

<div>METROPOLITAN UTILITIES DISTRICT</div> <div>Prepared by: D.J. Satterfield</div> <div>Approved by: James Bartels</div>	Construction Standard	No: 1.14.1
	Installation of Trace Wire on Water Mains	Page: 1 of 5
		Supersedes: 10-19-11
		Effective: 7-19-23
The latest revisions can be found at the end of this document		

GENERAL

- * This Construction Standard governs trace wire installation on water mains. An approved 14 gauge or 12 gauge horizontal directional drilling (HDD) or other approved Engineering Design trace wire shall be installed on all water mains, except water mains as part of a relocation project. Water mains as part of a relocation project shall have trace wire installed only if:
- The length of the relocated section is 600' or greater
 - The length of the relocated section is between 200' and 600' and includes a valve (including hydrant branch valves)
 - The main being relocated currently has trace wire on it
 - All relocated PVC and HDPE water mains
 - Where called for on project drawings

Typical hydrant branches, that are perpendicular to the water main, do not require trace wire. Trace wire shall be installed on non-typical hydrant branches (i.e. dog-legged hydrant branch).

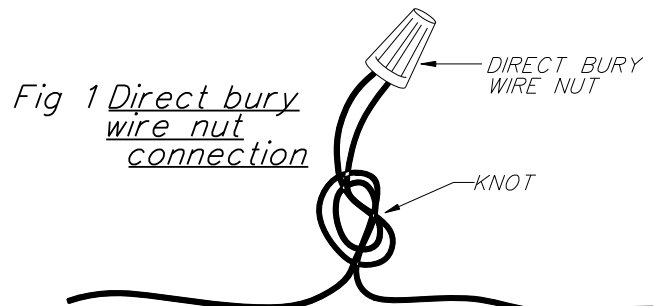
- * Take care to protect the wire insulation and repair it with electrical tape if the coating is damaged. Always attach the wire to the lead end of the pipe when boring or plowing and avoid kinking or tangling the wire during installation. When using directional boring equipment or pipe bursting equipment, 12 gauge HDD or other approved Engineering Design trace wire(s) should be pulled with the main.

APPROVED TRACE WIRE MATERIAL

- *
- Trace wire for direct bury installations shall be copper clad steel wire. Trace wire shall be 21% IACS with a minimum 30 mil high molecular weight polyethylene insulation.
 - Blue tri-view plastic markers w/test screws
 - 4 ft U-channel posts
 - Valve Box Top Sections
 - Direct Bury Wire Nuts
 - Direct Bury Lug

TRACE WIRE CONNECTIONS

Joining Ends of Trace Wire: Connections into existing trace wire, connections into trace wire used during water main bores, connections between one spool of trace wire to another, and other similar connections shall be made using a direct bury wire nut.



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When connecting trace wire ends together, strip 5/8" of insulation from the end of each wire. Insert the two ends firmly into the direct bury wire nut. Twist the wire nut clockwise while pushing the wires firmly into the nut. Do not over torque. Tie the wires in a knot as shown in Fig 1.

Joining Trace Wire - Branch to Main: Connections of trace wire at tees, crosses, and at locations where the trace wire will be brought to the surface shall be conducted using a direct bury lug. Refer to Fig 2 for this connection style.

