ELECTRICAL SPECIFICATION

<u>GENERAL NOTES</u>

- . WORK SHALL CONFORM TO THE MASSACHUSETTS ELECTRICAL CODE, NATIONAL ELECTRICAL CODE AND REQUIREMENTS OF LOCAL AUTHORITIES HAVING JURISDICTION.
- 2. THE WORD "CONTRACTOR" AS USED IN THE "ELECTRICAL WORK" SHALL MEAN THE ELECTRICAL SUBCONTRACTOR.
- 3. CONTRACTOR SHALL PAY FOR ALL PERMITS, INSURANCE, TESTS AND SHALL PROVIDE LABOR AND MATERIAL TO COMPLETE THE ELECTRICAL WORK SHOWN.
- I. EXCEPT AS OTHERWISE NOTED, THE ELECTRICAL WORK SHALL INCLUDE DEMOLITION, CIRCUIT BREAKERS, FEEDERS, WIRING, RACEWAYS, LIGHTING FIXTURES, DEVICES, SAFETY SWITCHES, AND CONNECTIONS NECESSARY TO OPERATE OTHER EQUIPMENT.
- AUTOMATIC TEMPERATURE CONTROLS SHALL BE PROVIDED AND INSTALLED BY THE MECHANICAL SUBCONTRACTOR. STARTERS AND OTHER CONTROL DEVICES FOR EQUIPMENT SHALL BE PROVIDED BY THE MECHANICAL SUBCONTRACTOR FOR INSTALLATION AND CONNECTION BY THIS CONTRACTOR.
- 6. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY LIGHTING AND POWER AND PAY ALL ENERGY CHARGES.
- DURING CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL KEEP HIS PORTION OF THE WORK NEAT, CLEAN AND ORDERLY.
- 8. ALL SYSTEMS SHALL BE TESTED FOR SHORT CIRCUITS AND GROUNDS PRIOR TO ENERGIZING. ANY DEFECTS SHALL BE
- 9. ALL CUTTING AND PATCHING REQUIRED FOR ELECTRICAL WORK SHALL BE INCLUDED AS PART OF THIS SECTION.
- 10. MATERIALS SHALL BE SPECIFICATION GRADE AND UL LISTED.
- 11. WHERE MATERIALS IS CALLED OUT IN THE LEGEND BY THE MANUFACTURER, TYPE OR CATALOG NUMBER, SUCH DESIGNATIONS ARE TO ESTABLISH STANDARDS OF DESIRED QUALITY, ACCEPTANCE OR REJECTION OF PROPOSED SUBSTITUTIONS SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER.
- 12. WORK SHALL BE COORDINATED WITH THAT OF OTHER TRADES TO ELIMINATE INTERFERENCES. 13. EXACT LOCATIONS OF MECHANICAL EQUIPMENT SHALL BE VERIFIED WITH HVAC SUBCONTRACTOR PRIOR TO ROUGHING FOR
- 14. ELECTRICAL CONTRACTOR SHALL OBTAIN SHOP DRAWINGS/SPECIFICATIONS OF ALL EQUIPMENT FROM THE MECHANICAL CONTRACTOR PRIOR TO PURCHASING AND INSTALLING ELECTRICAL EQUIPMENT FOR SAME. NOTIFY ENGINEER OF ANY DISCREPANCIES BETWEEN ACTUAL EQUIPMENT INSTALLED AND CONTRACT DOCUMENTS.
- 15. ELECTRICAL WORK SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF WHICH SYSTEM IS PUT INTO
- 16. WORK SHALL BE GROUNDED IN ACCORDANCE WITH CODE REQUIREMENTS. COMPLETE EQUIPMENT GROUNDING SYSTEM (INSULATED GREEN WIRE) SHALL BE INSTALLED.
- 17. WIRE AND COPPER, TYPE THHN/THWN INSULATED FOR 75°C WET OR DRY LOCATIONS 600 VOLTS, MINIMUM SIZE #12 AWG COPPER UNLESS SPECIFICALLY NOTED OTHERWISE.
- 18. WIRING METHODS:
- A. INTERIOR FEEDERS SHALL BE INSTALLED IN EMT. B. EMERGENCY LIGHTING CIRCUITRY SHALL BE INSTALLED IN EMT.
- FIRE ALARM WIRING SHALL BE INSTALLED IN EMT.
- INTERIOR BRANCH CIRCUITS ABOVE HUNG CEILINGS SHALL BE BE MC CABLE WITH GREEN INSULATED GROUND. INTERIOR BRANCH CIRCUITS FOR HVAC EQUIPMENT SHALL BE EMT.
- LIGHTING FIXTURE CONNECTIONS SHALL BE FLEXIBLE WHIPS. G. TELEPHONE CABLING SHALL BE BY OTHERS.
- H. DATA CABLING SHALL BE BY OTHERS.

MATCH OUTLET BOXES SPECIFIED.

