CITY OF MESA
DEVELOPMENT SERVICES
ELECTRICAL CODE REQUIREMENTS

PROJECT STREET ADDRESS:_____

PERMIT #_____

THIS CHECKLIST CAN BE USED AS A GUIDE WHEN PREPARING PLANS FOR ELECTRICAL CODE REVIEW. **NOTE: ALL REFERENCES WERE TAKEN FROM THE 2017 NATIONAL ELECTRIC CODE WITH AMENDMENTS.**

General/Site Plan:

_____ 1. The Electrical Code reference is not on the plans or is incorrect. The City of Mesa has adopted the 2017 National Electric Code with Amendments.

_____ 2. Plans submitted are incomplete and therefore a complete comprehensive review was not done at this time. Additional corrections may be identified upon review of a complete set of plans.

_____ 3. Plans, specifications and calculations must be sealed and signed by an architect or engineer licensed by the State of Arizona.

_____ 4. Include the City of Mesa address assigned on the cover sheet and all sheets of the plan set. The address shall contain all building numbers for multiple building sites, and all suite numbers for current or future tenant build-outs.

_____ 5. Provide business name on cover sheet and a narrative describing the scope of work for the permit applied for. Specify what each space of the building is intended for, operations and services to be provided and a description of materials stored, used, sold or manufactured.

_____ 6. For shell building construction a narrative shall be provided on the plans indicating the level of build-out for each building, including partitions, floors, ceilings, finishes, restrooms, fire riser rooms, mechanical, plumbing, electrical and fire sprinklers. If Bare, Unfinished or Finished is specified, elaborate to clarify the extent of shell completion.

_____ 7. Show location of utility power feed onto site and transformer pad location and size.

_____ 8. Show location of SES and panel board feeding equipment indicated on site plan. Show size of equipment and any required pads to scale.

_____ 9. Provide light fixture cut sheets for all light fixtures used outdoors to verify compliance with City of Mesa Outdoor Lighting Control Ordinance. Provide sufficient detail to verify that fixtures meet requirements. Luminaires submitted shall match those called out on the fixture schedule.

____ 10. Outdoor lighting fixtures shall not illuminate the surrounding areas per the City of Mesa Outdoor Lighting Control Ordinance.

____ 11. Provide photometric study to demonstrate compliance with City of Mesa Outdoor Lighting Control Ordinance. Maximum light level at property line shall be less than 0.5-foot candles for properties where the neighboring lot is zoned commercial or 0.3 foot candles where the neighboring property is residential.

____ 12. Provide light pole foundation design. Verify design with structural engineer prior to plan approval.

____ 13. Minimum depth of burial for conduit under driveways or parking lots is 24". NEC Table 300.5.

____ 14. Minimum depth of burial for conduit located _____ is _____ inches. NEC Table 300.5.

Building Lighting:

____ 15. Provide fixture schedule showing all fixture types used on this project.

____ 16. Provide exist signs at all required exits. Exit signs are required as identified in IBC 1011.1.

____ 17. Emergency lighting is required. Provide 1-foot candle minimum along egress pathway. IBC 1006.4.

____ 18. Exit and emergency lighting shall be provided with a separate source of power. IBC 1011.5.3 and IBC 1006.3.

____ 19. Provide illumination in room(s) _____ to comply with IBC 1205.3.

____ 20. A sign circuit is required for this commercial occupancy. Provide an outlet supplied by a branch circuit rated at 20 amperes that supplies no other load. NEC 600.5 (A)

Building Power:

____ 21. Show location of SES and all panel boards, switchboards and motor control centers.

____ 22. Show connection of all HVAC equipment. Coordinate with Mechanical for equipment sizes and locations.

____ 23. Provide disconnect means at _____ equipment as required by NEC 422.30, 424.19, 427.55, 430.102 and 440.11 through 14.

____ 24. Provide a general use receptacle within 25 feet of all mechanical equipment. NEC 210.63.

____ 25. Provide GFCI type receptacles where receptacles are shown in bathrooms, outdoors, on rooftops, kitchens, within 6' of sinks, indoor wet locations, locker rooms with associated showering facilities, garages, service bays, crawl spaces – at or below grade level or any other wet locations. NEC 210.8.

____ 26. Provide access and clear working space around all electrical equipment to permit ready and safe operation and maintenance of such equipment. NEC 110.26.

