ELECTRICAL SPECIFICATIONS

PART 1: GENERAL

A. PROVIDE ALL WORK AND MATERIALS FOR THE INSTALLATION OF COMPLETE WIRING SYSTEMS AS SPECIFIED HEREIN AND INDICATED ON THE DRAWINGS.

B. ALL ELECTRICAL PERMITS AND INSPECTION FEES SHALL BE OBTAINED AND PAID FOR BY THE ELECTRICAL CONTRACTOR.

C. ELECTRICAL CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS FOR ONE YEAR EFFECTIVE THE DAY THE PROJECT IS ACCEPTED BY THE OWNER.

D. WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, OSHA, STATE BUILDING CODE AND ALL OTHER APPLICABLE LOCAL REQUIREMENTS. ALL WORK SHALL COMPLY WITH THE LATEST ADDITION OF NECA STANDARDS OF INSTALLATION.

E. ALL MATERIALS, DEVICES, AND APPLIANCES SHALL BE NEW, EXCEPT WHERE OTHERWISE NOTED, AND SHALL BE LISTED BY AN APPROVED TESTING AGENCY WHERE SUCH A LISTING IS AVAILABLE. FACTORY ASSEMBLED EQUIPMENT SHALL BE LISTED AND LABELED AS AN ASSEMBLY, ANY EQUIPMENT NOT LISTED SHALL HAVE PRIOR APPROVAL FROM THE LOCAL AUTHORITY HAVING JURISDICTION. ALL MATERIALS SHALL COMPLY WITH APPLICABLE ANSI, IEEE AND NEMA STANDARDS.

F. PROVIDE ALL CUTTING, PATCHING, CHANNELING AND CHASING FOR INSTALLATION OF WORK AND REPAIR ANY DAMAGE OF EXISTING OR NEW INSTALLATIONS AT THE CONTRACTORS EXPENSE.

G. SHOP DRAWINGS AND CATALOG DATA SHALL BE SUBMITTED FOR APPROVAL PRIOR TO BEGINNING WORK. SUBMIT FOUR COPIES OF SHOP DRAWINGS FOR LIGHTING FIXTURES, LAMPS, BALLASTS AND PANELBOARDS. SUBMIT FOUR COPIES OF CATALOG DATA FOR DISCONNECT SWITCHES AND WIRING DEVICES.

H. PROVIDE ENGRAVED PHENOLIC NAMEPLATES FOR PANELBOARDS, WIRING TROUGHS, AND FUSED SWITCHES, WHITE LETTERS ON BLACK FOR 120/208 VOLT SYSTEMS. LABEL ALL BREAKERS INSIDE THE PANEL NEXT TO THE BREAKER USING THE NUMBER SCHEME INDICATED ON THE DRAWINGS.

I. AN ELECTRICAL INSPECTION CERTIFICATE SHALL BE ISSUED BY THE LOCAL INSPECTION AUTHORITIES BEFORE APPROVAL FOR FINAL PAYMENT.

J. THE CONDUIT AND NEUTRAL SYSTEM SHALL BE GROUNDED AT THE MAIN SERVICE EQUIPMENT. GROUNDING ELECTRODE SYSTEM SHALL BE INSTALLED PER N.E.C. ARTICLE 250 AND AS INDICATED ON THE DRAWINGS.

K. WIRING SHALL BE TESTED FOR CONTINUITY AND GROUNDS BEFORE BEING ENERGIZED. FAULTY WIRING SHALL BE REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER.

L. IF, DURING THE COURSE OF WORK, THE ELECTRICAL CONTRACTOR DISCOVERS A PROBLEM WITH THE PERFORMANCE OF THE INSTALLATION RELATIVE TO THE PLANS AND SPECIFICATIONS OR NEC OR OTHER CODES, THE CONTRACTOR SHALL IMMEDIATELY BRING THE PROBLEM TO THE ATTENTION OF THE ARCHITECT OR ENGINEER FOR RESOLUTION PRIOR TO THE EXECUTION OF THE WORK.

M. THE ELECTRICAL CONTRACTOR SHALL CONNECT ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS, UNLESS OTHERWISE NOTED, EXCEPT FOR CONTROL WIRING FOR EQUIPMENT NOT PROVIDED BY THE ELECTRICAL CONTRACTOR. CONTROL WIRING FOR SUCH EQUIPMENT SHALL BE PROVIDED BY THE RESPECTIVE DISCIPLINE.

N. COORDINATE LOCATION AND REQUIREMENTS FOR ELECTRICAL SERVICE WITH THE POWER COMPANY. WHERE MORE THAN ONE SERVICE IS SUPPLIED TO A BUILDING, PROVIDE IDENTIFICATION AT EACH SERVICE PER NEC 230-2(B) AND AS INDICATED ON THE DRAWINGS.

O. COORDINATE LOCATION AND REQUIREMENTS FOR TELEPHONE SERVICE WITH THE TELEPHONE COMPANY AND AS INDICATED ON THE DRAWINGS.

P. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PROVIDING TEMPORARY POWER.

PART 2: RACEWAY

A. CONDUIT SHALL BE ZINC-COATED EMT INDOORS. EMT FITTINGS SHALL BE STEEL SCREW. MINIMUM SIZE SHALL BE ½"C, UNLESS OTHERWISE NOTED. USE SCHEDULE 40 PVC OUTDOORS ABOVE 8'-0" OR BELOW GRADE. USE IMC WHERE REQUIRED BY CODE OR EXPOSED BELOW 8'-0".

B. SUPPORT ALL CONDUITS WITH STRAPS AND CLAMPS. RUN ALL CONDUIT PARALLEL OR PERPENDICULAR TO BUILDING WALLS.

C. JUNCTION AND PULL BOXES SHALL BE CODE GAUGE GALVANIZED SHEET METAL.

D. LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE USED FOR EQUIPMENT CONNECTIONS, BUT NOT AS A WIRING METHOD OTHERWISE.

E. MC CABLE MAY BE USED AS A WIRING METHOD WHERE ALLOWED BY CODE.

F. RACEWAY PENETRATIONS THROUGH FLOOR SLABS AND FIRE-RATED WALLS SHALL BE FILLED WITH IMPERVIOUS, NON-SHRINK GROUT SUFFICIENTLY TIGHT TO PREVENT THE TRANSFER OF SMOKE, WATER, AND DUST. ROOF PENETRATIONS SHALL BE WITHIN THE EQUIPMENT CURB WHERE POSSIBLE.

G. CONDUIT INSTALLED UNDERGROUND OR IN CONCRETE SHALL HAVE JOINTS MADE WATER-TIGHT BY USE OF POLYTETRA-FLUOROETHYLENE TAPE. APPROVED SEALS SHALL BE PROVIDED IN HAZARDOUS LOCATIONS AS REQUIRED BY THE N.E.C.

PART 3: CONDUCTORS

A. ALL CONDUCTORS SHALL BE SINGLE CONDUCTOR COPPER. THHN/THWN, SOLID FOR SIZES #14 THROUGH #10. THHN/THWN STRANDED FOR SIZES #8 AND LARGER.

B. BRANCH CIRCUITS SHALL NOT BE SMALLER THAN #12 AWG. CONTROL WIRING MAY BE #14 AWG.

C. CONDUCTORS SHALL BE COLOR CODED BLACK/RED/BLUE FOR 120/208 VOLT SYSTEMS FOR A, B, AND C PHASES, RESPECTIVELY.

D. WIRING TO LIGHTING FIXTURES SHALL BE AS REQUIRED BY UL LABEL.

E. ALL BRANCH CIRCUIT CONDUITS OR CABLE ASSEMBLIES SHALL CONTAIN AN INSULATED GREEN GROUNDING CONDUCTOR SIZED PER NEC 250-122.

F. ALL EQUIPMENT AND DEVICE TERMINATIONS SHALL BE UL LISTED FOR USE WITH 75°C INSULATED CONDUCTORS AT THEIR 75°C AMPACITY.

G. EITHER PROVIDE A SEPARATE NEUTRAL FOR EACH PHASE CONDUCTOR IN ALL BRANCH CIRCUITS OR 20A -1P BREAKER WITH HANDLE TIE FOR 20A CIRCUITS THAT SHARE COMMON NEUTRAL.

PART 4: WIRING DEVICES

A. WIRING DEVICES SHALL BE COLOR SELECTED BY ARCHITECT/OWNER WITH MATCHING PLASTIC COVER PLATES, SPECIFICATION GRADE AS INDICATED BELOW, EQUAL TO THE PASS & SEYMOUR QUALITY INDICATED.

TOGGLE SWITCHES SHALL BE AS FOLLOWS:

SINGLE POLE 20 AMP	PASS & SEYMOUR CSB20AC1
DOUBLE POLE 20 AMP	PASS & SEYMOUR CSB20AC2
THREE WAY 20 AMP	PASS & SEYMOUR CSB20AC3

DUPLEX RECEPTACLES SHALL HAVE A NYLON FACE AND SHALL BE AS FOLLOWS:

15 AMP DUPLEX	PASS & SEYMOUR CRB5262
20 AMP DUPLEX	PASS & SEYMOUR CRB5362
15 AMP DUPLEX-GFCI	PASS & SEYMOUR 1597
20 AMP DUPLEX-GFCI	PASS & SEYMOUR 2097
20 AMP DUPLEX/USB/TAMPER	PASS & SEYMOUR TM826USB

B. DUPLEX RECEPTACLES ON DEDICATED CIRCUIT SHALL BE 20 AMP. OTHER DUPLEX RECEPTACLES MAY BE 15 AMP, UNLESS OTHERWISE NOTED.

C. OUTLET BOXES SHALL NOT BE MOUNTED BACK-TO-BACK.

D. A MAXIMUM OF 10 RECEPTACLES SHALL BE ON EACH BRANCH CIRCUIT.

E. WEATHERPROOF COVERS SHALL HAVE A LID SO THAT PLUGS MAY BE INSTALLED WITHOUT COMPROMISING THE WP FUNCTION, EQUAL TO INTERMATIC GUARDIAN ONE #WP102OC.

