City of Stevenson
Design Standards for Street Lighting Arterial & Residential Applications

Introduction

The purposed of the City of Stevenson Design standards for Street Lighting, (here after referred to as design standards), is to provide consultants and contractors with a guideline for preparing plans and specifications and construction street lighting facilities within the City of Stevenson.

These design standards are intended to insure compatibility of equipment for ease of maintenance with reduced cost and uniformity of lighting system design throughout the City.

These design standards shall take precedence over the State of Washington Standard Specifications (here after referred to as standard specifications), for road and bridge construction where difference may occur. Where there is no reference in the Design Standards the Standard Specifications shall apply. Any reference to the Standard Specification shall refer to the current edition.

Any request to vary these standards or any questions regarding applications or clarification shall be directed to:

City of Stevenson
Department of Public Works
7121 E Loop Road
PO Box 371
Stevenson, WA 98648

Note: Any variation shall require the written approval of the Public Works Director. All references to "detail sheets" shall refer to the appendix sections of this document.

Light Poles

Light poles in all applications shall be spun aluminum davit style poles. Refer to detail sheets for pole detail requirements. Pole welding shall conform to the SS.

The pole shaft shall be provided with a 4" x 6" flush hand-hole near the base provided with a matching metal cover secured with stainless steel screws or bolts. The hand-hole shall be located near the base and on the same side of the pole as the davit are. A grounding nut or provision in the hand-hole frame for accommodating a threaded bolt for the purpose of attaching a grounding connector shall be provided on the inside or the shaft.

All poles and davit arms shall be designed to support a street light luminaire with a minimum weight of 50 lbs. And to withstand pressures caused by wind loads of 90 miles per hour with gust factor of 1.3.

The City has determined that decorative street light standards will be required for certain developments and/or projects and may be required for others. Roads planned for future upgrades with decorative lights include, but are not limited to Russell and Cascade avenues. All lumen coverage shall meet current City Standards.

The City's decorative street light standards are listed below with the manufacturer's (Holophane) catalog numbers for poles and fixtures. Acceptable colors for light poles are dark green or black.

Specifications for tall pole with banner arms and weather proof receptacle
POLE – KW21F5/20-CAIDG-RS/GFIIWPIS Kentwood series 21' pole with 5 inch fluted shaft and 20" base for use with GAC48/1-CAIDG-BAB24H1.75CO-CAIDG and EBCO Banner to be mounted at top 16' and 30" down (at13.5') Banner: 22 x 30. Pole will be used with 3/4" anchor bolts that are to be supplied. Includes weatherproof receptacles at top of pole.

Specifications for tear drop fixture on tall pole
FIXTURE - ES15AHP24N4. Esplanade style luminaire, 150 Watt/55 Volt High Pressure Sodium, Mogul Base Socket, 240 Volt, Green or Black Finish, Teardrop Type IV Glass Door.
Specifications for arm/fitter on tall light pole
FITTER- BHLF200-CNGN. Boston Harbour fitter, Dark Green or Black.

Specifications for shorter pole which includes flagpole holder
POLE - KWI4F5/20-CAlDG RS/GRIIWPIS FPH.75/CO-5.0 CAIDG. Kentwood series pole 14
feet, 5" fluted shaft with 20" base, Dark Green or Black with weatherproof receptacle at top of pole. Flag
Pole holder, clamp on style. Price includes 3/4 " anchor bolts.

Specifications for post light fixture
FIXTURE – WFC15AHP24NC3S. Washington Full Cut-off, 150 Watt/55 Volt High Pressure Sodium,
Mogul Base Socket, 240 Volt, Green or Black Finish, Asymmetric, Type IV, Gold Finish, Band,
Medallions, and Spike Finial.
Specifications for light shields
SHIELD - WHS-120. House side shields.

Davit Arms
The davit style arm length specified shall allow the luminaire head to overhang the curb a minimum of two feet to a maximum of four feet. The Arm, to insure a total height of 30 ft. shall incorporate a 5'9" radius bend as measured from the centerline of the shaft. The outer portion of the arm shall be nearly horizontal to +2° above horizontal and shall be furnished with a 2" diameter slipfitter with a maximum length of 8" to fit the luminaire specified.