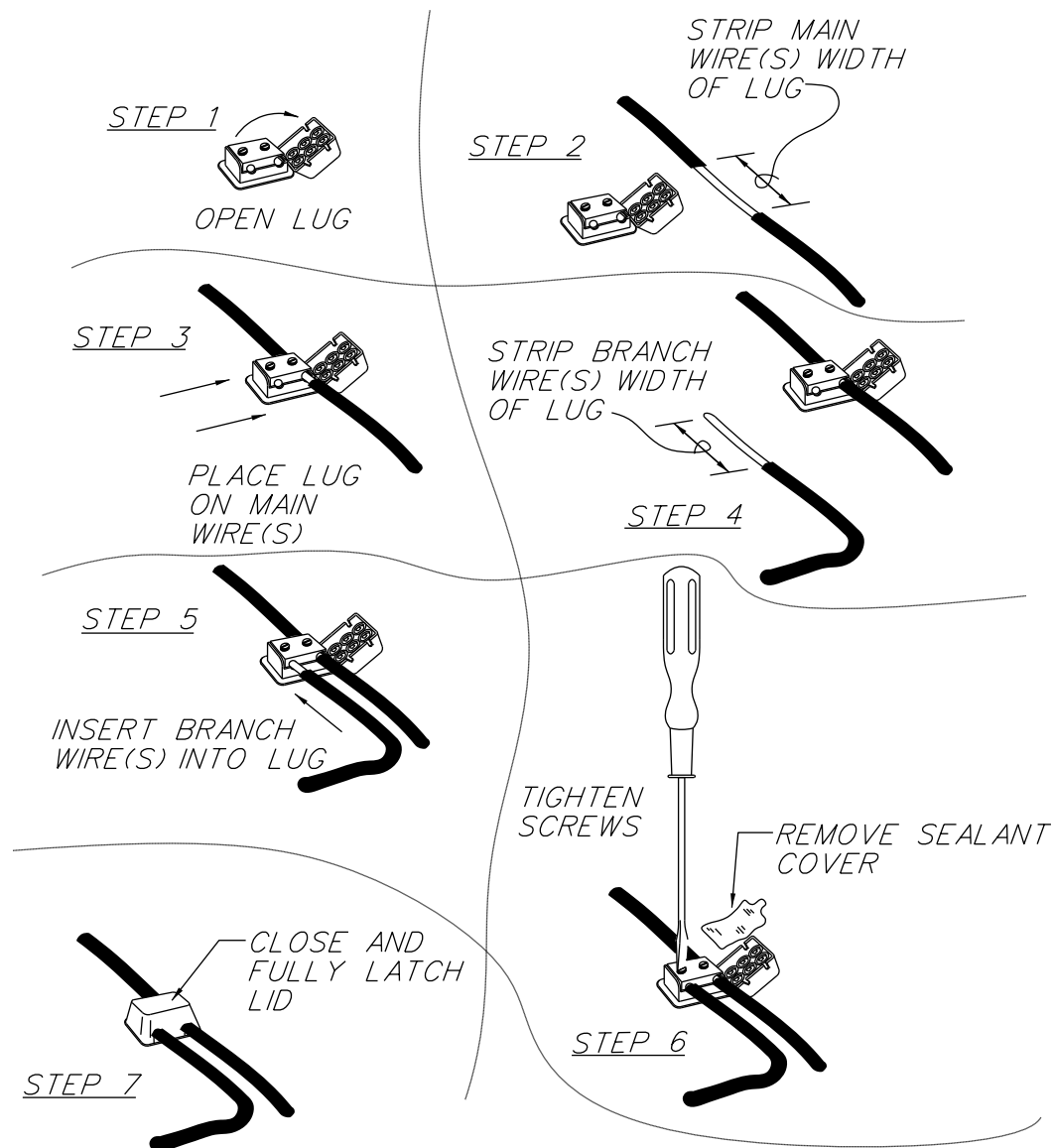


Fig 2

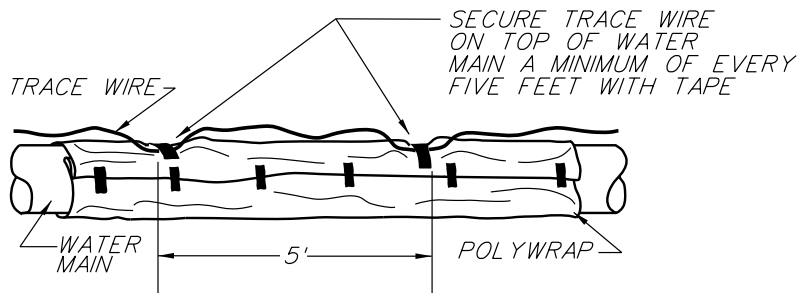
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INSTALLATION

- * Trace wire shall be installed in a continuous fashion. Install trace wire on top of water main and secure to the main a minimum of every five (5) feet with tape as shown in Fig 3.

**

Fig 3 Trace wire installation



Bring trace wire to surface at every cc box, vault, blue plastic marker with trace wire connectors, dead end hydrants, and as called out in the drawings. Trace wire shall be brought to the surface at least every one thousand (1,000) feet. Take care not to damage the wire coating. Repair damaged coating with electrical tape.

Trace Wire in a Vault

Trace wire shall be brought up in all vaults. Trace wire shall be brought to the surface according to Fig 4. Do not wrap the trace wire around the steps or any other place where a person entering the vault could trip on the wire.