- SECURITY CABLING SHALL BE BY OTHERS. I. EMPTY CONDUIT SYSTEM SHALL HAVE A NYLON PULL CORD.
- 19. CONNECTORS FOR RIGID CONDUIT SHALL BE MADE WITH THREADED COUPLINGS. CONNECTORS FOR ELECTRIC METALLIC TUBING SHALL BE DOUBLE SET SCREW TYPE. CONNECTORS FOR FLEXIBLE LIQUID TIGHT CONDUIT SHALL BE COMPRESSION TYPE WITH INSULATED THROATS, CONDUIT AND TUBING SHALL BE SUPPORTED ON GALVANIZED WALL BRACKETS, TRAPEZE HANGERS, OR PIPE STRAPS, SECURED BY MEANS OF TOGGLE BOLTS OR INSERTS IN WOOD CONSTRUCTION. FEEDERS SHALL BE ROUTED TIGHT TO THE UNDERSIDE OF THE BUILDING STRUCTURE. CONDUIT SHALL BE INSTALLED PARALLEL AND PERPENDICULAR TO MAIN BUILDING SUPPORTS.
- 20. BOXES SHALL BE GALVANIZED STEEL AND SHALL BE SIZED TO ACCOMMODATE THE EQUIPMENT OR APPARATUS TO BE INSTALLED. WHERE BOXES OF A STANDARD MAKE ARE NOT AVAILABLE. SPECIAL BOXES SHALL BE MANUFACTURED. FIXTURE SUPPORTED ON THE CEILING OR ON THE WALL SHALL HAVE SUITABLE FIXTURE SUPPORT FOR THE SPECIFIC FIXTURE.
- 21. CONTRACTOR SHALL PHASE BALANCE PANELBOARDS IN THE FIELD. LOAD ON EACH PHASE SHALL BE BALANCED WITHIN 10% OF EACHOTHER.
- 22. WALL PLATES SHALL BE PROVIDED FOR EACH SWITCH, RECEPTACLE ETC. PROVIDE WALL PLATES WITH WHITE FINISH FOR ALL DEVICES IN FINISHED AREAS. FOR DEVICES IN UNFINISHED AREAS, PROVIDE CAST IRON OR ALLOY OF SUITABLE TYPE TO
- 23. DUPLEX WALL RECEPTACLES SHALL BE 2 POLE, 3 WIRE, GROUNDING TYPE 20 AMPERE, 125 VOLT WITH METAL PLASTER EARS. RECEPTACLES SHALL BE NEMA STANDARD CONFIGURATION 5-20R.
- 24. FURNISH AND INSTALL SLEEVES IN FLOORS, BEAMS, WALLS, ETC REQUIRED FOR INSTALLING THIS WORK.
- 25. CONDUIT PASSING THROUGH FIRE-RATED WALLS AND FLOORS SHALL BE PROVIDED WITH ALL NECESSARY MATERIALS TO INSURE THAT THE FIRE—RATED INTEGRITY IS MAINTAINED.
- 26. FEEDER TAPS WILL NOT BE ALLOWED IN PANELBOARD GUTTERS.
- 27. CONDUIT RUNS AS SHOWN ON THE PLANS ARE DIAGRAMMATIC ONLY; EXACT LOCATION AND METHOD OF SUPPORT SHALL BE DETERMINED IN THE FIELD.
- 28. CONTRACTOR SHALL CHECK EXISTING CONDITIONS TO DETERMINE EXACT EXTENT OF WORK TO BE PERFORMED PRIOR TO BIDDING. DIMENSIONS RELEVANT TO EXISTING WORK SHALL BE VERIFIED IN THE FIELD.
- 29. IN AREAS NOT AFFECTED TO THIS RENOVATION, THE CONTRACTOR SHALL MAINTAIN CONTINUITY OF ELECTRIC SERVICE.
- 30. PRIOR TO THE REMOVAL OF EQUIPMENT, THE OWNER WILL INDICATE WHICH EXISTING DEVICES OR MATERIALS SHALL BE
- SALVAGED AND TURNED OVER TO SAME. 31. EXISTING LIGHTING FIXTURES TO BE REMOVED, ALL EXISTING OBSOLETE WIRING, CONDUIT AND ELECTRICAL DEVICES SHALL BE
- REMOVED BY THE CONTRACTOR. WIRING AND DEVICES TO REMAIN SHALL BE CONNECTED AND LEFT IN WORKING ORDER. 32. WHERE CONNECTIONS ARE MADE IN EXISTING PANELS, THE PANEL INDEX SHALL BE REVISED TO INDICATE THE NEW LOADS
- SERVED. NEW CIRCUIT BREAKERS ADDED TO EXISTING PANELS SHALL BE THE SAME FRAME SIZE, VOLTAGE RATING AND INTERRUPTING CAPACITY AS EXISTING PANELS AND CIRCUIT BREAKERS.
- 33. EXISTING LIGHTING FIXTURES INDICATED TO BE REUSED SHALL BE PUT IN PROPER OPERATING CONDITION. CLEAN, RELAMP AND REPAIR EXISTING LIGHTING FIXTURES AS REQUIRED.
- 34. WHERE EXISTING EQUIPMENT AND DEVICES ARE INDICATED TO BE RELOCATED, ALL ASSOCIATED CONDUIT, WIRE AND APPURTENANCES SHALL BE EXTENDED, RELOCATED OR PROVIDED AS REQUIRED.
- 35. ELECTRICAL SHUTDOWN SHALL BE AT AT TIME AND DATE APPROVED BY THE OWNER.

BE CAST IRON OR ALLOY OF SUITABLE TYPE TO MATCH THE EXISTING OUTLET BOX.

