

CUSTOMER STATION REQUIREMENTS

Because of the size or configuration of your project, an on-site customer station will be needed to meet your power needs. Certain on-site improvements must be made to accommodate the electrical equipment that LADWP will install and maintain. *Maintenance of the station, and future replacement of equipment, must be carefully considered in the design of the station.* Periodic disconnection and consequent loss of power may be required. LADWP attempts to minimize such outage time, but the developer is encouraged to consider the impact of design decisions on the ultimate customer, the project resident. The location, orientation, and size of the station are important considerations.

LADWP will produce a "Station Requirements" drawing to be used by your contractor to construct the station foundation, structure, and any required enclosure. We provide "point and line" information only; you may need to consult a structural engineer. LADWP will also produce an "Equipment" drawing for internal LADWP use in equipment installation.

This document outlines the process and time line for design and installation of a typical customer station. Note that the time required to design the station, and purchase and install the equipment, varies for each individual case as explained below. The total time required may vary from 20 to 36 months, with a minimum of 5 months allocated for LADWP construction. Experience has shown that you should schedule completion of the station enclosure to occur 6 to 7 months prior to the agreed in-service date. If the time periods outlined cause project scheduling problems, please consult with us as soon as possible to develop a mutually agreeable schedule.

Please note that good communication, prompt submission of required information, and advance notification of any possible changes will help avoid delays.

Phase One: Submittal of Information

LADWP cannot begin preparation of design documents or schedule until the following information is received:

- 1) Service Planning Information Form (SPIF) – complete & signed
- 2) Electrical Room Layout and Switchboard Elevations with proposed access path and ventilation in accordance with [LADWP Codes and Specifications](#).
- 3) Plot plan detailing the following: (PDF and CAD files)
 - Legal description
 - Street names, address, and North Arrow.
 - Property line lengths with dimensions to the centerline of the street and nearest cross street
 - Square footage of proposed or existing building
 - Location and outline of proposed or existing buildings on site
 - Preferred metering equipment locations
 - Preferred transformer vault and/or pad locations
 - Location of all existing overhead utilities in the vicinity
 - Street improvement plan (new/existing driveway & curb)
- 4) Building floor plans.
- 5) Building elevations and sections.
- 6) Preliminary one-line diagram indicating:
 - Main bus size
 - Meter panels
 - Main switch size(s)
 - Requested service voltage(s)
- 7) Load schedule (lighting, receptacles, air conditioning, elevators, general power, motors, and size of largest motor all summarized in kilowatts and horsepower).
- 8) Building square footage and use.
- 9) Electrical Room Layout and Switchboard Elevations
- 10) Methane level assessment report.
- 11) Start of construction date.
- 12) Reasonable in-service date and construction schedule in line with time lines mentioned in paragraph three above

Hard copies of the above information should be mailed to:

Los Angeles Department of Water and Power
ATTN: Customer Station Design
2633 Artesian Street, Room 270
Los Angeles, CA 90031-1805

To expedite the preliminary design process building plans should also be submitted in an electronic format such as PDF and CAD formats via e-mail, CD, or DVD.

These items are required to determine the type, location, and physical and electrical size of the station, to ensure adequate access, and to plan routing of service conductors.

Notes on Voltages and Service Sizes:

The LADWP will supply only one voltage class of service to a customer's premises unless provided for the LADWP's operating convenience or where otherwise mutually agreed to by the LADWP and the customer in writing, and only under circumstances where there is no additional cost to LADWP.

LADWP will not be required to supply service in excess of 1500kVA at 240/120 volts or less or in excess of 3750kVA at 480/277 volts. When larger capacity is required, the load may be served at high voltage or two or more services may be installed at the same location.

For services in excess of 1500kVA, the service voltage must be 480Y/277 volts or higher. For services in excess of 3750kVA, the service voltage must be 4160Y/2400 volts or higher.

If the customer requests to be served at a lower voltage, and LADWP agrees to the request, the customer will pay for the additional installation cost.

