

Electrical Plan Review for Complex Structures

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Purpose

The purpose of the electrical plan review for complex structure is to safeguard persons and property by ensuring that the installation of proposed electrical systems installed meet the current National Electrical Codes (NEC) and the Oregon Electrical Specialty Codes (OESC).

Authorization to Start Work / Partial Permits (OAR 918-309-0000) (OAR 918-309-0025)

An electrical permit will not be issued or will be locked until the electrical plan review is completed and approved.

Work may not proceed until the electrical plan review is completed and approved.

A partial permit can be issued before the entire plan review is completed.

The areas of work to be covered in a partial permit must meet the same guidelines and criteria listed in the **Installations Requiring Electrical Plan Reviews** (Page 2) and **Submittal Requirements Checklist** (Page 9) sections of this document.

Issuance of a partial permit only applies to the areas of work stated in the partial permit application.

Time Limit for Electrical Plan Review (OAR 918-311-0020)

(1) Electrical plan reviews shall be approved or denied within ten working days from receipt of the complete electrical plans by the jurisdiction requiring plan review. A reviewed set of plans shall be returned to the plan applicant:

(a) If a plan is rejected, the deficiencies must be set out in writing. Upon resubmission of the necessary items, the ten-day requirement starts again.

(b) If, because of the complexity or size of the installation, additional time beyond the ten working days is required to complete the review, the jurisdiction shall notify the person taking out the electrical permit of the reasons for the delay and the date the review will be completed.

(2) Phased permits may be issued as described in OAR 918-309-0025.

Installations Requiring Electrical Plan Reviews

The Oregon Administrative Rule (OAR 918-311-0040) requires plan reviews for “complex” commercial electrical systems. Electrical plan reviews for all other commercial electrical systems are optional.

The following information is based on the NFPA 70 - 2020 edition of the National Electric Code (NEC) and the adopted amendments of the 2021 Oregon Electrical Specialty Code (OESC).

Electrical plan reviews for complex structures are mandated by section 918-311-0040 of the Oregon Administrative Rules (OAR). This is a statewide mandate. **Bold text** indicates the Oregon Administrative Rules as written. All other text is additional information for clarification of the Oregon Administrative Rules.

