

# ELECTRICAL SPECIFICATIONS

## 1. GENERAL CONDITIONS

- A. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY ELECTRICAL EQUIPMENT NECESSARY TO FULFILL APPLICABLE CODES, REGULATIONS, BUILDING STANDARDS AND THE BEST PRACTICES OF THE TRADE FOR INSTALLATION OF ELECTRICAL WORK.
- B. ALL ELECTRICAL WORK, MATERIALS AND EQUIPMENT SHALL CONFORM WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE, UNDERWRITERS LABORATORIES BOARD OF UNDERWRITERS, OSHA, NEMA, NFPA, ALL STANDARDS AND ALL AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL PAY FOR AND OBTAIN ALL REQUIRED PERMITS AND CERTIFICATES OF REQUIRED ORDINANCES, AND DELIVER THEM TO THE OWNER'S REPRESENTATIVE.
- C. UPON REVIEW OF THE DRAWINGS PRIOR TO SUBMITTING HIS PROPOSAL, THE ELECTRICAL CONTRACTOR SHALL INFORM THE ARCHITECT AND/OR ENGINEER OF ANY DISCREPANCIES WITHIN THE DRAWINGS AND REQUEST CLARIFICATION CONCERNING THE DISCREPANCIES. LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS SHOULD SUCH PROCEDURE NOT BE FOLLOWED.
- D. THE CONTRACTOR SHALL COORDINATE THIS WORK WITH OTHER CONTRACTORS WHOSE WORK MIGHT AFFECT THIS INSTALLATION. THE CONTRACTOR SHALL ARRANGE ALL PARTS OF THIS WORK AND EQUIPMENT IN PROPER RELATION TO THE WORK AND EQUIPMENT OF OTHERS.
- E. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONDUIT, OUTLET BOXES, POKE-THRU SERVICE FITTINGS REQUIRED TO FACILITATE THE INSTALLATION OF COMMUNICATION WIRING AND DEVICES.
- F. THE DRAWINGS INDICATE THE SIZE AND GENERAL LOCATION OF WORK. SCALED DIMENSIONS SHALL NOT BE USED. VERIFY SCALE WITH ARCHITECTURAL DRAWINGS. THE EXACT LOCATION AND ELEVATION OF ALL LIGHTING FIXTURES, SWITCHES, RECEPTACLES, ETC. SHALL BE DETERMINED FROM THE ARCHITECT'S DRAWINGS.

## 2. SCOPE OF WORK

- THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR, TOOLS, SUPERVISION, ETC. REQUIRED TO INSTALL COMPLETE OPERATIONAL ELECTRICAL SYSTEMS AS DESCRIBED IN THESE PLANS AND SPECIFICATIONS. SUCH INSTALLATIONS INCLUDE, BUT ARE NOT SPECIFICALLY LIMITED TO THE FOLLOWING:
- A. INSTALLATION OF RACEWAY AND CIRCUIT WIRING.
- B. CUTTING, CHANNELLING, CORING AND CHASING REQUIRED TO ACCOMMODATE THE INSTALLATION OF ELECTRICAL WORK AND ROUGH PATCHING.
- C. INSTALLATION OF ELECTRICAL DISTRIBUTION EQUIPMENT.
- D. INSTALLATION OF CONDUIT, JUNCTION BOXES, PULL BOXES, ETC. REQUIRED FOR THE FOREMENTIONED EQUIPMENT.

## 3. PANEL BOARDS

- A. A TYPEWRITTEN DIRECTORY OF CIRCUITS SHALL BE INSTALLED INSIDE OF EACH PANELBOARD DOOR. THE LIST SHALL INCLUDE AS-BUILT CONDITIONS INCLUDING ALL TYPES OF DEVICES SERVED BY EACH CIRCUIT. EACH PANEL SHALL BE EXTERNALLY TAGGED WITH PERMANENT PHENOLIC PLATE INDICATING PANEL IDENTIFICATION AND VOLTAGE.
- B. PHASE LEGS OF PANELS SHALL BE BALANCED. ANY PANEL FOUND WITH UNBALANCED LOADS SHALL HAVE ITS CIRCUITS REARRANGED AS REQUIRED TO BALANCE PHASE LEGS.
- C. THE SHORT CIRCUIT RATING OF A PANEL SHALL APPLY TO ALL BRANCH DEVICES. SERIES CONNECTED SHORT CIRCUIT RATING OF BRANCH DEVICES WILL NOT BE ACCEPTED.

