

**Construction Specifications
For Handwells****Table of Contents**

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TTS 802.100.01 SCOPE

This specification covers the requirements for the supply, installation, adjustment and rebuilding of handwells.

TTS 802.100.02 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 3.30	Construction Specification for Hot Mix Asphalt Sidewalks, Boulevards and Driveways
TS 3.70	Construction Specification for Concrete Sidewalk and Concrete Raised Median
TS 5.00	Construction Specification for Sodding
TS 5.10	Construction Specification for Growing Medium
TS 13.10	Construction Specification for Unshrinkable Fill
TS 1010	Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material
TS 1350	Material Specification for Concrete – Materials and Production
TTS 801.100	Construction Specification for Electrical Work - General
TTS 803.100	Construction Specification for Ducts
TTS 804.100	Construction Specification for Cables
TTS 813.100	Construction Specification for Grounding
TTS 815.100	Construction Specification for the Removal of Electrical Equipment

City of Toronto Standard Drawings

TTD 802.001	Entry of Direct Buried and Encased Ducts into Electrical Handwell
TTD 802.005	Electrical Handwell Cast in Place with 460mm Diameter Cover
TTD 802.006	Precast Electrical Handwell with 460mm Diameter Cover
TTD 802.010	Electrical Handwell General Grounding Installation Requirements
TTD 802.020	Local Grading at Electrical Handwells
TTD 802.021	Installation of Handwell and Concrete Pole Bases in Medians
TTD 802.025	Entry of Direct Buried and Encased Ducts into Electrical Handwell
TTD 802.026	Electrical Handwell, Intercept Existing Duct in New Median Islands
TTD 802.027	Electrical Handwell Floating into Concrete Sidewalk

American National Standards Institute (ANSI)

ANSI/SCTE 77	Specification for Underground Enclosure Integrity
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American Standard for Testing and Materials (ASTM)

ASTM A48/A48M	Standard Specification for Gray Iron Castings
ASTM F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

Canadian Standards Association (CSA)

CSA A23.1/A23.2	Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete
CSA G40.20/G40.21	General Requirements for Rolled or Welded Structural Quality Steel
CSA C22.2 No. 42-10	General Use Receptacles, Attachment Plugs and Similar Wiring Devices

Electrical Safety Authority (ESA)

Ontario Electrical Safety Code Current Edition

Infrastructure Health and Safety Association (IHSA)

Electrical and Utilities Safety Association of Ontario Rule Book

Ontario Provincial Standards (OPS)

OPSS.MUNI 408	Adjusting or Rebuilding Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers
OPSS.MUNI 904	Constriction Specification for Concrete Structures
OPSS.MUNI 1004	Material Specification for Aggregates - Miscellaneous
OPSS.MUNI 1301	Material Specification for Cementing Materials
OPSS.MUNI 1302	Material Specification for Water
OPSS.MUNI 2401	Material Specification for Electrical Handholes

TTS 802.100.03 DEFINITIONS

For this specification, the following definitions and acronyms apply:

Cast-in-place concrete means building of handwells on site using poured concrete into formwork.

Handwell means a structure or chamber for placing and maintaining conductors, cables, ducts or electrical equipment. Handwells are also referred to as 'Electrical Chambers'.

Portland cement means the common cement mixture based on ASTM C150.

Precast concrete means concrete that is cured in a controlled environment within a mold and then transported to the construction site after curing

TTS 802.100.04 DESIGN AND SUBMISSION REQUIREMENTS

Shop drawings and specification sheets for the handwells shall be submitted to the City or its Contract Administrator before completing an order. Manufacturer part numbers and descriptions of all handwells being supplied shall be included.

The Contractor shall submit to the Contract Administrator certifications from the manufacturer that the product is according to the Contract Documents.

Production, fabrication, and/or shipping of the products shall not commence until all submitted items have been reviewed and approved.

TTS 802.100.05 MATERIALS

All electrical handholes shall be according to OPSS.MUNI 2401 and the Contract Documents.

Duct entry holes shall be provided in the walls of the handwells in the orientation and number required by the Contract.

TTS 802.100.05.01 Concrete for Precast and Cast In Place Handwells

All concrete shall be according to CSA A23.1 and CSA A23.2.

For cast-in-place handwells, concrete shall be according to TS 1350 with a nominal 28-day compressive strength of 30 MPa.

