



Customer Requirements
Downtown Secondary
Network Service

C-SV-4000

Application

This standard describes the limitations and requirements for receiving service from the Tacoma Power secondary network system within the City of Tacoma downtown core area.

In This Standard

The following table lists the location of different parts of this standard.

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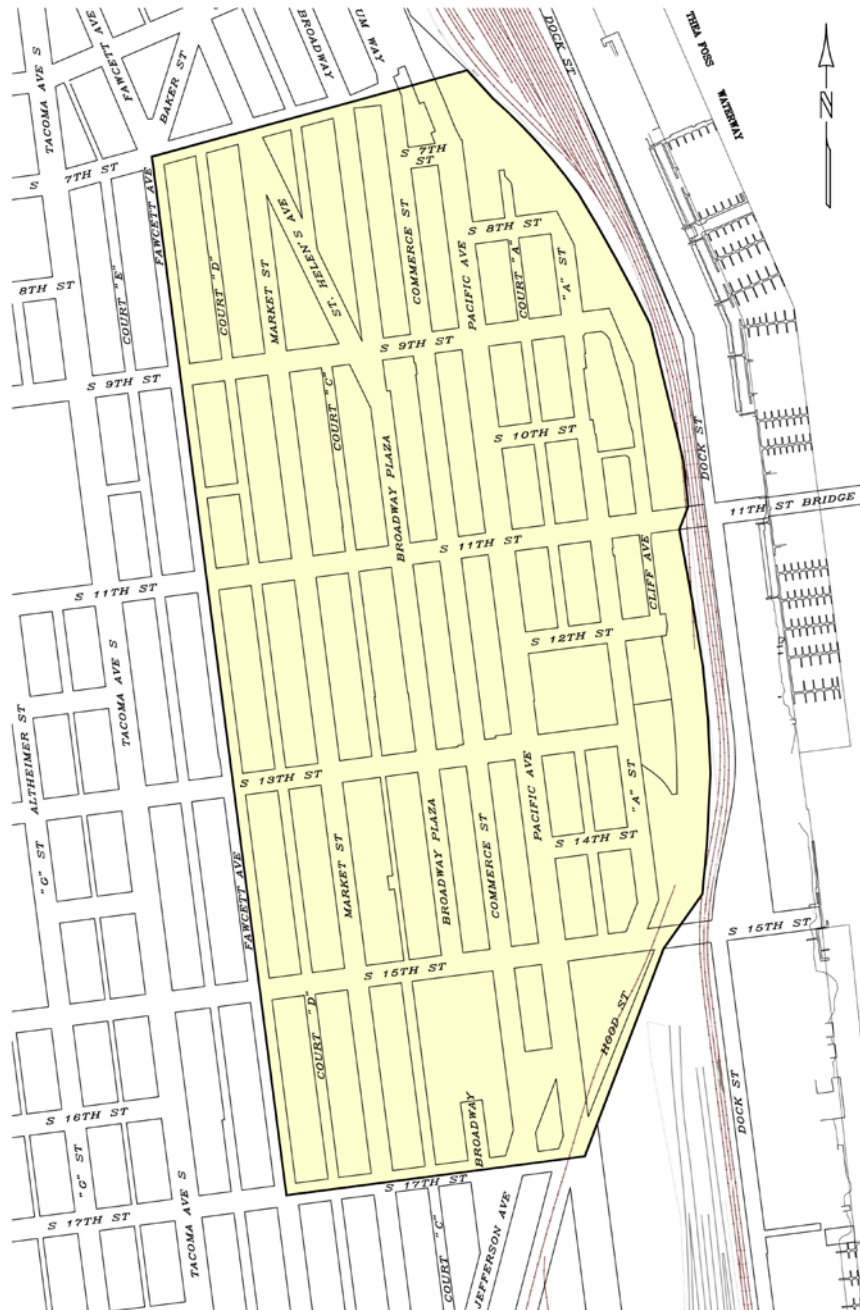
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Area of Availability

The figure below shows the approximate boundaries for providing service from the secondary network system.

