

SECTION - 700
UNDERGROUND UTILITIES

700 – UNDERGROUND UTILITIES

700.00.00 – Scope

These standards apply to companies franchised or licensed by the City of Cave Junction to install and operate a utility within the city limits and are further registered as a public utility in the State of Oregon. These companies include but are not limited to companies that provide underground and overhead electric power, natural gas, communications, and television services and shall hereinafter be referred to as the "Utility". These do not normally include City utilities such as water, sewer and traffic appurtenances except by crossing.

This section shall include, but is not limited to all materials, equipment, labor and plant necessary for, or incidental to construction of or preparation for underground utilities, any above ground appurtenances so connected, the excavation and backfill of utility trenches, providing and installing conduit as required, installing conduit provided by others, and the construction of footings for street lights and utility boxes, including picking up and installing embedded or above ground items to be provided by others.

710.00.00 – General

In addition to the Public Works Department standards as set forth herein, all of the "Utility(s)" requirements shall be followed in the installation of utility lines and appurtenances. As set forth below in Section 720.00.00, Design, the designs for layout from each of the Utility Companies along with existing utility locations shall be presented on a single utility plan. The utility plan shall also include the existing and planned water and sewer locations along with street and driveway details sufficient to resolve conflicting locations.

The utility plan shall contain the signed approvals of each "Utility". All underground utilities shall be located within Public Utility Easements (PUE) or a separate utility Right of Way (ROW). In most cases the required 10-foot wide PUE(s) shall be located on the private property contiguous to the street right-of-way lines. See Standard Details ST-10 thru ST-53 and Tables 300-1A thru 300-1E for locations and dimensions.

710.10.00 – References

Pacific Power and Light (PP&L) - current standards as they may apply.

Avista Utilities (Natural Gas) - current standards as they may apply.

Qwest (Telephone Communications) - current standards as they may apply.

Charter Communications (TV) - current standards as they may apply.

OUNC - Oregon Utilities Notification Center

City of Cave Junction - current standards as they may apply.

720.00.00 – Design

720.10.00 – Street Lighting

Locations for streetlights will be as required by these standards and shall be shown on the approved project plans. The City has a contract with Pacific Power and Light (PP&L), under which PP&L supplies and installs all streetlights, including supply of the anchor bolts and bolt template(s). The ground rods, required conduit, and other fittings shall meet PP&L design requirements. These materials, including materials noted below in Section 730.00.00, shall be supplied and installed by the Developer or Contractor.

720.10.01 – Spacing

- a) Spacing for streets – Street light pole spacing shall be a maximum of 200' between street light fixtures. However, a streetlight may be placed less than 200' apart.
- b) Spacing for Cul de Sacs – Cul de Sac spacing shall be as follows:

<u>Length of Cul de Sac</u>	<u>Location of Lights</u>
0 – 100'	1 light at intersection
101' – 200'	1 light at intersection, 1 light at end of Cul de Sac
201' – 400'	1 light at intersection, 1 light at the mid-point, and 1 light at end of Cul de Sac

On major arterial streets, lighting will be required on both sides of the street. At major intersections and other intersections with wide street sections where the luminosity at street level is not sufficient to provide adequate safe lighting for vehicle and pedestrians, additional lighting may be required on both sides of the street or at opposite diagonal street corners.

All streetlight locations shall be approved by the Public Works Department prior to installation. See Section 720.10.06, Location of Above Ground Utility Appurtenances below.

720.10.02 – Streetlight Type, Luminosity and Specifications

Streetlights are separated into 2 categories: Standard (cobra head style) and Decorative (Historic District).

720.10.02.01 – Standard Lighting

Standard streetlights shall be High Pressure Sodium Vapor, Luminaire style, I.E.S type II (2) light pattern with photoelectric operating controls. Luminosity requirements and height as measured from the base to the top of fixture are as follows:

<u>Street Classification</u>	<u>Lumens</u>	<u>Min. Height</u>	<u>Max. Height</u>
Local, Res. Lanes	5800	25	27
Collector	9500	25	27
Arterial	22,000	30	32

Offsite lighting on private property adjacent to city streets shall be located and / or shielded as not to conflict with vehicular or pedestrian safety. Such lighting shall be approved by the PWD in conjunction with the Site Development Plan.

