CONSTRUCTION SPECIFICATION FOR INSTALLATION OF POWER SUPPLY EQUIPMENT

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614.01 SCOPE

This specification covers the requirements for the installation of distribution assemblies, supply control cabinet assemblies, service supply pedestals, and service boxes.

614.01.01 Specification Significance and Use

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

Use of this specification or any other specification shall be according to the Contract Documents.

614.01.02 Appendices Significance and Use

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

614.02 REFERENCES

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Construction

OPSS 602 Installation of Electrical Chambers
OPSS 603 Installation of Ducts
OPSS 604 Installation of Cable
OPSS 609 Grounding
OPSS 616 Footings and Pads for Electrical Equipment

Ontario Provincial Standard Specifications, Material

OPSS 2414 Power Supply Equipment
OPSS 2485 Photoelectric Controllers

Electrical Safety Authority (ESA)

Ontario Electrical Safety Code

614.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Service Box means an approved pole mounted assembly consisting of an enclosure designed and constructed so that it can be locked and sealed; contain either service fuses and a service switch or a circuit breaker, and allow the switch or circuit breaker to be manually operated; and includes a metering compartment when specified in the Contract Documents.

Service Supply Pedestal means an approved ground mounted assembly consisting of an enclosure designed and constructed so that it can be locked and sealed; contain either service fuses and a service switch or a circuit breaker, and allow the switch or circuit breaker to be manually operated; and includes a metering compartment when specified in the Contract Documents.

614.04 DESIGN AND SUBMISSION REQUIREMENTS

614.04.01 Design Requirements

614.04.01.01 Service Supply Pedestals and Service Boxes

Service supply pedestals and service boxes shall be installed in the following manner:

a) Traffic signal installations:

   1. Non-metered pedestal on:

      i. A controller pad foundation; or

      ii. An independent foundation;

   2. Metered pedestal on:

      i. A controller pad foundation; or

      ii. An independent foundation;

   3. Non-metered service box mounted on an independent pole; or

   4. Metered service box mounted on an independent pole.

b) Roadway illumination installations:

   1. Non-metered pedestal on an independent foundation; or

   2. Metered pedestal on an independent foundation; or

   3. Non-metered service box mounted on an independent pole; or

   4. Metered service box mounted on an independent pole.

Service supply pedestals and service boxes shall be installed according to the Contract Documents.

614.04.02 Submission Requirements

The following information shall be submitted to the Contract Administrator:

a) Actual breakdown cost of Utility work, such as hook up, transformation, etc.

b) Utility company contact person's name, title, address, and telephone and mobile phone numbers.

The Utility invoice shall be forwarded to the Contract Administrator for payment or reimbursement to the Contractor. Unless otherwise specified, payment shall be made by the Contract Administrator.

Working drawings shall be submitted according to OPSS 2414.

614.05 MATERIALS

614.05.01 Distribution Assemblies

Distribution assemblies shall be according to OPSS 2414 and the Contract Documents.

614.05.02 Supply Control Cabinet Assemblies

Supply control cabinet assemblies shall be according to OPSS 2414 and the Contract Documents.

614.05.03 Service Supply Pedestals

Service supply pedestals shall be according to OPSS 2414 and the Contract Documents.

614.05.04 Service Boxes

Enclosures for service boxes shall be according to OPSS 2414 and the Contract Documents.

614.05.05 Photoelectric Controllers

Photoelectric controllers shall be according to OPSS 2485.

614.05.06 Cables and Cable Connectors

Cables and cable connectors shall be according to OPSS 604.

614.05.07 Grounding Materials

Grounding materials shall be according to OPSS 609.

614.05.08 Conduit and Fittings

Rigid ducts and fittings shall be according to OPSS 603.

614.07 CONSTRUCTION

614.07.01 General

General requirements for electrical work shall be as specified in the Contract Documents.

Electrical chambers shall be according to OPSS 602 and as specified in the Contract Documents.

Concrete pads shall be according to OPSS 616 and as specified in the Contract Documents.

614.07.02 Distribution Assemblies

Equipment enclosures shall be installed squarely and symmetrically on concrete pads.

A neoprene gasket shall be attached squarely and symmetrically on the bottom base H-beam of the enclosure prior to installation. Base H-beam anchor bolts shall be secured in place at locations specified in the Contract Documents.