Figure 1 Boundary diagram for network secondary service.





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Electrical Service Requirements

The information below describes the requirements for receiving service from the network secondary service. Customers must submit a set of electrical plans to the Tacoma Power electrical Inspection Office for three phase services of greater than 200A for plan review.

Service Panel Characteristics

The electrical service panel characteristics provided by the network secondary system are:

Item	Characteristic
Voltage	<ul style="list-style-type: none"> • 125/216 volts ONLY from the network • 120/208 & 277/480 volts are available in parts of the network area but are not supplied from the network system
Electrical Connection	Grounded Wye – 4 wire
<u>Panel Sizes</u> 2 phases & neutral 3 phases & neutral	100A and 200A 200A to 2400A
Limitations	<ul style="list-style-type: none"> • Tacoma Power may not always be able to readily accommodate panels in the 1600A to 2400A range. Each new service will be handled on an individual basis by the Tacoma Power Engineer. Necessary feeder upgrades may be required with lead times up to a year. • Electrical service panels that exceed 2400A are not served by the network secondary system. The Tacoma Power Engineer will design a separate power delivery system for panels sized over 2400A of service requirement.
Fault Duty	<ul style="list-style-type: none"> • 100A panels must have a brace rating of 40,000 A.I.C. • 200A panels must have a brace rating of 65,000 A.I.C. • 400A panels and larger must have a brace rating of 200,000 A.I.C.



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Electrical Service Requirements *(continued)*

Secondary Conductors Tacoma Power will furnish and install service conductor in customer-installed conduits from the network bus to the service panel at the customer's expense. Each secondary run or set of "phase & neutral" cables shall be installed in a separate conduit. The service conductor will be determined by panel size as indicated below:

Panel Size	Secondary Conductor
100A	#2 Cu, 600V, THHN, stranded
200A	250 kcmil Cu, 600V, (RHH-2)
400A to 2400A	350 kcmil Cu, 600V, (RHW-2)

Termination of Secondary Conductors Tacoma Power will terminate the secondary conductor at both the customer service panel and the secondary network bus where cable limiters are required. Customers are responsible to follow the manufacturer's recommendations for torquing and cable bracing.

Cable Limiters Tacoma Power will furnish and install cable limiters as required, at the customer's expense. On 100A and 200A customer panels, cable limiters are not required at the panel side. On 400A and larger services, they are required on **both** ends of each phase cable.

- Required Information for the Tacoma Power Engineer & Electrical Inspection Plan Review**
- Proposed panel size and A.I.C. rating
 - Confirm desired voltage
 - Connected load with panel schedule
 - Expected demand in kVA
 - Service address
 - Site plan with the electrical room location and dimensions noted
 - The date service energization is desired by the customer
 - For services greater than 200A, electrical drawings, stamped and signed by professional electrical engineer
 - Manufacturer's one-line diagram of service equipment
 - All information concerning plan review submitted to electrical plan review.

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Service Entrance Disconnect/Switchgear

Figure 2 Typical network service entrance switchgear configuration for 100A or 200A Service Panels

