HALTON HILLS HYDRO
UNDERGROUND DISTRIBUTION SPECIFICATIONS

The following Underground Distribution Specifications (UD-Specs) were developed by Halton Hills Hydro Inc. to be used only in this utilities service area. The following standards have been approved by a Professional Engineering accredited by the PEO in accordance with Ontario Regulation 22/04 and the appropriate Certificates of Approval have been issued in the specifications latest revision. For proof of Certificate, please contact Halton Hills Hydro Inc., Engineering Department. Halton Hills Hydro has and will continue to determine the application for each specification. Halton Hills Hydro will not be held responsible/liable for any misuse of these specifications by others (inside or outside the limits of this utilities service area). These specifications are not recommended for use outside of Halton Hills Hydro’s distribution service area as other standards/codes may apply in other areas. As such, Standards/Codes/other applicable documentation should be obtained from the utility responsible for power distribution in the area you are working, if not within the limits of this utilities service area.

Please note that these standards are subject to change without notification and as such it is recommended that the user confirm latest revision if in doubt.

Any questions should be direct to Halton Hills Hydro Inc., Engineering Department at 519-853-3700.

- UD-01 - Typical Concrete Encased Duct Bank Section (8 ducts) – Roadcrossing/Boulevard
- UD-02 - Concrete Encase Duct Bank Arrangements
- UD-03 - Hydro, Bell & TV Joint Use Trench Section 1.200 m Depth, Direct Buried Ducts, Boulevard
- UD-04 - Hydro, Bell & TV Joint Use Trench Section 1.425 m Depth, Direct Buried Ducts, Boulevard
- UD-05 - Hydro, Bell & TV Joint Use Trench Section 1.675 m Depth, Direct Buried Ducts, Boulevard
- UD-06 - Secondary Service Trench Section
- UD-07 - Street Lighting Trench Section
- UD-08 - Street Lighting Duct Termination Detail
- UD-09 - Secondary Service Installation Detail for Single Phase up to 400A and three Phase up to 200A
- UD-09-REC – Secondary Service Installation Detail (Recessed) for 1 Phase (& 3 Phase up to 200 AMP)
- UD-09B – Secondary Service on Stub Pole Installation Detail for 1 Phase (& 3 Phase up to 200A)
- UD-09C – CMS Secondary Service on Stub Pole Installation Detail for 1 Phase
- UD-09D - Secondary Service Installation Detail for 1 Phase (up to 400A)
• UD-09E- Ganged Meter Base (3 Position Max. + Entry Door), Secondary Service on Wood Structure – Installation Detail
• UD-10 - Secondary Service Cable Splice Detail
• UD-11 - Installation of Precast Foundation for Pad Mounted Transformer & Switchgear Including Grounding Detail
• UD-12 - Proposed Typical Lot Servicing Agreement (Future)
• UD-13 - Single Phase Low Profile Pad Mounted Transformer
• UD-14 - Secondary Underground Cable Termination
• UD-15 - Primary Underground Termination Pole
• UD-16 - Typical 1 Phase Low Profile Pad Mounted Transformer Installation
• UD-17 - Typical 3 Phase Pad Mounted Transformer Installation (Radial & Loop Feed)
• UD-18B Typical Canada Power Pad Mounted Switchgear with Resettable Fault Interrupter Installation Detail
• UD-18C Canada Power Pad Mounted Switchgear, 2 – 600A 3ϕ Loop Feed with Resettable Fault Interrupters on 6 – 200A Single Phase Taps
• UD-18D Canada Power Pad Mounted Switchgear, 2 – 600A 3ϕ Loop Feed with Resettable Fault Interrupters on 1 – 200A 3ϕ Tap and 3 – 200A Switchable Single Phase Taps
• UD-19 - Faulted Circuit Indicator Installation Details
• UD-20 – Typical Switching Kiosk Installation
• UD-23 – Proposed Joint-Use Secondary Service Lateral (Step) Trench Section
• UD-24 Proposed Joint Use Primary & Secondary Hydro, Bell, T.V., & Gas Concrete Encased Step Trench Section (1.
• UD-25 Proposed Joint Use Primary & Secondary Hydro, Bell, T.V., & Gas Step Trench Section (1.525m Depth) – Boulevard
• UD-26 Proposed Concrete Encased Duct Bank Section Step Trench (For 8 Ducts) – Roadcrossing
• UD-27 Concrete Foundation Standard (For Halton Hills Hydro 898 Series Canada Power Switchgear.
• UD-29 Concrete Foundation Standard Lid (for Retrofitting PMH-9 Foundations with Lid for 898 Series Canada Power Switchgears.
• UD-30 Directional Bore Street Crossing Secondary Services – Typical.
• UD-31 Directional Bore Street Crossing Primary Services - Typical

- End of List
1. Obtain all utility locate prior to construction.
2. All dimensions are the minimum distances required.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
4. The reinforcing bars along the bottom sides and bottom of the duct bank shall be concealed with a minimum of 50mm of concrete cover.
5. Backfill in layers not exceeding 300mm. Compaction to be to 95% Proctor density minimum (as per CSA C22.3 No.7-94 clause – 3.5.3.2).
6. This specification meets or exceeds CSA C22.3 No.7-94 standard.
7. All ducts to be PVC type DB2/ES2 as per CSA–C22.2 #211.1 standard. Vacant ducts to be capped prior to backfilling.
8. 5 – 18mm (3/4") PVC ducts to be installed inside 100mm (4") PVC duct, by contractor.
9. All PVC ducts and joints to be glued with approved adhesive.
10. Cable pulling ropes must be installed in all ducts at time of duct installation. Any concrete or other backfill shall not cover ends of ducts.

Typical Concrete Encased Duct Bank Section (for 8 ducts) – Roadcrossings/ Boulevards

Designed by:   H.H.H. File:
Drawn by:      U:\Engineering Operations\1.
               2. Specs\4. H.H.H. UnderGround Specs\UD Specs Reg 22-04
Approved by:   HH.H.H. DWG. NO:
Signature:     UD-01-R2
Scale:         Last Revised Date: 05-05-16
                Original Date: 00-04-18

CAUTION TAPE (150mm (6") WIDTH)
HHH SCADA/COMMUNICATION
100mm ("4") TYPE DB2/ES2 PVC
DUCT AS PER CSA C22.2
#211.1
SAND COVER
HHH METERING/ COMMUNICATION
19mm (3/4") HDPE DUCTS IN
100mm ("4") TYPW DB2/ES2 PVC
DUCT
100mm ("4") TYPE DB2/ES2 PVC
DUCT AS PER CSA C22.2 #211.1
20mm (3/4") DEFORMED STEEL
REINFORCING BARS
AS PER CAN/CSA G30.18-M92
BACKFILL FOR
ROAD CROSSINGS
AS PER
REQUIREMENTS OF
THE TOWN OF
HALTON HILLS
ROAD SIDE       FINAL GRADE LEVEL       PROPERTY SIDE
1.0m (MAIN TRENCH)
1.2m (ROAD CROSSINGS)
300mm
155mm
150mm
50.0mm
50.0mm
75.0mm

TYPICAL CONCRETE ENCASED DUCT BANK SECTION (FOR 8 DUCTS) – ROAD CROSSINGS/ BOULEVARDS

Designed by:   F. Lemut
Drawn by:      M. Maruschak & G. Ebersberger
Approved by:   M. Maruschak & G. Ebersberger
Signature:     M. Maruschak & G. Ebersberger
Scale:         N.T.S.
NOTES:
1. Obtain all utility locates prior to construction.
2. The top elevation of the concrete encasement shall be a depth of 1.0m. In rock or high water table areas, the top of the duct bank may be placed at subgrade elevation or as otherwise directed by the engineer.
3. The reinforcing bars along the bottom sides and bottom of the duct bank shall be concealed with a minimum of 50mm of concrete cover.
4. All dimensions are in millimetres or metres unless otherwise shown.
5. This specification meets or exceeds CSA 22.3 No.7-94 standard.
6. All ducts to be PVC Type DB2/ES2 as per CSA-C22.2 #211.1 standard.
7. All PVC ducts and joints to be glued with approved adhesive.

CONCRETE ENCASED DUCT STRUCTURE ARRANGEMENTS

DESIGNED BY: H.H.H. FILE: LAST REVISED DATE:
DRAWN BY: F. LEMUT U:\Engineering Operations\H.H.H. DWG. NO: 05-05-16
APPROVED BY: M. MAROSCHAK & C. EBERSBERGER UD Spec NO 22-04
SIGNATURE: M. MAROSCHAK & C. EBERSBERGER H.H.H. DWG. NO: 00-04-18
SCALE: N.T.S.
NOTES:
1. Obtain all utility locates prior to construction.
2. All dimensions are the minimum distances required.
3. Contact Halton Hills Hydro a minimum of 7 business days prior to backfill to schedule inspections.
4. Backfill in layers not exceeding 300 mm. Thoroughly compact each layer.
5. This specification meets or exceeds CSA C22.1 NO.7-94 standard.
6. All PVC ducts and joints to be glued with approved adhesive.