TTS 802.100.05.02 Formwork for Cast In Place Handwells

Void tubes used for cast in place handwells shall be paper fibre. The tubes shall be coated, spiral wound, wood fibre paperboard manufactured with waterproof glue.

TTS 802.100.05.03 Frames and Covers

The thickness of each electrical handhole cover shall be a minimum of 10 mm.

Each electrical handhole cover shall be galvanized steel according to CAN/CSA G40.20/G40.21 and CAN/CSA G164 or cast ferrous alloy according to ASTM A 48, Class No. 30 C. The top side of each metallic electrical handhole cover shall have a checkered tread.

Each handhole shall have identification markings located on the outside vertical surfaces of the handhole showing the manufacturer's name or trademark and the date of manufacture (e.g. yyyy-mm-dd).

The top surface of the handhole cover shall be permanently marked, showing the manufacturer's name or trademark. These markings shall be located on the top surface of the handhole cover or embossed into a corrosion-resistant metal plate securely cemented to the top surface of the handhole cover.

All covers shall be provided with an identification "TRAFFIC" logo as indicated on the Toronto Transportation Standard.

TTS 802.100.05.04 Fastening Material

All bolts, studs, screws, nuts, washers and other fastening material shall be stainless steel and shall be according to ASTM F593.

TTS 802.100.05.05 Grounding Materials

All grounding materials shall be according to TTS 813.100.

All electrical handholes shall have welded studs or other means of bonding all metallic components to ground.

TTS 802.100.05.06 Granular Material

Granular material for bedding and backfill shall be according to TS 1010.

TTS 802.100.05.07 Fittings

Fittings shall be suitable and compatible with the class and type of duct/conduit with which they will be used.

Plugs shall be polyethylene according to C22.2 NO. 42-10.

TTS 802.100.05.08 Mortar and Grout

Mortar shall consist of a mixture of one part Portland cement according to OPSS.MUNI 1301 and three 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. Air entrainment shall be 12 percent.

TTS 802.100.05.09 Backfill

Granular backfill material shall be according to TS 1010.

Concrete backfill material shall be according to TS 13.10.

TTS 802.100.05.10 Restoration

Sod materials shall be according to TS 5.00 and TS 5.10.

Asphalt material shall be according to TS 3.30.

Concrete material shall be according to TS 1350.

TTS 802.100.06 EQUIPMENT – Not Used

TTS 802.100.07 CONSTRUCTION

TTS 802.100.07.01 General

Installation of handwell type shall be in accordance with Contract Documents. Handwells shall be cast-in-place concrete, precast concrete, or semi-concrete handwells as indicated in the contract.

Excavation shall be according to TS 2.10

Earth shall be excavated to accommodate at least 300 mm of backfill around the outer walls of the unit.

The Contractor shall install all handwells – complete with frame and lid – plumb, on a level surface, true to alignment and grade, and firmly bedded on the drainage pocket backfill.

The Contractor shall clean and remove all liquid and debris from the handwell.

The Contractor shall grind smooth all sharp projections and edges of concrete before the installation of sleeves and cable.

Where it is required to construct a handwell on existing ducts, that is to say intercept existing ducts, the Contractor shall cut and trim the ducts to suit the handwell dimensions.

Floating of frame and cover shall be completed for precast and cast-in-place handwells in accordance with TTS 802.100.07.04.

The Contractor shall completely secure and bolt the handwell lid in place.

TTS 802.100.07.02 Cast-in-place Concrete Handwells

The Contractor shall secure formwork for cast-in-place handwells to form a complete envelope of uniform wall thickness. The cast-iron frame and all ducts/sleeves shall be installed in the formwork before pouring concrete.

The Contractor shall pour, cure, protect and finish concrete according to OPSS.MUNI 904.

The Contractor shall remove at least 200 mm of exterior formwork below the finished grade. The Contractor shall completely remove all interior formwork after the concrete sets.

TTS 802.100.07.03 Precast Handwells

Any adjustment of the unit for plumb, alignment or grade shall be carried out by lifting the unit free of the excavation, adjusting the bottom surface and replacing the unit to proper alignment and grade.

Lifting hooks on precast handwells shall be removed after installation.