614.07.03 Supply Control Cabinet Assemblies

Supply control cabinet assemblies shall be mounted securely on poles using stainless steel strapping.

Rigid ducts and fittings shall be installed on wooden poles using two-hole galvanized pipe straps one trade size larger with galvanized lag screws and on metal or concrete poles using stainless steel strapping, at intervals specified in the Ontario Electrical Safety Code. The conduit system shall be installed in straight lengths to follow the taper of the pole. Offset bends, meter hubs, terminal adapters, and fittings shall be used when required to avoid pole attachments and be kept free of kinks or scorch marks.

When specified in the Contract Documents, a meter socket, acceptable to the power supply authority, shall be installed.

614.07.04 Service Supply Pedestals

Service supply pedestals shall be installed according to the Contract Documents.

A neoprene gasket shall be attached squarely and symmetrically on the bottom of the service supply pedestal prior to installation. Base anchor bolts shall be secured in place at locations specified in the Contract Documents.

614.07.05 Service Boxes

Service boxes shall be installed according to the Contract Documents.

Rigid PVC ducts and fittings shall be installed on wooden poles using two-hole galvanized pipe straps one trade size larger with galvanized lag screws and on metal or concrete poles using stainless steel strapping, at intervals specified in the Ontario Electrical Safety Code. The conduit system shall be installed in straight lengths to follow the taper of the pole. Offset bends, meter hubs, terminal adapters, and fittings shall be used when required to avoid pole attachments and be kept free of kinks or scorch marks.

When specified in the Contract Documents, a meter socket, acceptable to the power supply authority, shall be installed.

614.07.06 Cables and Fuses

Cables, terminations, and connections shall be installed according to OPSS 604. Service cables from the point of service connection to the main disconnecting means shall be installed according to the Ontario Electrical Safety Code and the requirements of the power supply authority.

Only high-voltage fuses that have a current rating approved by the power supply authority shall be installed.

614.07.07 Grounding

All grounding work shall be according to OPSS 609.

All equipment mounted on concrete foundations shall be bonded by means of bonding jumpers connected between the equipment ground bus and the exterior ground grid. Lightning arrestors shall have the ground cable connected securely to the equipment ground bus. The neutral bus of the main disconnecting means or the secondary neutral terminal of the transformer shall be grounded.

The system ground wire and the service ground wire shall be connected to the neutral bus.

614.07.08 Photoelectric Controllers

614.07.08.01 General

Photo-conductive cell windows shall be set to face in a northerly direction and away from any nearby light sources.

614.07.08.02 Distribution Assemblies

Photoelectric controllers shall be installed according to the Contract Documents.

614.07.08.03 Supply Control Cabinet Assemblies

Photoelectric controllers shall be installed on poles with twist lock mounting sockets and brackets. Brackets shall be mounted on metal or concrete poles with stainless steel strapping or on wooden poles with galvanized lag screws.

614.07.08.04 Service Supply Pedestals

Photoelectric controllers shall be installed according to the Contract Documents.

614.07.09 Quality Control

614.07.09.01 Pre-Installation Testing and Inspection

Power supply equipment shall be inspected prior to installation to ensure that it meets the requirements of the Contract Documents. A visual inspection of all the power supply equipment shall be performed prior to its delivery. The following components shall be inspected to ensure that they meet the requirements of the Contract Documents:

a) Barriers and raceways
b) Breakers
c) Cabinet materials
d) Conduits and tubings
e) Contactors
f) Disconnect switches
g) Doors and latching mechanisms
h) Enclosure materials
i) Cabinet general appearance
j) Grounding and bonding materials
k) Grounding connections
l) Insulation
m) Labels
n) Lightning arrestors
o) Panelboards
p) Photoelectric controllers
q) Switches
r) Transformers
s) Wires and connectors

614.07.09.02 Proof of Performance Testing and Inspection

The installed power supply equipment shall be inspected and tested. All components listed under the Pre-Installation Testing and Inspection clause shall be inspected. Low voltage system tests shall be performed on wiring of the equipment according to OPSS 604. Grounding of equipment shall be tested according to OPSS 609.