- 36. WHERE EXISTING DEVICES ARE INDICATED TO BE REMOVED, CONTRACTOR SHALL PROVIDE BLANK COVER PLATE ON THE EXISTING OUTLET. COVER PLATE SHALL BE STAINLESS STEEL IN FINISHED AREAS AND IN UNFINISHED AREAS, PLATES SHALL
- 37. WHERE EXISTING WIRING IS INDICATED TO BE REUSED, CONTRACTOR SHALL VERIFY THAT THE INTEGRITY OF THE INSULATION IS ADEQUATE FOR REUSE. CONTRACTOR SHALL REPLACE EXISTING WIRING WHERE REQUIRED.
- 38. INTERRUPTIONS TO EXISTING ELECTRIC SERVICES AND SYSTEMS SHALL BE AS SHORT AS POSSIBLE AND AT A TIME AND DURATION APPROVED BY THE ARCHITECT OR OWNER. INCLUDE ALL PREMIUM TIME ASSOCIATED WITH INTERRUPTIONS.

ELECTRICAL SPECIFICATION

<u>PANELBOARDS</u>

- A. FURNISH AND INSTALL NEW LIGHTING AND DISTRIBUTION PANELS, COMPLETE WITH ALL CIRCUIT BREAKERS AS SHOWN ON
- B. SUBMIT SHOP DRAWINGS COMPLETE WITH MANUFACTURER'S PRODUCT DATA OF ALL MATERIALS AND SYSTEMS TO THE ENGINEER FOR APPROVAL. SHOP DRAWINGS SHALL INCLUDE COMPLETE PRODUCT DESCRIPTION AND SPECIFICATIONS, PERFORMANCE TEST DATA, PREPARATION AND INSTALLATION INSTRUCTIONS. DO NOT ORDER MATERIALS OR BEGIN INSTALLATION UNTIL THE ENGINEER'S REVIEW OF SUBMITTALS HAS BEEN OBTAINED. THE FOLLOWING INFORMATION SHALL BE SUBMITTED:
- BREAKER LAYOUT DRAWING WITH DIMENSIONS INDICATED AND NAMEPLATE DESIGNATION
- COMPONENT LIST CONDUIT ENTRY/EXIT LOCATIONS

THE DRAWINGS AND SCHEDULES.

- ASSEMBLY RATINGS INCLUDING; SHORT-CIRCUIT RATING, VOLTAGE, CONTINUOS CURRENT
- 5, CABLE TERMINAL SIZES EQUIPMENT OPERATION AND MAINTENANCE MANUALS SHALL BE PROVIDED WITH EACH ASSEMBLY SHIPPED AND SHALL INCLUDE INSTRUCTION LEAFLETS, INSTRUCTION BULLETINS AND RENEWAL PARTS LISTS WHERE APPLICABLE, FOR THE COMPLETE ASSEMBLY AND EACH MAJOR COMPONENT.
- A. APPLICABLE PROVISIONS OF THE FOLLOWING CODES AND TRADE STANDARD PUBLICATIONS SHALL APPLY TO THE WORK OF THIS SECTION AND ARE HEREBY INCORPORATED INTO, AND MADE A PART OF, THE CONTRACT DOCUMENTS:

UL:UNDERWRITER'S LABORATORIES

- NEMA: NATIONAL ELECTRICAL MANUFACTURERS ASSOC. 4. ANSI: AMERICAN NATIONAL STANDARDS INSTITUTE 5. IEEE: INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS
- UL 67: PANELBOARDS
- UL 50: CABINETS AND BOXES 9. FED. SPEC. W-P-115C

