**Fibre Optic Conduit Specifications**

Fibre Optic conduit Specifications – General

Abbreviations

When the following abbreviations are used in the Fibre Optic Conduit Specifications, they shall have the following meanings:

ANSI American National Standards Institute

AREMA American Railway Engineering and Maintenance-of-Way Association

ASA American Standards Association (formerly [American National Standards Institute](https://en.wikipedia.org/wiki/American_National_Standards_Institute) from 1928 to 1966)

ASTM ASTM International (formerly American Society for Testing and Materials)

AWG American wire gauge

BICSI Building Industry Consulting Service International

c/w complete with

C Celsius

CCH closet connector housing

CGSB Canadian General Standards Board

CN Canadian National Rail

CSA CSA Group (formerly Canadian Standards Association)

db decibel

db/km decibel per kilometer

EIA Electronic Industries Alliance

ESA Electrical Safety Authority

ESRI Environmental Systems Research Institute

ETL Electrical Testing Labs

FTTH fibre to the home

FOC fibre optic cable

FOSC fibre optic splice enclosure

GIS geographic information system

GLB grade level box

GPS global positioning system

HW handwell

HDPE high density polyethylene

ICEA Insulated Cable Engineers Association, Inc.

ID identification

IDC Insulation Displacement Connector

IEC International Electrotechnical Commission

ISO International Organization for Standardization

ITE Institute of Transportation Engineering

ITS Intelligent Transportation Systems

lbf pound force

lbf/in pound force to inch

LSRCA Lake Simcoe Region Conservation Authority

MC Municipal Consent

mm millimetre

MPa Megapascals

MTO Ministry of Transportation, Ontario

N newton

N/cm newton per centimetre

NAD North American Datum

NASTT North American Society for Trenchless Technology

NEC National Electrical Code

NECA National Electrical Contractors Association

NEMA National Electrical Manufacturers Association

NFPA National Fire Protection Association

nm nanometer

NSF “CSA Type Designation” for Neutral Supported Cable, Flame-Tested Polyvinyl Chloride (Ontario Electrical Safety Code, 27th Edition/2018)

NSSP Non-Standard Special Provisions

OD Outer Diameter

OFNP Optical Fiber Nonconductive Plenum

OPSD Ontario Provincial Standard Drawing

OPSS Ontario Provincial Standard Specification

OTDR Optical Time Domain Reflector

OTM Ontario Traffic Manual

PMBOK Project Management Institute’s Project Management Book of Knowledge

PVC polyvinyl chloride

RWU “CSA Type Designation” for Thermoset Insulated Wires & Cables (Ontario Electrical Safety Code, 27th Edition-2018)

SDR Standard Dimension Ratio

SPMDD Standard Proctor Maximum Dry Density

TIA Telecommunication Industry Association

TPZ Tree protection zone

TRCA Toronto and Region Conservation Authority

TWU “CSA Type Designation” for Thermoplastic Cable, Moisture-Resistant, Flame-Tested Thermoplastic (Ontario Electrical Safety Code, 27th Edition-2018)

UL Underwriters Laboratories

UTM Universal Transverse Mercator

V volt

VDC volts direct current

W watt

WMS web map services

General

Item quantities listed in the Schedule of Prices are approximations only. Payment will be made based on the actual quantities supplied and installed.

The Contractor shall honour all manufacturers’ warranties of the materials supplied.

Excess Soil Management

Unless specified otherwise in the Contract Documents, all surplus or unsuitable excavated materials shall be disposed of in accordance with O. Reg 406/19 (On-Site and Excess Soil Management) under the Ontario *Environmental Protection Act* and SC 16 – On-Site and Excess Soil Management of the Supplementary Conditions.

Disposal of Hazardous Waste

During the performance of the Work, the Contractor shall comply with all requirements of federal, provincial and municipal laws, Acts, Ordinances, Regulations, Orders-in-Council and Bylaws, which pertain to the disposal of any materials which may be deemed to be hazardous waste and shall not contravene any applicable laws in that regard. The Owner shall not be held responsible for the disposal of any materials in contravention of these laws.

