

**Construction Specification for
Watermain and Water Service Tracer Wire**

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TS 7.40.01 SCOPE

This specification covers the work to be undertaken for watermain and water service tracer wire installation.

Supply all labour, materials, tools, equipment, and transportation to complete the works as described in this document, as shown on the drawings, and as necessary by evidence.

TS 7.40.01.01 Workmanship

Skilled labour only shall be used for all work.

All work shall be performed according to instructions given by the Contract Administrator or his duly appointed representative using the most suitable equipment.

TS 7.40.01.02 Handling and Storage

Material shall be stored so as to prevent injury to persons and to prevent the delay of work by others.

All materials which can be damaged by exposure to the elements must be stored in a clean and dry enclosure.

TS 7.40.02 REFERENCES – Not Used

TS 7.40.03 DEFINITIONS – Not Used

TS 7.40.04 DESIGN AND SUBMISSION REQUIREMENTS – Not Used

TS 7.40.05 MATERIALS – Not Used

TS 7.40.06 EQUIPMENT – Not Used

TS 7.40.07 CONSTRUCTION

TS 7.40.07.01 General

- i. Tracer wire shall be installed on all non-ductile iron watermains, hydrant laterals and water services except where such water service pipe is of copper material. The wire shall be installed in such a manner as to be able to properly trace all watermains, hydrant laterals and water services without loss or deterioration of signal or without the transmitted signal migrating off the tracer wire.
- ii. Tracing wire shall be RWU90, AWG N° 10 single or seven strand, insulated copper wire with 60 mil of black, cross-linked polyethylene (XLPE) insulation specifically manufactured for direct burial applications.

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- iii. All tracer wire welds onto existing cast or ductile iron pipe shall be completely sealed with the use of an approved mastic type sealer specifically manufactured for underground use. The mastic shall be TC Mastic (Tapecoat of Canada) or approved equivalent and shall be applied in a thick coat a minimum of 12 mm thick and shall be protected from contamination by the backfill material with the use of a plastic membrane. As an alternative, Royston Handy Cap prefabricated assemblies used in conjunction with Royston Roybond 747 Primer may be used. In all cases, the pipe is to be properly cleaned and material applications shall be according to the manufacturer's instructions.
 - iv. All spliced or repaired wire connections in the tracer wire system shall be made using a Model Number 454, Catalogue Number 30-454, Wing Nut Wire Connector (for 2 - 4 AWG N° 10 wires), or approved equivalent, and made waterproof using an approved buried service wire closure. The buried service wire closure shall be either a Klik-It II Model C8816 Buried Service Wire Closure or a Raychem GHFC-2-90 H-Frame Gel Closure or approved equivalent.

TS 7.40.07.02 Installation Procedure

- i. At the point of connection between cast or ductile iron watermains, with any non iron watermain, the tracer wire shall be properly connected to the iron pipe with a thermite weld or approved equivalent.
- ii. Tracer wire shall be laid flat and securely affixed to the pipe at three metre intervals. The wire shall be protected from damage during the execution of the works. No breaks or cuts in the tracer wire or tracer wire insulation shall be permitted. At water service saddles, the tracer wire shall not be allowed to be placed between the saddle and the watermain.
- iii. Except for approved spliced in connections, tracer wire shall be continuous and without splices from valve chamber to valve chamber, valve chamber to fire hydrant or fire hydrant to fire hydrant.
- iv. At fire hydrants, no spliced in tracer wire connections shall be allowed regardless of the type of material of the hydrant lateral. The main line tracer wire shall follow and be secured to the hydrant lateral up to and back from the hydrant and then continue along the watermain. The tracer wire shall be wrapped neatly around the hydrant above grade and above the breakaway flange with at least 2 m of slack in the tracer wire above grade.
- v. At existing iron or copper water service connections where any portion of the water service is replaced with a non-ductile iron or non-copper material, a water service tracer wire shall be spliced into the watermain tracer wire and then connected to, the remaining iron water service by means of a thermite weld, or the remaining copper water service using a ground clamp sized appropriately for the copper pipe.
- vi. At water service connections where there is no tracer wire on the existing watermain and the water service connection is neither iron nor copper pipe, tracer wire shall be thermite welded to the watermain tee or tapping valve and placed along the water service to a point where the water service enters either inside the building or water meter chamber and shall be configured at the valve box according to TS 7.40.07.02 (viii) herein. The tracer wire inside the water meter chamber shall be brought up and attached under the access cover. The tracer wire brought into the building shall be left with a minimum of one metre of slack.

- vii. In valve chambers, a 12 mm diameter stainless steel eyebolt complete with stainless steel nut and 50 mm diameter stainless steel flat washer shall be installed between the layers of frame and cover adjustment rings. The eyebolt shall be of sufficient length to allow the nut and washer to be positioned on the outside of the adjustment rings. The tracer wire is to be securely affixed to the eye of the bolt with enough slack in the wire to extend a minimum of one metre above grade. The wire shall be brought through the wall into the chamber with the pipe and placed neatly along the inside wall of the chamber and brought up to the eyebolt.
- viii. Where a valve box is used instead of a valve chamber, the tracer wire from both directions shall be secured every 500 mm to the outside of the valve box and be brought up on the outside of the valve box to a point 100 mm below grade and then brought into the valve box and left with an additional 500 mm of slack.
- ix. At all watermain end caps, a minimum of 2 m of tracer wire shall be extended beyond the end of the pipe, coiled and secured for future connections. The end of the tracer wire shall be spliced to the wire of a 2.7 kg zinc anode and is to be buried at the same elevation as the watermain.
- x. For directional drilling, augering or boring installations, four #8 tracer wires shall be installed with the pipe and connected to the tracer wire at both ends, or thermite welded to the existing iron pipe at both ends.