10.CIRCUIT BREAKER: TYPE I CLASS I

- 2.1 PANELBOARDS A. PANELBOARDS SHALL BE UL LISTED (UL 67) AND SHALL CONFORM TO THE LATEST REQUIREMENTS OF NEC AND NEMA. B. PANELBOARDS SHALL BE OF DEAD FRONT CONSTRUCTION WITH THERMAL MAGNETIC CIRCUIT BREAKERS.
- PANELBOARDS SHALL BE RATED 600 VAC WITH MINIMUM SHORT CIRCUIT RATING OF 42,000 AMPERES RMS SYMMETRICAL. PANELBOARDS SHALL BE RATED 240 VAC WITH MINIMUM SHORT CIRCUIT RATING OF 22,000 AMPERES RMS SYMMETRICAL. PANELBOARDS SHALL BE LABELED WITH A UL SHORT-CIRCUIT RATING.
- PANELBOARDS SHALL BE FULLY RATED
- A. INTERIORS SHALL BE COMPLETELY FACTORY ASSEMBLED. THEY SHALL BE DESIGNED SUCH THAT SWITCHING AND PROTECTIVE DEVICES CAN BE REPLACED WITHOUT DISTURBING ADJACENT UNITS AND WITHOUT REMOVING THE MAIN BUS TRIMS FOR BRANCH CIRCUIT PANELBOARDS SHALL BE SUPPLIED WITH A HINGED DOOR OVER ALL CIRCUIT BREAKER HANDLES. DOORS IN PANELBOARD TRIMS SHALL NOT UNCOVER ANY LIVE PARTS. DOORS SHALL HAVE A SEMI FLUSH
- CYLINDER LOCK AND CATCH ASSEMBLY. DOOR-IN-DOOR TRIM SHALL BE PROVIDED. BOTH HINGED TRIM AND TRIM DOOR SHALL UTILIZE THREE POINT LATCHING. NO TOOLS SHALL BE REQUIRED TO INSTALL OR REMOVE TRIM. TRIM SHALL BE EQUIPPED WITH A DOOR-ACTUATED TRIM LOCKING TAB. EQUIP LOCKING TAB WITH PROVISION FOR A SCREW SUCH THAT REMOVAL OF TRIM REQUIRES A TOOL, AT THE OWNER'S OPTION. INSTALLATION SHALL BE TAMPER RESISTANT WITH NO EXPOSED HARDWARE ON THE PANELBOARD TRIM.
- DISTRIBUTION PANELBOARD TRIMS SHALL COVER ALL LIVE PARTS. SWITCHING DEVICE HANDLES SHALL BE ACCESSIBLE. SURFACE TRIMS SHALL BE SAME HEIGHT AND WIDTH AS BOX. A DIRECTORY CARD WITH A CLEAR PLASTIC COVER SHALL BE SUPPLIED AND MOUNTED ON THE INSIDE OF EACH DOOR.
- A. BUS BARS SHALL BE CURRENT DENSITY RATED AND MEET UL67 TEMPERATURE RISE LIMITS THROUGH ACTUAL TESTS. B. BUS BARS SHALL BE SEQUENCED PHASED AND RIGIDLY SUPPORTED BY HIGH IMPACT RESISTANT, INSULATED BUS SUPPORTING ASSEMBLIES TO PREVENT VIBRATION OR SHORT CIRCUITS. ALL SOLDERLESS TERMINATIONS SHALL BE
- MAIN BUS BARS SHALL BE COPPER SIZED IN ACCORDANCE WITH UL STANDARDS TO LIMIT TEMPERATURE RISE ON ANY CURRENT CARRYING PART TO A MAXIMUM OF 65 DEGREES C ABOVE AN AMBIENT OF 40 DEGREES C MAXIMUM. A SYSTEM GROUND BUS SHALL BE INCLUDED IN ALL PANELS. PANELBOARDS SHALL BE EQUIPPED WITH FULL-SIZE (100%-RATED) INSULATED NEUTRAL BARS.. BUS BAR TAPS FOR

SUITABLE FOR EITHER COPPER OR ALUMINUM UL LISTED WIRE OR CABLE AND SHALL BE UL TESTED AND LISTED.

- PANELS WITH SINGLE-POLE BRANCHES SHALL BE ARRANGED FOR SEQUENCE PHASING OF THE BRANCH CIRCUIT DEVICES. NEUTRAL BUSING SHALL HAVE A SUITABLE LUG FOR EACH OUTGOING FEEDER REQUIRING A NEUTRAL CONNECTION.
- 2.5 BRANCH CIRCUIT PANELBOARDS

 A. PANELBOARDS SHALL BE CUTLER-HAMMER TYPE POW-R-LINE 1A, POW-R-LINE 2A OR APPROVED EQUAL. BOLT-ON TYPE, HEAVY-DUTY, QUICK-MAKE, QUICK-BREAK, SINGLE- AND MULTI-POLE CIRCUIT BREAKERS OF THE TYPES SPECIFIED HEREIN, SHALL BE PROVIDED FOR EACH CIRCUIT WITH TOGGLE HANDLES THAT INDICATE WHEN UNIT HAS
- CIRCUIT BREAKERS SHALL BE THERMAL-MAGNETIC TYPE WITH COMMON TYPE HANDLE FOR ALL MULTIPLE POLE CIRCUIT BREAKERS. CIRCUIT BREAKERS SHALL BE MINIMUM 100-AMPERE FRAME AND THROUGH 100-AMPERE TRIP SIZES SHALL
- TAKE UP THE SAME POLE SPACING. CIRCUIT BREAKERS SHALL BE UL LISTED AS TYPE SWD FOR LIGHTING CIRCUITS. CIRCUIT BREAKERS USED TO CONTROL HEATING, A/C AND REFRIGERATION SHALL BE "HACR" RATED.
- CIRCUIT BREAKER HANDLE LOCKS SHALL BE PROVIDED FOR ALL CIRCUITS THAT SUPPLY EXIT SIGNS. EMERGENCY LIGHTS. ENERGY MANAGEMENT. AND CONTROL SYSTEM (EMCS) PANELS AND FIRE ALARM PANELS.

