## PANEL A SCHEDULE

SYSTEM VOLTAGE 240/120V 1Φ-3W

MAINS 400A MCB

MOUNTING SURFACE

| LOAD DESCRIPTION | COND SIZE | GND SIZE | WIRE SIZE | POLE | LOAD (KVA) LTG | REC | MTR | A/C | HTG | KIT | MISC | PHASE | CKT. | BKR. | BKR. | CKT. | LOAD (KVA) PHASE | MISC | KIT | HTG | A/C | MTR | REC | LTG | POLE | WIRE SIZE | GND SIZE | COND SIZE | LOAD DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PYLON SIGN (TC) | 1/2" | 12 | 12 | 1 | | | | | | | 1.2 | | 1 | 20A | 20A | 2 | | | | | | | | 0.7 | 1 | 12 | 12 | 1/2" | LIGHTING - SERVICE BAYS |
| LIGHTING - SERVICE PITS | 1/2" | 12 | 12 | 1 | | 0.3 | | | | | | | 3 | 20A | 20A | 4 | | | | | | | | 0.5 | 1 | 12 | 12 | 1/2" | LIGHTING - SUPPORT |
| REC. - IG WORK #3 (GFI) | 1/2" | 12 | 12 | 1 | | 0.4 | | | | | | | 5 | 20A | 20A | 6 | | | | | | | 0.5 | | 1 | 12 | 12 | 1/2" | REC. - SERVICE/RR (GFI) |
| IRRIGATION CONTROL | 1/2" | 12 | 12 | 1 | | | | | | | 1.2 | | 7 | 20A | 20A | 8 | | | | | | | 0.8 | | 1 | 12 | 12 | 1/2" | REC. - SERVICE/RR (GFI) |
| REC. - SERVICE (GFI) | 1/2" | 12 | 12 | 1 | | 1.0 | | | | | | | 9 | 20A | 20A | 10 | | | | | | 0.6 | | | 1 | 12 | 12 | 1/2" | VF-1, VF-2 |
| REC. - WORK #1 (GFI) | 1/2" | 12 | 12 | 1 | | 1.2 | | | | | | | 11 | 20A | 20A | 12 | | 1.65 | | | | | | | 1 | 12 | 12 | 1/2" | WH-1 |
| AIR COMPRESSOR | 1/2" | 10 | 8 | 2 | | | 3.9 | | | | | | 13 | 50A | 20A | 14 | | | | | | | | | 1 | | | | SPARE |
| | | | | | | | 3.9 | | | | | | 15 | | 30A | 16 | | 2.4 | | | | | | | 1 | 10 | 10 | 3/4" | LIFT |
| SPARE | | | 1 | | | | | | | | | | 17 | 20A | 30A | 18 | | 2.4 | | | | | | | 1 | 10 | 12 | 3/4" | LIFT |
| TELE BOARD (LO) (GFI) | 1/2" | 12 | 12 | 1 | | 0.4 | | | | | | | 19 | 20A | 20A | 20 | | | | | | | | | 1 | | | | SPARE |
| LOBBY REC | 1/2" | 12 | 12 | 1 | | 0.7 | | | | | | | 21 | 20A | 60A | 22 | | | | 5.04 | | | | | 2 | 6 | 10 | 3/4" | UH-1 |
| LIGHTING - EXTERIOR (TC) | 1/2" | 12 | 12 | 1 | 0.2 | | | | | | | | 23 | 20A | | 24 | | | | 5.04 | | | | | | | | | |
| BLDG SIGNAGE (TC) | 1/2" | 12 | 12 | 1 | | | | | | | 1.7 | | 25 | 20A | 20A | 26 | | | | | | | | | 1 | | | | SPARE |
| DGUH / DS-1 | 1/2" | 12 | 12 | 2 | | | 1.0 | | | | | | 27 | 15A | 20A | 28 | | | | | | | | | 1 | | | | SPARE |
| | | | | | | | 1.0 | | | | | | 29 | | 20A | 30 | | | | | | | 0.2 | | 1 | 12 | 12 | 1/2" | RECEPTACLE (GFI) |
| REC. - "OPEN" SIGN (TC) | 1/2" | 12 | 12 | 1 | | 0.4 | | | | | | | 31 | 20A | 20A | 32 | | | | | | | 0.2 | | 1 | 12 | 12 | 1/2" | RECEPTACLE (GFI) |
| SPARE | | | | 1 | | | | | | | | | 33 | 20A | 20A | 34 | | | | | | | 0.2 | | 1 | 12 | 12 | 1/2" | RECEPTACLE (GFI) |
| LIGHTING - SHOW WINDOW | 1/2" | 12 | 12 | 1 | | 0.2 | | | | | | | 35 | 20A | 20A | 36 | | | | | | 0.3 | | | 1 | 12 | 12 | 1/2" | VF-3 |
| SPARE | | | | 1 | | | | | | | | | 37 | 20A | 60A | 38 | | | | 5.04 | | | | | 2 | 6 | 10 | 3/4" | UH-2 |
| UH-3 | 3/4" | 10 | 6 | 2 | | | | | 5.04 | | | | 39 | 60A | | 40 | | | | 5.04 | | | | | | | | | |
| | | | | | | | | | 5.04 | | | | 41 | | 20A | 42 | | | | | | | | | 1 | | | | SPARE |
| LIGHTING (KVA) | | | | 1.4 | 0.2 | 4.6 | 9.8 | | 10.08 | | 4.1 | | | | | | | 6.45 | | 20.16 | | 0.9 | 1.9 | 1.2 | CONNECTED LOAD (KVA) | | | | 54.39 |
| RECEPTACLES (KVA) | | | | 6.5 | | | | | | | | | | | | | | | | | | | | | DEMAND LOAD (KVA) | | | | 54.74 |
| MOTORS (KVA) | | | | 10.7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| A/C (KVA) | | | | 0.0 | | | | | | | | | | | | | | | | | | | | | CONNECTED LOAD (AMPS) | | | | 247.5 |
| HEATING (KVA) | | | | 30.24 | | | | | | | | | | | | | | | | | | | | | DEMAND LOAD (AMPS) | | | | 248.9 |
| KITCHEN (KVA) | | | | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| MISCELLANEOUS (KVA) | | | | 10.55 | | | | | | | | | | | | | | | | | | | | | | | | | |

