City Electrical Code and Inspections Compared to Austin Energy Design Criteria

1.4.13 last paragraph (page 19)

In the Network Area the sum of the total maximum nameplate rating of service disconnects or circuit breaker shall be used for Customer load determination. Rating of the disconnect equipment shall be determined from the nameplate maximum ampacity rating, not the fuse/circuit breaker or relay setting. The maximum number of disconnects shall be in accordance with the currently effective NEC.

If these conductors are customer installed and customer owned, sizing the conductors for the rating of the equipment (disconnect) nameplate rating is not an NEC requirement.

1.5.1.5 F (page 23)

Neutral conductors for three-phase, 4-wire wye-connected services shall have the full-current-carrying capacity of the largest energized conductor from the Customer's service point to the Customer's service disconnect(s) at the service equipment. The neutral conductor must be properly marked and grounded.

For this voltage and phase configuration, the NEC does not require the neutral to be full sized; it requires the neutral to be considered a current carrying conductor when the majority of the load consists of nonlinear loads, due to harmonics.

✓ **1.5.2** H (page 25) **Main Disconnect Switches.** The Customer's main disconnect switch (es) shall be in accordance with the currently effective version of City of Austin Electrical Code (Ordinance number 201111020-089).

The ordinance shown is for the 2011 version; the City's current electrical ordinance is the 2014 edition.

1.5.2 O. (page 26)

Grounding and Bonding of Customer-installed Electric Services. Electric services, including, but not limited to, service equipment, raceways, service distribution enclosures, junction boxes, wireways, enclosures, and any service conductor to be grounded/bonded, shall be grounded/bonded in accordance with the latest edition of the NEC.
EXCEPTION: The grounding/bonding conductors for all services shall be copper only, with a minimum size of #6 AWG copper.

The NEC allows copper or aluminum; depending on the service entrance conductor size, the minimum size service grounding electrode conductor, or main bonding jumper can be #8 AWG copper, or #6 AWG aluminum.

✓ **1.5.2.2 Available Commercial Electric Service** note [1] (page 27)

[1] Contact COA Development Review & Inspection Department (Electric Inspection Section)

What would be the purpose of contacting the Electrical Inspection Section? AE would determine the available voltage and ampacity.

✓ **1.5.2.3** C 3. **Service Head (Weatherhead)** (page 31)

3. For multiple service head, Customer service conductors shall reach the rack(s) on the building (plus 36 inches). Each service head shall have a full-current neutral. AE SHALL CONNECT THE CUSTOMER'S CONDUCTORS WITH AE'S SERVICE-DROP CONDUCTORS. No more than six service conductors per phase will be connected at the service point.

Full current neutral (this term is used in several locations of the Criteria): the NEC does not require this, if the statement's intent is requiring the neutral to be the same size as the phase conductors.

1.5.2.4 B. Customer Installed, Owned, and Maintained Underground Service and Service Laterals (page 32)

1. **COA Electrical Inspection Section must inspect the Customer-installed and -owned service lateral** conductors and the Customer-owned electrical service equipment. AE must inspect the service lateral conduit on the source side of the AE meter (see Section 1.5.2.4.B.2-7).

The COA Electrical Inspectors inspect based on the amended NEC. The NEC does not include installations under the exclusive control of the electrical utility (AE). If this installation is not under AE's exclusive control, my question would be, why does AE have requirements?

✓ Page 33, **B.** 5. Multiple service conductors that are furnished, installed, owned, and maintained by the Customer and that are serviced by AE from one service point location shall be grouped. Only one circuit is permitted per conduit.

The NEC allows more than one circuit per conduit.

Page 34, **B.** 9. Neutral conductors of 3-phase and single-phase connected services shall have the full current-carrying capacity of the largest energized conductor from the Customer's service point to the Customer's service disconnect(s) at the service equipment. The neutral conductor must be properly marked and grounded.

The NEC does not, in all cases, require the neutral to have a current carrying ampacity of the largest energized conductor; and this subsection is specific to past the service point. Should AE regulate past the service point (creates conflict with the electrical code)?

Page 34, **B.** 11. Single-phase installations shall be 3-wire; three-phase installations shall be 4-wire. Conductor sizes shall conform to the NEC and approved by the COA Electrical Inspection Section. Minimum size service conductors for connection to AE facilities shall be #6 AWG copper or equivalent for commercial permanent services. Maximum size service conductors for connection to AE facilities shall be 750 kcmil.

