STERNBERGER ELEMENTARY

518 NORTH HOLDEN ROAD. GREENSBORO, NORTH CAROLINA 27410

Guilford County Schools
STRIVING. ACHIEVING. EXCELLING.

GCS STERNBERGER ELEMENTARY BOILER REPLACEMENT

PLAN NORTH

ENPULSE Energy Conservation

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CONSTRUCTION SCOPE

SEE SUMMARY OF WORK

SHEET INDEX

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Revisions

Date	#	Description

PHASE

Seal

Project

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Sheet Title

COVER PAGE

Scale

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COVER

MECHANICAL GENERAL NOTES:

1. CONTRACTOR IS REQUIRED TO ATTAIN A COPY OF THE ENTIRE DRAWINGS SET AND SPECIFICATIONS (IF PROVIDED; ASSUME ONE EXISTS UNLESS TOLD OTHERWISE). CONTRACTOR SHALL STUDY AND UNDERSTAND THE SCOPE OF ALL CONTRACTOR'S WORK IN ADDITION TO HIS OWN.
2. THE CONTRACTOR SHALL REVIEW THE PLANS AND THE SITE (IF EXISTING). IF DISCREPANCIES ARE FOUND, THE CONTRACTOR SHALL SEND THE ENGINEER A REQUEST FOR INFORMATION REQUEST VIA EMAIL OR FAX A MINIMUM OF 7 DAYS (UNLESS INDICATED OTHERWISE) IN ADVANCE. THE ENGINEER WILL THEN ANALYZE THE QUESTION AND PROVIDE A RESPONSE.
3. UPON SUCCESSFULLY WINNING THE BID, THE CONTRACTOR ACKNOWLEDGES THAT THE INTENT OF THE PLANS ARE FULLY UNDERSTOOD, ACCEPTS THE RESPONSIBILITY, AND SHALL PROVIDE ALL COMPONENTS AND SERVICES TO ACCOMPLISH THAT INTENT.
4. MATERIALS, EQUIPMENT, AND INSTALLATIONS SHALL COMPLY WITH ALL REQUIREMENTS OF THE PLANS AND SPECIFICATIONS (IF PROVIDED).
5. VISIBLE CONFLICTS NOT IDENTIFIED DURING THE BIDDING PROCESS FOR EXISTING FACILITIES NOT BROUGHT ABOUT DURING BIDDING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL PLANS, INCLUDING EQUIPMENT PLACEMENT, DUCT ROUTING, AND PIPING LAYOUTS ARE GENERALLY DIAGRAMMATIC. IN BIDDING THE PROJECT, THE CONTRACTOR IS ATTESTING THAT THEY UNDERSTAND THERE WILL BE CONFLICTS NOT NECESSARILY SHOWN ON THE PLANS OR THAT MAY DEVELOP FROM THE CONSTRUCTION PROCESS, AND THAT THEY WILL BE RESPONSIBLE FOR COORDINATING THESE CONFLICTS AND ADJUSTING THE MECHANICAL, ELECTRICAL, AND PLUMBING SYSTEMS ACCORDINGLY BY REROUTING, RESIZING, AND RESELECTING SYSTEMS.
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9. AFTER MEETING WITH OTHER CONTRACTORS, THE CONTRACTOR SHALL DEVELOP WORKING DRAWINGS SHOWING ANY VARIANCE FROM THE ENGINEER'S PLANS. THESE VARIANCES, AS A MINIMUM, SHALL BE NEATLY (USING RULER AND RED PENCIL/PEN) MARKED ON THE PLANS. ONCE MARKED, THE CONTRACTOR SHALL HOLD A MEETING WITH THE ENGINEER TO IDENTIFY ALL VARIANCES.
10. THE CONTRACTOR SHALL DEVELOP A SCHEDULE OF WORK TO INCLUDE WORK PERIODS, DELIVERY OF EQUIPMENT, START DATES, COMPLETION DATES, REVIEW PERIODS, AND OTHER TYPICAL CONSTRUCTION MILESTONES. IF OTHER DISCIPLINES ARE NOT TASKED TO DO SO, THE CONTRACTOR SHALL SUBMIT AN INDEPENDENT SCHEDULE TO THE ENGINEER. IF GENERAL CONTRACTOR IS REQUIRED TO PROVIDE A SCHEDULE, CONTRACTOR IS TO INTEGRATE HIS SCHEDULE WITH THE GENERAL CONTRACTOR'S.
11. ALL SIZING AND COMPONENTS ARE GENERALLY DIAGRAMMATIC. MANUFACTURER SIZES MAY HAVE CHANGED IN THE PROCESS OF DESIGN OR SIZES MAY VARY DEPENDING ON THE ACTUAL MANUFACTURER SUBMITTED. IN DESIGNING THE BUILDING, ALL COMPONENTS MAY NOT BE EXPOSED AND NOT ACCOUNTED FOR BY THE ENGINEER. IN BIDDING THE PROJECT, THE CONTRACTOR UNDERSTANDS THAT THESE INTERFERENCES OR CONFLICTS EXIST AND SHALL BE RESPONSIBLE TO ADJUST ACCORDINGLY. MAINTAIN SAME SIZE EQUIPMENT AND COMPONENTS WHENEVER POSSIBLE.
12. IF ANY UNUSUAL CIRCUMSTANCES ARE IDENTIFIED, IMMEDIATELY INFORM THE ENGINEER. STOP WORK IF THE UNUSUAL CIRCUMSTANCE IS DEEMED DANGEROUS OR MAY COST SIGNIFICANT CHANGES.
13. PROVIDE MINIMUM RED TAB WITH NUMBER TO ALL HIDDEN COMPONENTS ABOVE CEILINGS, WALLS, FLOOR, ETC.. PROVIDE THE OWNER WITH A TYPED SUMMARY OF THE NUMBERS ON THE TAB DESIGNATING THE EQUIPMENT HIDDEN.
14. IN INSTALLING THE EQUIPMENT, ADJUST LOCATION SO AS TO ALLOW MINIMUM CLEARANCES REQUIRED BY CODE AND MANUFACTURER.
15. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE CODES, LAWS AND REGULATIONS AND IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S INSTRUCTIONS AND RECCOMENDATIONS.
16. PROVIDE EQUIPMENT SUBMITTALS TO DESIGNER FOR APPROVAL ON ALL TAGGED OR SCHEDULED EQUIPMENT PRIOR TO INSTALLATION. APPROVAL OF SUBMITTAL SHALL NOT BE THE CAUSE OF SUBSEQUENT CONFLICTS OR CHANGE ORDERS.
17. REMOVE ALL DEMOLISHED MATERIALS, TRASH AND DEBRIS FROM THE SITE. ALL MATERIALS SHALL BE DISPOSED OF IN A LAWFUL MANNER.
18. CONTRACTOR SHALL VERIFY PRIOR TO INSTALLATION THAT INSTALLED EQUIPMENT WILL OPERATE ON EXISTING UTILITY SERVICES UNLESS OTHERWISE NOTED.
19. VERIFY STRUCTURAL CAPACITY OF ROOF PRIOR TO INSTALLATION OR ANY ROOFTOP EQUIPMENT.
20. MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ROOF CURBS FOR INSTALLED EQUIPMENT.
21. CLEAN ALL CONDUITS, HANGERS, SUPPORTS, PANELS, DEVICES, LIGHTS, ETC. AND LEAVE READY FOR USE OR PAINTING.
22. TOUCH UP ALL DAMAGED AND SCRATCHED SURFACES ON FACTORY FINISHED EQUIPMENT AND MATERIALS WITH PAINT OF SAME TYPE AND COLOR.
23. DEPARTURES AND/OR DEVIATIONS FROM THE SPECIFICATIONS OR EQUIPMENT SCHEDULES SHALL BE REQUESTED IN WRITING BY THE CONTRACTOR FROM THE ENGINEER AND NO SUCH DEPARTURES AND/OR DEVIATIONS SHALL BE MADE WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.
24. WORKMANSHIP SHALL BE OF THE HIGHEST GRADE, PERFORMED BY MECHANICS SKILLED IN THE INSTALLATION OF THIS TYPE OF WORK AND LICENSED BY THE PROPER AUTHORITIES TO PERFORM THE WORK.
25. THE CONTRACTOR SHALL SECURE ALL PERMITS OR APPLICATIONS AND PAY ANY AND ALL FEES.
26. FIRESTOP ALL OPENINGS AT FIRE WALL PENETRATIONS.
27. ALL EQUIPMENT AND MATERIALS SHALL BE AS SPECIFIED OR "APPROVED EQUAL" BY THE ENGINEER OR THE ARCHITECT.
28. SUBMIT A MATERIAL LIST AND SHOP DRAWINGS FOR MAJOR EQUIPMENT TO THE ARCHITECT OR ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ELECTRONICALLY
29. CONTRACTOR MAY REQUEST RESIZING OF DUCT TO ACCOMMODATE ACTUAL FIELD CONDITIONS
30. CONTRACTOR MAY REQUEST TO UTILIZE RECTANGULAR IN LIEU OF ROUND, OR VICE VERSA, TO ACCOMMODATE SPACE CONDITIONS.
31. MAINTAIN A DUCT ASPECT RATIO BETWEEN 1:1 TO 2:1. IF LARGER ASPECT RATIO IS TO BE USED, THEN CROSS BRACING SHALL BE REQUIRED PER THE CURRENT SMACNA STANDARDS.
32. ALL DUCTWORK SHOWN ON PLANS ARE FREE FLOW AREA (DOES NOT INCLUDE DUCT AND INSULATION THICKNESS). ASSUME A MINIMUM OF 2" THICKNESS, OR THICKNESS OF ACTUAL COMPONENTS, WHEN PLANNING ROUTING.
33. SUPPLY AND RETURN DUCTWORK SHALL BE MINIMUM 24 GAUGE.
34. ALL DUCTWORK JOINTS SHALL BE STANDING SEAM CONNECTIONS UNLESS SHOWN OTHERWISE.
35. A MINIMUM OF TWO LAYERS OF MASTIC SHALL BE APPLIED TO ALL JOINTS. WIDTH SHALL EXTEND 1/2" ON EACH SIDE OF JOINT. MASTIC SHALL BE THICK ENOUGH SO THAT NO SHEET METAL SHALL BE VISIBLE THROUGH THE MASTIC.
36. DUCTWORK SHALL BE EXTERNALLY WRAPPED WITH 1-1/2" FIBERGLASS WRAP INSULATION WITH FOIL SCKRIM KRAFT JACKET, AND ALL INSULATION JOINTS AND OPEN ENDS OF FIBERGLASS SHALL BE DUCT TAPED, UNLESS SHOWN OTHERWISE.
37. REFRIGERANT PIPING (GAS AND LIQUID) SHALL BE WRAPPED WITH MINIMUM 1/2" ARMAFLEX INSULATION UNLESS SHOWN OTHERWISE. DUCT TAPE ALL JOINTS. ALL DISHWASHER EXHAUST DUCT SHALL BE STAINLESS STEEL.
38. PRIMARY AND SECONDARY CONDENSATE PIPING SHALL BE MINIMUM 3/4" OR AS SHOWN ON PLANS. CONDENSATE PIPING SHALL BE HARD COPPER WHEN ROUTED IN PLENUM, EXPOSED, OR AS DEEMED BY LOCAL INSPECTOR. PVC IS ACCEPTABLE FOR OTHER APPLICATIONS. INSULATE WITH MINIMUM 1/2" ARMAFLEX WHEN ROUTED ABOVE CEILING OF OCCUPIED SPACES AND WITHIN WALLS OF OCCUPIED SPACES.
39. ALL AMTERIALS, INLUDING, DUCTWORK AND PIPING, SHALL BE STORED IN COVERED AREAS SO THAT IT IS NOT EXPOSED TO MUD, DIRT, MOISTURE, AND OTHER CONTAMINANTS. CONTRACTOR SHALL KEEP IN PROCESS CONSTRUCTION CLEAN AND FREE OF CONTAMINANTS. ENGINEER RESERVES THE RIGHT TO REJECT ANY DUCTWORK THAT IS DEEMED TO BE CONTAMINATED.
40. INSULATION SHALL BE PROPERLY PROTECTED SO THAT IT IS NOT EXPOSED TO MOISTURE, MUD, DIRT, OR CONTAMINANTS. ENGINEER RESERVES THE RIGHT TO REJECT ANY INSULATION THAT IS DEEMED TO BE CONTAMINATED.
41. AREA MUST BE DRIED-IN BEFORE ANY DUCT IS INSTALLED.
42. INSTALL DUCT PER CURRENT SMACNA STANDARDS.
43. CONTRACTOR, WHETHER SHOWN ON PLANS OR NOT, SHALL INSTALL FIRE AND/OR SMOKE DAMPERS ON ALL FIRE AND/OR SMOKE WALLS TO MATCH FIRE RATIN
44. WHETHER SHOWN OR NOT, PROVIDE ACCESS DOORS FOR ALL FIRE DAMPERS.
45. PROVIDE ACCESS DOORS ON THE BUILDING COMPONENTS TO ACCESS ALL EQUIPMENT EQUIPMENT THAT REQUIRE ACCESS (VAV BOXES, DAMPERS, ETC.).
46. ALL ELBOWS ARE TO BE SMACNA SMOOTH RADIUS TYPE. MITERED, RECTANGULAR, OR SHORT RADIUS ELBOWS SHALL BE PER ENGINEER PERMISSION.
47. ALL BRANCH DUCTS SHALL BE 45 DEGREE ENTRY TYPE.
48. UNLESS SPECIFICALLY NOTED, ALL THERMOSTATS SHALL BE MOUNTED AT SAME HEIGHT (BOTTOM) AS THE LIGHT SWITCH AND LOCATED NO FURTHER THAN 12 INCHES (HORIZONTALLY) FROM THE NEAREST LIGHT SWITCH.
49. CONTRACTOR SHALL PROVIDE TESTING AND BALANCING SERVICES FOR AIR AND WATER SYSTEMS AS PART OF THE SCOPE OF WORK. PROVIDE A TYPEWRITTEN TEST AND BALANCE REPORT BOUND IN A FOLDER TO THE ENGINEER UPON COMPLETION OF CONSTRUCTION. ENGINEER SHALL REVIEW AND APPROVE PRIOR TO APPROVING FINAL PAYMENT. CONTRACTOR SHALL BE REQUIRED TO ACHIEVE ALL AIRFLOWS LISTED ON THE PLANS.
50. PROVIDE MINIMUM 1/2" NEOPRENE HANGER ISOLATORS AT ALL SUPPORTS OF SUSPENDED EQUIPMENT WITH ROTATING OR MOVING PARTS.
51. PROVIDE MINIMUM HOUSEKEEPING PAD THAT IS 6" LARGER ON ALL SIDES OF ALL FLOOR MOUNTED EQUIPMENT. THE PAD SHALL BE MINIMUM 4" THICK CONCRETE
52. ALL DUCTWORK PENETRATIONS SHALL BE PROVIDED WITH SHEET METAL SLEEVE TO MATCH DUCTWORK.
53. GAS PIPING SHALL NOT BE INSTALLED IN SOLID FLOORS, PARTITIONS, AND WALLS. ALL GAS SHALL BE MARKED AT BEGINNING, ALL ENDS, ON EACH SIDE OF PARTITIONS, AND NOT LESS THAN 6 FEET INTERVALS ALONG ITS ENTIRE LENGTH DESIGNATING GAS PRESSURE AND GAS TYPE.
54. WHETHER SHOWN OR NOT, CONTRACTOR SHALL PROVIDE ALL GAS REGULATORS FOR ALL EQUIPMENT UTILIZING GAS TO REGULATE PRESSURE TO MANUFACTURER REQUIREMENTS.
55. ALL EXPOSED COMPONENTS SHALL BE PAINTGRIP AND PAINTED TO MATCH BUILDING COMPONENTS OR AS REQUIRED BY THE ARCHITECT OR OWNER.
56. LOCATE ALL ROOF MOUNTED EQUIPMENT A MINIMUM OF 10'-0" FROM ROOF EDGE. CONTRACTOR SHOULD HAVE VERIFIED AVAILABILITY OF CLEARANCE PRIOR TO BIDDING. IF NOT INSTALLED 10'-0" FROM EDGE, CONTRACTOR SHALL INSTALL MAINTENANCE RAILING AT ROOF EDGE AT HIS OWN COST PER LOCAL AUTHORITY REQUIREMENTS.
57. WHETHER SHOWN OR NOT OR OTHERWISE NOTED, ALL EXPOSED DUCTWORK SHALL BE DOUBLE WALL SPIRAL DUCT (MINIMUM 22 GAUGE GALVANIZED STEEL) WITH MINIMUM 1" FIBERGLASS INSULATION SANDWICHED BETWEEN THE DUCT WALLS. EXTERNAL DUCT SHALL BE PAINTGRIP AND PAINTED PER ARCHITECT/OWNER.
58. DUCT MOUNTED EXPOSED AIR DISTRIBUTION DEVICES SHALL BE FACTORY KYNAR FINISH. COLOR PER ARCHITECT/OWNER.
59. PROVIDE TRAPEZE SUPPORTS PER DETAIL FOR ALL DUCT WIDER THAN 18 INCHES WIDE OR EXCEEDING AN ASPECT RATIO OF 2. FOR DUCTS SMALLER THAN 18 INCHES WIDE OR LESS THAN AN ASPECT RATIO OF 2, PROVIDE TRAPEZE SUPPORT OR STRAP HANGERS. PROVIDE MINIMUM 1" WIDE 22 GAUGE GALVANIZED STEEL BAND STRAP SUPPORT A MINIMUM OF EVERY 10 FEET OF DUCT. PROVIDE HANGER STRAP DUCT CONNECTOR (MINIMUM 2 SHEET METAL SCREWS ON SIDE AND 2 SHEET METAL SCREWS ON BOTTOM), MINIMUM 3/8" HANGER ROD, AND JOIST CLAMP. APPLY MASTIC TO ALL SCREW PENETRATIONS. PROVIDE UNISTRUT OR C-CHANNEL SPANNERS BETWEEN JOISTS.

