ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL

1. GENERAL PROVISIONS: DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK IN CONTRACT. REFER TO ALL DRAWINGS ASSOCIATED WITH THIS PROJECT (EACH TRADE) FOR EXACT LOCATION OF ALL EQUIPMENT AND REQUIRED MOUNTING HEIGHTS.

2. SCOPE: PERFORM WORK AND PROVIDE NEW MATERIAL AND EQUIPMENT AS SHOWN ON DRAWINGS AND AS SPECIFIED IN THIS SECTION OF THE SPECIFICATIONS. PROVIDE ALL COMPONENTS AND MATERIALS, WHETHER SPECIFICALLY SHOWN OR NOT, THAT ARE NECESSARY TO MAKE THE SYSTEMS COMPLETE AND FULLY OPERATIONAL. WORK SHALL INCLUDE, BUT NOT BE LIMITED TO: 1) THE DESIGN INTENT AS ILLUSTRATED ON THESE DRAWINGS, 2) ALL TESTING AND CERTIFICATIONS NECESSARY FOR COMPLIANCE AND ANY REQUIRED REMEDIAL ACTIONS AND RETESTING DUE TO FAILURE.

3. SITE VISIT: VISIT AND CAREFULLY EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS THAT MAY AFFECT WORK OF THIS SECTION BEFORE SUBMITTING BID. NO EXTRA PAYMENT WILL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY DISCERNED.

4. RELATED WORK: THE FOLLOWING WORK IS NOT INCLUDED IN THIS SECTION AND WILL BE PROVIDED UNDER OTHER SECTIONS: 1) TEMPORARY LIGHTING AND POWER FOR USE DURING CONSTRUCTION AND TESTING UNLESS SPECIFICALLY NOTED IN OTHER SPECIFICATION SECTIONS, 2) TELECOMMUNICATIONS WIRING AND DEVICES UNLESS SPECIFICALLY NOTED ON THE DRAWINGS 3) AUTOMATIC TEMPERATURE CONTROL AND DIRECT DIGITAL COMMUNICATIONS WIRING UNLESS SPECIFICALLY NOTED ON THE DRAWINGS AND 4) PAINTING.

5. CODES, STANDARDS, AUTHORITIES AND PERMITS: ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE STATE BUILDING CODE, THE STATE ELECTRICAL CODE, NFPA, ANSI/NECA INSTALLATION STANDARDS AND OTHER APPLICABLE CODES, REGULATIONS AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENT, OTHER AUTHORITIES HAVING JURISDICTION AND APPLICABLE BASE BUILDING STANDARDS AND SPECIFICATIONS. CODES, LAWS AND ORDINANCES PROVIDE A BASIS FOR THE MINIMUM INSTALLATION CRITERIA. THESE DRAWINGS AND SPECIFICATIONS ILLUSTRATE THE SCOPE REQUIRED FOR THIS PROJECT, WHICH MAY EXCEED MINIMUM CODE, LAW AND STANDARDS CRITERIA. GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY BACKCHARGES AND OBTAIN NECESSARY APPROVALS FROM UTILITY COMPANIES AND AUTHORITIES HAVING JURISDICTION AS REQUIRED FOR THE EXECUTION OF ALL WORK ASSOCIATED WITH THIS PROJECT.

6. INTERPRETATION OF DOCUMENTS: ADVISE THE ENGINEER IN WRITING (RFI) PRIOR TO PROCEEDING WITH PROCUREMENT OR INSTALLATION THAT THE DESIGN INTENT IS UNCLEAR OR THAT CONSTRUCTION DOCUMENTS DO NOT COINCIDE WITH MANUFACTURER'S RECOMMENDATIONS. ALL COSTS FOR REWORK NECESSARY TO RESOLVE DISCREPANCIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

7. REQUEST FOR INFORMATION: RFI ISSUED TO RESOLVE A CONFLICT OR DISCREPANCY SHALL BE PROVIDED WITH THE PREFERRED SOLUTION VIA WRITTEN DESCRIPTION OR SKETCH.

8. SUBMITTALS: PROVIDE SPECIFIED MATERIALS AND EQUIPMENT UNLESS "EQUAL" OR "APPROVED EQUAL" IS EXPLICITLY INDICATED ON THE DRAWINGS. DEVIATIONS TO SPECIFIED MATERIALS SHALL BE AT THE SOLE RISK OF THE CONTRACTOR, WHO SHALL BE RESPONSIBLE FOR ALL ASSOCIATED CHANGES TO THIS AND OTHER TRADES. SUBMITTALS SHALL INDICATE REVIEW AND APPROVAL BY THE RESPONSIBLE CONTRACTOR. SUBMIT FOR REVIEW (6) SETS OF MANUFACTURER'S PRODUCT DATA FOR ALL LIGHTING, LAMPS, BALLASTS AND CONTROLS; DEVICES (RECEPTACLES AND SWITCHES) AND PLATES; FIRE ALARM SYSTEM COMPONENTS; PANELBOARDS, CIRCUIT BREAKERS AND TRANSFORMERS; DISCONNECT SWITCHES AND STARTERS. ALLOW ENGINEER A MINIMUM OF 10 WORKING DAYS FOR PROCESSING AND REVIEW OF EACH SUBMISSION.

9. OPERATION AND MAINTENANCE DATA: SUBMIT (3) SETS OF OPERATING AND MAINTENANCE MANUALS INCLUDING SYSTEM DESCRIPTION, WIRING DIAGRAMS, WRITTEN WARRANTY, RECOMMENDED SPARE PARTS AND ROUTINE MAINTENANCE REQUIREMENTS WITH RECOMMENDED INTERVALS FOR ALL SUPPLIED EQUIPMENT.

