DIVISION 16 ELECTRICAL

SECTION 16.1 GENERAL

16.1.1 The "General Requirements" of these specifications are hereby made a part of this Division.

SECTION 16.2 ELECTRICAL WORK

16.2.1 SCOPE

A.Before submitting proposals for this work, the Contractor will be held to be familiar with all governing codes and to have examined the premises to determine conditions which may affect or be affected by his work, and to understand the conditions under which he will be obliged to operate in performing his work. No allowance shall be made subsequently in this regard for any error through negligence on his part. The Contractor shall check for all addenda before submitting his bid.

B.This work includes furnishing and installing all electrical material, accessories, supports, conduit, wire, connections, grounding, excavating and all other labor and materials indicated on the drawings or specified herein and required by codes. This includes all electrical materials and connections required for operation of all items of equipment furnished under other sections of these specifications and by OWNER. For clarity some items may be noted as "BY ELECTRICAL CONTRACTOR" or "IN THIS CONTRACT".

C.Work Included:

The work under this section is not limited to, but shall include:

1.Electric service conduits and cables.
2.Coordinate with electrical utility company and provide metering facilities to comply with utility company requirements.
3.Coordinate with telephone company and provide telephone service conduits to comply with telephone company installation requirements.
4.Provide and install Main metering switchgear section.
5.Feeders for a complete power and lighting distribution system.
6. Installation of owner provided MDP Panel – (prewired panels, breakers, motor control and lighting control with all relays)..
7.Outlet boxes, conduit, wire wiring devices, control components and accessories.
8.Conduit, wiring and connection for all line voltage electrical equipment furnished and installed by others (see Mechanical, Refrigeration, Fire Control drawings).
9.Conduit and wire for low voltage controls. Final connections by others.
10. Trenching, excavating and backfilling for electrical work.
11. Additional Permit, plan check and inspection fees as required.
12. Disconnects for all fan motors.
13. Any fees or assessments required by local authorities are a part of the electrical contract.
14. Install car sensors in drive thru slab (2) each –provided by OWNER.
15. All power for site lighting, signs & menu boards as noted on plans.
16. Provide and install delivery door alarm system. (see plans & Spec Section 8)

D.Work Not Included:

1.Public telephone wiring and instruments.
2.Connection of low voltage wiring to air conditioning controls (except as shown on plans).
3.Public sound system.

E.Equipment provided under other sections, but connected under this section:

1.Mechanical.
2.Food service equipment.
3.Signs.

16.2.2 REQUIREMENTS OF REGULATORY AGENCIES

All work and materials shall comply with all regulations of the state and local Fire Marshall, the National Electrical Code, and all other applicable state and local codes and regulations. All such rules, regulations and ordinances in effect at the time the work is done shall be as fully binding as if written herein. Nothing in these drawings or specifications shall be construed to permit work not conforming to all such rules, regulations, and ordinances. Where the requirements of the drawings or these specifications exceeds those of governing codes or agencies, the plans and specifications shall govern.

16.2.3 PERMITS AND INSPECTIONS

This Contractor shall obtain and pay for all plan check, permit and inspection fees for all electrical material and connections which are required by legally constituted authorities having jurisdiction, and make arrangements for all inspection.

16.2.4 CHANGES TO ELECTRICAL WORK

OWNER reserves the right to order, in writing, any changes which they may desire to make in the work or materials herein specified, or shown on the drawings. Such changes shall not alter the terms of the contract. The true value of such changes, whether additions or deletions, shall be added to or deducted from the original price. All additional conduit, outlets, switches, fixtures and other material and labor added to the electrical work, not indicated on the drawings or in the specifications, and involving additional cost to OWNER, shall be submitted to OWNER and a price agreed upon, in writing: See Section 1.8 of this specification.