F. ALL OUTLETS (INCLUDING TELEPHONE, CABLE TV AND DATA) SHALL HAVE COVER PLATES, BLANK IF NOT USED.

PART 5: DISCONNECT SWITCHES

A. DISCONNECT SWITCHES SHALL BE HEAVY-DUTY TYPE IN NEMA 1 ENCLOSURES (UNLESS OTHERWISE INDICATED), FUSED OR NON-FUSED AS INDICATED. FUSED SWITCHES SHALL HAVE REJECTION-TYPE FUSE CLIPS. SWITCHES SHALL BE SQUARE D, OR EQUAL. FUSES SHALL BE CLASS R-5, TIME DELAY. A SET OF 3 SPARE FUSES OF EACH SIZE AND TYPE SHALL BE FURNISHED TO THE OWNER.

PART 6: PANELBOARDS

A. PANELBOARDS SHALL BE DEAD-FRONT SAFETY TYPE. ALL CIRCUIT BREAKERS SHALL BE MOLDED-CASE, BOLT-ON, AUTOMATIC THERMAL MAGNETIC TYPE, CALIBRATED FOR 40°C, OR AMBIENT COMPENSATION. CABINET SHALL BE 20 INCHES WIDE MINIMUM, WITH NOT LESS THAT 4-INCH WIRING GUTTERS AT TOP, SIDES, AND BOTTOM, SQUARE D "NF", "NQOD", OR EQUAL. BUS SHALL BE ALUMINUM WITH RATINGS AS INDICATED ON DRAWINGS. LUGS SHALL BE SIZED TO ACCOMMODATE CONDUCTORS INDICATED ON THE POWER RISER DIAGRAM.

B. PROVIDE HANDLE LOCK-ON DEVICES ON ALL CIRCUIT BREAKERS CONNECTED TO EMERGENCY, EXIT, AND NIGHT LIGHTING, FIRE ALARM, TELEPHONE AND SECURITY SYSTEMS.

C. CIRCUIT BREAKERS USED FOR SWITCHING OF LIGHTING OR SIGN CIRCUITS SHALL BE SWITCHING DUTY RATED AND SHALL BE MARKED "SWD".

PART 7: LIGHT FIXTURES

A. CATALOG NUMBERS GIVEN DENOTE MINIMUM QUALITY AND PERFORMANCE REQUIRED. EQUAL EQUIPMENT BY OTHER MANUFACTURERS IS ACCEPTABLE AS INDICATED ON THE LIGHT FIXTURE SCHEDULE.

B. H.I.D. BALLASTS SHALL BE HIGH POWER FACTOR WITH QUIETEST SOUND RATING.

C. LAY-IN FIXTURES SHALL BE SUSPENDED FROM STRUCTURE WITH 2 WIRES AT OPPOSITE CORNERS. DO NOT SUPPORT FROM CEILING GRID.

D. SEE ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF LIGHT FIXTURES.

E. ALL RECESSED LIGHTING FIXTURES SHALL BE THERMALLY PROTECTED.

F. COMPACT FLUORESCENT BALLASTS SHALL BE ELECTRONIC WITH END OF LIFE PROTECTION.

PART 8: TELEPHONE/DATA SYSTEM

A. FURNISH AND INSTALL A COMPLETE TELEPHONE/DATA CONDUIT SYSTEM AS INDICATED ON THE DRAWINGS. ALL OUTLET BOXES FOR TELEPHONE AND/OR DATA JACKS SHALL BE DOUBLE GANG WITH A SINGLE-GANG OPENING.

B. PULL AND LEAVE IN EACH CONDUIT ONE PULL CORD FOR PULLING IN CABLE. ALL WIRING, OUTLETS AND EQUIPMENT SHALL BE PROVIDED AND INSTALLED BY THE OWNERS TELE/DATA SUPPLIER.

C. TELEPHONE SERVICE CONDUITS SHALL BE PROVIDED TO THE PROPERTY LINE OR AS INDICATED ON THE DRAWINGS.

D. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL A #6 AWG GREEN COPPER WIRE IN A 3/4" CONDUIT FROM THE NEAREST COLD WATER METAL MAIN TO A LUG AT THE TELEPHONE/DATA BACKBOARD.

PART 9: LIGHTING CONTROLS

A. FURNISH AND INSTALL AN ELECTRONIC TIME CONTROLLER WHERE INDICATED. CONTROLLER SHALL BE CAPABLE OF SWITCHING 40 AMPERES PER POLE CONTINUOUSLY AT 120 VOLTS AND SHALL BE SPST (DPST, 3PST, DPTDT, SPDT, AS REQUIRED).

