENSOR WITH ATC.
TANK	PEABODY SQUARE NATURAL	STEAM BOILER	---	---	---	DUAL CONTAINMENT, 24Lx14Wx13.5H, ULTRIMINE SB-100K
PUMP	PROMINENT PUMP CONCEPT PLUS	STEAM BOILER	---	120/1/60	---	0.26 GPH, 145 PSI.
INJECTION QUILL	NEPTUNE	STEAM BOILER	---	---	---	3/4", 316 S.S. WITH CHECK VALVE QC-316-75

CONTACT: CHRIS BELLIZZI, ECONOMIC ALTERNATIVES, 951.272.8200

**WATER SOFTENER DETAIL**

SCALE: NONE **4**

**BOILER VENT THROUGH ROOF DETAIL**

SCALE: NONE **3**

**NOT USED**

SCALE: NONE **6**

**INLINE PUMP DETAIL**

SCALE: NONE **5**



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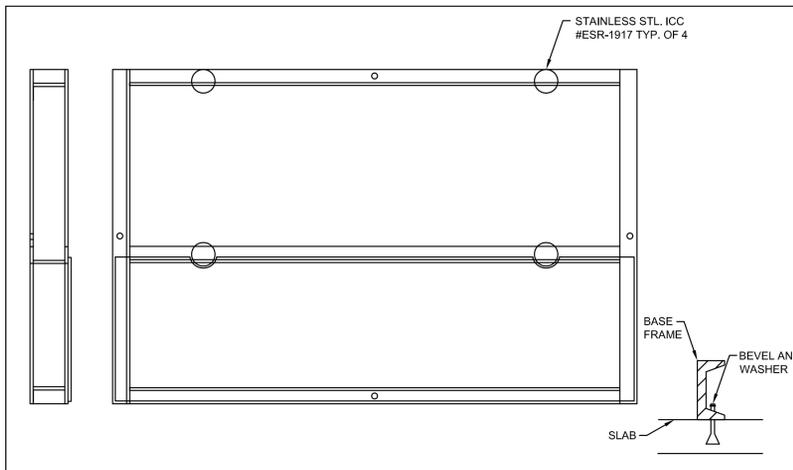
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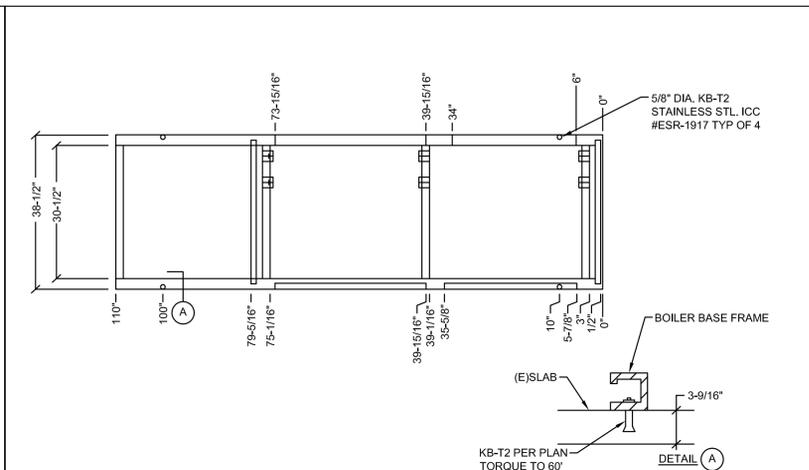
MECHANICAL  
DETAILS AND  
SCHEDULES

SHEET  
**M0.1**



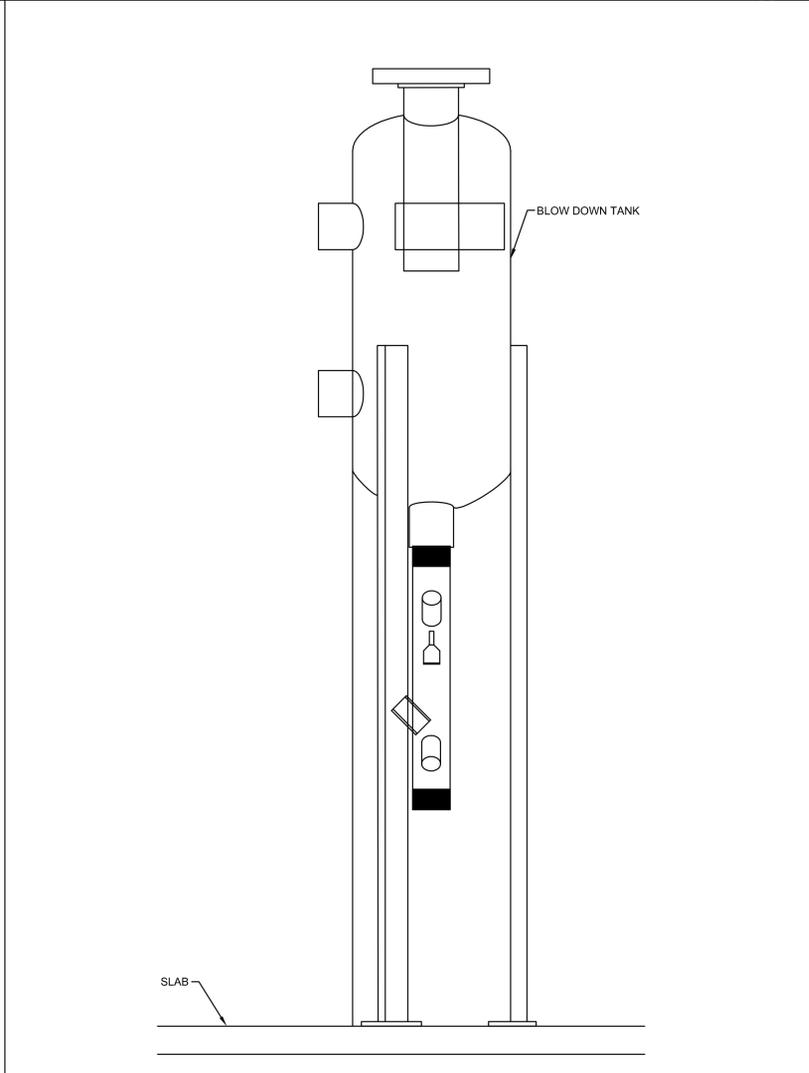
CONDENSATE BASE FRAME ANCHORAGE

SCALE: NONE 2



AB 200 BASE FRAME ANCHORAGE

SCALE: NONE 1



BLOW DOWN TANK ANCHORAGE

SCALE: NONE 3

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 MECHANICAL • PLUMBING • ENGINEERING  
 321 Rampart Street, Suite 203  
 Orange, CA 92668  
 TEL: 714.765.9700  
 WNeal@TrekEngineering.com

Professional Engineer  
 State of California  
 License No. M32264  
 Exp. 12/31/18  
 Mechanical

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MECHANICAL  
 STRUCTURAL  
 DETAILS

SHEET  
**M0.2**

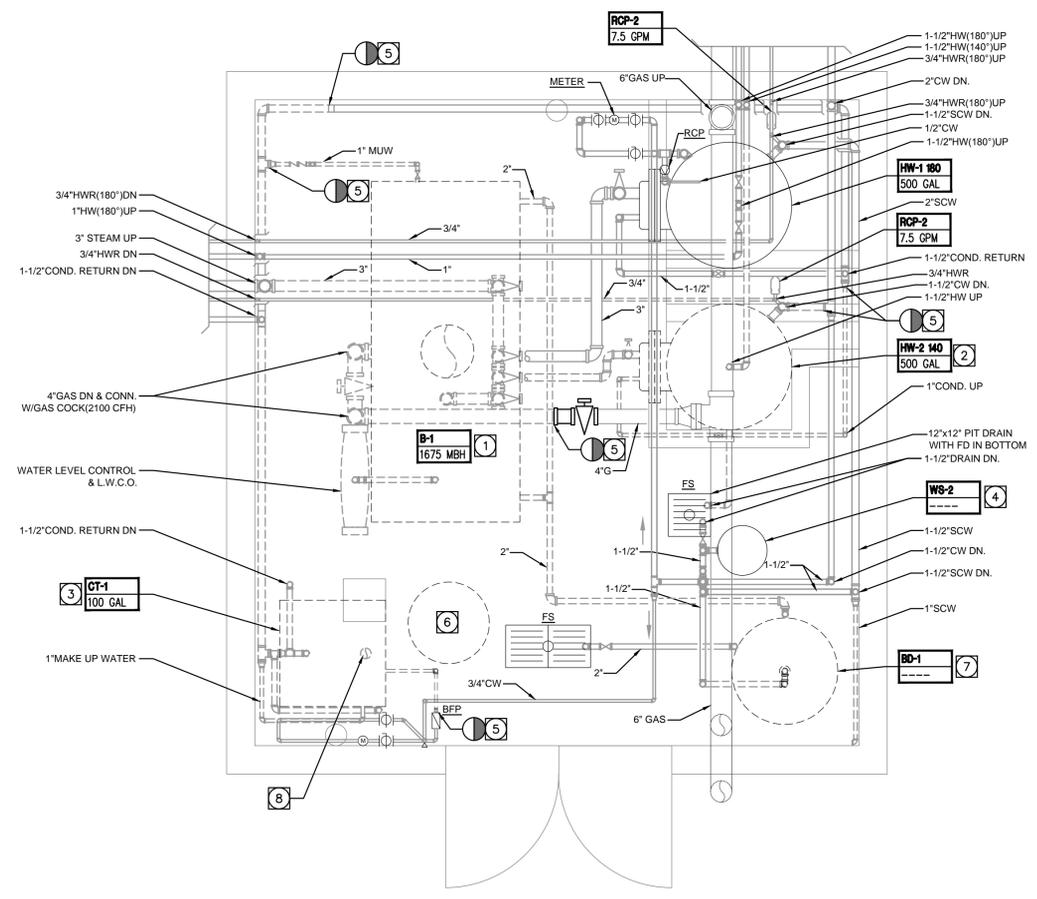


**GENERAL NOTES:**

1. CONTRACTOR TO PERFORM THOROUGH SITE VISIT PRIOR TO BID AND TO ISSUE RFIS FOR ANY PART OF THE SCOPE THAT IS UNCLEAR.
2. CONTRACTOR TO INCLUDE ALL REQUIRED TRADES FOR A COMPLETE TURNKEY PROPOSAL.

**PLAN NOTES:**

- 1 DEMO BOILER, FLUE, PIPING TO SOV, GAS PIPING TO SOV, VENTS, CONTROLS AND POWER. PREPARE FOR NEW BOILER.
- 2 DEMO HW-2 TANK, PIPING, VALVES AND FITTINGS.
- 3 DEMO CT-1, PIPING, VALVES AND FITTINGS, TO BE REPLACED WITH NEW, 2-PUMP MODEL.
- 4 WS-1 TO BE DEMOD FOR NEW.
- 5 DEMO EXISTING GAS PIPING AS INDICATED, PROVIDE NEW SOV AND TEMPORARY BLIND FLANGE.
- 6 DEMO CHEMICAL TREATMENT SYSTEM, TO BE REPLACED WITH NEW.
- 7 BD-1 TO BE DEMO D AND REPLACED WITH NEW. REUSE EXISTING VTR.
- 8 3" VTR TO REMAIN AND TO BE RECONNECTED TO NEW CONDENSATE RECEIVER VENT.