ROAD SIDE — FINAL GRADE LEVEL — PROPERTY SIDE

CAUTION TAPE (150mm (6") WIDTH)
HHH SCADA/ COMMUNICATION CABLES
100mm (4") TYPE DB2/ ES2 PVC DUCT
HHH METERING/COMMUNICATION
19mm (3/4") HDPE DUCT
BELL & T.V. COMMUNICATION CABLES
SAND COVER
100 mm (4") PRIMARY
AND SPARE DUCT
SAND BEDDING

TYPICAL PRIMARY HYDRO, BELL & T.V. JOINT USE
TRENCH SECTION (1.2 m DEPTH), DIRECT BURIED DUCTS
— BOULEVARD

DESIGNED BY:
F. LEHUT

DRAWN BY: F. LEHUT
APPROVED BY: M. MAROSCHAK & G. EBERSBERGER
SIGNATURE: N.T.S.
SCALE: N.T.S.

H.H.H. DWG. NO: UD-03-R2
LAST REVISED DATE: 05-05-16
C. HALE
ORIGINAL DATE: 00-04-18
NOTES:
1. Obtain all utility locates prior to construction.
2. All dimensions are the minimum distances required.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
4. Backfill in layers not exceeding 300 mm. Thoroughly compact each layer.
5. This specification meets or exceeds CSA C22.3 No.7-15 standard.
6. All PVC ducts and joints to be glued with approved adhesive.

TYPICAL PRIMARY & SECONDARY HYDRO, BELL & T.V. JOINT USE TRENCH SECTION (1.450 m DEPTH), DIRECT BURIED DUCTS — BOULEVARD

DRAWN BY: F. LEMUT LAST REVISED DATE: 17-02-08
APPROVED BY: C. HALE C.E.T LEL, ENG SUPERVISOR J. ORLENI
SIGNATURE: H.H.H. DWG. NO: UD-04-R3
SCALE: N.T.S. ORIGINAL DATE: 00-04-18
NOTES:
1 OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.
2 ALL DIMENSIONS ARE THE MINIMUM DISTANCES REQUIRED.
3 CONTACT HALTON HILLS HYDRO A MINIMUM OF 2 BUSINESS DAYS PRIOR TO BACKFILL TO SCHEDULE INSPECTIONS.
4 BACKFILL IN LAYERS NOT EXCEEDING 300 mm. THOROUGHLY COMPACT EACH LAYER.
5 THIS SPECIFICATION MEETS OR EXCEEDS CSA C22.3 NO.7-15 STANDARD.
6 ALL HYDRO PVC DUCTS AND JOINTS TO BE GLUED WITH APPROVED ADHESIVE.

TYPICAL HYDRO, BELL & T.V. JOINT USE
TRENCH SECTION (1.700 m DEPTH), DIRECT BURIED DUCTS
— BOULEVARD

DESIGNED BY:

DRAWN BY: F. LEMUT

APPROVED BY: C. HALE C.E.T LEL, ENG SUPERVISOR

SIGNATURE:

SCALE: N.T.S.


LAST REVISED DATE: 17-02-08

J. ORLENI

ORIGINAL DATE: 00-04-18

H.H.H. DWG. NO: UD-05-R3
NOTES:
1. Obtain all utility locates prior to construction.
2. All dimensions are the minimum required distances.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
4. Backfill in layers not exceeding 300 mm. Thoroughly compact each layer.
5. This specification meets or exceeds CSA-C22.3 NO.7-15 standard.
6. HHH metering/communication 100mm (4") HDPE poly duct shall be installed and terminated at each meter base and tie wrapped to the incoming rigid meter base duct. The other end shall be terminated and buried at the communication level in close proximity to the relevant transformer. The duct shall be sealed with appropriate tapered poly plug or end cap on both ends. Pulling rope 4.75 mm (3/16") shall be installed in this duct. See HHH duct installation specification for more details.
7. All PVC ducts and joints to be glued with approved adhesive.

*NOTE: SERVICES RATED 400A OR GREATER WILL REQUIRE ADDITIONAL DUCTS

SECONDARY SERVICE TRENCH SECTION

DESIGNED BY:
F. LEMUT

DRAWN BY:
C. HALE C.E.T LEL, ENG SUPERVISOR

APPROVED BY:

SIGNATURE:

SCALE:
N.T.S.

HH.H. FILE:
U:\Engineering Operations\6. Specs and Documents\4. HHH Underground Specs\UD Specs Reg 22-04

LAST REVISED DATE:
17-02-08

J. ORLENI

ORIGINAL DATE:
00-04-18

HH.H. DWG. NO:
UD-06-R3
NOTES:
1 OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.
2 ALL DIMENSIONS ARE THE MINIMUM REQUIRED DISTANCES.
3 CONTACT HALTON HILLS HYDRO A MINIMUM OF 2 BUSINESS DAYS PRIOR TO BACKFILL TO SCHEDULE INSPECTIONS.
4 BACKFILL IN LAYERS NOT EXCEEDING 300 mm. THOROUGHLY COMPACT EACH LAYER.
5 THIS SPECIFICATION MEETS OR EXCEEDS CSA C22.3 NO.7-94 STANDARD.
6 FOR MORE DETAILS SEE HALTON HILLS HYDRO STANDARD DWG. UD-08.
7 ALL PVC DUCTS AND JOINTS TO BE GLUED WITH APPROVED ADHESIVE.

STREET LIGHTING TRENCH SECTION

DESIGNED BY: 
DRAWN BY: F. LEMUT 
APPROVED BY: M. MAROSCHAK & C. EBERSBERGER 
SIGNATURE: 
SCALE: N.T.S. 

H.H.H. FILE: 
H.H.H. DWG. NO: UD-07-R1 
LAST REVISION DATE: 05-04-06 
ORIGINAL DATE: 00-04-18
NOTES:
1. Obtain all utility locates prior to construction.
2. All dimensions are the minimum distances required.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
4. Backfill in layers not exceeding 300 mm. Thoroughly compact each layer.
5. This specification meets or exceeds CSA C22.3 No. 7-94 standard.
6. For further details see Halton Hills Hydro Standard Dwg. UD-07.
7. All PVC ducts and joints to be glued with approved adhesive.

STREETLIGHTING DUCT TERMINATION DETAIL

DESIGNED BY: [Name]
DRAWN BY: F. LEMUT
APPROVED BY: M. MAROSCHAK & C. EBERSBERGER
SIGNATURE: [Signature]
SCALE: N.T.S.
H.H.H. DWG. NO: UD-08-R2
LAST REVISED DATE: 05-05-20
C. HALE
ORIGINAL DATE: 00-04-18
NOTES:
1. Obtain all utility locates prior to construction.
2. For more information see Halton Hills Hydro Secondary Service Trench Profile, UD-06.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
4. All materials shall meet the safety requirements of the Ontario Electrical Safety Code, 2002, or latest and O. Reg. 22/04, latest amendment.
5. All ducts to be sealed against dirt ingress.
6. Caution tape to be installed full length of the trench.
7. Sand cover will be required for all direct buried cable.
8. All ducts and joints to be glued with approved adhesive.
9. This specification meets or exceeds CSA-C22.3 No.7-15 standard.
10. HHH Metering/Communication 100mm (4") HDPE poly duct shall be installed and terminated at each meter base and tie wrapped to the incoming rigid meter base duct. The other end shall be terminated and buried at the communication level in close proximity to the relevant transformer. The duct shall be sealed with appropriate tapered poly plug or end cap on both ends. Pulling rope 4.75mm (3/16") shall be installed in this duct. See HHH Std. DWG. UD-08 for reference and HHH duct installation specification for more details.

SECONDARY SERVICE INSTALLATION DETAIL
FOR 1 PHASE (& 3 PHASE UP TO 200 AMP).

DESIGNED BY: L. BAKER

DRAWN BY: F. LEMUT

APPROVED BY: C. HALE C.E.T. LEL, ENG SUPERVISOR

SIGNATURE: ________________________________

SCALE: N.T.S.

