



ESR Supplement

Subdivision Construction Guide

December 2025



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Preface

About this Guide

PGE's electric service requirements are designed to provide customers with electric service in a safe, affordable, and reliable manner over the life of the service. The Subdivision Construction Guide (Guide) is intended to help customers in designing and constructing subdivisions within Portland General Electric's (PGE) service territory. The information in this Guide supplements PGE's [Electrical Service Requirements \(ESR\)](#) book.

This edition replaces all earlier editions. All new and updated content in this book is highlighted in gray, just like this paragraph. If changes have been made to a figure, the figure's caption is highlighted.

Individual figures or pages do not represent the complete requirements for service and should not be used out of context. This book may require different electrical equipment specifications than those previously accepted in PGE service areas. We highly recommend consulting PGE to resolve any questions concerning the requirements in this Guide.

IMPORTANT: Do not use figures in this book as construction plans. The text that accompanies a figure often contains important information not contained in the drawing. Additionally, customers must reference an approved job sketch for site-specific requirements.

Major changes in this edition include:

- The addition of a generic subdivision trench detail.
- Inclusion of information on temporary easements.

Remember, construction lead times vary. Contact PGE early in your design process by submitting a request for service in [PowerPartner](#).

Accuracy of Information and Conflicting Requirements

The Subdivision Guide is updated on a biannual basis and, if the need arises, PGE may update it out-of-cycle. The information in the *ESR* book is subject to change without notice. The online version always contains the most current and definitive information. Customers must ensure they have the current edition.

Requirements are intended to comply with all governing codes, ordinances, and tariffs, but they may change if any of those codes, ordinances, and tariffs change. If information in this book conflicts with a code, ordinance, or tariff, the requirement(s) of the code, ordinance, or tariff take precedence.

PGE Contact Information

Phone Numbers

Contact	Phone Number		
	Toll-Free	Local	Fax
Service Coordination To open a new request for service or schedule a final inspection	800-542-8818	503-323-6700	503-612-3501 971-253-2272
Customer Service To request billing and payment information for existing accounts	800-542-8818	503-228-6322	—
Tree Hotline	800-544-1794	503-736-5460	—
Oregon Utility Notification Center To locate underground utility cables	8-1-1 or 800-332-2344	503-246-6699	—
Outages and Emergencies, 24 hours To report a power outage	800-544-1795	503-464-7777	—
Light Out (streetlights) To report a streetlight problem	800-544-1795	503-612-4685 503-399-7717 (Salem)	—
Energy Theft Hotline To report an energy theft	800-962-8184	—	—
Interconnection Team To obtain information on customer-owned solar and wind systems, and batteries	—	503-464-8100	—

Email Addresses

Contact	Email Address
Service Coordination	service.coordinators@pgn.com
Tree Hotline	trees@pgn.com
Light Out (streetlights)	LightOut@pgn.com

PGE Teams Assisting in the Design Phase

The following teams need to receive your application materials at the start of a project.

Team	Key Words	Role
Design Project Manager (DPM) Provided after submission of a service request in PowerPartner .	Project Manager	<ul style="list-style-type: none"> Coordinates PGE's review of a service request. Sends final gear approval. Designs the service, including selecting the type of transformation, size of the transformer, and conduit pathway. Reviews and approves/rejects proposed locations for transformers. Provides the customer with an approved job sketch (aka Design)
Lighting Design Project Manager To contact a Streetlights DPM, contact the Service Coordination team at 503-323-6700.	Lighting DPM	<ul style="list-style-type: none"> Designs new/upgraded streetlights in parallel with the customer's service design, if required by the municipality. Designs area lighting services.
Interconnection Coordinators (Solar, Wind, Battery, etc.) To contact the Interconnection team, call 503-464-8100.	Renewable Lead	<ul style="list-style-type: none"> Receives interconnection applications. Coordinates the technical review of solar, wind, and other qualifying renewables. For approved interconnections, requests final PGE inspection and meter installation. Coordinates review of batteries and requests for parallel generation.
Fleet Partner Product Specialist To contact the Fleet Partner team, email fleetpartner@portlandgeneral.com .	EV Charging	<ul style="list-style-type: none"> Receives fleet electrification applications. Coordinates the technical review of fleet electrification.
Meter Gear Engineers	Gear Review	<ul style="list-style-type: none"> Reviews all gears 400 A and greater. Discusses gear requirements with electricians.

PGE Teams Assisting with the Construction and Inspection Phases of a Subdivision

The following teams may assist the DPM in reviewing your application materials and site.

Team	Project Phase(s)	Role
Field Construction Coordinator	Pre-Design, Design, Pre-Construction, and Inspection Phases	<ul style="list-style-type: none"> Facilitates the pre-construction meeting with the customer's civil contractor(s) installing the vault and conduit infrastructure for underground services. Conducts necessary trench and conduit inspections for services 400 A and greater. Supports streetlight improvement plans.
Construction Project Manager (CPM)	Permits and Construction & Inspection Phases	<ul style="list-style-type: none"> Facilitates project coordination after PGE's approved job sketch has been issued.
Service Inspector To schedule an inspection, contact the Service Coordination team 503-323-6700.	Inspection Phase - Final Inspector	<ul style="list-style-type: none"> Conducts final inspections for all services: residential, commercial, mixed-use, and medium voltage. Installs riser brackets on PGE poles. Drops off the bottom portion of PGE lockboxes.
Metermen	Inspection and Construction Phase	<ul style="list-style-type: none"> Installs Current Transformer and meters greater than 320 A. When customers rewire or upgrade existing services, reviews the service to ensure it meets current PGE requirements. Installs meters for solar, wind, and other renewables.
Crews	Construction Phase	<ul style="list-style-type: none"> Builds and energizes the service!

Chapter 1 Scope

This Subdivision Guide is intended to support a partnership between subdivision customers, their project team, and Portland General Electric (PGE). Creating a partnership at the beginning of a project aids in successful and timely delivery of the backbone of subdivisions.

This Guide supplements information available in PGE's [Electrical Service Requirements \(ESR\)](#) book. This Guide provides process specific information for each project phase:

- Design Phase,
- Pre-construction Phase,
- Construction Phase,
- Inspections, and
- Streetlights.

We strongly recommend that the customer consult PGE to resolve any questions concerning the requirements in this book. Project-specific drawings (Job Sketch) and arrangements with PGE may supersede the information contained in this Guide.

Do not use figures and/or text in this Guide as construction plans by themselves. An approved job sketch is required for site-specific requirements.

Chapter 2 Design Phase

2.1 Information Requirements for a Subdivision

Unless otherwise noted, subdivisions are designed for a single-family residence, one 200-amp service per tax lot. Equipment must be located in the public utility easement (PUE) or on private property. Information about Electric Vehicles (EVs) must be provided at the start of the project, if available, as they add significant load.

Temporary Service: The builder's temporary construction service can be provided in the following ways:

1. Pedestal Gold Temporary Service—Used on PF300 pedestals. These are supplied by PGE and installed by the customer.
2. Driven Post Gold Temporary Service at Stub—A Gold Temporary service on the metal standpipe inserted into 2-inch conduit and stubbed up at the elbow provided within 20 feet from any secondary junction box or transformer.
3. Secondary Handhole (aka 1730 vault, Carson box) Gold Temporary Service—A Gold Temporary service built right onto the lid of a 1730 Vault. Customers purchase and install the 1730 vaults.

Creating a New Project: To initiate PGE's design process for a subdivision, submit a request for service in [PowerPartner](https://portlandgeneral.force.com/powerpartner/s/login/) (<https://portlandgeneral.force.com/powerpartner/s/login/>) or by calling 503-323-6700. All the information requested in [PowerPartner](#) is required before PGE will design the primary and secondary systems. Be prepared to provide the following:

- Temporary Power Information: Type, Service Size, Voltage, and Phase. Please provide the General Contractor requirements for a construction trailer power.
- Type of Dwelling with the square footage and number of homes/units. For manufactured home parks, the type of lot and quantity.
- Project phases and estimated start date for each phase, if relevant.
- Request for meters for pools, lights, irrigation, or other shared services.
- Number and type of EV chargers requested.
- Lighting plans, with the option (A, B, or C) required by the municipality.
- Whether PGE equipment or power lines are adjacent to or within 15 feet of the property.
- Requirements and timing for the removal/relocation of existing PGE facilities on public right of way or private property.
- A basic site plan is required at the initial stage of a service request.
- Other information may be required.

For reference purposes, see the *Request for Multifamily Service* form in [Appendix A](#).

Starting the Design Phase for a New Project: A PGE Design Project Manager will be assigned to your project within five business days. They will need the following:

- The customer's preference for temporary service.
- The status of the jurisdictional land use and plan review submittal process as well as the tentative construction schedule.
- The projects computer-aided drafting (CAD) files with civil engineering drawings of the site plan and profile with the footprint of the land base, and preferred locations of electric equipment. See CAD File Requirements below.
- Other information may be required.

The design process will be delayed if the information submitted to PGE is incomplete or inaccurate.

2.2 CAD File Requirements

PGE requires CAD files with civil engineering drawings of the site plan and profile with the footprint of the land base, and preferred locations of electric equipment. PGE accepts AutoCAD 2018 or later. Updates to these files are requested at milestones in the project.

Make sure your data meets these requirements:

- PGE will use your files in the original survey coordinate system or datum; specify this on the drawing. If survey control points are unavailable in CAD format, PGE software will accept these points in text or Excel file format.
- If you use nonstandard file and layer naming conventions, provide guidelines for reference.
- If your data contains attachments—such as aerial imagery—either provide the attachments or delete the files from your reference before submittal.
- Manufacturer specifications must be submitted separately, not in the drawing package.
- For road construction projects, specify the datum of the file sent. PGE uses North Oregon State Plane (NAD83, international ft.). Provide the conversion factor if there is a local datum plane (LDP).

Include the same layers in the CAD files as shown on the site plan and profile hard copy. The minimum layers needed are as follows:

- Street Improvement/Frontage Plan, if applicable. Provide the existing and future street right of way, as well as existing pole/anchor locations as applicable, and the locations of existing electrical equipment relative to the new right of way improvements with annotations showing relocation, if applicable.
- Site Plans with lot lines, lot numbers, street names, building footprints, easements, driveway cuts, and survey control points.
- Civil Plans with street plans, grade, sidewalk, parking, and curbing details. Providing some information can help to avoid long service runs to meters or costly secondary pedestal or junction box relocations.
- Demo Plan as applicable, or a plan showing the remaining home to be fed from the new subdivision.

- Street Lighting Plan and Area Lighting Plan.
- Utility Plan showing wet utilities, hydrant locations, PUEs, stationing existing electrical facility locations, and street cross-sections.
- Landscaping Plan as applicable showing any trees or foliage to be saved and the placement of proposed irrigation systems.
- Electrical plans. For common-wall buildings or row homes, we request that you consult your electrician and determine the following:
 - If meters are to be banked in multiples
 - Location of the meter banks
 - Total number of meters at each bank
 - Individual amperage rating per meter
 - Total maximum rated amperage of the meter bank
- PGE's point of termination on row homes, townhomes, and condos with banked meters are at the main termination lug in those banks (see [ESR](#), Table 4, Meter Socket Requirements by Service Type and Gear Rating). These terminations are only appropriate when the building structure is commonly owned (usually apartments and condos). It is NOT appropriate for townhome and row home situations where each unit is individually platted and owned by an individual property owner. In those situations, separate meters must be set on each unit.
- Stationing Existing electrical facility locations.

Submitting CAD Files - Submit your files via email. Zipped files are acceptable, but executable (*.exe) files are not. Contact your PGE Project Manager for approved file transfer methods if your files are too large to transfer using e-mail.

Occasionally, PGE may request a hard copy of the full set of drawings, along with a cover letter. If requested, send the drawing to the appropriate PGE Regional Operation Center:

- Gresham 1705 E Burnside Street, Gresham, 97030
- Portland 3700 SE 17th Avenue, Portland, 97202
- Southern 4245 Kale Street, Salem, 97305
- Western 2213 SW 153rd Drive, Beaverton, 97003

2.2.1 UPDATES TO YOUR DRAWING PACKAGE


PGE must easily see what has changed in your drawing package. If you send a file that is 90% complete and later send a file that is 93% complete, it is critical that you let PGE know what changed in the second file.

- In your email, itemize all data that has changed.
- In the drawing, indicate revisions using the cloud method or place revision numbers next to affected portions of the drawing.

IMPORTANT: Non-itemized changes may result in inaccurate reviews or gear approval which, upon discovery, may require re-review and different gear at your expense.

