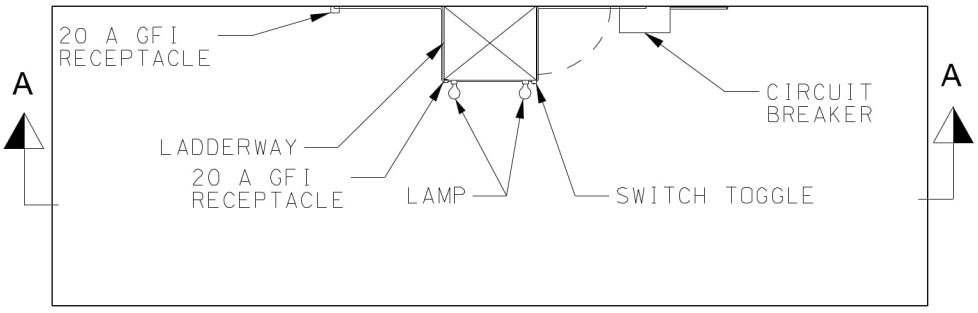
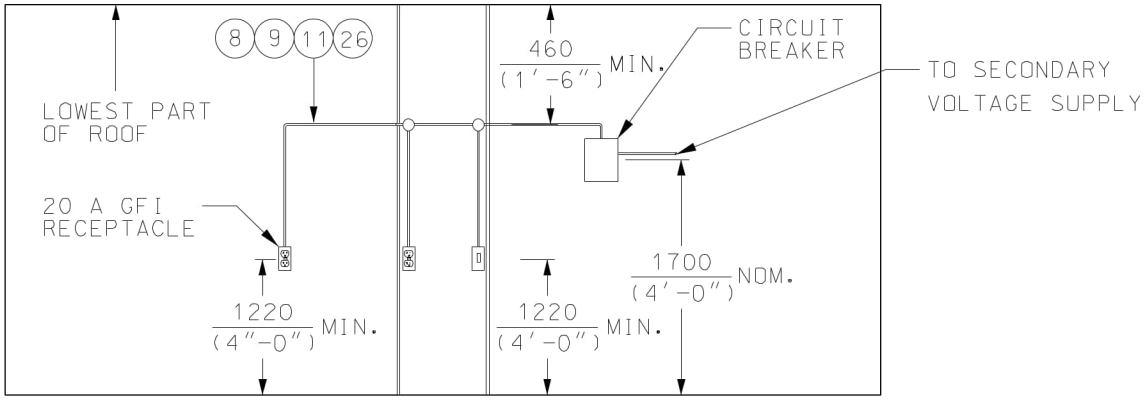
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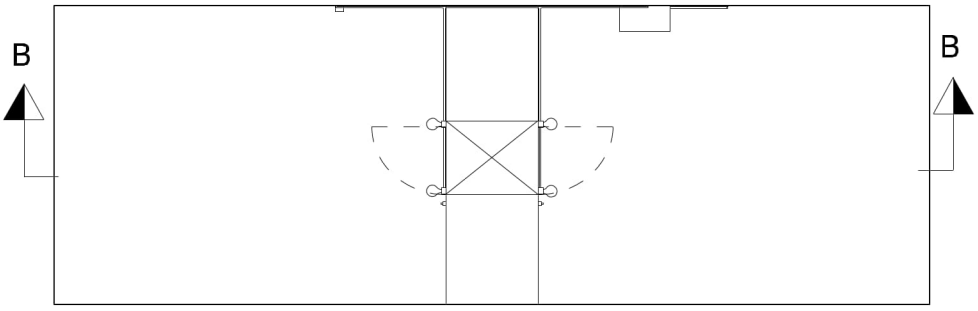


PLAN VIEW

TWO UNIT VAULT

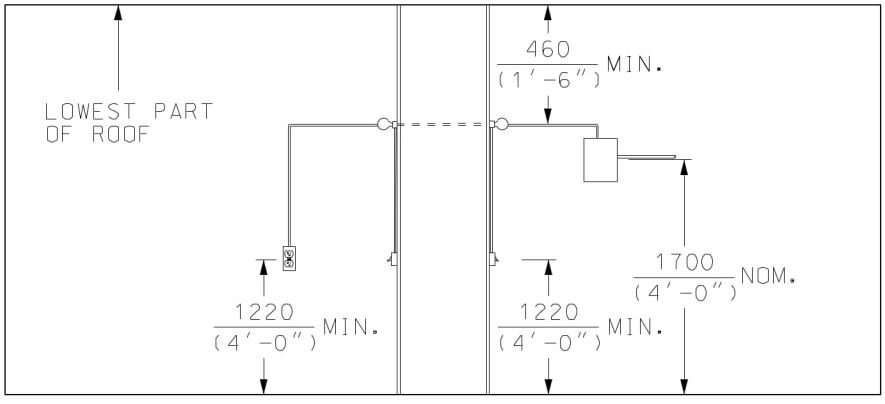


SECTION 'A-A'



PLAN VIEW

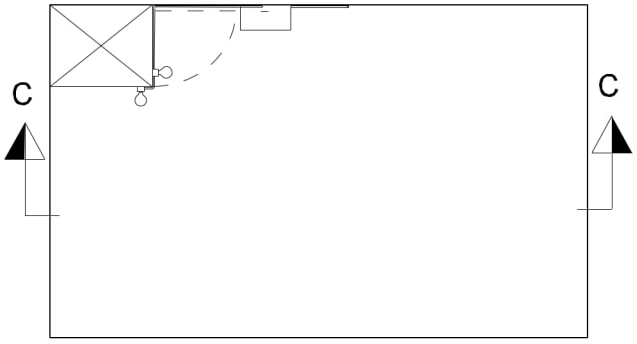
TWO UNIT VAULT (SPLIT VAULT)



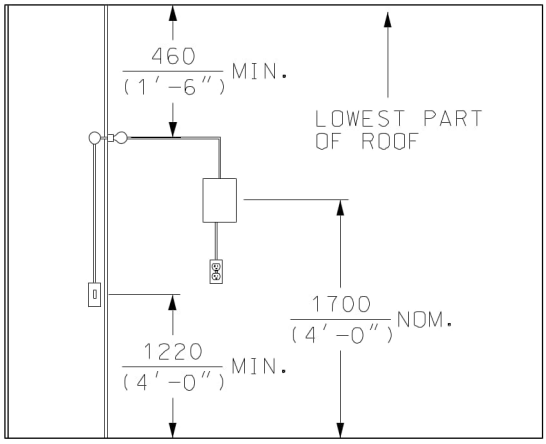
SECTION 'B-B'

DISTRIBUTION CONSTRUCTION STANDARD UG Transformers and Switchgears							
TORONTO HYDRO	Approved By: I.S. 2020-02-20		VAULT LIGHTING ARRANGEMENT				
	Drafted By: L.L.	Designed By: S.K.	Original Issue: K.S. 2009-09-08	Scale: N.T.S.	Rev: 3	13-2200	1/3

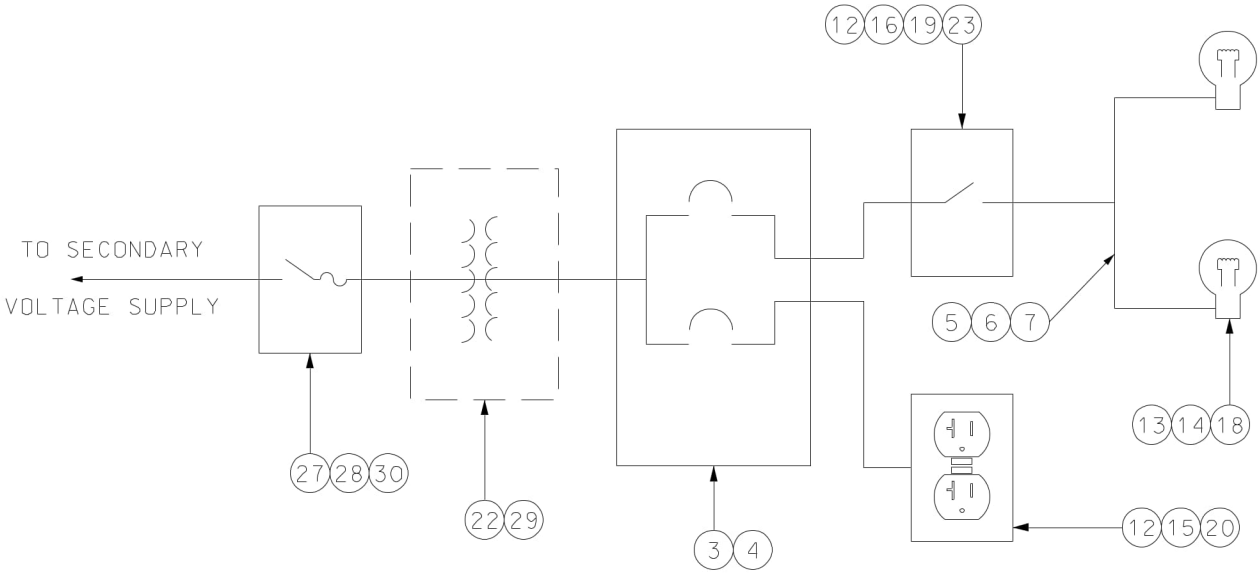
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PLAN VIEW
SINGLE UNIT VAULT - NON-URD



SECTION 'C-C'



WIRING SCHEMATIC

DISTRIBUTION CONSTRUCTION STANDARD UG Transformers and Switchgears			VAULT LIGHTING ARRANGEMENT				
TORONTO HYDRO	Approved By: I.S. 2020-02-20						
	Drafted By: L.L.	Designed By: S.K.	Original Issue: K.S. 2009-09-08	Scale: N.T.S.	Rev: 3	13-2200	2/3

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BOM LEGEND	
A	2 UNIT TRANSFORMER 120/208 V ROOM / VAULT
B	2 UNIT TRANSFORMER 347/600 V ROOM / VAULT
C	1-PHASE TRANSFORMER URD SYSTEM
D	3-PHASE 120/208 V TRANSFORMER URD SYSTEM
E	3-PHASE 347/600 V TRANSFORMER URD SYSTEM
F	3-PHASE 200 A SWITCH URD SYSTEM
G	3-PHASE 600 A SWITCH URD SYSTEM
H	MODULAR SWITCH
I	1 UNIT TRANSFORMER 120/208 V ROOM / VAULT
J	2 UNIT TRANSFORMER 240/416 V ROOM / VAULT
K	1 UNIT TRANSFORMER 240/416 V ROOM / VAULT
L	1 UNIT TRANSFORMER 347/600 V ROOM / VAULT

BILL OF MATERIALS FOR 13-2200

ITEM NO.	DESCRIPTION	ITEM I.D.	QUANTITY												
			A	B	C	D	E	F	G	H	I	J	K	L	
1	STRAP PIPE FOR 1/2" 1 HOLE COATED	100000653	15	15	10	15	15	10	15	18	15	15	15	15	3
2	ANCHOR THREADED CONCRETE 1/4" X 1 1/4"	2500100	30	30	20	30	30	20	30	40	30	30	30	30	
3	PANEL CIRCUIT BREAKER 70 A 120/240 V	9656560	1	1	1	1	1	1	1	1	1	1	1	1	
4	BREAKER CIRCUIT 20 A 120 V	9656680	2	2	2	2	2	2	2	2	2	2	2	2	
5	CABLE #12 STR CU TW75 600 V BLACK	7150100	25	25	20	25	25	20	25	25	25	25	25	25	
6	CABLE #12 STR CU TW75 600 V WHITE	7150102	20	20	10	20	20	10	20	20	20	20	20	20	
7	CABLE #12 STR CU TW75 600 V GREEN	7150098	20	20	10	20	20	10	20	20	20	20	20	20	
8	CONDUIT PVC RIGID 1/2" IN 10' LENGTHS	5230000	5	5	5	5	5	5	6	6	5	6	5	5	
9	COUPLING PVC 1/2" FOR CONDUIT	5231027	6	6	6	6	6	6	6	6	6	6	6	6	
10	ADAPTER MALE PVC 1/2" FOR CONDUIT	5232000	11	13	11	11	13	11	13	12	11	13	11	11	
11	BEND PVC 1/2" 90 DEG FOR CONDUIT	5233000	5	5	5	5	5	5	5	5	5	5	5	5	
12	BOX UTILITY PVC 2" DEEP FOR 1/2" CONDUIT	7405002	2	2	2	2	2	2	2	2	2	2	2	2	
13	BOX OCTOGON PVC 4" X 1 1/2" DEEP FOR 1/2" CONDUIT	7405003	3	3	2	3	3	3	3	3	3	4	3	3	
14	LAMPHOLDER PORCELAIN 660 W 250 V KEYLESS	7440020	2	2	2	2	2	2	2	2	2	4	2	2	
15	COVER PVC DUPLEX RECEPTACLE	7446000	1	1	1	1	1	1	1	1	1	1	1	1	
16	COVER PVC TOGGLE SWITCH	7446002	1	1	1	1	1	1	1	2	1	2	1	1	
17	TAPE PVC 3/4" X .0075" MIN LOW TEMPERATURE	7600001	1	1	1	1	1	1	1	1	1	1	1	1	
18	LAMP 300 W 125/130 V PS30	8010051	2	2	2	2	2	2	2	2	2	4	2	2	
19	SWITCH TOGGLE APPLIANCE 20 A 1 WAY	9653473	1	1	1	1	1	1	1	–	1	2	1	1	
20	RECEPTACLE GROUND FAULT 20 A 125 V	9665648	1	1	1	1	1	1	1	1	1	1	1	1	
21	LOCKNUT 1/2" CONDUIT	9655483	10	13	10	10	13	10	10	11	10	13	10	10	
22	TRANSFORMER DRY TYPE 1PH 3 kVA 600-120/240 V	6621501	–	1	–	–	1	–	–	–	–	–	–	1	
23	SWITCH TOGGLE APPLIANCE 20 A 3 WAY	9653472	–	–	–	–	–	–	–	2	–	–	–	–	
24	CONNECTOR CU SPLIT U-BOLT #1-4/0 STR	7213000	1	1	1	1	1	1	1	1	1	1	1	1	
25	CABLE #12 STR CU TW75 600 V RED	7190060	–	–	–	–	–	–	–	10	–	–	–	–	
26	CEMENT SOLVENT FOR RIGID PVC CONDUIT	9652392	1	1	1	1	1	1	1	1	1	1	1	1	
27	SWITCH SAFETY HEAVY DUTY 30A 600V AC	9653443	–	1	–	–	1	–	–	–	–	1	1	1	
28	FUSE 600V 10A	7073017	–	2	–	–	2	–	–	–	–	–	–	2	
29	TRANSFORMER DRY TYPE 1PH 3KVA 250V-120V	9662764	–	–	–	–	–	–	–	–	–	1	1	–	
30	FUSE 600V 15A	9651286	–	–	–	–	–	–	–	–	–	2	2	–	

* SEE NOTE 3

NOTES:

1) LIGHTING LAYOUTS IN THIS STANDARD ARE TO BE USED AS A GUIDELINE. LIGHTS AND ACCESORIES ARE TO BE ARRANGED TO SUIT SITE CONDITIONS.
2) 3 WAY TOGGLE SWITCHES SHALL BE INSTALLED NEAR EACH OF VAULT DOORS IN MODULAR SWITCHING VAULT.
3) QUANTITIES OF SOME MATERIALS MAY VARY DUE TO SIZE AND LAYOUT.
4) 1-PHASE TRANSFORMER AND 200 A SWITCH VAULT ON URD SYSTEM REQUIRES 1 LIGHT.
5) ALL EQUIPMENT TO BE MOUNTED ON WALLS IN URD NETWORK VAULTS.

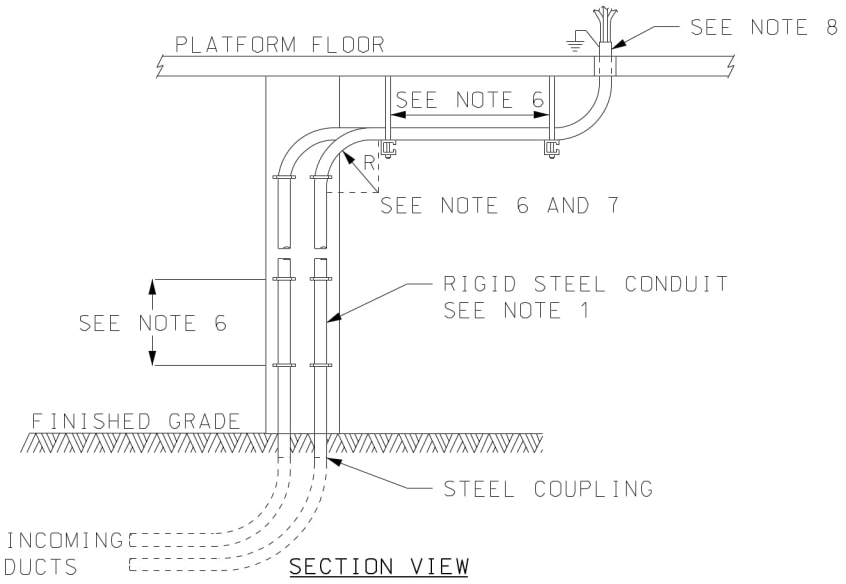
DISTRIBUTION CONSTRUCTION STANDARD
UG Transformers and Switchgears

VAULT LIGHTING ARRANGEMENT

TORONTO HYDRO

Approved By:						
I.S. 2020-02-20						
Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
L.L.	S.K.	K.S. 2009-09-08	N.T.S.	3	13-2200	3/3

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SECTION VIEW

TABLE 1			
SERVICE TYPE	SIZE AND TYPE OF CABLE	ITEM I.D.	MIN. CONDUIT SIZE FOR 3 CONDUCTOR
13.8 kV	#1/0 3-1C TRIPLEX 15 kV AL TRXLPE	7180016	3"
13.8 kV	#3/0 3-1C TRIPLEX 15 kV Cu TRXLPE	7180020	3"
13.8 kV	500 kcmil 3-1C TRIPLEX 15 kV Cu TRXLPE	7180032	4"

NOTES:

1) RIGID NON-FERROUS THREADED STEEL CONDUIT TO BE USED FOR CABLE ROUTING. CONDUIT SHALL HAVE TAPERED THREAD AND BE MADE WATERTIGHT.
2) CONDUITS SHALL BE SECURELY ATTACHED TO HANGERS OR TO A SOLID SURFACE. THE TYPE OF SUPPORTS USED TO BE DETERMINED BASED ON FIELD CONDITIONS.
3) CONDUIT SIZE SHALL BE IN ACCORDANCE WITH TABLE 1 AND BE OF SUFFICIENT SIZE TO PERMIT THE CONDUCTORS TO BE DRAWN IN AND WITHDRAWN WITHOUT DAMAGE TO THE CABLES.
4) THE INCOMING PRIMARY SERVICE CABLES SHALL HAVE A DEDICATED CONDUIT PER RUN AND SHALL NOT BE SHARED WITH OTHER SERVICES, CONDUCTORS OR NEUTRAL.
5) THERE SHALL BE NO CABLE JOINTS OR SPLICES WITHIN CONDUIT.
6) CONDUIT SHALL BE SUPPORTED AT MAXIMUM 3000 mm (9'-10") INTERVALS AS WELL AS BEFORE AND AFTER ALL CHANGES OF DIRECTION.
7) CONDUIT BEND RADII AND CABLE PULLING FORCES SHALL NOT EXCEED THE LIMITS REFERENCED IN STD. 16-0220, 16-0260 AND 16-1260.
8) WHERE A CONDUIT ENTERS A BOX, FITTING, OR OTHER ENCLOSURE, A BUSHING SHALL BE PROVIDED TO PROTECT THE CABLE FROM ABRASION UNLESS THE DESIGN OF THE BOX, FITTING, OR ENCLOSURE IS SUCH AS TO AFFORD EQUIVALENT PROTECTION. ALL CUT ENDS SHALL BE REAMED OR OTHERWISE FINISHED TO REMOVE ROUGH EDGES.
9) WEATHERPROOF LABEL WILL BE AFFIXED AT REGULAR INTERVALS AROUND THE CONDUIT IN BLACK TEXT AGAINST AN ORANGE BACKGROUND THAT READS "DANGER HIGH VOLTAGE" ALONG WITH THE SYSTEM VOLTAGE, I.E. DANGER HIGH VOLTAGE 13800 V.
10) CONDUIT SHALL BE BONDED TO GROUND BUS OR GROUND LOOP OF INCOMING SWITCHGEAR. BONDING CABLE TO BE STRANDED BARE CU, NO SMALLER THAN #2/0, AND SECURED RELIABLY TO CONDUIT VIA MECHANICAL GROUND CONNECTOR.
11) IF EXPANSION JOINTS USED, BONDING JUMPERS ON CONDUIT ARE REQUIRED TO MAINTAIN CONTINUITY ACROSS JOINT.

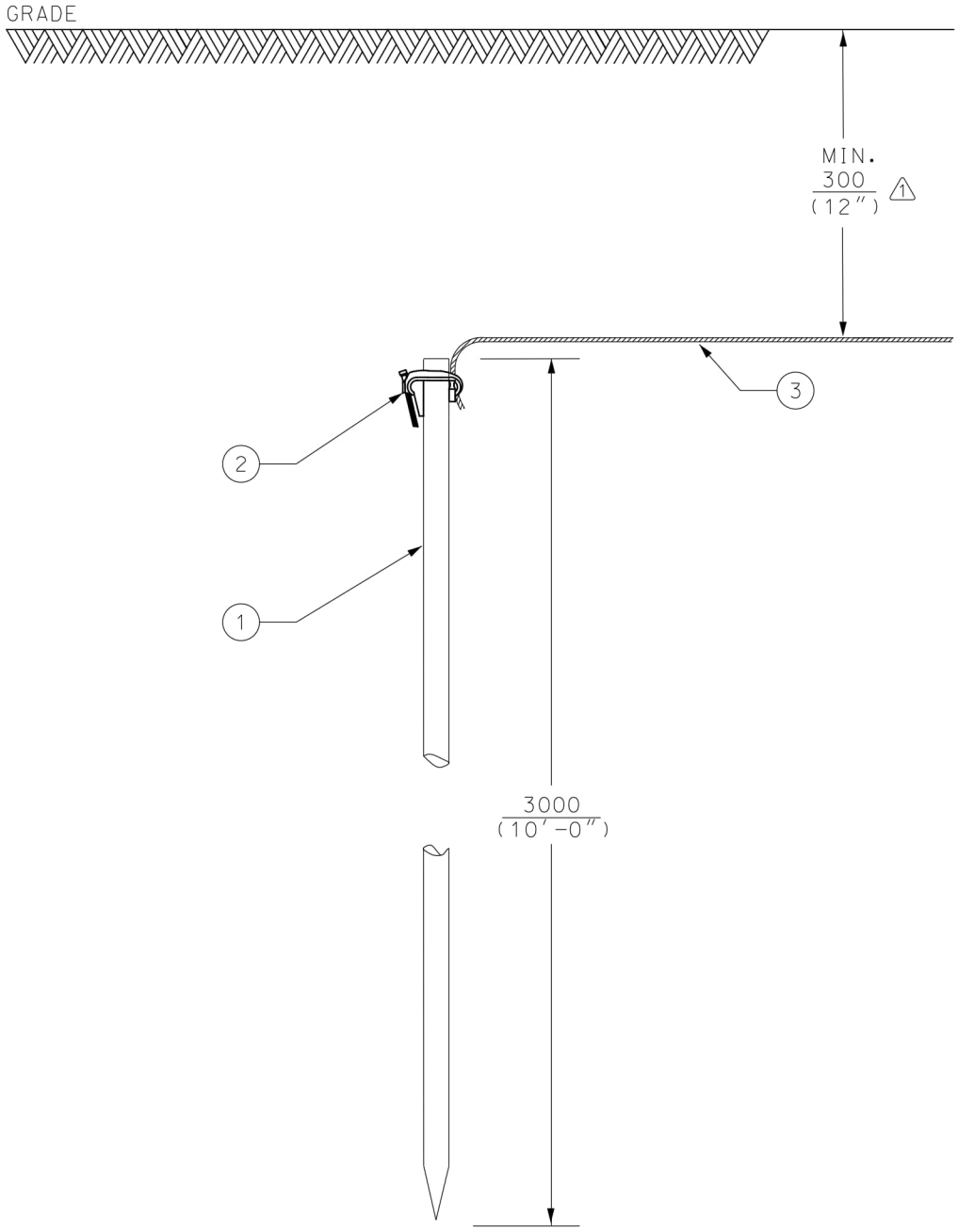
DISTRIBUTION CONSTRUCTION STANDARD
UG Secondary and Primary Services

TEMPORARY PRIMARY SERVICES
CONDUIT ROUTING

TORONTO HYDRO

Approved By:						
B.L. 2018-03-01						
Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
B.W.	B.L.		N.T.S.	0	15-8510	1/1

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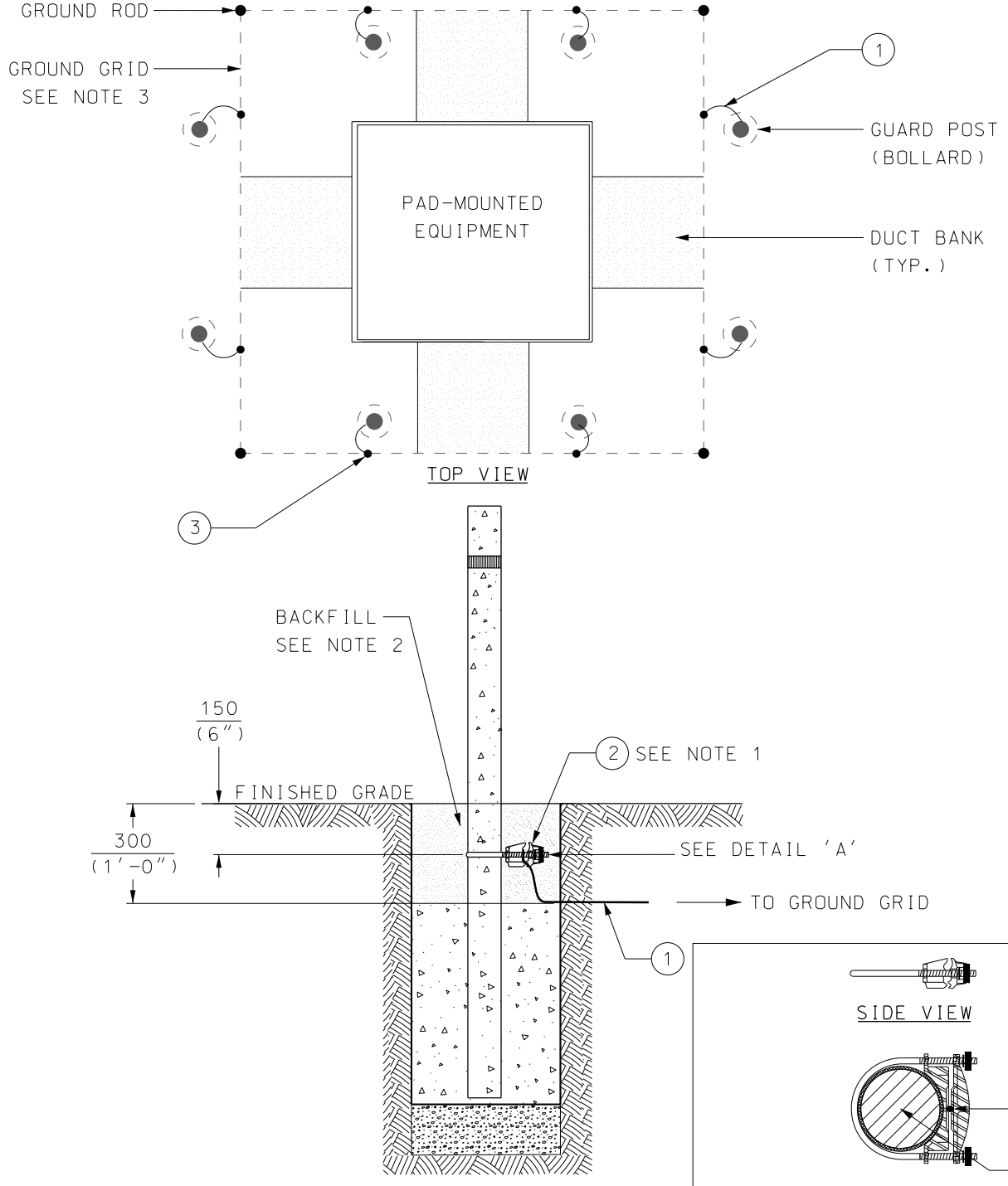
BILL OF MATERIALS FOR 18-4300			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY
1	ROD ¾″ x 10′ GROUND STEEL GALVANIZED	2470102	1
2	CONNECTOR GROUND ROD AMPACT	7214201	1
3	WIRE #2 19 STR CU	7105045	1

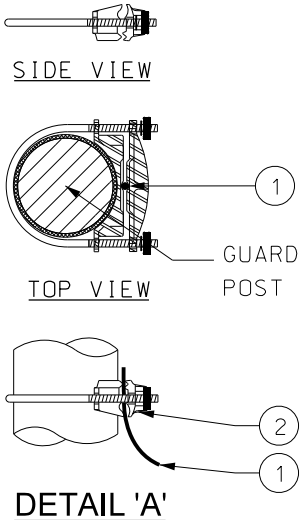
NOTES:

1) MINIMUM GROUND CONDUCTOR SIZE SHALL BE #2 CU.
2) CONDUCTOR QUANTITY IS BASED ON ONE METER LENGTH. ACTUAL QUANTITY TO SUIT FIELD MEASUREMENTS.
3) DISTANCE BETWEEN GROUND RODS SHALL BE NO LESS THAN 3000 mm (10′-0″).

DISTRIBUTION CONSTRUCTION STANDARD Grounding			# EQUIPMENT GROUND ROD INSTALLATION DETAIL				
TORONTO HYDRO	Approved By: T.T. 2013-11-07						
	Drafted By: K.H.	Designed By: I.E.	Original Issue: K.S. 2012-08-30	Scale: N.T.S.	Rev: 1	18-4300	1/1

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DETAIL 'A'

GROUND CLAMP CONNECTION TO GUARD POST

NOTES:

1) GROUND CONNECTOR SHALL BE CLAMPED TO NON-PAINTED SURFACE OF THE GUARD POST.
2) REFER TO STD. 31-4080 FOR GUARD POST INSTALLATION.
3) REFER TO STD. 18-5500 FOR GROUND GRID OF PAD-MOUNTED EQUIPMENT.
4) ALL METALLIC GUARD POSTS (BOLLARDS) WITHIN 2400 mm (8'-0) OF PAD-MOUNTED EQUIPMENT ENCLOSURE SHALL BE INTERCONNECTED WITH THE GROUND GRID OF THE PAD-MOUNTED EQUIPMENT.

DISTRIBUTION CONSTRUCTION STANDARD Grounding							
TORONTO HYDRO	Approved By: S.B. 2025-10-30		UNDERGROUND SYSTEMS GUARD POST GROUNDING DETAIL				
	Drafted By: A.S.	Designed By: S.B.	Original Issue: K.S. 2013-06-12	Scale: N.T.S.	Rev: 4	18-5000	1/2

BOM LEGEND				
		BOLLARD SIZE	TYPE	APPLICATION
	A	125 mm (5")	GALVANIZED PIPE	1-PHASE TRANSFORMER
				3-PHASE TRANSFORMER
				SWITCHGEAR
4	B	101 mm (4")	GALVANIZED PIPE	1-PHASE TRANSFORMER
				3-PHASE TRANSFORMER
				SWITCHGEAR
4	C	152 mm (6")	GALVANIZED PIPE	1-PHASE TRANSFORMER
				3-PHASE TRANSFORMER
				SWITCHGEAR

BILL OF MATERIALS FOR 18-5000					
ITEM NO.	DESCRIPTION	ITEM I.D.	QUANTITY		
			A	B	C
1	WIRE #2/0 19 STR CU SD	7105160	1	1	1
4 2	CONNECTOR CU GROUND CLAMP 4" PIPE - #4 TO #2/0	100003300	-	1	-
3	CONNECTOR CU GROUND CLAMP 5" PIPE - #4 TO #2/0	7214140	1	-	-
4 4	CONNECTOR CU GROUND CLAMP 6" PIPE - #4 TO #2/0	100001761	-	-	1
5	CONNECTOR CU PARALLEL GRV COMPRESSION - #2/0 RUN TO #2/0 TAP	7213156	1	1	1

* QUANTITIES SHOWN ARE PER BOLLARD.

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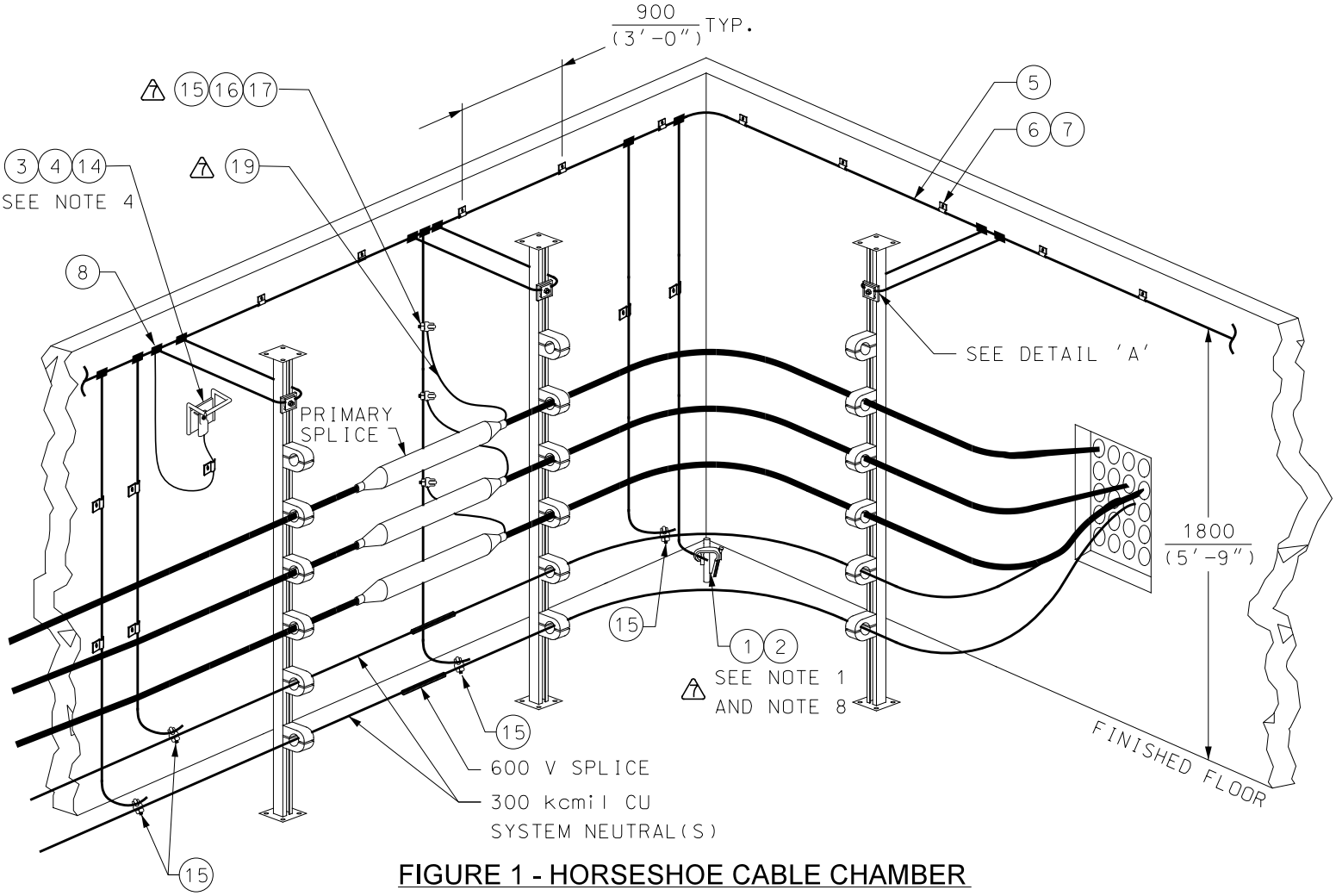


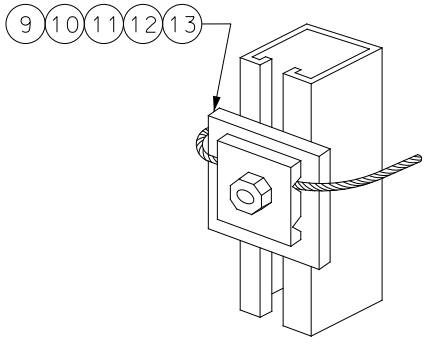
FIGURE 1 - HORSESHOE CABLE CHAMBER GROUNDING SYSTEM (UNISTRUT INSTALLATION)

⚠ PROCEDURES - HORSESHOE CABLE CHAMBER GROUNDING SYSTEM

THE BELOW PROCEDURES ARE TO BE FOLLOWED ONLY WHEN #2 STRANDED CU 600 V TW75 BLACK (ITEM I.D. 7150162) CABLE IS USED FOR BONDING OF 28 kV COLD SHRINK SPLICES.

