GENERAL ELECTRICAL NOTES:

ADMINISTRATIVE:
1. THE FOLLOWING ABBREVIATIONS SHALL APPLY TO NOTES AND PLANS: PC – PLUMBING CONTRACTOR, EC – ELECTRICAL CONTRACTOR, MC – MECHANICAL CONTRACTOR, GC – GENERAL CONTRACTOR, FASC – FIRE ALARM SYSTEM CONTRACTOR.
2. "PROVIDE" MEANS TO FURNISH AND INSTALL. THE ELECTRICAL CONTRACTOR SHALL ALSO INSTALL MATERIALS AND EQUIPMENT FURNISHED BY OTHERS AND THE GENERAL CONTRACTOR AS REQUIRED.
3. EC SHALL PROVIDE LABOR, MATERIALS, EQUIPMENT, AND SERVICES NECESSARY AND REASONABLY INCIDENTAL TO INSURE A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS. MINOR ITEMS, ACCESSORIES, AND DEVICES REASONABLY INFERABLE AS NECESSARY FOR THE COMPLETION AND PROPER OPERATION OF ANY ELECTRICAL SYSTEM SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.
4. WORKMANSHIP SHALL BE IN ACCORDANCE WITH NECA 1 "STANDARD PRACTICE FOR GOOD WORKMANSHIP IN ELECTRICAL CONTRACTING."
5. ALL MATERIALS AND EQUIPMENT SHALL BE DELIVERED TO THE SITE AND UNLOADED BY THE ELECTRICAL CONTRACTOR AT AN APPROVED LOCATION. THE ELECTRICAL CONTRACTOR SHALL PROTECT ALL MATERIALS AND EQUIPMENT FROM BREAKAGE, THEFT, AND THE ELEMENTS. ALL MATERIALS AND EQUIPMENT SHALL REMAIN THE PROPERTY OF THE ELECTRICAL CONTRACTOR UNTIL THE PROJECT HAS BEEN COMPLETED AND TURNED OVER TO THE OWNER.
6. THE ELECTRICAL CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, FEES, AND INSPECTIONS NECESSARY FOR THE COMPLETION OF THE WORK UNDER THIS CONTRACT.
7. DO NOT SCALE THESE DRAWINGS–REFER TO ARCHITECTURAL SHEETS FOR DIMENSIONS.
8. TRADE NAMES AND MANUFACTURERS ARE SPECIFIED TO ESTABLISH A QUALITY STANDARD. SUBSTITUTIONS SHALL BE PERMITTED IF APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. ALL LISTED MODEL NUMBERS SHALL BE VERIFIED WITH THE MANUFACTURER FOR PROPER APPLICATION OF EQUIPMENT.
9. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS. THE ELECTRICAL CONTRACTOR SHALL CONTACT THE ENGINEER TO RESOLVE ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THESE PLANS. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OTHER TRADES PRIOR TO THE START OF CONSTRUCTION.
10. GROUNDING AND BONDING SHALL BE PER NEC ARTICLE 250. THE RACEWAY SYSTEM SHALL NOT BE RELIED UPON FOR GROUNDING CONTINUITY. A GREEN EQUIPMENT GROUNDING CONDUCTOR, SIZED PER NEC TABLE 250–122, SHALL BE RUN IN ALL POWER RACEWAYS. FOR NON–ISOLATED GROUND CIRCUITS PROVIDE ONE EQUIPMENT GROUNDING CONDUCTOR PER CONDUIT RUN. FOR ISOLATED GROUND CIRCUITS, PROVIDE ONE NEUTRAL AND ONE ISOLATED GROUND WIRE FOR EACH CIRCUIT; IN ADDITION, PROVIDE ONE EQUIPMENT GROUNDING CONDUCTOR PER CONDUIT RUN. MAIN BONDING JUMPERS AND SYSTEM BONDING JUMPERS SHALL BE INSTALLED IN ACCORDANCE WITH 250.28 OF THE NEC. FOR BUILDINGS OR STRUCTURES SUPPLIED BY FEEDERS OR BRANCH CIRCUITS, GROUNDING AND BONDING SHALL BE IN ACCORDANCE WITH 250.32. SEPARATELY DERIVED AC SYSTEMS SHALL BE GROUNDED IN ACCORDANCE WITH 250.30. RESISTANCE TO GROUND SHALL NOT EXCEED 25 OHMS; ADDITIONAL GROUNDING ELECTRODES SHALL BE INSTALLED PER 250.56 AS NECESSARY.
11. THE ELECTRICAL CONTRACTOR SHALL ALSO COORDINATE WITH THE GENERAL CONTRACTOR REGARDING THE BONDING OF THE FOOTING REBAR, SO THAT IT WILL BE IN PLACE AND READY AT TIME OF FOOTING INSPECTION.
12. ALL MATERIALS AND EQUIPMENT SHALL COMPLY WITH THE UNDERWRITERS' LABORATORIES, INC. STANDARDS OR HAVE UL APPROVAL, OR BEAR UL RE–EXAMINATION LISTING WHERE SUCH APPROVAL HAS BEEN ESTABLISHED FOR THE TYPE OF DEVICE IN QUESTION.
13. CONDUCTORS, FUSES, CIRCUIT BREAKERS, AND DISCONNECT SWITCHES SHOWN ON THESE PLANS HAVE BEEN SIZED FOR THE SPECIFIED EQUIPMENT. BEFORE ORDERING ELECTRICAL EQUIPMENT, THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OTHER CONTRACTORS ON THE SITE AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES SHOULD CONDUCTOR, CIRCUIT BREAKER, OR FUSE SIZES REQUIRE CHANGE.
14. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE GENERAL CONTRACTOR TO ENSURE THE FOLLOWING MATERIALS ARE RECYCLED DURING THE CONSTRUCTION PHASE OF THE PROJECT: LIGHT FIXTURES, INCLUDING PROPER DISPOSAL OF BALLASTS, FLUORESCENT LIGHT BULBS, AND TRANSFORMERS, WIRING AND ELECTRICAL EQUIPMENT, AND INSULATION. WASTE MATERIALS CONTAINING LEAD, ASBESTOS, PCBs (FLUORESCENT LAMP BALLASTS), OR OTHER HARMFUL SUBSTANCES SHALL BE HANDLED AND DISPOSED OF IN ACCORDANCE WITH FEDERAL AND STATE LAWS AND REQUIREMENTS CONCERNING HAZARDOUS WASTE.
15. ALL WORK SHALL CONFORM TO 2017 NATIONAL ELECTRIC CODE, 2018 STATE BUILDING CODE, AND ALL APPLICABLE LOCAL CODES.

MATERIALS:
1. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY DISCONNECTS, SWITCHES, RECEPTACLES, TERMINALS, ETC, UNDER THE ELECTRICAL BID AND SHALL INCLUDE ALL NECESSARY CIRCUITS AND CONNECTIONS TO THE EQUIPMENT PROVIDED BY ALL SUPPLIERS, UNLESS NOTED OTHERWISE BY OTHER DISCIPLINES.
2. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL SERVICE ENTRANCE EQUIPMENT, SUB PANELS, AND OTHER ELECTRICAL DISTRIBUTION EQUIPMENT AS NECESSARY FOR A COMPLETE INSTALLATION. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH UTILITY REGARDING SERVICE AND METERING DETAILS. PRIOR TO ORDERING EQUIPMENT, THE ELECTRICAL CONTRACTOR SHALL OBTAIN THE AVAILABLE FAULT CURRENT OR TRANSFORMER SIZE AND IMPEDANCE FROM THE UTILITY AND CONTACT THE ENGINEER IF THE VALUE EXCEEDS THE EQUIPMENT SPECIFIED. PANEL BOARDS AND SWITCH BOARDS SHALL BE SQUARE D, CUTLER–HAMMER, SIEMENS, OR GE. BUSES SHALL BE COPPER UNLESS OTHERWISE APPROVED BY THE ENGINEER. RECESSED PANEL BOARDS SHALL BE INSTALLED FLUSH WITH THE WALL FINISH. METER BASES SHALL COMPLY WITH THE UTILITY'S SPECIFICATIONS AND SHALL BE MOUNTED AT A HEIGHT APPROVED BY THE UTILITY. ALL EQUIPMENT IDENTIFIED FOR SERVICE ENTRANCE USE SHALL BE SO LABELED AND UL LISTED FOR SUCH USE. ELECTRICAL CONTRACTOR SHALL INSTALL ALL ELECTRICAL EQUIPMENT WITH CLEARANCES PER NEC 110.26. ELECTRICIAN SHALL PERMANENTLY LABEL EQUIPMENT PER NEC 110.24.
3. ENCLOSED SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE BY SQUARE D, EATON, OR GE. ENCLOSED SWITCHES SHALL HAVE A HANDLE LOCKABLE IN THE OFF POSITION AND SHALL HAVE A HANDLE INTERLOCKED TO PREVENT OPENING THE FRONT COVER WHILE IN THE ON POSITION. ENCLOSED SWITCHES OF THE FUSIBLE TYPE SHALL BE FUSED IN ACCORDANCE WITH NAMEPLATE DATA WITH DUAL ELEMENT TYPE FUSES BY BUSSMAN, LITTELFUSE, OR MERSEN.
4. OCCUPANCY SENSORS SHALL BE BY WATTSTOPPER, LUTRON, LEVITON, SENSOR SWITCH, HUBBELL, OR APPROVED EQUAL.
5. CIRCUIT BREAKERS SHALL BE MOLDED–CASE, THERMAL MAGNETIC TYPE WITH QUICK–MAKE, QUICK–BREAK MECHANISM, COMMON TRIP ON MULTI–POLE BREAKERS, AND UL LISTED FOR BOTH COPPER AND ALUMINUM CONDUCTORS. CIRCUIT BREAKERS IN PANELS SHALL BE SERIES RATED WITH THE MAIN BREAKER, FULLY RATED FOR THE SYSTEM, OR SERIES RATED WITH THE BREAKER FEEDING THE PANEL FROM THE FACTORY.
6. ALL WIRE, CONNECTORS, TERMINALS, AND LUGS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. WHERE CONDUCTORS ARE RUN IN PARALLEL, LUGS SHALL BE LISTED FOR PARALLEL CONDUCTORS. PUSH WIRE CONNECTORS ARE NOT ALLOWED FOR BUILDING WIRE. PUSH CONNECTORS ARE ONLY ALLOWED, WHEN APPROVED, AS PART OF MANUFACTURED LISTED PRODUCTS. ALL WIRE SHALL BE INSTALLED IN CONDUIT UNLESS SPECIFICALLY NOTED OTHERWISE.
7. THE INSULATION TYPE FOR INTERIOR WIRING SHALL BE DUAL RATED THHN/THWN OR XHHW; ALL WIRING INSTALLED BELOW GRADE OR IN MOIST OR WET LOCATIONS SHALL HAVE TYPE THWN OR XHHW INSULATION. INSULATION VOLTAGE RATING SHALL BE 600 VOLTS AND A MINIMUM TEMPERATURE RATING OF 75°C. CONDUCTORS SHALL BE SOLID OR STRANDED COPPER FOR #10 AWG AND #12 AWG, AND STRANDED COPPER FOR #8 AWG AND LARGER SIZES. ALL WIRING AND CABLE SHALL BE UL LISTED. ALL TERMINATIONS AND DEVICES SHALL BE RATED FOR USE WITH 75°C CONDUCTORS. FINAL CONNECTIONS TO ALL MOTORS AND EQUIPMENT SUBJECT TO VIBRATION OR MOVEMENT SHALL BE MADE WITH STRANDED COPPER CONDUCTORS. CONDUCTORS SHALL BE BY CERRO WIRE, INC, INDUSTRIAL WIRE & CABLE, INC, OR SOUTHWIRE COMPANY.
8. JOINTS IN SOLID CONDUCTORS SHALL BE SPLICED USING IDEAL "WIRE NUTS", 3M "SCOTCH LOCK", OR T&B "PIGGY" CONNECTORS IN JUNCTION BOXES, OUTLET BOXES, AND LIGHTING FIXTURES. JOINTS IN STRANDED CONDUCTORS SHALL BE SPLICED BY APPROVED MECHANICAL CONNECTORS AND GUM RUBBER TAPE OR FRICTION TAPE. SOLDERLESS MECHANICAL CONNECTORS FOR SPLICES AND TAPS, PROVIDED WITH UL APPROVED INSULATING COVERS, MAY BE USED INSTEAD OF MECHANICAL CONNECTORS PLUS TAPE. IN ALL CASES, CONDUCTORS SHALL BE CONTINUOUS FROM OUTLET TO OUTLET AND NO SPLICING SHALL BE MADE EXCEPT WITHIN OUTLET OR JUNCTION BOXES, TROUGHS, OR GUTTERS. WHERE CONCENTRIC, ECCENTRIC, OR OVERSIZED KNOCKOUTS ARE ENCOUNTERED, A GROUNDING TYPE INSULATED BUSHING SHALL BE PROVIDED.
9. ALL LUMINAIRES SHALL BE LISTED. LUMINAIRES IN WET OR DAMP LOCATIONS SHALL BE MARKED AS SUITABLE FOR THE RESPECTIVE USE. EMERGENCY LIGHTING SHALL BE INSTALLED AS SHOWN. FINAL LOCATIONS OF ALL EXIT AND EMERGENCY LIGHTS SHALL BE VERIFIED WITH THE BUILDING INSPECTOR PRIOR TO INSTALLATION. ALL FLUORESCENT FIXTURES SHALL HAVE ELECTRONIC BALLASTS MEETING ANSI C82.11 FOR ELECTRONIC BALLAST PERFORMANCE. ALL BALLASTS SHALL BE UL LISTED AND MEET FEDERAL AND STATE EFFICIENCY REQUIREMENTS.
10. ALL CONDUIT, FITTINGS, COUPLINGS, AND SUPPORTS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. CONDUIT FITTINGS AND COUPLINGS SHALL BE BY APPLETON, RACO, OR O–Z/GEDNEY. COUPLINGS SHALL BE THREADED, SET–SCREW, OR COMPRESSION TYPE. INDENTER OR CRIMP TYPE ARE NOT PERMITTED. CONDUIT FITTINGS AT ALL ELECTRICAL BOXES INCLUDING PULL, JUNCTION, AND OUTLET BOXES, SHALL HAVE INSULATED THROATS TO PREVENT INSULATION SCORING. DIE CAST FITTINGS ARE NOT PERMITTED
11. EMT SHALL BE MANUFACTURED IN ACCORDANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE–AMERICAN NATIONAL STANDARD FOR STEEL ELECTRICAL METALLIC TUBING (EMT), ANSI C80.3 AND UL 797. RIGID METAL CONDUIT SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI–AMERICAN NATIONAL STANDARD FOR ELECTRICAL RIGID STEEL CONDUIT (ERSC), ANSI C80.1 AND UL 6. INTERMEDIATE METAL CONDUIT SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI–AMERICAN NATIONAL STANDARD FOR INTERMEDIATE METAL CONDUIT ANSI C80.6 AND UL 1242.
12. METAL CONDUIT SHALL BE BY ALLIED TUBING & CONDUIT, BECK MANUFACTURING, INC, OR WHEATLAND TUBE COMPANY. FLEXIBLE METAL CONDUIT, LIQUID–TIGHT FLEXIBLE METAL CONDUIT, AND NONMETALLIC CONDUIT SHALL BE BY AFC CABLE SYSTEMS, INC, ELECTRI–FLEX COMPANY, OR INTERNATIONAL METAL HOSE.

METHODS:
1. EC SHALL REVIEW THE MECHANICAL PLANS TO ESTABLISH POINTS OF CONNECTION AND THE EXTENT OF THE ELECTRICAL WORK TO BE PROVIDED IN THE CONTRACT.
2. ALL CIRCUIT BREAKERS FEEDING HVAC EQUIPMENT SHALL BE HACR BREAKERS. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE MINIMUM #12 AWG IN 3/4 in CONDUIT. EACH MULTI–WIRE BRANCH CIRCUIT SHALL BE PROVIDED WITH A MEANS TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT THE SOURCE PER NEC 210.4(B). GROUP ALL CONDUCTORS OF EACH MULTI–WIRE BRANCH CIRCUIT PER 210.4(D) WITH WIRE TIES OR SIMILAR MEANS. DO NOT EXCEED THREE HOMERUNS PER CONDUIT. DO NOT INSTALL ISOLATED GROUND AND NON–ISOLATED GROUND CIRCUITS IN THE SAME CONDUIT. INSTALL CONDUCTORS OF DIFFERENT VOLTAGES IN SEPARATE CONDUITS.
3. COLOR CODE CONDUCTORS PER NEC. FEEDERS SHALL BE IDENTIFIED IN ACCORDANCE WITH NEC 215.12. USE BLACK, RED, AND BLUE FOR PHASES A, B, AND C RESPECTIVELY ON 208Y/120 VOLT THREE–PHASE Y SYSTEMS AND WHITE FOR THE NEUTRAL. ISOLATED GROUND WIRES SHALL BE GREEN WITH YELLOW BANDS OR STRIPES. THIS IDENTIFICATION SHALL BE MADE AT EACH POINT WHERE A CONNECTION IS MADE. COLORS SHALL BE FACTORY APPLIED FOR CONDUCTORS #6 AWG AND SMALLER. ALL EQUIPMENT GROUNDING CONDUCTORS SHALL BE GREEN IN COLOR AND MINIMUM #12 AWG. THE EC SHALL PROVIDE PLENUM RATED CABLE FOR ANY ELECTRICAL, TELEPHONE, COMMUNICATION, OR OTHER CABLE THAT ENTERS CEILING RETURN PLENUMS.
4. ALL LIGHT FIXTURES SHALL BE SUPPORTED INDEPENDENTLY OF THE SUSPENDED CEILING. COORDINATE LIGHTING LAYOUT WITH CEILING GRID, MECHANICAL EQUIPMENT, DUCTWORK AND SPRINKLER HEADS AS NECESSARY. SEE REFLECTED CEILING PLAN FOR DETAILS. FLUORESCENT FIXTURES UTILIZING DOUBLE–ENDED LAMPS MUST HAVE A DISCONNECTING MEANS COMPLYING WITH NEC 410.130(G).
5. MOUNT LIGHT SWITCHES AT 48 in AFF. MULTIPLE SWITCHES AT SAME LOCATION SHALL BE UNDER ONE WALL PLATE. VERIFY WALL PLATE COLOR AND MATERIAL WITH THE ARCHITECT/OWNER. INSTALL SWITCHES WITH off POSITION DOWN. ALL SWITCHES SHALL BE HEAVY DUTY, IVORY PLASTIC WITH TOGGLE HANDLE, RATED 120–277V AC, AND COMPLYING WITH NEMA WD 6 AND WD 1. SWITCHES SHALL BE BY COOPER WIRING DEVICES, LEVITON MANUFACTURING, PASS & SEYMOUR, OR HUBBELL. PROVIDE BOX DEVICE PARTITION/DIVIDERS FOR MULTI–GANG BOXES FOR COMPLIANCE WITH NEC 404.8(B).
6. ELECTRICAL CONTRACTOR SHALL PROVIDE FIRE–STOPPING AT ALL ELECTRICAL PENETRATIONS OF RATED FLOORS AND WALLS TO PRESERVE OR RESTORE THE FIRE–RESISTANCE RATING. SEAL PENETRATIONS USING A UL LISTED SYSTEM FOUND IN THE UL DIRECTORY SPECIFIC TO THE UL LISTING OF THE ASSEMBLY BEING PENETRATED. SEE ARCHITECTURAL PLANS FOR UL RATED ASSEMBLIES SPECIFIC TO THIS PROJECT.
7. ELECTRICAL CONTRACTOR SHALL PROVIDE GFCI RECEPTACLES IN KITCHENS, RESTROOMS, OUTDOORS, AND IN SHOP AREAS AS REQUIRED BY NEC. REFRIGERATORS AND WATER COOLERS MUST HAVE A DEDICATED GFCI BREAKER. EACH OUTDOOR HVAC UNIT MUST HAVE A GFCI RECEPTACLE WITHIN 25 FEET FOR SERVICING. GFCI RECEPTACLES SHALL CONFORM TO UL 943 CLASS A AND UL 498 STANDARDS. SHOW WINDOW RECEPTACLES SHALL BE PROVIDED IN ACCORDANCE WITH 210.62 OF THE NEC. RECEPTACLES SHALL BE BY COOPER WIRING DEVICES, LEVITON MANUFACTURING, PASS & SEYMOUR, OR HUBBELL. ALL RECEPTACLES SHALL BE 125V RATED, HEAVY DUTY, AND COMPLY WITH NEMA WD 6 AND WD 1.
8. LOCATIONS AND HEIGHTS OF ALL WALL–MOUNTED DEVICES SHALL BE COORDINATED WITH THE ARCHITECT PRIOR TO INSTALLATION.
9. CONCEAL ALL CONDUIT EXCEPT IN MECHANICAL ROOMS OR UNFINISHED AREAS AS NOTED. USE EMT CONDUIT FOR ALL BRANCH CIRCUITS AND FEEDERS INSIDE THE BUILDING. TYPE MC CABLE AND TYPE AC CABLE MAY BE INSTALLED WITHIN WALLS IF ALL NEUTRAL WIRES, ISOLATED GROUND WIRES, AND EQUIPMENT GROUND WIRES AS LISTED ABOVE ARE CONTAINED IN THE CABLE. FLEXIBLE CONNECTIONS TO MOTORS AND OTHER EQUIPMENT SHALL BE MADE USING WEATHERPROOF FLEXIBLE CONDUIT. FOR LAY–IN LIGHT FIXTURES, USE MAXIMUM OF SIX (6) FEET OF FLEXIBLE MC CABLE (OR THE FLEXIBLE CONDUIT PROVIDED BY THE FIXTURE MANUFACTURER). SCHEDULE 40 PVC CONDUIT MAY BE USED FOR THE SECONDARY UNDERGROUND SERVICE, UNDERGROUND TELEPHONE SERVICE, AND BRANCH AND FEEDER CIRCUITS UNDER SLAB OR EXTERIOR TO THE BUILDING. EXPOSED EXTERIOR CONDUIT SHALL BE SCHEDULE 80 PVC. ALL UNDERGROUND RACEWAYS SHALL BE IDENTIFIED WITH UNDERGROUND LINE MARKING TAPE 6–8 in BELOW GRADE DIRECTLY ABOVE THE RACEWAY. PROVIDE PULL WIRE IN EMPTY CONDUITS. UPSIZE CONDUIT FROM MINIMUM SIZE AS NECESSARY FOR LONGER PULLS. UNDERGROUND RACEWAYS THAT STUB INTO THE BOTTOM OF SWITCHBOARDS, OUTDOOR TRANSFORMERS, GENERATORS, ETC., SHALL RISE AT LEAST 2 in ABOVE THE FINISHED SLAB TO PREVENT WATER FROM DRAINING INTO THE RACEWAYS. RACEWAYS THAT PENETRATE EXTERIOR WALLS OR INTERIOR PARTITIONS SEPARATING SPACES THAT WILL BE AT SIGNIFICANTLY DIFFERENT TEMPERATURES SHALL BE SEALED IN ACCORDANCE WITH 300.5(G), 300.7(A), AND 300.50(E) OF THE NEC. ROUTE CONDUIT IN AND UNDER SLAB FROM POINT–TO–POINT. ROUTE EXPOSED CONDUIT AND CONDUIT INSTALLED ABOVE ACCESSIBLE CEILINGS PARALLEL AND PERPENDICULAR TO WALLS. COMPLETELY AND THOROUGHLY SWAB ALL RACEWAYS BEFORE INSTALLING WIRE. PULL ALL CONDUCTORS INTO EACH RACEWAY AT ONE TIME. USE A SUITABLE WIRE PULLING LUBRICANT FOR BUILDING WIRE #4 AWG AND LARGER.
10. CABLES, RACEWAYS, OR BOXES, INSTALLED IN EXPOSED OR CONCEALED LOCATIONS UNDER METAL–CORRUGATED SHEET ROOF DECKING, SHALL BE INSTALLED AND SUPPORTED SO THERE IS NOT LESS THAN 1–1/2 in MEASURED FROM THE LOWEST SURFACE OF THE ROOF DECKING TO THE TOP OF THE CABLE, RACEWAY, OR BOX. A CABLE, RACEWAY, OR BOX SHALL NOT BE INSTALLED IN CONCEALED LOCATIONS IN METAL–CORRUGATED, SHEET DECKING–TYPE ROOF. SEE NEC 300.4(E).
11. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL OUTLET, JUNCTION, PULL BOXES, FITTINGS, AND SUPPORTS. ALL OUTLET AND JUNCTION BOXES SHALL BE GALVANIZED STEEL TYPE BY APPLETON, STEEL CITY, OR RACO. EXTERIOR BOXES SHALL BE TYPE FS. VAPORTITE BOXES SHALL BE TYPE GS. WHERE SURFACE MOUNTED BOXES ARE USED, THOSE BOXES AND THEIR FACEPLATES SHALL HAVE ROUNDED CORNERS. BOXES INSTALLED IN FLOORS SHALL BE RATED FOR THE APPLICATION. MOUNT JUNCTION AND OUTLET BOXES FLUSH WITH FINISH SURFACES UNLESS OTHERWISE NOTED. WHERE MOUNTING HEIGHTS ARE GIVEN, THEY SHALL BE MEASURED FROM THE FINISHED FLOOR TO THE CENTER OF THE BOX. ALL BOXES SHALL BE SIZED PER NEC ARTICLE 314. ALL OUTLET AND JUNCTION BOXES SHALL HAVE A COVER PLATE, PROVIDED BY THE ELECTRICAL CONTRACTOR. OUTLET BOXES IN RATED WALLS SHALL BE INSTALLED IN ACCORDANCE WITH NORTH CAROLINA BUILDING CODE 712.3.2 (MAXIMUM BOX SIZE IS 16 SQUARE in AND MAXIMUM OF SIX (6) BOXES PER 100 SQUARE FEET). INSTALL OUTLET BOXES IN RATED WALLS SUCH THAT OPENINGS OCCUR IN ONE SIDE ONLY WITHIN ANY GIVEN STUD SPACE. ALL CLEARANCES BETWEEN THE OUTLET BOX AND THE GYPSUM BOARD SHALL BE FILLED WITH JOINT COMPOUND OR OTHER APPROVED FIRE STOP MATERIAL. FLUSH MOUNTED JUNCTION BOXES IN ADJACENT ROOMS SHALL NOT BE MOUNTED BACK–TO–BACK. SURFACE MOUNTED FIXTURES SHALL BE FED THROUGH FLUSH MOUNTED 4X4 OCTAGONAL OR SQUARE BOXES.
12. ALL CONDUIT, BOXES, AND ELECTRICAL EQUIPMENT SHALL BE FIRMLY AND SECURELY FASTENED TO OR SUPPORTED FROM THE BUILDING STRUCTURAL MEMBERS OR EMBEDDED IN CONCRETE OR MASONRY. ELECTRICAL SUPPORTS SHALL NOT BE ATTACHED TO DUCTWORK, PIPING, OR THEIR SUPPORTS. HANGERS SHALL BE CATALOG ITEMS COMPATIBLE WITH AND SUITABLE FOR THE INTENDED USE. FOR METAL ROOF DECK INSTALLATIONS, 1 in EMT CONDUIT MAXIMUM AND 4 in JUNCTION BOXES MAXIMUM MAY BE SUPPORTED BY DECKING. THE SUSPENDED CEILING SYSTEM SHALL NOT BE USED FOR THE SUPPORT OF ELECTRICAL RACEWAY SYSTEMS OR SUPPORT OF COMMUNICATIONS OR DATA SYSTEMS WIRING. CONTRACTOR SHALL COMPLY WITH 1613 OF THE NORTH CAROLINA GENERAL CONSTRUCTION BUILDING CODE.
13. IN ASSEMBLY AREAS EXCEEDING 100 PERSONS OCCUPANCY, WIRING METHODS SHALL COMPLY WITH NEC 518.
14. ALL TELEPHONE AND COMMUNICATIONS OUTLETS AND RACEWAYS ARE ROUGH–INS ONLY. EACH TELEPHONE AND COMMUNICATIONS OUTLET SHALL BE A 4 in SQUARE BY 2–1/8 in DEEP BOX WITH 3/4 in KNOCK–OUTS AND A 3/4 in CONDUIT STUBBED FROM THE OUTLET BOX TO ABOVE THE CEILING. PROVIDE A NON–METALLIC INSULATING BUSHING ON ALL CONDUITS STUBBED ABOVE THE CEILING. PROVIDE A BLANK COVER PLATE ON ALL OUTLET BOXES.
15. ELECTRICAL CONTRACTOR SHALL INSTALL DISCONNECT SWITCHES IN SIGHT OF ALL HARDWIRED EQUIPMENT AND APPLIANCES OR PROVIDE BREAKERS CAPABLE OF BEING LOCKED IN THE OPEN POSITION PER NEC 422.31. FOR MOTOR DRIVEN APPLIANCES, PROVIDE A DISCONNECTING MEANS PER NEC 422.31 AND 430 PART IX. WHERE AN INDIVIDUAL DISCONNECT SWITCH, CIRCUIT BREAKER, STARTER, ETC, IS SHOWN ON THE PLANS ADJACENT TO ITS LOAD AND NOT LOCATED ON A WALL, PROVIDE NECESSARY MATERIALS AND LABOR TO SUPPORT THE DEVICE.
16. ELECTRICAL CONTRACTOR SHALL FIELD IDENTIFY ALL SWITCH BOARD, PANEL BOARDS, CONTROL PANELS, METER SOCKETS, ETC., TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRICAL ARC FLASH HAZARDS PER 110.16 OF NEC.
17. ELECTRICAL CONTRACTOR SHALL PROVIDE NAMEPLATES FOR IDENTIFICATION OF ALL EQUIPMENT, SWITCHES, PANELS, ETC. THE NAMEPLATES SHALL BE LAMINATED PHENOLIC PLASTIC, BLACK FRONT, AND BACK WITH WHITE CORE, WHITE ENGRAVED LETTERS (1/4 in MINIMUM) ETCHED INTO THE WHITE CORE. ELECTRICAL CONTRACTOR SHALL PROVIDE A TYPE WRITTEN DIRECTORY CARD THAT ACCURATELY IDENTIFIES CIRCUITS INSIDE EACH PANEL. HANDWRITTEN LABELS ARE NOT ACCEPTABLE.

