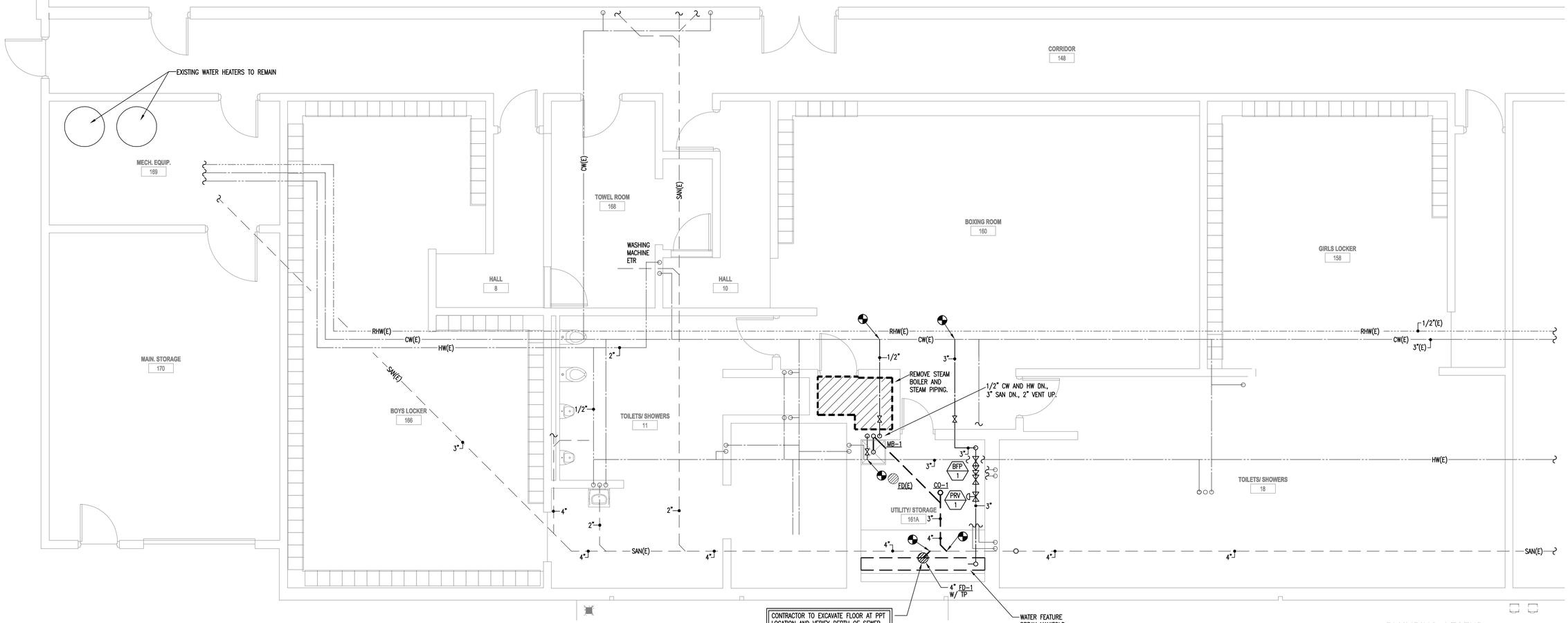
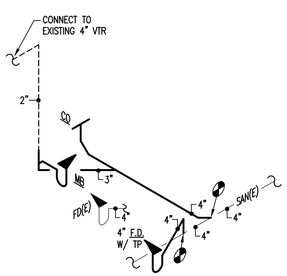


FLOOR PLAN AREA "B" PLUMBING PLAN

SCALE: 1/4" = 1'-0"

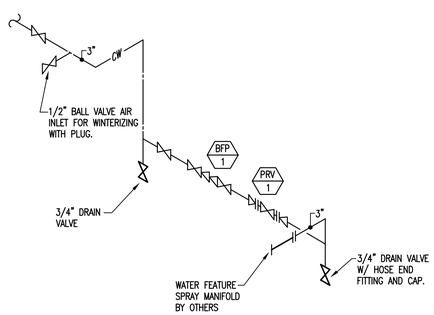
GENERAL NOTES: (PLUMBING)

1. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION AND PROPER INSTALLATION OF ALL PLUMBING SYSTEMS.
2. THE CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS SUPPORTING STEEL ETC. FOR THE PROPER INSTALLATION OF ALL PLUMBING SYSTEMS.
3. THE CONTRACTOR SHALL COORDINATE FLOOR, WALL AND ROOF PENETRATIONS WITH THE GENERAL CONTRACTOR.
4. PIPING SHALL NOT BE LOCATED IN ELECTRICAL ROOMS OR OVER THE TOP OF ANY ELECTRICAL PANELS OR EQUIPMENT.



PLUMBING ISOMETRIC DIAGRAM

N.T.S.



RM #161A WINTERIZING ISOMETRIC DIAGRAM

N.T.S.

PLUMBING FIXTURE CONNECTION SCHEDULE

DWG. DESIGNATION	FIXTURE	C.W.	H.W.	SAN	VENT	DESCRIPTION
MB-1	MOP BASIN	1/2"	1/2"	3"	2"	FIAT TBS-3000 24x24x12. TERRAZZO BASIN W/ DROP FRONT AND STAINLESS STEEL CAP IN ALL CURB SHOULDERS. PROVIDE CHICAGO 540-LD897SWXFXKCP CHROME PLATED CAST BRASS 8" FAUCET WITH QUARTER TURN CERAMIC DISK CARTRIDGES, INTEGRAL CHECK STOPS, 2-1/2" LEVER HANDLES, 6" SPOUT WITH INTEGRAL VACUUM BREAKER, ADJUSTABLE WALL BRACE, PAIL HOOK, 3/4" HOSE THREAD OUTLET AND ASSE 1070 MIXING VALVE MV-1.
FD-1	FLOOR DRAIN	-	-	SEE PLANS	SEE PLANS	SMITH 2005-B DUCO CAST IRON BODY WITH FLASHING COLLAR, ADJUSTABLE 6" SQUARE NICKEL BRONZE STRAINER HEAD, AND TRAP PRIMER CONNECTION.
CO-1	CLEANOUT	-	-	SEE PLANS	SEE PLANS	SMITH 4402 DUCO CAST IRON CLEANOUT WITH ROUND ADJUSTABLE SCORIATED SECURED NICKEL BRONZE TOP.

NOTE:
1. SEE SPECIFICATIONS FOR OTHER EQUIPMENT AND TRIM REQUIRED.

BACKFLOW PREVENTER SCHEDULE

MARK	BFP-1
MANUFACTURER	WATTS
MODEL No.	909 NRS
SERVICE	SPRAY EQUIP.
TYPE	RPZ
SIZE	3"
REMARKS	1

REMARKS:
1. ACCEPTABLE MANUFACTURERS; WATTS, FEBCO, ZURN, AMES, CONBRACO.

WATER PRESSURE REDUCING VALVE SCHEDULE

MARK	PRV-1
MANUFACTURER	WATTS
MODEL No.	N223BS
FLOW (GPM)	140
PRESSURE DROP (PSI)	2
SIZE	2-1/2"
INLET PRESSURE RANGE (PSI)	95-110
OUTLET PRESSURE SET POINT (PSI)	50
REMARKS	1,2,3

REMARKS:
1. PRESSURE VALVE WITH DUCTILE IRON BODY CONSTRUCTION, REPLACEABLE STAINLESS STEEL SEAT, AND STAINLESS STEEL STEM.
2. VALVE SHALL BE RATED FOR 33-160°F TEMPERATURE RANGE, 175 PSI MAXIMUM WORKING PRESSURE, AND 25-100PSI ADJUSTABLE PRESSURE RANGE.
3. FURNISH AND INSTALL EQUALIZER LINE WITH NEEDLE VALVE IN FIELD ACCORDING TO PRESSURE REDUCING VALVE MANUFACTURER'S RECOMMENDATIONS.

PLUMBING LEGEND

SAN	SANITARY SEWER PIPING
V	VENT PIPING
CW	DOMESTIC COLD WATER PIPING
HW	DOMESTIC HOT WATER PIPING
RHW	RECIRCULATING HOT WATER PIPING
	PIPING ABOVE GRADE/FLOOR
	PIPING BELOW GRADE/FLOOR
CW(E)	EXISTING COLD WATER TO REMAIN
HW(E)	EXISTING HOT WATER TO REMAIN
RHW(E)	EXISTING HOT WATER RETURN TO REMAIN
SAN(E)	EXISTING SANITARY TO REMAIN
	SHUTOFF VALVE
	POINT OF CONNECTION
XX / XX	EQUIPMENT TAG
CO	CLEANOUT
CTX	CONNECT TO EXISTING
WH	WATER HEATER
ETR	EXISTING TO REMAIN
E	EXISTING
FD	FLOOR DRAIN
MB	MOP BASIN
BP	BACKFLOW PREVENTER
TD	TRENCH DRAIN
TPV	TRAP PRIMER VALVE
WH	WALL HYDRANT
IE	INVERT ELEVATION
TP	TRAP PRIMER

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PLUMBING PLAN

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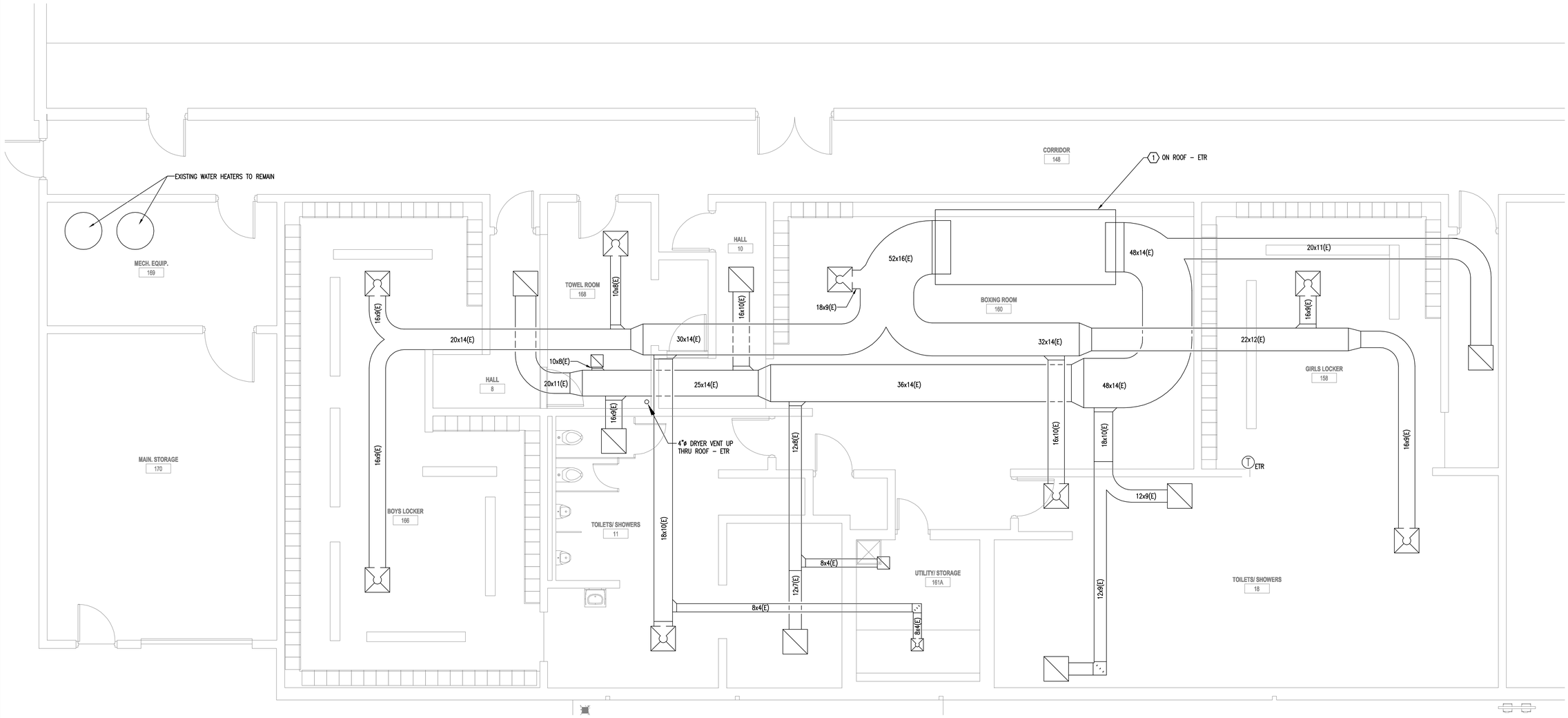

FLOOR PLAN AREA "B" MECHANICAL PLAN

SCALE: 1/4" = 1'-0"

CODED NOTES: (#)

1. EXISTING 100% OUTDOOR AIR HEAT RECOVERY HVAC UNIT. VERIFY FUNCTION AND PERFORM MAINTENANCE PER SPECIFICATION.

HVAC LEGEND

- EXISTING DUCTWORK
- THERMOSTAT (AC-1)
- SUPPLY OR OUTDOOR AIR DUCT
- RETURN OR EXHAUST DUCT
- DUCT LINING
- DUCT SOUND ATTENUATOR (SA-1) SA-1 = SEE SCHEDULE
- POINT OF CONNECTION
- EQUIPMENT TAG
- MANUAL DAMPER

CD	CEILING DIFFUSER
G	GRILLE
RG	RETURN GRILLE
L	LOUVER
D	DAMPER
SA	SUPPLY AIR
EA	EXHAUST AIR
RA	RETURN AIR
OA	OUTSIDE AIR
AP	ACCESS PANEL
CLG	CEILING
FD	FIRE DAMPER
ETR	EXISTING TO REMAIN
AFF	ABOVE FINISHED FLOOR
E	EXISTING
EUH	ELECTIC UNIT HEATER

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MECHANICAL PLAN

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MECHANICAL SPECIFICATIONS

Section 15010 – General Requirements

A. General
1. Specifications are applicable to all contractors and/or subcontractors for mechanical systems.
2. Check other plans and specifications and fully coordinate with other trades, owner and architect requirements.
3. Conform to all general and special conditions of contract as specified by architect and/or owner.
4. Visit site, check facilities and conditions and make all necessary observations and measurements. Note conditions under which work is to be performed and take all items into consideration in bid.
5. Systems are to be complete and workable in all respects, placed in operation and properly adjusted.
6. Each contractor shall provide for his own clean–up, removal and legal disposal of all rubbish daily.
7. Contractor shall protect his work, his existing and adjacent property against weather.
8. Contractor to protect his work, materials, apparatus and fixtures from damage. Any work damaged by failure to provide protection required, shall be removed and replaced with new material at the contractor's expense.
9. Contractor must confirm all utility company requirements and connection points in field, prior to starting work.
10. Arrange for and obtain owner's and insurance representative's permission for any service shutdowns.
11. The contractor shall be solely responsible for construction means, methods, sequences of construction and the safety of workmen.
12. No piping, ductwork, wiring, etc., shall be installed or routed above electrical panels and equipment or through elevator equipment rooms.
13. The mechanical contractor shall coordinate with the electrical contractor and obtain a written approval identifying the electrical characteristics of all mechanical equipment prior to ordering of equipment. No additional payment will be made for lack of contractor coordination of electrical characteristics.
14. During construction the contractor may uncover an existing condition that will have to be modified. Any such work which comes under the jurisdiction of this contractor shall be done by this contractor without extra cost to the owner, as though fully detailed on plans and/or described in the specifications.
15. Work related to the existing building shall be coordinated to minimize interference or interruption of normal building use by owner. Refer to architectural plans for phasing requirements.

B. Codes, permits, standards and regulations
1. Conform to all applicable codes (local, state, national codes, NFPA, OSHA, etc.), government regulations, utility company requirements, and applicable standards.
2. Obtain permits and pay all fees. Arrange for all required inspections and approvals.

C. Related work specified elsewhere
1. Openings and chases, when shown on architectural drawings.
2. Temporary water service, sanitary facilities, fire protection and heating during construction.
3. Poured–in–place concrete.
4. Finished painting.
5. Electric power wiring.

D. Drawings
1. The systems as shown on mechanical drawings are diagrammatic. Confirm all dimensions by field measurement.
2. The exact locations for fixtures, equipment and piping which is not covered by drawings, shall be obtained from the architect or his representative in the field and the work shall be laid out accordingly.
3. Drawings and specifications are intended to supplement one another. Any materials or labor called for in one but not the other shall be furnished as if both were mentioned in the specifications and shown on the drawings.