## 4. CIRCUIT BREAKERS AND FUSES

- A. CIRCUIT BREAKERS SHALL BE BOLT-IN TYPE. CIRCUIT BREAKERS SHALL BE OF THE SAME MANUFACTURER AND BE COMPATIBLE WITH THE PANELBOARD.
- B. CIRCUIT BREAKERS SHALL BE QUICK-MAKE, QUICK-BREAK COMPENSATED FOR AMBIENT TEMPERATURES AND SHALL HAVE A MINIMUM SHORT CIRCUIT RATING OF 10,000 AMPERES SYMMETRICAL OR HIGHER WHERE NOTED ON PANEL SCHEDULE.
- C. CIRCUIT BREAKERS SHALL BE OF THE "THERMAL-MAGNETIC" TYPE HAVING BIMETALLIC ELEMENT FOR TIME DELAY OVER LOAD PROTECTION AND MAGNETIC ELEMENT FOR SHORT CIRCUIT PROTECTION.
- D. CIRCUIT BREAKERS AND FUSES SHALL BE SIZED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EQUIPMENT BEING SERVED. VERIFY EQUIPMENT REQUIREMENTS AS NECESSARY PRIOR TO INSTALLATION OF BRANCH CIRCUIT OVERCURRENT PROTECTION.
- E. COORDINATE WITH ALL CONTRACTORS FOR THE ELECTRICAL REQUIREMENTS OF ALL EQUIPMENT TO BE INSTALLED. DO NOT RUN CONDUIT AND CONDUCTORS PRIOR TO THE CONFIRMATION OF THE

## EQUIPMENT REQUIREMENTS.

### 5. DISCONNECT SWITCHES

- A. THE CONTRACTOR SHALL SUPPLY AND INSTALL DISCONNECT SWITCHES AS SHOWN ON THE PLANS, OR AS OTHERWISE REQUIRED BY CODE, WHETHER SHOWN ON PLANS OR NOT.
- B. ALL SWITCHES SHALL BE HEAVY DUTY QUICK-MAKE QUICK-BREAK TYPE, RATED AS REQUIRED. EACH SWITCH SHALL HAVE A SUFFICIENT NUMBER OF POLES TO INTERRUPT ALL UNGROUNDED CONDUCTORS. DISCONNECT SWITCHES SERVING MOTOR LOADS SHALL BE HORSEPOWER RATED.
- C. FUSES SHALL BE INSTALLED IN ALL FUSED SWITCHES, SIZED AS INDICATED ON PLANS.
- D. UNLESS OTHERWISE NOTED, INDOOR SWITCHES SHALL BE PROVIDED WITH NEMA 1 ENCLOSURES; OUTDOOR SWITCHES WITH NEMA 3R ENCLOSURES.

### 6. RACEWAYS

- A. WHERE CONDUIT IS USED, 3/4" MINIMUM CONDUIT SHALL BE PROVIDED.
- B. ALL CONDUITS TO BE SUPPORTED BY STANDOFFS. CONNECTION TO CEILING SUPPORTS SHALL NOT BE PERMITTED. ALL CONDUIT SHALL BE RUN CONCEALED.
- C. ALL CONDUITS INSTALLED OUTDOORS SHALL BE RIGID GALVANIZED WITH THREADED CONNECTIONS. ALL CONDUITS INSTALLED UNDERGROUND OR IN CONCRETE SLABS SHALL BE RIGID PVC WITH A SEPARATE GROUNDING CONDUCTOR AND CONCRETE ENCASUREMENT WHERE REQUIRED. WHERE UNDERGROUND RACEWAYS TURN UP TO EQUIPMENT, THE ELBOW REQUIRED AND THE STUB-UP OUT OF THE SLAB OR EARTH MUST BE RIGID STEEL FOR THE LAST TWO FEET MINIMUM.
- D. FLEXIBLE CONDUIT SHALL BE USED TO MAKE FINAL CONNECTIONS TO MOTORS, TRANSFORMERS, RECESSED LIGHTING FIXTURES, EXPANSION JOINTS OR WHERE THE INSTALLATION OF RIGID CONDUIT IS IMPRACTICAL.
- E. INSTALL CONDUIT CONTINUOUS BETWEEN BOXES AND CABINETS WITH NO MORE THAN FOUR 90 DEGREE BENDS. SECURELY FASTEN IN PLACE WITH STRAPS, HANGERS, AND STEEL SUPPORTS AS REQUIRED.