2.3 Review and Acceptance of PGE Design (Job Sketch)

The PGE electrical design process depends on the customer first submitting all required documents. Once all required documents have been received, the following process occurs:

1. PGE will create a job sketch.
2. The customer will receive a preliminary job sketch. Review it promptly to see if there are any problems. If no problems exist, accept the job sketch and consent for PGE to develop a cost estimate.
3. PGE then provides the customer with a line extension cost agreement (LECA) and construction costs.
4. The customer signs the LECA and provide any necessary payments to PGE.
-  5. Until the LECA and payments are received, the job is "on hold" for obtaining permits and any special-order equipment or materials.
6. The LECA expires after six months. After this period, the LECA, job sketch, and construction cost must be reviewed by PGE (and revised if necessary) before moving to the pre-construction stage.

IMPORTANT: After the design has gone through PGE's approval process, if plans change (including landscaping), additional load is disclosed (like EVs or ADUs), or the LECA expires, PGE will need to review the LECA, job sketch, and construction costs (and revise them if necessary) before moving to the pre-construction stage. A redesign fee will be applied at the time of review, as well as updated construction costs.



Chapter 3 Pre-construction Phase

3.1 Pre-Construction Meeting

Once an approved job sketch is issued and before any construction begins, you must schedule a pre-construction meeting with a PGE Field Construction Coordinator (FCC) at the construction site. The civil contractor(s) used to install the vault and conduit infrastructure must be present at this meeting. During the meeting, you, the FCC, and the contractor(s) will walk through the design to uncover potential problems before construction.

A copy of the Pre-Construction Meeting Guide is available in [Figure 2](#). The Guide lists common discussion points covered in the pre-construction meeting.

PGE's inspection process starts with initial infrastructure inspections and continues to the final service and metering inspections. Frequent communication with the PGE DPM or FCC ensures a smoother project.

IMPORTANT: To avoid delays or unforeseen complications, all changes in the design must be addressed with the DPM or FCC before proceeding with construction.

3.2 Basic Requirements

Customer Responsibilities: Trenching, backfilling, compaction, the installation of conduit and conduit markers, transformer pads or vaults, ground rods, and any other construction requirements for the completion of underground service.

PGE Responsibilities:

- PGE will provide a job sketch after all required information has been submitted.
- PGE will inspect the trench and conduit pathway, review switchgear 401 amps and greater, and provide a final inspection.
- In most cases, PGE will install, maintain, and own the underground service line from the PGE distribution line or transformer in the customer-installed conduit to the point of delivery. See [ESR](#), Section 6.3, Conduit.
- Once PGE's service is energized, PGE will own and maintain the trench and conduit pathway for secondary services.

Location: For equipment (such as a transformer or vault), space must be provided for that equipment within the public utility easement (PUE) or on private property with a PGE easement.

Trenching: For all trenching and transformer installations, any requirements of governmental authorities must be met—including excavation permits—as well as those of PGE. See [ESR](#), Section 6.2, Trenches Provided by the Customer.

Backfill: To avoid damage to underground conductors and service equipment caused by soil settling, all service conduit riser elbows must be backfilled at least 4 inches deep with tamped 3/4-inch minus crushed rock.

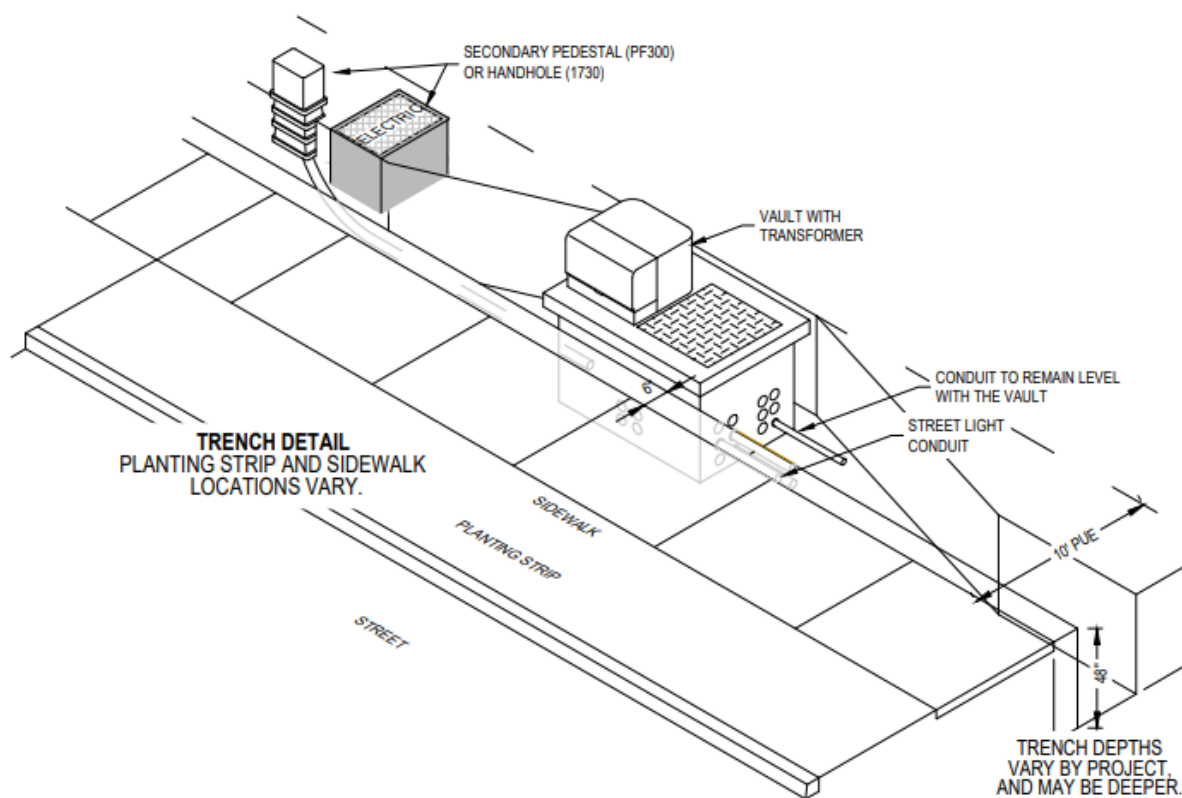
Materials Provided by PGE:

- Conduit markers, ground rods, and secondary pedestals (PF300s) can be picked up at a PGE storeroom by providing a job number.
- PGE Service Inspectors install standoff brackets. See ESR, Section 6.3.3 Standoff Brackets. To request the installation of a standoff bracket on a pole, contact the PGE Service Coordination team.

Conduit: All primary and secondary cables must be in conduit. If the service conduit riser extends vertically through a paved or concrete surface adjacent to the service entrance, a sleeve is required around the conduit to prevent it from direct contact with the pavement. See ESR, Section 6.3, Conduit, for complete requirements.

Pads/Vaults: See Section 3.4 in this Guide, your approved job sketch, and ESR, Section 6.4, Concrete Pads and Vaults for a Pad-Mounted Transformer.

Barrier Posts: Install barrier posts (bollards) around all electrical equipment (such as transformers, switchboards, CT cabinets, or sectionalizing cabinets) in areas where that equipment is exposed to vehicle traffic. See ESR, Section 5.6.8, Barrier Posts.

**CONSTRUCTION NOTES:**

1. INSTALL HANDHOLES ON PROPERTY LINES WITHIN THE UTILITY EASEMENT AND AT FINAL GRADE. ALTERNATE LOCATIONS MUST BE APPROVED BY PGE.
2. PGE INSPECTION AND ACCEPTANCE OF HANDHOLE WILL BE BASED ON INSTALLATION, LOCATION, AND FUNCTIONALITY SET BY THE CUSTOMER.
3. INSTALL CONDUIT AT DEPTHS NECESSARY TO ENTER ALL VAULTS, PADS, AND EQUIPMENT AS DETERMINED BY PGE.

Figure 1. Generic Subdivision Trench Detail (STD-D-3221)

3.3 Permits, Rights of Way, and Easements

The customer is responsible – without cost to PGE – for all permits and easements required for the installation and maintenance of the electrical facilities that serve the customer.

On private property, an easement is required for the placement of electrical facilities. These include poles, guy wires, anchors, overhead and underground lines, transformers, vaults, junction boxes, and pedestals.

Any electrical infrastructure that cannot be completely contained on private property will require review and permitting by the appropriate local governing jurisdiction. Permits may also be required if the electrical facilities cross property, railroad tracks, ODOT-managed highways, waterways, parks, or state/federal lands. The PGE DPM will assist in coordinating required permits but has no control over jurisdictional responses and timelines or conditions.

3.3.1 TEMPORARY EASEMENT

If plats are not recorded at the time PGE needs to install equipment, PGE will need a temporary easement.

3.3.2 PGE STREET-OPERATING PERMIT (A.K.A. RIGHT-OF-WAY PERMIT)

Only PGE-approved excavation contractors are allowed to work under a PGE street-operating permit. Contact your PGE Design Project Manager to verify excavator requirements and confirm that your excavator is approved at the time of excavation.

These steps are required when operating under a PGE street-operating permit:

1. PGE will acquire the permit and provide a copy to the contractor.
2. The contractor must notify the local jurisdiction before work begins according to the permit terms and conditions. Jurisdictions within the PGE service territory have varied requirements regarding the advance time needed to provide the notification.
3. A hard copy of the permit must be on-site at all times during construction.
4. PGE must inspect all PGE trenches, conduits, and vaults before backfilling.
5. Upon completion, the contractor must submit a post-construction notification to the jurisdiction.

3.3.3 TRANSMISSION LINES

Consult with PGE in the pre-design phase regarding additional clearance requirements for work under transmission lines and/or subdivisions located near transmission lines.



Jobs requiring transmission pole relocations will require significantly longer lead times.

3.3.4 PUBLIC UTILITY EASEMENTS

PGE needs 10 feet for front-of-lot installations. In addition, a private easement may be needed for PGE equipment if there is not enough room in the public utility easement (PUE). If a jurisdiction restricts the ability to attain the minimum 8-foot PUE, contact the PGE DPM to determine an alternative design or obtain a private easement for the areas with a reduced PUE.

PGE equipment (such as transformers, vaults, junction boxes, and pedestals) must be in the PUE or PGE easement unless an agreement with PGE has been made for another location due to space or other constraints. Since PGE line crews and vehicles need 24-hour access, the preferred location for equipment is front-of-lot next to a public street. Backlot locations are **not** allowed.

You will have a chance to review the design during the Review and Acceptance of the PGE Design stage described in section [1.3](#) of this Guide. Contact the DPM if there are any questions or concerns.

3.4 Codes and Ordinances

The design and construction of new or remodeled installations must conform to PGE requirements and applicable provisions of the following: National Electric Code (NEC), National Electrical Safety Code (NESC), Oregon Electrical Specialty Code (OESC), state rules and regulations, city and county ordinances and codes, and Occupational Safety and Health Administration (OSHA) rules (during construction and maintenance).



PERMITS:

Some points of emphasis:

-

Any contractors they hire who will be working under PGE's permit in the ROW must be preapproved by PGE to do so. Preapproval entails having insurances and bonding confirmed by PGE CS&I department prior to commencing work as well as being authorized to perform the scope of work.

Sketch review with PGE, customers, and contractors is vital to clearly understand everyone's responsibilities for the project. In addition to PGE installation instructions, the sketch also outlines specific requirements for how to install items that are customer responsibility.

PGE's inspection process starts from initial infrastructure inspections through final service and metering inspections. Timelines need to be considered for both the inspections and line crew for construction.

Keeping lines of communication open ensures a smoother project. Contact PGE with any and all questions. Significant changes in the design must be addressed with the project manager before proceeding to avoid delays or unforeseen complications.

Access to the work site is critical when the line crew arrives. If the site is not accessible, the job will likely be delayed.

Service Coordination

503-323-6700 Email: service coordinators@pgn.com

[illegible]

Figure 2. Pre-construction Meeting Guide Form

Chapter 4 Trench, Conduit, and Vault Construction Requirements

PGE has selected key sections of the [ESR](#) and supplemental information on trench, conduit, pad, and vault construction needed for the subdivision backbone. For additional PGE requirements, refer to the [ESR](#), review your approved job sketch, and consult your PGE project team with any concerns or questions.

4.1 Trench Depth and Cover Requirements

Trench depths vary by project. PGE requires that trenches be a minimum of 48 inches in depth with a minimum cover of 30 inches. Jurisdictions have different minimum cover requirements that may exceed PGE's requirements. For example, the City of Portland requires 36 inches of cover.

NOTE: The minimum coverage often is dictated by the depth of the radius sweep required to enter vaults, pads, or equipment as determined by PGE.

Do not exceed 6 feet in depth without PGE engineering or FCC approval. See [ESR](#), Section 6.2, Trenches Provided by the Customer for complete conduit requirements.

When on-site backfill contains rocks larger than 4 inches, or rocks with sharp corners, select backfill must be used. In certain circumstances, 3/4-inch minus crushed rock might be required; the FCC will determine this during the initial inspection. Select backfill must be placed a minimum of 4 inches below and 6 inches above the centerline of the conduit. ([Figure 3](#) illustrates these requirements.)