B. TIME CONTROLLER SHALL HAVE THE FOLLOWING:

B.1. A MINIMUM 7-DAY CLOCK
B.2. BE CAPABLE OF BEING SET FOR SEVEN DIFFERENT DAY TYPES PER WEEK.
B.3. INCORPORATES AN AUTOMATIC HOLIDAY "SHUTOFF" FEATURE, WHICH TURNS OFF ALL CONTROLLED LIGHTING LOADS FOR AT LEAST 24 HOURS AND THEN RESUMES NORMALLY SCHEDULED OPERATIONS.
B.4. HAVE PROGRAM BACKUP CAPABILITIES, WHICH PREVENT THE LOSS OF PROGRAM AND TIME SETTINGS FOR AT LEAST 10 HOURS, IF POWER IS INTERRUPTED.
B.5. INCLUDE A OVERRIDE SWITCH THAT COMPLIES WITH THE FOLLOWING:

B.5.1. SHALL BE A MANUAL CONTROL.
B.5.2. WHEN INITIATED, SHALL PERMIT THE CONTROLLED LIGHTING TO REMAIN ON FOR NOT MORE THAN 2 HOURS.
B.5.3. ANY INDIVIDUAL OVVERIDE SHALL NOT CONTROL THE LIGHTING FOR AN AREA NOT LARGER THAN 5,000 SQUARE FEET.

C. LIGHTING CONTACTORS SHALL SWITCH A LOAD AT 120 VOLTS, 60 HZ AND SHALL HAVE THE NUMBER OF POLES INDICATED ON THE DRAWINGS. THE CONTACTOR SHALL BE CONTINUOUSLY RATED 20 AMPERES PER POLE FOR ALL TYPES OF BALLAST AND TUNGSTEN LIGHTING AND RESISTANCE LOADS.

D. ALL LIGHTING CONTACTORS SHALL BE ELECTRICALLY HELD AND HAVE A NEMA 1 ENCLOSURE UNLESS OTHERWISE NOTED.

PART 10: FIRE ALARM SYSTEM

A. NEW DEVICES SHALL BE CONNECTED TO THE EXISTING FIRE ALARM SYSTEM IN COMPLIANCE WITH ALL APPLICABLE NFPA 72 AND OTHER STANDARDS AS WELL AS THE AMERICAN'S WITH DISABILITIES ACT (ADA). ALL FINAL CONNECTIONS, TESTING AND ADJUSTMENTS SHALL BE PERFORMED BY OR UNDER DIRECT SUPERVISION OF AN AUTHORIZED FACTORY REPRESENTATIVE. NEW DEVICES SHALL BE COMPATIBLE WITH THE EXISTING FIRE ALARM SYSTEM. THE CONTRACTOR SHALL FIELD VERIFY EXACT SYSTEM MANUFACTURER AND TYPE. THE FIRE ALARM SUPPLIER SHALL VERIFY THE EXISTING SYSTEM CAN ACCOMMODATE THE NEW DEVICES PRIOR TO BID. WHEN THE EXISTING SYSTEM CAN NOT HANDLE THE DEVICES, THE FIRE ALARM SUPPLIER SHALL INCLUDE IN THEIR PRICE THE ADDITION OF NOTIFICATION APPLIANCE CIRCUITS (NAC) POWER EXTENDERS AS REQUIRED. SUPPLIER SHALL INCLUDE THE UPDATING OF EXISTING STROBES IN THE RENOVATED AREA SO THAT ALL STROBES, NEW AND EXISTING, ARE SYNCHRONIZED.

B. INITIATING DEVICE ACTIVATION SHALL CAUSE OPERATION OF THE PROPER ZONE ALARM CIRCUIT IN THE CONTROL PANEL, AND OPERATE ALL AUDIBLE INDICATING ALARMS. ALL AIR HANDLING UNITS SHALL BE STOPPED UPON ANY ALARM INPUT. EACH AIR HANDLER UNIT SHALL BE PROVIDED WITH A SYSTEM CONTROLLED RELAY TO EFFECT SHUTDOWN. ALL ALARM DEVICES AND LAMPS SHALL CONTINUE TO OPERATE UNTIL THE INITIATING DEVICE IS RESET. SUBSEQUENT ALARMS SHALL RESOUND THE SYSTEM. AN AUDIBLE AND VISUAL SIGNAL SHALL INDICATE SYSTEM TROUBLE. THE CONTROL PANEL SHALL PROVIDE FOR ACTIVATING A UL LISTED CENTRAL STATION SIGNAL.

C. MANUAL STATIONS SHALL BE NON-CODED, WITH PULL LEVER AND GLASS ROD, SEMI-FLUSH MOUNTED. COMBINATION LIGHT AND HORN SIGNALS SHALL BE FLUSH MOUNTED. WIRING SHALL BE IN CONDUIT AS PREVIOUSLY SPECIFIED, #14 AWG MINIMUM, THHN, THE USE OF PLENUM RATED CABLE IS NOT ALLOWED. ALL JUNCTION BOXES USED FOR THE FIRE ALARM SYSTEM SHALL BE PAINTED RED.