- APPLY 2 HALF-LAPPED LAYERS OF PVC TAPE (ITEM I.D. 7600001) AROUND THE OTHER END OF CONDUCTOR CONNECTED TO CABLE CHAMBER GROUND LOOP EXTENDING 51 MM (2") OVER JACKET.

- APPLY HALF-LAPPED LAYERS OF SLIGHTLY STRETCHED RUBBER MASTIC TAPE (ITEM I.D. 7600007) EXTENDING 25 MM (1") OVER PVC TAPE.



DETAIL 'A'
CABLE SUPPORT
GROUND CONNECTION

DISTRIBUTION CONSTRUCTION STANDARD Grounding			UNDERGROUND SYSTEM CABLE CHAMBER GROUNDING				
TORONTO HYDRO	Approved By: 13/10/2026						
	Drafted By: T.F.	Designed By: S.B.	Original Issue: C.P. 2001-01-10	Scale: N.T.S.	Rev: 7	18-5100	1/3

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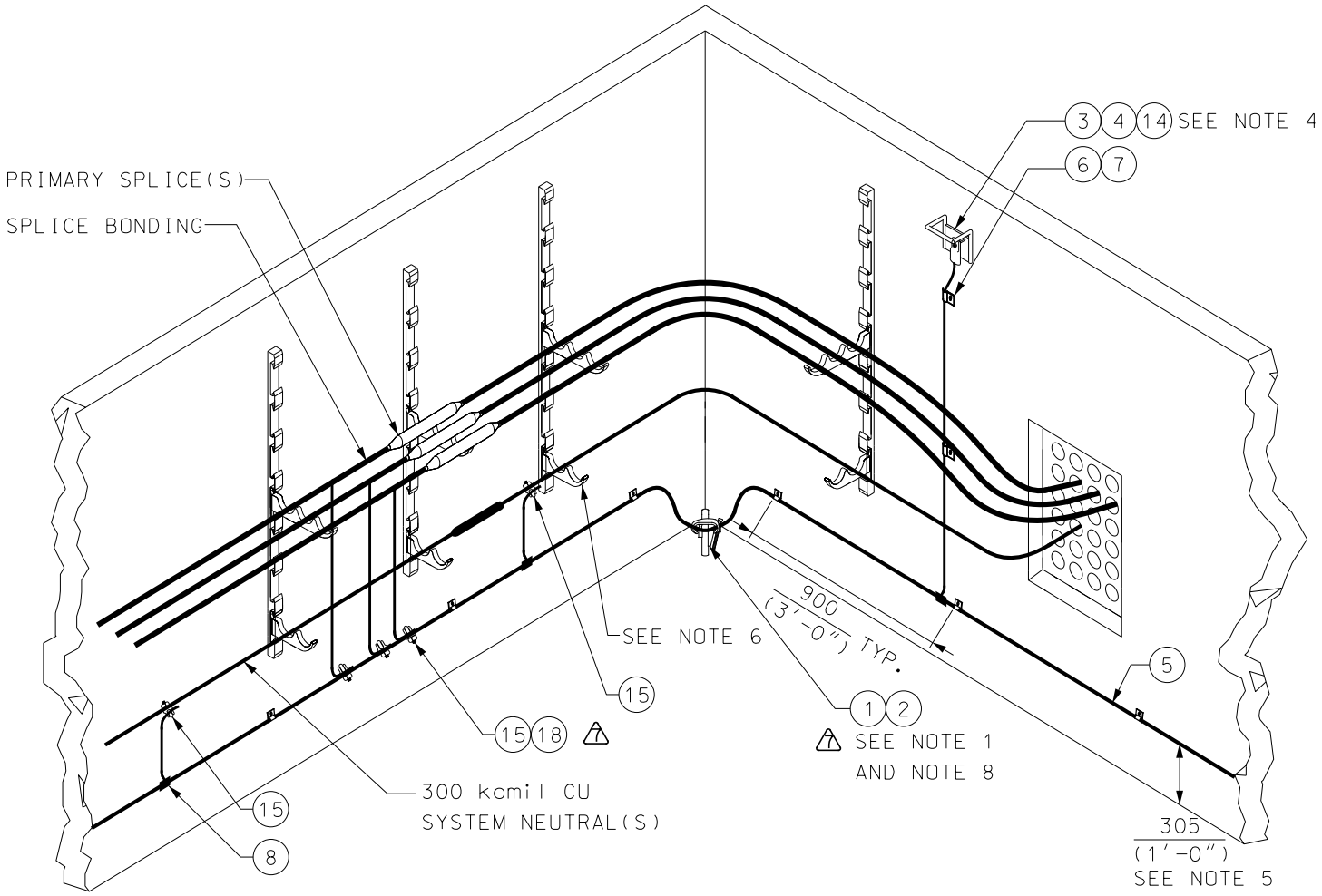


FIGURE 2 - DOWNTOWN CABLE CHAMBER GROUNDING SYSTEM (CAST IRON CABLE RACKS AND ARMS INSTALLATION)

⚠7

NOTES:

1) FOUR GROUND RODS SHALL BE INSTALLED NEAR THE CORNERS OF CABLE CHAMBER.
2) USE #2/0 BARE COPPER CONDUCTOR FOR GROUND LOOP AND CONNECTIONS TO GROUND RODS.
3) ALL NEUTRALS SHALL BE CONNECTED TO GROUND LOOP.
4) STIRRUP (ITEM I.D. 7251095) SHALL BE INSTALLED WHERE SPACE IS AVAILABLE TO ALLOW FOR PROPER GROUNDING PROVISIONS.
5) FOR DOWNTOWN CABLE CHAMBER ONLY (FIGURE 2), GROUND LOOP SHALL BE LOCATED 305 MM (1'-0") ABOVE FLOOR LEVEL. GROUND LOOP SHALL BE FASTENED TO CHAMBER WALL AT APPROXIMATELY 900 MM (3'-0") INTERVALS USING CABLE MOUNTING CLIP AS SHOWN.
6) FOR DOWNTOWN CABLE CHAMBER ONLY (FIGURE 2), SYSTEM NEUTRALS TO BE INSTALLED BELOW PRIMARY CABLES ON 2-WAY RACK (ITEM I.D. 7340303).
7) FOR ADDITIONAL REQUIREMENTS APPLICABLE TO SUPPLEMENTARY BONDING CONDUCTORS, SERVICE NEUTRAL(S) AND SYSTEM NEUTRAL(S), REFER TO THE RELEVANT STANDARDS IN SECTION 16, THE LATEST REVISION OF THE SDP (STANDARD DESIGN PRACTICE), AND CONDITIONS OF SERVICE DOCUMENTS.
⚠7 8) STD. 18-4310 MAY ONLY BE USED WHEN CLEARANCE BELOW CABLE CHAMBERS IS NOT SUFFICIENT TO ACCOMMODATE FOR A 10' GROUND ROD ELECTRODE AS SHOWN IN STD. 18-4300.

DISTRIBUTION CONSTRUCTION STANDARD Grounding			UNDERGROUND SYSTEM CABLE CHAMBER GROUNDING				
TORONTO HYDRO	Approved By:						
	Drafted By: T.F.	Designed By: S.B.	Original Issue: C.P. 2001-01-10	Scale: N.T.S.	Rev: 7	18-5100	2/3

BOM LEGEND		
A	FIGURE 1	HORSESHOE CABLE CHAMBER GROUNDING (WITH 1C TRXLPE PRIMARY)
B	FIGURE 1	HORSESHOE CABLE CHAMBER GROUNDING (WITH 3 - 1C TRXLPE PRIMARY)
C	FIGURE 2	DOWNTOWN CABLE CHAMBER GROUNDING (WITH 1C TRXLPE PRIMARY)
D	FIGURE 2	DOWNTOWN CABLE CHAMBER GROUNDING (WITH 3 - 1C TRXLPE PRIMARY)
E	FIGURE 1	HORSESHOE CABLE BONDING (WITH 1C TRXLPE PRIMARY)
F	FIGURE 1	HORSESHOE CABLE BONDING (WITH 3 - 1C TRXLPE PRIMARY)
G	FIGURE 2	DOWNTOWN CABLE BONDING (WITH 1C TRXLPE PRIMARY)
H	FIGURE 2	DOWNTOWN CABLE BONDING (WITH 3 - 1C TRXLPE PRIMARY)

⚠7

BILL OF MATERIALS FOR 18-5100

	ITEM NO.	DESCRIPTION	ITEM I.D.	QUANTITY A	B	C	D	E	F	G	H
	1	ROD 3/4" X 10' STEEL GALVANIZED	2470102	4	4	4	4	–	–	–	–
	2	CONNECTOR 3/4" ROD TO #2/0 CU	7214200	4	4	4	4	–	–	–	–
	3	CONNECTOR CU TERMINAL LUG TINNED #2/0 STR 1/2" HOLE	9662106	2	2	2	2	–	–	–	–
	4	ANCHOR CONCRETE SLEEVE 1/2" X 3" LONG	9653086	2	2	2	2	–	–	–	–
	5	WIRE #2/0 19 STR CU SD	7105160	43	43	43	43	–	–	–	–
	6	CLIP CABLE CSA - CONDUCTOR MOUNTING	7210190	36	36	36	36	–	–	–	–
	7	ANCHOR THREADED CONCRETE 1/4" X 1 3/4"	2500052	36	36	36	36	–	–	–	–
	8	CONNECTOR COMPRESSION #2/0 CU TO #2/0 CU	7213156	34	34	34	34	–	–	–	–
	9	NUT 1/2" CLAMPING C/W SPRING NUT	2520004	12	12	–	–	–	–	–	–
	10	BOLTED PARALLEL GROOVE GROUND CLAMP	7214105	12	12	–	–	–	–	–	–
	11	WASHER LOCK 1/2" GALV	2530116	12	12	–	–	–	–	–	–
	12	BOLT MACHINE 1/2" X 2" C/W HEX HEAD & NUT	2510330	12	12	–	–	–	–	–	–
	13	WASHER GALV SQUARE 1 1/2" X 1 1/2" C/W 9/16" HOLE	2530001	12	12	–	–	–	–	–	–
	14	CONNECTOR STIRRUP GROUNDING	7251095	2	2	2	2	–	–	–	–
⚠7	15	CONNECTOR CU U BOLT CLAMP 250-500 kcmil STR	7214413	8	10	8	10	1	3	1	3
	16	TAPE PVC 3/4" x 0.0075" MIN. x 22 yd ROLL	7600001	1	1	–	–	1	1	–	–
	17	TAPE RUBBER MASTIC 2" x 0.065" x 10 ft ROLL	7600007	1	1	–	–	1	1	–	–
	18	COND CU #4 SOLID SD BARE	7105085	–	–	1	3	–	–	1	3
	19	COND CU #2 STR 600 V TW75 BLACK	7150162	1	3	–	–	1	3	–	–
		ASSOCIATED STANDARDS									
	20	CABLE CHAMBER MATERIAL AND INSTALLATION	STD.31-2110	1	1	1	1	–	–	–	–
	21	CABLE RACK	STD.31-8260	–	–	1	1	–	–	–	–
	22	CABLE ARMS	STD.31-8270	–	–	1	1	–	–	–	–
	23	CABLE CHAMBER TYPICAL RACKING ARRANGEMENTS	STD.31-2180	–	–	1	1	–	–	–	–
⚠7	24	GROUND ROD INSTALLATION DETAIL	STD.18-4300	1	1	1	1	–	–	–	–
⚠7	25	GROUND ROD INSTALLATION DETAIL WITH G.E.M.	STD.18-4310	1	1	1	1	–	–	–	–

* QUANTITY IS BASED ON CABLE CHAMBER SIZE 3500 mm X 4000 mm

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DISTRIBUTION CONSTRUCTION STANDARD
Grounding

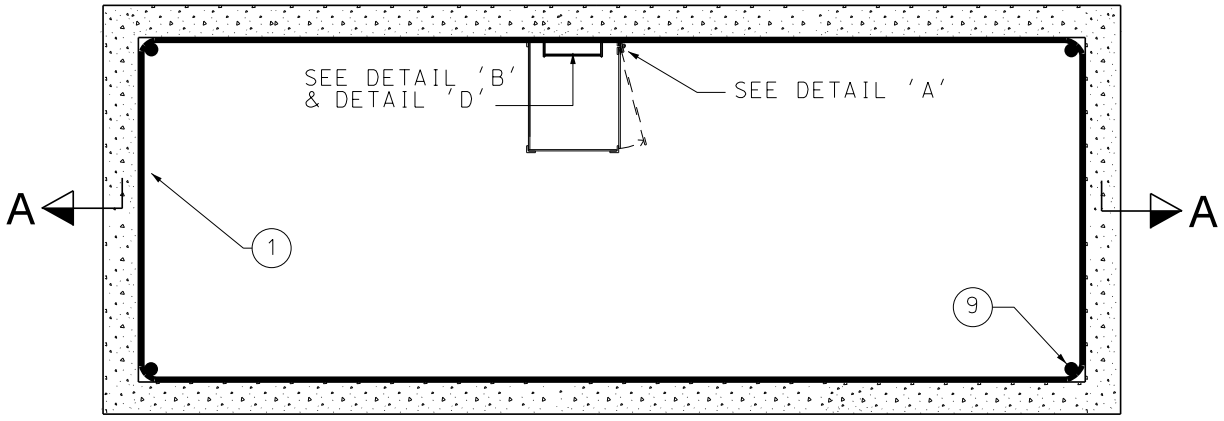
TORONTO HYDRO

Approved By:

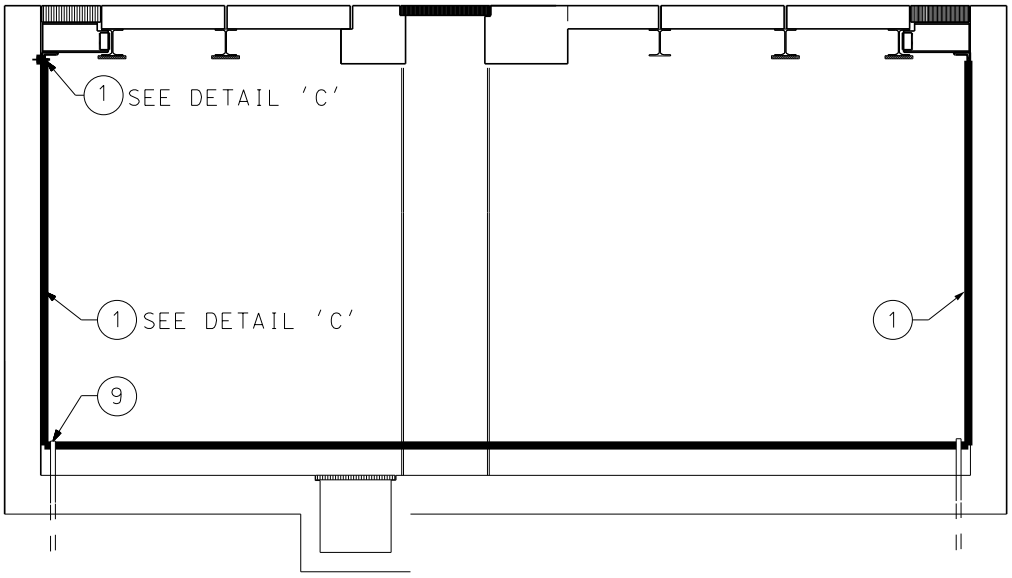
UNDERGROUND SYSTEM
CABLE CHAMBER GROUNDING

Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
T.F.	S.B.	C.P. 2001-01-10	N.T.S.	7	18-5100	3/3

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VAULT PLAN VIEW



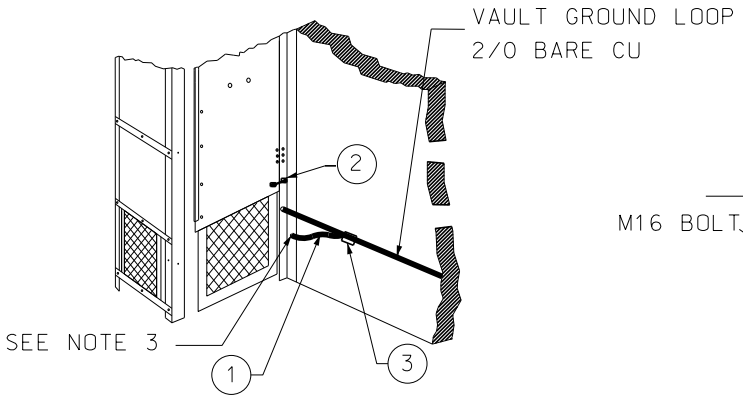
SECTION A-A

NOTES:

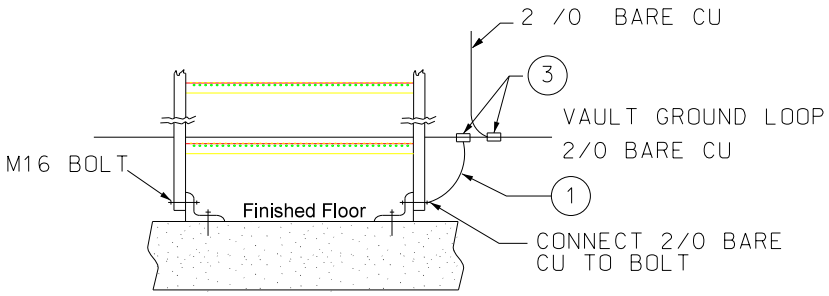
1) ALL MATERIAL IS GALVANIZED IN ACCORDANCE WITH LATEST CSA STANDARD G-164 EXCEPT HINGES WHICH ARE STAINLESS STEEL.
2) LOCATION OF LADDER AND DOOR SHALL BE DETERMINED AS PER CONSTRUCTION DRAWING.
3) DRILL $^{3}/_{8}$" HOLE, INSTALL $^{3}/_{8}$" BOLT (2510237), NUT (2530035), AND WASHER (2530127) CONNECT 2/0 BARE CU BOLT.

DISTRIBUTION CONSTRUCTION STANDARD Grounding			UNDERGROUND SYSTEM TRANSFORMER VAULT HATCHWAY FRAME & LADDER				
TORONTO HYDRO	Approved By: T.T. 2013-02-15						
	Drafted By: A.M.E	Designed By: I.E.	Original Issue: K.S./J.D. 2010-07-08	Scale: N.T.S.	Rev: 2	18-5300	1/3

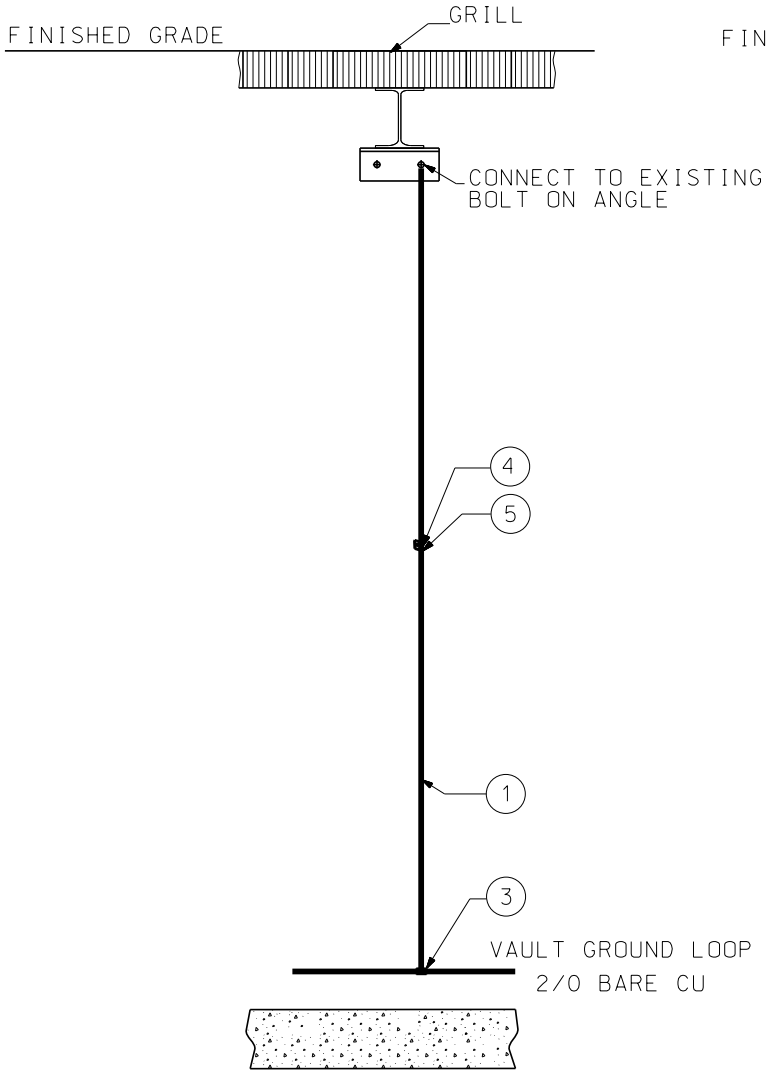
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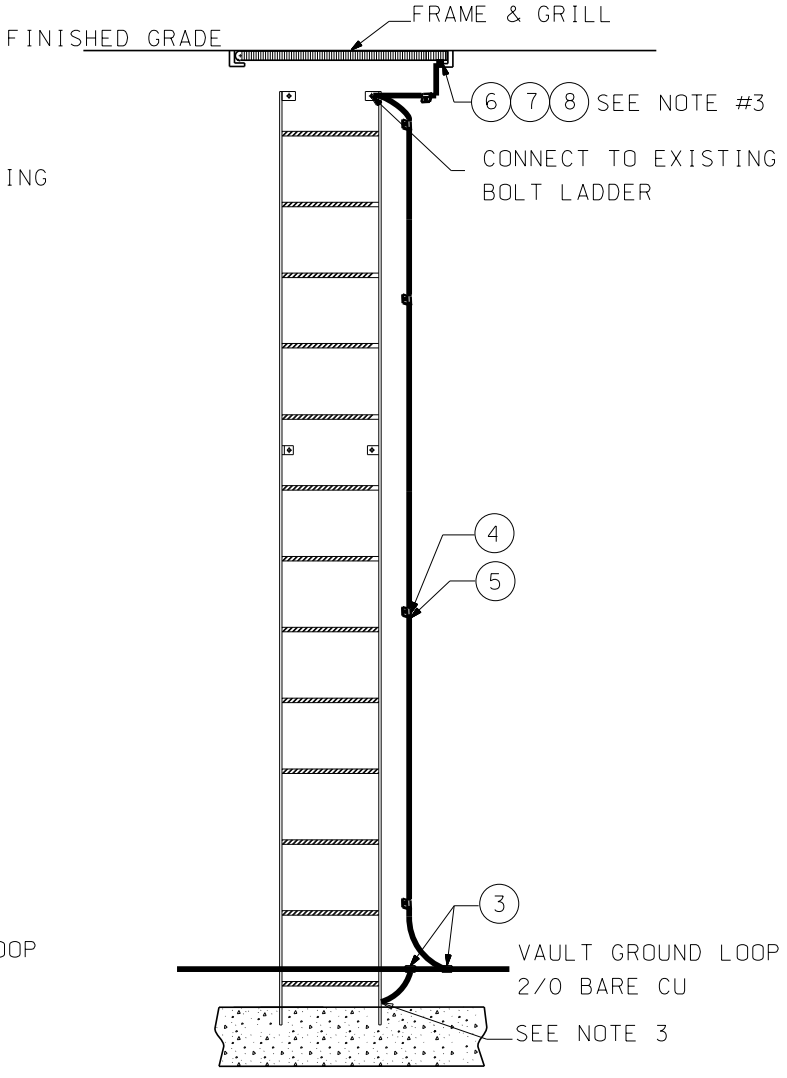
DETAIL 'A'
ISOMETRIC VIEW



DETAIL 'B'
LADDERS ANCHORED BY BRACKET



DETAIL 'C'
BEAM ANGLE



DETAIL 'D'
LADDERS EMBEDED
IN CONCRETE

DISTRIBUTION CONSTRUCTION STANDARD Grounding			UNDERGROUND SYSTEM TRANSFORMER VAULT HATCHWAY FRAME & LADDER				
TORONTO HYDRO	Approved By: T.T. 2013-02-15						
	Drafted By: A.M.E	Designed By: I.E.	Original Issue: K.S./J.D. 2010-07-08	Scale: N.T.S.	Rev: 2	18-5300	2/3

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△2

BILL OF MATERIALS FOR 18-5300			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A
1	WIRE 2/0 19 STR CU SD	7105160	20
2	GROUND STRAP FLAT BRAID C/W U-BOLT	9650096	1
3	CONNECTOR CU PARALLEL GROOVE COMPRESSION	7213156	8
4	CLIP CABLE CSA-CONDUCTOR MOUNTING HARDWARE	7210190	20
5	ANCHOR THREADED CONCRETE 1/4" X 1 3/4"	2500052	20
6	BOLT MACHINE 3/8" X 1 1/2" BLACK IRON	2510237	3
7	WASHER STAINLESS STEEL 3/8"	2530035	3
8	WASHER LOCK 3/8" STAINLESS STEEL	2530127	3
9	ROD 3/4" X 10' GROUND STEEL GALVANIZED	2470102	4

DISTRIBUTION CONSTRUCTION STANDARD
Grounding

TORONTO HYDRO

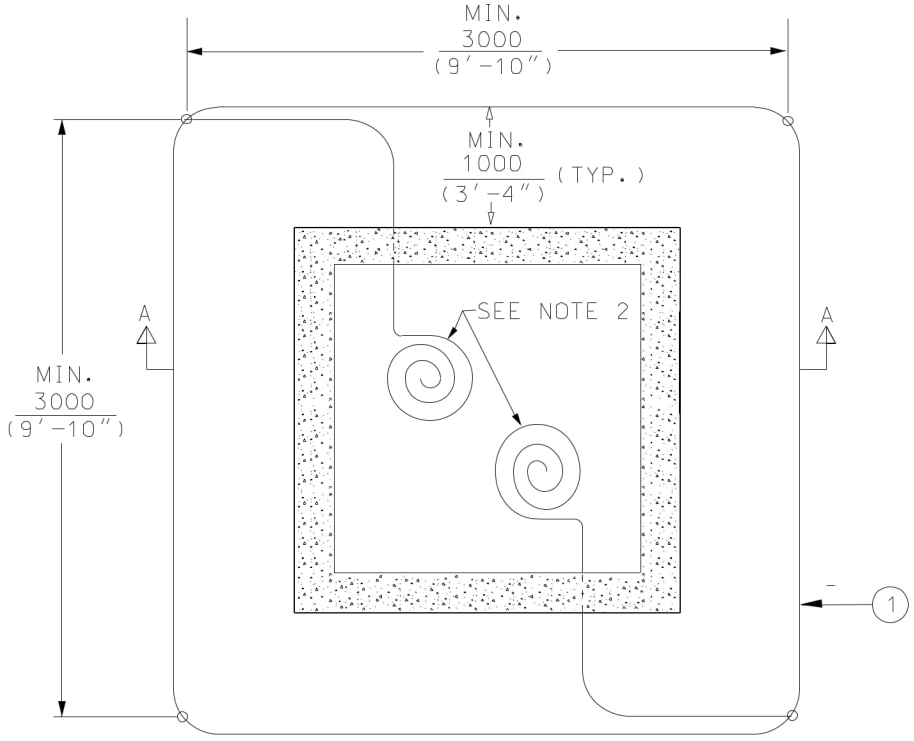
Approved By: T.T. 2013-02-15

Drafted By: A.M.E | Designed By: I.E.

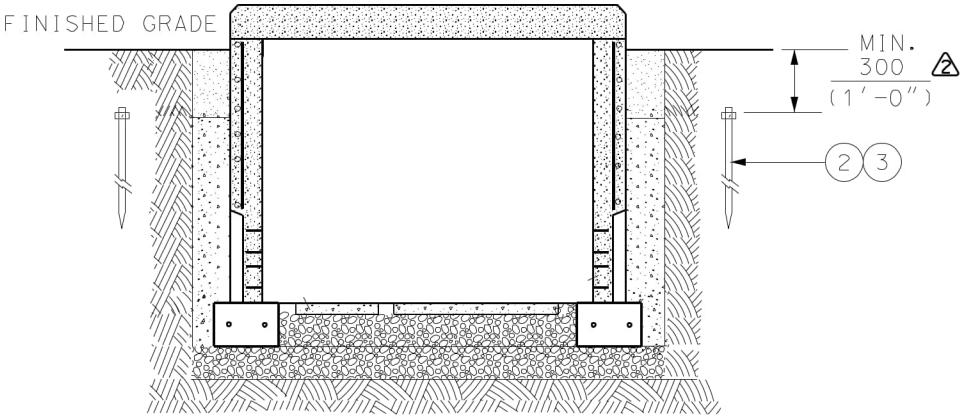
UNDERGROUND SYSTEM
TRANSFORMER VAULT
HATCHWAY FRAME & LADDER

Original Issue: K.S./J.D. 2010-07-08 | Scale: N.T.S. | Rev: 2 | 18-5300 | 3/3

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PLAN VIEW



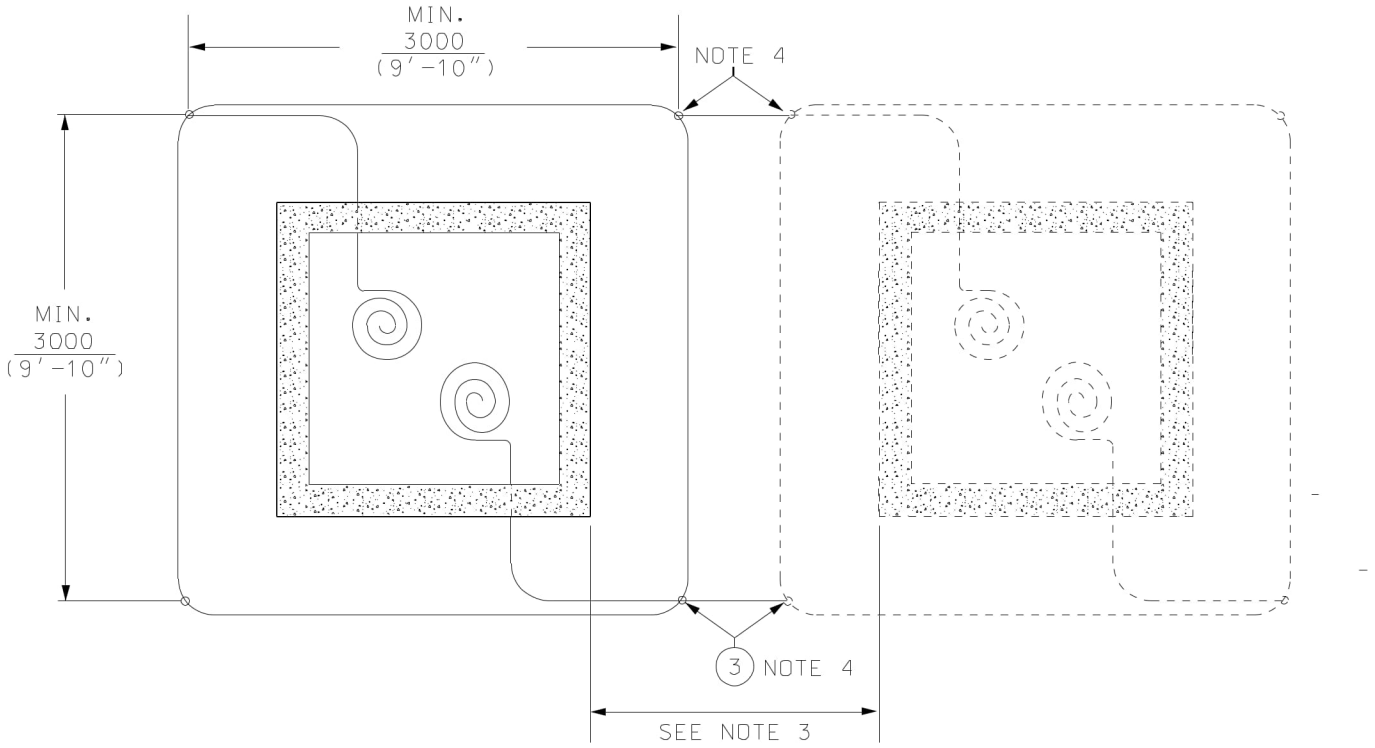
SECTION A-A

NOTES:

1) GROUNDING SHALL BE INSTALLED AS SHOWN. RODS TO BE CONNECTED BY 2/0 BARE COPPER TO FORM A COMPLETE GROUND LOOP AROUND FOUNDATION.
2) LEAVE TWO COILS EACH 2000 mm (6′-7″) INSIDE EACH FOUNDATION.

DISTRIBUTION CONSTRUCTION STANDARD Grounding			GROUND GRID PAD-MOUNTED EQUIPMENT 2				
TORONTO HYDRO	Approved By: V.B. 2019-05-27						
	Drafted By: N.H.	Designed By: V.B.	Original Issue: K.S. 2012-08-30	Scale: N.T.S.	Rev: 2	18-5500	1/3

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PLAN VIEW ⚠2

BONDING OF ADJACENT GROUND GRIDS
SEPARATED BY LESS THAN 5 m

NOTES: ⚠2

3) IF SEPARATION TO ANOTHER STRUCTURE IS LESS THAN 5 m, GROUNDING GRIDS SHALL BE BONDED.
4) IF GROUND GRIDS OVERLAP, GROUND RODS MAY BE SHARED BETWEEN GRIDS.

DISTRIBUTION CONSTRUCTION STANDARD Grounding			GROUND GRID PAD-MOUNTED EQUIPMENT ⚠2				
TORONTO HYDRO	Approved By: V.B. 2019-05-27						
	Drafted By: N.H.	Designed By: V.B.	Original Issue: K.S. 2012-08-30	Scale: N.T.S.	Rev: 2	18-5500	2/3

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△2

BOM LEGEND	
A	SINGLE GROUND GRID
B	SINGLE GROUND GRID WITH SEPARATION LESS THAN 5 m

BILL OF MATERIALS FOR 18-5500

ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	QTY B
1	WIRE 2/0 19 STR CU SD	7105160	24	34
2	ROD 3/4" X 10' GROUND STEEL GALVANIZED	2470102	4	4
3	CONNECTOR CU GROUND WRENCH LOCK 3/4" ROD TO 2/0 CU CONDUCTOR	7214200	6	10
	ASSOCIATED STANDARDS			
4	GROUND ROD INSTALLATION	STD. 18-4300	1	1

△2

DISTRIBUTION CONSTRUCTION STANDARD
Grounding

TORONTO HYDRO

Approved By: V.B. 2019-05-27

Drafted By: N.H.

Designed By: V.B.

GROUND GRID
PAD-MOUNTED EQUIPMENT

△2

Original Issue: K.S. 2012-08-30

Scale: N.T.S.

Rev: 2

18-5500

3/3

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MINIMUM UNDERGROUND CLEARANCES AS PER CITY OF TORONTO MCR (EDGE TO EDGE)

Utilities or Plant			Vertical mm (feet)	Horizontal mm (feet)
Railways	Heavy Rail (CN/CP/GO)		Refer to STD. 31-1310	
	Light Rail (TTC/LRT/Metrolinx)		Refer to STD. 31-1200	
Hydro One	All Infrastructure		1000 (3'-4")	1000 (3'-4")
Communication	Bell Canada	Manholes	1000 (3'-4")	1000 (3'-4")
		Concrete Encased Ducts	600 (2'-0")	600 (2'-0")
		Direct Buried Ducts	300 (1'-0")	600 (2'-0")
	Others	All Infrastructure	300 (1'-0")	600 (2'-0")
Enwave Energy Corporation	Steam Pipes		600 (2'-0")	600 (2'-0")
	Chilled Water Pipes		300 (1'-0")	300 (1'-0")
Enbridge Gas National Energy Board	≤ NPS 300 mm (12") (Open Trench)		300 (1'-0")	600 (2'-0")
	CER Regulated Pipelines and Vital Mains (Open Trench)		600 (2'-0")	1000 (3'-4")
	ALL Pipelines Directional Drilling/Boring		1000 (3'-4")	1000 (3'-4")
	Regulator Stations		Consult with City	1000 (3'-4")
City of Toronto	Trees		See Note 1 and Std. 31-0400	
	Catch Basins		Consult with City	500 (1'-8")
	Traffic Signal Ducts		300 (1'-0")	600 (2'-0")
	Storm Sewer	< 150 (6") Dia.	150 (6")	600 (2'-0")
		150 (6") < 750 (2'-6") Dia.	300 (1'-0")	750 (2'-6")
		≥ 750 (2'-6") Dia.	500 (1'-8")	900 (3'-0")
		Maintenance Hole	-	600 (2'-0")
	Sanitary/ Combined Sewer	< 100 (4") Dia.	150 (6")	600 (2'-0")
		100 (4") < 375 (1'-3") Dia.	300 (1'-0")	750 (2'-6")
		≥ 375 (1'-3") Dia.	500 (1'-8")	900 (3'-0")
		Maintenance Hole	-	600 (2'-0")
	Water Mains	< 100 (4") Dia.	150 (6")	600 (2'-0")
		≥ 100 (4") < 400 (1'-4") Dia.	300 (1'-0")	750 (2'-6")
		≥ 400 (1'-4") Dia.	500 (1'-8")	900 (3'-0")
		Water Valve Chamber	See Note 5	600 (2'-0")
		Fire Hydrant	400 (1'-4")	1500 (4'-11")
Toronto Hydro (This to be used when other Utilities are installing their plant close to THESL infrastructure)	Poles (Direct Buried)		See Std's. 03-2400, 04-4100 and 04-5100	
	Base Mounted Poles/ Reinforced Sidewalk Bays		See Note 3	
	Cable Chamber/Vault/Tap Boxes (No Grounding Outside Structures)		-	600 (2'-0")
	Padmounts/Sub Vaults/Splice Vaults (Grounding Outside Structure)		Refer to STD. 31-4100	
	Ducts/Duct Banks		300 (1'-0")	600 (2'-0")

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Notes:

1. Any construction activity in the vicinity of trees shall be carried out in compliance with latest City of Toronto's "Tree Protection Policy and Specification for Construction Near Trees" document.