TTS 802.100.07.04 Handwells in Concrete Sidewalk or Boulevard

In areas where a handwell is installed within a section of concrete sidewalk or boulevard, the Contractor shall install or modify the handwell or both such that the top section – to the thickness of the concrete surface – is integrated into the concrete surface in accordance with TTD 802.027 and clause TTS 802.100.07.11, herein.

The Contractor shall install a new sidewalk or boulevard section with the handwell's lid frame floated into the new concrete or asphalt surface. Expansion board shall not be installed around the handwell diameter.

TTS 802.100.07.05 Duct Entry Holes

The Contractor shall orient the handwells such that ducts and/or duct entry holes will have an angle of 90 degrees between the handwell wall and the axis of the ducts. The enlarging of duct entry holes is prohibited.

The Contractor shall firmly plug any unused duct entry holes from the inside of the handwell with plugs to the full thickness of the concrete walls.

Where ducts are installed in handwells such as through the duct openings, The Contractor shall grout the ducts in place with mortar mix to the full thickness of the handwell wall.

TTS 802.100.07.06 Grounding

The Contractor shall complete grounding according to TTS 813.100 and the Contract Documents.

Where a ground plate is required at a handwell, the Contractor shall install the system ground wire to exit and re-enter the handwell to enable the ground connection.

TTS 802.100.07.07 Backfill

Earth shall be excavated to accommodate at least 300 mm of backfill around the outer walls of the unit.

Unshrinkable backfill in accordance with TS 13.10 shall be used for handwells within 1.5 m of the outside edge of the shoulder. However, native material or granular backfill may be used when any part of the handwell is 1.5 m or more beyond the outside edge of the shoulder.

Backfill for handwells installed in grassed areas shall be native backfill.

TTS 802.100.07.08 Site Restoration

Sod shall be according to TS 5.00 and TS 5.10.

Asphalt shall be according to TS 3.30.

Concrete shall be according to TS 1350

TTS 802.100.07.09 Drainage

Drainage facilities lower than the handwell floor shall be excavated minimum 300 mm and backfilled with 19 mm clear crushed rock.

TTS 802.100.07.10 Adjusting and Rebuilding of Handwells

The adjusting and rebuilding of existing handwells shall be according to OPSS 408 and as specified in the Contract.

TTS 802.100.07.11 Rebuilding of Sidewalks

The Contractor shall rebuild the concrete sidewalk according to TS 3.70.

The Contractor shall replace all impacted concrete sidewalks, that is to say from expansion joint to expansion joint according to TS 4.60.

The Contractor shall install new sidewalk with the handwell's lid frame floated into the new concrete surface.

TTS 802.100.07.12 Utility Clearance

The Contractor shall notify the Contract Administrator where utilities interfere with the location of handwells. The Contractor shall adjust the location of the handwell to obtain the required clearance.

TTS 802.100.07.13 Handwell Installations

The Contractor shall ensure that the following are according to the requirements specified in this specification and the Contract Documents:

- a) Properly seated and aligned to a plumb position
- b) Type of backfill
- c) Compaction of backfill
- d) All unused holes and spaces are filled.
- e) All frames and covers are secured and adjusted to grade.

TTS 802.100.07.14 Temporary Electrical Work

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

TTS 802.100.07.15 Management of Excess Material

Management of excess material shall be as specified in the Contract Documents

TTS 802.100.08 QUALITY ASSURANCE

The City may perform material testing to ensure that concrete conforms to TS 1350.

The City may perform material testing to ensure that compaction conforms to TS 1010.

TTS 802.100.09 MEASUREMENT FOR PAYMENT

TTS 802.100.09.01 Supply and Install Precast Handwells

For measurement purposes, a count shall be made of the number of precast electrical handwells supplied and installed.

TTS 802.100.09.02 Supply and Install Cast-in-Place Handwells

For measurement purposes, a count shall be made of the number of cast-in-place electrical handwells supplied and installed.

TTS 802.100.09.03 Adjusting and Rebuilding Handwells

For measurement purposes, a count shall be made of the number of electrical handwells adjusted and rebuilt.

TTS 802.100.10 BASIS OF PAYMENT**TTS 802.100.10.01 Supply and Install Precast Handwells – Item**

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

TTS 802.100.10.02 Supply and Install Cast-in-Place Handwells – Item

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

TTS 802.100.10.03 Adjusting and Rebuilding Handwells – 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.