E. Base equipment, materials and substitutions
1. All equipment and materials shall be new, free of defects and UL labeled.
2. Base bid manufacturers are included in the specification or listed in schedules on the drawings. All other manufacturers are considered substitution.
3. The name or make of any article, device, material, form of construction, fixture, etc., stated in this specification, whether or not the words "or approved equal" are used, shall be known as a "standard".
4. All proposals shall be based on "standards" specified.
5. The equipment schedules on the drawings indicate manufacturers equipment model numbers that this design has been based on. The use of other manufacturer's equipment that is listed as acceptable alternates that entails general trades, structural, mechanical, electrical, etc., revisions is this contractor's responsibility. Any additional cost of such changes shall be paid by the contractor submitting the acceptable alternates which necessitates changes in installing such submitted alternate equipment, even though such costs may be part of another division of work.
6. Substitutions are subject to the approval of the owner. If a substitution is submitted, it is the contractor's responsibility to evaluate it and certify that the substitution is equivalent in all respects to the base specifications.
7. If substitutions are approved, notify all other contractors, subcontractors, etc., affected by the substitution and fully coordinate with them. Any costs resulting from substitution, whether by this contractor or others, shall be the responsibility of and paid for by the substituting contractor. Approved shop drawings do not absolve this contractor from this responsibility.
8. All equipment shall be installed in full accordance with the manufacturer's data and installation instructions. It is this contractor's responsibility to check and conform these requirements prior to starting work.

F. Warranty
1. Fully warrant all materials, equipment and workmanship for one (1) year from date of acceptance.
2. Repair or replace without charge to the owner all items found defective during the warranty period. In the case of replacement or repair due to failure within the warranty period, the warranty on that portion of the work shall be extended for a minimum period of one (1) year from the date of such replacement or repair.

G. Record Drawings
1. Each contractor or subcontractor shall keep one (1) complete set of the contract drawings on the job site on which he shall regularly record any deviations or changes from such contract drawings made during construction.
2. These drawings shall record the installed location of all concealed equipment, piping, electric service, sewers, wastes, vents, ducts, conduit, etc., by measure dimensions to each such item from column centerlines or readily identifiable and accessible walls or corners of the building. Plans also shall show invert elevation of sewers and top elevation of all other below–grade lines.
3. Record drawings shall be kept clean and undamaged and shall not be used for any purpose other than recording deviations from working drawings and exact locations of concealed work.
4. After the project is completed, these drawings shall be delivered to the architect in good condition, as a permanent record of the installation as actually constructed.

Section 15050 – Basic Materials and Methods

A. General
1. Provide all materials, labor, equipment, and accessories required to furnish and install the mechanical items identified in this section.
2. This section includes basic mechanical materials and methods to complement other division 15 sections in this specification and requirements indicated on the mechanical drawings.

B. Excavation and Backfill
1. Perform all excavation and backfill required for installation of below–grade piping.
2. Excavate as required to install piping at required depth and pitch. Pipe to be laid on sand bedding to give uniform bearing along length of pipe (sand inside building and interlocking aggregate outside building).
3. Backfill with bedding material to a minimum of twelve (12) inches above top of pipe and compact. Balance of backfill in indoor grass areas shall be clean earth up to six (6) inches above surrounding grades. Backfill below finished floors shall be sand, and outdoors under paving shall be interlocking aggregate and backfill shall be compacted in maximum twelve (12) inch layers.
4. All other excavations shall be backfilled with clean earth, excluding rubbish and boulders. Backfill shall be thoroughly tamped and puddled.
5. Patch floor to match existing adjacent surfaces.

C. Supports and Hangers
1. Hangers and supports are to be provided to properly support, secure and align piping and to meet field conditions and as manufactured by Grinnell or Michigan.
2. Spacing to comply with ASHRAE standards and local code requirements.

D. Escutcheons
1. Fit all pipe passing through walls, floors or ceilings in finished rooms with steel or brass escutcheons. Where surface is to receive a paint finish make escutcheons prime painted; otherwise make escutcheons nickel or chrome plated. Where piping is insulated, fit escutcheons outside insulation.

E. Pipe Identification
1. Identify each pipe, valve in equipment rooms, above accessible ceilings and in accessible shafts.
2. Color code identification bands or marker backgrounds to identify contents of pipe and direction of flow located near each valve and fitting, on both sides of pipe passing through walls and on long runs at not over 20 foot intervals.

F. Access Panels
1. Contractor shall be responsible for providing all required access panels necessary for his work. This includes any access panels required for HVAC, plumbing and fire protection. Contractor shall also provide access panels for any existing conditions as required.
2. Refer to architectural drawings and specifications for type of access panel and coordinate locations prior to any work.

G. Firestopping
1. All openings through fire rated walls, floors and/or roofs for ductwork, piping, etc., shall be fire sealed with calcium salicate, silicone "RTV" foam, "3M" fire rated sealants, Hilti Firestop Systems or approved equal to maintain the intended fire rating and associated UL ratings.

I. Cutting, Patching and Drilling
1. All cutting and patching of the building construction required for this work shall be by this contractor unless shown on architectural drawings and confirmed as to size and location prior to new construction. Cutting shall be in a neat and workmanlike manner.
2. Neatly saw cut all rectangular openings, set sleeve through opening, and finish patch or provide trim flange around opening.
3. Neatly saw cut floors and patch floor to match existing, including floor covering.
4. Contractor shall field verify slab–on–grade or supported floor construction type prior to cutting. Under no circumstances shall this contractor cut a structural floor slab, whether on grade or supported, without prior written approval from the architect. If floor slab indicated to be cut on mechanical plans is found to be structural in nature, do not cut. Contact architect immediately for further directions.
5. Core drill and sleeve all round openings.
6. Do not cut any structural components without architect's written approval, including, but not limited to roof joists, columns, floor joists, beams, girders, structural floor slabs, etc.
7. Patch and finish to match adjacent areas that have been cut, damaged or modified as a result of the installation of the mechanical systems. Fire stop all penetrations of fire rated construction in a code approved manner.
8. All contractors shall confirm with owner, prior to bid, times available for noise producing work such as cutting and core drilling of floors, walls, etc., as well as times for work which requires access into adjoining tenant spaces. Include any premium time in bid.
9. The mechanical contractor shall coordinate with the general contractor prior to construction. The mechanical contractor shall provide information regarding openings in walls, floors, etc., concrete equipment pads and foundations to the general contractor. IF the mechanical contractor fails to comply with this request, or if incorrect information is given, the necessary cutting and patching will be performed by the general contractor, at the mechanical contractor's expense.

J. Demolition and Removal
1. Disconnect, cap and remove all piping, ductwork and equipment indicated on the drawings or as required for the project.
2. Any equipment designated by owner to be salvaged shall be protected and delivered to the owner on site.
3. Demolition shall be done in a manner so as not to damage adjacent work and not affect the operation of systems to remain in use. Any item to remain that is damaged by the contractor shall be replaced and/or repaired at the contractor's expense.
4. All open ended piping and ductwork that is to remain shall be capped and properly secured.
5. All electrical devices, wiring, conduit, etc., related to demolished equipment/systems shall be removed. Wiring shall be disconnected at circuit breakers, removed and breakers marked "spare".
6. All asbestos removal will be handled by the owner and is not a part of this work.
7. Examine areas and conditions under which demolition work must be performed. This contractor shall coordinate his work with other trades performing demolition work and/or demolition work performed by the owner.
8. Remove all supports, hangers, etc., related to equipment and material indicated to be demolished.
9. Where temperature controls are indicated for demolition, retain the services of a temperature control contractor to perform such demolition.

Section 15100 – Insulation

A. General
1. Furnish all material, labor and equipment as required to install complete plumbing insulation as indicated on mechanical drawings and in these specifications.
2. Install in full accordance with manufacturer's recommendations.

B. Plumbing Insulation (as manufactured by Owens Corning, Knauf or Schuller)
1. Insulate all above grade hot and cold water piping with molded fiberglass having an all service jacket.
   - B.a. Insulation thickness schedule:
     - 1.1. Less than (<) 1–1/2" diameter pipe: 3/4" thick.
     - 1.2. 1–1/2"–8" diameter pipe: 1" thick.
2. Include insulation of fittings and valves. Keep vapor barriers intact. Apply to manufacturer's recommendations.
3. Handicapped lavatory insulation – insulate all exposed waste and water supply piping under lavatory with safety covers per ADA requirements as manufactured by Plumberex Specialty Products, McGuire or Truebro.
4. Repair sections of existing piping insulation damaged or damaged during this construction period. Use insulation of same thickness as existing insulation, install new jacket lapping and sealed over existing.

Section 15200 – Piping and Valves

A. General
1. Furnish all material, labor, equipment, and accessories as required to install complete plumbing piping systems as indicated on mechanical drawings and in these specifications.
2. Install in full accordance with local code requirements, other specification section requirements and manufacturer's recommendations.

B. Sanitary Sewers
1. Install sanitary sewers, stacks, vents, drains, etc., as indicated on the drawings.
2. Sewers to be pitched a minimum of 1/4" per foot for 3" sizes and under and 1/8" per foot for 4" sizes and larger or to grades indicated on drawings.
3. Changes in direction and branch connections shall be made with approved drainage fittings compatible with the piping system material in which it is installed.
4. Install cleanouts at base of each vertical waste stack, each change in a direction of piping greater than 45 degrees, and within five (5) feet of main sewer after exiting the building.
5. All fixtures and sanitary drains shall be vented as indicated on drawings and in accordance with code.
6. Vents are to be extended through roof as indicated on drawings and flashed with 4 lb. lead with vent flashing top turned down two (2) inches minimum inside pipe.
7. PVC piping shall not be installed unless permitted by code and shall not be installed in return air plenums.
8. Sanitary sewer and vent material shall be as follows:
   - B.a. Below grade storm and sanitary inside building
     - 8.1. Service weight – cast iron pipe ASTM A–74–82 with ASTM C–564–80 neoprene compression joints or no–hub with clamps.
     - 8.2. PVC–DWV plastic ASTM D–1785 with ASTM D–2665 DWV solvent weld socket fittings.
   - B.b. Above grade sanitary sewer and vent material shall be as follows:
     - 8.1. No–hub cast iron pipe CISPI 1–301–78.
     - 8.2. PVC–DWV plastic ASTM D–1785 with ASTM D–2665 DWV solvent weld socket fittings.
     - 8.3. SCH. 40 galvanized steel pipe ASTM A–120–83 with cast iron screwed fittings ANSI B–16.22 1983.

C. Domestic Water Piping
1. Install domestic water piping as indicated on drawings. Include all fittings, valves, hangers, and other accessories including backflow preventer. Extend domestic water piping to all fixtures and equipment required for complete installation.
2. Include unions, or other disconnect means, stops or valves for isolation of fixtures and equipment. Valves to be fully compatible with piping for service intended as manufactured by Nibco, Crane or Milwaukee. Include hose or drain valves at low points where fixtures cannot be used for drainage.
3. Install shock absorbers at each quick closing fixture and where required to prevent water hammer as manufactured by J.R. Smith, Sioux Chief or Zurn.
4. Hangers on insulated pipe to be outside of insulation, sized accordingly with a sufficient saddle to protect insulation as manufactured by Grinnell or Michigan.
5. Domestic water piping shall be as follows:
   - C.a. Above grade – type "L" hard copper ASTM B 88–832 with wrought copper fittings ASTM B 16.22 1980 and non–lead or antimony solder joints.
   - C.b. Below grade – type "K" soft copper without joints.
6. Flush, vent and sanitize all water piping with chlorine as required per AWWA, local building department and health department codes.
7. Domestic hot and cold water piping under concrete floor to be covered with sand so that piping will not become embedded in the floor slab.
8. All piping under concrete floor shall be type "K" soft copper, continuous. No splices or fittings will be allowed.
9. Extreme caution must be taken so that no copper piping and insulation under concrete floors becomes crushed, cut, split or deformed during the pouring of the floor slab.

D. Firestopping
1. See Section 15050, Basic Materials and Methods.

Section 15400 – Plumbing Fixtures and Equipment

A. General
1. Furnish all fixtures and equipment indicated and scheduled on drawings, complete with all accessories, controls, etc., as required.
2. Install in full accordance with manufacturer's recommendations and place in satisfactory operation.

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MECHANICAL SPECIFICATIONS

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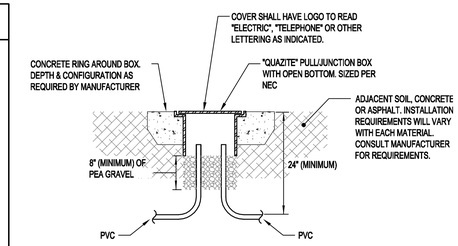
ALTERNATE E1:
PROVIDE SEPERATE PRICING TO FURNISH AND INSTALL ALL OF THE NEW TYPE "S1" SITE LIGHTING STANDARDS, INCLUDING THE CONCRETE FOUNDATION, POLES, FIXTURES AND ASSOCIATED BRANCH CIRCUIT WIRING.

ELECTRICAL SITE PLAN
SCALE: 1" = 25'-0"

SITE ELECTRICAL NOTES

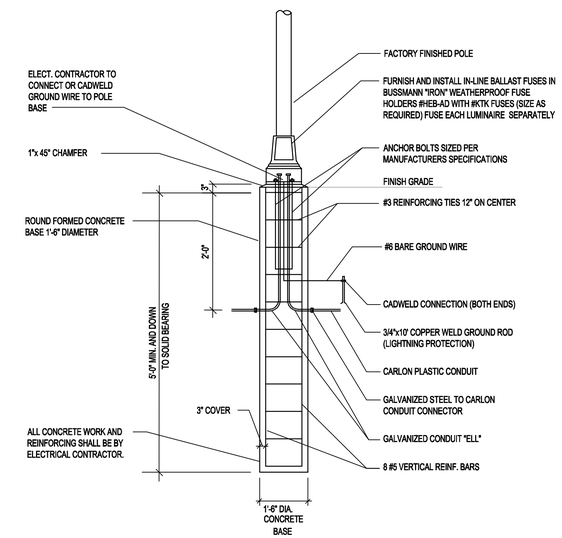
1. EXACT LOCATIONS OF PARKING LOT LIGHTING STANDARDS SHALL BE COORDINATED WITH APPROVED ARCHITECTURAL SITE PLAN AND PARKING LOT LAYOUT.
2. ALL LIGHTING FIXTURES PROJECTING TOWARD ADJACENT RESIDENTIAL AREAS MUST BE PROPERLY SHIELDED TO PREVENT LIGHT SOURCE FROM EXTENDING INTO THIS AREA.
3. THE LUMINAIRE MANUFACTURER SHALL PROVIDE COMPUTER GENERATED POINT BY POINT FOOTCANDLE CALCULATIONS ALONG WITH THEIR SHOP DRAWINGS SUBMITTAL. THE FORMAT OF THIS POINT BY POINT CALCULATION SHALL BE IN THE FORM OF AN OVERLAY OF THE ENTIRE PARKING AREA WITH CALCULATED POINTS 25 FEET ON CENTER.
4. ALL SITE LIGHTING POLES SHALL BE DESIGNED TO WITHSTAND 90 MPH WINDS WITH A 1.3 GUST FACTOR.
5. ELECTRICAL CONTRACTOR SHALL INSTALL EACH LIGHTING POLE PLUMB AND TRUE. ELECTRICAL CONTRACTOR SHALL PROVIDE NECESSARY LEVELING SHIMS.
6. ELECTRICAL CONTRACTOR SHALL BACKFILL ALL ELECTRICAL TRENCHES USING CLEAN FILL MATERIAL FREE OF ORGANIC CONTAMINATIONS AND OTHER DELETERIOUS MATTER. PLACE BACKFILL MATERIAL IN 8" THICK LAYERS WITH EACH LIFT COMPACTED AT NEAR OPTIMUM MOISTURE CONTENT. COMPACT LIFTS TO ACHIEVE A MINIMUM IN PLACE DENSITY OF 95% OF THE MAXIMUM DENSITY AS DETERMINED BY ASTM D698.
7. ELECTRICAL CONTRACTOR SHALL COORDINATE LOCATION OF EASEMENTS, UNDERGROUND UTILITES, AND DRAINAGE PRIOR TO TRENCHING OR AUGERING FOR POLE BASE. (TYPICAL)



IN-GRADE PULL/JUNCTION BOX DETAIL
NTS

NOTES:

1. SPLICES SHALL BE AVOIDED WHERE POSSIBLE. WHERE REQUIRED, SPLICES SHALL BE MADE WITH WATERPROOF CONNECTORS.
2. CONCRETE ENCASEMENT TO BE 3,000 PSI MINIMUM.
3. DO NOT LOCATE BOXES IN HIGH VOLUME TRAFFIC APPLICATIONS.
4. COMPACT SOIL AROUND BOX TO MANUFACTURERS RECOMMENDATIONS.
5. THIS DETAIL IS INTENDED TO SHOW GENERAL DESIGN INTENT ONLY. THE ELECTRICAL CONTRACTOR MUST VERIFY ALL INSTALLATION REQUIREMENTS WITH THE MANUFACTURER PRIOR TO THE BIDDING AND INSTALL ALL BOXES ACCORDINGLY.



POLE BASE DETAIL
NTS

NOTES:

1. 3500 P.S.I. MIN. 28 DAY COMPRESSIVE STRENGTH CONCRETE WITH GRADE 60 REINFORCING STEEL
2. IF WATER IS PRESENT IN HOLE. REMOVE BEFORE POURING CONCRETE.
3. FOUNDATION EXCAVATION SHALL BE BY 18" AUGER IN UNDISTURBED OR PROPERLY COMPACTED FILL PER SPECIFICATIONS.
4. FOUNDATION SHALL HAVE A MINIMUM ALLOWABLE END BEARING OF 2000 P.S.F., INCREASE BASE DEPTH AS REQUIRED.