2. If the minimum clearances shown cannot be met, the subject utilities approval may be obtained for reduced clearances.

3. Horizontal clearance shall be from edge of reinforced sidewalk bay or pole base to edge of proposed plant. Contractor shall at no time cut into reinforced sidewalk bays and pole bases. Sidewalk bays and pole bases provide loading support for the pole. Plant can be installed under reinforced sidewalk bays by tunneling at a minimum vertical clearance of 600 mm (2'-0"). Plant shall not be installed under pole bases.

△9 4. If the minimum horizontal clearance for utilities installing plant close to THESL plant cannot be met due to existing field conditions, clearance can be reduced to 300mm (1'-0") with the Contractor/Customer providing the reasons for the reduced clearance. Approvals can be provided by Toronto Hydro Standards Department for reduced clearance.

△9 5. Any proposed horizontal clearance less than 300 mm (1'-0") will require an ESA deviation with the following supporting documentation:

   a) A letter stamped and signed by a Professional Engineer of Ontario, outlining:
      - That the Contractor/Customer is responsible for all costs associated with support and inspection, as well as any damages and associated costs;
      - The method of protection and/or support. Support is required if Toronto Hydro plant is undermined;
      - That this is a unique scenario that requires a deviation from typical construction standard, and identify that the deviation is also from the typical clearances set out by Toronto Hydro and the City of Toronto.

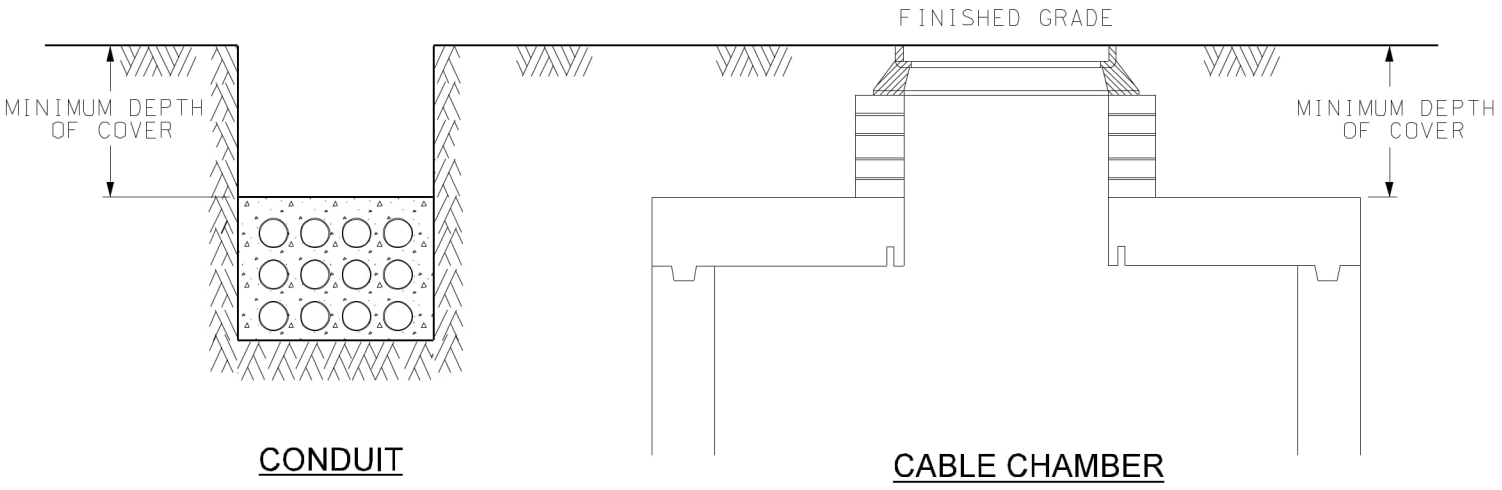
   b) Drawing which shall include:
      - Stamp and signature of a Professional Engineer in the Province of Ontario;
      - Length of the plant being supported and/or protected;
      - Method of protection and/or support system in both plan and section views;
      - Maximum deflection of the plant with the support;
      - Deflection monitoring system placement if soil settlement will occur on site;
      - Backfilling procedures.

6. Contact the City of Toronto for minimum vertical clearance to water valve chamber.

7. For above grade clearance refer to:
   - 03-2300 Building and Permanent Structures
   - 03-2400 Poles and Private Fences
   - 04-4100 Pole Location Guidelines

DISTRIBUTION CONSTRUCTION STANDARD **Civil Construction**			UNDERGROUND CLEARANCES				
TORONTO HYDRO	Approved by:						
	Drafted by: J.D.	Designed by: B.D.	Original issue: J.D. 2000-12-28	Scale: N.T.S.	Rev. 9	31-0100	2/2

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THE "MINIMUM DEPTH OF COVER" FOR THESL PLANT (CONDUITS AND CABLE CHAMBERS) SHALL BE AS FOLLOWS:

TYPE	MINIMUM DEPTH OF COVER	DESCRIPTION	
CURBED ROADS	1000 (3'-4")	FOR AREAS UNER THE ROAD, CURB, AND SIDEWALK, THE PORTION OF THE BOULEVARD WITHIN ONE METRE OF THE BACK OF CURB AND/OR SIDEWALK, AND THE ENTIRE RIGHT-OF-WAY WITHIN 30 METRES OF AN INTERSECTION, THE MINIMUM DEPTH OF COVER SHALL BE ONE METRE.	(2)
UNCURBED ROADS	1300 (4'-3") BELOW THE CENTERLINE OF THE ROAD, OR 600 (2'-0") BELOW THE LOWEST POINT OF THE ADJACENT DITCH, WHICHEVER IS DEEPER.	FOR THE ENTIRE RIGHT-OF-WAY, FROM STREET-LINE TO STREET-LINE, ON UNCURBED ROADS.	(2)
BOULEVARDS	800 (2'-8")	EXCEPT WHERE SPECIFIED ABOVE, THE MINIMUM DEPTH OF COVER ON ALL STREETS SHALL BE 800 MILIMETRES.	(2)

NOTES:
1) THE DEPTHS OF COVER ARE IN ACCORDANCE WITH THE CITY'S MUNICIPAL CONSENT REQUIREMENTS DOCUMENT.
2) THE DEPTHS OF COVER APPLY TO ALL CONDUITS IRRESEPECTIVE OF THE TYPE AND METHOD OF INSTALLATION.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			UNDERGROUND CLEARANCES MINIMUM DEPTH OF COVER FOR TORONTO HYDRO STRUCTURES				
TORONTO HYDRO	Approved By: B.D. 2018-08-29						
	Drafted By: M.D.	Designed By: B.D.	Original Issue: J.D. 2010-10-21	Scale: N.T.S.	Rev: 2	31-0300	1/1

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HEAVY EQUIPMENT OPERATION IN THE VICINITY OF THE TORONTO HYDRO UNDERGROUND PLANT

1.0 PURPOSE

1.1 To provide guidance to external party (contractor, developer or its agent) in the preparation of plans and proposals for the use of Heavy Equipment in the vicinity of the Toronto Hydro underground plant.

1.2 To maintain the electrical supply and to ensure the safety of persons, the structural integrity of the Toronto Hydro underground plant shall not be compromised whenever Heavy Equipment is used by an external party.

2.0 DEFINITIONS

2.1 Underground Plant

- **Cable Chamber**
  A reinforced concrete structure (walls, floor & roof slab) housing cables to accommodate cable connections or a change in cable direction. A cable chamber roof slab has a round lid, used for entering and exiting the cable chamber. A cable chamber roof slab is usually installed at a depth ranging from approximately 600 mm (2'-0") to 1250 mm (4'-2") below finished grade. Refer to Toronto Hydro Distribution Construction Standards, Section 31 – Cable Chambers
- **Conduit**
  A grouping of PVC ducts housing cables, either direct buried or encased in concrete, installed at a depth ranging from approximately 800 mm (2'-8") to 1000 mm (3'-4") below finished grade. Refer to Toronto Hydro Distribution Construction Standards, Section 31 – Conduits.
- **Vault**
  A cast in place reinforced concrete structure (walls, floor & roof slab) used for the purpose of housing transformers, cables, switchgears and other electrical equipment. A vault roof is constructed flush with finished grade. Refer to Toronto Hydro Distribution Construction Standards, Section 31 – Vaults.
- **Submersible Vault**
  A precast reinforced concrete structure (walls and floor), used for the purpose of housing transformers in residential sub-divisions. A Submersible vault roof is made of steel and is constructed flush with finished grade. Submersible vaults are installed in grass boulevards or sidewalks. A vault roof is constructed flush with finished grade. Refer to Toronto Hydro Distribution Construction Standard 31-5100.
- **Handwell or Tap/Splice Box**
  A fiberglass box with either fiberglass or composite lid, used for the purpose of making multiple cable connection or terminating ducts, installed in grass boulevard or sidewalk. Refer to Toronto Hydro Distribution Construction Standards, Section 31 – Splice Boxes.
- **Direct Buried Cables**
  Cable installed without any mechanical protection.

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2.2 Heavy Equipment

1 Any equipment (cranes, trucks, bulldozers, compactors, etc.) having weights exceeding CSA-S6, clause A3.4.1 CL-625-ONT live truck loading.

3.0 REFERENCES

All construction work shall conform to all the latest issues of referenced codes, standards, regulations and by-laws:

1
- Canadian Highway Bridge Design Code CSA-S6;
- Ontario Building Code
- Occupational Health & Safety Act and Regulation for Construction Project 1990 and Ontario Regulations 213/91;
- The Electricity Act, 1998 and the Ontario Regulation 22/04 Electrical Distribution Safety Regulation and other regulations which apply under this Act.

1 4.0 TECHNICAL INFORMATION

4.1 All Toronto Hydro underground plant is designed in accordance with the Canadian Highway Bridge Design Code CSA-S6, clause A3.4.1 CL-625-ONT live truck loading.

4.2 Except ducts buried at a depth greater than 800 mm, distributed loads shall not be placed above Toronto Hydro's underground plant. Any distributed load placed above Toronto Hydro's ducts shall not exceed the allowable bearing pressures prescribed in the Ontario Building Code.

4.3 The external party shall be responsible to confirm the depth and the location of the Toronto Hydro underground plant by having test holes excavated as necessary.

4.4 The external party shall assume that all underground and overhead conductors if encountered are live unless otherwise notified by Toronto Hydro.

4.5 The external party shall ensure that the Heavy Equipment is used in accordance with the manufacturers' instructions and all applicable regulations.

4.6 The external party shall ensure that all the appropriate safety measures are considered when using Heavy Equipment in the vicinity of the Toronto Hydro underground plant.

4.7 A minimum 2000 mm (6'-8") clearance is required between a conduit, direct buried and the Heavy Equipment. If minimum clearances cannot be met then the external party will have to submit a request to Toronto Hydro for approval as per clause 5.2 of this document.

4.8 A minimum 2000 mm (6'-8") horizontal clearance is required between the handwell or tap/splice box and the Heavy Equipment. Handwell and tap/splice box lids are not designed to support heavy load from equipment, vehicular traffic or Heavy Equipment. If minimum clearances cannot be met then the external party will have to submit a request to Toronto Hydro for approval as per clause 5.2 of this document.

4.9 A minimum 3000 mm (10'-0") horizontal clearance is required between submersible vault, cable chamber, vault, submersible vault and the Heavy Equipment. If minimum clearances cannot be met then the external party will have to submit a request to Toronto Hydro for approval as per clause 5.2 of this document.

4.10 No equipment including Heavy Equipment will be allowed to be placed directly on top of vault and submersible vault roofs, handwells or tap/splice box lids.

5.0 RESPONSIBILITIES

5.1 Toronto Hydro (Standards & Materials Section):

- Review the external party submission;
- Provide the external party with Toronto Hydro Distribution Construction Standard 31-0500;
- Field inspect/assess the Toronto Hydro underground plant and provide information to the external party;
- Review the external party's submission (including type of work conducted, drawings, structural analysis of the design, and the geotechnical report and any other related information dealing with using Heavy Equipment) and provide a recommendation;
- Notify the external party if the Heavy Equipment is allowed or disallowed to be used in the vicinity of Toronto Hydro plant.

5.2 External Party:

- Submit a request to the Toronto Hydro Standards and Materials section when using Heavy Equipment that will be operated under the following conditions:

  1) Within 3000 mm (10'-0") of Toronto Hydro's cable chambers, vaults, direct buried cables or submersible vaults;

  2) Within 2000 mm (6'-8") of Toronto Hydro's conduits, handwells, direct buried cables or tap/splice boxes.

  3) Crossing over Toronto Hydro's underground plant.

- When submitting the initial request, the external party is to provide Toronto Hydro with the following information: including type of work conducted, drawings, structural analysis of the design, and the geotechnical report and any other related information dealing with using Heavy Equipment.
- Submit a geotechnical report and structural analysis of the design, signed by a professional engineer licensed in Ontario, stating the added forces applied to Toronto Hydro's underground plant with as much lead time as possible (2-4 weeks). Submit follow up structural analysis/design if required;
- Follow the Toronto Hydro Distribution Construction Standard 31-0500;
- Pay for any costs associated with the use of the Heavy Equipment that Toronto Hydro may request;
- Be liable for all damages caused to the Toronto Hydro underground plant.

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SETTLEMENT IN THE VICINITY OF TORONTO HYDRO PLANT

1.0 PURPOSE

1.1 To provide guidance to external parties (contractor, developer or its agent) in the preparation of plans and proposals for construction in the vicinity of Toronto Hydro.

This is to ensure the continued reliability of the electrical supply and safeguard individuals, while preserving the structural integrity of Toronto Hydro plant.

1.2 Differential settlement around Toronto Hydro underground structures can induce shear and tensile strain on underground concrete structures, resulting in damaged structures and cables. Similarly, differential settlement around Toronto Hydro poles can cause poles to lean out of vertical alignment, which can result in operational and public safety risks.

This standard outlines a framework for analyzing and mitigating the risks associated with soil settlement in proximity to Toronto Hydro underground and overhead infrastructure.

1.3 Construction near Toronto Hydro plant shall adhere to the settlement limits established by Toronto Hydro. Third parties shall implement controls as required by this standard. The following documentation shall be submitted to Toronto Hydro:

1.3.1 A document containing a design, sealed by a Professional Engineer, clearly stating that the differential settlement will meet Toronto Hydro requirements; and

1.3.2 A memo/report, sealed by a Professional Engineer, clearly stating that the geotechnical assessment confirms that there is negligible risk for Toronto Hydro Plant.

2.0 OVERHEAD PLANT SETTLEMENT LIMITS

2.1 Settlement limits for poles are dependent on maximum pole lean and the presence of overhead equipment.

2.2 Equipment Relocation
If the total settlement in the settlement zone exceeds 10 mm, all Toronto Hydro equipment shall be relocated to poles outside the settlement zone to ensure operational integrity.

2.3 Maximum Deflection
For poles within a settlement zone, the maximum allowable horizontal deflection at the top of the pole, relative to the plumb position, shall not exceed the specified limit. Poles exceeding this limit shall be reset to the plumb position:

2.3.1 1% of the above ground pole height, or

2.3.2 300 mm, whichever is less.

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2.4 Settlement Tracking

Settlement shall be monitored with a minimum accuracy of 0.002 m. At a minimum, this shall include:

2.4.1 Pre-Construction Survey: A comprehensive deflection survey deflection survey of all poles shall be conducted prior to the commencement of construction.

2.4.2 Continuous Monitoring: Deflection surveys shall be preformed weekly during the construction phase. Monitoring must continue until construction is complete and any settlement has stabilized, with specific assessments at 30, 60, 90, and 180 days post-construction.

2.5 Survey Target Installation

2.5.1 Target Affixation: Targets must be securely affixed to the pole; drilling into the pole is strictly prohibited to prevent any structural damage. Maximum two screws with an embedment depth no greater than 25 mm (1”) when fastening the target or identification tag on a wood pole. An adhesive is required to fasten to concrete or aluminum poles.

2.5.2 Target Placement: Targets should be installed in pairs, positioned at a height of 3 meters above ground level.

2.5.3 An identification tag with contact/ownership information shall be placed near the target.

3.0 UNDERGROUND PLANT SETTLEMENT LIMITS

3.1 Settlement limits for underground plant are dependent on type of structure and extent of settlement.

3.2 Duct Structures

Toronto Hydro duct structures are designed to house primary and secondary cables. These duct banks are made up of PVC pipes encased in 20 MPa concrete , as per THESL Std. 31-1120. The maximum allowable differential settlement is determined by a shear strain limit, which is based on the maximum concrete strain of 0.0035, as specified in CSA A23.3. The limit set by Toronto Hydro is designed to permit cracking in the concrete without causing structural failure.

Settlement limits are outlined in the following chart:

Differential Settlement, mm/m	Minimum 10 mm Settlement Contour Spacing	Shear Strain	Severity Level	Action
1 mm	10 m	< 0.001	**Slight**	No immediate action required.
1 to 3 mm	3 m	0.001 – 0.003	**Moderate**	Engineering assessment.
3 to 10 mm	1 m	0.003 – 0.01	**Severe**	Mitigation required.
> 10 mm	–	> 0.01	**Very Severe**	Immediate action required.

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3.2.1 For slight and moderate severity levels, documentation shall be submitted to Toronto Hydro in accordance with Clause 1.3.

3.2.2 For severe risk levels structures shall be supported in place as per THESL Std. 31-1350.

3.2.3 For very severe risk levels, structures shall be supported in place as per THESL Std. 31-1350. Rebuilding structures may be required depending on backfill operations.

3.2.4 Surveys shall be conducted weekly during the construction phase and submitted to Toronto Hydro Representative for review. Monitoring must continue until construction is completed and any settlement has stabilized, with specific assessments at 30, 60, 90, and 180 days post-construction.

3.3 Below-grade structures:

Settlement around below-grade structures such as vaults, concrete pads, and concrete chambers are more critical than duct structures. These shall be assessed on a case-by-case basis. The combined effect of tensile and shear strains shall not exceed CSA A23.3 and ACI 318 Requirements:

$$\frac{\epsilon_t}{\epsilon_{t,limit}} + \frac{\gamma}{\gamma_{limit}} \leq 1$$

- ϵ_t – calculated tensile strain
- $\epsilon_{t,limit}$ – allowable tensile strain limit
- γ_t – calculated shear strain
- γ_{limit} – allowable shear strain limit

Third party shall submit documentation to Toronto Hydro in accordance with Clause 1.3.

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Ducts:

To comply with CSA C22.3 No.7-20 Clause 16.3, the color of the ducts shall be RED for all new and rebuild underground direct buried or directional drilled/Microtunneled duct installations. Ducts are considered to be direct buried when they have no mechanical protection like concrete encasing or steel caissons. This shall be applied to both electrical cables and communication cables.

Type of Ducts Table: △8

Duct Size	Type of Ducts	Construction Method	Type of Cables	Reference Standard
100 mm (4”)	Grey PVC DB2/ES2	Concrete Encased	Secondary/Primary	31-1120
100 mm (4”)	Red PVC DB2/ES2	Direct Buried	Secondary	31-1120
100 mm (4”)	Red HDPE SDR 13.5 or Sched. 40	Directional Drilling/Microtunneling	Secondary/Primary (Subdivision Only)	31-1210
100 mm (4”)	Black RTRC	Bridge Suspension	Secondary/Primary	31-1260
50 mm (2”)	Grey PVC DB2/ES2	Risers/Concrete Encased	Secondary (Streetlighting Only)	31-1120
50 mm (2”)	Red PVC DB2/ES2	Direct Buried	Secondary (Streetlighting Only)	31-1120
50 mm (2”)	Grey HDPE or Polypipe	Risers	Secondary	Legacy Standard

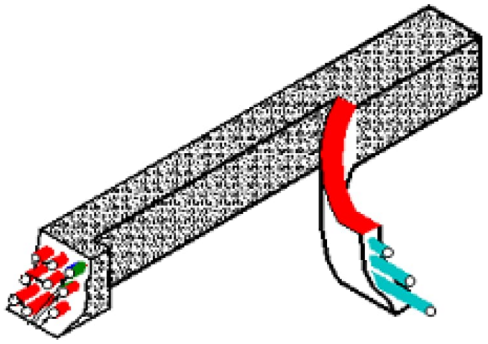
- **50 (2”) and 100 mm (4”) PVC DB2/ES2** △8
  - All PVC ducts shall conform to the latest edition of CAN/CSA C22.2 No. 211.1.
- **100 mm (4”) HDPE SDR 13.5 or Sched 40 Ducts**
  - HPDE ducts are laid by directional drilling/Microtunneling as per Standard 31-1210.
  - Straight length HDPE ducts can also be used as an alternative to PVC in open trench installations (direct buried or concrete encased).
  - HDPE ducts shall conform to the latest edition of CAN/CSA-C22.2 No. 327.
- **50 mm (2”) Polypipes**
  - Polyethylene conduits (Poly pipes) (used for legacy secondary cables) shall conform to the latest edition of CAN/CSA-C22.2 No. 327.
- **Reinforced Thermosetting Resin Conduit (RTRC)** (Refer to Std. 31-1260)
  - RTRC ducts are used for bridge crossings. RTRC shall conform to the latest edition of CSA C22.2 NO. 2515.
  - RTRC ducts are resistant to rain, snow, road salts, seepage, and spillage of car fuels.

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Breaking Out Existing Duct Bank and Diverting Ducts (Refer to Std. 31-1170)

The main purpose of breaking out an existing duct bank and diverting ducts is to supply customers or to re-arrange the electrical distribution plant. Typical cases:

- Supplying a new customer where constructing new duct run is not feasible due to economic or technical difficulties.
- Rising up a pole where constructing new duct is not feasible.
- Connecting an existing cable chamber to a newly built cable chamber.



Before any work is done on an existing duct bank, Toronto Hydro shall verify the position of all cables in the duct bank. All work on an existing duct bank shall be done in the presence of a Toronto Hydro representative. Work shall be carried out on the assumption that all cables are energized and operating at a voltage of 750 V or more.

Caution shall be used when breaking out the concrete around the duct.

In breaking out an existing duct bank it is important to note that only spare ducts located in the side column or top row of the duct bank can be diverted due to construction difficulties.

Plugging Ducts

The underground duct system provides an easy access for water and gas to flow into the underground plant (cable chambers, padmounts and transformer vaults). Some hazardous materials such as corrosive chemicals, fire, smoke, noxious gases, and small rodents can enter the underground plant via the underground duct system.

To stop these materials from entering the underground plant and/or customer buildings, ducts shall be plugged at the duct face by using sealants.

Sealants

Sealants are used to plug and seal all the ducts entering a building at the duct face to prevent water or gas from entering into the building. A building can be fed by underground ducts via an overhead system (from a pole) or from an underground system (cable chamber, padmount or vault) as per Standards 31-1220 and 31-1230.

In both cases the ducts shall be sloped away from the building with a slope of 1-2% and the ducts entering the building shall be sealed at the duct face with duct seal material (Standard 31-1400).

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Directional Drilling/Microtunneling (Refer to Std. 31-1210)

During the construction of underground plant, sometimes it is not possible to apply conventional construction methods, which are normally referred to as “open trench”.

Several reasons can make conventional methods not feasible:

- City’s restrictions or by-laws for constructing plant in a newly paved or repaved street (sidewalk and roadway) e.g. City of Toronto does not allow any construction from 2 to 5 years after the pavement is completed;
- To avoid disturbances to the public, especially in a congested area;
- To avoid disturbances to landscaping and monumental places;
- To avoid exposure of contaminated soils in areas which are highly polluted.

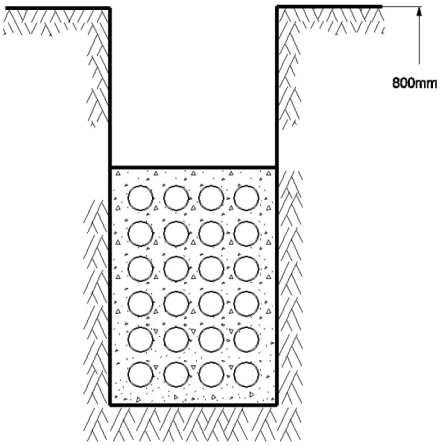
The type of equipment used in directional drilling depends on the soil type (hardness) and the duct size.

Note: New construction on reconstructed pavement/sidewalk is restricted for 5 years; overlaid pavement for 3 years; and slurry seal treatment pavement for 2 years (City of Toronto, Department of Public Works and the Environment).

Duct Layout or Arrangement (Refer to Std. 31-1120)

Duct arrangement shall be decided by the planner based on a number of factors:

- Number of required circuits;
- Number of services;
- Future use/expansion;
- Heat dissipation;
- Cost;
- Electromagnetic field (EMF).



A duct run shall be selected in a way to conform best to the following requirements:

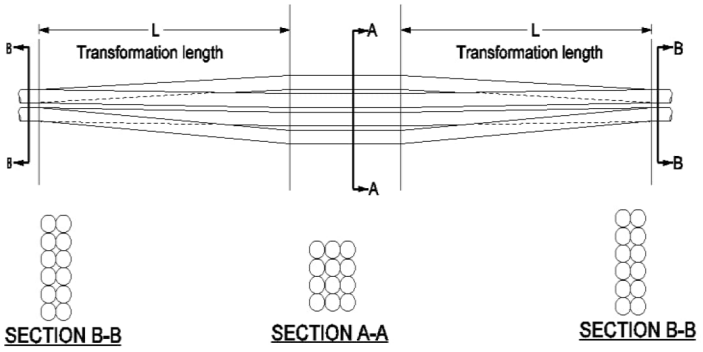
- To avoid surface obstructions in digging the trench, such as poles, trees, fire hydrants, etc;
- To avoid sub-surface obstructions, such as sewers, conduits of other utilities, tunnels, vaults, etc;
- To avoid cutting the pavement more than necessary;
- To avoid curves and bends in the ducts as much as possible;
- To avoid possible damage to the ducts by other utilities in the course of maintaining their plant (Refer to Std. 31-0100 for clearances from other utilities);
- To avoid blocking construction by other utilities or sewer connections parallel to the conduit run;
- To provide for possible street widening and paving programs.

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Transposing Ducts (Refer to Std. 31-1190)

In some cases, in order to cross obstructions, the duct arrangement shall be changed.

For example, a duct bank with a duct arrangement of 3W4H may not be able to cross over a utility because of the required clearance and minimum depth of cover. In this case, to avoid deep excavation, changing the formation of the ducts from 3W4H to 2W6H may solve the problem



Typical Duct Arrangement

- **1 Duct:** One duct installation is not a common practice to build. It is preferable to use at least 2 ducts. However, in special cases one duct may be used for runs shorter than 2 meters (6'-8") – 3 meters (9'-10").
- **2 Ducts:** Can be either 2W1H or 1W2H. Common applications are services and risers.
- **3 Ducts:** Can be either 3W1H or 1W3H. Common applications are primary risers and services.
- **More than 3 Ducts:**

  The number of ducts required and the location of the duct structure shall be determined in accordance with the project details. Where there are minimal sub-surface obstructions along the trench route, the ducts shall be configured in a 3 or 4 wide formation. The 3 wide formation is preferred as it keeps the "inside" ducts to a minimum. In general, new duct structures installed may consist of ducts ranging in number from 9 to 24 ducts. The typical formations shall be 4 wide x 6 high in the downtown area and 3 wide x 5 high in the horseshoe area

Ducts can be divided into three groups: △8

- **Duct Banks**
  - When a duct bank enters a cable chamber or a transformer vault, the width (number of ducts in a row) shall be limited to a maximum of 4 wide. This is to avoid racking difficulties.
  - Maximum height of the duct bank shall be limited based on a number of factors such as the number of secondary services and the minimum required depth of cover.
- **Secondary Service Ducts**
  - Secondary service ducts are normally 100 mm (4") ducts.
  - Secondary service ducts shall be concrete encased when crossing roadways and/or driveways.

  All secondary service ducts shall be tagged to avoid confusion.

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- **Streetlight Ducts**

  - Secondary streetlight ducts are normally 50 mm (2") ducts.
  - Secondary streetlight ducts shall be concrete encased when crossing roadways and/or driveways.

Depth of Cover for Underground Duct System (Refer to Std. 31-0200 and 31-0300)

Depth of cover is the vertical distance between the top of the duct bank and the finished grade.

For reduced depth of cover, refer to Standard 31-1150.

Risers/Laterals: Introduction (Refer to Std. 31-1220 and 31-1230 for details)

Changing the distribution system from overhead to underground or vice versa need a riser or a lateral. If the distribution system changes from an underground system to overhead, a riser at the changing point shall be needed and if the distribution system changes from an overhead to underground, a lateral at the changing point shall be needed.

Risers and laterals both need Galvanized Iron (G.I.) or rigid PVC bends encased in concrete. A riser or a lateral always terminates at one end in a cable chamber or a transformer vault and the other end on a pole or in a building.

In order to protect the risers from possible damage, they shall always rise up at the side of the pole which is opposite to the traffic flow. Risers can be divided into two groups:

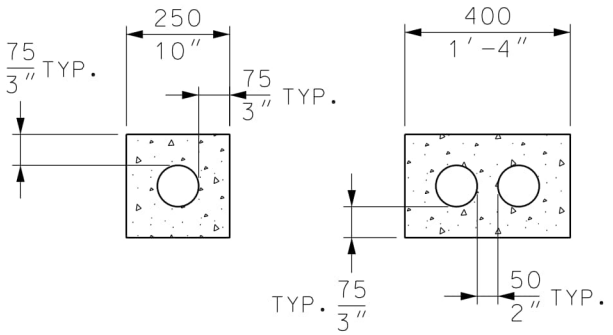
- **Pole Risers**

  This group of risers rise up on any type of pole (wood poles, concrete poles, and metallic poles). The number of risers may vary from one to four. The typical case has normally two risers, one will be capped and kept as spare and the other one will rise up the pole. There is a minimum clearance between ducts and between every duct and the pole. The purpose of having this clearance is to make room for straight coupling. No risers can be installed on a base mounted pole due to the pole's base plate.

- **Risers to a Building (Formerly Supplied by Overhead System)**

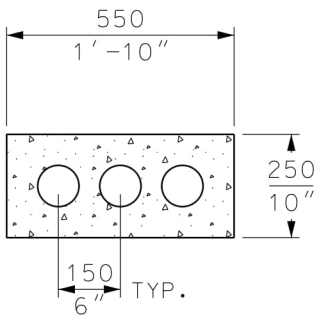
  In order to change the supply system to a building from overhead to underground, the underground cable shall rise up and connect to the meter box outside the building. This happens mostly in conversion areas where the distribution system converts from overhead to underground. In this case the above-mentioned clearances shall apply.

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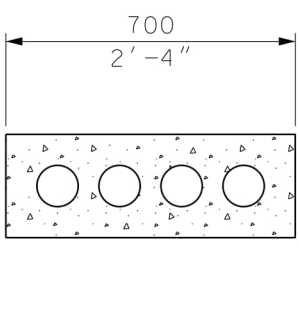


1W1H

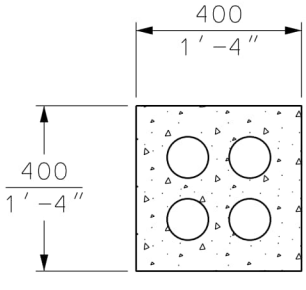
2W1H



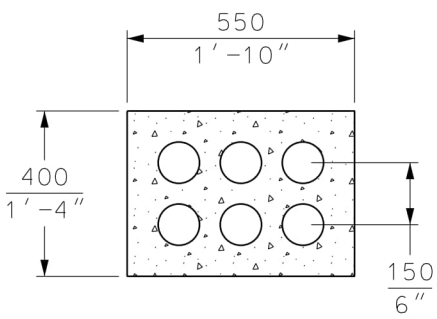
3W1H



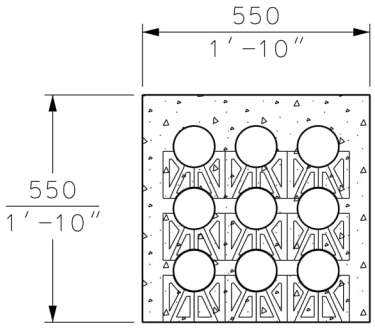
4W1H



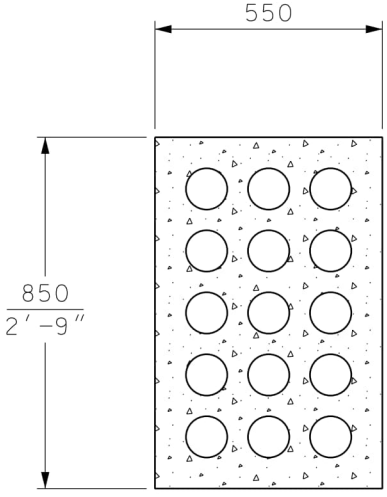
2W2H



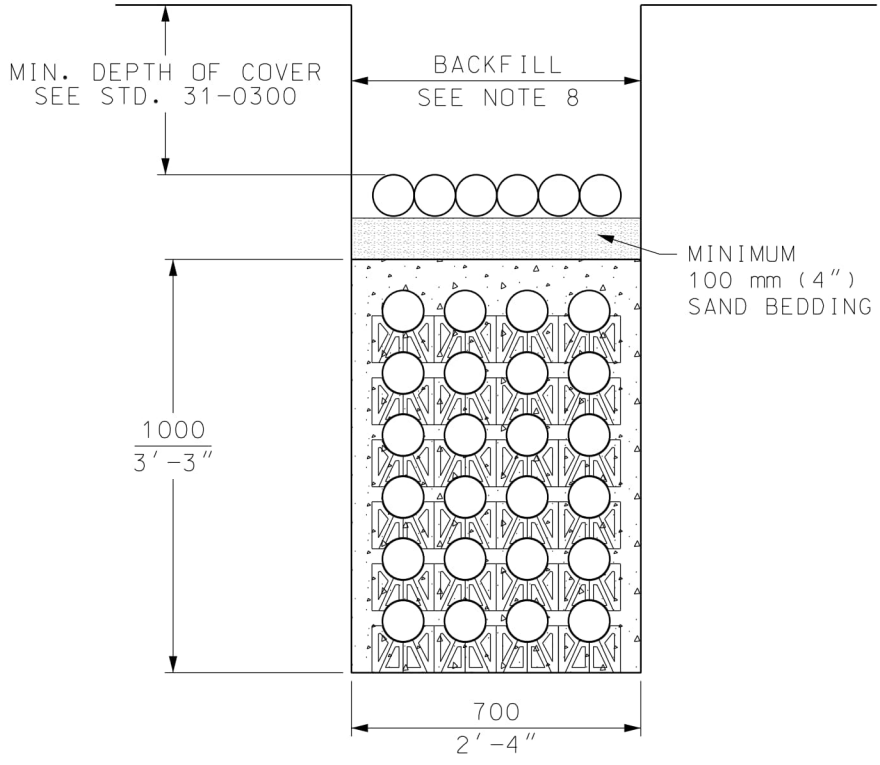
3W2H



3W3H



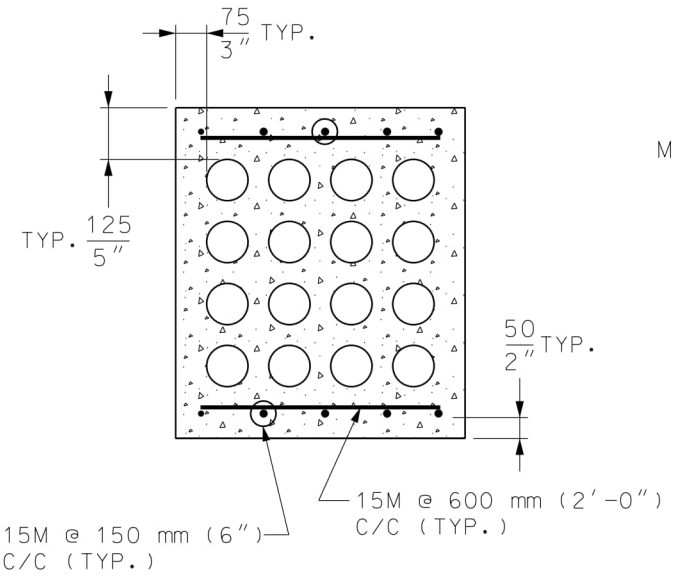
3W5H



4W6H

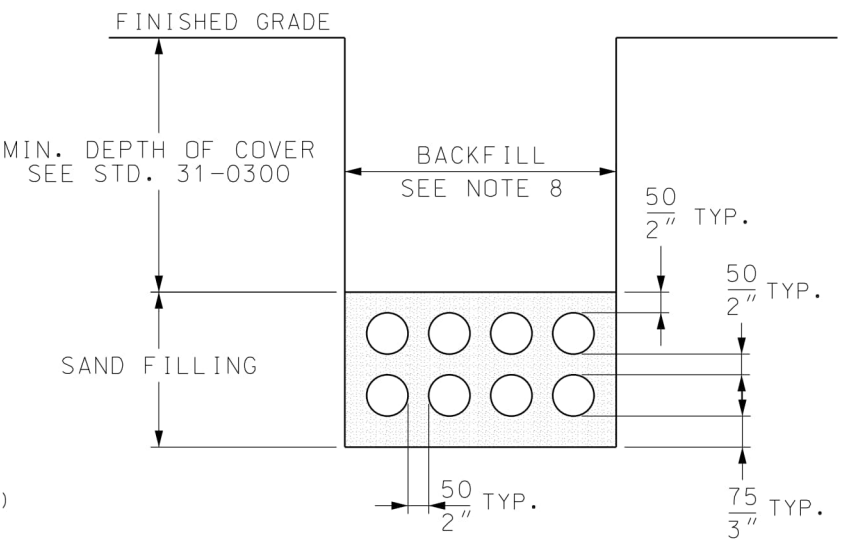
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CONDUITS (ELECTRICAL AND COMMUNICATIONS) ## CONCRETE ENCASED AND DIRECT BURIED DUCTS				
TORONTO HYDRO	Approved By: 23/10/2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./C.P. 2002-07-11	Scale: N.T.S.	Rev: 10	31-1120	1/3

