CSC.2024.01.007

# ELECTRICAL SPECIFICATIONS

DIVISION 26

ELECTRICAL

SECTION A: GENERAL ELECTRICAL REQUIREMENTS

1. THESE PLANS AND SPECIFICATIONS APPLY TO DRYWALL WAREHOUSE HWY 81, OXFORD, GEORGIA. THE WORK DESCRIBED BY THESE PLANS AND SPECIFICATIONS APPLY TO THE INDICATED PROJECT AND MAY NOT BE MODIFIED OR REUSED WITHOUT WRITTEN APPROVAL OF THE ENGINEER.

2. ALL WORK SHALL BE PERFORMED BY LICENSED ELECTRICAL CONTRACTOR WITH MINIMUM OF TWO YEARS OF EXPERIENCE. LIST OF PREVIOUS JOBS AND REFERENCES SHALL BE MADE AVAILABLE UPON REQUEST. CONTRACTOR SHALL PROVIDE ADEQUATE INSURANCE FOR PERSONNEL AND SHALL REPAIR ANY DAMAGE OCCURRING AS THE RESULT OF THIS PROJECT SITE AND RELATED PROPERTY.

3. ALL WORK SHALL BE PERFORMED IN A PROFESSIONAL MANNER IN ACCORDANCE WITH THE 2023 NATIONAL ELECTRICAL CODE, LIFE SAFETY CODE NFPA 101, ADA CODE, GA ACCESSIBILITY CODE, STATE OF GEORGIA ENERGY CODE AND ALL OTHER APPLICABLE CODES AND ORDINANCES.

4. ALL PERMITS AND FEES SHALL BE OBATINED AND PAID FOR BY THE CONTRACTOR.

5. ALL EQUIPMENT, MATERIAL, AND DEVICES SHALL BE LISTED OR RECOGNIZED BY UNDERWRITER'S LABORATORY OR ELECTRICAL TESTING LABORATORY AND USED AND INSTALLED IN ACCORDANCE WITH IT'S LISTING.

6. ALL WORK PERFORMED SHALL BE WARRANTED FOR A PERIOD OF ONE YEAR FROM THE THE FINAL COMPLETION DATE EXCEPT FOR FUSES AND LAMPS IN LIGHT FIXTURES. UPON NOTIFICATION OF A PROBLEM, THE CONTRACTOR SHALL INVESTIGATE THE PROBLEM WITHIN 48 HOURS UNLESS A DIFFERENT TIME PERIOD IS AGREED TO. THE CONTRACTOR SHALL INVESTIGATE, REPAIR OR REPLACE ALL FAULTY EQUIPMENT WITHIN A REASONABLE TIME PERIOD WITHOUT CHARGE TO THE OWNER.

7. THE TERM "PROVIDE" SHALL BE UNDERSTOOD TO MEAN, OBTAIN THE ITEM DESCRIBED, INSTALL ITEM IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS, AND MANUFACTURER'S RECOMMENDATIONS.

8. ALL PENETRATIONS MADE IN FIRE RATED BUILDING PORTIONS SHALL BE SEALED WITH A LISTED RESISTANT MATERIAL SUITABLE FOR THE APPLICATION.

9. ALL INSTALLATIONS OF ELECTRICAL EQUIPMENT AND MATERIALS SHALL BE COORDINATED WITH OTHER TRADES PRIOR TO INSTALLATION.

10. PLANS ARE DIAGRAMMATIC AND SHOW THE LOCATION OF THE EQUIPMENT, RACEWAY AND FIXTURES, AND ARE NOT TO BE SCALED. ALL DIMENSIONS SHALL BE VERIFIED AT THE BUILDING SITE.

11. CONTRACTOR SHALL VERIFY AND COORDINATE ALL EQUIPMENT AND DEVICE LOCATIONS WITH OWNER'S PROJECT MANAGER PRIOR TO INSTALLATION.

12. EQUIPMENT BREAKER AND WIRING REQUIREMENTS; THE CONTRACTOR SHALL SUBMIT FOR REVIEW A TABULATED SHEET OF BREAKER AND WIRING REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT REQUIRING POWER AS SPECIFIED IN DIVISION 23. REQUIREMENTS SHALL BE IDENTIFIED BY HORSEPOWER OR KW, OPERATING AMPERAGE, REQUIRED VOLTAGE AND PHASE REQUIREMENTS, AND MANUFACTURERS SUGGESTED OVERCURRENT CIRCUIT PROTECTION DEVICE SIZE AND MINIMUM CIRCUIT AMPACITY SIZE. WHERE THE ELECTRICAL REQUIREMENTS SUBMITTED FOR MECHANICAL EQUIPMENT DIFFERS FROM THE BRANCH CIRCUITRY SHOWN ON THE ELECTRICAL DRAWINGS (WHEN USING THE BASIS OF DESIGN UNIT LISTED IN THE MECHANICAL SCHEDULES/SPECIFICATIONS OR A SIMILAR UNIT OF THE SAME SIZE FROM LISTED ALTERNATE MANUFACTURERS), THE CONTRACTOR SHALL MAKE THE NECESSARY ADJUSTMENTS TO THE BRANCH CIRCUITRY PER THE CURRENT NEC AT NO ADDITIONAL COST TO THE OWNER. WHEN CHANGES ARE MADE TO POWER REQUIREMENTS FOR EQUIPMENT DUE TO OWNER. ARCHITECT/ENGINEER APPROVED VALUE ENGINEERING CHANGES TO EQUIPMENT, THE COST MUST NE INCLUDED IN THE VALUE ENGINEERING OVERALL CHANGE ORDER COST. COSTS DUE TO ADJUSTMENTS IN BRANCH CIRCUITRY TO EQUIPMENT DUE TO VALUE ENGINEERING CHANGES WILL NOT BE ALLOWED AFTER THE OVERALL VALUE ENGINEERING CHANGE ORDER HAS BEEN APPROVED. IN ALL CASES, BREAKER AND WIRING REQUIREMENTS FOR MECHANICAL EQUIPMENT MUST BE PROVIDED TO THE ENGINEER BEFORE OR AT THE SAME TIME AS THE SHOP DRAWINGS FOR THE ELECTRICAL DISTRIBUTION GEAR OR EQUIPMENT. IN NO CASE SHALL THE ELECTRICAL DISTRIBUTION GEAR OR EQUIPMENT BE ORDERED OR BRANCH CIRCUITRY ROUGHED IN PRIOR TO ENGINEER REVIEW AND COMMENT ON THIS DOCUMENT. ANY EQUIPMENT ORDERED OR BRANCH CIRCUITRY ROUGHED IN ON THE JOBSITE WITHOUT THIS REVIEW AND COMMENT WILL BE TOTALLY AT THE CONTRACTORS RISK.