10. RECORD DRAWINGS: CAD RECORD DRAWING FILES SHALL BE SUBMITTED AT THE COMPLETION OF THE PROJECT SHOWING THE "AS-BUILT" CONDITION INCLUDING WORK INSTALLED AND ALL MODIFICATIONS OR ADDITIONS TO ORIGINAL DESIGN. OBTAIN THE AUTOCAD FILES FOR PREPARATION OF AS-BUILT DRAWINGS FROM THE ARCHITECT. THE ARCHITECT AND ENGINEER ARE NOT GRANTING ANY OWNERSHIP OR PROPERTY INTEREST IN THE CAD DRAWINGS BY THE DELIVERY OF THE CAD FILES. THE RIGHTS TO USE THE CAD FILES AND DRAWINGS ARE LIMITED TO USE FOR THE SOLE PURPOSE OF ASSISTING IN THE PERFORMANCE OF CONTRACTUAL OBLIGATIONS WITH RESPECT TO THIS PROJECT. ANY REUSE AND/OR OTHER USE WILL BE AT THE CONTRACTOR'S SOLE RISK AND WITHOUT LIABILITY TO THE ARCHITECT AND ENGINEER.

11. WARRANTIES: WARRANTY INSTALLATION IN WRITING FOR ONE YEAR FROM DATE OF OWNER'S ACCEPTANCE OF CERTIFICATE OF SUBSTANTIAL COMPLETION. REPAIR, REPLACE OR PROVIDE TEMPORARY ACCOMMODATIONS FOR DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN 24 HOURS OF NOTIFICATION. WARRANTY SHALL INCLUDE A CONTACT PERSON (NAME AND 24 HOUR TELEPHONE NUMBER) FOR SERVICE REQUESTS. CORRECT DAMAGE CAUSED WHILE MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER WARRANTY PERIOD AT NO ADDITIONAL COST.

12. COORDINATION: CONFER WITH ALL OTHER TRADES RELATIVE TO LOCATION OF ALL APPARATUS AND EQUIPMENT TO BE INSTALLED AND SELECT LOCATIONS SO AS NOT TO CONFLICT WITH OR HINDER PROGRESS OF WORK OF OTHER SECTIONS. WORK INSTALLED THAT CREATES INTERFERENCE OR RESTRICTS ACCESS REQUIRED BY CODE OR TO CONDUCT MAINTENANCE AND/OR ADJUSTMENTS SHALL BE MODIFIED AT NO ADDITIONAL COST TO THE OWNER.

13. SUPPORTS: INCLUDE ALL STRUCTURAL STEEL SUPPORTS, HANGER BRACKETS, ETC., REQUIRED FOR THE EXECUTION OF THE WORK OF THIS SECTION. HANGERS SHALL BE PRE-FINISHED CHANNEL AND THREADED ROD USED WITH APPROVED CLAMPS, HARDWARE, ETC. CHANNEL INSTALLED IN EXTERIOR LOCATIONS SHALL BE GALVANIZED STEEL WITH STAINLESS STEEL HARDWARE.

14. CUTTING AND PATCHING: INCLUDE ALL CORING, CUTTING, PATCHING AND FIREPROOFING NECESSARY FOR THE EXECUTION OF THE WORK OF THIS SECTION. STRUCTURAL ELEMENTS SHALL NOT BE CUT WITHOUT WRITTEN APPROVAL OF THE ARCHITECT. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING ALL PRECAUTIONS REQUIRED TO IDENTIFY HIDDEN PIPING, CONDUITS, ETC. BEFORE ANY CORE DRILLING AND/OR CUTTING OF SLABS COMMENCES,INCLUDING X-RAYING THE AFFECTED SLABS. PROVIDE FIRE STOPPING TO MAINTAIN THE FIRE RATING OF THE FIRE RESISTANCE-RATED ASSEMBLY. ALL PENETRATIONS AND ASSOCIATED FIRE STOPPING SHALL BE INSTALLED IN ACCORDANCE WITH THE FIRE STOPPING MANUFACTURER'S LISTED INSTALLATION DETAILS AND BE LISTED BY UL OR FM.

15. HOISTING, SCAFFOLDING AND PLANKING: INCLUDE THE FURNISHING, SET-UP AND MAINTENANCE OF ALL HOISTING MACHINERY, CRANES, SCAFFOLDS, STAGING AND PLANKING AS REQUIRED FOR THE EXECUTION OF WORK FOR THIS SECTION.

16. SAFETY PRECAUTIONS: LIFE SAFETY AND ACCIDENT PREVENTION SHALL BE A PRIMARY CONSIDERATION. COMPLY WITH ALL OF THE SAFETY REQUIREMENTS OF THE OWNER AND OSHA THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD OF THE PROJECT. FURNISH, PLACE AND MAINTAIN PROPER GUARDS AND ANY OTHER NECESSARY CONSTRUCTION REQUIRED TO SECURE SAFETY OF LIFE AND PROPERTY.

17. ACCESSIBILITY: ALL WORK PROVIDED UNDER THIS SECTION OF THE SPECIFICATION SHALL BE INSTALLED SO THAT PARTS REQUIRING PERIODIC INSPECTION, MAINTENANCE AND REPAIR ARE READILY ACCESSIBLE. WORK OF THIS TRADE SHALL NOT INFRINGE UPON CLEARANCES REQUIRED BY EQUIPMENT OF OTHER TRADES.