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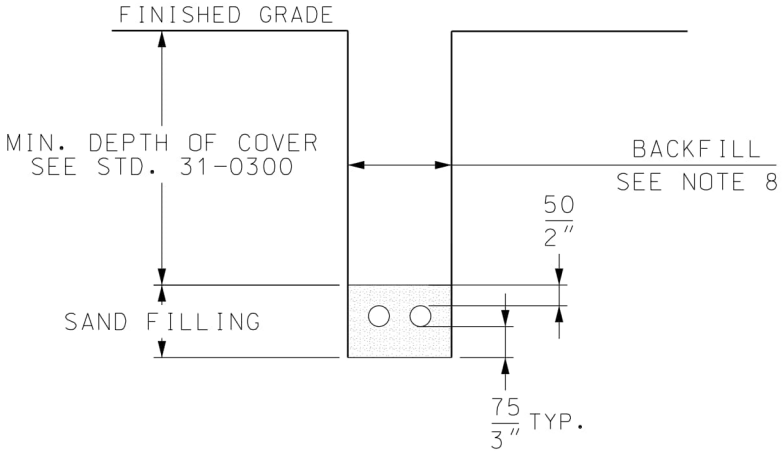
REINFORCED DUCT BANK

SEE NOTE 3



DIRECT BURIED DUCTS

SEE NOTES 2, 9 AND 10



DIRECT BURIED STREETLIGHTING DUCTS △10

SEE NOTES 2, 9 AND 10

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CONDUITS (ELECTRICAL AND COMMUNICATIONS) CONCRETE ENCASED AND DIRECT BURIED DUCTS				
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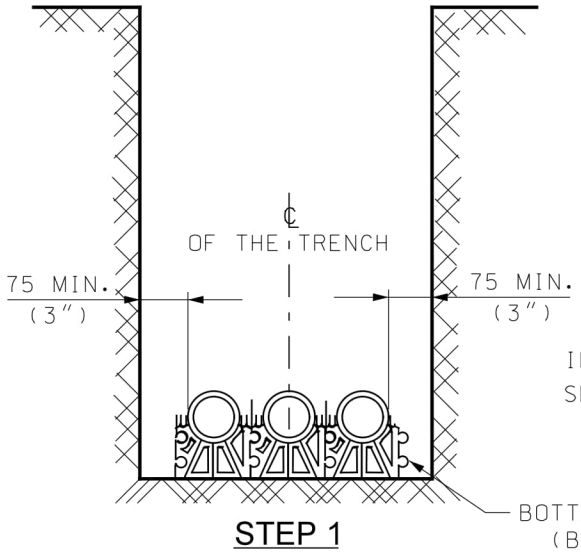
NOTES:

1) REFER TO STD. 31-0300 FOR MIN. DEPTH OF COVER.
2) IN OPEN TRENCH CONSTRUCTION, ENCASE THE DUCTS IN CONCRETE IF:
   - DUCTS ARE CARRYING PRIMARY CABLES (750 V OR MORE),
   - DUCTS ARE UNDER ROADWAY OR DRIVEWAY,
   - DUCT HAVE 90 DEGREE BENDS,
   - THE NUMBER OF DUCTS ARE MORE THAN 8.
   - IF NONE OF THE ABOVE CATEGORY APPLIES, THEN THE DUCTS SHALL BE DIRECT BURIED.
3) REINFORCED DUCT BANK SHALL BE USED IN POOR SOIL CONDITIONS OR WHERE THERE IS HIGH WATER TABLE.
4) CONCRETE SHALL BE A MIN. 20 MPa, WITH 10 mm ($^{3}/_{8}$") AGGREGATES.
5) REINFORCING SHALL CONFORM TO CSA STANDARD G30.18-09, Fy = 400 MPa.
10 6) ALL DUCTS SHALL BE 100 mm (4") IN DIAMETER UNLESS NOTED OTHERWISE, EXCEPT SECONDARY STREETLIGHTING DUCTS, WHICH CAN BE 50 mm (2") IN DIAMETER.
7) HORIZONTAL AND VERTICAL SEPARATION BETWEEN DUCTS IS CONTROLLED DURING CONSTRUCTION BY PLASTIC DUCT SPACERS.
8) EXCAVATION SHALL BE BACKFILLED PER THESL CIVIL CONSTRUCTION WORK SPECIFICATION CV-CON-01 AND/OR TS4.60 CONSTRUCTION SPECIFICATION FOR UTILITY CUT AND RESTORATION.
9) MAX. NUMBER OF DIRECT BURIED DUCTS SHALL BE 8. DUCTS MAY BE PLACED IN AN IRREGULAR FORMATION IN A MAX. OF TWO ROWS.
10) RED DUCTS SHALL BE USED FOR ALL NEW AND REBUILD DIRECT BURIED DUCT BANKS CONTAINING ELECTRICAL SECONDARY SUPPLY CABLES AND OR COMMUNICATION CABLES.

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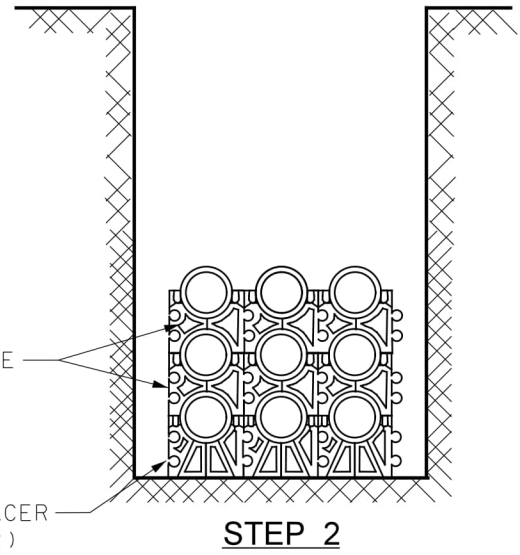
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CONDUITS (ELECTRICAL AND COMMUNICATIONS) CONCRETE ENCASED AND DIRECT BURIED DUCTS				
TORONTO HYDRO	Approved By: 23/10/2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./C.P. 2002-07-11	Scale: N.T.S.	Rev: 10	31-1120	3/3

THE FOUR STEPS IN LAYING DUCTS WITH SPACERS ARE AS SHOWN BELOW:



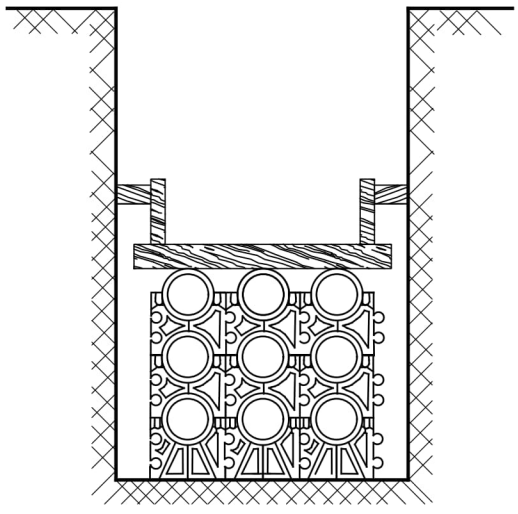
STEP 1

LAY THE BASE SPACERS AND THE FIRST ROW OF DUCTS



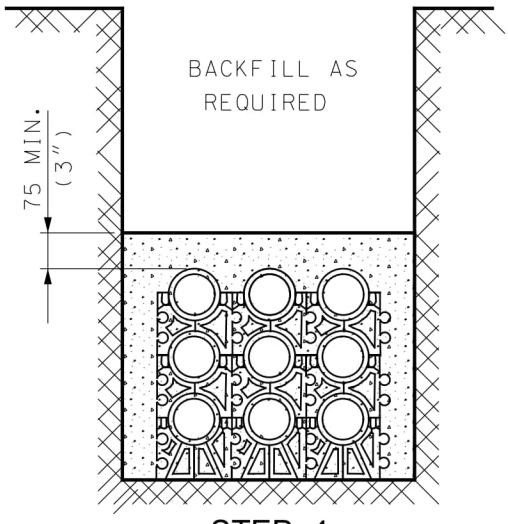
STEP 2

LAY ALL THE DUCTS ACCORDING TO THE DUCT CONFIGURATION



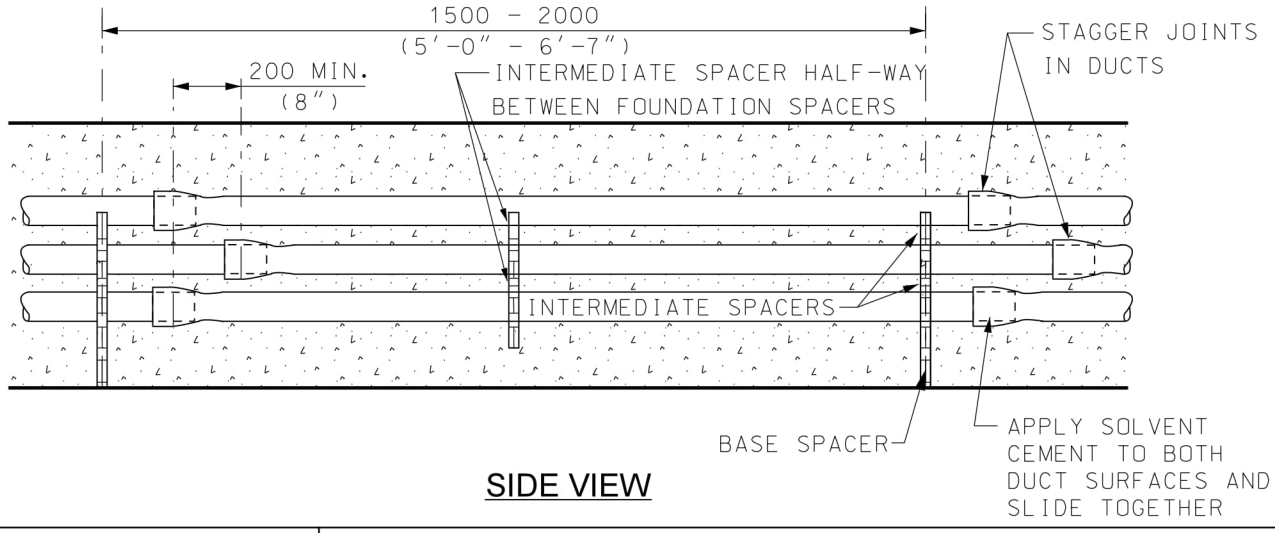
STEP 3

BRACE DOWN TO PREVENT FLOATING WHEN CONCRETE IS POURED



STEP 4

POUR CONCRETE. BACKFILL AFTER CONCRETE HAS SET.

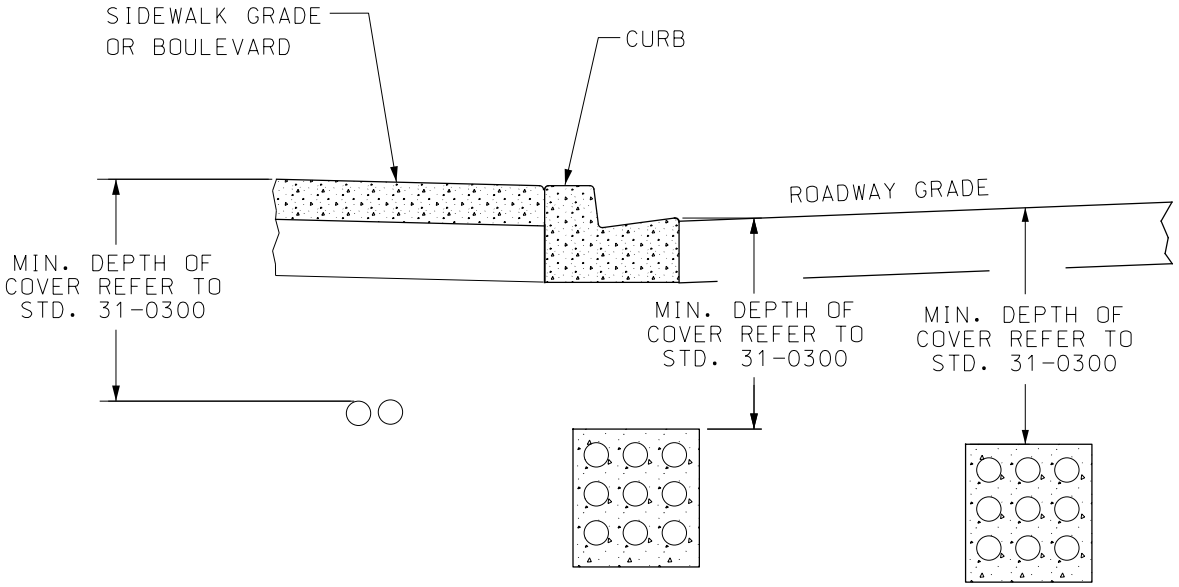


SIDE VIEW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CONDUITS LAYOUT DUCTS USING SPACERS				△2
TORONTO HYDRO	Approved By: J.D. 2012-11-12						
Drafted By: D.L.	Designed By: J.D.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 2	31-1130	1/1	

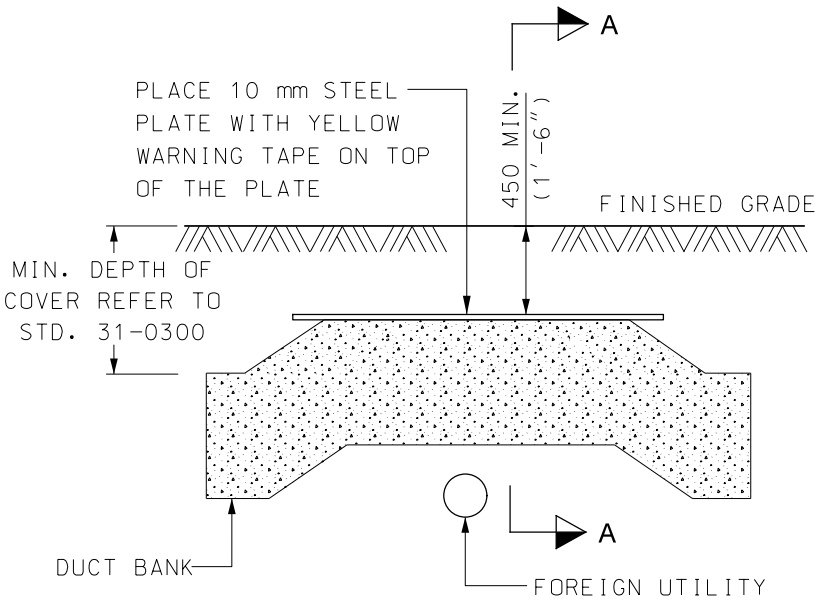
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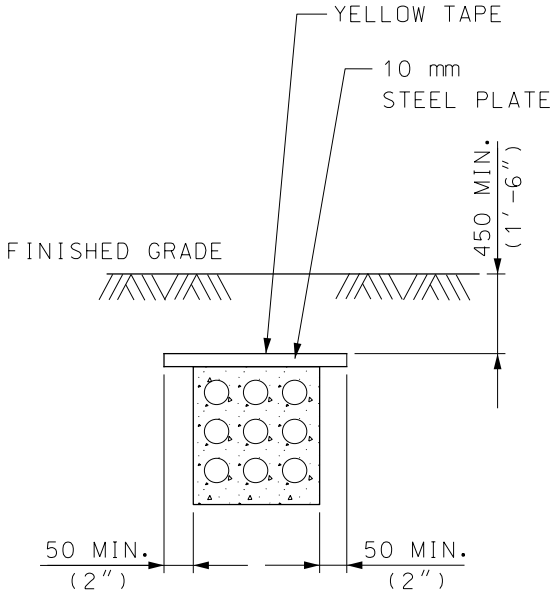
DETAIL "A"

NOTE: THIS ALSO APPLIES TO DIRECT BURIED DUCTS AND POLYPIPES



DETAIL "B"

REDUCED DEPTH OF COVER



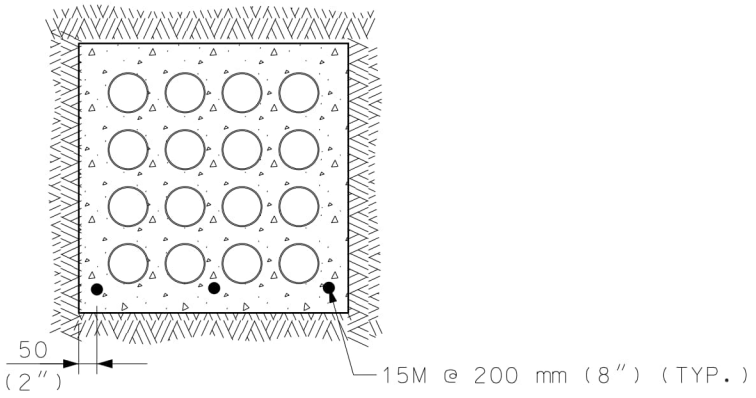
SECTION A-A

NOTES:

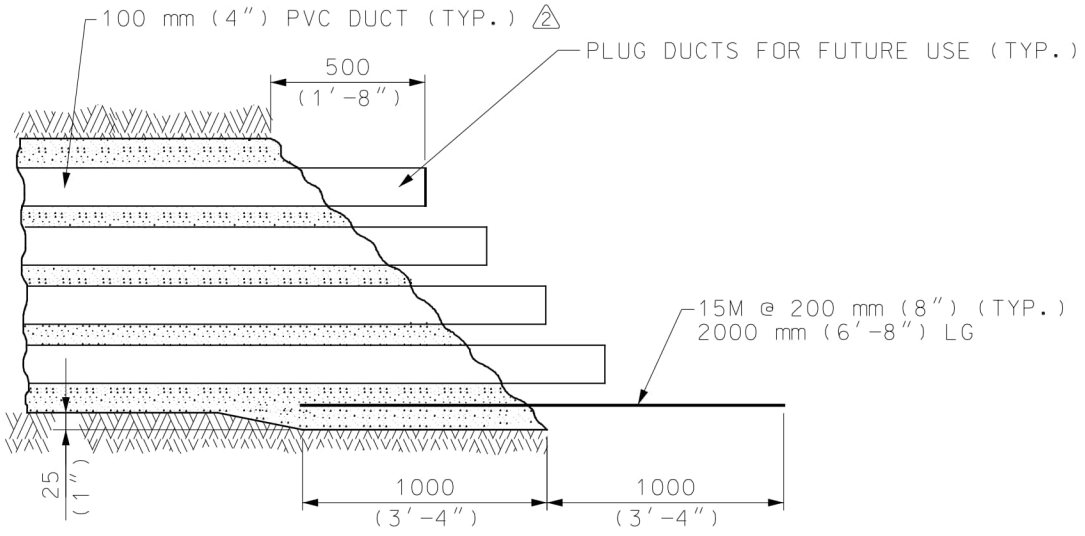
1) IF UNDER SPECIFIC CIRCUMSTANCES MINIMUM DEPTH OF COVER REQUIREMENT CANNOT BE MET, REDUCED COVER MAY BE USED WITH CITY'S APPROVAL. THE REDUCED COVER SHALL NOT BE LESS THAN 450 mm (1'-6").
2) IF MINIMUM DEPTH OF COVER IS REDUCED, A 10 mm STEEL PLATE AND WARNING TAPE HAS TO BE PROVIDED AS SHOWN IN DETAIL "B".
△7 3) STEEL PLATES SHALL BE EDGE TO EDGE WITH NO GAPS.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CONDUITS DEPTH OF CONDUITS				
TORONTO HYDRO	Approved By: 2025-01-29 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 7	31-1150	1/1

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TYPICAL CROSS SECTION.



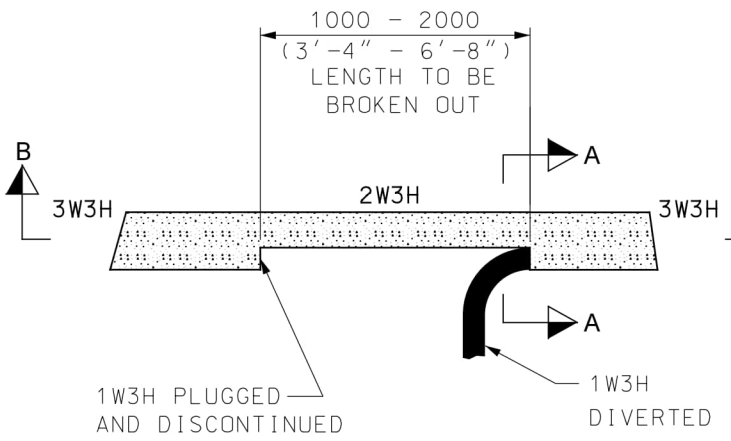
CAPPING PROPOSED DUCTS FOR FUTURE EXTENSION

NOTES: 2

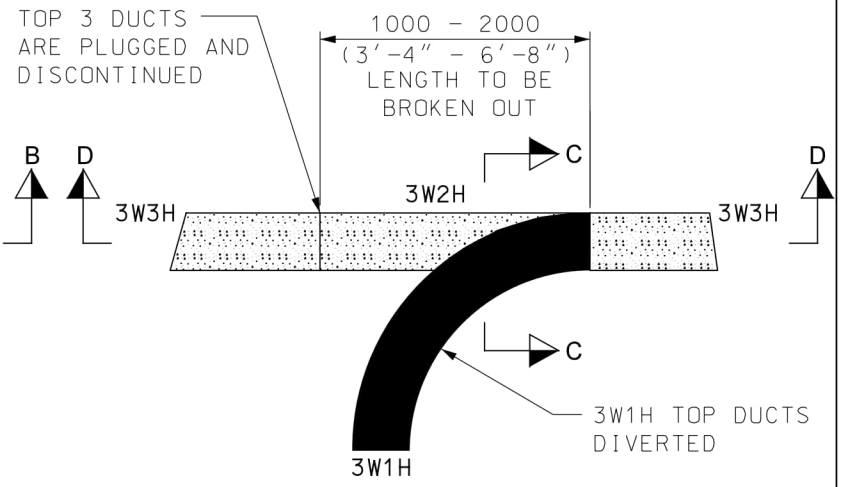
1) ALL REINFORCEMENT TO BE 15M BARS.
2) PROPOSED DUCTS TO BE STEPPED TO ACCOMODATE FUTURE CONNECTION. REINFORCEMENT TO BE INSTALLED AS SHOWN.
3) AT GRADE LEVEL, CONTRACTOR TO INDICATE TERMINATION POINT OF DUCT;
   A) ON PRIVATE PROPERTY USE STAKE.
   B) WITHIN CITY ALLOWANCE USE A METAL PLATE WITH RAISED LETTERS "TORONTO HYDRO MARKER". REFER TO STD. 31-8100 FOR DETAILS.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CONDUITS CAPPING PROPOSED DUCTS FOR FUTURE EXTENSION				
TORONTO HYDRO	Approved By: J.D. 2012-11-08						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: L.G. 2000-12-30	Scale: N.T.S.	Rev: 2	31-1160	1/1

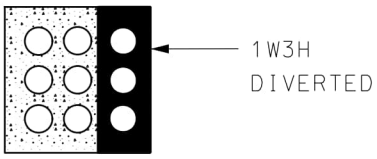
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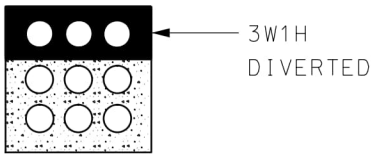
DETAIL "A" - PLAN VIEW
DIVERSION OF 1W3H FROM 3W3H DUCT BANK



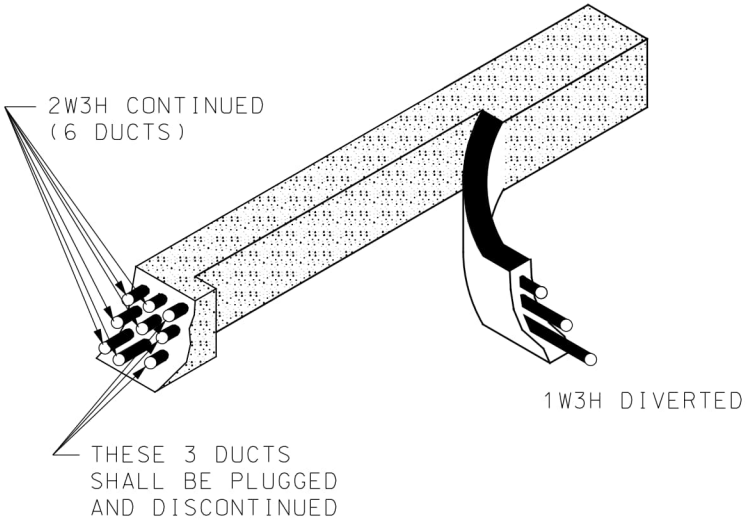
DETAIL "B" - PLAN VIEW
DIVERSION OF 3W1H FROM 3W3H DUCT BANK



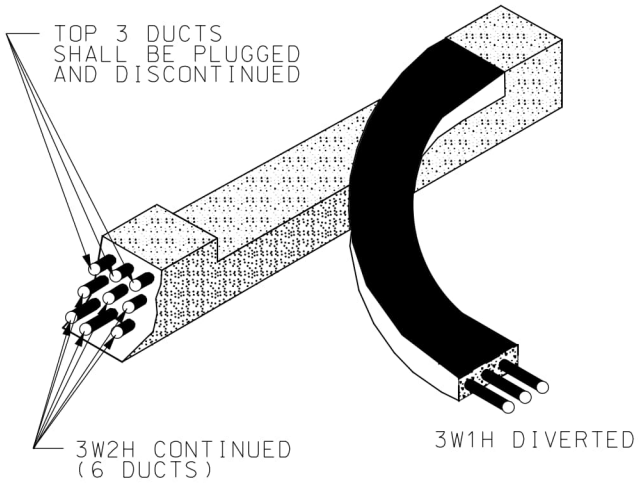
SECTION A-A



SECTION C-C



SECTION B-B



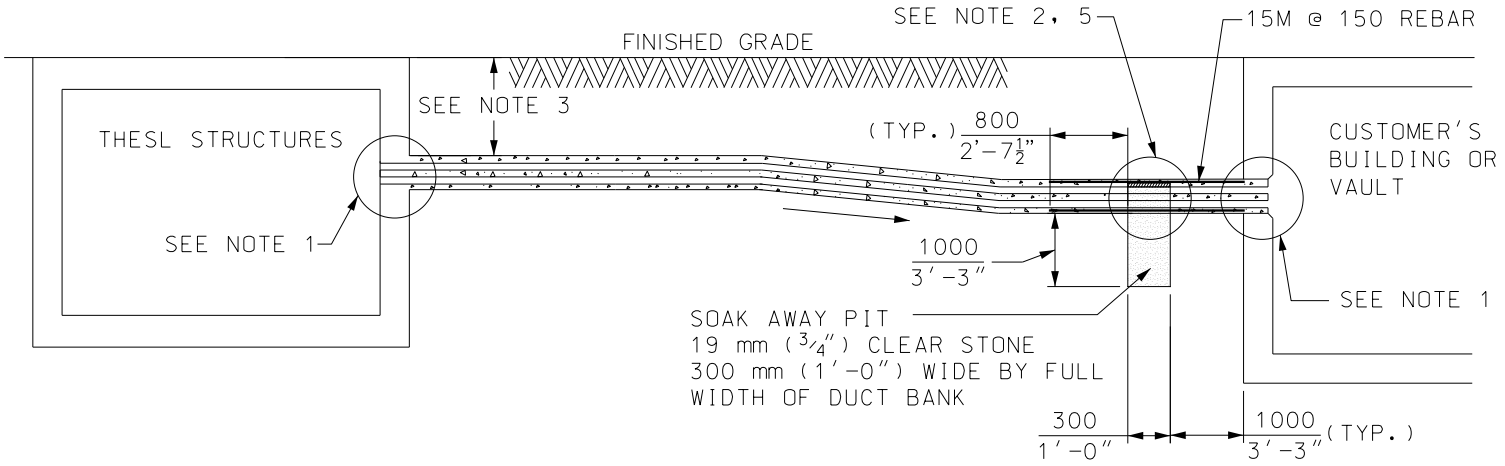
SECTION D-D

NOTES: ⚠2

1) THIS DRAWING IS TO BE USED ONLY AS A GUIDELINE.
2) REFER TO RELEVANT CONSTRUCTION DRAWINGS FOR SPECIFICS OF DIVERTING DUCTS.

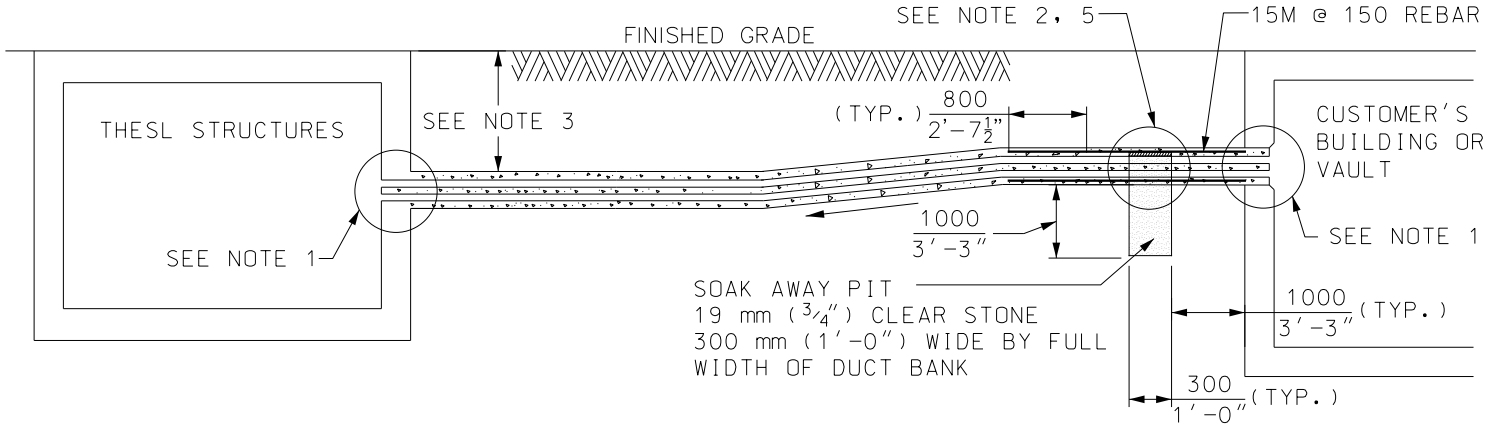
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CONDUITS DIVERTING DUCT BANK				
TORONTO HYDRO	Approved By: J.D. 2014-03-16						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: G.D./C.P. 2002-07-11	Scale: N.T.S.	Rev: 2	31-1170	1/1

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SECTION VIEW 'A' ⚠

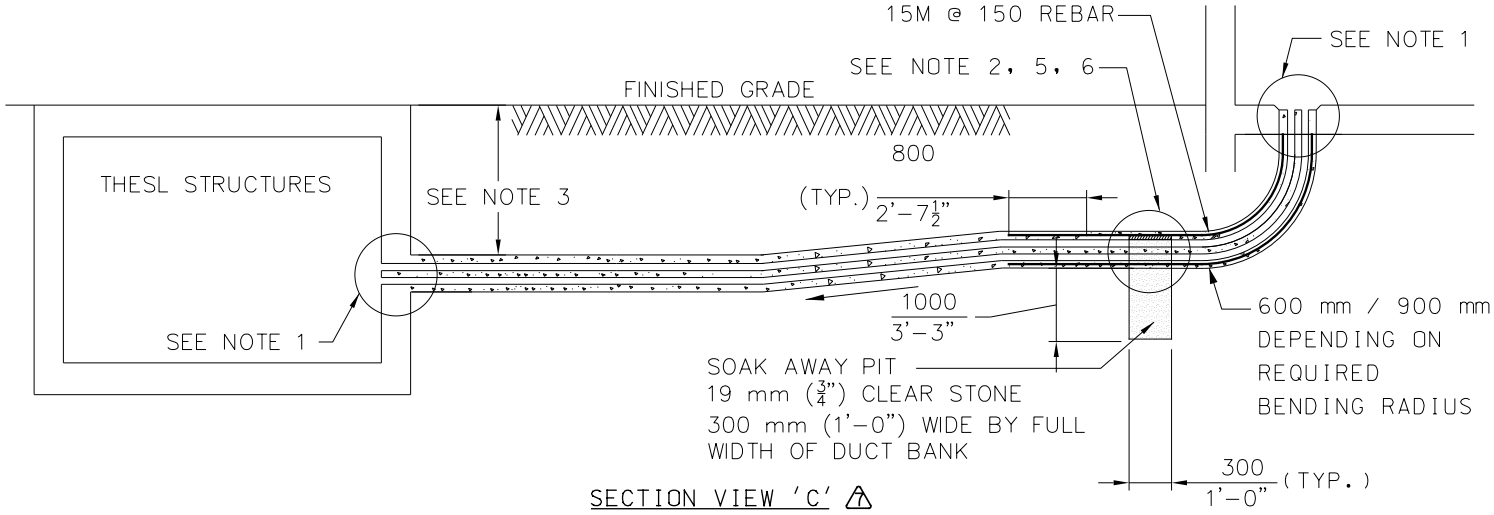
DUCTS FROM THESL STRUCTURES TO CUSTOMER'S BUILDING/VAULT (DOWNWARD SLOPE)



SECTION VIEW 'B' ⚠

DUCTS FROM THESL STRUCTURES TO CUSTOMER'S BUILDING/VAULT (UPWARD SLOPE)

CUSTOMER'S BUILDING OR VAULT

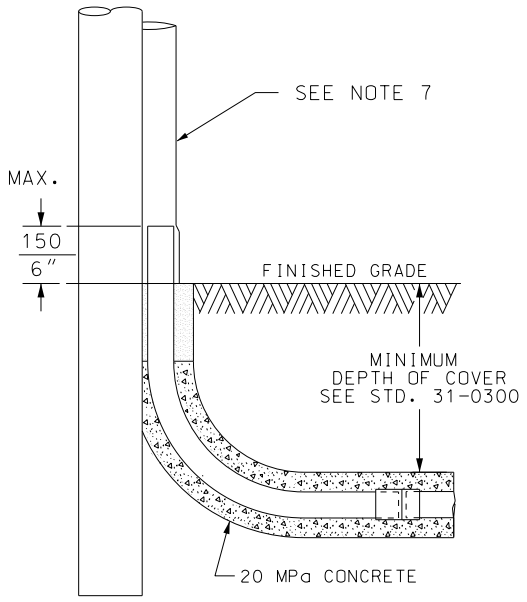


SECTION VIEW 'C' ⚠

DUCTS FROM THESL STRUCTURES TO CUSTOMER'S BUILDING/VAULT (UNDERSIDE SLAB ENTRANCE)

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CONDUITS SUPPLYING CUSTOMER'S BUILDING				
TORONTO HYDRO	Approved By: 11/11/2025 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./C.P. 2002-11-25	Scale: N.T.S.	Rev: 7	31-1230	1/2