SECTION B: BASIC MATERIALS

1. ALL CONDUCTORS USED FOR 600 VOLTS OR LESS SHALL BE HIGH GRADE COPPER CONDUCTORS WITH 75 DEGREE C, THHN OR THWN THERMOPLASTIC INSULATION. ALL CONDUCTORS SHALL BE MADE IN THE USA. ALL CONDUCTORS ROUTED IN UNDERGROUND CONDUIT SHALL BE RATED FOR WET LOCATIONS.

2. ALL INTERIOR 120/208 VOLT, 20 AMP POWER AND LIGHTING WIRING SHALL BE INSTALLED IN ELECTRICAL METALLIC TUBING OR "MC" CABLE (IF NOT EXPOSED) FOR ALL INTERIOR CIRCUITS UNLESS OTHERWISE NOTED. IF "MC" CABLE IS USED, HOMERUNS SHALL BE IN 3/4 IN. EMT. POWER CIRCUITS FOR HVAC EQUIPMENT SHALL BE IN 3/4" ELECTRICAL METALIC CONDUIT MINIMUM. ALL CONDUIT SHALL BE SUPPORTED FROM BUILDING STRUCTURE. IT SHALL NOT BE SUPPORTED FROM DUCTWORK, PIPING, CEILING GRID OR CEILING GRID SUPPORTS, OR ANY OTHER NON-STRUCTURAL ITEM. CONDUIT SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC. CONDUIT IN EXPOSED STRUCTURE AREAS SHALL BE EMT. GALVANIZED RIGID STEEL CONDUIT SHALL BE USED IN AREAS WHERE IT WILL BE EXPOSED TO PHYSICAL DAMAGE.

3. CONDUIT UNDERGROUND SHALL BE SCHEDULE 40 PVC. IF MORE THAN ONE CONDUIT IS PROVIDED IN A SINGLE TRENCH, THE CONDUIT SHALL BE RACKED WITH SPACERS EVERY FOUR FEET TO MAINTAIN A MINIMUM SPACING BETWEEN CONDUIT OF TWO INCHES. BACKFILL USED FOR UNDERGROUND INSTALLATIONS SHALL BE FREE OF FOREIGN MATTER. WHERE EXPOSED TO WEATHER, CONDUIT SHALL BE GALVANIZED RIGID STEEL OR INTERMEDIATE METALLIC CONDUIT. THE CONDUIT SHALL BE TERMINATED WITH LISTED FITTINGS AND ALL CONDUIT ENDS SHALL BE REAMED AND SMOOTH. ALL CONDUIT ENDS IN BOXES SHALL BE PROVIDED WITH INSULATED BUSHINGS.

4. A #12 INSULATED COPPER GROUND CONDUCTOR SHALL BE INCLUDED IN ALL BRANCH CIRCUITS RATED 20 AMPERES. ALL OTHER CIRCUITS AND FEEDERS WILL BE PROVIDED WITH AN INSULATED COPPER CONDUCTOR SIZED AS NOTED OR IN ACCORDANCE WITH THE NEC, WHICHEVER IS GREATER.

5. THE MINIMUM SIZE OF ALL CONDUCTORS NOT OTHERWISE INDICATED IS #12 AND THE MINIMUM SIZE OF ALL CONDUIT UNLESS OTHERWISE INDICATED IS 1/2 IN.

6. ALL JUNCTION BOXES SHALL BE PROVIDED WITH COVERS AND ALL UNUSED OPENINGS SHALL BE PLUGGED. ALL JUNCTION BOXES SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURE. COVERS OF BOXES SHALL BE LABELED WITH THE CIRCUIT NUMBER WITH A BLACK PERMANENT MARKER IN 3/4 IN. HIGH LETTERS (LEGIBLE HANDWRITTEN LETTERING IS ACCEPTABLE).

7. ALL OUTLET BOXES SHALL BE SQUARE METAL BOXES. PROVIDE PLASTER RINGS FOR ALL OUTLET BOXES CONTAINING DEVICES TO PROVIDE A FIRM MOUNTING SUPPORT FOR THE DEVICE.

8. ALL CONVENIENCE RECEPTACLES SHALL BE SPECIFICATION GRADE 20 AMP RECEPTACLES, OWNER TO SELECT COLOR. TAMPER RESISTANT (TR) TYPE.

9. ALL LIGHT SWITCHES SHALL BE SPECIFICATION GRADE 20 AMP TOGGLE SWITCHES FULL LOAD RATED FOR TUNGSTEN-HALOGEN LAMPS, OWNER TO SELECT COLOR.
10. PROVIDE FACEPLATES FOR ALL RECEPTACLES AND SWITCHES. COORDINATE STYLE AND COLOR WITH OWNER'S PROJECT MANAGER.

