

**CORPORATION OF THE TOWNSHIP OF ESQUIMALT**  
**SUBDIVISION AND DEVELOPMENT CONTROL BYLAW**  
**SCHEDULE 'D'**  
**DESIGN AND CONSTRUCTION SPECIFICATIONS**  
**STREET LIGHTING**

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**CORPORATION OF THE TOWNSHIP OF ESQUIMALT**  
**SUBDIVISION AND DEVELOPMENT CONTROL BYLAW**

**SCHEDULE 'D'**

**L-1**

**STREET LIGHTING DESIGN STANDARDS**

**1.0 Scope**

1.01 A system shall be designed and installed to provide lighting of a type and intensity as hereinafter specified, on all roadways and walkways.

**2.0 Basic Design Criteria - Lighting Levels**

2.01 All facilities shall be designed and installed in accordance with good current Engineering practice, and complying to the current B.C. Electrical Code. Not limiting the foregoing, the following basic design criteria shall be used:

	<u>Horizontal Average Illuminance</u>	<u>Uniformity Avg./Min.</u>	<u>Average Illum.</u>
<b>a) <u>Roadways</u></b>			
Provincial Arterial	15	3:1	
Major Road	12	3:1	
Collector	10	3:1	
Local Road	6	6:1	
<b>b) <u>Walkways (bikeways)</u></b>			
Residential	3.5	10:1	3
<b>c) <u>Cross Walks</u></b>			
<b><u>Mid Block</u></b>			
Provincial Arterial	30	3:1	22
Major Road	24	3:1	22
Collector	20	3:1	22
Local Road	12	3:1	22
<b><u>Intersection</u></b>			
Provincial Arterial	60	3:1	11
Major Road	48	3:1	11
Collector	45	3:1	11
Local Road	45	3:1	11

**d) Intersections**

To have the horizontal average illuminance of the two streets added together.

The average vertical illuminance shall be achieved throughout the approach side of the crosswalk area which includes an off-road area of at least 2.5m depth.

The vertical illuminance criteria is for the approach vehicle side of the pedestrian measured at 1.8m above grade.

- 2.02 The light levels specified are minimum for normal conditions. The Engineer shall increase levels to suit conditions where visibility is restricted and shall take into account trees and other objects that may reduce the effectiveness of the lighting scheme.

**3.0 TYPE OF LIGHTING**

3.01 Ornamental Lighting

Ornamental lighting shall be provided on all roadways and walkways not specifically designated by the Township of Esquimalt for overhead power lines.

The type of standards, luminaries, lamps, underground wiring, etc., shall be as hereinafter specified.

3.02 Non-Ornamental Lighting

Luminaries may be attached to power poles on roadways designated by the Township of Esquimalt for overhead power lines, provided that davit arms of sufficient length are installed to bring the fixture to the edge of the travelled portion of the roadway. Failing the above, ornamental lighting shall be provided. Special overhead pole lines for street lighting, or additional wood poles to accommodate span wires, are not permitted. The type of luminaries, lamps, etc., shall be as hereinafter specified.

**4.0 STREET LIGHTING STANDARDS FOR ORNAMENTAL LIGHTING**

- 4.01 All standards shall be steel, of the type shown in the following table, and of a model approved by the Township of Esquimalt Municipal Engineer.

Application	Type	Minimum Mounting Height	Maximum Height
Provincial Arterial	Davit Arm	10 m	13 m
Major Road	Davit Arm	9 m	13 m
Collector	Davit Arm	5.5 m	6.5 m
Local Road	Post Top	5.5 m	6.5m

**NOTE:** All standards situated within nine (9) metres of the travelled portion of a roadway shall be designed to shear under high impact.

- 4.02 All standards shall have heavy dipped galvanized finish.
- 4.03 All standards must be certified for wind loadings suitable to the exposure of the location, but not less than 160 kmh.
- 4.04 The general arrangement of standards shall be decided upon by the Township of Esquimalt Municipal Engineer in consultation with the Owner's Consulting Engineer prior to design approval.

## **5.0 LUMINARIES**

- 5.01 Luminaries shall be specially designed to accept the type and size of lamp proposed, and with a distribution pattern suited to the street width and location of the fixture. They shall be equipped with a closed refractor and be of a design approved by the Township of Esquimalt Municipal Engineer.
- 5.02 Luminaries and all electrical components must be C.S.A. approved.
- 5.03 Street luminaries shall be so placed and of distribution type to avoid excessive light pollution to residences. I.E.S. Type V distribution should only be used where no residences would be adversely affected.
- 5.04 Post top luminaries shall be one piece die cast aluminium with integral pole top adapter, containing the ballast and photocell (where required) within the

luminaire housing. The prismatic refractors shall be polycarbonate. The refractor shall be secured to the luminaire to totally seal the luminaire but allow movement if impacted. The luminaire shall have captive hinged lid and the lid shall be secured to the luminaire by metal rods, and not be supported by the refractor. Pre-approved luminaire is Crouse-Hinds PTA series.