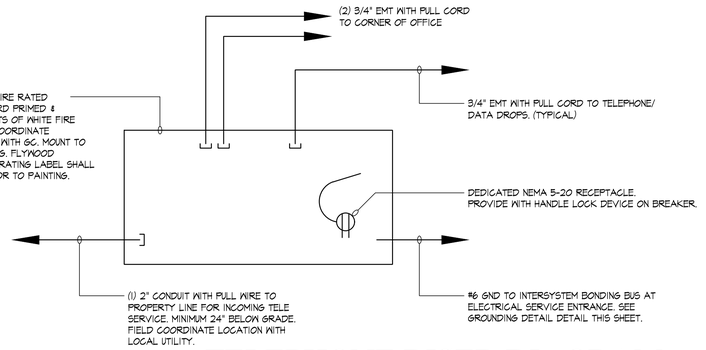
NOTE: 1. SUBSCRIPTS: TC/PC - CONTROL VIA TIME CLOCK AND PHOTOCELL BY E.C., GFI - PROVIDE GFI TYPE CIRCUIT BREAKER, I.G. - PROVIDE ISOLATED GROUND

## A DEMAND CALCULATION

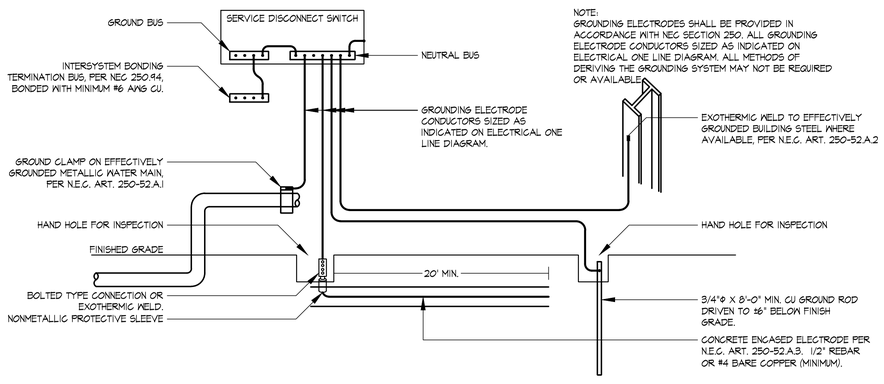
SINGLE PHASE POWER

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. LIGHTING | | 1.4 | KVA | x | 125 | % | = | 1.75 | KVA |
| 2. RECEPTACLE | TOTAL | 6.5 | KVA | | | | | | |
| | 1ST | 6.5 | KVA | x | 100 | % | = | 6.5 | KVA |
| | REMAIN | 0 | KVA | x | 50 | % | = | 0 | KVA |
| 3. MOTORS | | 10.7 | KVA | x | 100 | % | = | 10.7 | KVA |
| 4. A/C | | 0 | KVA | x | 100 | % | = | 0 | KVA |
| 5. HEATING | | 30.24 | KVA | x | 100 | % | = | 30.24 | KVA |
| 6. FUTURE | | - | KVA | x | 100 | % | = | - | KVA |
| 7. MISCELLANEOUS | | 10.55 | KVA | x | 100 | % | = | 10.55 | KVA |
| TOTAL | | 248.9 AMPS | | | | | | 59.74 | KVA |

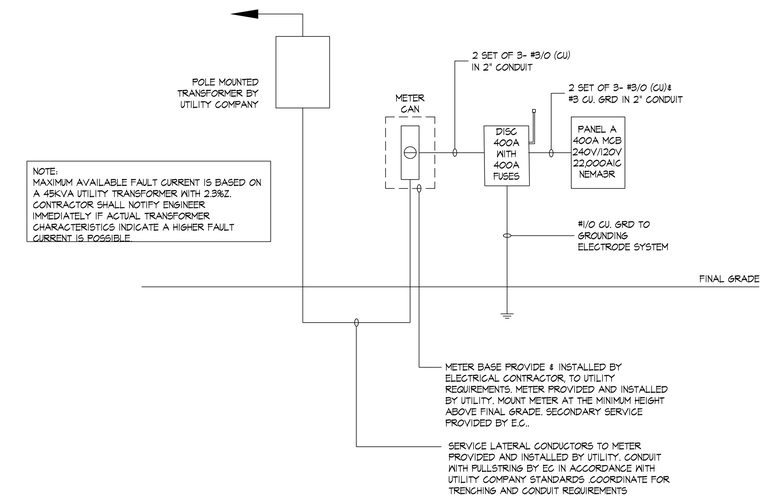
# ELECTRICAL PANEL SCHEDULE




## TELEPHONE RISER DIAGRAM




## GROUNDING DETAIL




## ELECTRICAL ONE LINE DIAGRAM

ELECTRICAL SPECIFICATIONS