### 7. WIRE AND CABLE

- A. FOR CONCEALED BRANCH CIRCUIT WIRING, TYPE EMT CONDUIT SHALL BE USED WHERE PERMITTED BY CODE. TYPE AC FLEXIBLE METAL CONDUIT AND ROMEX SHALL NOT BE USED.
- B. ALL CONDUCTORS SHALL BE SOFT ANNEALED 98% PURE INSULATED COPPER. ALL CONDUCTORS SHALL HAVE 600 VOLT RATED INSULATION AND RATED 90 DEGREE CELCIUS UNLESS OTHERWISE NOTED. SERVICE ENTRANCE CONDUCTORS SHALL BE TYPE USE-2, RHW-2 OR XHHW-2.
- C. CONDUCTORS #8 AWG AND LARGER SHALL BE STRANDED, # 10 AND SMALLER SHALL BE SOLID.
- D. THE MINIMUM WIRE SIZE FOR BRANCH CIRCUITS SHALL BE #12 AWG. LAYOUT OF BRANCH CIRCUIT WIRING AND ARRANGEMENT OF HOME RUNS SHALL BE FOR MAXIMUM ECONOMY AND EFFICIENCY.

- E. THE SECONDARY SERVICE, FEEDERS AND BRANCH CIRCUITS SHALL BE COLOR CODED AS FOLLOWS:

PHASE	208/120V	480/277V
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
NEUTRAL	WHITE	NATURAL GRAY
GROUND	GREEN	GREEN

- F. TAG ALL FEEDERS IN ALL PULL BOXES AND IN ALL GUTTER SPACE AND WIREWAYS THROUGH WHICH THEY PASS.

- G. MAKE SPLICES IN FEEDER TAPS IN PANEL BOX GUTTERS WITH PRESSURE TYPE CONNECTORS.

- H. SPLICES IN CIRCUITS SHALL BE TWISTED AND MADE MECHANICALLY TIGHT. SECURE WITH SCOTCHLOCK OR PIGTAIL CONNECTORS. CRIMP TYPE CONNECTORS SHALL NOT BE USED.

### 8. WIRING DEVICES

- A. WIRING DEVICES SHALL BE OF THE SPECIFICATION GRADE, UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED UNLESS OTHERWISE NOTED. SWITCHES SHALL BE MANUFACTURED BY LEVITON OR APPROVED EQUAL.
- B. SINGLE POLE SWITCHES SHALL BE 120 VOLTS, RATED AT 20 AMPERES, QUIET OPERATION TYPE, COLOR OF SWITCH AND DEVICE PLATE AS DIRECTED BY ARCHITECT.
- C. THREE WAY SWITCHES SHALL BE 120 VOLT 20 AMPERES.

- D. SWITCH AND RECEPTACLE PLATES SHALL BE PLUMB AND SHALL FIT FLAT AGAINST WALL. FINISH AS DIRECTED BY ARCHITECT.

- E. ALL SWITCH AND RECEPTACLE MOUNTING HEIGHTS AND LOCATIONS SHALL BE TAKEN FROM ARCHITECTS DRAWINGS UNLESS OTHERWISE NOTED.

- F. MULTIPLE DEVICES AT A COMMON LOCATION SHALL BE INSTALLED IN A COMMON MULTIGANG DEVICE PLATE.
- G. STANDARD DUPLEX RECEPTACLES SHALL BE NEMA 5-20 R, BACK AND SIDE WIRED. OTHER DEVICES SHALL BE AS INDICATED ON THE DRAWINGS.