16.2.5 COORDINATION WITH OTHER TRADES

The drawings indicate the approximate location of outlets and materials unless dimensions are shown. The Contractor shall coordinate with other trades and use good judgment in locating outlets and materials to avoid conflicts with work being installed by others. Outlets for connection to equipment shall be located by referring to shop drawings, manufacturer's recommendations and by measuring actual equipment to be installed. The Contractor shall examine all contract documents and drawings to determine division of work between trades and to logically locate work to coordinate with structural elements, cabinet work, mirrors, windows, doors, door swings, including cabinet doors, furring, ducts, pipes and other elements of construction and equipment.

16.2.6 DRAWINGS AND SPECIFICATIONS

A.The drawings indicate the general arrangement of equipment and routing of conduit and wiring systems an for clearness and legibility are essentially diagramatic. It is not the intent of the drawings to show exact connection points, offsets, pull box locations and routing through structural elements.

Where not specifically located, all outlets shall be located in accordance with good practice and shall be readily accessible for operation and maintenance. All scale dimensions are approximate. Before installing electrical work, the Contractor shall verify requirements for other trades and construction details and verify dimensions on the job.

16.2.7 DRAWING CONFLICTS

In the event of a conflict or inconsistency between items indicated on the drawings and in the specifications or conflicts with code requirements applying to the same item, that drawing indication, note, specification or code which prescribes and establishes the higher standard, provides for a better grade of material or provides a more complete job shall take precedence. The Contractor shall notify OWNER to obtain a clarification.

16.2.8 MATERIALS AND WORKMANSHIP

A.All material shall be new, unless specifically noted otherwise, and shall bear the label of, or be listed by, the Underwriters' Laboratories, Inc., where applicable. All materials shall be products of manufacturers regularly engaged in the production of such material and shall be the latest improved design, unless specifically noted otherwise. All materials of one type or of one system shall be supplied by the same manufacturer.

B.All workmen shall be skilled in the kind of work they are performing and shall be under the direction of a competent foreman. All material shall be installed in a neat workmanlike manner and firmly secured in place, consistent with standard practices, of the electrical construction industry, as defined in the "Standards of Installation" published by the National Electrical Contractors Association.

16.2.9 REMOVAL OF MATERIAL

A.All materials not approved by OWNER and all material not properly installed, shall be promptly removed from the premises by the Contractor, whether or not it has been incorporated into the work. The Contractor shall then promptly replace and reconnect all work in accordance with the drawings and specifications, at his own expense, and shall also bear the expense of restoring all work of other trades damaged or disturbed by such removal or replacement.

B.Should the Contractor refuse to remove and replace unsatisfactory materials and installation, and restore work of other trades after having been notified by OWNER, then OWNER shall have the right to enter upon the work and procure such materials and labor required to remove and replace all unsatisfactory work and restore work of other trades, in order to complete the project. All costs incurred by OWNER for such corrective work shall be borne by the Contractor.

16.2.10 STRUCTURAL CONDITIONS _ SPECIAL NOTE

A.Where conduits, sleeves, inserts, supports, cabinets, fixtures and other material are to be attached to, pass through, or interfere with, any structural member, or where notching, boring or cutting of any structural member is necessary, or where special openings are required through floors, footings, foundations, walls, roofs, or other structural elements to accommodate the electrical work, this Contractor shall obtain the approval of OWNER and shall coordinate all such work with the General Contractor, and other trades. The Electrical Contractor shall perform all such work and shall patch and repaint all members and surfaces damaged or soiled in performing the electrical installation, unless specifically instructed otherwise.

B.Where conduits pass through walls or foundations, seal around conduits to make the work watertight. Where conduits pass through roofs, provide galvanized metal flashing and seal with a suitable compound, intended for the purpose to make the work watertight.

C.See detail and plan for conduits through roof on Architectural drawings.