PLUMBING GENERAL NOTES:

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28. SUBMIT A MATERIAL LIST AND SHOP DRAWINGS FOR MAJOR EQUIPMENT TO THE ARCHITECT OR ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ELECTRONICALLY
29. IF IT IS NECESSARY FOR THE CONTRACTOR TO RESIZE THE PLUMBING PIPING TO ACCOMMODATE FIELD CONDITIONS, THE CONTRACTOR MAY RESIZE THE PIPE AT 4 FT. PER 100 FEET PRESSURE DROP, OR AS DESIGNATED FOR THE PIPING MATERIAL AND SIZE PER THE LATEST INGERSOLL RAND CAMERON HYDRAULIC DATA SIZING TABLES WITH THIS INSTALLATION.
30. FOR EXISTING BUILDINGS, FIELD VERIFY EXISTING PLUMBING PIPING TO VERIFY THAT IT MATCHES THAT SHOWN ON PLANS.
31. ALL NEW PIPING SHALL BE HARD COPPER UNLESS SHOWN OTHERWISE.
32. ALL HOT WATER PIPING SHALL BE INSULATED WITH MINIMUM 1" CELLULAR GLASS INSULATION WITH CANVAS JACKET.
33. ALL WATER SUPPLY PIPING IN THE ATTIC, CRAWLSPACE, AND OTHER BUILDING AREAS WHERE THE TEMPERATURE MAY FALL BELOW 42 F AND EXCEED 95 F SHALL BE INSULATED WITH MINIMUM 1" FIBERGLASS INSULATION WITH CANVAS JACKET.
34. ALL COLD AND HOT WATER PIPING SHALL BE MARKED (EITHER STENCILED OR STICKER WITH MINIMUM 1/4" TEXT IN BLUE FOR COLD AND RED FOR HOT ON WHITE BACKGROUND) WITH ITS SERVICE (CW/HW/HWR) EVERY 10 FEET OF PIPE AND AN ARROW DESIGNATING FLOW DIRECTION. FOR PIPING CARRYING TEMPERATURE OTHER THAN NORMAL TEMPERATURE (55 F FOR COLD AND 110 F FOR HOT), MARK THE PIPE WITH THE TEMPERATURE (EXAMPLE: 140 F) TO MATCH OTHER TEXT.
35. ROUTE ALL PIPING BELOW DUCTWORK LEVEL. WHEN POSSIBLE ROUTE PARALLEL, BUT MINIMUM 12" AWAY, TO CONDUITS NOT TO EXCEED TOP OF LIGHT FIXTURE. ROUTE FLUSH WITH STRUCTURE ABOVE WHENEVER POSSIBLE. IF ROUTED BETWEEN STRUCTURE AND ABOVE LIGHT, ROUTE BELOW THE DUCT LEVEL. COORDINATE WITH MECHANICAL CONTRACTOR.
36. IF CONFLICT BETWEEN PLUMBING PIPE AND DUCT ARISE PRIOR TO INSTALLATION, DUCT SHALL TAKE PRECEDENCE AND PLUMBING SHALL BE REROUTED. AFTER INSTALLATION, THE CONTRACTOR WHO DOES NOT FOLLOW THE DESIGNATED ROUTING AS DESCRIBED AT CONSTRUCTION COORDINATION MEETING SHALL MOVE THEIR EQUIPMENT.
37. WHETHER SHOWN ON PLUMBING PLANS/SCHEDULES OR NOT, PLUMBING TYPE (ADA, FLOOR MOUNTED, COUNTER MOUNTED, WALL HUNG, ETC.) SHALL MATCH THAT SHOWN ON THE ARCHITECTURAL PLANS. CONTRACTOR IS TO NOTE THE CONFLICT AND INFORM THE ENGINEER PRIOR TO SUBMITTING SHOW DRAWINGS.
38. ALL FIXTURES SHALL BE WHITE UNLESS NOTED OTHERWISE.
39. ALL WATER DELIVERING FIXTURES SHALL BE CHROME OR BRUSHED NICKEL UNLESS NOTED OTHERWISE.
40. FOR WATER HEATERS, PROVIDE ALL COMPONENTS NECESSARY FOR COMPLETE OPERATION OF THE WATER HEATER AS RECOMMENDED BY THE MANUFACTURER FOR COMPLETE OPERATION OF THE HOT WATER SYSTEM.
41. FOR WATER HEATERS AND OTHER FLOOR MOUNTED EQUIPMENT, PROVIDE 4" CONCRETE PAD THAT IS 6" LARGER THAN ALL SIDES OF THE WATER HEATER.
42. CONTRACTOR SHALL PROVIDE BACKFLOW PREVENTER TO WATER SYSTEM PER LOCAL INSPECTOR (EITHER IN HOTBOX OR IN WATER SERVICE ROOM AS REQUIRED BY LOCAL INSPECTOR) IF ONE DOES NOT EXIST.
43. IF UPON FINDING THE WATER PRESSURE AND FLOW OF THE BUILDING IS INSUFFICIENT, THE ENGINEER MAY ISSUE SUPPLEMENTAL DRAWINGS SHOWING WATER PUMP AND TANK. CONTRACTOR WILL BE REQUIRED TO PROVIDE A CHANGE ORDER PROPOSAL SHOWING DETAILED BREAKDOWN OF ALL COSTS ASSOCIATED WITH THE CHANGE ORDER. CONTRACTOR SHALL BE REQUIRED TO SOLICIT A MINIMUM OF TWO PRICES FOR THE PUMP AND TANK, AND PROVIDE ACTUAL BILL OF SALE FROM MANUFACTURER. CONTRACTOR MAY NOT CHARGE MORE THAN THE OVERHEAD AND PROFIT DESIGNATED BY THE CLIENT'S REGULATIONS AND STANDARDS (MAXIMUM 20% OVERHEAD AND PROFIT). LABOR AMOUNTS SHALL BE ITEMIZED.
44. DOMESTIC POTABLE WATER PIPING SHALL BE TYPE "K" COPPER PIPING. INSULATE ALL PIPING WITH 1/2" ARMAFLEX INSULATION.
45. PRESSURE TEST ALL PIPING PER THE PLUMBING CODE.
46. ALL PIPING LAYOUTS ARE GENERALLY DIAGRAMMATIC. CONTRACTOR SHALL VERIFY AND RECONFIGURE FOR AVAILABLE SPACE FOR INDICATED EQUIPMENT BASED ON MEASUREMENTS AND SURVEYS TAKEN FROM THE FIELD.
47. EQUIPMENT CONNECTION SIZES, ELEVATIONS AND CONFIGURATIONS ARE SUBJECT TO CHANGE WHEN CERTIFIED VENDOR SHOP DRAWINGS ARE RECEIVED. CONTRACTOR SHALL CHECK THE CERTIFIED DRAWINGS PRIOR TO INSTALLATION OF PIPING AND SHALL MAKE REQUIRED ADJUSTMENTS AT NO ADDITIONAL COST TO THE OWNER.
48. CONTRACTOR SHALL FURNISH AND INSTALL ALL VALVES, BALANCING VALVES, BALL VALVES ETC. AS REQUIRED FOR LOCATIONS RECOMMENDED BY THE EQUIPMENT MANUFACTURER AND WHERE REQUIRED BY THE CONTRACT DRAWINGS.
49. ALL PIPING PENETRATIONS THROUGH CORRIDOR WALLS, OTHER THAN FIRE RATED WALLS, FLOORS AND CEILINGS SHALL BE PROPERLY FIRE-STOPPED IN ACCORDANCE WITH CODE AND ALL UL REQUIREMENTS BY THE MECHANICAL CONTRACTOR.
50. IN AREAS WHERE PIPING PENETRATIONS THROUGH WALLS, FLOORS AND CEILINGS ARE EXPOSED, ESCUTCHEONS SHALL BE PROVIDED TO IMPROVE THE APPEARANCE OF ALL PENETRATIONS. PROVIDE ADEQUATE SPACING BETWEEN PIPES THAT RUN PARALLEL THROUGH THESAME WALLS, FLOORS AND CEILINGS. TO ACCOMMODATE THE ESCUTCHEONS OF ALL PIPES WHERE THE WALLS, FLOORS AND CEILING ARE FIRE RATED, THE ESCUTCHEONS SHALL BE PROVIDED HOWEVER THEY SHALL NOT BE PLACED OVER THE PENETRATIONS UNTIL THEY HAVE FIRST BEEN INSPECTED FOR PRIOR CONSTRUCTION AND APPROVED BY THE OWNER'S REPRESENTATIVE.
51. ALL PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMANLIKE MANNER. USE OF WIRE OR METAL STRAPS TO SUPPORT PIPES WILL NOT BE PERMITTED. SPACING OF PIPE SUPPORTS SHALL NOT EXCEED 8 FEET FOR ALL PIPING. PLASTIC PIPING SHALL BE SUPPORTED EVERY 4 FEET.
52. FURNISH AND INSTALL NEW PLUMBING FIXTURES AS INDICATED ON THE ARCHITECTURAL PLANS. PROVIDE ALL WALL STOPS, SUPPLIES, "P" TRAPS, WALL ESCUTCHEON PLATES, URINAL MANUAL FLUSH VALVES, LAVATORY BATTERY POWERED TOUCHLESS FAUCETS AS REQUIRED FOR A COMPLETE INSTALLATION.
53. INSULATE ALL NEW WATER PIPING WITH 1/2" ARMAFLEX INSULATION
54. ALL WORK IS TO BE PERFORMED IN STRICT COMPLIANCE WITH THE NORTH CARLINA PLUMBING CODE.
55. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK, MATERIALS AND LABOR TO SATISFY A COMPLETE WORKING SYSTEM WHETHER SPECIFIED OR IMPLIED.
56. PIPING SHALL BE PVC CHEDULE 40 WITH GLUED JOINTS. SLOPE WASTE AND VENT PIPE PER THE NORTH CAROLINA STATE PLUMBING CODE REQUIREMENTS. PRESSURE TEST NEW WASTE PIPING.
57. INSTALL "P"-TRAPS SERVING EXTERIOR FIXTURES IN CHASE TO PREVENT FREEZING.
58. ALL EXTERIOR WATER SUPPLIES (AFWH, HOSE BIBS) SHALL HAVE DEDECATED INTERIOR ISOLATION VALVES
59. SEE FIXTURE SCHEDULE FOR CONNECTION SIZES FOR SUPPLIES, WASTE AND VENTS TO FIXTURES
60. ALL CHASE WALLS / BATHROOM GROUPS SHALL HAVE SEPARATE ISOLATION VALVES