The pole end of the davit arm tube shall be fastened securely to the top of the shaft producing a flush joint with and even profile.

Anchor Base

A one-piece anchor base of adequate strength, shape and size shall be secured to the lower end of the shaft so that the base shall be capable of resisting at yield strength stress the binding moment of the shaft at its yield strength stress. The base shall be provided with four slotted or round holes to receive the anchor bolts. Nut cover shall be provided with each pole.

Anchor Bolts

Four high strength steel anchor bolts, each fitted with two hexnuts and two washers, shall be furnished with the pole. Each anchor bolt shall have a 4" "L" bend at the bottom end and be threaded at the top end. Threaded ends, all nuts and washers shall be hot-dip galvanized. The anchor bolts shall be capable of resisting at its yield point the bending moment of the shaft at its point.

Luminaires

Luminaires shall have a cast-aluminum housing providing for slip-fitter and mounting capable of adapting to 2-inch diameter pipe tenons.

There shall be an internal 240 volt regulator-type ballast (high power factor). The ballast shall be pre-wired to lamp socket and terminal board. The ballast shall have an allowable voltage variation of less than 10%.

The luminaire shall have a gasket between refractor and reflector. A gasket or filter material shall be placed between the lamp socket and the reflector.

The lamp sockets shall be adjustable and factory set to produce IES patterns as required. The standard refractor shall be made of heat and impact-resistant glass.

Luminaires shall be of the cobra head style with and ovate refractor (dropped lens) for arterials and a clear flat lens for residential roadway applications. The luminaire shall include the power door feature.

The manufacturer's name or symbol shall be clearly marked on each luminaire.

All cobra head style luminaire installed shall be 100/200 watts as specified.

Luminaires will have the ability to produce 0.3 t 1 foot candle with 0.6 foot candle being the preferred standard.

Note: See Attached Foot Candle Chart.

Each luminaire shall have a weather-resistant, ANSI-approval decal attached to the ballast housing so as to be readily visible from the ground. The decal shall be approximately 3 inches square and the legend shall be a minimum of 2 inches in height.

The decal shall be gold in color with lamp wattage indicated by the following numerical legend:

7 for 70 watts	25 for 250 watts
10 for 100 watts	31 for 310 watts
15 for 150 watts	40 for 400 watts
17 for 175 watts	70 for 700 watts
20 for 200 watts	X1 for 1,000 watts

All luminaries shall have their components secured to the luminaire frame with stainless steel mounting hardware (nuts, bolts, washers, hinges, etc.). The housing, complete with integral ballast, shall be weather-tight.

Illumination System

Electrical Service Cabinet (to be used with multiple lights)
The service cabinet shall be fabricated from galvanized cold rolled sheet steel, with 12 gauge used for exterior surfaces, and 14 gauge for interior surfaces. Door hinges shall be the continuous concealed piano type and no screws, rivets or bolts shall be visible outside the enclosure. The finish shall be a factory prepared baked-on enamel which is gray in color. The galvanized surface shall be etched before baked-on enamel is applied. The electrical service cabinet door shall be fitted for a Best Internal EX-1 lock.

The cabinet shall have ventilation louvers on the lower and upper sides complete with screens and filters. They shall also be rain tight and have gaskets.

Electrical equipment in the cabinet shall be in accordance wit the detail sheet.

The following items shall be features within the cabinet:

1. Main Circuit Breaker
2. Branch Circuit Breakers.
3. Utility Plug (120 volt – 20 Amp) G.F.I. Type
4. Light control Test Switch (120 volt – 15 Amp)
5. Contractor relay for each circuit.
6. Double pole branch breaker(s) for lighting circuits (240 volt)
7. One 120 volt, 20 Amp single pole branch breaker (for Utility plug)
8. Type 3 – Single phase 120/240 volt grounded neutral service
9. Complete provisions for 16 breaker poles.
10. Name plates phenolic black with white engraving except the main breaker which shall be red with white lettering. All name plates shall be attached by S.S. screws.
11. Meter base sections are unnecessary.