- H. ALL OUTDOOR RECEPTACLES SHALL BE WEATHERPROOF RATED WHEN THE ATTACHMENT PLUG IS INSERTED.

### 9. PULL BOXES, JUNCTION BOXES AND OUTLET BOXES

- A. PULL BOXES, JUNCTION BOXES AND OUTLET BOXES SHALL BE MANUFACTURED FROM GALVANIZED INDUSTRY STANDARD GAUGE SHEET STEEL.
- B. PROVIDE PULL BOXES AND JUNCTION BOXES IN RACEWAYS TO ASSURE THAT CABLES ARE NOT DAMAGED WHEN THEY ARE PULLED AND TO FULFILL MINIMUM CODE REQUIREMENTS.
- C. PULL BOXES AND JUNCTION BOXES SHALL BE SIZED SO THAT THE MINIMUM BENDING RADIUS CRITERIA SPECIFIED FOR THE WIRES AND CABLE ARE MAINTAINED.
- D. PROVIDE AND INSTALL ALL REQUIRED JUNCTION AND PULL BOXES REGARDLESS WHETHER INDICATED ON DRAWINGS OR NOT.

### 10. ELECTRICAL IDENTIFICATIONS

- A. FURNISH AND INSTALL ENGRAVED LAMINATED PHENOLIC NAMEPLATES FOR ALL SAFETY SWITCHES, PANELBOARDS, TRANSFORMERS, SWITCHBOARDS, MOTOR CONTROL CENTERS AND OTHER ELECTRICAL EQUIPMENT SUPPLIED FOR THE PROJECT. FOR SWITCHBOARDS AND SWITCHGEAR PROVIDE NAMEPLATES FOR EACH FEEDER AND/OR BRANCH CIRCUIT. IN OUTDOOR LOCATIONS, LABELS SHALL BE APPLIED USING TWO-PART EPOXY THAT IS WEATHERPROOF AND SUNLIGHT RESISTANT. LETTERS SHALL BE APPROXIMATELY 1/2-INCH HIGH EXCEPT WHERE RESULTANT NAMEPLATE SIZE EXCEEDS EQUIPMENT SIZE. NAMEPLATE LETTERING MAY BE ADJUSTED ACCORDINGLY WITH APPROVAL OF THE ENGINEER. NAMEPLATES SHALL REMAIN LEGIBLE, EMBOSSED, SELF-ADHESIVE PLASTIC TAPE IS NOT ACCEPTABLE FOR MARKING EQUIPMENT. NAMEPLATE MATERIAL COLORS SHALL B AS FOLLOWS:
- o. BLUE SURFACE WITH WHITE CORE FOR 120/208-VOLTS EQUIPMENT.
- b. BLACK SURFACE WITH WHITE CORE FOR 277/480-VOLTS EQUIPMENT.

### 11. GROUNDING

- A. ALL ELECTRICAL SYSTEMS SHALL BE GROUNDED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE, THE LOCAL UTILITY COMPANY AND ALL OTHER LOCAL AUTHORITIES HAVING JURISDICTION. PERMANENTLY AND EFFECTIVELY GROUND ALL METALLIC CONDUITS, SUPPORTS, CABINETS, PANELBOARDS AND SYSTEM GROUNDING NEUTRAL.
- B. A SEPARATE GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL CONDUITS SIZED IN ACCORDANCE WITH THE EQUIPMENT GROUNDING CONDUCTOR TABLE NEC 250.122 OF THE NATIONAL ELECTRICAL CODE.
- C. GROUND CLAMPS SHALL BE LISTED SPECIFICALLY FOR GROUNDING, WHERE GROUNDING CONDUCTOR IS ENCLOSED IN CONDUIT, GROUND CLAMP SHALL GROUND BOTH CONDUCTOR AND CONDUIT.