ELECTRICAL NOTES:

GENERAL.

REFER TO GENERAL AND SPECIAL CONDITIONS, ETC. OF THE CONTRACT REGARDING THE INSURANCE, TEMPORARY UTILITIES AND OTHER ITEMS AFFECTING THIS CONTRACT.

THE WORK COVERED IN THE SPECIFICATIONS AND SHOWN ON THE DRAWINGS CONSISTS OF PROVIDING A COMPLETE SYSTEM INCLUDING LABOR, MATERIALS, ETC..

THE TERM "PROVIDE" USED THROUGHOUT THESE SPECIFICATIONS AND ON DRAWINGS SHALL MEAN "TO FURNISH, INSTALL AND CONNECT WITH ALL RELATED ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION READY FOR USE."

COMPLY WITH ALL CODES, LAWS AND REGULATIONS APPLICABLE TO ELECTRICAL INSTALLATION INCLUDING THE LATEST NATIONAL ELECTRICAL AND ALL OTHER APPLICABLE CODES AND LATEST REVISIONS.

THE ENTIRE INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF THE NORTH CAROLINA STATE BUILDING CODE WHICH INCLUDES THE LATEST EDITION OF THE NATIONAL ELECTRICAL AND ALL OTHER APPLICABLE CODES WITH LATEST REVISIONS.

ELECTRICAL INSPECTIONS SHALL BE COORDINATED AND SCHEDULED WITH THE STATE CONSTRUCTION OFFICE (SCO) INSPECTIONS DEPARTMENT.

CHECK AND VERIFY WITH THE OWNER ALL OTHER CONTRACT DOCUMENTS FOR THE PROJECT, THE EXACT REQUIREMENTS FOR PROVIDING THE REQUIRED AND COMPLETE SERVICES FOR EQUIPMENT SYSTEMS ETC. AS SHOWN OR INDICATED. MINOR CHANGES IN OUTLETS, LIGHT AND EQUIPMENT LOCATIONS MAY BE MADE AT ANY TIME PRIOR TO ROUGHING IN OF THE ELECTRICAL WORK WITHOUT ANY ADDITIONAL COSTS.

SUBMIT A MINIMUM OF EIGHT COPIES OF SUBMITTAL DATA FOR APPROVAL FOR ALL MATERIALS AND EQUIPMENT. FOUR COPIES WILL BE RETURNED. PRIOR TO SUBMITTAL, THE CONTRACTOR SHALL STAMP OR SHOP DRAWINGS AND SUBMITTAL DATA AS APPROVED INDICATING FULL COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS. SHOP DRAWINGS AND SUBMITTAL DATA WILL NOT BE REVIEWED WITHOUT THE APPROVED STAMP.

SHOP DRAWINGS AND SUBMITTAL DATA SHALL BE CLEARLY MARKED AND EQUIPMENT SIZES, CAPACITIES ETC. INDICATED FOR THE PROJECT. INDICATE CLEARLY THE EXACT REQUIREMENTS FOR ACCESS FOR SERVICE AND MAINTENANCE AND MINIMUM CLEARANCE AS REQUIRED BY THE MANUFACTURERS AND FOR COMPLIANCE WITH ALL APPLICABLE CODES. ALL SHOP DRAWINGS SHALL BE SUBMITTED AT THE SAME TIME AS SOON AS POSSIBLE AFTER AWARD OF THE CONTRACT.

NO MATERIALS OR EQUIPMENT SHALL BE PLACED ON THE JOBSITE OR INSTALLED WITHOUT PRIOR APPROVAL BY THE ENGINEER.

FURNISH TO THE ENGINEER TWO SETS OF MARKED UP ELECTRICAL PRINTS WITH ALL ELEVATIONS AND CORRECTIONS SHOWING THE AS BUILT AND DIMENSIONED, IF NECESSARY, LOCATIONS, ELEVATIONS ETC. OF ALL CONDUITS, EQUIPMENT, BOXES ETC. UNDERGROUND, IN WALLS, ABOVE CEILINGS AND OTHERWISE CONCEALED, WHICH WILL REQUIRE SERVICE AND MAINTENANCE.

FURNISH, PLACE AND GROUT NEATLY IN PLACE SCHEDULE 40 STEEL PIPE SLEEVES FOR ELECTRICAL WORK IN WALLS, PARTITIONS, FLOOR SLABS ABOVE GRADE, THROUGH AND BELOW FOOTINGS, FOUNDATIONS, ETC. ALL SLEEVES SHALL BE NEATLY GROUTED IN PLACE. EXTEND VERTICAL IN ALL SLABS MINIMUM 1" ABOVE FINISHED FLOOR AND CAULK WATERTIGHT BETWEEN EACH SLEEVE AND SLAB AND BETWEEN EACH CONDUIT AND SLEEVE.

SEAL AIRTIGHT AROUND ALL CONDUITS, CABLE BOXES, ETC. USE FIRE BARRIER CAULK AND PUTTY EQUAL TO 3M TYPE 503 PUTTY OR TYPE CP-25 CAULK AS APPLICABLE AROUND PENETRATIONS THROUGH FIRE RATED WALLS, PARTITIONS, FLOOR, CEILING, ROOF, ETC.

ARRANGE WORK TO AVOID CUTTING WORK OF OTHER TRADES. WHERE CUTTING IS UNAVOIDABLE, CUT AND PATCH IN A MANNER NOT TO WEAKEN THE STRUCTURE OR ADVERSELY AFFECT THE FINISHED APPEARANCE. REPAIR CUT AREAS TO MATCH ADJACENT WORK.

WATERPROOF ALL CONDUITS ETC. THROUGH WALLS, FLOORS , ROOF, ETC. AND ALL CUT AND PATCHED AREAS WHICH ARE SUBJECT TO MOISTURE PENETRATION.

CODES AND STANDARDS:

MATERIALS INSTALLED IN THIS CONTRACT SHALL CONFORM TO THE STANDARDS LISTED BELOW WHERE SUCH STANDARDS ARE APPLICABLE AND SHALL BE NEW AND FIRST CLASS IN ALL RESPECTS.

UNDERWRITERS LABORATORIES INC. STANDARDS AND APPROVED LISTINGS (UL)

ELECTRICAL TESTING LABORATORIES STANDARDS (ETL)

CERTIFIED BALLAST MANUFACTURERS STANDARDS (CBMS)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION STANDARDS (NEMA)

NORTH CAROLINA STATE BUILDING CODE, LATEST EDITION WHICH INCLUDES THE NATIONAL ELECTRICAL CODE (NEC) WITH LATEST REVISIONS.

INSULATED POWER CABLE ENGINEERS ASSOCIATION STANDARD (IPCEA)

EDISON ELECTRICAL INSTITUTE (EEI)

AMERICAN NATIONAL STANDARDS INSTITUTE STANDARDS (ANSI)

AMERICAN SOCIETY FOR TESTING MATERIALS STANDARDS (ASTM)

ELECTRICAL AND OTHER EQUIPMENT AND/OR MATERIALS THAT ARE DEFECTIVE OR ARE DAMAGED IN THE COURSE OF CONSTRUCTION SHALL BE REMOVED AND REPLACED BY THIS CONTRACTOR AT HIS EXPENSE.

DEPARTURES AND/OR DEVIATIONS FROM THE SPECIFICATIONS SHALL BE REQUESTED IN WRITING BY THE CONTRACTOR FROM THE ENGINEER AND NO SUCH DEPARTURES AND/OR DEVIATIONS SHALL BE MADE WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.

WORKMANSHIP SHALL BE OF THE HIGHEST GRADE, PERFORMED BY MECHANICS SKILLED IN THE INSTALLATION OF THIS TYPE OF WORK AND LICENSED BY THE PROPER AUTHORITIES TO PERFORM THE WORK.

LIGHTING NOTES:

LIGHTING FIXTURES SHALL BE AS SCHEDULED ON THE DRAWINGS.

BALLASTS: FLUORESCENT FIXTURES SHALL BE PROVIDED WITH ELECTRONIC BALLASTS MEETING THE FOLLOWING CRITERIA:

BALLAST TO BE UL LISTED, CLASS P.

BALLAST TO BE SOUND RATED A.

NO PCS BALLASTS WILL BE ACCEPTED.

BALLAST ENCLOSURE SIZE BE SAME AS OR SMALLER THAN MAGNETIC BALLAST.

LIGHT REGULATION SHALL BE +10% INPUT VOLTAGE VARIATION.

BALLAST SHALL HAVE HIGH POWER FACTOR (MINIMUM OF 90%)

LAMP CURRENT CREST FACTOR SHALL BE EQUAL TO OR LESS THAN 1.2.

INPUT CURRENT THIRD HARMONIC SHALL NOT EXCEED ANSI RECOMMENDATIONS (32% TOTAL HARMONIC DISTORTION, 27.5% OF THE THIRD TRIPLETS).