1 MECHANICAL DEMOLITION PLAN BOILER ROOM  
SCALE: 1/2" = 1'-0"

ROWLAND UNIFIED SCHOOL DISTRICT  
RUTH RICHARD FOOD CENTER  
4032 S. ELLESFORD AVENUE  
WEST COVINA, CALIFORNIA 91792

STEAM SYSTEM BOILER  
REPLACEMENT PROJECT

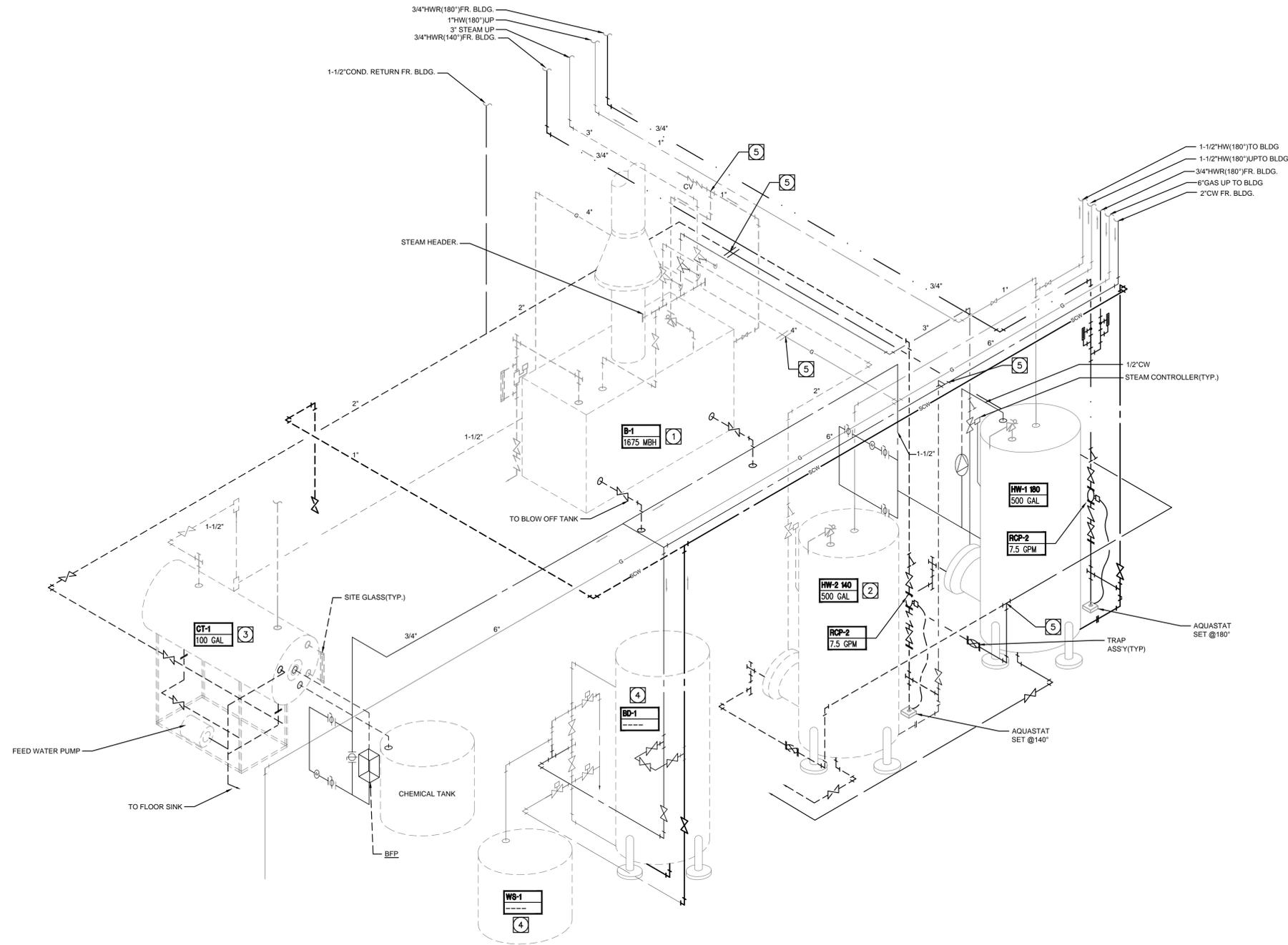
DATE	REMARKS
04/04/17	50% PROGRESS SET
06/05/17	80% PROGRESS SET
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05/15/18	REVISED BID SET

MECHANICAL  
DEMOLITION  
PLAN  
BOILER ROOM

SHEET  
M.1.1

**PLAN NOTES:**

- 1 DEMO BOILER, FLUE TO BELOW ROOF. PIPING TO SOV, GAS PIPING TO SOV, VENTS, CONTROLS AND POWER. PREPARE FOR NEW BOILER. NEW FLUE TO REUSE EXISTING FLUE THROUGH ROOF.
- 2 DEMO HW-2 TANK, PIPING, VALVES AND FITTINGS.
- 3 DEMO CT-1, PIPING, VALVES AND FITTINGS. VTR TO REMAIN AND TO BE CONNECTED TO NEW CT VENT.
- 4 DEMO WS AND BD TANKS. BD VENT THROUGH ROOF TO REMAIN AND BE RESUED.
- 5 DEMO EXISTING PIPING AS INDICATED. PREPARE FOR MODIFICATIONS.



1 MECHANICAL DEMOLITION ISOMETRIC PLAN BOILER ROOM  
SCALE: N/A



TREK ENGINEERING, INC.  
MECHANICAL • PLUMBING ENGINEERING  
321 Rampart Street, Suite 203  
Orange, CA 92668  
TEL: 714.769.9700  
WNeal@TrekEngineering.com



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MECHANICAL  
DEMOLITION  
ISOMETRIC PLAN  
BOILER ROOM

SHEET  
M1.2



**GENERAL NOTES:**

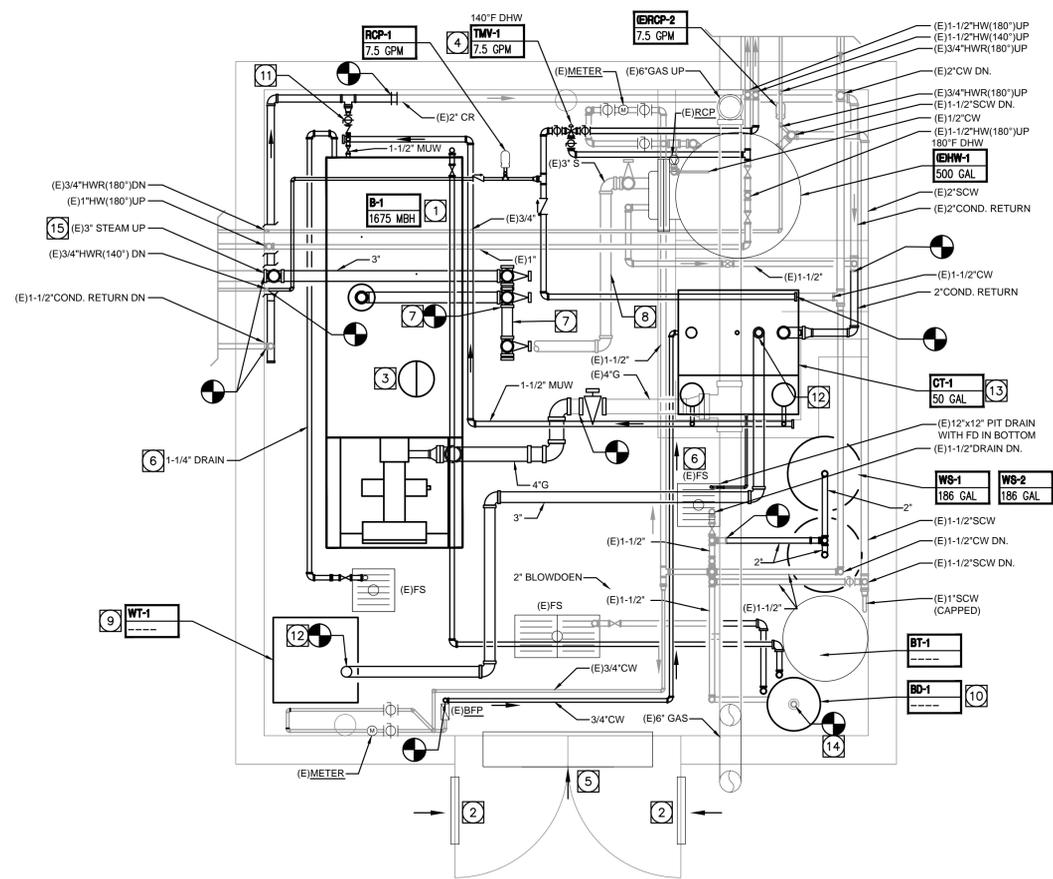
- CONTRACTOR TO PERFORM THOROUGH SITE VISIT PRIOR TO BID AND TO ISSUE RFIS FOR ANY PART OF THE SCOPE THAT IS UNCLEAR.
- CONTRACTOR TO INCLUDE ALL REQUIRED TRADES FOR A COMPLETE TURNKEY PROPOSAL.

**PLAN NOTES:**

- INSTALL NEW BOILER, 10"Ø FLUE, PIPING TO SOV, GAS PIPING TO SOV, VENTS, CONTROLS AND POWER. PROVIDE NEW 4" HK PAD, EXTEND 6" BEYOND BOILER EDGE.
- (E) 19"x69" COMBUSTION AIR DOOR LOUVER, QTY 2.
- 10"Ø TYPE B FLUE UP THROUGH EXISTING ROOF OPENING, REUSE (E) FLUE CAP OR PROVIDE NEW.
- THERMOSTATIC MIXING VALVE TO BE INSTALLED FOR 140°F DOMESTIC HOT WATER.
- INSTALL 48"x24" DRAINABLE COMBUSTION AIR LOUVER AT 12" BELOW CEILING, PROVIDE INSECT SCREEN.
- ROUTE BOILER DRAIN/RELIEF LINES TO EXISTING FLOOR SINK.
- REPLACE (E) 3" STEAM HEADER AND VALVES WITH NEW.
- (E) 3" STEAM, EXTEND TO NEW STEAM HEADER.
- WATER TREATMENT SYSTEM, REFER TO M-0.1 FOR COMPONENT REQUIREMENTS.
- INSTALL 3"Ø AUTOMATIC AFTER COOLER WITH MODULATING TEMP CONTROLLER. PROVIDE 3"Ø DRAIN LINE TO FLOOR SINK, COORDINATE BLOWOFF INLET PIPE SIZE WITH BOILER. CONNECT VENT TO (E) VTR.
- SOV TO BE IN CLOSED POSITION.
- 3" VENT THRU ROOF. CONNECT TO EXISTING VENT PENETRATION.
- CHEMICAL TREATMENT SYSTEM, INSTALL AND CONNECT TO CT-1.
- CONNECT VENT TO (E) VTR.
- PROVIDE FULL SIZE STEAM ISOLATION VALVE AT STEAM MAIN AT CEILING.

**COMBUSTION AIR REQUIREMENTS**

- REQUIREMENTS: 1 SQIN FREE AREA PER 4000 BTUH.
  - (1) BOILERS AT 2,000,000 BTUH.
  - (2,000,000 BTUH) / (15SQIN / 4000 BTUH) = 500 SQIN FREE AREA REQUIRED, HIGH AND LOW.
  - EXISTING DOOR LOUVERS: (2) 66"x19" = 2508 SQIN FACE AREA.
  - EXISTING FREE AREA: 2508 x 0.50 = 1254 SQIN FREE AREA.
- EXISTING DOOR LOUVERS ADEQUATE FOR LOW INTAKE REQUIREMENT.  
A NEW 48"x24" LOUVER AT 12" FROM CEILING REQUIRED FOR HIGH LOUVER.



1 MECHANICAL PLAN BOILER ROOM  
SCALE: 1/2" = 1'-0"

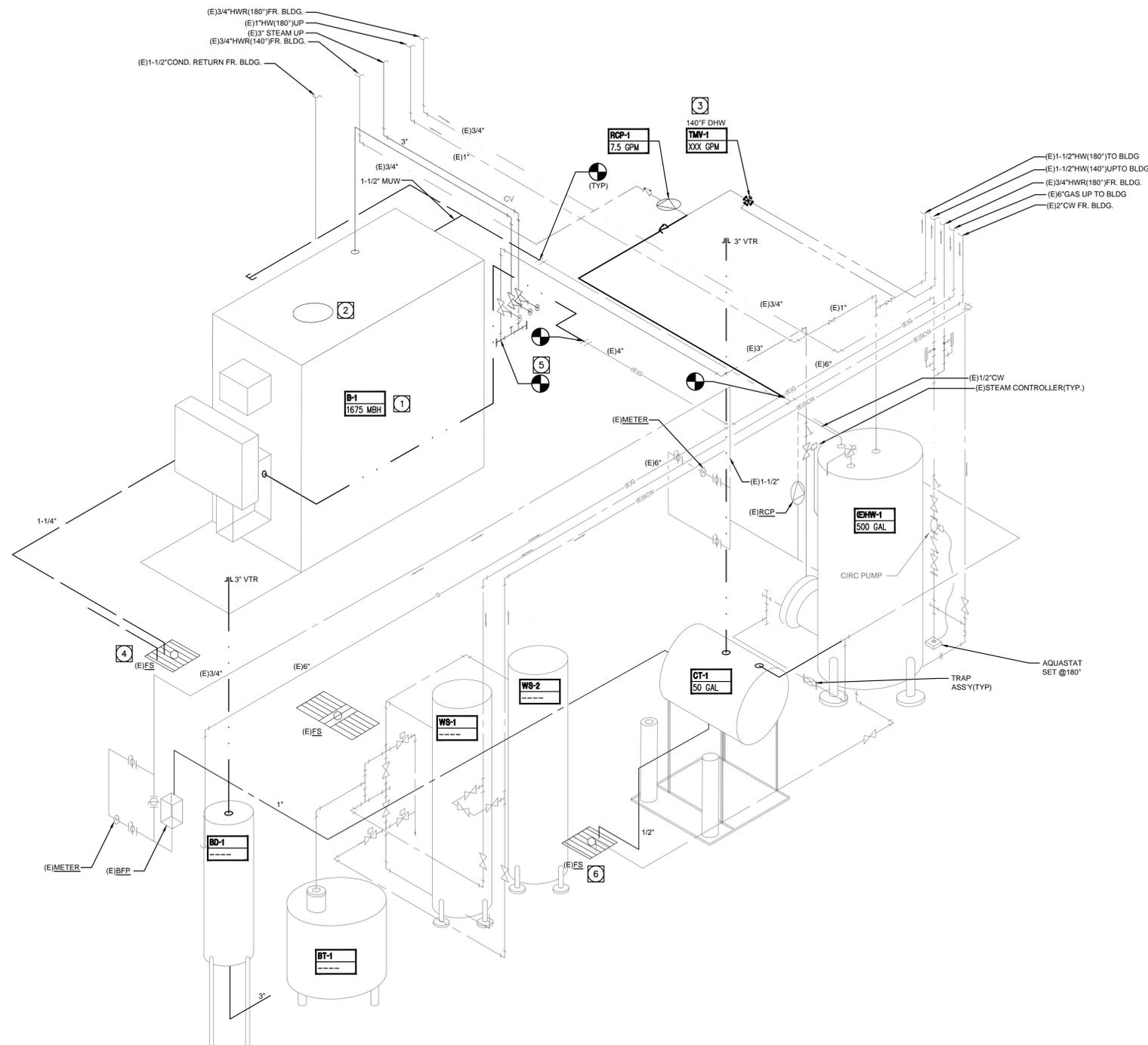
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MECHANICAL  
PLAN  
BOILER ROOM

SHEET  
M2.1



1 MECHANICAL ISOMETRIC PLAN BOILER ROOM  
SCALE: N/A

**PLAN NOTES:**

- 1 INSTALL NEW BOILER, FLUE, PIPING TO SOV, GAS PIPING TO SOV, VENTS, CONTROLS AND POWER. MOUNT TO (E) HK PAD. REPLACEMENT OF BOILERS TO BE STAGED TO ALLOW ONE BOILER OPERATIONAL AT ALL TIMES.
- 2 100# TYPE B FLUE UP THROUGH EXISTING ROOF OPENING. REUSE (E) FLUE CAP OR PROVIDE NEW.
- 3 THERMOSTATIC MIXING VALVE TO BE INSTALLED FOR 140°F DOMESTIC HOT WATER.
- 4 ROUTE BOILER DRAIN/RELIEF LINES TO EXISTING FLOOR SINK.
- 5 REPLACE (E) 3" STEAM HEADER AND VALVES WITH NEW.