16.2.11 TRENCHING, EXCAVATION AND BACKFILLING

A.All trenching, excavating and backfilling for the installation of all electrical work shall be done under this section of the specifications. After approval of installation, trenches and excavations shall be backfilled with the excavated material or approved imported soil. Conduit trenches shall be leveled to prevent deformation of conduits after backfill. Backfill materials shall be free of large clods, stones and debris and shall be compacted to eliminate voids and to obtain a density of ninety (90%) percent of the adjacent soil. Care shall be taken to prevent damage to conduits or other buried items and to obtain full and uniform bearing against the sides. Truck rolling may be used for shallow trenches 24 inches or less in depth. Where backfill occurs in paved areas, a mechanical tamper shall be used to obtain the compaction required under other sections of these specifications applicable to work in such areas. Backfill under building slabs shall be approved by OWNER.

B.All plants, shrubs and turf in the area of trenching or excavating shall be carefully removed, protected replanted after backfilling is completed.

C.All sidewalks, driveways, and other cement or asphalt surfaces, which are cut or damaged during trenching or excavation shall be repaired to match the adjacent work in materials and finish.

16.2.12 SLEEVES, INSERTS AND SUPPORTS

The Contractor shall be responsible for making all necessary provisions throughout the building to receive his work as the construction progresses. He shall provide all sleeves, backing, inserts, anchor bolts, brackets, hangers and other supports necessary for the installation of all electrical fixtures, pull boxes, conduits, wireways, panelboards, switchgear, control equipment, and all other material and equipment in this contract.

16.2.13 ELECTRIC SERVICE

A.The general arrangement of the service entrance conduits are indicated on the drawings. The Contractor shall be responsible for verifying the exact location of the point of service connection, routing of incoming service lines and service metering requirements with utility company and shall provide all service equipment in accordance with the utility company requirements. Before submitting his bid, the Contractor shall also contact the utility company and determine the cost of labor and material to be furnished and installed by the utility company but will be chargeable to the customer, and he shall include all such charges in his bid. All labor and material required to leave the electric service installation complete and connected, without additional cost to OWNER shall be included in this contract.

B.The Contractor shall give OWNER sufficient advance notice, in writing, when they must make application for permanent service.

16.2.14 PROTECTION

The Contractor shall protect new and existing work, materials and landscape from damage and theft, provide for the safety of the public and workmen by warning lights and barricades or other suitable safety devices. The Contractor shall assume all responsibility for materials, storage, damage to equipment and safety to public and workmen until final acceptance by OWNER.

16.2.15 MATERIALS

A.Main Metering and Distribution Switchgear:

1.The approximate locations of the metering and distribution equipment are indicated on the drawings. Verify building dimensions, on the site, and equipment dimensions from shop drawings and coordinate space requirements with other trades. Coordinate with the utility company and manufacturer and provide metering equipment, and space with provisions and fittings for equipment to be furnished by the utility company, to comply with the utility company requirements.

2.All switchgear shall be totally metal enclosed, dead front, dead rear, with line side bussing for all present equipment and spaces. Bussing in space for future equipment shall be drilled and tapped and ready to receive equipment. All load and line side lugs for service and feeders shall be of proper size to hold all strands of the wires. Provide all circuit breakers, switches, fuses, motor control devices and all other equipment as specified herein and as indicated on switchgear and feeder diagrams and notes on drawings. Provide NEMA "Class 1B" wiring. Provide an identifying nameplate for each device on the switchboard. Nameplates shall be black and white nameplate stock with characters cut through the black exposing the white. Cabinets shall be treated with a rust inhibitor and have standard factory finish, unless indicated otherwise. Level all floor standing switchgear and fasten securely to floor. Where floor is not level, pour a separate level concrete base or cut floor and grout in suitable channels to provide a level base.

B.Panelboards and Load Centers – (when plans reflect to be provided by Electrical Contractor):

NOTE: When MDP Panel is specified on plans-- This item is provided by OWNER & installed by EC. It is a pre-wired packaged system that includes electrical panels, motor control systems and lighting system. Information below is for non-prepackaged systems.