11. PROVIDE BETWEEN 12 AND 24 INCHES OF LIQUID TIGHT FLEXIBLE CONDUIT BETWEEN RIGID CONDUIT AND ANY EQUIPMENT CONTAINING MOTORS. THE FLEXIBLE CONDUIT SHALL BE SUPPORTED TO PREVENT THE CONDUIT FROM RESTING ON THE GROUND OR CONCRETE PAD.

12. PROVIDE WEATHERPROOF RECEPTACLE WITHIN 25 FEET OF EACH PIECE OF EXTERIOR EQUIPMENT. THIS RECEPTACLE SHALL BE MOUNTED HORIZONTALLY WITH METAL HINGED "IN USE" COVER MOUNTED TO OPEN UP. THIS OUTLET SHALL BE A GFCI RECEPTACLE. THIS RECEPTACLE SHALL BE BE MOUNTED IN DIE CAST NON CORRODING METAL BOX.

13. WHEN OUTLETS OR BOXES ARE INDICATED INSTALLED ON OPPOSITE SIDES OF THE SAME WALL. THE CONTRACTOR SHALL ADJUST THE LOCATION TO OFFSET THE OUTLETS WITH A WALL STUD PROVIDING SEPERATION.

SECTION C: DISTRIBUTION EQUIPMENT

1. CONTRACTOR SHALL PROVIDE CONDUCTORS AND CONDUIT FOR ALL FEEDERS IN ACCORDANCE WITH THE PLANS.

2. SEPERATELY MOUNTED CIRCUIT BREAKERS SHALL BE MOUNTED IN NEMA TYPE I ENCLOSURES IN INDOOR APPLICATIONS AND IN NEMA 3R ENCLOSURES IN EXTERIOR OR WET LOCATIONS. ALL CIRCUIT BREAKER ENCLOSURES SHALL BE PROVIDED WITH HINGED COVERS AND PROVISIONS FOR PADLOCKING THE COVERS.

3. ALL EQUIPMENT CONTAINING MOTORS SHALL BE PROVIDED WITH A DISCONNECTING MEANS WITHIN TEN FEET OF THE UNIT UNLESS OTHERWISE NOTED. THIS DISCONNECTING MEANS SHALL AS A MINIMUM BE A NON-FUSED SWITCH OR TOGGLE STARTER SIZED TO MATCH THE EQUIPMENT. PROVIDE OTHER DEVICES AS NOTED ON THE PLANS. PROVIDE NEMA TYPE I ENCLOSURES INDOORS AND NEMA 3R OUTDOORS.

4. PROVIDE GFCI CIRCUIT BREAKERS AND RECEPTACLES AS INDICATED ON THE PLANS AND IN THESE SPECIFICATIONS. THESE DEVICES SHALL BE CLASS A GFCI DEVICES.

5. PROVIDE PANELS AS SCHEDULED ON PLANS. CIRCUIT BREAKERS SHALL BE THERMAL-MAGNETIC BREAKERS WITH A MINIMUM INTERRUPTING RATING OF 10,000 AIC FOR 120/208V AND 14,000 AIC FOR 277/480V OR AS INDICATED ON THE PLANS. BREAKERS SHALL HAVE 65/75 DEGREE C RATED TERMINATIONS. PANEL NOTED SHALL BE SERVICE ENTRANCE RATED. MOUNT PANELS WITH TOP OF PANEL 6 FT. ABOVE FLOOR, PROVIDE 3/4 IN., GREY PAINTED PLYWOOD BACKBOARD FOR ALL PANELS SECURED TO WALL WITH 1/4 IN. TOGGLE BOLTS. PANEL MANUFACTURERS: SQUARE D, GE, SEIMENS, AND CULTER HAMMER. ALL CURRENT CARRYING PARTS SHALL BE COPPER.

6. SYSTEM COORDINATION: THE MANUFACTURER OF THE PANELBOARDS SHALL PROVIDE SERIES RATED EQUIPMENT BASED ON U.L. LISTED TEST RESULTS. THE CONTRACTOR SHALL VERIFY THE AVAILABLE SHORT CIRCUIT CURRENT AT THE SERVING TRANSFORMER.

7. PROVIDE EACH PANELBOARD WITH A TYPEWRITTEN CIRCUIT BREAKER DIRECTORY CARD INSIDE A PLASTIC COVERING (EVERY CIRCUIT AND CIRCUIT MODIFICATION SHALL BE LEGIBLY IDENTIFIED AS TO ITS CLEAR, EVIDENT, AND SPECIFIC PURPOSE OR USE. THE INDETIFICATION SHALL INCLUDE SUFFICIENT DETAIL TO ALLOW EACH CIRCUIT TO BE DISTINGUISHED FROM ALL OTHERS). THE DIRECTORY AND COVERING SHALL BE LOCATED INSIDE A STEEL FRAME PROVIDED INSIDE THE DOOR OF EACH PANELBOARD. THE DIRECTORY SHALL BE TYPED TO IDENTIFY THE LOAD FED BY EACH CIRCUIT BREAKER AND THE AREAS SERVED.