This subsection contradicts itself, and the NEC; it states, conductor sizes shall conform to the NEC and approved by the COA Electrical Inspection Section; then it states, minimum size service conductors for connection to AE facilities shall be #6 AWG copper or equivalent for commercial permanent services. There are cases in the NEC where the service conductors can be smaller than #6 AWG.

Page 35, **B.** 12. Service conductors must be consistent in size, type (copper or aluminum), and such through the metering equipment. If the meter is not located at the point of service (where the Customer conductors are connected to AE facilities), there must be no splices, connections, or Customer-accessible enclosure between the point of service and the meter. Outlet, device, cutout, pull or junction boxes, cabinets, wireways, gutters, conduit bodies (such as, condulets–LB, LL, LR) or any other apparatus that is designed and intended to allow access to conductors shall not be allowed ahead of metering equipment.

The NEC does not require service conductors to be consistent in size, type (copper or aluminum).

Page 35, **B. 14. (also located in Section 1.5.3.7 C, page 60)** When the Customer desires AE to install the meter on the building or structure(rather than taking service at the transformer or service-box/pull-box), AE requires that the Customer installed, owned, and maintained service conduit and service lateral conductors installed ahead of the AE meter(s) not be installed under or through a building or structure, including, but not limited to, porches, stairways, decks, carports, garages.

Should future ordinances or legislation require the AE meter to be the point of service and where the above conditions are not met, the Customer assumes the total responsibility for establishing a master-meter/submeter system or for relocating the service conduit and service lateral conductors so that they are AE-accessible.

Customer installed, owned, and maintained service conduit and service lateral: why does AE regulate this? The second paragraph: if this relates to the possibility of deregulation, my experience has been, the requirements were not retroactive; what was existing prior to deregulation was allowed to remain. a

1.5.2.6 A. (page 37) A. General. Where underground secondary voltage service is provided by means of underground primary voltage cable, padmounted transformers, and associated equipment, the Customer will need to provide space on his property and the necessary easements for the required AE underground cable, underground facilities, and padmounted equipment. The Customer is required to install the civil work for AE facilities installed on the Customer's property and to pay AE any additional cost differential between the overhead and underground distribution costs. AE Design will determine this cost. The Customer must also grant the City an easement on the City's standard form. The padmounted transformers and associated equipment must be installed on concrete pads or in transformer vaults. All Customer installed civil work for AE facilities must comply with all provisions of the COA Design Criteria, NESC, NEC, AE Design, and any applicable Specifications, Rules, Regulations, and Conditions. For more information, contact AE Design.

The NEC does not cover distribution and or metering under the exclusive control of the electrical utility (AE).

1.5.2.6 D. 1. e (page 39) **COA Electric Inspection Section** – Any service conduit installed behind the AE meter and all of the Customer's metering and service equipment. (See section 1.2.0 for phone numbers.)

COA Electrical Inspection Section: utility metering is not covered in the NEC.

1.5.2.7 7. (page 40) 7. THE CUSTOMER ASSUMES ALL RESPONSIBILITY FOR FURNISHING, INSTALLING, OWNING, MAINTAINING AND OPERATING ALL FACILITIES ON THE CUSTOMER'S SIDE OF THE POINT OF SERVICE. All Customer-owned installations shall be in accordance with the NESC and NEC.

Does the NESC include requirements for facilities on the customer's side of the point of service?

1.5.2.7 C. 7. and 8. (page 42) 7. The COA Electric Inspection Section (and other regulating bodies) will inspect the final installation of the Customer's metering enclosure and all the primary service equipment on the load side of the Customer's service point.

8. The Customer shall be responsible for maintaining all facilities beyond the service point except AE meters and AE metering equipment.

The NEC does not regulate utility metering, and utility equipment.

1.5.2.9 (page 42) A. Service Disconnects and Meters. All multiple-meter/shell buildings shall have all service disconnects and meters grouped in a common location on the exterior finished surface of the building or structure after and adjacent to the service distribution enclosure. All meters and disconnects shall be permanently sequentially marked, in order for each respective occupancy or unit. Each meter shall have a service disconnect consisting of one fused switch or circuit breaker.