1.Lighting, power panelboards and load centers shall be dead front, dead rear, flush or surface mounted, as noted on plans, with hinged door, in trim, unless noted otherwise.

2.A directory frame with plastic shield shall be factory assembled on inside of doors with a directory card, neatly typed, indicating circuit numbers and circuits controlled. Cabinets shall be of code gauge galvanized steel. Door trim shall be treated with a rust inhibitor and have standard factory finish unless indicated otherwise. A stamped metal nameplate shall be installed on all dead fronts indicating U.L. approval, volts, amps and phase of panel. All panels shall have a black laminated plastic nameplate on outside, engraved with panel identification. Quantity and rating of breakers, bus capacity, cabinet size, bussing sequence and circuit numbering shall be as indicated on drawings. All outlets and equipment shall be connected to circuit numbers as indicated on drawings. Circuit breakers shall be trip indicating with quick_make, quick_break mechanism with thermal magnetic trip, unless specifically noted otherwise. All 2 and 3 pole breakers shall have common trip. Circuit breakers used for switches of electric discharge lighting shall have provision for padlocking in the open position and shall be rated for switching duty.

3.Cabinets and trims for all panels of one type shall be matching in style and finish, except as noted otherwise, and cabinets and door in trim shall be obtained from the same manufacturer. At each flush mounted panelboard, extend a one_inch spare conduit, in addition to any spare conduits shown on plans, into furred space, attic or joist space above the panel.

C.Motor, Controls Equipment – (when called for by Electrical Contractor on Plans-see note "B" above)

NOTE: When MDP Panel is specified on plans-- This item is provided by OWNER & installed by EC. It is a pre-wired packaged system that includes electrical panels, motor control systems and lighting system. Information below is for non-prepackaged systems.

1.The Electrical Contractor shall provide all conduit, wiring and connections for all line voltage, and low voltage, and low voltage equipment, (48 volts and under), motor controls and mechanical equipment furnished under the electrical and other sections of the specifications and furnished by OWNER, unless specifically noted otherwise. Air conditioning contractor shall make final connection of low voltage controls. For conduit wiring and connections of motors, starters, controls and related components and equipment furnished by others, but not prewired, and for interwiring of motor starters and controls, furnished under the electrical contract, to control equipment by others, obtain the manufacturer's approved shop drawings, diagrams and instructions for the specific equipment and application, as furnished by the manufacturers of the various items of equipment to be used on this project.

2.All motor starters, if provided under this section of the work shall have overload elements in all phases. Verify the actual motor nameplate current rating and ambient conditions and provide the proper overload heater elements. Starters and relays shall be provided with all hand_off_auto switches, pushbuttons, pilot lights, auxiliary contacts and other accessories and with coil voltages as required for the proper operation indicated by the diagram and instructions for the equipment to be controlled.

3.Individually mounted units shall have enclosures suitable for the location and atmosphere in which they are installed. Starters, relays and controls shall be as manufactured by G.E., Square "D", or Cutler Hammer. All starters, relays and control components furnished by others, but not integrally mounted on their equipment, shall be installed by the Electrical Contractor as directed by the trade furnishing the material.

D.Conduit

1.The Contractor may install whichever of the following types of conduit are permitted by code, unless indicated otherwise:

a.Rigid conduit and fittings shall be steel, hot dipped galvanized or sherardized, or aluminum.

b.Electrical metallic tubing and fittings shall be steel, galvanized or sherardized, or aluminum. Fittings shall be water resistant type.

c.Flexible metal conduit and fittings shall be steel galvanized or aluminum and shall be continuous from outlet to outlet and shall be used only in dry locations. "Sealtite" liquid tight flexible conduit, shall be used where flexible metal conduit is not covered by walls or above ceiling,and at exposed open areas of equipment , and shall be installed per N.E.C. Article #351.