LADWP will determine if the station will be served from the 4.8kV system (designated a "CS") or from the 34.5kV system (designated an "IS").

A "CS" would typically serve one of the following:

<u>Service Class</u>	<u>Ampacity Range</u>
120 / 240V 1 ϕ - 3W	0 - 3,000*
120 / 240V 3 ϕ - 4W	0 - 1,800
208Y / 120V 3 ϕ - 4W	0 - 2,000
480Y / 277V 3 ϕ - 4W	0 - 1,000

*Served through three 1,000 Ampere maximum switchboards

An "IS" would typically serve one of the following:

<u>Service Class</u>	<u>Ampacity Range</u>
208Y / 120V 3 ϕ - 4W	0 - 4,000
480Y / 277V 3 ϕ - 4W	0 - 5,000
2,400V 3 ϕ - 4W	0 - 2,000
4,160V 3 ϕ - 3W	0 - 1,200
4,800V 3 ϕ - 3W	0 - 1,000
34,500V 3 ϕ - 3W	0 - 600

In addition, the following information must be received before design documents can be finalized:

1. Final one-line diagram.
2. The location of all physical features in the customer station, such as columns, beams, and ventilation equipment that could affect station access or equipment placement.
3. Mechanical ventilation design for the customer station.
4. Elevations and sections relevant to the station and station access.

Phase Two: Preparation of Station Requirements Drawings

At this time, discussions may be held with you or your representatives to clarify and refine the station configuration.

After a station site is selected which satisfies both LADWP and your requirements, LADWP will begin the design of the station. It normally takes three to six months to design, draft, and transmit drawings to you, depending on the size and complexity of the installation. It is suggested that, at this time, you allow the maximum time for these activities. A more accurate schedule can be prepared after the station arrangement is finalized.

Phase Three: Preparation of Equipment Drawings and Purchase of Equipment

An "Equipment" drawing, for LADWP use in equipment installation, may be prepared after the requirement drawings, or concurrently to accelerate the overall process.

For standard equipment, four to six months may be required to complete the equipment drawings and procure the equipment. If non-standard equipment is required for your service, 12 to 18 months may be required.

Phase Four: Installation

Once the customer completes the construction as shown on the "Station Requirements" drawings, the station is inspected, approved, and accepted. Once the station has been accepted and all equipment is available, allow LADWP construction 5 months for installation.

Phase Five: Energization

The following must be completed before energization can be scheduled:

1. The LADWP inspection release of onsite construction.
2. The LADWP inspection release of metering equipment.
3. Final list of meter addresses which are to be served.
4. Payment of all outstanding charges.
5. The LADWP receipt of the LADBS release to energize equipment installed under their jurisdiction.
6. Application(s) for service on file with the LADWP Customer Service Section.

After these are completed, allow at least 5 to 10 days to energize the station.

Consult with your Customer Station Design Engineer for more station information, and refer to the LADWP Electric Service Requirements.

The requirements book is available on-line for download at <http://www.ladwp.com/codes>.

General Requirements for Indoor Stations

The following are general requirements for a typical indoor on-site station, for preliminary discussion. *Do not use these for final design or construction.* LADWP will provide a specific station requirements drawing for your project after the size and location of your station are determined.

The customer shall furnish and install:

- 1) A station enclosure:
 - a) All walls, ceiling and floor to be three hour fire rated (reinforced concrete or block)
 - b) Weatherproof and water tight (no permanent planters above)
 - c) Accessible 24 hours a day
 - d) No foreign pipes or ducts
 - e) Approved by LADWP
 - f) Sump
 - g) Cable trench with sectionalized cover
 - h) Equipment hatch or lockable equipment door and personnel door(s)
 - i) Approved sloping concrete floor
 - j) For equipment
 - i) Concrete inserts (typically "Unistrut")
 - ii) Beams and channels anchored in the floor, approved by a structural engineer
 - k) Ventilation system
 - l) Lighting
 - m) Convenience outlets
 - n) Ground System
 - i) 8' electrodes
 - ii) ground plates
 - iii) bare copper cable grid system
 - iv) connected to cold water piping or substitute grounding system as approved by LADWP
- 2) A permanent, approved, unobstructed access path to the station location capable of supporting a 125 ton crane to allow transformer change.
- 3) Conduits for high voltage cable (34.5kV or 4.8kV, as appropriate), pulling irons and pipe, and conduits, cable bus, or busway system for service conductors.
- 4) Approved switchboard, located adjacent to transformer station, and metering facilities.