All new service terminal blocks ahead of the meter(s) shall be located in the service distribution enclosure. (New service additions to existing wireway services with terminal

blocks may be located in the wireway as approved by the COA Electric Inspection Section.) The wireway and junction box should be sized according to the table Junction Box and Wireway Specifications in Section 1.14.1.Commercial transocket or CT services. – the conductors for a CT service may also use the common wireway if the CT service is located on the end of the wireway. Transocket or CT services served from a common wireway shall be limited to one service disconnect.

The NEC does not have a requirement for the customers' main service disconnect to be grouped with the utility meter; does not limit each occupant to one main service fused disconnect or breaker; and does not limit splices or taps to be made using terminal blocks only.

1.5.2.9 B 5. a. and b. (page 43) 5. The Customer's initial electrical installation shall include the following:

a. Service distribution enclosure. Contact the Development Review & Inspection Department, Electric Inspection Section, for information and approval prior to purchasing and installation.

b. The required number and size of service conductors, as per calculated load for entire building per the NEC, must be pulled from service point and properly terminated in service distribution enclosure.

a. The electrical Inspections Section does not provide information and approve service distribution enclosure (size); the service distribution enclosure size is regulated by AE Design Criteria, Table 1.14.1, page 110.

b. this subsection, in part, states, the required number and size of service conductors, as per calculated load for entire building per the NEC,. In other sections of the Criteria the service neutral conductor is not allowed to be sized per the NEC.

1.5.3 F. *(page 47)* ***Grounding and Bonding of Electric Services.*** *Electric services, including, but not limited to, service equipment, raceways, service distribution enclosures, junction boxes, wireways, enclosures, and any service conductor to be grounded/bonded shall be grounded/bonded in accordance with the NEC.*

EXCEPTION: *The grounding/bonding conductors for all services shall be copper only, with a minimum size of #6 AWG.*

The subsection requires the service to be grounded/bonded in accordance with the NEC, however the exception requires a minimum size copper to be #6 AWG. In the NEC, depending on the service conductor size, the NEC will allow a minimum #8 AWG copper.

1.7.14 C. (page 66) C. For permits (or information) on HBL and TPL permits, please call the Austin Watershed Protection and Development Review Department (WPDRD). An application for temporary service must also be made to AE for either type of temporary loop. All HBL and TPL.....

Wrong department shown

1.8.4 (page72) Customer's Main Disconnect The Customer's main disconnect switch(es) shall be located on the load side (behind) and next to the AE meter(s) on the outside the building. .....

The City's Electrical Code, which includes the NEC as amended by the City, does not require the customer's main service disconnect to be located next to the meter.

1.9.4.2 (page 84) **Approval** Before any commercial or residential unit may be submetered, approval must be obtained from the COA Electrical Inspection Section. Approval shall be based on compliance with the requirements in the following subsection.

The COA Electrical Inspection Section does not approved or inspect for the mentioned following subsection of the AE Design Criteria. The inspector verifies the submeter is listed/labeled by a Nationally Recognized Testing Laboratory (NRTL), and installed per the manufacturer's installation guidelines.

1.11.0 Glossary (page 96) **NEC** The National Electrical Code, City of Austin's latest adopted edition. The NEC is the code that the electrical contractors must follow for wiring a Customer's electrical installation and equipment.

The electrical contractors, anyone, performing electrical work in the City's zoning jurisdiction is required to follow the City's Electrical Code. The City's Electrical Code has adopted and amended the National Electrical Code.

Appendix C

Figure 1-13 and 1-14

The illustration for the ground wire on the bottom of the pole, and on the customer's side of the meter, is not an Electrical Code acceptable method.

Figure 1-15A, 1-16A, 1-18, 1-19, 1-20, 1-21, 1-22, 1-23, 1-25

Notes 2. IF 25' OF #6 CU (MIN.) DOES NOT HAVE A RESISTANCE TO GROUND OF 25 OHMS OR LESS, AN ADDITIONAL LENGTH OF 6' (MIN.) #6 CU SHALL BE INSTALLED UNTIL 25 OHMS IS ACHIEVED.

This is not an Electrical Code acceptable method.

Figure 1-23 is for underground. Below the title, this statement is made: THROUGH ROOF SERVICE MAST INSTALLATION