d.Plastic conduit: Plastic conduit and fittings may be used for underground runs for electric and telephone service, panel feeders and branch circuits. All conduit sizes shown on plans are based on steel conduits with the number of conductors shown. Where plastic conduits are used the contractor shall be responsible for providing the proper size ground conductors and increasing the size of conduit where necessary. All plastic conduits shall be PVC, schedule 40, heavy wall rigid conduit. All joints shall be firmly cemented together. Where conduits are turned up above grade or into buildings, all elbows and risers shall be Schedule 80 P.V.C.

e.Intermediate Metal Conduit shall be hot dipped, galvanized or sherardized. IMC may be used the same as rigid steel except it shall not be used in concrete or underground.

f.BX, MC or armored cable is not permitted except for light whips.

g.Plastic flex conduit is not permitted.

h.Seal–Tite is to be used in any exposed areas.

2.Conduit Installation

a.Conduit routing indicated on the drawings is diagramatic only and is not necessarily the intended, actual conduit run. The Contractor shall check and be responsible for the actual installation with regard to available space and shall cooperate with other trades. Conduit and metallic raceway shall be mechanically and electrically continuous from sources of current to all outlets in a manner to provide a continuous ground path. Ends of conduit shall be closed during construction to prevent entrance of dirt or moisture. All conduit work shall be concealed unless otherwise shown or indicated. All empty conduits and ducts shall have a No. 12 B.W.G. steel, zinc_coated pull wire or nylon pull line installed therein. Empty conduits stubbed out shall be threaded and capped at both ends unless indicated otherwise.

b.All conduits installed underground must be at least 18 inches below finished grade, and all backfilling tamped every 6 inches. All surplus earth shall be disposed of as directed on the site. All conduits must be tested and approved before covering. Where installed in ground floor slab, the conduits shall be trenched under or blocked up to provide a minimum of two inches of concrete on all sides of the conduit.

c.The joints of all conduits run in concrete or underground shall be liquid and gas tight and all threads shall be thoroughly filled with red lead or other approved compound before screwing into coupling.

d.All underground metal conduits not in concrete, either inside or outside the building area, shall be wrapped with a pipe coating tape of not less than 10 mil thickness. Tape shall be applied with a minimum one_half inch overlap. Width shall follow manufacturer's recommendation for the size of conduits used. Tape shall be Scotchwrap No. 52 or Johns_Manville NO. VID_10. Fittings and couplings shall be covered with an additional molding tape under the coating tape.

e.Install electrical metal conduit (EMT) per N.E.C. Article 348. EMT shall be securely fastened in place at least every 10 feet and within 3 feet of each outlet box, junction box, cabinet or fitting.

f.Install flexible metal conduit per N.E.C. Articles 350 and 250–91. Flexible metal conduit shall be secured by approved means at intervals not exceeding 4–1/2 feet and within 12 inches of each side of every outlet box, junction box, cabinet or fitting. A ground wire shall be installed in all flexible metal conduits except where less than 6 feet long and installed wires are protected by maximum 20 AMP over current devices. A ground wire shall be installed in all conduits which are used to connect equipment where flexibility is required. Flexible metal conduit shall be installed in essentially straight lines without loops. Provide additional supports as necessary to eliminate sagging. Armored cable (BX or MC) shall not be used.

g.Where conduit penetrates any refrigerated areas or boxes, conduit shall be sealed inside and outside to prevent condensation transference.

E.Grounding: All wiring shall be in a grounded, continuous metal raceway system, except as specified above for service ducts. The raceway system and all electrical and mechanical equipment shall be grounded as required by all applicable codes, whether such grounding is shown or not.