D. WHERE REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION, THE FIRE ALARM SUPPLIER SHALL A SEPARATE SET OF PLANS FOR A SEPARATE FIRE ALARM PERMIT. THE ENGINEER IS NOT RESPONSIBLE FOR PRODUCING THESE DRAWINGS OR FOR SUBMITTING FOR THIS PERMIT, IT IS THE SOLE RESPONSIBILITY OF THE FIRE ALARM SUPPLIER.

E. ALL STROBES LOCATED WITHIN THE SAME AREA SHALL BE SYNCHRONIZED.

PART 11: FIRE STOPPING

A. ALL PENETRATIONS OF NON-RATED PENETRATIONS SHALL BE SEALED WITH RATED MATERIALS MEETING ASTM E-814.

B. PROVIDE FIRE STOPPING DEVICE(S) OR SYSTEM(S) WHICH HAVE BEEN TESTED AND LISTED AS COMPLYING WITH ASTM E-814. INSTALL THE DEVICE(S) OR SYSTEM(S) IN ACCORDANCE WITH THE CONDITIONS OF THEIR LISTING. PROVIDE THE APPROPRIATE DEVICE(S) OR SYSTEM(S) WITH AN "F" RATING EQUAL TO THE RATING OF THE ASSEMBLY BEING PENETRATED.

C. DEVICE(S) AND/OR SYSTEM(S) SHALL BE BY HILTI, 3M OR EQUIVALENT.

D. WHERE OPENINGS FOR INSTALLATION OF ELECTRICAL BOXES EXCEEDS 16 SQUARE INCHES IN RATED WALLS OR PARTITIONS, THE OPENING SHALL BE PROTECTED AS REQUIRED BY THE APPROPRIATE WALL LISTING TYPE.

PART 12: RENOVATION OF EXISTING

A. EACH BIDDER SHALL VISIT THE PROJECT SITE PRIOR TO BID AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS. FAILURE TO VISIT THE SITE SHALL NOT EXCUSE THE CONTRACTOR FROM PERFORMING THE REQUIRED WORK NOR SHALL IT BE AN ACCEPTABLE REASON FOR REQUESTING ADDITIONS TO THE CONTRACT.

B. EXISTING PORTIONS OF THE FACILITY SHALL REMAIN IN OPERATION DURING THIS RENOVATION AND/OR ADDITION. THE CONTRACTOR SHALL CAUSE AS LITTLE DISRUPTION AS POSSIBLE TO MAINTAIN THE COMFORT AND SAFETY OF THE BUILDING OCCUPANTS. ALL POWER OUTAGES SHALL BE CLOSELY COORDINATED WITH THE OWNER'S REPRESENTATIVE.

C. PROJECT INVOLVES WORK ON EXISTING ELECTRICAL PANELS AND FEEDERS REQUIRED IN OPERATING THE FACILITY. TEMPORARY POWER ARRANGEMENTS SHALL BE MADE TO SERVE THOSE AREAS AFFECTED BY THIS PROJECT.

ABBREVIATIONS

A	AMPERE
AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ASW	ABOVE SHOW WINDOW
C	CONDUIT
CKT	CIRCUIT
EWC	ELECTRIC WATER COOLER
FLA	FULL LOAD AMPS
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
G	GROUND
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
IG	ISOLATED GROUND
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KCMIL	THOUSAND CIRCULAR MILS
KW	KILOWATT
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MISC	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MTS	MANUAL TRANSFER SWITCH
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NL	NIGHT LIGHT
NO	NORMALLY OPEN
#	NUMBER
NTS	NOT TO SCALE
P	POLE
Ø	PHASE
PNL	PANELBOARD
SCWT	SCREW COVER WIRE TROUGH
SPD	SURGE PROTECTION DEVICE
SW	SWITCH
TELE/DATA	TELEPHONE/DATA
TYP	TYPICAL
UG	UNDERGROUND
V	VOLT
UON	UNLESS OTHERWISE NOTED
WP	WEATHERPROOF
XFMR	TRANSFORMER
3R	NEMA 3R ENCLOSURE

NOTES:
1. SEE DEVICE MOUNTING ELEVATION FOR MOUNTING HEIGHTS.
2. SEE SPECIFICATIONS FOR DEVICE COLOR AND COVER PLATE STYLE.