- 5.05 Davit mounted street luminaries to be smooth cast aluminum housing with prismatic polycarbonate refractor and one piece die formed alzak finished aluminum reflector. Luminaire should be natural aluminum finish and have hinged housing for access to lamp and ballast. The photocell socket shall have adjustable twist lock receptacle and be sealed when not used. The Crouse-Hinds OV series is pre-approved.

## **6.0 LAMPS**

- 6.01 Unless otherwise approved by the Township of Esquimalt Municipal Engineer, all lamps shall be high pressure sodium, having a minimum rated life of 20,000 hours.
- 6.02 The lamp sizes shall be 70, 100, 150 or 250 watts and universal mounting.

## **7.0 BALLASTS**

- 7.01 The ballasts shall be 120 volt supply and have 55V lamp voltage for 70, 100 and 150 watt size, 100V lamp voltage for 250 watt size.
- 7.02 The ballasts shall be auto regulating type, with Class H insulation. The ballasts shall have push-on connectors to simplify maintenance.

## **8.0 CONTROLS**

- 8.01 Photocell control may be used to operate luminaries without contactors, but the maximum current carried by the photocell contacts shall not exceed 50% of the rated capacity.
- 8.02 Controls shall be provided on all street lighting. Use service base for davit type installation per Detail L4. For pole top luminaries, the controls may be contained within the pole, except the main disconnect shall be mounted externally as shown in L3, and to the current Electrical Code.
- 8.03 Wiring from B.C. Hydro Service to main disconnect shall be run in raceway

internal to the pole. The raceway within the pole to be P.V.C. conduit or liquid tight flexible conduit.

- 8.04 Luminaries shall be controlled in groups, with H.O.A. control for inspection installed in poles or service bases at each main service point.
- 8.05 The main disconnects shall be secured to the pole with at least two 6.3 mm self-tapping screws. The main disconnects shall be able to be locked off using a padlock. The main disconnects shall be enclosed in a gasketed weatherproof enclosure (EEMAC4). Any exposed fastening shall be the oval head tamper proof type.
- 8.06 Where less than three (3) lights are involved in the system, and where possible, the luminaries shall be connected to an existing adjacent luminaire controlled by an exiting controller. If this is not possible then the luminaries shall have individual photo-electric controls.

## **9.0 UNDERGROUND WIRING**

- 9.01 All duct work and wiring shall be in accordance with the requirements of the B.C. Electrical Code. Not limiting the foregoing, the following are the Township of Esquimalt minimum requirements:
  - a) All underground wiring to be installed in P.V.C. conduits of a minimum of 25mm in size.
  - b) All wiring to be copper, and insulation of RWU type.
  - c) Utility warning tape 300mm over all underground conduit runs.

## **10.0 CONCRETE BASES**

- 10.01 Concrete bases shall be provided for all ornamental light standards.
- 10.02 Bases shall not protrude more than 150mm above the finished grade of the adjacent ground, or less than 25mm.
- 10.03 Bases shall exceed the width of the luminaire base plate by a minimum of 25mm at all points around the base.
- 10.04 Concrete bases and bolt must be adequate to withstand the earlier noted wind

loads, being installed in the ground to a minimum depth of 1.5m.

**CORPORATION OF THE TOWNSHIP OF ESQUIMALT**  
**SUBDIVISION AND DEVELOPMENT CONTROL BYLAW**

**SCHEDULE 'D'**

L-2

**INSTALLATION OF STREET LIGHTING**

**1.0 SCOPE**

- 1.01 This specification shall govern the installation of all street lighting and lighting appurtenances within the Township of Esquimalt.

**2.0 PERMITS AND REGULATION**

- 2.01 The equipment, equipment installation, wiring methods and materials shall conform to the rules and regulations contained in the Electrical Energy Inspection Act and rules of overhead and underground electric-line construction as issued by the Ministry of Labour, Province of B.C. and all amending bulletins, any local or provincial bylaws or statutes in effect on the site and the Fire Marshall and Worker's Compensation Acts.
- 2.02 Wherever the drawings or specifications call for material, workmanship, arrangement or construction of a superior quality than is required, the drawings and specifications will prevail.