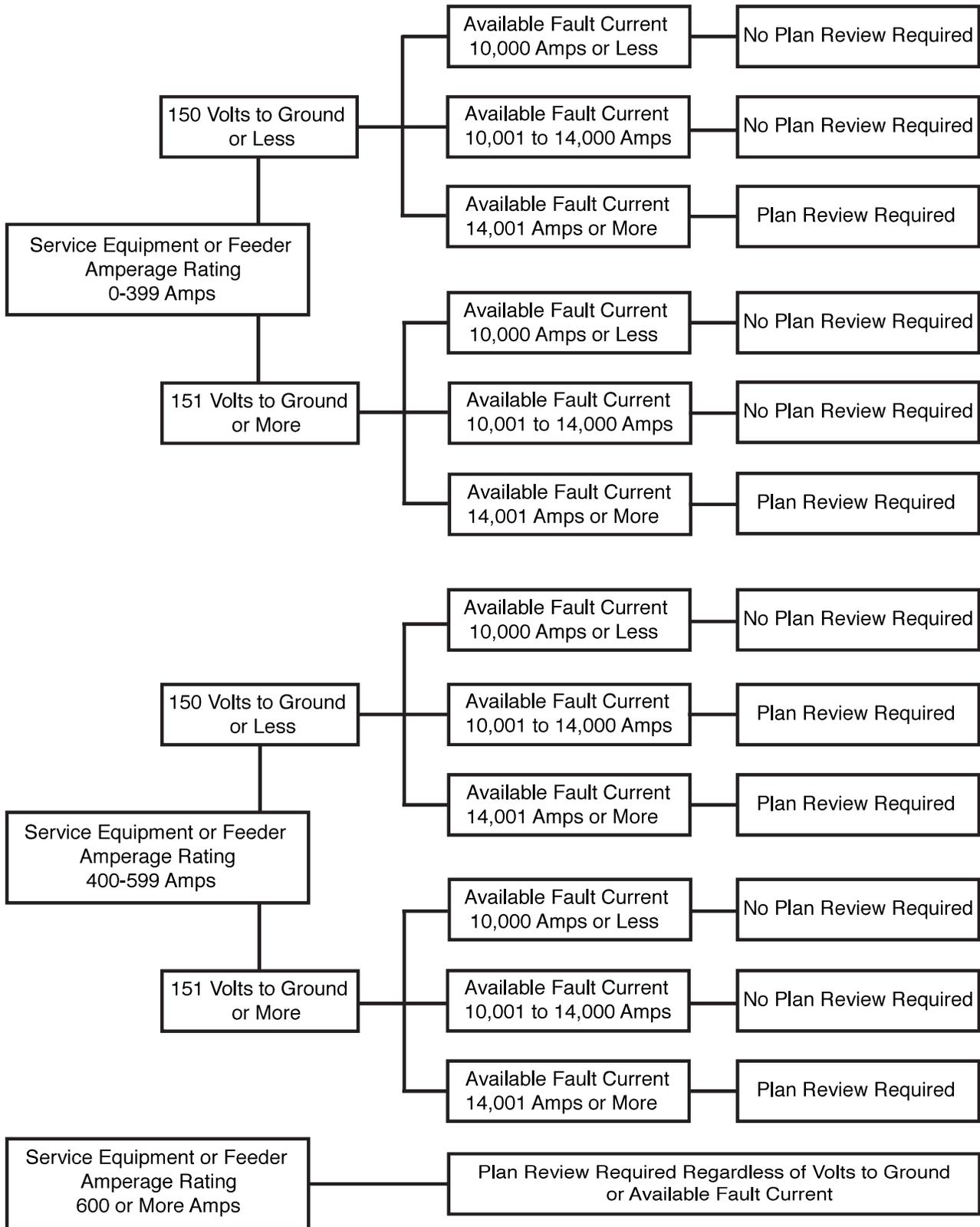
Electrical Plan Review for Complex Structures

(1) A jurisdiction providing electrical code plan review services may only require electrical plan review for a complex structure. For the purpose of this rule, “complex structures” have an electrical system designed, constructed or reconstructed with any of the following:

(a) A service or feeder beginning at 400 Amps where the available fault current exceeds 10,000 Amps at 150 Volts or less to ground or exceeds 14,000 Amps for all other installations

The maximum value of available fault current must be known to design a project and to be sure that the service equipment is installed within the maximum available fault current rating marked on the equipment.

The following flow chart will determine if an electrical plan review is required for service and feeder installations.



(b) Installation of a 150 KVA or larger separately derived system as defined in Article 100 of the National Electrical Code (NEC)

Article 100 – Definitions Separately Derived System. An electrical source, other than a service, having no direct connection(s) to circuit conductors of any other electrical source other than those established by grounding and bonding connections. (CMP-5)

For example, no direct connection exists between the primary and secondary winding of a delta-wye transformer; generators, converter windings and UPS systems are separately derived systems only when all circuit conductors - including the grounded (neutral) conductor - are independent of the supply conductors.

(c) Addition of a new motor load of 100 HP or more

The additional new motor load could be one new motor (100HP) or more, or any number of new motors that would have the combined HP of 100 HP or more.

(d) Fire pump installations as defined in Article 695 of the NEC

No definition for a “Fire Pump” is given in section 695.2 (definitions).

A Fire Pump supplies water to a facility's fire protection piping, which, in turn, supplies water to the sprinkler system and fire hoses.

(e) Emergency systems installations as defined in Article 700 of the NEC

Article 700 – Definitions (700.2) Emergency Systems. This definition shall apply within this article and throughout the code. Those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction. These systems are intended to automatically supply illumination, power, or both, to designated areas and equipment in the event of failure of the normal supply or in the event of accident to elements of a system intended to supply, distribute, and control power and illumination essential for safety to human life.