Contact your project's FCC with any concerns or questions related trenching.



- Figure 3. Service Cable Trench for Joint Use with Gas (STD-D-3100)**

4.2 Conduit

- PGE requires rigid steel or PGE-approved fiberglass sweeps for conduit runs greater than 150 feet and all runs with more than 180 degrees in bends, regardless of length. Fiberglass sweeps are longer and require extra excavation at the stub-ups for proper clearance.
- When all the bends in a conduit are added up, the sum must not exceed 270 degrees, regardless of the conduit type.
- All conduits stubbed at a secondary pedestal must have a minimum of 3 feet of straight conduit before the first bend.
- Sweeps must be separated by a straight section at least 5 feet long.
- If PGE approves a horizontal directional bore, HDPE duct may be used. For safety reasons, all HDPE ducts must conform to the following:
 - Be black with three equally spaced extruded red stripes.
 - Be joined by a swedge coupler with BonDuit or PGE approved equal. HDPE to PVC conduit transitions must also use a swedge coupler with BonDuit or PGE approved equal.
 - Meet the requirements of [ESR](#), Section 6.3.6, Duct and Connectors.
- Install communication conduits before inspection when applicable. No water or sewage conduits may be in the same trench as the PGE conduit. See [Figure 3](#) for clearance requirements between PGE and other facilities.
- Label conduits on the vault wall with the PGE pad or vault number to which the conduit is routed. Pull strings must be tied to the vault lids of switch vaults, transformer vaults, and the conduit plug eyelet on PF300 pedestals. Vaults must be free of mud, dirt, and debris. Steel risers may be required on risers that face traffic.

4.3 Vault Grade, Location, and Clearances

Install and level all vaults to the proper grade and locate them as far back on the field side of the public utility easement as possible. No other facilities (such as gas, sewer, or communications) should be located behind a vault.

NOTE: Locate transformers between 5 and 15 feet from a maintained drivable surface. See [ESR](#), Section 5.5.3, Drivable and Accessible Surface for drivable surface requirements.

Vaults installed within 12 inches of a sidewalk must be the same grade as the sidewalk; all other vault locations must be 2 inches above the final grade. Vaults must not be located where swales, ditches, or tree wells—whether existing or planned—will impede working clearances.

IMPORTANT: PGE conduit pathway cannot reside under or behind stormwater structures, including bio-swales. Vaults and conduit pathways must be adjusted to be parallel to swales.

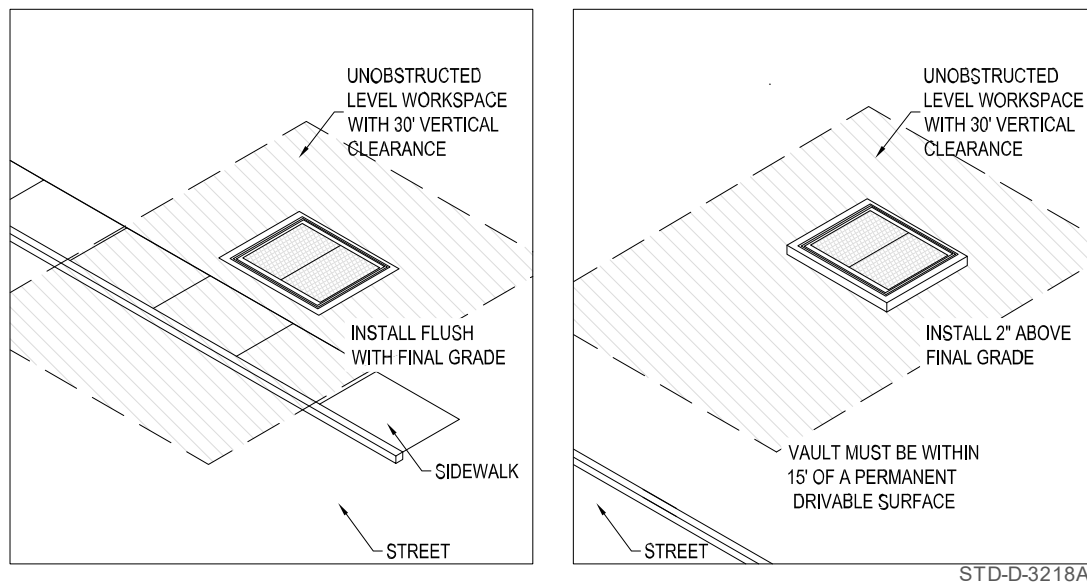


Figure 4. Vault Installation Relative to Final Grade (STD-D-3218A)

When vaults and pads are installed with a sloped grade behind them or to their sides, do one of the following:

- Slope the grade enough to prevent erosion from causing dirt or debris to enter or cover up PGE equipment, or
- Install a PGE-approved retaining wall around the PGE equipment. Contact the FCC if a retaining wall is needed.

In addition to proper grade, all PGE electrical equipment requires appropriate working clearances.

4.3.1 WORKING CLEARANCES FOR PAD-MOUNTED EQUIPMENT

Pad-mounted equipment requires the following working clearances, as measured from the edge of the pad or vault:

- At least 10 feet of horizontal separation in front of and extending parallel to:
 - The front of the equipment enclosure and
 - Any side of the enclosure that has a door or access panel.
- At least 36 inches of horizontal separation on any non-opening side of the electrical equipment.
- At least 30 feet vertical clearance above the final grade.

IMPORTANT: Working clearances also apply to shrubs and trees.

[Figure 5](#) shows the working clearances around pad-mounted electrical equipment adjacent to a combustible structure.

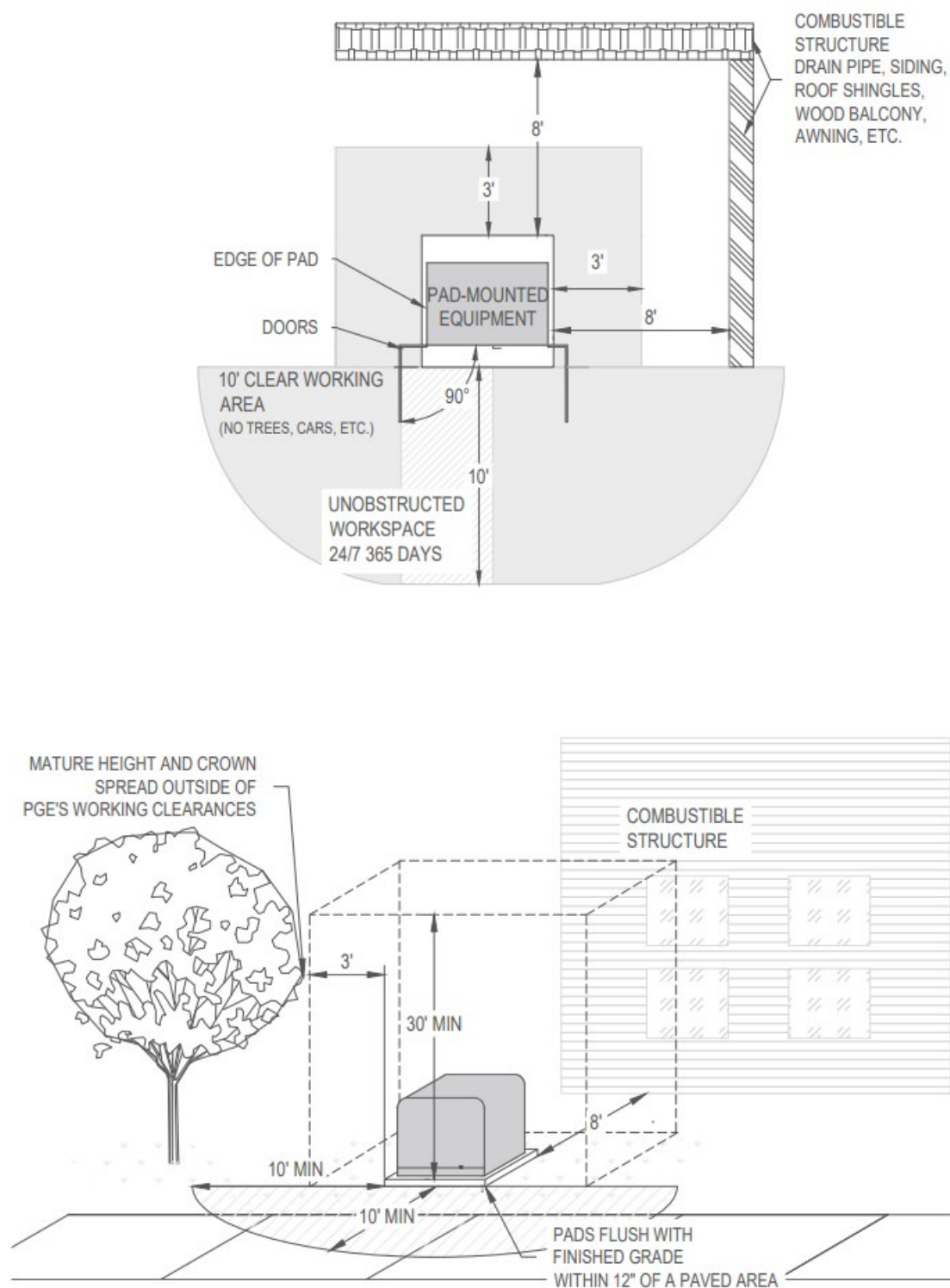


Figure 5. Working Clearances Around Pad-Mounted Electrical Equipment Adjacent to a Combustible Structure (STD-D-3203)

4.3.2 CLEARANCES OF FLUID-FILLED TRANSFORMERS FROM OTHER OIL-FILLED EQUIPMENT

Locate fluid-filled transformers away from buildings wherever possible. When it is not possible to locate a fluid-filled transformer away from a building, you must apply the minimum clearances shown in [Figure 6](#) and listed in [Table 1](#). Transformer oil quantity may vary by manufacturer. The oil capacity is shown on the transformer nameplate.

IMPORTANT: Locate transformers between 5 and 15 feet from a maintained drivable surface.

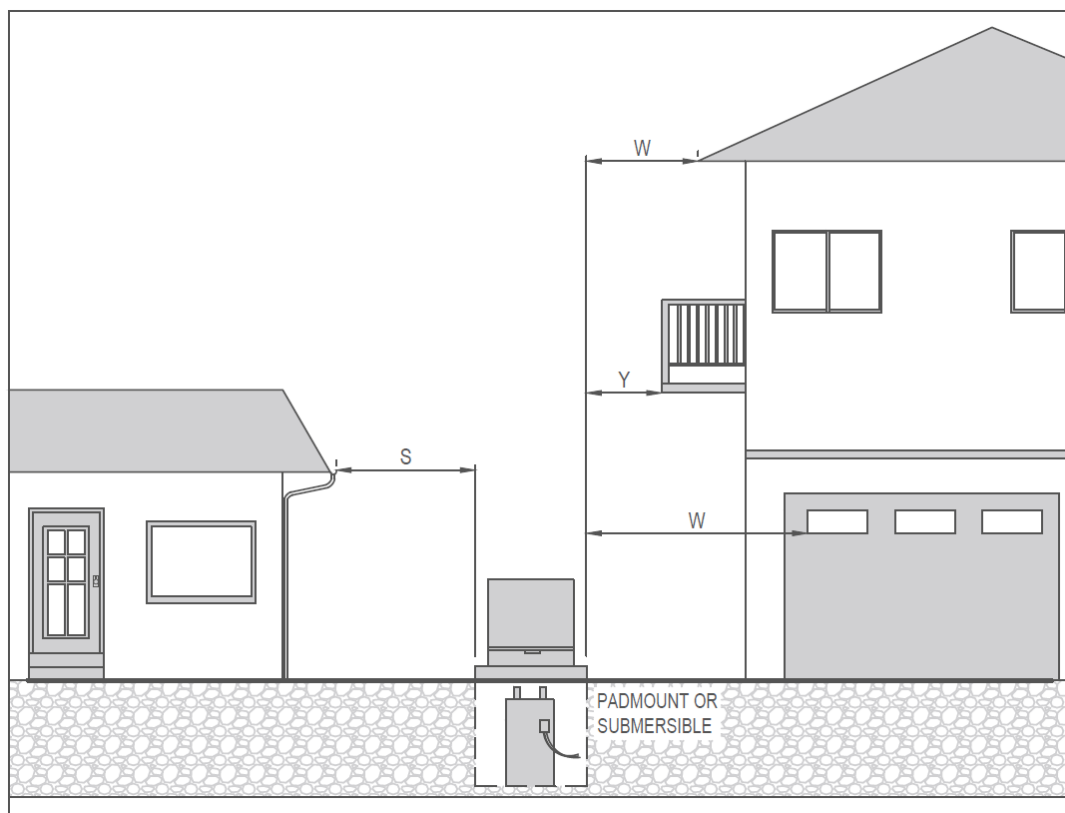


Figure 6. Minimum Clearance for Oil-Filled Transformers from Buildings (STD-D-3207)

Table 1. Minimum Clearances of Fluid-filled Transformers from Buildings

Oil Capacity (gallons)	Clearance			
	To Noncombustible Structure (S) (feet)	To Combustible Structure (Y) (feet)	To Any Opening in Structure (W) (feet)	Vertical Distance (Z) (feet)
0–499	3*	8**	8†	30††
500–5000	25*	50**	50†	50††
5001 or more	50*	100**	100†	100††

* Clearance to the nearest component if the structure is noncombustible and there are no openings closer than 8 feet.