CODED NOTES: #

1. EXISTING UTILITY POLE WITH (3) TRANSFORMERS IS TO REMAIN. EXISTING OVERHEAD PRIMARY ELECTRIC SERVICE CONDUCTORS, TELEPHONE/DATA/CABLE TV SERVICE CABLES TO BE RE-WORKED TO NEW UTILITY POLE LINE.
2. EXISTING UTILITY POLE TO BE REMOVED.
3. CONFIRM WITH OWNER WHETHER EXISTING UTILITY POLE WITH STREET LIGHT IS TO REMAIN OR BE ROMOVED.
4. EXISTING ELECTRIC SERVICE, METERING AND LIGHTING CONTROLS TO BE REMOVED. INTERCEPT (2) 1" CONDUITS CONTAINING SITE LIGHTING BRANCH CIRCUITS AT GRADE. FURNISH AND INSTALL FLUSH TO GRADE PULL BOX AND EXTEND BRANCH CIRCUITS UNDERGROUND TO BUILDING PANEL BOARDS. FURNISH AND INSTALL NEW BREAKERS, AND PHOTOCELL TO SERVE SITE LIGHTING BRANCH CIRCUITS.
5. EXISTING SITE LIGHTING POLES. EXISTING CIRCUITS TO BE RE-WORKED PER CODED NOTE #4
6. NEW UTILITY POLE TO BE INSTALLED.

GENERAL NOTES:

1. ROOMS OR AREAS SHOWN SHADED ON THIS PLAN, WITH THE FOLLOWING SHADING TYPE ARE DEDICATED FOR A SPECIFIC USE. EXAMPLES INCLUDE ELECTRICAL ROOMS, TECHNOLOGY/DATA CLOSETS, EXIT STAIRWELLS, AND ELEVATOR EQUIPMENT ROOMS. UNDER NO CIRCUMSTANCES SHALL PIPING, DUCTWORK, OR EQUIPMENT BE INSTALLED IN OR ROUTED THROUGH THESE ROOMS OR AREAS EXCEPT FOR BRANCH PIPING OR DUCTWORK SPECIFICALLY SERVING THE ROOM OR AREA. DEDICATED SPACE SHALL EXTEND VERTICALLY FROM FLOOR TO STRUCTURAL CEILING.

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ELECTRICAL SITE PLAN

ES-101

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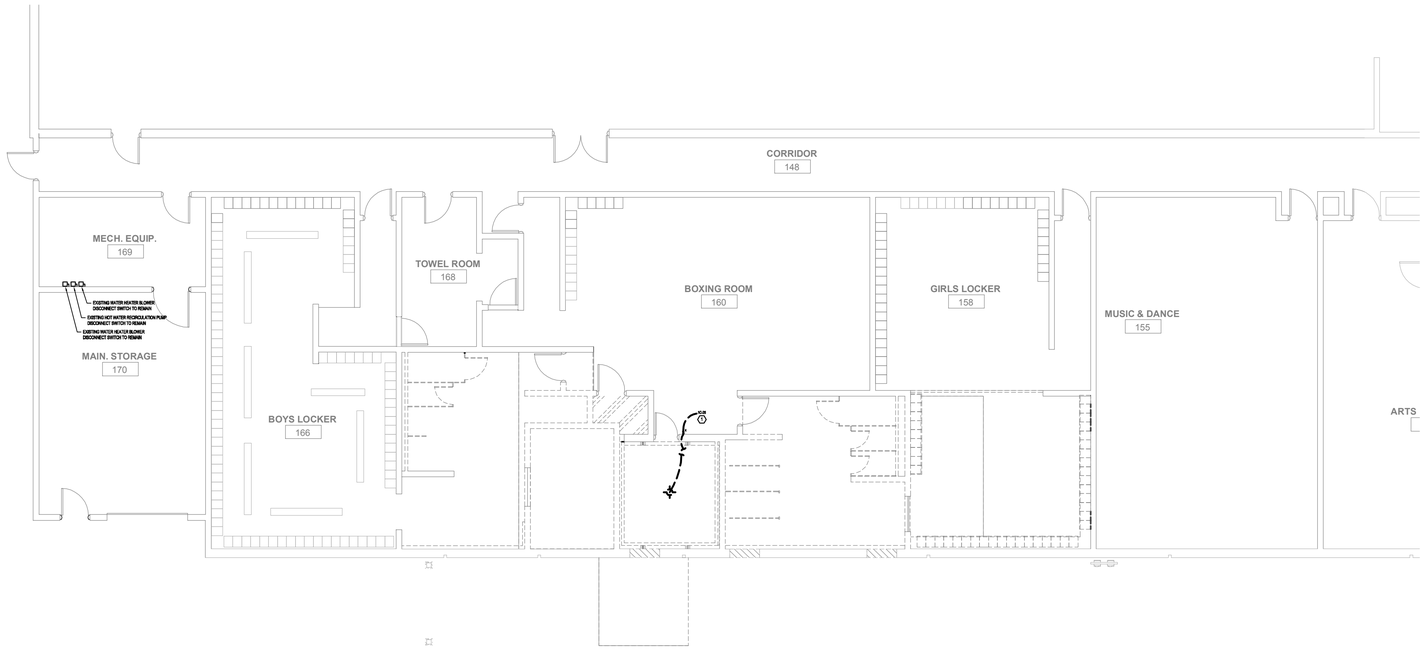

FLOOR PLAN AREA "B" ELECTRICAL DEMO

SCALE: 1/4" = 1'-0"

DEMOLITION NOTES

1. IN EVERY INSTANCE OF DEMOLITION AND/OR REMODELING, THE ELECTRICAL CONTRACTOR SHALL FIGURE A COMPLETE JOB AS NONE OTHER SHALL BE ACCEPTED.
2. THE DRAWINGS ARE TO BE USED ONLY AS A GUIDELINE FOR DEMOLITION. THE ELECTRICAL CONTRACTOR MUST VISIT THE SITE PRIOR TO BIDDING TO VERIFY ALL WORK REQUIRED FOR A COMPLETE JOB & INCLUDE THE COST OF SUCH WORK IN HIS BID.
3. THE ELECTRICAL CONTRACTOR SHALL MAINTAIN EXISTING SERVICES TO & IN THE EXISTING AREA AS REQUIRED.
4. IF NECESSARY, THE ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY SERVICES IN THE EXISTING AREAS.
5. THE ELECTRICAL CONTRACTOR SHALL DISCONNECT & REMOVE ELECTRIC SERVICE TO ALL MECHANICAL EQUIPMENT BEING REMOVED AS A RESULT OF THE REMODELING.
6. ELECTRICAL EQUIPMENT & DEVICES SHALL BE REMOVED COMPLETE INCLUDING CONDUIT & WIRE.
7. FLUSH MOUNTED WALL OUTLETS SHALL BE BLANKED-OFF WITH A COVERPLATE. COVERPLATE COLOR SHALL BE SELECTED BY ARCHITECT.
8. ANY EXISTING CONDUIT, WIRING AND/OR ELECTRICAL & MECHANICAL DEVICES BEING DISTURBED BY THE WORK SHALL BE REWORKED BY THIS CONTRACTOR AS REQUIRED TO RETURN TO ITS FORMER EXISTING OPERATING CONDITION.
9. ANY CIRCUITS FEEDING THROUGH DEVICES OR EQUIPMENT BEING RELOCATED, REWORKED, OR ABANDONED & SERVING OTHER ELECTRICAL DEVICES, AND/OR EQUIPMENT SHALL BE MAINTAINED BY PROVIDING J-BOXES OR OTHER ACCEPTABLE METHOD AS REQUIRED.
10. ALL WALLS, CEILINGS, FLOORS, ETC., BEING DISTURBED BY THE WORK SHALL BE RETURNED TO FINISHED CONDITIONS TO MATCH EXISTING BY THE ELECTRICAL CONTRACTOR & HE SHALL DO HIS OWN CUTTING & PATCHING AS NECESSARY UNDER HIS CONTRACT.
11. EXISTING MATERIALS SHALL BE TURNED OVER TO THE OWNER. IF NOT REQUIRED BY OWNER, THE ELECTRICAL CONTRACTOR SHALL REMOVE THESE MATERIALS FROM THE PREMISES.
12. NO CONDUIT, BOXES, WIRING, OR CABLES SHALL BE INSTALLED WITHIN 1 1/2" OF THE LOWEST POINT OF THE UNDERSIDE OF THE ROOF DECKING, NOR SHALL THEY BE INSTALLED CONCEALED WITHIN METAL-CORRUGATED ROOF DECKING. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE AND/OR REWORK EXISTING CONDUIT, BOXES, WIRING, AND CABLING THAT IS NOT IN COMPLIANCE WITH THIS REQUIREMENT.
13. ALL CONDUIT AND CABLING SHALL BE PROPERLY SUPPORTED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE AND/OR REWORK EXISTING CONDUIT AND/OR CABLING THAT IS NOT IN COMPLIANCE WITH THIS REQUIREMENT.

GENERAL NOTES:

1. REFERENCE ARCHITECTURAL, CIVIL AND MECHANICAL PLANS FOR ADDITIONAL WORK RELATED TO THE ELECTRICAL DEMOLITION SCOPE OF WORK.
2. REFERENCE ELECTRICAL DEMOLITION NOTES, THIS DRAWING.

DEMOLITION LEGEND:

ETR EXISTING DEVICE/FIXTURE/EQUIPMENT/CONDUIT/WIRE TO REMAIN

RM EXISTING DEVICE/FIXTURE/EQUIPMENT/CONDUIT/WIRE TO BE REMOVED

RL EXISTING DEVICE/FIXTURE/EQUIPMENT/CONDUIT/WIRE TO BE RELOCATED

CODED NOTES:

1. RE-USE AND REWORK EXISTING BRANCH CIRCUIT AS INDICATED ON LIGHTING AND/OR POWER PLAN.
2. EXISTING GAS WATER HEATERS ARE TO BE REMOVED AND REPLACED WITH NEW. REMOVE/DISCONNECT EXISTING CONTROL/BLOWER CIRCUIT TO EACH EXISTING UNIT. RECONNECT EXISTING CONTROL/BLOWER CIRCUIT TO EACH OF THE NEW HEATERS.
3. EXISTING HOT WATER RECIRCULATION PUMP IS TO BE REMOVED AND REPLACED WITH NEW. REMOVE/DISCONNECT EXISTING CIRCUIT TO UNIT. RECONNECT EXISTING CIRCUIT TO NEW FRACTIONAL PUMP.

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POWER & LIGHTING DEMO

ED-101

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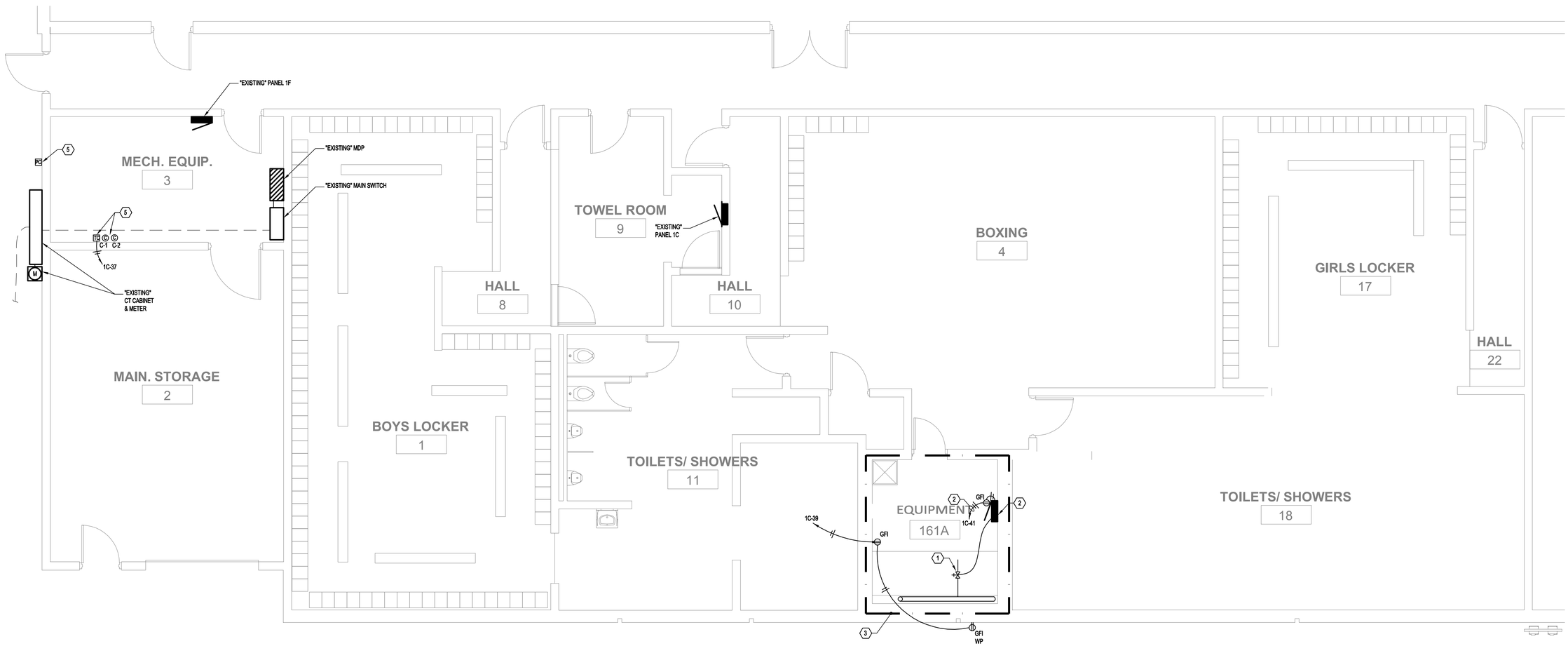
GENERAL NOTES:

1. REFERENCE ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO THE ELECTRICAL INSTALLATION. COORDINATE DEVICE LOCATIONS WITH ACCESSORIES BEING PROVIDED.
2. REFERENCE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION. COORDINATE ELECTRICAL CONDUIT, WIRE, LIGHT FIXTURES AND EQUIPMENT LOCATIONS WITH MECHANICAL DUCTWORK, PIPING AND EQUIPMENT.
3. PRIOR TO ROUGH-IN COORDINATE EXACT POWER REQUIREMENTS AND LOW VOLTAGE ROUGH-IN REQUIREMENTS FOR ALL OWNER FURNISHED EQUIPMENT AND SYSTEMS.
4. NEW CONDUIT/RACEWAY BEING INSTALLED SHALL BE CONCEALED WITHIN NEW AND EXISTING CONSTRUCTION. WHERE REQUIRED, INSTALL MC CABLE IN EXISTING STUD WALLS AND INSTALL SURFACE MOUNTED RACEWAY ON EXISTING BLOCK WALLS. WHEN THERE IS NO AVAILABLE OPTION BUT TO SURFACE MOUNT A VISIBLE RACEWAY, CONSULT ARCHITECT/ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
5. ALL EXISTING UNUSED WIRE, CABLING, CONDUIT AND EQUIPMENT SHALL BE REMOVED COMPLETE.

CODED NOTES: (#)

1. FURNISH AND INSTALL 24VAC CABLING IN WEATHER-TIGHT CONDUIT FROM EACH OF 37 SOLENOID VALVES TO WATER FEATURE CONTROL PANEL.
2. FURNISH AND INSTALL A 20A, 120V, GFI PROTECTED CIRCUIT TO WATER FEATURE CONTROL PANEL.
3. COORDINATE LOCATIONS OF WATER FEATURE EQUIPMENT AND ELECTRICAL REQUIREMENTS WITH SUPPLIER PRIOR TO ROUGH-IN.
4. RE-WORK EXISTING CIRCUIT THAT WAS MADE SPARE DUE TO DEMOLITION OF RENOVATED AREA.
5. REFERENCE SITE LIGHTING CONTROL DIAGRAM, SHEET E201.