H.H.H. FILE: ________________________________

H.H.H. DWG. NO: ________________________________

LAST REVISED DATE: 17-02-08

ORIGINAL DATE: 01-01-17

J. ORLENI

U:\Engineering Operations\ 6. Specs and Documents\ 4. HHH Underground Specs UD Specs Reg 22-04
NOTES:
1. Obtain all utility locates prior to construction.
2. For more information see Halton Hills Hydro Secondary Service Trench Profile, UD–06.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
4. All materials shall meet the safety requirements of the Ontario Electrical Safety Code, 2002, or latest and O. Reg. 22/04, latest amendment.
5. All ducts to be sealed against dirt ingress with electrically insulated foam.
6. CAUTION TAPE TO BE INSTALLED FULL LENGTH OF THE TRENCH.
7. Sand cover will be required for all direct buried ducts per UD–06.
8. Ducts shall be concrete encased under vehicle traveled surfaces per UD–02.
9. All ducts and joints to be glued with approved adhesive.
10. THIS SPECIFICATION MEETS OR EXCEEDS CSA–C22.3 NO.7–15 STANDARD.
11. HHH METERING/COMMUNICATION 100mm (4") HDPE POLY DUCT SHALL BE INSTALLED AND TERMINATED AT EACH METER BASE AND TIE WRAPPED TO THE INCOMING RIGID METER BASE DUCT. THE OTHER END SHALL BE TERMINATED AND BURIED AT THE COMMUNICATION LEVEL IN CLOSE PROXIMITY TO THE RELEVANT TRANSFORMER. THE DUCT SHALL BE SEALED WITH APPROPRIATE TAPERED POLY PLUG OR END CAP ON BOTH ENDS.
12. Pulling rope 4.75mm (3/16") shall be installed in this duct. See HHH STD. DWG. UD–06 for reference and HHH duct installation specification for more details.
13. Meter cabinet shall be electrical bonded/grounded per ESA Code. Meter cabinet shall be doorless and shall have a wood backpanel for mounting meter base. Cabinet opening shall remain unobstructed.
14. Frost loop shall be installed below meter base and shall not be concrete encased. If a frost loop is not possible, a CSA 36" radius bended conduit per detail 1 may be used with HHH’S approval.

**Meter Enclosure (Doorless)**
HYDEL P/N ST301812SC

**Plan Detail**

**Box Detail**

**Secondary Service Installation Detail (Recessed)**
For 1 Phase (& 3 Phase up to 200 Amp)

**Designed by:** C. Hale
**Drawn by:** C. Hale
**Approved by:** C. Hale C.E.T. LEL, Eng Supervisor
**Signature:**
**Scale:** N.T.S.

**HHH File:**
U:\Engineering Operations\6. Specs and Documents\4. HHH UnderGround Specs\UD Specs Reg 22–04

**Last Revised Date:** 17–02–08
**J. Orleni**

**HHH DWG. No:** UD–09–REC–R2
**Original Date:** 07–05–01
NOTES:
1. Obtain all utility locates prior to construction.
2. For more information see Halton Hills Hydro Secondary Service Trench Profile, UD-06.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
4. All materials shall meet the safety requirements of the Ontario Electrical Safety Code, 2002, or latest and O. Reg. 22/04, latest amendment.
5. All ducts to be sealed against dirt ingress.
6. Caution tape to be installed full length of the trench.
7. Sand cover will be required for all direct buried cable.
8. All ducts and joints to be glued with approved adhesive.
9. This specification meets or exceeds CSA-C22.3 No.7-15 standard.
10. See Halton Hills Hydro’s approved materials list for approved meter bases, cable, conduit, straps, transformers, and concrete foundations.
11. Where applicable, ESA Code shall be followed and inspection required prior to energizing the service.
12. Meter shall be oriented opposite the direction of traffic.

SECONDARY SERVICE ON STUB POLE INSTALLATION DETAIL
FOR 1 PHASE (& 3 PHASE UP TO 200 AMP)

DESIGNED BY: C. HALE
DRAWN BY: C. HALE
APPROVED BY: C. HALE C.E.T LEL, ENG. SUPERVISOR
SIGNATURE: ___________________________
SCALE: N.T.S.

HH.H. DWG. NO: UD-09B-R1
LAST REVISED DATE: 17-02-08
J. ORLENI
ORIGINAL DATE: 07-07-12
NOTES:
1. Obtain all utility locates prior to construction.
2. For more information see Halton Hills Hydro Secondary Service Trench Profile, UD-06.
3. Contact Halton Hills Hydro 4 minimum of 2 business days prior to backfill to schedule inspections.
4. All materials shall meet the safety requirements of the Ontario Electrical Safety Code 2002, or latest and O. Reg. 22/04, latest amendment.
5. All ducts to be sealed against dirt ingress.
6. Stub pole shall be installed on secondary side of transformer (detail 1) and be anchored to the concrete foundation.
7. Mud cover will be required for around stub post and duct.
8. All ducts and joints to be glued with approved adhesive.
9. This specification meets or exceeds C.S.A.-Z240.1-94 Standard.
10. See Halton Hills Hydro’s approved materials list for approved meter bases, cable, conduit, straps, transformers, and concrete foundations.
11. Where applicable, ESA code shall be followed and inspection required prior to energizing the service.
12. Meter shall be oriented opposite the direction of traffic.

CMS SECONDARY SERVICE ON STUB POLE INSTALLATION DETAIL (FOR 1 PHASE)

DESIGNED BY: C. HALE
DRAWN BY: C. HALE
APPROVED BY: W. VAROSCHAK & K. DURSKI
SIGNATURE:
SCALE: N.T.S.

H.H.H. FILE:
6. Specs and Documents
4. HHH UnderGround Spec
UD Spec Reg 22-04

H.H.H. DWG. NO: UD-09C-R0

LAST REVISED DATE: 07-07-12
ORIGINAL DATE:
NOTES:
1. OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.

2. ALL MATERIALS SHALL MEET THE SAFETY REQUIREMENTS OF THE ONTARIO ELECTRICAL SAFETY CODE. 2002, OR LATEST AND 0. REG. 22/04, LATEST AMENDMENT.

3. HYDRO WILL SUPPLY CURRENT TRANSFORMER (CT), CT WIRING HARNESS, AND WIRE CT'S INTO METER BASE.

4. CUSTOMER SHALL PROVIDE CSA APPROVED METER BASE, SERVICE MAST, AND WEATHERHEAD. SEE HALTON HILLS HYDRO APPROVED MATERIALS LIST FOR APPROVED MATERIALS.

5. OVERHEAD AND UNDERGROUND SERVICES SECONDARY, OR A COMBINATION OF BOTH, ARE PERMITTED.

6. DISTRIBUTION TRANSFORMER INSTALLATION BY HYDRO SHALL BE DONE IN ACCORDANCE WITH SECTIONS 19 AND 41 OF HYDRO’S APPROVED STANDARDS.

7. CUSTOMERS WORK MUST MEET WITH ESA CODE AND BE INSPECTED BY ESA. PRIOR TO CONNECTION BY HYDRO, CUSTOMER WILL NEED TO SUPPLY HYDRO WITH A COPY OF ESA’S CONNECTION AUTHORIZATION.

8. CUSTOMERS POLE SHALL BE SIZED PER ESA CODE AND MUST BE OF LENGTH TO ALLOW THE INSTALLATION SHOWN AT LEFT.

9. CT'S SHALL BE INSTALLED SUCH THAT CT RATIO CAN BE SEEN FROM THE GROUND.

CMS SECONDARY SERVICE INSTALLATION DETAIL
FOR 1 PHASE (UP TO 400 AMP).

DESIGNED BY: C. HALE
DRAWN BY: C. HALE
APPROVED BY: M. MAROSCHAK & K. DURSKI
SIGNATURE:
SCALE: N.T.S.

H.H.H. FILE: UD\Engineering Operations\6. Specs and Documents\4. HHH UnderGround Specs\UD Specs Reg 22-04
H.H.H. DWG. ND: UD-09D-R0
LAST REVISED DATE: 07-07-19
ORIGINAL DATE: 07-07-19
NOTES:
1. Obtain all utility locates prior to construction.
2. This standard is only to be used when approved by HHH and is only intended for rural customer services where a CMS is not applicable. This standard shall not be used for subdivisions, condominiums, townhouse, or apartment complexes.
3. See Halton Hills Hydro secondary service trench profile, UD-06.
4. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
5. All materials shall meet the safety requirements of the Ontario Electrical Safety Code, 2002, or latest and 0. Reg. 22/04, Latest Amendment.
6. All ducts to be sealed against dirt ingress.
7. The metering structure shall be installed at the rear facing of the transformer.
8. Refer to UD-11 (latest revision) for backfill around stub post and ducts.
9. All ducts and joints to be glued with approved adhesive.
10. This specification meets or exceeds CSA-C22.3 No.7-06 standard.
11. See Halton Hills Hydro's approved materials list for approved meter bases, cable, conduit, straps, transformers, and concrete foundations.
12. Where applicable, ESA Code shall be followed and inspection required prior to energizing the service (including the meter base structure).

GANGED METER BASE (3 POSITION MAX. + ENTRY DOOR) SECONDARY SERVICE ON WOOD STRUCTURE – INSTALLATION DETAIL

Designed by: N. Roknic & C. Hale
Drawn by: C. Hale
Approved by: K. Durski
Signature: N.T.S.
Scale: N.T.S.