8. PROVIDE NAMEPLATES FOR ALL PANELBOARDS, DISCONNECT SWITCHES, ENCLOSED CIRCUIT BRAKERS, COMBINATION STARTERS, CONTACTORS, AND ALL OTHER ELECTRICAL DISTRIBUTION EQUIPMENT PANELS. MOUNT NAMEPLATES ON EXTERIOR OF THE DOOR OF ALL SURFACE MOUNTED PANELS AND EQUIPMENT. NAME PLATES SHALL BE LAMINATED PLASTIC PLATES WITH 3/16 IN. HIGH WHITE LETTERS ETCHED ON BLACK BACKGROUND. NAME PLATES SHALL BE INSTALLED PARALLEL TO EQUIPMENT LINES. THE NAME OR USEAGE OF EACH DEVICE OR BRANCH CIRCUIT SHALL BE ETCHED IN THE NAMEPLATE. CONTRACTOR TO COORDINATE EXACT EQUIPMENT IDENTIFICATION WITH THE OWNER. SECURE NAMEPLATES VIA EPOXY GLUE.

SECTION D: LIGHTING

1. TYPES AND SPECIFIC REQUIREMENTS ARE PROVIDED ON THE LIGHTING FIXTURE SCHEDULE ON THE PLANS. ALL LIGHT FIXTURES SHALL BE PROVIDED WITH LAMPS, DRIVERS, BALLASTS, AND FULLY FUNCTIONING AT COMPLETION OF PROJECT.

2. ALL LIGHTINGFIXTURES SHALL BE U.L. LISTED AND HAVE A MINIMUM OF 5 YEAR ON-SITE REPLACEMENT WARRANTY FOR DEFECTIVE OR NON-STARTING SOURCE ASSEMBLIES, DRIVERS, AND FOR LUMINAIRES EXHIBITING INADEQUATE LUMEN OUTPUT. IT SHALL COVER MATERIAL, FIXTURE FINISH, WORKMANSHIP, AND SHIPPING. ON-SITE REPLACEMENT SHALL INCLUDE TRANSPORTATION, REMOVAL, AND INSTALLATION OF NEW FIXTURE.

3. RATED LUMINAIRE WATTAGE SHALL BE ACTUAL, ACCOUNTING FOR ANY REDUCTION IN EFFICIENCY DUE TO SUB-OPTIMAL LOADING OF DRIVERS.

4. BALLAST SHALL BE CAPABLE OF ACCEPTING THE VOLTAGE INDICATED ON THE LIGHTING FIXTURE SCHEDULE AND CAPABLE OF DIMMING IF REQUIRED. DRIVERS SHALL HAVE A CLASS A RATING, TOTAL HARMONIC DISTORTION OF LESS THAN 20%, AND SHALL NOT CONTAIN ANY POLYCHLORINATED BIPHENYL (PCB).

5. ALL LIGHTING FIXTURES SHALL BE TESTED TO IES LM-79 AND IES LM-80 STANDARDS. OUTDOOR FIXTURES SHALL BE IP65 RATED. FIXTURS, BALLAST AND ALL COMPONENTS SHALL HAVE A SYSTEM LIFETIME OF 50,000 HOURS OR MORE AT 25 DEGREES CELSIUS AND SHALL MAINTAIN A MINIMUM OF 85% OF INITIAL LUMEN OUTPUT AFTER 55,000 HOURS OF OPERATION. LED'S SHALL HAVE COLOR RENDERING INDEX (CRI) OF 80 OR GREATER.

6. ALL SURFACE MOUNTED FIXTURES SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURE. ALL CEILING MOUNTED FIXTURES SHALL BE SUPPORTED FROM STRUCTURE AND BRACED TO PREVENT MOVEMENT IF IMPACTED.

7. ALL RECESSED FIXTURES IN LAY IN TYPE CEILINGS SHALL BE PROVIDED WITH GRID CLIPS TO FASTEN FIRMLY TO CEILING SUPPORT GRID. THE CEILING GRID SHALL BE SUPPORTED AT EACH CORNER OF A FIXTURE.

8. CONNECTION TO ALL FIXTURES IN LAYIN CEILING SHALL BE BY FLEXIBLE CONDUIT OF FOUR TO SIX FEET IN LENGTH. A GROUND CONDUCTOR WILL BE INCLUDED WITH THIS CONNECTION.

9. ALL LENSES ON FIXTURES SHALL BE 0.125 INCH THICK MINIMUM. ALL HOUSINGS SHALL BE 22 GAUGE STEEL MIN. AND HAVE A POST FABRICATION HIGH REFLECTIVE WHITE FINISH.