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MECHANICAL  
ISOMETRIC PLAN  
BOILER ROOM

SHEET  
M2.2

# MECHANICAL SPECIFICATIONS



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INSULATION THICKNESS		CONDUCTIVITY	
PIPING SYSTEM	FLUID TEMPERATURE RANGE, F	RUNOUTS OR LESS	BTUH-INHR-F-SF AT MEAN TEMP F
	UP TO 2" 1" & 1-1/4"	2-1/2" 5" TO LESS TO 2" TO 4" 6"	
HEATING WATER	140-200	2.0 2.0 2.0 2.0	0.23 @ 75°

- C. INSULATION ON FITTINGS, VALVES AND FLANGES
- FITTINGS, VALVES AND FLANGES SHALL BE INSULATED WITH SAME MATERIAL AND TO SAME THICKNESS AS ADJOINING PIPE INSULATION, WITH PRESENT SECTIONS. R
  - FOR STRAINERS AND OTHER VALVES OR FITTINGS WHICH NEED MAINTENANCE, PROVIDE PREFORMED REMOVABLE INSULATION SECTION.

## 2.4 PIPE HANGERS AND SUPPORTS

- PROVIDE PIPE STANDS, SUPPORTS, HANGERS AND OTHER SUPPORTING APPLIANCES AS NECESSARY TO SUPPORT WORK MATERIALS BY CONTRACT DOCUMENTS. SPACING OF HANGERS SHALL BE INSTRUCTED IN ACCORDANCE WITH APPLICABLE BUILDING AND MECHANICAL CODES.
- PROVIDE PREFABRICATED RAIL TYPE ROOF CURBS FOR ROOF MOUNTED PIPING, U-BOLT PIPES TO CURB, SPACING SHALL BE IN ACCORDANCE WITH APPLICABLE BUILDING AND MECHANICAL CODES.

## 2.5 SLEEVES AND PENETRATIONS

### A. PIPE SLEEVES

- SLEEVES THROUGH FLOORS AND THROUGH EXTERIOR, STRUCTURAL AND FIRE-RATED CONSTRUCTION SHALL BE HOT-DIPPED GALVANIZED SCHEDULE 40 STEEL PIPE.
- SLEEVES THROUGH PARTITIONS AND NON-FIRE-RATED CONSTRUCTION SHALL BE 26 GAUGE GALVANIZED STEEL WITH LOCK LONGITUDINAL SEAMS, OR APPROVED PLASTIC PIPE.
- PROVIDE WATERPROOFING MEMBRANCE LOCKING DEVICES AT FLOORS. PROVIDE 150 LB. SLIP-ON WELDING FLANGES AT EXTERIOR WALL PENETRATIONS.

### B. DUCT SLEEVES AND OPENINGS.

- SLEEVES THROUGH FLOORS, THROUGH EXTERIOR STRUCTURE, THROUGH FIRE-RATED CONSTRUCTION AND THROUGH SMOKE PARTITIONS THAT REQUIRE SMOKE DAMPERS SHALL BE SCHEDULE 40 GALVANIZED STEEL PIPE FOR ROUND DUCT AND SHALL MEET SMACNA FIRE DAMPER AND HEAT STOP GUIDE FOR RECTANGULAR AND FLAT OVAL DUCTS. FIREPROOF PACKING SHALL BE APPLIED TO SEAL ANY OPENINGS BETWEEN SLEEVE AND WALL.
- OPENINGS IN WALLS, PARTITIONS AND OTHER FIRE-RATED CONSTRUCTION THAT DO NOT REQUIRE SMOKE DAMPERS SHALL MEET NFPA 90A, SECTION 3-3.8.

### C. PIPE SLEEVE PACKING.

- PACKING BETWEEN THE PIPE AND THE SLEEVE (OR WALL OR SLAB OPENING) IN FIRE RATED WALLS OR SLABS SHALL BE A COMBINATION OF FIREPROOF INSULATION AND FIREPROOF CAULK. THE COMBINATION OF MATERIALS SHALL HAVE THE SAME FIRE RATING IN HOURS, AS THE WALL OR SLAB AS TESTED IN ACCORDANCE WITH THE LATEST EDITION OF ASTM E-814 (UL 1479). THE COMBINATION OF MATERIALS SHALL BE CLASSIFIED BY U.L. (FILL, VOID, OR CAVITY MATERIALS) FOR THE FIRE RATING REQUIRED AND SHALL BE LISTED AS A NUMBERED SYSTEM IN THE U.L. FIRE RESISTANCE DIRECTORY. FIBROUS GLASS SHALL NOT BE USED AS THE INSULATION MATERIAL.
- ACCEPTABLE FIREPROOF INSULATION MATERIALS SHALL BE: KAOLIN (KAOWOOL BY BABCOCK AND WILCOX), CERAMIC FIBER BLANKET (FIBERFRAX BY STANDARD OIL) OR FIRE RATED MINERAL WOOL (OTHER FIBER BY USG). ACCEPTABLE FIREPROOF CAULK SHALL BE: SILICONE FIRESTOP 2000 BY DOW CORNING, OR INTUMESCENT SYNTHETIC ELASTOMER (FIRE BARRIER CAULK BY 3M, HILTI CS2420).

- ## 2.6 ESCUTCHEONS AND DUCT COLLARS
- PROVIDE ADJUSTABLE ESCUTCHEONS ON EXPOSED PIPING THAT PASSES THROUGH FINISHED FLOORS, WALLS AND CEILINGS. ESCUTCHEONS SHALL BE CHROMIUM-PLATED CAST BRASS, SIZED TO COVER SLEEVE OPENING AND TO ACCOMMODATE PIPE AND INSULATION.
  - PROVIDE 4" WIDE 20 GAUGE GALVANIZED SHEET METAL COLLARS AT SLEEVES AND PREPARED OPENINGS, SIZED TO COVER ENTIRE DUCT PENETRATION INCLUDING SLEEVE AND SEAL, AND TO ACCOMMODATE DUCT AND INSULATION AS NECESSARY. EDGES SHALL HAVE MILLED LIPS GROUND SMOOTH. PAINT TO MATCH FINISH OF DUCT OR AS DIRECTED BY ARCHITECT.

## 2.7 WATER SPECIALTIES

- PROVIDE WATER SPECIALTIES BY BEEL & GOSSETT, TACO OR AMTROL AS INDICATED ON THE DRAWINGS.
- EXPANSION TANKS SHALL BE ASME CONSTRUCTED, APPROVED STAMPED DIAPHRAM TYPE RATED FOR 125 PSIG WORKING PRESSURE.

## 2.8 EQUIPMENT INSULATIONS. R

### A. GENERAL

- INSULATION SHALL BE CERTAIN-TEED, KNAUF, MANVILLE OR OWENS CORNING AND SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- INSULATE THE FOLLOWING EQUIPMENT:
  - PIPING AND VALVES
  - EXPANSION TANKS
  - AIR SEPARATORS
  - PUMPS
- INSULATION SHALL BE 1" THICK FIBROUS GLASS RIGID BLOCK OR SEMIRIGID BOARD RATED FOR TEMPERATURE INTERFIBER BY USG. INSULATION SHALL BE FORMED OR FABRICATED TO FIT EQUIPMENT. BEVEL EDGES AND BUTT AND STAGGER JOINTS.

END

## 2.5.3. PIPE IDENTIFICATION

- PIPING IDENTIFICATION PER ANSI AND OSHA STANDARDS: EACH INDIVIDUAL PIPELINE SHALL BE MARKED FOR QUICK AND EASY IDENTIFICATION AS TO CONTENT AND CHARACTER OF MATERIAL CARRIED IN THE PIPES BY SET ON SNA OR STR MARKER.
- MARKERS SHALL BE INSTALLED AND SPACED AT NOT MORE THAN 8 FT. INTERVALS AND SO LOCATED THAT MARKERS SHALL BE VISIBLE WHERE PIPING SYSTEM IS EXPOSED.
- COLOR SCHEME SHALL BE APPROVED. BASE COLOR FOR MARKERS SHALL BE AS FOLLOWS:
 

DOMESTIC HOT WATER	----	YELLOW
DOMESTIC COLD WATER	----	GREEN
FUEL GAS	----	YELLOW
SANITARY SEWER	----	GREEN
SANITARY VENT	----	GREEN
STORM DRAINS	----	GREEN
COMPRESSED AIR	----	BLUE

- ONE MARKER SHALL BE INSTALLED AT EACH SIDE OF VALVES, SPECIAL FITTINGS AND AT BRANCH TAKE-OFF. IN FURRED SPACES INSTALL ONE BAND 2 FT. ABOVE FLOOR AND 19 IN. BELOW CEILING LINE.
- FURNISH TWO IDENTIFICATION CHARTS COMPLETE WITH GLASS AND FRAME SHOWING LIST OF MATERIALS CARRIED IN THE PIPING SYSTEM, CLASSIFIED BY NATURE OF ITS CONTENTS AND RESPECTIVE IDENTIFYING COLORS.
- MATERIALS: MATERIALS WHEN NOT OTHERWISE DEFINITELY SPECIFIED SHALL CONFORM TO THE APPLICABLE ASTM, ASME, AGA, AND ASA STANDARDS.

- ### 3. DEFINITIONS
- PROVIDE MEANS "FURNISH AND INSTALL"
  - "FURNISH" MEANS "TO PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH NECESSARY APPURTENANCE AND SUPPORT."
  - "INSTALL" MEANS "TO UNLOAD AT THE SITE DELIVERY POINT AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT."
  - "ENGINEER" MEANS "PRIME DESIGN CONSULTANT."
  - PERFORM WORK, PROVIDE MATERIALS AND EQUIPMENT FOR SYSTEMS SHOWN, SPECIFIED AND DESCRIBED ON DRAWINGS. COMPLETELY COORDINATE WORK WITH WORK OF OTHER CONTRACTORS AND PROVIDE COMPLETE AND FULLY FUNCTIONAL INSTALLATION. REMOVE ALL DEBRIS CAUSED BY THIS CONTRACTOR'S WORK.

- ADDRESS QUESTIONS REGARDING DRAWINGS TO ARCHITECT IN WRITING BEFORE AWARD OF CONTRACT. OTHERWISE, ARCHITECT'S INTERPRETATION OF MEANING AND INTENT OF DRAWINGS SHALL BE FINAL.
- CONTRACTOR TO GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND BACK CHARGES AND OBTAIN NECESSARY APPROVALS FROM AUTHORITIES THAT HAVE JURISDICTION.
- GUARANTEE WORK OF THIS CONTRACTOR IN WRITING FOR ONE YEAR FROM THE DATE OF OWNER'S ACCEPTANCE OF CERTIFICATE OF SUBSTANTIAL COMPLETION. PROMPTLY, REPAIR OR REPLACE DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATIONS THAT DEVELOP DEFECTS WITHIN THIS PERIOD. PROMPTLY AND TO OWNERS SATISFACTION, CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE AT NO ADDITIONAL COST TO OWNER. SUBMIT GUARANTEE TO ARCHITECT BEFORE FINAL PAYMENT. STATEMENT OF GUARANTEE REQUIREMENTS SHALL NOT BE INTERPRETED TO LIMIT OWNER'S RIGHTS UNDER LAW AND THIS CONTRACT.

- ALL MATERIALS, EQUIPMENT, AND METHOD OF INSTALLATION SHALL BE IN ACCORDANCE WITH THE STANDARDS, REGULATIONS, CODES, ORDINANCES, AND LAWS OF LOCAL, STATE, AND FEDERAL GOVERNMENTS, AND OTHER AUTHORITIES THAT HAVE LAWFUL JURISDICTION.
- PRIOR TO COMMENCING WORK, CONTRACTOR SHALL SUBMIT THREE COPIES OF THE SHOP DRAWINGS AND EQUIPMENT DATA FOR MATERIALS AND EQUIPMENT TO THE ARCHITECT FOR REVIEW AND APPROVAL. MATERIALS AND EQUIPMENT SHALL NOT BE INSTALLED BEFORE SHOP DRAWINGS ARE REVIEWED AND APPROVED. SCHEDULE AT LEAST FIVE WORKING DAYS, EXCLUSIVE OF TRANSMITTAL TIME, FOR SUBMITTAL REVIEW.