ELECTRICAL SYMBOLS SCHEDULE

Symbol	Description
	CONDUIT AND/OR WIRING SYSTEM CONCEALED IN CONSTRUCTION IN FINISHED AREAS, EXPOSED IN UNFINISHED AREAS.
	CONDUIT AND/OR WIRING SYSTEM CONCEALED BELOW FLOOR OR FLOOR SLAB.
	CONDUIT STUB. TERMINATE WITH BUSHING OR CAP IF UNDERGROUND.
	BREAK IN CONDUIT, SEE PLAN FOR CONTINUATION.
	NON-RIGID RACEWAY SYSTEM
	BRANCH CIRCUIT HOMERUN TO PANEL.
J J	JUNCTION BOX SIZED PER NEC.
S	SINGLE POLE SWITCH, 20 AMP, 120/277 VOLT, COOPER 1221, OR EQUAL.
S_3	THREE WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1223, OR EQUAL.
S_{3D}	LEVITON RENOIR II SERIES, OR EQUAL. 3-WAY DIMMER SWITCH SUITABLE FOR USE WITH MULTIPLE DIMMING TYPES. CONTRACTOR SHALL COORDINATE WITH EACH FIXTURE TYPE PRIOR TO USE.
S_{OC}	WALL MOUNTED, PIR/MICORPHONICS TECHNOLOGY OCCUPANCY SENSOR, 120/277 VOLT, LEVITON RENOIR II SERIES, OR EQUAL WITH 15 FT MINOR MOTION COVERAGE, MINIMUM.
S_{OD}	WALL MOUNTED, PIR/MICORPHONICS TECHNOLOGY DIMMING OCCUPANCY SWITCH, 120/277 VOLT, SUITABLE FOR USE WITH MULTIPLE DIMMING TYPES. DIMMER SWITCH SHALL MATCH FIXTURE TYPE. LEVITON, OR EQUAL WITH 15 FT MINOR MOTION COVERAGE, MINIMUM.
S_D	DIMMER SWITCH, LUTRON OR EQUAL, DIMMER SWITCH SHALL MATCH RESPECTIVE DIMMING CHARACTERISTIC OF LUMINIARE. CONTRACTOR SHALL PROVIDE LOW VOLTAGE CABLES AS REQUIRED.
S_M	FRACTIONAL HORSEPOWER MANUAL MOTOR STARTER WITH O.L.'S
	DUPLEX RECEPTACLE, 15 AMP, 120 VOLT (USE 20 AMP FOR SINGLE RECEPTACLE ON A CIRCUIT.) MOUNT 18" A.F.F., U.O.N., COOPER 5252 OR EQUAL.
	DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER BACKSPLASH, OR AT 48" A.F.F. U.O.N., COOPER 5252 OR EQUAL.
	DOUBLE DUPLEX RECEPTACLE MOUNT AT 18" A.F.F. TWO NEMA 5-15R DUPLEX RECEPTACLES IN A COMMON BOX AND COVER PLATE.
GFCI	GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE. NEMA 5-20R DUPLEX. ALL RECEPTACLES INSTALLED OUTSIDE, WITHIN 6' OF A SINK OR IN A KITCHEN SHALL BE GFCI.
EWC	GROUND FAULT NEMA 5-20R DUPLEX RECEPTACLE FOR ELECTRIC WATER COOLER COORDINATE LOCATION WITH PLUMBING CONTRACTOR.
WP	WEATHERPROOF RECEPTACLE. NEMA 5-15R DUPLEX. COVER SHALL BE COOPER #1991 WHERE MOUNTED HORIZONTAL AND #4966 WHERE MOUNTED VERTICAL.
USB	DUPLEX/USB/TAMPER RESISTANT RECEPTACLE, 15 AMP, 120 VOLT (USE 20 AMP FOR SINGLE RECEPTACLE ON A CIRCUIT.) MOUNT 18" A.F.F., U.O.N., COOPER TR-7755 OR EQUAL.
USB	DUPLEX/USB/TAMPER RESISTANT RECEPTACLE MOUNTED ABOVE COUNTER BACKSPLASH, OR AT 48" A.F.F. U.O.N., COOPER TR-7755 OR EQUAL.
	DUPLEX RECEPTACLE MOUNTED IN "F" FOR FLOOR AND "C" FOR CEILING. FLOOR BOX SHALL BE CAST ALUMINUM WITH BRASS COVER.
D	125/250V, 30A, 3-POLE, 4-WIRE GROUNDING RECEPTACLE FOR DRYER BLACK WITH STAINLESS STEEL COVER, MOUNT 18" A.F.F., COOPER 5716N OR EQUAL.
	FRACTIONAL HORSEPOWER MOTOR CONNECTION.
	CONNECTION FOR WATER HEATER, VOLTAGE, PHASE AND SIZE AS INDICATED.
	STRIP FLUORESCENT LIGHT FIXTURE. LETTER INDICATES TYPE, SEE LIGHT FIXTURE SCHEDULE. INDEPENDENTLY SUPPORT FIXTURE TO STRUCTURE UNLESS MOUNTED TO STRUCTURAL CEILING.
	ROUND RECESSED OR SURFACE MOUNTED LIGHT FIXTURE. LETTER INDICATES FIXTURE TYPE, SEE LIGHT FIXTURE SCHEDULE. INDEPENDENTLY SUPPORT FIXTURE TO STRUCTURE UNLESS SURFACE MOUNTED TO A STRUCTURAL CEILING.
	WALL MOUNTED ROUND LIGHT FIXTURE. LETTER INDICATES TYPE, SEE LIGHT FIXTURE SCHEDULE.
	FIXTURE WITH INTEGRAL 600 LUMEN BATTERY INVERTER AND/OR ON EMERGENCY LIGHTING CIRCUIT. LETTER INDICATES TYPE, SEE LIGHT FIXTURE SCHEDULE FOR TYPE AND FOR BATTERY REQUIREMENT. SUPPORT FIXTURES IN SAME MANNER AS NOTED ABOVE.
	WALL MOUNTED EMERGENCY LIGHTING BATTERY PACK FIXTURE, SEE LIGHT FIXTURE SCHEDULE.
	CEILING OR WALL MOUNTED EXIT SIGN RESPECTIVELY. SOLID SPACES INDICATE FACES. PROVIDE ARROWS AS INDICATED ON PLANS. SEE LIGHT FIXTURE SCHEDULE.
	WALL MOUNTED COMBINATION EMERGENCY BATTERY PACK AND EXIT SIGN. SEE LIGHT FIXTURE SCHEDULE.
F	FIRE ALARM MANUAL STATION, MOUNT 48"A.F.F.
S	FIRE ALARM STROBE, 15CD, MOUNT 80" TO BOTTOM.
F S	FIRE ALARM SPEAKER STROBE, 15CD, MOUNT 80" TO BOTTOM.
S	FIRE ALARM SMOKE DETECTOR, CEILING MOUNTED.
SD	FIRE ALARM DUCT SMOKE DETECTOR.
	FIRE ALARM DUCT DETECTOR REMOTE INDICATING LIGHT.
	NONFUSED DISCONNECT SWITCH, SIZE AS INDCIATED ON DRAWINGS, NEMA 1 ENCLOSURE U.O.N.
	FUSED DISCONNECT SWITCH, SIZE AS INDICATED ON DRAWINGS, FUSE PER NAMEPLATE DATA OR AS INDICATED, NEMA 1 ENCLOSURE U.O.N.
	LIGHTING AND/OR POWER PANEL BOARD, SURFACE MOUNTED WITH REQUIRED CODE CLEARANCE. SEE PANEL SCHEDULE FOR AMPERAGE.
	PLYWOOD TELEPHONE OR DATA BACKBOARD. SIZE AS INDICATED ON THE RESPECTIVE RISER DIAGRAM.
	WALL MOUNTED UTILITY METER.