SYSTEM COMMISSIONING PLAN

PURSUANT TO THE REQUIREMENTS OF SECTION 408 OF THE NC ENERGY CONSERVATION CODE, COMMISSIONING MAY BE REQUIRED BY THE AHJ ON MECHANICAL, HOT WATER, AND LIGHTING CONTROLS SYSTEMS. A REPRESENTATIVE OF KILIAN ENGINEERING, INC. WOULD THEN BE REQUIRED TO PERFORM A SITE VISIT TO OBSERVE THE INSTALLED AND OPERATIONAL SYSTEMS AND VIEW ANY PRE–PERFORMED TESTS AS NOTED BELOW. KILIAN ENGINEERING SHALL BE CONTACTED NOT LESS THAN 3 BUSINESS DAYS PRIOR TO NECESSARY TESTING TO SCHEDULE A VISIT. COORDINATION BETWEEN THE MC, EC, AND PC SHALL OCCUR SO THAT SYSTEM COMMISSIONING CAN BE DONE FOR ALL THREE PORTIONS OF THE APPENDIX C1 DOCUMENT IN A SINGLE VISIT.

LIGHTING CONTROLS:
- ELECTRICAL CONTRACTOR TO TEST ALL OCCUPANCY SENSORS FOR OPERATION ACCORDING TO MANUFACTURER'S INSTRUCTIONS AND SEQUENCE OF OPERATIONS. PROVIDE WRITTEN DOCUMENTATION OF ANY DISCREPANCIES FROM PLANS.
- ELECTRICAL CONTRACTOR TO TEST ALL TIME CLOCKS FOR OPERATION ACCORDING TO MANUFACTURER'S INSTRUCTIONS AND SEQUENCE OF OPERATIONS. TIME CLOCKS TO BE SET FOR ACCURATE DAY/TIME CALIBRATION AND SET TO OWNER'S PREFERRED SCHEDULE.
- ELECTRICAL CONTRACTOR MUST PROVIDE FULL DOCUMENTATION (SUBMITTALS, MANUALS, MAINTENANCE SCHEDULE, ETC.) TO OWNER AS REQUIRED IN 2018 NCECC C408.2.5.2

NOTE: STATEMENT OF SYSTEM COMMISSIONING REFLECTS OPERATION OF EQUIPMENT PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY AND DOES NOT CONSTITUTE A WARRANTY FOR CONTINUED OPERATION

ELECTRICAL GENERAL NOTES | 1

LED LIGHT FIXTURE SCHEDULE

MARK	DESCRIPTION	LOUVER/LENS	LAMPS – SYLVANIA		VOLTAGE	INPUT WATTAGE	ALLOWANCE	MOUNTING	REMARKS	MFG	MODEL
			TYPE	CCT							
A	DIMMING LED HIGH BAY	0.125" ACRYLIC	LED	3500K	120	125	-	SUSPENDED	2	LITHONIA	IBL-15L-WD-MVOLT-LP835-NPP16D-WGIBL
B	2X4 LED LENSED TROFFER DIMMING	0.125" ACRYLIC	LED	3500K	120	71	-	LAY-IN	2	LITHONIA	2GTL-4-72L-EZ1-LP835
C	2X2 LED LENSED TROFFER DIMMING	0.125" ACRYLIC	LED	3500K	120	71	-	LAY-IN	2	LITHONIA	2GTL-2-72L-EZ1-LP835
D	6" LED CAN	-	LED	3500K	120	15 MAX	-	RECESSED	2	OWNER TO SPECIFY	OWNER TO SPECIFY
EXH	LED EXIT/EMERGENCY COMBO	ACRYLIC	LED	N/A	120	3	-	VARIES	1,2	EELP	XC-LED-2-R-W-SD
OE	EXTERIOR OVAL LED EMERGENCY LIGHT	ACRYLIC	LED	-	120	9	-	SURFACE	1,2	EELP	OEM-LED-BR-ACEM
EM	DUAL HEAD EMERGENCY FIXTURE	ACRYLIC	LED	N/A	120	2	-	VARIES	1,2	LITHONIA	ELM2-LED-SD
EWP	EXTERIOR WALL PACKS	ACRYLIC	LED	N/A	120	50 MAX	$250	WALL	2,3	BY OWNER	BY OWNER

1. FIXTURE SHALL HAVE BATTERY BACKUP FOR 90 MINUTE ILLUMINATION.
2. OR EQUAL BY COOPER, GE, OR SIGNIFY
3. PROVIDE WITH PHOTOCELL FOR EXTERIOR FIXTURES

PANEL A

CKT	LOAD	BKR	LOAD kVA	PH	LOAD kVA	BKR	LOAD	CKT
1	MULTI-PURPOSE LIGHTS	20/1	1.45	A	0.18	20/1	WATER FOUNTAIN	(2)
3	CONFERENCE ROOM RECEPTACLES	20/1	0.90	B	0.50	20/1	FACP	4
5	CONFERENCE ROOM RECEPTACLES	20/1	1.08	C	0.00	20/1	SPARE	6
7	MULTI-PURPOSE RECEPTACLES	20/1	0.90	A	0.36	20/1	MENS/WOMENS RECEPTACLES	(8)
9	SERVICE RECEPTACLES	20/1	0.36	B	0.90	20/1	MULTI-PURPOSE RECEPTACLES	10
11	SPARE	20/1	0.00	C	2.81	30/2	WH-1	12
13	AHU-1	20/2	2.08	A	2.81			14
15			2.08	B	1.25	25/2	WH-2	16
17	AHU-2	25/2	2.60	C	1.25			18
19			2.60	A	2.60	25/2	AHU-4	20
21	AHU-3	25/2	2.60	B	2.60			22
23			2.60	C	2.60	25/2	AHU-5	24
25	HP-1	25/2	2.29	A	2.60			26
27			2.29	B	2.60	25/2	AHU-6	28
29	HP-2	45/2	2.91	C	2.60			30
31			2.91	A	2.91	45/2	HP-4	32
33	HP-3	45/2	2.91	B	2.91			34
35			2.91	C	2.91	45/2	HP-5	36
37	INTERIOR LIGHTS	20/1	1.52	A	2.91			38
39	LOBBY & EXTERIOR LIGHTS	20/1	0.58	B	3.54	50/2	HP-6	40
41	SPARE	20/1	0.00	C	3.54			42
43	SPARE	20/1	0.00	A	0.00	20/1	SPARE	44
45	SPACE	-	0.00	B	0.00	20/1	SPARE	46
47	SPACE	-	0.00	C	0.00	-	SPACE	48
49	SPACE	-	0.00	A	11.90	200/3	PANEL B	50
51	SPACE	-	0.00	B	10.80			52
53	SPACE	-	0.00	C	10.10			54
			kVA	PH	AMPS			
			40.0	A	334			
			36.8	B	307			
			37.9	C	316			

VOLTAGE/PHASE	208Y/120V, 3P, 4W
BUS RATING	400A
MAIN CIRCUIT BREAKER RATING	MLO
AIC RATING	22K (EC TO VERIFY)
SERVICE ENTRANCE RATED	YES
ENCLOSURE	NEMA 3R
MOUNTING	SURFACE

◯ GFCI BREAKER

PANEL B

CKT	LOAD	BKR	LOAD kVA	PH	LOAD kVA	BKR	LOAD	CKT
1	DOUBLE WALL OVEN	50/2	4.20	A	1.2	20/1	DISHWASHER	2
3			4.20	B	3.4	40/2	WALL OVEN	4
5	ELECTRIC COOKTOP	40/2	3.75	C	3.4			6
7			3.75	A	1.0	20/1	MICROWAVE / EXHAUST FAN	8
(9)	REFRIGERATOR	20/1	1.8	B	0.5	20/1	WARMING DRAWER	10
(11)	RELOCATED ICE MAKER	20/1	1.0	C	1.0	20/1	2 DOOR UNDER COUNTER FREEZERS	(12)
13	KITCHEN LIGHTING	20/1	0.64	A	0.90	20/1	KITCHEN COUNTER RECEPTACLES	(14)
(15)	KITCHEN COUNTER RECEPTACLES	20/1	0.90	B	0.00	20/1	SPARE	16
17	BATH/STORAGE RECEPTACLE	20/1	0.90	C	0.00	20/1	SPARE	18
19	SVC RECEPTACLES	20/1	0.18	A	0.00	-	SPACE	20
21	SPACE	-	0.00	B	0.00	-	SPACE	22
23	SPACE	-	0.00	C	0.00	-	SPACE	24
			kVA	PH	AMPS			
			11.9	A	99			
			10.8	B	90			
			10.1	C	84			

VOLTAGE/PHASE	208Y/120V, 3P, 4W
BUS RATING	200A
MAIN CIRCUIT BREAKER RATING	200A
AIC RATING	22K (EC TO VERIFY)
SERVICE ENTRANCE RATED	YES
ENCLOSURE	NEMA 1
MOUNTING	SURFACE

◯ GFCI BREAKER

ELECTRICAL DESIGNER'S STATEMENT

ELECTRICAL SYSTEM AND EQUIPMENT METHOD OF COMPLIANCE
PRESCRIPTIVE _X_ PERFORMANCE ___ ENERGY COST BUDGET ___

LIGHTING SCHEDULE:

LAMP TYPE REQUIRED IN FIXTURE:	SEE LIGHTING LEGEND	
NUMBER OF LAMPS PER FIXTURE:	SEE LIGHTING LEGEND	
BALLAST TYPE USED IN FIXTURE:	SEE LIGHTING LEGEND	
NUMBER OF BALLASTS IN FIXTURE:	SEE LIGHTING LEGEND	
TOTAL WATTAGE PER FIXTURE:	SEE LIGHTING LEGEND	
TOTAL INTERIOR WATTAGE SPECIFIED VS ALLOWED:	WATTS SPECIFIED	WATTS ALLOWED
	3355.0	4670.40

OCCUPANCY	AREA (sf)	ALLOWANCE (W/sf)	WATTAGE ALLOWED
GYMNASIUM PLAN	3892	1.20	4670.40
CONFERENCE	403	1.23	495.69
FOOD PREP AREA	406	1.21	491.26
RESTROOM	463	0.98	453.74
CORRIDOR	115	0.66	75.90
STORAGE	412	0.63	259.56
TOTAL	5691		4670.40

EQUIPMENT SCHEDULES WITH MOTORS (NOT USED FOR MECHANICAL SYSTEMS)
MOTOR HORSEPOWER: N/A
NUMBER OF PHASES: N/A
MINIMUM EFFICIENCY: N/A
MOTOR TYPE: N/A
NUMBER OF POLES: N/A

DESIGNER STATEMENT: TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE DESIGN OF THIS BUILDING COMPLIES WITH THE 2018 NORTH CAROLINA ENERGY CONSERVATION CODE.

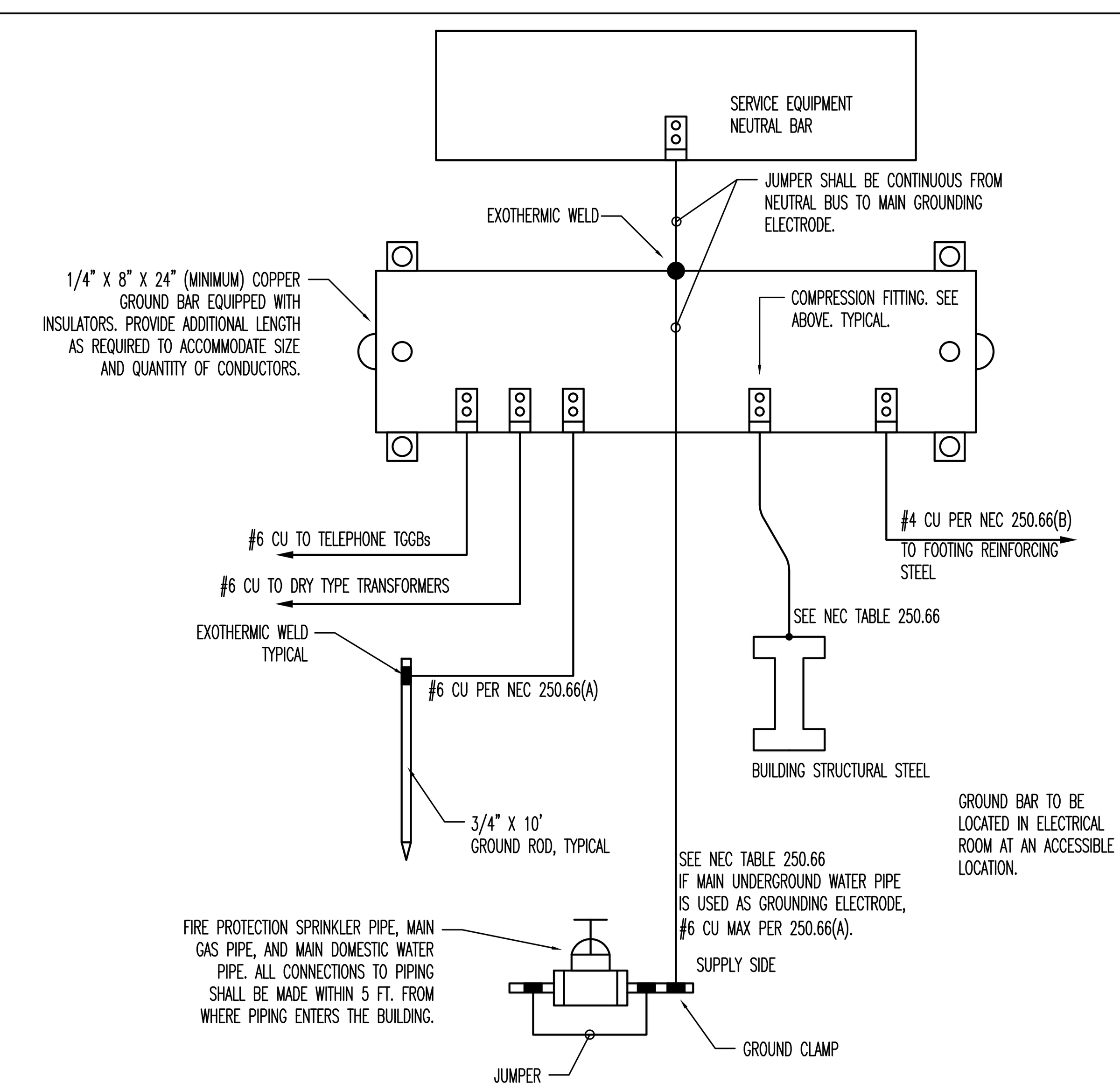
FOR THE ADDITIONAL PRESCRIPTIVE REQUIREMENT REQUIRED BY C406 OF 2018 NORTH CAROLINA ENERGY CONSERVATION CODE, WE ARE CHOOSING C406.3 – REDUCED LIGHTING POWER DENSITY.

3355 W SPECIFIED <= 4203 W (4670 W ALLOWED X 90%)

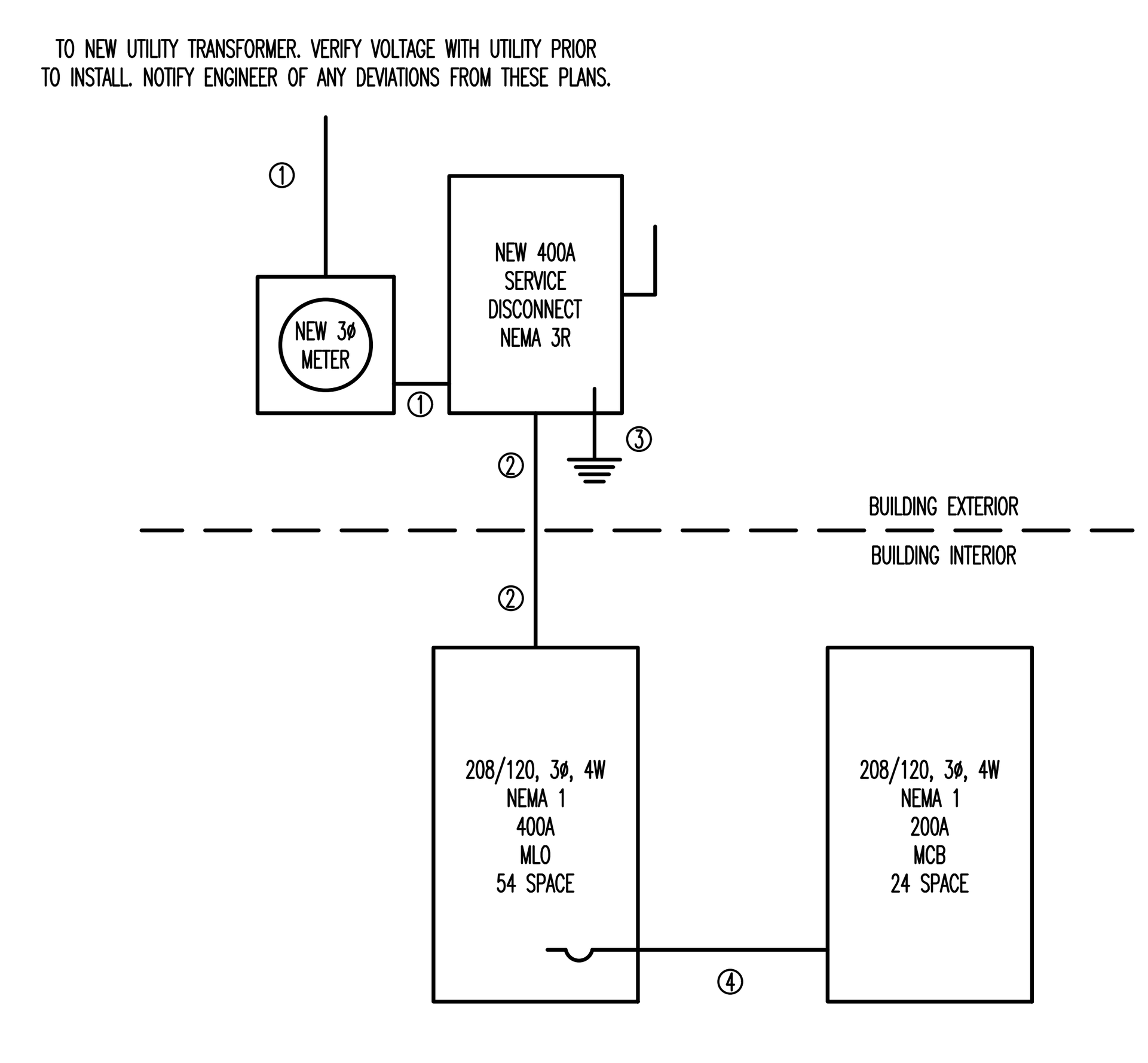
NEC ELECTRIC DEMAND SUMMARY 208Y/120V, 3P, 4W

EQUIPMENT	DEMAND FACTOR	kVA			LOAD kVA	NEC REFERENCE	NOTES/CALCULATIONS
		A	B	C			
LIGHTING	125%	3.56	3.56	3.56	10.67	220.12	5691 SF X 1.5 VA/SF X 1.25
RECEPTACLES	100%	3.06	4.14	2.88	10.08	220.44	
HVAC	100%	20.90	21.53	19.13	61.56	--	BASED ON MCA
WATER HEATER	125%	2.81	1.25	4.06	8.12	422.13	STORAGE TANK (120 GAL @ 125%
KITCHEN EQUIPMENT	SEE CODE	10.15	9.90	9.15	29.20	220.56	
DEMAND kVA PER PHASE		40.48	40.38	38.78			
DEMAND AMPS PER PHASE		337	336	323			

THE CALCULATED LIGHTING LOAD EXCEEDS THE CONNECTED LIGHTING LOAD.