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SECTION VIEW 'D' ⚠1

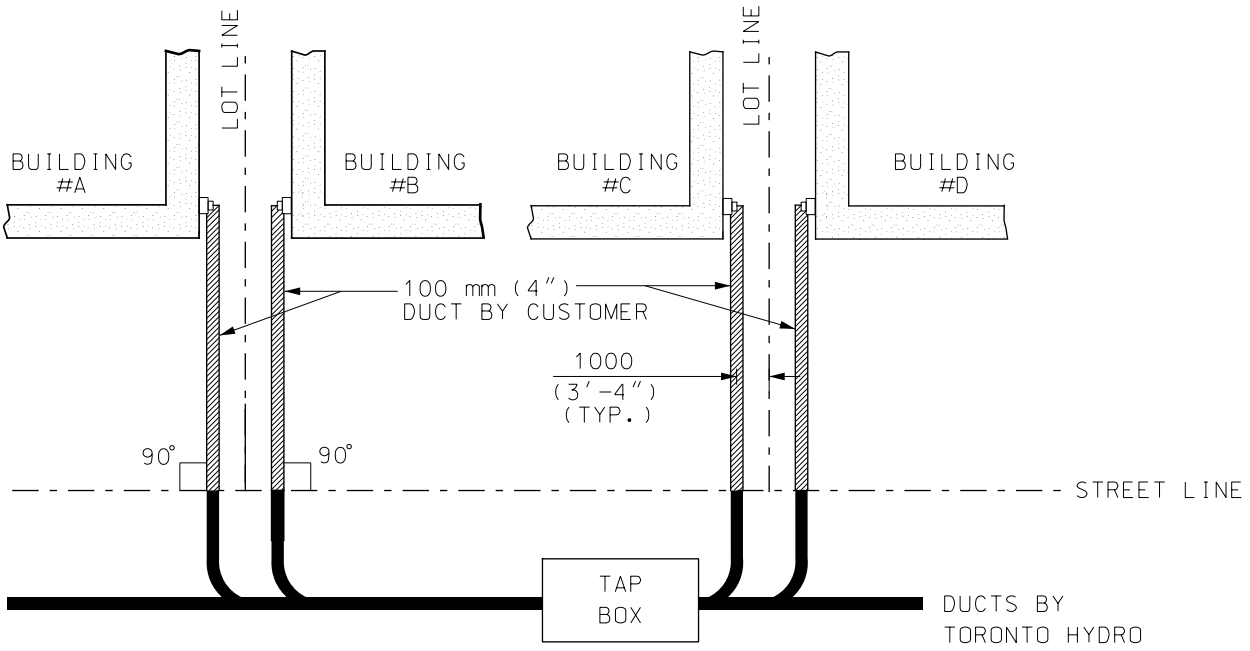
DUCTS FROM THESL POLES
TO CUSTOMER'S BUILDING/VAULT

NOTES:

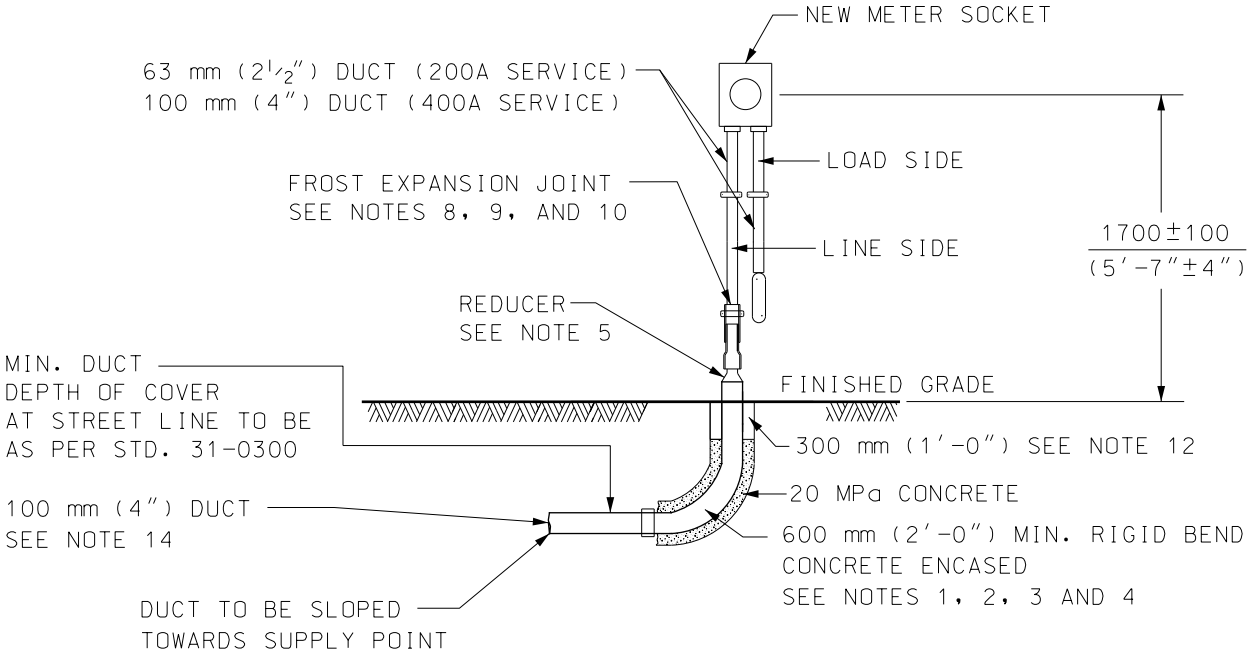
1) SEALANT SHALL BE APPLIED TO:
   - DUCTS EXITING THESL STRUCTURES (POLES, CABLE CHAMBERS, PADMOUNTS, SPLICE VAULTS, TAP/SPLICE BOXES AND VAULTS) WHEN FEEDING INTO CUSTOMER'S BUILDING/VAULTS NEW BULLET POINT DUCTS AT CUSTOMER'S BUILDING/VAULTS ENTRANCE POINT;
   - LOCATIONS WHERE EXISTING SEALANT (STOCK CODES 8940011, 9656790 OR 9656791) IS NOT ADEQUATE.
2) DRILL 4 DRAINAGE HOLES IN THE BOTTOM OF EACH DUCT. 13 mm ($^{1}/_{2}$") DIA. AT 50 mm (2") CENTRES. FILL TO TOP OF DUCTS WITH 19 mm ($^{3}/_{4}$") CLEAR STONE. TOP OFF WITH A LAYER OF 25 mm (1") STYROFOAM, AND A FINAL LAYER OF CONCRETE.
3) REFER TO STD. 31-0300 FOR MIN. DEPTH OF COVER.
4) FOR SERVICES NOT EXCEEDING 750 V, THE CUSTOMER'S MAIN SERVICE BOX SHALL BE AS CLOSE AS PRACTICABLE TO THE POINT WHERE THE SERVICE CONDUCTORS ENTER THE BUILDING. CONDUCTORS SHALL BE INSTALLED IN A MIN. 100 mm (4") RIGID PVC CONDUIT, WITH A MAXIMUM RUN LENGTH OF:
   - NO MORE THAN 1.5M INTO ROOMS OR AREAS WITH COMBUSTIBLE CONSTRUCTION, USING RIGID PVC CONDUIT FOR WIRING, OR
   - NO MORE THAN 7.5M INTO OTHER AREAS, USING RIGID PVC CONDUIT FOR WIRING.
5) CUSTOMER IS RESPONSIBLE TO CONSTRUCT SOAKAWAY PIT ON CUSTOMER PROPERTY AS INDICATED ABOVE.
⚠1 6) FOR UNDERSIDE SLAB ENTRANCE, SOAKAWAY PIT NOT REQUIRED IF SLAB FINISHED GRADE IS ABOVE ROOF OF THE NEAREST THESL STRUCTURE.
⚠1 7) REFER TO THE FOLLOWING ASSOCIATED STANDARDS:
   - 12-1200 - RISER INSTALLATION DETAILS
   - 18-3200 - CABLE GUARD OR GALVANIZED PIPE RISER FOR DUCTED BEND
   - 31-0300 - UNDERGROUND CLEARANCES MINIMUM DEPTH OF COVER FOR TORONTO HYDRO STRUCTURES
   - 31-1220 - CONDUITS INSTALLATION OF BENDS ON POLES

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CONDUITS SUPPLYING CUSTOMER'S BUILDING				
TORONTO HYDRO	Approved By:						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./C.P. 2002-11-25	Scale: N.T.S.	Rev: 7	31-1230	2/2

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PLAN VIEW



FRONT VIEW

NEW UNDERGROUND FEED

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CONDUITS UNDERGROUND SECONDARY SERVICE PROJECTS FOR NEW INSTALLATION				
TORONTO HYDRO	Approved By: 28/11/2014 J.D.						
	Drafted By: Y.A.	Designed By: J.D.	Original Issue: G.D. 2000-12-19	Scale: N.T.S.	Rev: 10	31-1250	1/2

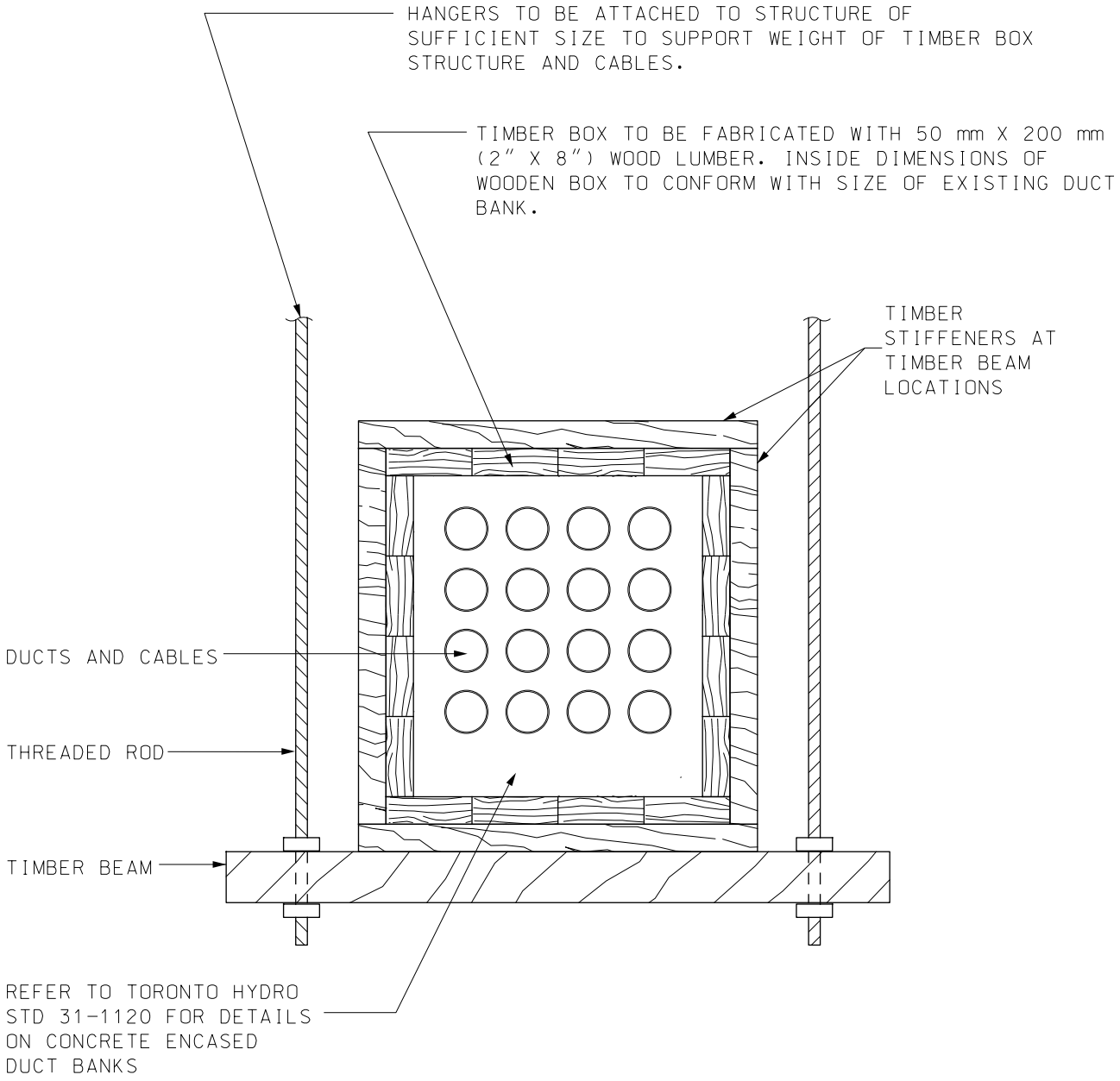
NOTES:

1) CONTRACTOR SHALL REMOVE LOOSE MATERIAL UNDER BEND AND PLACE APPROXIMATELY 150 mm (6") OF COMPACTED 19 mm (3/4") CLEAR STONE FOR THE WIDTH OF THE TRENCH.
2) WHEN IT IS NOT POSSIBLE TO TERMINATE BENDS ABOVE THE FINISHED GRADE, A 300 mm (1'-0") EXTENSION PIPE WITH COUPLING SHALL BE USED TO ACCOMMODATE INSTALLATION.
3) USE RIGID BEND UNDER DRIVEWAYS, WALKWAYS OR BOULEVARDS. USE 20 MPa CONCRETE AROUND BEND.
4) BENDS SHALL BE PLACED 25 mm (1") FROM THE BUILDING WALL TO ACCOMMODATE INSTALLATION OF A REDUCER AND STRAIGHT COUPLING.
5) RIGID DUCT REDUCER 100 mm (4") TO 63 mm (2 1/2") SHALL BE PLACED ABOVE FINISHED GRADE.
10 6) REFER TO STD. 17-2250 FOR METER SOCKET CLEARANCE REQUIREMENTS.
7) SIZE OF THE METER SOCKET MOUNTING DEVICE SHALL BE BASED ON SIZE AND TYPE OF SERVICE.
8) INSTALL FROST EXPANSION JOINT ABOVE GRADE TO ALLOW FOR CABLE AND GROUND MOVEMENT. INSTALL FROST EXPANSION JOINT IN ITS HALFWAY POSITION. LEAVE 1500 mm (5'-0") CABLE COIL INSIDE OF TAP OR CABLE CHAMBER.
9) WHILE INSTALLING FROST EXPANSION JOINT, FOLLOW MANUFACTURER'S INSTALLATION THOROUGHLY TO AVOID SEPARATION FROM PIPE.
10) FROST EXPANSION JOINT SIZE SHALL BE BASED ON SIZE AND TYPE OF SERVICE. FOR 200A SERVICE, 63 mm (2 1/2") FROST EXPANSION JOINT SHALL BE INSTALLED.
11) EXPOSE THE EXTERIOR FACE OF BUILDING FOUNDATION WALL AND WATERPROOF WITH A SUITABLE BITUMEN COMPOUND MEMBRANE (BLUE SKIN).
12) BACKFILL TO FINISHED GRADE AS PER PROJECT REQUIREMENT.
13) ALL DUCT JOINTS SHALL BE SOLVENT WELDED.
14) UNDERGROUND DUCT SHALL BE INSTALLED AS FOLLOWS:
- BOULEVARD - DIRECT BURIED RED TYPE II PVC DUCT OR MICROTUNNEL RED HDPE DUCT,
- PAVEMENT OR DRIVEWAY - MICROTUNNEL RED HDPE DUCT OR CONCRETE ENCASE TYPE II GREY PVC DUCT.

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DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CONDUITS UNDERGROUND SECONDARY SERVICE PROJECTS FOR NEW INSTALLATION				
TORONTO HYDRO	Approved By:						
	Drafted By: Y.A.	Designed By: J.D.	Original Issue: G.D. 2000-12-19	Scale: N.T.S.	Rev: 10	31-1250	2/2

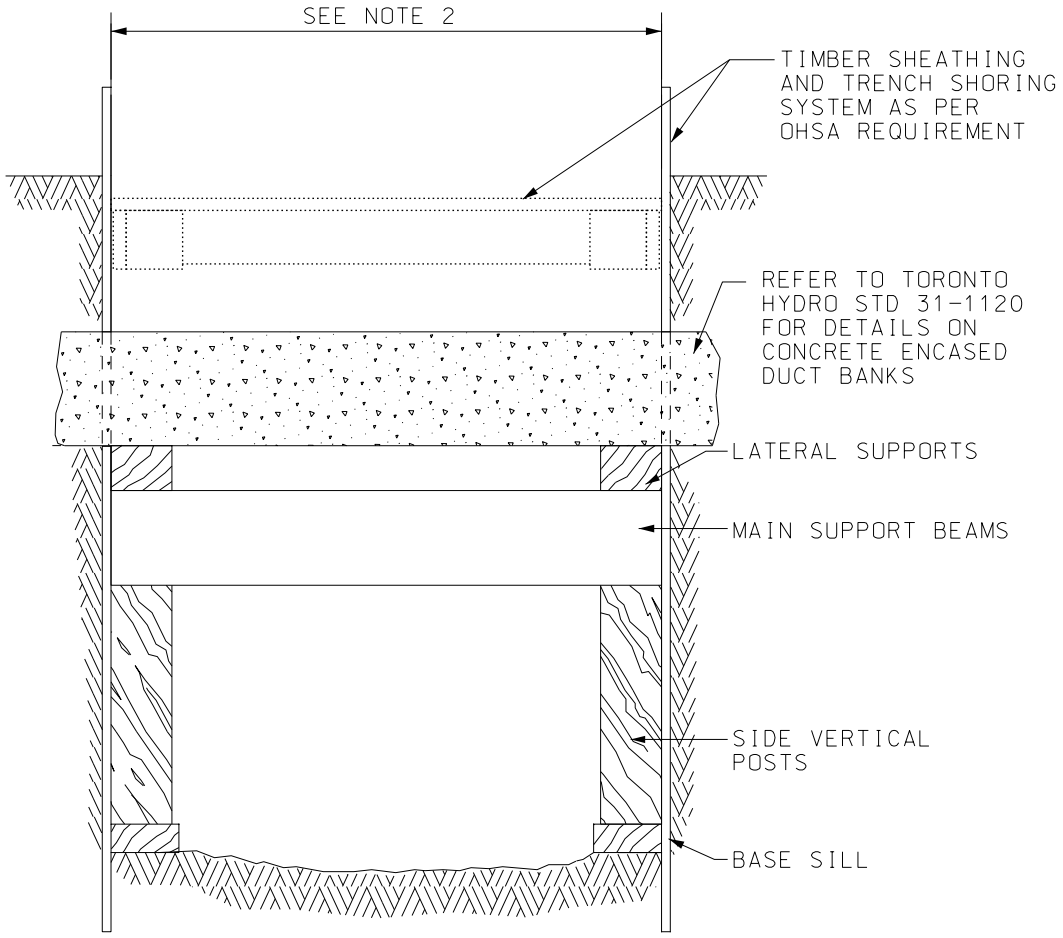
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CONCRETE ENCASED DUCTS ③
TIMBER BOX DETAIL
SUPPORT FROM ABOVE

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DUCT OR CABLE SUPPORT IN PLACE SYSTEM					③
TORONTO HYDRO	Approved By: B.D. 2022-01-31							
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-11-25	Scale: N.T.S.	Rev: 3	31-1350	1/4	

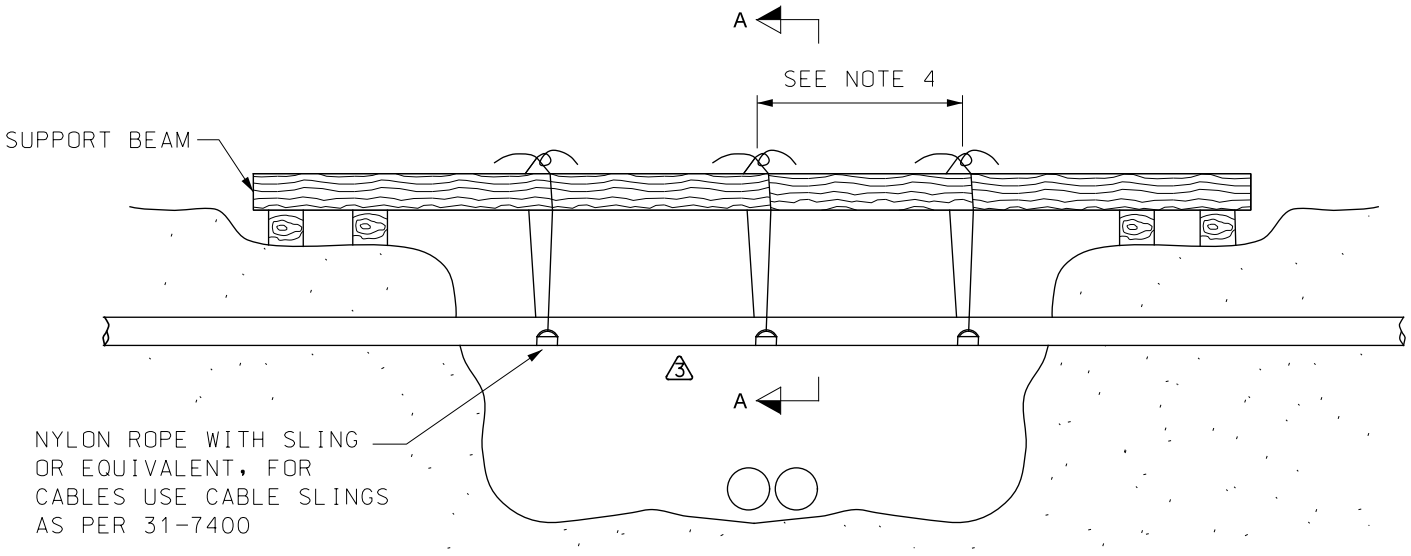
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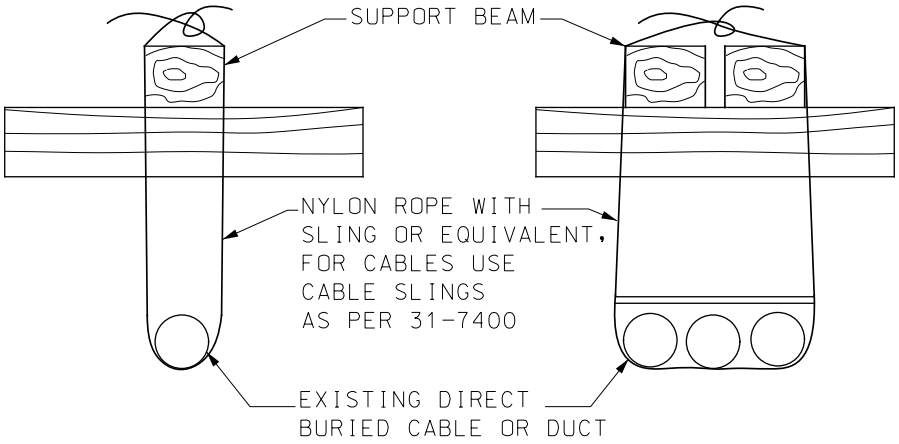
CONCRETE ENCASED DUCTS △3
SUPPORT FROM BELOW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# DUCT OR CABLE △3 SUPPORT IN PLACE SYSTEM					
TORONTO HYDRO	Approved By: B.D. 2022-01-31							
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-11-25	Scale: N.T.S.	Rev: 3	31-1350	2/4

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DIRECT BURIED DUCT OR CABLE



SECTION 'A-A'

MULTIPLE CABLES OR DUCTS

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DUCT OR CABLE SUPPORT IN PLACE SYSTEM					3
TORONTO HYDRO	Approved By: B.D. 2022-01-31							
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-11-25	Scale: N.T.S.	Rev: 3	31-1350	3/4	

NOTES:

1) THIS DRAWING IS TO BE USED ONLY AS A GUIDELINE AS THE SUPPORT STRUCTURE ELEMENTS WILL BE SITE SPECIFIC.

3 2) TEMPORARY SUPPORT IS REQUIRED WHENEVER THE UNDERGROUND CONDUIT IS UNDERMINED FOR MORE THAN 1200 mm (3'-11") IN LENGTH. ALL SUCH SUPPORTS SHALL MEET REQUIREMENTS OF NOTE #3.

3) THE CONTRACTOR/CONSULTANT SHALL PROVIDE A DETAILED DRAWING FOR THE SUPPORT SYSTEM SIGNED AND SEALED BY A PROFESSIONAL CIVIL ENGINEER OF ONTARIO TO SUIT SITE CONDITIONS. ENGINEER SHALL ACCOUNT FOR CABLE PULLING TENSION, LIVE LOADS, WIND LOADS, AND MAINTENANCE LOADS IN THEIR CALCULATIONS.

4) WHEN SUPPORTED FROM ABOVE, DIRECT BURIED DUCTS AND DIRECT BURIED CABLE, SPACING BETWEEN SUPPORTS SHALL NOT EXCEED 0.6 m (2'-0").

3 5) FOR CONCRETE ENCASED AND DIRECT BURIED DUCTS, ZERO VERTICAL OR HORIZONTAL DISPLACEMENT IS REQUIRED. DISPLACEMENT OUTSIDE OF THIS RANGE SHALL BE REPORTED TO TORONTO HYDRO.

6) FOR CONCRETE ENCASED AND DIRECT BURIED DUCTS, MONITORING OF SUPPORT STRUCTURE WITH RESPECT TO HORIZONTAL, VERTICAL, AND VIBRATIONAL MOVEMENTS SHALL BE PROVIDED.

7) TEMPORARY SUPPORT WILL REMAIN IN-PLACE UNTIL THE BACK FILL MATERIAL UNDER THE STRUCTURE HAS BEEN COMPACTED ADEQUATELY TO RESTORE SUPPORT. BACKFILL ON TOP TO BE AS PER CV-CON-01.

8) ALTERNATIVE METHODS OF SUPPORT SYSTEM CAN BE CHOSEN BUT WILL REQUIRE TORONTO HYDRO TO REVIEW AND APPROVAL.

9) TIMBER BOX TO BE PAINTED RED AND MARKED WITH SAFETY "DANGER" SIGN.

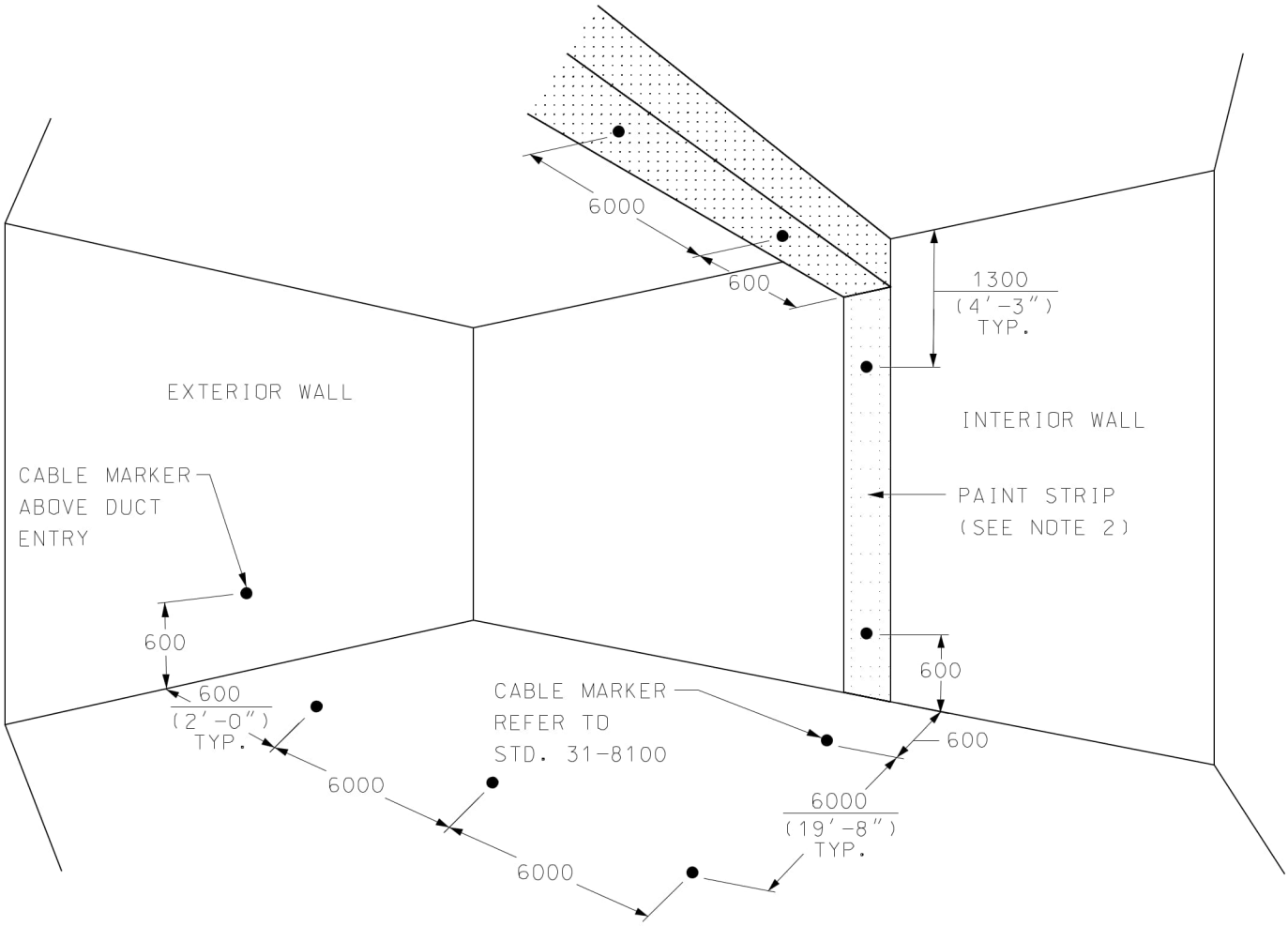
10) DAMAGED DIRECT BURIED DUCTS OR CONCRETE ENCASED DUCTS WILL REQUIRE TO BE REBUILT PRIOR TO SUPPORT IN PLACE INSTALLATION.

11) CONTRACTOR IS RESPONSIBLE TO MEET ALL REQUIREMENTS WITH CONSIDERATION TO SUPPORTING OR WORKING CLOSE TO LIVE ENERGIZED CABLES.

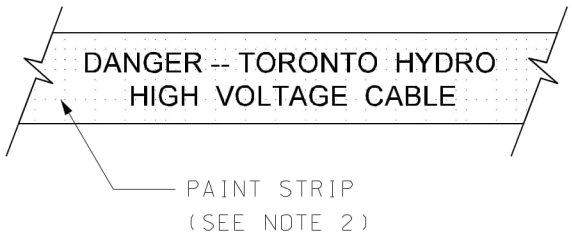
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DUCT OR CABLE SUPPORT IN PLACE SYSTEM					3
TORONTO HYDRO	Approved By: B.D. 2022-01-31							3
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-11-25	Scale: N.T.S.	Rev: 3	31-1350	4/4	

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DUCT IDENTIFICATION IN GARAGE FLOOR, CEILING OR INTERIOR WALL



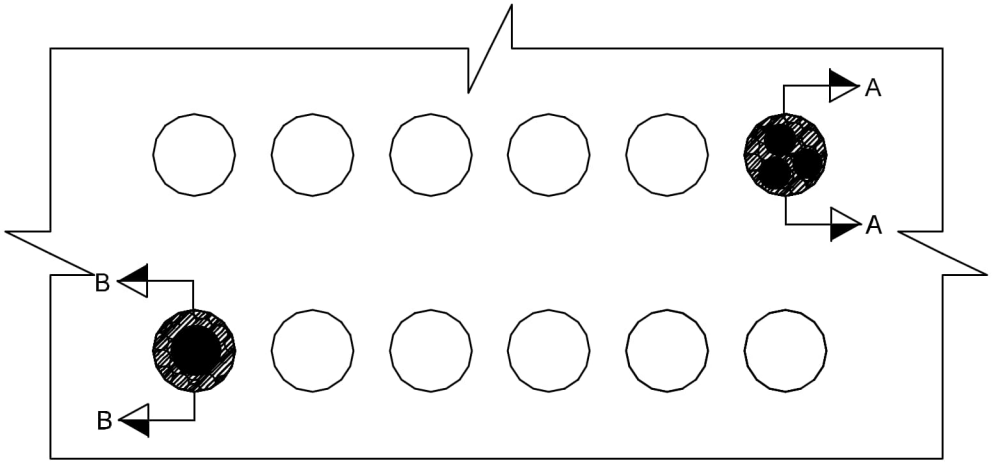
DUCT IDENTIFICATION IN GROUND LEVEL FLOOR UNDER CARPET OR FLOORING

NOTES: (1)

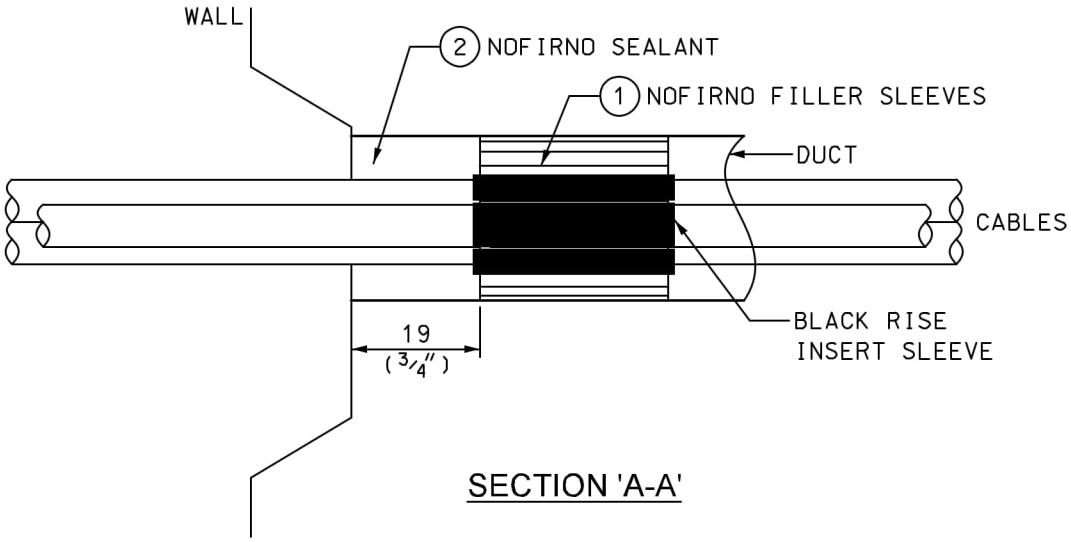
1) CABLE MARKER TO BE INSTALLED FLUSH WITH SURFACE OF DUCT STRUCTURE.
2) PAINT STRIP TO BE 600 mm (2'-0") WIDE OR MAXIMUM WIDTH OF DUCT STRUCTURE.
3) FLUORESCENT PAINT TO BE RED EXTERIOR ACRYLIC LATEX.
4) LETTERING TO BE BLACK EXTERIOR LATEX PAINT.
5) PERMANENT IDENTIFICATION MUST BE COMPLETED BEFORE THE SERVICE IS ENERGIZED.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CONDUITS IDENTIFICATION OF HYDRO DUCTS IN BUILDING COMPLEXES				
TORONTO HYDRO	Approved By: J.D. 2012-11-09						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: G.D./C.P. 2004-03-31	Scale: N.T.S.	Rev: 1	31-1360	1/1

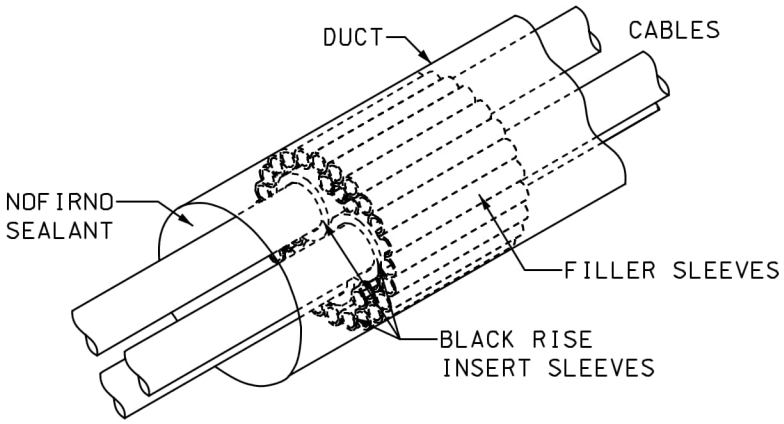
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DUCT BANK
FRONT VIEW



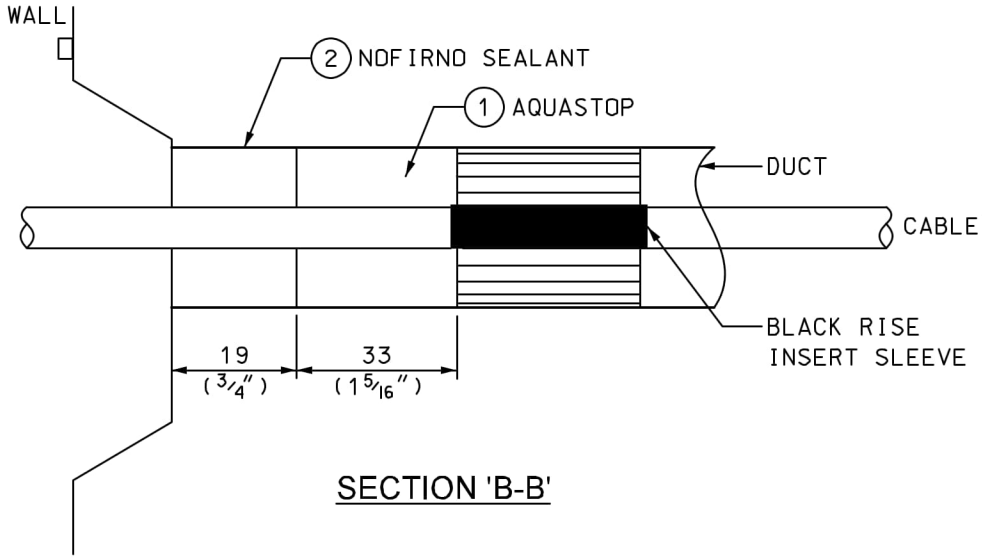
SECTION 'A-A'