If LADWP determines that the station is to be served from the 4.8kV system (a "CS"), specific requirements include:

- 1) Location at ground level or below (e.g. not on roof)
- 2) Minimum inside dimensions of 15' x 30' x 10' high, clear and unobstructed
- 3) 5' x 5' equipment hatch or 5' x 7' high equipment door
- 4) Minimum 12' wide DWP truck access path to equipment door or hatch
- 5) Minimum 15' high clearance over hatch and over a border 3' wide on all sides of hatch, plus room for crane operations
- 6) Two or more 3'x 7' personnel doors

If LADWP determines that the station will be served from the 34.5kV system (an "IS"), specific requirements include:

- 1) Location at ground level or below (e.g. not on roof)
- 2) Minimum inside dimensions of 25' x 50' x 18' high, clear and unobstructed
- 3) 14' x 14' equipment hatch or 14' x 14' high equipment door
- 4) Minimum 20' wide DWP crane access path to equipment door or hatch
- 5) Unlimited height clearance over hatch and over a border 3' wide on all sides of hatch, plus room for crane operations
- 6) Two or more 3'x 7' personnel doors
- 7) 40' x 40' crane staging area adjacent to the equipment door or hatch

General Requirements for Outdoor Stations

The following are general requirements for a typical outdoor on-site station, for preliminary discussion. *Do not use these for final design or construction.* LADWP will provide a specific station requirements drawing for your project after the size and location of your station are determined.

For stations served from the underground 34.5kV system, refer to the requirements for indoor stations, and consult your Customer Station Engineer for further information.

For outdoor stations served from the 34.5kV overhead system, or from the 4.8kV system, the customer shall furnish and install:

- 1) A ground level station enclosure:
 - a) Fenced:
 - i) Concrete, masonry, or 9 gauge 2" square galvanized chain link
 - ii) Removable section
 - iii) Two or more lockable personnel gates
 - b) 6" high curb
 - c) Pipe barrier posts (bollards)
 - d) Accessible 24 hours a day
 - e) No foreign pipes or ducts
 - f) Approved by LADWP
 - g) If the enclosure adjoins a building:
 - i) Building wall shall:
 - (1) Be three hour fire resistant
 - (2) Have no openings located within 10' radially from enclosure
 - ii) Provide a protective fence on the adjoining roof or parapet
 - h) Cable trench with sectionalized cover
 - i) Approved sloping concrete pad(s) for transformer(s) and switchgear
 - j) Area around pad(s):
 - i) Treated with soil sterilizer
 - ii) Filled with commercial gravel no. 2
 - k) For equipment
 - i) Concrete inserts (typically "Unistrut")
 - ii) Beams and channels anchored in the floor, approved by a structural engineer
 - l) Lighting
 - m) Convenience outlets
 - n) Ground System
 - i) 8' electrodes
 - ii) ground plates
 - iii) bare copper cable grid system
 - iv) connected to cold water piping or substitute grounding system as approved by LADWP
- 2) A permanent, approved, unobstructed access path capable of supporting a 125 ton crane to allow transformer change.
- 3) Conduits for high voltage cable (34.5kV or 4.8kV, as appropriate), pulling irons and pipe, and conduits, cable bus, or busway system for service conductors.
- 4) Approved switchboard and metering facilities, located adjacent to transformer station.