Informational Note: Emergency systems are generally installed in places of assembly where artificial illumination is required for safe exiting and for panic control in buildings subject to occupancy by large numbers of persons, such as hotels, theaters, sports arenas, health care facilities, and similar institutions. Emergency systems may also provide power for such functions as ventilation where essential to maintain life, fire detection and alarm systems, elevators, fire pumps, public safety communications systems, industrial processes where current interruption would produce serious life safety or health hazards, and similar functions.

(f) A service or feeder rated at 600 Amps or over

A service or feeder rated at 600 Amps or over, regardless of the nominal voltage or available fault current.

Article 100 – Definitions Voltage, Nominal. A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class (e.g., 120/240 volts, 480Y/277 volts, 600 volts). (CMP-1)

Informational Note No. 1: The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment.

(g) Voltage. More than 600 supply volts nominal

Article 100 – Definitions Voltage, Nominal. A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class (e.g., 120/240 volts, 480Y/277 volts, 600 volts). (CMP-1)

Informational Note No. 1: The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment.

(h) Renewable Energy. Renewable electrical energy systems rated over 25 KVA

Renewable electrical energy systems that could included, but not limited to: Solar, Wind power, Geothermal, Hydro electric, Biofuel, Biogas, Biomass, Tidal power and Hydrogen.

(i) Height. More than three stories

Any building structure more than three stories in height.

(j) Occupancy.

(A) Six or more residential units in one structure

Residential Units means any portion of a building that contains living facilities, including a room or rooms in a facility that have shared cooking, bathing, toilet, or laundry facilities such as dormitories, shelters, assisted living facilities, and boarding homes. "Residential dwelling unit" also means facilities that include provisions for sleeping, cooking, bathing, and toilet facilities for one or more persons and are used for extended stays, such as time-shares and extended-stay motels. "Residential dwelling unit" does not mean a guest room in a motel or hotel.

(B) An “A” (Assembly) occupancy, “E” (Educational) occupancy, or “I-2” or “I-3” (Institutional) occupancy as defined in the adopted Oregon Structural Specialty Code

Contact the Building Official to determine if the project is classified as an “A” (Assembly) occupancy, “E” (Educational) occupancy, or “I-2” or “I-3” (Institutional) occupancy as defined in the adopted Oregon Structural Specialty Code.

Also contact the Building Official to determine what is the type of building construction. This will determine what type of wiring methods that will be required for the project. For additional information on types of construction, see Informative Annex E – Types of Construction in the 2020 NEC.

(C) Any of the following special occupancies as described in Chapter 5 of the NEC adopted by the board in OAR 918-305-0100:

(i) Hazardous (Classified) locations as defined in Articles 500 to 516

500 – Hazardous (Classified) Locations, Classes 1, 2 and 3, Divisions 1 and 2

501- Class 1 Locations

502 – Class 2 Locations

503 – Class 3 Locations

504 – Intrinsically Safe Systems

505 – Zone 0, 1 and 2 Locations

506 – Zone 20, 21 and 22 Locations for Combustible Dusts or Ignitable Fibers/Flyings

510 - Hazardous (Classified) Locations – Specific

511 – Commercial Garages, Repair and Storage

513 – Aircraft Hangers

514 – Motor Fuel Dispensing Facilities

515 – Bulk Storage Plants

516 – Spray Application, Dipping, Coating, and Printing Processes Using Flammable or Combustible Materials

(ii) Installations in patient care areas of health care facilities as defined in Article 517

Article 517 – Definitions Health Care Facilities. Buildings, portions of buildings, or mobile enclosures in which human medical, dental, psychiatric, nursing, obstetrical, or surgical care is provided.
[99:3.3.71]

Informational Note: Examples of health care facilities include, but are not limited to, hospitals, nursing homes, limited care facilities, clinics, medical and dental offices, and ambulatory care centers, whether permanent or movable.

(iii) Agricultural buildings used for commercial purposes, as defined in Article 547

547.1 Scope This article applies to the following agricultural buildings or that part of a building or adjacent areas of similar or like nature as specified in 547.1(A) or (B).