GROUNDING DETAIL-NO SCALE | 4



① 2 SET OF CONDUITS, EACH WITH:
3 – 3/0 COPPER
1 – 3/0 COPPER NEUTRAL
2-1/2" CONDUIT

② 2 SET OF CONDUITS, EACH WITH:
3 – 3/0 COPPER
1 – 3/0 COPPER NEUTRAL
1 – #3 COPPER GRD
2-1/2" CONDUIT

③ 1 – 1/0 COPPER GRD TO BUILDING GROUND BAR

④ 3 – 3/0 COPPER
1 – 3/0 NEUTRAL
1 – $6 GRD
2-1/2" CONDUIT

ELECTRICAL SCHEDULES | 2

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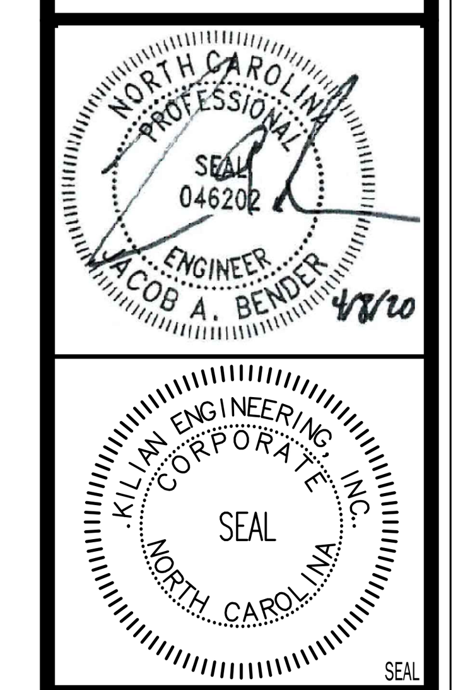


NEW FELLOWSHIP HALL FOR:
NEILL'S CREEK BAPTIST CHURCH
4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

NO.	DATE	DESCRIPTION

ISSUED:

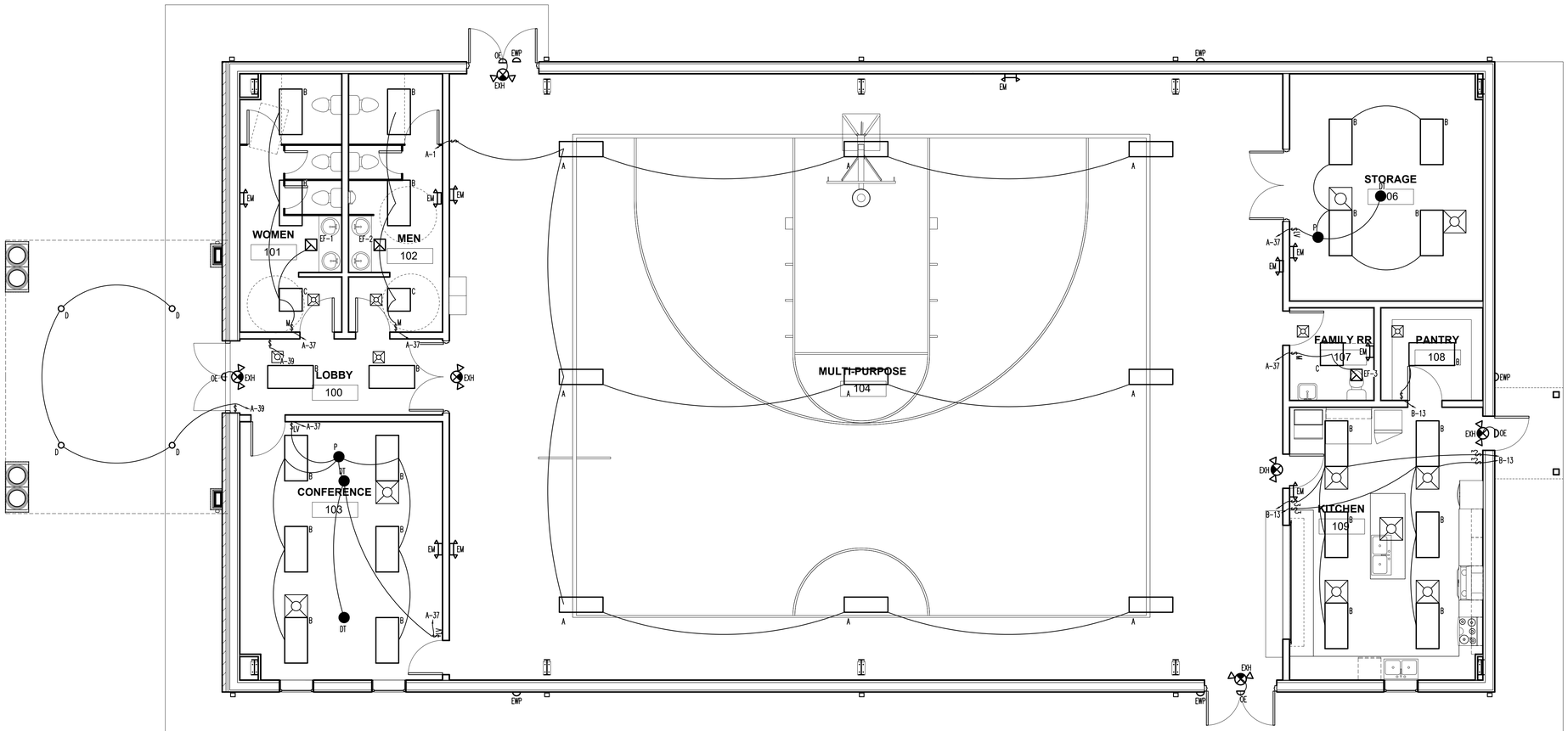
NO.	DATE	DESCRIPTION
2	04 08 2020	OWNER COMMENTS
1	02 13 2020	PERMIT SET

DRAWN BY: JAM
CHECKED BY: MWK/JAB

ELECTRICAL NOTES AND SCHEDULES

SHEET NO.
E1

PROJECT NO: 20015



GENERAL LIGHTING SENSOR NOTES:

1. ALL SWITCHES AND SENSORS TO BE WHITE
2. EC TO ORDER ALL WALL PLATES AND ACCESSORIES FOR COMPLETE INSTALLATION.
3. EC TO INCLUDE PRE-INSTALLATION MEETING IN BID.

LIGHTING DEVICE LEGEND		
SYMBOL	DESCRIPTION	REMARKS
$	SINGLE POLE WALL SWITCH	HEAVY DUTY, AC ONLY, COMMERCIAL GRADE GENERAL USE SNAP SWITCH COMPLYING WITH NEMA WD 6 AND WD 1. IVORY PLASTIC BODY WITH TOGGLE HANDLE. 120-277V, 20A. MEET FEDERAL SPECIFICATION W-S-896.
$D	DIMMER SWITCH	COMMERCIAL GRADE, 120V, 1500W
$P	WIRELESS 2 BUTTON SWITCH	PJ2-2B-GWH-L01(CW-1-WH)
$M	WALL MOUNTED OCCUPANCY SENSOR	WATTSTOPPER DW-100 LINE VOLTAGE OCCUPANCY SENSOR. ULTRA SONIC AND INFRARED.
$LV	LOW VOLTAGE SWITCH	WATTSTOPPER LVS-1 LOW VOLTAGE MOMENTARY CONTROL SWITCH.
$3	3 WAY SWITCH	3-WAY TYPE SWITCH WITH SAME CHARACTERISTICS AS SINGLE POLE SWITCH ABOVE.
$$	2-SINGLE POLE SWITCHES	INDICATES BI-LEVEL SWITCHING. INNER LAMPS SWITCHED INDEPENDENTLY OF OUTER LAMPS.
(DT)	CEILING OCCUPANCY SENSOR	WATTSTOPPER, DT-300 LOW VOLTAGE OCCUPANCY SENSOR. 360° ULTRA SONIC AND INFRARED.
(US)	CEILING OCCUPANCY SENSOR	WATTSTOPPER, WT-2255 LOW VOLTAGE OCCUPANCY SENSOR. ULTRA SONIC, 90 LINEAR FT COVERAGE.
(SP)	SWITCHING PHOTOSENSOR	WATTSTOPPER, LS-102, CONSULT OWNER FOR FOOT-CANDLE SET POINT.
(P)	POWER PACK	WATTSTOPPER, BZ-150 LOW VOLTAGE POWER PACK FOR CEILING PACK SENSORS.
(J)	JUNCTION BOX	GALVANIZED METAL BOX CONSTRUCTED IN ACCORDANCE WITH 314.40 OF THE NEC.
⊠	EXHAUST FAN	VENT FAN, 120V, CFM AS NOTED MC TO PROVIDE AND VENT, EC TO WIRE.

PLAN GENERAL NOTES

1. CONNECT ALL EM FIXTURES AHEAD OF SWITCHING IN EACH RESPECTIVE ROOM (CIRCUIT A-39 FOR EXTERIOR & LOBBY, CIRCUIT A-1 FOR GYMNASIUM, CIRCUIT B-13 FOR THE KITCHEN, AND CIRCUIT A-37 FOR ALL OTHER INTERIOR ROOMS). EC TO COORDINATE.
2. CONNECT ALL EXTERIOR WALL PACKS TO CIRCUIT A-39.
3. ALL EXTERIOR FIXTURES TO HAVE PHOTOCELL.

LIGHTING PLAN - SCALE: 3/16" = 1'0" | 1

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NORTH CAROLINA PROFESSIONAL SEAL 048202 ENGINEER JACOB A. BENDER 4/1/20

KILIAN ENGINEERING CORPORATE INC. SEAL NORTH CAROLINA SEAL

NEW FELLOWSHIP HALL FOR:

NEILL'S CREEK BAPTIST CHURCH

4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

DESCRIPTION	DATE

ISSUED:

DESCRIPTION	DATE
OWNER COMMENTS	04/08/2020
PERMIT SET	02/13/2020

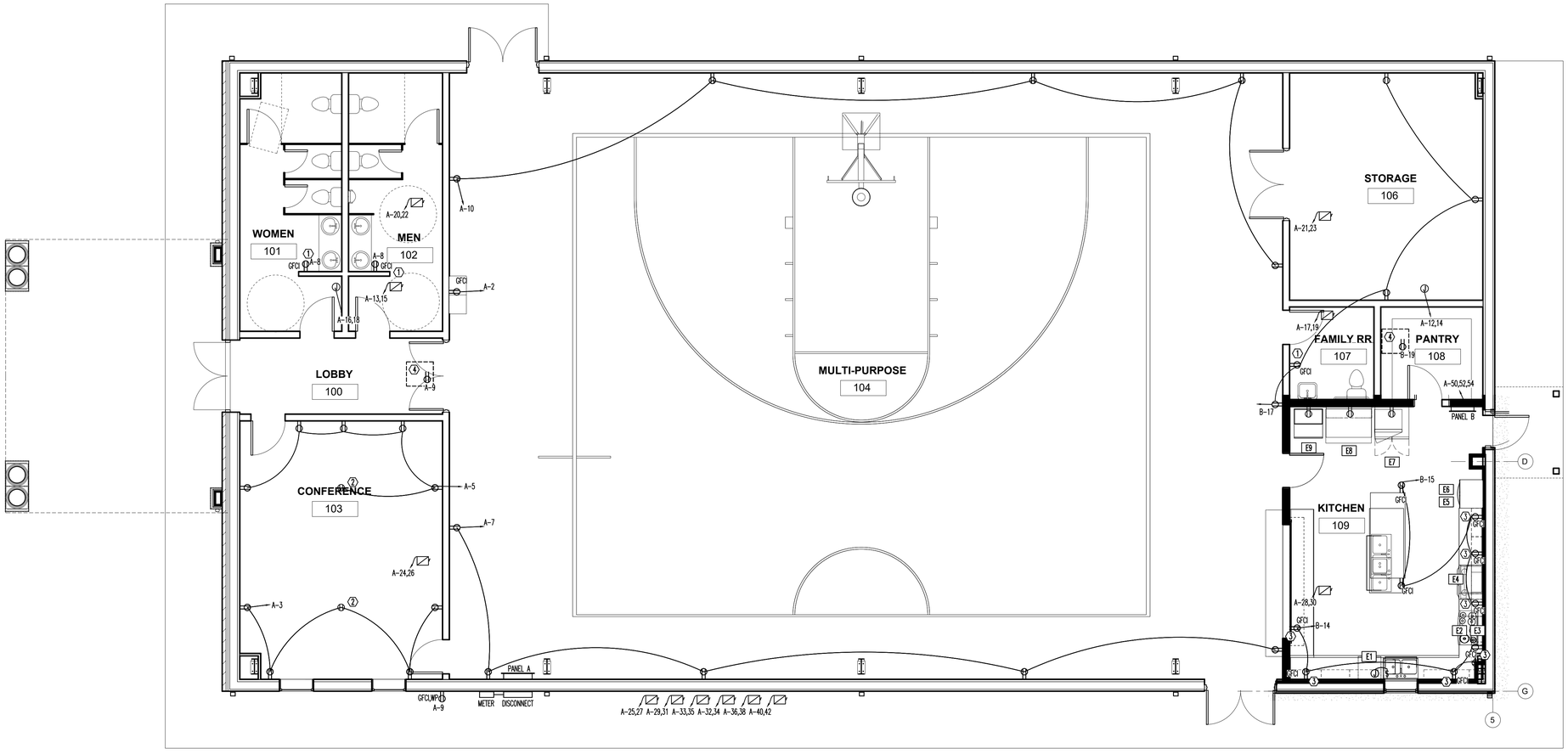
DRAWN BY: JAM
CHECKED BY: MWK / JAB

LIGHTING PLAN

SHEET NO.

E2

PROJECT NO: 20015



EQUIPMENT CONNECTION SCHEDULE							
SYMBOL	DESCRIPTION	MFG / MODEL	kVA	VOLT/PH	MCA	MOCP	CIRCUIT
E1	DISHWASHER	WHIRLPOOL / WDT730PAHZ	1.2	120/1	15.0	20.0	B-2
E2	ELECTRIC COOKTOP	KITCHENAID / KCED606GBL	7.5	240/1	31.3	40.0	B-5,7
E3	MICROWAVE / EXHAUST FAN	WHIRLPOOL / WMH31017HZ	1.0	120/1	15.0	20.0	B-8
E4	WALL OVEN	KITCHENAID / KOSE500ESS	6.8	240/1	28.0	40.0	B-4,6
E5	DOUBLE WALL OVEN	GE / JTD3000	8.4	240/1	40.0	50.0	B-1,3
E6	WARMING DRAWER	BOSCH / HWD5051UC	0.5	120/1	15.0	20.0	B-10
E7	REFRIGERATOR	WHIRPOOL / WRF535SWHZ	1.8	120/1	15.0	20.0	B-9
E8	2 DOOR UNDER COUNTER FREEZERS	AUC48F	1.0	115/1	9.0	20.0	B-12
E9	EXISTING / ICE MAKER RELOCATED	-	1.0	115/1	15.0	20.0	B-11

POWER PLAN HEX NOTES

1. MOUNT 6" ABOVE COUNTER HEIGHT. PROVIDE DEDICATED CIRCUIT.
2. MAINTAIN A MINIMUM CLEARANCE OF 6" FROM ANY WALL DURING FLOOR RECEPTACLE INSTALLATION.
3. MOUNT GFCI RECEPTACLE 6" ABOVE COUNTER HEIGHT.
4. SERVICE RECEPTACLE ABOVE CEILING FOR HVAC UNITS. COORDINATE LOCATION WITH OWNER PRIOR TO INSTALL.
5. SERVICE RECEPTACLE TO BE LOCATED WITHIN 25' OF HVAC UNIT.

POWER DEVICE LEGEND		
SYMBOL	DESCRIPTION	REMARKS
	DATA AND TELEPHONE JACK	PHONE/DATA OUTLET. EC TO INSTALL 3/4"C WITH PULL-STRING FROM OUTLET BOX TO ABOVE CEILING FOR FUTURE USE. JACKS AND COMMUNICATION CABLING BY OTHERS.
	DUPLEX RECEPTACLE	NEMA 5-20R, HEAVY DUTY, COMMERCIAL GRADE, 125V, 20A COMPLYING WITH NEMA WD 6 AND WD 1. GFCI OR AFCI IF NOTED. 'WP' DENOTES WEATHERPROOF COVER. 'CH' DENOTES COUNTER HEIGHT. LISTED TAMPERPROOF IF NOTED. MEET FEDERAL SPECIFICATION W-C-596.
	QUAD RECEPTACLE	QUAD RECEPTACLE OF SAME CHARACTERISTICS AS DUPLEX TYPE ABOVE.
	DEDICATED RECEPTACLE	NEMA 5-20R, HEAVY DUTY, COMMERCIAL GRADE, 125V, 20A COMPLYING WITH NEMA WD 6 AND WD 1 UNLESS OTHERWISE NOTED ON PLANS. VERIFY PLUG TYPE PRIOR TO PURCHASE & INSTALLATION. GFCI OR AFCI IF NOTED. 'WP' DENOTES WEATHERPROOF COVER. 'CH' DENOTES COUNTER HEIGHT. LISTED TAMPERPROOF IF NOTED. MEET FEDERAL SPECIFICATION W-C-596. MAY BE EITHER SIMPLEX, DUPLEX, OR QUAD.
	DUPLEX FLOOR RECEPTACLE	DUPLEX RECEPTACLE OF SAME CHARACTERISTICS AS ABOVE WITH BRASS COVER. MOUNT IN FLOOR. ALL FLOOR BOXES MUST BE LISTED FOR FLOOR APPLICATION.
	QUAD FLOOR RECEPTACLE	QUAD RECEPTACLE OF SAME CHARACTERISTICS AS ABOVE WITH BRASS COVER. MOUNT IN FLOOR. ALL FLOOR BOXES MUST BE LISTED FOR FLOOR APPLICATION.
	FUSIBLE DISCONNECT SWITCH	HEAVY DUTY TYPE. TYPE 1 ENCLOSURE IN INTERIOR APPLICATIONS, TYPE 3R ENCLOSURE IN EXTERIOR APPLICATIONS, FUSE ACCORDING TO NAMEPLATE DATA.
	DISCONNECT SWITCH	HEAVY DUTY TYPE. TYPE 1 ENCLOSURE IN INTERIOR APPLICATIONS, TYPE 3R ENCLOSURE IN EXTERIOR APPLICATIONS.
J	JUNCTION BOX	GALVANIZED METAL BOX CONSTRUCTED IN ACCORDANCE WITH 314.40 OF THE NEC.

POWER PLAN - SCALE: 3/16" = 1'0" | 1

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NORTH CAROLINA PROFESSIONAL SEAL 046202 ENGINEER JACOB A. BENDER 4/7/20

KILIAN ENGINEERING CORPORATE INC. SEAL NORTH CAROLINA

NEW FELLOWSHIP HALL FOR:

NEILL'S CREEK BAPTIST CHURCH

4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

ISSUED:

DESCRIPTION	DATE
OWNER COMMENTS	04/08/2020
PERMIT SET	02/13/2020

DRAWN BY: JAM
CHECKED BY: MWK / JAB

POWER PLAN

SHEET NO.

E3

PROJECT NO: 20015

GENERAL MECHANICAL NOTES:

ADMINISTRATIVE:
1. THE FOLLOWING ABBREVIATIONS SHALL APPLY TO NOTES AND PLANS:
PC – PLUMBING CONTRACTOR, EC – ELECTRICAL CONTRACTOR,
MC – MECHANICAL CONTRACTOR, GC – GENERAL CONTRACTOR,
FASC – FIRE ALARM SYSTEM CONTRACTOR.
2. "PROVIDE" MEANS TO FURNISH AND INSTALL. MC SHALL ALSO INSTALL MATERIALS FURNISHED BY OTHERS AND GENERAL CONTRACTOR AS SHOWN ON THE PLANS OR NECESSARY FOR A COMPLETE INSTALLATION.
3. THE MC SHALL BE RESPONSIBLE FOR A COMPLETE AND OPERATING SYSTEM AS DESCRIBED BY THESE PLANS AND SPECIFICATIONS.
4. ALL MATERIALS AND EQUIPMENT SHALL BE DELIVERED TO THE SITE AND UNLOADED BY THE CONTRACTOR AT AN APPROVED LOCATION. THE MC SHALL PROTECT ALL MATERIALS AND EQUIPMENT FROM BREAKAGE, THEFT, AND THE ELEMENTS. ALL MATERIALS AND EQUIPMENT SHALL REMAIN THE PROPERTY OF THE MC UNTIL THE PROJECT HAS BEEN COMPLETED AND TURNED OVER TO THE OWNER.
5. THE MC SHALL INSTALL ALL MATERIALS AND EQUIPMENT IN ACCORDANCE WITH THE 2018 NORTH CAROLINA MECHANICAL AND BUILDING CODES AND ANY APPLICABLE LOCAL CODES. WHERE A CONFLICT EXISTS BETWEEN THE ABOVE REQUIREMENTS, THE MC SHALL OBTAIN CLARIFICATION FROM THE ENGINEER OR IN THE EVENT ANY PART OF THESE PLANS CONFLICTS WITH THE ABOVE REQUIREMENTS.
6. THE MC SHALL OBTAIN AND PAY FOR ALL PERMITS, FEES, AND INSPECTIONS NECESSARY FOR THE COMPLETION OF THE WORK UNDER THIS CONTRACT.
7. DO NOT SCALE THESE DRAWINGS–REFER TO ARCHITECTURAL SHEETS FOR DIMENSIONS.
8. THE MC SHALL VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS. THE MC SHALL CONTACT THE ENGINEER TO RESOLVE ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THESE PLANS. THE MC SHALL COORDINATE WITH OTHER TRADES PRIOR TO THE START OF CONSTRUCTION.
9. ALL MECHANICAL MATERIALS SHALL BE NEW AND FREE OF DEFECT AND LISTED AND LABELED BY UL OR AN APPROVED THIRD PARTY AGENCY. ANY MATERIALS FOUND TO BE DEFECTIVE SHALL BE REPLACED BY THE MC WITHOUT ADDITIONAL COST TO THE OWNER. WHERE A MANUFACTURER AND MODEL NUMBER IS GIVEN, THE CITED EXAMPLE IS INTENDED TO ESTABLISH A STANDARD OF QUALITY AND NOT TO LIMIT PRODUCTS TO A PARTICULAR MANUFACTURER. SUCH EXAMPLES ARE USED TO CONVEY A GENERAL STYLE, TYPE, CHARACTER, AND QUALITY OF THE PRODUCT DESIRED; PRODUCTS DETERMINED TO BE EQUAL BY THE ENGINEER WILL BE ACCEPTED.
10. THESE PLANS ARE DIAGRAMMATIC. THE MC SHALL ADJUST THE LOCATIONS OF EQUIPMENT, DUCTS, REGISTERS, GRILLES, ETC, TO ACCOMMODATE PLANNED AND ENCOUNTERED INTERFERENCES. THE DRAWINGS DO NOT SHOW ALL BENDS, OFFSETS, AND FITTINGS THAT MAY BE REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. THE MC SHALL MAKE ALLOWANCES FOR SUCH DEVIATIONS AND CONTINGENCIES IN BID TO IMPLEMENT THEM WITHOUT ADDITIONAL COST TO THE OWNER.
11. THE MC SHALL VERIFY THE FUNCTIONALITY AND OPERATION OF ALL EXISTING MECHANICAL EQUIPMENT IN THE AREA OF WORK. REPLACE FILTERS, LEAK TEST AND RECHARGE REFRIGERANT LINES, REPLACE OR LUBRICATE BEARINGS, CHECK LINKAGES AND ACTUATORS, AND PERFORM OTHER MAINTENANCE SERVICE AS NECESSARY TO GET THE EQUIPMENT IN PROPER ORDER
12. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POWER CONNECTIONS TO THE MECHANICAL EQUIPMENT. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONTROL WIRING.
13. IT IS THE MC'S RESPONSIBILITY TO VERIFY THAT ITEMS FURNISHED FOR THIS CONTRACT WILL FIT IN THE SPACE AVAILABLE. THE MC SHALL MAKE FIELD MEASUREMENTS AS NECESSARY TO DETERMINE SPACE REQUIREMENTS. IF THE MC MUST ALTER EQUIPMENT DUE TO SPACE CONSIDERATIONS, THE MC SHALL PROVIDE SIZES AND SHAPES THAT FIT THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS.
14. MC SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR REGARDING THE ELECTRICAL REQUIREMENTS OF ALL EQUIPMENT BEING PROVIDED.
15. MAINTAIN CLEARANCES FOR ALL EQUIPMENT ACCORDING TO MANUFACTURER'S RECOMMENDATIONS FOR SERVICEABILITY. ALL ROOFTOP EQUIPMENT MUST BE A MINIMUM OF 10 FEET FROM ROOF EDGE.
16. MC SHALL FURNISH A BOUND SET OF OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL EQUIPMENT TO THE OWNER UPON COMPLETION OF THE PROJECT. MC SHALL PROVIDE ALL DOCUMENTATION TO THE OWNER AS NECESSARY TO SUBMIT FOR FACTORY WARRANTIES.
17. CONTRACTOR SHALL PROTECT ALL HVAC EQUIPMENT FROM CONSTRUCTION AND SHEET ROCK DUST DURING CONSTRUCTION. ALL FILTERS SHALL BE REPLACED WITH NEW AT THE COMPLETION OF THE PROJECT.
18. ALL EQUIPMENT INSTALLED ON ROOF MUST BE WITHIN THE ROOF SCREEN.
19. IF A ROOF PENETRATION IS REQUIRED AND THE ROOF IS UNDER WARRANTY, USE THE AUTHORIZED ROOFER. PROVIDE DOCUMENTATION.
20. ALL PIPING, WIRING, CONDUIT, INSULATION, EQUIPMENT, SUPPORTS, ETC. SHALL BE SUITABLE FOR INSTALLATION IN A RETURN PLENUM AS NECESSARY. COORDINATE WITH OTHER TRADES ON LOCATIONS OF ALL PLENUMS.
21. MC SHALL COORDINATE WITH THE GENERAL CONTRACTOR TO ENSURE ALL APPLICABLE CONSTRUCTION WASTE IS RECYCLED DURING THE CONSTRUCTION PHASE OF THE PROJECT.