Salvage/Reuse of Materials

The Contractor shall identify materials that can be salvaged and reused and store them with the other materials. Salvaged materials shall only be reused as directed or approved by the Owner. Materials to be salvaged include, but are not limited to, the following:

* Vaults and lids
* Fibre optic cable greater than 100 m in length
* Microducts conduit and conduit greater than 100 m in length

Testing and Acceptance of Work

Factory finished equipment shall be protected so that the surface will not be damaged during construction. The Contractor shall remove and replace any damaged work at its own expense.

Discrepancies and Conflicts

Discrepancies and conflicts in the Contract Documents shall be brought to the Owner’s attention prior to commencing work on that portion of the Work. No additional payment will be made for the correction of errors made in this regard.

Coordination

The fibre optic conduit work shall be coordinated with the other work required by different trades so as to minimize any disturbance, alteration or damage to adjacent and/or adjoining facilities.

Except as otherwise provided for in the Specifications, or as may be approved, adjacent and/or adjoining facilities shall not be disturbed, altered or damaged in any way to permit the construction of the Work.

Adjustment of Equipment

All equipment shall be installed in a neat and orderly manner.

The Contractor shall make minor adjustments to equipment which in the Owner’s opinion are required to improve the appearance of the Site and such adjustments shall be completed at the Contractor's expense.

The Contractor shall also make minor adjustments, if so required, to any equipment that can be adjusted to provide optimum performance and such adjustments shall be completed at the Contractor's expense.

Fibre Optic Conduit Specifications – Items

Item F101 Supply and Install 50 mm Diameter Rigid DB2 PVC Conduit by Open Cut (Traffic Controller Handholes)

This Specification shall be read in conjunction with OPSS.MUNI 1010 (Nov 2013).

The Contractor shall supply and install 50 mm rigid DB2 PVC conduit in the locations shown on the Drawings and as directed by the Owner. The rigid DB2 PVC conduit shall conform to the requirements of CSA C22.2, No. 211.1.

The Contractor shall excavate the trench by either hand or hydrovac, install the conduit in the trench, backfill the trench and compact the backfill in the trench.

The conduit shall be installed 1.0 metre below the final grade and 1.5 metres under the road crossing unless specified differently in the Drawings. The Contractor shall obtain the Owner’s approval prior to adjusting the depth of the conduit where the proposed conduit conflicts with other utilities. The excavation and conduit shall be kept free of water at all times.

Individual conduit sweeps shall not exceed 90 degrees and the sum total of conduit sweeps for a section of conduit between termination points (e.g. vaults) shall not exceed 180 degrees. The sweep radius shall be a minimum of 10 times the internal diameter of the conduit. 90-degree condulets and electrical elbows are not acceptable. Factory-manufactured sweeps, as recommended by the conduit manufacturer, are required for bends in conduit and shall be supplied by the Contractor at no additional cost to the Owner.

Couplings shall be used to join sections of rigid conduit. When connecting to conduit of a different diameter, reducer couplings must be used. The couplings shall be as recommended by the conduit manufacturer and shall be supplied by the Contractor at no additional cost to the Owner. The couplings shall be watertight and installed in accordance with the manufacturer’s recommended practice for joining conduit. Should the coupling be an adhesive type, the manufacturer’s approved adhesive and installation techniques shall be followed. The Contractor shall ensure that couplings are not split or damaged in any way that could allow the seepage of water and/or foreign material into the conduit.

If the Contractor is required to break into a vault, the Contractor shall route the conduit under the existing vault. The Contractor shall repair any damage it causes to the vault at its own expense.

The Contractor shall supply and install a pull line and conduit caps in all conduits and shall leave 1.5 m of line coiled in the bottom of the vaults at the end of each conduit run. Splicing or knots will not be accepted in the pull line. All pull line shall be continuous from vault to vault. Recommended products include Mule Tape, Mule Webbing and Slick Tape or Equivalent. Nylon and marine rope will not be accepted.