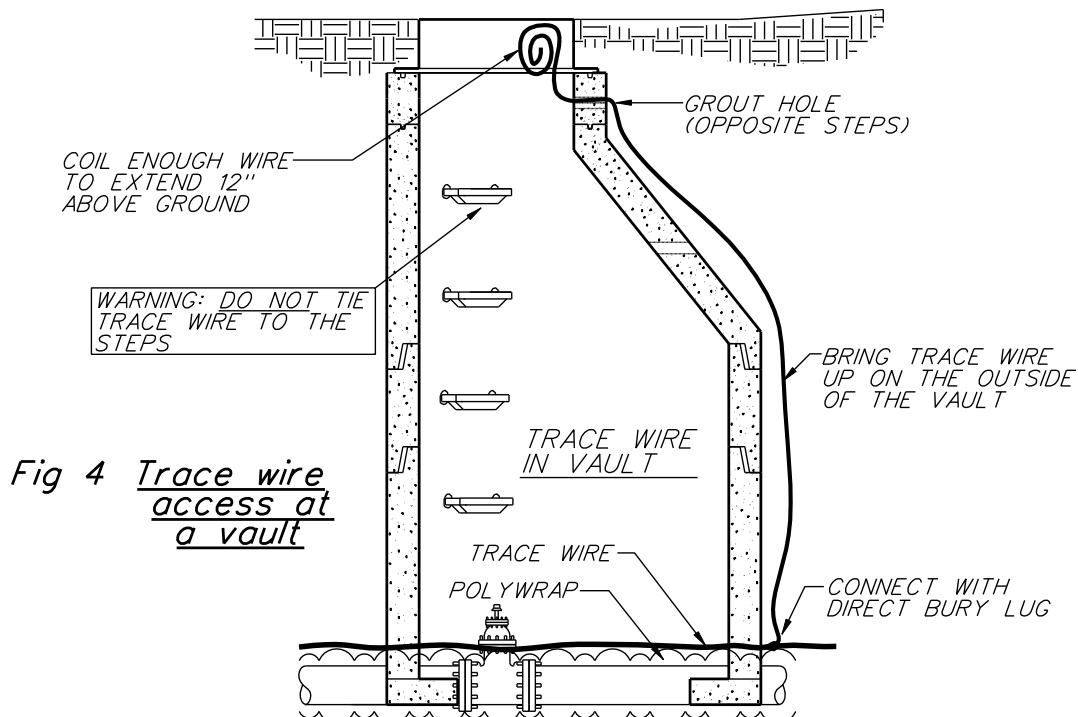


Fig 4 Trace wire access at a vault

- * Revised Text
 ** Revised Drawing

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Trace Wire in Blue Plastic Pipe Line Marker

When bringing the trace wire up in a blue plastic pipe line marker, install the trace wire according to Fig 5. Bury a four foot u-channel post two feet in the ground. Run the trace wire up through the marker and slide the blue plastic marker over the post. Bury the bottom six inches of the marker. Connect the trace wire to the brass connecting screws and label the screws with a permanent marker as shown in Fig 5. Note location of trace wire pipeline marker on as-built drawings.

Note: If a marker is used only to mark the main location and not bring up the trace wire, use the blue markers without the trace wire connectors.