547.1(A) Excessive Dust and Dust with Water. Agricultural buildings where excessive dust and dust with water may accumulate, including all areas of poultry, livestock, and fish confinement systems, where litter dust or feed dust, including mineral feed particles, may accumulate.

547.1(B) Corrosive Atmosphere. Agricultural buildings where a corrosive atmosphere exists. Such buildings include areas where the following conditions exist:

- (1) Poultry and animal excrement may cause corrosive vapors.
- (2) Corrosive particles may combine with water.
- (3) The area is damp and wet by reason of periodic washing for cleaning and sanitizing with water and cleansing agents.
- (4) Similar conditions exist.

(iv) Floating Buildings as defined in Article 553

Article 553 – Floating Buildings was removed from the 2020 NEC. Information and code requirements for Floating Buildings are now located in Part 3 of Article 555 – Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities.

Article 555.2 – Definitions Floating Building. A building unit, as defined in Article 100, that floats on water, is moored in a permanent location, and has a premises wiring system served through connection by permanent wiring to an electrical supply system not located on the premises.

Article 100 – Definitions Building. A structure that stands alone or that is separated from adjoining structures by fire walls. (CMP-1)

(v) Marinas and boat yards as defined in Article 555

555.1 Scope. This article covers the installation of wiring and equipment in the areas comprising fixed or floating piers, wharves, docks, floating buildings, and other areas in marinas, boatyards, boat basins, boathouses, yacht clubs, boat condominiums, docking facilities associated with one-family dwellings, two-family dwelling, multifamily dwellings, and residential condominiums; any multiple docking facility or similar occupancies; and facilities that are used, or intended for use, for the purpose of repair, berthing, launching, storage, or fueling of small craft and the moorage of floating buildings.

Article 555.2 – Definitions Boatyard. A facility used for construction, repairing, servicing, hauling from the water, storing (on land and in water), and launching of boats. [303:3.3.2]

Article 555.2 – Definitions Marina. A facility generally on the waterfront, that stores and services boats in berths, on moorings, and in dry storage or dry stack storage. [303:3.3.12]

(k) Recreational Vehicle Park. A new recreational vehicle park, or any addition or alteration to an existing park.

Article 551.2 – Definitions Recreational Vehicle Park. This definition shall apply only within this article. Any parcel or tract of land under the control of any person, organization, or governmental entity wherein two or more recreational vehicle, recreational park trailer, and/or other camping sites are offered for use by the public or members of an organization for overnight stays.

(2) Plan review is not required for work permitted through minor installation labels under OAR 918-309-0210 to 918-309-0260.

Submittal Requirements Checklist

Electrical Plan Review For Complex Structures – Checklist

All electrical plan reviews are based on the 2020 National Electrical Code (NEC), 2021 Oregon Electrical Specialty Code (OESC) & 2018 Oregon Administrative Rules (OAR).

The checklist below was created to help fulfill the requirements of an Electrical Plan Review for Complex Structures as required by the State of Oregon. OAR 918-311-0040

Electrical Plan Review For Complex Structures – Checklist

- 1) Submit two sets of plans.
- 2) Electronic print files (Email) will not be accepted. It shall be responsibility of the plans submitter, to submit paper prints.
- 3) Submitted plans shall be printed to a readable size.
- 4) Submitted plans shall be drawn to scale.
- 5) Submitted plans shall be dated.
- 6) Submitted plans shall have the address of the installation.
- 7) Submitted plans shall have the name and address of the property owner.
- 8) Submitted plans shall have the name of the company who prepared the plans.
- 9) Submitted plans shall have the name and the signature of the person who prepared the plans.
- 10) Submitted plans shall have the electrical supervisor license number on the plans if the person is an electrical supervisor.
- 11) Submitted plans shall have the professional registration number on the plans if the person is an architect or registered professional electrical engineer.
- 12) Submitted plans shall contain definitions for legends used, be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the applicable electrical code requirements, laws, ordinances, rules and regulations.
- 13) Revised plans shall have a revision number and a revision date printed on the revised plans.
Example: (Revision-1 10-21-2018)