- DEVIATION FROM CONTRACT DOCUMENTS, OR PROPOSED SUBSTITUTION OF MATERIALS OR EQUIPMENT FOR THOSE SPECIFIED, SHALL BE REQUESTED IN SEPARATE LETTER, WHETHER DEVIATIONS ARE DUE TO FIELD CONDITIONS, STANDARD SHOP PRACTICE OR OTHER CAUSE.
- GENERAL NOTES, SYMBOLS LIST AND DETAILS ARE APPLICABLE TO ALL DRAWINGS OF THIS SECTION.
- WORK SHALL BE EXECUTED IN A WORKMANLIKE MANNER AND SHALL PRESENT NEAT, RECTILINEAR APPEARANCE WHEN COMPLETED. MAINTAIN MAXIMUM HEADROOM AT ALL TIMES. DO NOT RUN PIPES AND DUCTS EXPOSED UNLESS SHOWN AND NOTED TO BE EXPOSED ON DRAWINGS. MATERIALS AND EQUIPMENT SHALL BE NEW AND INSTALLED ACCORDING TO MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS, SO THAT COMPLETED INSTALLATION SHALL OPERATE SAFELY AND EFFICIENTLY.

- AS WORK PROGRESSES AND FOR DURATION OF CONTRACT, MAINTAIN A COMPLETE SET OF PRINTS AND CONTRACT DRAWINGS AT JOB SITE AT ALL TIMES. RECORD WORK COMPLETED AND ALL CHANGES FROM ORIGINAL CONTRACT DRAWINGS CLEARLY AND ACCURATELY INCLUDING WORK INSTALLED AS A MODIFICATION OR ADDITION TO THE ORIGINAL DESIGN.
- INTERRUPTIONS TO EXISTING SERVICES AND SYSTEMS SHALL BE AS SHORT AS POSSIBLE AND AT A TIME AND DURATION APPROVED BY THE ARCHITECT OR OWNER. INCLUDE ALL PREMIUM TIME ASSOCIATED WITH INTERRUPTIONS.

- ### PART 2 - PRODUCTS
- #### 2.1 PIPING AND FITTINGS
- ##### A. GENERAL
- PIPE MATERIALS AND FITTING MATERIALS SHALL BE AS INDICATED IN SCHEDULE OF PIPE AND FITTING MATERIALS, PROVIDE DIELECTRIC FITTING TO CONNECT DIFFERENT PIPING MATERIALS.
  - SPECIAL REQUIREMENTS FOR HYDRONIC SYSTEMS.
    - PROVIDE AIR VENT AT EACH HIGH POINT AND DRAIN VALVE AT EACH LOW POINT FOR COMPLETE SYSTEM DRAINAGE AND FOR MANUAL VENTING OF AIR FROM SYSTEM.
    - PROVIDE A SHUTOFF/ISOLATION VALVE AT THE SUPPLY AND RETURN TO EACH PIECE OF EQUIPMENT AND AS INDICATED ON DRAWINGS.
    - EQUIPMENT COOLING COIL CONDENSATE DRAINS SHALL BE TRAPPED AT EQUIPMENT CONNECTION. DRAIN LINES SHALL RUN FULL SIZE OF DRAIN TAPPING TO NEAREST FLOOR DRAIN OR AS SHOWN ON DRAWINGS. INSTALL WITH A PITCH OF 1" IN 20 FEET.

- ##### C. SCHEDULE OF PIPE AND FITTING MATERIALS:
- | SERVICE PSI       | PIPE MATERIAL WEIGHT | JOINTS OF TYPE | FITTING MATERIAL | PRESSURE RATING SWP. OR WEIGHT |
|-------------------|----------------------|----------------|------------------|--------------------------------|
| HEATING WATER     | STEEL                | SCREWED        |                  | 150                            |
| 2" AND SMALLER    | SCHEDULE 40          | IRON           | MALLEABLE        |                                |
| HEATING WATER     | STEEL                | WELDED         | STEEL            | SCHEDULE 40                    |
| 2-1/2" AND LARGER | SCHEDULE 40          |                |                  |                                |

- ##### D. CONNECTIONS
- PROVIDE ECCENTRIC REDUCING COUPLINGS TO ALIGN HYDRONIC PIPES FLUSH ON TOP.
  - BRANCH LINES IN WELDED PIPING SHALL BE MADE WITH WELDING TEES EXCEPT THAT BRANCH LINES LESS THAN ONE-HALF DIAMETER OF MAIN MAY BE MADE WITH WELD-O-LETS.

## 1. GENERAL CONDITIONS

- FURNISH AND INSTALL MATERIALS AND PERFORM ALL LABOR NECESSARY FOR THE WORK SHOWN OR SPECIFIED, INCLUDING ALL CONNECTIONS TO EXISTING SYSTEMS, RESULTING IN A COMPLETE AND OPERATING INSTALLATION, IN ACCORDANCE WITH MCI'S REQUIREMENTS.
- DRAWINGS ARE DIAGRAMATIC AND ARE NOT INTENDED TO INDICATE EVERY OFFSET, FITTING AND COMPONENT. BASED ON THE SYSTEM CONCEPT, THE CONTRACTOR SHALL PROVIDE ALL COMPONENTS AND MATERIALS NECESSARY FOR A FULLY COMPLETE AND OPERATIONAL SYSTEM TO SATISFY THE DESIGN INTENT.

- BEFORE SUBMITTING BID, VISIT AND EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS AND CONDITIONS THAT WILL ADVERSELY AFFECT THE WORK. NO ADDITIONAL PAYMENT WILL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY OF SITE CONDITIONS THAT ARE VISIBLE OR READILY DETERMINABLE BY AN EXPERIENCED OBSERVER. NOTIFY CLIENT PRIOR TO SCHEDULE VISIT.
- INTERRUPTIONS TO EXISTING SERVICES AND SYSTEMS SHALL BE AS SHORT AS POSSIBLE. INTERRUPTIONS SHALL BE SCHEDULED AT A TIME AND FOR A DURATION ACCEPTABLE TO THE OWNER/TENANT.

- TEST AND BALANCING: ADJUST DAMPERS, AIR OUTLETS, FANS AND PUMPS TO FLOW QUANTITIES INDICATED ON THE DRAWINGS. TEST AND BALANCE REPORT SHALL INCLUDE REGISTER SIZE AND MANUFACTURER, DESIGN CFM AND FINAL CFM. ENGINEER SHALL HAVE SELECTED DIFFUSERS DEMONSTRATED AFTER COMPLETION OF THE WORK.
- CODES: ENTIRE INSTALLATION SHALL COMPLY WITH ALL GOVERNING CODE AND LOCAL AUTHORITY HAVING JURISDICTION REQUIREMENTS AND SHALL BE COMPATIBLE WITH THE BASE BUILDING SYSTEMS.

- SUBMITTAL/SHOP DRAWINGS: CONTRACTOR SHALL SUBMIT A COMPLETE SUBMITTAL FOR THE FOLLOWING EQUIPMENT/DEVICES TO THE MEOR, FOR REVIEW & APPROVAL:
  - GRILLES, REGISTERS AND DIFFUSERS EQUIPMENT
  - SHEET METAL SHOP DRAWING
  - TEST AND BALANCE REPORT

## 2. BASIC MATERIAL AND METHODS

### 2.1 PIPE AND FITTINGS:

- HEATING HOT WATER: BLACK STEEL SEAMLESS PIPE, WITH SCREWED OR FLANGED OR BUTT-WELDED JOINTS. MAXIMUM 0.375-IN. WALL THICKNESS, CONFORMING TO ASTM A53, SCHEDULE 40.
- PIPE SPECIALTIES:
  - SHUT-OFF VALVES: FOR 2" PIPE AND SMALLER SHALL BE 2-PIECE BRONZE BODY BALL VALVE WITH BRONZE TRIM. FULL PORT DESIGN, CHROME PLATED BRONZE, BLOWOUT-PROOF STEM WITH EXTENSION FOR INSULATED SERVICE. SHUT-OFF VALVES FOR 2-1/2" PIPE AND LARGER SHALL BE LOG STYLE BUTTERFLY VALVES. PROVIDE VALVES WITH MEMORY STOP WHEN USED FOR BALANCING SERVICE. DUCTILE IRON WITH EPDM TRIM, 150 PSIG, ASTM.

- CHECK VALVES:
 

HEATING WATER SERVICE						
MAXIMUM 300°F AND 150 PSIG (1/2" - 12")/125 PSIG (14"-24")						
SPECIALTY	APPLICATION	TYPE	SIZE	BODY/SEAT BODY/TRIM	CONNECTION	MINIMUM RATING
CHECK VALVE	PUMPS	SILENT	1/2"-2"	BRONZE/BRONZE	THREADED	200 PSIG WOG
		SILENT GLOBE	2 1/2"-24"	IRON/BRONZE	FLANGED	CLASS 125
	PIPING	Y-PATTERN SWING	1/2"-2"	BRONZE/BRONZE	THREADED	200 PSIG WOG
			2 1/2"-24"	IRON/BRONZE	FLANGED	CLASS 125

- STRAINERS:
 

HEATING WATER SERVICE						
MAXIMUM 300°F AND 150 PSIG (1/2" - 12")/125 PSIG (14"-24")						
SPECIALTY	APPLICATION	TYPE	SIZE	BODY/SEAT BODY/TRIM	CONNECTION	MINIMUM RATING
STRAINER	CONTROL VALVES AIR FLOW METERS	Y-TYPE	1/2"-2"	BRONZE/STAINLESS (1/4" DIA.)	THREADED	200 PSIG WOG
			2 1/2"-4"	IRON/STAINLESS (1/4" DIA.)	FLANGED	CLASS 125
	PUMP SUCTION	IN-LINE Y-TYPE	1/2"-2"	BRONZE/STAINLESS (1/4" DIA.)	THREADED	200 PSIG WOG
			2 1/2"-4"	IRON/STAINLESS (1/4" DIA.)	FLANGED	CLASS 125
	ANGLE SUCTION DIFFUSER END SUCTION PUMPS		2"-12"	IRON/STAINLESS (3/4" DIA.) STARTUP STRAINER-16 MESH BRONZE	FLANGED	CLASS 125

- INSULATION:
  - WATER PIPE: ONE OR TWO PIECE FIBERGLASS PIPE INSULATION WITH ALL PURPOSE SERVICE JACKET, WITH OR WITHOUT SELF SEALING LAP. JACKET-LAMINATED ALUMINUM FOIL AND GLASS REINFORCED VINYL COATED KRAFT PAPER. 1" THICK. COLD PIPING SHALL BE INSTALLED USING VAPOR PROOF METHODS.

- HANGERS:
  - SUPPORT HANGERS FROM SIDES OF BEAMS OR JOISTS USING POWERED ACTUATED FASTENERS OR CONCRETE ANCHORS.
 

COPPER PIPE - GRINNEL CT-65 OR APPROVED EQUAL STEEL OR CAST IRON PIPE - GRINNEL CT-65 OR EQUAL.
  - SUPPORT SPACING:
 

COPPER PIPE:  
UP TO 1" 6 FT - 3/8" ROD  
1-1/4" AND 1-1/2" 8 FT - 3/8" ROD

STEEL OR CAST IRON PIPE:  
UP TO 2" 8 FT - 3/8" ROD  
2-1/2" AND OVER 10 FT - 1/2" ROD

- TAGS:
  - UPON COMPLETION OF WORK, ATTACH ENGRAVED LAMINATED TAGS TO ALL VALVES. VALVE TAGS SHALL HAVE BLACK CHARACTERS ON WHITE FACES CONSECUTIVELY NUMBERED AND PREFIXED BY LETTER "V". EQUIPMENT TAGS SHALL HAVE BLACK CHARACTERS ON WHITE FACE, WITH LABELS CORRESPONDING TO DRAWING SCHEDULE NUMBERS.

- PROVIDE FLOW ARROWS FOR ALL PIPING.

ROWLAND UNIFIED SCHOOL DISTRICT  
RUTH RICHARD FOOD CENTER  
4032 S. ELLESFORD AVENUE  
WEST COVINA, CALIFORNIA 91792

STEAM SYSTEM BOILER  
REPLACEMENT PROJECT

DATE	REMARKS
04/04/17	50% PROGRESS SET
06/05/17	80% PROGRESS SET
03/20/18	BID SET
03/28/18	REVISED BID SET
05/15/18	REVISED BID SET

MECHANICAL SPECIFICATIONS

SHEET  
M3.0



STATE OF CALIFORNIA  
**Indoor Lighting**  
 NRCC-LTI-E (Created 3/18)  
 CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE  
 Project Name: STEAM SYSTEM BOILER REPLACEMENT PROJECT  
 Project Address: 4032 S. ELLESFORD AVENUE  
 Report Page: Page 1 of 6  
 Date Prepared: 4-27-2018

**A. GENERAL INFORMATION**

01 Project Location (city): WEST COVINA  
 02 Climate Zone: 9  
 03 Occupancy Types Within Project (select all that apply):  
 Office  Retail  Warehouse  Hotel/Motel  School  Support Areas  
 Parking Garage  High-Rise Residential  Relocatable  Other (write in):

**B. PROJECT SCOPE**

Table Instructions: Include any lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.6 or §141.0(b)(2) for alterations. WARNING: Changing the Calculation Method in this table will result in the deletion of data previously input. If you need to change the calculation method, please open a new form or use "Save As".