FLOOR PLAN AREA "B" POWER
SCALE: 1/4" = 1'-0"

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POWER PLAN

E-101

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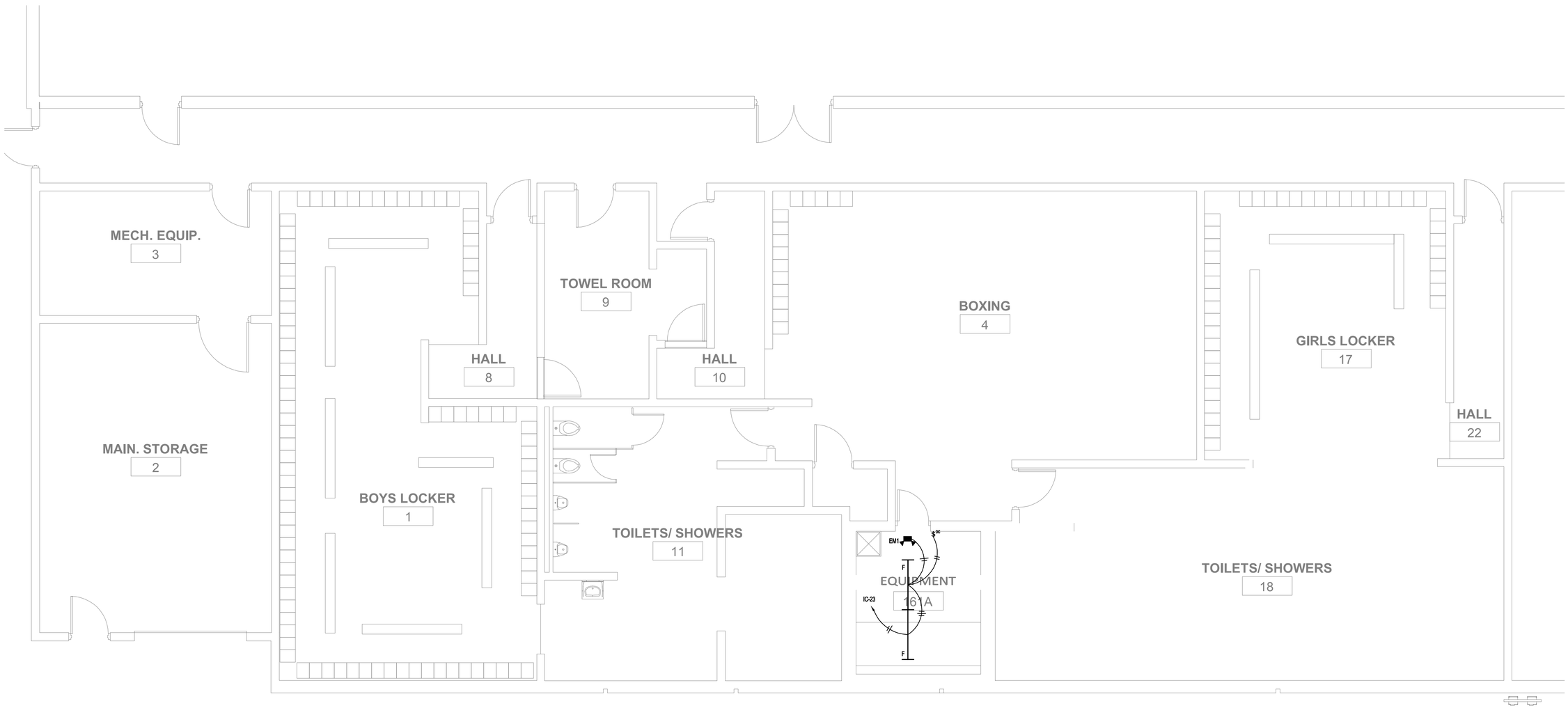
GENERAL NOTES:

1. REFERENCE ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO THE ELECTRICAL INSTALLATION. COORDINATE LIGHT FIXTURE LOCATIONS AND MOUNTING OPTIONS WITH CEILING GRID AND CEILING TYPE BEING INSTALLED.
2. REFERENCE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION. COORDINATE ELECTRICAL CONDUIT, WIRE, LIGHT FIXTURE AND EQUIPMENT LOCATIONS WITH MECHANICAL DUCTWORK, PIPING AND EQUIPMENT.
3. WHERE EMERGENCY AND EXIT FIXTURES WITH AN INTEGRAL BATTERY PACK ARE USED, WIRE FIXTURES AHEAD OF ALL SWITCHING ON CIRCUIT INDICATED. EMERGENCY BATTERY BALLAST'S ASSOCIATED WITH FLUORESCENT FIXTURES SHALL BE WIRED FOR SWITCHED OPERATION, UNLESS INDICATED OTHERWISE. PROVIDE AN ADDITIONAL HOT WIRE TO EMERGENCY BALLAST FOR SWITCHED OPERATION.
4. THE BALLAST(S) FOR FLUORESCENT EMERGENCY FIXTURES DESIGNATED AS NIGHT LIGHTS (NL) SHALL BE WIRED FOR 24 HOUR OPERATION (NON-SWITCHED).
5. FURNISH AND INSTALL OCCUPANCY SENSORS PER MANUFACTURER'S RECOMMENDATIONS.
6. PROVIDE TEMPORARY POWER AND TEMPORARY EMERGENCY, EXIT AND GENERAL LIGHTING FOR ALL RENOVATED AREAS AS REQUIRED.

CODED NOTES: (#)

1. WIRE EMERGENCY BALLAST FOR SWITCHED OPERATION



FLOOR PLAN AREA "B" LIGHTING
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LIGHTING PLAN

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SERVICE EQUIPMENT

SYMBOL	DESCRIPTION
	SWITCHBOARD FLOOR MOUNTED ON 4" HIGH CONCRETE HOUSING KEEPING PAD. SEE PANEL SCHEDULES AND ONE-LINE DIAGRAM.
	DISTRIBUTION PANEL MOUNTED 6'-6" TO TOP. SEE PANEL SCHEDULES AND ONE-LINE DIAGRAM.
	PANELBOARD RECESSED MOUNTED 6'-6" TO TOP. SEE PANEL SCHEDULES AND ONE-LINE DIAGRAM.
	PANELBOARD SURFACE MOUNTED 6'-6" TO TOP. SEE PANEL SCHEDULES AND ONE-LINE DIAGRAM.
	DRY TYPE TRANSFORMER. SEE ONE-LINE DIAGRAM.
	CONDUIT WITH WIRING RUN CONCEALED IN OR ABOVE CEILING OR WALL, OR RUN EXPOSED IN UNFINISHED AREAS. CROSS HATCHING INDICATES NUMBER OF CONDUCTORS (#12 AWG – MINIMUM). PROVIDE A CODE-SIZED GROUND WIRE IN ALL CONDUITS IN ADDITION TO THE CONDUCTORS SHOWN.
	CONDUIT WITH WIRING RUN CONCEALED BELOW FLOOR. CROSS HATCHING INDICATES NUMBER OF CONDUCTORS (#12 AWG – MINUMUM). PROVIDE A CODE-SIZED GROUND WIRE IN ALL CONDUITS IN ADDITION TO THE CONDUCTORS SHOWN.

RECEPTACLES

SYMBOL	DESCRIPTION
	20A – 125V GROUNDING TYPE DUPLEX RECEPTACLE MOUNTED 18" AFF, UNLESS NOTED OTHERWISE
	20A – 125V GROUNDING TYPE QUADRAPLEX RECEPTACLE MOUNTED 18" AFF, UNLESS NOTED OTHERWISE
GFI	20A – 125V GROUND FAULT INTERRUPTING TYPE DUPLEX RECEPTACLE MOUNTED 18" AFF, UNLESS NOTED OTHERWISE
GFI WP	20A – 125V GROUND FAULT INTERRUPTING TYPE DUPLEX RECEPTACLE, WEATHER RESISTANT LISTED WITH DIE-CAST ALUMINUM "WHILE IN-USE COVER" AND MOUNTED 18" AFF, UNLESS NOTED OTHERWISE
	20A – 125V GROUNDING TYPE DUPLEX RECEPTACLE MOUNTED 6" ABOVE TOP OF COUNTER/BACKSPLASH, UNLESS NOTED OTHERWISE. COORDINATE LOCATION WITH INTERIOR ELEVATIONS INDICATED ON ARCHITECTURAL PLANS. SUBSCRIPT "GFI" INDICATES TO PROVIDE A DUPLEX GROUND FAULT INTERRUPTING TYPE DEVICE.
C	20A – 125V GROUNDING TYPE DUPLEX RECEPTACLE RECESSED MOUNTED FLUSH IN FINISHED CEILING, UNLESS NOTED OTHERWISE. RECEPTACLE AND FACEPLATE FINISH TO MATCH FINISH OF CEILING.
T	20A – 125V GROUNDING TYPE DUPLEX RECEPTACLE WITH TAMPER RESISTANT LISTED AND MOUNTED 18" AFF, UNLESS NOTED OTHERWISE

LIGHT SWITCHES

SYMBOL	DESCRIPTION
$x	20A – 120V/277V SINGLE POLE TOGGLE SWITCH MOUNTED 48" AFF, UNLESS NOTED OTHERWISE. IF APPLICABLE, LOWER CASE SUBSCRIPT "x" – KEYS SWITCH TO FIXTURES BEING CONTROLLED (TYPICAL OF ALL SWITCH SYMBOLS)
$2	20A – 120V/277V DOUBLE POLE TOGGLE SWITCH MOUNTED 48" AFF, UNLESS NOTED OTHERWISE.
$3	20A – 120V/277V THREE WAY SWITCH MOUNTED 48" AFF, UNLESS NOTED OTHERWISE.
$4	20A – 120V/277V FOUR WAY SWITCH MOUNTED 48" AFF, UNLESS NOTED OTHERWISE.
$OC	120V/277V OCCUPANCY SENSING SWITCH MOUNTED 48" AFF, UNLESS NOTED OTHERWISE. TYPE AND RATING AS INDICATED ON PLANS.
OS	120V/277V OCCUPANCY SENSING SWITCH CEILING MOUNTED, UNLESS NOTED OTHERWISE. TYPE AND RATING AS INDICATED ON PLANS.
$P	20A – 120V/277V SINGLE POLE PILOT LIGHT SWITCH MOUNTED 48" AFF, UNLESS NOTED OTHERWISE. (2P – DOUBLE POLE, 3P – THREE WAY)
$T	TIMER SWITCH MOUNTED 48" AFF, UNLESS NOTED OTHERWISE. TYPE AND RATING PER LOAD BEING SERVED. WATT-STOPPER #TS-400.

OCCUPANCY SENSOR SCHEDULE

DESIGNATION	MANUFACTURER	MODEL #	TECHNOLOGY	MOUNTING (HEIGHT)	VOLTAGE (V)	REMARKS
$OC	WATTSTOPPER	PW-100	P	+48" AFF	120/277	–
OS	WATTSTOPPER	DT-300	D	CLG. CTR	24V DC	FURNISH & INSTALL BZ-150 POWER PACK

NOTES:
1. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
2. FURNISH AND INSTALL POWER MODULES AND ACCESSORIES AS REQUIRED FOR SENSOR BEING PROVIDED.
3. ADJUST SENSOR SETTINGS PER OWNER'S REQUIREMENTS. COMMISSION SENSORS IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE.
4. BASIS OF DESIGN IS WATTSTOPPER. SEE SPECIFICATIONS FOR OTHER ACCEPTABLE MANUFACTURERS.

TECHNOLOGY LEGEND:
P – PASSIVE INFRARED
U – ULTRASONIC
D – DUAL TECHNOLOGY

FIRE EQUIPMENT

SYMBOL	DESCRIPTION
FACP	FIRE ALARM CONTROL PANEL
FAA	FIRE ALARM ANNUNCIATOR PANEL RECESSED MOUNTED IN WALL
NAC	FIRE ALARM NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANEL SURFACE MOUNTED ON WALL
F	FIRE ALARM MANUAL PULL STATION MOUNTED 48" AFF TO TOP.
V	FIRE ALARM VISUAL (STROBE) NOTIFICATION APPLIANCE MOUNTED AT THE LESSOR OF 80" AFF TO BOTTOM OR 6" BELOW FINISHED CEILING. IF APPLICABLE, SUBSCRIPT "c" INDICATES CEILING MOUNTED APPLIANCE.
F	FIRE ALARM AUDIO/VISUAL (HORN/STROBE) NOTIFICATION APPLIANCE MOUNTED AT THE LESSOR OF 80" AFF TO BOTTOM OR 6" BELOW FINISHED CEILING. IF APPLICABLE, SUBSCRIPT "c" INDICATES CEILING MOUNTED APPLIANCE.
	SMOKE DETECTOR WITH BASE MOUNTED FLUSH IN CEILING
	DUCT-TYPE SMOKE DETECTOR WITH REMOTE TEST STATION AND AUXILIARY RELAY FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR; INSTALLED IN DUCTWORK BY MECHANICAL CONTRACTOR PER CODE. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR AND MANUFACTURER. PROVIDE CONDUIT AND WIRING NECESSARY TO SHUT DOWN HVAC UNIT UPON ACTIVATION OF SMOKE DETECTOR.
	HEAT DETECTOR WITH BASE MOUNTED FLUSH IN CEILING. TEMPERATURE RATING AS REQUIRED FOR APPLICATION.
RM	ADDRESSABLE FIRE ALARM RELAY CONTROL MODULE WITH DRY CONTACT OUTPUT FOR ACTIVATING AUXILIARY DEVICES.
MM	ADDRESSABLE FIRE ALARM MONITOR MODULE TO SUPERVISE DRY CONTACT INPUT DEVICES.
TS	TAMPER SWITCH FURNISHED AND INSTALLED BY SPRINKLER CONTRACTOR. FURNISH AND INSTALL A FIRE ALARM MONITORING MODULE FOR INTEGRATION INTO FIRE ALARM SYSTEM.
FS	FLOW SWITCH FURNISHED AND INSTALLED BY SPRINKLER CONTRACTOR. FURNISH AND INSTLL A FIRE ALARM MONITORING MODULE FOR INTEGRATION INTO FIRE ALARM SYSTEM.

MISC. POWER

SYMBOL	DESCRIPTION
J	JUNCTION BOX – TYPE AND SIZE AS REQUIRED BY NEC
PB	PULL BOX – TYPE AND SIZE AS REQUIRED BY NEC
$M	MANUAL MOTOR STARTER TOGGLE SWITCH WITH THERMAL OVERLOAD PROTECTION – TYPE AND RATING PER EQUIPMENT BEING SERVED.
D	DISCONNECT SWITCH – TYPE AND RATING AS INDICATED ON PLANS
	MAGNETIC STARTER WITH (2) NO & (2) NC CONTACTS – TYPE AND RATING AS INDICATED ON PLANS
M	COMBINATION MAGNETIC STARTER/FUSE DISCONNECT SWITCH WITH HAND-OFF-AUTO SWITCH, (2) NO & (2) NC CONTACTS – TYPE AND RATING AS INDICATED ON PLANS.
R	CONTROL RELAY – TYPE AND RATING AS INDICATED ON PLANS
C#	CONTACTOR – TYPE AND RATING AS INDICATED ON PLANS. SEE CONTACTOR SCHEDULE.
	MOTOR – TYPE AND RATING AS INDICATED ON PLANS
MOD	MOTOR OPERATED DAMPER – FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTACTOR. TYPE AND RATING AS INDICATED ON PLANS. SEE MECHANICAL PLANS FOR CONTROL REQUIREMENTS.
	PUSH-BUTTON OR PUSH-PAD ASSEMBLY MOUNTED AT 48" AFF. TYPE AND RATINGS PER LOAD BEING SERVED. MAKE CONNECTIONS TO EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS.