720.10.02.02 – Decorative Lighting

Where special lighting fixtures are required such as in the Historic area, the completed lighting shall provide the same amount of illumination at the street level as would the standard lighting fixtures, spacing and pole heights specified herein.

720.10.02.02.01 – Developer Responsibility

The Developer will be required to furnish and install all new street lighting as part of a new development. This will be accomplished in the following manner:

- (a) The City will furnish and install the following materials as part of the inspection and start-up process: 1 pole tag and 1 lock and tag for each electrical enclosure and junction box.
- (b) All street lights in subdivisions and land partitions must be installed complete with power-on prior to the Final Inspection(walk through) of the land division. Building permit applications will not be accepted by the City's Building Department until a "walk-through" has been conducted and all aspects of public improvements approved for acceptance by the City.
- (c) The Developer or his representative will submit 2 sets of electrical plans for review by the City of Cave Junction Public Works and Building Departments. Plans must contain the following: Site plan with luminaire locations, service location, conduit route, service 1-line, luminaire specifications, and street light foundation specifications. An electrical permit shall be issued after plan has been reviewed and approved.
- (d) Prior to request for power from Pacific Power, all street lights in subdivisions, land partitions, new developments or any other development applications must be installed complete with bases, luminaires and satisfactorily inspected by City of Cave Junction Building Department. The City of Cave Junction Public Works Department must be provided with street light electrical as-builts at this time. As-builts are required prior to submission of power request to Pacific Power.

- (e) To provide power to street lights in commercial and industrial subdivisions and land partitions, the developer may be required to install transformers in addition to the electrical backbone system. After the City of Cave Junction provides street light locations, the developer's engineer shall determine number and location of transformers, with approval by Pacific Power and the City of Cave Junction .
- (f) Surety - In those cases where surety is allowed or required, it shall be of a form acceptable to the City of Cave Junction City Municipal. The amount of surety shall be \$8500 per streetlight.
- (g) The Contractor shall call The City of Cave Junction's inspector to verify location of streetlight units at least 24 hours **PRIOR** to drilling foundations or laying conduit. The Contractor shall provide trench and backfill per City of Cave Junction Standard Drawings T-6 and lay conduit as required. All trenching is to be within public utility easements or public right of ways. The Contractor shall call for electrical inspection of trench and conduit at least 24 hours **PRIOR** to backfill. Failure to do so may result in contractor digging new trench to City requirements. The trench is to have a minimum of 18" compacted cover over lighting conduit; 2" of sand is required below lighting conduit and 2" above, for a 4" total around lighting conduit.
- (h) The Contractor shall dig and set pole foundations, per City of Cave Junction Standard Drawing SL-2. Contractor shall call City Inspector for inspection of pole foundations at least 24 hours **PRIOR** to pouring concrete. Pouring without inspection may result in contractor removing bases and installing new bases to City of Cave Junction requirements. All concrete shall be 3300psi strength after 28 days per section 930.00.00, Portland Cement Concrete. Concrete shall be poured to undisturbed soil. If concrete is poured to forms, compaction of backfill to 95% is required. A 7-day minimum curing period is required for foundation concrete before poles are to be set.
- (i) When wire is pulled, the free end in the junction box at the transformer shall be of adequate length to make the connection to Pacific Power wires. Junction box installation to be per City of Cave Junction Standard Drawings E-5. The amount of wire at the foundation shall be of sufficient length to allow contractor to make connection in the pole.
- (j) The Contractor shall not set poles until Inspector has examined all materials for conformance to specifications. Contractor shall call for inspection of material **PRIOR** to setting of pole.
- (k) The Contractor shall set light pole, install luminaire, lamp and BMC's and perform all wiring and other work necessary for a complete streetlight installation. BMC-2's are to be set per City of Cave Junction Standard Drawings E-1 through E-3. At this time, the Contractor should call City Inspector to request electrical turn-on inspection to include electrical service with breakers, junction boxes, contractor photocells, and connections at light poles. After successful turn-on inspection the City of Cave Junction should be contacted to request turn-on by Pacific Power.
- (l) Contractor will be required to repair or correct, at his expense, any problem that develops up to the time that the units are successfully placed in service by Pacific Power, including refinishing any units that have been scuffed or scratched. Use of metal chains or cables will not be permitted.