Scope of Work	Conditioned Spaces	Unconditioned Spaces
01	02	03
My Project Consists of (check all that apply):	Calculation Method	Area (ft <sup>2</sup> )
<input type="checkbox"/> New Lighting System		
<input checked="" type="checkbox"/> Altered Lighting System	Entire Luminaire Alteration	Area Category: 210
Total Area of Work (ft <sup>2</sup> )		210

**C. COMPLIANCE RESULTS**

Table Instructions: If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Lighting in conditioned and unconditioned spaces must not be combined for compliance per §140.6(b)(1).	Allowed Lighting Power per §140.6(b) (Watts)				Total Allowed (Watts)	Actual Lighting Power per §140.6(a) (Watts)				Compliance Results
	01	02	03	04		06	07	08	09	
Conditioned:	Complete Building §140.6(c)1	Area Category §140.6(c)2	Area Category Footnotes §140.6(c)2G (+)	Tailored §140.6(c)3 (+)	= 115.5	Total Designed (Watts)	Portable §140.6(a) (-)	PAF Control Credits §140.6(a)2 (-)	= 98	COMPLIES
	(See Table I)	(See Table I)	(See Table K)	(See Table L)		(See Table F)	(See Table J)	(See Table R)		
Unconditioned:	115.5									COMPLIES
Controls Compliance (See Table H for Details)										COMPLIES
Rated Power Reduction Compliance (See Table S for Details)										Not Applicable

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**D. EXCEPTIONAL CONDITIONS**

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.  
 No exceptional conditions apply to this project.  
 Selections made in Table I have been changed by the permit applicant. See Table E. Additional Remarks for permit applicant's explanation.

**E. ADDITIONAL REMARKS**

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

**F. INDOOR LIGHTING FIXTURE SCHEDULE**

Table Instructions: Include all permanent designed lighting and all portable lighting in offices.

Designed Wattage: Conditioned Spaces  
 Designated Wattage: Unconditioned Spaces

Name or Item Tag	02 Complete Luminaire Description	03 Specialized Luminaire Types Track Portable	04 Watts per luminaire <sup>1</sup>	05 How Wattage is determined Mfr. Spec <sup>1</sup>	06 Total number luminaires	07 Exempt per §140.6(a)3	08 Design Watts	09 Field Inspector Pass Fail
U3	VAPOR TIGHT LED	<input type="checkbox"/>	49		2		98	<input type="checkbox"/>
Total Designed Watts UNCONDITIONED SPACES:							98	

\*NOTES: Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per §130.0(c). Wattage used must be the maximum rated for the luminaire, not the lamp.

**G. TRACK LIGHTING**

This Section Does Not Apply

**H. INDOOR LIGHTING CONTROLS (Not Including PAFs)**

Table Instructions: Please include lighting controls for conditioned and unconditioned spaces in this table. When an option having a \* is selected, the notes section of this table must be completed. The lighting controls section of the Compliance Summary Table on the first page will show "DOES NOT COMPLY" if the notes are left blank.

Area Level Controls	Building Level Controls		
	01	02	03
Mandatory Demand Response §130.1(e)	Shut-off Controls §130.1(c)	Field Inspector Pass Fail	
Not Required ≤ 10,000 SF	See Area Level Controls	<input type="checkbox"/>	

Area Level Controls Table Continued

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04	05	06	07	08	09	10	11	12
Area Description	Complete Building or Area Category Primary Function Area	Area Controls §130.1(a)	Multi-Level Controls §130.1(b)	Shut-Off Controls §130.1(c)	Primary/Skylight Daylighting §130.1(d)	Secondary Daylighting §140.6(d)	Interlocked Systems §140.6(a)1	Field Inspector Pass Fail
BOILER ROOM	Elec, Mech, Telephone	Manual ON/OFF	Bi-level Switch	Occ Sensor	N/A	N/A		
*NOTES: Controls with a * require a note in the space below explaining how compliance is achieved. EX: Conference 1: Primary/Skylight Daylighting: Exempt because less than 120 watts of general lighting; EXCEPTION 1 to §130.1(d)2							13 Plan Sheet Showing Daylit Zones:	

**I. LIGHTING POWER ALLOWANCE: COMPLETE BUILDING OR AREA CATEGORY METHODS**

Table Instructions: Complete the table for each area complying using the Complete Building or Area Category Methods per §140.6(b). Indicate if additional lighting power allowances per §140.6(c) or adjustments per §140.5(a) are being used.

Unconditioned Spaces

01	02	03	04	05	06
Area Description	Complete Building or Area Category Primary Function Area	Allowed Density (W/ft <sup>2</sup> )	Area (ft <sup>2</sup> )	Allowed Wattage (Watts)	Additional Allowances / Adjustments Footnotes PAF Portable Ltg
BOILER ROOM	Elec, Mech, Telephone	0.55	210	115.5	
TOTAL:			210	115.5	See Tables J, K, R for detail

**J. POWER ADJUSTMENT: PORTABLE LIGHTING IN OFFICES**

This Section Does Not Apply

**K. ADDITIONAL LIGHTING ALLOWANCE: AREA CATEGORY METHOD FOOTNOTES**

This Section Does Not Apply

**L. TAILORED METHOD GENERAL LIGHTING POWER ALLOWANCE**

This Section Does Not Apply

**M. ADDITIONAL LIGHTING ALLOWANCE: TAILORED SPECIAL FUNCTION AREAS**

This Section Does Not Apply

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**N. ADDITIONAL LIGHTING ALLOWANCE: TAILORED WALL DISPLAY**

This Section Does Not Apply

**O. ADDITIONAL LIGHTING ALLOWANCE: TAILORED FLOOR AND TASK LIGHTING**

This Section Does Not Apply

**P. ADDITIONAL LIGHTING ALLOWANCE: TAILORED ORNAMENTAL/SPECIAL EFFECTS**

This Section Does Not Apply

**Q. ADDITIONAL LIGHTING ALLOWANCE: TAILORED VERY VALUABLE MERCHANDISE**

This Section Does Not Apply

**R. POWER ADJUSTMENT: LIGHTING CONTROL CREDIT (PAF)**

This Section Does Not Apply

**S. RATED POWER REDUCTION COMPLIANCE BY SPACE**

This Section Does Not Apply

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**T. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION**

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at <http://www.energy.ca.gov/2015publications/CEC-400-2015-033/appendices/forms/NRCI>

YES	NO	Form/Title	Field Inspector	
			Pass	Fail
<input checked="" type="radio"/>	<input type="radio"/>	NRCI-LTI-01-E - Must be submitted for all buildings	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="radio"/>	<input type="radio"/>	NRCI-LTI-02-E - Must be submitted for a lighting control system, or for an Energy Management Control System (EMCS), to be recognized for compliance.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input checked="" type="radio"/>	NRCI-LTI-03-E - Must be submitted for a line-voltage track lighting integral current limiter, or for a supplementary overcurrent protection panel used to energize only line-voltage track lighting, to be recognized for compliance.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input checked="" type="radio"/>	NRCI-LTI-04-E - Must be submitted for two interlocked systems serving an auditorium, a convention center, a conference room, a multipurpose room, or a theater to be recognized for compliance.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input checked="" type="radio"/>	NRCI-LTI-05-E - Must be submitted for a Power Adjustment Factor (PAF) to be recognized for compliance.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input checked="" type="radio"/>	NRCI-LTI-06-E - Must be submitted for additional wattage installed in a video conferencing studio to be recognized for compliance.	<input type="checkbox"/>	<input type="checkbox"/>

**U. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE**

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and must be completed through a Certification Provider (ATTCP). For more information visit: <http://www.energy.ca.gov/title24/attcp/providers.html>

YES	NO	Form/Title	Field Inspector	
			Pass	Fail
<input checked="" type="radio"/>	<input type="radio"/>	NRCA-LTI-02-A - Must be submitted for occupancy sensors and automatic time switch controls.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input checked="" type="radio"/>	NRCA-LTI-03-A - Must be submitted for automatic daylight controls.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input checked="" type="radio"/>	NRCA-LTI-04-A - Must be submitted for demand responsive lighting controls.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="radio"/>	<input checked="" type="radio"/>	NRCA-LTI-05-A - Must be submitted for institutional tuning power adjustment factor (PAF).	<input type="checkbox"/>	<input type="checkbox"/>

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**DOCUMENTATION AUTHOR'S DECLARATION STATEMENT**

Documentation Author Name: GARY M STEPHENS  
 Company: Q3 INC.  
 Address: 17162 GOTHARD STREET  
 City/State/Zip: HUNTINGTON BEACH, CA 92647

Documentation Author Signature: Gary M Stephens  
 Signature Date: 4-27-2018  
 CEA/HERS Certification Identification (if applicable):  
 Phone: 714-234-9319

**RESPONSIBLE PERSON'S DECLARATION STATEMENT**

I certify the following under penalty of perjury, under the laws of the State of California:

- The information provided on this Certificate of Compliance is true and correct.
- I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
- The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
- The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
- I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: GARY M STEPHENS  
 Company: Q3 INC.  
 Address: 17162 GOTHARD STREET  
 City/State/Zip: HUNTINGTON BEACH, CA 92647

Responsible Designer Signature: Gary M Stephens  
 Date Signed: 4-27-2018  
 License: E11445  
 Phone: 714-234-9319

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance: <http://www.energy.ca.gov/title24/2016standards> March 2018

**STEAM SYSTEM BOILER REPLACEMENT PROJECT**  
 ROWLAND UNIFIED SCHOOL DISTRICT  
 RUTH RICHARD FOOD CENTER  
 4032 S. ELLESFORD AVENUE  
 WEST COVINA, CALIFORNIA 91792

No.	Revision/Issue	Date
	BID SET	3/22/18
	REVISED BID SET	3/28/18
	REVISED BID SET	4/30/18
	PLAN CHECK SUBMITTAL	5/1/18



**ELECTRICAL TITLE 24 COMPLIANCE FORMS**

Project: ----- Sheet: -----  
 Date: 3/22/2018  
 Title: AS NOTED  
**E-0.1**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. DRAWINGS ARE DIAGRAMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. FOLLOW DRAWINGS INCLUDING OUT WORK AND CHECK DRAWINGS OF OTHER TRADES TO VERIFY SPACE CONDITIONS, MAINTAIN HEADROOM AND SPACE CONDITIONS.
B. DEFINITIONS
1. FURNISH TO SUPPLY MATERIALS OR DOCUMENTATION.
2. INSTALL TO ERECT, MOUNT, AND CONNECT COMPLETE SYSTEM WITH RELATED ACCESSORIES.
3. PROVIDE TO FURNISH INSTALL AND CONNECT A COMPLETE SYSTEM READY FOR SAFE AND REGULAR OPERATION OF PARTICULAR WORK REFERENCED.
4. SUPPLY TO PURCHASE, PROCURE, ACQUIRE, AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
5. WORK LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES, AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
6. WIRING, RACEWAY, FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
7. CONCEALED EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAV, SPACES, OR IN ENCLOSURES.
8. EXPOSED: NOT INSTALLED UNDERGROUND OR CONCEALED AS DEFINED ABOVE.
9. EQUAL: EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN, AND EFFICIENCY OF SPECIFIED PRODUCT.
10. SCOPE OF WORK: LABOR, MATERIALS, EQUIPMENT, SERVICES, AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
C. THE CONTRACTOR SHALL SECURE ALL APPROVALS AND PAY ALL FEES FOR ALL WORK INSTALLED. CERTIFICATES SHALL BE DELIVERED TO THE OWNER BEFORE FINAL PAYMENT WILL BE MADE.

1.02 JOB CONDITIONS

- A. QUALITY AND GAUGES OF MATERIALS
1. QUALITY OF MATERIALS
a. NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR BEARING EQUALS.
b. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SAME MANUFACTURER, EXCEPT AS NOTED.
B. VOLTAGE CHARACTERISTICS: DISTRIBUTION
a. 480 VOLTS, 60 HERTZ
b. 480/277 VOLTS, 60 HERTZ WITH GROUNDED NEUTRAL
c. 208Y/120 VOLTS, 60 HERTZ WITH GROUNDED NEUTRAL
C. HEIGHT OF OUTLETS
1. RECEPTACLE, TELEPHONE, AND DATA:
a. GENERALLY: 18 IN.
b. WALL SWITCHES: 42 IN.
c. MOTOR CONTROLLERS: 60 IN.
EXCEPTIONS:
a. AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS.
b. ON MOLDING OR BREAK IN WALL SURFACE.
c. IN VIOLATION OF CODE.
d. AS NOTED OR DIRECTED.

- D. CONNECTIONS TO EXISTING WORK
1. INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES.
2. TEMPORARY SHUTDOWNS OF EXISTING SERVICES:
a. AT NO ADDITIONAL CHARGES.
b. TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES.
c. ONLY WITH WRITTEN CONSENT OF OWNER.
3. ALARM AND EMERGENCY SYSTEMS: NOT TO BE INTERRUPTED.
4. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK.
5. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER, RESTORE EXISTING DISTURBED WORK TO ORIGINAL WORKING CONDITION INCLUDING MAINTENANCE OF WORKING CONTINUITY AS REQUIRED.