If LADWP determines that the station is to be served from the 4.8kV system, (a "CS") specific requirements include:

- 1) Minimum inside dimensions of 15' x 30', clear and unobstructed
- 2) Minimum 10' high fence
- 3) Two or more 3' x 7' personnel doors
- 4) Minimum 12' wide LADWP truck access path to enclosure

If LADWP determines that the station will be served from the 34.5kV system, (an "IS") specific requirements include:

- 1) Minimum inside dimensions
 - a) Primary direct from pole: 20' x 30', no cover
 - b) Primary from pole and underground to station: 20' x 30'
- 2) Fence or block enclosure:
 - a) If open top: minimum 10' high
 - b) If covered: minimum varies, 17' to 25'
- 3) Two 3' x 7' personnel doors
- 4) Minimum 20' wide LADWP crane access path to enclosure
- 5) 40' x 40' crane staging area adjacent to the station

Consult with your Customer Station Design Engineer for more station information, and refer to the LADWP Electric Service Requirements.

The requirements book is available on-line for download at <http://www.ladwp.com/codes>.

CHARGES

Your Customer Station Design Engineer will be able to calculate applicable charges as more information becomes available.

Customer shall pay to LADWP, in advance, the cost of dedicated onsite transformer, and total cost to install. Ownership will remain with LADWP. If customer demand exceeds fifty percent of rated transformer capacity for 48 of first 60 months following installation, customer payment may be returned in full.

When a transformer installation other than a standard installation is requested by the customer, or required as a result of the customer's construction, the customer shall pay LADWP the estimated cost difference. This cost is non-refundable.

Additional charges may result from the following:

- Conduit and cable
- Design changes, other than minor changes, due to relocation or for customer convenience, requested or initiated by the customer during the progress of the design, which require additional engineering and/or drafting. LADWP will proceed with the changes after receipt of full payment. Changes will require rescheduling.
- Repetitive engineering and drafting, and installation, labor, and material resulting from design changes.
- If the customer cancels or substantially reduces the scope of a project during or after completion of design. Should the customer reactivate a project or reduced portion, and LADWP determines that the original design can be used with no more than minor modifications, a refund will be given after the project is energized.
- Special requests made by the customer, such as the installation of an automatic transfer system, installation of a non-standard transformer, or interconnection of a Co-Generation system.

Excerpts from the Rules Governing Water and Electric Service:

The Department will exercise due diligence to complete within a reasonable time the installation of facilities, supplying of service, or making of repairs or improvements, giving due regard to the customer's needs and capacity required. However, periodic outages are required to service, maintain, and calibrate both Department circuit breakers, disconnect switches, insulators, transformers and customer-owned circuit breakers, fused disconnect switches, and associated equipment. If the customer, whether commercial, industrial, or residential, must have a continuous service, then such customer shall provide motor generators or other such standby equipment as may be necessary to maintain service while both the Department and/or the customer facilities are serviced, maintained, and calibrated.

Transformer Installations on Customer's Premises

- a. The Department may, at its sole discretion, supply electric service by means of transformer racks, vaults, or other stations on the Customer's Premises. Customer shall pay to the Department, in advance, the cost of dedicated onsite transformer, and total cost to install. Ownership will remain with the Department. If customer demand exceeds fifty percent of rated transformer capacity for 48 of first 60 months following installation, Customer payment may be returned in full.
- b. When the Department requires transformers to be located on the Customer's Premises, the Customer shall provide adequate space to the Department's specifications for the electrical equipment, and shall provide at all times ingress to and egress from the electrical equipment locations. At the Department's sole discretion, the transformer installations may consist of one or more of the following:
 - 1) Pole-top transformer installation: When supplied from the overhead distribution system, a pole or pole rack shall be furnished, installed, and maintained by the Department at the Customer's expense.
 - (2) Padmount transformer installation: The Customer shall purchase, furnish, install, and maintain, at the Customer's expense, approved concrete pads or other slab-boxes.
 - (3) Underground vault transformer installation: The Customer shall purchase, furnish, install, and maintain, at the Customer's expense, approved concrete vaults.
 - (4) Indoor transformer installation: The Customer shall purchase, furnish, install, and maintain, at the Customer's expense, indoor transformer rooms, per the Department's specifications.
 - (5) Outdoor transformer installation: The Customer shall purchase, furnish, install, and maintain, at the Customer's expense, fenced concrete slabs, per the Department's specifications.