____ 27. Provide an equipment list, including electrical loads for all equipment.

____ 28. Metal piping systems including water, gas and any other metal piping shall be bonded as required in NEC 250 104 (A) through (B) and the grounding conductor shall be sized per NEC 250.122. (Note the restriction for use of underground gas piping systems for grounding in NEC 250.52(B).)

____ 29. Exposed structural metal that is interconnected to form a metal building frame and is not intentionally grounded or bonded and is likely to become energized shall be bonded per NEC 250.104 (C).

Special Systems – Fueling Stations

____ 30. Provide classification for fueling locations as indicated and illustrated in NEC 514.3. Include all Class 1 Div 1 and Class 1 Div 2 areas.

____ 31. All wiring inside fuel handling areas shall be in accordance with NEC 501 and NEC 502 for Class 1 and Class 2 areas.

____ 32. All electrical wiring passing under or through classified areas shall be sealed within 3.05m (10') of the point of emergence above grade. Except for listed explosion-proof reducers at the conduit seal, there shall be no union, coupling, box, or fitting between the conduit seal and the point of emergence above grade. NEC 514.8.

____ 33. Provide conduit seals for all conduit entering, leaving or passing through classified areas as required by NEC 514.9.

____ 34. Provide emergency shut off switch/disconnect means to shut off all power to the fuel dispensing system and locate the shutoff device not less than 20 feet or more than 100 feet from the fuel dispensing devices that they serve. NEC 514.11.

Special Systems – Repair Garages

____ 35. All wiring within hazardous areas shall comply with requirements of NEC 501 as applicable.

____ 36. Provide classified locations. NEC 511.3. Use Table 511.3(C) to determine the extent of the classified location.

____ 37. Wiring and equipment located in Class I locations shall conform to applicable provisions of NEC 501.

____ 38. Underground wiring shall be installed in threaded rigid metal conduit or intermediate metal conduit. NEC 511.8

____ 39. Seals complying with the requirements of 501.15 and 501.15(B)(2) shall be provided and shall apply to horizontal as well as vertical boundaries of the defined Class I locations. NEC 511.9.

____ 40. Battery chargers and their control equipment, and batteries being charged, shall not be located within location classified in 511.3.

____ 41. All receptacles supplying hand tools, portable diagnostic equipment, or portable lighting shall be provided with GFCI protection as required by NEC 511.12

Special Systems – Aircraft Hangars

____ 42. See NEC 513.3 (A) through (D) to determine the classification of the area.

____ 44. Wiring and equipment installed in Class I locations shall comply with the applicable provisions of NEC 501 or NEC 505 for the division or zone in which they are used. NEC 513.4

____ 45. All wiring installed in or under the hangar floor shall comply with the requirements for Class I, Division 1 locations. NEC 513.8

____ 46. Provide drainage for the wiring installed in vaults, pits or ducts. NEC 513.8

____ 47. Seals complying with the requirements of 501.15 or 505.16 shall be provided and shall apply to horizontal as well as vertical boundaries of the defined Class I locations. NEC 513.9.

____ 48. Provide an affixed warning sign on all mobile battery chargers per NEC 513.10 (B).

____ 49. External power sources for energizing aircraft shall be designed and mounted such that all electrical equipment and fixed wiring will be at least 18 inches above the floor and shall not be operated in a Class I location as defined in 513.3(C). NEC 513.10(C) (1)

____ 50. All 125-volt, 50/60Hz, single-phase 15-and 20-ampere receptacles installed in areas where electrical diagnostic equipment, electrical hand tools, or portable lighting equipment are to be used shall have ground-fault circuit-interrupter protections for personnel. NEC 513.12

Special Systems – Spray Booths

____ 51. Area classifications for open containers shall be per NEC 516.4. Show these locations on plans.

____ 52. Area classifications for spray application processes shall be per NEC 516.5. Show these locations on plans.

____ 53. Show location of all open flame, spark-producing equipment or processes on plans. These types of equipment or processes shall not be located in any area that is classified as Division 2, Zone 2, or Zone 22. NEC 516.5 (A)(3).

____ 54. Electrical area classifications for spray application operations confined to an enclosed spray booth or room shall be per NEC 516.5(D)(4).

____ 55. Electrical equipment is not permitted inside a spray booth, in the exhaust duct from a spray booth, in the entrained air of an exhaust system from a spraying operation, or in the direct path of spray unless it is specifically listed for readily ignitable deposits and flammable vapor. NEC 516.6

____ 56. Illumination within spray or coating booths or rooms shall comply with NEC 516.6(C).

____ 58. Fixed electrostatic equipment shall be per NEC 516.10(A) 1 through 10 and hand-spraying electrostatic equipment shall be per NEC 516.10(B) 1 through 5.