ELECTRICAL SUB-CONTRACTOR WORK

- PROVIDE FULLY COORDINATED DEMOLITION OF EXISTING ELECTRICAL SYSTEMS AND SERVICE TO DESIGNATED MECHANICAL EQUIPMENT TO BE DEMOLISHED AS SHOWN AND SPECIFIED ON PROJECT DRAWINGS. THIS SHALL INCLUDE BUT NOT BE LIMITED TO THE REMOVAL AND DEMOLITION OF STARTERS, POWER WIRING, DISCONNECTS, ETC. PROVIDE FULLY COORDINATED RE-LOCATION AND/OR RE-INSTALLATION AND RE-ROUTING OF DESIGNATED EXISTING POWER WIRING, CONDUIT, JUNCTION BOXES, PANELS, LIGHTING FIXTURES, ETC. TO ACCOMMODATE THE INSTALLATION OF THE NEW EQUIPMENT AND SYSTEMS SPECIFIED UNDER THIS SECTION AND AS DIRECTED BY THE MECHANICAL CONTRACTOR.
- PROVIDE POWER FOR NEW MECHANICAL EQUIPMENT INSTALLED AS PART OF THIS PROJECT, INCLUDING ALL ASSOCIATED CONDUIT, JUNCTION BOXES, WIRING AND OTHER REQUIRED COMPONENTS. INSTALL VFDS FURNISHED BY THE MECHANICAL CONTRACTOR, INCLUDING FURNISHING OF ALL REQUIRED SUPPORTS (PLYWOOD BACKING AND UNISTRUTS) FOR WALL-MOUNTED VFDS. THE MECHANICAL CONTRACTOR SHALL PROVIDE RIGGING OF THE VFD UNITS TO THEIR DESIGNATED LOCATION. THE MECHANICAL CONTRACTOR SHALL PROVIDE NEW CONCRETE HOUSEKEEPING PADS FOR ANY FLOOR-MOUNTED VFDS.
- PROVIDE NEW LIGHTING FIXTURES AS SHOWN ON PROJECT DRAWINGS. PROVIDE AS NOTED ON ELECTRICAL DRAWINGS NEW BUILDING SMOKE DETECTORS THROUGHOUT ELECTRIC ROOM AND WIRING TO BUILDING FIRE ALARM SYSTEMS. PROVIDE LABELING AND TAGS FOR ALL NEW ELECTRICAL EQUIPMENT AND POWER SERVICE (I.E., CONDUIT). THIS INCLUDES
- PANELBOARDS, CIRCUIT BREAKERS, ETC. PROVIDE EQUIPMENT AND SYSTEM MAINTENANCE DURING CONSTRUCTION AND THROUGHOUT WARRANTY PERIOD FOR
- PROVIDE AS-BUILT RECORD DOCUMENTS/DRAWINGS FOR REVIEW AND APPROVAL. PREPARE AND SUBMIT TO THE GENERAL CONTRACTOR THE FOLLOWING SHOP DRAWING AND SUBMITTAL PACKAGES. PROVIDE (6) COPIES FOR OWNER AND OWNER'S ENGINEER REVIEW AND APPROVAL: PANELBOARDS, TRANSFORMERS

2 3/4" ----

PANEL

120/208V., 3ø, 4W

1. REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS.

LAMINATION. FACE TO BE WHITE, ENGRAVED LETTERS TO BE BLACK.

SECURE NAMEPLATE TO SURFACES WITH (2) FLAT HEAD BRASS SCREWS.

2. NAMEPLATE TO BE 1/16" WHITE PLASTIC WITH BLACK CENTER

DETAIL OF TYPICAL NAMEPLATE

— 5/32" DIA. HOLE

_____ 1/4" LETTERS (TYPICAL)

COMBINATION STARTER/DISCONNECT SWITCHES LIGHTING FIXTURES AND CONTROLS

3/4"

FIRE ALARM DEVICES PROVIDE O&M MANUALS AS PART OF PROJECT CLOSEOUT DOCUMENTS

GENERAL DEMOLITION NOTES

THE ELECTRICAL DEMOLITION PLANS AND DETAILS INDICATE THE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO THE SUBMISSION OF BIDS TO BECOME FAMILIAR WITH THE ACTUAL CONDITIONS AND EXTENT OF WORK. DEVICES AND EQUIPMENT LOCATED ON WALL AND/OR CEILINGS TO BE REMOVED SHALL BE DISCONNECTED AND MADE SAFE. THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY UNANTICIPATED HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION.

THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL SYSTEMS OR BUILDING COMPONENTS DAMAGED DURING THE EXECUTION OF THE WORK, DAMAGE SHALL INCLUDE BUT NOT BE LIMITED TO DESTRUCTION OR DISPOSAL OF ITEMS INTENDED TO REMAIN OR TO BE SALVAGED. THE ELECTRICAL CONTRACTOR SHALL CIRCUIT TRACE AND LABEL ALL EXISTING BRANCH CIRCUITS AND FEEDERS

DEMOLITION SCOPE LIMIT IS AFFECTED. THE ELECTRICAL CONTRACTOR SHALL IDENTIFY ALL BRANCH CIRCUITS, FEEDERS AND SYSTEM COMPONENTS, WHICH ARE TO REMAIN WITHIN THE AREA OF DEMOLITION SCOPE. THERE SHALL BE NO INTERRUPTION OF SERVICE TO ANY

AREA OUTSIDE THE SCOPE LIMITS WITHOUT APPROVAL FROM THE OWNERS REPRESENTATIVE. EXISTING EQUIPMENT

TO REMAIN SHALL BE LEFT IN A CODE COMPLIANT MANNER.

DESCRIPTION

SYMBOL

KW

WITHIN THE AREA OF DEMOLITION SCOPE PRIOR TO DE-ENGERGIZING AND DISCONNECTION. ALL CIRCUITS WITHIN

PANELBOARDS IDENTIFIED FOR REMOVAL SHALL BE TRACED AND LABELLED TO ENSURE THAT NO AREA OUTSIDE THE

THE ELECTRICAL CONTRACTOR SHALL DE-ENERGIZE AND REMOVE ALL CONDUCTORS AND RACEWAY 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 LABELLED SPARE.

THE ELECTRICAL CONTRACTOR SHALL TEMPORARILY SUPPORT ALL ITEMS TO REMAIN THAT ARE AFFECTED BY THE DEMOLITION OF BUILDING STRUCTURAL COMPONENTS (WALL, CEILINGS, ETC.). TEMPORARILY SUPPORTED ITEMS SHALL BE PERMANENTLY SUPPORTED AND INSTALLED WHEN FINALIZED STRUCTURES ARE IN PLACE.