GENERAL NOTES

1. FINAL CONNECTIONS TO LIGHT FIXTURES SHALL BE MADE WITH GREENFIELD FLEXIBLE CONDUIT. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL BE 6'-0".
2. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF LIGHT FIXTURE LAY-OUT. CONTRACTORS TO COORDINATE LOCATIONS OF LIGHTING, SPEAKERS, AIR DIFFUSERS, GRILLES, SPRINKLER HEADS & THE LIKE, WITH REFLECTED CEILING LAY-OUTS AS REQUIRED & DIRECTED BY THE ARCHITECT.
3. ALL DEVICES, EQUIPMENT, FIXTURES, & THE LIKE, MUST BE GROUNDED BY USE OF A PROPERLY SIZED GROUNDING CONDUCTOR. MECHANICAL/ ELECTRICAL BONDS OF THE METALLIC RACEWAY SYSTEM SHALL ALSO BE MAINTAINED.
4. REFER TO MECHANICAL AND PLUMBING PLANS FOR EXACT LOCATION OF MECHANICAL AND PLUMBING EQUIPMENT. COORDINATE LOCATION OF DISCONNECT SWITCH ASSOCIATED WITH EACH PIECE OF EQUIPMENT WITH MECHANICAL CONTRACTOR AND INSTALL IN ACCORDANCE WITH THE NEC.
5. REFER TO DIVISION 15 (22 & 23) SPECIFICATIONS, HVAC PLANS & PLUMBING PLANS FOR ADDITIONAL ELECTRICAL WORK REQUIREMENTS & COORDINATION.
6. ALL RECEPTACLES SHOWN BACK-TO-BACK IN WALLS SHALL BE SEPARATED HORIZONTALLY BY 8" MINIMUM.
7. WHERE OPEN WIRING METHODS FOR LOW VOLTAGE SYSTEMS ARE PERMITTED BY THE CONTRACT DOCUMENTS AND LOCAL AUTHORITY, THE CONDUCTOR INSULATION MUST BE PLENUM RATED. (REFERENCE NEC 300.22(C)(1))
8. BRANCH CIRCUIT CONDUCTOR SIZES (& CONDUITS) SHALL BE INCREASED FROM THOSE INDICATED ON THE PLANS TO PREVENT EXCESSIVE VOLTAGE DROP. BRANCH CIRCUITS SHALL BE INSTALLED WITH WIRES OF SUFFICIENT SIZE SO THAT VOLTAGE DROP BETWEEN THE PANEL & THE LOADS DO NOT EXCEED A LIMIT OF 3%.
9. REGARDLESS OF THE TEMPERATURE RATING OF THE CONDUCTOR INSULATION, ALL CONDUCTOR AMPACITY RATINGS FOR THIS PROJECT SHALL BE DETERMINED FROM THE 75°C CONDUCTOR TEMPERATURE RATINGS INDICATED IN THE NEC TABLES. WHERE EQUIPMENT OR DEVICES ARE PROVIDED WITH TERMINALS/LUGS RATED FOR 60°C, THE AMPACITY RATING OF THE 75°C CONDUCTOR SHALL BE LIMITED TO ITS ASSOCIATED 60°C RATING AS INDICATED IN THE NEC TABLES. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO INCREASE THE CONDUCTORS AND CONDUIT SIZE AS REQUIRED.
10. ALL 120V AND 277V BRANCH CIRCUITS SHALL BE PROVIDED WITH SEPARATE NEUTRAL CONDUCTORS. SHARED NEUTRALS WILL NOT BE PERMITTED FOR MULTI-CIRCUIT INSTALLATIONS. WHERE MULTIPLE CIRCUITS ARE RUN IN A COMMON RACEWAY, THE AMPACITY OF THE CONDUCTORS SHALL BE PROPERLY DERATED & CONDUIT SHALL BE SIZED PER CODE. REFERENCE NEC ARTICLE AND TABLE 310.15(B)(2)(a).
11. ALL CONDUITS SHALL CONTAIN A GROUND CONDUCTOR SIZED PER NEC TABLE #250.122. IN ADDITION, WHERE AN ISOLATED, INSULATED GROUND IS REQUIRED, A SEPARATE GROUND CONDUCTOR WITH GREEN INSULATION SHALL BE RUN FROM THE PANEL GROUND BUS TO THE ISOLATED GROUND CONNECTION OF THE DEVICE. IN NO CASE SHALL THE SYSTEM GROUND (CONDUCTOR & ASSOCIATED OUTLET BOXES, CONDUIT & BUILDING STEEL) BE ALLOWED TO CONTACT THE ISOLATED GROUND (CONDUCTOR & DEVICE). WHERE CIRCUIT CONDUCTORS ARE INCREASED IN SIZE FOR VOLTAGE DROP, THE GROUND CONDUCTOR SIZE SHALL BE INCREASED PROPORTIONATELY (ACCORDING TO CIRCULAR MIL AREA) FROM THE SIZE REQUIRED BY NEC TABLE #250.122.
12. EXACT WIRING REQUIREMENTS FOR ALL HVAC, PLUMBING AND OWNER FURNISHED EQUIPMENT SHALL BE VERIFIED WITH THE MANUFACTURER OF THE FURNISHED EQUIPMENT PRIOR TO ROUGH-IN.
13. THE ELECTRICAL CONTRACTOR SHALL FURNISH ALL ACCESS PANELS, AS REQUIRED FOR SERVICING AND TESTING, FOR EQUIPMENT AND/OR DEVICES FURNISHED UNDER HIS CONTRACT. THE GENERAL CONTRACTOR SHALL INSTALL ACCESS PANELS. THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE SIZE AND LOCATION OF EACH ACCESS PANEL WITH THE ARCHITECT AND GENERAL CONTRACTOR PRIOR TO ROUGH-IN.
14. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS BID ALL CUTTING, TRENCHING AND PATCHING ASSOCIATED WITH THE ELECTRICAL INSTALLATION.
15. ALL PENETRATIONS THROUGH FIRE RATED WALLS ASSOCIATED WITH THE ELECTRICAL INSTALLATION SHALL BE SLEEVED AND FIRE-STOPPED USING A UL APPROVED METHOD. UL APPROVED METHOD SHALL MEET OR EXCEED FIRE RATING OF STRUCTURE BEING PENETRATED. REFERENCE ARCHITECTURAL PLANS FOR FIRE RATED STRUCTURES. (REFERENCE NEC 300.21)
16. NEW CONDUIT/RACEWAY BEING INSTALLED SHALL BE CONCEALED WITHIN NEW AND EXISTING CONSTRUCTION. WHERE REQUIRED, INSTALL MC CABLE IN EXISTING STUD WALLS AND INSTALL SURFACE MOUNTED RACEWAY ON EXISTING BLOCK WALLS. WHEN THERE IS NO AVAILABLE OPTION BUT TO SURFACE MOUNT A VISIBLE RACEWAY, CONSULT ARCHITECT/ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
17. LIGHT FIXTURES SHALL BE SUPPORTED INDEPENDENTLY OF SUSPENDED CEILINGS OR THE SUSPENDED CEILING SHALL BE SUPPORTED WITHIN (6) INCHES OF EACH CORNER OF FIXTURE IN ACCORDANCE WITH ASTM C636-76 (LATEST REVISION).
18. PER ADAAG THE HEIGHT OF ALL ELECTRICAL OUTLETS, SWITCHES AND CONTROLS SHALL BE: A) A MAXIMUM 48" ABOVE THE FINISH FLOOR PER SECTION 4.2.5; B) MINIMUM 15" ABOVE FINISH FLOOR PER SECTION 4.27.3.
19. ALL EXISTING UNUSED ELECTRICAL WIRE, CONDUIT AND EQUIPMENT SHALL BE REMOVED COMPLETE.
20. WHERE PERMITTED BY THE OWNER AND LOCAL AUTHORITY, TYPE MC CABLE MAY BE FURNISHED AND INSTALLED IN CONCEALED ACCESSIBLE LOCATIONS IN LIEU OF CONDUIT AND WIRE. WHERE A FINISHED AREA IS EXPOSED TO STRUCTURE, CONDUIT AND WIRE SHALL BE USED. WHERE CEILINGS ARE NOT ACCESSIBLE, CONDUIT AND WIRE SHALL BE USED.
21. RACEWAY PASSING FROM THE INTERIOR TO THE EXTERIOR OF THE BUILDING SHALL BE FILLED WITH AN APPROVED MATERIAL TO PREVENT THE CIRCULATION OF WARM AIR TO A COLDER SECTION OF THE RACEWAY. (REFERENCE NEC 300.7(A))

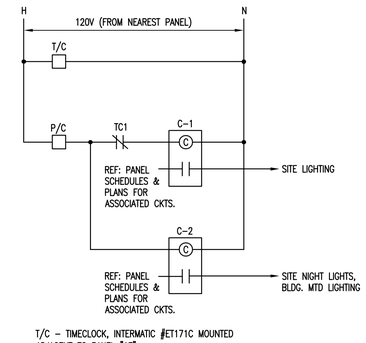
ELECTRICAL ABBREVIATIONS

A	AMPS
AC	AIR CONDITIONING UNIT
AFC	ABOVE FINISH COUNTER
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AHU	AIR HANDLING UNIT
AIC	ASYMMETRICAL INTERRUPTING CURRENT
ARCH.	ARCHITECTURAL
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAGE
BKR	BREAKER
BLDG.	BUILDING
C	CONDUIT
CATV	CABLE TELEVISION
CCTV	CLOSED CIRCUIT TELEVISION
CH	CHILLER
CONTR	CONTRACTOR
CT	COOLING TOWER
CU	COPPER
CUH	CABINET UNIT HEATER
DE	DUAL ELEMENT
DN	DOWN
DS	DISCONNECT SWITCH
DWG.	DRAWING
(E) or EXIST.	EXISTING
EBB	ELECTRIC BASEBOARD
E.C.	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EH	ELECTRIC HEATER
ELEC.	ELECTRICAL
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EQ.	EQUAL
ETR	EXISTING TO REMAIN
EUH	ELECTRIC UNIT HEATER
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
F	FUSE
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FC	FAN COIL UNIT
FLUOR	FLUORESCENT
FPB	FAN POWER BOX (VAV)
F.P.C.	FIRE PROTECTION CONTRACTOR
FS	FLOW SWITCH
FT.	FOOT/FEET
G.C.	GENERAL CONTRACTOR
GFI	GROUND FAULT INTERRUPTING PROTECTION
GND	GROUND
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HVAC	HEATING, VENTILATION, AIR CONDITIONING
IG	ISOLATED GROUND
INCAND.	INCANDESCENT
JB	JUNCTION BOX
KCMIL	ONE THOUSAND CIRCULAR MILS
K.E.C.	KITCHEN EQUIPMENT CONTRACTOR
KVA	KILOVOLT AMPERE
KW	KILOWATT
LTG	LIGHTING
MATV	MASTER ANTENNA TV
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
M.C.	MECHANICAL CONTRACTOR
MECH.	MECHANICAL
MFR	MANUFACTURER
MH	METAL HALIDE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MOD	MOTOR OPERATED DAMPER
MSB	MAIN SWITCHBOARD
MTD	MOUNTED
NEC	NATIONAL ELECTRIC CODE
NF	NON FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHTLIGHT
NTS	NOT TO SCALE
ø or PH	PHASE
P	POLE
PB	PULL BOX
P.C.	PLUMBING CONTRACTOR
PNL	PANEL
PRE	POWER ROOF EXHAUSTER
PVC	POLYVINYL CHLORIDE
RTU	ROOF TOP UNIT
SPKR	SPEAKER
SPST	SINGLE POLE SINGLE THROW
TIE	MULTIPLE OUTLETS WIRED ON SAME BRANCH CICRUIT
TS	TAMPER SWITCH
TTB	TELEPHONE TERMINAL BOARD
TV	TELEVISION
TYP.	TYPICAL
UH	GAS FIRED UNIT HEATER
UL	UNDERWRITER'S LABORATORY
UNO	UNLESS NOTED OTHERWISE
UV	UNIT VENTILATOR
V	VOLTS
W	WATTS
WP	WEATHERPROOF TYPE DEVICE (NEMA 3R RATED)
X'FMR	TRANSFORMER

CONTACTOR SCHEDULE

DESIGNATION	CONTACT AMPERE RATING	NO. OF POLES	CONTACT VOLTAGE RATING	COIL VOLTAGE RATING	FUNCTION	CONTROL
C-1	30A	6	600V	120V	SITE LIGHTING	P.C. ON/ T.C. OFF
C-2	30A	3	600V	120V	SITE LIGHTING	P.C. ON/OFF

NOTES:
1. MOUNT CONTACTORS IN PROPER NEMA ENCLOSURE FOR ENVIRONMENT AND ADACENT TO ASSOCIATED BRANCH CIRCUIT PANEL.
2. ALL CONTACTORS SHALL BE MECHANICALLY-HELD WITH 2-WIRE CONTROL MODULE.
3. ACCEPTABLE MANUFACTURERS ARE SQUARE "D" AND ASCO.



T/C – TIMECLOCK, INTERMATIC #ET171C MOUNTED ADJACENT TO PANEL "1f".

P/C – PHOTOCELL, INTERMATIC #K4221 MOUNTED AT ROOF. FACE SENSOR NORTH.

SITE LIGHTING CONTROL DIAGRAM

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ELECTRICAL DETAILS, NOTES & SCHEDULES

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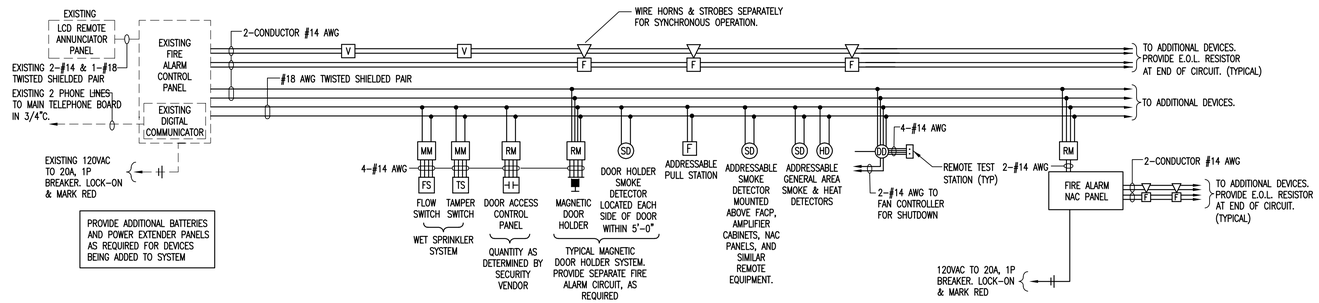
LIGHTING FIXTURE SCHEDULE

TYPE	LOAD (VA)	LAMPS NO.	LAMPS TYPE	MANUFACTURER	CATALOG NUMBER	DESCRIPTION
EX	4	–	LED (WITH UNIT)	SURE-LITES OR APPROVED EQUAL BY: DUAL-LITE MCPHILBEN LITHONIA	LPX-7-0-R-WH	THERMOPLASTIC LED EXIT SIGN WITH UNIVERSAL MOUNTING, RED LETTERS ON A WHITE STENCIL FACE, CHEVRON KNOCKOUTS, SELF-TEST/SELF-DIAGNOSTICS, NICKEL CADMIUM BATTERY, AND 120/277V INPUT. NOTE: MOUNTING, NUMBER OF FACES, AND CHEVRONS AS INDICATED ON PLANS. VERIFY PRIOR TO ORDERING. 120V INPUT.
EM	20	2	10W MR16 (WITH UNIT)	DUAL-LITE MCPHILBEN LITHONIA SURE-LITES	LZ30-10W CAX6H ELM618 CC4-WH-MRT	WALL MOUNTED EMERGENCY LIGHTING UNIT WITH TWO ROUND WHITE THERMOPLASTIC ADJUSTABLE LAMP HEADS, WHITE THERMOPLASTIC HOUSING, SELF-TEST/SELF-DIAGNOSTICS, LEAD CALCIUM BATTERY, AND 120/277V INPUT. NOTE: AIM HEADS AS REQUIRED FOR PROPER ILLUMINATION ALONG PATH OF EGRESS. ADJUST AS REQUIRED PER AHJ. 120V INPUT.
F	60	2	32W T8	COLUMBIA DAY-BRITE LITHONIA METALUX	KL-4-232-E-ST 1FD-232-PP-UNV-1/2-EB10I EJ-232-MVOLT-GEB10IS DCIF-232-UNV-EB81	4'L CEILING MOUNTED INDUSTRIAL FLUORESCENT FIXTURE WITH TWO LAMPS PER CROSS SECTION, PAINTED POLYESTER REFLECTOR WITH STIFFENING RIBS, 10% UPLIGHT, HEAVY-DUTY DIE FORMED STEEL CHANNEL, CONTINUOUS ROW MOUNTING WHERE SHOWN ON PLANS, BAKED WHITE ENAMEL FINISH, AND (1) 2-LAMP 120/277V ELECTRONIC BALLAST. 120V
S1	185	1	150W M.H.	US ARCHITECTURAL LTG	LUMINAIRE: RSBPT318-VSQ-150PSMH-208-PTA-XX POLE: RNTS-144-11-PTA-XX-RBC PROVIDE A SET OF FIXED BANNER ARMS FOR 3 OF 5 SITE LIGHTING POLES. COORDINATE WHICH POLES ARE HAVE BANNER ARMS AND MOUNTING HEIGHT/SPACING OF BANNER ARMS ON POLES WITH ARCHITECT PRIOR TO ORDERING.	ONE PULSE START METAL HALIDE LUMINAIRE WITH FULL CUT-OFF, DIE-CAST ALUMINUM HOUSING AND DOOR FRAME, TEMPERED FLAT GLASS LENS, DOOR GASKETING, MULTIFACE OPTICAL SYSTEM WITH TYPE V IES LIGHT DISTRIBUTION AND HPF BALLAST POST TOP MOUNTED ON A ROUND STRAIGHT 14FT WITH A ROUND BASE COVER. FIXTURES AND POLE TO HAVE A PAINT FINISH ("XX") AS DIRECTED BY THE ARCHITECT. INCLUDE (1) PORTABLE LOWERING WINCH AND TURN OVER TO OWNER FOR FUTURE MAINTENANCE. 208V

LIGHTING FIXTURE SCHEDULE NOTES:

1. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN AND/OR ROOM FINISH SCHEDULE TO DETERMINE PROPER TYPE OF LIGHT FIXTURE REQUIRED FOR THE CEILING CONSTRUCTION PRIOR TO ORDERING THE FIXTURES & PROVIDE FIXTURES THAT ARE COMPATIBLE WITH THE CEILING SYSTEM.
2. ALL BALLASTS FOR LINEAR AND COMPACT FLUORESCENT LAMPS SHALL BE INSTANT START WITH LESS THAN 10% THD. ALL SUCH BALLASTS FOR EXTERIOR FIXTURES SHALL BE COLD WEATHER BALLASTS RATED FOR 0°F OR LOWER. SEE ELECTRICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. ALL LIGHTING FIXTURES UTILIZING DOUBLE ENDED FLUORESCENT LAMPS SHALL BE PROVIDED WITH AN INTEGRAL DISCONNECTING MEANS INSTALLED BY THE FIXTURE MANUFACTURER. FOR SAID FIXTURES WHERE AN INTEGRAL DISCONNECTING MEANS IS NOT AVAILABLE BY THE MANUFACTURER, THE E.C. SHALL FURNISH AND INSTALL A LOCAL EXTERNAL DISCONNECTING MEANS AS REQUIRED PER NEC 410.
4. ALL MR16 LAMPS SHALL BE 10,000 HOUR LAMPS.
5. OTHER FIXTURE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THAT THE FIXTURES SUBMITTED MEET OR EXCEED THE QUALITY, PERFORMANCE, AND AESTHETICS OF THE SPECIFIED STANDARDS AS DETERMINED BY THE ENGINEER AND ARCHITECT. PHOTOMETRIC CALCULATIONS MAY BE REQUIRED FOR SOME FIXTURE TYPES AS PART OF SHOP DRAWING SUBMITTALS AS DETERMINED BY THE ENGINEER.
6. WHERE LIGHT FIXTURES ARE NOTED TO HAVE EMERGENCY BALLASTS THE EMERGENCY BALLASTS SHALL PROVIDE A MINIMUM OF NINETY (90) MINUTES OF CODE REQUIRED EMERGENCY LIGHTING. EACH EMERGENCY BALLAST PROVIDED SHALL PRODUCE THE MAXIMUM LUMEN OUTPUT AVAILABLE FOR THE LAMP USED. EMERGENCY LIGHTING BALLASTS SHALL BE BODINE OR APPROVED EQUAL.