GENERAL NOTES

A. ELECTRICAL CONTRACTOR SHALL REVIEW ENTIRE SET OF CONTRACT DOCUMENTS INCLUDING BUT NOT NECESSARILY LIMITED TO ALL ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND ENTIRE PROJECT MANUAL. ELECTRICAL CONTRACTOR SHALL ACKNOWLEDGE AND INCLUDE IN THE SCOPE OF WORK (CONTRACT) ALL CONDITIONS PERTINENT TO THE COMPLETION OF THE ELECTRICAL WORK. ELECTRICAL CONTRACTOR SHALL FULLY COORDINATE ELECTRICAL WORK WITH THE INSTALLATION OF WORK BY ALL OTHER TRADES AND MAKE NECESSARY FIELD ADJUSTMENTS AS REQUIRED TO ACCOMODATE THE ELECTRICAL INSTALLATION. ALL OF THE ABOVE SHALL BE INCLUDED IN THE SCOPE OF WORK AT NO ADDITIONAL COST TO THE OWNER.

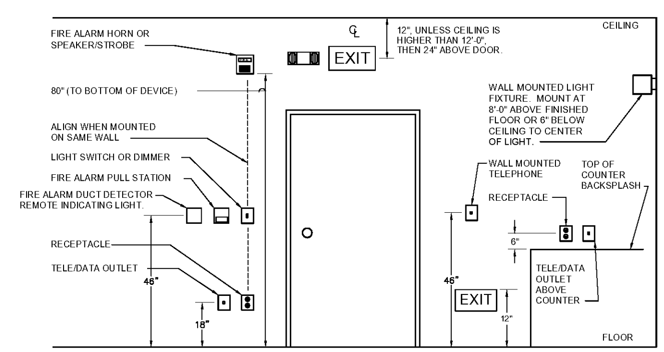
B. VERIFY ALL REQUIREMENTS AND COORDINATE EXACT LOCATION OF INCOMING ELECTRICAL SERVICE WITH LOCAL POWER COMPANY PRIOR TO PROJECT START-UP. NOTIFY ENGINEER OF ANY CHANGES AS MAY BE REQUIRED.

C. ENGRAVED, LAMINATED PLASTIC IDENTIFICATION PLATES SHALL BE FURNISHED AND INSTALLED ON ALL PANELS AND SWITCHGEAR. PLATES SHALL BE AFFIXED TO FRONT PANELS, INDICATING PANEL NAME, VOLTAGE AND AMPERAGE. PROVIDE UPDATED PANEL DIRECTORIES FOR ALL PANELS.