The Contractor shall supply and install a 16-gauge copper, 600 V insulated tracer wire in all conduits. The tracer wire shall interconnect in the vaults. The Contractor shall confirm the continuity of all installed tracer wire using electronic instruments made for this purpose. Should the Contractor find breaks or faults in the continuity of the tracer wire, the Contractor shall repair the breaks or faults and ensure a properly functioning system of tracer wire is delivered to the Owner. After the repairs have been completed, the testing shall be repeated at no additional cost to the Owner.

The tracer wire shall interconnect in the vaults on the IDC block. Once the installation is complete and prior to bolting the vault lid closed, the Contractor shall take pictures of the inside vault and label the pictures with the date, location and Contract number.

Backfill shall conform to the requirements of OPSS.MUNI 1010 for Granular ‘A’ and Granular ‘B’ Type 1 and shall be compacted to 100% maximum dry density. Native backfill shall be compacted to 95% maximum dry density. Backfill shall be as shown on typical section of the Drawings or match the existing conditions.

The Contractor shall install a 150 mm wide, red plastic “CAUTION” tape, buried 300 mm above the conduit, for the full length of all of the conduits where open trenching is performed.

The Contractor shall complete red-line Drawings for all constructed fibre optic conduit and associated equipment under the Contract. Payment for the red-line Drawings will be made under Item G11 – Red-Line Drawings.

Measurement for Payment

Measurement for payment shall be per metre (m) along the centerline of conduit supplied and installed, measured from centre to centre of vaults and/or traffic controllers.

Basis of Payment

Payment shall be made at the unit price and shall be full compensation for all labour, equipment and materials necessary to complete the work as specified.

Item F102 Supply and Install 2.03 inches (51.6 mm) Diameter 7-Way HDPE Bundled 16/12 mm Microducts by Open Cut (All Configurations)

This Specification shall be read in conjunction with OPSS.MUNI 1010 (Nov 2013).

The Contractor shall supply and install 2.03 inches (51.6 mm) diameter, 7-way HDPE bundled 16/12 mm microducts (conduit) by open cut in the locations shown on the Drawings. The bundled microducts shall be supplied by Dura-Line Canada as shown on Drawing – FuturePath 7-way 16\_12 mm with HDPE Sheath.

The Contractor shall excavate the trench by either hand or hydro-vac, install the conduit in the trench, backfill the trench and compact the backfill in the trench.

The conduit shall be installed 1.0 metre below the final grade and 1.5 metres under the road crossing unless specified differently in the Drawings. The Contractor shall obtain the Owner’s approval prior to adjusting the depth of the conduit where the proposed conduit conflicts with other utilities. The excavation and conduit shall be kept free of water at all times.

Individual conduit sweeps shall not exceed 90 degrees and the sum total of conduit sweeps for a section of conduit between termination points (e.g. vaults) shall not exceed 180 degrees. The sweep radius shall be a minimum of 10 times the internal diameter of the conduit. 90-degree condulets and electrical elbows are not acceptable. Factory-manufactured sweeps, as recommended by the conduit manufacturer, are required for bends in conduit and shall be supplied by the Contractor at no additional cost to the Owner.

The microduct conduit shall be continuous with no joints between vaults. In the event a joint cannot be avoided, the Contractor shall use couplings to join the conduit. The couplings shall be as recommended by the conduit manufacturer and shall be supplied by the Contractor at no additional cost to the Owner. The couplings shall provide an airtight, watertight and secure fit and be installed in accordance with the conduit manufacturer’s recommended practice for joining conduit. The preinstalled tracer wire shall be spliced together using the manufacturer’s recommended conduit splicing product to ensure tracer wire continuity. The Contractor shall document all joint locations on red-line Drawings.

In vaults, the imbedded tracer wire shall be continuous from the conduit end to the IDC block. Tracer wire extensions inside the vault will not be accepted. Once the installation is complete and prior to bolting the vault lid closed, the Contractor shall take pictures of the inside vault and label the pictures with the date, location and Contract number.