TYPICAL FIRE ALARM DEVICE WIRING DIAGRAM

NTS

- - - - INDICATES EXISTING EQUIPMENT/CONDUIT/WIRING, UNLESS INDICATED OTHERWISE

——— INDICATES EQUIPMENT/CONDUIT/WIRING INSTALLED UNDER THIS CONTRACT

FIRE ALARM SYSTEM NOTES

1. THE FIRE ALARM SYSTEM MUST BE INSTALLED IN ACCORDANCE WITH PLANS AND SPECIFICATIONS AND MUST MEET ALL STATE & LOCAL CODE REQUIREMENTS. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL CODE REQUIRED DOCUMENTS INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:
   A. A FLOOR PLAN WHICH INDICATES THE USE OF ALL ROOMS.
   B. LOCATIONS OF ALARM-INITIATING AND NOTIFICATION APPLIANCES.
   C. ALARM CONTROL AND TROUBLE SIGNALING EQUIPMENT.
   D. ANNUNCIATION.
   E. POWER CONNECTION.
   F. BATTERY CALCULATIONS.
   G. CONDUCTOR TYPE AND SIZES.
   H. VOLTAGE DROP CALCULATIONS.
   I. MANUFACTURERS, MODEL NUMBERS AND LISTING INFORMATION FOR EQUIPMENT, DEVICES AND MATERIALS.
   J. DETAILS OF CEILING HEIGHT AND CONSTRUCTION.
   K. THE INTERFACE OF FIRE SAFETY CONTROL FUNCTIONS.

   THESE DOCUMENTS MUST BE PREPARED BY A CERTIFIED FIRE ALARM DESIGNER AND MUST BE SUBMITTED TO THE LOCAL AUTHORITIES FOR REVIEW AND APPROVAL PRIOR TO ROUGH-IN OF SYSTEM.
2. ALL WIRING SHALL BE IN CONDUIT & SHALL BE SIZED PER THE NATIONAL ELECTRIC CODE. DO NOT RUN ANY OTHER WIRING IN THE SAME CONDUIT WITH ALARM WIRING. DO NOT RUN 120VAC WIRING WITH ALARM WIRING. ALL WIRE TO BE SHIELDED CABLE. ALL J-BOXES ASSOCIATED WITH THE FIRE ALARM SYSTEM SHALL BE SPRAY PAINTED "FIRE ENGINE" RED.
3. ALL WIRE & CABLE MUST BE RATED PER THE LATEST REVISION OF THE NATIONAL ELECTRIC CODE SECTION 760.
4. CONFIRM ALL WIRING REQUIREMENTS WITH PROPOSED FIRE ALARM SUPPLIER PRIOR TO BID AND PROVIDE IN ACCORDANCE THEREWITH. WIRING SHOWN ON THIS DIAGRAM REPRESENTS THE MINIMUM SIZE REQUIRED. WIRE SIZES SHALL BE INCREASED AS REQUIRED FOR VOLTAGE DROP.
5. WIRING SHALL BE CONTINUOUS FROM ONE DEVICE TO THE NEXT. SPLICING IS PROHIBITED.
6. THE TYPICAL WIRING DIAGRAM IS NOT INTENDED TO SHOW QUANTITIES OF DEVICES. REFER TO PLANS FOR EXACT QUANTITIES.
7. ALL CONDUCTORS INCLUDING SHIELDS MUST TEST FREE OF OPENS, SHORTS & GROUNDS BEFORE MAKING CONNECTIONS TO THE FIRE ALARM CONTROL PANEL.
8. EACH FIRE ALARM PANEL REQUIRES A DEDICATED 120VAC CIRCUIT. RUN 3-#12 (INCLUDES THE GREEN GROUND WIRE) FROM A 20 AMP CIRCUIT BREAKER. PROVIDE A LOCK-ON CLIP & RED MARKING ON THE BREAKER.
9. SMOKE DETECTOR HEADS MUST BE INSTALLED FREE OF DUST OR ANY OTHER CONTAMINATION. SMOKE DETECTORS SHALL NOT BE MOUNTED WITHIN 3'-0" OF A SUPPLY OR RETURN AIR GRILLE. COORDINATE SMOKE DETECTOR LOCATIONS WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION.
10. IN ALL ROOMS REQUIRING SMOKE DETECTION, IF THERE IS NOT A SMOOTH, FLAT CEILING, THEN DETECTION SHALL BE SPACED PER NFPA 72. IF THERE ARE BEAM DEPTHS LESS THAN 10% OF THE CEILING HEIGHT (0.1 X H), SMOOTH CEILING SPACES SHALL BE PERMITTED. IF THERE ARE BEAM DEPTHS EQUAL OR GREATER THAN 10% OF THE CEILING HEIGHT (0.1 X H), AND THE BEAM SPACING IS EQUAL TO OR GREATER THAN 40% OF THE CEILING HEIGHT (0.4 X H), SPOT SMOKE DETECTORS SHALL BE LOCATED ON THE CEILING IN EACH BEAM POCKET PER NFPA 72 2007, 5.7.3.2.4.
11. HORNS AND STROBES SHALL BE WIRED SEPARATELY FOR SYNCHRONOUS OPERATION. PROVIDE SYNCHRONIZATION MODULES AS REQUIRED TO COMPLY WITH CODE.
12. DUCT DETECTORS SHALL HAVE REMOTE TEST STATIONS INSTALLED IN AN ACCESSIBLE LOCATION AND BE CLEARLY LABELED TO INDICATE THEIR FUNCTION AND THE MECHANICAL UNIT ASSOCIATED WITH EACH DETECTOR.

    DUCT DETECTOR TEST STATIONS SHALL BE LOCATED AS CLOSE TO THE APPLIANCES AS POSSIBLE FOR EASE IN LOCATING AND UNLESS ASSOCIATED WITH ROOF TOP MECHANICAL UNITS
    A. IF THERE IS A DROP CEILING, THE REMOTE TEST STATIONS SHALL BE MOUNTED IN CEILING TILES BELOW THE DUCT DETECTORS.
    B. IF THERE IS A HARD CEILING, THE REMOTE TEST STATIONS SHALL BE LOCATED IN THE CEILING NEXT TO A MINIMUM OF A 2'x4' OR 3'x3' ACCESS PANEL LOCATED BELOW THE DUCT DETECTOR.
    C. IF THERE IS NO CEILING, THE REMOTE TEST STATIONS SHALL BE MOUNTED ON A PILLAR OR WALL AS CLOSE TO THE DEVICE AS POSSIBLE.
14. THE LOCATION OF ALL DETECTORS IN AIR DUCT SYSTEMS SHALL BE PERMANENTLY AND CLEARLY IDENTIFIED AND RECORDED.
15. LOCATIONS OF ALL FIRE ALARM REMOTE TEST STATIONS SHALL BE LABELED PER LOCAL LOCAL AUTHORITY REQUIREMENTS. TEST STATION LOCATIONS SHALL BE FIELD VERIFIED WITH LOCAL AUTHORITY PRIOR TO ROUGH-IN.
16. DUCT DETECTORS SHALL BE INSTALLED AND POSITIONED TO ALLOW EASY ACCESS FOR PERIODIC INSPECTION AND TESTING.
17. FURNISH AND INSTALL A KNOX BOX AS REQUIRED BY LOCAL FIRE DEPARTMENT. EXACT QUANTITIES AND LOCATIONS AS DETERMINED BY LOCAL AUTHORITY. KNOX BOX MANUFACTURER SHALL BE AS REQUIRED BY LOCAL AUTHORITY. PROVIDE AN ADDRESSABLE MONITOR MODULE WHEN REQUIRED.
18. THE FIRE ALARM SUPPLIER SHALL PROVIDE A COPY OF THE PROGRAMMING CODES AND OPERATION MANUALS IN A SLEEVED BINDER ATTACHED TO THE FIRE ALARM CONTROL PANEL.
19. ALL DEVICES TO BE FIELD TESTED WITH WRITTEN CERTIFICATION OF SYSTEM. PERFORM ALL TESTS IN THE PRESENCE OF THE AUTHORITY HAVING JURISDICTION.
20. PROVIDE CONNECTION TO REMOTE SUPERVISION AS DIRECTED FOR SUPERVISION OF SYSTEM IN COMPLIANCE WITH LOCAL AUTHORITY & OWNER. PROVIDE ALL INTERFACE REQUIRED TO INITIATE REMOTE SUPERVISION.
21. PROVIDE & INSTALL A CEILING MOUNTED SMOKE DETECTOR IN FRONT OF FIRE ALARM CONTROL PANEL AND EACH REMOTE MOUNTED AUXILIARY PANEL IN ADDITION TO THE DEVICES SHOWN ON THE FLOOR PLANS.
22. PROVIDE & INSTALL MANUAL STATIONS WHERE REQUIRED BY LOCAL AUTHORITIES TO MEET THE REQUIREMENTS OF NFPA-72 SECTION 3-8.1.2 IN ADDITION TO THE DEVICES SHOWN ON THE PLANS. VERIFY WITH LOCAL AUTHORITY PRIOR TO BIDDING & INDICATE COST IN BID PRICE.
23. NEW DEVICES SHALL MATCH AND BE COMPATIBLE WITH EXISTING SYSTEM.
24. FURNISH AND INSTALL NEW POWER EXTENDER PANEL AND/OR BATTERIES AS REQUIRED TO INCORPORATE NEW DEVICES INTO EXISTING SYSTEM. CONFIRM SCOPE WITH FIRE ALARM VENDOR.

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ELECTRICAL DETAILS, NOTES & SCHEDULES

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EXISTING

PANELBOARD DESIGNATION 1C

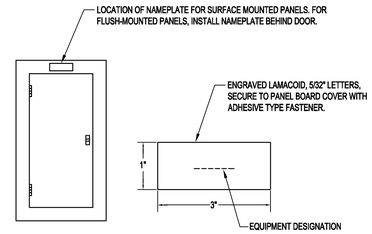
120/208 VOLTS 3 PH. 4 WIRE SOLID NEUTRAL MOUNTING: FLUSH -
225 AMPERE BUS 225 AMPERE MAIN LUGS SURFACE -
SPECIAL REQUIREMENTS

CKT NO.	KVA	DESCRIPTION	A	B	C	DESCRIPTION	KVA	CKT No.
1	-	LIGHTING RM 166	-			LIGHTING RM 168	-	2
3	-	LIGHTING RM 163		-		RECEPTACLE-WASHER	-	4
5	-	LIGHTING RM 164,165			-	GFI RECEPTACLE RM 165	-	6
7	-	RECEPTACLE HALL 148	-			GFI RECEPTACLE RM 159	-	8
9	-	HAIR DRYER RM 166		-		GFI RECEPTACLE 159	-	10
11	-	HAIR DRYER RM 166			-	HAND DRYER RM 159	-	12
13	-	RECEPTACLE RM 168	-			HAND DRYER RM 165	-	14
15	-	GFI RECEPTACLE 166		-		GFI RECEPTACLE RM 158	-	16
17	-	GFI RECEPTACLE 165			-	RECEPTACLE RM 158	-	18
19	-	HAIR DRYER RM 158	-			LIGHTING RM 158	-	20
21	-	HAIR DRYER RM 158		-		CONTROL PWR - STEAM	-	22
23	-	LIGHTING RM 162			-	HAIR DRYER RM 160	-	24
25	-	LIGHTING RM 161	-			HAIR DRYER RM 160	-	26
27	-	LIGHTING RM 159		-		SPACE	-	28
29	-	DRYER RM 168	20		-	GYM CURTAIN	-	30
31	-	↓	-			↓	-	32
C-2 [5] 33	0.5	NEW SITE LIGHTING	20	-	20	EXISTING SITE LIGHTING	0.6	34 [5] C-1
35	0.5	↓		-		↓	0.6	36
[5] 37	0.2	SITE LTG CONTROLS	-		20	EXISTING SITE LIGHTING	0.6	38 [5] C-1
[5] 39	0.2	RECEPTACLE		-		↓	0.6	40
[5] 41	0.2	FEATURE CTRL PWR			-	SPARE	-	42 [5]
		KVA SUB TOTALS	-	-	-			

TOTAL CONNECTED LOAD -_____ KVA

PANELBOARD NOTES

1. [1] INDICATES BREAKER SHALL BE "SWD" RATED.
2. [2] INDICATES BREAKER SHALL BE "HACR" RATED.
3. [3] INDICATES BREAKER SHALL BE 30 mA "G.F.I." TYPE.
4. [4] INDICATES BREAKER SHALL BE SHUNT-TRIP TYPE.
5. [5] INDICATES FURNISH & INSTALL NEW BREAKER. BREAKER TO MATCH AIC, TYPE & RATINGS OF EXISTING DEVICES WITHIN PANEL.
6. [6] INDICATES BREAKER TO HAVE LOCK-ON CLIP.
7. [7] INDICATES BREAKER TO HAVE LOCK-ON CLIP AND RED MARKING.
8. "C-#" INDICATES DESIGNATION OF CONTACTOR CONTROLLING CIRCUIT. SEE CONTACTOR SCHEDULE.
9. ALL BREAKERS SHALL BE 20A/1P, UNLESS NOTED OTHERWISE.



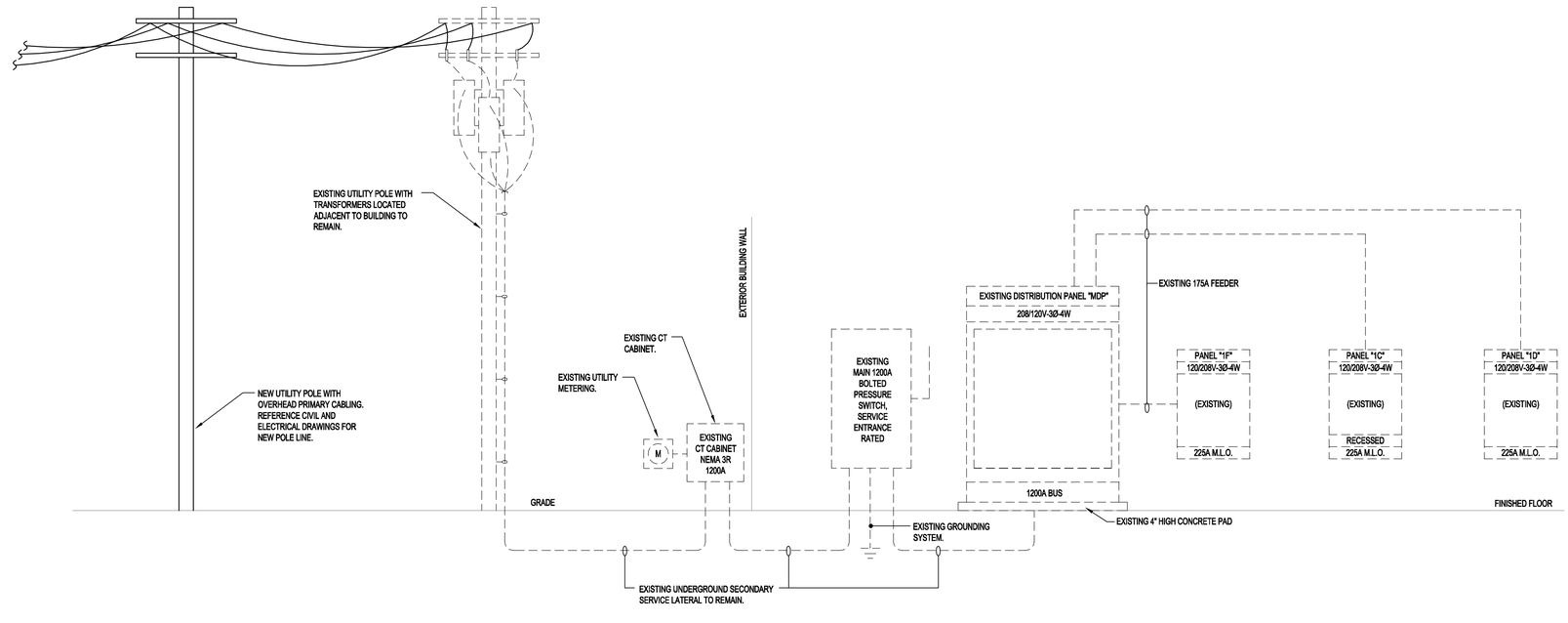
NOTE:
NAMEPLATES ARE REQUIRED ON ALL SWITCHBOARDS, DISTRIBUTION PANELS, PANEL BOARDS, STARTERS, DISCONNECT SWITCHES, RELAYS AND JUNCTION BOXES GREATER THAN 4 11/16" SQUARE. ALSO PROVIDE NAMEPLATES ON BRANCH SWITCHES OF SWITCHBOARDS AND DISTRIBUTION PANELS.