DIVISION 27

TELE / DATA NETWORK

SECTION E: CONDUIT AND OUTLET SYSTEM FOR TELE / DATA NETWORK

1. PROVIDE A COMPLETE SYSTEM OF CONDUITS AND OUTLET BOXES FOR SYSTEMS AS REQUIRED. EACH OUTLET SHALL HAVE A CONDUIT ROUTED FROM THE FLUSHED RECESSED OUTLET BOX UP TO THE ACCESSIBLE CEILING SPACE ABOVE, TURN CONDUIT OUT ABOVE CEILING WITH A 90° HORIZONTAL ELBOW AND TERMINATE WITH AN INSULATED BUSHING. WHERE CEILING FINISH IS EXPOSED STRUCTURE (I.E. NO ACOUSTICAL TILE CEILING), EXTEND CONDUIT TO AN AREA WITH AN ACCESSIBLE CEILING. WHERE THERE ARE NO ACCESSIBLE CEILINGS, EXTEND CONDUIT TO BACKBOARD OR DATA RACK/CABINET AND TERMINATE WITH AN INSULATED BUSHING.
2. ALL CONDUIT SHALL BE CONCEALED UNLESS OTHERWISE NOTED. CONDUIT SHALL BE MINIMUM 1", WITH EXPOSED CONDUIT MINIMUM 3/4" TRADE SIZE. PROVIDE NYLON PULL STRING IN ALL CONDUIT. ALL CONDUIT FOR HORIZONTAL TELE / DATA CABLES AND FOR INTERIOR BACKBONE CABLING BETWEEN MDF AND IDF, SHALL BE ROUTED ABOVE GROUND AND SHALL BE EMT WITH COMPRESSION FITTINGS WHERE CONCEALED OR NOT SUBJECT TO DAMAGE, WHERE EXPOSED AND SUBJECT TO DAMAGE CONDUIT IS TO BE RIGID STEEL WITH THREADED FITTINGS.
3. PROVIDE SERVICE ENTRANCE CONDUIT BELOW GRADE AT LOCATION AND ROUTING SHOWN OR NOTED. CONDUIT IS TO BE A MINIMUM OF TWO CONDUITS, EACH (3", ONE WITH THREE 1" INNERDUCTS) (4", ONE WITH THREE 1-1/4" INNERDUCTS) PROVIDE PULL STRING IN EACH DUCT / INNERDUCT AND PROVIDE TRACER WIRE IN EACH CONDUIT.
4. ALL CONDUIT FOR FIBER OPTIC CABLE SHALL UTILIZE LONG RADIUS ELBOWS, INSIDE RADIUS OF BEND OF NOT LESS THAN 18" FROM CENTER OF CURVATURE.
5. LOCATION OF OUTLETS SHALL BE AS SHOWN ON THE DRAWINGS AND HEIGHTS AS DEFINED ON LEGEND OR ELSEWHERE IN SPECIFICATIONS OR ON DRAWINGS.
6. ALL RECESSED WALL OUTLETS AND BOXES IN NEW CONSTRUCTION SHALL BE TWO GANG TYPE, 4" X 4" X 2 1/8" DEEP, WITH SINGLE GANG PLASTER RINGS. PLASTER RINGS SHALL BE FLUSH WITH FINISH OF WALL. COORDINATE DEPTH OF PLASTER RING REQUIRED WITH TYPE OF WALL CONSTRUCTION. FOR SURFACE MOUNT BOXES PROVIDE 4" X 4" X 2 1/8" BOX WITH 2 GANG FACEPLATE WITH CENTERED SINGLE GANG KNOCKOUTS / PORT CUTOUTS. SEE SPECIFICATION F TELE / DATA NETWORK FOR FACEPLATE INFORMATION.
7. COLOR AND MATERIAL OF FACEPLATES IS TO MATCH CONVENIENCE OUTLETS AND LIGHT SWITCHES, COORDINATE COLOR WITH ARCHITECT.
8. BOXES FOR RECESSED INSTALLATION SHALL BE STANDARD SHEET METAL TYPE, FOR EXPOSED BOX LOCATIONS PROVIDE CAST TYPE BOX WITH THREADED HUBS.
9. PROVIDE JUMBO BLANK WALL PLATES FOR ALL OUTLETS NOT CABLED, FINISH TO MATCH ALL OTHER OUTLETS.