720.10.02.02.02 – Approved Materials Specifications

All Contractor supplied material used in street light installations shall be as follows:

Base Mounted Cabinet (BMC-2)

Refer to City of Cave Junction Standard Drawings E-1 through E-3 for details and specifications.

Junction Boxes

17" x 24" x 12" deep- Plastic junction box for use in dirt areas to be Carson, Inc. – 1419-12-4BE, HDPE black with lid stamped "electric" LDR lighting and hex bolts. 14" x 20" x 12" deep- Concrete junction box with lid labeled "lighting" or "electric" for use in sidewalk areas to be Christy / Utility Vault, Cat. No. 36-1017 PB with solid cover Cat. No. 36-1017C-L. Junction boxes SHALL NOT be installed in any part of a driveway, ramp, or traveled ways unless otherwise specified.

Conduit

- (a) For conduit in Arterial, Collector and Parking: All conduit in foundations will be 1-¼" rigid steel electrical or fiberglass. Conduit in trenches will be 1-¼" schedule 40 PVC electrical, unless plans specify larger size. All bends or turns in conduit will be factory rigid steel electrical 90's or 45's. All stand-alone road projects will require continuous conduit between all pole foundations.
- (b) For conduit in Residential, Walkway and Alley: All conduit in foundations will be 1-¼" rigid steel electrical. Conduit in trenches will be 1-¼" Schedule 40 PVC, unless plans specify larger size. All bends or turns in conduit will be factory rigid steel electrical 90's or 45's.

Wire

- (a) Underground circuits in conduit to be No. 8 THW/THHN stranded copper, 600 volt, unless plans specify larger size. Voltage requirements will vary according to transformer availability. The following wire requirements correspond to each voltage. Circuits in PVC conduit will require a continuous No. 6 green ground wire.

Requested Voltage:

120V
240V
277V
208V

Wiring Required:

1-hot leg, 1-neutral, equipment ground
2-hot legs, 1-bond wire, equipment ground
1-hot leg, 1-neutral, equipment ground
2-hot legs, 1-bond wire, equipment ground

Hot legs are to be black, the neutral or bond wire is to be white. No phase tape shall be allowed. Equipment ground is to be green.

- (b) Wire in poles, from pole base to luminaire, to be No. 10 THW/THHN stranded copper, 600 volt.

Fusing

All PPL owned cobrahead(or other) street lights shall have an in-line fuse connector and fuse installed in the pole hand hole, with the exception of Pedestrian lighting, where the fuse holder shall be installed in the junction box adjacent to the pole base. Decorative street lights, powered centrally by a BMC, do not require individual fusing. Each in-line fuse connector shall be supplied with a 10-amp fuse, Bussman KTKR10 or approved equal.

In-line fuse connectors to be used on 240V and 208V lighting circuits shall be designed for two pole fusing such that both poles disconnected simultaneously from both legs of the line side. The connector shall have no exposed metal parts, except the head of the metal assembly screw shall be recessed a minimum of 1/32inch below the top of a plastic boss which surrounds the head. The connector shall be designed for compression connection to the line and luminaire conductors. Screw connection will not be allowed. Split bolt or other approved crimp shall be used. NO WIRE NUTS. Crimp shall be made with proper crimping tool and shall be made watertight by use shrinktube or splice tape.

Approved in-line fuse connectors include:

- 1. TRON HEB (for 120V and 277V circuits)
- 2. TRON HEX (for 240V and 208V circuits)

Photo Electric Control

Photo electric control is to be supplied and installed by the contractor. The photo electric control manufacture will be reviewed and approved by the Public Works Department or their representative. Installation location of the photo electric control is to be reviewed and approved by the Public Works Department or their representative.

720.10.02.02.03 – Contacting Power Source

- a. For individual units, Contractor is to set junction box within 3’ of Pacific Power secondary terminal pad. When junction box is set to grade there is to be a minimum of 3” between conduit stub and top of junction box. Install fuse holder and supply sufficient wire for Pacific Power to make hook up to power source. If power source is transformer, Contractor is to contact Pacific Power to have a serviceperson standby on-site while Contractor makes entry into vault.
- b. For dip circuit, Contractor to set a junction box at Pacific Power service pole. Install fuse holder and supply sufficient wire for Pacific Power to make hook up to power source. The contractor will contact Pacific Power for a Work Order Number. Contractor is to use Work Order Number to contact Pacific Power Estimator to determine location of junction box and placement of conduit riser sweep. All riser sweeps are to be installed to Pacific Power requirements.