HHH. File: U:\Engineering Operations\6. Specs and Documents\4. HHH UnderGround Specs\UD Specs Reg 22-04
Last Revised Date: 2008-11-05 C. Hale
Original Date: 2008-10-20

6 ft above grade
1524mm (5ft)
+/- 100mm meter base height

Transformer concrete foundation
All PVC rigid conduits sized as per Ontario electrical safety code, 75 mm (3") minimum

Transformer
12"x6"x6" pressure treated wood post

Meter cabinet
Grounded per ESA code

Straps
Sized to suit

Label duct with "to transformer"

Wood posts shall be anchored to concrete pad (see detail 2)

Detail 2
Anchoring to concrete pad

10" x 1" dia. CSA lag bolt (2 per post)

Detail 1
Rear of meter base installation

1"x8" lag bolt and washer (x4)
Wood brace shall be flush with cabinet rear

Meterbase mounting bolt and washers (x4)
Aligned with middle of cabinet

4"x4" brace
NOTES:
1 OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.
2 FOR MORE INFORMATION SEE HALTON HILLS HYDRO SECONDARY TRENCH PROFILES UD-06, UD-09 AND UD-14.
3 CONTACT HALTON HILLS HYDRO A MINIMUM OF 2 BUSINESS DAYS PRIOR TO BACKFILL TO SCHEDULE INSPECTIONS.
4 BACKFILL IN LAYERS NOT EXCEEDING 300 mm. THOROUGHLY COMPACT EACH LAYER.
5 THIS SPECIFICATION MEETS OR EXCEEDS CSA C22.3 NO.7-94 STANDARD.

CRIMP DETAIL

SPLICE STAGGERING DETAIL

NOTES:
A) IF THE CORE CONDUCTOR HAS BEEN EXPOSED TO MOISTURE, SUFFICIENT LENGTH OF CABLE MUST BE CUT OFF TO ENSURE THAT NO MOISTURE IS PRESENT BETWEEN INSULATION AND CORE. ANY PORTION OF THE CABLE THAT IS DAMAGED OR SubjectED TO PULLING GRIPS SHALL BE REMOVED.
B) CABLES SHALL BE TRAINED INTO POSITION FACING EACH OTHER AND CUT OFF SQUARELY AND BUTTED TOGETHER.
C) CONDUCTORS SHALL BE CLEANED WITH GRIT PAPER OR WIRE BRUSHED BEFORE CONNECTOR INSTALLED.
D) APPROPRIATELY SIZED COMPRESSION CONNECTORS AS LISTED IN HHH’S APPROVED MATERIALS LIST SHALL BE USED FOR UNDERGROUND SECONDARY CABLE SPlicing. USE DIES RECOMMENDED BY MANUFACTURER IN CRIMPING TOOL.
E) CONDUCTORS SHALL BE INSERTED INTO COMPRESSION CONNECTOR AND DRESSED WITH APPROPRIATE DIE. EXCESS OF OXIDE INHIBITOR SHALL BE REMOVED AND SHARP EDGES FILED OFF.
F) INSULATION SURFACES AND THE CONNECTOR SHALL BE FIRST CLEANED WITH CLEAN CLOTH DAMPENED WITH ISOPROPYL ALCOHOL AND THEN WIPE DRY WITH A CLEAN CLOTH.
G) SPLICE SPECIFICATION APPLIES TO DIRECT BURIED CABLES AND CABLES IN DUCTS.
H) WHERE CABLES TO BE SPLICED LAY SIDE-BY-SIDE, SPLICE POINTS SHALL BE STAGGERED AS INDIcATED ABOVE TO REDUCE CONGESTION AND THERMAL INTERERENCE.

SECONDARY SERVICE CABLE SPLICE DETAIL

DESIGNED BY: L. BAKER
DRAWN BY: F. LEMUT
APPROVED BY: M. MAROSCHAK & G. EBERSBERGER
SIGNATURE: N.T.S.
SCALE:
H.H.H. FILE:
U:\Engineering Operations\6. Specs & Documents\4. HHH UnderGround Specs\UD Specs Reg 22-04
H.H.H. DWG. NO:
UD-10-R2
LAST REVISED DATE:
05-05-16
C. HALE
ORIGINAL DATE:
00-04-18
NOTES:
1. Obtain all utility locates prior to construction.
2. Coil 3.0m of each ground conductor tail inside foundation for connection to transformer/switchgear.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections.
4. Backfill in layers not exceeding 300 mm, thoroughly compact each layer.
5. This specification meets or exceeds CSA C22.3 No.7-94 standard.
6. Refer to HHH Material Specifications for concrete foundation catalog number.

Halton Hills Hydro

Transformer Application Requires
2-2/0 Ground Tails (in one continuous length).
Switchgear Application Requires
4-2/0 Ground Tails.

Wedge Connector

Pre-cast Concrete Foundation as per Halton Hills Hydro Specifications

Continuous #2/0 Bare Cu. Ground Conductor C/W two 3.0m Tails
Wedge Connector

4-19.0mm x 3.0m (3/4" x 10'') Ground Rods & 4 Ground Rod Connectors

Plan

Section A-A

300 mm MIN

Installation of pre-cast foundation for padmount transformer & switchgear including grounding detail

Designed By:  
Drawn By:  
P. Lemut
Approved By: M. Maroschak & G. Ebersberger
Signature:  
Scale:  
N.T.S.

H.H.H. File:
U:\Engineering Operations\6. Specs & Documents\4. HHH UnderGround Specs\UD Specs Reg 22-04

H.H.H. DWG. No:  
UD-11-R1

Last Revised Date:  
05-04-07  
C. Hale

Original Date:  
00-04-18
NOTES:
1 OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.
2 FOR MORE INFORMATION SEE HALTON HILLS HYDRO SECONDARY TRENCH PROFILE
3 CONTACT HALTON HILLS HYDRO A MINIMUM OF 2 BUSINESS DAYS PRIOR TO FILLING TO SCHEDULE INSPECTIONS

PROPOSED LOT SERVICING ARRANGEMENT
(TOWN OF HALTON HILLS)

DESIGNED BY: L. BAKER
DRAWN BY: F. LEMUT
APPROVED BY: 
SIGNATURE:
SCALE: N.T.S.

H.H.H. FILE: 
U:\Engineering Operations\ 
6. Specs and Documents\ 
4. H.H.H. Underground Specs\ 
UD Specs Reg 22-04

H.H.H. DWG. NO: UD-12-R1

LAST REVISED DATE: 05-04-07
CHALE

ORIGINAL DATE: 01-03-22

Date: 
Approved Union Gas
Date: 
Approved Bell Canada
Date: 
Approved COGECO
Date: 
Approved Town of Halton Hills

Curb Line
Sanitary
Storm
Water main
Typical Sidewalk
2.75m
1.5m
1.0m
4.5m

Date: 

0.5m
1.0m
1.5m
0.61m
Lot Line
Lot Line
Lot Line
Lot Line
Lot Line
0.61m
NOTES:
1. OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.
2. APPLICABLE STANDARDS AS PER HHH SINGLE PHASE LOW PROFILE PAD-MOUNTED TRANSFORMER GUIDE, CAN/CSA-C22.3-M91, CAN/CSA-C2-M91 AND CEA-12WGC-02 (99)
3. ALL SECONDARY CABLES SHALL BE TAGGED WITH LOT NUMBER AND CULV ADDRESS.
   SEE HALTON HILLS HYDRO SPECIFICATION 12-400 (CABLE IDENTIFICATION).
4. TRANSFORMER IDENTIFICATION DATA ON OUTSIDE OF TRANSFORMER SHELL SHALL CONFORM TO CEA-12WG-02 (99) STANDARD.
5. ALL DUAL VOLTAGE TRANSFORMERS SHALL MEET THE REQUIREMENTS OF CEA-12WG-02 (99) CLAUSE "5.3.3 FUSE IDENTIFICATION" AND "5.3.4 FAYONET FUSE LABEL." WHEN CHANGING THE OPERATING VOLTAGE, THE FAYONET FUSE MUST BE CHANGED. SEE TRANSFORMER NAMEPLATE FOR FUSE.

FIGURE 1.
TYPICAL 1 PHASE LOW PROFILE TRANSFORMER

FIGURE 2.
SINGLE LINE DIAGRAM

FIGURE 3.
SINGLE LINE DIAGRAM FOR DUAL VOLTAGE TRANSFORMER

FIGURE 4.
TYPICAL DESIGNATION
NOTES:
1. OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.
2. CUSTOMER TO COIL SUFFICIENT LENGTH OF U/G SECONDARY CABLE AT BASE OF POLE.
   CABLE TO BE SUPPORTED OFF THE GROUND AND THE CABLE ENDS MUST BE SEALED WITH TAPE.
3. CUSTOMER TO SUPPLY CONDUIT, STRAPS AND WEATHERHEAD AND LEAVE THEM ON SITE.
   HYDRO TO INSTALL CABLE AND CONDUIT ON POLE AND MAKE CONNECTIONS.
4. THIS SPECIFICATION MEETS OR EXCEEDS CSA – C22.3 No. 7–15 STANDARD.
5. ALL PVC DUCTS AND JOINTS TO BE GLUED WITH APPROVED ADHESIVE.
6. SECONDARY DIP & CABLE GUARD SHALL BE INSTALLED ON SIDE OF POLE OPPOSITE TRAFFIC.