** Clearance to the nearest component (wall or overhang) if the structure is combustible.

† Opening in structure does not include windows not designed to be opened.

†† Clearance is measured from the top of the cabinet to any barrier which is not a living space or workspace. This separation is for working clearance only.

Figure 7 and Figure 8 show the minimum clearances of the side or back of a transformer from combustible and non-combustible surfaces. All distances are measured from the edge of the transformer pad.

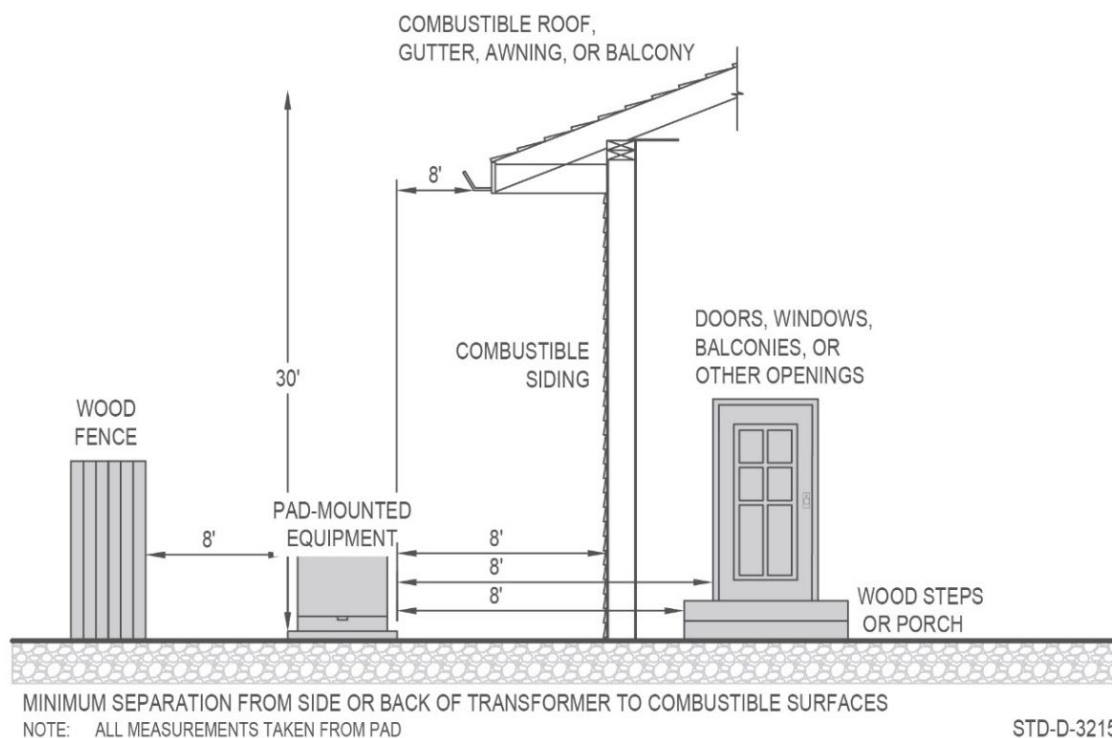


Figure 7. Minimum Clearances of the Side or Back of a Transformer from Combustible Surfaces (STD-D-3215)

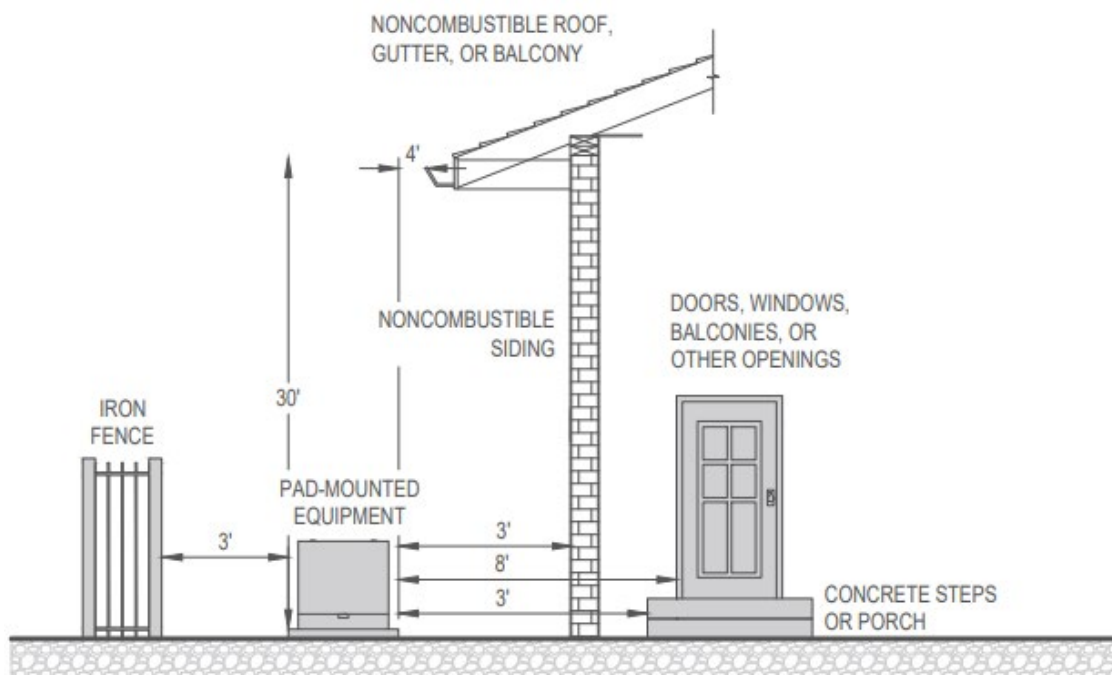


Figure 8. Minimum Clearances of the Side or Back of a Three-Phase Transformer from Noncombustible Surfaces (STD-D-3215)

4.4 Secondary Handhole (a.k.a. 1730 Vault, Carson Box) and Splice Pedestal (a.k.a. PF300) Requirements

Customers and their developers or contractors are required to use the PGE construction drawing provided to them for their site. Notify PGE promptly if there are changes in the type of surfaces or the elevations for your project. PGE's Design Project Manager must re-review the design details, and those details may need to be changed.

These are some (but not all) of PGE's requirements for secondary handholes (aka Carson box, 1730 vault) and splice pedestals (aka PF300).

- Secondary Handholes (aka Carson box, 1730 vault) must have a cover marked with the word ELECTRIC, and 3/8"-16 UNC penta-head hardware.
- Typically, 17" × 30" handholes are used for residential or commercial service junction locations.
- PGE requires Tier 22 handholes (junction boxes) if it's expected that the box will be exposed to vehicle traffic like for example a driveway or parking lot (see [Figure 10](#)). Contact your project's FCC for more information about Tier 22 junction boxes.
- For complete requirements, see [ESR](#), Section 6.4.7, Secondary Splice Pedestal (aka PF300) and Section 6.4.8, Secondary Handhole (aka Carson box, 1730 Box).

Table 2. Equipment Purchasing and Installation Responsibilities

Item	Responsible Party
Ducts	Customer provided; customer installed
Ground Rod	PGE provided; customer installed
PF300	PGE provided; customer installed
Junction Box	Customer provided; customer installed
Conduit Plugs	Customer provided; customer installed
Conduit Markers	PGE provided; customer installed
Standoff Bracket	PGE provided; PGE installed

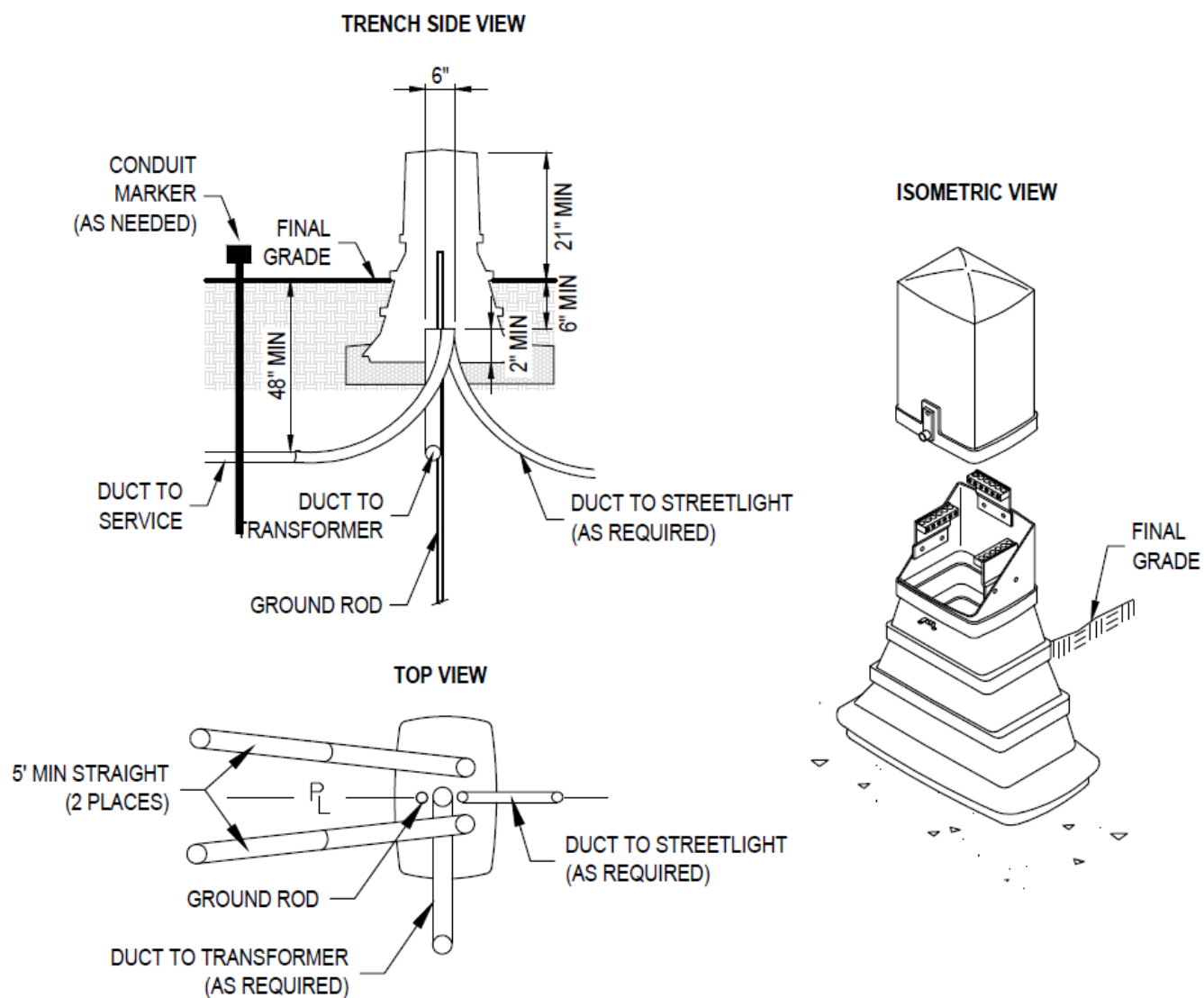
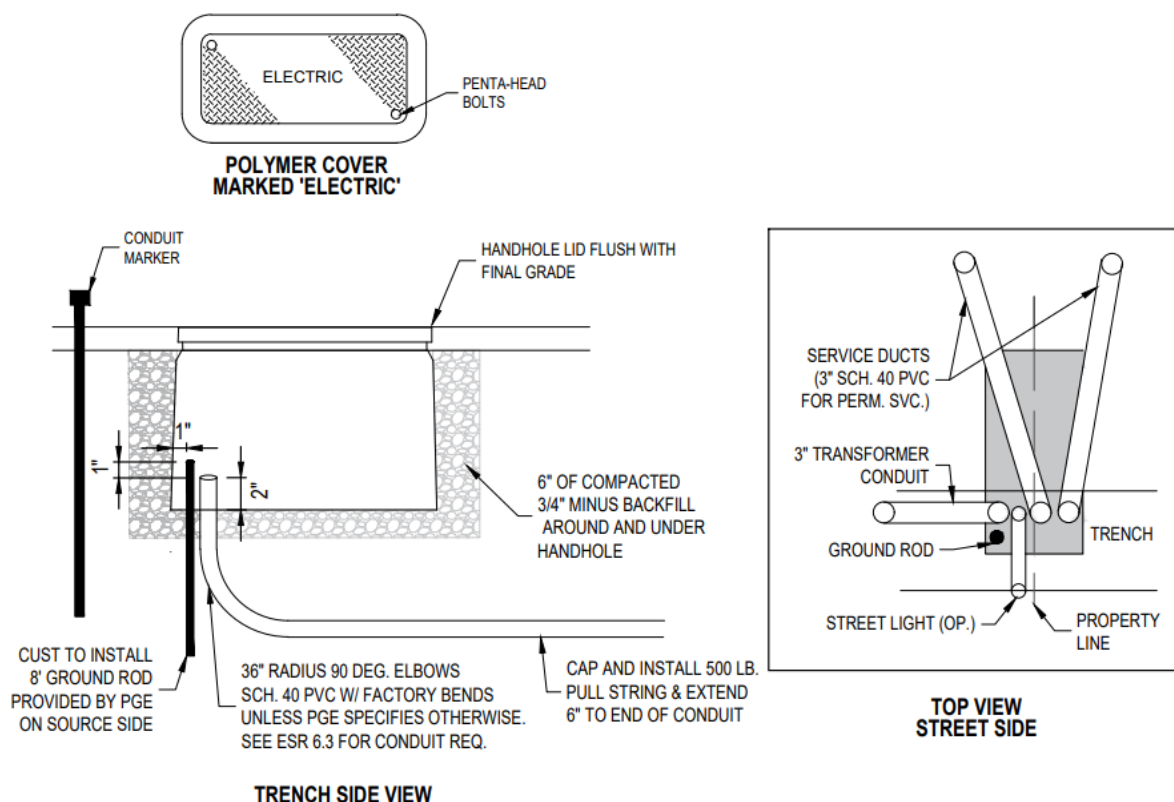