GENERAL:

PROVIDE NEMA 1 ENCLOSURES FOR INTERIOR LOCATIONS AND NEMA 3R ENCLOSURES FOR EXTERIOR LOCATIONS UNLESS NOTED OTHERWISE.

CONDUITS:

CONDUITS WITHIN CLASSIFIED AREAS SHALL BE IN ACCORDANCE WITH NEC REQUIREMENTS.

ALL CONDUIT SHALL BE 1/2" MINIMUM SIZE AND ZINC-COATED EMT, EXCEPT IN WET, DAMP, OR WASHDOWN AREAS WHERE ZINC-COATED RIGID STEEL (GRC) OR INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED. EMT FITTINGS SHALL BE HEXAGONAL, GALVANIZED, STEEL GLAND, COMPRESSION TYPES.

EMT CONNECTORS SHALL HAVE INSULATED THROATS. INSULATING THROATS SHALL BE MANUFACTURED WITH THE CONNECTORS; USE OF INSULATING SLEEVES IS NOT ALLOWED. ALL GRC OR IMC CONDUITS ENTERING ENCLOSURES SHALL BE TERMINATED WITH DOUBLE LOCKNUTS AND A FIBER BUSHING OR BOND BUSHING (WHERE NEC REQUIRED).

FLEXIBLE CONDUIT CONNECTORS SHALL BE T & B NYLON INSULATED "TITE-BITE."

LIQUID-TIGHT FLEXIBLE CONDUIT SHALL BE USED FOR FINAL EQUIPMENT CONNECTIONS, AND IN DAMP LOCATIONS.

SECURE CONDUITS USING MANUFACTURED STRAPS. TIE WIRE IS NOT ALLOWED.