SECONDARY UNDERGROUND TERMINATION POLE

DESIGNED BY: H.H.H. FILE: H.H.H. DWG. NO:
DRAWN BY: F. LEMUT UD–14–R3
APPROVED BY: C. HALE C.E.T LEL, ENG SUPERVISOR
SIGNATURE: H.H.H. REG.
SCALE: N.T.S. LAST REVISED DATE: 17–02–08
ORIGINAL DATE: 00–08–31
NOTES:
1. Obtain all utility locate prior to construction.
2. Contractor to coil sufficient length of U/G primary cable.
3. Cable to be suspended from terminal pole at minimum 3.0 m height.
4. Complete activity to be coordinated with Halton Hills Hydro.
5. This detail applies to single phase and three phase installations.
6. This specification meets or exceeds CSA – C22.3 No. 7-94 standard.
7. All PVC ducts and joints to be glued with approved adhesive.
8. Rigid PVC U-Guard shall be the primary selection for cable protection.
9. 2” and 3” vented boots are permitted above grade as needed (Detail 1).
10. U-Guard shall be affixed to pole using CSA approved bolts.
11. PVC U-Guard is not available, metal cable guard may be acceptable and is to be grounded as per PER HH Distribution Standard 41-99 “Grounding for overhead installations – 0V to 44kV”.
12. Contact HH prior to purchasing metal U-Guard for approval.
13. See Halton Hills Hydro’s approved materials list for U-Guard selection.

**PVC U-Guard Table**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Primary Cable Type</th>
<th>Description</th>
<th>No. of U-Guards</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBD</td>
<td>#1/0 Cu., 28kV TRXLPEI - (PVC OR LLDPE Jacket)</td>
<td>U-Guard, 2&quot;x8&quot;, Flanged, Heavy Duty</td>
<td>1 (1 phase)</td>
</tr>
<tr>
<td>TBD</td>
<td>#2/0 Al., 28kV TRXLPEI - (PVC OR LLDPE Jacket)</td>
<td>U-Guard, 2&quot;x8&quot;, Flanged, Heavy Duty</td>
<td>1 (3 phase)</td>
</tr>
<tr>
<td>TBD</td>
<td>#500 MCM Cu. or Al., 28kV TRXLPEI - PVC Jacket</td>
<td>U-Guard, 4&quot;x8&quot;, Flanged, Heavy Duty</td>
<td>3 (1-per phase)</td>
</tr>
<tr>
<td>TBD</td>
<td>#1000 MCM Cu. or Al., 28kV TRXLPEI - PVC Jacket</td>
<td>U-Guard, 4&quot;x8&quot;, Flanged, Heavy Duty</td>
<td>3 (1-per phase)</td>
</tr>
</tbody>
</table>

*Quantity of U-Guards to be selected per application.*

**Please refer to Halton Hills Hydro Standard 41-99 or 41-100 (as applicable) for ground wire installation.**
NOTES:
1 BOLT TRANSFORMER TO THE CONCRETE BASE
2 SEE UD-19 FOR FAULT INDICATOR INSTALLATION DETAIL
3 ALL CABLES TO BE TAGGED AND IDENTIFIED
4 TRANSFORMER DOOR OPENS TOWARDS SIDEWALK
5 INSTALL FOUR GROUND RODS (18.0 mm X 3.2 m (3/4" X 10') -- GALVANIZED STEEL) COMPLETE WITH #2/0 BARE COPPER GROUND LOOP AROUND TRANSFORMER FOUNDATION AND APPROVED GROUND ROD CONNECTORS. GROUND WIRE TAILS TO BE PROVIDED FOR DETAILED INFORMATION SEE HALTON HILLS HYDRO DWG UD-11
6 H.H.H SINGLE PHASE LOW PROFILE PAD-MOUNTED TRANSFORMER SPECIFICATION AS PER CAN/CSA-C22.3-M01, CAN/CSA-0-2-M01, AND CCA-DRTG-02 (90) STANDARDS
7 ALL SECONDARY CABLES SHALL BE TAGGED WITH LOT NUMBER AND CIVIC ADDRESS AS PER HALTON HILLS HYDRO SPECIFICATION 37-400 (CABLE IDENTIFICATION)

CONCRETE FOUNDATION
(AS PER HALTON HILLS HYDRO
APPROVED MATERIALS LIST)

TYPICAL 100 mm (4") DIA. DB2/ES2 DUCT
FLUSH MOUNTED BELL END

200 Amp. LOADBREAK (ELBOW) CONNECTOR

TRAIN PRIMARY CABLE WITH A (1) SINGLE LOOP AT THE BASE OF THE FOUNDATION
(8 m Minimum)

TYPICAL 100 mm (4") DIA. DB2/ES2 DUCT
FLUSH MOUNTED BELL END

PLAN VIEW
WITH SECONDARY CABLES AND
TRANSFORMER DOOR REMOVED

TYPICAL 1 PHASE LOW
PROFILE TRANSFORMER

BAYONET FUSE

LOADBREAK SWITCH
PARKED ELBOW
TAP SWITCH

ELBOW (HV--TERMINATION)
**NOTE: IN THE CASE OF AN
OPEN POINT / RADIAL FEED,
OPEN PHASE IS TO BE PARKED AND
AN ARRESTER ELBOW INSTALLED ON THE OPEN
BUSHING PER MANUFACTURER SPECIFICATIONS,
CONNECTED TO GROUND BUS BAR,
(CONNECTION NOT SHOWN).
PARKED CABLE TO BE INSTALLED INTO A PARKING
STAND ARRESTER (INSTALLED PER
MANUFACTURER'S SPECIFICATIONS)

BASE COPPER GROUND WIRES TO BE
CONNECTED TOGETHER WITH A COPPER
WEDGE TYPE CONNECTOR

PRIMARY CABLE

SECTION 'A-A'

DUAL VOLTAGE SWITCH (IF SPECIFIED)

UNDERGROUND PRIMARY CABLES TO BE TAGGED AND IDENTIFIED
(SEE HALTON HILLS HYDRO
APPROVED MATERIALS LIST)

GROUND STRAP
BARE COPPER GROUND WIRES AND CONCENTRIC neutral
W IRES TO BE CONNECTED ON GROUND BUS BAR WITH LUG
CONNECTORS

GRADE

CONCENTRIC NEUTRALS TO BE CONNECTED TOGETHER USING
COPPER WEDGE TYPE CONNECTOR

GROUND WIRE

TYPICAL 1 PHASE LOW PROFILE PAD MOUNTED TRANSFORMER INSTALLATION (UP TO 167 kVA)

DESIGNED BY: F. LEMUT
DRAWN BY: F. LEMUT
APPROVED BY: M. MAROSCHAK & G. EBERSBERGER
SIGNATURE: N.T.S.
SCALE: UD-16-R2
4. HHH UnderGround Specs
UD Specs Reg 22-04
LAST REVISED DATE: 06-02-22
C. HALE
ORIGINAL DATE: 02-02-18
NOTES:
1. BOLT TRANSFORMER TO THE CONCRETE BASE
2. SEE UD-19 FOR FAULT INDICATOR INSTALLATION DETAIL
3. ALL CABLES TO BE TAGGED AND IDENTIFIED
4. TRANSFORMER DOORS OPEN TOWARDS 5100 WALK IF PLACED IN BOULDER
5. TRANSFORMER DOORS OPEN ALLOWING LINES STAFF TO FACE ONCOMING TRAFFIC IF PLACED ELSEWHERE.
6. HHH THREE PHASE PAD MOUNTED DISTRIBUTION TRANSFORMER SPECIFICATION
   AS PER CAN/CSA-C22.1-01, CAN/CSA-C2-001 & CAN-2-WTT-03 (12/93) STANDARDS.
7. INSTALL FOUR GROUND RODS (7 19.0 mm x 3.0m (3/4" x 10") GALVANIZED STEEL) COMPLETE WITH
   \( 2/0 \) BAR COPPER GROUND LOOPS AROUND TRANSFORMER FOUNDATION AND APPROVED GROUND ROD
   CONNECTORS (2 GROUND WIRE TAILS TO BE PROVIDED) AS PER UD-11.
8. FOR DETAILED INFORMATION SEE HALTON HILLS HYDRO APPROVED MATERIALS LIST
9. ALL SECONDARY SERVICES SHALL BE TAGGED WITH CIVIC ADDRESS AS PER HALTON HILLS HYDRO
   SPECIFICATION 37-400 (CABLE IDENTIFICATION).