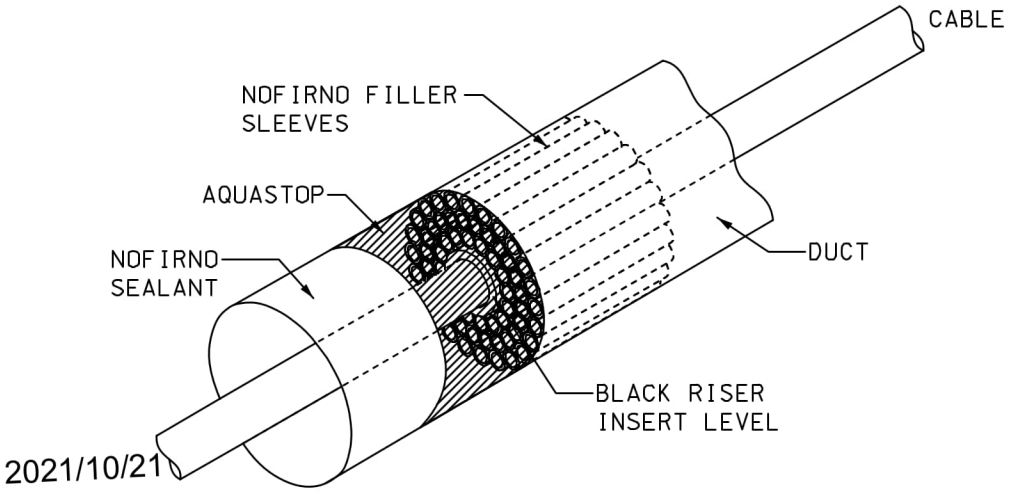
INSTALLATION IN DRY DUCT

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DUCT SEALANT INSTALLATION				
TORONTO HYDRO	Approved By: 2021/10/21						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: J.D. 2015-11-23	Scale: N.T.S.	Rev: 2	31-1400	1/3

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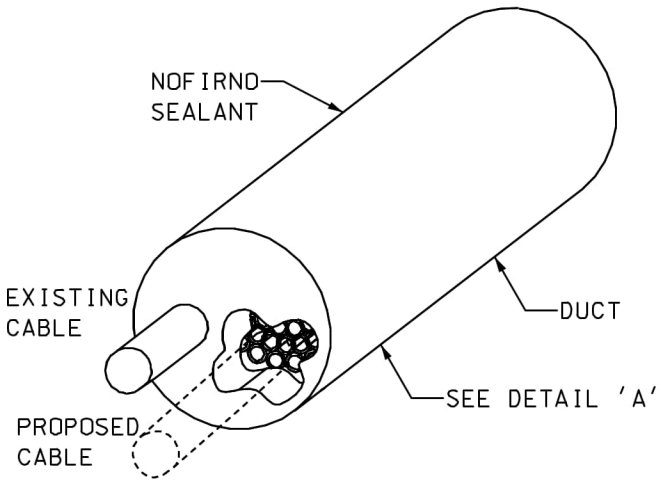


SECTION 'B-B'

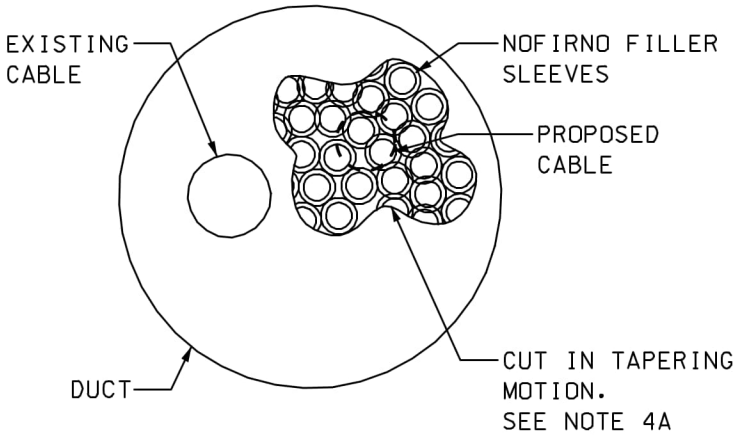


2021/10/21

INSTALLATION IN WET OR LEAKING DUCT



ADDING ADDITIONAL CABLES



DETAIL 'A'

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DUCT SEALANT INSTALLATION				
TORONTO HYDRO	Approved By: 2021/10/21						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: J.D. 2015-11-23	Scale: N.T.S.	Rev: 2	31-1400	2/3

BILL OF MATERIALS FOR 31-1400				
	ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A
*	1	DUCT SEALANT KIT	9665194	1
+	2	SEALANT	9665195	1
+	3	CAULKING GUN	2730104	1

+ AS REQUIRED

* DUCT SEALANT KIT INCLUDES:
  - NOFIRNO FILLER SLEEVES
  - BLACK RISE INSERT SLEEVES
  - AQUASTOP

NOTES:

1) SEALANT SHALL BE APPLIED TO:
   - DUCTS EXITING THESL STRUCTURES (POLES, CABLE CHAMBERS, PADMOUNTS, SPLICE VAULTS, TAP/SPLICE BOXES AND VAULTS) WHEN FEEDING INTO CUSTOMER'S BUILDING/VAULTS AND ALSO DUCTS AT CUSTOMER'S BUILDING/VAULTS ENTRANCE POINT;
   - LOCATIONS WHERE EXISTING SEALANT (STOCK CODES 8940011, 9656790 OR 9656791) IS NOT ADEQUATE.
2) INSTALLATION IN DRY DUCT (AS PER SECTION 'A-A'):
   A) CLEAN THE DUCT AND CABLE THOROUGHLY USING A CLOTH TO REMOVE ALL DEBRIS AND DIRT FROM INSIDE THE DUCT. DO NOT USE HAND SANITIZER CLOTHS OR CLOTHS MIXED WITH SOAPY MIXTURE.
   B) PLACE BLACK RISE INSERT SLEEVES AROUND EACH CABLE.
   C) FILL THE REMAINDER OF THE SPACE IN DUCT WITH RED NOFIRNO FILLER SLEEVES 22/15 (22 mm (9/10") OUTER DIAMETER AND 15 mm (3/5") INNER DIAMETER).
   D) ADJUST THE SLEEVES SO THAT THEY ARE ALIGNED AND RECESSED, BY USING NEEDLE NOSE PLIERS.
   E) OVERFILL THE DUCT WITH NOFIRNO SEALANT.
   F) USING A WET CLOTH, COMPRESS AND SMOOTHEN THE NOFIRNO SEALANT FOR A SMOOTH SURFACE.
3) INSTALLATION IN WET OR LEAKING DUCTS (AS PER SECTION 'B-B'):
   A) FOLLOW PROCEDURES AS PER 2A, 2B AND 2C.
   B) INSERT THE AQUASTOP INTO THE DUCT AGAINST THE NOFIRNO FILLER SLEEVES.
   C) TIGHTLY COMPRESS THE AQUASTOP AGAINST THE FILLER SLEEVES BY HAND OR BY USING A WOOD PIECE OR ANY OBJECT WITH A FLAT SURFACE.
   D) ENSURE THE EDGES ARE PROPERLY SEALED BY SMEARING THE AQUASTOP RUBBER ALONG THE EDGES OF THE DUCT WALL. ENSURE THAT THERE IS AT LEAST 19 mm (3/4") OF SPACING BETWEEN THE FINAL LAYER OF AQUASTOP STRIP AND DUCT EDGE.
   E) INSPECT THE DUCT TO ENSURE THAT THE LEAKAGE HAS STOPPED. IN ORDER TO EXPEDITE DRYING TIME, USE A DRYER. DO NOT USE A HEAT GUN, AS PROLONGED USE WILL DAMAGE CABLE.
   F) APPLY THE NOFIRNO SEALANT OVER THE AQUASTOP UNTIL THE DUCT OVERFLOWS.
   G) USING A WET CLOTH, COMPRESS AND SMOOTHEN THE NOFIRNO SEALANT.
4) ADDING ADDITIONAL CABLES TO DRY DUCT CONTAINING NOFIRNO SEALANT (AS PER DETAIL 'A'):
   A) USING A KNIFE, PENETRATE THE NOFIRNO SEALANT LAYER (AND AQUASTOP LAYER, IF APPLICABLE) AND BEGIN TO CUT SEALANT WIDE ENOUGH TO ACCOMMODATE THE OUTER DIAMETER OF THE CABLE TO BE PULLED INTO THE DUCT. A TAPERING MOTION SHALL BE USED TO ENSURE APPROPRIATE MASS IS AVAILABLE FOR RE-SEAL.
   B) REMOVE THE APPROPRIATE AMOUNT OF NOFIRNO FILLER SLEEVES, IN ORDER TO ACCOMMODATE THE OUTER DIAMETER OF THE CABLE TO BE PULLED INTO THE DUCT.
   C) PULL THE DESIRED CABLE THROUGH THE DUCT AND ADD A BLACK RISE INSERT SLEEVE AROUND THE CABLE.
   D) PUSH THE RISE INSERT SLEEVES INTO THE DUCT AT A DEPTH OF 19 mm (3/4") FROM THE DUCT OPENING.
   E) FOLLOW PROCEDURES AS PER 2D AND 2E.

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

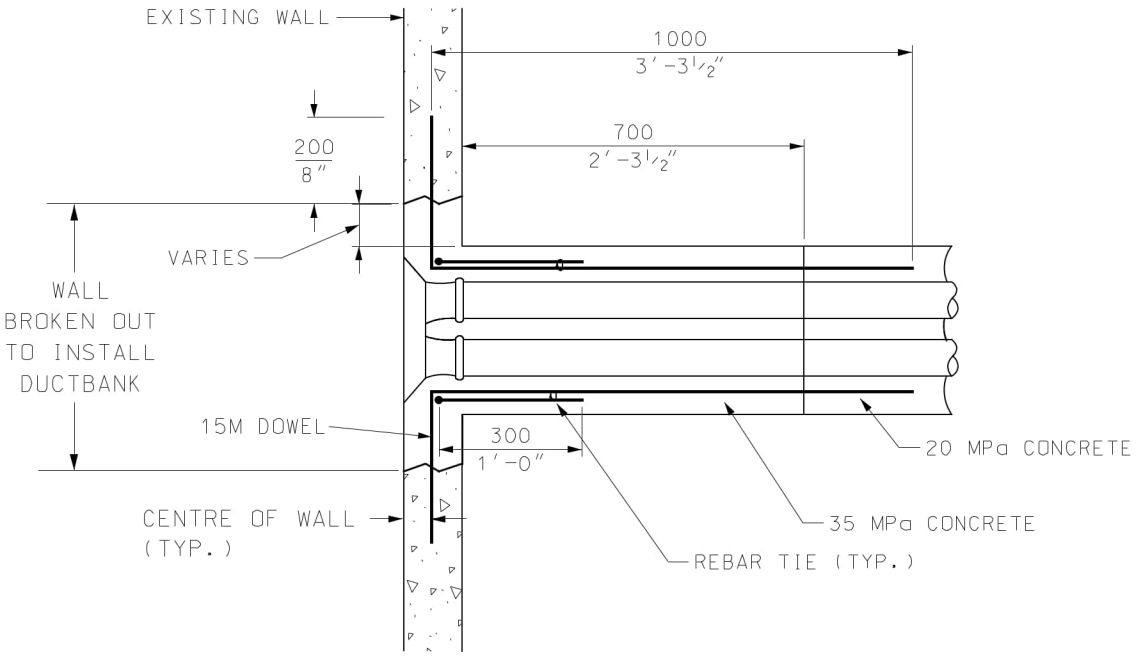
TORONTO HYDRO

DUCT SEALANT INSTALLATION

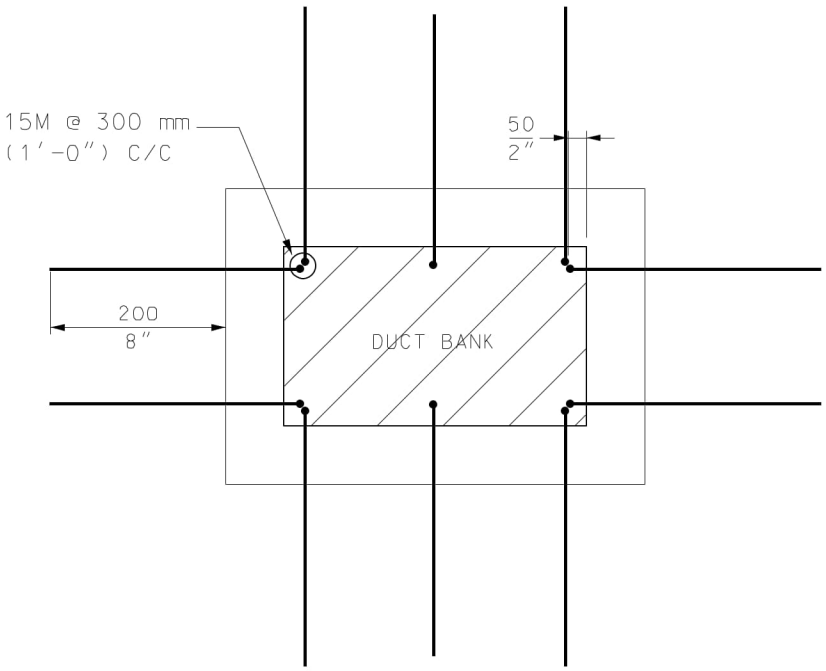
Approved By:	Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
2021/10/21	U.K.	B.D.	J.D. 2015-11-23	N.T.S.	2	31-1400	3/3

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CONNECTION INTO EXISTING WALL



ELEVATION VIEW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CONDUITS NEW DUCT BANK RECESS INSTALLATION IN EXISTING STRUCTURES					
TORONTO HYDRO	Approved By: B.D. 2019-03-22							
	Drafted By: B.D.	Designed By: B.D.	Original Issue: B.D. 2019-03-22	Scale: N.T.S.	Rev: 0	31-1600	1/2

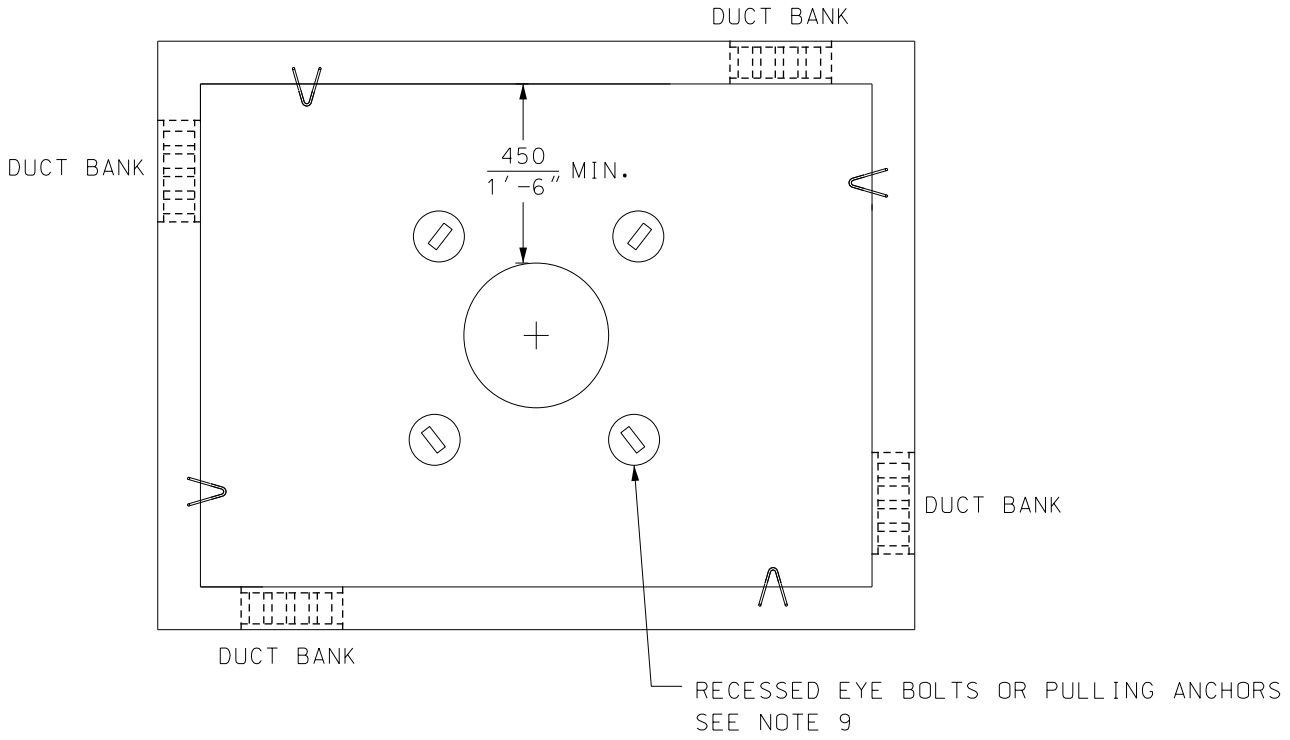
NOTES:

1) DRILL 15M DOWEL BARS INTO EXISTING CONCRETE WALL FOR A LENGTH OF AT LEAST 200 mm (8"). USE HILTI HY-200 CHEMICAL ADHESIVE ANCHORS ACCORDING TO THE MANUFACTURERS INSTRUCTIONS.
2) ALL REINFORCEMENT BARS SHALL CONFORM TO LATEST CSA STANDARD G30.18, Fy=400 MPa.
3) WITHIN 700 MM OF EXTERIOR WALL FACE, CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa AND EXPOSURE CLASS OF C-1 AS DEFINED IN CSA A23.1.
4) FOR CABLE CHAMBERS, IF CABLE PULLING LOOPS ARE REQUIRED, INSTALL IN ACCORDANCE TO TORONTO HYDRO STANDARD 31-8220. CABLE PULLING LOOP SHALL BE IN-LINE WITH AND ON OPPOSITE WALLS OF EACH DUCT FACE (TYPICAL 300 mm (1'-0") FROM FINISHED FLOOR).
5) DUCT BANK RECESS INSTALLATION SHALL APPLY TO DUCT CONFIGURATIONS GREATER THAN 6 DUCTS. NUMBER OF DUCTS WITHIN RECESS SHALL NOT EXCEED 24. DUCT CONFIGURATIONS SHALL BE IN ACCORDANCE WITH STD. 31-1120.
6) FOR DUCT BANK RECESS INSTALLED IN EXISTING STRUCTURES, CLEARANCES SHALL BE AS FOLLOWS:
   - MIN. 400 mm (1'-4") FROM CEILING;
   - MIN. 400 mm (1'-4") FROM ADJACENT WALLS;
   - MIN. 400 mm (1'-4") FROM OTHER DUCT BANKS.
   - MIN. 400 mm (1'-4") FROM FLOOR OR, IF APPLICABLE, MIN. 100 mm (4") ABOVE BACKWATER VALVE.
7) TO PREVENT DAMAGE TO REINFORCEMENT BARS ADJACENT TO RECESS, SAW OVERRUN SHALL BE AVOIDED DURING RECESS INSTALLATION.
8) INSTALLATION SHALL CONFORM TO THE LATEST EDITION OF TORONTO HYDRO TECHNICAL SPECIFICATION FOR CIVIL CONSTRUCTION WORK CV-CON-01.
9) THE CONTRACTOR SHALL ENSURE THAT THE WALL IS STRUCTURALLY SOUND PRIOR TO COMMENCING WORK. MINIMUM WALL THICKNESS SHALL BE 200 mm (8"). OTHERWISE CORE DRILLING SHALL BE USED FOR STRUCTURES HAVING WALL THICKNESS LESS THAN 200 mm (8"). NO RECESS SHALL BE INSTALLED IN A SUBMERSIBLE TRANSFORMER VAULT.
10) DUCT BANK RECESS SHALL BE PERFORMED BY AN APPROVED TORONTO HYDRO CONTRACTOR TO ENSURE THAT CONSTRUCTION COMPLIES WITH TORONTO HYDRO CIVIL SPECIFICATIONS, STANDARDS AND ALL RELEVANT ACCEPTABLE PRACTICES AND METHODS APPROVED BY TORONTO HYDRO.
11) THE CONTRACTOR SHALL PROVIDE TEMPORARY PROTECTION TO ALL CABLES LOCATED INSIDE THE STRUCTURE, AND WILL CLEAN, REMOVE AND DISPOSE OF ALL DEBRIS RESULTING FROM THE CONSTRUCTION.
12) THIS INSTALLATION SHALL NOT APPLY TO STRUCTURES CONSTRUCTED WITH CONCRETE BLOCKS/BRICKS.

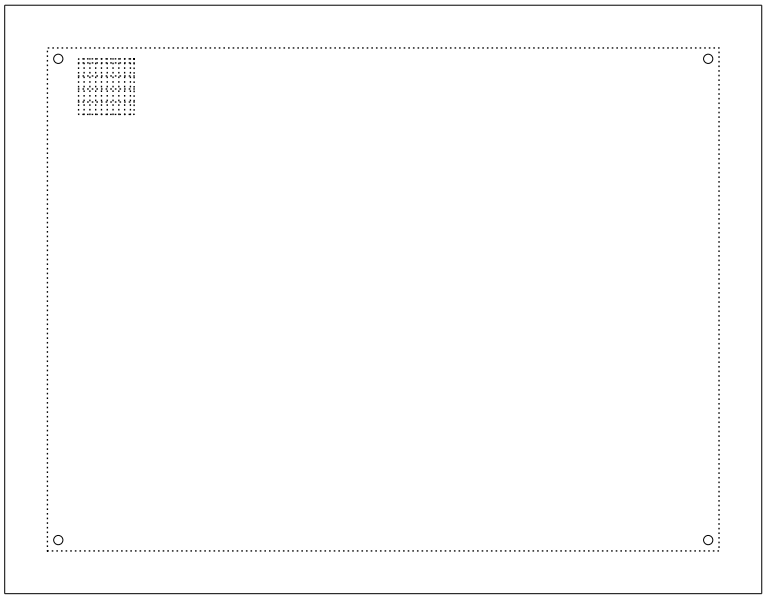
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DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			**CONDUITS** **NEW DUCT BANK RECESS** **INSTALLATION IN EXISTING STRUCTURES**				
TORONTO HYDRO	Approved By: B.D. 2019-03-22						
	Drafted By: B.D.	Designed By: B.D.	Original Issue: B.D. 2019-03-22	Scale: N.T.S.	Rev: 0	31-1600	2/2

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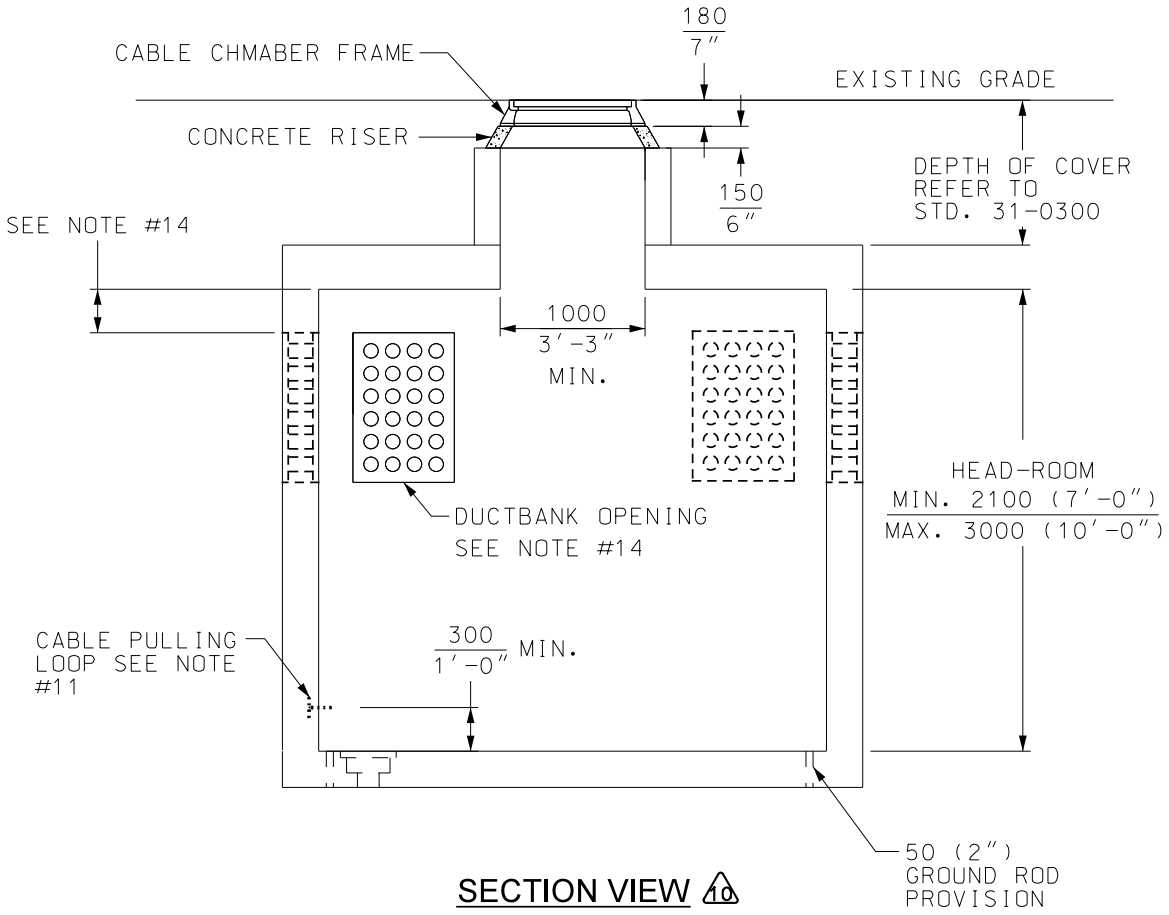
PLAN VIEW



FLOOR PLAN VIEW 10

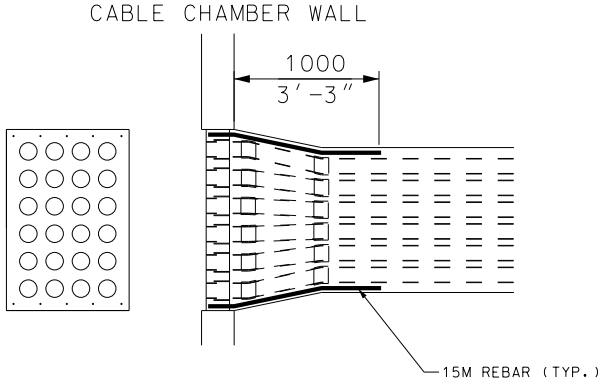
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CABLE CHAMBERS PRECAST CHAMBER					
TORONTO HYDRO	Approved By:							
	Drafted By: J.D.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-30	Scale: N.T.S.	Rev: 10	31-2160	1/3	

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SECTION VIEW 10

CABLE CHAMBER			
TYPE #	SIZES		NUMBER OF LIDS
	WIDTH	LENGTH	
1	2000 (6′-8″)	2500 (8′-4″)	1
2	2000 (6′-8″)	3000 (10′-0″)	
3	2500 (8′-4″)	3000 (10′-0″)	
4	2500 (8′-4″)	3500 (11′-8″)	1 OR 2
5	2500 (8′-4″)	4000 (13′-4″)	
6	3000 (10′-0″)	3000 (10′-0″)	1
7	3000 (10′-0″)	3500 (11′-8″)	1 OR 2
8	3000 (10′-0″)	4000 (13′-4″)	
9	3500 (11′-8″)	4000 (13′-4″)	



DETAIL 'A'

DUCTBANK CONNECTION TO
PRECAST CABLE CHAMBER
SEE NOTE 15

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

Approved By:

Drafted By: J.D.

Designed By: A.P.

CABLE CHAMBERS
PRECAST CHAMBER

Original Issue: G.D./L.G. 2000-12-30

Scale: N.T.S.

Rev: 10

31-2160

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NOTES:

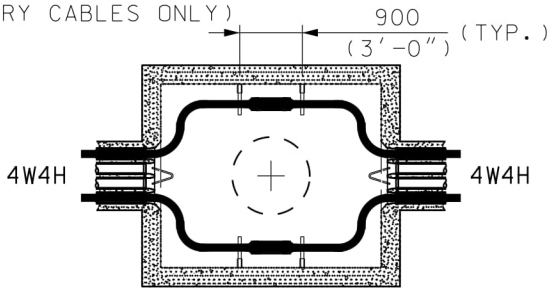
1) CHAMBER SHALL BE DESIGNED TO MEET CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6. DRAWINGS SHALL BE STAMPED AND SIGNED BY THE MANUFACTURER'S PROFESSIONAL ENGINEER. MANUFACTURER SHALL SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY TORONTO HYDRO PRIOR TO FABRICATION
2) MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 35 MPa AND MINIMUM CLASS OF EXPOSURE SHALL BE C-1.
3) REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 400 MPa AS PER LATEST CSA SPEC. G.30.18. STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD G40.21, GRADE 300W.
4) ROOF ACCESS OPENINGS (NECK) SHALL BE A MINIMUM 1000 mm (3'-4") IN DIAMETER AND BE A MINIMUM 450 mm (1'-6") FROM WALL.
5) CHAMBER SIZES SHALL BE AS PER TABLE IN THIS STANDARD. MANUFACTURER CHAMBER SIZES CAN VARY FROM WHAT IS SHOWN. TORONTO HYDRO STANDARDS APPROVAL IS REQUIRED PRIOR TO FABRICATION.
6) CHAMBER HEAD-ROOM SHALL BE A MINIMUM OF 2100 mm (7'-0") AND MAXIMUM OF 3000 mm (10'-0").
7) CHAMBER ROOF SHALL BE A MINIMUM THICKNESS OF 250 mm (9").
8) NUMBER OF ACCESS OPENING (NECK) IN ROOF SLAB SHALL BE AS PER TABLE IN THIS STANDARD.
9) A MINIMUM OF 4 ROOF RECESS EYE BOLTS SHALL BE INSTALLED IN ROOF SLAB AS PER STD. 31-8230.
10) CHAMBER WALLS SHALL HAVE A MINIMUM THICKNESS OF 200 mm (8").
11) WALL CABLE PULLING LOOPS SHALL BE INSTALLED ON OPPOSITE WALL OF EACH DUCT FACE (TYPICAL 300 mm (1'-0") FROM FINISH FLOOR). EYE BOLTS SIMILAR TO STD. 31-8210.
12) CHAMBER FLOOR SHALL HAVE A SUMP HOLE LOCATED IN CORNER OF CHAMBER. SUMP HOLE SHALL ACCOMMODATE A GRATING SIZE OF 384 X 380 X 40 AS PER STD. 31-8280. ALTERNATIVE DRAIN CONFIGURATION SHALL REQUIRE A STANDARDS ENGINEER APPROVAL.
13) EXACT LOCATION OF FLOOR DRAIN OR SUMP HOLE SHALL BE DETERMINED AS PER CONSTRUCTION DRAWING.
14) (10) MAX. OF 4W6H DUCTBANK CONFIGURATION SHALL BE INSTALLED IN EACH WALL OF CABLE CHAMBER. LOCATION AND DEPTH OF DUCTBANKS SHALL BE AS PER PROJECT REQUIERMENTS.
15) (10) DUCT HOLES SHALL BE 125 mm (5") IN DIAMETER, 175 MM (7") CENTER ON CENTER, AND ALL DUCT HOLES SHALL BE PLUGGED WITH DUCT PLUGS.
16) CHAMBER WALLS CAN BE BUILT IN SECTIONS. EACH SECTION SHALL BE SEALED TO PREVENT WATER FROM ENTERING THE CABLE CHAMBER.
17) 4-50 (2") HOLES FOR GROUND ROD PROVISIONS SHALL BE PLACED IN EACH CORNER OF THE FLOOR SLAB. GROUND ROD PROVISIONS SHALL BE A MINIMUM 75 mm (3") FROM WALL.
18) LIFTING OF CHAMBER INTO PLACE SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER AND THE CONTRACTOR. MINIMUM OVERHEAD CLEARANCE OF 5500 mm (18'-0") IS NEEDED TO LIFT CHAMBER IN PLACE.
19) THE EXTERIOR SURFACE OF THE ROOF AND NECK SHALL BE WATERPROOFED WITH A BITUMEN MEMBRANE.
20) PARGING MIX ON ALL BRICK WORK SHALL BE ONE PART NON-SHRINK CEMENT AND THREE PARTS SAND AND APPLIED 15 mm THICK.
21) (10) CABLE CHAMBER SHALL ONLY BE CORE DRILLED AT MANUFACTURE APPROVED LOCATIONS.
22) DRILL 15M BARS INTO EXISTING DUCTBANK RECESS USE HILTI HY-200 CHEMICAL ADHESIVE ANCHORS ACCORDING TO THE MANUFACTURERS INSTRUCTIONS.
23) ALL REINFORCEMENT BARS SHALL CONFORM TO LATEST CSA STANDARD G30.18, Fy=400 MPa

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CABLE CHAMBERS ## PRECAST CHAMBER				
TORONTO HYDRO	Approved By:						
	Drafted By: J.D.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-30	Scale: N.T.S.	Rev: 10	31-2160	3/3

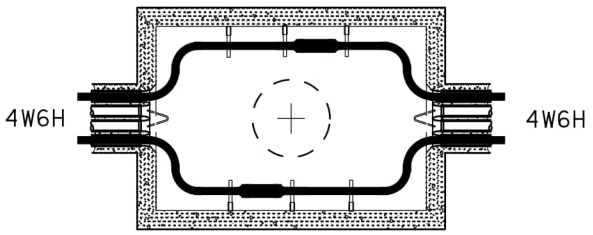
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TYPE 1 - 2000 x 2500

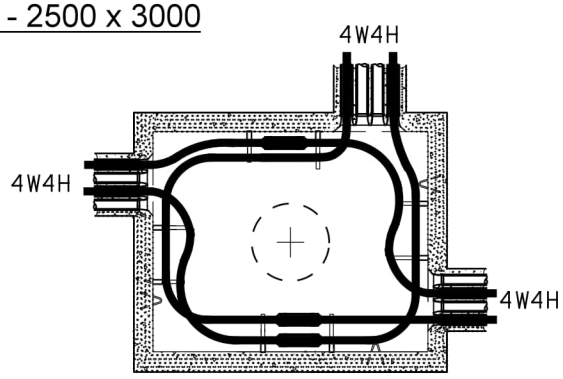
FOR CUSTOMER INSTALLATIONS (SECONDARY CABLES ONLY)