**3.0 SOIL CONDITIONS**

- 3.01 Where soil conditions and/or foundations are unsuitable, the Contractor shall notify the Owner's Consulting Engineer in order that a special design can be produced to accommodate same.

**4. CONDUIT INSTALLATION**

- 4.01 The depth of bury over the top of conduit shall be as follows unless otherwise noted on the drawings or approved by the Township of Esquimalt Municipal Engineer:

- a) The minimum depth of bury on conduit below finished grade in areas not subject to vehicular traffic shall be 600mm; and
- b) In areas subject to vehicular traffic, depth of bury shall be 1.000mm.

There shall be a 150mm separation between the exterior of conduit and any excavated rock surface. Conduits shall be installed parallel or perpendicular to the roadway, and routed to run in a direct line between adjacent poles. Bends shall be of large radius type unless otherwise approved by the Township of Esquimalt Municipal Engineer.

- 4.02 During construction conduits shall be capped and covered when electrical work is not actually in progress. A manufactured PVC cap shall be used. Conduit systems shall be cleaned and clear from all moisture and foreign materials prior to pulling the conductors. Empty conduits shall be provided with an acceptable string line and properly capped.
- 4.03 Buried conduits shall be capped and identified at both ends prior to pouring of concrete or backfilling. Conduits shall extend a minimum of 75mm above the top of the concrete base.
- 4.04 Conduits laid in the same trench with the communication and power cables shall maintain the required minimum spacing throughout. Conduits laid near underground pipes and the underground portion of overhead structures shall maintain the required minimum clearance. Crossovers shall be kept to a minimum.

## **5.0 UTILITY WARNING TAPE**

- 5.01 Underground utility warning tape shall be installed 300mm directly above the conduit.

## **6.0 CONDUCTOR INSTALLATION**

- 6.01 Minimum conductor sizes are subject to voltage drop not exceeding 5% from Hydro source to point of utilizations. No conductor shall be drawn into any raceway until all work of any nature that may cause injury to the conductor or its insulation has been completed. The conductors shall be fed carefully into the raceway to prevent twisting, kinking or looping. Only CSA approved wire lubricants shall be used to assist in the pulling operations. Conductor connections

in the base of the poles shall be made accessible from the handhole.

## **7.0 SERVICE BASE INSTALLATION**

- 7.01 Service panels shall be mounted in service bases at the locations as per the design prepared by the Owner's Consulting Engineer and acceptable to the Electrical Safety Officer. Service panels and other electrical equipment in the service base shall be properly protected against the entrance of dust, dirt and moisture, and protected against mechanical injury at all times. Unused openings in the sheet steel panels shall be plugged with approved press-in plugs.

## **8.0 CONCRETE BASE INSTALLATION**

- 8.01 Where possible, the hole for the concrete base shall be dug without disturbing the surrounding soil. The pedestal portion of the base shall be neatly formed to the given dimensions. The top of the base shall be trowelled smooth and level. An accurate template shall be used to locate conduits and pole anchors. Anchor bolts shall be set with a template to suit the poles.
- 8.02 Before mounting poles, all formwork shall be removed and backfill placed around the base and compacted with a mechanical tamper to 100% of Proctor Density. Bases shall be neatly grouted after pole installation ensuring that drain holes are not plugged. Temporary protective covers shall be provided over any concrete pole base which has exposed wiring prior to the installation of the steel pole.

## **9.0 POLES, INSTALLATION**

- 9.01 Poles shall be erected plumb, using the shims supplied if required. No more than six (6) shims shall be used for any one pole. Davits and mast arms shall be installed at right angle to the centre-line of the road. Poles shall be cleaned after installation.

## **10.0 LUMINARIES**

- 10.01 Luminaries shall be cleaned after pole installation and plumbing is complete. Luminaries shall be securely fastened to the poles and oriented to produce the required light distribution.

## **11.0 TESTING AND CALIBRATION**

- 11.01 The Contractor shall carry out all adjustments and tests necessary to ensure that the entire electrical installation and all its equipment, material and components are in satisfactory condition electrically and perform the intended function and operations. The Contractor is responsible for any adjustment that may be required. At the completion of the job, proper systems operation shall be demonstrated to, and certified by, the Owner's Consulting Engineer.