614.07.10 As Constructed Drawings

In the event changes to the accepted Working Drawings are necessary, as constructed drawings bearing the stamp and signature of an Engineer shall be submitted to the Contract Administrator.

614.07.11 Temporary Electrical Work

The work for temporary electrical installations shall be the same as for permanent installations of the same type of work, except the work shall include the removal of the installations when they are no longer required.

614.07.12 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

614.09 MEASUREMENT FOR PAYMENT

614.09.01 Actual Measurement

614.09.01.01 Distribution Assemblies
Supply Control Cabinet Assemblies
Service Supply Pedestals
Service Boxes

For measurement purposes, a count shall be made of the number of assemblies installed.

614.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

614.10 BASIS OF PAYMENT

614.10.01 Distribution Assemblies - Item
Supply Control Cabinet Assemblies - Item
Service Supply Pedestals - Item
Service Boxes - Item

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

614.10.02 Distribution Assemblies, Temporary - Item
Supply Control Cabinet Assemblies, Temporary - Item
Service Supply Pedestals, Temporary - Item
Service Boxes, Temporary - Item

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, Material to do the work.

Progress payment for temporary installation of the above tender items shall be based on the following percentages of the Contract price:

80% for supply and installation
20% for removal

Additional payment shall not be made for the electrical energy and service required to do the work.

Appendix 614-A, November 2019
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS

Note: This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

Designer Action/Considerations

The designer should specify the following in the Contract Documents:

- Distribution assembly material requirements as follows: (614.05.01)

  Distribution assembly, pad mounted, ___ kVA
  ___ volt, 3-phase, complete with:
  ___ amp Main fused disconnect ___ volt
  ___ amp Main unfused disconnect
  ___ amp Main lighting breaker
  ___ amp Main auxiliary system fused disconnect
  ___ - ___ amp ___ volt Auxiliary system fused disconnect
  ___ - ___ amp Branch breakers (for lighting panelboard)
  ___ - ___ amp Branch breakers (for ___ volt panelboard)
  ___ amp Meter socket (as per local power supply authority standards)
  Meter socket catalogue No. _____

- Supply control cabinet assembly material requirements as follows: (614.05.02)

  Supply control cabinet assembly, type ___, ___ volt
  ___ amp ___ -phase, complete with:
  ___ amp Main circuit breaker
  ___ amp Traffic signal circuit breaker
  ___ amp Circuit breakers
  ___ amp Meter socket (as per local power supply authority standards)
  Meter socket catalogue No. _____

- Service supply pedestal material requirements as follows: (614.05.03)

  Service supply pedestal, ___ volt
  ___ amp ___ -phase, complete with:
  ___ amp Main circuit breaker
  ___ amp Traffic signal circuit breaker
  ___ amp Circuit breakers
  ___ amp Meter socket (as per local power supply authority standards)
  Meter socket catalogue No. _____

- Service box material requirements as follows: (614.05.04)

  Service box, ___ volt
  ___ amp ___ -phase, complete with:
  ___ amp Main circuit breaker
  ___ amp Traffic signal circuit breaker
  ___ amp Circuit breakers
  ___ amp Meter socket (as per local power supply authority standards)
  Meter socket catalogue No. _____

The designer should determine if the following is required and, if so, specify it in the Contract Documents:

- Meter sockets. (614.07.03)
- Meter sockets. (614.07.05)

The designer should coordinate with the power supply authority the payment for electrical energy and service.

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Related Ontario Provincial Standard Drawings

OPSD 2126.010 to 2126.020	Distribution Assembly
OPSD 2130.010 to 2130.013	Supply Control Cabinet Installation
OPSD 2135.010	Service Supply Pedestal For Traffic Signal And Street Lighting
OPSD 2140.010	Service Box Installation, Overhead Services
OPSD 2200.050	Precast Pedestal Foundation For Metering Or Street Lighting
OPSD 2400.000 to 2400.030	Distribution Assembly
OPSD 2400.100 to 2400.101	Warning Signs
OPSD 2440.010 to 2441.030	Supply Control Cabinet Assembly
OPSD 2443.010	Service Supply Pedestal For Traffic Signal And Street Lighting, Layout And Wiring Schematic, 120/240V, 100A, 1-Phase, 3-Wire