18. PROTECTION OF WORK AND PROPERTY: THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE CARE AND PROTECTION OF ALL WORK INCLUDED UNDER THIS SECTION UNTIL THE COMPLETION AND FINAL ACCEPTANCE OF THIS PROJECT. PROTECT ALL EQUIPMENT AND MATERIALS FROM DAMAGE FROM ALL CAUSES INCLUDING, BUT NOT LIMITED TO FIRE, VANDALISM AND THEFT. ALL MATERIALS AND EQUIPMENT DAMAGED OR STOLEN SHALL BE REPAIRED OR REPLACED WITH EQUAL MATERIAL OR EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER. PROTECT ALL EQUIPMENT, OUTLETS AND OPENINGS, AND ROOF PENETRATIONS WITH TEMPORARY PLUGS, CAPS AND COVERS. PROTECT WORK AND MATERIALS OF OTHER TRADES FROM DAMAGE THAT MIGHT BE CAUSED BY WORK OR WORKMEN UNDER THIS SECTION AND MAKE GOOD DAMAGE THUS CAUSED. DAMAGED MATERIALS ARE TO BE REMOVED FROM THE SITE; NO SITE STORAGE OF DAMAGED MATERIALS WILL BE ALLOWED. ANY DAMAGE TO EXISTING SYSTEMS AND EQUIPMENT CAUSED BY THIS CONTRACTOR DURING INSTALLATION SHALL BE REPAIRED AND/OR REPLACED AT THIS CONTRACTOR'S EXPENSE TO THE COMPLETE SATISFACTION OF THE BUILDING OWNER.

19. SEISMIC RESTRAINT REQUIREMENTS: PROVIDE SEISMIC RESTRAINTS AS REQUIRED IN ACCORDANCE WITH THE STATE BUILDING CODE. A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER, LICENSED IN THE APPLICABLE STATE FOR THE PROJECT LOCATION, SHALL PREPARE THE SEISMIC RESTRAINT DESIGN AND CERTIFY THAT THE DESIGN IS IN COMPLIANCE WITH THE STATE BUILDING CODE REQUIREMENTS.

PART 2 - PRODUCTS

1. IDENTIFICATION: NAMEPLATES SHALL INDICATE EQUIPMENT TAG, VOLTAGE CHARACTERISTICS AND SOURCE OF POWER. REFER TO NAMEPLATE DETAIL FOR ADDITIONAL INFORMATION.

2. RACEWAYS AND CONDUIT: RIGID GALVANIZED STEEL CONDUIT (RGS) SHALL BE UTILIZED WITH THREADED FITTINGS ONLY. ELECTRICAL METALLIC TUBING (EMT) SHALL BE UTILIZED WITH SET SCREW TYPE FITTINGS. PROVIDE CONDUIT EXPANSION FITTINGS WITH EXTERNAL BONDING JUMPERS EQUAL TO OZ GEDNEY TYPE EX FOR RGS AND TYPE TX FOR EMT WHEN CROSSING EXPANSION JOINTS. UL LISTED LIQUID TIGHT FLEXIBLE METAL CONDUIT (LFMC) AND FLEXIBLE METAL CONDUIT (FMC) SHALL BE USED FOR FINAL CONNECTIONS TO EQUIPMENT WHERE FLEXIBILITY OR VIBRATION ISOLATION ARE REQUIRED. LFMC SHALL BE UV RESISTANT WHEN INSTALLED IN AN EXTERIOR LOCATION.

3. WIRE AND CABLE: ALL CONDUCTORS SHALL BE TYPE THHN/THWN OR XHHW, COPPER, RATED 75°/90°C, 600 VOLT INSULATION UNLESS OTHERWISE NOTED. MINIMUM SIZE CONDUCTOR SHALL BE #12 AWG COPPER. CONDUCTORS #10 AWG AND LARGER SHALL BE STRANDED; #12 AWG AND SMALLER SHALL BE SOLID. EACH BRANCH CIRCUIT AND FEEDER SHALL BE PROVIDED WITH AN INSULATED GROUNDING CONDUCTOR SIZED IN ACCORDANCE WITH NEC TABLE 250.122. CONDUCTOR COLOR CODING SHALL BE IN ACCORDANCE WITH THE DETAILS ON THESE DRAWINGS. COLOR CODING SHALL BE CONSISTENT THROUGHOUT INCLUDING CONDUCTORS INSTALLED IN RACEWAYS AND IN ALL CABLE ASSEMBLIES (MC AND/OR AC). FLEXIBLE METAL CLAD (MC) CABLE SHALL BE UL LISTED WITH INSULATED THHN PHASE AND GROUND CONDUCTORS WITHIN A GALVANIZED STEEL OR ALUMINUM INTERLOCKING ARMOR.

4. WIRING DEVICES AND PLATES: ALL DEVICES SHALL BE SPECIFICATION GRADE WITH NYLON PLATE, COLOR AS SPECIFIED BY THE ARCHITECT OR TO MATCH EXISTING. ALL DEVICES SHALL HAVE A GREEN GROUNDING TERMINAL ON THE YOKE. RECEPTACLES SHALL BE UL FEDERAL SPECIFICATION WC-596 EXTRA HEAVY DUTY 20A 125V EQUAL TO COOPER 5362. GFCI RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE 20A 125V EQUAL TO COOPER VGF20. SWITCHES SHALL BE INDUSTRIAL-INSTITUTIONAL HEAVY DUTY SPECIFICATION GRADE 20A 120/277V EQUAL TO COOPER 1200 SERIES. DEVICES MOUNTED IN EXTERIOR APPLICATIONS SHALL BE WR LISTED.