FLICKER SHALL BE 1.5% OR LESS WITH AW LAMP SUITABLE FOR THE BALLAST.

BALLAST DESIGN SHALL WITHSTAND LINE TRANSIENTS PER IEEE 587, CATEGORY A.

BALLAST CASE TEMPERATURE SHALL NOT EXCEED 25 DEG, C RISE OVER 40 DEG. C AMBIENT.

BALLAST SHALL MEET FOC RULES AND REGULATIONS PART 18.

LAMPS: FLUORESCENT LAMPS TYPE T8 LAMPS, 3380 DEG. K, UNLESS OTHERWISE SCHEDULED ON DRAWINGS.

SUPPORT: FIXTURES SHALL BE SUPPORTED FROM THE CEILING STRUCTURE.

CLEANING, PAINTING:

CLEAN ALL CONDUITS, HANGERS, SUPPORTS, PANELS, DEVICES, LIGHTS, ETC. AND LEAVE READY FOR USE OR PAINTING.

TOUCH UP ALL DAMAGED AND SCRATCHED SURFACES ON FACTORY FINISHED EQUIPMENT AND MATERIALS WITH PAINT OF SAME TYPE AND COLOR.

TESTS, INSTRUCTIONS:

PERFORM ALL TESTS AS REQUIRED BY CODES. MEG TEST ALL PANELS TO ELIMINATE GROUNDS AND SHORTS. TEST ALL LIGHTS, RECEPTACLES, EQUIPMENT, ETC. FOR PROPER CONNECTION AND GROUNDING.

CHECK GROUND SYSTEM WITH "EARTH MEGGER". FURNISH THE TEST RESULT TO OWNER AND ENGINEER. THE READINGS SHALL BE 25 OHMS OR LESS.

MAKE SURE THAT ALL LUGS ON ALL FEEDERS ARE TIGHT THROUGHOUT THE CONSTRUCTION.

INSTRUCT OWNER'S REPRESENTATIVE IN PROPER OPERATION AND MAINTENANCE OF ALL SYSTEMS AND EQUIPMENT. FURNISH TO OWNER TWO (2) BOUND COPIES OF ALL OPERATING AND MAINTENANCE DATA INCLUDING GUARANTEES AND SPARE PARTS LIST.

GUARANTEE:

GUARANTEE ALL MATERIALS, EQUIPMENT AND WORKMANSHIP FOR ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY OWNER AS STATED IN WRITING. REPAIR AND/OR REPLACE WITHOUT ANY COST TO THE OWNER ANY DEFECTIVE PART OR PARTS OF THE WORK WITHIN THE GUARANTEE PERIOD FROM THE TIME THE SYSTEM IS PUT INTO OPERATION AS DETERMINED BY THE DATE OF FINAL CERTIFICATE OF PAYMENT WITH EXCEPTIONS AS NOTED.

PROVIDE PERIODICAL INSPECTION AND ADJUSTMENT SERVICE THROUGHOUT THE GUARANTEE PERIOD.

GENERAL DEMOLITION NOTE:

REMOVE EXISTING WIRING AND CONDUIT AND ELECTRICAL DEVICES RENDERED INACTIVE AS A RESULT OF THE RENOVATION WORK. REMOVE WIRING BACK TO THE SOURCE.

PIPING SYSTEMS

Symbol	Description	Symbol	Description
CHS	CHILLED WATER SUPPLY	— — —	DOMESTIC HOT WATER
CHR	CHILLED WATER RETURN	— — — —	DOMESTIC HOT WATER RETURN
CWS	CONDENSER WATER SUPPLY	F	FIRE LINE
CWR	CONDENSER WATER RETURN	NP	NON-POTABLE WATER
DTWS	DUAL TEMPERATURE WATER SUPPLY	SD	STORM
DTWR	DUAL TEMPERATURE WATER RETURN	V	VENT
— - —	DOMESTIC COLD WATER	S	WASTE OR SOIL LINE

MISCELLANEOUS

POINT OF NEW CONNECTION TO EXISTING

EQUIPMENT, PIPING, DUCTWORK, ETC. TO BE REMOVED

VIBRATION ISOLATOR

NEW CONSTRUCTION

EXISTING CONDITION

SPECIAL DESIGNATION

P / 1 — EQUIPMENT (PUMP INDICATED)

2 — SPECIALTY ITEMS (I.E. GAUGE FILTER, ETC.)

REFER / HV-1 — PLAN CONTINUATION REFERENCE

2 / M.1 — DETAIL REFERENCE (TOP=DETAIL NO., BOTTOM=DRAWING NO. SHOWN ON)

A/15B-6 OR A / 15B-6 — DETAIL REFERENCE (TOP= DETAIL NO., BOTTOM=SHEET NO. IN DETAIL MANUAL)

1 — REVISION REFERENCE

3 — PLAN NOTES REFERENCE

PIPING SPECIALTIES

- PIPELINE STRAINER
- DUPLEX STRAINER
- BASKET STRAINER
- FLANGE
- UNION
- 2" AND SMALLER, CAP OR PLUG 2 1/2" AND LARGER, BLIND FLANGE
- THERMOMETER
- THERMOMETER WELL
- FLOW SENSING DEVICE
- TEST PLUG (PRESSURE/TEMP.)
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- DIRECTION OF PITCH (DOWN)
- PIPE FLEXIBLE CONNECTION
- WATER PIPING CONNECTION
- MECHANICAL SHOCKSTOP
- FHC — FIRE HOSE CABINET (FHC)
- FVC — FIRE VALVE CABINET (FVC)
- STP — FIRE STANDPIPE (STP)
- FIXTURE WASTE TRAP
- P-TRAP
- FLOW METER
- PRESSURE SWITCH OR VACUUM SWITCH
- FLOW SWITCH
- AUTOMATIC AIR VENT
- MANUAL AIR VENT
- THERMOSTATIC AIR VENT
- VACUUM BREAKER
- GAUGE CONNECTION (WITH VALVE)
- PRESSURE GAUGE (WITH VALVE)
- DIRECTION OF FLOW
- PIPE GUIDE
- PIPE SLEEVE
- ANCHOR
- WH — WALL HYDRANT (WH)
- HB — HOSE BIBB (HB)
- FD FD — FLOOR DRAIN (FD)
- RD — ROOF DRAIN (RD)
- HD — HUB DRAIN (HD)
- CO CO — CLEANOUT (CO)
- SOIL, STORM, OR WASTE PIPE PLUG

PIPING

SINGLE	DOUBLE	
		ELBOW DOWN
		ELBOW UP
		BOTTOM CONNECTION (45\DEG OR 90\DEG)
		TOP CONNECTION (45\DEG OR 90\DEG)
D	D	45\DEG PIPE RISE(R) /DROP(D)
	N/A	TEE (REFER TOSPECIFICATION FOR SIDE, TOP OR BOTTOM TEE)
		EXISTING PIPING TO REMAIN
		EXISTING PIPING TO BE REMOVED
		PIPE BREAK

VALVES

- BUTTERFLY VALVE
- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- SHUTOFF VALVE (BUTTERFLY VALVE FOR 2 1/2" AND LARGER. BALL VALVE FOR 2" AND SMALLER)
- ECCENTRIC PLUG VALVE
- BALANCING VALVE
- THERMAL EXPANSION VALVE
- SWING CHECK VALVE
- SPRING CHECK VALVE
- TRIPLE DUTY VALVE
- DRAIN VALVE
- LOCKSHIELD GATE VALVE
- PRESSURE REDUCING VALVE (PRV) BACKPRESSURE REGULATOR (BPR)
- REDUCED PRESSURE BACKFLOW PREVENTER (RPBP)
- PRESSURE RELIEF OR SAFETY VALVE
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- BUTTERFLY CONTROL VALVE

GENERAL

ADJ	ADJUSTABLE	MBH	THOUSANDS OF BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MC	MECHANICAL CONTRACTOR
AL	ALUMINUM	MEP	MECHANICAL, ELECTRICAL AND PIPING
ALT	ALTERNATE	MER	MECHANICAL EQUIPMENT ROOM
AP	ACCESS PANEL	NA	NOT APPLICABLE
BOD	BOTTOM OF DUCT	NC	NORMALLY CLOSED
BOP	BOTTOM OF PIPE	NIC	NOT IN CONTRACT
BTU	BRITISH THERMAL UNIT	NO	NORMALLY OPEN
BTUH	BRITISH THERMAL UNITS PER HOUR	NPS	NOMINAL PIPE SIZE
CA	COMBUSTION AIR	NPT	NATIONAL PIPE THREAD
CAV	CONSTANT AIR VOLUME	NTS	NOT TO SCALE
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED	OA	OUTSIDE AIR
CFM	CUBIC FEET PER MINUTE	OC	ON CENTER
CL	CENTERLINE	OED	OPEN END DUCT
CLG	CEILING	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
COND	CONDENSATE/CONDENSER	OFOI	OWNER FURNISHED, OWNER INSTALLED
COP	CENTER OF PIPE	OV	OUTLET VELOCITY
CS	CARBON STEEL	PA	PLANT AIR
CU	COPPER	PC	PLUMBING CONTRACTOR
DB	DRY BULB	PCF	POUNDS PER CUBIC FOOT
DDC	DIRECT DIGITAL CONTROL	PD	PRESSURE DROP
DX	DIRECT EXPANSION	PH	PHASE
EA	EXHAUST AIR	PP	POLYPROPYLENE
EAT	ENTERING AIR TEMPERATURE	PSF	POUNDS PER SQUARE FOOT
EC	ELECTRICAL CONTRACTOR	PSI	POUNDS PER SQUARE INCH
EDR	EQUIVALENT DIRECT RADIATION	PSIA	POUNDS PER SQUARE INCH ABSOLUTE
EL	ELEVATION	PSIG	POUNDS PER SQUARE INCH GAUGE
ESP	EXTERNAL STATIC PRESSURE	PVC	POLYVINYL CHLORIDE
ETR	EXISTING TO REMAIN	RA	RETURN AIR
EWT	ENTERING WATER TEMPERATURE	RPM	REVOLUTIONS PER MINUTE
EXH	EXHAUST	SA	SUPPLY AIR
FA	FRESH AIR INTAKE/ FIELD ADJUSTABLE	SCH	SCHEDULE
FAT	FINAL AIR TEMPERATURE	SOG	SLAB ON GRADE
FC	FAIL CLOSED	SP	STATIC PRESSURE
FE	FUME HOOD EXHAUST	SS	STAINLESS STEEL
FLA	FULL LOAD AMPS	TA	TRANSFER AIR
FLR	FLOOR	TBR	TO BE REMOVED
FO	FAIL OPEN	TC	TEMPERATURE CONTROL
FPI	FINS PER INCH	TOB	TOP OF BEAM
FPM	FEET PER MINUTE	TOD	TOP OF DUCT/TOP OF DECK
FPS	FEET PER SECOND	TOJ	TOP OF JOIST
FTG	FOOTING	TOP	TOP OF PIPE
GA	GAUGE	TOS	TOP OF SLAB
GC	GENERAL CONTRACTOR	TSP	TOTAL STATIC PRESSURE
GE	GENERAL EXHAUST	V	VOLTS
GPM	GALLONS PER MINUTE	VAV	VARIABLE AIR VOLUME
GS	GALVANIZED STEEL	VP	VELOCITY PRESSURE
HP	HORSE POWER/HIGH POINT	VTR	VENT THRU ROOF
IA	INSTRUMENT AIR	WB	WET BULB
IE	INVERT ELEVATION	WC	WATER COLUMN
KO	KNOCK-OUT	WG	WATER GAUGE
LAT	LEAVING AIR TEMPERATURE	X	EXISTING
LP	LOW POINT		
LWT	LEAVING WATER TEMPERATURE		

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Guilford County Schools
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Revisions

Date	#	Description

PHASE

Seal

Project

GCS STERNBERGER ELEMENTARY BOILER REPLACEMENT

STERNBERGER ELEMENTARY

518 NORTH HOLDEN ROAD. GREENSBORO, NORTH CAROLINA 27410

Sheet Title

GENERAL NOTES

Scale

12" = 1'-0"

DRAWN BY:

CHECKED BY:

DATE: 02/19/2016

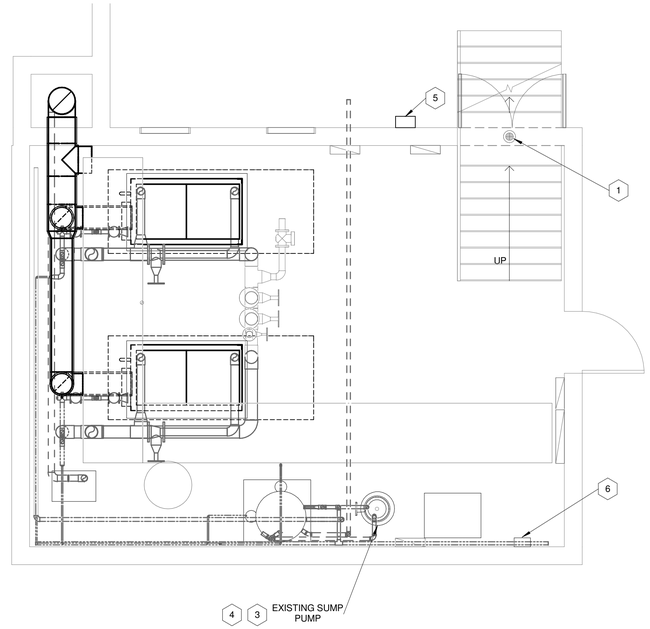
Sheet #

G-0.0

1 STERNBERGER MECHANICAL BOILER ROOM AIRIAL VIEW
NTS

EXTERIOR WATER CONTROL SHEET NOTES:

1. IMPROVE THE GRADING AROUND THE MECH ROOM AREA TO CONTROL THE WATER RUNOFF FROM THE ROOF. NEW GRADING SHALL KEEP WATER FROM ENTERING INTO THE MECH ROOM FROM THE STEPS AND EXISTING LOUVERS.
2. INSTALL NEW GUTTERS OVER MECH ROOM AREA. GUTTERS SHALL ROUTE WATER FROM ROOF AWAY FROM MECH ROOM AREA.
3. RAISE FOUNDATION ON THE SIDES OF THE STEPS GOING INTO THE MECH ROOM BY AT LEAST 12". FOUNDATION SHALL ELIMINATE WATER RUNOFF TO THE SUMP.
4. MECHANICALLY CLEAN ALL FLOOR DRAINS IN THE MECH ROOM TO THE CITY SEWER LINE.
5. CLEAN AND REPAIR EXISTING GUTTERS AT MECHANICAL ROOM AND KITCHEN AREA.



2 MECH BOILER ROOM PLBG NEW LAYOUT
1/4" = 1'-0"

MECH ROOM PLUMBING PLAN KEY NOTES:

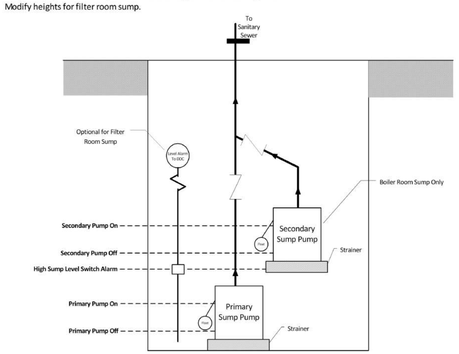
1. MECHANICALLY CLEAN ALL WASTE PIPE AND FLOOR DRAINS IN MECH ROOM.
2. NOT USED.
3. FABRICATE AND INSTALL A NEW GRATE OVER THE SUMP PIT AND REPLACE EXISTING SUMP PUMP PVC PIPING WITH NEW SCH 40 STEEL PIPING.
4. REPLACE EXISTING SUMP PUMP WITH 2 NEW CONDENSATE HEAVY DUTY PUMPS.
5. INSTALL STROBE AND ALARM TO ALERT WHEN SUMP PIT OVERFLOWS.
6. INSTALL UPS FOR SUMP ALARM SYSTEM.

Primary and Secondary Pump Sequence of Operations (Boiler Room Sump)

#	Description	Approx Height (inches)	Comments
6	Top of Sump	45	
5	Secondary Pump On	19	
4	Secondary High Sump	15	
3	High Sump Level Switch Alarm	12	Strobe and audible alarm via DDC, email through DDC and autodialer activated.
2	Primary Pump On	7	
1	Primary Pump Off	3	
0	Bottom of Sump	0	

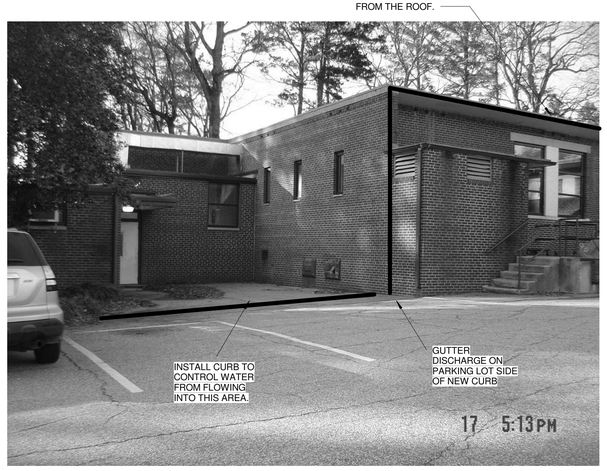
SUMP PUMPS SHALL BE POWERED FROM SEPERATE CIRCUITS

Sump Pumps, level sensors, and DDC Controller powered on stanby panel.
Modify heights for filter room sump.



5 PRIMARY AND SECONDARY SUMP PUMP DETAIL
NTS

3 MECHANICAL BOILER ROOM AREA
NTS



4 WATER RUNOFF FROM GUTTERS
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GCS STERNBERGER ELEMENTARY BOILER REPLACEMENT

STERNBERGER ELEMENTARY
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GREENSBORO, NORTH CAROLINA 27410

Sheet Title
BULK WATER CONTROL PLAN

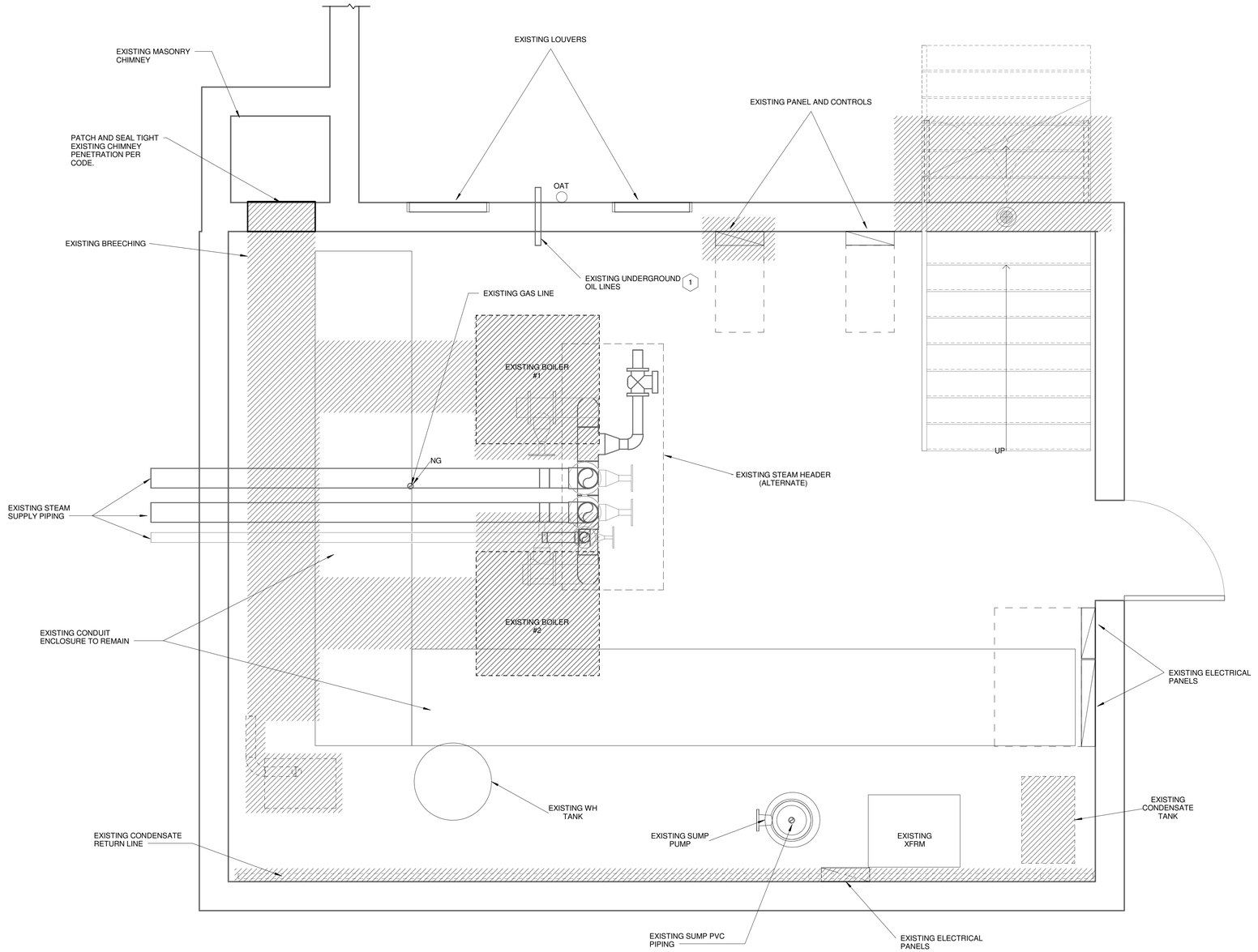
Scale
As indicated

DRAWN BY:

CHECKED BY:

DATE: 02/19/2016

Sheet #
G-1.1



1 MECH BOILER ROOM EXISTING & DEMOLITION PLAN
1/2" = 1'-0"

PLAN NORTH

MECHANICAL ROOM DEMOLITION SHEET NOTES:

A. INSPECT ALL EQUIPMENT BEFORE ANY DEMOLISHING WORK IS DONE. CONTRACTOR TO COORDINATE WITH GCS ON ALL ASBESTOS WORK. ASBESTOS COMPANY SHALL REMOVE ALL ASBESTOS, IF NEEDED.
B. DEMOLISH EXISTING CONDENSATE RETURN PIPING IN THE MECH ROOM AND REPLACE WITH NEW CONDENSATE RETURN LINES.
C. CONTRACTOR SHALL INSPECT ALL PIPING. REPLACE DAMAGED OR RUSTED PIPING AS NEEDED.
D. DEMO EXISTING WATER HEATER VENT AND INSTALL NEW WATER HEATER VENT.
E. DEMO EXISTING LOUVERED DOOR AND REPLACE WITH NEW FULLY LOUVERED DOOR.
F. DEMO EXISTING CONDENSATE TANK AND EQUIPMENT PAD.
G. REPAIR ALL DAMAGES IN THE FLOOR OVER ALL FLOOR DEMOLISHED EQUIPMENT. PAVE AND FILL FLOOR DAMAGES TO CONFORM TO EXISTING.
H. DEMO EXISTING SUMP PVC PIPING AND REPLACE WITH NEW SCH 40 STEEL PIPING.