CONCRETE FOUNDATION

TRAIN PRIMARY CABLE WITH A SINGLE
LOOP AT THE BASE OF THE FOUNDATION

TYPICAL 100mm (4") DIA. DB2/ES2 DUCT
FLUSH MOUNTED BELL END

200 AMP POS-BREAK (OR EQUIV)
ELBOW CONNECTOR

PLAN VIEW
WITH SECONDARY CABLES AND
TRANSFORMER DOOR REMOVED

SECTION 'A-A'

TAP SWITCH
LOADBREAK SWITCH
DUAL VOLTAGE SWITCH (IF SPECIFIED),
WITH VOLTAGES LABELLED
UNDERGROUND SECONDARY CABLES TO
TAGGED AND IDENTIFIED

CONCENTRIC NEUTRAL WIRING TO BE
CONNECTED ON GROUND BUS BAR WITH
LUG CONNECTORS
CONCENTRIC NEUTRAL WIRING TO BE CONNECTED TOGETHER USING
COPPER WEDGE TYPE CONNECTORS
REFER TO UD-11 FOR GROUNDING DETAILS

FINISHED
GRADE

TYPICAL 3 PHASE PAD MOUNTED TRANSFORMER INSTALLATION
(RADIAL & LOOP FEED)

DESIGNED BY: F. LEMUT
DRAWN BY: F. LEMUT
APPROVED BY: M. MAROSCHAK & K. DURSKI

H.H.H. FILE:

H.H.H. DWG. NO: UD-17-R3

LAST REVISED DATE: 06-02-22
ORIGINAL DATE: 02-02-26
NOTES:
1. SEE UD-19 FOR FAULT INDICATOR INSTALLATION DETAIL
2. ALL CABLES TO BE TAGGED AND IDENTIFIED
3. SWITCHGEAR SHALL BE INSTALLED IN SUCH A WAY THAT DOORS OPEN AWAY FROM ROAD ALLOWING LINE CREW THE ABILITY TO SEE ONCOMING TRAFFIC.
4. REFER TO HALTON HILLS HYDRO Dwg UD-27 FOR SWITCHGEAR CONCRETE FOUNDATION.
5. CANADA POWER SWITCHGEARS ARE TO MEET OR EXCEED THE FOLLOWING STANDARDS:
   SWITCH: ANSI C37.71 & C37.73. BUSHINGS: ANSIEE 388.
   PADMOUNT ENCLOSURE: ANSI C37.72 & C57.12.28.
6. SWITCHGEAR TO BE PAINTED GREEN (R-Y 1.5/2.6) WITH STAINLESS STEEL HARDWARE.
   SWITCHGEAR AND ENCLOSURE TO BE BOLTED TO CONCRETE PAD.
7. SEE HALTON HILLS HYDRO PURCHASING SPECIFICATIONS FOR SWITCHGEAR MODEL NUMBERS, T-OP II, AND 200A BUSHING.
8. T-OP II SHALL BE SUPPLIED WITH 200A REDUCING BUSHING ON BACK OF 600A TERMINATION AND CAPPED USING INSULATED PROTECTIVE CAP. LIGHTNING ARRESTER ELOWS SHALL BE INSTALLED ON 200A REDUCING BUSHING AT OPEN POINTS/ENDS OF RUNS.
9. SWITCHGEAR ENCLOSURE TO BE GROUNDED TO SWITCH USING TWO HOLES IN THE FRONT BOTTOM CORNERS OF THE ENCLOSURE.
10. WARNING LABELS PER CSA DTW-03 (12/93) SHALL BE INSTALLED ON EXTERIOR AND INTERIOR COMPARTMENT DOORS OF ENCLOSURE (SEE BELOW).

INTERLOCKED WITH (3) DOORS DESIGN
HAZARD WARNING SIGNS
(Exterior/Interior)
PER CEA DTW-03 (12/93)
SWITCHGEAR OUTER ENCLOSURE

LINE DIAGRAM - SWITCH INTERCONNECTIONS

TYPICAL CANADA POWER PADMOUNTED SWITCHGEAR
WITH RESETTABLE FAULT INTERRUPTER
INSTALLATION DETAIL

DESIGNED BY: C. HALE
DRAWN BY: C. HALE
APPROVED BY: M. MAROSCHAK & K. DURSKI
SIGNATURE: N.T.S.
SCALE: N.T.S.

H.H.H. DWG. NO: UD-18B-R3

LAST REVISED DATE: 06-07-24
ORIGINAL DATE: 05-04-08
NOTES:
1. All dimensions are the minimum distances required.
2. Fault indicator to be mounted on the cable connected to the H18 bushing.
3. If H18 bushing in an open point, mount fault indicator on H1A bushing.
4. Fault indicator clamps around primary elbow and above concentric neutral wires.
   Hardwire to remote L.E.D. in side of door facing traffic.
   Fiber optic wire connecting FCI to L.E.D. shall be trained such that it will not come in contact with X1 or X3 secondary terminals.
5. The concentric neutral wires shall be looped back from the faulted circuit indicator to cancel out any stray or concentric neutral currents.

FAULTED CIRCUIT INDICATOR INSTALLATION DETAIL
FOR 1 PHASE LOW PROFILE PADMOUNT TRANSFORMER

DESIGNED BY: F. LEMUT
DRAWN BY: F. LEMUT
APPROVED BY: M. MAROSCHAK & C. EBERSBERGER
SIGNATURE:
SCALE: N.T.S.

H.H.H. DWG. NO: UD–19–R2
LAST REVISED DATE: 05–05–16
C.HALE
ORIGINAL DATE: 02–03–04
NOTES:
1. Obtain all utility locates prior to construction.
2. All dimensions are the minimum required distances.
3. Contact Halton Hills Hydro and Union Gas a minimum of 2 business days prior to backfill to schedule inspections.
4. Electrical contractor to excavate trench and install hydro and communications plant. Gas contractor to install the gas service. Gas contractor to coordinate backfill of trench with electrical contractor.
5. All hydro PVC ducts and joints to be glued with approved adhesive.
6. HHH metering/communication 19mm (3/4''), poly duct shall be installed and terminated at each meter base flush with grade level. The other end shall be terminated and buried at communication level on street property of each individual lot. The duct shall be sealed with appropriate tapered poly plug or end cap on both ends. Pulling rope 4.75mm (3/16'') shall be installed in this duct.

**Final Grade Level**

- Caution tape (150mm (6'') width)
- HHH metering/communication 19mm (3/4'') HDP poly duct
- Communications cables
- Gas service
- Secondary cable in min. 75 mm PVC type DB2/ES2 duct
- Sand bedding & cover

---

**Joint—Use Secondary Service Lateral Trench Section**

<table>
<thead>
<tr>
<th>Designed By:</th>
<th>L. Baker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawn By:</td>
<td>L. Baker</td>
</tr>
<tr>
<td>Approved By</td>
<td>L. Baker</td>
</tr>
<tr>
<td>Signature:</td>
<td>N.T.S.</td>
</tr>
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<td>Scale:</td>
<td>N.T.S.</td>
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**H.H.H. File:**

- U:\Engineering Operations\6. Specs & Documents\4. HHH Underground Specs\UD Spec Reg 22-04

**H.H.H. DWG. No:**

- UD-23-R2

**Last Revised Date:**

- 05-05-20
- C. Hale

**Original Date:**

- 02-05-06
NOTES:
1. OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.
2. ALL DIMENSIONS ARE THE MINIMUM DISTANCES REQUIRED.
3. CONTACT HALTON HILLS HYDRO 48 HRS. PRIOR TO BACKFILL TO SCHEDULE INSPECTIONS.
4. BACKFILL IN LAYERS NOT EXCEEDING 300 mm. THOROUGHLY COMPACT EACH LAYER
   95% STANDARD PROCTOR.
5. THIS SPECIFICATION MEETS OR EXCEEDS CSA C22.3 NO.7–94 STANDARD.
6. ALL PVC DUCTS AND JOINTS TO BE GLUED WITH APPROVED ADHESIVE.
7. 900mm FOR GAS IS TO ACCOMMODATE WATER LATERALS.
8. INSTALL CABLE PULLING ROPES IN ALL DUCTS AT TIME OF DUCT INSTALLATION.
9. AT HALTON HILLS HYDRO’S DISCRETION, PRIMARY AND SECONDARY DUCTS ARE TO BE CONCRETE
   ENCASED. THIS APPLIES ESPECIALLY FOR TOWNHOUSE COMPLEXES.
10. GAS AND OTHER UTILITY STRUCTURES SHALL DEViate AROUND TRANSFORMER GROUND GRID.