If the Contractor is required to break into a vault, the Contractor shall route the conduit under the existing vault. The Contractor shall repair any damage it causes to the vault at its own expense.

After laying the conduit, the Contractor shall conduct a duct integrity test of the microducts to validate proper laying, crush and deformity. Prior to conducting the duct integrity test, the Contractor shall run a sponge through each microduct to ensure that the microduct is free and clear of any debris. The duct integrity test shall consist of blowing a bead through each of the microducts to ensure full continuity from vault to vault or stub. The bead shall not be less than 80% of the diameter of the microduct being tested. The Contractor shall document and submit all testing procedures to the Owner for review. At a minimum, documentation shall include the date of the test, names of who conducted the test and the test results.

The Contractor shall supply microduct ends recommended by the conduit manufacturer to protect microducts during and after construction. Microduct ends shall be installed to provide a watertight and/or airtight and secure fit in accordance with manufacturer’s recommended practice for installation and use. The Contractor shall ensure that the duct ends are not split or damaged in anyway that could allow seepage of water or foreign material in the conduit.

Backfill shall conform to the requirements of OPSS.MUNI 1010 for Granular ‘A’ and Granular ‘B’ Type 1 and shall be compacted to 100% maximum dry density. Native backfill shall be compacted to 95% maximum dry density. Backfill shall be as shown on typical section of the Drawings or match the existing conditions.

The Contractor shall install a 150 mm wide, red plastic “CAUTION” tape, buried 300 mm above the conduit, for the full length of the conduits.

The Contractor shall complete red-line Drawings for all constructed fibre optic conduit and associated equipment under the Contract. Payment for the red-line Drawings will be made under Item G11 – Red-Line Drawings.

Measurement for Payment

Measurement for payment shall be per metre (m) along the centerline of conduit supplied and installed, measured from centre to centre of vaults, regardless of the number of conduits being installed.

Basis of Payment

Payment shall be made at the unit price and shall be full compensation for all labour, equipment and materials necessary to complete the work as specified.

Item F103 Supply and Install 2.03 inches (51.6 mm) Diameter 7-Way HDPE Bundled 16/12 mm Microducts by Directional Bore (All Configurations)

This Specification shall be read in conjunction with OPSS.MUNI 450 (Nov 2021) and OPSS.MUNI 1010 (Nov 2013).

All directional drilling within Regional right of ways shall conform to the requirements of OPSS.MUNI 450 and NASTT Horizontal Directional Drilling Good Practices Guidelines 2017 (4th Edition).

The Contractor shall supply and install 2.03 inches (51.6 mm) diameter, 7-way coilable HDPE bundled 16/12 mm microducts (conduit) by directional bore in the locations shown on the Drawings and as directed by the Owner. The bundled microducts shall be supplied Dura-Line Canada as shown on Drawing – FuturePath 7-way 16\_12 mm with HDPE Sheath.

When directed by the Owner or indicated on the Drawings, one (1) or all of the 51.6 mm diameter HDPE bundled microducts shall be substituted with 50 mm diameter HDPE conduit. For example, the design may require the installation of three (3) 51.6 mm diameter bundled microducts, but the Owner may require one (1) of the 51.6 mm diameter bundled microducts to be substituted with 50 mm diameter HDPE conduit. In this scenario, the Contractor will be paid for the installation of three (3) 51.6 mm diameter bundled microducts and no additional payment will be provided for substituting the 51.6 mm diameter HDPE bundled microduct with 50 mm diameter HDPE conduit.

Road crossings shall be completed using a directional bore machine that removes material to make room for the conduit. The use of a machine that displaces material rather than remove it will not be permitted.

The Contractor shall perform its own Site investigation, make the results available upon request and complete drill log sheets and provide copies to the Owner upon request.

The conduit shall be installed 1.0 metre below the final grade and 1.5 metres under road crossing unless specified differently in the Drawings. The Contractor shall obtain the Owner’s approval prior to adjusting the depth of the conduit where the proposed conduit conflicts with other utilities. The excavation and conduit shall be kept free of water at all times.

