This specification covers the requirements for the installation of concrete footings for high mast lighting poles.

Appendices are not a mandatory part of this specification unless invoked by the Owner.

Appendix 631-A is a commentary appendix to provide designers with information on the use of this specification in a Contract.
631.02 REFERENCES

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

Ontario Provincial Standards Specifications, Construction

OPSS 206  Grading
OPSS 501  Compacting
OPSS 601  Electrical Work - General
OPSS 603  Installation of Ducts
OPSS 903  Deep Foundations
OPSS 904  Concrete Structures
OPSS 905  Steel Reinforcement For Concrete

Ontario Provincial Standards Specifications, Materials

OPSS 1010  Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
OPSS 1350  Concrete - Materials and Production
OPSS 1440  Steel Reinforcement for Concrete
OPSS 2474  High Mast Pole Anchorage Assembly

631.03 DEFINITIONS

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

Earth means as defined in OPSS 206.

Quality Verification Engineer means a professional Engineer who has a minimum of five years experience in the field of construction and inspection of shallow and deep foundations, and construction and inspection of anchorage assemblies, sleeves, and ducts in concrete footings, or alternatively with demonstrated expertise through providing satisfactory quality verification services for a minimum of two projects in which the work was of similar scope to that in the Contract Documents. The Quality Verification Engineer is retained by the Contractor to certify that the work is in conformance with the Contract Documents and to issue the Certificate of Conformance report.

631.04 SUBMISSION AND DESIGN REQUIREMENTS

631.04.01 Submission of Certificate of Conformance

Upon completion of the concrete footing, a Certificate of Conformance report sealed and signed by the Quality Verification Engineer shall be submitted to the Contract Administrator. The report shall include but not be limited to the following:

a) The excavation was carried out without causing instability to the base and walls of the excavation.

b) The base of the caisson or shallow concrete foundation was cleaned of loosened or softened material or both prior to placing concrete.

c) The anchorage assemblies, sleeves, and ducts were properly placed in the centre of the concrete footings with a 15 mm tolerance.

d) The placement of concrete was completed according to OPSS 904.

The certificate of conformance shall state that the work has been carried out in conformance with the Contract Documents.
631.05 MATERIALS

631.05.01 Concrete
Concrete shall be according to OPSS 1350 with a minimum 28-Day strength of 30 MPa.

631.05.02 Reinforcing Steel
Reinforcing steel shall be according to OPSS 1440.

631.05.03 Granular A
Granular A shall be according to OPSS 1010.

631.05.04 Sleeves and Ducts
Sleeves and ducts shall be according to OPSS 603.

631.05.05 Anchorage Assemblies
Anchorage assemblies shall be according to OPSS 2474.

631.07 CONSTRUCTION

631.07.01 Concrete Footings for High Mast Lighting Poles

631.07.01.01 General
The work for concrete footings for high mast lighting poles, regardless of size and depth of footing, shall include earth excavation, caissons, reinforcing steel, anchorage assemblies, sleeves and ducts, concrete, granular backfill and apron, and grading.

The general works requirements for electrical work shall be according to OPSS 601.

When required, rock excavation shall be according to OPSS 603.

631.07.01.02 Earth Excavation
Excavation of the pole base shall be to the neat lines and grades specified in the Contract Documents.

Excavation shall be completed without disturbing the sides or base of the excavation.

The base of the caisson or shallow foundation shall be cleaned of loosened or softened materials or both and inspected prior to placing concrete.

631.07.01.03 Caisson Pile
Caisson piles shall be as specified in the Contract Documents and placed according to OPSS 903.

631.07.01.04 Reinforcing Steel
Reinforcing steel shall be according to OPSS 905.
631.07.01.05 Anchorage Assemblies

Anchorage assemblies of the size, diameter, length, and type indicated in the Contract Documents shall be positioned in footings to obtain the proper handhole orientation.

Anchorage assemblies shall be securely tied to the reinforcing steel and provided with supports to maintain the position of the anchorage assembly during the placing of concrete. The anchorage assembly shall not be welded to the reinforcing cage.