MATERIALS:
1. THE MC SHALL PROVIDE ALL DX UNITARY HEATING AND COOLING EQUIPMENT AS SCHEDULED ON THE DRAWINGS. AIR-COOLED SPLIT SYSTEM HEAT PUMPS AND AIR-CONDITIONERS SHALL BE BY TRANE, CARRIER, OR YORK. AIR-COOLED ROOFTOP PACKAGE HEAT PUMPS, GAS-ELECTRIC UNITS, AND AIR-CONDITIONERS SHALL BE BY TRANE, CARRIER, OR YORK. GAS FURNACES SHALL BE BY TRANE, CARRIER, OR YORK. THE MC SHALL PROVIDE FACTORY AND FIELD INSTALLED ACCESSORIES AS SCHEDULED OR AS NECESSARY FOR A COMPLETE AND OPERATIONAL HVAC SYSTEM.
2. THE MC SHALL PROVIDE ALL EXHAUST AND SUPPLY FANS AS SCHEDULED. FANS SHALL BE BY GREENHECK, LOREN COOK, TWIN CITY, OR PENNBARRY.
3. DUCTWORK IS SHOWN WITH FREE AREA DIMENSIONS. ALL DUCTWORK SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH SMACNA LOW PRESSURE DUCT STANDARD, 2 INCH S.P.
4. EXTERNAL DUCT INSULATION AND FACTORY-INSULATED FLEXIBLE DUCT SHALL BE LEGIBLY PRINTED OR IDENTIFIED AT INTERVALS NOT GREATER THAN 36 INCHES WITH THE NAME OF THE MANUFACTURER, THE THERMAL RESISTANCE R-VALUE AT THE SPECIFIED INSTALLED THICKNESS AND THE FLAME SPREAD AND SMOKE-DEVELOPED INDEXES OF THE COMPOSITE MATERIALS. ALL DUCT INSULATION PRODUCT R-VALUES SHALL BE BASED ON INSULATION ONLY, EXCLUDING AIR FILMS, VAPOR RETARDERS OR OTHER DUCT COMPONENTS, AND SHALL BE BASED ON TESTED C-VALUES AT 75°F MEAN TEMPERATURE AT THE INSTALLED THICKNESS, IN ACCORDANCE WITH RECOGNIZED INDUSTRY PROCEDURES. THE INSTALLED THICKNESS OF DUCT INSULATION USED TO DETERMINE ITS R-VALUES SHALL BE DETERMINED AS FOLLOWS:
4.1. FOR DUCT BOARD, DUCT LINER AND FACTORY-MADE RIGID DUCTS NOT NORMALLY SUBJECTED TO COMPRESSION, THE NOMINAL INSULATION THICKNESS SHALL BE USED.
4.2. FOR DUCT WRAP, THE INSTALLED THICKNESS SHALL BE ASSUMED TO BE 75 PERCENT (25-PERCENT COMPRESSION) OF NOMINAL THICKNESS.
4.3. FOR FACTORY-MADE FLEXIBLE AIR DUCTS, THE INSTALLED THICKNESS SHALL BE DETERMINED BY DIVIDING THE DIFFERENCE BETWEEN THE ACTUAL OUTSIDE DIAMETER AND NOMINAL INSIDE DIAMETER BY TWO.
5. DUCT LINER MAY BE SUBSTITUTED FOR EXTERIOR DUCT WRAP. DUCT LINER INSULATION MATERIALS SHALL MEET THE REQUIREMENTS OF ASTM C 1071, AND ASTM G 21. EXTERIOR DUCT R-VALUE SHALL BE R-8 AND INTERIOR R-VALUE SHALL BE R-6 IN ACCORDANCE WITH THE 2018 NORTH CAROLINA ENERGY CONSERVATION CODE. NOMINAL DUCT SIZES SHALL BE ADJUSTED AS NECESSARY SO THAT FREE AREA DIMENSIONS ARE PRESERVED AS SHOWN ON THE PLANS. FABRICATION AND INSTALLATION SHALL CONFORM TO THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS AND TO THE REQUIREMENTS OF THE LATEST EDITION OF THE NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION FIBROUS GLASS DUCT LINER STANDARDS AND/OR SMACNA HVAC DUCT CONSTRUCTION STANDARDS. DUCT LINER SHALL HAVE A BLACK PIGMENTED MAT ON THE AIRSTREAM SIDE TO RESIST DAMAGE DURING INSTALLATION AND SERVICE. EDGES SHALL BE FACTORY COATED WITH BLACK PIGMENTED COATING TO COMPLY WITH SMACNA DCS REQUIREMENTS. ALL PORTIONS OF DUCT DESIGNATED TO RECEIVE DUCT LINER SHALL BE COMPLETELY COVERED WITH DUCT LINER. TRANSVERSE JOINTS SHALL BE NEATLY BUTTED AND THERE SHALL BE NO INTERRUPTIONS OR GAPS. THE BLACK PIGMENTED OR MAT FACED SURFACES SHALL FACE THE AIRSTREAM. DUCT LINER SHALL BE ADHERED TO THE SHEET METAL WITH 90 PERCENT COVERAGE OF ADHESIVE COMPLYING WITH REQUIREMENTS OF ASTM C 916. ALL EXPOSED LEADING EDGES AND TRANSVERSE JOINTS SHALL BE FACTORY COATED OR COATED WITH ADHESIVE DURING FABRICATION. DUCT LINER SHALL BE ADDITIONALLY SECURED WITH MECHANICAL FASTENERS, EITHER WELD-SECURED OR IMPACT DRIVEN, WHICH SHALL COMPRESS THE DUCT LINER SUFFICIENTLY TO HOLD IT FIRMLY IN PLACE. ADHESIVE BONDED PINS ARE NOT PERMITTED DUE TO LONG-TERM ADHESIVE AGING CHARACTERISTICS. LININGS SHALL BE INTERRUPTED AT THE AREA OF OPERATION OF A FIRE DAMPER AND AT A MINIMUM OF 6 INCHES UPSTREAM AND 6 INCHES DOWNSTREAM OF ELECTRIC RESISTANCE AND FUEL-BURNING HEATERS IN A DUCT SYSTEM. METAL NOSINGS OR SLEEVES SHALL BE INSTALLED OVER EXPOSED DUCT LINER THAT FACE OPPOSITE THE DIRECTION OF AIRFLOW. UPON COMPLETION OF INSTALLATION OF DUCT LINER AND BEFORE OPERATION IS TO COMMENCE, VISUALLY INSPECT SYSTEM AND VERIFY THAT THE DUCT LINER IS PROPERLY INSTALLED. OPEN ALL SYSTEM DAMPERS AND TURN ON FANS TO BLOW ALL SCRAPS AND OTHER LOOSE PIECES OF MATERIAL OUT OF THE DUCT SYSTEM. ALLOW FOR A MEANS OF REMOVAL OF SUCH MATERIAL.
6. ALL INSULATION CONTAINING FIBROUS MATERIALS EXPOSED TO AIRFLOW SHALL BE RATED FOR THAT EXPOSURE OR SHALL BE ENCAPSULATED. INSULATING PROPERTIES FOR ALL MATERIALS SHALL MEET OR EXCEED INDUSTRY STANDARDS. POLYSTYRENE PRODUCTS SHALL MEET ASTM C578. ALL INSULATION SHALL HAVE FORMALDEHYDE EMISSIONS NOT GREATER THAN 0.05 PPM. THE MAXIMUM FLAME SPREAD AND SMOKE DEVELOPED INDEX FOR INSULATION SHALL MEET THE REQUIREMENTS OF THE LOCAL CODES AND ORDINANCES ADOPTED BY THE JURISDICTION IN WHICH THE BUILDING IS LOCATED.
7. MASTIC USED TO SEAL DUCTWORK SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A-95 OR UL 181B-98. MAINTAIN AMBIENT TEMPERATURES AND CONDITIONS REQUIRED BY MANUFACTURER OF ADHESIVES, MASTICS, AND INSULATION CEMENTS. DO NOT INSTALL DUCT SEALANT WHEN TEMPERATURES ARE LESS THAT THOSE RECOMMENDED BY THE SEALANT MANUFACTURER.
8. ALL ADHESIVES AND SEALANTS SHALL HAVE VOC CONTENT BELOW 20 GRAMS PER LITER AND WHICH MEET THE REQUIREMENTS OF THE MANUFACTURER OF THE PRODUCTS BEING ADHERED OR INVOLVED. ADHESIVES AND SEALANTS SHALL CONTAIN NO HEAVY METALS OR FORMALDEHYDE.
9. FACTORY-MADE AIR DUCTS AND CONNECTORS SHALL COMPLY WITH UL 181-96.
10. FLEXIBLE DUCT SHALL BE UL LISTED CLASS 0 OR CLASS 1, INSULATED, AND COMPLY WITH UL 181. FLEXIBLE DUCT SHALL BE FACTORY FORMED, COMPOSED OF SPIRAL WOUND CORROSION RESISTANT WIRE BONDED TO AN INNER FABRIC LINER. DUCT SHALL BE FACTORY INSULATED WITH A FOIL VAPOR BARRIER JACKET. CONNECT TO RIGID DUCT WITH SPIN-IN FITTING AND DAMPER. FLEXIBLE DUCTS AND AIR CONNECTORS SHALL NOT PASS THROUGH ANY FIRE RESISTANCE RATED ASSEMBLY.
11. THE MC SHALL PROVIDE ALL DIFFUSERS GRILLES, LOUVERS, AND OTHER AIR DISTRIBUTION OUTLETS AND INLETS. LOUVERS, GRILLES, AND DIFFUSERS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. FOR LAY-IN CEILINGS, INSTALL SUPPORT FROM THE STRUCTURE FOR EACH DIFFUSER OR DAMPER. AIR DISTRIBUTION OUTLETS AND INLETS SHALL BE BY HART & COOLEY, PRICE, METAL-AIRE, NAILOR, OR CARNES.
12. AIR FILTERS SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 605 OF THE 2018 NC MECHANICAL CODE.
13. THE MC SHALL PROVIDE ALL REFRIGERATION PIPING. ALL PIPE AND FITTINGS SHALL BE TYPE ACR HARD COPPER TUBING WITH SWEAT FITTINGS. REFRIGERATION LINES SHALL BE RUN NEATLY. WHERE A GROUP OF LINES ARE RUN, TRAPEZE HANGERS MAY BE USED. DO NOT USE CHAIN OR WIRE HANGERS. WRAP TUBING WITH RUBBER TAPE AT EACH CLAMP OR HANGER. FOR COVERED PIPES, HANGERS SHALL FIT AROUND THE OUTSIDE OF THE COVERING WITH 12 GAUGE GALVANIZED STEEL SHIELDS OF A LENGTH EQUAL TO THE OUTSIDE DIAMETER OF THE INSULATION AND COVERING 3/4 OF THE CIRCUMFERENCE OF THE INSULATION. SAGS SHALL NOT BE PERMISSIBLE. HORIZONTAL LINES SHALL PITCH DOWN NOT LESS THAN 1 INCH IN 40 FEET. INSULATE WITH 1 INCH CLOSED CELL ARMAFLEX TYPE INSULATION WITH A FLAME DENSITY RATING LESS THAN 25 AND A SMOKE DENSITY RATING LESS THAN 50. ALL JOINTS AND SPLICES IN INSULATION SHALL BE TAPED AND AIR TIGHT. SOLDER REFRIGERATION LINES USING 15 PERCENT SILVER SOLDER AND EVACUATE LINES TO 300 MICRONS. PROVIDE MOISTURE INDICATING SIGHT GLASS AND FILTER DRYER IN LIQUID LINE. PROVIDE OIL TRAPS AND DOUBLE RISERS IN REFRIGERANT SUCTION AND HOT GAS LINES WHERE REQUIRED TO PREVENT OIL SLUGGING AT THE COMPRESSOR AND INSURE PROPER LUBRICATION. MC SHALL BE RESPONSIBLE FOR SEALING LINE SET PENETRATIONS OF ANY RATED ASSEMBLIES IN ACCORDANCE WITH A SYSTEM LISTED IN THE UL DIRECTORY FOR THE SPECIFIC ASSEMBLY BEING PENETRATED. SEE ARCHITECTURAL PLANS FOR A LIST OF ALL UL FIRE RATED ASSEMBLIES.

METHODS:
1. INSULATE DUCTWORK WITH FIBERGLASS DUCT WRAP; INSTALLED R-VALUE SHALL BE A MINIMUM R-6. COVERINGS AND LININGS, INCLUDING ADHESIVES WHEN USED, SHALL HAVE A FLAME SPREAD INDEX NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E 84. ALL NEW DUCTWORK SHALL RECEIVE INSULATION ON THE OUTSIDE. INSTALL DUCT WRAP INSULATION WITH FACING OUTSIDE SO THAT TAPE FLAP OVERLAPS INSULATION AND FACING OF ADJACENT PIECE OF DUCT WRAP. INSULATION SHALL BE TIGHTLY BUTTED. FOR RECTANGULAR DUCTS, INSTALL SO INSULATION IS NOT EXCESSIVELY COMPRESSED AT DUCT CORNERS. STAPLE SEAMS APPROXIMATELY 6 INCHES ON CENTER WITH OUTWARD CLINCHING STAPLES. SEAL SEAMS WITH PRESSURE SENSITIVE TAPE MATCHING THE FACING. FOR RECTANGULAR DUCTS 24 INCHES IN WIDTH OR GREATER, SECURE DUCT WRAP TO THE BOTTOM OF THE DUCT WITH MECHANICAL FASTENERS SPACED 18 INCHES ON CENTER TO PREVENT SAGGING OF INSULATION. ADJACENT SECTIONS OF DUCT WRAP SHALL BE TIGHTLY BUTTED WITH THE 2 INCH TAPE FLAP OVERLAPPING. ALL TEARS, PUNCTURES, ETC. OF THE DUCT WRAP INSULATION SHALL BE SEALED WITH TAPE OR MASTIC TO PROVIDE A VAPOR TIGHT SYSTEM. INSULATION SHALL BE BY KNAUF INSULATION, OWENS CORNING CORP, OR CERTAINTEED CORPORATION.
2. VERIFY THAT DUCTS HAVE BEEN TESTED BEFORE APPLYING INSULATION MATERIALS. VERIFY THAT DUCT SURFACES ARE CLEAN, DRY AND FREE OF FOREIGN MATERIAL PRIOR TO INSULATING. DUCT COVERINGS SHALL NOT PENETRATE A WALL OR FLOOR REQUIRED TO HAVE A FIRE-RESISTANCE RATING OR REQUIRED TO BE FIRE BLOCKED.
3. WHERE DUCTS ARE CONNECTED TO EXTERIOR WALL LOUVERS AND DUCT OUTLET IS SMALLER THAN LOUVER FRAME, PROVIDE BLANK-OUT PANELS SEALING LOUVER AREA AROUND DUCT. USE SAME MATERIAL AS DUCT, PAINTED BLACK ON EXTERIOR SIDE; SEAL TO LOUVER FRAME AND DUCT.
4. DUCTS CONNECTING TO A FURNACE SHALL HAVE A CLEARANCE TO COMBUSTIBLES IN ACCORDANCE WITH THE FURNACE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
5. FOR STRUCTURES IN FLOOD HAZARD AREAS, DUCTS SHALL BE LOCATED ABOVE THE DESIGN FLOOD ELEVATION. DUCT SHALL NOT BE INSTALLED IN OR WITHIN 4 INCHES OF THE EARTH.
6. PROVIDE DUCT ACCESS DOORS FOR INSPECTION AND CLEANING BEFORE AND AFTER FILTERS, COILS, FANS, AUTOMATIC DAMPERS, AT FIRE DAMPERS, COMBINATION FIRE AND SMOKE DAMPERS.
7. CONSTRUCT T's, BENDS, AND ELBOWS WITH RADII OF NOT LESS THAN 1-1/2 TIMES THE WIDTH OF THE DUCT ON CENTERLINE. WHERE NOT POSSIBLE AND WHERE RECTANGULAR ELBOWS MUST BE USED, PROVIDE TURNING VANES.
8. INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 15 DEGREES DIVERGENCE; MAXIMUM OF 30 DEGREES DIVERGENCE UPSTREAM OF EQUIPMENT AND 45 DEGREES CONVERGENCE DOWNSTREAM.
9. IT SHALL BE THE RESPONSIBILITY OF THE MC TO SUSPEND AND SUPPORT ALL EQUIPMENT, DUCTWORK, DIFFUSERS, AND OTHER MATERIALS FOLLOWING RECOGNIZED ENGINEERING PRACTICES AND USING STANDARD, COMMERCIALLY ACCEPTED HANGERS AND SUSPENSION EQUIPMENT. ALL HVAC EQUIPMENT SHALL BE SECURELY MOUNTED TO THE BUILDING STRUCTURE AND SHALL NOT RELY ON CEILING OR WALL SURFACES FOR SUPPORT. THE SUPPORT ATTACHMENT SHALL SUPPORT THE WEIGHT OF THE EQUIPMENT PLUS THE WEIGHT OF THE SUPPORT ATTACHMENT ITSELF. SUPPORT FROM THE TOP CHORD OF THE ROOF JOISTS, GIRDERS, AND BEAMS. THE BOTTOM CHORD IS NOT TO BE USED FOR EQUIPMENT OR PIPING SUPPORT. HANGERS SHALL NOT BE ATTACHED TO CORRUGATED STEEL DECKING.
10. DUCTS SHALL BE SUPPORTED IN ACCORDANCE WITH SMACNA AT INTERVALS NOT EXCEEDING 10 FEET. DUCTS 36 INCHES OR LARGER SHALL HAVE TRAPEZE TYPE HANGERS SUSPENDED WITH THREADED ROD. SUPPORT DUCTS FROM BAR JOISTS, GIRDERS, OR BEAMS.
11. CHECK LOCATIONS OF AIR OUTLETS AND INLETS AND MAKE NECESSARY ADJUSTMENTS IN POSITION TO CONFORM WITH ARCHITECTURAL FEATURES, SYMMETRY, AND LIGHTING ARRANGEMENT. COORDINATE WITH SPRINKLER CONTRACTOR IF APPLICABLE.
12. PROVIDE BALANCING DAMPERS AT POINTS ON SUPPLY WHERE BRANCHES ARE TAKEN FROM LARGER DUCTS AS REQUIRED FOR AIR BALANCING. INSTALL MINIMUM 2 DUCT WIDTHS FROM DUCT TAKE-OFF. PROVIDE BALANCING DAMPERS ON DUCT TAKE-OFFS TO DIFFUSERS, AND REGISTERS, REGARDLESS OF WHETHER DAMPERS ARE SPECIFIED AS PART OF THE DIFFUSER OR REGISTER ASSEMBLY. ADJUST AIR HANDLING AND DISTRIBUTION SYSTEMS TO PROVIDE DESIGN SUPPLY, RETURN, AND EXHAUST AIR QUANTITIES AT SITE ALTITUDE.

13. MC SHALL INSTALL FIRE DAMPERS AT EACH PENETRATION OF A RATED WALL AS INDICATED ON THE DRAWINGS OR AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION. FIRE DAMPERS SHALL BE UL LABELED (UL 555), CURTAIN TYPE, WITH INTEGRAL FACTORY SLEEVE AND BLADES LOCATED OUTSIDE THE AIR STREAM. INSTALLATION OF ALL FIRE DAMPERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SECTION 607 OF THE 2018 NC MECHANICAL CODE. PROVIDE ACCESS PANELS FOR TESTING AND SERVICE AS NECESSARY. MC SHALL PROVIDE RADIATION DAMPERS AND THERMAL BLANKETS FOR ALL PENETRATIONS OF RATED CEILING ASSEMBLIES. RADIATION DAMPERS SHALL BE UL LABELED (UL 555C) AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFIC INSTALLATION INSTRUCTIONS. FIRE DAMPERS, COMBINATION FIRE/SMOKE DAMPERS, AND CEILING RADIATION DAMPERS SHALL BE BY RUSKIN, NAILOR, OR LLOYD INDUSTRIES.
14. MC SHALL INSTALL A SMOKE DETECTOR-UL LISTED FOR DUCT INSTALLATION (UL 268A) IN EACH UNIT'S RETURN UPSTREAM OF ANY FILTERS, OUTSIDE AIR CONNECTIONS, OR DECONTAMINATION EQUIPMENT. DUCT SMOKE DETECTORS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 72. DUCT SMOKE DETECTOR SUPERVISION SHALL COMPLY WITH 606.4.1 OF THE 2018 NC MECHANICAL CODE. IF THE BUILDING IS (TO BE) EQUIPPED WITH A FIRE ALARM SYSTEM, THE FIRE ALARM SYSTEM CONTRACTOR SHALL FURNISH AND WIRE ALL DUCT SMOKE DETECTORS. IF THE BUILDING IS NOT PROVIDED WITH A FIRE ALARM SYSTEM, THE MC SHALL FURNISH AND WIRE THE DUCT SMOKE DETECTORS AND A/V DEVICE. IT SHALL BE THE RESPONSIBILITY OF THE MC TO INSTALL ALL SMOKE DUCT DETECTORS PER NFPA AND MFG'S INSTALLATION INSTRUCTIONS REGARDLESS OF WHO FURNISHES THE DEVICES.
15. MC SHALL INSTALL PROGRAMMABLE THERMOSTATS AS SHOWN ON THE PLANS. THERMOSTAT SHALL BE MOUNTED AT 48 INCHES AFF. THERMOSTATS SHALL MEET THE REQUIREMENTS OF SECTION C403.2.4 OF THE 2018 NORTH CAROLINA ENERGY CONSERVATION CODE.
16. FRESH AIR INTAKES SHALL BE INSTALLED ON ALL UNITS AS SHOWN ON DRAWINGS. MAINTAIN 10 FEET OF DISTANCE BETWEEN FRESH AIR INTAKES AND ALL EXHAUST TERMINATIONS AND PLUMBING VENT THRU ROOFS.
17. UNITS PROVIDED WITH ECONOMIZERS SHALL ALSO BE PROVIDED WITH POWERED EXHAUST AND COMPARATIVE ENTHALPY CONTROLS.
18. MC SHALL INSTALL ALL EXHAUST FANS AND VENT TO THE BUILDING'S EXTERIOR. EC SHALL SWITCH FANS WITH LIGHTS OR ON SEPARATE SWITCH AS SHOWN.
19. P-TRAPS MUST BE INSTALLED ON ALL UNITS. MC SHALL INSTALL AUXILIARY DRAIN PANS UNDER OVERHEAD AIR HANDLERS AND AN AUTOMATIC CUT-OFF FLOAT SWITCH FOR EACH. P-TRAPS AND CONDENSATE LINES SHALL BE 1 INCH. P-TRAPS AND CONDENSATE LINES MAY BE PVC WHERE NOT LOCATED IN PLENUMS; OTHERWISE, THEY SHALL BE TYPE M COPPER.
20. INSTALL BACKDRAFT DAMPERS ON FRESH AIR AND EXHAUST DUCTS WHERE THEY PENETRATE THE THERMAL ENVELOPE PER NORTH CAROLINA ENERGY CONSERVATION CODE C402.5.5

SYSTEM COMMISSIONING PLAN

PURSUANT TO THE REQUIREMENTS OF SECTION 408 OF THE NC ENERGY CONSERVATION CODE, COMMISSIONING MAY BE REQUIRED BY THE AHJ ON MECHANICAL, HOT WATER, AND LIGHTING CONTROLS SYSTEMS. A REPRESENTATIVE OF KILIAN ENGINEERING, INC. WOULD THEN BE REQUIRED TO PERFORM A SITE VISIT TO OBSERVE THE INSTALLED AND OPERATIONAL SYSTEMS AND VIEW ANY PRE-PERFORMED TESTS AS NOTED BELOW. KILIAN ENGINEERING SHALL BE CONTACTED NOT LESS THAN 3 BUSINESS DAYS PRIOR TO NECESSARY TESTING TO SCHEDULE A VISIT. COORDINATION BETWEEN THE MC, EC, AND PC SHALL OCCUR SO THAT SYSTEM COMMISSIONING CAN BE DONE FOR ALL THREE PORTIONS OF THE APPENDIX C1 DOCUMENT IN A SINGLE VISIT.