ALL REMOVED ITEMS SHALL BE LEGALLY DISPOSED OF UNLESS IDENTIFIED FOR REUSE. THE OWNERS REPRESENTATIVE SHALL INSPECT ALL RETAINED ITEMS PRIOR TO PLACEMENT IN THE IDENTIFIED STORAGE LOCATION BY THE ELECTRICAL CONTRACTOR.

THE FIRE ALARM SYSTEM SHALL REMAIN FULLY FUNCTIONAL DURING THE ENTIRE DEMOLITION AND CONSTRUCTION PERIOD. ALL REQUIRED SYSTEM SHUTDOWNS SHALL BE COORDINATED WITH AND APPROVED BY THE OWNERS 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

REMOVED FLUORESCENT, HID LAMPS AND BATTERIES SHALL BE RECYCLED BY A FACILITY APPROVED BY THE OWNER'S REPRESENTATIVE. A UNIFORM HAZARDOUS WASTE MANIFEST SHALL BE PREPARED FOR ALL DISPOSALS AND RETURNED WITH ALL APPLICABLE SIGNOFFS PRIOR TO APPLICATION FOR FINAL PAYMENT.

ALL BALLASTS IN LIGHTING FIXTURES TO BE DISPOSED SHALL BE VERIFIED TO BE PCP FREE. ALL BALLASTS MANUFACTURED PRIOR TO 1979 AND NOT LABELLED AS PCB FREE SHALL BE CONSIDERED TO CONTAIN PCB'S. PROVIDE WRITTEN VERIFICATION TO THE OWNER'S REPRESENTATIVE THAT CONFIRMS PCB FREE WASTE. WHERE PCB WASTE CANNOT BE VERIFIED, BALLASTS SHALL BE RECYCLED BY A FACILITY APPROVED BY THE ONWER'S REPRESENTATIVE, WITH PCB COMPONENTS ELIMINATED BY A HIGH TEMPERATURE INCINERATION. A UNIFORM HAZARDOUS WASTE MANIFEST SHALL BE PREPARED FOR ALL DISPOSALS AND RETURNED WITH ALL APPLICABLE SIGNOFFS PRIOR TO APPLICATION FOR FINAL PAYMENT. ALL HANDLING SHALL CONFORM TO EPA REQUIREMENTS. PROVIDE BREAKOUT COST FOR THIS SCOPE.

ABBREVIATIONS

DESCRIPTION

TO EMERGENCY LIGHTING IN

RELAY COMBINED WITH SINGLE

POLE OR THREE- WAY

SWITCHING AS SHOWN

— THREE—WAY SWITCHING

RFI AY

PUBLIC AREAS SUPERVISED BY

A	AMPERES	LA	LIGHTING ARRESTOR
AFF	ABOVE FINISH FLOOR	LISW	LOAD INTERRUPTER SWITCH
AFG	ABOVE FINISH GRADE	LTG	LIGHTING
AHJ	AUTHORITY HAVING JURISDICTION	MCB	MAIN CIRCUIT BREAKER MANHOLE
AL ARCH	ALUMINUM ARCHITECT	MH MISC	MISCELLANEOUS
ATS	AUTOMATIC TRANSFER SWITCH	MLO	MAIN LUGS ONLY
AWG	AMERICAN WIRE GUAGE	MTD	MOUNTED
BLDG	BUILDING	MTS	MANUAL TRANSFER SWITCH
С	CONDUIT - RACEWAY	NEC	NATIONAL ELECTRICAL CODE - NFPA 70
C/B	CIRCUIT BREAKER	NC	NORMALLY CLOSED
CKT	CIRCUIT	NIC	NOT IN CONTRACT
CL	CENTERLINE	NO	NORMALLY OPEN
COL	COLUMN	NTS	NOT TO SCALE
C/PT	CONTROL POWER TRANSFORMER	P	POLE
CR	CARD READER	PB	PULLBOX
C/T	CURRENT TRANSFORMER	PNL	PANEL OR PANELBOARD
CU	COPPER	POS	PROVIDED UNDER OTHER SECTIONS
DWG	DRAWING	P/T	POTENTIAL TRANSFORMER
DS	DISCONNECT SWITCH	PVC	POLYVINYL CHLORIDE
EC	ELECTRICAL CONTRACTOR	PWR	POWER
EF	EXHAUST FAN	RSC	RIGID STEEL CONDUIT
EMT	ELECTRICAL METALLIC TUBING	SA	SURGE ARRESTOR
ETR	EXISTING TO REMAIN	SP	SPARE
EWC	ELECTRIC WATER COOLER	SW	SWITCH
F	FUSE	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
FACP	FIRE ALARM CONTROL PANEL	UG	UNDERGROUND OR UNDER GRADE
FT	FEET	UL	UNDERWRITERS LABORATORIES
GF	GROUND FAULT	UPS	UNINTERRUPTIBLE POWER SUPPLY
GFI	GROUND FAULT INTERRUPTER	V	VOLT
GND	GROUND OR GROUNDING	VFD	VARIABLE FREQUENCY DRIVE
GRSC	GALVANIZED RIGID STEEL CONDUIT	l w	WIRE
HP	HORSEPOWER	WP	WEATHERPROOF
IG	ISOLATED GROUND	XFMR	TRANSFORMER
JB	JUNCTION BOX	\(\triangle \)	DELTA
KCMIL	THOUSAND CIRCULAR MILS	Ø	PHASE
KVA	KILOVOLT AMPERES	Y	WYE
	1	1 '	"'IL