Typical Disconnect Configuration

DISCONNECT HEAVY DUTY
w/ REJECTION TYPE
CURRENT LIMITING FUSES

MANUAL BY-PASS
METER SOCKET

SERVICE PANEL w/
MAIN BREAKER

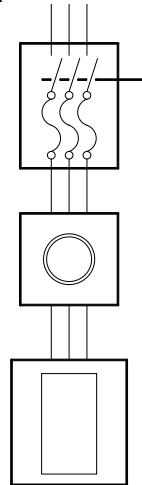
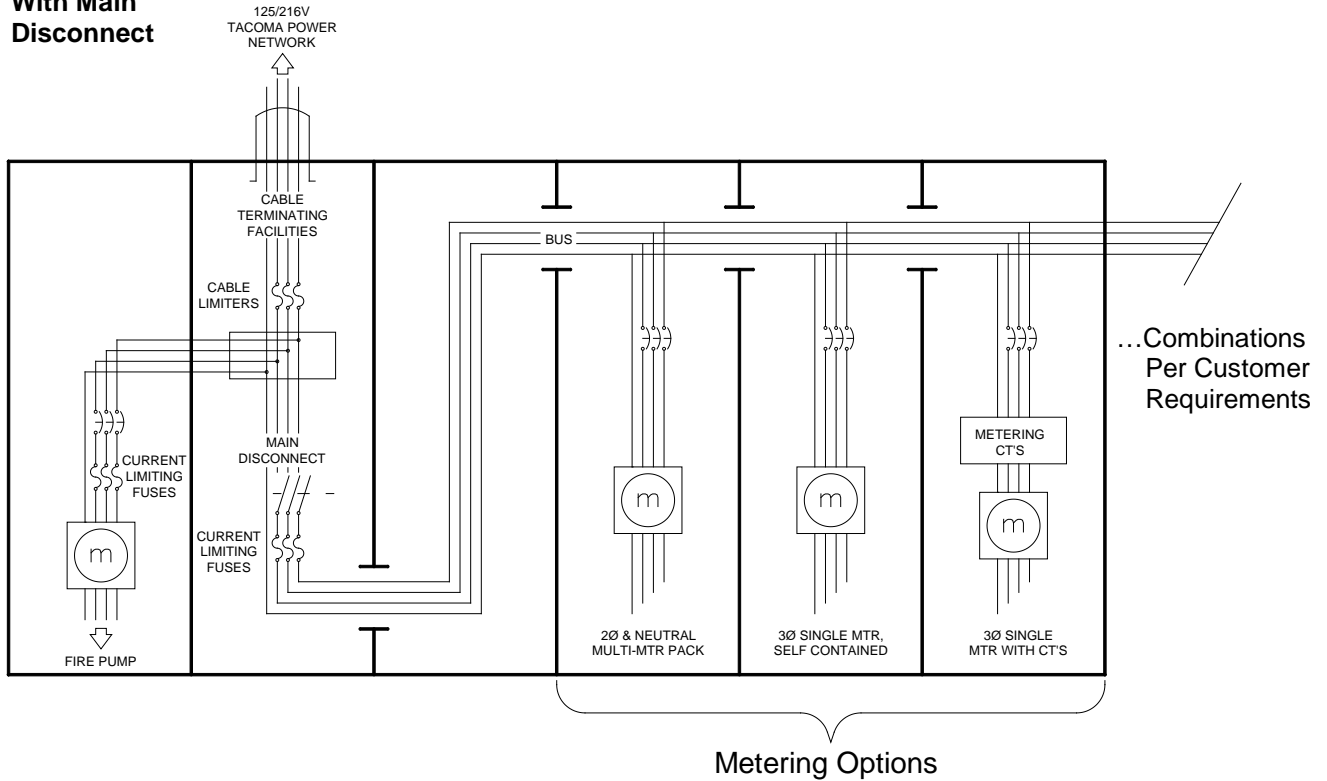


Figure 3 The figure below shows a typical network service entrance switchgear configuration for 400A to 2400A systems. All equipment must be fully rated or series rated.

Typical Switchgear Configuration, With Main Disconnect



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Service Entrance Disconnect/Switchgear *(continued)*

Disconnect (100A to 200A Panels) The main disconnect for 100A or 200A panels shall meet the following requirements for 2 phases and neutral or 3 phase/4-wire “Y” self-contained services:

Area	Requirements
Type	UL or other accredited testing laboratory as required by the NEC listed Heavy Duty Safety Switch with provisions for current limiting fuses, combination or a rated breaker.
Disconnects or Current Limiting Fuses	Current limiting fuses must be rated for expected RMS asymmetrical fault current. Note: use only rejection-type fuse holders
Breaker(s)	Series rated breaker per the NEC.