HVAC EQUIPMENT AND CONTROLS:
- MECHANICAL CONTRACTOR SHALL TEST FULL FUNCTIONALITY OF EQUIPMENT OPERATIONS AND PROVIDE WRITTEN DOCUMENTATION OF ANY DEVIATIONS FROM DESIGN DOCUMENTS. THIS ITEM IS NOT REQUIRED FOR UNITARY SYSTEMS NOT REQUIRED TO HAVE AN ECONOMIZER.
- MECHANICAL CONTRACTOR SHALL PROVIDE TEST AND BALANCE REPORT PROVING FINAL AIR OUTLET QUANTITIES TO BE WITHIN 10% OF DESIGN NUMBERS
- MECHANICAL CONTRACTOR MUST CHECK FULL COMPATIBILITY OF HVAC EQUIPMENT WITH ANY AND ALL BMS OR OTHER CONTROL SYSTEMS AS NOTED ON THE DRAWINGS
  - •• ANY CONTROLS INSTALLED BEYOND WHAT IS LISTED ON DRAWINGS IS RESPONSIBILITY OF CONTRACTOR AND OWNER AND NOT OF ENGINEER
- MECHANICAL CONTRACTOR MUST PROVIDE FULL DOCUMENTATION (SUBMITTALS, MANUALS, MAINTENANCE SCHEDULE, ETC.) TO OWNER AS REQUIRED IN 2018 NCECC C408.2.5.2

NOTE: STATEMENT OF SYSTEM COMMISSIONING REFLECTS OPERATION OF EQUIPMENT PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY AND DOES NOT CONSTITUTE A WARRANTY FOR CONTINUED OPERATION

MECHANICAL NOTES AND SCHEDULES | 1

Ventilation Calculation (For AHU-1)

Room Name(s)	Zone Type	Area (sq.ft.)	Rp	Ra	Default Occupancy	Pz	Ez	Airflow to Zone (cfm)	Required Exhaust (cfm)
LOBBY 100	Corridors	120	0	0.06	0	0.00	0.8	50	0
CONFERENCE 103	Meeting/Conference Room	403	5	0.06	50	20.15	0.8	400	0
BATHROOM 101&102	N/A	403	0	0	0	0.00	0.8	150	0
	N/A		0	0	0	0.00	0.8		0
	N/A		0	0	0	0.00	0.8		0

K-12 School? No

Maximum Zp: 0.390406
Ev: 0.7
Actual System Population: 10

Uncorrected Intake 81 cfm
Outdoor Air Intake *116 cfm*
Percent of Unit Air 19%

Ventilation Calculation (For AHU-2)

Room Name(s)	Zone Type	Area (sq.ft.)	Rp	Ra	Default Occupancy	Pz	Ez	Airflow to Zone (cfm)	Required Exhaust (cfm)
STORAGE 106	Storage	338	0	0.12	0	0.00	0.8	125	0
FAMILY RR 107	N/A	60	0	0	0	0.00	0.8	50	0
PANTRY 108	Storage	73	0	0.12	0	0.00	0.8	75	0
KITCHEN 109	Kitchen	406	0	0	0	0.00	0.8	1150	284.2
	N/A		0	0	0	0.00	0.8		0

K-12 School? No

Maximum Zp: 0.4056
Ev: 0.7
Actual System Population: 5

Uncorrected Intake 49 cfm
Outdoor Air Intake *70 cfm*
Percent of Unit Air 5%

Ventilation Calculation (For AHU-3,4,5,6)

Room Name(s)	Zone Type	Area (sq.ft.)	Rp	Ra	Default Occupancy	Pz	Ez	Airflow to Zone (cfm)	Required Exhaust (cfm)
MULTIPURPOSE 104	Multiuse Assembly	3900	7.5	0.06	120	468.00	0.8	6400	0
	N/A		0	0	0	0.00	0.8		0
	Storage		0	0.12	0	0.00	0.8		0
	Kitchen		0	0	0	0.00	0.8		0
	N/A		0	0	0	0.00	0.8		0

K-12 School? No

Maximum Zp: 0.73125
Ev: 0.4
Actual System Population: 22

Uncorrected Intake 399 cfm
Outdoor Air Intake *998 cfm*
Percent of Unit Air 16%

SPLIT SYSTEM HEAT PUMP SCHEDULE

MARK	MFG / MODEL #	NOMINAL CAPACITY	REF LINES		MOTORS		EFFICIENCIES			ELECTRICAL			WEIGHT	REMARKS
		TONS	GAS	LIQ	COMPRESSOR NO.	COND. FAN NO.	SEER / EER	COP @ 17°	HSPF	V/PH	MCA	MOCP	LBS	
HP-1	TRANE 4TWR4030D1000	2.5	3/4	3/8	1	1	14/11.5	2.5	8.2	208/1	17	25	199	2, 7, 8, 10, 14, 18, 19, 20
HP-2, HP-3, HP-4, HP-5	TRANE 4TWR4048D1000	4	7/8	3/8	1	1	14/11.5	2.6	8.5	208/1	26	45	234	2, 7, 8, 10, 14, 18, 19, 20
HP-6	TRANE 4TWR4060D1000	5	1-1/8	3/8	1	1	14/11.5	2.4	8.2	208/1	32	50	295	2, 7, 8, 10, 14, 18, 19, 20

SPLIT SYSTEM AIR HANDLER SCHEDULE

MARK	MFG / MODEL #	NOMINAL CAPACITY	AIR FLOW		FAN MOTORS		HEATING CAPACITY			COOLING CAPACITY			ELECTRICAL			WEIGHT	REMARKS
			SUPPLY	MIN. OA	SUPPLY	ESP	OUTPUT	AUX ELEC HEAT		EAT WB/DB	TOTAL	SENSIBLE	V/PH	MCA	MOCP		
		TONS	CFM	CFM	NO.	in wg	MBH	kW	STAGES	°F	MBH	MBH				LBS	
AHU-1	TRANE TEM4A0B30S-1S	2.5	1000	SEE TABLE	1	.25	18.2	2.88	1	67/80	28.6	22.8	208/1	20	20	110	7, 8, 13, 17, 18, 19, 20
AHU-2, AHU-3, AHU-4, AHU-5	TRANE TEM4A0B48S-1S	4	1600	SEE TABLE	1	.25	30.1	2.88	1	67/80	46.9	34.4	208/1	25	25	133	7, 8, 13, 17, 18, 19, 20
AHU-6	TRANE TEM4A0C60S-1S	5	2000	SEE TABLE	1	.25	38.7	2.88	1	67/80	62.6	28.7	208/1	25	25	159	7, 8, 13, 17, 18, 19, 20

1. PROVIDE COMPATIBLE ROOF CURB
2. PROVIDE CONCRETE PAD FOR UNIT TO SIT ON
3. PROVIDE DUCT DETECTOR IN RETURN DUCT. PROVIDE RELAY FOR KILLING POWER TO UNIT'S FAN.
4. PROVIDE HEAT STRIP OUTDOOR TEMPERATURE LOCKOUT TO PREVENT SUPPLEMENTAL HEAT OPERATION IN RESPONSE TO THE THERMOSTAT BEING CHANGED TO A WARMER SETTING. SET NO LOWER THAN 35°F AND NO HIGHER THAN 40°F FOR USE WITH HEAT PUMP OR AC WITH STRIP HEAT..
5. PROVIDE WITH 0-100% ECONOMIZER WITH BAROMETRIC RELIEF FOR USE WITH PACKAGED UNITS
6. PROVIDE WITH COMPARATIVE ENTHALPY CONTROLS FOR ECONOMIZER FOR USE WITH PACKED UNITS
7. PROVIDE HINGED ACCESS DOORS
8. PROVIDE HAIL GUARDS FOR COIL
9. PROVIDE OVER SIZED FAN MOTOR (FOR USE ON 7.5 TON OR GREATER PACKAGE UNIT)
10. REPLACE ALL FILTERS AT PROJECT'S COMPLETION
11. PROVIDE CO2 SENSOR FOR MODULATING OUTSIDE AIR (FOR USE ON SPLIT SYSTEM)
12. PROVIDE MOTORIZED OUTSIDE AIR DAMPER. CONNECT TO FAN RELAY AT AIR HANDLER (FOR USE ON SPLIT SYSTEM)
13. PROVIDE 7-DAY PROGRAMMABLE THERMOSTAT WITH NIGHT-TIME SET BACK
14. CONSULT MANUFACTURER ON LINE SET LENGTHS EXCEEDING 60FT (FOR SPLIT SYSTEM'S ONLY)
15. PROVIDE HARD START KIT (FOR 4 OR 5 TON SINGLE PHASE UNITS)
16. PROVIDE LOW AMBIENT COOLING KIT (USE IN SERVER ROOMS)
17. HEATER RATED AT 208V (240V) (480V)
18. OR EQUAL BY CARRIER, LENNOX, OR YORK
19. ANY EQUIPMENT SUBSTITUTIONS MUST EQUAL OR EXCEED EFFICIENCIES LISTED (RATINGS PER ARI)
20. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES

MECHANICAL SYSTEM, SERVICE SYSTEMS, AND EQUIPMENT

METHOD OF COMPLIANCE — PRESCRIPTIVE
THERMAL ZONE — ZONE 3A

EXTERIOR DESIGN CONDITIONS
HEATING DESIGN DRY BULB — 23.1°F
COOLING DESIGN DRY BULB — 91.7°F
COOLING DESIGN WET BULB — 75.6°F

INTERIOR DESIGN CONDITIONS
HEATING DESIGN DRY BULB — 72°F
COOLING DESIGN DRY BULB — 75°F
COOLING RELATIVE HUMIDITY — 50%

HEATING LOAD: — 32.3 MBTU/H

SENSIBLE COOLING LOAD: — 18.5 MBTU/H
LATENT COOLING LOAD: — 6.9 MBTU/H

MECHANICAL SPACING CONDITIONING SYSTEM:
UNITARY — SPLIT SYSTEM
DESCRIPTION OF UNIT(S)
BOILER — N/A
TOTAL BOILER OUTPUT — N/A
CHILLER — N/A
TOTAL CHILLER CAPACITY — N/A

EQUIPMENT EFFICIENCIES: — SEE SCHEDULES

EQUIPMENT SCHEDULES WITH MOTORS (MECHANICAL SYSTEMS): — SEE SCHEDULES

DESIGNER STATEMENT:

TO THE BEST OF MY KNOWLEDGE, THE MECHANICAL DESIGN FOR THIS BUILDING COMPLIES WITH MECHANICAL AND EQUIPMENT REQUIREMENTS OF THE 2018 NORTH CAROLINA STATE BUILDING CODE AND 2018 NORTH CAROLINA ENERGY CONSERVATION CODE.

MECHANICAL SYSTEM, SERVICE SYSTEMS, AND EQUIPMENT

METHOD OF COMPLIANCE — PRESCRIPTIVE
THERMAL ZONE — ZONE 3A

EXTERIOR DESIGN CONDITIONS
HEATING DESIGN DRY BULB — 23.1°F
COOLING DESIGN DRY BULB — 91.7°F
COOLING DESIGN WET BULB — 75.6°F

INTERIOR DESIGN CONDITIONS
HEATING DESIGN DRY BULB — 72°F
COOLING DESIGN DRY BULB — 75°F
COOLING RELATIVE HUMIDITY — 50%

HEATING LOAD: — 46.3 MBTU/H

SENSIBLE COOLING LOAD: — 30.8 MBTU/H
LATENT COOLING LOAD: — 15.9 MBTU/H

MECHANICAL SPACING CONDITIONING SYSTEM:
UNITARY — SPLIT SYSTEM
DESCRIPTION OF UNIT(S)
BOILER — N/A
TOTAL BOILER OUTPUT — N/A
CHILLER — N/A
TOTAL CHILLER CAPACITY — N/A

EQUIPMENT EFFICIENCIES: — SEE SCHEDULES

EQUIPMENT SCHEDULES WITH MOTORS (MECHANICAL SYSTEMS): — SEE SCHEDULES

DESIGNER STATEMENT:

TO THE BEST OF MY KNOWLEDGE, THE MECHANICAL DESIGN FOR THIS BUILDING COMPLIES WITH MECHANICAL AND EQUIPMENT REQUIREMENTS OF THE 2018 NORTH CAROLINA STATE BUILDING CODE AND 2018 NORTH CAROLINA ENERGY CONSERVATION CODE.

MECHANICAL SYSTEM, SERVICE SYSTEMS, AND EQUIPMENT

METHOD OF COMPLIANCE — PRESCRIPTIVE
THERMAL ZONE — ZONE 3A

EXTERIOR DESIGN CONDITIONS
HEATING DESIGN DRY BULB — 23.1°F
COOLING DESIGN DRY BULB — 91.7°F
COOLING DESIGN WET BULB — 75.6°F

INTERIOR DESIGN CONDITIONS
HEATING DESIGN DRY BULB — 72°F
COOLING DESIGN DRY BULB — 75°F
COOLING RELATIVE HUMIDITY — 50%

HEATING LOAD: — 97.1 MBTU/H

SENSIBLE COOLING LOAD: — 76.5 MBTU/H
LATENT COOLING LOAD: — 58.4 MBTU/H

MECHANICAL SPACING CONDITIONING SYSTEM:
UNITARY — SPLIT SYSTEM
DESCRIPTION OF UNIT(S)
BOILER — N/A
TOTAL BOILER OUTPUT — N/A
CHILLER — N/A
TOTAL CHILLER CAPACITY — N/A

EQUIPMENT EFFICIENCIES: — SEE SCHEDULES

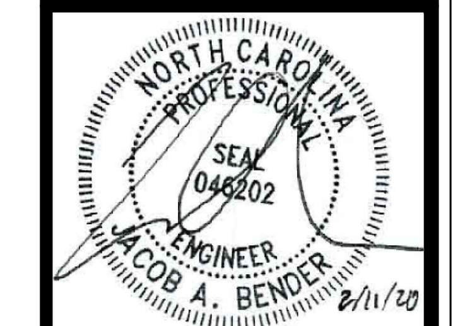
EQUIPMENT SCHEDULES WITH MOTORS (MECHANICAL SYSTEMS): — SEE SCHEDULES

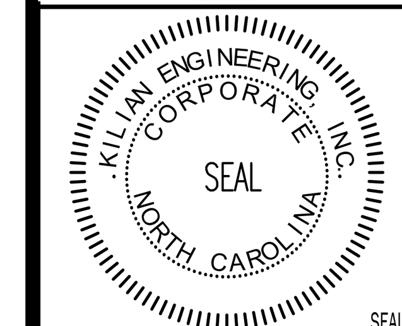
DESIGNER STATEMENT:

TO THE BEST OF MY KNOWLEDGE, THE MECHANICAL DESIGN FOR THIS BUILDING COMPLIES WITH MECHANICAL AND EQUIPMENT REQUIREMENTS OF THE 2018 NORTH CAROLINA STATE BUILDING CODE AND 2018 NORTH CAROLINA ENERGY CONSERVATION CODE.

MECHANICAL DESIGNER'S STATEMENT | 2

Kilian Engineering, Inc.
PO Box 3301, Henderson, NC 27536 | www.kiliannengineering.com
(P) 252.438.8778 | CORPORATE LICENSE C-2277





SEAL

NEW FELLOWSHIP HALL FOR:
NEILL'S CREEK BAPTIST CHURCH
4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

NO.	DATE	DESCRIPTION

ISSUED:

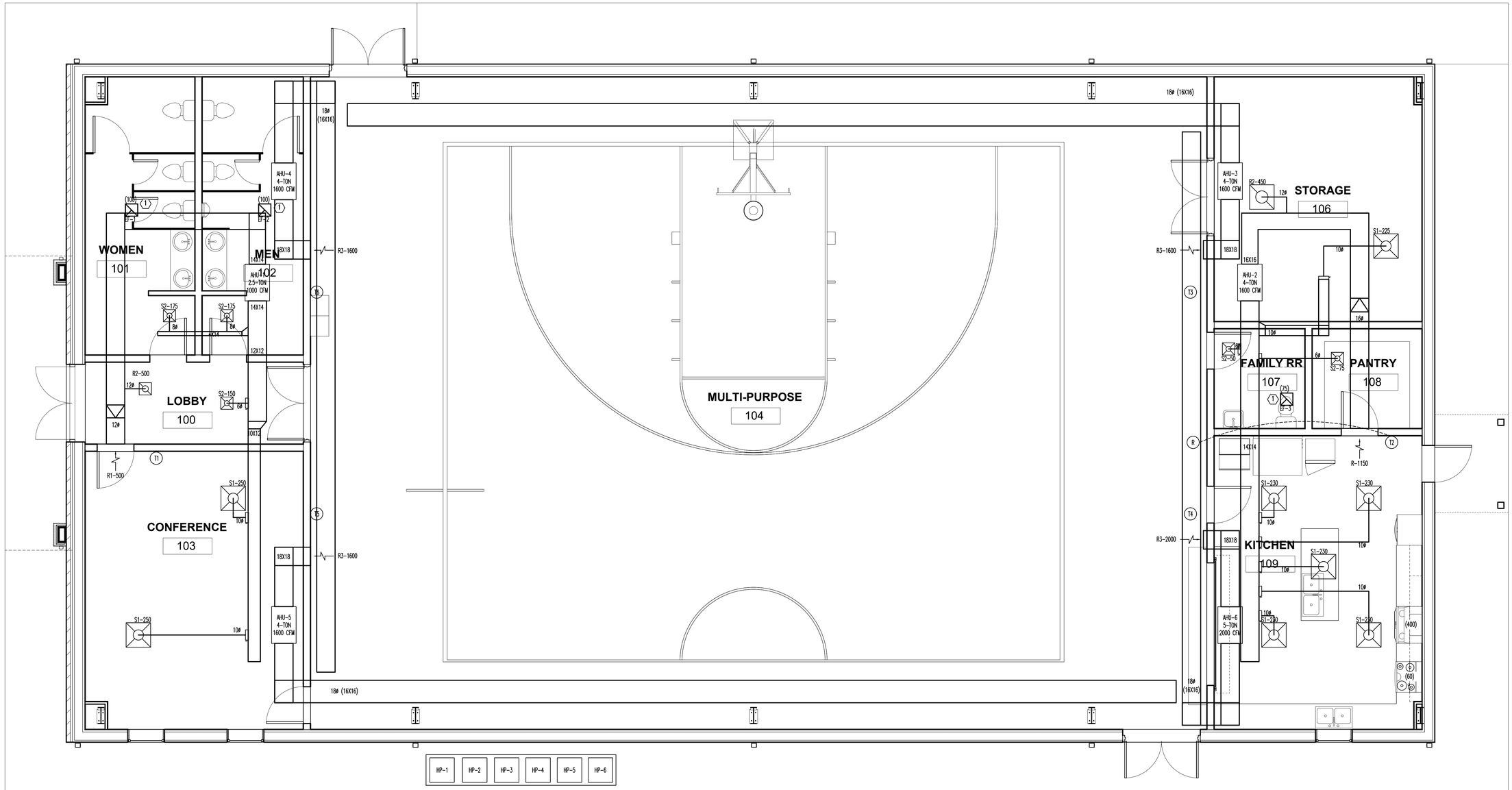
NO.	DATE	DESCRIPTION
1	02.13.2020	PERMIT SET

DRAWN BY: JAM
CHECKED BY: MWK

MECHANICAL NOTES AND SCHEDULES

SHEET NO.
M1

PROJECT NO: 20015



HEX PLAN NOTES

1. PROVIDE 6" EXHAUST DUCT TO EXTERIOR WITH HOODED ROOF OR WALL CAP. COORDINATE TERMINATION POINT WITH GC PRIOR TO INSTALL.

REGISTER & GRILLE SCHEDULE

MARK	MFG	MODEL #	SIZE (WXH)	MOUNTING	DESCRIPTION	NOTES
S1	HART & COOLEY	HVS	24X24	LAY-IN	4-WAY DIFFUSER, BRIGHT WHITE	1
S2	HART & COOLEY	ARE	24X24	SURFACE	ALUMINUM, 4 WAY DIFFUSER, BRIGHT WHITE	1
R	HART & COOLEY	RH90	36X14	SURFACE	ALUMINUM SURFACE MOUNT RETURN GRILLE	1
R1	HART & COOLEY	RH90	18X14	SURFACE	ALUMINUM SURFACE MOUNT RETURN GRILLE	1
R2	HART & COOLEY	RH45T	24X24	LAY-IN	ALUMINUM, LAY IN RETURN GRILLE	1
R3	HART & COOLEY	RH90	36X36	SURFACE	ALUMINUM SURFACE MOUNT RETURN GRILLE	1

1. OR EQUAL BY PRICE, METAL-AIRE, CARNES, TITUS OR NAILOR.

T THERMOSTAT LOCATION MOUNT AT 48" A.F.F.

AV AUDIO VISUAL ANNUNCIATOR WITH RESET FOR DUCT DETECTOR, WALL MOUNT.

S--- DUCT DETECTOR

CO_2 CO_2 SENSOR LOCATION. INSTALL NEXT TO THERMOSTAT

MECHANICAL PLAN - SCALE 1/4" = 1'-0" | 1

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NORTH CAROLINA PROFESSIONAL SEAL 045202 ENGINEER JACOB A. BENGER 8/11/20

KILIAN ENGINEERING CORPORATE SEAL NORTH CAROLINA

NEW FELLOWSHIP HALL FOR:

NEILL'S CREEK BAPTIST CHURCH

4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

ISSUED:

DRAWN BY: JAM
CHECKED BY: MWK

MECHANICAL PLAN

SHEET NO.

M2

PROJECT NO: 20015

GENERAL PLUMBING NOTES:

ADMINISTRATIVE:

1. THE FOLLOWING ABBREVIATIONS SHALL APPLY TO NOTES AND PLANS: PC – PLUMBING CONTRACTOR, EC – ELECTRICAL CONTRACTOR, MC – MECHANICAL CONTRACTOR, GC – GENERAL CONTRACTOR, FASC – FIRE ALARM SYSTEM CONTRACTOR.
2. "PROVIDE" MEANS TO FURNISH AND INSTALL. THE PLUMBING CONTRACTOR SHALL ALSO INSTALL MATERIALS FURNISHED BY OTHERS AND THE GENERAL CONTRACTOR.
3. THE PC SHALL BE RESPONSIBLE FOR A COMPLETE AND OPERATIONAL SYSTEM AS DESCRIBED BY THESE PLANS AND SPECIFICATIONS.
4. ALL MATERIALS AND EQUIPMENT SHALL BE DELIVERED TO THE SITE AND UNLOADED AT AN APPROVED LOCATION. PC SHALL PROTECT ALL MATERIALS AND EQUIPMENT FROM BREAKAGE, THEFT, AND THE ELEMENTS. ALL MATERIALS AND EQUIPMENT SHALL REMAIN THE PROPERTY OF THE PC UNTIL THE PROJECT HAS BEEN COMPLETED AND TURNED OVER TO THE OWNER.
5. ALL MATERIALS USED SHALL BE NEW AND FREE OF DEFECTS. ANY MATERIALS FOUND TO BE DEFECTIVE SHALL BE REPLACED AT NO EXPENSE TO THE OWNER. ALL MATERIALS AND EQUIPMENT SHALL BEAR APPROVAL FROM UL OR AN APPROVED THIRD PARTY AGENCY. WHERE A MANUFACTURER AND MODEL NUMBER IS GIVEN, IT IS TO ESTABLISH A STANDARD OF QUALITY AND NOT TO LIMIT PRODUCTS TO A PARTICULAR MANUFACTURER. PRODUCTS DETERMINED TO BE EQUAL BY THE ENGINEER WILL BE ACCEPTED.
6. THE PLUMBING SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE 2018 NORTH CAROLINA PLUMBING CODE AND ANY APPLICABLE LOCAL CODES. WHERE A CONFLICT EXISTS BETWEEN THE ABOVE REQUIREMENTS, THE CONTRACTOR SHALL OBTAIN CLARIFICATION FROM THE ENGINEER OR IN THE EVENT ANY PART OF THESE PLANS CONFLICTS WITH THE ABOVE REQUIREMENTS.
7. THE PC SHALL OBTAIN AND PAY FOR ALL PERMITS, FEES, AND INSPECTIONS NECESSARY FOR THE COMPLETION OF THE WORK UNDER THIS CONTRACT.
8. DO NOT SCALE THESE DRAWINGS–REFER TO ARCHITECTURAL SHEETS FOR DIMENSIONS.
9. THESE PLANS ARE DIAGRAMMATIC. THE PC SHALL ADJUST THE LOCATIONS OF EQUIPMENT, FIXTURES, PIPING, ETC, TO ACCOMMODATE PLANNED AND ENCOUNTERED INTERFERENCES. THE DRAWINGS DO NOT SHOW ALL BENDS, OFFSETS, AND FITTINGS THAT MAY BE REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. THE PC SHALL MAKE ALLOWANCES FOR SUCH DEVIATIONS AND CONTINGENCIES IN BID TO IMPLEMENT THEM WITHOUT ADDITIONAL COST TO THE OWNER. THE PC SHALL VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS. CONTRACTOR SHALL CONTACT THE ENGINEER TO RESOLVE ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THESE PLANS. TO AVOID POTENTIAL CONFLICTS, COORDINATE WITH OTHER TRADES PRIOR TO THE START OF CONSTRUCTION. ALL UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO ANY DIGGING.
10. TRENCHING, COMPACTION, AND BACKFILL SHALL BE BY PC AND SHALL BE IN ACCORDANCE WITH SECTION 306 OF THE NC PLUMBING CODE. UNDERGROUND LINES SHALL BE LOCATED SUCH THAT THEY DO NOT ENDANGER FOOTINGS OR FOUNDATION WALLS.
11. THE PC SHALL PROVIDE FIRESTOPPING AT ALL PENETRATIONS OF RATED FLOOR/CEILING ASSEMBLIES AND RATED WALL ASSEMBLIES TO PRESERVE OR RESTORE THE FIRE RESISTANCE RATING. SEAL ALL PENETRATIONS USING A UL LISTED SYSTEM FOUND IN THE UL DIRECTORY SPECIFIC TO THE UL LISTING OF THE ASSEMBLY BEING PENETRATED. SEE ARCHITECTURAL PLANS FOR UL RATED ASSEMBLIES SPECIFIC TO THE PROJECT.
12. SYSTEM TESTING SHALL BE PERFORMED BY PLUMBING CONTRACTOR IN ACCORDANCE WITH NORTH CAROLINA PLUMBING CODE, SECTIONS 312.2, 312.3, AND 312.5.
13. PC SHALL DISINFECT THE ENTIRE DOMESTIC WATER PIPING SYSTEM IN ACCORDANCE WITH THE AMERICAN WATER WORKS ASSOCIATION'S SPECIFICATIONS AND LOCAL HEALTH DEPARTMENT REGULATIONS.
14. AT THE COMPLETION OF WORK AND PRIOR TO ACCEPTANCE BY OWNER, THE PC SHALL CLEAN ALL EXPOSED FIXTURES, MATERIALS, AND EQUIPMENT UNDER THIS CONTRACT.
15. PC SHALL COORDINATE WITH THE GENERAL CONTRACTOR TO ENSURE ALL APPLICABLE CONSTRUCTION WASTE IS RECYCLED DURING THE CONSTRUCTION PHASE OF THE PROJECT.