5. SAFETY DISCONNECT SWITCHES: DISCONNECT SWITCHES SHALL BE THREE-POLE HEAVY DUTY TYPE RATED FOR 600 VOLT IN NEMA 1 (INTERIOR DRY APPLICATIONS) AND NEMA 3R (EXTERIOR APPLICATIONS) ENCLOSURES UNLESS NOTED OTHERWISE ON THE DRAWINGS. ALL SWITCHES SHALL BE HORSEPOWER RATED AND SUITABLE FOR SERVICE ENTRANCE USE WHERE INDICATED ON THE DRAWINGS. PROVIDE WITH SOLID NEUTRAL WHERE FOUR WIRE CIRCUITS ARE ILLUSTRATED. MANUAL MOTOR STARTERS SHALL HAVE QUICK MAKE, QUICK BREAK TOGGLE MECHANISMS WITH ALLOWANCE FOR UP TO 10% FIELD ADJUSTMENT TO NOMINAL OVERLOAD HEATER VALUES. MANUAL MOTOR STARTERS SHALL BE SINGLE PHASE AND MAY BE USED FOR APPLICATIONS UP TO 1 HP AT 277 VOLT. ACCEPTABLE MANUFACTURERS SHALL BE SQUARE D, GE, SIEMENS OR EATON CUTLER-HAMMER.

6. LIGHTING: FLUORESCENT FIXTURES SHALL HAVE ELECTRONIC BALLAST WITH HIGH POWER FACTOR AND SOUND RATING "A". TOTAL HARMONIC DISTORTION SHALL BE LESS THAN 10%. BALLAST SHALL BE PROGRAMMED RAPID START OR INSTANT START AND HAVE A MINIMUM BALLAST FACTOR OF 0.88. ACCEPTABLE BALLAST MANUFACTURER ARE OSRAM SYLVANIA INC., ADVANCE ELECTRIC, OR APPROVED EQUAL. ELECTRONIC BALLAST THAT OPERATE T-5 AND COMPACT FLUORESCENT LAMPS SHALL HAVE END-OF-LAMP-LIFE SHUT DOWN TO PROTECT AGAINST LAMP OVER HEATING. LAMPS SHALL HAVE MINIMUM CRI RATING OF 82. FLUORESCENT LAMPS IN DIMMED FIXTURES SHALL BE SEASONED BY OPERATION AT FULL INTENSITY FOR 100 HOURS PRIOR TO DIMMING.

7. LIGHTING CONTROL EQUIPMENT: LIGHTING CONTROL PANELS SHALL BE STAND ALONE PROGRAMMABLE SYSTEMS WITH CAPABILITY TO CONTROL MULTIPLE LIGHTING CIRCUITS BASED UPON USER INTERFACE OR PROGRAMMED EVENTS. NETWORK INTERFACE SHALL BE PROVIDED TO ALLOW MONITORING AND OVER RIDE CAPABILITIES FROM AN OWNER PROVIDED WORK STATION. LIGHTING CONTROL SHALL BE VIA 20A 120-277V RATED RELAYS WITH A MINIMUM 10 YEAR WARRANTY. USER INTERFACE CAPABILITIES SHALL INCLUDE MOMENTARY CONTACT SWITCHES, OCCUPANCY SENSORS OR PHOTOCELLS AS DEFINED ON THE DRAWINGS. MOMENTARY CONTACT SWITCHES SHALL BE SPECIFICATION GRADE DEVICES EQUAL TO COOPER 1895GY.

8. FIRE ALARM SYSTEM MODIFICATIONS:

A. MODIFICATIONS MADE TO THE BASE BUILDING FIRE ALARM SYSTEM SHALL BE MADE IN COMPLIANCE WITH ALL APPLICABLE CODES AND REQUIREMENTS. ALL NEW COMPONENTS SHALL BE UL LISTED FOR THEIR INTENDED PURPOSE AND CROSS-LISTED FOR USE ON THE EXISTING SYSTEM.

B. THE ADDITION OF NEW INITIATING DEVICES OR NOTIFICATION APPLIANCES TO THE EXISTING SLC AND NAC SHALL NOT ADVERSELY EFFECT SUPERVISION. THE WIRING CLASS FOR THE ADDITION OF DEVICES SHALL BE CONSISTENT WITH EXISTING AND PER THE RISER DIAGRAM INCLUDED IN THESE DRAWINGS.

C. NEW DEVICES SHALL BE PROGRAMMED TO INITIATE ACTION IN ACCORDANCE WITH THE EXISTING SEQUENCE OF OPERATION AS APPROVED BY THE AHJ. SYSTEM SUBMITTAL SHALL INCLUDE AN INPUT/OUTPUT MATRIX CLEARLY DEFINING THE SEQUENCE FOR EACH ADDED DEVICE.

D. PROVIDE DISTRIBUTED INTELLIGENT POWER SUPPLIES TO ACCOMMODATE THE POWER REQUIREMENTS OF NAC CIRCUITS. POWER SUPPLIES SHALL COMMUNICATE WITH THE FACP VIA DATA COMMUNICATIONS, WHEREBY EACH POWER SUPPLY SHALL REPORT A LOSS OF AC POWER, BATTERY FAIL OR GROUND FAULT, AND EACH NOTIFICATION APPLIANCE CIRCUIT SERVED SHALL BE INDIVIDUALLY MONITORED FOR WIRING INTEGRITY. POWER SUPPLIES/AMPLIFIERS SHALL BE SIZED TO ACCOMMODATE THE DESIGN LOAD PLUS RESERVE CAPACITY OF 50% OR 1 WATT/1,000 SF, WHICHEVER IS GREATER. STANDBY BATTERIES SHALL SUPPORT THE SYSTEM IN THE EVENT OF A LOSS OF PRIMARY POWER FOR 24 HOURS OF FULL SUPERVISORY OPERATION FOLLOWED BY 15 MINUTES OF ALARM. BATTERIES SHALL BE MOUNTED INTEGRAL TO THE POWER SUPPLY CABINET.