____ 59. Identify any powder coating processes. Powder coating processes shall comply with NEC 516.10(C).

____ 60. Printing, dipping and coating processes shall be per NEC 516.29.

Special Systems – Health Care Facilities

____ 61. All branch circuits serving patient care spaces shall be provided with an effective ground-fault current path by installation in a metal raceway system; or a cable having a metallic armor or sheath assembly. The metal raceway system, metallic cable armor, or sheath assembly shall itself qualify as an equipment grounding conductor in accordance with NEC 250.118. NEC 517.13(AA)

____ 62. Grounding terminals of all receptacles other than isolated ground receptacles, metal outlet boxes, metal device boxes, metal enclosures and all non-current-carrying conductive surfaces of fixed electrical equipment likely to become energized that are subject to personal contact, operating at over 100 volts shall be directly connected to an insulated copper equipment grounding conductor.

____ 63. Equipment grounding terminal buses of the normal and essential branch-circuit panelboards serving the same individual patient care vicinity shall be connected with an insulated continuous copper conductor not smaller than 10 AWG. NEC 517.14

____ 64. Isolated grounding receptacles are not permitted within a patient care vicinity. NEC 517.16(A)

____ 65. Isolated ground receptacle(s) installed in patient care spaces outside of a patient care vicinity(s) shall comply with NEC 517.16(B)(1) and (2).

____ 66. In hospitals and other buildings that provide critical care (Category 1) or utilize electrical life-support equipment and the buildings that provide the required essential utilities or services for the operation of critical care spaces or electrical life-support equipment an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load. NEC 517.17(B)

____ 67. Provide each patient bed location with at least two branch circuits, one from the critical branch and one from the normal system. The critical branch circuit shall be readily identifiable and shall indicate the panelboard and branch-circuit number supplying them. NEC 517.18(A)

____ 68. Provide a minimum of eight (8) receptacles at each patient bed location. All receptacles shall be “hospital grade” and shall be so identified. NEC 517.18(B)

____ 69. All receptacles located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover. NEC 517.18(C)

____ 70. Provide each critical care patient bed location with at least one branch circuit from the critical branch that supplies an outlet(s) only at that bed location. NEC 517.19(A)

____ 71. Provide a minimum of fourteen (14) receptacles at critical care patient bed locations, one of which shall be connected to either the normal system branch circuit required in 517(19)(A) or a critical branch circuit supplied by a different transfer switch than the other receptacles at the same patient bed location. NEC 517.19(B)(1)

____ 72. An essential electrical system is required for hospitals and other health care facilities serving patients. NEC 517.25

____ 73. The essential electrical system shall have a minimum of the following two independent sources of power; a normal source generally supplying the entire electrical system and one or more alternate source(s) for use when the normal source is interrupted. NEC 517.30(A)

____ 74. Provide three (3) separate branches capable of supplying a limited amount of lighting and power service that is considered essential for life safety and effective hospital operation during the time the normal electrical service is interrupted. The three (3) branches are life safety, critical and equipment. NEC 517.31(A)

____ 75. The life safety branch shall supply power for the illumination of means of egress, exit signs, alarm and alerting systems, communications systems, generator set locations generator set accessories, elevators and automatic doors. NEC 517.33

____ 76. The critical branch shall supply power for task illumination and selected receptacles. NEC 517.34

____ 77. The equipment branch shall supply power for equipment for delayed automatic connection, equipment for delayed automatic or manual connection and AC equipment for nondelayed automatic connection. NEC 517.35

____ 78. Locations using medical gases show the extent of the hazardous area per NEC 517.60(A) or (B)

____ 79. Provide wiring in hazardous areas per NEC 517.61.

____ 80. Where isolated power circuits are used, comply with NEC 517.160.

____ 81. Provide individual branch circuits for portable, mobile and transportable medical X-ray equipment requiring a capacity of over 60 amperes. NEC 517.71(B)

____ 82. Provide a disconnecting means at a location readily accessible from the X-ray control. NEC 517.72(B)

____ 83. For X-ray equipment the ampacity of supply branch-circuit conductors and the current rating of overcurrent protective devices shall not be less than 50% of the momentary rating or 100% of the long-time rating, whichever is greater. NEC 517.73(A)(1)

____ 84. For X-ray equipment the ampacity of supply feeders and the current rating of overcurrent protective devices supplying two or more branch circuits shall not be less than 50% of the momentary demand rating of the largest unit plus 25% of the momentary demand rating of the next largest unit plus 10% of the momentary demand rating of each additional unit. NEC 517.73(A)(1)

Special Systems - Restaurants

____ 85. All receptacles installed in commercial kitchens or other areas with a sink and permanent facilities for food preparation shall be GFCI type per NEC 210.8(B)(2).