MATERIALS:

1. ALL OVERHEAD DOMESTIC WATER PIPING SHALL BE TYPE L COPPER WITH 95/5 LEAD FREE SOLDER, AND ALL BELOW GRADE WATER PIPING SHALL BE TYPE K COPPER WITH NO JOINTS. ALL PIPING SHALL HAVE MANUFACTURER'S NAME AND THE APPLICABLE STANDARD TO WHICH IT WAS MANUFACTURED CLEARLY MARKED ON EACH LENGTH. PIPING SHALL COMPLY WITH ASTM B-88. USE BRAZED JOINTS ON ALL COPPER PIPING 1-1/2 INCH AND LARGER. *** PC MAY USE PEX (ASTM F 877) WITH APPROVED FITTINGS (ASTM F 1807) WITH OWNER'S APPROVAL. *** CPVC PIPING (ASTM D 2846 OR ASTM F 441) WITH APPROVED FITTINGS (ASTM D 2846, ASTM F 438, OR ASTM F 439) MAY ALSO BE USED WHERE NOT LOCATED IN PLENUMS. ALL PLASTIC PIPE, FITTINGS, AND COMPONENTS SHALL BE THIRD PARTY CERTIFIED AS CONFORMING TO NSF 14. ALL PIPE AND PIPE FITTINGS, INCLUDING VALVES AND FAUCETS, USED IN THE WATER DISTRIBUTION SYSTEM SHALL HAVE A MAXIMUM LEAD CONTENT OF .25-PERCENT AND SHALL CONFORM TO NSF 61. HOT WATER DISTRIBUTION PIPE AND TUBING SHALL HAVE A MINIMUM PRESSURE RATING OF 100 PSI AT 180°F. COLD WATER DISTRIBUTION PIPE AND TUBING SHALL HAVE A MINIMUM PRESSURE RATING OF 160 PSI AT 73.4°F. DO NOT INSTALL PEX OR CPVC PIPING IN RETURN AIR PLENUMS.
2. BALL VALVES SHALL HAVE BRASS BODY, FULL PORT, CHROME PLATED BALL, WITH TEFLON SEATS, 150 PSI WSP, AND COMPLY WITH MSS SP-110. GATE VALVES SHALL HAVE BRONZE BODY, CLASS 150, AND COMPLY WITH MSS SP-80, TYPE 2 STANDARD. VALVE BODY SHALL BE ASTM B 62, BRONZE WITH INTEGRAL SEAT AND UNION RING BONNET. ENDS SHALL BE THREADED OR SOLDER WITH COPPER-SILICON BRONZE STEM AND SOLID-WEDGE BRONZE DISC. INSTALL VALVES IN LOCATIONS THAT PERMIT EASY ACCESS WITHOUT DAMAGE TO BUILDING OR FINISHED MATERIALS; PROVIDE ACCESS DOORS IF REQUIRED. VALVES SHALL BE BY NIBCO, WATTS, OR STOCKHAM.
3. COLD WATER LINES SHALL BE INSULATED WITH 1/2 INCH THICK FIBROUS GLASS INSULATION WITH A FLAME DENSITY RATING LESS THAN 25 AND A SMOKE DENSITY RATING LESS THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E 84. HOT WATER LINES UP TO 2 INCHES DIAMETER SHALL HAVE 1 INCH THICK INSULATION CONFORMING TO THE SAME STANDARD. PIPING LARGER THAN 2 INCHES SHALL RECEIVE 1-1/2 INCH THICK INSULATION. CLOSED CELL RUBBER INSULATION MEETING THE SMOKE AND FLAME RATINGS ABOVE MAY BE SUBSTITUTED FOR FIBROUS GLASS TYPE IF SO DESIRED. INSULATION INSTALLED ON PIPING OPERATING BELOW AMBIENT TEMPERATURES MUST HAVE A CONTINUOUS VAPOR RETARDER. ALL JOINTS, SEAMS AND FITTINGS MUST BE SEALED. ON SYSTEMS OPERATING ABOVE AMBIENT, THE BUTT JOINTS SHOULD NOT BE SEALED. ON COLD SURFACES WHERE A VAPOR SEAL MUST BE MAINTAINED, INSULATION SHALL BE APPLIED WITH A CONTINUOUS, UNBROKEN MOISTURE AND VAPOR RETARDER. ALL HANGERS, SUPPORTS, ANCHORS, OR OTHER PROJECTIONS SECURED TO COLD SURFACES SHALL BE INSULATED AND VAPOR SEALED TO PREVENT CONDENSATION. ALL PIPE INSULATION SHALL BE CONTINUOUS THROUGH WALLS, CEILING OR FLOOR OPENINGS, OR SLEEVES EXCEPT WHERE FIRESTOP OR FIRESAFING MATERIALS ARE REQUIRED. INSULATION SHALL HAVE A FACTORY APPLIED ALL-SERVICE JACKET WITH SELF-SEALING LAP. WHITE-KRAFT PAPER BONDED TO ALUMINUM FOIL AND REINFORCED WITH GLASS FIBERS; CONFORMING TO ASTM C 1136 TYPE 1; VAPOR RETARDER; WITH A SELF-SEALING ADHESIVE. VERIFY THAT PIPING HAS BEEN TESTED, SURFACES ARE CLEAN AND DRY, AND ALL FOREIGN MATERIALS ARE REMOVED BEFORE APPLYING INSULATION MATERIALS. INSULATION SHALL BE BY KNAUF, ARMACELL, JOHNS-MANVILLE, OR OWENS-CORNING.
4. ALL INSULATION CONTAINING FIBROUS MATERIALS EXPOSED TO AIRFLOW SHALL BE RATED FOR THAT EXPOSURE OR SHALL BE ENCAPSULATED. INSULATING PROPERTIES FOR ALL MATERIALS SHALL MEET OR EXCEED INDUSTRY STANDARDS. POLYSTYRENE PRODUCTS SHALL MEET ASTM C578 91. ALL INSULATION SHALL BE LOW-EMITTING WITH NOT GREATER THAN 0.05 PPM FORMALDEHYDE EMISSIONS. THE MAXIMUM FLAME SPREAD AND SMOKE DEVELOPED INDEX FOR INSULATION SHALL MEET THE REQUIREMENTS OF THE LOCAL CODES AND ORDINANCES ADOPTED BY THE JURISDICTION IN WHICH THE BUILDING IS LOCATED.
5. FAUCETS AND FIXTURE FITTINGS SHALL CONFORM TO ASME A112.18.1. FAUCETS AND FIXTURE FITTINGS THAT SUPPLY DRINKING WATER FOR HUMAN CONSUMPTION SHALL CONFORM TO THE REQUIREMENTS OF NSF 61, SECTION 9. FIXTURE FITTINGS, FAUCETS, AND DIVERTERS SHALL BE INSTALLED AND ADJUSTED SO THAT THE FLOW OF HOT WATER FROM THE FITTINGS CORRESPONDS TO THE LEFT HAND SIDE OF THE FIXTURE FITTING.
6. BACKFLOW PREVENTION SHALL BE IN ACCORDANCE WITH SECTION 608.13 OF THE NC PLUMBING CODE AND THE LOCAL AUTHORITY HAVING JURISDICTION. REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTERS SHALL CONFORM TO ASSE 1013 OR AWWA C511. THE RELIEF OPENING SHALL DISCHARGE BY AIR GAP. AIR GAPS SHALL COMPLY WITH ASME A112.1.1 AND AIR GAP FITTINGS WITH ASME A112.1.3. DOUBLE CHECK VALVE ASSEMBLIES SHALL CONFORM TO ASSE 1015 OR AWWA C510. ACCESS TO BACKFLOW PREVENTERS SHALL BE PROVIDED AS SPECIFIED BY THE INSTALLATION INSTRUCTIONS OF THE APPROVED MANUFACTURER.
7. FOR BELOW GRADE SANITARY WASTE PIPING, PC SHALL USE SERVICE WEIGHT CAST IRON PIPE WITH COMPRESSION JOINTS (ASTM A 74). USE MINIMUM 2 INCH SIZE UNDERGROUND. SOLID WALL SCHEDULE 40 PVC (ASTM D 2665) WITH SCHEDULE 40 SOCKET TYPE PIPE FITTINGS (ASTM D 3311) MAY ALSO BE USED. DO NOT USE PVC PIPE FOR APPLICATIONS WHERE THE WASTE WATER TEMPERATURE EQUALS OR EXCEEDS 140°F OR IF THE BUILDING HEIGHT EXCEEDS 75 FEET.
8. FOR ABOVE GRADE SANITARY WASTE AND VENT PIPING, USE SERVICE WEIGHT CAST IRON NO-HUB TYPE WITH COUPLINGS (CISPI 301). SOLID WALL SCHEDULE 40 PVC (ASTM D 2665) WITH SCHEDULE 40 SOCKET TYPE FITTINGS (ASTM D 3311) MAY BE USED IF PERMITTED BY LOCAL CODE, EXCEPT IN BUILDINGS EXCEEDING 75 FEET IN HEIGHT. DO NOT INSTALL PVC IN RETURN AIR PLENUMS. ALL VENT AND BRANCH VENT PIPES SHALL BE SO GRADED AND CONNECTED AS TO DRAIN BACK TO THE DRAINAGE PIPE BY GRAVITY. BRANCH VENTS EXCEEDING 40 FEET IN DEVELOPED LENGTH SHALL BE INCREASED BY ONE NOMINAL SIZE FOR THE ENTIRE DEVELOPED LENGTH OF THE PIPE.
9. PC SHALL PROVIDE ALL WATER HEATERS (WATTAGE/INPUT AND CAPACITY AS NOTED IN SCHEDULE). ALL WATER HEATERS SHALL BE THIRD PARTY CERTIFIED; PROVIDE PANS FOR WATER HEATERS IN ACCORDANCE WITH 504.7 OF THE NC PLUMBING CODE. ELECTRICAL CONNECTIONS SHALL BE BY ELECTRICAL CONTRACTOR, PC SHALL COORDINATE WITH EC ON ELECTRICAL CHARACTERISTICS OF THE EQUIPMENT PROVIDED.
10. ALL PUMPS SHALL BE RATED FOR TRANSPORT OF POTABLE WATER. PUMPS IN AN INDIVIDUAL WATER SUPPLY SYSTEM SHALL BE CONSTRUCTED AND INSTALLED SO AS TO PREVENT CONTAMINATION FROM ENTERING THE WATER SUPPLY SYSTEM.

METHODS:

1. EXTEND DOMESTIC WATER PIPE FROM FIVE (5) FEET OUTSIDE THE BUILDING INTO THE BUILDING AS INDICATED ON THE PLANS AND INSTALL DOMESTIC WATER DISTRIBUTION PIPING TO ALL FIXTURES AND EQUIPMENT REQUIRING THE SAME. WATER SERVICE PIPE AND THE BUILDING SEWER SHALL BE SEPARATED BY 5 FEET OF UNDISTURBED OR COMPACTED EARTH IN ACCORDANCE WITH 603.2. PROVIDE ALL FITTINGS, VALVES, AND OTHER ACCESSORIES AS NECESSARY FOR A COMPLETE INSTALLATION. ALL DOMESTIC WATER PIPING SHALL BE CONCEALED IN FINISHED AREAS. ANY OPEN ENDS SHALL BE PROTECTED UNTIL FINAL CONNECTIONS ARE MADE.
2. ABOVE GRADE DOMESTIC WATER PIPING SHALL BE SLOPED AT A MINIMUM OF 1/32 INCH PER FOOT AND ARRANGED TO DRAIN AT LOW POINTS. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS, OR CONNECTED EQUIPMENT. ROUTE PIPING IN AN ORDERLY MANNER-PARALLEL OR PERPENDICULAR TO WALLS WHEN POSSIBLE-AND MAINTAIN GRADIENT. EACH SUPPLY BRANCH LINE SERVING MORE THAN ONE FIXTURE SHALL HAVE A SHUTOFF VALVE INSTALLED TO ISOLATE ALL FIXTURES AND PIECES OF EQUIPMENT SUPPLIED BY THE BRANCH LINE. THE SHUTOFF VALVE SHALL BE LABELED AND LOCATED AS CLOSE TO THE CONNECTION TO THE SUPPLY MAIN AND RISER AS POSSIBLE. PROVIDE A FULL-OPEN VALVE ON THE BASE OF EVERY WATER RISER PIPE AND ON THE TOP OF EVERY WATER DOWN-FEED PIPE. PROVIDE VALVE HANDLE EXTENSIONS AS NECESSARY FOR INSULATION.
3. IT SHALL BE THE RESPONSIBILITY OF THE PC TO SUSPEND AND SUPPORT ALL PIPING SYSTEMS FOLLOWING RECOGNIZED ENGINEERING PRACTICES AND USING STANDARD, COMMERCIALLY ACCEPTED PIPE HANGERS AND SUSPENSION EQUIPMENT. ALL FIXTURES, DEVICES, AND EQUIPMENT SHALL BE SECURELY MOUNTED TO THE BUILDING STRUCTURE AND SHALL NOT RELY ON CEILING OR WALL SURFACES FOR SUPPORT. THE SUPPORT ATTACHMENT SHALL SUPPORT THE WEIGHT OF THE FIXTURE OR EQUIPMENT PLUS THE WEIGHT OF THE SUPPORT ATTACHMENT ITSELF. SUPPORT FROM THE TOP CHORD OF THE ROOF JOISTS, GIRDERS, AND BEAMS. THE BOTTOM CHORD IS NOT TO BE USED FOR EQUIPMENT AND PIPING SUPPORT. HANGERS SHALL NOT BE ATTACHED TO CORRUGATED STEEL DECKING. USE STEEL HANGERS FOR STEEL AND PLASTIC PIPE AND COPPER OR COPPER-PLATED HANGERS FOR COPPER PIPE. PROVIDE PROTECTION FOR COPPER PIPING IN CONTACT WITH DISSIMILAR METALS. WHERE COPPER PIPING IS SUPPORTED ON HANGERS WITH OTHER PIPING, PROVIDE A PERMANENT ELECTROLYTIC ISOLATION MATERIAL TO PREVENT CONTACT WITH OTHER METALS. IN GENERAL, HANGERS SHALL BE CLEVIS TYPE, STANDARD WEIGHT. FOR PIPING, HANGER SPACING SHALL BE IN ACCORDANCE WITH TABLE 308.5 OF THE NC PLUMBING CODE. HANGERS AND ACCESSORIES SHALL BE GRINNEL, MASON, OR B-LINE.
4. SLEEVE ALL PIPES PASSING THROUGH PARTITIONS, WALLS, AND FLOORS. SLEEVES IN FLOORS AND INTERIOR WALLS OF POURED IN PLACE CONCRETE, BRICK, TILE, OR MASONRY SHALL BE SCHEDULE 40 STEEL PIPE, MACHINE CUT. SLEEVES IN GYPSUM BOARD WALLS SHALL BE 22 GAUGE, ROLLED GALVANIZED SHEET METAL. TACK WELD ON THE LONGITUDINAL SEAM. PROVIDE SLEEVES WHERE PIPES PASS THROUGH FLOORS AND WALLS ABOVE AND BELOW CEILINGS. PROVIDE SPLIT PIPE SLEEVES IN NEW WALLS BUILT UP AROUND EXISTING PIPES. TACK WELD SPLIT SLEEVES TOGETHER. SLEEVES IN WALLS SHALL BE INSTALLED FLUSH WITH THE WALL. SLEEVES IN FLOORS SHALL EXTEND 3/4 INCH ABOVE THE FLOOR-EXCEPT THEY SHALL BE FLUSH FOR 2 HOUR RATED FLOORS-AND SHALL BE FLUSH WITH THE STRUCTURE BELOW. EACH SLEEVE SHALL HAVE AN INSIDE DIAMETER 1 INCH LARGER THAN THE OUTSIDE DIAMETER OF THE COVERING OF EACH COVERED PIPE TO ALLOW CONTINUOUS INSULATION-BUT NOT LESS THAN TWO PIPE SIZES LARGER THAN EACH UNCOVERED. ANNULAR SPACES BETWEEN SLEEVES AND PIPES SHALL BE FILLED OR CAULKED IN AN APPROVED MANNER.
5. THE TOP OF WATER PIPES INSTALLED BELOW GRADE OUTSIDE THE BUILDING SHALL BE BELOW THE FROST LINE OR A MINIMUM OF 12 INCHES BELOW FINISHED GRADE WHICHEVER IS GREATER. WATER PIPING INSTALLED IN A WALL EXPOSED TO THE EXTERIOR SHALL BE LOCATED ON THE HEATED SIDE OF THE WALL INSULATION. WATER PIPING INSTALLED IN AN UNCONDITIONED UTILITY ROOM OR UNCONDITIONED ATTIC SHALL BE INSULATED TO A MINIMUM OF R6.5 DETERMINED IN ACCORDANCE WITH ASTM C 177.
6. HOT WATER PROVIDED TO PUBLIC HAND-WASHING FACILITIES/LAVATORIES SHALL BE TEMPERED WATER DELIVERED THROUGH AN APPROVED WATER-TEMPERATURE LIMITING DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3.
7. INSULATE ALL EXPOSED WASTE AND SUPPLY PIPING UNDER LAVATORIES, SINKS, AND ELECTRIC WATER COOLERS WITH THE HANDI-LAV GUARD INSULATION KIT BY TRUEBRO OR EQUAL.
8. POTABLE WATER OUTLETS SHALL BE PROTECTED FROM BACKFLOW IN ACCORDANCE WITH 608.15. PRESSURE TYPE VACUUM BREAKERS SHALL CONFORM TO ASSE 1020 AND SPILPROOF VACUUM BREAKERS SHALL COMPLY WITH ASSE 1056. HOSE-CONNECTION VACUUM BREAKERS SHALL CONFORM TO ASSE 1011, ASSE 1019, ASSE 1035, OR ASSE 1052. CONNECTIONS TO BEVERAGE DISPENSERS, COFFEE MACHINES, AND NON-CARBONATED BEVERAGE DISPENSERS SHALL BE PROTECTED BY A BACKFLOW PREVENTER IN ACCORDANCE WITH ASSE 1022.
9. THE PC SHALL INSTALL WATER HAMMER ARRESTORS ON BRANCH LINES WITH QUICK CLOSING VALVES PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. WATER HAMMER ARRESTORS SHALL CONFORM TO ASSE 1010.
10. THE PC SHALL PROVIDE CHECK VALVES AT ALL FIXTURES WITH THREADED OUTLETS AS REQUIRED BY CODE. TRAP PRIMERS SHALL BE PROVIDED AS SHOWN ON THE PLANS OR AS REQUIRED.
11. ADJUST STOPS AND VALVES FOR INTENDED FLOW RATE TO FIXTURES WITHOUT SPLASHING, NOISE, OR OVERFLOW.
12. BEFORE COMMENCING WORK, CHECK INVERT ELEVATIONS REQUIRED FOR SEWER CONNECTIONS, CONFIRM INVERTS, AND VERIFY THESE CAN BE PROPERLY CONNECTED TO WITH SLOPE FOR DRAINAGE AND COVER TO AVOID FREEZING. ONCE INVERTS AND FALL HAVE BEEN ESTABLISHED, EXTEND SANITARY SEWER PIPING TO 5 FEET OUTSIDE THE BUILDING AND INSTALL ALL DRAINS, STACKS, VENTS, FLOOR DRAINS, AND CLEANOUTS NECESSARY FOR A COMPLETE INSTALLATION.
13. ALL SANITARY SEWER PIPING IS BELOW GRADE OR WITHIN WALLS UNLESS OTHERWISE NOTED. ALL SANITARY VENT PIPING IS ABOVE THE CEILING OR WITHIN WALLS UNLESS OTHERWISE NOTED. SOIL AND WASTE PIPING SHALL BE INSTALLED TO PROVIDE PROTECTION AGAINST FREEZING PER 305.6.1. WASTE AND SOIL LINES LEAVING THE BUILDING MUST HAVE A MINIMUM COVER OF 3 INCHES.
14. SOIL AND WASTE LINES 2-1/2 INCHES AND SMALLER SHALL BE SLOPED AT 1/4 INCH PER FOOT MINIMUM. SOIL AND WASTE LINES 3 INCHES TO 6 INCHES IN DIAMETER SHALL BE SLOPED AT 1/8 INCH PER FOOT MINIMUM.
15. FOR WATER CLOSET WASTE CONNECTIONS, A 4 INCH BY 3 INCH CLOSET BEND SHALL BE ACCEPTABLE. WHERE A 3 INCH BEND IS UTILIZED ON WATER CLOSETS, A 4 INCH BY 3 INCH FLANGE SHALL BE INSTALLED TO RECEIVE THE FIXTURE HORN.
16. FOR PLASTIC PIPE SIZES GREATER THAN 6 INCHES, AND OTHER PIPE SIZES GREATER THAN 4 INCHES, RESTRAINTS SHALL BE PROVIDED FOR DRAIN PIPES AT ALL CHANGES IN DIRECTION AND AT ALL CHANGES IN DIAMETER GREATER THAN TWO PIPE SIZES. BRACES, BLOCKS, RODDING, BACKFILL AND OTHER SUITABLE METHODS AS SPECIFIED BY THE COUPLING MANUFACTURER SHALL BE UTILIZED.
17. BASES OF STACKS SHALL BE SUPPORTED BY THE BUILDING STRUCTURE, VIRGIN OR COMPACTED EARTH, OR OTHER SUITABLE MATERIAL TO SUPPORT THE WEIGHT OF THE PIPING.
18. HORIZONTAL DRAIN PIPES SHALL HAVE CLEANOUTS IN ACCORDANCE WITH 708.10. EXTEND CLEANOUTS TO FINISHED FLOOR OR WALL SURFACE. LUBRICATE THREADED CLEANOUT PLUGS WITH A MIXTURE OF GRAPHITE AND LINSEED OIL. ENSURE CLEARANCE AT ALL CLEANOUTS FOR RODDING OF DRAINAGE SYSTEM. INSTALL FLOOR CLEANOUTS AT AN ELEVATION TO ACCOMMODATE FINISHED FLOOR. EVERY CLEANOUT SHALL BE INSTALLED TO ALLOW CLEANING IN THE DIRECTION OF FLOW OF THE DRAINAGE PIPE OR AT RIGHT ANGLES THERETO. CLEANOUTS ON 6 INCH AND SMALLER PIPES SHALL BE PROVIDED WITH A CLEARANCE OF NOT LESS THAN 18 INCHES FOR RODDING.
19. DRAINAGE PIPING FOR FUTURE FIXTURES SHALL TERMINATE WITH AN APPROVED CAP OR PLUG.
20. AIR ADMITTANCE VALVES SHALL BE INSTALLED AFTER THE DWV TESTING REQUIRED BY SECTIONS 312.2 AND 312.3. PROVIDE ACCESS TO ALL AIR ADMITTANCE VALVES PER CODE. INSTALLATION OF ALL AIR ADMITTANCE VALVES SHALL CONFORM TO SECTION 917 OF THE NC PLUMBING CODE. AIR ADMITTANCE VALVES SHALL CONFORM TO ASSE 1050 OR 1051.
21. INDIRECT WASTE PIPING THAT EXCEEDS 2 FEET IN DEVELOPED LENGTH MEASURED HORIZONTALLY, OR 4 FEET IN TOTAL DEVELOPED LENGTH, SHALL BE TRAPPED. THE AIR GAP BETWEEN THE INDIRECT WASTE PIPE AND THE FLOOD LEVEL RIM OF THE WASTE RECEPTOR SHALL BE A MINIMUM OF TWICE THE EFFECTIVE OPENING OF THE INDIRECT WASTE PIPE.
22. THE PC SHALL PROVIDE UNIONS FOR DISASSEMBLY AND SERVICE OF ALL FIXTURES AND OTHER RELEVANT PLUMBING EQUIPMENT. UNIONS SHALL BE GROUND-JOINT WITH BRASS SEAT. PROVIDE INSULATING UNIONS AT EACH JUNCTION OF DISSIMILAR MATERIALS.
23. THE PC SHALL ACCURATELY ROUGH-IN ALL FIXTURES ACCORDING TO MANUFACTURER'S INSTALLATION DIMENSIONS AND INSTRUCTIONS. OFFSET ADAPTERS AND FLEXIBLE CONNECTORS ARE NOT ACCEPTABLE. FLUSH HANDLES SHALL BE MOUNTED ON THE WIDE SIDE OF TOILET AREAS FOR ADA COMPLIANCE. INSTALL EACH FIXTURE WITH TRAP EASILY REMOVABLE FOR SERVICING AND CLEANING. SEAL FIXTURES TO WALL AND FLOOR SURFACES WITH SEALANT. SOLIDLY ATTACH WATER CLOSETS TO FLOOR WITH LAG SCREWS. SEAL ALL SELF-RIMMING LAVATORIES AND SINKS (VITREOUS CHINA AND STAINLESS STEEL) WITH A COMMERCIAL GRADE PLUMBER'S PUTTY OR ACRYLIC LATEX CAULK APPLIED TO THE UNDERSIDE OF THE FIXTURE RIM IN A GENEROUS AMOUNT SO THAT WHEN FIXTURE IS SET, SEALANT SHALL OOZE OUT.
24. ALL VENT THRU THE ROOF (VTR) PENETRATIONS SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. PC SHALL PROVIDE FLASHING MATERIAL REQUIRED FOR VTRS. JOINTS AT THE ROOF AND AROUND VENT PIPES, SHALL BE MADE WATER TIGHT BY THE USE OF LEAD, COPPER, GALVANIZED STEEL, ALUMINUM, OR OTHER APPROVED FLASHINGS OR FLASHING MATERIAL. MAINTAIN MINIMUM 10 FEET FROM ALL OUTSIDE AIR INTAKES.