- 14) Submitted plans shall contain available fault current on the line side of service disconnect. The utility power provider will provide available fault current information.
- 15) Submitted plans shall include a one-line diagram detailing the complete electrical system including the utility transformer, service equipment, transformers, electrical panels, emergency systems and all other electrical equipment that is powered by service and feeder conductors.
- 16) Submitted plans shall include the size of all conduits for the one-line diagram detailing the complete electrical system including the utility transformers, service equipment, transformers, electrical panels, emergency systems and all other electrical equipment that is powered by service and feeder conductors. (Example: 2", 3 ½")
- 17) Submitted plans shall include the type of all conduits for the one-line diagram detailing the complete electrical system including the utility transformer, service equipment, transformers, electrical panels, emergency systems and all other electrical equipment that is powered by service and feeder conductors. (Example: PVC, EMT)
- 18) Submitted plans shall include the number, the type and the material (AL or CU) of ungrounded conductors, grounded conductors and equipment grounding conductors in each conduit raceway for the one-line diagram detailing the complete electrical system including the utility transformers, service equipment, transformers, electrical panels, emergency systems and all electrical equipment that is powered by service and feeder conductors. (Example: 3-250 THHN-CU, 1-250 THHN-CU, 1-#4 THHN-CU GRD)
- 19) Submitted plans shall include the number, the type and the material (AL or CU) of ungrounded conductors, grounded conductors and equipment grounding conductors in each cable for the one-line diagram detailing the complete electrical systems including the utility transformer, service equipment, transformers, electrical panels, emergency systems and all other electrical equipment that is powered by service and feeder conductors. (Example: (3) 4/0 AWG and (1) 2/0 AWG Bare Ground, SER AL PVC Jacket, (2) 4 AWG and (1) 6 AWG Bare Ground, SEU CU PVC Jacket)
- 20) Submitted plans shall include the size of all conduits for branch circuits. (Example: 1/2", 1")
- 21) Submitted plans shall include the type of all conduits for branch circuits. (Example: PVC, EMT)
- 22) Submitted plans shall include the number, the type and the material (AL or CU) of ungrounded conductors, grounded conductors and equipment grounding conductors in each branch circuit conduit raceway. (Example: 3-#12 THHN-CU, 1-#12 THHN-CU, 1-#12 THHN-CU GRD)
- 23) Submitted plans shall include the number, the type and the material (AL or CU) of ungrounded conductors, grounded conductors and equipment grounding conductors in each branch circuit nonmetallic-sheathed cable, metal-clad cable or other types of cables. (Example: 12-2w/g NM cable CU, (3) 6 AWG with (1) Ground, MC cable AL)

- 24) Submitted plans shall include load calculations of the service, or provide applicable load records, for all new installations and for additions to existing installations.
- 25) Submitted plans shall include load calculations of each individual electrical panel.
- 26) Submitted plans shall include a panel schedule of each individual electrical panel.
- 27) Submitted plans shall include a one-line riser diagram showing all bonding conductors for service equipment, transformers, electrical panels, emergency systems and all other electrical equipment that is powered by service and feeder conductors. This would also include all bonding for building components and other systems.
(Example: 3/0 THHN CU to building steel)
- 28) Submitted plans shall include a one-line riser diagram showing the size and type (CU / AL) of the grounding electrode conductor, the type of grounding electrode (UFER /Ground Rods) and locations of both.
- 29) Submitted plans shall include a fixture schedule, showing type, location and layout of the fixtures.
- 30) Submitted plans shall include electrical panel name and branch circuit number for all outlets, devices, equipment and lighting fixtures. (Example: Panel-A Circuit-17 or simplified: A-17)
- 31) Submitted plans shall include the type, location (shown on plan) and electrical output of emergency systems. (Example: Diesel - 208V 3 ϕ 125KVA)
- 32) Submitted plans shall include locations of all low voltage system(s) components and cable type. (Example: Cat-5, RG-6)
- 33) Fire Alarm System plan reviews do not fall under the jurisdiction of this OAR section. Contact the Building Official for further information.