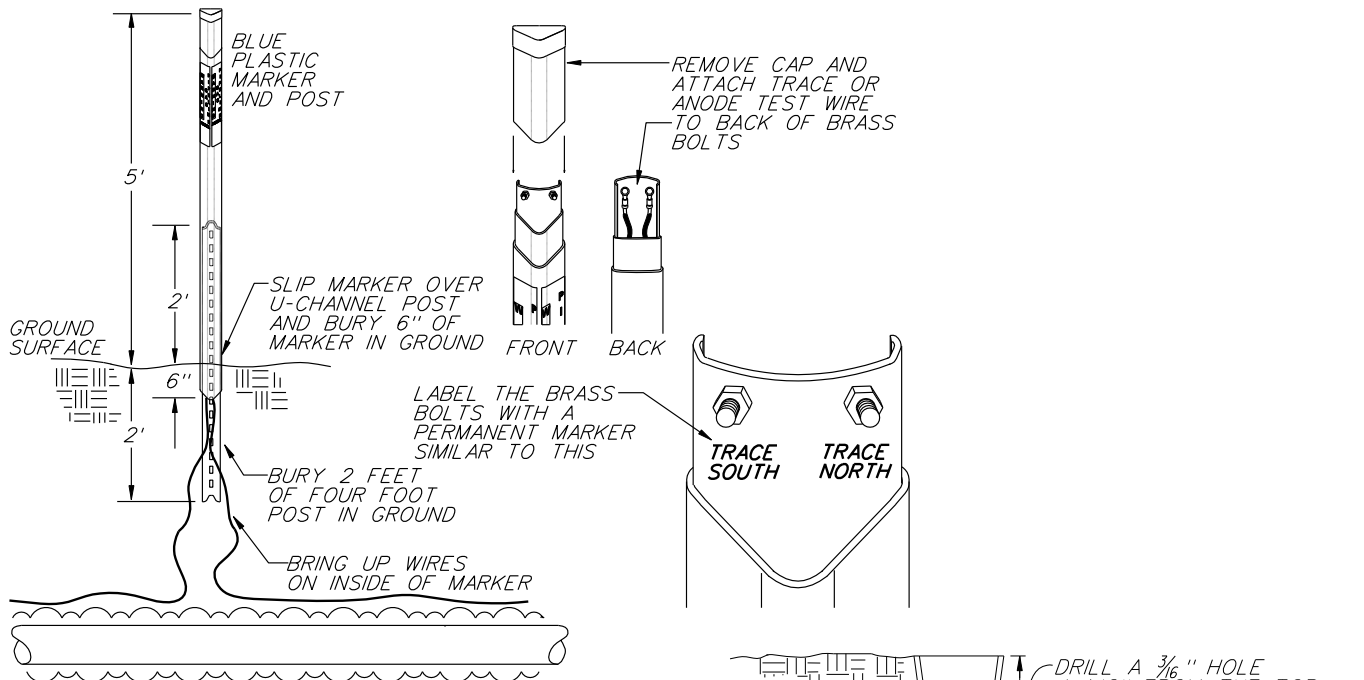


Fig 5 Trace wire access at a pipeline marker

Trace Wire in a CC Valve Box

Trace wire shall be brought up in all cc valve boxes. The trace wire shall be brought to the surface according to Fig 6.

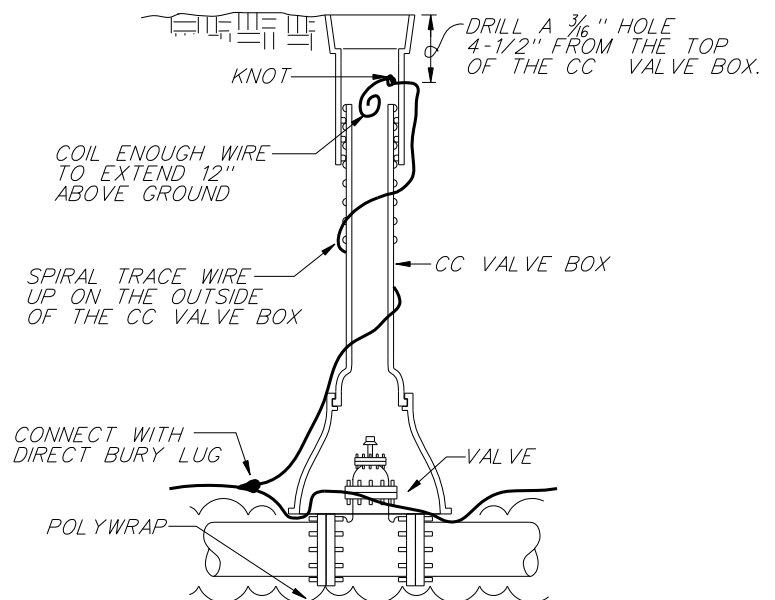


Fig 6 Trace wire access at a CC vlave box

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Trace Wire in PVC Conduit at Hydrant

Trace wire shall be brought up in a PVC conduit at all dead end/end of main fire hydrants without a valve and at hydrants of a non-typical hydrant branch (i.e. dog-legged hydrant branch). Trace wire shall be brought to the surface according to Fig 7. Note location of PVC conduit in relation to the hydrant (i.e. north, east, south or west) on as-built drawings.