### 12. TEMPORARY LIGHTING AND POWER

- A. FURNISH AND INSTALL WIRING FOR ADEQUATE TEMPORARY LIGHT AND POWER FOR THE PROJECT.
- B. MAINTAIN THE SYSTEM IN GOOD AND ADEQUATE WORKING CONDITIONS AT ALL TIMES.
- C. FURNISH AND INSTALL ALL LAMPS, BREAKERS, AND FUSING, AS IS NECESSARY.
- D. REPLACE BURNED OUT LAMPS, DEFECTIVE BREAKERS OR BLOWN FUSES.
- E. SYSTEM SHALL BE NOMINALLY 120/240 VOLT, 3 PHASE, 4 WIRE ADEQUATE FOR ALL CONSTRUCTION NEEDS.

### 13. SHOP DRAWINGS

- A. SUBMIT TO THE ARCHITECT FIVE (5) SETS OF SHOP DRAWINGS FOR THE FOLLOWING:
- f. OVER CURRENT PROTECTIVE DEVICES, CIRCUIT BREAKERS AND FUSES
- g. PANEL BOARDS
- h. WIRING DEVICES INCLUDING SWITCHES AND RECEPTACLES

### 14. SYSTEM SHUT DOWNS

- A. SHOULD IT BE NECESSARY TO SHUT DOWN ANY EXISTING ELECTRICAL SYSTEM, THE CONTRACTOR SHALL NOTIFY THE PROJECT MANAGER AND BUILDING MANAGEMENT, IN WRITING, AT LEAST 3 DAYS PRIOR TO THE REQUESTED DATE. ALL SHUT DOWN WORK SHALL BE DONE AFTER NORMAL BUILDING OPERATING HOURS, IF SO DIRECTED BY THE FOREMENTIONED PARTIES, AT NO ADDITIONAL COST.

### 15. JOB COMPLETION

- A. AT THE COMPLETION OF THE JOB, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL WORK AREA, RESTORING ANY DAMAGED OR DEFACED SURFACES OF FIXTURES OR EQUIPMENT TO THEIR ORIGINAL CONDITION. THE CONTRACTOR SHALL REMOVE ALL TEMPORARY SYSTEMS UNLESS THE OWNER SPECIFICALLY REQUESTS THAT THEY BE LEFT IN PLACE.
- B. THE ELECTRICAL CONTRACTOR SHALL THOROUGHLY TEST ALL NEW ELECTRICAL SYSTEMS, INCLUDING THOSE INSTALLED BY OTHERS AND WIRED BY ELECTRICAL CONTRACTOR. CORRECT ALL FAULTY CONDITIONS AT NO EXTRA COST. ALL PANELS SHALL BE BALANCED SO THAT THERE IS NO MORE THAN 10% DIFFERENCE IN PHASE CURRENTS UNDER NORMAL OPERATING CONDITIONS.MODIFY PANEL SCHEDULES AS REQUIRED.
- C. THE CONTRACTOR SHALL DEMONSTRATE TO THE OWNER THAT ALL ELECTRICAL DEVICES AND SYSTEMS ARE FULLY FUNCTIONAL, AND SHALL GIVE INSTRUCTIONS IN THEIR OPERATION AS REQUESTED.
- D. THE CONTRACTOR SHALL OBTAIN, AND GIVE TO THE OWNER, AN UNDERWRITER'S CERTIFICATE COVERING ALL NEW ELECTRICAL EQUIPMENT. THE CONTRACTOR SHALL CORRECT ANY DEFICIENCIES NOTED BY THE INSPECTOR, AT NO EXTRA COST, UNTIL SUCH CERTIFICATE IS RECEIVED.
- E. ALL WORK SHALL BE GUARANTEED TO BE FULLY OPERATIONAL AND FREE OF DEFECTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE.
- F. PROVIDE INITIAL START UP AND OWNER TRAINING. PROVIDE A LOAD TEST, START-UP AND OWNER TRAINING BY THE GENERATOR MANUFACTURER'S FACTORY TRAINED REPRESENTATIVE.
- G. ELECTRICAL CONTRACTOR SHALL BE PRESENT FOR SCO FINAL ACCEPTANCE INSPECTION.