E. PROVIDE FIRE ALARM TERMINAL CABINETS WHERE NECESSARY. THE CABINETS SHALL HAVE A REMOVABLE HINGED COVER WITH LOCK AND HIGH BARRIER TERMINAL STRIPS WITH 64 OR 128 POINT CAPACITY MOUNTED TO A PLYWOOD BACKBOARD. TERMINAL CABINETS SHALL BE RED AND LABELED WITH PERMANENT WHITE LETTERING.

F. VISUAL SIGNAL SHALL BE SELF-SYNCHRONIZING XENON STROBES RATED BY UL 1971 TEST CRITERIA AND IN ACCORDANCE WITH NFPA 72. VISUAL SIGNALS SHALL HAVE A MINIMUM EFFECTIVE INTENSITY OF 15 CANDELA (CD) OR AS OTHERWISE SPECIFIED ON THE DRAWINGS. DEVICES SPECIFIED AS 15CD SHALL BE 15/75CD DUAL RATED. MULTIPLE STROBES VISIBLE FROM A SINGLE LOCATION SHALL BE SYNCHRONIZED.

G. SUBMITTALS: PROVIDE THE FOLLOWING DOCUMENTS FOR REVIEW AND EVALUATION 1) POINT TO POINT WIRING DIAGRAMS OF THE PROPOSED MODIFICATION INCLUDING ALL CONDUCTOR QUANTITY AND SIZING 2)PANEL LAYOUTS INDICATING MODULE PLACEMENT AND SPARE CAPACITY ALLOWANCE FOR FUTURE EXPANSION 3)MANUFACTURERS CATALOG CUT SHEETS OF ALL COMPONENTS AND DEVICES WITH INTERCONNECTION DIAGRAMS 4) BATTERY CAPACITY CALCULATIONS INDICATING REQUIRED AND SPARE CAPACITY 5)POWER SUPPLY CAPACITY CALCULATIONS INCLUDING EACH CIRCUIT LOAD, VOLTAGE DROP AND SPARE CAPACITY 6) WRITTEN TEST REPORT FOR NOTIFICATION OF SUCCESSFUL COMPLETION OF EACH REQUIRED TEST AND SYSTEM RECORD OF COMPLETION. 7) AS-BUILT DRAWINGS INCLUDING ALL DEVICE ADDRESSES AND ALPHANUMERIC DESCRIPTORS ASSIGNED IN THE CONTROL PANEL.

PART 3 EXECUTION

1. GENERAL: ALL INTERRUPTIONS AND SHUTDOWNS OF EXISTING ELECTRICAL SYSTEMS AND SERVICES SHALL BE AS SHORT AS POSSIBLE AND AT A TIME AND DURATION APPROVED BY THE OWNER AND ENGINEER. THE CONTRACTOR SHALL INCLUDE ALL PREMIUM TIME ASSOCIATED WITH THE SYSTEM AND SERVICE INTERRUPTIONS AND SHUTDOWNS.

2. IDENTIFICATION: FURNISH AND INSTALL NAMEPLATES ON ALL ELECTRICAL EQUIPMENT INCLUDING PANELS, JUNCTION BOXES, DISCONNECT SWITCHES, TRANSFORMERS AND STARTERS.

3. RACEWAYS AND CONDUIT: REFER TO POWER, LIGHTING AND FIRE ALARM DRAWINGS FOR ALLOWABLE WIRING METHODS. EMT MAY BE USED WITH SET SCREW FITTINGS IN CONCEALED AND EXPOSED LOCATIONS WHERE NOT EXPOSED TO PHYSICAL DAMAGE OR MOISTURE. USE RIGID GALVANIZED STEEL WITH THREADED FITTINGS WHERE EMT PROHIBITED. ALL RACEWAYS, WHICH PASS THROUGH BUILDING EXPANSION JOINTS, SHALL BE EQUIPPED WITH EXPANSION FITTINGS. ALL CONDUITS SHALL BE SUPPORTED IN AN APPROVED MANNER TO THE BUILDING STRUCTURE. SUPPORT FROM CONDUITS, DUCTWORK, PIPING, ETC. WILL NOT BE PERMITTED. RACEWAYS SHALL BE RUN CONCEALED UNLESS NOTED OTHERWISE, PERPENDICULAR AND/OR PARALLEL TO THE BUILDING STRUCTURE. NECA STANDARDS SHALL DEFINE MINIMUM QUALITY LEVEL FOR INSTALLATION WHERE APPLICABLE.

4. WIRE AND CABLE: BRANCH CIRCUIT WIRING IS NOT ILLUSTRATED ON THE DRAWINGS AND IS INDICATED BY CIRCUIT NUMBERS NEXT TO FIXTURES, EQUIPMENT AND DEVICES. PROVIDE COMPLETE WIRING SYSTEM TO MEET ILLUSTRATED INTENT. CONDUIT HOMERUNS SHOWN ON THE DRAWINGS WITH MORE THAN 3 CURRENT CARRYING CONDUCTORS ARE SHOWN DIAGRAMMATICALLY. THE INSTALLATION OF MORE THAN 3 CURRENT CARRYING CONDUCTORS IN A COMMON RACEWAY SHALL REQUIRE THE DERATING OF ALL ASSOCIATED CONDUCTORS. ALL CIRCUITS SHALL CONTAIN A FULL SIZE, INSULATED GROUND CONDUCTOR.

