



ELECTRICAL DRAWINGS

Sealed by a professional electrical engineer registered in the State of Arizona or by another registrant as permitted in PBCC 106.1.1

2011 National Electrical Code (NEC)

1. Architectural Plans

- Find occupancy group, square footage, construction type, # of exits required, and intended use.
- Determine where the building is located on the site, the proximity to other structures, the quantities of buildings to be reviewed, etc.

2. Site Plan

- Utility Transformer location(s), # of services per transformer, proximity of oil-insulated transformer(s) to building. Note: if transformer is located within 25' of building, see NEC Section 450.27 and Technical Guideline – "Transformers, Outdoor Oil-Insulated."
- Service location(s), # of services per building. NEC Section 230.2
- Exterior lighting and power circuiting and controls
- Exterior energy calculations. 2012 IECC C405.6.2
- Signage. NEC Article 600
- Circuiting – Check conductor sizes vs. load and breaker or fuse sizes. NEC 310.15(B)(16), 240.4, 110.14(C) Equipment grounding conductor sized per NEC 250.122. Conduit sized per NEC Chapter 9, Tables 4 & 5

3. Lighting Plan(s)

- Circuiting – Check conductor sizes vs. load and breaker or fuse sizes. NEC 310.15(B)(16), 240.4, 110.14(C). Equipment grounding conductor sized per NEC 250.122. Conduit sized per NEC Chapter 9, Tables 4 & 5
- Controls
 - Manual controls. 2012 IECC C405.2.1.1
 - Light reduction controls. 2012 IECC C405.2.1.2
 - Automatic lighting shutoff. 2012 IECC C405.2.2.1 & C405.2.2.2
 - Daylight zone control. 2012 IECC C405.2.2.3
- Interior energy calculations. 2012 IECC C405.5.2
- Means of egress lighting (normal) and (emergency). 2012 IBC 1006.1, 2, 3 & NEC Article 700
- Take note of any line-voltage track for feeder load calculations. NEC Section 220.43(B)

4. Power Plan(s)

- Circuiting - Check conductor sizes vs. load and breaker or fuse sizes. NEC 310.15(B)(16), 240.4, 110.14(C) Equipment grounding conductor sized per NEC 250.122. Conduit sized per NEC Chapter 9, Tables 4 & 5
- GFCI per NEC Article 210.8
- Electrical distribution equipment layouts – Working space NEC 110.26
- Classified locations, NEC Articles 500 - 517, – identified on plan, electrical equipment and wiring methods within classified locations properly rated. (Also verify rating of lighting within or above classified locations)
- Review mechanical & plumbing equipment power, circuiting, OCPD sizes, loads, disconnecting means (Note: may be on separate power plans). Review mechanical and plumbing equipment schedules vs. load information shown in panel schedules and load calculations
- Review other equipment power, such as kitchen equipment, circuiting, OCPD sizes, loads, disconnecting means

5. One-Line Diagram(s)

- If more than one service is serving a building, verify that the design meets one of the conditions in NEC 230.2 permitting more than one service
- Verify building disconnecting means are provided for each building in scope. NEC 230.70 or 225.31
- Verify electrical distribution equipment ratings, (voltage, phase, wire, ampacity, AIC, enclosure). Check ampacity of distribution equipment vs. load shown in load calculations
- Verify if GFP is required and indicated. NEC 230.95, 215.10
- Check feeder sizes, (line, neutral, and grounding conductors, and conduit). Verify that loads do not exceed conductor ampacity
- Check OCPD (fuses, breakers) sizes and types. Verify that loads do not exceed OCPD ratings. Verify that OCPD's properly protect conductors and equipment
- Check grounding and bonding of service(s), transformer(s), generator(s), etc. per NEC Article 250
- Review any NEC Article 700, 701, and 702 systems indicated. Verify separation as required by code
- Review Essential Electrical Systems for health care facilities per NEC Article 517
- Verify if Special Electrical Inspection or Electrical Observation is required. Review Special Inspection or Observation form for completeness

6. Check load calculations.

- Load calculations are required for all distribution equipment (up to and including the SES) affected by the load for the project.

7. Check fault calculations

- Identify utility company. (APS or SRP)
- Verify that AFC shown at the SES is no less than that shown in the utility company tables.
Note: tables are based on one transformer serving one service. If more than one service is served by a single transformer, the transformer will likely be larger (KVA) and consequently have a larger AFC at each service served. If two or more transformers are networked, the AFC will be much higher than the table value.
- Check fault calculations to all panels, contactors, relays, etc. vs. AIC / SCCR rating indicated for same. Other equipment should also be checked, such as chillers, A/C units, elevator controllers, etc.

8. Panel Schedules

- If multiwire branch circuits are present on plan drawings, verify compliance with 210.4(B)
- Verify that any line-voltage track lighting is included in feeder calc for panel. NEC Section 220.43(B)
- If show windows are identified in panel schedule, verify code required feeder load is included in load calculation for panel. NEC Section 220.43(A)
- Sign circuit required by NEC Section 600.5(A) must have a minimum load per NEC Section 220.14(F)
- Panel schedules should include: breaker ratings, circuit loads, description of loads, panel ratings, (voltage, phase, wire, ampacity, AIC, enclosure), and panel load calculations
- Verify that load shown does not exceed panel ampacity rating
- Verify panel available fault current (AFC) from fault calculations does not exceed panel AIC rating, or that a series rated system is designed