### 16. SUBSTITUTIONS

- A. THE CONTRACTOR IS REQUIRED TO BID ON THIS PROJECT WITH THE UNDERSTANDING THAT ALL EQUIPMENT WILL BE PROVIDED AS SPECIFIED.
- B. ANY SUBSTITUTIONS FROM THE SPECIFIED ITEMS MUST BE INCLUDED WITH A NUMBER INDICATING THE SAVINGS OVER THE SPECIFIED ITEMS THAT THE OWNER WILL REALIZE.
- C. PROPOSED SUBSTITUTIONS SHALL BE PRESENTED TO THE ARCHITECT FOR CONSIDERATION PRIOR TO BID DATE PER REQUIREMENTS OF SPECIFICATION SECTION 016000.3.01. NO CONSIDERATION SHALL BE GIVEN TO SUBSTITUTION REQUESTS AFTER RECEIPT OF BIDS.

# GENERAL NOTES

1. WORKING CLEARANCE IN FRONT OF ALL ELECTRICAL EQUIPMENT SHALL BE MAINTAINED DURING AND AFTER CONSTRUCTION; FULL WIDTH OF THE EQUIPMENT.
2. THE PROJECT SHALL USE GROUND-FAULT CIRCUIT INTERRUPTERS.
3. ALL 120 VOLT SINGLE PHASE, 15 AND 20 AMP RECEPTACLE OUTLETS ON CONSTRUCTION SITE, WHICH ARE NOT A PART OF THE PERMANENT WIRING OF THE BUILDING OR STRUCTURE AND WHICH ARE IN USE BY EMPLOYEES, SHALL HAVE APPROVED GROUND-FAULT CIRCUIT INTERRUPTERS FOR PERSONAL PROTECTION.
4. RECEPTACLES ON A TWO-WIRE, SINGLE-PHASE PORTABLE OR VEHICLE-MOUNTED GENERATOR RATED NOT MORE THAN 5KW, WHERE THE CIRCUIT CONDUCTORS OF THE GENERATOR ARE INSULATED FROM THE GENERATOR FRAME AND ALL OTHER GROUNDED SURFACES, NEED NOT BE PROTECTED WITH GROUND-FAULT CIRCUIT.
5. INTERRUPTERS OR AN ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM TO PROTECT EMPLOYEES AND IT SHALL ESTABLISH AND IMPLEMENT AN ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM FOR THE CONSTRUCTION SITES COVERING ALL CORD SETS, RECEPTACLES WHICH ARE NOT A PART OF THE PERMANENT WIRING OF THE BUILDING OR> STRUCTURE, AND EQUIPMENT CONNECTED BY CORD AND PLUG WHICH ARE AVAILABLE FOR USE ALL LABELING SHALL BE PERMANENT, DURABLE AND APPROVED BY THE CODE ENFORCEMENT OFFICIAL
6. ALL CORRIDOR, WALKWAY OR BREEZEWAY LIGHTING SHALL BE LISTED ADA COMPLIANT OR BE MOUNTED 80" AFF TO THE BOTTOM OF THE FIXTURE A NOTE NEEDS TO BE ADDED TO REFLECT THAT APPENDIX 5 FROM THE ENERGY CODE WILL BE REQUIRED AT END OF PROJECT PRIOR TO CERTIFICATE OF OCCUPANCY AND CERTIFIED BY THE ENGINEER
7. HEAT TAPE INSTALLATION SHALL CONFORM TO NEC 427.22 REQUIREMENTS.

# ELECTRICAL SYMBOLS



PANELBOARD, FLUSH MOUNTED



CONCEALED RACEWAY. INDICATES 2#12 AND 1#12 GROUND



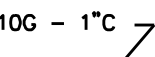
CONCEALED RACEWAY. INDICATES HOMERUN TO PANEL WITH 2#12 AND 1#12 GROUND.



CONCEALED RACEWAY. INDICATES 2#12, 1#12 NEUTRAL AND 1#12 GROUND IN 3/4"CONDUIT.



CONCEALED RACEWAY. INDICATES 2#12, 1#12 NEUTRAL AND 1#12 GROUND. 2#12, 1#12 NEUTRAL AND 1#12 GROUND. WILL CONTINUE UNTIL 3 WIRE BRANCH CIRCUIT CHANGES TO A 2 WIRE BRANCH CIRCUIT.