FROM EMERGENCY SINGLE POLE CIRCUIT SWITCH CLOSEST NON EMERGENCY LIGHTING CIRCUIT UNSWITCHED SOURCE ____ SERVING THIS AREA ASCO RELAY OR APPROVED EQUAL— (NO. OF POLES AS REQUIRED) ALL SWITCH CONTROLLED EMERGENCY LIGHTING IN PUBLIC AREAS, EGRESS ROUTES AND ALL "NORMALLY-OFF" EMERGENCY LIGHTING SHALL BE CONTROLLED BY AN EMERGENCY SUPERVISORY RELAY TO AUTOMATICALLY ENERGIZE EMERGENCY LIGHTS WHEN NORMAL POWER FAILS. DETAIL OF EMERGENCY SUPERVISORY BY-PASS RELAY NTS

KILOWATTS

FIRE ALARM LEGEND

- FIRE ALARM SYSTEM MANUAL PULL STATION. MOUNTED
- FIRE ALARM COMBINATION SPEAKER/STROBE UNIT MOUNTED 80"AFF OR 6" BELOW CEILING (WHICHEVER IS
- © CEILING PHOTOELECTRIC SMOKE DETECTOR "I" INDICATES IONIZATION SMOKE DETECTOR
- RI REMOTE INDICATING LIGHT

EXISTING EQUIPMENT LEGEND

- EXISTING DEVICE TO BE MAINTAINED EXISTING DEVICE TO BE REMOVED. REMOVE ASSOCIATED
- WIRING BACK TO POINT OF ORIGIN
- EXISTING DEVICE TO BE RELOCATED
- EXISTING DEVICE AND DEVICE PLATE TO BE REMOVED AND REPLACED WITH NEW. MAINTAIN EXISTING OUTLET

NEW LOCATION OF EXISTING DEVICE

- BOX AND WIRING EXISTING DEVICE TO BE REMOVED AND ASSOCIATED WIRING ABANDONED, MAINTAIN OUTLET BOX AND PROVIDE
- EXISTING EQUIPMENT TO BE REMOVED AND NEW EQUIPMENT TO BE INSTALLED ON EXISTING BOX. UTILIZE

EXISTING CONDUIT. PROVIDE NEW WIRING TO PANEL

- → → FEEDER TO BE REMOVED. DASHED LINEWEIGHT "X" INDICATES TO BE REMOVED
- FEEDER TO REMAIN. LIGHT OUT OF FUNCTION LINEWEIGHT INDICATES TO REMAIN AS IS

COMMUNICATION DEVICE LEGEND

- COMBINATION TELEPHONE/DATA OUTLET
- COMBINATION TELEPHONE/DATA OUTLET ("C" INDICATES MOUNTED ABOVE COUNTER)
- COMBINATION TEL/DATA OUTLET. PROVIDE LOW VOLTAGE MOUNTING BRACKET CADDY #MP1S WITH 3/4" EMPTY CONDUIT AND PULL STRING TO ABOVE HUNG CEILING. CABLING AND DEVICE BY OTHERS.

LIGHTING EQUIPMENT LEGEND

(REFER TO LIGHTING FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION) "A" INDICATES FIXTURE TYPE 13" INDICATES CIRCUIT NUMBER "a"

QTY TYPE

INDICATES SWITCH CONTROL

 \circ LIGHTING FIXTURES INDICATED WITH SHADING DENOTES CIRCUITED TO NORMAL/EMERGENCY SUPPLY.

ILLUMINATED "EXIT" SIGN LIGHTING FIXTURE. CEILING MOUNTED OR WALL MOUNTED PROVIDE DIRECTIONAL ARROWS AS INDICATED ON

CIRCUITRY, RACEWAYS & FEEDERS LEGEND

HOMERUN TO PANEL "LG1", CIRCUIT #1,3,5 (VIA 20A-1P C/B'S). TICKS INDICATE QUANTITY OF #12AWG. (CU.) CONDUCTORS. GROUNDING CONDUCTORS ARE NOT INDICATED IN TICKS. PROVIDE GROUNDING CONDUCTOR IN ACCORDANCE WITH SPECIFICATIONS.

HOMERUN TO PANEL "LG1", CIRCUIT #2 VIA 60A-3P CIRCUIT BREAKER. REFER TO ONE-LINE DIAGRAM AND

PANEL SCHEDULES FOR ADDITIONAL INFORMATION. CIRCUITRY TURNING UP

CIRCUITRY TURNING DOWN

CIRCUITRY RUN CONCEALED

———— CIRCUITRY RUN EXPOSED. BRANCH CIRCUIT WIRING. "E" INDICATES EMERGENCY

WIRING DEVICES LEGEND

125 VOLT, 2 POLE, 3 WIRE, 20 AMP., DUPLEX RECEPTACLE. "2" DENOTES CIRCUIT NUMBER. "WP" INDICATES WEATHERPROOF, "GFI" INDICATES GROUND

RECEPTACLE MOUNTED ABOVE COUNTER.