____ 86. All receptacles installed in bathrooms shall be GFCI type per NEC 210.8(B)(1).

____ 87. Luminaires installed in kitchen hoods shall be permitted as outlined in NEC 410.10(C).

____ 88. For new restaurants, the calculation of a service or feeder load, where the feeder serves the total load, shall be permitted in accordance with Table 220.88.

One-Line Diagram

____ 89. Provide load calculations to verify that the service and feeders will not be overloaded, as required by NEC 220.

____ 90. Show feeder wire, ground wire and conduit sizes. Conductors shall be sized for ampacity per NEC 310. Ground wire size shall be sized per NEC 250.66 or NEC 250.122 as appropriate. Conduits shall be sized per NEC Chapter 9 tables.

____ 91. Panelboard(s) _____ is not shown on riser diagram. Show all panelboards on riser diagram.

____ 92. Provide a grounding electrode system that complies with NEC 250.50 through NEC 250.70.

____ 93. Metal underground gas piping systems shall not be used as grounding electrodes. NEC 250.52(B)

____ 94. Provide bonding of equipment, communication systems and other enclosures per NEC 250.90 through NEC 250.96.

____ 95. Provide bonding of metal water piping per NEC 250.104(A). Other metal piping shall be bonded per NEC 250.104(B).

____ 96. Provide fault current calculations for building service and feeders to panelboards.

____ 97. Switchboards, panelboards and other protective equipment shall be capable of interrupting the available fault current as required by NEC 110.9.

____ 98. Provide ground-fault protection of equipment for solidly grounded wye electric services of more than 150 volts to ground but not exceeding 1000 volts phase-to-phase for each service disconnect rated 1000 amperes or more. NEC 230.95 and NEC 240.13

____ 99. Size feeders per NEC 215.2 and use the temperature correction factor in NEC 310.15.

____100. Submit calculations to verify compliance with voltage drops per NEC 215.2 and NEC 210.19.

____101. Where more than one (1) service is provided to a building as permitted in NEC 230.2(A), provide a permanent plaque or directory at each service disconnect location. NEC 230.2(E)

____102. Size all conductors per Table 310.106(A).

Schedules and Details

____103. Identify what is new and what is existing in the panel schedule(s). Include any modifications to loads.

____105. Provide panel schedules for all panelboards. NEC 408.4

____106. Panelboard _____ is not rated for the full fault current available as shown on the One-Line Diagram. Increase the panelboard fault current rating to meet or exceed the available fault current as required by NEC 110.9.

____107. Panelboard _____ is overloaded. Increase the panelboard rating or remove load so that the panelboard meets the requirements of NEC 215.2 and NEC 408.30.

____108. Panelboard _____ is an engineered series combination system. Provide warning labels that meet the requirements of NEC 110.21(B) and shall be readily visible and state the following: CAUTION – ENGINEERED SERIES COMBINATION SYSTEM RATED _____ AMPERES. IDENTIFIED REPLACEMNET COMPONENTS REQUIRED. NEC 110.22(B)

____109. Equipment enclosures for circuit breakers or fuses applied in compliance with the series combination rating marked on the equipment by the manufacturer accordance with 240.86(B) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall meet the requirements in 110.21(B) and shall be readily visible and state the following: CAUTION – SERIES COMBINATION SYSTEM RATED _____ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED. NEC 110.21(C).

____110. Provide engineering where the available fault current is increased beyond the interrupting rating of the existing circuit overcurrent protection equipment. NEC 240.86(A)

____111. The enclosure must have a label affixed by the equipment manufacturer that provides the series rating of the combination(s). NEC 240.86(B)

____112. Series rating cannot be used where the motors are connected on the load side of the higher-rated overcurrent device and on the line side of the lower-rated overcurrent device or where the sum of the motor full-load currents exceeds 1% of the interrupting rating of the lower-rated circuit breaker. NEC 240.86(C)