## **12.0 CLEAN-UP AND FINAL ACCEPTANCE**

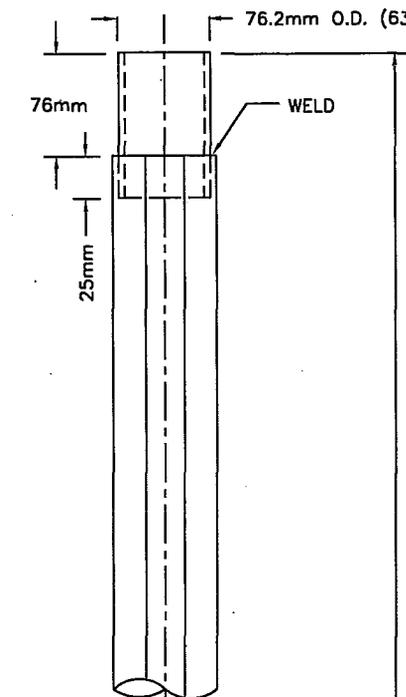
- 12.01 The interior of enclosures, pole handholds and wiring areas shall be cleaned of dust, dirt and loose materials, vacuum-cleaned and all water and moisture removed. All fastening screw holes provided in enclosures shall have a fastening screw installed.
- 12.02 The Contractor shall submit to the Owner's Consulting Engineer and the Township of Esquimalt Municipal Engineer, prior to requesting final inspection, a copy of the Certificate of Inspection signed by the local electrical authority.

**CORPORATION OF THE TOWNSHIP OF ESQUIMALT**  
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**SCHEDULE "D"**

**L-3**

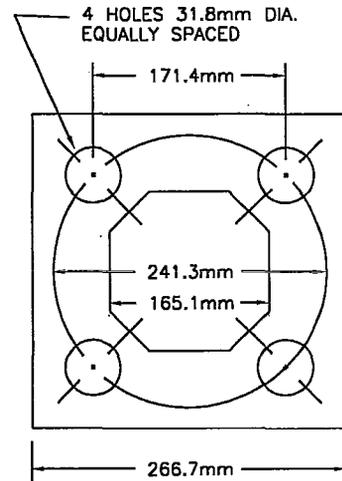
**STREET LIGHT STANDARD DRAWINGS**

- L-1 Street Light Standard — 5.5m Post Top
- L-2 Street Light and Traffic Signal Standard Bases
- L-3 Service Base
- L-4 Control Schematic and Wiring Diagram for Roadway Lighting
- L-5 Street Light Standard (Major Roads)

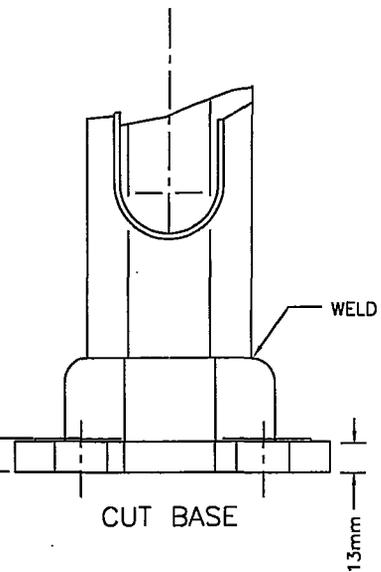
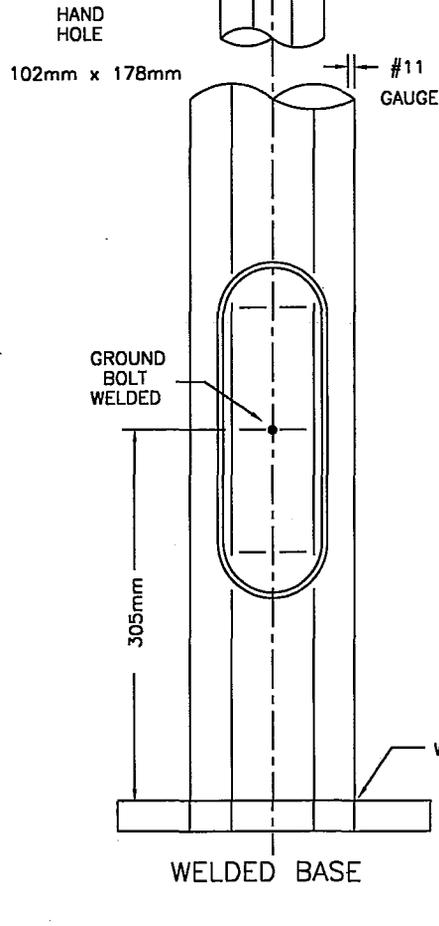


NOTES

1. TO BE SUPPLIED COMPLETE WITH HAND HOLE COVER AND BOLT, NUT, COVERS, SHIMS, AND WASHERS
2. A SWAGED TIP MAY BE SUBSTITUTED FOR THE PIPE INSERT PROVIDED DIMENSIONS AND ALIGNMENT ARE RETAINED
3. BASE PLATE AND PIPE TIP TO BE TRUE AND PLUMB
4. FINISH TO BE GALVANIZED 76.2mm O.D. FOR SLIPFITTER TO INCLUDE GALVANIZING, OTHERWISE OMIT GALVANIZING FROM SLIPFITTER
5. ALL DIMENSION ARE NOMINAL
6. SHALL MEET LATEST REVISION OF MOTH STANDARD DWG SP235 53.1 AND 53.2