PLUMBING GENERAL NOTES | 1

PLUMBING FIXTURE SCHEDULE

SYMBOL	FIXTURE	MANUFACTURER	FITTING	HW	CW	WASTE
P1	TWO PIECE TANK TYPE WATER CLOSET	TOTO CST744EL OR EQUAL BY AMERICAN STANDARD OR KOHLER	TWO-PIECE VITREOUS CHINA TOILET WITH HIGH-PROFILE TANK, ELONGATED FRONT BOWL AND CHROME TRIP LEVER. 1.28 GPF. PROVIDE SC534 OPEN FRONT SEAT LESS COVER. ASME 112.19.2 COMPLIANCE.	-	1/2"	3"
P1H	TWO PIECE TANK TYPE ADA WATER CLOSET	TOTO CST744EL OR EQUAL BY AMERICAN STANDARD OR KOHLER	TWO-PIECE VITREOUS CHINA TOILET WITH HIGH-PROFILE TANK, ELONGATED FRONT BOWL AND CHROME TRIP LEVER. 1.28 GPF. PROVIDE SC534 OPEN FRONT SEAT LESS COVER. ASME 112.19.2 COMPLIANCE. TOP OF SEAT SHALL BE 17-19 INCHES AFF FOR ADA. LEVER MOUNTED ON WIDE SIDE FOR ADA	-	1/2"	3"
P2	WALL MOUNT LAVATORY	TOTO LT307.4 OR EQUAL BY AMERICAN STANDARD OR KOHLER	VITREOUS CHINA LAVATORY WITH BACKSPLASH COMPLYING WITH ASME 112.19.2. TOP OF RIM SHALL BE 34 INCHES AFF FOR ADA. PROVIDE WITH LAV-GUARD PROTECTORS FOR SUPPLY AND DRAIN LINES. PROVIDE JR SMITH 0700 (CONCEALED ARMS) WITH 19" ARMS 0800 (WALL SUPPORT PLATE). USE A METERING TYPE FAUCET SIMILAR TO CHICAGO 3300-E280SAB.	1/2"	1/2"	2"
P2	WALL MOUNT LAVATORY	TOTO LT307.4 OR EQUAL BY AMERICAN STANDARD OR KOHLER	VITREOUS CHINA LAVATORY WITH BACKSPLASH COMPLYING WITH ASME 112.19.2. TOP OF RIM SHALL BE 34 INCHES AFF FOR ADA. PROVIDE WITH LAV-GUARD PROTECTORS FOR SUPPLY AND DRAIN LINES. PROVIDE JR SMITH 0700 (CONCEALED ARMS) WITH 19" ARMS 0800 (WALL SUPPORT PLATE). USE MOEN 8430 FAUCET.	1/2"	1/2"	2"
P3	URINAL	TOTO UT447E OR EQUAL BY AMERICAN STANDARD OR KOHLER	VITREOUS CHINA, WALL-MOUNTED, ADA COMPLIANT, LOW CONSUMPTION WASHOUT URINAL COMPLYING WITH ASME 112.19.2. 0.5 GPF. SLOAN CROWN 186-0.5 FLUSHOMETER VALVE OR EQUAL BY ZURN OR TOTO. TOP OF RIM SHALL BE 17 INCHES AFF FOR ADA.	-	3/4"	2"
P4	1" RPZ BACKFLOW PREVENTER	WATTS LF909 QT OR EQUAL BY CONBRACO OR WILKINS	RPZ ASSEMBLY CONSISTING OF A PRESSURE DIFFERENTIAL RELIEF VALVE LOCATED IN A ZONE BETWEEN TWO POSITIVE SEATING CHECK VALVES. THE ASSEMBLY SHALL INCLUDE TWO TIGHTLY CLOSING SHUTOFF VALVES BEFORE AND AFTER THE ASSEMBLY, TEST COCKS AND A PROTECTIVE STRAINER UPSTREAM OF THE FIRST SHUTOFF VALVE. THE ASSEMBLY SHALL MEET THE REQUIREMENTS OF ASSE 1013 AND AWWA C511	-	1"	-
P5	EXPANSION TANK	AMTROL ST-5 OR EQUAL BY WATTS OR BELL & GOSSETT	INSTALL ON COLD WATER LINE BETWEEN WATER HEATER AND RPZ	-	3/4"	-
P6	KITCHEN SINK	SELECTION BY OWNER	SELECTION BY OWNER	1/2"	1/2"	2"
P7	REFRIGERATOR VALVE BOX	OATEY OR APPROVED EQUAL	HIGH IMPACT POLYSTYRENE BOX WITH 1/4 TURN BRASS BALL VALVE. COMPLIANT WITH NSF 61, SECTION 9.	-	1/2"	-
P8	THERMOSTATIC MIXING VALVE	WATTS LFMMV OR EQUAL BY LAWLER OR LEONARD VALVE	ASSE STANDARD 1069 OR 1070 APPROVED WITH 1/2 INCH FEMALE NPT INLET AND OUTLET CONNECTIONS, BRASS BODY, AND INTEGRAL MOUNTING HOLES. TAMPER RESISTANT THERMOPLASTIC ENCLOSURE. SINGLE REPLACEABLE CARTRIDGE DESIGN.	1/2"	1/2"	-
P9	DISHWASHER	GE MODEL NO. GDF650SSJSS	STAINLESS STEEL INTERIOR DISHWASHER	3/8"	-	2"
P10	FLOOR SINK	WATTS FS-740 OR EQUAL BY ZURN OR JR SMITH	12 INCH SQUARE X 8 INCH DEEP SANITARY FLOOR SINK WITH WHITE PORCELAIN ENAMEL COATED INTERIOR, LOOSE SET PORCELAIN ENAMEL COATED CAST IRON GRATE, ALUMINUM DOME BOTTOM STRAINER, AND NO HUB OUTLET.	-	-	3"
P11	DRINKING FOUNTAIN	OASIS PG8ACSL OR EQUAL BY ELKAY OR STERN WILLIAMS	ADA COMPLIANT FOR ADULT AND CHILD. 8.0 GPH OF 50°F WATER AT 90°F AMBIENT. PROVIDE ACCESSORY APRON FOR ADA COMPLIANCE AS NECESSARY	-	3/8"	2"
FCO	FLOOR CLEANOUT	ZURN, WATTS, JR SMITH	EPOXY COATED CAST IRON FLOOR CLEANOUT WITH ROUND ADJUSTABLE GASKETED NICKEL BRONZE TOP, REMOVABLE GAS TIGHT GASKETED BRASS CLEANOUT PLUG, AND NO HUB INLET.	-	-	4"
WCO	WALL CLEANOUT	ZURN, WATTS, OR JR SMITH	CAST IRON CLEANOUT FERRULE WITH THREADED BRASS COUNTERSUNK CLEANOUT PLUG, STAINLESS STEEL ACCESS COVER, AND VANDAL PROOF STAINLESS STEEL SCREW	-	-	4"
RD	ROOF DRAIN	ZURN Z121 OR APPROVED EQUAL	12 in DIAMETER ROOF DRAIN. DURA-COATED CAST IRON BODY WITH COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARD AND LOW SILHOUETTE CAST IRON DOME.	-	-	4"
AAV	AIR ADMITTANCE VALVE	STUDOR REDIVENT OR APPROVED EQUAL	ANSI/ASSE 1051 LISTED. NSF STANDARD 14. PROVIDE PVC OR ABS CONNECTOR AS NECESSARY. CONNECT VALVE TO PIPING PER MANUFACTURER. INSTALL IN THE VERTICAL, UPRIGHT POSITION AFTER ROUGH-IN AND PRESSURE TESTING OF THE SYSTEM. PROVIDE WALL BOX IF NOT ABOVE CEILING OR OTHERWISE CONCEALED.	-	-	2"
P12	LARGE CAPACITY GREASE INTERCEPTOR	JAY R. SMITH MODEL # 8460	STEEL INTERCEPTOR WITH GRAY DUCO. COATING INSIDE AND OUTSIDE. FLOW CONTROL FITTING. PROVIDE TRAFFIC RATED COVER.	-	-	4"

LINETYPE LEGEND

- 140 D HOT WATER RECIRCULATING
- 140 D HOT WATER RETURN
- COLD WATER SUPPLY
- HOT WATER SUPPLY
- GREASE LADEN LINE
- SANITARY SEWER LINE
- VENT LINE

ELECTRIC WATER HEATER SCHEDULE

MARK	MFG	MODEL	TANK VOL	INPUT	RECOVERY	SET POINT	POWER		CONNECTIONS		OPTIONS
			GALS	kW	GPH @ 60° ΔT	°F	VOLTAGE	PHASE	HOT	COLD	
WH-1	RHEEM	ELDS40	38	4.5	30	110	208	1	3/4	3/4	1-5
WH-2	RHEEM	XE30P06PU20U1	30	2.0	30	110	208	1	3/4	3/4	1-5

1. PROVIDE GALVANIZED STEEL SAFETY PAN
2. UL 174 LISTED
3. PROVIDE ASME LISTED TEMPERATURE AND PRESSURE RELIEF VALVE
4. MEET OR EXCEED ENERGY FACTOR REQUIREMENTS OF ASHRAE 90.1-2007
5. OR EQUAL BY A.O. SMITH, BRADFORD WHITE, OR STATE

HOT WATER HEATER SIZING TABLE PER NC DIVISION OF ENVIRONMENTAL HEALTH

FIXTURE	QTY	GPH/FIX	TOTAL GPH
2-COMP SINK (15"X18"X12")	2	21.0	42.00
HAND SINKS	5	5.0	25.00
TOTAL			67.00

PLUMBING LINES SIZING TABLE

FIXTURE TYPE	OCCUPANCY	QTY	DRAINAGE FIXTURE UNITS		WATER SUPPLY FIXTURE UNITS				
			EACH	TOTAL	CW	HW	CW & HW	HW TOTAL	TOTAL
WATER CLOSET (FLUSH TANK)	PUBLIC	6	4.00	24.00	5.00	0.00	5.00	0.00	30.00
LAVATORY	PUBLIC	5	1.00	5.00	1.50	1.50	2.00	7.50	10.00
URINAL (¾" FLUSH VALVE)	PUBLIC	1	2.00	2.00	5.00	0.00	5.00	0.00	5.00
EMERGENCY FLOOR DRAIN	PUBLIC	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEMAND FIXTURE	GPM	QTY	TOTAL GPM	TOTAL DFU				31.0	
KITCHEN DISHWASHER	4	1	4.00	TOTAL WFSUs				7.5	45.0
				GPM				12.30	27.70
				OTHER FIXTURES' GPM				4.00	4.00
				TOTAL GPM				16.30	31.70
MINIMUM BUILDING DRAIN SIZE	4"								
MINIMUM WATER LINE SIZE	1 1/2"								

PROCEDURE FOR SIZING HYDROMECHANICAL GREASE INTERCEPTORS

FIXTURE TYPE	QUANTITY	COMPARTMENTS	LENGTH	WIDTH	HEIGHT	$INCH^3$
Pot Sink	1	3	60	15	14	37800
Prep Sink	1	2	33	15	14	13860
Other						0
Dishwasher						4
Grease Interceptor Size For 1 Minute Drainage Period (preferred)					172	GPM
Grease Interceptor Size For 2 Minute Drainage Period					86	GPM
Please round up to the next available size to deteremine the required grease interceptor.						

PLUMBING FIXTURE SCHEDULES | 2

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NORTH CAROLINA PROFESSIONAL SEAL 046202 ENGINEER JACOB A. BENDER 2/11/20

KILIAN ENGINEERING, INC. CORPORATE SEAL NORTH CAROLINA

SEAL

NEW FELLOWSHIP HALL FOR:
NEILL'S CREEK BAPTIST CHURCH
4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

NO.	DATE	DESCRIPTION

ISSUED:

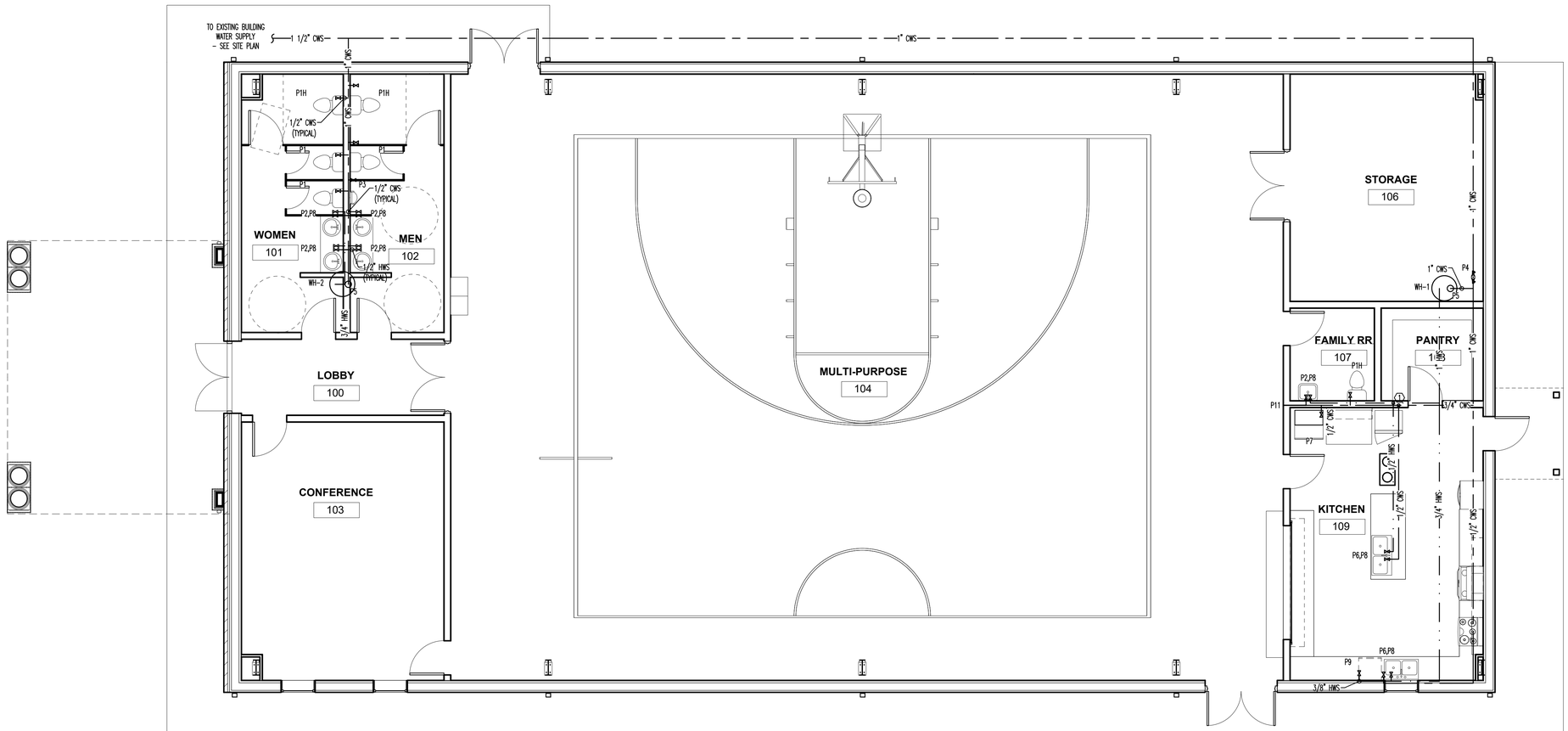
NO.	DATE	DESCRIPTION
1	02.13.2020	PERMIT SET

DRAWN BY: JAM
CHECKED BY: MWK-

PLUMBING NOTES AND SCHEDULES

SHEET NO.
P1

PROJECT NO: 20015



SUPPLY PLAN HEX NOTES

1. HOT AND COLD WATER SOURCE DOWN WALL IN ORDER TO RUN BELOW FLOOR TO ISLAND SINK.

SUPPLY PLAN - SCALE: 3/16" = 1'0" | 1

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NORTH CAROLINA PROFESSIONAL SEAL 045202 ENGINEER JACOB A. BENDER 8/11/20

KILIAN ENGINEERING CORPORATE INC. SEAL NORTH CAROLINA

NEW FELLOWSHIP HALL FOR:

NEILL'S CREEK BAPTIST CHURCH

4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

ISSUED:

02.13.2020 PERMIT SET

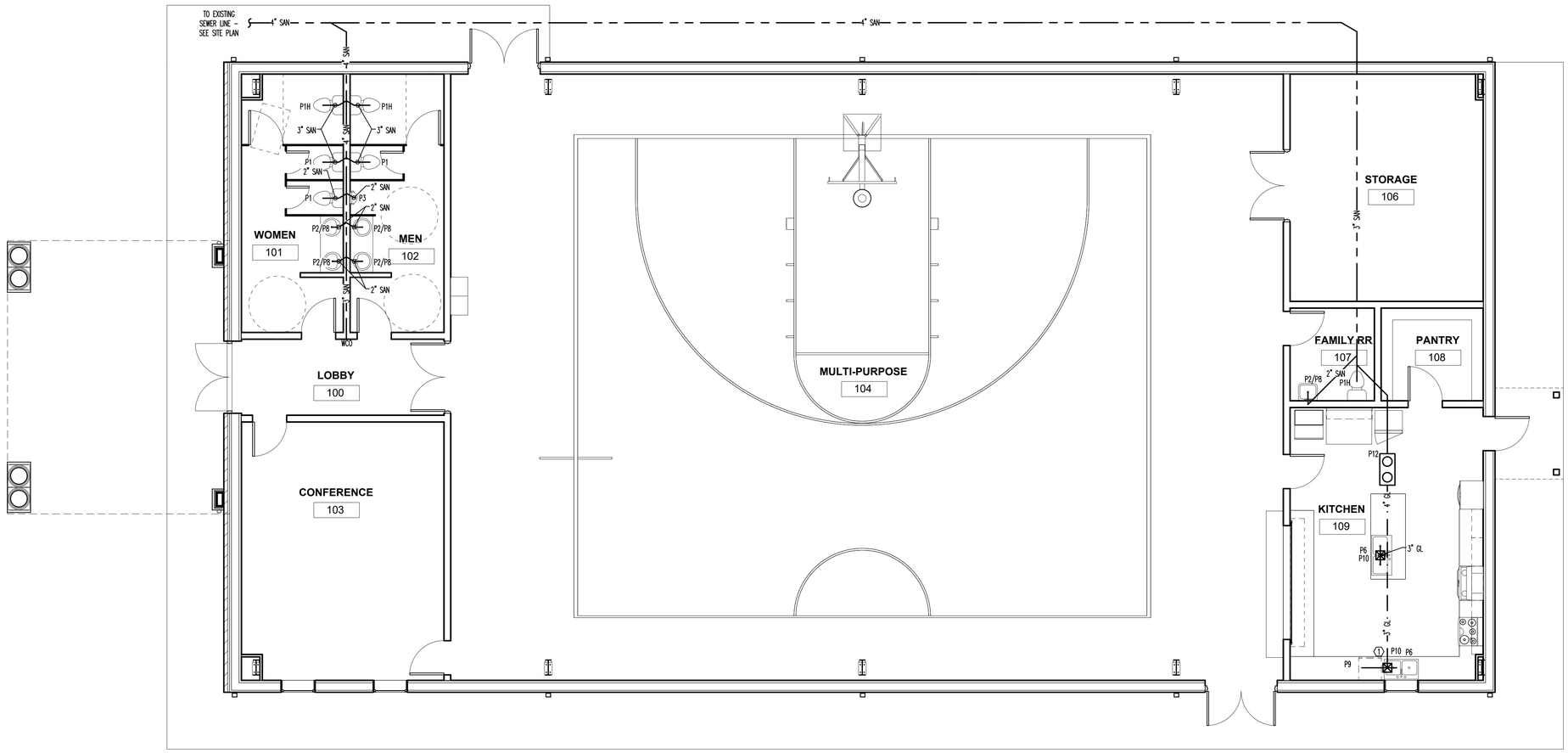
DRAWN BY: JAM
CHECKED BY: MWK-

PLUMBING SUPPLY PLAN

SHEET NO.