- E. DEMOLITION
1. REMOVE ALL UNUSED CONDUIT AND WIRING, SWITCHES, RECEPTACLES, LIGHT FIXTURES, ETC., WHERE CEILINGS, CEILING TILES, OR WALLS ARE DEMOLISHED EXCEPT WHERE WALLS AND CEILINGS ARE TO REMAIN, MAINTAIN EXISTING CONDUIT, WIRING, AND BOXES SERVING ALL ELECTRICAL EQUIPMENT, OUTLETS, AND SWITCHES IN THOSE AREAS. REMOVE ALL POWER WIRING BACK TO ITS OVERCURRENT DEVICE AND MARK CIRCUIT BREAKERS AS SPARE. INSTALL BLANK COVERS ON ALL BOXES. VERIFY OTHER SPECIFIC OPERABLE SYSTEMS ARE NOT REMOVED. REFER TO DRAWINGS FOR ADDITIONAL REQUIREMENTS.
2. COORDINATE ALL DEMOLITION WORK WITH NEW REQUIREMENTS TO ASSURE THAT EXISTING EQUIPMENT, WIRING, ETC., THAT IS REQUIRED FOR COMPLETE AND FUNCTIONAL SYSTEM IS NOT DEMOLISHED.
3. ALL EXISTING ELECTRICAL EQUIPMENT AND CONDUITS THAT INTERFERE WITH ANY NEW CONSTRUCTION SHALL BE RELOCATED OR RE-ROUTED AS REQUIRED TO CLEAR THE NEW CONSTRUCTION, RECONNECT ALL EXISTING EQUIPMENT THAT IS TO REMAIN AND NOT AFFECTED BY THE NEW CONSTRUCTION, TO THE NEWLY RELOCATED OR RE-ROUTED SYSTEM TO ENSURE A SAFE AND OPERATIONAL SYSTEM.
4. DISCONNECT AND RECONNECT THE EXISTING ELECTRICAL EQUIPMENT AS REQUIRED BY THE CONSTRUCTION MODIFICATIONS.
5. MODIFY AND RECONNECT THE EXISTING ELECTRICAL EQUIPMENT REQUIRED TO REMAIN, AND NOT AFFECTED BY THE NEW CONSTRUCTION, TO ENSURE THE FINAL SYSTEM WILL FUNCTION IN A SAFE MANNER ACCEPTABLE TO AUTHORITIES.
6. ALL REMOVED MATERIAL AND EQUIPMENT THAT IS SALVAGEABLE SHALL REMAIN THE PROPERTY OF THE OWNER. DELIVER SUCH SALVAGED MATERIAL AND EQUIPMENT ON THE PREMISES AS DIRECTED BY THE OWNER, AND NEATLY PILE OR STORE IT AND PROTECT FROM DAMAGE. REMOVE FROM PREMISES AND DISPOSE OF ALL MATERIAL CONSIDERED BY THE OWNER TO BE SCRAP. FURNISH CERTIFICATE OF DESTRUCTION FOR EQUIPMENT SUCH AS BALLASTS, TRANSFORMERS, ETC., CONTAINING PCB OR OTHER MATERIALS CLASSIFIED AS HAZARDOUS.
7. UNLESS OTHERWISE NOTED, REMOVE ALL ELECTRICAL EQUIPMENT THAT IS NOT TO BE REUSED WITHIN THE RENOVATED AREA, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
a. LIGHTING FIXTURES
b. WALL SWITCHES
c. FIRE ALARM DEVICES
d. RECEPTACLES
e. TELEPHONE OUTLETS
f. DATA OUTLETS
g. DISCONNECT SWITCHES
h. FIDS OUTLETS
8. REFER TO ARCHITECTURAL DRAWINGS AND NOTES FOR ADDITIONAL REQUIREMENTS FOR THE DEMOLITION WORK WITHIN THE AREA.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CRATED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
B. ACCESSIBILITY
1. FOR OPERATION, MAINTENANCE, AND REPAIR.
2. MINOR DEVIATIONS PERMISSIBLE.
3. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST: NOT PERMISSIBLE WITHOUT REVIEW.
4. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOOR.

1.04 SUBMITTALS

- A. SUBMIT SHOP DRAWINGS AND PRODUCT DATA IN ACCORDANCE WITH GENERAL REQUIREMENTS SPECIFIED IN ARCHITECTURAL SPECIFICATIONS, OR FURNISH ELECTRONIC PDF COPIES OF SUBMITTAL MATERIAL WITH DESCRIPTIVE DATA FOR ALL PRODUCTS AND MATERIALS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: PRIOR TO INSTALLATION, ALL SUBMITTALS SHALL BE HIGHLIGHTED TO INDICATE SPECIFIC PRODUCTS OR MATERIALS BEING USED.
B. SHOP DRAWINGS:
1. SUBMIT PRIOR TO INSTALLATION.
2. TRANSFORMER.
3. PANELBOARDS: DIMENSIONS, SCHEDULES, AND CATALOG CUTS.
4. WALL SWITCHES.
5. RECEPTACLES.
6. DEVICE PLATES.
7. POKE-THROUGH.

- 8. LIFE SAFETY SYSTEMS:
a. DESCRIPTIVE DATA FOR ALL PRODUCTS AND MATERIALS.
b. RECOMMENDED APPLICATION AND INSTALLATION METHODS, INCLUDING AREA COVERAGE FOR SMOKE DETECTORS.
c. INFORMATION AND DATA, SUCH AS DRAWINGS SHOWING DEVICE LOCATIONS AND TYPES, RISE/DIAGRAMS, WIRING DIAGRAMS, APPROVALS, TEST DATA, ETC., REQUIRED BY LOCAL AUTHORITIES.
d. WIRING SHOP DRAWINGS OF ALL CUSTOM-FABRICATED OR ASSEMBLED PRODUCTS, INCLUDING WIRING DIAGRAMS.
e. DRAWINGS IDENTIFYING ALL TERMINALS AND ILLUSTRATING ALL DEVICE WIRING CONNECTIONS.

1.05 MAINTENANCE MANUALS AND AS-BUILT DRAWINGS

- A. FURNISH FOUR (4) COPIES OF OPERATING AND MAINTENANCE MANUALS FOR OWNER'S USE FOR EACH PIECE OF EQUIPMENT. EACH ITEM SHALL BE CROSS-REFERENCED AND NUMBERED WITH AS-BUILT DRAWING DESCRIPTIONS.
B. AS-BUILT DRAWINGS: ONE (1) SET OF PRINTS TO OWNER, TWO (2) BOUND SETS OF RED-LINED PANEL SCHEDULES SHOWING WORK AS ACTUALLY INSTALLED TO OWNER, AND AUTOCAD AS-BUILT DRAWINGS TO THE ENGINEER.

PART 2 - PRODUCTS

2.01 GENERAL

- A. NAMEPLATES
1. FASTENED WITH EPOXY CEMENT, ENGRAVED BLACK LAMICOID SHEET WITH 3/8 IN. WHITE LETTERING FOR UTILITY EQUIPMENT, 3/8 IN. RED SHEET WITH WHITE LETTERING FOR EMERGENCY EQUIPMENT, 3/8 IN. BLUE SHEET WITH WHITE LETTERING FOR UPS EQUIPMENT, OR BUILDING STANDARD.
2. INSPECTION, SUBJECT TO REVIEW, INDICATING EQUIPMENT, AMPERAGE, AND VOLTAGE.
3. PROVIDE FOR:
a. DISCONNECT SWITCHES.
b. CIRCUIT BREAKERS.
c. PANELS.
d. CABINETS.
e. MOTOR CONTROLLERS.
B. SUPPORTS:
1. SUPPORTS FROM BUILDING CONSTRUCTION: BEAM CLAMPS, STEEL FISHPLATES IN CONCRETE FILL ONLY, OR CANTILEVER BRACKETS.
2. GROUDED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
3. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING.

2.02 MATERIALS

- A. RACEWAYS
1. ELECTROMETALLIC TUBING (EMT) 1/2 IN. WALL PIPE, GALVANIZED, THREADED.
2. RIGID STEEL CONDUIT: FULL WEIGHT PIPE, GALVANIZED, THREADED.
B. FITTINGS AND ACCESSORIES:
1. RACEWAY FITTINGS:
a. ELECTROMETALLIC TUBING: COMPRESSION OR DOUBLE SET SCREW TYPE, GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
b. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
c. BUSHINGS: METALLIC INSULATED TYPE.
C. BOXES:
1. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES, OR WIRING:
a. STAMPED OR WELDED STEEL, 4 IN. SQUARE OR OCTAGON FOR:
i. LIGHT FIXTURES: 1-1/2 IN. DEEP ABOVE CEILING, 2-1/8 IN. DEEP IN WALL.
ii. IN WALL FOR TELEPHONE AND DATA: 2-1/8 IN. DEEP.
iii. WITH RASSED COVERS AND FIXTURE STUDS WHERE REQUIRED.
b. NEW EXIT SIGN (IF REQUIRED BY INSPECTOR) SHALL BE LITHONIA PRECISE SERIES GREEN LED WITH DUAL 120V/277V INPUTS.
c. GALVANIZED CAST IRON OR ALUMINUM WITH THREADED HUBS: 4 IN. ROUND, 2 IN. DEEP ON CEILING, AND 4 IN. SQUARE, 2 IN. DEEP ON WALL.
d. BOXES WITHOUT FIXTURE OR DEVICE: PROVIDE WITH BLANK COVER.
2. JUNCTION AND PULL BOXES:
a. GALVANIZED STEEL.
b. COVERS: SCREEN ON, EXCEPT AS NOTED.
c. WITH INSULATED SUPPORTS FOR CABLES.
d. LOCATION: AS NOTED OR REQUIRED AND ACCESSIBLE.
e. PROVIDE BARRIERS BETWEEN.
f. 480V/277V WIRING ENERGIZED FROM SEPARATE SERVICES.
g. 208Y/120V VOLT AND 480/277V VOLT WIRING.
h. EMERGENCY AND NORMAL WIRING.
D. WIRE AND CABLE:
1. CONDUCTORS:
a. ASTM STANDARD SOLID NO. 10 AND SMALLER; STRANDED NO. 8 AND LARGER.
b. TYPE: COPPER.
i. GENERAL USE.
ii. 14 NO. 14 MINIMUM.
iii. 12 NO. 12 MINIMUM.
iv. 12 AT 120 VOLTS AND OVER 100 FT. CIRCUIT LENGTH; NO. 10 MINIMUM.
v. 3 AT 277 VOLTS AND OVER 200 FT. CIRCUIT LENGTH; NO. 10 MINIMUM.
c. CONTROL AND ALARM, EXCEPT AS NOTED:
i. NO. 14 MINIMUM.
ii. 12 AT 120 VOLTS AND OVER 200 FT. CIRCUIT LENGTH; NO. 12 MINIMUM.
c. OVER VOLTAGES AND PHASE: AS REQUIRED TO MAINTAIN VOLTAGE DROP.
d. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.
2. INSULATION:
a. THINWALL FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED.
b. SFF-2 BRANCH CIRCUITS LOCATED IN:
i. WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES.
ii. AMBIENT TEMPERATURES OVER 75 DEG. C.
c. COLOR CODING: AS PER CODE, WHERE COLOR CODING IS UNAVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERTAP COLOR TAPING CONDUCTORS (MINIMUM LENGTH 18 IN.) IN ACCESSIBLE LOCATIONS.
d. 600V INSULATION, INCLUDING CONTROL, WIRING, COORDINATE WITH MECHANICAL FOR CURF UNIT.
3. ACCESSORIES:
a. TAGS.
b. FLAMEPROOF LINEN OR FIBER IN ACCESSIBLE LOCATIONS.
i. FEEDERS: INDICATE FEEDER NUMBER, SIZE, PHASE, AND POINTS OF ORIGIN AND TERMINATIONS.
ii. CONTROL AND ALARM WIRING: INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.
b. TERMINATIONS, SPLICES, AND TAPS UNDER 600 VOLTS.
c. COPPER CONDUCTORS NO. 10 AND SMALLER, WITH COMPRESSION-TYPE OR TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON UNINSULATED COVERING.
i. COPPER CONDUCTORS NO. 8 AND LARGER, MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION-TYPE USING MANUFACTURER'S RECOMMENDED TOOLING.
ii. CABLE LUGS AND CONNECTORS: COMPRESSION-TYPE OF SAME METAL AS CONDUCTOR.
MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE.
iii. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTI SEIZE COMPOUND ON TANG.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. GENERAL:
1. PAINTING:
a. PAINT.
i. BEST GRADE FOR ITS PURPOSE.
ii. DELIVER IN ORIGINAL SEALED CONTAINERS.
iii. APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
iv. COLORS: AS SELECTED BY ARCHITECT.
b. GALVANIZED IRON PRIMER: PANEL AND PULL BOXES, AFTER FABRICATION.
c. HOT DIPPED GALVANIZED OR DIPPED IN ZINC CHROMIATE: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, ROD INSERTS, AND SUPPORTS.
d. ZINC CHROMIATE WITH FINISH TO MATCH SURROUNDINGS: MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS.
2. CLEANING:
a. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING, AND ACCEPTANCE.
b. PAINTED EXPOSED WORK SOLED OR DAMAGED: CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE.
c. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

- 3. CUTTING AND PATCHING: AS REQUIRED FOR NEW WORK.
B. RACEWAYS:
1. RUN CONCEALED, EXCEPT AS NOTED.
2. SUPPORTS:
a. CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS.
b. USOLTS: AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS.
c. RISER CLAMPS: AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB.
d. SPACING:
i. MINIMUM 10 FT. ON CENTERS FOR METALLIC RACEWAY AND AS REQUIRED FOR NON-METALLIC RACEWAY.
ii. 5 FT. ON CENTERS FOR WIRE WAYS.
iii. PER CODE AND AS NOTED FOR OTHERS.
e. MOUNT SUPPORTS TO STRUCTURE WITH:
i. TOGGLE BOLTS ON HOLLOW MASONRY.
ii. EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK.
iii. MACHINE SCREWS ON METAL.
iv. BEAM CLAMPS ON FRAMEWORK.
v. WOOD SCREWS ON WOOD.
vi. PAN-THROUGH STRAPS IN METAL DECK.
vii. NAILS, RAWL PLUGS, OR WOOD PLUGS NOT PERMITTED.
viii. WHERE REQUIRED BY STRUCTURE: THROUGH-BOLTS AND FISH-PLATES.
3. EXPOSED: RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
4. CLEARANCE FROM WATER, STEAM, OR OTHER PIPING: MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS.
5. FOR HUNG CEILING OUTLETS: RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS.
6. IN MASONRY: RUN VERTICALLY ONLY.
7. MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS WITH GALVANIZED CONDUCTOR.
8. EMPTY RACEWAYS OVER 18 FT. LONG: PROVIDE FISH GROUNDING PULL WIRE, OR NYLON ROPE.
9. EMT:
a. PERMITTED USES:
i. FEEDERS AND BRANCH CIRCUITS.
ii. DRY LOCATIONS: DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS, AND FURRED SPACES.
iii. METALLIC STEEL CONDUIT:
i. PERMITTED LOCATIONS WHERE HUNG CONDUIT IS IMPRACTICAL (MAXIMUM OF 3 FT.).
ii. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: MINIMUM 4 FT., MAXIMUM 8 FT. LENGTH.
iii. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMERS, AND OTHER VIBRATING EQUIPMENT: MINIMUM 18 IN. WITH SLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE ON LENGTH OF RUNS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. PRESET TO ALLOW FOR TEMPERATURE VARIATION.
iv. RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.
10. OUTLET BOXES:
a. SET BOXES SQUARE AND TRUE WITH BUILDING FINISH.
b. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP-IRONS OR GROUT IN WALL WITH MASONRY.
c. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES.
d. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.
14. PANEL, JUNCTION, AND PULL BOXES:
a. LOCATION:
i. CLEAR OF OTHER TRADES.
ii. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES.
b. ACCESSIBLE:
i. SUPPORT FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRY WALL AND LIGHTWEIGHT CONSTRUCTION.
ii. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS: ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE; SECURE TO BLACK IRON CEILING SUPPORT.
iii. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING. ADD BOX VOLUME WHERE REQUIRED.
15. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES, OR OPENINGS IN FIRE-RATED PARTITION WALLS.
16. OUTDOOR INSTALLATION: RIGID STEEL CONDUIT EXCEPT AS NOTED, BELOW GRADE, WATERPROOF.
17. TEST:
a. CONTINUITY.
b. TEST RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING ONE (1) CONDUCTOR RETURN.
i. MAXIMUM 25 OHMS RESISTANCE.