- c. For overhead span, contractor will attach wires to Pacific Power service pole with sufficient length to make connection to service wires.

720.10.02.02.04 – City of Cave Junction /Contractor Responsibility

The City of Cave Junction will assume ownership and will pay electrical energy costs for the new street lights as soon as the new lights are accepted and in operation. The Contractor shall warranty the workmanship and materials for a period of 24 months following acceptance by the City of Cave Junction after which the City of Cave Junction will assume total responsibility. Lighting in private areas outside of the City of Cave Junction or Pacific Power jurisdiction, shall be the responsibility of the Developer and/or the Home Owner's Association including maintenance and electrical energy costs.

These specifications may not apply to projects if they reside within a Historic District.

720.10.03 – Street Intersections

When a street of higher classification intersects a street of lower classification, the standard for the street light installation at the intersection shall be that of the higher classification.

720.10.04 – Arm Position

Unless otherwise directed, all street light arms shall be positioned at right angles to the street centerline.

Streetlights installed at intersections shall face the street with the higher street classification. If both streets are of the same classification, the streetlight shall be positioned so that the light equally illuminates both streets to the extent possible.

720.10.05 – Utility and Conduit Trench Location

- a) New Construction - In new residential and commercial developments, the major utility runs shall be placed in 4' wide trenches located at the rear of the 10' wide PUE adjacent to the right-of-way. Unless otherwise detailed or specified the trench width for street crossings and other locations of main utility runs shall be also be 4' wide. Utilities shall be arranged, separated and embedded as shown on Standard Detail U-1A, Utility Trench. The trench depth shall be measured below the finish Grades set forth on the Street Profiles or established on the Utility or Grading Plan.
- b) Existing Streets – Mainline utility conduit runs and crossings shall be established as noted in (a) above. Hookup runs and other installations shall be so arranged as to minimize trenching across or in the street section. Utilities within the existing street section shall be and arranged, separated and embedded in trenches as shown on Standard Detail U-1B, Existing Street Utility Trench.

Trenches shall be excavated to the minimum widths required for separation of utilities but in no case shall the trench width be less than 18".

720.10.06 – Location of Above Ground Utility Appurtenances

The location of existing or planned future driveway and street entrances shall be considered when locating street lights poles, overhead power poles, transformer or communication pedestals, and utility boxes. If located on street frontage, they normally shall be located near the front property corner, opposite the driveway entrance. With the exception of power poles and light poles, no structures including those noted above shall be installed within the clear vision triangle where the height of such structure or feature exceeds 42" above the top of curb and interrupts sight vision as set forth in Table 300-5 and shown on Standard Detail A-11. In addition, a 5' clear space shall be maintained in proximity of all fire hydrants.

720.10.07 – Communications Towers

This section will be written in the future

730.00.00 – Materials

730.10.00 – Utility Materials

This section will only describe utility materials common to the construction and installation of franchised utilities such as natural gas, electrical power, cable TV, and telephone/communications. All materials specific to each utility application shall be as required or specified by the "utility". Materials common to all phases of construction are described in Section 900, Construction Materials.

730.10.01 – Sand Backfill and Bedding

Sand for backfill and bedding in the 12" "bedding zone" of the trench shall be compacted, clean natural sand, such as concrete sand, plaster sand, or "reject" sand as described in Section 910.11.01(c), Bedding for Water Service lines and Utilities.

730.10.02 – Trench Backfill

- a) *New Construction* (not in a street section) – Trenches outside the street right-of-way within a Public Utility Easement (PUE) shall be backfilled with the various materials as described in Section 910.11.01 (g), Trench Backfill Outside of Street R/W.
- b) *Existing Streets, and New Construction (within a street right-of-way)* – Trenches constructed or repaired within the street section shall be backfilled with materials described in Section 910.11.01 (e), Variable Zone Trench Backfill (3/4"-0 crushed base rock) and (f), Upper Zone Trench Backfill (1 sack cement / sand slurry) as applicable.

730.10.03 – Conduit

Conduit, as required for telephone lines shall be minimum Schedule 40 PVC pipe or Schedule 80 for power lines of the sizes shown on the Plans or as described in the Special Specifications. Individual "Utility" material requirements for types and specifications of conduit or direct bury applications shall apply if in excess of the minimum requirements unless otherwise shown and approved on the plans.