Individual conduit sweeps shall not exceed 90 degrees and the sum total of conduit sweeps for a section of conduit between termination points (e.g. vaults) shall not exceed 180 degrees. The sweep radius shall be a minimum of 10 times the internal diameter of the conduit. 90-degree condulets and electrical elbows are not acceptable. Factory-manufactured sweeps are required for bends in conduit and shall be supplied by the Contractor at no additional cost to the Owner.

The conduit shall be continuous with no joints between vaults. In the event a joint cannot be avoided, the Contractor shall use couplings to join the conduit. The couplings shall be as recommended by the conduit manufacturer and shall be supplied by the Contractor at no additional cost to the Owner. The couplings shall provide an airtight, watertight and secure fit in accordance with the conduit manufacturer’s recommended practice for joining conduit. The Contractor shall ensure that the 20 AWG tracer wire within the conduit is properly connected at joints. The preinstalled tracer wire shall be spliced together using the manufacturer’s recommended conduit splicing product to ensure tracer wire continuity. The Contractor shall document all joint locations on red-line Drawings.

In vaults, the imbedded tracer wire shall be continuous from the conduit end to the IDC block. The Contractor shall ensure that there is sufficient conduit in the vaults to allow for the tracer wire to connect to the IDC block. Tracer wire extensions inside the vault will not be accepted. Once the installation is complete and prior to bolting the vault lid closed, the Contractor shall take pictures of the inside vault and label the pictures with the date, location and Contract number.

After laying the duct network, the Contractor shall conduct a duct integrity test of the microducts to validate for proper laying, crush and deformity. Prior to the duct integrity test, the Contractor shall run a sponge through each microduct to ensure the microduct is free and clear of any debris. The integrity test shall consist of blowing a bead through each of the micro ducts to ensure full continuity from vault to vault or stub. The bead shall not be less than 80% of the diameter of the microduct being tested. The Contractor shall document and submit all testing procedures to the Owner for review. At a minimum, documentation shall include the date of the test, names of who conducted the test and results. At the conclusion of the testing, the microducts shall be securely sealed with caps as recommended by the manufacturer of the microduct. The microduct caps shall be supplied by the Contractor at no additional cost to the Owner.

The Contractor shall supply microduct ends recommended by the conduit manufacturer to protect microducts during and after construction. Microduct ends shall be installed to provide a watertight and/or airtight and secure fit in accordance with manufacturer’s recommended practice for installation and use. The Contractor shall ensure that the duct ends are not split or damaged in anyway that could allow seepage of water or foreign material in the conduit.

Bore pits backfill shall conform to the requirements of OPSS.MUNI 1010 for Granular ‘A’ and Granular ‘B’ Type 1 and shall be compacted to 100% maximum dry density. Native backfill shall be compacted to 95% maximum dry density. Backfill shall be as shown on typical section of the Drawings or match the existing conditions.

The Contractor shall complete red-line Drawings for all constructed fibre optic conduit and associated equipment under the Contract. Payment for the red-line Drawings will be made under Item G11 – Red-Line Drawings.

Measurement for Payment

Measurement for payment shall be per metre (m) along the centerline of conduit supplied and directionally drilled, measured from centre to centre of vaults and/or bore pits, regardless of the number of conduit being placed.

Basis of Payment

Payment shall be made at the unit price and shall be full compensation for all labour, equipment and materials necessary to complete the work as specified.

Item F104 Supply and Install 50 mm Diameter Coilable HDPE Conduit by Directional Bore

This Specification shall be read in conjunction with OPSS.MUNI 450 (Nov 2021) and OPSS.MUNI 1010 (Nov 2013).

All directional drilling within Regional right of ways shall conform to the requirements of OPSS.MUNI 450 and NASTT Horizontal Directional Drilling Good Practices Guidelines 2017 (4th Edition).

The Contractor shall supply and install coilable HDPE conduit by directional bore in the locations shown on the Drawings and as directed by the Owner. The coilable HDPE conduit shall be 50 mm (2 inches) diameter Smoothwall, wall type SDR 13.5 supplied by Dura-Line Canada.