SECTION F: TELE / DATA NETWORK

1. GENERAL: THE CONTRACTOR SHALL FURNISH AND INSTALL A COMPLETE TELE / DATA NETWORK AS FOLLOWS AND AS SHOWN ON PLANS. TELE / DATA NETWORK IS TO INCLUDE BUT NOT BE LIMITED TO THE INSTALLATION OF A PLYWOOD BACKBOARD, WITH (WALL / FLOOR) MOUNT CABINET/RACK(S), BACKBONE AND OR HORIZONTAL CABLING AND CABLE PATHWAY SYSTEM, CABLE TERMINATIONS, WORKSTATION AND PATCHING CABLES, OUTLETS/CONNECTORS, BOXES, AND FACEPLATES. BOXES ARE TO BE FLUSH / RECESSED IN WALL AND CONDUIT CONCEALED IN WALL OR ABOVE CEILING, UNLESS NOTED OTHERWISE.
2. ALL PRODUCTS ARE TO BE INSTALLED PER THE INSTALLATION DETAILS AND REQUIREMENTS OF THE RESPECTIVE MANUFACTURER NECESSARY TO MAINTAIN PERFORMANCE STANDARDS AND WARRANTY REQUIREMENTS. OBTAIN AND COORDINATE ALL INSTALLATION INSTRUCTIONS PRIOR TO ROUGH IN OF ANY CABLE PATHWAY.
3. CODES AND STANDARDS: CONTRACTOR IS TO COMPLY WITH THE LATEST VERSION, INCLUDING SUPPLEMENTS, OF THE FOLLOWING STANDARDS OR CODES:
   a. EIA / TIA - 568 COMMERCIAL BUILDING TELECOMMUNICATIONS WIRING.
   b. EIA / TIA - 569 COMMERCIAL BUILDING STANDARD FOR TELECOMMUNICATIONS PATHWAYS AND SPACES.
   c. EIA / TIA - 606 ADMINISTRATION STANDARD FOR THE TELECOMMUNICATIONS INFRASTRUCTURE OF COMMERCIAL BUILDINGS.
   d. EIA / TIA - 607 COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS.
4. QUALIFICATIONS: DATA / VOICE CONTRACTOR SHALL SUBMIT CERTIFICATION STATING THAT HE IS AN AUTHORIZED REPRESENTATIVE AND CERTIFIED INSTALLER FOR THE MANUFACTURER OF THE EQUIPMENT HE IS SUBMITTING FOR APPROVAL. INSTALLATION SHALL BE COMPLETED BY TECHNICIANS THAT ARE FACTORY CERTIFIED FOR THE MANUFACTURER WHO'S PRODUCTS ARE BEING INSTALLED. SUBMIT VALID LOW VOLTAGE LICENSE OR CERTIFICATION OF AGENCY, VALID BICSI RCDD CERTIFICATE FOR CONTRACTOR, AND FACTORY CERTIFICATIONS FOR INSTALLATION TECHNICIANS, FOR REVIEW PRIOR TO ROUGH IN.
5. WARRANTY: CABLING AND CONNECTORS FOR HORIZONTAL STATION OUTLET SERVICE ARE TO BE PROVIDED, TESTED AND WARRANTED AS A COMBINED END TO END SYSTEM. THE CONTRACTOR SHALL FURNISH WRITTEN LIMITED WARRANTY THAT DESCRIBES THE EQUIPMENT SUPPLIED UNDER THIS SPECIFICATION WILL BE FREE FROM DEFECTS OF MANUFACTURER MATERIAL OR WORKMANSHIP FOR A PERIOD OF FIFTEEN (15) YEARS FROM THE DATE OF FINAL ACCEPTANCE, AND FOR INSTALLATION MATERIAL AND TESTING OF HORIZONTAL CHANNEL SHALL BE FREE OF DEFECT FOR A PERIOD OF TWO (2) YEARS. ALL DEFECTS OCCURRING WITHIN THOSE PERIODS SHALL BE CORRECTED IN A TIMELY MANNER AT NO COST TO OWNER.
6. SUBMITTALS: CONTRACTOR IS SUBMIT THE FOLLOWING INFORMATION FOR REVIEW PRIOR TO PROCUREMENT OF ANY PRODUCT SPECIFIED:
   a. CONTRACTOR AND INSTALLER CERTIFICATIONS.
   b. SUBMIT A ONE-LINE SCHEMATIC OF THE COMPLETE SYSTEM SHOWING FLOOR PLAN TO SCALE, SHOWING LOCATIONS AND TYPES OF EQUIPMENT AND CABLES.
   c. MANUFACTURERS STANDARD PRODUCT DATA FOR ALL ITEMS PROVIDED, ALL CUT SHEETS SHALL BE FULLY ANNOTATED TO INDICATE PRODUCTS PROPOSED.
   d. MANUFACTURERS PUBLISHED WARRANTY INFORMATION.
   e. SUBMIT SAMPLE TEST REPORT, AND TESTING EQUIPMENT TO BE USED.
   f. DOCUMENTATION OF TESTING / TEST DATA RESULTS OF ALL WIRING AND TERMINATIONS AND CONFORMANCE TO WARRANTY REQUIREMENTS (SUBMITTED AFTER INSTALLATION).
7. TESTING AND CERTIFICATIONS:
   a. COPPER CABLE SYSTEMS: ALL DATA AND VOICE TERMINATIONS SHALL BE TESTED AND CONFORM TO TIA/EIA-569.C.2 FOR STANDARD. TESTING SHALL BE ACCOMPLISHED USING A POE (CLASS 1-8) CABLE + NETWORK SCANNER, FLUKE LIQ-100 OR FLUKE MS-POE-IE, (OR PRIOR APPROVED EQUAL). TEST EACH PAIR AND SHIELD OF CABLE FOR OPENS, SHORTS, GROUNDS AND PAIR REVERSALS, CORRECT ALL GROUNDS OR PAIR REVERSALS, WHERE A REPAIR IS NOT POSSIBLE REPLACE ENTIRE CABLE AND RETEST TO ENSURE COMPLIANCE WITH STANDARDS.
   b. TEST RESULTS: ALL COMMUNICATIONS OUTLETS WIRED AND SERVICEABLE AND SUPPORTING HORIZONTAL OR BACKBONE CABLING SHALL BE FULLY TESTED PER THE APPROPRIATE STANDARD NOTED ABOVE AND TEST RESULTS SUBMITTED TO SHOW COMPLIANCE WITH STANDARDS, INCLUDING AT LEAST THE FOLLOWING INFORMATION OR ITEMS CLEARLY DETAILED, NOT LESS THAN 7 DAYS PRIOR TO FINAL INSPECTION:
      1. WIRE MAP
      2. LENGTH
      3. INSERTION LOSS
      4. NEAR-END CROSSTALK (NEXT)
      5. POWER SUM NEAR END CROSSTALK (PSNEXT)
      6. EQUAL-LEVEL FAR END CROSSTALK (ELFEXT)
      7. POWER SUM EQUAL-LEVEL FAR END CROSSTALK (PSELFEXT)
      8. RETURN LOSS
      9. PROPAGATION DELAY
8. RACK AND CABINET:
   a. WALL MOUNT DATA CABINET: PROVIDE AND INSTALL A WALL MOUNT SWING GATE TYPE ENCLOSED LOCKABLE CABINET WITH CLEAR PLEXI FRONT DOOR INSERT, HAVING FRONT AND REAR HINGES TO ALLOW FRONT OR REAR ACCESS TO CONNECTIONS. THE CABINET IS TO BE SIZED FOR INSTALLATION OF STANDARD 19" PANELS AND CABLE MANAGEMENT AND HAVE FULLY ADJUSTABLE EIA COMPLIANT MOUNTING RAILS. ENCLOSURE IS TO BE PROVIDE WITH FRONT AND REAR WIRE MANAGEMENT FOR EACH PATCH PANEL OR PLATE, A GROUND BAR, AND VENTS ON TOP, BOTTOM AND BOTH SIDES. PROVIDE CABINET WITH 24U VERTICAL MOUNTING SPACE AND MIN. 24" DEPTH. SECURE THE CABINET TO WALL BY MINIMUM 300 POUND ANCHORS. WHERE ON DRYWALL ENSURE THE ANCHORS ARE SUPPORTED FROM STUD IN WALL. CABINET TO BE CHATSWORTH "CUBE-iT" SERIES, SIEMON "WC2P" SERIES, OR APPROVED EQUAL.
9. ENHANCED CATEGORY 6 (6E) CABLE AND CONNECTORS:
   a. CAT 6E CABLE: PROVIDE AND INSTALL PREMIUM / ENHANCED CATEGORY 6 (6E) DATA CABLE AND CONNECTORS AT LOCATIONS AND QUANTITIES SHOWN OR NOTED ON THE PLANS FOR VOICE AND DATA COMMUNICATIONS SYSTEM. CABLE IS TO HAVE FOUR (4) UNSHIELDED TWISTED PAIRS (UTP) OF CONDUCTORS THAT ARE MINIMUM 23 AWG INDIVIDUALLY INSULATED, WITH A CENTER ISOLATION MEMBER SEPARATING EACH OF THE 4 INDIVIDUALLY TWISTED PAIRS. PROVIDE CABLES THAT MEET OR EXCEED THE PERFORMANCE STANDARDS OF ANSI / TIA-568.2-D AND ISO / IEC 11801-1, AND ARE MANUFACTURER TESTED TO 550 MHz FREQUENCY, MINIMUM. THE JACKET IS TO BE PLENUM RATED (CMP) WITH FEP INSULATION, BLUE COLOR, OR AS SHOWN AND NOTED ON DRAWINGS, OR AS DIRECTED BY OWNER. CABLE IS TO BE SIEMON "PREMIUM 6 UTP (9C6PR-E4-XX)" SERIES OR APPROVED EQUAL.
   b. WORST CASE TRANSMISSION PERFORMANCE ACCEPTABLE FOR CAT 6E CABLE AT 550 MHz, BASED ON 100 METER CHANNEL LENGTH:
      1. INSERTION LOSS - 50.2dB
      2. NEXT - 40.2dB
      3. PSNEXT - 38.2dB
      4. ACR - -10.0dB
      5. PSACR - -12.0dB
      6. ACR-F - 19.9dB
      7. PSACR-F - 16.9dB
      8. RETURN LOSS - 14.9dB
      9. PROPOGATION DELAY - 536ns
   c. CAT 6 CONNECTORS: PROVIDE AN INSTALL CATEGORY 6 MODULAR CONNECTORS THAT ARE DUAL LABELED FOR 568-A/B INSTALLATION AND USE. PROVIDE ANGLED MODULES FOR WORKSTATION OUTLETS AND FLAT FRONT MODULES FOR INSTALLATION IN PATCH PANELS OR FOR WALL MOUNT PHONE / DEVICE INSTALLATION. PROVIDE CONNECTORS ON EACH END OF EACH CABLE, AND PROVIDE AN ADDITIONAL 20% OF THE TOTAL NUMBER OF CONNECTORS USED AS SPARE. CONNECTOR MODULES ARE TO BE SIEMON "MAX-6 (MX6)" OR "Z-MAX-6 (Z6)" SERIES OR APPROVED EQUAL.
   d. CAT 6 PATCH / STATION CORDS: FOR EACH CATEGORY 6 OR 6E TELE / DATA PORT INSTALLED, PROVIDE ONE WORKSTATION CABLE AND ONE PATCH CORD. CABLES ARE TO BE STANDARD CATEGORY 6. STATION CABLES ARE TO BE BLUE AND 2 METER IN LENGTH, PATCH CORDS ARE TO BE 2 METERS IN LENGTH AND YELLOW IN COLOR. CABLES / CORDS ARE TO BE SIEMON "MC-6 UTP" SERIES OR APPROVED EQUAL.
10. PATCH PANEL AND WIRE MANAGEMENT:
   a. FOR WALL MOUNT DATA CABINET, PROVIDE MODULAR PATCH PANELS THAT ARE COMPATIBLE WITH CONNECTOR MODULES SPECIFIED. PATCH PANELS ARE TO BE STANDARD 19" WIDTH, TYPICALLY 1U MOUNTING HEIGHT FOR 16 OR 24 PORT PANELS AND HAVE FLAT FRONT CONNECTOR MODULES, AND 2U MOUNTING HEIGHT FOR 48 PORT PANELS. PROVIDE TYPICAL 16, 24 OR 48 PORT FLAT PANELS AS NOTED ON DRAWINGS OR AS REQUIRED FOR FULL INSTALLATION. PANELS ARE TO HAVE ONE PORT FOR EACH HORIZONTAL CABLE PLUS 25% SPARE / OPEN PORTS AND ALL PORTS ARE TO BE PROVIDED WITH PRINTED LABEL HOLDERS. OPEN PORTS ARE TO BE PROVIDED WITH FILLER PLATES. PATCH PANELS ARE TO BE SIEMON "MAX" PATCH PANELS OR APPROVED EQUAL.