EXCEPT FOR MECHANICAL AREAS, ALL CONDUIT SHALL BE INSTALLED CONCEALED WHEREVER POSSIBLE. CONDUITS SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO STRUCTURAL ELEMENTS AND SHALL BE INSTALLED IN GROUPS. WHERE INSTALLED AT THE ROOF OR CEILING, GROUPINGS SHALL BE SINGLE DEPTH AND INSTALLED TIGHT AGAINST THE STRUCTURE. FOR MULTIPLE DEPTH GROUPINGS AND OTHER SITUATIONS, A TRAPEZE ARRANGEMENT USING APPROPRIATE CHANNELS SUSPENDED FROM THE STRUCTURE USING THREADED RODS OF SUFFICIENT SUPPORTING STRENGTH WILL BE PERMITTED. ALL CONDUITS SHALL BE KEPT A MINIMUM OF (SIX) 6 INCHES AWAY FROM PARALLEL RUNS OF STEAM OR HOT WATER PIPES AND FLUES.

THE CONTRACTOR MAY, AT HIS OPTION, USE TYPE MC CABLE ONLY IN CONCEALED LOCATIONS AS PERMITTED BY OWNER AND THE AUTHORITY HAVING JURISDICTION. TYPE MC CABLE SHALL NOT BE USED IN ANY EXPOSED LOCATIONS.

THE CONTRACTOR SHALL PROVIDE ACCESS DOORS IN WALLS AND CEILINGS FOR ACCESS TO PULL BOXES, ACCESSORIES, ETC., UNDER THE ELECTRICAL CONTRACT WHERE REQUIRED. DOORS SHALL BE SIZED AS REQUIRED (MINIMUM 16" X 16") WITH A FINISH TO MATCH THAT OF THE ROOM IN WHICH IT IS INSTALLED. THE ARCHITECT SHALL APPROVE FINISH OF THE ACCESS DOORS.

ALL UNDERGROUND METALLIC CONDUITS SHALL BE THOROUGHLY COATED WITH TWO COATS OF ASPHALTUM OR BITUMASTIC PAINT. CONDUITS INSTALLED UNDERGROUND ON THE EXTERIOR OF THE BUILDING SHALL BE BURIED 3'-6" MINIMUM UNDER ROADWAYS AND PARKING AREAS, AND BURIED 2'-6" IN OTHER AREAS.

THE CONTRACTOR MAY, AT HIS OPTION, USE RIGID NONMETALLIC CONDUIT ONLY FOR THE SECONDARY UNDERGROUND SERVICE, THE UNDERGROUND TELEPHONE SERVICE CONDUIT, AND BRANCH CIRCUITS AND TELEPHONE SYSTEM CONDUITS LOCATED BELOW THE CONCRETE FLOOR SLAB ON GRADE OR BURIED ON THE EXTERIOR OF THE BUILDING. ALL PVC SHALL BE SCHEDULE 40 (UNLESS NOTED OTHERWISE) POLYVINYL CHLORIDE
UL. LISTED FOR USE WITH 75 DEGREE C CONDUCTORS. INSTALLATION SHALL BE IN ACCORDANCE WITH NEC ARTICLE 352, ALL CODES, THE UTILITY COMPANY REGULATIONS, AND THE MANUFACTURER'S INSTRUCTIONS.

ALL PVC COMPONENTS OF THE PVC CONDUIT SYSTEM SHALL BE FURNISHED FROM THE SAME MANUFACTURER AND USED SPECIFICALLY FOR THEIR INTENDED PURPOSE. ALL FIELD BENDS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND ACCREDITED TESTING LABORATORY REQUIREMENTS. PVC THAT
HAS BEEN HEATED WITH A TORCH SHALL BE REPLACED. USE SCHEDULE 80 PVC 90 DEGREE ELBOWS IN LIEU OF ALL SCHEDULE 40 PVC 90 DEGREE ELBOWS EXCEPT FOR CONDUITS 1" AND SMALLER. PVC SHALL NOT PENETRATE SLAB ON GRADE FOR ANY REASON; USE GRC CONDUIT FOR ALL PENETRATIONS.

PROVIDE 100-POUND TEST, NYLON PULL CORDS IN ALL EMPTY CONDUITS.

ALL OUTLET BOXES SHALL BE GALVANIZED STEEL EXCEPT THAT CAST BOXES WITH GASKETED COVERS SHALL BE REQUIRED IN ALL INTERIOR WET AREAS AND ON THE EXTERIOR OF THE BUILDING. OUTLET BOXES SHALL BE NO LESS THAN 4" SQUARE BY 1-1/2" DEEP. MULTIGANG BOXES SHALL BE OF SINGLE PIECE CONSTRUCTION.

PULL BOXES SHALL BE CONSTRUCTED OF THE CODE GAUGE GALVANIZED SHEET METAL AND SHALL COMPLY WITH NEC ARTICLE 314. SEAMS SHALL HAVE A CONTINUOUS WELD.