730.10.04 – Embedded Items

The Contractor shall arrange to pick up the items to be embedded in the Light Pole Footings from the Pacific Power and Light Company, including ground rods, anchor bolts, conduit, and the templates.

730.10.05 – Non Embedded (above ground)

Above ground items such as light poles, transformers, telephone or communication pedestals, and utility boxes shall meet applicable industry standards and shall be supplied by the "Utility". Any such items to be placed within the street right-of-way shall be approved by the Public Works Department during the Project Utility Meeting.

Streetlights for residential and commercial applications shall be Luminaire style, I.E.S type II (2) light pattern with photoelectric operating controls.

730.10.06 – Concrete footings and miscellaneous utility structures

Concrete for light pole footings, pads and other similar structures shall conform to Section 930.00.00, Portland Cement Concrete (PCC)

740.00.00 – Construction and Workmanship

740.00.01 – General

It is the intent of these Standard Specifications that the progress of the work shall progress in a systematic and efficient manner so that as little inconvenience as possible to the public will result during the course of construction.

No work within a City right of way or easement shall commence until the Applicant has applied for and received a Public Works Department "Construction Permit" or unless during emergencies has been authorized by the PWD to conduct such work.

Prior to beginning work the Applicant or Contractor shall submit Traffic Control Plan to the PWD for approval. Once approved and prior to beginning work the Contractor shall notify the PWD and Emergency Dispatch Center of the address, periods of work, road closures and detours and other operations critical to public safety. Applicant shall obtain all utility locates in accordance with OAR 952-001-0010 through 952-001-0100. Call OUNC 1- 800- 332- 2344 or dial 811.

Except by permission of the Public Works Department, at no time shall the trenching equipment be farther than 200' ahead of each utility crew.

Backfill of the trench shall be accomplished so that no section of approved utility lines shall be left open longer than 48 – hours unless otherwise authorized by the Public Works Department. Backfill and cleanup shall be completed as each section of utility trench has been inspected, tested, and approved.

All trench excavation and backfilling operations shall be conducted in a safe manner in accordance with OSHA requirements as administered by the State of Oregon.

The Contractor shall promptly repair and re-grade all existing drainage ditches, natural drainage courses and all other drainage facilities, including culverts, damaged or removed during the construction.

The Contractor shall give prompt consideration for reopening street, roads and driveways to the public after the conduit has been installed. No traffic-way shall be closed while work is suspended over weekends or holidays and closures during workdays shall be as brief as practicable.

The Contractor shall be required to provide the necessary trained personnel and signing to control traffic for the duration of the project in accordance with MUTCD and ODOT "Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less", latest edition.

Where private accesses are to be closed, the property owner(s) shall be notified by the Contractor at least 24-hours in advance of the closure. Access for fire and emergency equipment shall be maintained at all times. Also see Section 350.20.00, Street Cutting including Curbs, Gutters and Sidewalks.

740.10.00 – Trench Excavation

740.10.01 – Existing Utility Crossing

Where the contractor discovers unmarked (un-located) existing City water and sewer lines during his excavation he shall promptly notify the Public Works Department and the OUNC per OAR 952-001-0070. In accordance with other applicable sections of these Standard Specifications the Contractor shall be required to support, repair or cause to be repaired such "unmarked or "un-located" utilities, including protection of the pipe or utility. Where the City utility has been "located" and "marked" on the street surface the repair of damage shall be at the Contractor's expense. In the case of substantiated cases of "un-marked" or "un-located" City utilities, the Contractor may submit a billing invoice for repair expenses in accordance with City procedures. Regardless of fault, repairs to City waterline will be completed by City forces.

If the pipe or utility is not damaged, a "warning mound" of sand shall be placed immediately above the facility to a depth of 12" and marked with a heavy duty, highly

visible highly visible metallic/ plastic locating tape laid across the full width of the trench before backfilling with the specified materials. The requirements for the plastic locating tape are described in Section 960.00.00, Miscellaneous Materials.