Conductors
Illumination circuits shall consist of two conductors. The circuit conductors shall be insulated with THW grade plasticized polyvinyl chloride compound or an approved equal. Wire size shall be sized in accordance with the electrical code and the voltage drop shall not exceed the manufacturer's specifications.

The wire conductor inside the street light standard from the quick disconnect fuse to the luminaire head shall be a 600 volt conductor, solid or stranded copper wire size #12 AWG insulated for 600 volts.

There shall be a minimum of 3 feet of slack wire between the luminaire and each splice kit.

Service

The electrical service for contactor type systems shall be 120/240 volt, 3 wire, 60 cycle A.C., and for individual controlled photo cell systems, 240 volt, 2 wire, 60 cycle A.C. The electrical power service point shall be verified with electrical utility and noted on plans.

Fuse Kits

Fuse holders shall be S.E.C. style waterproof, quick disconnect type. Fused quick disconnect kits shall provide waterproof in line fuse protection. All connections shall be made with compression fittings. Upon disconnect, fuse shall remain in the load side of the kit..

The fused shall be located in two locations, the first being inside the hand hole at the base of the pole and the second being provided for the whole lighting circuit shall be located in a type "B" junction box as near as practical to electrical utilities vault which provides the source of power for the lighting system.

Fuses furnished for all lighting circuits shall be capable of handling the operating voltages of the circuit involved and have the characteristics as specified in the SS.

Splice Kits

The splice kit shall consist of a pressure type device where the connection of the wire in the kit is achieved by crimping or by compression bolt. No twist on connectors are allowed. After the splice kit has been installed, the outer shell shall be filled with a clear epoxy to from a water tight seal. All material used in the splice kit shall be compatible with the wire used in the lighting system.

Photo Cell

The photo-cell shall be a solid state device with stable turn-on values in the temperature range -55°C to +77°^C. the photo-electrical cell shall be a plug in device mounted externally on top of the luminaire. In a contactor control system, the photo-cell to control the system should be mounted on the nearest luminaire to the contactor cabinet.

Grounding

Each street light standard as well as the service cabinet shall be grounded to a copper clad ground rod 5/8" diame4ter x 8' located in the nearest junction box.

Junction Boxes

Junction boxes to be provided and installed shall be Design "B" and shall conform to specifications shown in the detail sheet.

A junction box shall be provided at the power service point, each pole, and each junction splice point.

The pole junction box shall be located adjacent to pole foundation separated by 5 feet and conduit sweeps into the junction box shall begin 19 feet from the box. The junction box shall be mounted within a concrete slab with a minimum of 1 foot perimeter around the junction box and a 4 inch thickness. An expansion pad should be mounted between the concrete perimeter slab and the back edge of the sidewalk.

The inscriptions on the covers of the junction boxes shall be as follows:

Street lighting only: "LIGHTING"
Street lighting and traffic signal facilities: "TS-LT"

Letters of the above shall not rise above the covers top surface.

Conduit

Conduit in all roadway sections shall be P.V.C. Schedule 80 and all other conduits shall be P.V.C. Schedule 40. Minimum size of conduit shall be 1 ½ inch. Runs requiring larger conduit shall be as specified per code.

Trenching

Trenching for conduit runs shall be done in a neat manner and the trench bottom shall be graded to provide a uniform grade with a width as required and a depth as required to insure a minimum of 24 inches of cover from the finished grade.

Plans

The plan for all projects shall be provided with professional quality workmanship on 22" x 34" sheets of Mylar. Calculations for voltage drop, lighting level and uniformity ration for the system are to be submitted with the plans.

The plans shall be prepared to include the following:

Construction Notes

1. The Contractor shall submit a request for materials approval at the earliest possible date.
2. As-Built drawings will be required on completion of all projects.
3. The Contractor shall notify all utilities regarding their facilities located within the project limits 48 hours prior to commencing work.
4. The Contractor shall be responsible for any damage to existing utilities. The Contractor shall notify the affected utility and the City immediately upon damage.

Light Poles & Luminaire

1. Location
2. Dimension
3. Size
4. Other pertinent information as indicated in the detail sheet.

Illumination System

1. Location of facilities
2. Dimensions
3. X-Sectional view of underground facilities, trenching, and pole location as specified in detail sheets.

