Construction Specification for Footings and Sidewalk Bays

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TTS 807.100.01 SCOPE

This specification covers the requirements for the installation of footings and reinforced sidewalk bays required for mounting of electrical equipment.

TTS 807.100.02 REFERENCES

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

City of Toronto Standard Specifications

TS 2.10	Construction Specification for General Excavation
TS 13.10	Specification for Unshrinkable Fill
TS 206	Construction Specification for Grading – Amendment to OPSS.MUNI 206
TS 501	Construction Specification for Compacting – Amendment to OPSS.MUNI 501
TTS 803	Ducts
TS 815.100	Construction Specification for The Removal of Electrical Equipment
TS 1010	Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material - Amendment to OPSS.MUNI 1010 (Apr 2013)
TS 1350	Material Specification for Concrete - Amendment to OPSS.MUNI 1350 (Nov 2014)

City of Toronto Standard Drawings

TTD 807.025	Local Grading at Pole Foundations

Ontario Provincial Standard Specifications Material

OPSS.MUNI 1004	Aggregates – Miscellaneous
OPSS.MUNI 1301	Cementing Materials
OPSS.MUNI 1302	Water
OPSS.MUNI 1308	Joint Filler in Concrete
OPSS.MUNI 1440	Steel Reinforcement for Concrete

Canadian Standards Association

CSA C22.2 No. 211.2	Rigid PVC, Unplasticized Conduit
CAN/CSA G164-M92 (R2003)	Hot Dip Galvanizing of Irregularly Shaped Articles
CSA W59-03	Welded Steel Construction (Metal Arc Welding)
G30.18-09	Carbon Steel Bars for Concrete Reinforcement
G40.20-04/G40.21-13	General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel

ASTM International

A53/A53M-12	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
A193/A193M-17	Standard Specification for Alloy-Steel and Stainless-Steel Bolting Materials for High-Temperature Service
A325M-03	Standard Specification for Structural Bolts, Steel Heat Treated 830 MPa Minimum Tensile Strength (Metric)
A563M-15	Carbon and Alloy Steel Nuts
C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

American National Standards Institute (ANSI)

B18.22.1-1965 (R2008) Plain Washers

Society of Automobile Engineers (SAE)

J403 - 2014 Chemical Composition of SAE Carbon Steels

Others

AASHTO M 182-05 (2021) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

NCHRP 244 Concrete Sealers for the Protection of Bridge Structures

TTS 807.100.03 DEFINITIONS – Not Used

TTS 807.100.04 DESIGN AND SUBMISSION REQUIREMENTS – Not Used

TTS 807.100.05 MATERIALS

TTS 807.100.05.01 General

Imperial equivalent sizes of nuts, bolts and washers will be acceptable.

TTS 807.100.05.02 Concrete

Concrete shall be 32 MPa class C-2. Concrete shall be according to TS 1350.

TTS 807.100.05.03 Steel Reinforcement

Steel reinforcement shall be according to OPSS.MUNI 1440.

TTS 807.100.05.04 Granular Material

Granular material shall be Granular A or B according to TS 1010.

TTS 807.100.05.05 Unshrinkable Fill

Unshrinkable fill shall be according to TS 13.10.

TTS 807.100.05.06 Ducts and Fitting

Rigid PVC conduit and fittings for the installation of pole-mounted equipment shall be according to CSA C22.2 No. 211.2.

TTS 807.100.05.07 Anchorage Assemblies and Hardware

Anchor assemblies, anchor assembly bolts shall conform to grade SAE No. 1020 steel as detailed in ANSI/SAE J403h. Galvanized steel anchor bolts shall be of the high strength type 1 according to ASTM A325M. Galvanized steel nuts and flat washers shall conform to ASTM A325 M.

All steel components shall be hot dipped galvanized according to CAN/CSA G164.

TTS 807.100.05.08 Anchor Assembly Struts

Anchor assembly struts shall be grade SAE No. 1030 steel according to SAE J403.

TTS 807.100.05.09 Studs, Nuts and Washers

Studs shall be grade SAE No. C1541 steel according to SAE J403, high tensile stress proof with a yield strength of 690 MPa, and a tensile strength of 860 MPa. Hex nuts shall be steel grade B steel according to ASTM A563. Washers shall be according to ANSI B18.22.1.

TTS 807.100.05.10 Ferrules

Steel ferrules shall be grade SAE No. C12L14 rotoprobed bar according to SAE J403.

TTS 807.100.05.11 Expansion Joint Filler

Expansion joint filler shall be type A or B and according to OPSS.MUNI 1308.

TTS 807.100.05.12 Grout

Grout shall consist of a mixture of one part Portland cement according to OPSS.MUNI 1301 and two parts mortar sand according to OPSS.MUNI 1004, wetted with sufficient water to make the mixture plastic. Water shall be according to OPSS.MUNI 1302.

TTS 807.100.06 EQUIPMENT – NOT USED

TTS 807.100.07 CONSTRUCTION

TTS 807.100.07.01 Concrete Footings

The work for concrete footings regardless of types or sizes, shall include earth excavation, sleeves and ducts, anchor assemblies, reinforcing steel, concrete, granular backfill, grading, removals and restoration, and site trimming.