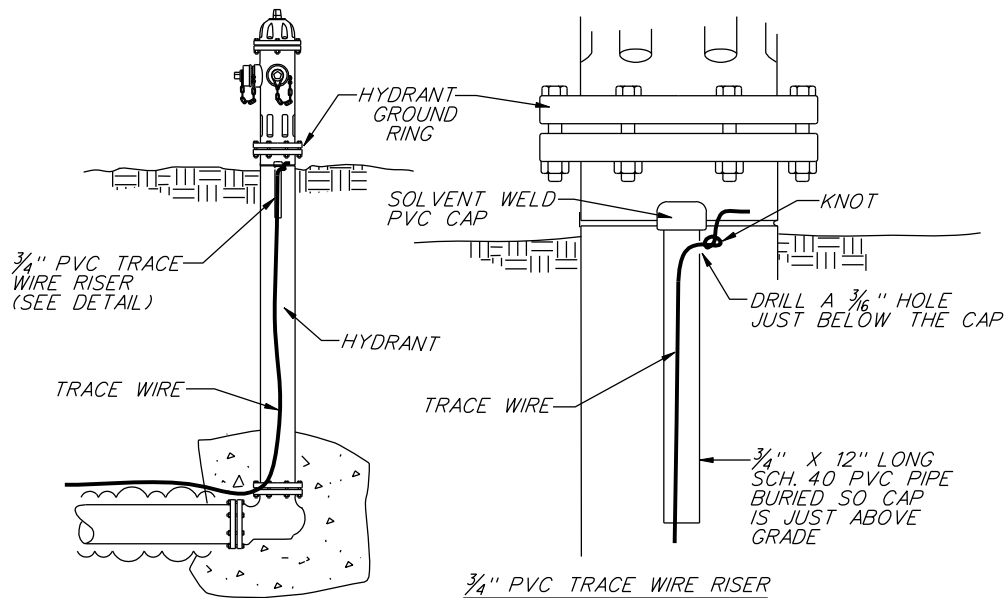


Fig 7 Trace wire access at a hydrant

Revision

The latest revision is detailed on the following page(s).

Pages affected: X _____

GENERAL

- * This Construction Standard governs trace wire installation on water mains. An approved 14 gauge or 12 gauge horizontal directional drilling (HDD) or other approved Engineering Design larger trace wire shall be installed on all water mains., except ~~Exception:~~ water mains as part of a relocation project. Water mains as part of a relocation project shall have trace wire installed only if:
- ~~If~~ The length of the relocated section is 600' or greater
 - The length of the relocated section is between 200' and 600' and includes a valve (including hydrant branch valves)
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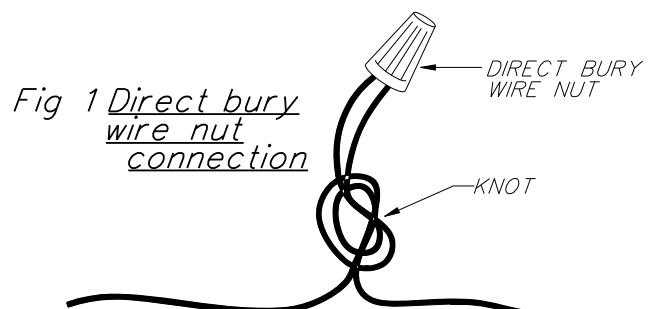
- * Take care to protect the wire insulation and repair it with electrical tape if the coating is damaged. Always attach the wire to the lead end of the pipe when boring or plowing and avoid kinking or tangling the wire during installation. ~~Because of the tremendous strain on trace wire~~ When using directional boring equipment or pipe bursting equipment, two three 10 or 12 gauge HDD or other approved Engineering Design trace wires should be pulled with the main. ~~in case one or two wires break.~~

APPROVED TRACE WIRE MATERIAL

- * - Trace wire for direct bury installations shall be ~~#14 AWG copper clad steel wire. as manufactured by Copperhead Industries, LLC #14 AWG solid Copper wire with 30 mil high molecular weight polyethylene insulation as manufactured by Agave Wire LTD, or approved equal.~~ Trace wire shall be 21% IACS with a minimum 30 mil high molecular weight polyethylene insulation.
- * ~~Trace wire for water mains installed by directional boring shall be #12 or #10 AWG copper clad steel wire as manufactured by Copperhead Industries, or approved equal.~~
- Blue tri-view plastic markers by Rhino w/test screws
 - 4 ft U-channel posts
 - Valve Box Top Sections
 - Direct Bury Wire Nuts (~~Dryconn Direct Bury Wire Nut (10444) manufactured by King Innovation, DBY-6 or DBR-6 as manufactured by 3M or approved equal.~~
 - Direct Bury Lug (~~Dryconn Direct Bury Lug as manufactured by King Innovation or approved equal.~~

TRACE WIRE CONNECTIONS

Joining Ends of Trace Wire: Connections into existing trace wire, connections into trace wire used during water main bores, connections between one spool of trace wire to another, and other similar connections shall be made using a direct bury wire nut.