COMMON MOUNTING DETAILS



REFER TO SPECIFICATIONS FOR FURTHER DETAILS

STREET LIGHT  
STANDARD  
5.5m POST TOP



TOWNSHIP OF ESQUIMALT  
ENGINEERING DEPARTMENT

DATE : JANUARY 14, 1993

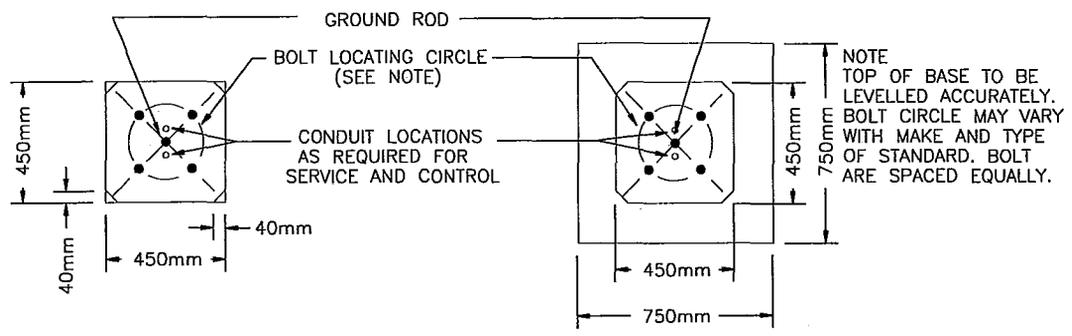
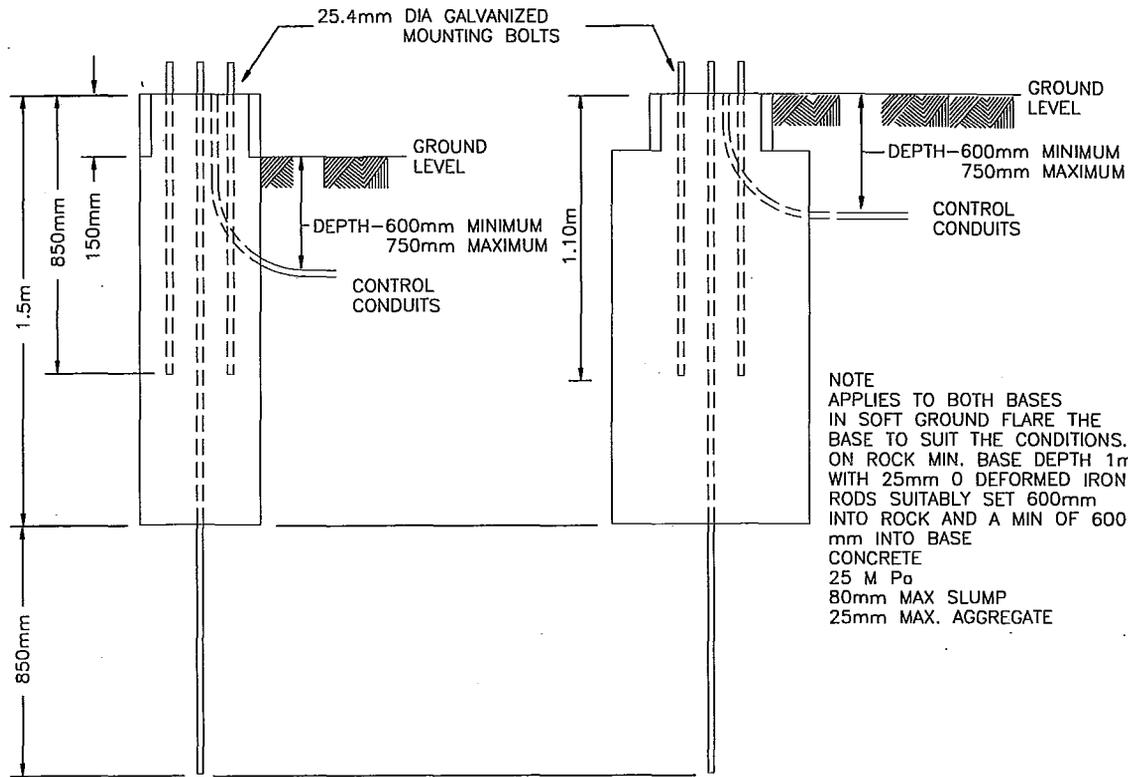
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APPROVED  
BY :