Except where otherwise specified by the Department, a pole-type transformer installation or a padmount transformer installation shall be the standard Department installation. Where a transformer installation other than a standard installation is requested by the customer, or required as a result of the customer's construction, the customer shall pay the Department in advance the estimated cost of added facilities exceeding an equivalent standard installation.

Premises: Integrated land area including the improvements thereon, undivided by public thoroughfares or railroads and where all parts of the Premises are operated under the same management and for the same purpose. Indications of "Same Management" include, but are not limited to, common access, parking, lighting, landscaping, and combined maintenance of common areas. A single Premises may consist of several lots, properties and/or joint/multiple owners and/or several businesses.

VENTILATION REQUIREMENTS

The customer shall provide an independent forced air ventilating system that will deliver _____ cubic feet per minute (CFM) of clean, filtered, outside air to the station in accordance with the following design criteria:

- A. A continuous, independent duct shall provide outside air to the blower motor and then continue from the blower motor to the station without any breaks to the duct.
- B. The filter shall be 2-inch, Farr model 30/30 or equivalent, ASHRAE test standard 52-76, 25% efficiency, 90% arrestance and equipped with an audible alarm so located that it will alert building personnel when filter replacement is necessary.
- C. The atmospheric pressure inside the station shall not exceed 1/2" water gauge.
- D. A direct-coupled or multiple belt-driven blower shall be located outside the station.
- E. A cooling type, externally adjustable, wall-mounted thermostat, equivalent to Honeywell model T651A, having a range of 70 degrees F to 90 degrees F, and an operating differential of 3 degrees F shall be set to start the blower when the temperature rises above 80 degrees F.
- F. Provide a heat alarm system with a wall-mounted thermostat, equivalent to Honeywell model T675A-1458, having a range of 55 degrees F to 175 degrees F. Set to activate an audible alarm when the temperature rises above 120 degrees F. The alarm shall be so located that it will alert building personnel to advise DWP of the high temperature.
- G. An air inlet (with a structurally supported duct) shall be provided in the station to direct the air as shown on the drawing. The registers shall be equipped with adjustable vertical and horizontal louvers.
- H. An (structurally supported) air outlet shall be provided as shown on the drawing. The air outlet from the station shall be thru a continuous, independent duct to the outside without any breaks to the duct.

Both inlet and outlet shall be equipped with self-closing 3-hour fire protection assemblies, held open by fusible links, at each station penetration. Smoke or combination smoke/fire dampers are not acceptable. The fire protection assemblies shall be accessible thru large hinged inspection doors located immediately (inside) outside the station for (both) the inlet and (inside) outside for the outlet. The 3-hour rated assemblies shall have a label from a nationally recognized testing laboratory or a variance from the L.A. Dept. of Bldg. and Safety. Both the inlet and outlet shall terminate outdoors at least 10-ft from each other and from any other inlets and outlets, and from all other openings, including operable and non-operable windows, unless otherwise agreed to in advance. They shall also be at least 10-ft from any other adjacent structures or property lines and the bottom of the inlet and outlet shall be at least 10-ft above the adjacent grade level. Roof top terminations shall be such that the bottom of the outlet is at least 3-ft above the roof surface and with a 6" x 6" curb around the roof penetration. Any necessary ventilation duct shall be of fire-resistant material and shall not open into any other ventilating system or plenum. All duct openings shall be screened with 1/2" square mesh galvanized heavy hardware wire cloth, and openings to outdoors shall be weatherproof and shall be provided with means to prevent entrance of rain.

- J. The ventilation system shall be tested and approved by the DWP engineer before permanent service is provided. If the ventilation system is inoperable after the station is energized, the station shall be de-energized until the ventilation system is made operable. Costs for additional inspection and re-energizing of the station will be charged to the customer.
- K. Variances on any items associated with this station, which must meet both DWP and building and safety requirements, must be submitted for approval to both DWP and building and safety prior to construction.