MISCELLANEOUS

Warranty

All equipment furnished shall be guaranteed against component failure for a period of one year following acceptance by the City.

Testing

Testing of the entire system shall be performed. Any defects noted shall be corrected before final acceptance.

Bill of Sale (Only on Non-City contracts)

When the lighting system has been completely tested and all deficiencies corrected, a bill of sale shall be provided to the City. The City shall then supply a letter of acceptance for release of bondage on the project. The bill of sale shall include the following:

1. Number of poles
2. Number of luminaires
3. Number of junction boxes
4. Contractor cabinets
5. Statement identifying all necessary appurtenances (wire, conduit, etc.)

Materials to be Approved

1. Street light standards
2. Luminaire
3. conductors
4. Junction boxes
5. Conduit
6. Control contactor cabinets
7. Fusing and splicing materials

I.D. (Identification for Poles)

The contractor shall supply and install a combination of 4 digits and one letter on each light pole. The letter and numbers combination shall be mounted at the 15 foot level on the pole facing approaching traffic. Legends shall be sealed with transparent film, resistant to dust, weather and ultraviolet exposure. The decal markers shall be 3 inch square with gothic bold, white reflectorized 2 inch legend on a black background.

ID number will be assigned to each pole at the end of the end of the contract of project by the City Public Works Director.

Cost for the decals shall be considered incidental to the contract bid.

MATERIALS TO BE APPROVED

Manufacturer

1. Street Light Standards _____
2. Luminaire _____
3. Conductors _____
4. Junction Boxes _____
5. Conduit _____
6. Control Contactor Cabinets _____
7. Fusing and Splicing Materials _____
8. ID Decal Mark for Poles _____

LUMINAIRE SPECIFICATIONS

This specifications covers the requirements for a street lighting luminaire with integral ballast, for use with a horizontal burning High Pressure Sodium.

DETAILED REQUIREMENTS

1. Housing
    a. The housing shall be a precision aluminum die cast. This housing shall enclose the slipfitter, reflector, lamp socket terminal board and ballast components.
    b. Provision shall be made on the top hosing to permit leveling of the unit.
    c. The housing shall be of adequate size to allow for operation of all the components within their designed cooperating temperatures.
    d. Housing shall be able to withstand 1000 hour salt spray test. Per ASTM 117.
    e. The housing shall have an acrylic base electrocoat finish, the color to be ASA 70 gray.
2. Slipfitter
    a. The slipfitter shall be suitable to accept a 1 ¼" to 2" pipe and shall contain a pipe stop.
    b. Clamping and leveling of the luminaire to the mounting pipe shall be from within the unit.
    c. No rearrangement of parts or separate parts shall be required when mounting the unit to either 1 ¼" or 2" pipe.
3. Lamp Socket
    a. The lamp socket shall be a mogul porcelain enclosed. The rating of the socket shall exceed the lamp starting voltage.
    b. The screw shall contain integral lamp grips and the center contact shall be non-cautilever spring loaded.
    c. The socket shall be adjustable to any of two vertical and four horizontal positions.
    d. Socket shall conform with TDG-147 specification of EEI standards.
4. Reflector

a. The reflector shall be of aluminum hydro-from construction finish with the Alglas process.
b. The reflector shall be rigidly mounted within the housing to assure a firm surface for proper sealing when the unit is closed.
c. Gaskets between the reflector and glassware shall be made of Ethylene Propylene Diene Monomer Rubber. The optical assembly shall also contain an activated charcoal filter to be effective both mechanically and chemically in removing airborne particulate and gaseous matter and assure proper breathing of the optical assembly. This filter shall be so located so as not to interfere with the light distribution.