FILE NO. : 10.1.2.17

L1



BASE  
STREET LIGHTING STANDARD

BASE  
TRAFFIC SIGNAL STANDARD

REFER TO SPECIFICATIONS FOR FURTHER DETAILS

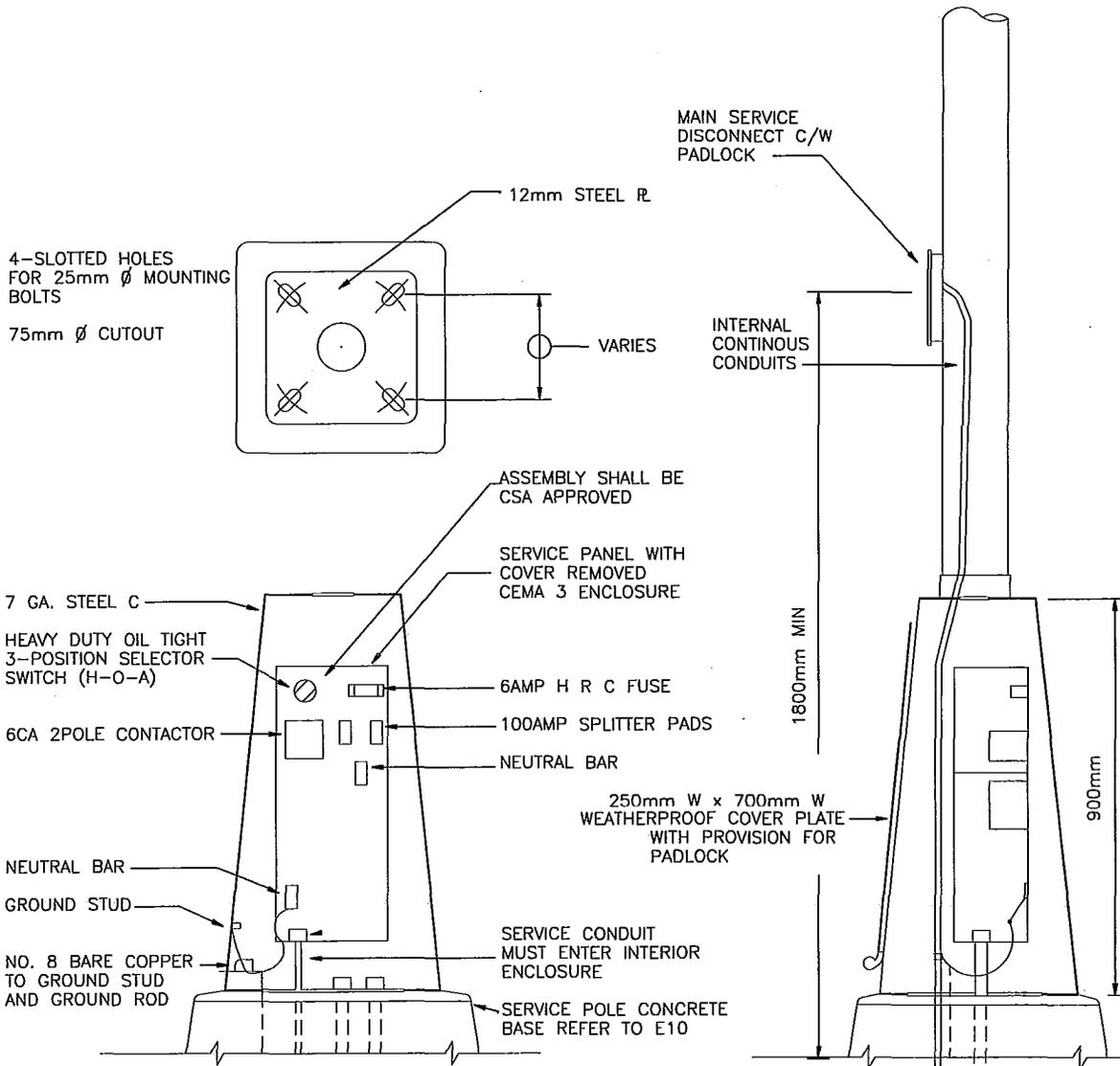
STREET LIGHT &  
TRAFFIC SIGNAL  
STANDARD BASES