F.Boxes and Covers: All boxes and plaster rings shall be of size required by ordinances or larger and unless noted otherwise, shall be standard code gauge pressed steel, galvanized or sherardized. Proper plaster covers, which rise the full thickness of plaster or finish material, must be installed on all outlets in finished locations. All boxes, except in concrete or masonry, shall be securely screwed to suitable blocking, 2" x 4" or 2" x 6" as required. Device outlet boxes shall be minimum 4 inches square, 1-1/2 inches deep. Flush outlets shall be provided with proper flush device cover. Surface outlets shall be provided with proper zinc coated steel surface cover in unfinished areas. All outlets shall be flush, unless otherwise indicated. In finished areas install stainless steel plates in food preparation, serving and sanitary areas. In all other areas, smooth plastic plates may be installed. All exterior boxes shall be threaded, cast, weatherproof type boxes. No "open to earth bottom" type concrete boxes are allowed.

G.Lighting Fixtures, General

1.A lighting fixture shall be installed at all lighting outlets. All light fixtures and lamps to be provided by owner unless noted otherwise on plans. All lighting fixtures shall be of the type indicated on plans and described in the fixture schedule and shall be furnished complete with lamps. All fixtures of one type shall be by one manufacturer and shall be identical in appearance and finish.

2.Proper hangers or fixture studs shall be provided for the type of installation used. Blocking and intermediate supports between joists, or channels for suspended ceilings, shall be furnished under this section of the specifications. Use approved bar hangers to support fixtures on suspended ceilings. All fixtures shall be provided with proper plaster frames or adapters necessary for a complete installation in the type of ceiling in which they are installed whether such accessory materials are specified or not.

3.The Electrical Contractor shall check with the ceiling installers for location and installation of all fixtures. Where dimensions or other orientation are not shown, fixtures shall be installed in straight lines, spaced to obtain a symmetrical arrangement within the room, with distance from wall to nearest fixture one_half the distance between fixtures. Where fixtures are installed in or on acoustic tile or panel ceilings, the spacing of fixtures shall be adjusted to obtain the most nearly symmetrical arrangement with the lines of the acoustic material. (See Reflected Clg. Plan.)

4.Where specified on plans and Contractor is to provide fixtures, the Catalog No., in the lighting fixture schedule, indicates the type of fixture. The Contractor shall provide all fixtures with all accessories required for a complete installation. Also provide the fixtures with all variations from standard as indicated by the description or other notes, specifications or codes whether or not such accessories, variations or additional components are indicated by the catalog number.

H.Light Fixtures

1.All recessed incandescent fixtures shall have approved heat resistant wire (AF) between junction box and fixture socket. A clearance of 1/2 inch or more shall be maintained between fixture and wood members.

2.Fluorescent lighting fixtures for direct mounting on combustible ceiling material shall be attached with short stems or pedestals to suspend the bottom of the luminaire a minimum of 1_1/2 inches below the ceiling, unless approved direct mounting fixtures are used. Luminaires shall be attached to at least two pedestals by two screws each and pedestals shall be supported from blocking by at least two screws each, where mounted on wood blocking. Fixtures on low density tile shall be approved for direct mounting, unless specifically noted otherwise.

I. Lamps and Ballasts

1.Incandescent lamps shall be inside frosted, unless indicated otherwise, from 0 to 300 watts, and clear for higher wattages, except that PAR lamps or reflector lamps shall be provided for fixtures designed for same.

2.Fluorescent lamps shall be per Lighting Fixture Schedule, as manufactured by Westinghouse, General Electric Co., or Sylvania Electrical Products. Fluorescent lamps and ballasts shall be designed for 430 milliamp operation of either rapid start or T_12 slimline lamps, unless indicated otherwise on plans. Ballasts shall be high power factor, E.T.L. tested and approved and C.B.M. certified. Any fluorescent fixtures or ballasts which have a noise level which is obviously above the average shall be corrected or replaced. All ballasts shall be energy efficient type.

J.Lighting Switches

1.Install a light switch, at all switch outlets, of type indicated on plans. Lighting switches shall be tumbler type. Switches shall have plaster ears for mounting and shall have fire resistant, non_absorbitive, composition cups which fully enclose the operating mechanism.