Figure 9. Secondary Splice Pedestal (aka PF300) (STD-D-3302)

Conduit plugs with an eyelet to tie the pull string are required on all PF300 conduits. Customers are responsible for the installation of the 8-foot ground rod.

**CONSTRUCTION NOTES:**

1. INSTALL HANDHOLES ON PROPERTY LINES WITHIN THE UTILITY EASEMENT AND AT FINAL GRADE. ALTERNATE LOCATIONS MUST BE APPROVED BY PGE.
2. RELOCATION OR ADJUSTMENT OF HANDHOLES WILL BE APPROVED BY PGE AND WILL BE THE RESPONSIBILITY OF THE BUILDER OR DEVELOPER REQUESTING THE MOVE.
3. PGE INSPECTION AND ACCEPTANCE OF HANDHOLE WILL BE BASED ON INSTALLATION, LOCATION, AND FUNCTIONALITY SET BY THE CUSTOMER.

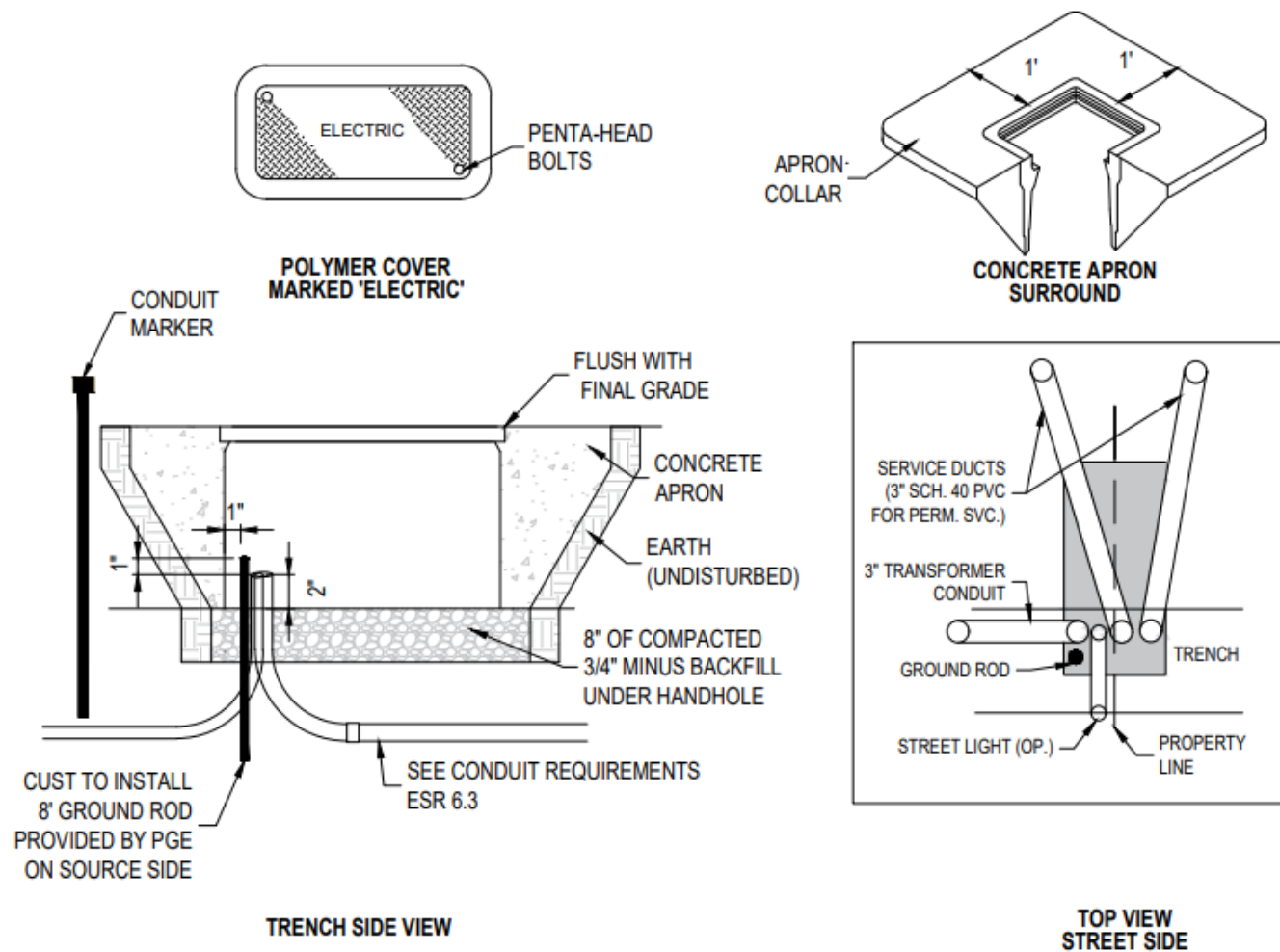
Figure 10. Tier 15: Secondary Handhole (aka Carson box, 1730 Vault) (STD-D-3300)

PGE provides customers with a construction drawing that list the size and type of handholes used in the job and their locations on the site. The type of handhole is selected by PGE based on the amperage of the service, type of service, and grade adjacent to the vault.

PGE is not responsible for sourcing handholes. A list of approved manufacturers of secondary handholes is available on portlandgeneral.com/esr.

IMPORTANT: Installation of secondary handhole hardware is very important to avoid hardware failure, and replacement at the customer's cost. Install the hardware as follows:

- Only hand tighten hardware. Do not use drills or impact drivers to fasten bolts.
- Clean dirty hardware before installation.
- Do not secure hardware until cable is energized. Keep uninstalled hardware in a plastic bag at the bottom of the handhole for protection.

**CONSTRUCTION NOTES:**

1. INSTALL HANDHOLES ON PROPERTY LINES WITHIN THE UTILITY EASEMENT AND AT FINAL GRADE. ALTERNATE LOCATIONS MUST BE APPROVED BY PGE.
2. RELOCATION OR ADJUSTMENT OF HANDHOLES WILL BE THE RESPONSIBILITY OF THE BUILDER OR DEVELOPER REQUESTING THE MOVE.
3. PGE INSPECTION AND ACCEPTANCE OF HANDHOLE WILL BE BASED ON INSTALLATION, LOCATION, AND FUNCTIONALITY SET BY THE CUSTOMER.

Figure 11. Tier 22: Secondary Handhole (STD-D-3303)

Chapter 5 Inspection Phase

This section describes the initial and final inspection of a subdivision backbone's trench and conduit pathway. Inspections are conducted by the project's Field Construction Coordinator (FCC).

5.1 Initial Inspection

Contact the FCC if there are questions about vault or pad placement.

Once all requirements for trenches, conduits, and vault have been met, schedule an initial inspection with the FCC before any backfilling is done. Before the inspection, mark sidewalks and the back of the PUE using temporary pins, flags, or stakes. The initial inspection checklist contains the most common requirements (see [Figure 12](#)).

During the initial inspection, the FCC will verify that all requirements have been met. If any problems or potential problems are identified, the FCC will work with you to address them.

IMPORTANT: If required communication conduits are not installed in the trench at the time of inspection, the FCC may refuse to inspect and approve the job.

Initial Trench and Conduit Checklist Guide to Calling In for T&C inspections

Items to consider before calling in for the first T&C inspection.

- ☐ Trench depth is adequate to enter all vaults, pads, and PGE equipment as determined by PGE. PGE requires a 48-inch minimum depth. **THE MAXIMUM TRENCH DEPTH IS 6 FEET.** Deeper depths must have PGE's approval.
 - ☐ No conduits are allowed behind the back side of any PGE pads or vaults without PGE approval.
 - ☐ No more than 270 degrees in sweeps in any one conduit run. **NO HEAT BENDS!**
 - ☐ Conduit runs over 150 feet and requires fiberglass sweeps. All runs over 180 degrees—regardless of length— require fiberglass sweeps.
 - ☐ Conduit sweeps are separated by a minimum of 5 feet of straight conduit.
 - ☐ Minimum of 3 feet of straight conduit in and out of vaults before attaching any conduit sweeps or HDPE bore pipes.
 - ☐ Conduit is installed, glued with proper glue for the application (PVC-to-PVC, PVC-to-ABS, etc.) and has the proper sweeps: 36-inch radius sweeps on 4-inch and under conduit; 60-inch radius on 5-inch and over the conduit.
 - ☐ All conduit risers for PF-300 secondary splice pedestals and 1730 junction boxes are splitting lot lines and are in easement/PUE or as designed.
 - ☐ Pad vaults are installed by splitting lot lines or as designed.
- Transformer pad vaults require primary conduit installed on the field side on the end specified in the design.**
- ☐ Transformer pad vaults have secondary conduit installed on the roadside of the vault on the end specified in the design. Refer to design or contact the Field Construction Coordinator (FCC) if minimum conduit depth cannot be met or if all the road-side Term-a-Ducts are full.
 - ☐ Conduit must be installed in the short side of switch vaults, starting with the lower right set of Term-a-Ducts when looking at the vault end. PGE does not allow conduit ducts to enter a vault's front or back (long side), except for 504 vaults. See the PGE job sketch for vault detail.
 - ☐ Vaults are installed on the proper compacted 3/4 minus rock pad with a compaction rate of at least 95% within 5 feet of the pad or vault (444, 504, 644, 660, 5106, 810, etc.). Vaults installed within 12 inches of the sidewalk must be the same grade, and all other vault locations must be 2 inches above grade.
 - ☐ All transformer vaults, switch vaults, and pads must be within 15 feet of a drivable surface. When installed, all vaults and pads must face a drivable surface. Barrier posts are required when transformers are less than 5 feet from the drivable surface. All transformers, vaults, and pads must be at least 30 feet from switch vaults. For more information, refer to Section 5, *Clearances and Location Requirements*, and Section 5.6.8, *Barrier Posts*, in PGE's ESR book.
 - ☐ All conduit risers must come out of the ground 90 degrees to grade (straight) at the pole, into a secondary vault, and at the meter base.
 - ☐ Developers must mark sidewalks and the back of the PUE using temporary pins, flags, or stakes.

Notes: _____

Figure 12. Initial Trench Inspection Checklist

5.2 Final Inspection

As construction nears completion, schedule a final inspection with the FCC. The final inspection checklist contains the most common requirements (see [Figure 13](#)).

During the final inspection, the FCC will verify that all trenches, vaults, pedestals, junction boxes, and other equipment are installed according to PGE standards. This includes verifying that:

- Each conduit on the vault wall is labeled with the PGE pad or vault number to which the conduit is routed.
- PF300 pedestals have conduit plugs with an eyelet for pull strings.
- Pull strings are tied to conduit plug eyelets in PF300s.
- Pull strings are tied to the vault lids of switch vaults and transformer vaults.
- Pull strings have an excess slack of 6 feet (minimum) on each conduit end. Vaults are free of mud, dirt, and debris.
- Any open PGE vault is covered with 3/4-inch marine-grade plywood. Pallets and other covers are not acceptable.
- Sidewalks and the back of the PUE have been marked using temporary pins, flags, or stakes.
- An 8-foot ground rod, provided by PGE, has been installed in PF300s and Handholes. See [Figure 10](#) and [Figure 9](#).