5. Refractor
    a. The refractor shall be of borosilicate prismatic glass.
6. Door Glass Holder Door
    a. The door glass holder door shall be secured and hinged to the upper housing at one end and latched to the upper housing at the opposite end with a spring loaded stainless steel latch piece. The latch shall be of such size as to permit opening by a lineman when working with lineman's gloves when the luminaire is mounted either in its normal position or upside down.
7. Terminal Board
    a. The terminal board shall be molded of Fiberglass Reinforced Polyester-protective barriers between each terminal
    b. The terminal screws shall be or the captive type and each screw shall be equipped with wire grips which will automatically be raised and lowered as the terminal screw is operated. Terminals shall be capable of accepting up to #6AWG conductors.
    c. All components are to be prewired to a single terminal board requiring only customer connections to clearly identified terminals.
    d. Terminal Board shall be a Dead Back design with no exposed electrical components.
8. Hardware
    a. All hardware shall be of non-corrosive or suitably protected metal, plated where necessary to prevent electrolytic action by contact with aluminum.
9. Ballast
    a. The ballast shall be of the built-in design mounted within the luminaire in such a manner that it can be easily disconnected by simple disconnecting plugs.
    b. The ballast and other auxiliary equipment shall be mounted on a separable die-case component of the luminaire to facilitate replacement.
    c. The High Pressure Sodium ballast shall be of the Magnetic Regulator design rated for _____ volts.
    d. Ballast core laminations shall be of high quality electrical grade steel welded together to minimize noise and assure trouble free operation over the life of the luminaire.
    e. Ballast coils shall be precision wound on formed insulating bobbins and terminals shall be of a push on type connection.

f. Components to provide the high starting voltage required by the High Pressure Sodium lamp shall be mounted on a plug in assembly for easy servicing.

g. General compliance with lamp specifications. The ballast shall be capable of starting and operating one (200, 250,310 or 400) watt High Pressure Sodium lamp from a nominal (120, 208, 240, 277 or 480) volt 60 hz. Power source within the limits specified by the lamp manufacturer. The ballast, including starting aid, must protect itself against normal lamp failure modes. The ballast shall be capable of operating with the lamp in an open – or shore circuit – condition for six months without significant loss of ballast life.

   The fixture manufacturer shall submit a statement to the effect that the ballast to be furnished is in full compliance with lamp ballast specifications available to the fixture manufacturer from the lamp manufacturer at the time of bidding.

   Lamp Wattage. For nominal line voltage and nominal lamp voltage, the ballast design center will not vary more than 5% from rated lamp watts.

   Regulation. At any lamp voltage, from nominal through life lamp wattage regulation spread, that lamp voltage shall not exceed 18% for ± 10% line voltage variation.

   The luminaire manufacturer will supply ballast electrical data and lamp operating volt watt traces for nominal and ± 10% rated line voltage to verify ballast performance and compliance with lamp specifications, for the rated life of the lamp.

   Starting requirements. The ballast must reliably start and operate the lamp in ambient temperatures down to 40°F for the rated life of the lamp.

   Ballast primary current during starting must not exceed normal operating current.

   Lamp Current Crest Factor. Te lamp current crest factor shall not exceed 1.7 for ± 10% line voltage variation at any lamp voltage, for nominal through life.

   Ballast Poser Factor. The power factor of the lamp-ballast system, shall not drop below 90% for 10% line voltage variations at any lamp voltage, through life.

   Capacitor Variance. The ballast design shall be such that the normal manufacturing tolerance for capacitors of ± 6% will not cause more than a ± 8% variation in regulation through rated lamp life for nominal line voltage.

10. Photoelectric Receptacles.
    a. Luminaries with photoelectric receptacles shall be in accordance with EEI-NEMA standards and prewired to the terminal board and quick disconnect plugs and shall be adjustable without tools.
11. Photometric performance
    a. When used with the (200, 400) High Pressure Sodium Lamp, the luminaire shall produce a .03 to Foot candle light distribution. With .06 being the preferred standard, the photometric performance of the luminaire shall as a minimum conform to the appropriate following table.

City of Stevenson
Design Standards for Street Lighting Design of
Arterial & Residential Streets

Project Title: _____

Project Location: _____

Date Project Initiated: _____

Note: The Designer of the above stated project does affirm he has red the enclosed standards for street lighting and will comply with the standards as set forth in all manners described herein.

_____
(Please print name)

_____
(Designer's Signature)

_____
(Address)

_____
(City, State & Zip)

_____
(Phone #'s)

PUBLIC WORKS DEPARTMENT