2.Switches in all finished areas shall have ivory handles.

3.Switches for incandescent and fluorescent lighting shall be A.C. type rated 15 amps. 120/277 volts.

K.Device Plates

1.Furnish and install all device plates for all outlets, including switches, receptacles, telephone outlets, etc.

2.In all areas, including ceiling, device plates shall be satin stainless steel, Sierra "S" line unless indicated otherwise.

3.Where two or more devices are installed at the same location, gang plates shall be used.

4.Install all satin stainless steel cover plates with 1–1/2" dia. Hole and grommet on all data boxes PRIOR to electronics vendor arrival for their installation.

5.Outlets for pulling and junction points shall have blank plates to match the other plates in the area. Where boxes with blank plates are required on the ceiling, the covers shall be painted to match the finished surfaces. Do not install sheet metal covers on boxes in finished walls or ceilings.

L.Disconnect Switches

1.Enclosures for EXO switches shall be general purpose NEMA 1 for indoor applications and raintight NEMA 3R for outdoor applications, unless noted otherwise.

2.Switches shall be fused or non_fused, 2 or 3 pole as required for the circuit or equipment to which it is connected.

3.Switches for motors shall be general duty type, horsepower rated, side operated, with quick_make and quick_break operating mechanism, unless noted otherwise.

M.Convenience Outlets

1.Shall be "Specification Grade", duplex, 3 wire, with one pole grounded.

2.At convenience outlets behind shelving, install the outlet boxes flush with the wall and use a plaster ring to project through back of the shelving.

3.Where outlets are indicated at counter tops and no mounting height is indicated, the Contractor shall check the architectural drawings for counter height and install the outlets above the counter and above the backsplash, unless indicated otherwise.

4.Receptacles shall be ivory in all areas including ceiling, except where isolated ground (orange) receptacles are called for.

5.Receptacles:

a.15A, 125V (parallel blade): Sierra No. 1402

b.15A, 250V (tandem blade): Sierra No. 1403

c.20A, 225V: Sierra No. 1462

N.600V Wire and Cable

1.All wire shall be new, A.W.G. size, and of recent manufacture, bearing the Underwriter's label, the manufacturer's trademark and the type and size of wire. Conductors shall be continuous between outlets without splices, except in outlets or junction boxes.

2.Minimum wire size shall be No. 12 A.W.G., except No. 14 A.W.G. may be used for motor control circuits. All wire No. 8 A.W.G. and larger shall be stranded.

All wires in raceways shall be Type THHN or THW. Wire in continuous row fluorescent fixtures shall be type AVA, RHH or THHN. Fixture wire shall not be less than No. 14 A.W.G., stranded type AVA, AF or other approved heat resisting wire. Unless specifically indicated otherwise, all conductors shall be copper.

3.No wires shall be installed in conduit until conduit and outlet boxes have been permanently installed and are free of moisture and all debris have been removed from boxes and outlets and conduit swabbed clean.

4.Use only approved compounds for pulling wires. Use of green soap or petroleum products will not be permitted as wire lubricants.

5.Wiring at panelboards, switchboard and terminal cabinets shall be neatly formed and laced. Tag each wire by circuit number, including neutral, with adhesive markers.

6.Circuits for cash registers, computer processor and printers shall have separate neutrals and equipment ground wires for each circuit, run from the outlets to the panel.

7.150 degree type FEPB wire shall be used at all heating appliance connections.

8. Wiring Connections:

All connections shall be made without strain on conductors, allowing conductors to take a natural position after connection. All foreign materials shall be thoroughly cleaned from the contacting surfaces of lugs and wire before making connection.