The installation procedure is illustrated in Figure 1.

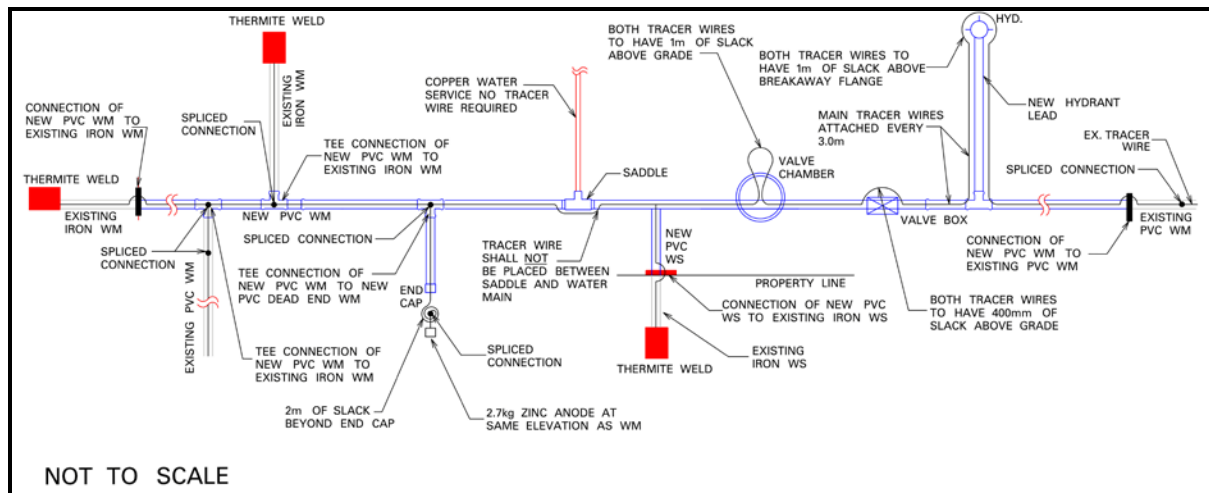


Figure 1: Illustration of installation procedure

TS 7.40.07.03 Repairs and Watermain Cleaning and Lining Contracts

- i. At all repair locations in cast or ductile iron pipe, double tracer wires shall be placed across the repaired section and securely thermite welded to the iron pipe within 300 mm of both ends of the repair according to TS 7.40.07.01 (iii) herein.
- ii. At all repair locations where there is existing tracer wire, the tracer wire shall be properly reconnected and spliced according to TS 7.40.07.01 (iv) herein.

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- iii. Whenever any valve or pipe repair occurs within or at a valve chamber, tracer wire shall be thermite welded to the existing cast or ductile iron pipe on both sides of the replaced section. Tracer wire within the valve chamber shall be configured and secured according to TS 7.40.07.02 (vii) herein.
 - iv. Whenever any valve or pipe repair occurs at valve box locations, tracer wire shall be thermite welded to the existing cast or ductile iron pipe on both sides of the replaced section. Tracer wire shall be configured and secured according to TS 7.40.07.02 (viii) herein.

TS 7.40.07.04 Spliced Connections

Spliced connections between the main line tracer wire and branch connection tracer wire shall only be allowed at watermain tees, crosses or at iron or copper water services where a portion of the branch connection watermain or water service is replaced with a non iron or non copper material. The branch connection tracer wire shall be a single tracer wire properly spliced to the main line tracer wire. Where the existing branch connection is neither iron nor copper, then the new branch connection tracer wire shall be properly spliced to the existing tracer wire on the branch connection. All spliced connections shall be made according to TS 7.40.07.01 (iv) herein.

TS 7.40.08 QUALITY ASSURANCE

TS 7.40.08.01 Tracer Wire System Testing

The Contractor shall conduct and produce a Tracer Wire Certification that the entire tracer wire system is installed and functioning properly according to TS 7.40.07.01 (i) herein.

If deficiencies are found in the tracer wire system when tested by City forces, then the Contractor shall be charged the full cost incurred by the City for all subsequent visits to site to confirm functionality and acceptability of the tracer wire system. Such costs shall be deducted from the Contractor's final payment.

TS 7.40.09 MEASUREMENT FOR PAYMENT

TS 7.40.09.01 Watermain and Water Service Tracer Wire Installation

Not applicable.

TS 7.40.10 BASIS OF PAYMENT

TS 7.40.10.01 Watermain and Water Service Tracer Wire Installation - Item

There is no separate payment for the supply and installation of tracer wire on any construction or installation of non-ductile iron watermain, hydrant laterals and non-copper water services by the Contractor. The Contractor shall consider the supply and installation of tracer wire incidental to all construction of non-ductile watermain, hydrant laterals and non-copper water services, and any construction and installation of other related utility structures as specified in the Contract.