Items reviewed during the final trench and conduit checklist must be maintained until PGE energizes the backbone service. The site must provide a safe working environment for PGE.

Final Trench and Conduit Checklist Guide to Calling In for T&C inspections

Things to consider before calling in for final inspection.

- ☐ All trenches are backfilled 100%, and vaults are backfilled to the final grade.
- ☐ All primary vaults, pads, secondary vaults, and PF-300 secondary splice pedestals have proper clearances around them. For more information, refer to Section 5, *Clearances and Location Requirements*, in PGE's ESR book, or contact your Design Project Manager (DPM) or Field Construction Coordinator (FCC).
- ☐ Each conduit on the vault wall is labeled with the PGE pad or vault number that the conduit is routed to.
- ☐ Be prepared to run a mandrel through any conduit section installed for PGE. Contact your FCC to determine whether they must be on site while proofing.
- ☐ Developers must mark sidewalks and the back of the PUE using temporary pins, flags, or stakes.
- ☐ When blowing string into or penetrating energized vaults, a PGE standby crew **MUST** be used.
- ☐ A minimum of 6 feet of string is required at each end of conduit runs for the crew to have an ample amount to connect to.
- ☐ All pull strings have been installed with a minimum 500-lb. strength using the proper size rigid mouse to ensure that the conduit is clear of obstructions. No baggies or parachutes are allowed for installing pull string.
 - ☐ PF300 pedestals require conduit plugs with an eyelet to tie a pull string to.
 - ☐ Pull strings must be tied to conduit plug eyelets in PF300s.
 - ☐ Pull strings must be tied to the vault lids of switch vaults and transformer vaults.
 - ☐ Pull string must have a minimum excess slack of 6 feet on each conduit end.
- ☐ All conduits are capped and free of debris.
- ☐ All primary vaults, secondary vaults, and pads are clean of mud, dirt, and debris. 3/4-inch marine grade plywood is installed and secured over any openings in PGE vaults. Pallets or other covers are **NOT** acceptable.
- ☐ PF 300s, 1730s, and 1324s all installed to proper grade and backfilled with ¾-inch minus rock.
- ☐ All conduit risers must be backfilled with ¾-inch minus.
- ☐ Ground rods are all installed in the proper location. In rocky areas, contact DPM or FCC for an alternate location of ground rods.
- ☐ Barrier posts are installed where transformers are less than 5 feet away from a drivable surface. All transformer vaults and pads are at least 30 feet from switch vaults. For more information, refer to Section 5, *Clearances and Location Requirements*, and Section 5.6.8, *Barrier Posts*, in PGE's ESR book.
- ☐ Conduit risers are attached to the standoff bracket in the proper location on the pole.
- ☐ All PF-300s, 1730s, 1324s, pads, and vaults are installed in easement/PUE, splitting lot lines unless designed otherwise, and clean of mud, rock, and debris.
- ☐ Concrete street light bases are clean from all debris on the surface, and all nuts and washers are present.
- ☐ Permanent property pins have been installed in the front and back of lot lines. A waiver must be obtained from your project manager if permanent pins cannot be installed, and temporary stakes need to be used.

Notes: _____

Figure 13. Final Trench Inspection Checklist

Chapter 6 Streetlight Installation

This section discusses the basic requirements for streetlight installations and specific requirements for ducts, elbows and sweeps, and junction boxes.

6.1 Basic Requirements

Streetlighting Project Managers are available to answer questions regarding streetlight designs. Streetlight designs are one of the following:

- Option A: PGE owns and maintains.
- Option B: Customer owns, PGE maintains.
- Option C: Customer owns and maintains.

Provide the PGE Streetlighting Project Manager with a streetlight design layout stamped Approved by the municipality or county in whose jurisdiction it falls. The layout must include complete streetlight design details (pole and fixture specifications).

- For Option A and Option B, all streetlight materials maintained by PGE must be specified according to PGE's approved streetlighting equipment list.
- For Option C, the locations of demarcation points must be determined in consultation with the Streetlighting Project Manager.

Install the bottom piece of streetlight poles and/or concrete footings for streetlights while the trench is open. All aluminum streetlight poles must be grounded in compliance with NESC 215C1. PGE will provide the materials for Option A streetlight bases and request that you install them.

If an aluminum streetlight pole is being installed, install the PGE-provided ground rods. Refer to the job sketch for installation information.

Facilities (including conduit, junction boxes, and streetlight poles) must not be located in bioswales or rain gardens because PGE does not have the resources to construct a bioswale or rain garden back to the original design if a facility must be repaired.

In-depth information on the three streetlight options can be found in [Appendix B, Option A and Option B Streetlight Installation Requirements](#), and [Appendix C, Option C Streetlight Installation Requirements](#). Contact the Streetlighting Project Manager for additional information when needed.

6.2 Duct Requirements

Streetlight ducts must be installed at a minimum depth of 36 inches.

The approved streetlight duct sizes are 1-inch, 2-inch, and 3-inch.

- Use 1-inch duct from the junction box to the streetlight pole.
- The Streetlighting Project Manager will determine whether a 2-inch and/or 3-inch duct is needed between the transformer and the junction box at the design time.
- All Option C streetlight designs require 3-inch duct from PGE's source to a demarcation location.

All ducts—except for the 1-inch duct between the junction box and the pole—must contain a 500-pound pull line.

6.3 Elbow and Sweep Requirements

Long-sweep PVC elbows are acceptable for ducts up to 150 feet long with less than 180 degrees in bends. If a duct is more than 150 feet long or a conduit run contains more than 180 degrees in bends, elbows must be made of rigid steel or PGE-approved fiberglass. No single conduit run may have more than 270 degrees in bends. A 36-inch radius elbow is required for 1–4" conduit. A 60-inch radius elbow is required for 5–6" elbow. Five-foot straight sections must separate conduit elbows.

6.4 Junction Box Requirements

Install junction boxes at final grade level, with all duct elbows clustered at one end of the junction box. [Figure 14](#) shows the hard and soft surface installation.

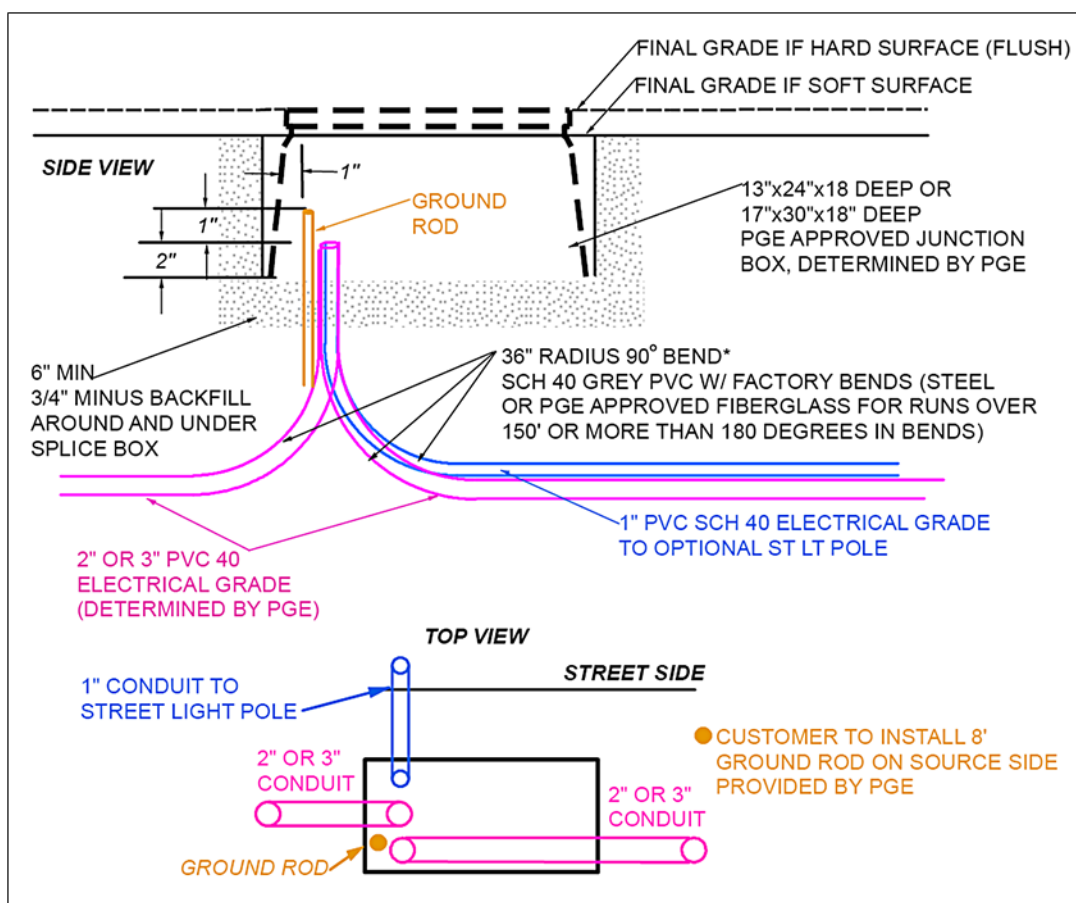


Figure 14. 1730 and 1324 Junction Box Layout

Two junction box sizes are available for use:

- The smaller junction box—commonly called a 1324 box—measures 13 × 24 × 18 inches. This box is used for streetlight circuits with one or two 2-inch conduits or one 3-inch conduit.
- The larger junction box—commonly called a 1730 box—measures 17 × 30 × 18 inches. This box is used for streetlight circuits with three or four 2-inch conduits or two 3-inch conduits.


Customers and their developers or contractors are required to use the PGE construction drawing and this list of approved handholes when obtaining the required handholes for their site. **PGE is not responsible for sourcing these handholes.**

A list of approved manufacturers of secondary handholes is available on portlandgeneral.com/esr.

Appendix A Request for Multifamily Service Form

REFERENCE ONLY

Request for Multifamily Service



Note: Please fill out all fields. If the field is not applicable, enter N/A.

Information about the process and what to expect can be found on our website: portlandgeneral.com/builders-new-construction

In addition to completing this form, a site plan or scaled plot is required. Forms and files can be submitted via email to service coordinators@pgn.com, faxed to 503-612-3501 or mailed to 7800 SW Mohawk St., Tualatin, OR 97062.

A site plan must include the following:

- Location of the lot with street names on at least two sides of the property
- Distance measurements showing the size of the lot
- Orientation of the building and where it sits on the lot relative to the street and any other buildings on the lot
- North arrow indicating which direction is north
- Expected location of your meter
- Any topographical information available — i.e., is the lot flat or sloped and by how many feet
- Additional information may be required for subdivisions, commercial and multifamily site plans

GENERAL INFORMATION

Applicant

Name _____

Email address _____

Phone number(s) _____

Service address _____

City _____ County _____ Zip _____

Nearest cross street _____

Legal description (tax lot number, lot number, block number) _____

Applicant Role: ☐ Architect ☐ Builder ☐ Customer ☐ Electrician ☐ Engineer ☐ Excavator
☐ General Contractor ☐ Other

Billing Information (for construction costs only)

Name _____

Company name _____

Email address _____

Phone number(s) _____

Mailing address _____

City _____ State _____ Zip _____

Existing customer account number (if applicable) _____

Portland General Electric Multifamily Use Service Request

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Figure 15. Request for Multifamily Service Form (1 of 6)

REFERENCE ONLY

Type of Request

☐ New service — Date you would like permanent power: _____

☐ Convert existing service from overhead to underground

☐ Change existing service/panel size, phase type, adding new meter — specify changes on next page, if you aren't changing, enter N/A

Temporary Power

Do you need temporary power? ☐ Yes ☐ No ☐ Not sure ☐ Already requested

Type of temporary power:

☐ Overhead ☐ Underground ☐ Gold temp (not available in all areas) ☐ Not sure

Service size of temp meter: _____ amps

Voltage for temporary service: ☐ 120/240 ☐ 120/208 ☐ 277/480

Phase: ☐ Single (for residential) ☐ Three (for commercial)

Date you would like temporary power installed: _____

Permitting

Have you applied for all necessary building and/or electrical permits? ☐ Yes ☐ No

Note: You need to have all required permits before PGE work can begin

MULTIFAMILY INFORMATION

Type of dwelling

☐ Subdivision ☐ Subdivision backbone only ☐ Minor partition

Number of lots: _____

Square footage	Number of homes
Under 1,000 sq ft	
1,000 – 1,600 sq ft	
1,601 – 2,000 sq ft	
2,001 – 2,800 sq ft	
2,801 – 3,500 sq ft	
Over 3,500 sq ft	

☐ ADU/Tiny home ☐ Apartment ☐ Condominium ☐ Row house ☐ Town house

Square footage	Number of units
Under 800 sq ft	
800 – 1,400 sq ft	
Over 1,400 sq ft	

Portland General Electric Multifamily Use Service Request

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Figure 16. Request for Multifamily Service Form (2 of 6)

REFERENCE ONLY

☐ Manufactured home park

Type of Lot	Quantity
Single wide	
Double wide	

If you have a phased project, please provide the number of phases and the estimated start date of each phase: _____

SERVICE INFORMATION

Do you need additional meters for irrigation, pools, lights, or other shared services? ☐ Yes ☐ No

If yes, how many? _____

If yes, please complete a Connected Load Worksheet for each additional meter.