* ~~Revised Text~~

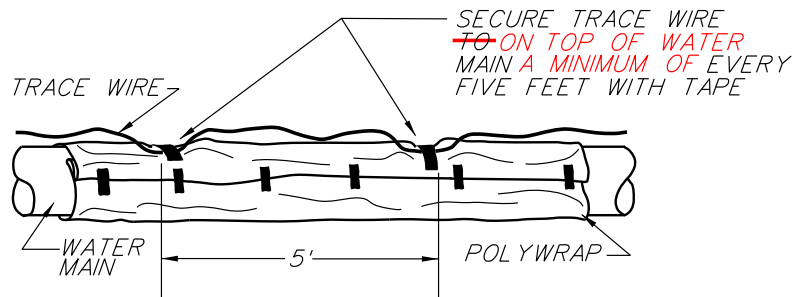
* Revised Text

INSTALLATION

- * Trace wire shall be installed in a continuous fashion. Install trace wire on top of water main and secure to ~~the main~~ **a minimum of every five (5) feet with tape** as shown in Fig 3.

**

Fig 3 Trace wire installation



Bring trace wire to surface at every cc box, vault, blue plastic marker with trace wire connectors, dead end hydrants, and as called out in the drawings. Trace wire shall be brought to the surface at least every one thousand (1,000) feet. Take care not to damage the wire coating. Repair damaged coating with electrical tape.

Trace Wire in a Vault

Trace wire shall be brought up in all vaults. Trace wire shall be brought to the surface according to Fig 4. Do not wrap the trace wire around the steps or any other place where a person entering the vault could trip on the wire.

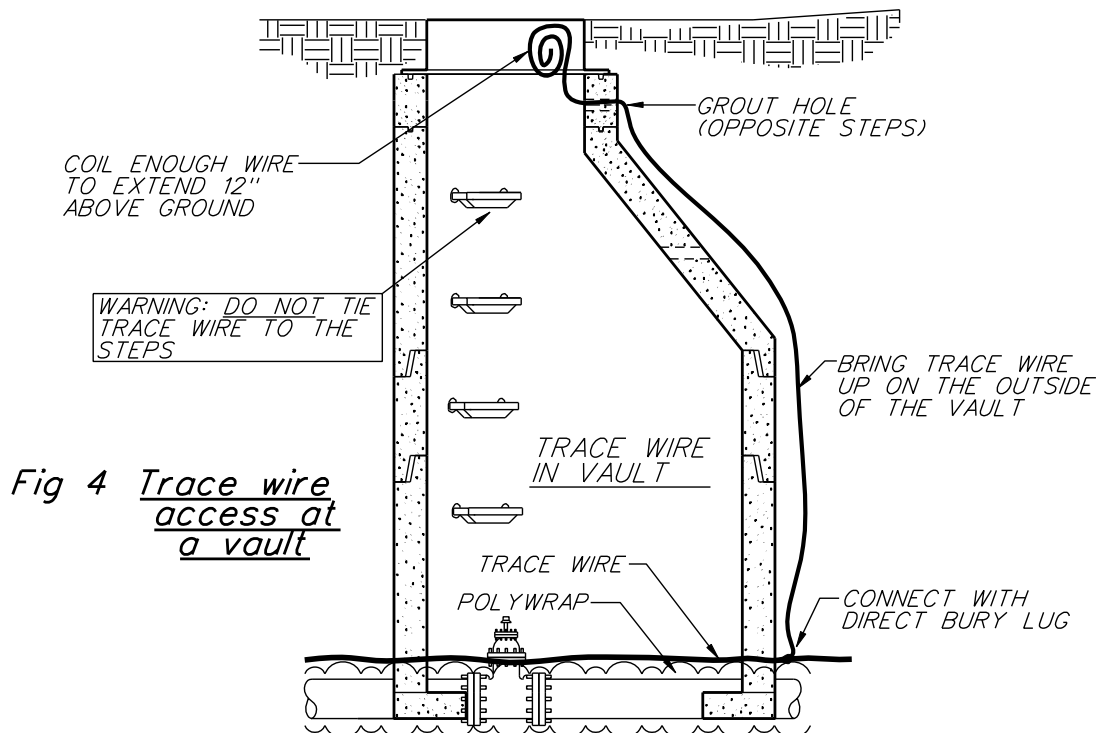


Fig 4 Trace wire access at a vault

- * Revised Text
- ** Revised Drawing