MECHANICAL ROOM DEMOLITION KEY NOTES: ⬡

1. CAP AND SEAL WATERTIGHT EXISTING UNDERGROUND OIL LINES.

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Sheet Title
BOILER ROOM EXISTING MECHANICAL PLAN

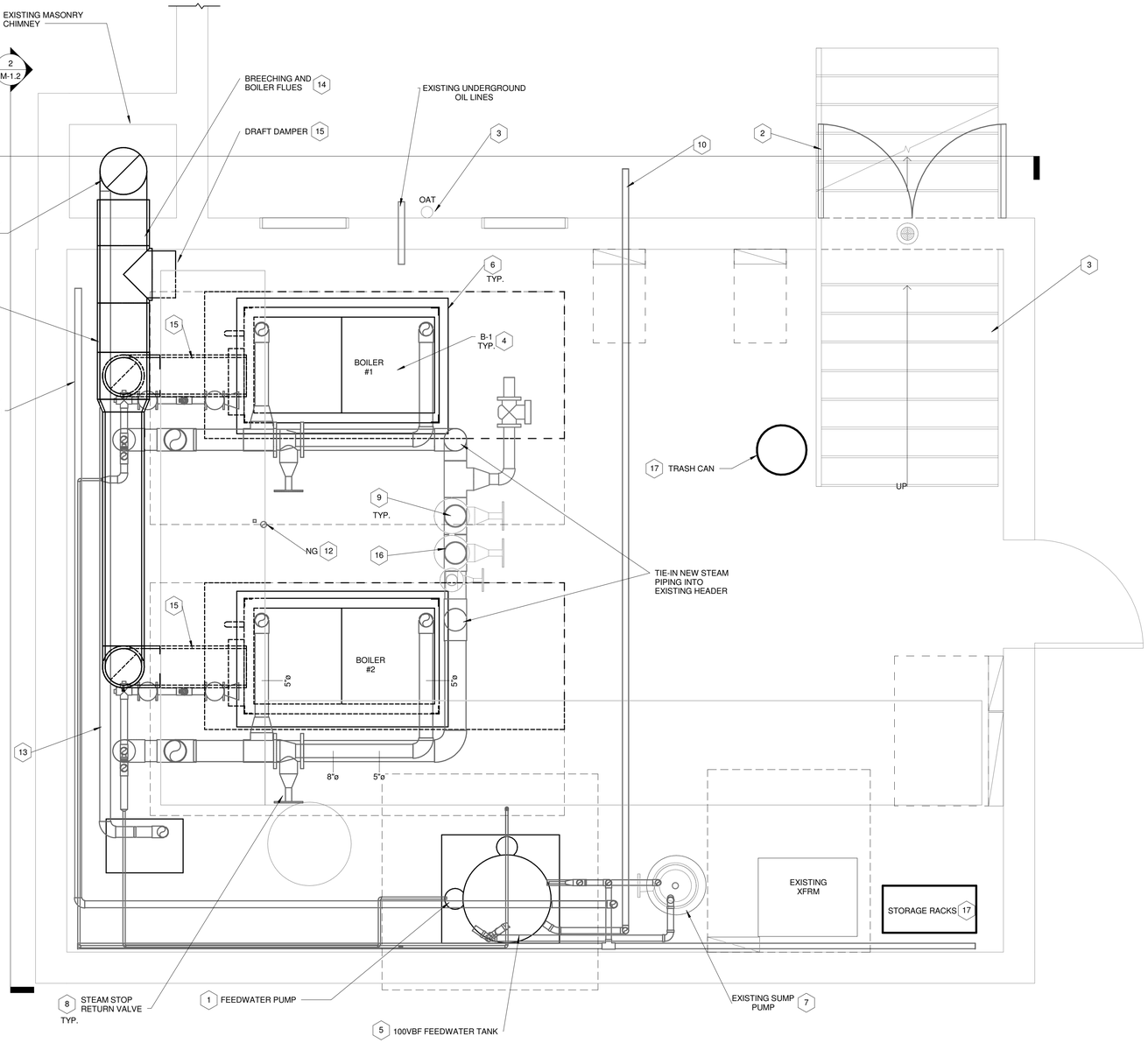
Scale
1/2" = 1'-0"

DRAWN BY:

CHECKED BY:

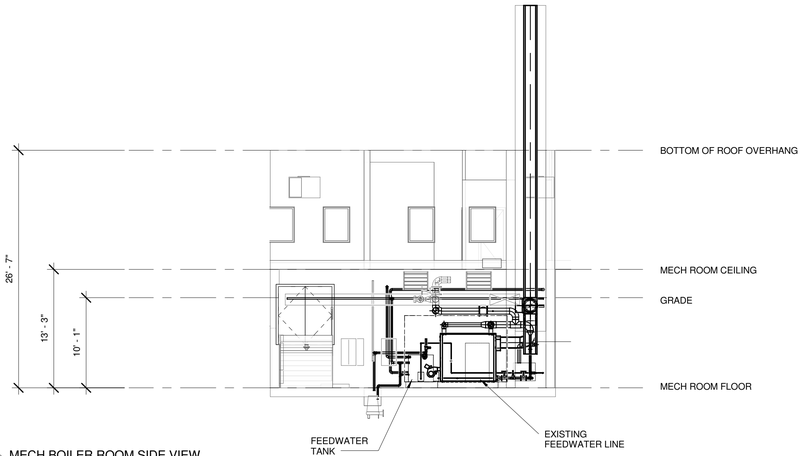
DATE: 02/19/2016

Sheet #
M-1.1

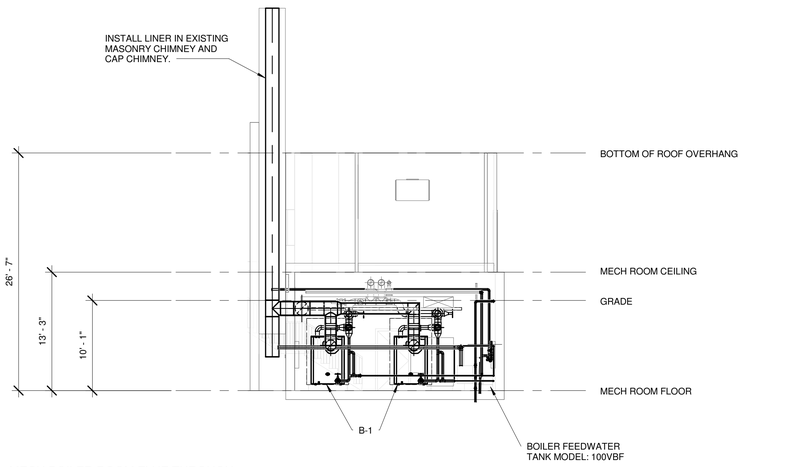


1 MECH BOILER ROOM NEW LAYOUT
1/2" = 1'-0"

PLAN NORTH



3 MECH BOILER ROOM SIDE VIEW
1/8" = 1'-0"



2 MECH BOILER ROOM FLUE THROUGH CHIMNEY SECTION VIEW
1/8" = 1'-0"

MECHANICAL BOILER ROOM NEW WORK SHEET NOTES:

A. INSTALL 2" INSULATION ON ALL STEAM, DOMESTIC WATER, AND CONDENSATE PIPING.
B. CLEAN WALLS, PRIME AND PAINT MECH ROOM WITH 2 COATS OF PAINT. CONTRACTOR TO INSTALL RACKS AND TRASH CANS IN MECH ROOM.
C. OIL LINE SHALL BE COMPLETELY SEALED.
D. INSPECT ALL EQUIPMENT BEFORE ANY DEMOLISHING WORK IS DONE. MECHANICAL CONTRACTOR SHALL COORDINATE WITH GCS ASBESTOS CONTRACTOR ON ALL EQUIPMENT ASBESTOS REMOVAL.
E. DEMOLISH AND REPLACE EXISTING CONDENSATE RETURN LINE.
F. PIPE AROUND EXISTING ELECTRICAL CONDUIT BOX. IF OVER OR ABOVE CONDUIT BOX, INSTALL ENOUGH INSULATION TO CONTAIN STEAM PIPING HEAT.
G. SEPERATE THE HARTFORD LOOP FOR BOTH BOILERS.
H. CONTRACTOR SHALL INSPECT ALL PIPING. REPLACE DAMAGED OR RUSTED PIPING AS NEEDED.
I. CONTRACTOR SHALL MECHANICALLY CLEAN ALL EXISTING FLOOR DRAINS TO THE CITY SEWER LINE.
J. ROUTE FEEDWATER TANK AND BOILER WASTE TO SUMP.
K. CONTRACTOR TO VERIFY ALL PIPING SIZES PER NC CODE AND MANUFACTURER'S REQUIREMENTS.
L. BOILER AND LEVEL CONTROL BLOW DOWNS SHALL BE PIPED TO SUMP.

MECHANICAL BOILER ROOM NEW LAYOUT KEY NOTES:

1. FEEDWATER TANK PUMPS SHALL INDIVIDUAL SERVE ONLY ONE BOILER. INSTALL A SUCTION SIDE ISOLATION VALVE ON EACH FEEDWATER TANK PUMP.
2. REPLACE EXISTING MECH ROOM DOORS WITH NEW FULLY LOUVERED DOORS.
3. REPAIR CONCRETE, STAIRS, AND RAILINGS. REPLACE DAMAGED STAIR NOSES.
4. INSTALL 2 NEW BOILERS.
5. INSTALL NEW BOILER FEEDWATER TANK. INSTALL FLOAT IN THE RECEIVER. CONNECT NEW MAKE-UP WATER PIPING TO EXISTING MAKE-UP WATER PIPING.
6. PROVIDE AN 8" CONCRETE SLAB FOR BOILERS AND FEEDWATER TANK.
7. FABRICATE AND INSTALL A NEW GRATE OVER THE SUMP PIT AND REPLACE EXISTING SUMP PUMP WITH 2 NEW CONDENSATE DUTY PUMPS IN PARALLEL. PROVIDE REPLACE PVC PIPING AND CHECK VALVE TO SUMP WITH NEW SCH 40 STEEL PIPING.
8. INSTALL A STEAM STOP CHECK VALVE. SEE BOILER RISERS.
9. INSPECT AND SERVICE ISOLATION VALVES ON EXISTING STEAM HEADER; REPLACE VALVES IF NEEDED.
10. VENT FEEDWATER TANK TO EXTERIOR.
11. NOT USED
12. CONTRACTOR SHALL VERIFY GAS LINE LOCATION. CONTRACTOR IS RESPONSIBLE FOR GAS LINE TO NOT CONFLICT WITH NEW BOILER LOCATIONS.
13. INSTALL NEW WH FLUE 18" - 24" BELOW BOILER COMMON BREECHING. TIE WATER HEATER FLUE INTO NEW CHIMNEY LINER. ADJUST MOUNTING HEIGHT OF EXISTING WATER HEATER SUPPORT AND REPIPE WATER HEATER NEEDED TO ACCOMODATE NEW VENT.
14. INSTALL DOUBLE WALL INSULATED VENT PIPE ON ALL APPLIANCE VENTING INTERIOR TO THE MECHANICAL ROOM. VAN PACKER MODEL DW OR EQUIVALENT WITH 1" INSULATION.
15. INSTALL DRAFT AND BALANCE DAMPERS.
16. INSTALL STEAM TRAP ON HEADER.
17. INSTALL HEAVY DUTY TRASH CAN AND SOTRAGE RACKS.