D. ELECTRICAL CONTRACTOR SHALL CAREFULLY EXAMINE THE DRAWINGS AND SPECIFICATIONS, VISIT THE SITE OF THE WORK, AND FULLY INFORM HIMSELF AS TO ALL CONDITIONS AND MATTERS THAT CAN, IN ANY WAY AFFECT THE WORK OR THE COST THEREOF, SHOULD THE CONTRACTOR FIND DISCREPANCIES IN, OR OMISSIONS FROM, THE DRAWINGS, SPECIFICATIONS OR OTHER DOCUMENTS OR BE IN DOUBT AS TO THEIR MEANING, NOTIFY THE ARCHTIECT/ENGINEER AT ONCE, IN WRITING, OF ANY DISCREPENCIES BETWEEN EXISTING CONDITIONS AND NEW WORK, OR BETWEEN ELECTRICAL WORK AND THE WORK OF OTHER TRADES PRIOR AND OBTAIN CLARIFICATION PRIOR TO SUBMITTING ANY BID. LACK OF SUCH NOTIFICATION SHALL BE CONSTRUED TO INDICATE NO DISCREPANCIES OR CONFLICTS EXIST. ADDITIONAL COMPENSATION WILL NOT BE GRANTED AFTER AWARD OF CONTRACT FOR ANY WORK REQUIRED TO COMPLY WITH THESE REQUIREMETNS.

E. SHARED NEUTRALS ARE NOT ALLOWED. EACH CIRCUIT SHALL HAVE ITS OWN INDEPENDENT NEUTRAL. EACH CONDUIT RUN SHALL CONTAIN A GROUND WIRE. CONDUIT ONLY IS NOT AN ACCEPTABLE GROUND PATH.

F. TO G.C. AND ALL SUBCONTRACTORS: NO PRICING SHOULD BE DONE FROM A PARTIAL SET AND NO CHANGE ORDER WILL BE ALLOWED FOR PRICING BASED ONLY ON A PARTIAL SET OF REVIEW OF A SINGLE TRADE'S DRAWINGS. ALL TRADES SHOULD CROSS REFERENCE ARCHITECTURAL SHEETS AND ALL OTHER TRADES FOR ADDITIONAL INFORMATION, CLARIFICATION AND COORDINATION REQUIRED- TYP. RELATED TO PRICING RELATED TO ANY CONTRADICTIONS THAT MAY BE FOUND IN THE DOCUMENT SET BIDDERS SHOULD INCLUDE THE MOST RESTRICTIVE (I.E. MOST EXPENSIVE) AS PART OF THE BID. ALL BIDS AND PRICING IN THEIR ENTIRETY SHALL BE BASED SOLELY ON THE FULL AND COMPLETE SET OF CONSTRUCTION DOCUMENTS ISSUED FOR THIS SPECIFIC PROJECT- TYP. NO CHANGE ORDERS OR MODIFICATION TO THE CONTRACT DOCUMENTS SHALL BE MADE OR CONSIDERED BASED ON OWNER/SUBCONTRACTOR ASSUMPTIONS BASED ON REVIEW OF A PARTIAL SET OR PAST PROJECT COMPARISONS- TYP.



NOTES:
1. ALL DIMENSIONS ARE TO CENTER LINE OF DEVICE, UNLESS OTHERWISE NOTED.

1 / E-1 DEVICE MOUNTING ELEVATION
NO SCALE

NORTH CAROLINA ENERGY CODE

APPENDIX B (NORTH CAROLINA 2018 ENERGY CONSERVATION CODE)
ELECTRICAL SUMMARY

METHOD OF COMPLIANCE:
☒ PRESCRIPTIVE ☐ PERFORMANCE ☐ ENERGY COST BUDGET

LIGHTING SCHEDULE
LAMP TYPE REQUIRED IN FIXTURE
NUMBER OF LAMPS IN FIXTURE
BALLAST TYPE USED IN THE FIXTURE
NUMBER OF BALLASTS IN FIXTURE
TOTAL WATTAGE PER FIXTURE
— SEE LIGHT FIXTURE SCHEDULE SHEET E-101
TOTAL INTERIOR WATTAGE SPECIFIED VS ALLOWED 1457 WATTS VS. 2327 WATTS
EXTERIOR WATTAGE SPECIFIED VS ALLOWED N/A EXISTING TO REMAIN

SECTION C401.2 SHALL BE ACHIEVED BY ONE OF THE BELOW:

- ☐ a. C406.2 MORE EFFICIENT HVAC EQUIPMENT
- ■ b. C406.3 REDUCED LIGHTING POWER DENSITY
- ☐ c. C406.4 ENHANCED DIGITAL LIGHTING CONTROL SYSTEM
- ☐ d. C406.5 ON-SITE SUPPLY OF RENEWABLE ENERGY
- ☐ e. C406.6 DEDICATED OUTDOOR AIR SYSTEM
- ☐ f. C406.7 REDUCED ENERGY USE IN SERVICE WATER HEATING

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

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037734 MICHAEL J. SENUTA 6/28/2019

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WAVE PROJECT #19102

Hustle House

ODA Project No. 183324

Charlotte, NC

FOR CONSTRUCTION

06.28.2019

REVISIONS		
No.	Description	Date

ELECTRICAL SYMBOLS & SPECS

E-001

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