STANDARD COLORS:
1. NORMAL POWER - BLACK BACKGROUND, WHITE LETTERS
2. EMERGENCY POWER - RED BACKGROUND, WHITE LETTERING
3. IN ADDITION TO THE FUNCTION NAMEPLATE, PROVIDE NAMEPLATES IDENTIFYING ALL "MAIN SERVICE NAMEPLATE DISCONNECTS" - RED BACKGROUND - WHITE LETTERING

NAMEPLATE DETAIL
N.T.S.

ONE-LINE DIAGRAM NOTES

1. THE ELECTRICAL CONTRACTOR SHALL VERIFY ALL POWER COMPANY REQUIREMENTS PRIOR TO BIDDING & INCLUDE THE COST OF ALL ASSOCIATED LABOR, MATERIALS, & CHARGES IN HIS BID.
2. THE ELECTRICAL CONTRACTOR SHALL VERIFY THE AVAILABLE FAULT CURRENT WITH THE UTILITY COMPANY PRIOR TO BIDDING AND PROVIDE EQUIPMENT RATED ACCORDINGLY. SUBMIT FAULT CURRENT CALCULATIONS WITH SHOP DRAWING SUBMITTAL.
3. ALL BUSSING SHALL BE COPPER.
4. PROVIDE FULL LENGTH VERTICAL BUSSING IN ALL SWITCHBOARDS, DISTRIBUTION PANELS, & PANELBOARDS.
5. PROVIDE FULL SIZE HORIZONTAL BUSSING IN ALL SWITCHBOARDS.
6. ALL CIRCUIT BREAKERS SHALL BE BOLT-ON TYPE.
7. ALL WALL-MOUNTED EQUIPMENT SHALL BE MOUNTED ON 3/4" FIRE RATED BACKBOARD.
8. ALL FLOOR-MOUNTED EQUIPMENT SHALL BE MOUNTED ON 4" HIGH CONCRETE HOUSEKEEPING PAD.
9. PROVIDE NAMEPLATES PER NAMEPLATE DETAIL.
10. COORDINATE SPACE WITH ALL OTHER TRADES TO MAINTAIN ALL CODE-REQUIRED CLEARANCES.
11. REFER TO ELECTRICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
12. THE ELECTRICAL CONTRACTOR SHALL PROVIDE FINAL SETTINGS REQUIRED FOR ALL ADJUSTABLE/ELECTRONIC TYPE CIRCUIT BREAKERS WITH LONGTIME, SHORT TIME, GF, INSTANTANEOUS, ETC. THE ELECTRICAL CONTRACTOR SHALL PROVIDE FINAL COORDINATION STUDY.
13. THE ELECTRICAL CONTRACTOR SHALL COMPLY WITH NEC ARTICLE 110.16 FOR LABELING OF PANELS FOR ARC FLASH HAZARD WARNING AS WELL AS FOLLOWING REQUIRED SAFETY PRECAUTIONS WHEN SERVICING OR MAINTAINING ELECTRICAL EQUIPMENT.



PARTIAL ELECTRICAL ONE-LINE DIAGRAM
N.T.S. 120/208V-3Ø-4W

- - - - INDICATES EXISTING EQUIPMENT/CONDUIT/WIRE, UNLESS NOTED OTHERWISE

——— INDICATES EQUIPMENT/CONDUIT/WIRE INSTALLED UNDER THIS CONTRACT

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ELECTRICAL ONE-LINE DIAGRAM

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ELECTRICAL SPECIFICATIONS

Section 13851 – Alarm System

A. Fire Alarm System
1. This contractor shall submit fire alarm system drawings and specification to the local fire department for their approval before installation of any fire alarm components or wiring.
2. Equipment: all devices, combinations of devices, appliances and equipment shall be listed for the purpose for which they are used and shall be installed in compliance with applicable codes and standards.
3. Expand upon the existing system to provide a complete, supervised, power–limited, fire alarm system. All equipment herein specified is that of Simplex Time Recorder Co. for bidding purposes only. Equipment supplied shall be by the same manufacturer as is currently installed within the building and meet or exceed the quality of the Simplex equipment specified. Field verify whether existing system is an addressible or conventional type. Drawings indicate an addressible system. Provide wiring and components to match the existing system as directed by the fire alarm system manufacturer's representative.
4. The fire alarm system shall be an electrically supervised system, which shall monitor the integrity of circuit conductors and power supplies.
5. The installation organization shall be a company specializing in the installation of fire alarm systems. This organization shall have a minimum of five years experience with installation of such systems.
6. The contractor shall provide and maintain on the site an up–to–date record set of approved shop drawings.
7. Record drawings shall include location of end–of–line device locations.
8. Upon completion of the work, and final acceptance by the local authority, the contractor shall submit record drawings to the owner.
9. Existing control panel and DACT to remain. Provide new power supply, as required, which shall be adequate to serve control panel modules, relays and alarm indicating appliances. Provide new batteries, as required, to provide a secondary emergency power supply with capacity for operating system in stand–by mode for 24 hours followed by alarm mode for ten minutes.
10. LCD annunciator panel shall be Simplex #4606–9101 with Simplex #4603–9111 brushed aluminum trim plate.
11. Addressable pull stations shall be semi–flush, action push/pull type, simplex #4099–9003.
12. Smoke detectors shall be analog photoelectric type, Simplex #4098–9710.
13. Analog heat detectors shall be 135 degrees F fixed temperature with rate–of–rise type, Simplex #4098–9733 with addressable base, Simplex #4098–9788.
14. Duct–mounted smoke detectors shall have a base with auxiliary relay (Simplex Type 4098–9756), analog photoelectric detector (Simplex Type 4098–9714), and sampling tubes (length as required).
15. Duct detector remote key reset/test station with alarm LED shall be Simplex Type 2098–9806.
16. Semi–flush audio/visual unit shall be Simplex Type 4903–9301 Series with A.D.A. complying 15/75 Candela strobe and horn. All strobe lights shall be synchronized. Provide weatherproof type devices where required.
17. Visual only unit shall be Simplex Type 4904–9307 with A.D.A complying 15/75 Candela strobe. All strobe lights shall be synchronized. provide weatherproof covers where required.
18. Waterflow and temper switches shall be furnished and installed by the sprinkler contractor. The electrical contractor shall connect each device to the fire alarm system using an individual addressable module (IAM) Simplex #4090–9001.
19. Provide and install wiring per manufacturers' specifications. All wiring shall be in conduit (3/4" minimum).
20. The completed fire alarm system shall be fully tested in accordance with NFPA–72H, and local fire department requirements, by the installer, in the presence of the owner's representative and the local fire marshal. Upon completion of a successful test, the installer shall so certify, in writing, to the owner and general contractor.
21. Include on–site services of a certified technician to provide technical installation support for panel start up, program editing, troubleshooting of the fire alarm system control panel, and assistance to the installer for one complete final system checkout in accordance with the field quality control section of these specifications.
22. Acceptable manufacturers/suppliers shall be Simplex, Notifier (as supplied by a certified Nesco affiliate), Silent Knight, EST or Siemens.

Section 16010 – General Provisions

A. General
1. Requirements specified in Division 1, instructions to bidders, supplemental general conditions, special conditions, addenda, alternates, contract and proposal, along with Division 16 and all its sections, comprise the contract documents for the electrical contract, along with these specifications as though they were one, and anything implied by the specifications shall be interpreted as also implied by the drawings and vice versa. Provide necessary items for a complete installation of all electrically operated equipment listed in the specifications or shown on the contract drawings.
2. The architectural, structural, mechanical, plumbing and equipment drawings and specifications are incorporated into, and become a part of this division. This contractor shall examine all such drawings and specifications and become thoroughly familiar with the provisions contained therein. The submission of his bid shall indicate such knowledge.
3. Electrical drawings are diagrammatic. They are intended to show the approximate locations of equipment and conduit. Dimensions given on the plans, in figures, shall take precedence over scaled dimensions and shall be verified in the field. The electrical contractor shall layout all equipment rooms to make sure the equipment, as purchased, fits in the room or space shown. Exact location of all equipment shall be verified in the field and routing of conduits shall suit field conditions.
4. Until the time of installation, the architect reserves the right to make minor changes in the location of conduit and equipment without additional cost to the contract.
5. The electrical drawings and specifications are intended to supplement each other. Material and labor necessary to the project shall be furnished and installed even though not specifically mentioned in both. Labor and/or materials neither shown nor specified, but obviously necessary for the completion and proper functioning of the system, shall be furnished and installed by the electrical contractor.
6. Arrange all equipment substantially as shown on the drawings. Make deviations only where necessary to avoid interference. Check all equipment sizes against available space prior to shipment to avoid interference.
7. Examine the work of other trades insofar as their work comes in contact with or is covered by this work in no case attach to, or finish against any defective work or install work in a manner which will prevent proper installation of the work of other trades.
8. Electrical contractor shall verify with other trades all electrical characteristics of equipment requiring electrical connections, contractor shall verify voltage, phase and horsepower and shall notify engineer of any discrepancies prior to start of work. Electrical contractor shall provide disconnecting means and overload protection for all equipment, unless furnished integral with equipment package.
9. It is the intent of these drawings that this be a complete electrical job, any errors or omissions shall be brought to the attention of the engineer prior to bidding the job.

B. Visit to the Site
1. This contractor shall visit the site of the work and familiarize himself with all conditions affecting his work. The submission of his proposal shall indicate such knowledge. No additional payment shall be made on claims that arise from a lack of knowledge of the existing conditions

Section 16010 (cont.)

C. Code and Permits
1. Installation shall be in full accordance with all codes, rules and regulations of municipal, city, county, state and public utilities and all other authorities having jurisdiction over the premises.
2. Comply with any specification requirements that are in excess but not in conflict with code requirements.
3. The contractor shall secure and pay for all permits, plan reviews and certificates of inspection in connection with his work, required by the foregoing authorities. Before final payment of the contract is allowed, all certificates shall be delivered to the architect in duplicate.
4. Electrical material and equipment shall bear the UL label except where UL does not label such types of material and equipment.

D. Shop Drawings Submittals
1. The electrical contractor shall submit five (5) sets of shop drawings, the shop drawings of the following equipment using the indicated numbering system and titles, shall be submitted through the architect to the engineer and then resubmitted for final approval if necessary. Shop drawings shall be submitted for the following items:
   - D.a. Contactors, time switches and photocell
   - D.b. Lighting fixtures
   - D.c. Fire alarm system
2. All submitted shop drawings (manufacturers' equipment descriptive sheets or vendors' prepared drawings) shall have the general contractor's or subcontractor's "stamp of approval" indicating that the item submitted is as called for on the plans and specifications, is approved by the general contractor or subcontractor, the date of approval and initialed by the person approving the submittal and the name of the company submitting said equipment for approval.
3. Submit bound brochures complete with a table of contents. Loose or stapled together sheets are not acceptable. Any submittals not in brochure form or not as specified shall be returned at the contractor's expense for resubmittal.
4. All descriptive literature shall be submitted in a three (3) hole brochure with a cover identifying the following:
   - D.a. Name of the job
   - D.b. Location of the job, address, city and state.
   - D.c. Name and address of the company submitting the brochures.
   - D.d. Date of the submittal.
5. Every effort shall be made, in checking the shop drawings, to detect and correct all errors, omissions and inaccuracies. Failure to do this will not relieve the electrical contractor of the responsibility for the proper and complete installation in accordance with the contract documents.

E. As–built Drawings
1. Submit to the architect one set of reproducible (mylars) electrical drawings showing the as–built conditions.

F. Standards and Substitutions
1. Wherever the words "approved by", "approved equal", "as directed" or similar phrases are used in the following specifications, they shall be understood to refer to the owner as the approving agency. The name or make of any equipment or materials named in this specifications (whether or not the words "or approved equal" are used) shall be known as the "standard".
2. These specifications establish quality standard of materials and equipment to be provided. Specific items are identified by manufacturer, trade name or catalog designation. This contractor shall submit his base bid price based upon standard specified equipment described herein and as detailed on drawings and associated contract documents. These specifications are not to be considered proprietary. The contractor may submit information on materials and manufacturers (other than those listed) for review by the architect and engineer no later than ten (10) days before bids are submitted. Manufacturers of products accepted by the architect and engineer will be listed in an addendum to the specifications as an acceptable substitution equipment accepted as detailed below and shall be shown as a separate add or deduct price to be factored into the base bid price by the architect and owner if accepted.
3. Should the contractor propose to furnish materials and equipment other than those specified or approved by addendum, submit a written request for substitutions to the architect at the bid opening. The request shall be an alternate to the original bid; be accompanied with complete descriptive (manufacturer, brand name, catalog number, etc.) and technical data for all items. Failure by this contractor to submit the requisite documentation detailed above shall be understood by the architect and engineer to indicate that substitute equipment will not be presented by the contractor for consideration. Such substitutions will not be considered after the bid opening date and delay of project will not be permitted for further inspection and evaluation after this date.
4. Where such substitutions alter the design or space requirements indicated on the drawings, include all items of cost for the revised design and construction including cost of all allied trades involved.
5. Acceptance or rejection of the proposed substitutions shall be subject to approval of the architect and engineer. If requested, the contractor shall submit (at his cost) inspection samples of both the specified and proposed substitute items.
6. In all cases where substitutions are permitted, the contractor shall bear any extra cost of evaluating the quality of the material and equipment to be provided.

G. Testing and Placing in Service
1. Any material or equipment failing a test shall be repaired or replace at the contractor's expense.
2. Tests shall include the following:
   - G.a. Measure the load on each phase of the main service and each phase of every feeder under full load conditions.
   - G.b. Measure the no–load and full–load voltages (phase to phase, phase to neutral and phase to ground for each phase of each service, of each separately derived system, and at each panelboard or transformer).
   - G.c. Measure the ground resistance of the main service grounding electrode and the ground resistance of each separately derived system's grounding electrode.
   - G.d. Make insulation resistance tests on all dry type transformers and motors.

H. Interferences
1. Before the installation of any item begins, the electrical contractor shall carefully ascertain that it does not interfere with clearances for the erection of finish beams, columns, pilasters, walls or other structural or architectural members as shown on the architectural drawings. If any work is installed and the architectural design cannot be followed, this contractor shall, at his own expense, make changes in his work as directed by the architect to permit the completion of the architectural work in accordance with drawings and specifications.
2. It shall be the duty of this contractor to report any interferences between his work and that of any of the other contractors as soon as they are discovered. The architect shall determine which equipment will be relocated, regardless of which was installed first. His decision will be final.

I. Quality Assurance
1. All products shall be new and of the type and quality specified. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type of catalog number, such designation shall establish the standards of the desired quality and style. It is the intent of these specifications to establish a standard of quality of materials and equipment installed.

Section 16050 – Basic Electrical Materials and Methods

A. Nameplates
1. General: furnish and mount on each panelboard, switchboard (including branch switches), large junction box, safety switch, starter, remote control, push button station, and all similar controls, a nameplate descriptive of the equipment or equipment controlled
2. Provide black and white nameplates constructed from laminated phenolic with a white center core. Letters shall be engraved in the phenolic to form white letters 3/8" high. Fasten the nameplates with an adhesive type fastener.

Section 16050 (cont.)

B. Mounting Accessories
1. This contractor shall furnish and install all angle iron, channel iron, rods, supports, hangers, concrete or plywood required to install, mount and support any electrical equipment or device called for on the plans.
2. Supporting material shall be complete with hangers, connectors, bolts, clamps and necessary accessories to make a complete installation. Supporting material shall be galvanized, painted or otherwise suitably finished. Products by Binkley, Steel City, or Raco will be acceptable.
3. All surface–mounted equipment on block walls shall be mounted on 3/4" plywood backboard. All floor–mounted equipment shall be installed on a 4" high concrete housekeeping pad.

C. Execution
1. The electrical work for construction proposed shall conform to all federal (OSHA), state, all specific safety requirements and the requirements of the current edition of the NEC.
2. Check the HVAC and plumbing specifications for electrical requirements and include the same in the contract cost.
3. Equipment connections, starters, disconnect switches, control transformers and pushbutton stations for the equipment furnished by the owner or under a separate contract shall be installed and connected under this division, as indicated on the contract drawings.
4. All cutting, patching, excavating, backfilling and concrete work related to this contract will be the responsibility of the electrical contractor. This contractor shall assume the responsibility of providing the sleeves, chases and openings necessary for the electrical installation and for their repair in an acceptable manner, as determined by the architect. All holes shall be core–drilled. Provide fire stop in all openings created through fire–rated walls, floors or ceilings.
5. This contractor shall be responsible for providing all required access panels necessary for his work, coordinate with architect prior to installation.