TTS 807.100.07.02 Reinforced Sidewalk Bays

The work for reinforced sidewalk bays regardless of type or size, shall include granular bases, concrete, sleeves and ducts, and the work described herein for reinforcing steel, grading, removal and restoration, and site trimming.

TTS 807.100.07.03 Earth Excavation

Where footings are to be installed in asphalt boulevards, the dry cutting of the asphalt shall include all applicable measures and procedures according to City measures and procedures for roadwork with asphalt containing asbestos fibres.

Footings shall be vacuum excavated unless otherwise approved. Auger excavation (or other method) may be utilized at no extra cost to the City.

Where unsuitable materials are encountered in the excavation, they shall be removed and disposed of according to TS 2.10.

TTS 807.100.07.04 Granular Bases

Granular bases shall be installed as foundations for reinforced sidewalk bays. Granular material shall be placed in conjunction with the installation of ducts under the reinforced sidewalk bays. Granular bases shall be compacted according to TS 501.

TTS 807.100.07.05 Unshrinkable Fill

Unshrinkable fill shall be according to TS 13.10 and placed around footings.

TTS 807.100.07.06 Grading

The Contractor shall excavate and place fill materials to finished grade elevation conforming to TTD 807.025.

TTS 807.100.07.07 Concrete

Concrete shall be poured as one monolithic slab and vibrated to eliminate voids, honeycomb and entrapped air.

In earth, concrete shall be placed directly against the undisturbed materials or shall be formed in place providing that a minimum 300 mm width is available for placing backfill.

Wood template is to be temporarily removed to finish the top of the concrete. Wood template to be in place for curing period. Top of concrete is to be marked where the ducts enter footings.

When concrete is placed immediately adjacent to other concrete structures or pavement, 5 mm thick expansion joint filler of premoulded bituminous fibre type shall be installed around the abutting edge of the footing.

When concrete is placed immediately adjacent to other concrete structures or pavement, expansion filler shall be installed around the abutting edge of the reinforced sidewalk bays.

The concrete finish for footings installed in concrete barrier wall shall match the barrier wall finish.

For reinforced sidewalk bays, formwork shall be removed prior to placing granular backfill. Where openings in reinforced sidewalk bays are required, the Contractor shall ensure that concrete is not poured around ducts entering the opening.

TTS 807.100.07.08 Reinforcing Steel

Reinforcing steel shall be installed as specified in the Contract Documents.

TTS 807.100.07.09 Sleeves and Ducts

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

All sleeves or ducts shall be cut off cleanly above the footing at the height indicated in the contract.

Sleeves and ducts in footings shall be temporarily plugged or sealed until wiring is installed. Where ducts or sleeves are 'spare' or intended for future use, the ducts or sleeves shall be plugged with plastic plugs at both ends.

The location of sleeves or ducts shall be marked on the top of the concrete footing with a 50 mm x 50 mm cut or formed cross.

An additional 50 mm rigid duct sleeve, for future use, shall be provided at all pole bases with vehicle and pedestrian head displays.

Sleeves in reinforced sidewalk bays shall be located such that cables may be installed vertically to the cable terminations in the sidewalk bay equipment. Ducts shall be installed below sidewalk bays conforming to TS 803 and shall be suitably aligned for connection to exterior duct or cable systems.

TTS 807.100.07.10 Anchor Assemblies

Alignment of the anchor bolts shall be according to the Drawings.

Anchor assemblies of the size and type indicated in the Drawings shall be accurately positioned in the footings. Anchor bolts are to be greased and wrapped in duct tape prior to the concrete pour. Anchor assemblies shall be securely tied to reinforcing steel and be provided with a wood template to maintain the position of the bolts during placing of concrete. Anchor bolts are to be fully threaded into the ferrules and the wood templates shall remain in place until poles are to be installed.

No portion of the anchor assembly shall be cut or removed before concrete pour.

Wedge type expansion anchors are to be installed to secure the controller cabinet to the concrete footing for the controller cabinet. The wedge type expansion anchors are to be 13 mm diameter x 108 mm long hot dipped galvanized units Red Head Trubolt Carbon Steel Wedge anchors or approved equivalent.

TTS 807.100.07.11 Removals and Restoration

Removals and restoration work shall be according to TS 815.

TTS 807.100.08 QUALITY ASSURANCE

The Contract Administrator may request the Contractor to perform field sampling and testing of concrete according to TS 1350 and compaction of earth and granular materials according to TS 501. The tests shall be witnessed by the Contract Administrator.

All material and workmanship is subject to an inspection by the Contract Administrator.

TTS 807.100.09 MEASUREMENT FOR PAYMENT

TTS 807.100.09.01 Actual Measurement

TTS 807.100.09.01.01 Concrete Footings

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

TTS 807.100.09.01.02 Reinforced Sidewalk Bays

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

TTS 807.100.09.02 Plan Quantity Measurement

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

TTS 807.100.10 BASIS OF PAYMENT

TTS 807.100.10.01 Concrete Footings in Earth – Item

TTS 807.100.10.02 Reinforced Sidewalk Bays – Item

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