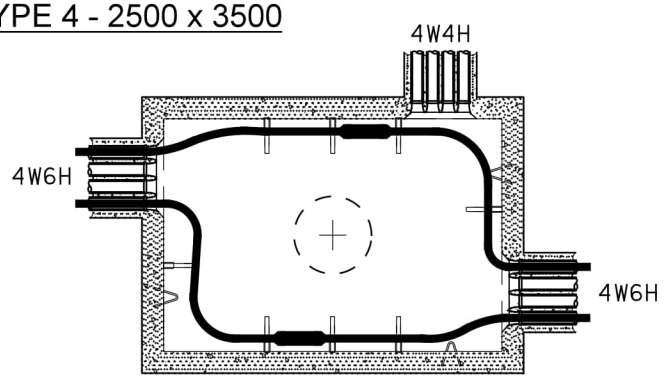
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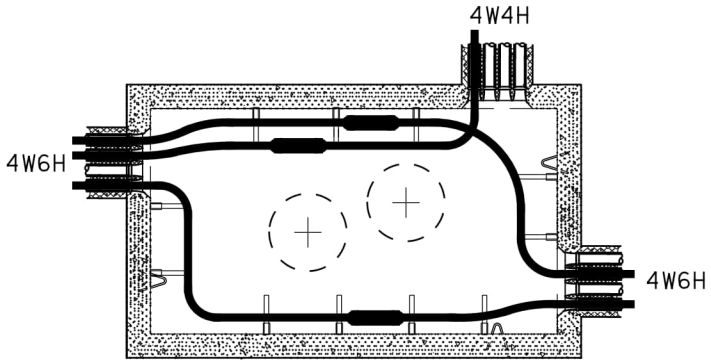
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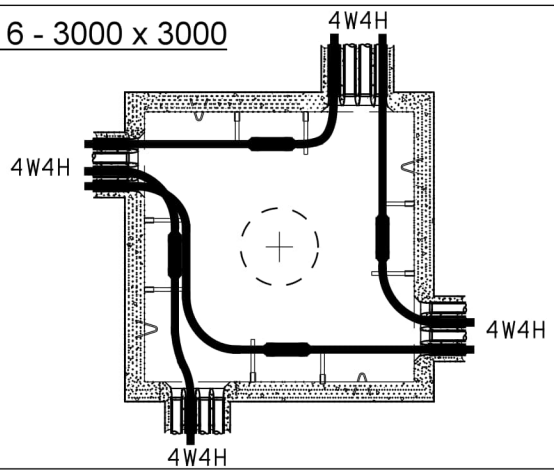
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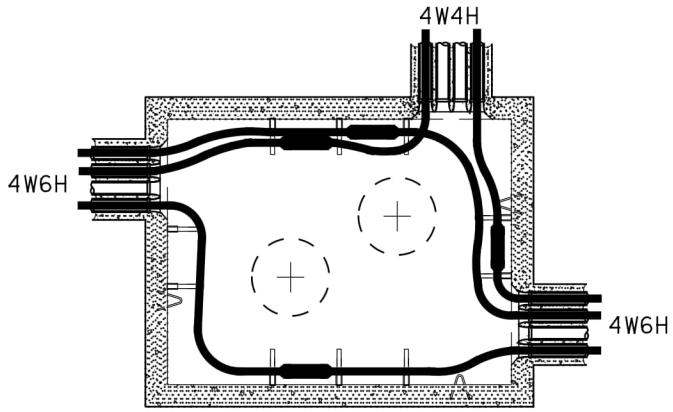
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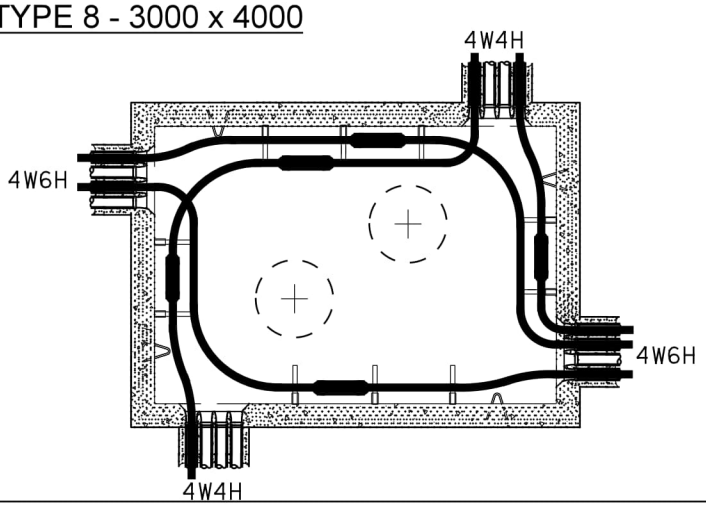
TYPE 6 - 3000 x 3000



TYPE 7 - 3000 x 3500



TYPE 8 - 3000 x 4000



DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

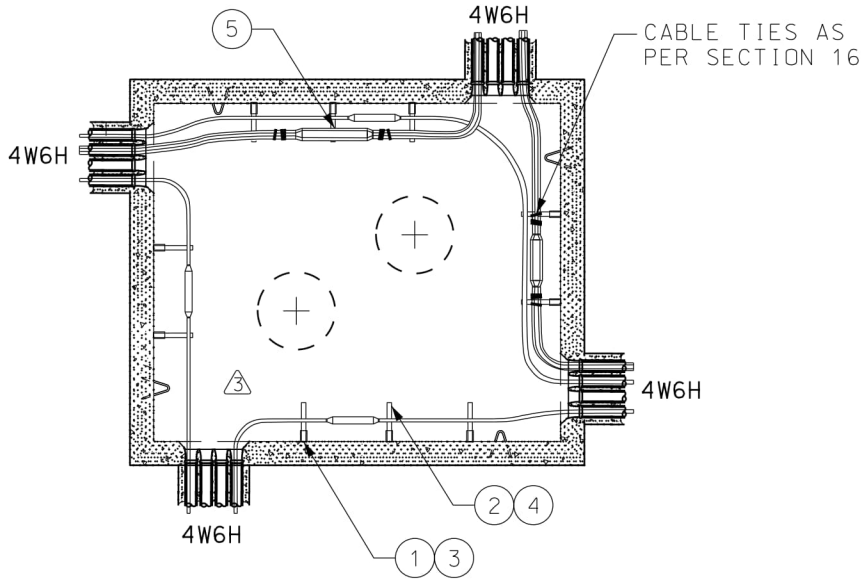
TORONTO HYDRO

CABLE CHAMBERS

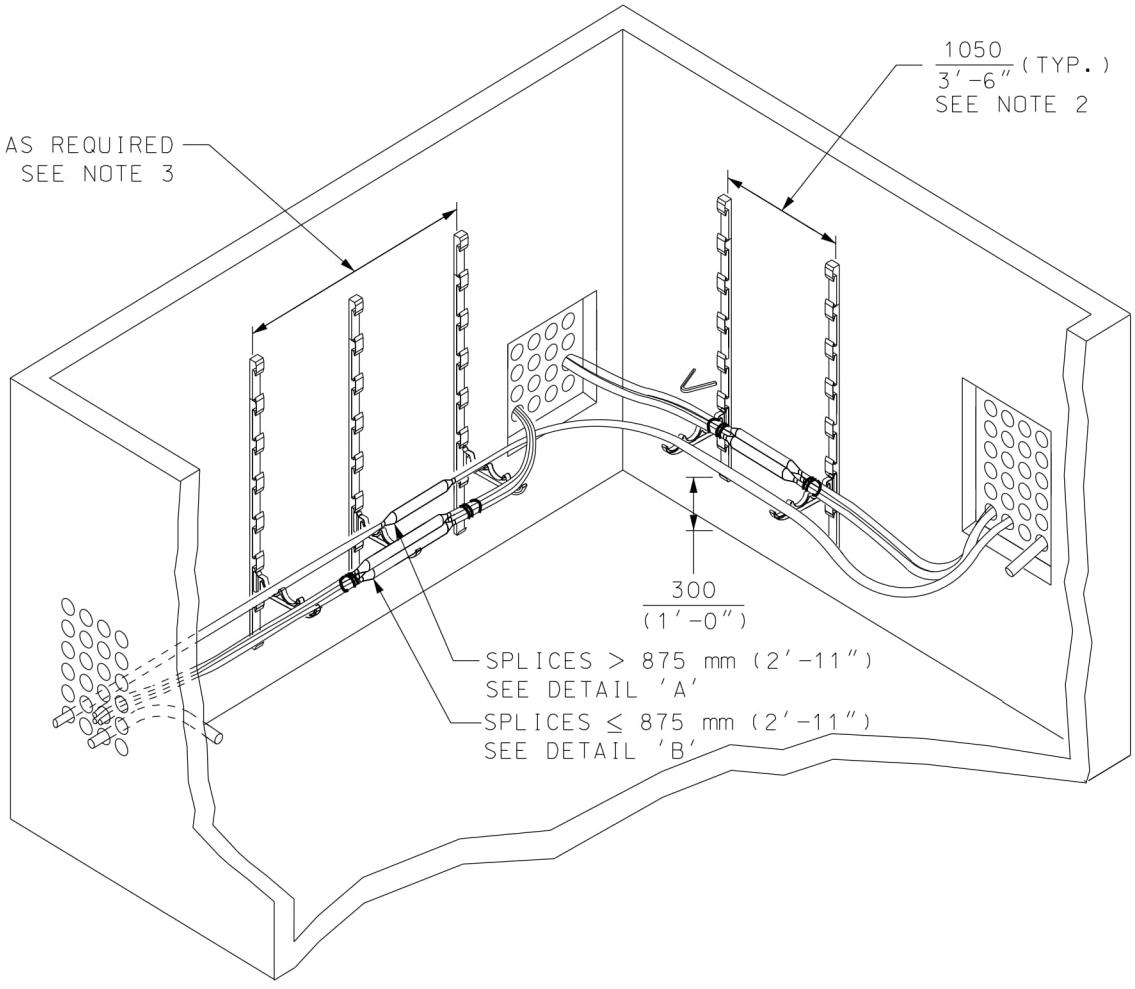
TYPICAL RACKING ARRANGEMENTS

Approved By:						
A.P. 2025-03-01						
Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
A.P.	A.P.	C.P. 2002-07-11	N.T.S.	4	31-2180	1/4

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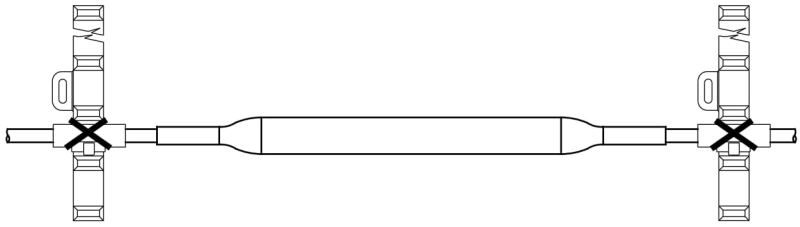
TYPE 9 - 3500 x 4000 ⚠4



ISOMETRIC VIEW ⚠4

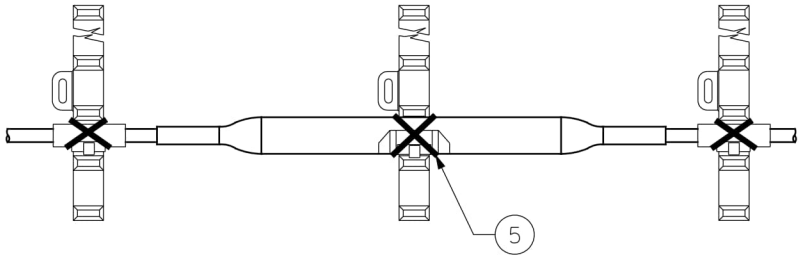
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CABLE CHAMBERS TYPICAL RACKING ARRANGEMENTS				
TORONTO HYDRO	Approved By: A.P. 2025-03-01						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P. 2002-07-11	Scale: N.T.S.	Rev: 4	31-2180	2/4

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DETAIL 'A' ⚠4

SEE NOTE 2, 6, & 7



DETAIL 'B' ⚠4

SEE NOTE 3, 6 & 7

NOTES: ⚠4

1) CHAMBER SIZES SHOWN ARE BASED ON INSIDE DIMENSIONS.
2) FOR ALL PILC TO PILC CABLE SPLICES AND ALL OTHER WITH COMPLETED INSTALLATION LENGTH UP TO AND INCLUDING 875 mm (2'-11"), STANDARD SPACING BETWEEN CABLE RACKS SHALL BE 1050 mm (3'-6"). POSITION SPLICE BODY CENTRALLY BETWEEN CABLE ARMS SUCH THAT CABLE IS SUPPORTED ON CABLE ARMS AT EITHER END OF SPLICE.
3) FOR TRXLPE TO TRXLPE, TRANSITION OR TRIFURCATING SPLICES WHERE COMPLETED INSTALLATION LENGTHS ARE GREATER THAN 875 mm (2'-11") OR ADDITIONAL SUPPORT IS REQUIRED TO AVOID CABLE SAGGING, THE SPACING BETWEEN OUTER CABLE RACKS SHALL BE SUCH THAT THE SPLICE IS POSITIONED CENTRALLY BETWEEN CABLE ARMS AND SUPPORTED ON CABLE 150 mm (6") AWAY FROM EITHER END OF SPLICE. INSTALL AN ADDITIONAL CABLE RACK/ARM ASSEMBLY TO SUPPORT THE CENTER OF THE SPLICE BODY AND PLACE AN INSULATING CRADLE (ITEM I.D. 7360306) ONLY ON THIS ARM FOR THE SPLICE BODY TO REST.
4) WHERE RACKS EXIST IN CABLE CHAMBERS, ENSURE CABLE AND SPLICE IS SUPPORTED IN ACCORDANCE WITH NOTE 2 AND/OR NOTE 3.
5) ENSURE A MINIMUM OF 300 mm (1'-0") OF STRAIGHT CABLE RUN BEYOND THE CABLE ARM PRIOR TO ANY BEND. ADHERE TO MINIMUM CABLE BENDING RADII AS PER STD. 16-0220 (15 kV) AND 16-0260 (28 kV).
6) PLACE CORLON TUBING (OR SPLIT SPARE CABLE JACKET) AROUND CABLE AT EACH ARM WHERE CABLE IS SUPPORTED.
7) INSTALL CABLE TIE DIAGONALLY ACROSS BOTH THE SPLICE AND CABLE ARM AS SHOWN IN DETAIL 'A' AND 'B'.

DISTRIBUTION CONSTRUCTION STANDARD			CABLE CHAMBERS TYPICAL RACKING ARRANGEMENTS				
TORONTO HYDRO	Approved By: A.P. 2025-03-01						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P. 2002-07-11	Scale: N.T.S.	Rev: 4	31-2180	3/4

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BOM LEGEND	
A	TYPE 4 CABLE CHAMBER
B	TYPE 1 CABLE CHAMBER
C	TYPE 2 CABLE CHAMBER
D	TYPE 3 CABLE CHAMBER
E	TYPE 5 CABLE CHAMBER
F	TYPE 6 CABLE CHAMBER
G	TYPE 7 CABLE CHAMBER
H	TYPE 8 CABLE CHAMBER
I	TYPE 9 CABLE CHAMBER

BILL OF MATERIALS FOR 31-2180

	ITEM NO.	DESCRIPTION	ITEM I.D.	QUANTITY A	B	C	D	E	F	G	H	I	
	1	CABLE RACK TYPE C	7360300	8	4	6	8	10	8	10	10	10	
	2	CABLE ARM 3 WAY TYPE G	7340306	32	16	24	32	40	32	40	40	40	
	3	ANCHOR CONCRETE SLEEVE $\frac{1}{2}$" HOLE X 3" LONG	9653086	24	12	18	24	30	24	30	30	30	
	4	CABLE ARM INSULATED BOOT	10001696	32	16	24	32	40	32	40	40	40	4
+	5	CRADLE INSULATING FOR STD UG ARM AS PER	7360306	1	1	1	1	1	1	1	1	1	4
		ASSOCIATED STANDARDS											
	6	CABLE CHAMBERS LID PLACEMENT	STD.31-2120	1	1	1	1	1	1	1	1	1	
	7	CABLE CHAMBER MATERIAL AND INSTALLATION	STD.31-2110	1	1	1	1	1	1	1	1	1	
	8	CABLE RACK	STD.31-8260	1	1	1	1	1	1	1	1	1	
	9	CABLE ARMS	STD.31-8270	1	1	1	1	1	1	1	1	1	

+ AS REQUIRED

DISTRIBUTION CONSTRUCTION STANDARD

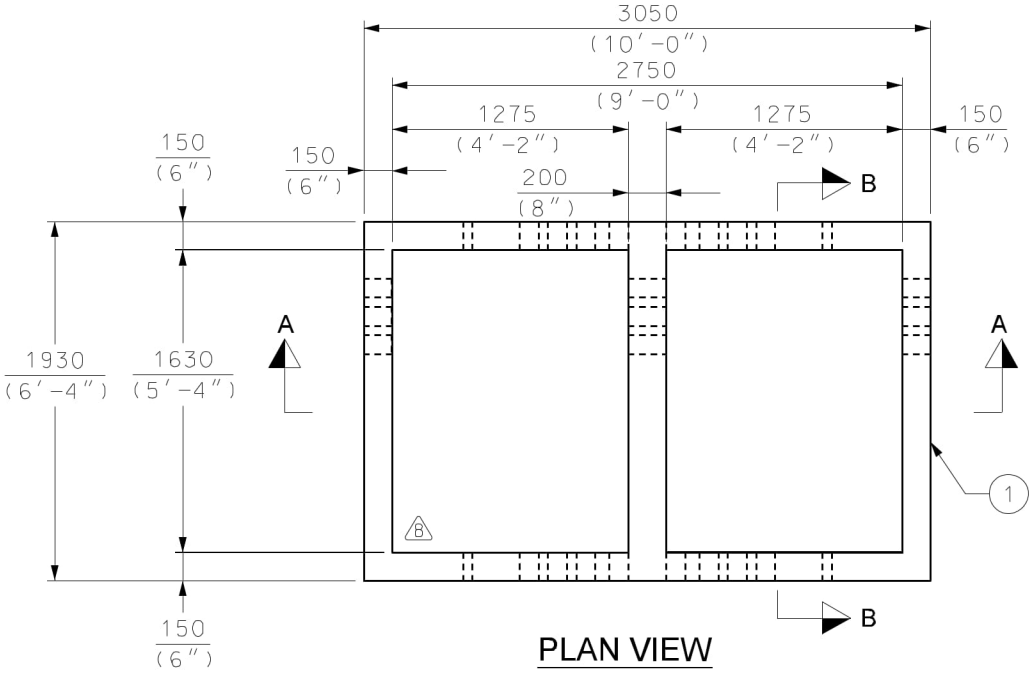
CABLE CHAMBERS

TYPICAL RACKING ARRANGEMENTS

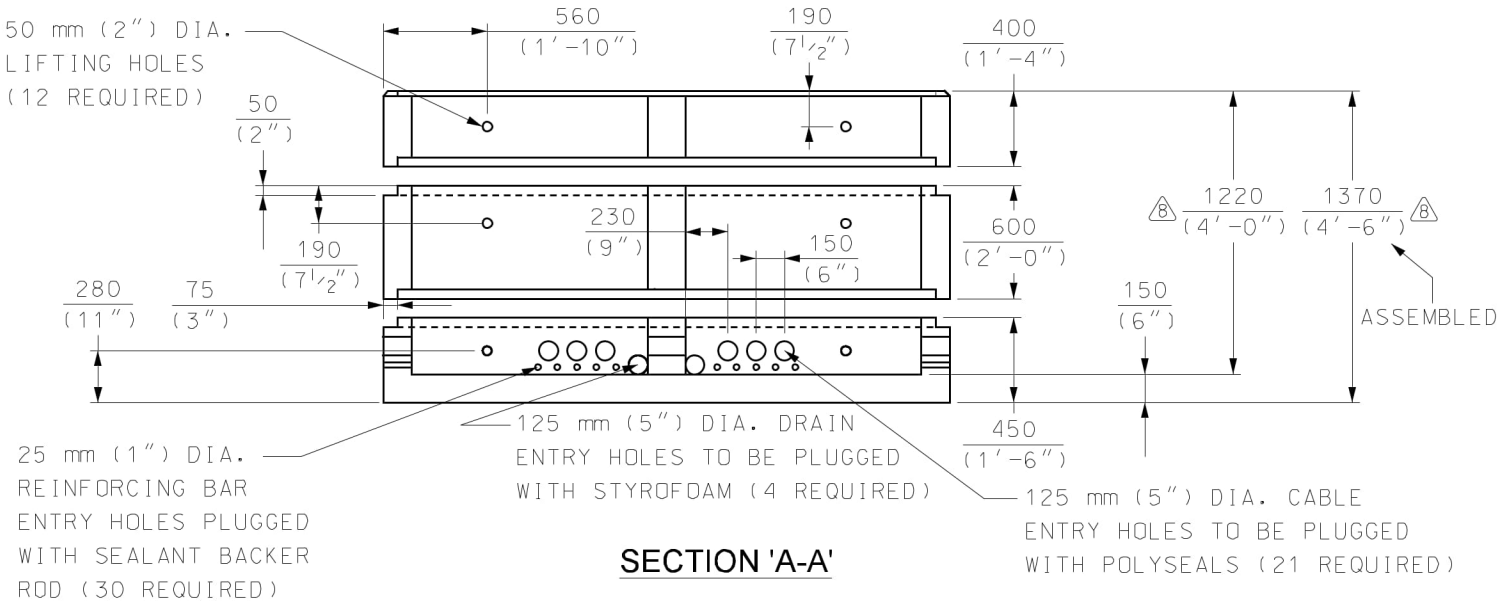
TORONTO HYDRO

Approved By:		Original Issue:	Scale:	Rev:		
A.P. 2025-03-01		C.P. 2002-07-11	N.T.S.	4	31-2180	4/4
Drafted By: A.P.	Designed By: A.P.					

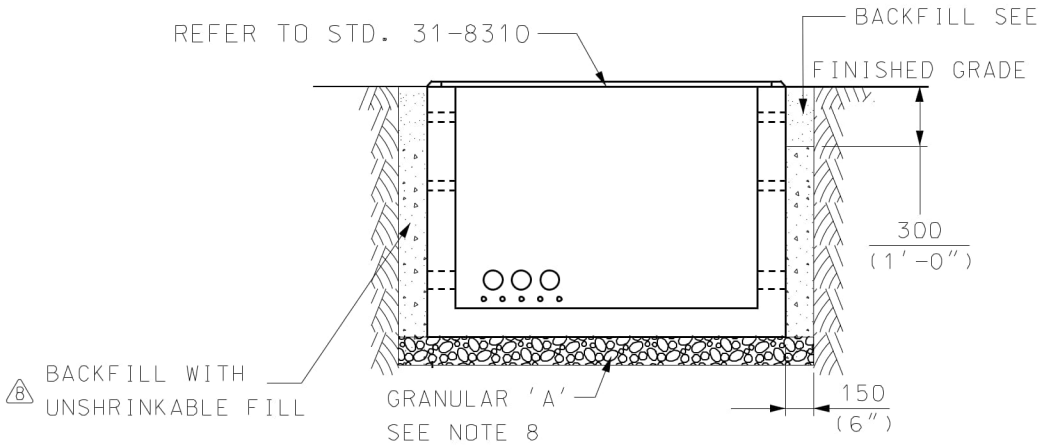
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PLAN VIEW



SECTION 'A-A'



SECTION 'B-B'

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

Approved By: B.D. 2018-08-28

Drafted By: M.D. | Designed By: B.D.

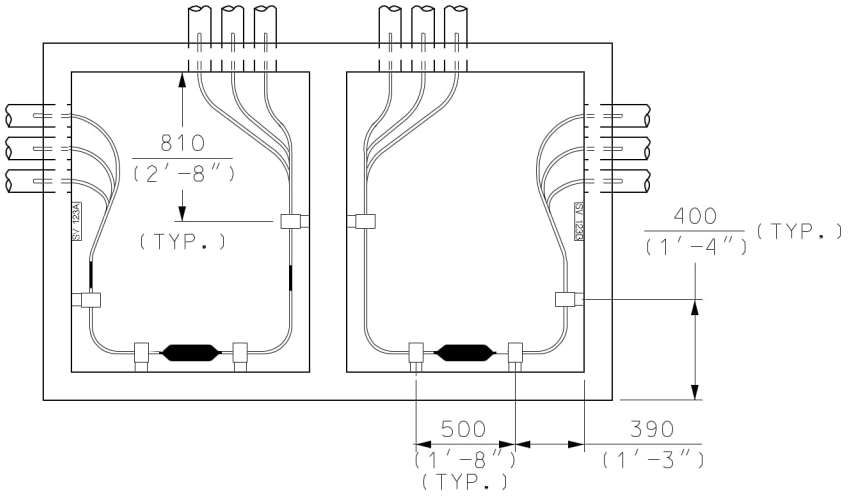
Original Issue: G.D./C.P. 2003-05-30 | Scale: N.T.S. | Rev: 8

VAULTS

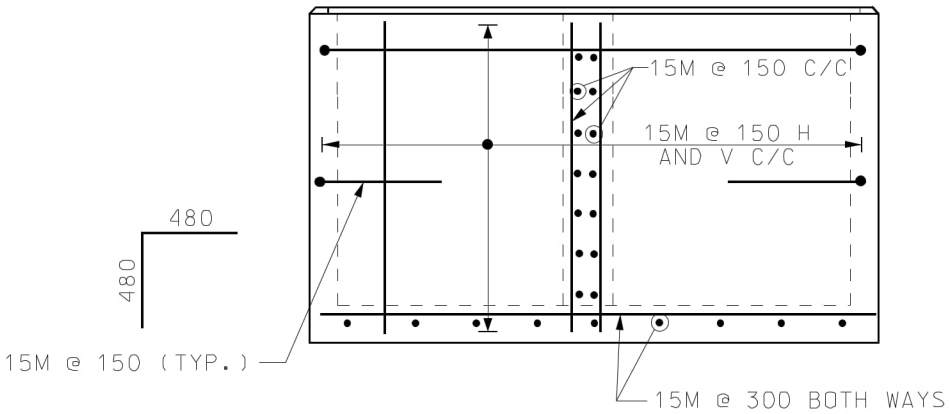
SPLICE VAULT 'B' - 3 PIECE PRECAST
1930 mm (6'-4") x 3050 mm (10'-0") x 1370 (4'-6") mm DEEP

31-2240 | 1/4

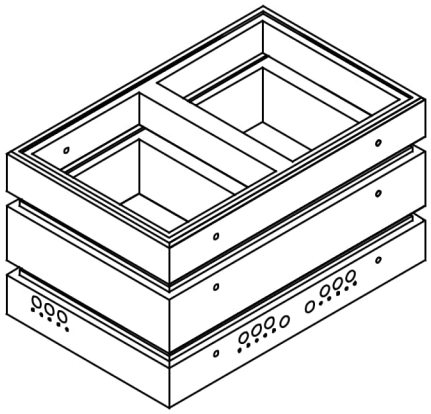
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TYPICAL SPLICE RACKING



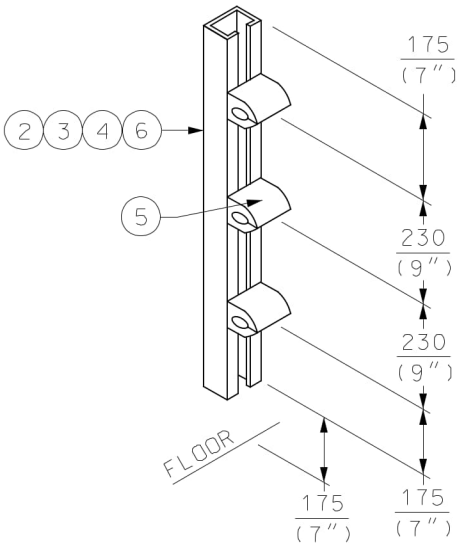
DETAIL 'A'
WALL AND FLOOR REINFORCEMENT



ISOMETRIC

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			VAULTS SPLICE VAULT 'B' - 3 PIECE PRECAST 1930 mm (6'-4") x 3050 mm (10'-0") x 1370 (4'-6") mm DEEP				
TORONTO HYDRO	Approved By: B.D. 2018-08-28						
	Drafted By: M.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2003-05-30	Scale: N.T.S.	Rev: 8	31-2240	2/4

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CABLE SUPPORT

NOTES:

MATERIAL:

1) CONCRETE SHALL HAVE A MIN. 28-DAY COMPRESSIVE STRENGTH OF 35 MPa. CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST CSA-A23.1. ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.
2) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
3) EXPOSURE CLASSIFICATION TO FREEZING AND THAWING IN A SATURATED CONDITION BUT WITH NO CHLORIDES SHALL BE F-1. ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.
4) CONCRETE COVER ON PRECAST UNIT SHALL BE 50 mm (2").
5) ALL EXPOSED EDGES SHALL HAVE 25 mm (1") CHAMFER.
6) LIFTING HOLES CAN BE INSTALLED IN FOUNDATION WALLS FOR MANUFACTURER'S LIFTING PREFERENCE.
7) 4-LIFTING ANCHORS FOR LIFTING PURPOSES BY OTHERS SHALL BE PROVIDED ON THE INSIDE OF ALL FOUNDATION WALLS. LIFTING ANCHORS SHALL BE GALVANIZED. LIFTING ANCHORS SHALL BE CAPABLE OF LIFTING THE PRECAST UNITS AND THIS SHALL BE CERTIFIED BY MANUFACTURER PRIOR TO DELIVERY.

INSTALLATION:

8) PLACE 150 mm (6") GRANULAR "A" BEDDING ON UNDISTURBED SOIL CAPABLE OF SUSTAINING 75 KPa AND COMPACT TO 95% STANDARD PROCTOR DENSITY.
△8 9) EXCAVATION SHALL BE BACKFILLED TO FINISHED GRADE AS PER TORONTO HYDRO CIVIL SPECIFICATION CV-CON-01 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.
△8 10) TORONTO HYDRO INSPECTOR SHALL BE PRESENT DURING THE INSTALLATION, 24-HOUR NOTICE IS REQUIRED PRIOR TO STARTING THE INSTALLATION.
△8 11) DRAIN CONNECTION SHALL BE AS PER STANDARD 31-7100.
△8 12) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.
△8 13) CONTRACTOR TO PLUG ALL HOLES (LIFTING AND GROUNDING) AND PARGED PRIOR TO BACKFILLING.
△8 14) PRECAST UNITS ARE DELIVERED BY CRANE-EQUIPPED TRUCKS. EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK. MIN. OVERHEAD CLEARANCE OF 5500 mm (18'-0") IS REQUIRED. CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE PRECAST UNITS INTO EXCAVATION.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			VAULTS SPLICE VAULT 'B' - 3 PIECE PRECAST 1930 mm (6'-4") x 3050 mm (10'-0") x 1370 (4'-6") mm DEEP				
TORONTO HYDRO	Approved By: B.D. 2018-08-28						
	Drafted By: M.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2003-05-30	Scale: N.T.S.	Rev: 8	31-2240	3/4

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BILL OF MATERIALS FOR 31-2240				
ITEM NO.	DESCRIPTION		ITEM I.D.	QTY
1	PRECAST CONCRETE 3 PIECE SUBMERSIBLE SPLICE VAULT C/W FRAME, CHECKER PLATES AND SUPPORT BEAMS 1930 X 3050 X 1370 mm DEEP		3540040	1
2	CHANNEL STEEL GALV. 41 mm x 41 mm x 3000 mm ($1\frac{5}{8}$" x $1\frac{5}{8}$" x 10') PUNCHED		3520220	4
3	ANCHOR STUD BOLT WEDGE $\frac{3}{8}$" X 3"		2500057	24
4	WASHER BELLIVILLE $\frac{1}{2}$"		2530100	24
5	CLAMP CABLE $1\frac{1}{4}$" HOLE THERMOPLASTIC		9663121	24
6	NUT PENTA $\frac{1}{2}$"-13 UNC ZINC ALLOY		2520095	24
	ASSOCIATED STANDARDS			
7	FRAME, BEAMS AND COVER	STD. 31-8310		1
8	GROUNDING	STD. 18-5400		1
9	VAULT LOCATION NUMBER	STD. 21-3100		1
8 10	DRAINING STRUCTURES	STD. 31-7100		1

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

Approved By: B.D. 2018-08-28

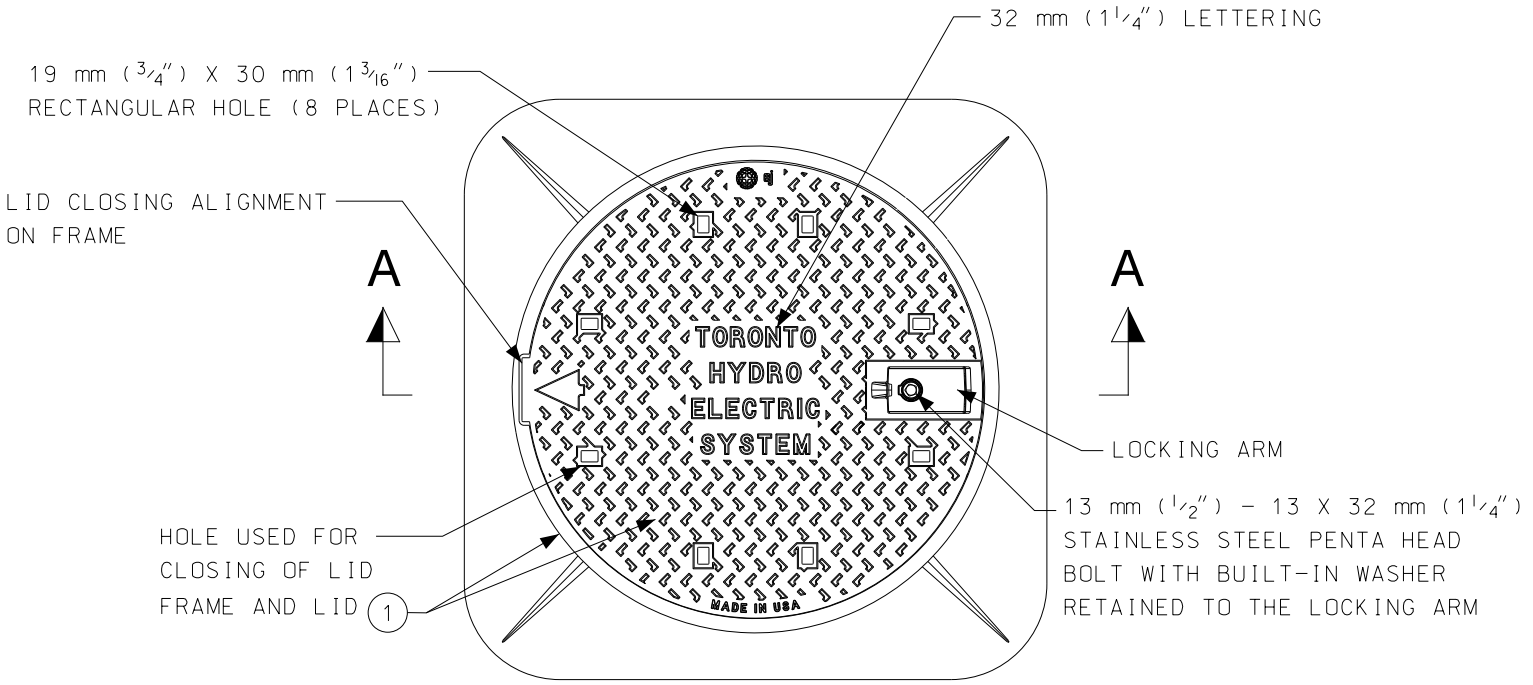
Drafted By: M.D. | Designed By: B.D.