- C. WIRE AND CABLE:
1. 800 VOLT CABLE:
a. NOT MORE THAN THREE (3) LIGHTING OR CONVENIENCE OUTLET CIRCUITS IN ONE (1) CONDUIT UNLESS OTHERWISE INDICATED.
b. SEPARATE RACEWAYS FOR CONDUCTORS OF 208Y/120 AND 480/277V VOLT SYSTEMS, EXCEPT 480 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING.
2. TESTS:
a. CONTINUITY AND INSULATION TESTS:
i. 600 VOLTS MEASUR.
ii. 10 PERCENT OF FEEDERS.
iii. 10 PERCENT OF BRANCH CIRCUITS.
b. PERFORM:
i. EQUIPMENT AND MATERIALS USED SHALL BE STANDARD COMPONENTS, REGULARLY MANUFACTURED, AND OF THE SAME MANUFACTURER AS THE EXISTING BASE BUILDING STANDARDS.
ii. IN PRESENCE OF AUTHORIZED REPRESENTATIVES.
c. SUBMIT WRITTEN REPORT OF RESULTS.
d. CORRECT OR REPLACE CABLE RESULTING BELOW MANUFACTURER'S STANDARDS.
D. PANELBOARDS:
1. ENCASE THE LOAD OVER THE PHASES WHEN CIRCUITS ARE ADDED TO NEW OR EXISTING PANELS.
2. PROVIDE MULTICABLE LUGS WHERE REQUIRED.
3. PROVIDE TWENTY-THREE DIRECTORIES IN NEW AND EXISTING PANELBOARDS WHERE CIRCUITING IS CHANGED.
4. TESTS: OPEN AND CLOSE LOAD BREAK SWITCHING DEVICES UNDER LOAD.
E. LIFE SAFETY SYSTEM:
1. INSTALLATION SHALL BE SUPERVISED AND TESTED BY THE MANUFACTURER OF THE SYSTEM EQUIPMENT. THE WORK SHALL BE PERFORMED BY SKILLED TECHNICIANS UNDER THE DIRECTION OF EXPERIENCED ENGINEERS, ALL OF WHOM SHALL BE PROPERLY TRAINED AND QUALIFIED FOR THIS WORK.
2. SYSTEM SHALL BE INSTALLED WITH ALL CONDUITS, CONDUCTORS, OUTLET BOXES, FITTINGS, CONNECTORS, AND ACCESSORIES NECESSARY TO ENSURE A COMPLETE, OPERABLE SYSTEM IN COMPLIANCE WITH ALL APPLICABLE CODES AND REGULATIONS.
a. CONDUIT: ALL CONDUIT SHALL BE INSTALLED ACCORDING TO THIS SPECIFICATION.
b. WIRE AND CABLE: ALL WIRING SHALL BE INSTALLED IN METAL CONDUIT OR WITHIN EQUIPMENT. CONDUCTORS SHALL BE INSTALLED ACCORDING TO THIS SPECIFICATION. CONDUCTORS WITHIN EQUIPMENT ENCLOSURES SHALL BE CAREFULLY CABLED AND LACED. THEY SHALL BE COLOR-CODED AND INDIVIDUAL CONDUCTORS SHALL BE TAGGED WITH E-Z CODE MARKERS INDICATING CIRCUIT NUMBER AND TYPE. MARKERS SHALL BE USED ON ALL CONDUCTORS AT EACH OUTLET OR PULL BOX AND AT EACH EQUIPMENT ENCLOSURE.
c. OUTLET PULL AND JUNCTION BOXES SHALL BE PAINTED RED ON THE EXTERIOR AND SHALL BE INSTALLED ACCORDING TO THIS SPECIFICATION.
d. END-OF-LINE RESISTORS FOR SPEAKER CIRCUITS SHALL BE INSTALLED IN FLOOR TERMINAL CONNECTIONS.
e. PISTAL AND/OR TAPPED CONNECTIONS WILL NOT BE ALLOWED ON SUPERVISED CIRCUITS. CONNECTIONS SHALL BE MADE DIRECTLY TO AND FROM DEVICE TERMINAL SCREWS.
3. CONTRACTOR IS TO ENSURE THE EXISTING FIRE ALARM CONTROL PANEL WILL ACCOMMODATE THE NEW FIRE ALARM INITIATING DEVICES, SPEAKERS, AND STROBE LIGHTS. MODIFY AND ADD NEW CONTROL MODULES IN EXISTING CONTROL PANEL AS REQUIRED.
4. ALL NEW AIR HANDLING EQUIPMENT SHALL BE SHUT DOWN VIA THE BUILDING FIRE ALARM PANEL UPON ACTIVATION OR ANY NEW DUCT DETECTORS DESCRIBED UNDER THIS SCOPE OF WORK.

- F. TELEPHONE/DATA SYSTEMS:
1. PROVIDE CABLES AS INDICATED.
2. RUN CONDUIT FROM OUTLET INTO ACCESSIBLE HUNG CEILING.
G. OTHER APPLICABLE SPECIFICATIONS
A. DAMAGE TO OTHER WORK: REPAIR ANY DAMAGE CAUSED BY THIS SECTION TO WORK OF OTHER SECTIONS.
B. DAMAGE TO FIREPROOFING: REPAIR ANY DAMAGED FIREPROOFING CAUSED BY THIS SECTION TO INTEGRITY OF ORIGINAL CONSTRUCTION.

- C. DAMAGE TO OTHER WORK: REPAIR ANY DAMAGE CAUSED BY THIS SECTION TO WORK OF OTHER SECTIONS.
D. DAMAGE TO FIREPROOFING: REPAIR ANY DAMAGED FIREPROOFING CAUSED BY THIS SECTION TO INTEGRITY OF ORIGINAL CONSTRUCTION.
E. SITE SAFETY: CONTRACTOR COVENANTS AND AGREES THAT THEIR COMPANY, SUBCONTRACTORS, AGENTS, SERVANTS, AND EMPLOYEES WILL PROTECT AND MAINTAIN A SAFE PLACE TO WORK AND THAT THEY WILL COMPLY WITH ALL LAWS AND REGULATIONS OF ANY GOVERNMENT AUTHORITY HAVING JURISDICTION THEREOF, AND CONTRACTOR AGREES TO INDEMNIFY, DEFEND, AND HOLD HARMLESS, ENGINEER, ARCHITECT, AND OWNER FROM AND AGAINST ANY LIABILITY, LOSS, DAMAGE, OR EXPENSE, INCLUDING ATTORNEY'S FEES ARISING FROM A FAILURE OR ALLEGED FAILURE.

- F. VERIFICATION OF EXISTING: BEFORE SUBMITTING BID, BECOME THOROUGHLY FAMILIAR WITH ACTUAL EXISTING CONDITIONS AND OF THE PRESENT INSTALLATIONS TO WHICH CONNECTIONS MUST BE MADE OR WHICH MUST BE CHANGED OR ALTERED. THE INTENT OF THE WORK IS SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN, AND NO CONSIDERATION WILL BE GIVEN BY REASON OF LACK OF FAMILIARITY ON THE PART OF THE CONTRACTOR WITH ACTUAL PHYSICAL CONDITIONS, REQUIREMENTS, AND PRACTICES AT THE SITE.
G. REQUIREMENTS OF OTHER SECTIONS: CAREFULLY CHECK THE DOCUMENTS OF OTHER SECTIONS TO ASCERTAIN THE REQUIREMENTS OF ANY INTERFACING MATERIALS OR EQUIPMENT BEING FURNISHED AND/OR INSTALLED BY THAT SECTION WHICH RELATE TO THIS SECTION, AND PROVIDE THE PROPER INSTALLATION AND/OR CONNECTION.
H. SLEEVES: FURNISH AND SET ALL SLEEVES FOR THE PASSAGE OF CONDUIT THROUGH WALLS, ROOF, AND FLOORS AND ELSEWHERE AS WILL BE REQUIRED FOR THE PROPER PROTECTION OF EACH CONDUIT PASSING THROUGH BUILDING SURFACES. COORDINATE THIS WORK WITH THE GENERAL CONTRACTOR IN ORDER TO PROPERLY EXPEDITE AND PERFORM THIS WORK.
I. FIRE/SMOKE DAMPER ASSEMBLIES: VERIFY EXACT LOCATIONS WITH THE MECHANICAL DRAWINGS. PROVIDE LINE VOLTAGE MOTOR CONNECTIONS AND LOCAL DISCONNECT SWITCHES AS REQUIRED. PROVIDE DUCT ANODER AREA SMOKE DETECTORS AS REQUIRED FOR ACTUATION OF THE DAMPER MOTORS.

- J. GUARANTEE: SUBMIT A SINGLE GUARANTEE STATING THAT ALL PORTIONS OF THE WORK ARE IN ACCORDANCE WITH CONTRACT REQUIREMENTS. GUARANTEE ALL WORK AGAINST FAULTY AND IMPROPER MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE BY OWNER, EXCEPT THAT WHERE GUARANTEES OR WARRANTIES FOR LONGER TERMS ARE SPECIFIED BY CONTRACT, SUCH LONGER TERM SHALL APPLY.
K. GENERAL ITEMS:
1. ACCESS DOORS/PANELS: PROVIDE CONCEALED OUTLET, JUNCTION BOXES, AND EQUIPMENT REQUIRING ACCESS WITH ADEQUATELY SIZED ACCESS DOORS/PANELS. IN REMOVABLE TYPE CEILING, PROVIDE ACCESS TILE.
2. CUTTING AND PATCHING FOR ELECTRICAL WORK.
L. REFERENCE STANDARDS: PUBLISHED CODES, SPECIFICATIONS, STANDARDS, TESTS, OR RECOMMENDED METHODS OF TRADE, INDUSTRY, GOVERNMENTAL, ORGANIZATIONS, OR LOCAL UTILITIES APPLY TO WORK IN THIS DIVISION WHERE CITED BELOW:
1. ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE.
2. ASTM - AMERICAN SOCIETY OF TESTING AND MATERIALS.
3. CBM - CERTIFIED BALLAST MANUFACTURERS.
4. ETL - ELECTRICAL TESTING LABORATORIES.
5. IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS.
6. IES - ILLUMINATING ENGINEERS SOCIETY.
7. ICEA - INSULATED CABLE ENGINEERS ASSOCIATION.
8. IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS.
9. IES - ILLUMINATING ENGINEERS SOCIETY.
10. NEC - CALIFORNIA ELECTRICAL CODE.
11. NEMA - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION.
12. NFPA - NATIONAL FIRE PROTECTION ASSOCIATION.
13. OSHA - OCCUPATIONAL SAFETY AND HEALTH ACT.
14. UL - UNDERWRITERS LABORATORIES, INC.
15. NATIONAL, STATE, AND LOCAL CODES OF ALL AUTHORITIES HAVING JURISDICTION.