   b. WIRE MANAGEMENT: PROVIDE FRONT AND REAR 1U WIRE MANAGEMENT BAR FOR EACH PATCH PANEL PROVIDED. PROVIDE ONE ADDITIONAL PAIR OF WIRE MANAGEMENT BARS TO ALLOW AN ABOVE AND BELOW INSTALLATION OF WIRE MANAGEMENT. PRODUCT TO BE SIEMON "WM-143" SERIES OR APPROVED EQUAL.
11. FACEPLATES: FOR WORK AREA OUTLETS, PROVIDE MODULAR FACEPLATES THAT ALLOW INSTALLATION OF AND ARE FULLY COMPATIBLE WITH THE MODULAR CONNECTORS SPECIFIED ABOVE. PROVIDE PLATES OF THE SAME MATERIAL AS DUPLEX OR SWITCH PLATES AND SAME COLOR. PROVIDE BLANK FILLER PLATE FOR ANY CUTOUTS THAT ARE NOT USED. PLATES ARE TO BE SIEMON "CT" FACEPLATES OR APPROVED EQUAL.
12. WIRELESS ACCESS POINTS: PROVIDE WIRELESS ACCESS POINTS AS SHOWN OR NOTED ON PLANS AND PER SPECIFICATIONS BELOW. AT LOCATIONS SHOWN PROVIDE DUAL PORT "BISCUIT" TYPE SURFACE MOUNT BOX, WITH TWO (2) CATEGORY 6 PORTS AND OUTLETS/JACKS. MOUNT BOX ABOVE CEILING ON STANDARD 4X4 JUNCTION BOX WITH FACEPLATE AS REQUIRED. LOCATE AND MOUNT BOX SO THAT THERE ARE NO OBSTRUCTIONS TO ACCESS FROM BELOW FOR ACCESS POINT INSTALLATION. SURFACE MOUNT BOX TO BE SIEMON "MX-SM" SERIES OR EQUAL.
13. TELE / COMM BACKBOARD: PROVIDE A MINIMUM 3/4" X 4' X 8' PLYWOOD TELECOM BACKBOARD (OR AS SHOWN ON PLANS FOR LARGER AREAS), SECURED TO WALL STRUCTURE WITH MINIMUM 300 POUND ANCHORS. PAINT BACKBOARD WITH FLAT GRAY OR BLACK FIRE-PROOFING / FLAME RETARDANT INTUMESCENT LATEX PAINT.
14. CABLE SUPPORTS:
   a. J-HOOK CABLE SUPPORTS: PROVIDE 4" OPEN TYPE CABLE HOOKS WITH CABLE RETAINER CLIPS FOR SUPPORT OF TELE/DATA CABLING, HOOKS ARE TO BE SPACED AT A MAXIMUM LATERAL DISTANCE OF 48 INCHES. HOOKS ARE TO BE PRE-GALVANIZED FINISH, WITH STATIC LOAD CAPACITY OF AT LEAST 30 POUNDS. WHERE PROTECTION SYSTEMS ARE ROUTED USING PLENUM CABLE EXPOSED, PROVIDE SEPARATE CABLE SUPPORTS AND INCLUDE COLOR CODE ID CLIPS (RED - FOR PROTECTION SYSTEMS). SUPPORT FROM WALL OR STRUCTURE PER MANUFACTURERS GUIDELINES AND INSTALLATION INSTRUCTIONS. PRODUCT IS EATON / B-LINE "CABLE HOOK / J-HOOK" SERIES OR APPROVED EQUAL.
15. GROUNDING: PROVIDE A TELECOM GROUND BAR, 1/4" X 2" X 15" COPPER GROUND BAR MEETING REQUIREMENTS OF TIA-607-C/D AND NEMA STANDARDS. PROVIDE WITH UNIVERSAL HOLE PATTER OF 5/16" AND 7/16" HOLES PRE-DRILLED, AND 3" INSULATED STANDOFF BRACKETS. PROVIDE AND ROUTE A MINIMUM #4 AWG COPPER GROUNDING CONDUCTOR FROM THE TELECOM GROUND BAR TO THE MAIN ELECTRICAL SERVICE ENTRANCE GROUND, AND BOND PER BICSI RECOMMENDATIONS. EXTEND A #10 GROUNDING CONDUCTOR FROM GROUND BAR TO THE GROUND LUG ON EACH RACK OR CABINET PROVIDED. PRODUCT IS THE NVENT / ERICO "TGBA-XX" SERIES OR APPROVED EQUAL
16. LABELING: ALL CABLING, CORDS, PORTS AND EQUIPMENT SHALL BE LABELED PER THE ANSI/TIA-606-D ADMINISTRATION STANDARDS FOR TELECOMMUNICATIONS INFRASTRUCTURE STANDARD. LABELS ARE TO BE PERMANENT TYPE AFFIXED FOR EASE VISIBILITY AND IDENTIFICATION AT EACH TERMINATION, AND IN EACH BOX OR CABINET. EACH JACK SHALL HAVE FACEPLATE LABELED WITH MANUFACTURER PROVIDED PRINTED TEMPLATE. ALL DROPS IN A COMMON SPACE SHALL BE LABELED SEQUENTIALLY WITH ROOM AND CABLE IDENTIFIER. LABELS SHALL BE CONSISTENT BETWEEN RACK AND WORK AREA OUTLETS, AND ALL LABELS SHALL BE CLEARLY RECORDED AND MARKED ON THE WIRE MAP SUBMITTED. TAPE TYPE LABELS AND HANDWRITTEN LABELS ARE NOT ACCEPTABLE.
17. MANUFACTURERS: ENHANCED CATEGORY 6 (6E) CABLING AND CONNECTORS FOR HORIZONTAL STATION OUTLET SERVICE ARE TO BE PROVIDED, TESTED AND WARRANTED AS A COMBINED END TO END SYSTEM. PROVIDE ALL CABLE AND CONNECTORS BY ONE COMMON MANUFACTURER. SPECIFIED PRODUCTS ARE BY BASIS OF DESIGN MANUFACTURER "SIEMON" FOR ENHANCED CATEGORY 6 (6E) CABLE AND FOR CORRESPONDING CATEGORY 6 CONNECTORS, OTHER APPROVED MANUFACTURERS OF CABLE / CONNECTORS FOR A FULL END TO END SOLUTIONS ARE:
   a. SIEMON "PREMIUM 6 UTP" SERIES - BASIS OF DESIGN
   b. HUBBELL "NEXTSPEED 6E"
   c. COMMSCOPE SYSTIMAX "GIGASPEED XL-2071E"
   d. PANDUIT "TX6000"
   e. BERKTEK "LANMARK-2000" / LEVITON CONNECTORS
   f. BELDEN "3600"
   g. MOHAWK "ADVANCENET" / BELDEN CONNECTORS
   h. OR APPROVED EQUAL


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