WIRING:

CONDUCTORS SHALL BE COPPER, THW OR THHN/THWN, SOLID FOR #10 AWG OR #12 AWG, AND STRANDED FOR ALL LARGER SIZES. CONTROL CIRCUIT CONDUCTORS MAY BE #14 AWG, SOLID, TYPE THW. ALL 208/120 VAC CONDUCTORS SHALL BE COLOR-CODED BLACK, RED, BLUE, WHITE, AND GREEN FOR PHASES A, B, C, NEUTRAL, AND GROUND RESPECTIVELY.

ALL CONDUITS AND CABLES SHALL BE INSTALLED IN RACEWAYS EXCEPT AS OTHERWISE SPECIFIED HEREIN.

THE CONTRACTOR MAY, AT HIS OPTION, USE TYPE MC CABLE ONLY IN CONCEALED LOCATIONS AS PERMITTED BY CODE. TYPE MC CABLE SHALL NOT BE USED IN ANY EXPOSED LOCATIONS.

ELECTRICAL CONDUCTORS SHALL BE TESTED FOR CONTINUITY AND GROUNDS BEFORE BEING ENERGIZED. ALL FAULTY CONDUCTORS SHALL BE REPLACED. SERVICE ENTRANCE CONDUCTORS SHALL BE MEGGER TESTED AND THE RESULTS SUBMITTED TO THE ARCHITECT FOR APPROVAL.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR FULLY COORDINATING WITH THE OTHER TRADES TO DETERMINE THE POWER REQUIREMENTS AND CONNECTION POINTS FOR EQUIPMENT FURNISHED BY OTHERS. HE SHALL PROVIDE ELECTRICAL POWER TO EACH PIECE OF EQUIPMENT BASED UPON THE MANUFACTURER'S WIRING DIAGRAMS AND UNIT MOUNTED NAMEPLATES.

THE CONDUIT AND NEUTRAL CONDUCTORS OF THE ELECTRICAL SYSTEM AND ALL ELECTRICAL EQUIPMENT SHALL BE GROUNDED. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR WITH EVERY CIRCUIT AND IN EVERY CONDUIT. THE CONDUIT SYSTEM AND NEUTRAL CONDUCTORS SHALL BE BONDED TOGETHER ONLY AT THE SERVICE ENTRANCE
EQUIPMENT. GROUNDING AT THE SERVICE ENTRANCE SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250. NO CONDUIT SHALL CONTAIN MORE THAN THREE PHASE CONDUCTORS. DERATING OF CONDUCTORS WILL NOT BE ALLOWED.

DEVICES:

ALL WIRING DEVICES SHALL BE SPECIFICATION GRADE, GRAY IN COLOR. SWITCHES SHALL BE QUIET OPERATING TYPES RATED 20A-120/277 VAC.

RECEPTACLES SHALL BE NEMA 5-20R TYPES UNLESS OTHERWISE NOTED. SPECIAL PURPOSE RECEPTACLES SHALL BE HEAVY DUTY, SPECIFICATION GRADE TYPES. THE CONTRACTOR SHALL COORDINATE EACH DEVICE FOR THE CIRCUIT AND EQUIPMENT TO WHICH IT WILL BE CONNECTED. PROVIDE THE PROPER DEVICE BASED UPON THE ACTUAL EQUIPMENT SUPPLIED TO THE PROJECT.

PROVIDE A SINGLE MULTI-GANG OUTLET BOX AND DEVICE PLATE FOR ALL GROUP MOUNTED WIRING DEVICES. PROVIDE FULL HEIGHT AND DEPTH BARRIERS IN OUTLET BOXES WHERE POWER AND COMMUNICATION CONDUCTORS WOULD BE MIXED.

ALL COVERPLATES IN AREAS WHICH ARE FINISHED SHALL BE NYLON AND SHALL MATCH THE COLOR OF THE WIRING DEVICES. COVERPLATES IN UNFINISHED MECHANICAL AND ELECTRICAL AREAS MAY BE GALVANIZED STEEL TYPES WITH BEVELED EDGES.