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Sheet Title

BOILER ROOM NEW LAYOUT MECHANICAL PLAN AND SECTIONS

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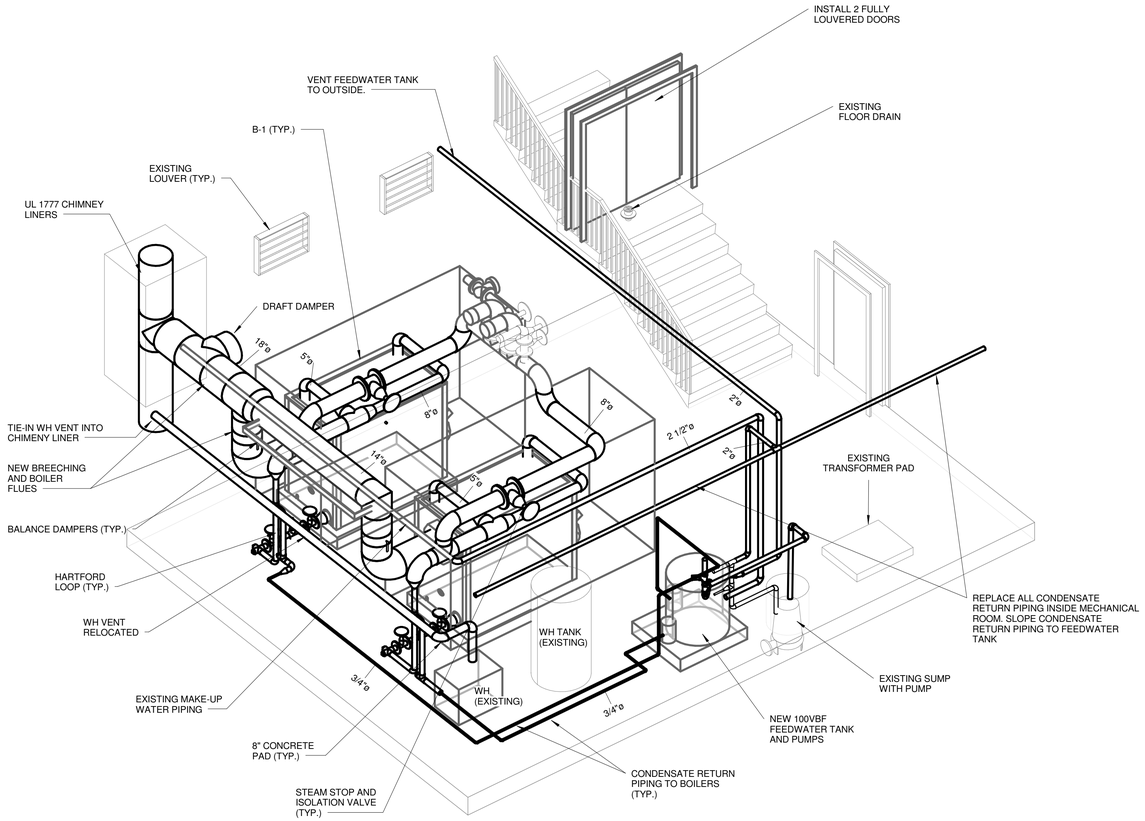
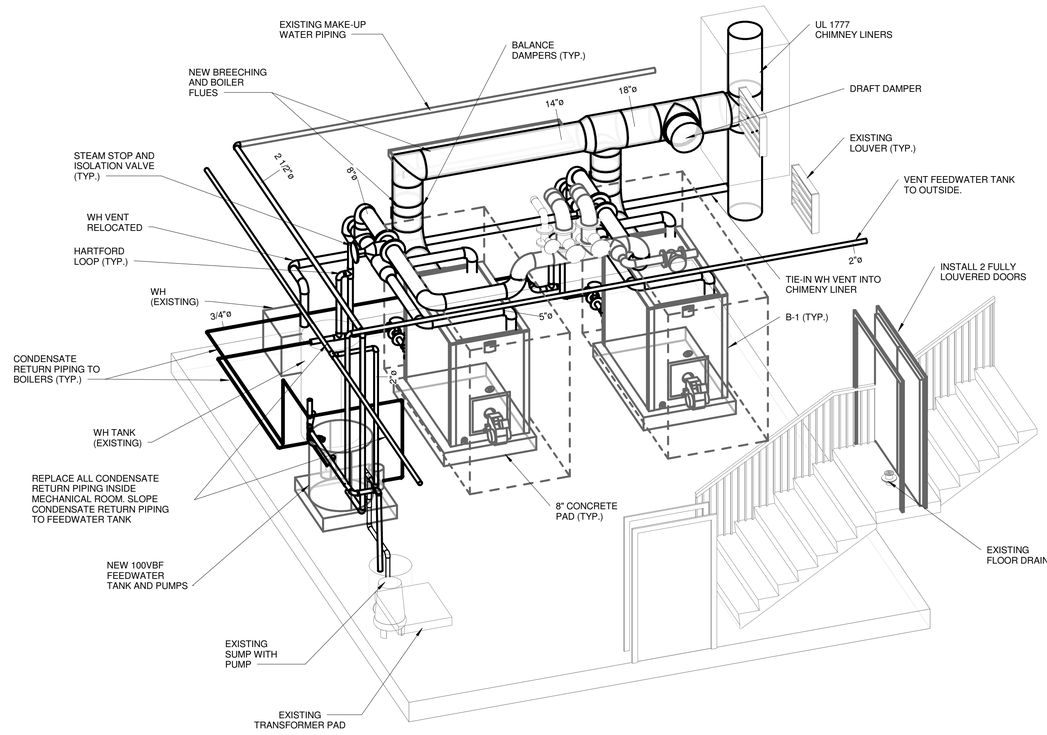
M-1.2



1 BOILER REAR - RISER DIAGRAM



2 BOILER FRONT - RISER DIAGRAM

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BOILER ROOM RISER DIAGRAMS

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M-1.3

BOILER SCHEDULE

		BOILER CAPACITY				FUEL GAS DATA			ELECTRICAL DATA		BASIS OF DESIGN		
MARK	ITEM	MAX. INPUT (NG) (BTU)	MAX. OUTPUT (NG) I=B=R NET OUTPUT (BTU)	BOILER HP	MAX. OPERATING PRESSURE (PSIG)	FUEL	VENT SIZE - FORCED DRAFT (IN)	COMBUSTION FREE AREA REQUIRED (IN^2 / BTU)	VOLT	PHASE	MANUFACTURER	MODEL	REMARKS
B-3	BOILER, STEAM	3,082,000	1,988,000	76.5	15	NG	14	2,055	120	1	WEIL-MCLAIN	1088	

PUMP SCHEDULE

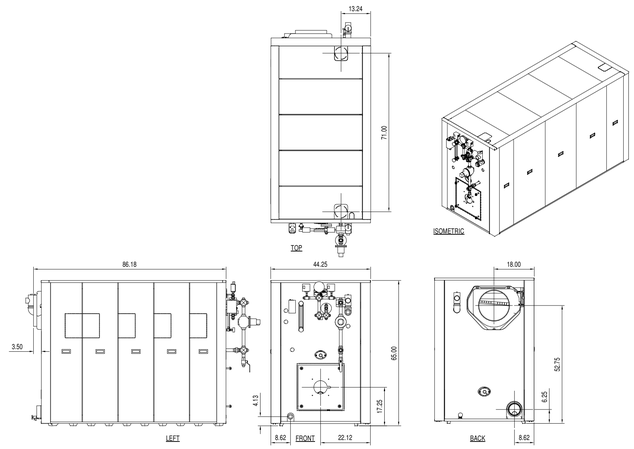
						FEEDWATER TANK		ELECTRICAL DATA						BASIS OF DESIGN		
MARK	NO. OF PUMPS	SYSTEM AND/OR SERVICE	PUMP CAPACITY (EACH) (GPM AT 15PSI)	MIN RECEIVER SIZE (CAPACITY)	DISCHARGE PRESSURE	FEEDWATER TANK MANUFACTURER	FEEDWATER TANK MODEL	VOLT RANGE	VOLTAGE (V)	PHASE (PH)	AMPS	HP	MAX RPM	PUMP MANUFACTURER	PUMP MODEL NO	REMARKS
CP-1	2	CONDENSATE PUMP AND RECEIVER	6	14	30			115/230	115	1	20	0.5	1750	B & G	63CC	
FW-1	2	FEEDWATER PUMP AND RECEIVER	8.7	100		HOFFMAN SPECIALTY	100VBF	115/230	115	1	14	0.33	3500	B & G	C35 609	CENTRIFUGAL PUMP

AVAILABLE COMBUSTION AIR CALCULATION

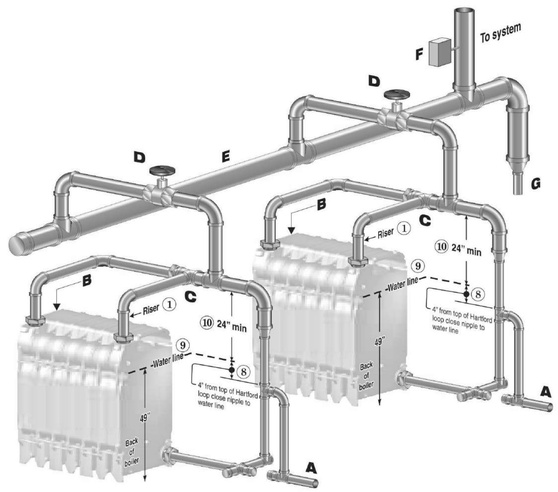
					DIMENSIONS					
QTY	MARK	ITEM	DESCRIPTION	SERVICE	W (IN)	H (IN)	GSF	DESIGN MIN FREE AREA (%)	MIN FREE AREA (SF)	REMARKS
2	LU-1	LOUVER	WALL MOUNTED	COMBUSTION AIR	33	21	9.6	50%	4.8	EXISTING
2	DL-1	DOOR LOUVER	30 X 80	COMBUSTION AIR	30	80	33.3	50%	16.7	NEW CONSTRUCTION
	TOTAL						43.0		28.2	

REQUIRED COMBUSTION AIR CALCULATION

QTY	APPLIANCE	INPUT BTU / HR	IN^2 / BTU	IN^2 / BTU	FREE AREA REQUIRED (IN^2)	FREE AREA REQUIRED (SF)	REMARKS
1	HEATER, WATER -	225,000	1/3000	1/3000	75	0.52	EXISTING
2	BOILER - B-3	6,164,000	1/3000	1/3000	2,055	14.27	
TOTAL REQUIRED					2130	15	



2 WM 1088 STEAM BOILER DETAIL
NTS



WEIL-MCLAIN 1088 BOILER RISER NOTES

1. Riser pipes (one for each supply intermediate section)
2. Horizontal pipes needed to offset the header to allow for expansion and contraction of the header
3. Steam supply must be located between last riser connection and equalizer elbow
4. Equalizer elbow — full size or reducing
5. Equalizer pipe
6. Close nipple at Hartford loop tee to reduce water hammer potential
7. Condensate return line (gravity or pumped)
8. Minimum 4 inches between water line and top of Hartford loop return nipple
9. Boiler water line — all automatic water level controls must be set to maintain this level
10. Minimum 24 inches between water line and bottom of header

NOTES TO BOILER RISER DIAGRAM:

A. Pipe as shown for gravity return systems, connecting point A to the wet gravity return. For pumped-return systems, install boiler water level control on each boiler with body mark at level indicated **in Figure 42, page 28.** Provide at point A either: Separate feed pumps and check valves for each boiler, or Single feed pump, with separate solenoid valve for each boiler.

B. For pumped-return systems, install a combination float and thermostatic trap on each boiler to prevent flooding of one boiler while other boiler is firing. Install trap in skim tapping **(see Figure 39, page 27)**. Connect traps to condensate receiver. Gravity-return systems are self-levelling if the wet returns are piped to the common system wet return.

C. Install boiler piping as shown **in the preceding pages of this manual.**

D. Install stop valves per ASME code requirements. For pump-return systems, if using automatic steam valves, use only slow-opening automatic valves. Use a Weil-McLain Boiler Control System (such as a BCP panel) to open each steam valve automatically before firing burner.

E. Construct common supply drop header with pipe size at least same size as largest boiler header size.

F. Use: A Weil-McLain Boiler Control System (such as a BCP panel) with header-mounted pressure control(s) to sequence boilers, or A steam pressure controller.

G. Install drip line in common supply drop header. Gravity-return: Pipe drip line to wet return. Pumped-return: Use combination float and thermostatic trap and drain to condensate receiver.

3 WEIL-MCLAIN DUAL BOILER PIPING RISER
NTS

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MECHANICAL SCHEDULES AND DETAILS

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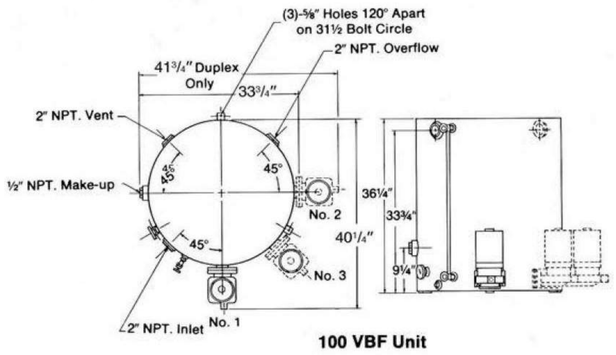
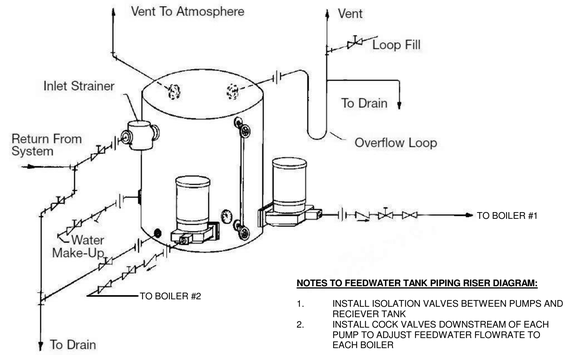


1 100 VBF FEEDWATER TANK PLAN AND SECTION DETAIL
NTS

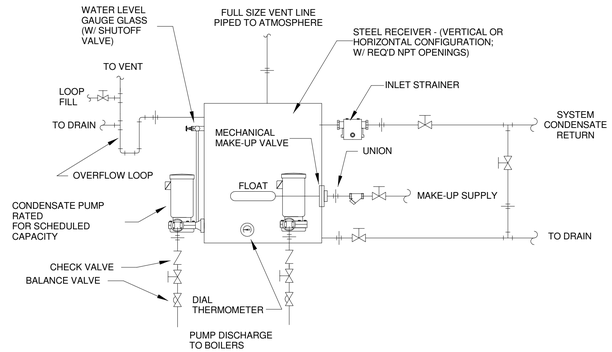
SERIES VBF



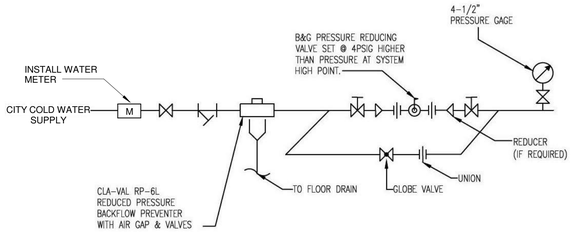
NOTES TO FEEDWATER TANK PIPING RISER DIAGRAM:

1. INSTALL ISOLATION VALVES BETWEEN PUMPS AND RECIEVER TANK
2. INSTALL COCK VALVES DOWNSTREAM OF EACH PUMP TO ADJUST FEEDWATER FLOWRATE TO EACH BOILER

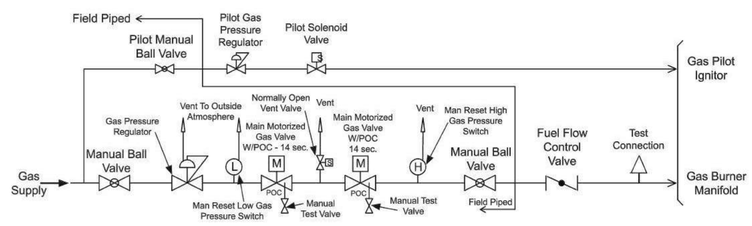
2 100 VBF FEEDWATER TANK PIPING RISER DIAGRAM
NTS



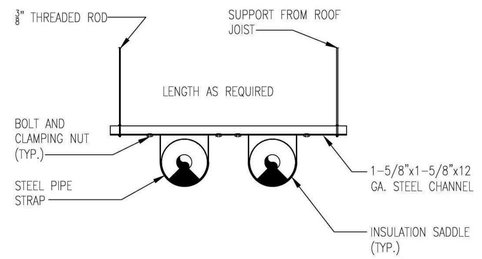
3 100 VBF FEEDWATER TANK PUMP PACKAGE DETAIL
NTS



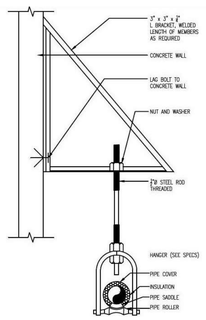
4 MAKE UP WATER DETAIL
NTS



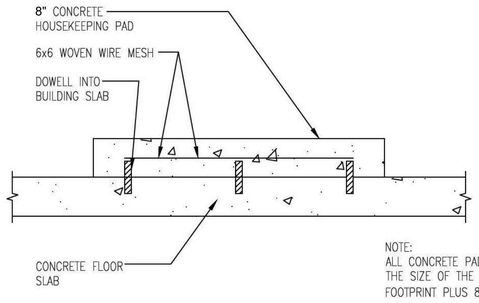
5 GAS TRAIN DETAIL
NTS



6 PIPE HANGER DETAIL
NTS



7 PIPE SUPPORT DETAIL
NTS



9 CONCRETE EQUIPMENT PAD DETAIL
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CONDENSATE PUMP LOCATION PLAN SHEET NOTES:

A. REPLACE EXISTING CONDENSATE PUMPS.
B. REPAIR EXISTING CONDENSATE PUMPS CONCRETE PADS
C. CONDENSATE PUMPS SHALL USE EXISTING PUMP CONTROLS.
D. VENT CONDENSATE RECEIVERS TO EXTERIOR OF BUILDING. PIPE OVERFLOWS TO DRAIN.

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1 CONDENSATE PUMPS LOCATIONS PLAN
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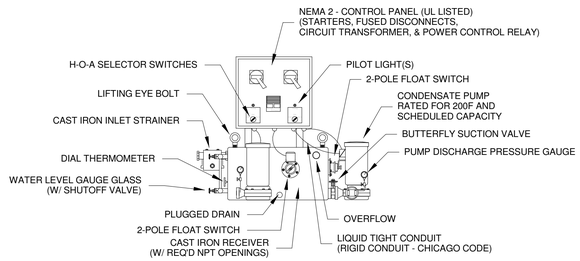
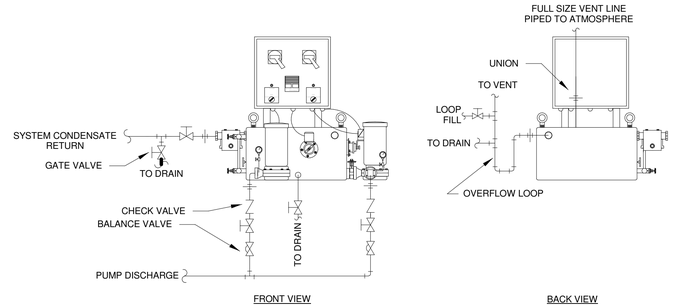
2 CRAWL SPACE CONDENSATE PUMP (CP-1) LOCATION
12" = 1'-0"

3 MECHANICAL ROOM CONDENSATE PUMP (CP-1) LOCATION
12" = 1'-0"





5 DUPLEX CONDENSATE PUMP PACKAGE DETAIL
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CONDENSATE PUMP LOCATIONS AND KITCHEN PLAN

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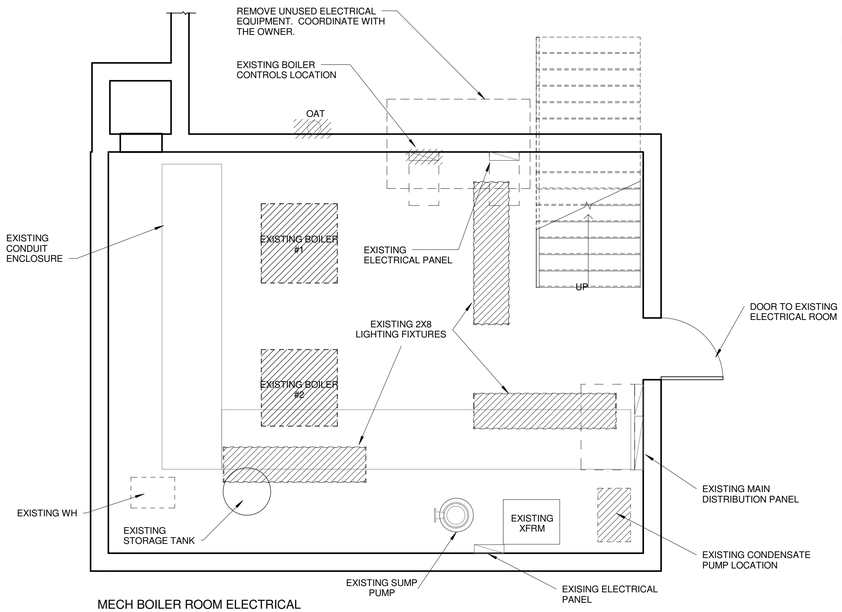


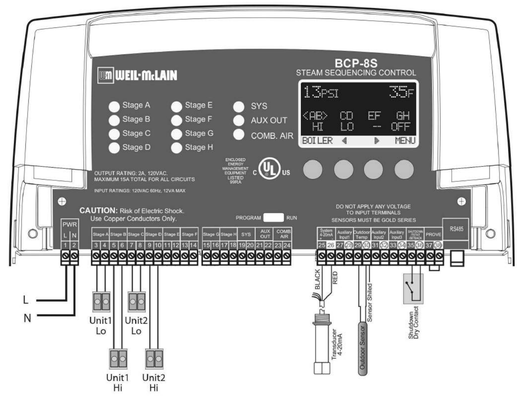
1 MECH BOILER ROOM ELECTRICAL DEMOLITION PLAN
1/4" = 1'-0"

MECH ROOM ELECTRICAL PLAN SHEET NOTES:

A. ALL ELECTRICAL EQUIPMENT AND CONNECTIONS SHALL BE VERIFIED BY THE ELECTRICAL CONTRACTOR. CONTRACTOR SHALL SIZE EQUIPMENT CIRCUITS PER NEC AND EQUIPMENT REQUIREMENTS.
B. MAINTAIN ELECTRICAL CLEARANCE FOR NEW EQUIPMENT.

MECH ROOM ELECTRICAL DEMOLITION KEY NOTES:

1. DEMO EXISTING BOILER CONTROL PANEL AND REPLACE WITH NEW PANEL.
2. RELOCATE EXISTING OAT. NEW OAT LOCATION SHALL BE OUT OF CONTACT WITH DIRECT SUNLIGHT.



3 WEIL-MCLAIN BOILER WIRING CONTROL DIAGRAM
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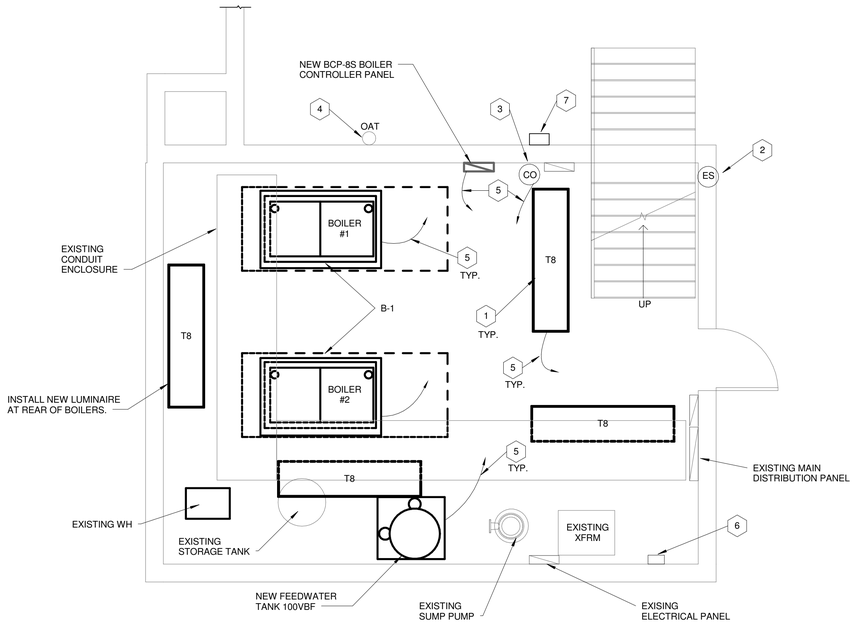
GENERAL NOTES TO WEIL-MCLAIN BOILER WIRING CONTROL DIAGRAM:

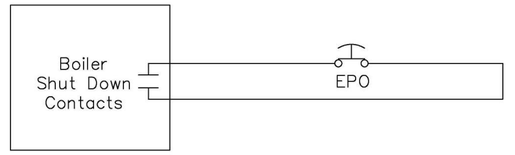
1. BOILER SHUTDOWN CONTACT SHALL BE WIRED TO CO SENSOR SET AT 30 PPM.
2. CONFIGURE ALL CONTROLLER FUNCTIOALITY APPLICABLE TO THIS INSTALLATION.



2 MECH BOILER ROOM ELECTRICAL NEW LAYOUT
1/4" = 1'-0"

MECH ROOM ELECTRICAL PLAN KEY NOTES:

1. REPLACE EXISTING LUMINAIRES WITH NEW T8 LUMINAIRES. SEE LUMINAIRE SCHEDULE.
2. INSTALL A EMERGENCY BOILER SHUT OFF SWITCH.
3. INSTALL CARBON MONOXIDE SENSOR IN MECH ROOM. WIRE CARBON MONOXIDE SENSOR TO SHUTDOWN BOILER.
4. RELOCATE EXISTING OAT 1 FOOT BELOW ROOF OVERHANG. OAT SHALL NOT BE IN CONTACT WITH DIRECT SUNLIGHT.
5. USE EXISTING CIRCUITS FOR BOILERS, LIGHTING, CONTROLS, AND CONDENSATE AND FEEDWATER PUMPS.
6. INSTALL UPS.
7. INSTALL STROBE AND ALARM TO ALERT WHEN SUMP PIT OVERFLOWS.



EPO Shall be a trigger action emergency stop mushroom head push button (red in color) normally open, 30mm diameter head and turn to release. Provide with standard legend plate with circular legend 45mm diameter, yellow with "Emergency Stop" text

4 BOILER SHUT DOWN DETAIL
NTS

LUMINAIRE SCHEDULE									
							LAMPS	BASIS OF DESIGN	
ITEM	DESCRIPTION	LOCATION	MOUNTING SURFACE	MOUNTING TYPE	VOLTAGE RANGE (LUMINAIRE)	RANGE OF LAMPS	LAMP TYPE	MANUFACTURER	SERIES
LUMINAIRE, CEILING - 1X8	1X8 MECHANICAL ROOM LIGHT	INTERIOR	CEILING	SURFACE/SUSPENDED	120-277	2 LAMPS	T8	LITHONIA	UNS

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