PROP. JOINT USE PRI. & SEC. HYDRO, BELL, T.V. & GAS
CONCRETE ENCASED STEP TRENCH SECTION (1.35 m DEPTH)

DESIGNED BY: M. MAROSCHAK & M. GONZALES
DRAWN BY: F. LEMUT
APPROVED BY: 
SIGNATURE: 
SCALE: N.T.S.

LAST REVISED DATE: 06-12-06
C. HALE
ORIGINAL DATE: 03-03-24
NOTES:
1. Obtain all utility locates prior to construction.
2. All dimensions are the minimum distances required.
3. Contact Halton Hills Hydro 48 hrs. prior to backfill to schedule inspections.
4. Backfill in layers not exceeding 300 mm. Thoroughly compact each layer.
5. 95% standard proctor.
6. This specification meets or exceeds CSA C22.3 No.7-94 standard.
7. All PVC ducts and joints to be glued with approved adhesive.
8. Install cable pulling rope in all ducts at time of duct installation.
9. At Halton Hills Hydro’s discretion, primary and secondary ducts are to be concrete encased. This applies especially for townhouse complexes.
10. Gas and other utility duct structures shall deviate around transformer ground grid.

Prop. Joint Use Pri. & Sec. Hydro, Bell, T.V., & Gas Step Trench Section (1.525 m depth) — Boulevard

Designed by: M. Maroschak & M. Gonzales
Drawn by: F. Lemut
Approved by:
Signature: N.T.S.
Scale: N.T.S.

H.H.H. File:
U:\Engineering Operations\6. Specs & Documents\4. HHH UnderGround Specs\UD Specs Reg 22-04

Last Revised Date: 06-12-06  C. Hale
Original Date: 03-03-24
NOTES:
1. Obtain all utility locate prior to construction.
2. All dimensions are the minimum distances required.
3. Contact Halton Hills Hydro 48 hrs. prior to backfill to schedule inspections.
4. The reinforcing bars along the bottom sides and bottom of the duct bank shall be concealed with a minimum of 50mm of concrete cover.
5. Backfill in layers not exceeding 300mm. Compaction to be to 95 standard proctor density minimum (as per CSA C22.3 — No. 7—94 — clause 3.5.3.2).
6. This specification meets or exceeds CSA C22.3 No.7—94 standard.
7. All ducts to be PVC Type DB2/ES2 as per CSA—C22.2 #211.1 standard.
8. All PVC ducts and joints to be glued with approved adhesive.
9. Install cable pulling rope in all ducts at time of duct installation.

FINAL GRADE LEVEL

BACKFILL FOR ROAD CROSSINGS AS PER REQUIREMENTS OF THE TOWN OF HALTON HILLS

CAUTION TAPE (150mm (6") WIDTH)

HHH SCADA/COMMUNICATION 100mm (4") TYPE DB2/ES2 PVC DUCT AS PER CSA C22.2 #211.1
BELT & T.V. COMMUNICATION CABLES

SAND COVER CONCRETE ENCAUSEDMENT 100mm (4") TYPE DB2/ES2 PVC DUCT AS PER CSA C22.2 #211.1
20mm (3/4") DEFORMED STEEL REINFORCING BARS AS PER CAN/CSA G30.18-M92

PROPOSED CONCRETE ENCAUSED DUCT BANK SECTION STEP TRENCH (FOR 8 DUCTS) — ROAD CROSSING

DESIGNED BY: M. MAROSCHAK & M. GONZALES
DRAWN BY: F. LEMUT
APPROVED BY: 
SIGNATURE: 
SCALE: N.T.S.

H.H.H. DWG. NO: UD-26-R3
LAST REVISED DATE: 06-12-06
C. HALE
ORIGINAL DATE: 03-03-24

Approved Union Gas
Date: 
Approved COGECO
Date: 
Approved Bell Canada
Date: 
Approved Town of Halton Hills
Date:
NOTES:
1. ALL DIMENSIONS ARE SHOWN IN INCHES UNLESS OTHERWISE INDICATED.
2. CANADA POWER SWITCHGEAR 898 SERIES SHALL BE IDENTIFIED FOR HALTON HILLS HYDRO INC.
3. THE CONCRETE FOUNDATION DIMENSIONS SHALL BE OF SIZE AS INDICATED.
4. LID OPENING DIMENSIONS AS PER "TABLE A" SHALL BE APPLIED TO THE SPECIFIC SWITCHGEAR.
5. CONCRETE FOUNDATION MUST BE ABLE TO SUPPORT A MINIMUM OF 2,200 LBS.
6. FOUNDATION TO BE SET ON A 12" THICK BASE MADE OF TAMPERED 3/4" CRUSHED STONE.
7. CONCRETE TO BE A MINIMUM 30MPa, AIR ENTRAINED.
8. LID CABLE ENTRY AND CABLE ENTRY KNOCKOUT SURFACES TO BE SMOOTH FINISHED.
9. ALL CABLES OPENINGS IN FOUNDATION SHALL BE MANUFACTURED TO ACCOMODATE 4" PVC DUCTS, COMPLETE WITH POLYLOC PLASTIC PIPE SEALS INSTALLED.
11. FOR SWITCHGEAR GROUNDING DETAIL, REFER TO HALTON HILLS HYDRO DRAWING UD-II.
12. PLEASE REFER TO HALTON HILLS HYDRO APPROVED MATERIALS LIST FOR MANUFACTURER PART NUMBERS.

### TABLE A
#### FOUNDATION LID OPENING DIMENSIONS

<table>
<thead>
<tr>
<th>SWITCHGEAR MODEL No.</th>
<th>W</th>
<th>X</th>
<th>Y</th>
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<tbody>
<tr>
<td>6TT6/ 898 (801C1801)</td>
<td>12.5&quot;</td>
<td>71&quot;</td>
<td>24&quot;</td>
</tr>
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<td>6TT6/ 898 (801C1806)</td>
<td>12.5&quot;</td>
<td>71&quot;</td>
<td>24&quot;</td>
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<td>6TT6/ 898 (801C1781)</td>
<td>12.5&quot;</td>
<td>71&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>6TT6/ 898B (801C1810)</td>
<td>12.5&quot;</td>
<td>71&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>6TT6/ 898C (801C1809)</td>
<td>12.5&quot;</td>
<td>71&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>6TT6/ 898 (801C1767)</td>
<td>12.5&quot;</td>
<td>71&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>6TT6/ 898 (801C1928)</td>
<td>12.5&quot;</td>
<td>71&quot;</td>
<td>24&quot;</td>
</tr>
</tbody>
</table>

### CONCRETE FOUNDATION STANDARD
(FOR HALTON HILLS HYDRO 898 SERIES CANADA POWER SWITCHGEAR)

**DESIGNED BY:** C. HALE  
**DRAWN BY:** C. HALE  
**APPROVED BY:** M. MAROSCHAK / K. DURSKI  
**SIGNATURE:** N.T.S.  
**SCALE:** N.T.S.

**H.H.H. FILE:** U:\ENGINEERING OPERATIONS\6. SPECS AND DOCUMENTS\04. HHH UNDERGROUND SPECS\UD SPECS REG 22-04\  
**LAST REVISED DATE:** 2007-07-03 C. HALE

**H.H.H. DWG. NO.:** UD-27-R3  
**ORIGINAL DATE:** 2005-03-02
NOTES:
1. ALL DIMENSIONS ARE SHOWN IN INCHES UNLESS OTHERWISE INDICATED.
2. CANADA POWER SWITCHGEAR 898 SERIES SHALL BE IDENTIFIED FOR HALTON HILLS HYDRO INC.
3. THE CONCRETE LID DIMENSIONS SHALL BE OF SIZE AS INDICATED.
4. LID OPENING DIMENSIONS AS PER "TABLE A" SHALL BE APPLIED TO THE SPECIFIC SWITCHGEAR.
5. CONCRETE LID MUST BE ABLE TO SUPPORT A MINIMUM OF 2,200 LBS.
6. CONCRETE TO BE A MINIMUM 30MPa, AIR ENTRAINMENT.
7. LID CABLE ENTRY SURFACES TO BE SMOOTH FINISHED.
9. FOR SWITCHGEAR GROUNDING DETAIL, REFER TO HALTON HILLS HYDRO DRAWING UD-11.
10. PLEASE REFER TO HALTON HILLS HYDRO APPROVED MATERIALS LIST FOR MANUFACTURER PART NUMBERS.

| TABLE A |
|---|---|---|
| FOUNDATION LID OPENING DIMENSIONS |
| DIMENSIONS |
| SWITCHGEAR MODEL No. | W | X | Y |
| 6TT6/ 898 (801C1801) | 12.5" | 71" | 24" |
| 66T6/ 898 (801C1806) | 12.5" | 71" | 24" |
| 6TT6/ 898 (801C1781) | 12.5" | 71" | 24" |
| 6TT6/ 898 (801C1810) | 12.5" | 71" | 24" |
| 6TT6/ 898C (801C1809) | 12.5" | 71" | 24" |
| 6TT6/ 898 (801C1767) | 12.5" | 71" | 24" |

CONCRETE FOUNDATION LID STANDARD
(FOR RETROFITTING PMH-9 FOUNDATIONS WITH LID FOR 898 SERIES CANADA POWER SWITCHGEAR)

DESIGNED BY: C. HALE
DRAWN BY: C. HALE
APPROVED BY: M. MAROSCHAK/ K. DURSKI
SIGNATURE:
SCALE: N.T.S.