5. WIRING DEVICES AND PLATES: ALL DEVICES OTHER THAN 20A 120V SHALL BE CLEARLY LABELED WITH PERMANENTLY APPLIED NAMEPLATES (OR ENGRAVED FACEPLATES) DETAILING THE VOLTAGE CHARACTERISTICS AND CIRCUIT NUMBER.

6. SAFETY DISCONNECT SWITCHES: FUSES SHALL BE CLASS RK-1 SIZED PER DRAWING AND NAMEPLATE REQUIREMENTS. INSTALL REJECTION CLIPS TO PROHIBIT INSTALLATION OF OTHER THAN CURRENT LIMITING FUSES.

7. PANELBOARDS: THE CONTRACTOR SHALL BALANCE PANELBOARD LOADS TO WITHIN 10% PHASE TO PHASE. PROVIDE NEW AND OR UPDATED TYPEWRITTEN DIRECTORIES OF BRANCH CIRCUITS IN ALL PANELBOARDS, NEW AND EXISTING, WHICH ARE MODIFIED UNDER THIS CONTRACT. INDICATE CIRCUIT CHANGES IN AS-BUILT RECORD DRAWINGS.

8. LIGHTING: ALL LIGHT FIXTURES SHALL BE SUPPORTED IN AN APPROVED MANNER TO THE BUILDING STRUCTURE WITH A MINIMUM OF TWO SAFETY CHAINS, CONNECTED AT OPPOSITE ENDS OF THE FIXTURE. SUPPORT FROM CONDUITS, DUCTWORK, PIPING, ETC. WILL NOT BE PERMITTED.

9. LIGHTING CONTROL EQUIPMENT: PROGRAM CONTROL PANELS IN ACCORDANCE WITH THE SCHEDULE INCLUDED ON THE DRAWINGS AND PER OWNER INPUT FOR ON/OFF SWEEP TIMES. ADJUST ALL INDIVIDUAL OCCUPANCY SENSOR TIME DELAYS TO 15 MINUTES AND SET TO "MANUAL ON" OPERATION. SENSOR SENSITIVITY SHALL BE ADJUSTED FOR 100% COVERAGE OF THE ASSOCIATED SPACE AND FOR MINIMIZATION OF FALSE SENSING FROM ADJOINING AREAS WITH DOORS IN THEIR NORMAL POSITIONS (OPEN OR CLOSED).

10. FIRE ALARM SYSTEM MODIFICATIONS:

A. ALL NEW DETECTORS SHALL BE LABELED WITH ASSIGNED ADDRESS ON BOTH THE DETECTOR HOUSING AND THE BASE WITH A BLACK ON CLEAR TYPED LABEL EQUAL TO KROY. THE BASE ADDRESS SHALL BE LEGIBLE WITHOUT REMOVAL OF THE DETECTOR. THE DETECTOR ADDRESS SHALL BE CONCEALED WHEN PLACED INTO THE BASE.

B. ALL JUNCTION BOXES SHALL BE SPRAYED RED AND LABELED "FIRE ALARM". CONDUIT COUPLINGS SHALL BE SPRAY PAINTED RED PRIOR TO INSTALLATION.

C. CONNECTIONS AND SPLICES SHALL BE MADE USING SCREW TERMINAL BLOCKS. THE USES OF WIRE NUT TYPE CONNECTORS ARE PROHIBITED IN THE SYSTEM.

D. PERFORM INSULATION TESTING (MEGGER), CONTINUITY AND LOOP RESISTANCE CHECKS ON ALL SYSTEM CONDUCTORS TO DETERMINE THAT THE SYSTEM IS FREE FROM GROUNDED, SHORTED, OR OPEN CIRCUITS. THESE TESTS SHALL BE CONDUCTED PRIOR TO THE INSTALLATION OF FIRE ALARM EQUIPMENT. LOOP RESISTANCE MEASUREMENT SHALL VERIFY THAT THE LOOP RESISTANCE DOES NOT EXCEED THE MANUFACTURERS SPECIFIED LIMITS. CORRECTIONS SHALL BE MADE AND THE SYSTEM SHALL BE RETESTED IF DEFICIENCIES ARE FOUND. A WRITTEN REPORT SHALL BE SUBMITTED DETAILING THE RESULTS OF THE PRELIMINARY TESTS SHALL ACCOMPANY THE REQUEST FOR FINAL ACCEPTANCE TEST.

E. THE FIRM WHO HOLDS THE EXISTING SYSTEM MAINTENANCE CONTRACT SHALL PERFORM FINAL CONNECTIONS, PROGRAMMING, AND TESTING. THE CONTRACTOR SHALL CARRY ALL COSTS ASSOCIATED WITH FINAL CONNECTIONS, PROGRAMMING AND TESTING AS WELL AS DISABLING CONNECTIONS TO THE MUNICIPAL LOOP DURING FINAL CONNECTIONS AND TESTING.