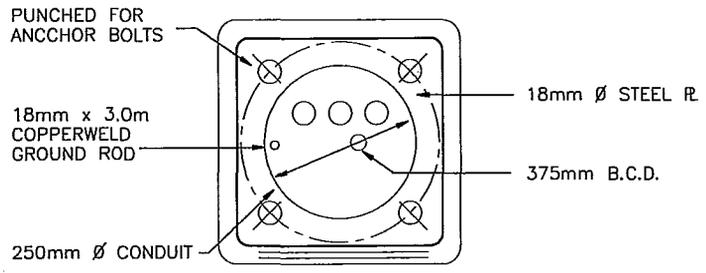
TOWNSHIP OF ESQUIMALT  
ENGINEERING DEPARTMENT

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POLE TOP PHOTOCELL



SIDE VIEW



NOTE  
 1. FOR CONDUIT RUNS REFER TO ELECTRICAL DRAWING

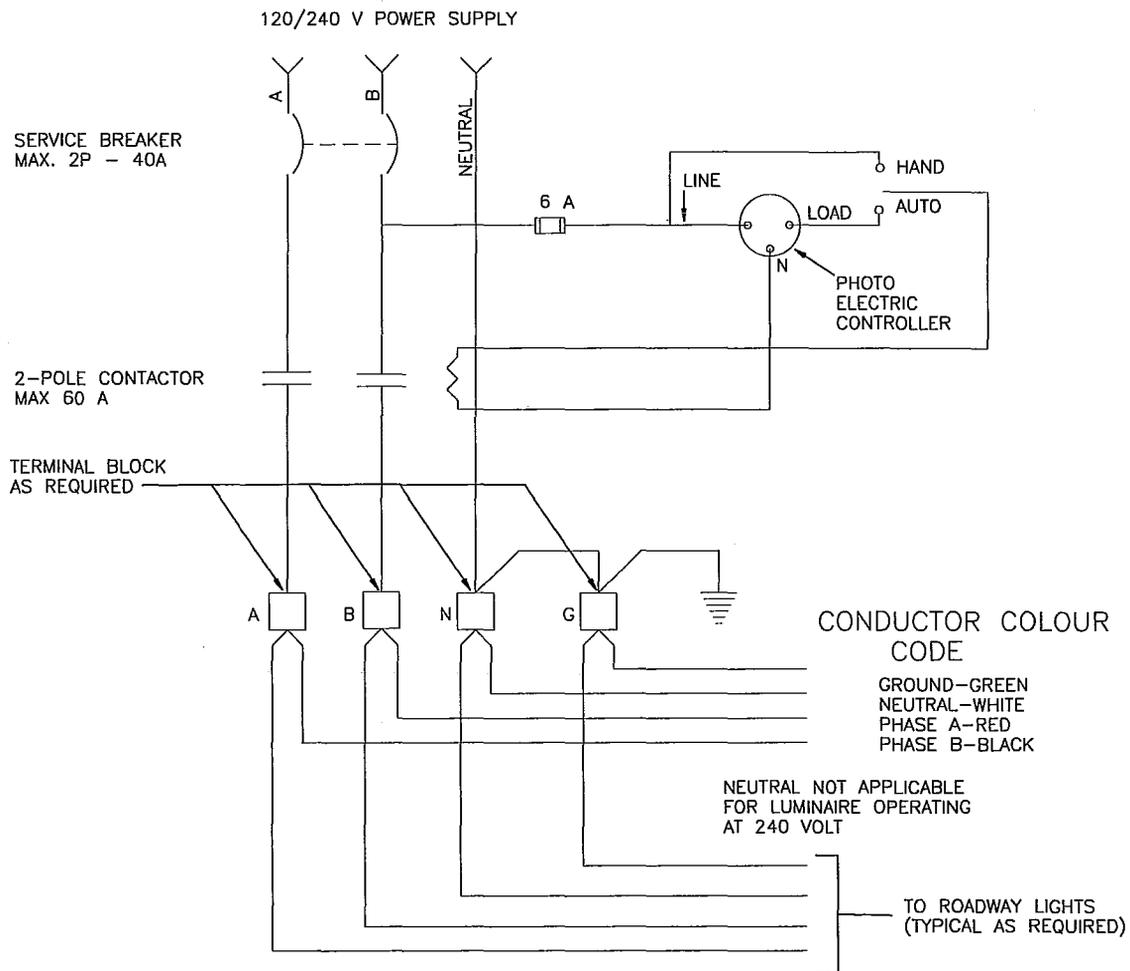
REFER TO SPECIFICATIONS FOR FURTHER DETAILS

SERVICE BASE



**TOWNSHIP OF ESQUIMALT**  
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NOTES

1. FOR ACTUAL SERVICE BREAKER AND CONTACTOR RATING REFER TO ELECTRICAL DRAWING
2. FOR USE WITH SERVICE, BASE SHOWN ON STANDARD DRAWING L4