POWER EQUIPMENT:

PANELBOARDS SHALL BE LIGHTING AND APPLIANCE TYPE. DEAD-FRONT SAFETY TYPE. ALL CIRCUIT BREAKERS SHALL BE MOLDED CASE, BOLT-ON, AUTOMATIC THERMAL MAGNETIC TYPE, CALIBRATED FOR 40°C OR AMBIENT COMPENSATING. CABINETS SHALL BE A NOMINAL 22 INCHES WIDE. PANELBOARD SHALL HAVE FULL HEIGHT, COPPER BUSSING. PANELBOARD DIRECTORIES SHALL BE TYPED.

SAFETY SWITCHES SHALL BE HEAVY DUTY, QUICK-MAKE, QUICK-BREAK, TYPES OF THE SIZE AND FUSE AMPACITY AS DENOTED ON THE DRAWINGS. PROVIDE GROUND BUS, SOLID NEUTRAL (WHEN REQUIRED), CLASS RK-5 DUAL ELEMENT, TIME DELAY FUSES, AND NEMA RATED ENCLOSURE.

MANUAL MOTOR STARTERS SHALL BE MOTOR SENTINEL TYPE WITH PROPERLY SIZED OVERLOAD HEATERS AND DISCONNECT SWITCH (TOGGLE TYPE) MOUNTED IN A NEMA RATED ENCLOSURE.

LUMINAIRES

ALL LUMINAIRES SHALL BE PROVIDED COMPLETE WITH LAMPS, ALL NECESSARY ACCESSORIES, AND AS SCHEDULED ON THE DRAWING. LUMINAIRES AS SCHEDULED ESTABLISH A STANDARD OF QUALITY AND APPEARANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING CONSTRUCTION DETAILS SUCH AS LUMINAIRE TRIM AND
CEILING CONSTRUCTION.

CEILING MOUNTED OR SUSPENDED LUMINAIRES SHALL BE SUPPORTED BY A METHOD RATED AT LEAST FIVE TIMES THE LUMINAIRE WEIGHT. THE METHOD SHALL ALSO COMPLY WITH ARTICLES 314.27, 410.15, AND 410.16, AS APPROPRIATE, OF THE NEC.

OTHER REQUIREMENTS:

PROVIDE ENGRAVED, PHENOLIC NAMEPLATES, WHITE LETTERS ON BLACK BACKGROUND (208/120 VAC) FOR EACH PANELBOARD AND DISCONNECT SWITCH. NAMEPLATES SHALL BE PERMANENTLY ATTACHED TO THE EQUIPMENT USING RIVETS.

PROVIDE FUSES FOR ALL EQUIPMENT REQUIRING FUSES AND LAMPS FOR EVERY LUMINAIRE.

PROVIDE A SYSTEM OF EMPTY CONDUIT, OUTLETS, POWER SOURCES, AND PHYSICAL SPACE TO ALLOW THE INSTALLATION OF A PRIVATE "INTERCONNECT" TELEPHONE/DATA SYSTEM. PROVISION OF THE TELEPHONE EQUIPMENT AND CABLE IS NOT PART OF THIS CONTRACT; HOWEVER, THE INSTALLATION OF CABLING AND INSTRUMENTS WILL COINCIDE WITH THIS WORK. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE SYSTEM INSTALLER TO INSURE THE SYSTEM'S INSTALLATION IS NOT HINDERED OR DEGRADED.

THE CONTRACTOR SHALL FURNISH AND INSTALL ANY MISCELLANEOUS METAL OR WOOD SUPPORTS, FASTENERS, MOUNTS, HANGERS, SIDE BRACES, ETC., WHICH MAY BE REQUIRED TO SECURELY ANCHOR AND SUPPORT ELECTRICAL EQUIPMENT FURNISHED UNDER HIS CONTRACT.

ALL POWER EQUIPMENT SHALL BE EATON,ABB, SIEMENS, OR SQUARE D. ALL LUMINAIRES SHALL BE AS SPECIFIED. ALL WIRING DEVICES SHALL BE EATON, HUBBELL, OR LEGRAND. ALL WIRE SHALL BE ANACONDA, CAROL, SOUTHWIRE, OR EQUAL. ALL NEW CONDUIT SHALL BE REPUBLIC OR EQUAL.

THE MANUFACTURER OF POWER EQUIPMENT SHALL PROVIDE ARC FLASH VALUES FOR EACH PANELBOARD.

PANELBOARDS SHALL BE LABELED TO IDENTIFY THE AVAILABLE FAULT CURRENT AT THE PANEL AND THE ARC FLASH HAZARD AT THE PANEL IN ACCORDANCE WITH NEC REQUIREMENTS.

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SHEET
E2.0
ELECTRICAL DETAILS