F. CERTIFY INSTALLATION WITH THE SUCCESSFUL COMPLETION OF ALL ASSOCIATED NFPA 72 TESTS, MEASURE SOUND PRESSURE LEVELS IN ALL ROOMS WITHIN THE SCOPE OF THIS PROJECT AND VERIFY INTELLIGIBILITY OF VOICE EVACUATION SYSTEMS IN ACCORDANCE WITH NFPA 72. ADJUST TAP SETTINGS AND RETEST WHERE SOUND LEVELS ARE NON-CONFORMING. SUBMIT THE TEST REPORTS FOR REVIEW PRIOR TO REQUEST FOR FINAL PUNCH LIST INSPECTION.

11. EQUIPMENT TESTING AND CLEANING:

A. CLEAN THE INTERIOR AND EXTERIOR OF ALL EQUIPMENT AT PROJECT COMPLETION OF ALL CONSTRUCTION DEBRIS AND RESIDUE. DAMAGED SURFACES SHALL BE REPAIRED AND FINISHES TOUCHED UP PAINT TO MATCH THE MANUFACTURER'S FINISH. EXTENSIVELY DAMAGED ENCLOSURES SHALL BE REPLACED.

B. TEST THE INSULATION RESISTANCE BETWEEN EACH PHASE AND GROUND OF ALL FEEDERS ILLUSTRATED ON THE ONE LINE DIAGRAM. PROVIDE A TEST REPORT INDICATING THE RESULTS. REPLACE ALL CONDUCTORS THAT FAIL TO COMPLY WITH NETA TESTING STANDARDS.

C. VERIFY VOLTAGE AT THE ASSOCIATED PANELBOARD UNDER LOAD AND ADJUST TAP SETTINGS AS REQUIRED TO DELIVER NOMINAL VOLTAGE DURING NORMAL AND LIGHTLY LOADED CONDITIONS.

PART 4 PROJECT CLOSEOUT

1. PROJECT CLOSEOUT: A CERTIFICATE OF COMPLETION SHALL BE ISSUED BY THE CONTRACTOR INDICATING THAT THE INSTALLATION IS IN CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS AND ALL APPLICABLE LOCAL, STATE AND FEDERAL STATUTES AND CODES. ALL SUBMITTALS, AS-BUILTS, O&M MANUALS, AND BALANCING REPORTS ARE TO BE PROVIDED, FOR ENGINEER'S REVIEW, PRIOR TO REQUEST FOR COMPLETION CERTIFICATES. IN ADDITION, AND ALSO PRIOR TO REQUEST FOR COMPLETION CERTIFICATES, ALL PUNCH LIST ITEMS MUST BE COMPLETED TO THE SATISFACTION OF THE ENGINEER. THE CONTRACTOR MUST VERIFY THAT ALL SEQUENCES OF OPERATIONS AND CONTROLS HAVE BEEN INCORPORATED AND ALL SYSTEMS AND EQUIPMENT ARE WORKING PER THE SPECIFIED SEQUENCES OF OPERATIONS. A BLANK CONTRACTOR'S CERTIFICATE FORM CAN BE FURNISHED BY RDK ENGINEERS UPON REQUEST. FINAL OBSERVATION/ WALK-THROUGH BY THE ENGINEER SHALL BE CONDUCTED AFTER RECEIPT OF THE CERTIFICATE OF COMPLETION. PREMATURE REQUESTS FOR FINAL OBSERVATION/WALK-THROUGHS THAT REQUIRE RE-OBSERVATION OF DEFICIENT ITEMS WILL RESULT IN BACK CHARGES OF THE COSTS ASSOCIATED WITH THE RE-OBSERVATION.

ELECTRICAL DEMOLITION NOTES

DEMOLITION NOTES:

1. REFER TO THE ARCHITECTURAL DRAWINGS FOR THE EXTENT OF THE DEMOLITION SCOPE OF WORK AND AREA. THE DEMOLITION PLANS INDICATE THE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL ITEMS TO BE REMOVED OR RETAINED.

2. VISIT THE SITE PRIOR TO SUBMISSION OF THE BIDS TO BECOME FAMILIAR WITH THE ACTUAL CONDITIONS AND EXTENT OF THE WORK.

3. TRACE AND LABEL ALL EXISTING SYSTEMS WITHIN THE DEMOLITION AREA AND BEYOND PRIOR TO DISCONNECTION AND REMOVAL TO ENSURE THAT NO AREA OUTSIDE THE DEMOLITION AREA IS AFFECTED. REVIEW IN DETAIL WITH THE GENERAL CONTRACTOR AND OWNER WHAT IS TO BE REMOVED AND REMAIN PRIOR TO WORK COMMENCING THE DEMOLITION. THERE SHALL BE NO INTERRUPTION OF SERVICES OUTSIDE THE DEMOLITION AREA WITHOUT APPROVAL FROM THE OWNER'S REPRESENTATIVE.

4. NOTIFY THE OWNER'S REPRESENTATIVE IMMEDIATELY OF ANY UNANTICIPATED HIDDEN CONDITIONS ENCOUNTERED DURING THE DEMOLITION.

5. ALL ITEMS REMOVED SHALL BE OFFERED TO THE OWNER FOR SALVAGE. IF THE OWNER DOES NOT TAKE POSSESSION, DISPOSE OF THE ITEMS IN A SAFE AND LEGAL MANNER. ALL ITEMS CLASSIFIED AS HAZARDOUS SHALL BE DISPOSED AS HAZARDOUS WASTES AND A UNIFORM HAZARDOUS WASTE MANIFEST SHALL BE PROVIDED TO THE OWNER.