Road crossings shall be completed using a directional bore machine that removes material to make room for the conduit. The use of a machine that displaces material rather than remove it will not be permitted.

The Contractor shall perform its own Site investigation, make the results available upon request and complete drill log sheets and provide copies upon request.

The conduit shall be installed 1.0 metre below the final grade and 1.5 metres under road crossing unless specified differently in the Drawings. The Contractor shall obtain the Owner’s approval prior to adjusting the depth of the conduit where the proposed conduit conflicts with other utilities. The excavation and conduit shall be kept free of water at all times.

Individual conduit sweeps shall not exceed 90 degrees and the sum total of conduit sweeps for a section of conduit between termination points (e.g. vaults) shall not exceed 180 degrees. The sweep radius shall be a minimum of 10 times the internal diameter of the conduit. 90-degree condulets and electrical elbows are not acceptable. Factory-manufactured sweeps are required for bends in conduit and shall be supplied by the Contractor at no additional cost to the Owner.

The HDPE conduit shall be continuous with no joints between the vaults. In the event a joint cannot be avoided, the Contractor shall use couplings to join sections of the conduit. The couplings shall be as recommended by the conduit manufacturer and shall be supplied by the Contractor at no additional cost to the Owner. Couplings shall be single piece metallic, provide a watertight and secure fit and be installed in accordance with the conduit manufacturer’s recommended practice for joining conduit. Should the coupling be an adhesive type, the manufacturer’s approved adhesive and installation technique shall be followed. The Contractor shall ensure that couplings are not split or damaged in any way that could allow the seepage of water and/or foreign material into the conduit. The Contractor shall document all joint locations on red-line Drawings.

After laying the conduit, the Contractor shall conduct a duct integrity test of the HDPE conduits to validate for proper laying, crush and deformity. The Contractor shall remove any obstructions and/or deformities before handing over the conduit to the Owner.

The Contractor shall supply and install a pull line and conduit caps in all conduits and shall leave 1.5 m of line coiled in the bottom of the vaults at the end of each conduit run. Splicing or knots will not be accepted in the pull line. All pull line shall be continuous from vault to vault. Recommended products include Mule Tape, Mule Webbing and Slick Tape or Equivalent. Nylon and marine rope will not be accepted.

The Contractor shall supply and install a 16-gauge copper, 600 V insulated tracer wire on the inside of conduits. The tracer wire shall interconnect in the vaults. The Contractor shall confirm the continuity of all installed tracer wire using electronic instruments made for this purpose. Should the Contractor find breaks or faults in the continuity of the tracer wire, the Contractor shall repair the breaks or faults and ensure a properly functioning system of tracer wire is delivered to the Owner. After the repairs have been completed, the testing shall be repeated at no additional cost to the Owner.

The tracer wire shall interconnect in the vaults on the IDC block. Once the installation is complete and prior to bolting the vault lid closed, the Contractor shall take pictures of the inside vault and label the pictures with the date, location and Contract number.

The Contractor shall supply conduit caps recommended by the conduit manufacturer to protect the conduit during and after construction. Manufactured conduit caps shall be installed to provide a watertight and/or airtight and secure fit in accordance with the manufacturer’s recommended practice for installation and use. Glue adhesive shall not be used. The Contractor shall ensure that the duct ends are not split or damaged in any way which could allow seepage of water or foreign material in the conduit.

Bore pits backfill shall conform to the requirements of OPSS.MUNI 1010 for Granular ‘A’ and Granular ‘B’ Type 1 and shall be compacted to 100% maximum dry density. Native backfill shall be compacted to 95% maximum dry density. Backfill shall be as shown on typical section of the Drawings or match the existing conditions.

The Contractor shall complete red-line Drawings for all constructed fibre optic conduit and associated equipment under the Contract. Payment for the red-line Drawings will be made under Item G11 – Red-Line Drawings.