D. Materials and Workmanship
1. All work shall be installed in a practical and workmanlike manner, by mechanics skilled in the several trades necessary.
2. All materials shall be new and free from defects and shall be the best of their several kinds unless specified or indicated on the drawings to the contrary.
3. During each phase and at the completion of the construction, this contractor shall remove all debris and excess materials caused by his work. He shall leave the area of operation broom clean.
4. All electrical equipment shall bear the underwriters laboratories label or ETL label.
5. This contractor shall guarantee his workmanship and material (lamps excepted) for a period of one year from the date of building opening and leave his work in perfect order at the completion. Should defects develop within the guarantee period, the contractor shall, upon notice of the same, remedy the defects and have all damages to other work or furnishings caused by the repairs corrected at his expense to the condition before such damage.

E. Scope of Work
1. The electrical contractor shall provide all labor, material, storage, unpacking and placement; to include but not be limited to, the following items:
   - E.a. Emergency lighting.
   - E.b. Complete power and lighting distribution system including all panels, over–current protection devices and feeders.
   - E.c. Complete branch circuit wiring system.
   - E.d. Complete power wiring for all air conditioning equipment, plumbing system, heating equipment, ventilating and exhaust equipment.
   - E.e. Complete lighting fixture installation, including all lamps.
   - E.f. Complete telephone and communication conduit system including boxes, plates, jacks, etc., as specified, shown on the drawings and required by the local telephone company and/or owner.
   - E.g. Temporary electrical power and lighting as required for construction.
   - E.h. Testing of all cables and circuit wiring after installation.
   - E.i. Exit light system.
   - E.j. Wiring devices.
   - E.k. Lighting controls.
   - E.l. Grounding of the electrical system.
   - E.m. Outdoor lighting and controls.
   - E.n. Fire alarm system.
   - E.o. Coordination of the reworking of the Telephone/Data/Cable TV and Electric services with the respective utility companies.

F. Temporary Service
1. The electrical contractor shall furnish, install and remove as required all temporary power and temporary lighting in all areas and individual rooms when needed by the individual trades in the performance of their work. This contractor shall provide a minimum of twenty (20) footcandles of illumination for temporary lighting. Any additional lighting required by individual trades shall be provided by the individual trades including power for the lighting. The electrical work for construction purposes shall conform to all federal (OSHA), state, specific safety requirements, as well as the requirements of the national electric code and national electrical safety code. The electrical contractor shall obtain and pay for all required applications, permits and inspections pertaining to this work. This cost shall be included in the contractor's price.
2. New light fixtures shall not be used for temporary lighting.

Section 16060 – Grounding and Bonding

A. Ground all equipment per N.E.C.

B. Ground each outside lighting pole separately with one ground rod and a #6 ground wire.

C. Ground all dry type transformers as per drawings and NEC #450–10.

D. All conduits shall contain a code–sized ground wire size per N.E.C. in addition to the conductors shown on the plans. Where circuit conductors are increased in size for voltage drop, the ground wire size shall be increased proportionately.

Section 16120 – Wiring and Cable

A. Color code conductors (except control and instrumentation conductors) as follows:

	208/120 System
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green

1. #12 and #10 conductors shall have continuous insulation color, as listed above.
2. Color code conductors larger than above, which do not have continuous insulation color by application of at least two laps of colored tape on each conductor at all points of access including junction boxes. Color tape shall be the equal of 3M products Scotch #35.
3. Conductors shall be soft annealed copper insulated for 600 volts unless specifically indicated otherwise. Aluminum conductors are not allowed on this project.

B. Insulation type shall be type THWN for wire sizes #8 AWG and larger and THHN or THWN for #10 AWG and smaller. THHN shall not be used in wet or damp locations.

C. Flexible cord shall be heavy duty type so with an equipment ground conductor in addition to the current carrying conductors.

D. Provide #12 conductors, unless otherwise indicated.
1. Control conductors shall be #14 minimum for NEC class I and #16 for NEC class II.

Section 16120 (cont.)

E. Conductors #8 AWG and larger shall be stranded.

F. Conductors #10 AWG and smaller shall be solid.

G. Install wiring in conduit.

H. Connect #10 and smaller wires with constant pressure expandable spring type connectors, "Scotchlok" by 3M or B–Cap by Buchanan.

I. Connect #8 and larger wires with compression connectors or splices as manufactured by Burndy or T&B.

J. Insulate splicing connectors to at least 200% of the wire insulation. Use pre–stretched tubing connector insulators, 3M PST for #2 and larger conductors.

K. Pull conductors using recognized methods and equipment leaving at least 6" wire at all junction boxes for connections.
1. Clean out each conduit system before pulling wire.

L. Form and tie all wiring in panelboards.

M. There shall be no wirenut joints or splices made inside switchboards/panelboards.

N. Branch circuit wire sizes (and conduits) shall be increased from those indicated on the plans to prevent excessive voltage drop. Branch circuits shall be installed with wires of sufficient size so that voltage drop between the panel and the loads does not exceed limit of 3%.

O. Regardless of the temperature rating of the conductor insulation, all conductor ampacity rating for this project shall be determined from the 75°C conductor temperature ratings indicated in the NEC tables. Where equipment or devices are provided with terminals/lugs rated for 60°C, the ampacity rating of the 75°C conductor shall be limited to its associated 60°C rating as indicated in the NEC tables. The electrical contractor shall be responsible to increase the conductors and conduit size as required.

P. Circuits may be multi–plexed in conduit provided wire is properly derated and conduit sized per code. Under no circumstances shall more than six (6) current carrying conductors be run in a single conduit.

Section 16130 – Raceways and Boxes

A. Raceways
1. All wire shall be run in accordance with code in corrosion resistant, rigid, threaded, metal conduit or electrical metallic tubing (E.M.T.) unless otherwise specifically stated herein.
   - A.a. Conduit in exterior walls, below floor slab, or underground shall be rigid, threaded, galvanized, heavy wall type.
   - A.b. Carlon PVC type 40 heavy wall conduit with ground wire may be used below floor slab or underground in lieu of rigid, threaded, galvanized conduit. PVC 40 conduit shall not be run in or above floor slab. PVC conduit shall terminate below floor slab with rigid, threaded metal conduit adapter. Conduit above slab shall be metal.
   - A.c. Conduit run exposed to the weather shall be heavy wall, metal threaded type.
2. Conduit size shall be 3/4" minimum.
3. Conduit shall be securely fastened in place.
4. All conduit shall be concealed in walls, floor and ceilings wherever possible. Exposed conduit in finished areas will not be permitted. Exposed conduit will be permitted in the unfinished areas with the specific approval of the architect.
5. Use flexible conduit for the connection to recessed or semi–recessed lighting fixtures (6' length maximum). Use liquid tight metal conduit for all connections to motors and other equipment subject to vibration and in areas subject to moisture.
6. Use watertight joints with buried and concrete encased conduit. All buried conduits outside of buildings shall have a minimum of 24" of cover. Metal conduits buried in earth shall be painted (two coats) with heavy asphaltum paint.
7. Support runs of conduit as detailed in the appropriate table of the national electrical code (NEC).
8. Installed exposed runs of conduit and conduit above lay–in ceilings parallel or perpendicular to the walls, structural members of intersections of vertical planes and ceilings. Provide right angle turns using fittings or symmetrical bends. Support conduits within 1" of all changes in direction.
9. If a conduit is suspended, it shall be supported on trapeze hangers which use "all–thread" rods from the structural steel. The use of ceiling support wire or similar material will not be accepted.
10. Install empty conduit for future use as indicated on the drawings. Conduit shall be complete with jetline or pull rope, junction/outlet boxes, tile rings and appropriate cover plates.
11. Provide pitchpockets where conduits penetrate the roof.
12. Thread lubrication/sealant is required on outdoor and underground threaded metal joints.
13. Install fire seal fittings where conduits penetrate concrete floor slabs or masonry walls required to be fire rated.
14. Horizontal portion of conduit exposed on the roof and feeding equipment shall not be more than 5'–0" unless the written approval from architect or engineer is obtained.

B. Pull and Junction Boxes
1. Install pull and junction boxes where shown on the drawings, and where required for changes in direction, at junction points, and to facilitate wire pulling. Furnish box sizes in accordance with NEC unless larger boxes are indicated.
2. Provide steel boxes and removable covers of code gauge, hot rolled sheet steel, hot dipped galvanized inside and outside, for above ground work. Furnish weatherproof boxes when installed above ground outside.
3. Provide cast iron boxes, hot dipped galvanized inside and outside where shown on the drawings. Furnish removable covers with gaskets and stainless steel, brass or bronze screws.
4. Provide concrete boxes for underground work unless otherwise indicated on the drawings. Furnish steel frames and covers with the cover attached to the frame with hexagon head, brass or bronze cap screws, 3/8" in diameter. Provide a rubber gasket for sealing between the cover and the frame. Paint the cover with two coats of heavy asphaltum.

C. Outlet Boxes
1. Use sheet steel boxes, zinc coated or cadmium plated, for concealed interior work.
2. Use cast boxes, zinc–cadmium finish malleable iron, for exposed interior work, and for exposed or concealed work in wet, damp or exterior locations. Cast boxes shall be series FD by Crouse Hinds or Appleton.
3. Wall box sizes (minimum) shall be 4" square X 2–1/2" deep where wall construction permits. Where wall construction dictates, the depth may be reduced to 2–1/8" or 1–1/2" under special conditions.
4. Fixture outlets in ceilings (minimum) shall be 4" octagonal X 1–1/2" deep (4–11/16" octagonal X 2–1/2" deep where required to accommodate larger conduit or larger number of wires).
5. Ganged boxes shall be one piece (minimum), 2–1/8" deep.
6. Provide cast iron, concrete–tite floor boxes with adjustable covers set flush and level with the finished floor, with outlets as indicated on the drawings. Provide Hubbell #B–2400, 4200, or 4300 series boxes with leveling screws. Flush type covers and openings to serve outlets used. Furnish flush caps for closing off box when not in use.
7. Flush mount boxes in all finished walls, install the plaster rings in drywalled plastered walls and raised covers as required in walls with other finishes so that the cover plates fit tightly against boxes or rings, 3/16" maximum gaps are allowed for noncombustible walls.
8. Adjust location of outlets in masonry or tile construction to occur in the nearest joint to the height specified. Heights shall meet A.D.A. requirements.
9. Support all boxes to maintain proper alignment and rigidity.
10. Clean boxes of all foreign matter prior to the installation or wiring of devices.
11. Mounting heights on the drawings are to the centerline of the box unless otherwise noted.

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ELECTRICAL SPECIFICATIONS

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Section 16140 – Wiring Devices

A. Wiring device color shall be selected by architect, unless otherwise indicated.
B. Provide totally enclosed, 20 ampere, 120/277 volt, quiet A/C general use snap switches.
C. Switches shall be specification grade as manufactured by Hubbel, P&S, or Leviton.
D. Provide NEMA configuration 5–20R Duplex 125 volt grounding type receptacles rated for 20 amperes unless otherwise indicated on the drawings. Provide tamper resistant rated devices in public areas.
E. Receptacles shall be specification grade as manufactured by Hubbell, P&S or Leviton.
F. Receptacles requiring amperages, voltages or configurations different from the duplex convenience receptacles above shall be as indicated on the drawings.
G. Provide other receptacles of a quality, material and workmanship equal to that specified for duplex convenience receptacles.
H. Provide cover or device plates for outlet boxes as follows unless otherwise noted:
    1. Finished areas: thermoplastic – color to match device.
    2. Unfinished areas: zinc coated sheet metal, aluminum, or cast metal as appropriate for the type of box.
    3. Exterior areas: copper free aluminum with gray, powder epoxy finish, gasket, weatherproof, Crouse–Hinds "WLRD" for duplex receptacles and WLRS for single receptacles or equal.
    4. Telephone, communication, and signal outlet plates, shall match those used for receptacles and switches. All outlet and/or junction boxes shall be complete with a cover plate by this contractor.
    5. Where devices are ganged, they shall be installed under a common coverplate.
I. Locate the switches approximately 4'–0" above the finished floor elevation or nearest block course (within A.D.A. requirements), unless otherwise indicated. The long dimension of the switches shall be vertical.
J. Locate receptacles approximately 1'–6" above the finished floor elevation or nearest block course (within A.D.A. requirements), unless noted otherwise. The long dimension of receptacles shall be vertical.

Section 16410 – Safety Switches

A. Safety switches shall be the enclosed heavy–duty type (type HD) with quick–make, quick–break mechanism and external pad lockable operating handle.
B. Safety switches shall be rated for 240 or 600 volts as applicable. They shall be horsepower rated when used in motor circuits.
C. Safety switches shall be fusible or non–fusible 2, 3, or 4 pole as indicated on the drawings.
D. Safety switches shall be single throw unless otherwise indicated on the drawings.
E. Enclosures shall be NEMA 1 indoors and NEMA 3R outdoors unless otherwise indicated on the drawings.
F. Manufacturer shall be Square D, Siemens, G.E., or Cutler–Hammer. All safety switches shall be by one manufacturer.
G. Mount the safety switches securely between 3' X 6' levels above the floor unless otherwise indicated on the drawings.
H. Switches on block walls shall be mounted on a 3/4" plywood backboard, where located indoors.

Section 16420 – Motor Starters

A. Provide motor starters (magnetic or fused combination) and control equipment where shown. Starters shall be provided with 120 volt coils, 3 overloads, control transformer with fused 120 volt secondary control circuit, (2) N.O. and (2) N.C. auxiliary contacts, hand–off–auto selector switch and running pilot light, unless otherwise noted. Wire thru control devices furnished by other trades. Since motor driven equipment is furnished by other trades, the control indicated on the drawings shall be considered as for bidding purposes only. Wire to conform to the actual equipment supplied and installed by the other trades. All fuses shall be dual element type. Provide "blownfuse" indicator lamps in cover.
B. Starters shall be Square D, G.E., Cutler–Hammer, or Siemens.
C. The exact number of normally open and normally close auxiliary contacts in each starter shall be determined by the temperature control contractor.
D. Coordinate all equipment indicated on the electrical drawings with mechanical equipment schedules and specifications and provide motor starters for all equipment indicated as being interlocked or started from a remote location.
E. Starters supplied as an integral part of equipment shall be furnished under the division providing the equipment. Wiring and disconnect shall be by this contractor. All other starters and auxiliary control equipment shall be supplied and wired by this contractor unless otherwise noted.

Section 16442 – Distribution and Panelboards

A. Panelboards
    1. Panelboards shall be enclosed dead front safety type with features and ratings as scheduled on the drawings.
    2. Panels known as "load centers" are unacceptable.
    3. Molded case circuit breakers shall be as scheduled on the drawings and specified in this division. Provide new breakers as required.
    4. All bus bar shall be rectangular solid copper.
    5. Space, where shown in panel schedules, designates space for future protective devices and shall include bus and support.
    6. Install cabinets so that center of the top breaker does not exceed 6'–6" above the finished floor.
    7. Entries on directory cards shall be typed, complete and accurate.
    8. All bolted connections shall be torqued in accordance with manufacturer's standards.
    9. Electrical contractor shall arrange circuits as near as possible to circuit numbers on the drawings. At completion of job, electrical contractor shall take current reading checks of respective phases. A minimum of circuit connections shall be rearranged to balance, as closely as possible, the load in the panel.
    10. All breakers shall be bolt–on type.
    11. Provide (3) spare 1" conduits into accessible ceiling space where panels are flush–mounted.
    12. Manufacturer shall be Square D, Siemens, G.E., or Cutler–Hammer.

Section 16491 – Fuses

A. The contractor shall furnish a complete set of fuses for all switches, plus fusible equipment furnished by other trades. Unless indicated otherwise on plans, the fuses shall be of the following types:
    1. Fuses 601 to 6000 amps shall be UL class. Trade type shall be KRP–C as manufactured by Bussmann Company.
    2. Fuses 1/10 to 600 amps shall be UL class RK1. Trade type shall be low peak LPS–RK (600V) and LPN–RK (250V) as manufactured by Bussmann Company.
    3. All other fuses shall be dual–element current–limiting type with 200,000 amperes symmetrical interrupting capacity.
B. Fuses shall be manufactured by Bussman, Gould–Shawmutt, or Reliance.
C. Spare fuses amounting to a duplicate set of each size installed shall be turned over to the owner upon completion of the project. Provide and place in a spare fuse cabinet similar to Bussman # SFC.
D. This contractor shall replace all fuses blown during construction.

Section 16750 – Telephone System

A. This contractor shall provide and install all conduits with pull wires, outlet boxes, metal cabinets and pull boxes. Provide a complete conduit system with pull wire as indicated on drawings.
B. Provide plates of same material and finish as specified for receptacles. Wall phone plates shall have mounting studs.
C. Provide plywood terminal board as shown on drawings.
D. A conduit run shall have not more than three (3) bends in a run between outlet boxes or between outlet box and a metal cabinet or pull box. When a run requires more than three (3) bends, a pull box of suitable size shall be placed in suitable location to meet the above conditions.

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ELECTRICAL SPECIFICATIONS

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