If changing service, enter both current and new information. If requesting new service, enter only new.

	Current	New
Service size	Amps:	Amps:
Service voltage	<input type="checkbox"/> 120/240 <input type="checkbox"/> 120/208 <input type="checkbox"/> 277/480 <input type="checkbox"/> Other (specify): _____	<input type="checkbox"/> 120/240 <input type="checkbox"/> 120/208 <input type="checkbox"/> 277/480 <input type="checkbox"/> Other (specify): _____
Service type	<input type="checkbox"/> Overhead <input type="checkbox"/> Underground	<input type="checkbox"/> Overhead <input type="checkbox"/> Underground
Phase type	<input type="checkbox"/> Single phase <input type="checkbox"/> Three phase	<input type="checkbox"/> Single phase <input type="checkbox"/> Three phase

RESIDENTIAL ELECTRIC VEHICLE CHARGERS

If charging stations will be in common spaces, enter EV charging info on the Connected Load Worksheet

Type	Quantity
Level 1 – 120 Volt – Standard wall outlet	
Level 2 – 240 Volt – Like an oven or dryer	
Level 3 – 480 Volt – DC fast charging	

Portland General Electric Multifamily Use Service Request

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Figure 17. Request for Multifamily Service Form (3 of 6)

REFERENCE ONLY

ADDITIONAL JOBS

Is street lighting needed? ☐ Yes ☐ No ☐ Not sure

If yes, list quantity for each type, if known:

Type	Quantity
Option A - PGE owned & maintained	
Option B - Muni owned & PGE maintained	
Option C - Muni owned & maintained	

Will any part of your work or building activity be within 15 feet of power lines, poles or transformers?

☐ Yes ☐ No ☐ Not sure

Is there any PGE equipment adjacent to the property that needs to be moved?

☐ Yes ☐ No ☐ Not sure

If yes, is your municipality requiring that you make these changes?

☐ Yes ☐ No

ELECTRIC ALLOWANCE

Type of heating	Number of units
Primary heating fueled by an active electric HVAC system (such as a heat pump or PTAC) with no secondary heat system or a secondary electric heat system	
Primary heating fueled by an active electric HVAC system (such as a heat pump or PTAC) with secondary heat fueled by anything other than electric	
Primary heating fueled by an HVAC system using combustion furnaces fueled by natural gas, propane, oil, or biodiesel OR electric resistant in wall or baseboard heaters OR a passive system	
Yet to be determined primary heating	

Portland General Electric Multifamily Use Service Request

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Figure 18. Request for Multifamily Service Form (4 of 6)

REFERENCE ONLY

CONNECTED LOAD WORKSHEET FOR SHARED METERS

If (and only if) you have additional meters for shared services such as irrigation, laundry rooms, pool, elevators, or lights, you must complete a worksheet for each meter. If you don't have shared meters, please don't complete the worksheet.

Load type:	Qty:	Connected kW:	Locked rotor amps:
Cooking (include ovens, ranges, hoods, dishwashers and fryers)			
Lighting (include specialized lighting such as grow lights, high-pressure sodium, etc.)			
Receptacles			
Water heating			
Electric heat or heat pump			
Air conditioning (1 ton = 1kW)			
Refrigeration (1 ton = 1kW)			
Other motorized equipment not included elsewhere (1 hp = 0.8kW)			
Computers/servers			
Welders			
Elevators			
Irrigation/other pumping			
Miscellaneous			
Number of EV charging units (Qty column) AND total kW (Connected kW column)			

Determining connected load requires extensive electrical knowledge. We recommend an electrician complete this form. PGE uses this information to properly size our equipment to deliver reliable electricity with the correct power quality to meet customers' needs.

Instructions:

- Fill in fields where applicable. Some may not be relevant to all customers (for example residential shop/barn). If not applicable, please enter N/A.
- For Connected kW column, fill in total kW for each load type. If not applicable, please enter N/A.
- For Locked rotor amps column, if there's more than one motor in that load type, enter LRA for the largest motor. See motor nameplate or mfg. info for LRA.
- For upgraded service, only enter the new/additional load; we know your existing peak demand.
- Do not fill in gray fields.

Accurate information is important to avoid outages and repair/replacement work, including damage to customer property. When inadequate or inaccurate information results in design changes, the cost will be borne by the property owner or electrician.

Portland General Electric Multifamily Use Service Request

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Figure 19. Request for Multifamily Service Form (5 of 6)

REFERENCE ONLY

Helpful conversion information to determine kW load:

- See nameplate on electrical equipment for kW Rating
- 1 horsepower = 0.8 kW
- 1 ton cooling = 1 kW
- Volts x amps = watts
- 1,000 volt amps = 1 kW
- 1,000 watts = 1 kW
- 1 each 100-watt lightbulb = 0.10 kW
- Maximum load on 1 each, 20 Amp, 120 Volt Circuit Breaker = 0.19 kW

Portland General Electric Multifamily Use Service Request

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Figure 20. Request for Multifamily Service Form (6 of 6)

Appendix B Option A and Option B Streetlight Installation Requirements

Portland General Electric

STATEMENT OF STREETLIGHT INSTALLATION RESPONSIBILITIES

JUNE 20, 2018

This letter states the installation service requirements for Option A and B streetlights in the Portland General Electric (PGE) service territory. Its purpose is to clarify streetlight design and installation procedures. This update supersedes all previous publications.

Ownership Options under Streetlight Tariff Schedules 91 and 95.

- ◆ Option A is for luminaires owned, maintained and supplied with electric energy by PGE.
- ◆ Option B is for maintenance and energy supplied to equipment owned by the customer. This option is applicable only to Schedule 91. **NOTE:** If customer (municipality) has begun converting their Option B lights to LED (Schedule 95 C), then any new lights cannot be installed under Schedule 91 B.

DESIGN RESPONSIBILITIES

1. Design Layout for Option B Streetlights (Owned by Municipality)

For Option B streetlights (owned by the municipality), the developer/project is responsible to provide the PGE Lighting Design Project Manager with the streetlight design layout stamped approved by the municipality under whose jurisdiction it falls, which includes complete streetlight design details (pole and fixture specifications). This approved layout is to be submitted simultaneously with any projects needing power plans, to avoid delays with the PGE electrical plans. Option B street lighting materials need to be specified from PGE's approved street lighting equipment list.

2. Design Layout for Option A Streetlights (Owned by PGE)

For Option A streetlights, materials need to be specified from PGE's approved street lighting equipment list. PGE Lighting Design Project Managers are available to assist with pole and fixture information needed on the project, this information will be based on municipality direction. The lighting design layout will need to meet the recommended maintained illuminance values in the current revision of *ANSI/IES RP-8 American National Standard Practice for Roadway Lighting*, or the appropriate standard adopted by the municipality with jurisdiction over the project. A municipality has the option to accept & authorize streetlight designs that do not meet ANSI/IES RP-8 guidelines, PGE will put a notation on the letter of authorization that is signed by the City as well as the sketch.

3. Bioswale / Rain Gardens & Trees

PGE does not allow any facilities (conduit, junction box, streetlight pole, etc) in bioswale / rain gardens. PGE does not have the resources to construct the bioswale / rain garden back to original design if a streetlight infrastructure needed replaced. The bioswale / rain garden infrastructure may not adequately support the installation of a

streetlight pole. (Exceptions may be granted. The engineer for the project must provide PGE with a design for the proposed streetlight pole location. All exceptions need to be approved by the Lighting Project Manager prior to PGE finalizing design.)

Suggestions for exceptions:

- ◆ Need a 4' section of the bioswale/rain garden dedicated to the streetlight pole location. This area would need to be separated by a concrete wall and compacted with $\frac{3}{4}$ minus rock for the streetlight pole foundation. This section cannot be considered part of the bioswale/rain garden.

There are no exceptions for the infrastructure (junction box/conduits).

A streetlight pole cannot occupy the same space with a tree in a tree well. PGE recommends streetlights to be a minimum of 15' from any tree location.

4. Design Alterations

In order to meet customer needs in a timely manner PGE must have adequate notice of design changes. If PGE is not given adequate notification of design changes PGE reserves the right to bill the developer, the municipality, or the designated contractor, responsible for the installation, for any costs to PGE associated with the changes. This billing may include, but is not limited to, the cost of additional trips, corrective trenching, conduit work, and alterations to PGE design sketches.

5. Approved Materials

Street lighting designs can only use materials that are listed on PGE's approved streetlight equipment list. A list of approved streetlight luminaires, lamps, photo controls, poles, pole bases, mast arms, wire, and junction boxes [is](#) available upon request. **No substitutions are allowed.** Materials installed must also meet the standards of the local municipality in whose jurisdiction the development exists.

TRENCH AND INSTALLATION REQUIREMENTS

1. Trench Excavation

- ▮ **Only PGE-approved excavation contractors and contractors who have made special arrangements with PGE will be allowed to work under a PGE street right-of-way permit. The contractor must notify the local jurisdiction 48 hours before the work is to begin. A copy of the permit must be on site.**
- ▮ The developer/contractor is responsible for all trench excavation and backfilling, compaction, road crossings, conduits, elbows, vaults, junction boxes, landscape restoration, associated permits and any other requirements to complete the construction for streetlight service.
- ▮ Trenches are to be 48 inches deep when shared with other utilities, and otherwise at least 36 inches in depth.
- ◆ An on-site preconstruction meeting is required for all projects with the PGE's Field Construction Inspector.
- ▮ Finished grade must be established prior to trench excavation to ensure that minimum cover requirements for cables and conduits are attained. Minimum cover requirements for cables are measured from the trench surface to the top of the cable or conduit.

2. Conduits and Elbows

- ▮ All conduit routes must be approved by PGE prior to installation by the Customer, customer-installed conduit must be inspected by PGE before backfill.

- ▢ All conductors are to be installed in conduit. Conduits are to be sized for the required conductor, as determined by PGE.
 - Three-inch and/or two-inch diameter conduit is required for all runs over 100 feet and for all runs serving more than one light.
 - One-inch diameter conduits may be used for runs not exceeding 100 feet in length and serving only one light.
- ▢ HDPE duct may be used for horizontal directional boring applications. The duct must meet the requirements of PGE specification L22501 (available upon request of your PGE project manager).
 - For safety reasons, the duct must be black with three equally spaced extruded red stripes, which is a specification requirement. Aluminum couplings with barbed threads on both ends must be used to join HDPE duct sections, and straight couplings with barbed threads on one end and NPT on the other end must be used for connecting to PVC duct.
- ▢ All conduits must be gray electrical grade schedule 40 PVC, flex conduit is not allowed.
- ▢ All conduits are to contain a 500-pound test non-conductive pull string with 6 feet of pull string extending beyond each end of the conduit.
- ◆ Bends are to be rigid steel or PGE approved fiberglass as noted in PGE's Electrical Service Requirements book: For conduit runs longer than 150 feet, or for any length run with more than 180 degrees in bends. No more than 3-90 degree elbows or a total of 270 degrees of bends in any conduit run;
- ▢ 36-inch radius elbows are required for all conduit runs longer than 6 feet. 24-inch radius elbows are allowed for 1-inch Sch 40, PVC conduit runs of 6 feet or less, while still maintaining a 36-in minimum depth with prior PGE approval.
- ▢ For three-inch and two-inch conduit, sweeps must be separated by a minimum 5-foot straight section. There must be a 3-foot minimum straight section from a vault.
- ▢ All elbow bends must be factory made and all conduit and elbow ends shall be smooth and free of burrs and rough edges.
- ▢ If the power source is at a utility pole, the terminal elbow is to be installed eight inches from the pole, and attached to a PGE installed standoff bracket, at the quadrant specified by PGE.
- ▢ When a new conduit and/or pull line will be entering an existing PGE secondary vault or transformer, the installer is required to contact PGE prior to installation. A PGE crew will be scheduled to meet the installer at the site to assist with the installation. **To schedule a PGE stand-by crew, please call PGE Service Coordinators at (503) 323-6700 or toll-free (800) 542-8818.**
- ▢ **Oregon Utility Notification Center at, (800) 332-2344, 811, or online at www.callbeforeyoudig.org, must be called to locate any underground facilities at least two business days (48 business hours) prior to any digging.**
- ▢ The Customer is responsible for duct proofing all ducts installed for PGE jobs before the job is completed and before the installation of PGE conductors.