- FAULT CIRCUIT INTERRUPTER 125 VOLT, 2 POLE, 3 WIRE, 20 AMP., DUPLEX
- 125 VOLT, 2 POLE, 3 WIRE, 20 AMP., DOUBLE DUPLEX RECEPTACLE. 125 VOLT, 2 POLE, 3 WIRE, 20 AMP., DUPLEX

RECEPTACLE FLUSH FLOOR MOUNTED. 120/208 VOLT, 3ø, 4 WIRE PANEL

SINGLE POLE TOGGLE SWITCH "b" DENOTES SWITCH CONTROL "3" INDICATES 3 WAY TOGGLE TYPE SWITCH

277/480 VOLT, 3ø, 4 WIRE PANEL

SINGLE POLE TOGGLE SWITCH "b" DENOTES SWITCH CONTROL LINE VOLTAGE OCCUPANCY SENSOR. SENSOR SWITCH CMRB

WALL MOUNTED PROGRAMMABLE PASSIVE INFRARED

CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY

SENSOR AS MANUFACTURED BY SENSOR SWITCH CAT

- SERIES. MOUNTED TO INDIVIDUAL LIGH FIXTURES WALL MOUNTED PASSIVE INFRARED OCCUPANCY SENSOR AS MANUFACTURED BY SENSOR SWITCH CAT #WSD-W.
- OCCUPANCY SENSOR WITH TWO ISOLATED RELAYS AS MANUFACTURED BY SENSOR SWITCH CAT #WSD-2P-W
- CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR AS MANUFACTURED BY SENSOR SWITCH CAT
- #CM-PDT-10 POWER FLUSH FLOOR BOX. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION
- RECESSED PUSHBUTTON DOOR ACTUATOR. PROVIDE 3/4"C EMPTY TO ABOVE HUNG CEILING WITH PULL STRING

LIGHTING FIXTURE SCHEDULE MANUFACTURER/CAT # DESCRIPTION | VOLT | NOTES LEDALITE PUREFX SERIES 277 | 4.5 RECESSED 2'X2' FLUORESCENT LIGHT FIXTURE CAT#9422A2STD217-S-1-2-E 32W 6"X4' RECESSED FLUORESCENT LIGHT FIXTURE LEDALITE PUREFX SERIES 1 277 | 4,5 CAT#9464A2STT132-S-1-2-E SAME AS FIXTURE TYPE "B" EXCEPT CONTINUOUS ROW LEDALITE PUREFX SERIES CAT#9464A2CRT132-S-1-2-E LED LED RECESSED HOCKEY PUCK FIXTURE FOR MOUNTING MP LIGHTING CAT#L57-3W35S60-MA IN MILLWORK STUDY CUBICLE

WITH DRIVER CAT #LED12W350

PROVIDE LENGTHS AS REQUIRED TO SUIT PROJECT | 120

CAT#HDS232-UNV-EB101

MATCH BUILDING STANDARD

ALKCO ARIS SERIES

CONDITION

LIGHTING NOTES:

LED LED UNDERCABINET LIGHT FIXTURE

T8 | ELECTRIC CLOSET

FLOOR PLANS

1. REFER TO FLOOR PLANS FOR LOCATION AND QUANTITIES OF LIGHT FIXTURES.

32W | SURFACE MOUNTED INDUSTRIAL STRIP FIXTURE FOR

LED LED EXIT SIGN WITH ARROWS AS INDICATED ON

- 2. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL LIGHT FIXTURES.
- 4. ALL FLUORESCENT LIGHT FIXTURES SHALL HAVE ENERGY EFFICIENT ELECTRONIC BALLASTS UNLESS NOTED OTHERWISE.

COORDINATE LOCATIONS AND MOUNTING HEIGHTS WITH ELEVATIONS AND MOUNTING DETAILS ON ARCHITECTURAL DRAWINGS.

- 5. FIXTURE SHALL BE EQUIPPED WITH SUPER T8 LAMP/BALLAST COMBINATION AND COMPLY WITH UTILITY COMPANY NSTAR REBATE PROGRAM. 6. E.C. SHALL PROVIDE LINE VOLTAGE SWITCH FOR INDIVIDUAL CONTROL OF EACH FIXTURE. COORDINATE ALL WORK MILLWORK CONTRACTOR AND GENERAL
- 7. ALL FLUORESCENT FIXTURES SHALL BE RETURN AIR TYPE.

DEI PM MELU REILLY ELECTRICAL CONTRACTORS, RECORD DRAWING 14 Norfolk Avenue Easton, Massachusetts 02375 Phone: 508-230-8001 Fax: 508-230-8885

Littauer Library **Littauer Center**

79 John F. Kennedy Street

Cambridge, MA 02138

Proposed Library Renovation For:

Engineered Solutions Inc 6 UNION STREET NATICK, MA 01760 TEL(508) 647-9200(x(508) 652-1936

DESIGN INTEGRATION 23 DRYDOCK AVENUE, SIXTH FLOOR

TEL: 617.338.8870

FAX: 617.338.8876

BOSTON, MASSACHUSETTS 02210 USA

BAKER DESIGN GROUP INC.

Architect's / Engineer's Stamp

Date Description

Issued for Construction 30 October 2009 Orawing North: Drawing Scale: 1/8"=1'-0 Job Number:

Drawing Title **ELECTRICAL** LEGEND, FIXTURE **SCHEDULE & NOTES**

Drawn By:

E1.0