Switchgear (400A to 2400A Panels) The main switchgear for 400A to 2400A panels shall meet the following requirements for 3 phase/4-wire “Y” CT services

Area	Requirements
Submittal of Electrical Drawings	The manufacturer’s shop drawings of switchgear and electrical service equipment must be submitted for approval to the Tacoma Power Electrical Inspection Department during the Plan Review stage of the project.
Bracing Rating	200,000 AIC rated
Standards	The switch shall meet the NEC for high fault duty applications.
Meter & CT Enclosures	Manufacturer to supply service equipment elevation showing EUSERC drawings for utility meter section(s)
Main Panel Protection	Current limiting fuses rated for 200,000 RMS A.I.C. with disconnects or bolted-pressure contact switch
Cable Terminals	The phase and neutral cables shall terminate on a bus bar that are capable of accepting NEMA Style 2-hole terminals. The 2-hole terminal locations shall be spaced 2 inches apart.
Breaker(s)	Series rated breakers can be used on the load side of the current limiting fuses per the NEC.
Secondary Lashing	Service entrance cables must be lashed per the panel manufacturer’s recommendations.

Cable Pulling and Terminating Sections Adequate space for pulling and terminating cable shall meet EUSERC standards at the switchgear. The space shall be full front accessible with removable cover(s) that are sealable and have two lifting handles on each cover. A removable cover cannot be greater than 9 square feet in area.



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Service Entrance Conduit

The following describes the requirements for customer furnished and installed conduits that extend from the customer's service panel into Tacoma Power's secondary network vault.

Number & Type of Conduits

Conduit requirements are indicated in the table below:

Main Service Panel Size (Amp)	Number of Conduits	Type	Size (inch)
100	1	Steel or Sch 80 PVC	2-1/2
200	1	Steel or Sch 80 PVC	3
400	2	Steel	4
600	2	Steel	4
800	3	Steel	4
1000	4	Steel	4
1200	4	Steel	4
1600	6	Steel	4
2000	7	Steel	4
2400	9	Steel	4

Extension of Conduit

The customer shall extend the service conduit(s) into the Tacoma Power vault as described below. The following must be approved by Tacoma Power prior to construction

- route
- depth
- joints
- vault entry point of the conduit.

Customer Core Drilling of Tacoma Power Vaults

Core drilling into Tacoma Power's vault will be performed by the customer in accordance with the following:

- in the presence of a Tacoma Power representative
- drilling points as approved by Tacoma Power Engineer
- drill holes large enough for conduit nipples
- the customer shall permanently seal and grout around the conduit

Number Of Bends

The conduit run shall not have more than **270°** of total bends, for example, three 90° elbows.

Conduit Proofing

The completed conduit system shall be proven in the presence of a Tacoma Power Representative. The proving mandrel shall be supplied by Tacoma Power.

Pull Line

Each conduit shall have 1/8" pull line blown in and tied off at each end. One conduit shall have a pull tape included with printed footage markings.



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Metering

Metering facilities requirements are listed.

Location of Metering Facilities

All metering facilities are to be installed on the load side of the main disconnect due to the high available fault current from the network system.

Installation Responsibilities

The following table explains who will install and provide metering items:

Items	Provided by	Installed by
Meter socket and CT Enclosure	Customer	Customer
Current Transformers	Tacoma Power	Tacoma Power
Meter test switch	Tacoma Power	Tacoma Power
Revenue Meters	Tacoma Power	Tacoma Power
CT wiring	Tacoma Power	Tacoma Power

Customer Owned Generation

Connecting customer owned generation to network distribution systems is limited by Institute of Electrical and Electronics Engineers (IEEE) 1547.6. Tacoma Power's Central Business District Engineering must pre-approve all customer owned generation installations in the downtown area and at area hospitals. Approved customer owned generation installations may require the installation of net metering.