H.H.H. FILE:
U:\ENGINEERING OPERATIONS\6. SPECS AND DOCUMENTS\04. H.H.H UNDERGROUND SPECS\UD SPECS REG 22-04\

LAST REVISED DATE: 2006-10-04
C. HALE

H.H.H. DWG. NO: UD-29-R1

ORIGINAL DATE: 2006-09-26
**NOTES:**
1. Obtain all utility locates prior to construction. Approval of the respective authorities must be obtained for directional bored street crossing and all materials used therein. Maintain a minimum 300mm horizontal and 500mm vertical distance from other utilities throughout the length of bore.
2. When crossing in rural areas, minimum 1000mm depth must be maintained from bottom of ditch grade. See Details 2.
3. Contact Halton Hills Hydro a minimum of 2 business days prior to backfill to schedule inspections at entrance locations.
4. All road crossings shall be perpendicular in nature when crossing the curb line.
5. The drill path shall be accurately surveyed with entry and exit areas placed in appropriate locations as shown on drawings and shall be drilled so as not to exceed the manufacturer's bending limitations of the pipe. Drill path to be as straight as possible at all times. Depth of crossing may be varied depending on location of other underground utilities and/or structures. Depth of duct as per Ontario Provincial Standards Specification OPSS #450. Maintain a minimum 1200mm vertical distance from roadway final grade throughout length of bore.
6. All ducts bored to be high density polyethylene (HDPE) as per CSA-C22.2 #211.1 Standard. HDPE shall be SDR (20) psi pressure.
7. At either side of road crossing where the HDPE duct terminates, PVC duct type DB2/ES2 shall be coupled to the HDPE duct. See HHH Std. UD-06. HDPE duct shall not be used for the entire length of the trench.
8. Maintain minimum distances around existing utilities, access to hydrant per OPSS 217.050 and the Regional Municipality of Halton by-laws and specifications.
9. Following drilling operations, the contractor shall de-mobilize equipment and restore work site to pre-construction or better conditions.
10. Fill annular voids using grout (one part of Portland cement & 2 parts of sand).
11. Open bore pits shall have snow fence erected around the outer perimeters when left unattended.
12. This specification meets or exceeds CSA-C22.2 No. 7-15 Standard.
13. All directional boring works to conform to town of Halton Hills requirements unless otherwise approved by the town prior to commencement of work including but not limited to the following: entry and exit pits to remain outside of driveways/entrances. Backfill in the town's boulevard shall be clean native material (free of top soil) and compacted to minimum 55% standard proctor dry density. The use of lean concrete (U-Fill) is not permitted as backfill material. All works shall comply with the town of Halton Hills tree by-law 92-10-05 (as amended).

**DIRECTIONAL BORED STREET CROSSING**

**SECONDARY SERVICES - TYPICAL**

**DESIGNED BY:**

**DRAWN BY:** J. Aichwalder

**APPROVED BY:** C. Hale, C.E.T., LEL

**SIGNATURE:**

**SCALE:** N.T.S.

**H.H.H. FILE:** UD-30

**LAST REVISED DATE:** 01-03-2019

**ORIGINAL DATE:** 01-03-2019
NOTES:
1. OBTAIN ALL UTILITY LOCATES PRIOR TO CONSTRUCTION. APPROVAL OF THE RESPECTIVE AUTHORITIES MUST BE OBTAINED FOR DIRECTIONAL BORED STREET CROSSING AND ALL MATERIAL USED THEREIN. MAINTAIN A MINIMUM 500mm HORIZONTAL AND 300mm VERTICAL DISTANCE FROM OTHER UTILITIES THROUGHOUT THE LENGTH OF BORE.
2. WHEN CROSSING IN RURAL AREAS, MINIMUM 1000mm DEPTH MUST BE MAINTAINED FROM BOTTOM OF DITCH GRADE. SEE DETAIL A2.
3. CONTACT HALTON HILLS HYDRO A MINIMUM OF 2 BUSINESS DAYS PRIOR TO BACKFILL TO SCHEDULE INSPECTIONS AT ENTRANCE LOCATIONS.
4. ALL ROAD CROSSINGS SHALL BE PERPENDICULAR IN NATURE. WHEN CROSSING THE CURB LINE, THE DRILL PATH SHALL BE ACCURATELY SURVEYED WITH ENTRY AND EXIT Holes PLACED IN APPROPRIATE LOCATIONS AS SHOWN ON DRAWINGS AND SHALL BE DRILLED SO AS NOT TO EXCEED THE MANUFACTURERS RECOMMENDED LIMITATIONS OF THE PIPE OR DUCT PATH TO BE AS STRAIGHT AS POSSIBLE AT ALL TIMES.
5. DEPTH OF CROSSING MAY BE VARIED DEPENDING ON LOCATION OF OTHER UNDERGROUND UTILITIES OR STRUCTURES. DEPTH OF DUCT AS PER ONTARIO PROVINCIAL STANDARDS SPECIFICATION OPSS 4410. MAINTAIN A MINIMUM 1200mm VERTICAL DISTANCE FROM ROADWAY FINAL GRADE THROUGHOUT LENGTH OF BORE.
6. ALL DUCTS BORED TO BE HIGH DENSITY POLYETHYLENE (HDPE) AS PER CSA-Z23.2 #2111.1 STANDARD. HDPE SHALL BE 200 (PSI) PRESSURE.
7. AT EITHER SIDE OF ROAD CROSSING TRENCH THE HDPE DUCT TERMINATES PVC DUCT TYPE DB2/ES2 SHALL BE COUPLED TO THE HDPE DUCT. SEE HHH Std. UD-06. HDPE DUCT SHALL NOT BE USED FOR THE ENTIRE LENGTH OF THE TRENCH.
8. MAINTAIN MINIMUM DISTANCES AROUND EXISTING UTILITIES. ACCESS TO HYDRANT AS PER OPSS 237.050 AND THE REGIONAL MUNICIPALITY OF HALTON BY-LAWS AND SPECIFICATIONS.
9. FOLLOWING DRILLING OPERATIONS, THE CONTRACTOR SHALL DE-MONIZABLE EQUIPMENT AND RESTORE WORK SITE TO PRE-CONSTRUCTION OR BETTER CONDITIONS.
10. FILL ANNUAL HOLE USING GROUT (ONE PART OF PORTLAND CEMENT & 2 PARTS OF SAND).
11. OPEN BORE HOLE MAY HAVE SNOW FENCE ERECTED AROUND THE OUTER PERIMETER. WHEN LEFT UNTENDED.
12. THIS SPECIFICATION MEETS OR EXCEEDS CSA-Z23.2 NO. 7.15 STANDARD.
13. ALL DIRECTIONAL BORING WORKS TO CONFORM TO TOWN OF HALTON HILLS REQUIREMENTS UNLESS OTHERWISE APPROVED BY THE TOWN PRIOR TO COMMENCEMENT OF WORK INCLUDING BUT NOT LIMITED TO THE FOLLOWING: ENTRY AND EXIT HOLES TO REMAIN OUTSIDE OF DRIVEWAYS/ENTRYWAYS, BACKFILL IN THE TOWNS BOULEVARD SHALL BE CLEAN NATIVE MATERIAL (FREE OF TOP SOIL) AND COMPACTED TO MINIMUM 50% STANDARD PROCTOR DRY DENSITY, THE USE OF LEAN CONCRETE (U-FILL) IS NOT PERMITTED AS BACKFILL MATERIAL. ALL WORKS SHALL COMPLY WITH THE TOWN OF HALTON HILLS' BY-LAW 98-33A (AS AMENDED).

DIRECTIONAL BORED STREET CROSSING
PRIMARY SERVICES - TYPICAL

DESIGNED BY: R.R., J.A.
DRAWN BY: J. AICHVALDER
APPROVED BY: C.HALE, C.E.T., LEL
SIGNATURE:
SCALE:

H.H.H. FILE:

U:\Engineering Operations\6. Spec and Documents\4. HHH Underground Spec\UD Specs Reg 22-04

LAST REVISED DATE: 01-03-2019

ORIGINAL DATE: 01-03-2019

H.H.H. DWG. NO: UD-31