REFER TO SPECIFICATIONS FOR FURTHER DETAILS

CONTROL SCHEMATIC &  
WIRING DIAGRAM FOR  
ROADWAY LIGHTING



**TOWNSHIP OF ESQUIMALT**

**ENGINEERING DEPARTMENT**

DATE : NOV 1992

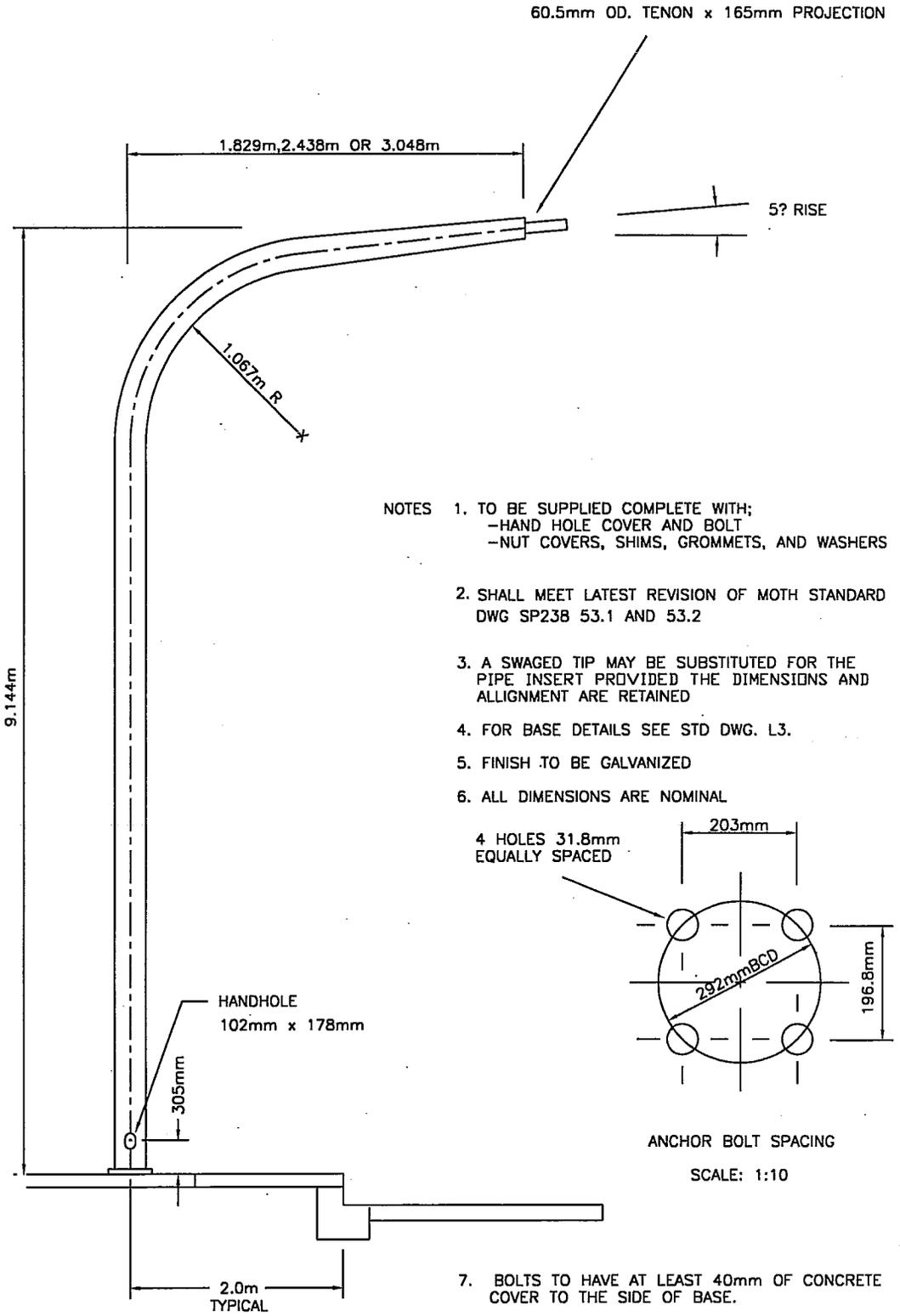
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**L4**



REFER TO SPECIFICATIONS FOR FURTHER DETAILS

**STREET LIGHT  
STANDARD  
(MAJOR ROADS)**



**TOWNSHIP OF ESQUIMALT**  
ENGINEERING DEPARTMENT

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