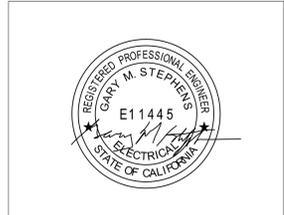
- M. SEISMIC DESIGN: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ANCHORS, SUPPORTS, AND CONNECTIONS OF ELECTRICAL WORK TO THE BUILDING STRUCTURE TO PREVENT DAMAGE AS A RESULT OF AN EARTHQUAKE, INCLUDING MANUFACTURED EQUIPMENT, THE CONNECTION, AND INTEGRITY OF SHOP FABRICATED AND FIELD FABRICATED MATERIALS AND EQUIPMENT. ALL SUPPORTS, EQUIPMENT, AND CONNECTIONS THERETO SHALL BE DESIGNED TO CONFORM TO THE REQUIREMENTS OF THE LOCAL CITY ORDINANCE OR OTHER GOVERNING CODES.
N. PROJECT CLOSE-OUT:
1. AFTER FINAL OPERATION FOR INSPECTION AND ACCEPTANCE, DELIVER ALL COPIES OF OPERATION INSTRUCTIONS, MAINTENANCE MANUALS, AND PARTS DESCRIPTIONS TO THE ARCHITECT.
2. ALL TOOLS RESSUPPLIED WITH THE EQUIPMENT FOR MAINTENANCE SHALL BE TAGGED AND TEMPORARILY RESERVED TO THE UNIT, OR TURNED OVER TO THE OWNER.
3. UPON COMPLETION OF THE FIRE LIFE SAFETY SYSTEMS INSTALLATION, THE SYSTEM INSTALLER SHALL CONDUCT A THOROUGH TEST OF THE SYSTEM AND SUBMIT A WRITTEN REPORT OF THE FINDINGS TO THE LANDLORD AND TENANT'S ARCHITECT. THE TEST SHALL INCLUDE THE FOLLOWING:
a. BEFORE ENERGIZING THE CABLES AND WIRES, CHECK FOR CORRECT CONNECTIONS AND TEST FOR SHORT CIRCUITS, GROUND FAULTS, CONTINUITY, AND INSULATION.
b. CLOSE EACH SPRINKLER SYSTEM CONTROL VALVE AND VERIFY PROPER SUPERVISORY ALARM AT THE BASE BUILDING FIRE ALARM CONTROL CABINET.
c. VERIFY ACTIVATION OF ALL FLOW SWITCHES.
d. OPEN INITIATING DEVICE CIRCUITS AND VERIFY THAT THE TROUBLE SIGNAL ACTUATES.
e. OPEN AND SHORT NOTIFICATION APPLIANCE CIRCUITS AND VERIFY THAT THE TROUBLE SIGNAL ACTUATES.
f. GROUND INITIATING DEVICE CIRCUITS AND VERIFY RESPONSE OF TROUBLE SIGNALS.
g. CHECK ALL ALARM NOTIFICATION DEVICES FOR PROPER OPERATION PRIOR TO FUNCTIONAL TEST.
h. CHECK INSTALLATION, SUPERVISION, AND OPERATION OF SMOKE DETECTORS.
i. VERIFY THAT EACH INITIATING DEVICE ALARM SIGNAL IS PROPERLY RECEIVED AND PROCESSED BY THE BASE BUILDING FIRE ALARM CONTROL PANEL.
j. FUNCTIONAL OPERATION OF EACH ALARM INITIATION DEVICE AND CIRCUIT.
k. FUNCTIONAL OPERATION OF EACH MONITORED DEVICE CIRCUIT.
l. FUNCTIONAL OPERATION OF EACH CONTROL CIRCUIT.
m. FUNCTIONAL OPERATION OF EACH ALARM NOTIFICATION DEVICE, APPLIANCE, AND CIRCUIT.
n. CONDUCT TESTS TO VERIFY TROUBLE INDICATIONS FOR COMMON MODE FAILURES, SUCH AS ALTERNATING CURRENT POWER FAILURE. CONSULT THE MANUFACTURER'S MANUAL FOR OTHER COMMON MODE FAILURES AND TESTS TO THE DESCRIBED TESTING PROCEDURES.

- O. PERFORM CALIBRATION AND ACCEPTANCE TESTING FOR ALL LIGHTING CONTROL SYSTEMS.

STEAM SYSTEM BOILER REPLACEMENT PROJECT ROWLAND UNIFIED SCHOOL DISTRICT RUTH RICHARD FOOD CENTER 4032 S. ELLESFORD AVENUE WEST COVINA, CALIFORNIA 91792

Table with 2 columns: Bid Set, Revised Bid Set, Plan Check Submittal. Values: 3/22/18, 3/28/18, 4/30/18, 5/1/18.

Table with 3 columns: No., Revision/Issue, Date.

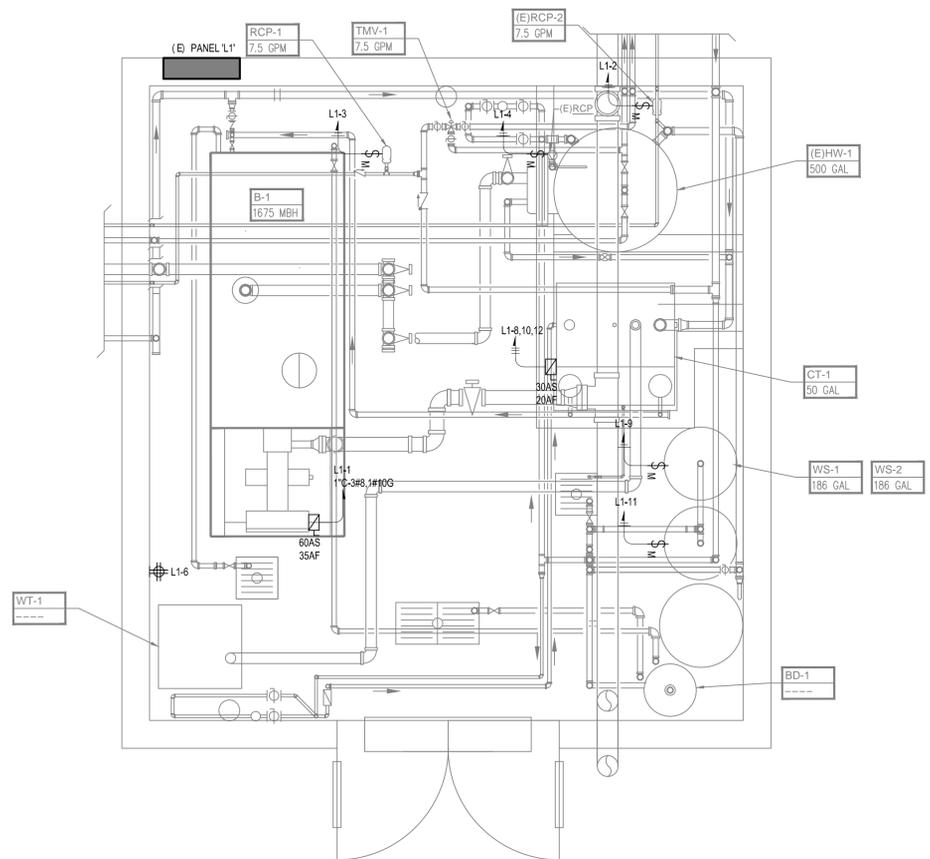


Q3 inc. QUALITY AND EXCELLENCE IN ENGINEERING AND DESIGN SOLUTIONS. 18972 FLORIDA STREET, UNIT 200A HUNTINGTON BEACH, CA 92648. PHONE: 714-947-1100. FAX: 714-242-9499.

ELECTRICAL SPECIFICATIONS

Table with 2 columns: Project, Sheet. Values: ----, E-1.0. Also includes Date: 3/22/2018 and Note: AS NOTED.

**STEAM SYSTEM BOILER  
REPLACEMENT PROJECT**  
ROWLAND UNIFIED SCHOOL DISTRICT  
RUTH RICHARD FOOD CENTER  
4032 S. ELLESFORD AVENUE  
WEST COVINA, CALIFORNIA 91792



**ELECTRICAL POWER PLAN**

1  
1/2"=1'-0"

(E) L1		SERVICE	MAIN	BUS	POLES	MOUNT	AIC	LOCATION: BOILER ROOM							
		208/120V, 3P, 4W	100	100	18	SURFACE	10K	FED FROM: PANEL 'G'							
		PROJECT NAME: STEAM SYSTEM BOILER REPLACEMENT PROJECT													
CKT NO.	C.B. AMP	C.B. POLE	DESCRIPTION	LOAD (KVA)					DESCRIPTION	C.B. AMP	C.B. POLE	CKT NO.			
				TOTAL	TYPE	A	B	C					TYPE	TOTAL	
1	35	1	BOILER 'B-1'	3.36	M	3.61				M	0.25	EXISTING 'RCP-2'	20	1	2
3	20	1	RECIRC PUMP 'RCP-1'	0.25	M		0.50			M	0.25	EXISTING 'RCP'	20	1	4
5	20	1	LIGHTING	0.20	L			0.56		R	0.36	RECEPTACLE	20	1	6
7						0.55				A	0.55	CONDENSATE TANK 'CT-1'	20	3	8
9	20	1	WATER SOFTENER 'ST-1'	0.18	M		0.73			A	0.55	CONDENSATE TANK 'CT-1'	-	-	10
11	20	1	WATER SOFTENER 'ST-2'	0.18	M			0.73		A	0.55	CONDENSATE TANK 'CT-1'	-	-	12
13															14
15															16
17															18
CONNECTED LOAD PER PHASE (KVA):				4.16	1.23	1.29									
CONNECTED LOAD PER PHASE (AMPS):				34.67	10.25	10.72									
<b>LOAD SUMMARY</b>				CONN. KVA	DEMAND FACTOR	DEMAND KVA									
TYPE "L": CONTINUOUS LOADS				0.20	125%	0.25									
TYPE "R": RECEPTACLES (FIRST 10KVA)				0.36	100%	0.36									
TYPE "R": RECEPTACLES (OVER 10KVA)					50%										
TYPE "M": MISCELLANEOUS LOADS				4.47	100%	4.47									
TYPE "A": LARGEST MOTOR LOAD				1.65	125%	2.06									
TYPE "K": KITCHEN LOADS					65%										
TOTAL				6.68		7.14	DEMAND AMPS					19.83			
<b>NOTES:</b>															
• NEW = BOLD FACE, EXISTING = NON-BOLD FACE															
• PROVIDE MULTI-POLE BREAKERS, OR SINGLE-POLE BREAKERS WITH HANDLE-TIE, FOR ANY MULTI-WIRE BRANCH CIRCUITS TO BE INSTALLED PER NEC 210.4(B).															
• NEW CIRCUIT BREAKERS AIC RATING TO MATCH PANEL AIC															
• PANEL WAS REVIEWED IN FIELD AND EXISTING LOADS WERE OBTAINED FROM AS-BUILTS.															

**ELECTRICAL PANEL SCHEDULE**

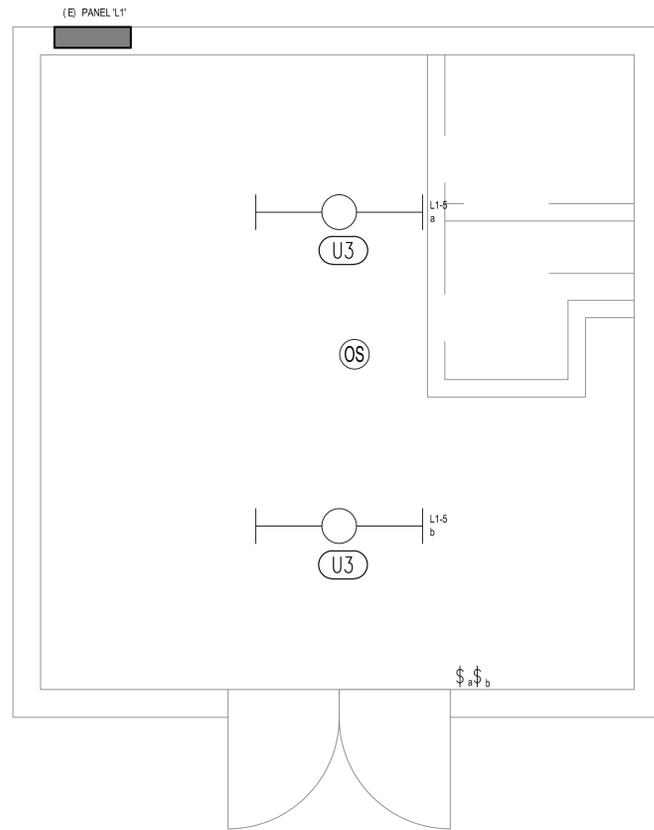
2  
NTS

BID SET	3/22/18	
REVISED BID SET	3/28/18	
REVISED BID SET	4/30/18	
PLAN CHECK SUBMITTAL	5/1/18	
No.	Revision/Issue	Date



**ELECTRICAL  
POWER PLAN AND  
PANEL SCHEDULE**

Project	-----	Sheet	-----
Date	3/22/2018	Sheet	<b>E-2.0</b>
Status	AS NOTED		



ELECTRICAL LIGHTING PLAN

1  
1/2"=1'-0"

Description			Lamp					Control				Manufacturer		Mounting		Designer Notes
Basic	Detail	TAG	Type	Lumens	CCT	CRI Min	Type	Protocol	Voltage	Wattage	LM/W	Name	Cat #	Type	Recess Depth	
Utility	Vaportight	U3	LED	5000	5000	80	Switched	-	UNV	49	102	Lithonia	XVML-L48-5000LM-MVOLT-50K-80CRI	Surface		

ELECTRICAL FIXTURE SCHEDULE

2  
NTS

**STEAM SYSTEM BOILER  
REPLACEMENT PROJECT**  
ROWLAND UNIFIED SCHOOL DISTRICT  
RUTH RICHARD FOOD CENTER  
4032 S. ELLESFORD AVENUE  
WEST COVINA, CALIFORNIA 91792

BID SET	3/22/18	
REVISED BID SET	3/28/18	
REVISED BID SET	4/30/18	
PLAN CHECK SUBMITTAL	5/1/18	
No.	Revision/Issue	Date



**SHEET TITLE:**  
**ELECTRICAL  
LIGHTING PLAN AND  
FIXTURE SCHEDULE**

Project	-----	Sheet	<b>E-3.0</b>
Date	3/22/2018		
Scale	AS NOTED		