740.10.02 – New Development

In new residential developments the major utility runs shall be placed in 4' wide trenches located at the rear of the 10' wide PUE adjacent to the right-of-way. Unless otherwise detailed or specified the trench width for street crossings and other locations shall be 4.0' wide. Utilities shall be arranged and embedded as shown on Standard Details U-1A and U-1B, Utility Trench. The trench depth shall be measured below the finish Grades set forth on the Street Profiles or established on the Utility or Grading Plan. Excess excavated materials shall be disposed of as set forth in Section 330, of these Standard Specifications.

740.10.03 – Existing Street Trench Excavation

Trenches shall be excavated as shown on Standard Details U-2, Existing Street Utility Trench and T-1, Trench Section Under Existing Paving, to the minimum widths required for separation of utilities. The minimum trench width below the pavement shall be 18". Also, refer to Sections 350.20.00, Street Cutting including Curbs, Gutters and Sidewalks, and 350.20.02, Curb, Gutter and Sidewalk Cuts. Excess excavated materials shall be disposed of as set forth in Section 330, of these Standard Specifications.

740.10.04 – Shoring, Sheet piling and Bracing

The Contractor's "competent person" shall determine all requirements, including but not limited to, equipment, materials, shoring, sheet piling, bracing, trench widths, trench slopes including any methodology or techniques thereof in order to comply with all applicable OR-OSHA provisions and requirements for trench excavation and related activities.

Trench support shall remain in place until the pipe has been placed, inspected, tested, and repaired if necessary; and until the backfill in the pipe zone has been placed and compacted as specified to a minimum of 6" above the top of the pipe.

740.20.00 – Trench Bedding, Pipe Zone and Backfill

740.20.01 – Bedding and Conduit Zone Materials

Conduit and Direct Bury – Unless required by the "Utility" and approved by the PWD, all material used in the bedding and to 8" above the conduit ("conduit bedding zone") shall be clean sand as described in Section 910.11.01(c), Bedding for Water Service Lines and Utilities.

740.20.02 – Trench Backfill Materials

- (a). *New Street construction* – All utility main runs and crossings installed within the Rights of Way for newly constructed streets shall be back filled above the “conduit bedding zone” to the top of sub-grade with ¾”-0 crushed base rock as described in Section 910.11.00, Trench Backfill and Bedding Aggregate, of these Standard Specifications.
- (b). *Existing Paved Streets and Shoulders* – All main utility runs and crossings installed, repaired or modified within the existing street section including sidewalks or adjacent shoulders shall be back filled according to Standard Detail U-1B. Extending 3’ down from finished grade (upper zone), uncompressible one (1) sack sand / cement slurry mixture as described in Section 945.00.00, Cement-Sand Slurry, shall be used. Variable zone may be ¾”-0 crushed rock or Cement-Sand Slurry as above. Paving materials shall meet the requirements of Section 925.00.00, Hot Mix Asphaltic Concrete Paving (HMAC). Also refer to Sections 350.20.00, Street Cutting including Curbs, Gutters and Sidewalks, and 350.20.02, Curb, Gutter and Sidewalk Cuts.

Trenches within non-adjacent shoulders, but not under any portion of the paved street section shall be back filled with ¾”-0 crushed rock meeting the requirements of Section 910.11.00, Trench Backfill and Bedding Aggregate.

- (c). *Natural Ground* – Utility main runs and crossings above the “conduit bedding zone” and outside the street Rights of Way may be back filled above the pipe zone with materials described in Section 910.11.01 (g), Trench Backfill Outside of Street R/W.

740.20.03 – Trench Backfill Compaction

Within the street Right of Way, above the “conduit bedding zone”, backfill conforming to the requirements of Section 910.11.00, Trench Backfill and Bedding Aggregate, and as illustrated by Standard Detail U-1B, Utility Trench, shall be placed and compacted in lifts not exceeding 8” in depth. The PWD may authorize the installation of increased lift thickness where high frequency vibrators mounted on large excavators are used. After backfill has been placed and compacted as required, contractor shall utilize a “T-Cut” method on the existing asphalt, in which the asphalt is cut again a minimum of 6” wider than the existing trench wall, on both sides, including any undermined areas. Exposed road bed will then be satisfactorily compacted, as determined by the Public Works Department, or their representative, prior to paving the trench.