P2

PROJECT NO: 20015



SANITARY PLAN HEX NOTES

1. DISHWASHER DRAINS TO SAME FLOOR SINK AS DOUBLE SINK.

WASTE PLAN - SCALE: 3/16" = 1'0" | 1

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ANGIER, NC 27501

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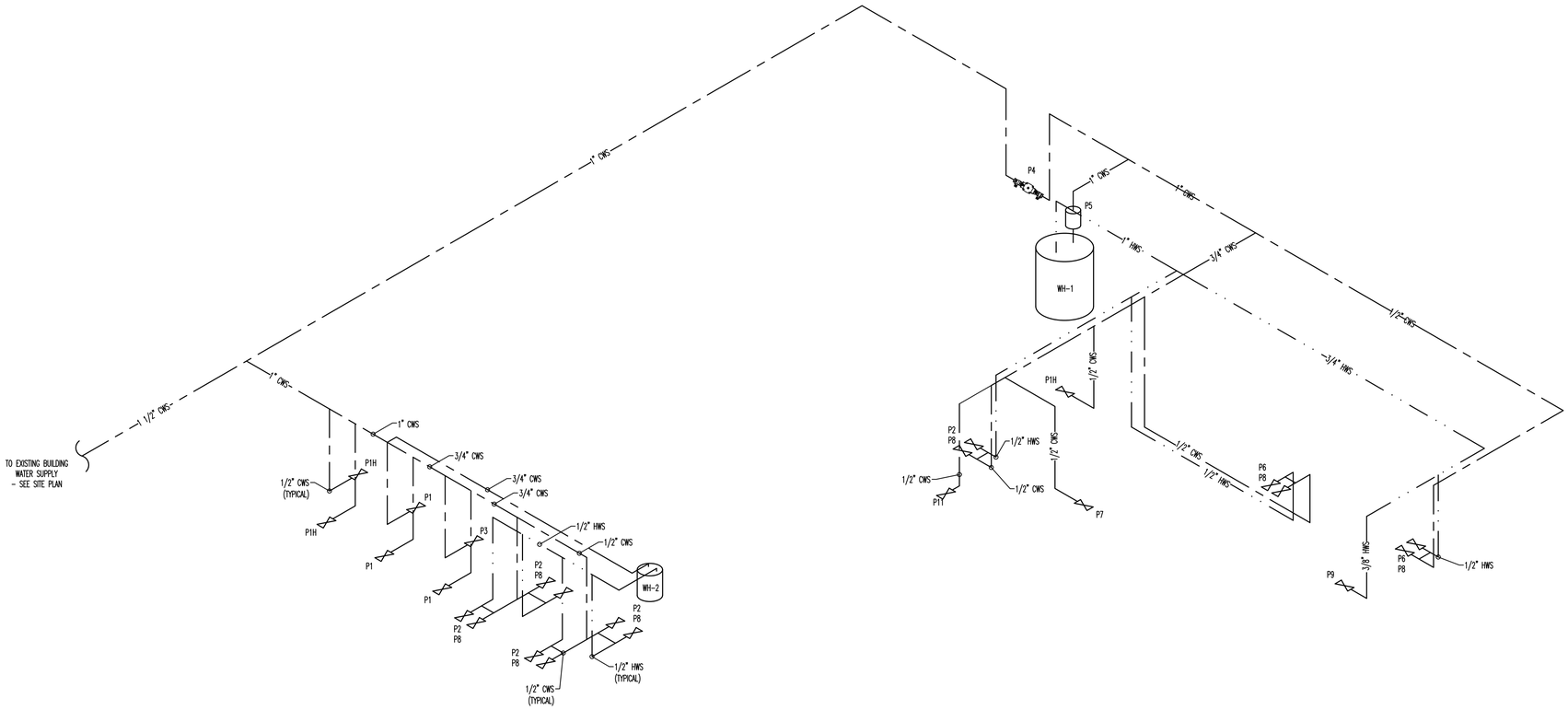
PLUMBING WASTE PLAN

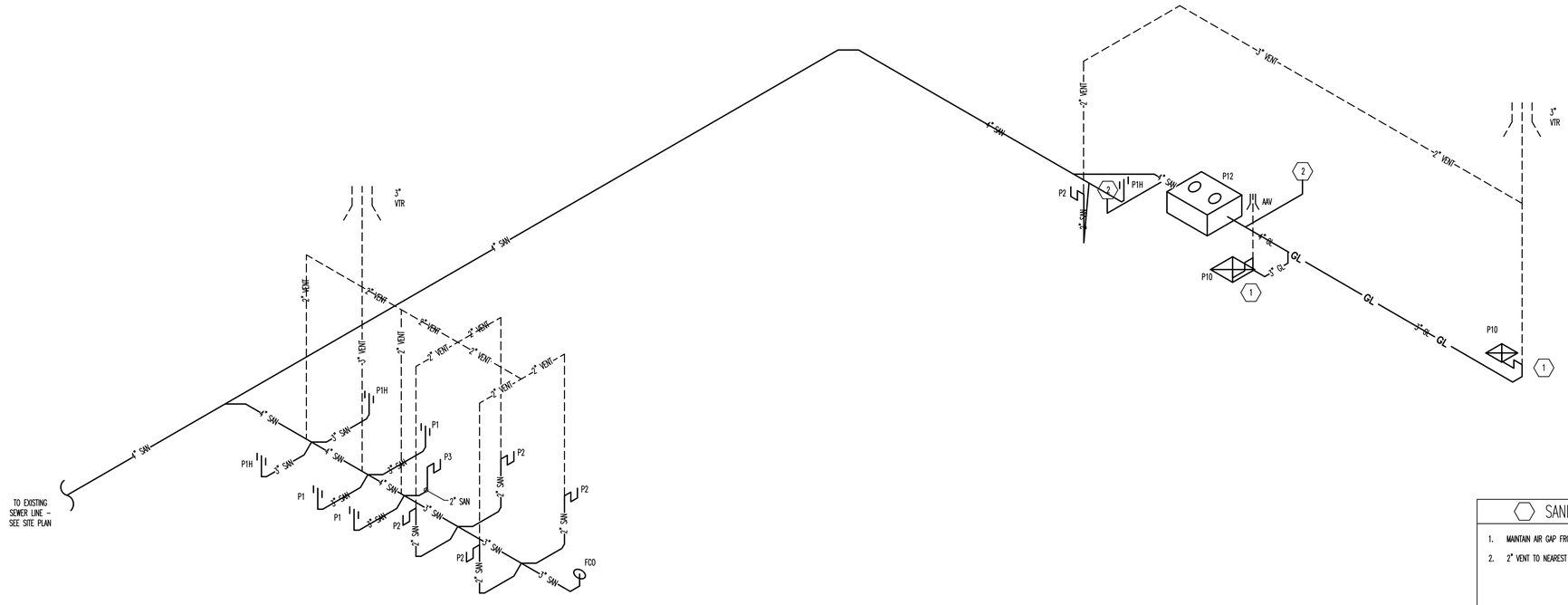
SHEET NO.

P3

PROJECT NO: 20015



SUPPLY PLAN RISER - NOT TO SCALE | 1



SANITARY PLAN HEX NOTES

1. MAINTAIN AIR GAP FROM FIXTURE TO FLOOR SINK
2. 2" VENT TO NEAREST WALL AND CONNECT TO MAIN VENT ABOVE CEILING.

WASTE PLAN RISER - NOT TO SCALE | 2

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KILIAN ENGINEERING CORPORATE SEAL NORTH CAROLINA

NEW FELLOWSHIP HALL FOR:

NEILL'S CREEK BAPTIST CHURCH

4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

DESCRIPTION	DATE

ISSUED:

DESCRIPTION	DATE
PERMIT SET	02.13.2020

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PLUMBING PLAN RISERS

SHEET NO.

P4

PROJECT NO: 20015

FIRE ALARM GENERAL NOTES

1. THE FOLLOWING ABBREVIATIONS SHALL APPLY TO NOTES AND PLANS: PC – PLUMBING CONTRACTOR, EC – ELECTRICAL CONTRACTOR, MC – MECHANICAL CONTRACTOR, GC – GENERAL CONTRACTOR, FASC – FIRE ALARM SYSTEM CONTRACTOR.
2. "PROVIDE" MEANS TO FURNISH AND INSTALL.
3. THE FIRE ALARM SYSTEM CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR, ETC, AS NECESSARY FOR A COMPLETE AND OPERATIONAL FIRE ALARM SYSTEM.
4. THESE DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL MINOR DETAILS AND EXACT LOCATIONS. THE FASC SHALL ALLOW FOR ADJUSTMENTS TO ACCOMMODATE INTERFERENCES BOTH PLANNED AND ENCOUNTERED AND SHALL INCLUDE SUCH CONTINGENCIES IN THEIR BID.
5. THE SUCCESSFUL FIRE ALARM BIDDER SHALL PROVIDE CONSTRUCTION DOCUMENTS TO THE AUTHORITY HAVING JURISDICTION FOR APPROVAL INCLUDING ALARM CONTROLS AND TROUBLE SIGNALING EQUIPMENT, ANNUNCIATION, POWER CONNECTIONS, BATTERY CALCULATIONS, VOLTAGE DROP CALCULATIONS, CONDUCTOR TYPES AND SIZES, LOCATIONS OF INITIATING AND NOTIFICATION APPLIANCES, AND MANUFACTURERS, MODEL NUMBERS, AND LISTING INFORMATION FOR ALL EQUIPMENT, DEVICES AND MATERIALS.
6. ALL WORK SHALL BE IN ACCORDANCE WITH NFPA 72 AND APPLICABLE SECTIONS OF NFPA 70 AND 13.
7. CONDUIT, CONDUCTORS, BOXES, AND HANGERS SHALL BE THE SAME AS THOSE SPECIFIED IN THE ELECTRICAL SYSTEM.
8. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BEAR UL LABEL OR EQUIVALENT WHERE APPLICABLE.
9. THE FIRE ALARM SYSTEM SHALL BE OF THE ADDRESSABLE TYPE WITH EACH INITIATING DEVICE REPORTING INDIVIDUALLY TO THE FIRE ALARM CONTROL PANEL. ONLY THE MANUFACTURER OR AN AUTHORIZED DISTRIBUTOR WHO STOCKS SPARE COMPONENTS FOR THE ENTIRE SYSTEM SHALL CONNECT, PROGRAM, OR TEST THE ADDRESSABLE FIRE ALARM SYSTEM. ALL TECHNICIANS PERFORMING SUCH WORK SHALL BE TRAINED AND INDIVIDUALLY CERTIFIED BY THE MANUFACTURER FOR THE MODEL OF SYSTEM BEING INSTALLED. COPIES OF THEIR CERTIFICATION SHALL BE AVAILABLE UPON REQUEST. THE MANUFACTURER OR AUTHORIZED DISTRIBUTOR SHALL STORE THE COMPLETE PROGRAMMING FOR THE ADDRESSABLE SYSTEM ON A COMPUTER DISK OR DISKETTE OR OTHER MEDIA AND ARCHIVE APPROPRIATELY. A COPY OF THE PROGRAM SHALL BE MADE AVAILABLE TO THE OWNER WHEN THE SYSTEM IS COMMISSIONED. THE MANUFACTURER OR AUTHORIZED DISTRIBUTOR SHALL MAINTAIN SOFTWARE VERSION RECORDS ON THE SYSTEM INSTALLED AND PROVIDE FREE UPGRADES IF THE MANUFACTURER RELEASES A NEW VERSION OF THE SOFTWARE DURING THE WARRANTY PERIOD. PROVIDE A SYSTEM FUNCTION MATRIX THAT GIVES THE FIRE ALARM CONTROL PANEL RESPONSE FOR EACH INITIATING DEVICE.
10. THE SYSTEM SHALL BE NOMINAL 24VDC, NON-CODED, AND SUPERVISED (INCLUDING CONTROL CIRCUITS). ALL EQUIPMENT SUPPLIED MUST BE LISTED FOR ITS PARTICULAR USE AND INSTALLED IN ACCORDANCE WITH ANY INSTRUCTIONS APPLICABLE TO ITS LISTING.
11. THE SYSTEM SHALL BE ELECTRICALLY SUPERVISED FOR OPEN OR GROUND FAULT CONDITIONS IN DETECTION, ALARM, AND CONTROL CIRCUITS. THE REMOVAL OF ANY DETECTION DEVICE, ALARM APPLIANCE, PLUG-IN RELAY, SYSTEM MODULE, OR STANDBY BATTERY CONNECTION SHALL ALSO ACTIVATE A TROUBLE SIGNAL. THE FIRE ALARM SIGNAL SHALL OVERRIDE TROUBLE SIGNALS, BUT THE PRE-ALARM TROUBLE SIGNAL SHALL REAPPEAR WHEN THE PANEL IS RESET.
12. PROVIDE EACH SIGNALING LINE CIRCUIT WITH A MINIMUM OF 20 PERCENT SPARE ADDRESSES FOR FUTURE USE.
13. THE CONNECTIONS BETWEEN INDIVIDUAL ADDRESSABLE MODULES AND THEIR CONTACT TYPE INITIATING DEVICES MUST BE SUPERVISED.
14. THE FIRE ALARM CONTROL PANEL (FACP) POWER SUPPLY MUST HAVE A CONTINUOUS RATING ADEQUATE TO POWER ALL DEVICES AND FUNCTIONS IN FULL ALARM CONTINUOUSLY. BATTERIES MUST MEET THE APPROPRIATE NFPA CAPACITY REQUIREMENTS. THE FACP SHALL INCLUDE AN ALARM SILENCE SWITCH AND SHALL BE EQUIPPED WITH THE SUBSEQUENT ALARM RESOUND FEATURE. THE ALARM SILENCING AND RESET FEATURE SHALL NOT REVERSE AIR HANDLING UNITS SHUTDOWN. A SUPERVISED "HVAC SYSTEM SHUTDOWN" SWITCH MUST BE PROVIDED IN THE FACP WITH ITS "NORMAL" POSITION INDICATED.
15. ALL CONNECTIONS MADE AT THE FACP MUST BE BY THE MANUFACTURER'S AUTHORIZED FACTORY TRAINED PERSONNEL (NOT THE ELECTRICAL CONTRACTOR).
16. PERMANENT WIRE MARKERS SHALL BE USED TO IDENTIFY ALL CONNECTIONS AND TERMINATIONS FOR EACH CIRCUIT. ALL FIRE ALARM JUNCTION BOXES SHALL BE SPRAYED RED AND LABELED "FIRE ALARM." TERMINAL BLOCKS SHALL BE PROVIDED IN ALL JUNCTION BOXES WHERE CONNECTIONS ARE MADE. IDENTIFICATION AT SPLICES SHALL INDICATE WHICH CONDUCTOR LEADS TO THE FACP.
17. THE FOLLOWING COLOR SCHEME SHALL BE USED FOR SYSTEM CONDUCTORS:

17.1. INITIATING CIRCUITS (OTHER THAN SMOKE)	RED & WHITE
17.2. INITIATING CIRCUITS (SMOKE DETECTION)	VIOLET & GRAY
17.3. NOTIFICATION APPLIANCE CIRCUITS	BLUE & BLACK
17.4. AIR HANDLING SHUT DOWN CIRCUITS	YELLOW
17.5. DOOR CONTROL CIRCUITS	ORANGE
17.6. ELEVATOR CIRCUITS	BROWN

18. LOW VOLTAGE WIRING SHALL NOT BE INSTALLED IN ANY RACEWAY CONTAINING POWER OR LINE VOLTAGE CONTROL WIRING. WITHIN THE FACP, ANY AC CONTROL WIRING SHALL BE PROPERLY SEPARATED FROM OTHER CIRCUITS AND THE ENCLOSURE SHALL BE LABELED TO ALERT SERVICE PERSONNEL TO THE HAZARD.
19. DEVICES SHALL BE INSTALLED AS INDICATED ON THE PLANS AND AS DETAILED. WHENEVER POSSIBLE, DEVICES SHOULD BE CENTERED ON SPACES OR LOCATED ABOVE OTHER OUTLETS. SMOKE DETECTORS SHALL NOT BE LOCATED WITHIN THREE (3) FEET OF AN HVAC SUPPLY OR RETURN. INSTALL WALL MOUNTED SMOKE DETECTORS A MAXIMUM OF TWELVE (12) INCHES FROM CEILING.
20. PROVIDE A PERMANENT MARKER ON EACH DEVICE INSTALLED INDICATING THE DEVICE NUMBER AND ADDRESSABLE LOOP NUMBER. PROVIDE THE SAME INFORMATION INSIDE THE BOX FOR EACH DEVICE.
21. ALL HVAC EQUIPMENT SHALL SHUTDOWN UPON ACTIVATION OF ANY FIRE ALARM DEVICE.
22. WATER FLOW SWITCHES, VALVE TAMPER SWITCHES, AND PRESSURE SWITCHES SHALL BE PROVIDED AND INSTALLED BY THE SPRINKLER CONTRACTOR, CONNECTED BY THE ELECTRICAL CONTRACTOR, AND SUPERVISED BY THE FACP.
23. TESTING SHALL INCLUDE ALL TESTS REQUIRED FOR THE ELECTRICAL SYSTEMS IN ADDITION TO TESTING AND CERTIFICATION BY THE FIRE ALARM SYSTEM SUPPLIER. PROVIDE INSTRUCTION MANUALS TO OWNER PERSONNEL.
24. FASC SHALL VERIFY THAT ALL VISIBLE NOTIFICATION DEVICES ARE SYNCHRONIZED PER NFPA 72.
25. VERIFY DECIBEL LEVELS ARE MINIMUM 60 DBA AND MAXIMUM 120 DBA THROUGHOUT THE ZONE; ADJUST DEVICES AS NECESSARY. MAINTAIN MINIMUM 100 DBA IN EQUIPMENT AND MECHANICAL ROOMS.
26. DEVICES MUST MEET SURVIVABILITY REQUIREMENTS OF THE NFPA AS APPLICABLE.
27. THE AUDIBLE ALARM NOTIFICATION APPLIANCES SHALL PROVIDE A SOUND PRESSURE LEVEL OF 15 DECIBELS (dBA) ABOVE THE AVERAGE AMBIENT SOUND LEVEL OR 5 dBA ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEAST 60 SECONDS, WHICHEVER IS GREATER, IN EVERY OCCUPIABLE SPACE WITHIN THE BUILDING.

OVERALL MATRIX

FIRE ALARM SYSTEM INPUT/OUTPUT MATRIX

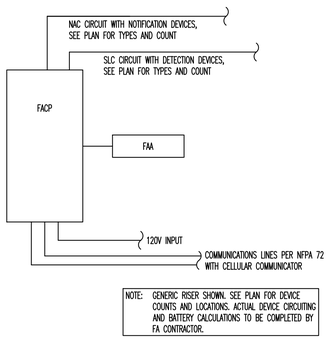
SYSTEM OUTPUTS: FACP ANNUNCIATION | NOTIFICATION | REQUIRED FIRE SAFETY CONTROL

	SYSTEM INPUTS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	
1	FIRE ALARM SYSTEM AC POWER FAILURE			●	●							●	●						●								1
2	FIRE ALARM SYSTEM LOW BATTERY					●	●					●															2
3	OPEN CIRCUIT					●	●					●															3
4	GROUND FAULT					●	●					●															4
5	NOTIFICATION APPLIANCE CIRCUIT SHORT					●	●					●															5
6	BUILDING MANUAL PULL STATIONS	●	●					●	●	●	●		●						●	●							6
7	CORRIDOR SMOKE DETECTORS	●	●					●	●	●	●		●	●					●	●	●	●	●	●			7
8	AREA SMOKE DETECTORS	●	●					●	●	●	●		●	●					●	●	●	●	●	●			8
9	HVAC AIR DUCT SMOKE DETECTORS			●	●			●		●										●							9
10	AREA HEAT DETECTORS	●	●					●	●	●	●		●	●					●	●	●	●	●	●			10
11	HOOD OR ROOM FIRE SUPPRESSION SYSTEM ALARM	●	●					●	●	●	●		●	●					●	●							11
12	SPRINKLER TAMPER SWITCH			●	●			●			●																12
13	SPRINKLER WATER FLOW IN BUILDING	●	●					●	●	●	●		●	●					●	●							13
14	SPRINKLER WATER FLOW IN ELEV EQUIP RM OR SHAFT	●	●					●	●	●	●		●	●		●	●	●	●	●							14
15	ELEV EQUIP RM AREA SOME DETECTOR	●	●					●	●	●	●		●	●		●	●	●	●	●							15
16	ELEV SHAFT AND ELEV EQUIP RM HEAT DETECTORS	●	●					●	●	●	●		●	●		●	●	●	●	●							16
17	ELEV LOBBY SMOKE DETECTORS - UPPER FLOORS	●	●					●	●	●	●		●	●					●	●	●	●	●	●			17
18	ELEV LOBBY SMOKE DETECTOR - RECALL FLOOR	●	●					●	●	●	●		●	●	●	●			●	●	●	●	●	●			18
19	ELEV CONTROLLER POWER SHUNT TRIP STATUS			●	●			●				●															19
20	FIRE PUMP POWER FAILURE/PHASE REVERSAL			●	●			●				●															20
21	FIRE PUMP RUNNING	●	●					●	●	●	●		●	●					●	●							21
22	FIRE PUMP SYSTEM NOT IN AUTOMATIC			●	●			●				●															22
23	LEGALLY REQUIRED GENERATOR SYSTEM LOW FUEL			●	●			●				●															23
24	LEGALLY REQUIRED GENERATOR NOT IN AUTOMATIC			●	●			●				●															24
25	AREA OF REFUGE TWO-WAY COMMUNICATIONS STATUS			●	●			●				●															25
26	-																										26
27	-																										27
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	

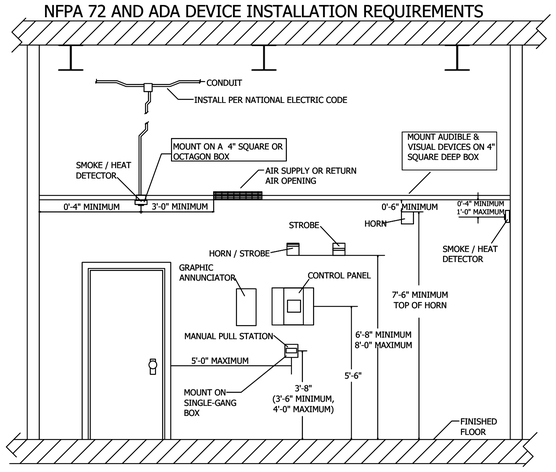
NFPA 170 SYMBOL GUIDE	
SYMBOL	DESCRIPTION
FACP	FIRE ALARM CONTROL PANEL
FAA	FIRE ALARM ANNUNCIATOR
WF	WATER FLOW SWITCH
VS	VALVE SUPERVISORY SWITCH (TAMPER SWITCH)
	HEAT DETECTOR/SENSOR (RATE OF RISE)
F	PULL STATION / FIRE ALARM
	SMOKE DETECTOR/SENSOR (DEFAULT PHOTOELECTRIC TYPE)
SS	SMOKE ALARM (SINGLE STATION)(RESIDENCE)
	DUCT SMOKE DETECTOR (NFPA 72, SECTION 17.7.5.5)
FC	AUDIBLE ONLY APPLIANCE (WALL MOUNTED)(BEL LOUTSIDE SPRINK RM.)
FC	VISUAL ONLY APPLIANCE (WALL MOUNTED)
FC	AUDIBLE/VISUAL APPIANCE (WALL MOUNTED)
FC	VISUAL ONLY APPLIANCE (CEILING MOUNTED)
	AUDIBLE ONLY APPLIANCE (CEILING MOUNTED)
FC	AUDIBLE/VISUAL APPIANCE (CEILING MOUNTED)
	END OF LINE RESISTOR

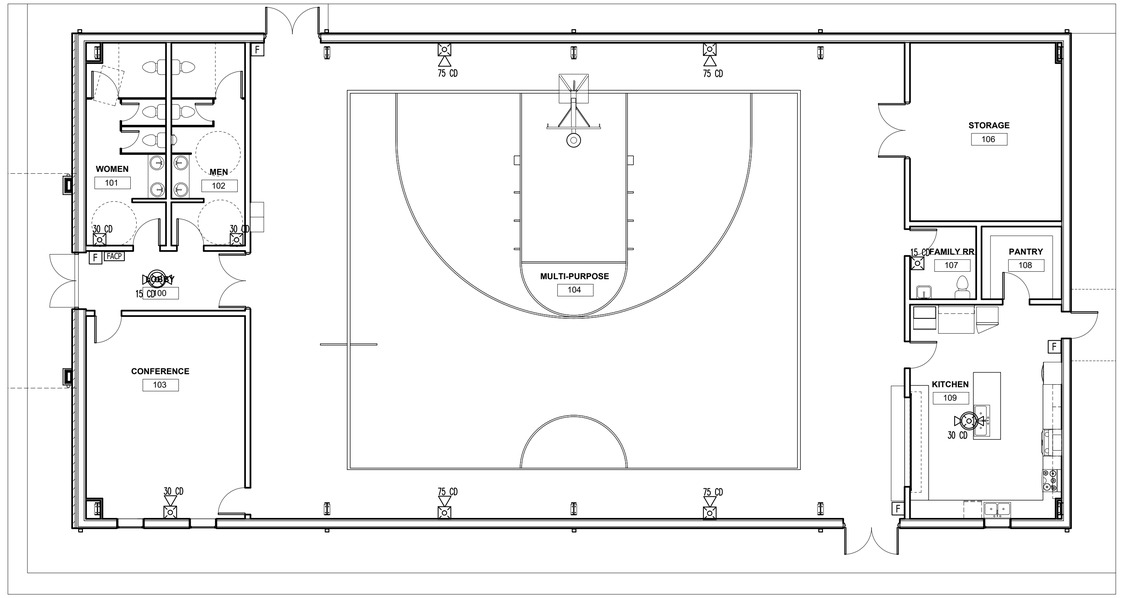
WIRE REQUIREMENTS

NAC CIRCUITS – 16/2, SOLID, FPLP WIRE
DATA CIRCUITS – 18/2, SOLID, FPLP WIRE



NFPA 72 AND ADA DEVICE INSTALLATION REQUIREMENTS





FIRE ALARM RISER - NTS | 1

FIRE ALARM PLAN 1/8" = 1'-0" | 2

Kilian Engineering, Inc.
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(P) 252.438.8778 | CORPORATE LICENSE C-2277

NORTH CAROLINA PROFESSIONAL SEAL 045202 ENGINEER JACOB A. BENDER 8/11/20

KILIAN ENGINEERING CORPORATE INC. SEAL NORTH CAROLINA SEAL

NEW FELLOWSHIP HALL FOR:

NEILL'S CREEK BAPTIST CHURCH

4200 NEILLS CREEK RD
ANGIER, NC 27501

REVISION:

DESCRIPTION	DATE

ISSUED:

DESCRIPTION	DATE
PERMIT SET	02.13.2020

DRAWN BY: -
CHECKED BY: MWK-

FIRE ALARM NOTES, SCHEDULES, PLAN

SHEET NO.

FA1

PROJECT NO: 20015