CONCEALED RACEWAY. ALL RACEWAYS WITH OTHER THAN #12 CONDUCTORS WILL HAVE WIRE AND CONDUIT SIZES DESIGNATED ON PLAN OR RISER DIAGRAMS.

## RACEWAY NOTES:

1. ALL RACEWAYS SHALL CONTAIN A SEPARATE GREEN EQUIPMENT GROUND CONDUCTOR SIZED IN ACCORDANCE WITH NEC 250-122.
2. IF NO HOME RUN OR CIRCUIT SYMBOL IS SHOWN, PROVIDE 2#12, 1#12G TO THE CIRCUIT NUMBER INDICATED ADJACENT TO FIXTURE OR OUTLET.



LIGHT FIXTURE



LIGHT FIXTURE TO ALWAYS BE ON



SINGLE POLE SWITCH ON NORMAL CIRCUIT; WALL-MOUNTED AT 48" AFF UNO; WHERE SHOWN, "Q" INDICATES LAMPS CONTROLLED BY SWITCH; WHERE SHOWN, "XX" INDICATES MODIFIER AS LISTED BELOW; SEE WIRING DEVICE SCHEDULE

## MODIFIERS:

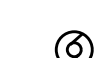
- 3 = 3-WAY SWITCH  
4 = 4-WAY SWITCH  
D = DIMMER SWITCH  
WP = WEATHERPROOF COVER  
T = TIMER SWITCH  
O = OCCUPANCY SENSING  
DO = DIMMER OCCUPANCY SENSOR  
M = FLUSH MTD MANUAL MOTOR STARTER SWITCH WITHOUT OVERLOAD HEATERS



WALL MOUNTED OCCUPANCY SENSOR LIGHT SWITCH



CEILING MOUNTED OCCUPANCY SENSOR LIGHT SWITCH



MOTOR



MOTOR STARTER SEE FLOOR PLANS FOR SIZE



SIMPLEX RECEPTACLE AND OUTLET, 20A, 125V, 3W



SPECIAL PURPOSE RECEPTACLE AND OUTLET. REFER TO DRAWINGS FOR NEMA CONFIGURATION



30 AMP NON-FUSED DISCONNECT SWITCH. NUMBER OF POLES AND VOLTAGE PER CIRCUIT FED. REFER TO SCHEDULE.



30 AMP NON-FUSED, WEATHERPROOF DISCONNECT SWITCH. NUMBER OF POLES AND VOLTAGE PER CIRCUIT FED. REFER TO SCHEDULE.



FURNISHED DISCONNECT WITH EQUIPMENT



CEILING MTD OR ABOVE CEILING OUTLET BOX WITH BLANK COVER



FLUSH MTD DUPLEX RECEPTACLE AND OUTLET, 20A, 125V, 3W



FLUSH MTD ABOVE COUNTER DUPLEX RECEPTACLE AND OUTLET, 20A, 125V, 3W



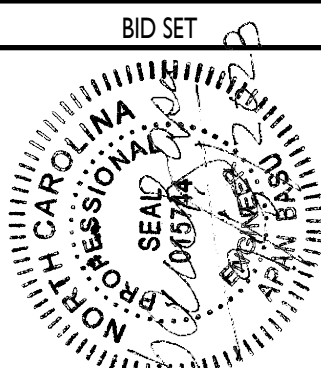
FLUSH MTD MANUAL MOTOR STARTER SWITCH WITH OVERLOAD HEATERS



COMBINATION TELE/DATA OUTLET



TV OUTLET



NCDOT FACILITIES DESIGN UNIT  
ARCHITECT & ENGINEERS



ELECTRICAL SPECIFICATIONS AND  
ABBREVIATIONS

Modular Office Relocation for  
NCDOT Highway Division 5  
Bridge Maintenance Office  
5650 CORNWALL ROAD  
OXFORD, NORTH CAROLINA 27565

STATE CONSTRUCTION  
ID.# 22-24690-01A

EQUIPMENT NUMBER:  
1320-0008-3222

## REVISIONS

NO. DATE

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DRAWN BY: CCM

CHECKED BY: AB

SHEET NO.

E-001



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