In all cases, the backfilled trench sections shall be compacted to the following densities:

New street sections - From finish sub-grade elevation (*upper zone*) to the top of the variable zone or the “conduit bedding zone”, whichever is less, the ¾”-0 crushed rock backfill above the pipe zone shall be compacted to a minimum of 95% of maximum density AASHTO T-99(A). On existing streets the upper zone backfill section is

measured as 2-1/2' from finished pavement to the top of the conduit zone since there usually is not a layer of sub-base material being placed.

From the top of the "conduit bedding zone" to a level 3' below the top of sub-grade (variable zone), the ¾"-0 crushed rock backfill above the pipe zone shall be compacted to a minimum of 90% of maximum density AASHTO T-99(A).

Existing Streets - Under all existing paved street sections a 1 sack cement-sand slurry mix as conforming to Section 945.00.00, Cement-Sand Slurry shall be used as backfill in the upper zone as shown on Standard Detail T-1. Also see Section 350.20.00, Street Cutting including Curbs, Gutters and Sidewalks.

Public Utility Easements – Unless otherwise directed, backfill above the conduit-bedding zone shall be placed in lifts not exceeding 12" in depth and compacted to the following densities:

From the top of the conduit-bedding zone to finish grade, the backfill above the conduit zone shall be compacted to a minimum of 90% of maximum density. AASHTO T-99(A) shall be used in accordance with the type of backfill material installed. The type of backfill material used may be approved select native material, ¾"-0 crushed rock or decomposed granite. Muck, vegetative material, or other incompetent materials shall not be installed.

Open Ground – In trenches outside of the street Right of Way and adjacent PUE, selected excavated native materials shall be placed in the trench above the bedding zone to a level approximately 6" below finish grade, leveled out, and shall then be mechanically tamped or wheel-rolled, using rubber-tired equipment such as an approved loader, dump truck, or backhoe, making at least 3 passes along the trench.

After compacting as specified, the trench shall be refilled to 4" to 6" above the finish grade, and shall then be wheel-rolled again. The surface of the ground at the trench and adjacent to the trench shall then be brought to a smooth finish grade with excess excavated materials spread evenly over the surface. The Contractor shall protect the Utility stub-outs and other structures during backfilling.

740.20.04 – Construct Light Pole Footings

Excavation - The excavations for the light pole footings for PPL owned Cobra Heads shall be made at the locations shown on the plans and on Sheet SL-2 of the Uniform Standards. If within a HISTORIC DISTRICT decorative light pole footings shall be constructed in accordance with approved engineering plans. The excavation may be made using an appropriate sized auger, and cutting out the corners with a shovel, bar, or other appropriate hand tools. Small side excavations shall be made to accommodate the conduit, as detailed. All loose soils shall be removed from the entire excavation before pouring concrete.

Forming - The top 4" of the footing shall be formed to the required dimensions, leveled with the rear edge of sidewalk unless other wise shown on the plans or approved. A 2" space is required between the light pole footing and edge of sidewalks, curbs or other

similar concrete structures to accommodate forming and prevent cracking of the adjacent structure.

The footing shall not be formed below ground. If the footing is over-excavated, it shall be backfilled with concrete at the time of the pour.

Placing Embedded Items - The anchor bolts, copper ground rod, and conduit for the light pole footing shall be properly located and firmly supported using a template provided by the utility.

Pouring Concrete - Concrete meeting the requirements of Section 930.00.00, Portland Cement Concrete shall be poured into the prepared excavation taking care not to displace the embedded utility items and anchor bolts. The concrete shall then be thoroughly vibrated and tamped. Concrete shall be poured neat against undisturbed earth except at the conduit extensions, and shall be poured to finish grade as shown on Standard Details, with bolts extending as directed by the appropriate standard detail, and the conduit and ground rod extending above the finish concrete, as directed by the appropriate standard detail.

Finishing and Grouting - Surface of the exposed concrete footing shall receive a medium broom finish. The space between the top of the footing and bottom of the pole anchor plate shall be filled with a cement-sand grout mixture and troweled to a 45-degree bevel. The wet grout shall be brush finished to a smooth appearance.

750.00.00 – Inspection

750.10.01 – Requirements

Prior to pouring the concrete footings, the Contractor shall arrange for an inspection. The PWD will inspect the footing excavations and the required forming to assure proper location and grade. The PWD may require testing to determine the strength of the concrete. The cylinders for testing will be taken at random by a materials testing laboratory approved by the PWD.