The anchorage setting templates shall remain in place until the poles are installed.

631.07.01.06 Sleeves and Ducts

Sleeves and ducts for footings shall be located to suit incoming duct or cable systems and shall be securely tied to the steel reinforcement and supported prior to placing concrete.

The number of sleeves shall be as specified in the Contract Documents.

Sleeves shall be cut off cleanly above the footing a minimum of 150 mm above the pole base plate.

Sleeves shall be temporarily plugged or sealed until wiring is installed.

631.07.01.07 Concrete

Concrete shall be placed according to OPSS 904, except as noted herein.

In earth, concrete may be placed directly against the undisturbed earth or may be formed in place such that a surrounding area of a minimum distance of 300 mm is available for the placing of granular backfill. The upper portion of the footing shall be formed to a minimum of 150 mm below grade level. Formwork shall be removed to a minimum depth of 150 mm below finished grade prior to placing granular backfill.

In rock, concrete shall be placed directly against the excavated rock surfaces. Portions of footings in earth above the top of the rock surface shall be formed as noted above, leaving a 300 mm minimum wide area around the footing for the placing of granular backfill.

Prior to the installation of the pole, the concrete shall have a minimum strength as specified in the Contract Documents.

Concrete for the high mast pole footings shall be cured for a minimum of 96 hours and shall be treated as follows:

a) Wet burlap shall be applied to the top surface of the footing immediately after completion of finishing operation without damaging or marring the surface of the concrete and maintained wet during the minimum curing period.

b) Where the formwork is left in place for 96 hours or more, no additional curing of the formed concrete surface will be required.

c) Where the formwork is removed in less than 96 hours, the formed concrete surface shall be cured with burlap and water for the remainder of the curing period.

d) When white pigmented membrane is used as a curing compound on adjacent concrete barrier wall a minimum of one coat of the curing compound shall be applied to the concrete footing immediately after completion of the curing cycle for the footing. Additional curing compound shall be applied as necessary to ensure colour uniformity with the adjacent concrete barrier wall.

e) The curing compound shall only be used on the exposed final surfaces of the footing. Curing compound shall not be applied to construction joints.
631.07.01.08 Granular Backfill

When required, Granular A backfill shall be placed around footings and compacted according to OPSS 501.

631.07.01.09 Granular Apron

A granular apron consisting of Granular A shall be placed around each high mast lighting pole footing.

631.07.01.10 Grading

Earth grading around the high mast lighting pole footings shall be as specified in the Contract Documents and OPSS 206.

631.09 MEASUREMENT FOR PAYMENT

631.09.01 Actual Measurement

631.09.01.01 Concrete Footings for High Mast Lighting Poles

For payment purposes, a count shall be made of the number of concrete footings for high mast lighting poles placed.

631.09.02 Plan Quantity Measurement

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

631.10 BASIS OF PAYMENT

631.10.01 Concrete Footings for High Mast Lighting Poles - Item

Payment at the Contract price for the above item shall be full compensation for all labour, Equipment, and Material required to do the work.
Appendix 631-A, Commentary for OPSS 631, April 2004

Note: This appendix does not form part of the standard specification. It is intended to provide information to the designer on the use of this specification in a Contract.

Designer Action/Considerations

The designer should specify the following in the Contract Documents:

- Earth excavation limits. (631.07.01.02)
- Caisson piles. (631.07.01.03)
- Anchorage assembly size, diameter, length, and type. (631.07.01.05)
- Number of sleeves and ducts. (631.07.01.06)
- Grading around pole footing. (631.07.01.10)

Related Ontario Provincial Standard Drawings

OPSD 2210.030 High Mast Lighting Pole Granular Apron
OPSD 2218.010 High Mast Lighting Pole Anchorage Assembly Placement
OPSD 2456.010 High Mast Lighting Pole Anchorage Assembly Details for Double Base Plate
OPSD 2456.011 High Mast Lighting Pole Anchorage Assembly Details