Measurement for Payment

Measurement for payment shall be per metre (m) along the centerline of conduit supplied and directionally drilled, measured from centre to centre of vaults and/or bore pits.

Basis of Payment

Payment shall be made at the unit price and shall be full compensation for all labour, equipment and materials necessary to complete the work as specified.

Item F105 Supply and Install 30 inches x 48 inches x 36 inches Polymer Concrete Vault with Lid

The following Standard Drawing is applicable to this item: YorkNet Standard Vault Installation.

The Contractor shall supply and install a polymer concrete vault and lid in the location(s) shown on the Drawings and as directed by the Owner. The vault shall be gray Ultra-Lite Cover Vault System supplied by Connect Telecommunications Incorporated.

The Contractor shall install the vault and lid in accordance with the installation guidelines supplied with the vault and lid.

The Contractor shall field-locate the vault to avoid steep slopes and low-lying locations with poor drainage.

The Contractor shall not install the vault within the travelled right of way or shoulders.

The Contractor shall remove and dispose of the excavated material and spoils off Site and place 300 mm of free draining granular bedding material under the vault.

The Contractor shall hand tamp granular backfill material or approved native soil around the vault collar and match the top 150 mm to the composition, density and elevation of the surrounding surface.

The towel bar side of the vault shall be installed closest to the road and conduits shall be installed on the opposite side to avoid crowding and allow maximum space for the fibre optic cable.

All conduits shall be installed from under the vault, **not** through the base, to ensure that the vault structure is not altered and the Tier 22 rating is not compromised.

The Contractor shall install conduit in the vault and comply with the following additional requirements:

* Do not install conduit within 50 mm of the corner of the vault.
* Extend PVC conduit 100 mm, and HDPE conduit 150 mm, beyond the inside wall of the vault.
* Align conduit ends by colour at each side of the vault.
* Conduit shall be deburred and free from all sharp edges prior to being capped.
* Conduit with tracer wire shall be cut back to ensure there is sufficient ground wire to run neatly along the vault’s inner wall to reach the IDC ground block.

Vaults shall be left clean and free of dirt and debris on the internal stones, walls and lid.

Measurement for Payment

Measurement for payment shall be a count of each vault supplied and installed with a lid.

Basis of Payment

Payment shall be made at the unit price and shall be full compensation for all labour, equipment and materials necessary to complete the work as specified.

Item F106 Break into Existing Traffic Handwell

*This Specification shall be read in conjunction with OPSS.MUNI 603 (Apr 2021).*

The following Standard Drawing is applicable to this item: E-1.02.

The Contractor shall break into the existing traffic handwell and connect the new conduit in the locations shown on Drawings.

The Contractor shall expose the traffic handwell and core into the structure unless pre-cut conduit sleeve is available. The Contractor shall grout around the opening/conduit sleeve on the inside and outside of the traffic handwell to the satisfaction of the Owner. The Contractor shall repair any damage it causes to the traffic handwell at its own expense.

Measurement for Payment

Measurement for payment shall be a count of each opening made in existing traffic handwells.

Basis of Payment

Payment shall be made at the unit price and shall be full compensation for all labour, equipment and materials necessary to complete the work as specified.

Item F107 Break into Existing Vault

This Specification shall be read in conjunction with OPSS.MUNI 603 (Apr. 2021).

The Contractor shall break into the existing vault and connect the new conduit in the locations shown on the Drawings.

The Contractor shall comply with the following requirements:

* Bring the conduit inside the wall of the vault a maximum of 8 inches (203 mm) above the gravel base.
* Replace the 3/4 inch (19 mm) crushed stone at the base of the excavated hole and ensure that the excavation floor is well compacted and level.
* The crushed stone shall be free of soil and organic material.

The Contractor shall not use “river rock” or “round stone” at the base of the excavated hole as the desired compaction and equivalent resistance to lateral loading will not be met.

Measurement for Payment

Measurement for payment shall be a count of each opening made in existing vaults.

Basis of Payment

Payment shall be made at the unit price and shall be full compensation for all labour, equipment and materials necessary to complete the work as specified.