6. NOTIFY UTILITY COMPANIES IN ACCORDANCE WITH THEIR REQUIREMENTS PRIOR TO DEMOLITION. VERIFY THAT THE UTILITIES HAVE BEEN DISCONNECTED, CAPPED AND MADE SAFE PRIOR TO DEMOLITION.

7. ENSURE THE SAFE PASSAGE OF PERSONS IN AND AROUND THE BUILDING DURING DEMOLITION. PREVENT INJURY TO PERSONS AND DAMAGE TO PROPERTY. PROVIDE ADEQUATE SHORING AND BRACING TO PREVENT COLLAPSE. IMMEDIATELY REPAIR DAMAGED PROPERTY TO THE CONDITION BEFORE BEING DAMAGED. TAKE EFFECTIVE MEASURES TO PREVENT WINDBLOWN DUST.

8. DO NOT USE CUTTING TORCHES UNTIL WORK AREA IS CLEARED OF FLAMMABLE MATERIALS. AT CONCEALED SPACES, SUCH AS PIPE INTERIORS, VERIFY CONDITION AND CONTENTS OF HIDDEN SPACE BEFORE STARTING FLAME-CUTTING OPERATIONS. MAINTAIN FIRE WATCH AND PORTABLE FIRE-SUPPRESSION DEVICES DURING FLAME-CUTTING OPERATIONS. MAINTAIN ADEQUATE VENTILATION WHEN USING CUTTING TORCHES.

9. ALL DEMOLITION SCOPE ASSOCIATED WITH LOW VOLTAGE SYSTEMS INCLUDING BUT NOT LIMITED TO TELEPHONE, DATA, SECURITY, PAGING, CCTV, ETC. SHALL BE INCLUDED IN THIS CONTRACT.

10. CIRCUIT TRACE AND LABEL ALL EXISTING BRANCH CIRCUITS AND FEEDERS WITHIN THE AREA OF DEMOLITION SCOPE PRIOR TO DE-ENERGIZING AND DISCONNECTION. ALL CIRCUITS WITHIN PANELBOARDS IDENTIFIED FOR REMOVAL SHALL BE TRACED AND LABELED TO ENSURE THAT NO AREA OUTSIDE THE DEMOLITION SCOPE LIMIT IS AFFECTED.

11. DE-ENERGIZE AND REMOVE ALL CONDUCTORS AND RACEWAYS TO THEIR POINTS OF ORIGIN WITHIN THE AREA OF DEMOLITION SCOPE. ITEMS IDENTIFIED FOR DEMOLITION SHALL NOT BE ABANDONED IN PLACE. RACEWAYS THAT ENTER MASONRY WALLS AND FLOORS SHALL BE CUT FLUSH AT THE SURFACE FOR PATCHING BY OTHERS. ALL CIRCUIT BREAKERS ASSOCIATED WITH THE DEMOLITION SCOPE SHALL BE DE-ENERGIZED AND LABELED SPARE.

12. THE EXISTING FIRE ALARM SYSTEM SHALL REMAIN FULLY FUNCTIONAL DURING THE ENTIRE DEMOLITION AND CONSTRUCTION PERIOD. REUSE OF EXISTING FIRE ALARM SYSTEM RACEWAYS SHALL NOT BE ALLOWED. ALL REQUIRED SYSTEM SHUTDOWNS SHALL BE COORDINATED WITH AND APPROVED BY THE OWNER'S REPRESENTATIVE AND THE AUTHORITY HAVING JURISDICTION. DEMOLITION OF THE EXISTING SYSTEM SHALL NOT COMMENCE UNTIL THE NEW SYSTEM HAS BEEN COMPLETELY INSTALLED, TESTED AND APPROVED BY THE AUTHORITY HAVING JURISDICTION.

13. CREATE AND SUBMIT IMPAIRMENT PLANS TO THE AHJ IF ANY PORTION OF THE EXISTING FIRE ALARM SYSTEM IS TAKEN OUT OF SERVICE DURING THE EXECUTION OF THE PROJECT.

14. REMOVED FLUORESCENT AND HID LAMPS AND BATTERIES SHALL BE RECYCLED BY A FACILITY APPROVED BY THE OWNER'S REPRESENTATIVE.

15. ALL BALLASTS IN LIGHTING FIXTURES TO BE DISPOSED SHALL BE VERIFIED TO BE PCB FREE. ALL BALLASTS MANUFACTURED PRIOR TO 1979 AND NOT LABELED AS PCB FREE SHALL BE CONSIDERED TO CONTAIN PCBS. PROVIDE WRITTEN VERIFICATION TO THE OWNER'S REPRESENTATIVE THAT CONFIRMS PCB FREE WASTE. WHERE PCB FREE WASTE CANNOT BE VERIFIED, BALLASTS SHALL BE RECYCLED BY A FACILITY APPROVED BY THE OWNER'S REPRESENTATIVE, WITH PCB COMPONENTS ELIMINATED BY A HIGH TEMPERATURE INCINERATION.

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Project Title:
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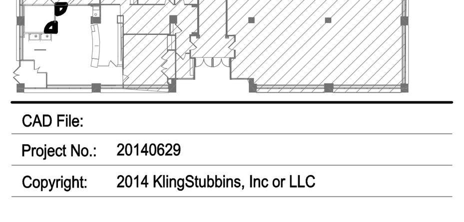
Number	Description	Date
	ISSUED FOR PERMIT & CONSTR	03 OCT 14

Key Plan: Project North



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Drawing Sheet Title :
ELECTRICAL SPECIFICATIONS & DEMOLITION NOTE

Drawing Sheet Number:
E-1000

Owner's Drawing Sheet No.:

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