16.2.16 SUBSTITUTIONS

All materials and equipment shall be as specified herein or as indicated on the drawings. Substitutions may not be made without written approval of OWNER. Wiring quality and space requirements shown on plans is for equipment as specified. In the event that the Contractor makes substitutions in materials, equipment or designs, with or without OWNER's approval, the Contractor shall assume full responsibility for all changes in conduit, wiring, space requirements and for the effects of such substitutions on the entire project. He shall pay all charges resulting from such substitution including charges for removal of such material, modification in the work of other trades and including charges for additional engineering. Acceptable alternate materials are indicated on the drawings and in these specifications. No other substitutes shall be made.

16.2.17 CLEANING EQUIPMENT AND MATERIALS

The Contractor shall thoroughly clean all fixtures, switchgear, panels and other equipment and material installed under this contract. Parts which are to be painted shall be thoroughly cleaned of cement, plaster, grease and oil spots, brushed with steel brush to remove rust, and left smooth and clean. Where finished surfaces have been damaged, the Contractor shall paint or otherwise finish such items to match the surrounding finish. Any dirt, rubbish, paint spots or grease on walls, floors, ceilings or equipment caused by the Contractor shall be removed by him and the premises left in first class condition in every respect, to the satisfaction of OWNER.

16.2.18 TEST AND INSPECTIONS

Test all wiring for continuity, grounds and short circuits before devices and equipment are connected. After electrical system is energized, test all circuits for proper operation. Verify operation of all motors and connect for proper rotation. Meter the service neutral and equipment grounding system and make any adjustments or additions necessary to comply with the maximum ground circuit resistances by codes.

Meter the voltage across all lines and to neutral at the main service and provide a written report of all readings, to OWNER. Where service voltage is more than five (5%) percent above or below rated voltage notify the utility company and make necessary arrangements to have the voltage adjusted to within the limits permitted by the Public Utilities Commission. Where transformers are installed make tests as indicated for that equipment. During inspections by OWNER or Engineer, the Contractor shall provide all labor necessary to expedite inspection of interiors of equipment and shall remove and reinstall dead fronts and wireway covers on switch board, panels, junction boxes, light fixtures, fixture lenses and other terminal space covers or control equipment. The Contractor shall energize and operate all equipment and arrange for operation tests of all equipment. All defects shall be corrected promptly.

16.2.19 GUARANTEES

The Contractor shall guarantee all parts of this work, including all individual items of material and equipment and the system as a whole, to be free from defects for a period of one year from the date of acceptance of the project. Upon proper notice, the Contractor shall investigate the problem and provide the necessary labor and materials to correct all defects which develop or become apparent during this period, at his own expense. Lamp bulbs shall carry the standard factory guarantee, except as noted otherwise on plans.

16.2.20 COMPLETION OF WORK

Upon completion of all electrical work, the Electrical Engineer will make a final inspection. Any work not complying with these specifications and with the plans, must be corrected before acceptance by OWNER.

Should the Electrical Engineer be required to return to the project for a reinspection, all costs shall be charged to the Electrical Contractor, and said costs will be with held from Electrical Contractors final payment.

16.2.21 DECORATIVE FIXTURES

The contractor shall be responsible for receiving decorative fixtures furnished by others, and installing same under this contract.

NRD Project # 16399

NRD national restaurant designers
ARCHITECTS & ENGINEERS
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SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14782 NELSON RAY THORNTON JR

SOUTH CAROLINA LMHT ASSOCIATES, P.A. No. C02215 CERTIFICATE OF AUTHORIZATION

Hardee's CHARBROILED THICKBURGERS

HARDEE'S T24KE PROTOTYPE
143 CHURCH STREET
BATESBURG-LEESVILLE, SOUTH CAROLINA 29054

REVISIONS

NO.	DESCRIPTION	DATE

SPECIFICATIONS

DRAWN BY	CHECKED BY #1	CHECKED BY #2	APPROVED BY

CKE SITE ID.:

DATE: 2-28-17

SHEET NUMBER: SP6

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