3. Junction Boxes:

- ▢ All junction boxes are to be PGE-approved (available upon request of your PGE project manager), the lid must be secured with five sided Penta-head bolts.
- ▢ Minimum 6 inches of 3/4-inch minus well-compacted backfill under and around the outside of the junction box
- ▢ Customer to install a PGE-provided ground rod inside the junction box, a maximum of 3 inches of ground rod must be showing inside the junction box.
- ▢ Junction box must be set 2 inches above final grade or on the highside of the slope. Junction boxes set on a sidewalk must be set to grade.

- Junction boxes are required at each streetlight location where:
 - conduit runs serve more than one light, or
 - conduit runs exceed 100 feet in length, or
 - conduit sizes are greater than one-inch diameter.
- A minimum of twelve inches working space is to be provided between the top of elbows and the junction box lid to allow bending wire without damage to the wire.
- The elbows are to be clustered at one end of the junction box.
- Where multiple lights are served from a run of wire, three-inch or two-inch conduit and junction boxes are always required.

4. **Light and Pole Placements**

- Where there is a planter strip, streetlights are to be placed a minimum of 2 foot Face of Pole, Face of Curb.
- ◆ Where sidewalk is directly behind curb, streetlight placement is 6" behind walk.
- Conduit and junction boxes are to be placed in the Public Utility Easement (PUE).
- All other locations must be approved by a PGE Lighting Project Manager.
- ◆ All metal poles must be grounded per NESC 215.C and NESC Section 9, using a 5/8" x 8' galvanized rod, connected to the grounding lug inside the pole using solid #6 Cu BSD wire (stranded wire is not acceptable). PGE will provide the ground rod and copper wire for grounding the metal streetlight pole. Ground rods will be installed a minimum of 6 inches behind the concrete footing and a minimum of 2 inches below grade. The copper wire is to be coiled at both ends for PGE, copper wire will be pulled through one of the flutes in the concrete footing during the footing installation and the other end placed adjacent to the groundrod.

5. **Light and Pole Installation by Contractor (Option B):**

- Where junction boxes are installed, the contractor shall run continuous #10 Cu 3-conductor streetlight wire from the luminaire to the junction box.
- Where junction boxes are not installed, the contractor shall run continuous #10 Cu 3-conductor streetlight wire from the luminaire to the hand hole of the pole. PGE will run conductor from the source to the pole hand hole.
- In both cases, 18" of extra conductor shall be provided for PGE to make the connection.
- All direct burial type streetlight poles are to be set to the depth specified in PGE standards:
 - five feet for 30 and 35 foot poles,
 - four feet for all shorter poles.
- **Where anchor-base type poles are installed using precast concrete footings, PGE specifies:**
 - Utility Vault #20R-LB-4-PGE: 20" diameter/4' long round footing with 11" bolt circle for all 14' or 16' decorative aluminum or composite poles.
 - Utility Vault #4-LB-PGE: 18" square/4' long footing with 8" bolt circle for all 16' regular aluminum poles.
 - Utility Vault #5CL-LB-PGE: 14" square/5' long footing with 11" bolt circle for all 25' to 35' regular-arm aluminum, davit-arm aluminum and composite poles.
 - Utility Vault #7LB: 18" top to 24" bottom tapered square/7' long footing with 11" bolt circle for all 40' davit-arm aluminum poles and composite poles.
 - All Concrete Footings are to be installed with top of concrete base flush to curb/sidewalk.
- ◆ Minimum 8 inch tamped 3/4-inch minus crushed rock backfill is required around all poles and footings regardless of soil condition to maintain proper pole alignment.

- ◆ All metal poles must be grounded per NESC 215.C and NESC Section 9, using a 5/8" x 8' galvanized rod, connected to the grounding lug inside the pole using solid #6 Cu BSD wire (stranded wire is not acceptable). The ground rod is to be driven into undisturbed soil near the pole.
- ▢ All streetlights are to be connected 240 volts to the black and red hot legs of the conductor, unless other voltage is approved by PGE lighting project manager. The green wire is to be connected to ground.
- ▢ Wire nuts are not allowed by PGE. The contractor may only connect approved wire directly to the terminal block in the luminaire itself. PGE will make all other connections using compression clamps.
- ▢ PGE will make the final connection in the junction box or hand hole to energize the streetlight.

NOTE: The contractor is responsible for the correct operation of the street light system for the first year after being energized by PGE. The contractor is also responsible for any poles which go out of plumb within this first year. During this acceptance period any repairs or pole straightening performed on the installed system by PGE will be billed to the developer.

BILLING AND AUTHORIZATION

1. Line Extension Charge:

There will be a cost to install circuitry for all streetlight projects. The line extension cost is the total material and labor cost for PGE to install as necessary the conductors, transformers, pole conduits, anchors and guying, conductor support poles, and related hardware. The line extension charge is the line extension cost less the allowance based on anticipated revenue to PGE, as approved by the Oregon Public Utility Commission in the PGE tariff.

The line extension charge is to be paid in full prior to any streetlight installations. A signed Streetlight Job Cost Agreement needs returned with payment to **PGE, Attn: Line Extensions, PO Box 3340, Portland, OR 97208** with PGE's job number on the check.

2. Authorization to Energize and Initiate Billing:

PGE will request authorization from the municipality to install or energize the streetlights as installed, and to begin billing for them under provisions of the appropriate streetlight option.

This letter is effective as of June 20, 2018. If you have any questions or if we can be of any assistance please call your local Outdoor Lighting Project Manager.

Appendix C Option C Streetlight Installation Requirements

OPTION C STREETLIGHT INSTALLATION RESPONSIBILITIES

REVISED JULY 18, 2018

This letter states the installation service requirements for Tariff Schedules 91 and 95 Option C streetlights in the Portland General Electric (PGE) service territory. Its purpose is to clarify streetlight design and installation procedures. Option C is for energy only for equipment owned and maintained by the customer. This update supersedes all previous publications.

Design Responsibilities

1. Design Layout

The customer is responsible for the lighting design which shall be approved by the municipality. PGE will determine the power source, calculate fault current as needed, and approve the conduit design from the source to the designated point of connection. PGE requires a minimum 60 day lead time as stated in the PGE Electric Service Requirements book.

2. Termination / Demarcation Point

The developer needs to work with the municipality as to what type of termination is required. There are a few different types available it is up to the municipality to make that determination. PGE needs a place to terminate their cable which can be in a non-metered pedestal (if it has a separate lockable side for PGE connections and one for customer connections) or a PGE approved junction box. Anything beyond this point is 100% municipal owned – PGE stops at the customer's pedestal or in the j-box. Contact local municipality for additional details.

Note: Customer to provide and install a non-metered disconnect near PGE junction box with conduit and circuitry plumbed into PGE junction box. PGE to make electrical connections in PGE junction box; **please specify voltage to connect**. Contact local municipality for information regarding disconnect, conduit and circuit beyond PGE connection. **Note: Panel must be inspected and approved by municipality prior to PGE energizing it.**

3. Bioswale / Rain Gardens & Trees

PGE does not allow any facilities (conduit, junction box, streetlight pole, etc) in bioswale / rain gardens. PGE does not have the resources to construct the bioswale / rain garden back to original design if a streetlight infrastructure needed replaced.

4. Design Alterations

In order to meet customer needs in a timely manner PGE must have adequate notice of design changes. When the developer, contractor, or the municipality alters the agreed upon connection point or the quantity or wattage of luminaires, it is their responsibility to notify the PGE Lighting Services Specialist in writing prior to installation. If PGE

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is not given adequate notification of design changes PGE reserves the right to bill the developer, the municipality, or the designated contractor, responsible for the installation, for any costs to PGE associated with the changes. This billing may include, but is not limited to, the cost of additional trips, corrective trenching, conduit work, and alterations to PGE design sketches.

5. Approved Materials

Street lighting junction boxes must be on PGE's approved streetlight equipment list.

TRENCH AND INSTALLATION REQUIREMENTS FROM POWER SOURCE TO CONNECTION POINT

1. Trench Excavation

- **Only PGE-approved excavation contractors and contractors who have made special arrangements with PGE will be allowed to work under a PGE street right-of-way permit. The contractor must notify the local jurisdiction 48 hours before the work is to begin. A copy of the permit must be on site.**
- The developer is responsible from the PGE power source to the designated point of connection for all trench excavation, road crossings, conduits, elbows, vaults, junction boxes, and associated permits.
- Trenches are to be 48 inches deep when shared with other utilities, and **otherwise at least 36 inches in depth.**
- An on-site preconstruction meeting is required for all projects. All conduit routes must be approved by PGE prior to installation and conduit must be inspected by PGE before backfill.
- Call PGE Service Coordinators at (503) 323-6700 to schedule a pre-construction meeting or an inspection. The developer is also responsible for all trench backfill and landscape restoration.

2. Conduits and Elbows

- All conduit routes must be approved by PGE prior to installation by the Customer, customer-installed conduit must be inspected by PGE before backfill.
- All PGE conductors are to be installed in conduit. Three-inch diameter conduit is the minimum required size for all runs, unless otherwise specified by PGE.
- HDPE duct may be used for horizontal directional boring applications. The duct must meet the requirements of PGE specification L22501 (available upon request of your PGE project manager).
 - For safety reasons, the duct must be black with three equally spaced extruded red stripes, which is a specification requirement. Aluminum couplings with barbed threads on both ends must be used to join HDPE duct sections, and straight couplings with barbed threads on one end and NPT on the other end must be used for connecting to PVC duct.
- All conduits must be gray electrical grade schedule 40 PVC, flex conduit is NOT allowed.
- All conduits are to contain a 500-pound test non-conductive pull string with 6 feet of pull string extending beyond each end of the conduit.
- Bends are to be rigid steel or PGE approved fiberglass as noted in PGE's Electrical Service Requirements book: For conduit runs longer than 150 feet, or for any length run with more than 180 degrees in bends. No more than three 90-degree elbows or a total of 270 degrees of bends in any conduit run;
- 36-inch radius elbows are required for all conduit runs longer than 6 feet.
- Sweeps must be separated by a minimum 5-foot straight section. There must be a 3-foot minimum straight section from a vault.
- All elbow bends must be factory made and all conduit and elbow ends shall be smooth and free of burrs and rough edges.

- If the power source is at a utility pole, the terminal elbow is to be installed eight inches from the pole, and attached to a PGE installed standoff bracket, at the quadrant specified by PGE.
- When a new conduit and/or pull line will be entering an existing PGE secondary vault or transformer, the installer is required to contact PGE prior to installation. A PGE crew will be scheduled to meet the installer at the site to assist with the installation. **To schedule a PGE stand-by crew, please call PGE Service Coordinators at (503) 323-6700 or toll-free (800) 542-8818.**
- **Oregon Utility Notification Center at, (800) 332-2344, 811, or online at www.callbeforeyoudig.org, must be called to locate any underground facilities at least two business days (48 business hours) prior to any digging.**
- The Customer is responsible for duct proofing all ducts installed for PGE jobs before the job is completed and before the installation of PGE conductors.

3. Junction Boxes

- All PGE junction boxes are to be 17" x 30" x 18" (available upon request of your PGE project manager), the lid must be secured with five sided Penta-head bolts.
- Minimum 6 inches of 3/4-inch minus well-compacted backfill under and around the outside of the junction box
- Customer to install a PGE-provided ground rod inside the junction box, a maximum of 3 inches of ground rod must be showing inside the junction box.
- Junction box must be set 2 inches above final grade or on the highside of the slope. Junction boxes set on a sidewalk must be set to grade.
- A minimum of twelve inches working space is to be provided between the top of elbows and the junction box lid to allow bending wire without damage to the wire.
- The elbows are to be clustered at one end of the junction box.

BILLING AND AUTHORIZATION

1. Line Extension Charge

PGE will provide and install the line extension necessary to serve the streetlights. The line extension cost is the total material and labor cost for PGE to install as necessary, the conductors, transformers, pole conduits, anchors and guying, conductor support poles, and related hardware. The line extension charge is the line extension cost less the allowance based on anticipated revenue to PGE, as approved by the Oregon Public Utility Commission in the PGE tariff. **The line extension charge is to be paid in full prior to installation unless prior arrangements have been made.** A signed Streetlight Job Cost Agreement needs returned with payment to **PGE, Attn: Line Extensions, PO Box 3340, Portland, OR 97208** with PGE's job number on the check.

2. Authorization to Energize and Initiate Billing

PGE will request Authorization (LOA) from the local municipality to energize the streetlights and begin billing for them upon installation.

If you have any questions or if we can be of any assistance please call your local Outdoor Lighting Project Manager.



PGE Corporate Headquarters
121 S.W. Salmon Street | Portland, Oregon 97204
portlandgeneral.com