VAULTS

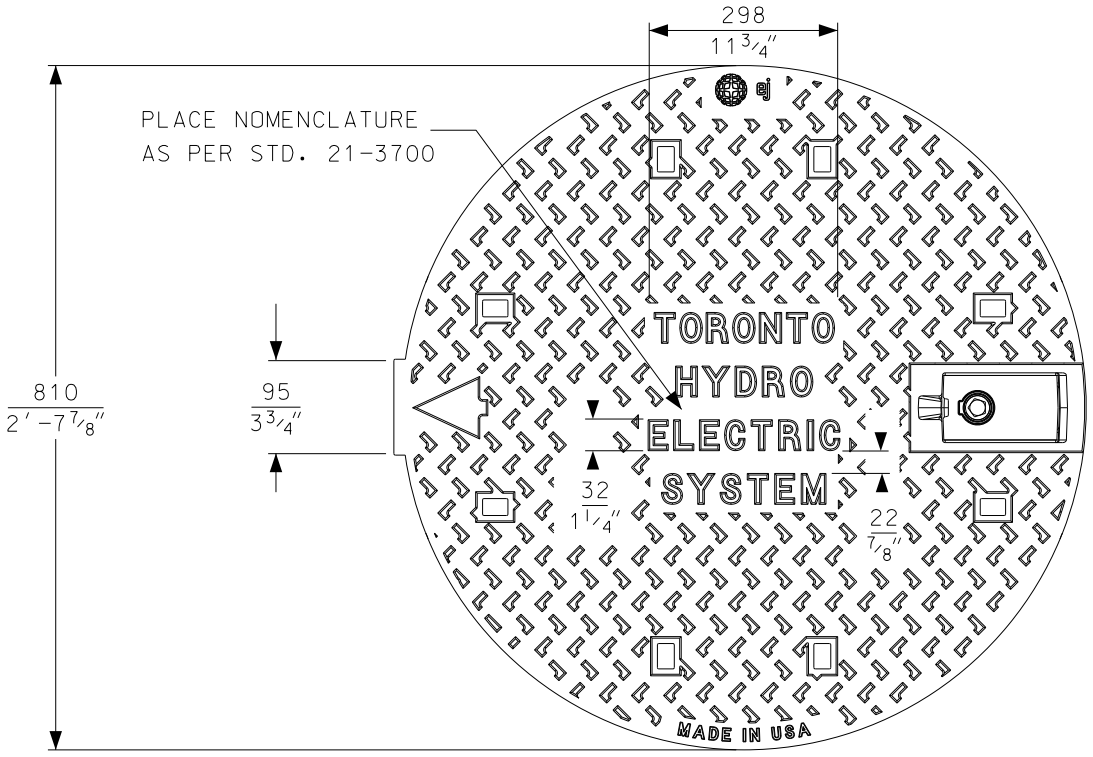
SPLICE VAULT 'B' - 3 PIECE PRECAST
1930 mm (6'-4") x 3050 mm (10'-0") x 1370 (4'-6") mm DEEP

Original Issue:	Scale:	Rev:		
G.D./C.P. 2003-05-30	N.T.S.	8	31-2240	4/4

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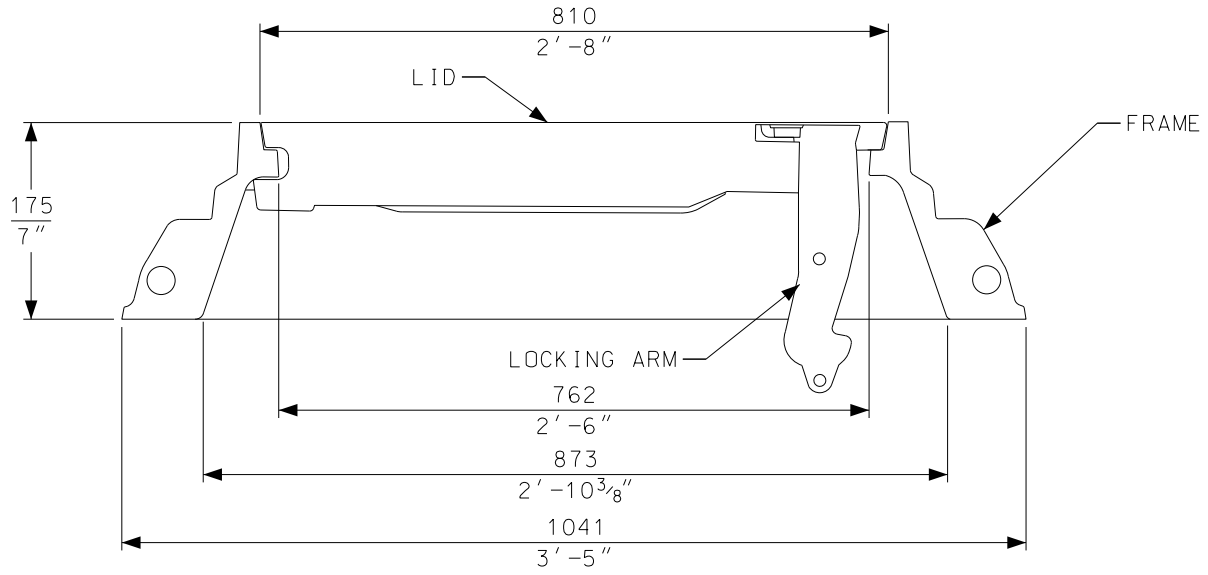
TOP VIEW - CABLE CHAMBER LID AND FRAME



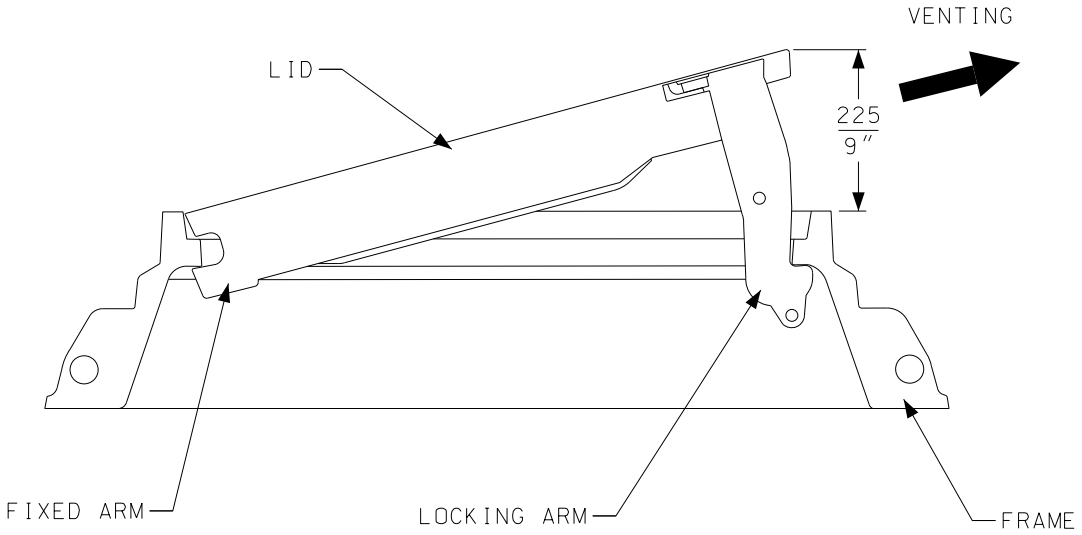
TOP VIEW - CABLE CHAMBER LID

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			ENERGY MITIGATING CABLE CHAMBER FRAME AND LID					⚠1
TORONTO HYDRO	Approved By:							
	Drafted By: B.D.	Designed By: B.D.	Original Issue: B.D. 2020-05-15	Scale: N.T.S.	Rev: 1	31-2270	1/4	

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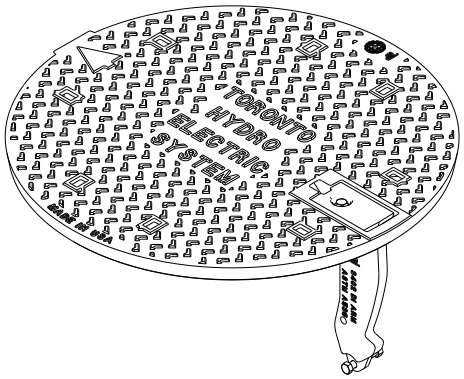
SECTION 'A-A' - LID AND FRAME



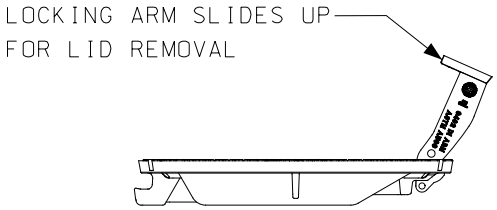
SIDE VIEW - LID DURING VENTING

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			ENERGY MITIGATING CABLE CHAMBER FRAME AND LID					⚠1
TORONTO HYDRO	Approved By:							
	Drafted By: B.D.	Designed By: B.D.	Original Issue: B.D. 2020-05-15	Scale: N.T.S.	Rev: 1	31-2270	2/4	

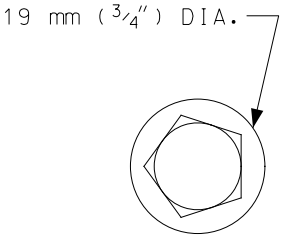
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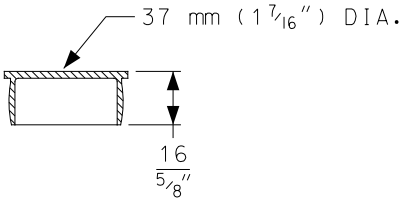
ISOMETRIC VIEW - CABLE CHAMBER LID



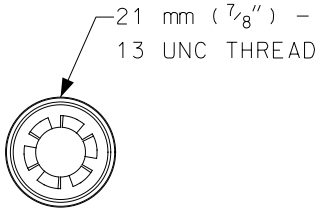
SIDE VIEW - CABLE CHAMBER LID REMOVAL



TOP VIEW - PENTA BOLT
ITEM ID#:100000678



SIDE VIEW - BOLT CAP
ITEM ID#:100000680



TOP VIEW - WASHER
ITEM ID#:100000679

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			ENERGY MITIGATING CABLE CHAMBER FRAME AND LID					⚠1
TORONTO HYDRO	Approved By:							
	Drafted By: B.D.	Designed By: B.D.	Original Issue: B.D. 2020-05-15	Scale: N.T.S.	Rev: 1	31-2270	3/4	

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BOM LEGEND	
A	NEW INSTALLATION C/W (FRAME/LID/LOCKING ARM/PENTA BOLT/WASHER/CAP)
B	REPLACEMENT PARTS

BILL OF MATERIALS FOR 31-2270				
ITEM NO.	DESCRIPTION	ITEM I.D.	QUANTITY A	QUANTITY B
1	ENERGY MITIGATING CABLE CHAMBER LID/FRAME AND ALL COMPONENETS	9664903	1	–
2	PENTA BOLT 13 mm (1/2")-13 X 32 mm (1 1/4")	100000678	–	1
3	RETAIN WASHER 1/2"	100000679	–	1
4	PLASTIC CAP CAM LOCK	100000680	–	1
	ASSOCIATED STANDARDS			
5	GENERAL INFORMATION AND GUIDELINES	STD.31-2010	1	1
6	LID PLACEMENT	STD.31-2120	1	1
7	STRUCTURAL DETAILS	STD.31-2130	1	1
8	CABLE CHAMBER STENCILING	STD.21-3700	1	1

NOTES: ⚠1

1) REFER TO STANDARD 31-2010 FOR CABLE CHAMBER GENERAL INFORMATION AND GUIDELINES.
2) DESIGN LOAD MEETS CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6-06, CL-625 ONT LIVE LOADING.
3) LID MATERIAL IS DUCTILE IRON.
4) CABLE CHAMBER LID DESIGN SHALL MEET NON-SLIP REQUIREMENTS AS OUTLINED IN THE STANDARD PRACTICE FOR SAFE WALKING SURFACES DOCUMENT "ASTM F1637-09" AND ALSO THE "CITY OF TORONTO ACCESSIBILITY DESIGN GUIDELINES".

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

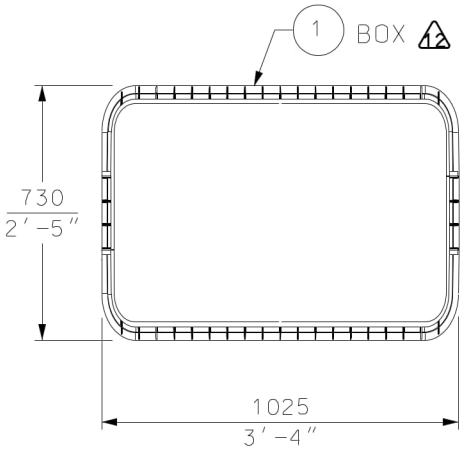
ENERGY MITIGATING CABLE CHAMBER FRAME AND LID ⚠1

TORONTO HYDRO

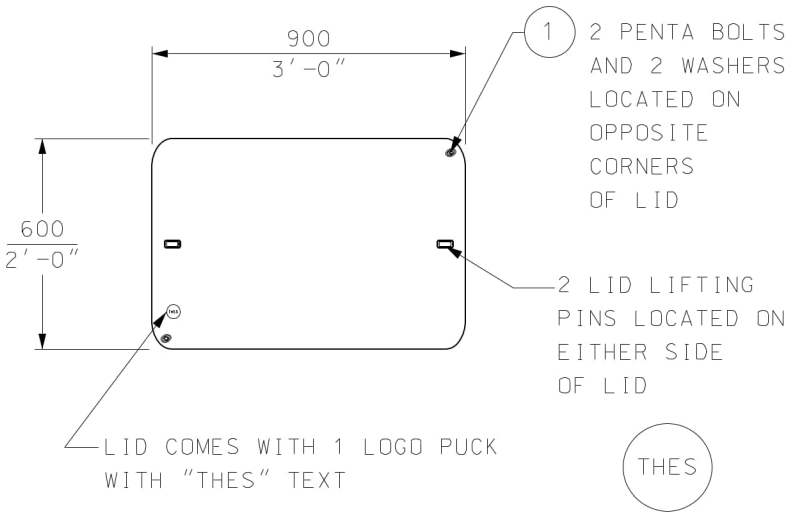
Approved By:

Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
B.D.	B.D.	B.D. 2020-05-15	N.T.S.	1	31-2270	4/4

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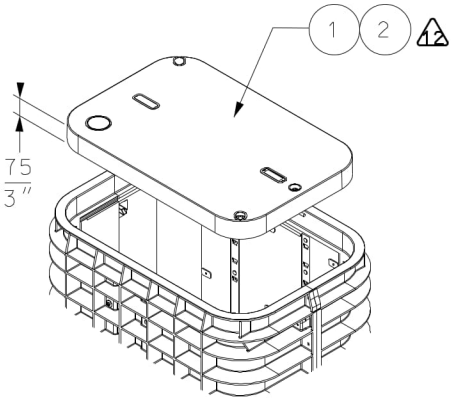
BOX PLAN VIEW



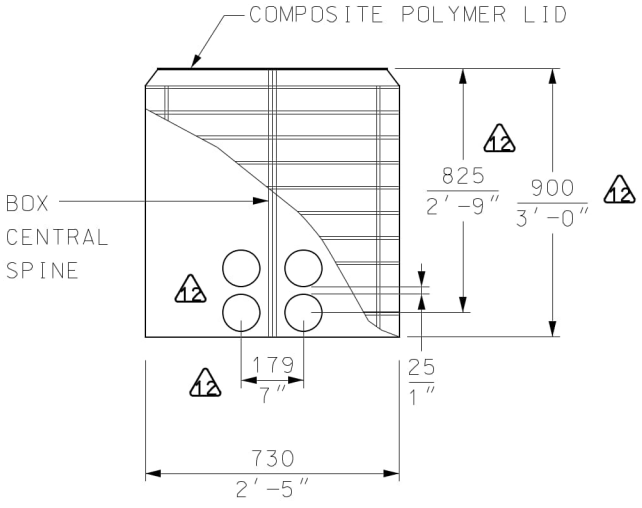
LID PLAN VIEW

COMPOSITE POLYMER LID
WEIGHS 50 LBS

LOGO PUCK DETAIL



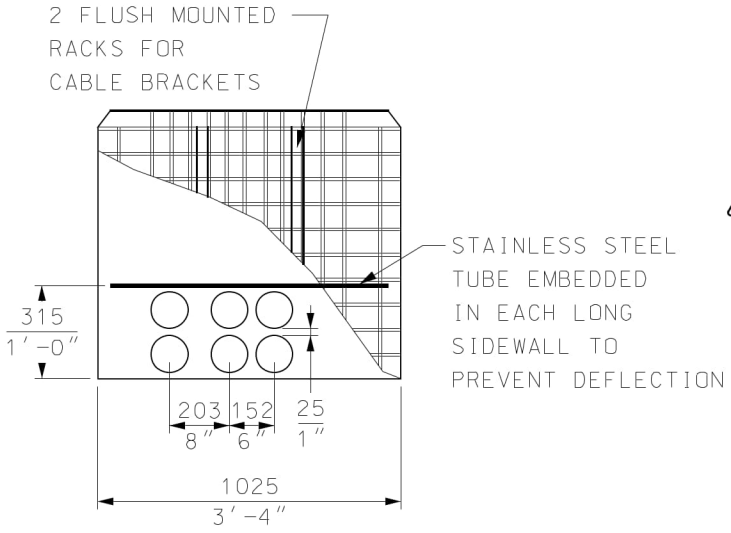
ISOMETRIC VIEW



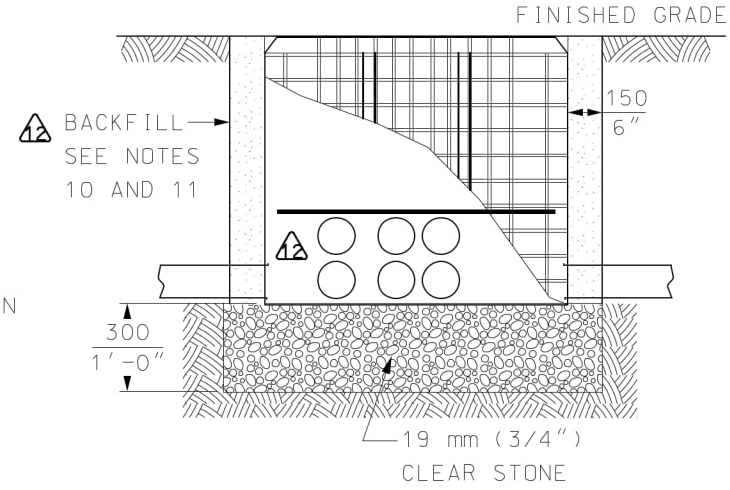
BOX SIDE VIEW - SHORT SIDEWALL

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE/TAP BOX TYPE 'A' - FOR SECONDARY CABLES ONLY				
TORONTO HYDRO	Approved By: B.D. 2022/01/10						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 12	31-3120	1/3

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BOX SIDE VIEW - LONG SIDEWALL 12



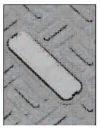
BOX SIDE VIEW - INSTALLATION DETAIL



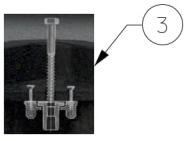
NON-SLIP
LID SURFACE



LID LIFTING HOOK
ID #9666054

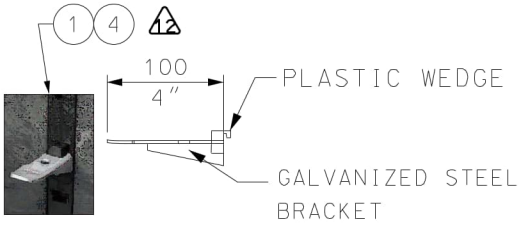


LIFTING PIN
ACCESS COVER

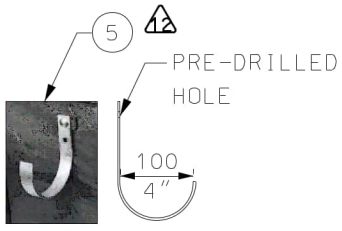


BOLT DOWN KIT 12

LID DETAIL



STEP BRACKET



HOOK BRACKET

CABLE BRACKETS

BOM LEGEND	
A	SPLICE/TAP BOX TYPE 'A'
12 B	REPLACEMENT ACCESSORIES

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction							
TORONTO HYDRO	Approved By:		SPLICE/TAP BOX TYPE 'A' - FOR SECONDARY CABLES ONLY				
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 12	31-3120	2/3

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BILL OF MATERIALS FOR 31-3120

	ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	QTY B	
	1	1 - 600X900X900 HDPE BOX 1 - COMPOSITE POLYMER LID 2 - 8 mm PENTA HEAD BOLTS 2 - WASHERS 2 - 4" STEP BRACKETS 2 - 4" HOOK BRACKETS	9665466	1	-	
12	2	LID KIT CW 1-600X900 LID, 2-PENTA BOLTS, 2-RETAINERS, 2-WASHERS	100001694	-	1	*
12	3	BOLT DOWN KIT CW - PENTA LAG W/RETAINERS AND WASHERS (2/PACKAGE)	100001689	-	1	*
12	4	4" STEP BRACKETS	100001690	-	1	*
12	5	4" HOOK BRACKETS	100001691	-	1	*

12 * WHEN REQUIRED

NOTES:

1) FOR LEGACY LID REPLACEMENTS ONLY, REFER TO FOLLOWING STOCK CODES:
   - COVER GREEN HDPE WITH LOCKING ASSEMBLY: ID# 9656831
   - GREEN EXTENSION RING 75mm: ID# 9662994
   - COVER POLYMER CONCRETE (GREY COLOR) WITH LOCKING ASSEMBLY: ID# 9662431
   - GREY EXTENSION RING 75mm: ID# 9662995
   - PENTA HEAD BOLT LOCKING ASSEMBLY: ID# 9663408

12 2) AS SHOWN, BOX COMES WITH PRE DRILLED 125 mm (5") HOLES ON EACH SIDEWALL. IF REQUIRED A MAX. OF 2 ADDITIONAL HOLES CAN BE DRILLED IN THE SHORT SIDEWALL BY USING A STANDARD HOLE SAW OR A DRILL BIT. AVOID DRILLING HOLES OR CUTTING AT THE FOLLOWING LOCATIONS:
   - THE BOX'S CENTRAL SPINE (LOCATED IN THE SHORT SIDEWALLS),
   - TOP 300 mm (1'-0") OF THE BOX.

3) BOX SHALL BE INSTALLED IN GRASSY OR PAVED BOULEVARDS. FOR INSTALLATION IN SIDEWALKS, APPROVAL IS REQUIRED FROM THE CITY OF TORONTO. FOR OPERATIONAL REASONS, BOX SHALL NOT BE INSTALLED IN ROADS, DRIVEWAYS OR AREAS WITH CONSISTENT VEHICULAR TRAFFIC.

4) TO REMOVE A FROZEN LID, MANUFACTURER RECOMMENDS HITTING AROUND PENTA BOLT LOCATIONS WITH SLEDGE HAMMER TO LOOSEN BOLTS.

5) LIFTING HOOK SHALL BE USED TO REMOVE LID (ITEM ID# 9666054).

INSTALLATION NOTES:

6) EXCAVATE 150 mm (6") LARGER THAN THE WIDTH AND LENGTH OF THE BOX.

7) EXCAVATE 300 mm (1'-0") DEEPER THAN THE OVERALL DEPTH OF THE BOX. TAMP THE BOTTOM OF THE EXCAVATION TO COMPRESS AND FLATTEN ANY LOOSE SOIL.

8) PLACE 300 mm (1' -0") OF 19 mm (3#4") CRUSHED STONE BEDDING OVER THE ENTIRE FLOOR OF THE EXCAVATION. THE CRUSHED STONE SHALL BE FREE OF SOIL AND OTHER ORGANIC MATTER. THIS PREVENTS SETTLEMENT, AIDS IN DRAINAGE, AND PROVIDES A SOLID BEDDING. AS AN ALTERNATIVE, A DRY MIX OF CEMENT AND CRUSHED ROCK IN A 1:10 RATIO MAY BE USED TO FORM A HIGHER STRENGTH BEDDING.

9) PLACE THE BOX IN THE EXCAVATION AND LEVEL SO THAT THE BOX IS FLUSH WITH FINISHED GRADE BY ADDING/ADJUSTING THE BEDDING.

10) COMPLETE EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 mm (4") FROM FINISHED GRADE. CARE SHALL BE TAKEN SO NOT TO CAUSE EXCESSIVE DAMAGE TO THE BOX'S CELLULAR RIBS DURING THE BACKFILLING PROCESS.

11) BACKFILL THE REMAINING 100 mm (4") TO FINISHED GRADE AS PER SPECIFICATION #CV-CON-01 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

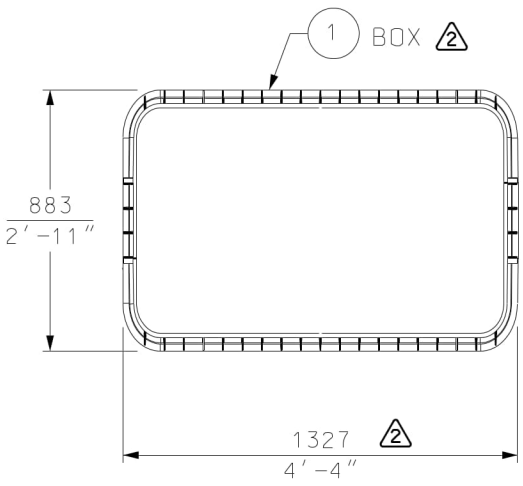
SPLICE/TAP BOX

TYPE 'A' - FOR SECONDARY CABLES ONLY

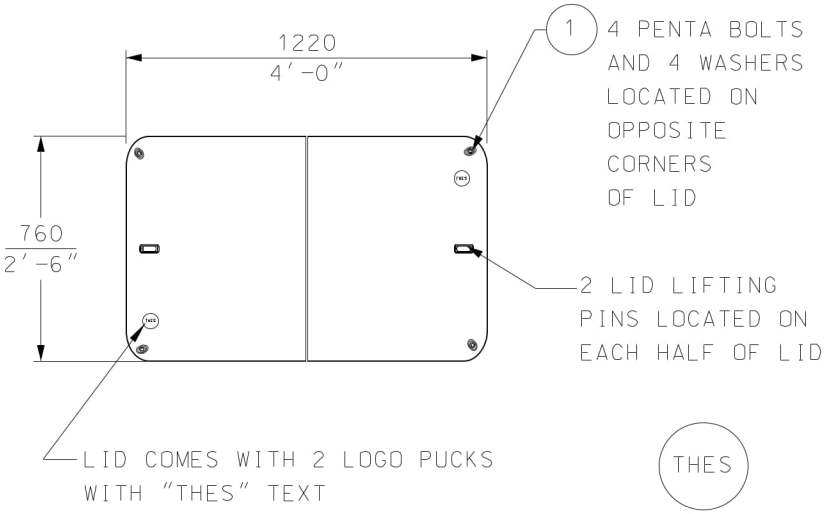
TORONTO HYDRO

Approved By:						
Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 12	31-3120	3/3

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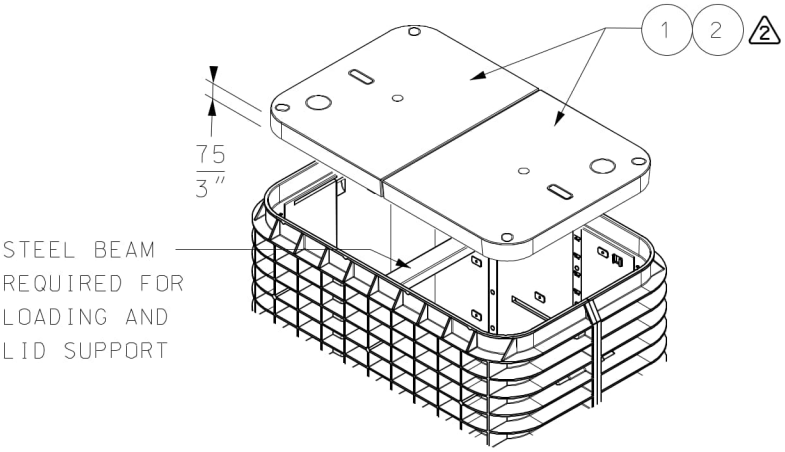
BOX PLAN VIEW



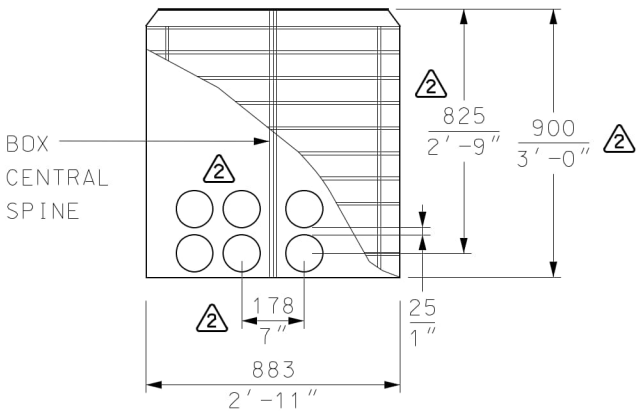
LID PLAN VIEW

COMPOSITE POLYMER LID
EACH HALF WEIGHS 50 LBS

LOGO PUCK DETAIL



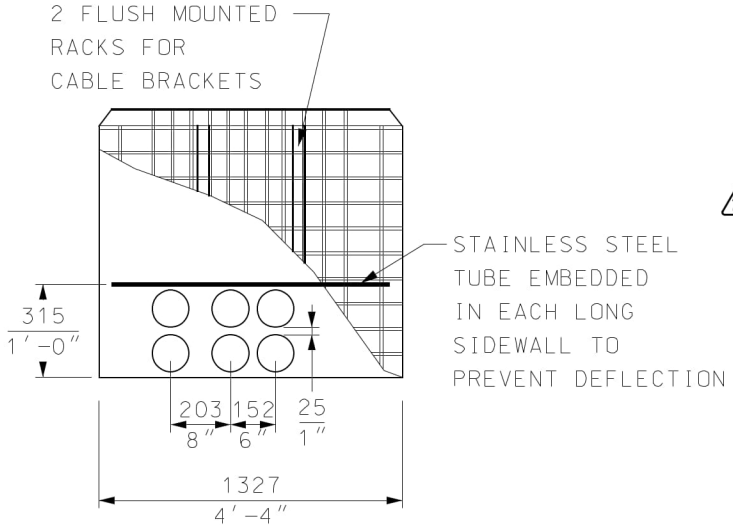
ISOMETRIC VIEW 2



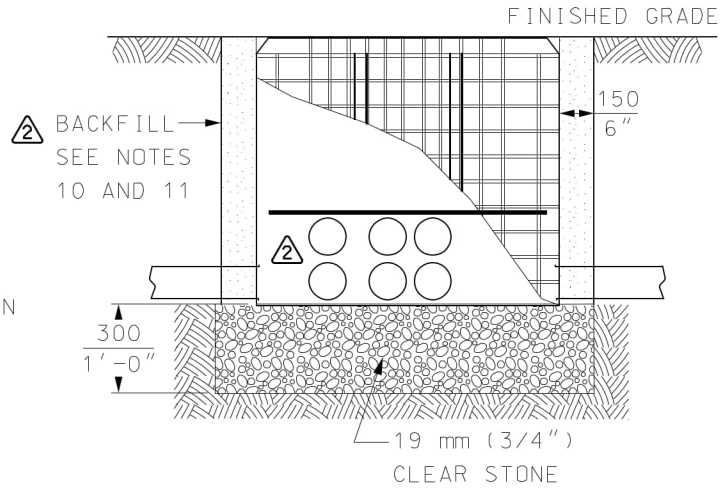
BOX SIDE VIEW - SHORT SIDEWALL

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE/TAP BOX TYPE 'B' - FOR PRIMARY OR SECONDARY CABLES				
TORONTO HYDRO	Approved By:						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: B.D. 2019-08-26	Scale: N.T.S.	Rev: 2	31-3150	1/3

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BOX SIDE VIEW - LONG SIDEWALL (2)



BOX SIDE VIEW - INSTALLATION DETAIL



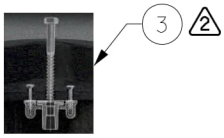
NON-SLIP
LID SURFACE



LID LIFTING HOOK
ID #9666054

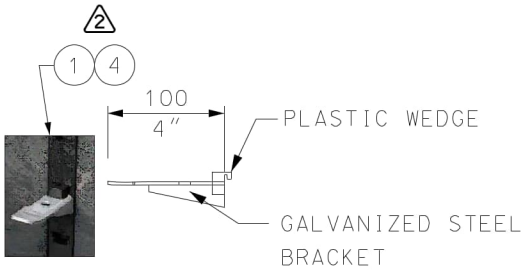


LIFTING PIN
ACCESS COVER

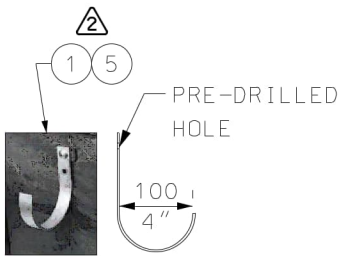


BOLT DOWN KIT

LID DETAIL



STEP BRACKET



HOOK BRACKET

CABLE BRACKETS

BOM LEGEND	
A	SPLICE/TAP BOX TYPE 'B'
(2) B	REPLACEMENT ACCESSORIES

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction							
TORONTO HYDRO	Approved By:		SPLICE/TAP BOX TYPE 'B' - FOR PRIMARY OR SECONDARY CABLES				
	Drafted By: J.D.	Designed By: B.D.	Original Issue: B.D. 2019-08-26	Scale: N.T.S.	Rev: 2	31-3150	2/3

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BILL OF MATERIALS FOR 31-3150

ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	QTY B	
1	1 – 760x1220x900 mm HDPE BOX (2) 1 – COMPOSITE POLYMER LID 4 – 8 mm PENTA HEAD BOLTS 4 – WASHERS 2 – 4″ STEP BRACKETS 2 – 4″ HOOK BRACKETS	9665467	1	–	
(2) 2	LID KIT CW 1-600X900 LID, 2-PENTA BOLTS, 2-RETAINERS, 2-WASHERS	100001693	–	1	*
(2) 3	BOLT DOWN KIT CW – PENTA LAG W/RETAINERS AND WASHERS (2/PACKAGE)	100001689	–	1	*
(2) 4	4″ STEP BRACKETS	100001690	–	1	*
(2) 5	4″ HOOK BRACKETS	100001691	–	1	*

(2) * WHEN REQUIRED

NOTES:

1) FOR LEGACY LID REPLACEMENTS ONLY, REFER TO FOLLOWING STOCK CODES:
   - COVER GREEN HDPE WITH LOCKING ASSEMBLY: ID# 9656868
   - GREEN EXTENSION RING 75mm: ID# 9662996
   - COVER POLYMER CONCRETE (GREY COLOR) WITH LOCKING ASSEMBLY: ID# 9662430
   - GREY EXTENSION RING 75mm: ID# 9662997
   - PENTA HEAD BOLT LOCKING ASSEMBLY: ID# 9663408

(2) 2) AS SHOWN, BOX COMES WITH PRE DRILLED 125 mm (5″) HOLES ON EACH SIDEWALL. IF REQUIRED A MAX. OF 2 ADDITIONAL HOLES CAN BE DRILLED IN ALL SIDEWALLS BY USING A STANDARD HOLE SAW OR A DRILL BIT. AVOID DRILLING HOLES OR CUTTING AT THE FOLLOWING LOCATIONS:
   - THE BOX'S CENTRAL SPINE (LOCATED IN THE SHORT SIDEWALLS),
   - TOP 300 mm (1'-0″) OF THE BOX.

3) BOX SHALL BE INSTALLED IN GRASSY OR PAVED BOULEVARDS. FOR INSTALLATION IN SIDEWALKS, APPROVAL IS REQUIRED FROM THE CITY OF TORONTO. FOR OPERATIONAL REASONS, BOX SHALL NOT BE INSTALLED IN ROADS, DRIVEWAYS OR AREAS WITH CONSISTENT VEHICULAR TRAFFIC.

4) TO REMOVE A FROZEN LID, MANUFACTURER RECOMMENDS HITTING AROUND PENTA BOLT LOCATIONS WITH SLEDGE HAMMER TO LOOSEN BOLTS.

5) LIFTING HOOK SHALL BE USED TO REMOVE LID (ITEM ID# 9666054).

INSTALLATION NOTES:

6) EXCAVATE 150 mm (6″) LARGER THAN THE WIDTH AND LENGTH OF THE BOX.

7) EXCAVATE 300 mm (1'-0″) DEEPER THAN THE OVERALL DEPTH OF THE BOX. TAMP THE BOTTOM OF THE EXCAVATION TO COMPRESS AND FLATTEN ANY LOOSE SOIL.

8) PLACE 300 mm (1' -0″) OF 19 mm (3#4″) CRUSHED STONE BEDDING OVER THE ENTIRE FLOOR OF THE EXCAVATION. THE CRUSHED STONE SHALL BE FREE OF SOIL AND OTHER ORGANIC MATTER. THIS PREVENTS SETTLEMENT, AIDS IN DRAINAGE, AND PROVIDES A SOLID BEDDING. AS AN ALTERNATIVE, A DRY MIX OF CEMENT AND CRUSHED ROCK IN A 1:10 RATIO MAY BE USED TO FORM A HIGHER STRENGTH BEDDING.

9) PLACE THE BOX IN THE EXCAVATION AND LEVEL SO THAT THE BOX IS FLUSH WITH FINISHED GRADE BY ADDING/ADJUSTING THE BEDDING.

10) COMPLETE EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 mm (4″) FROM FINISHED GRADE. CARE SHALL BE TAKEN SO NOT TO CAUSE EXCESSIVE DAMAGE TO THE BOX'S CELLULAR RIBS DURING THE BACKFILLING PROCESS.

11) BACKFILL THE REMAINING 100 mm (4″) TO FINISHED GRADE AS PER SPECIFICATION #CV-CON-01 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.

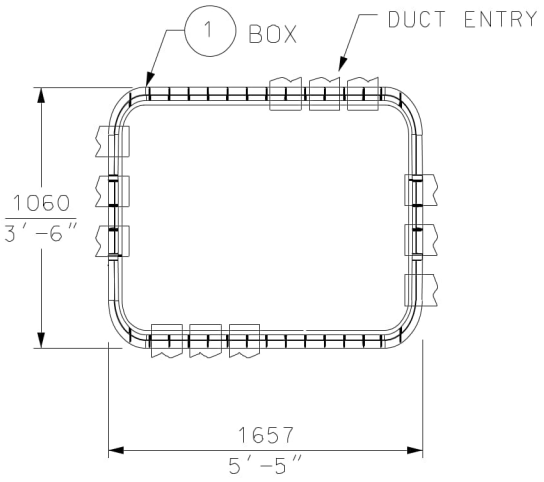
DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

SPLICE/TAP BOX
TYPE 'B' - FOR PRIMARY OR SECONDARY CABLES

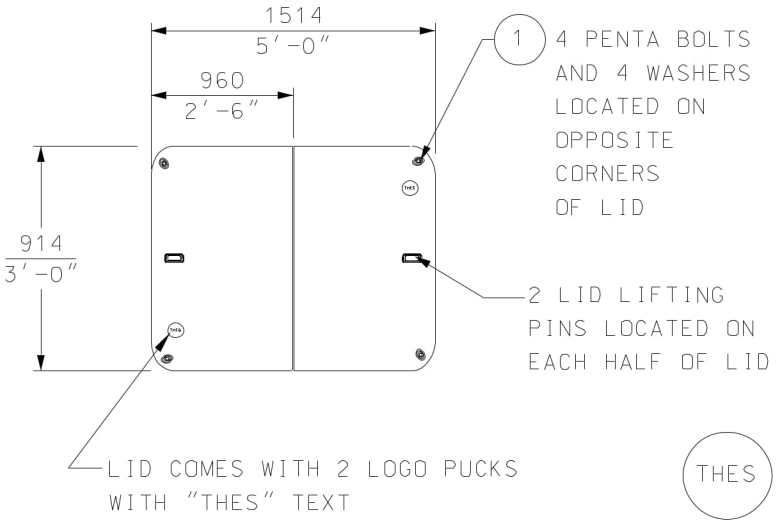
TORONTO HYDRO

Approved By:						
Drafted By: J.D.	Designed By: B.D.	Original Issue: B.D. 2019-08-26	Scale: N.T.S.	Rev: 2	31-3150	3/3

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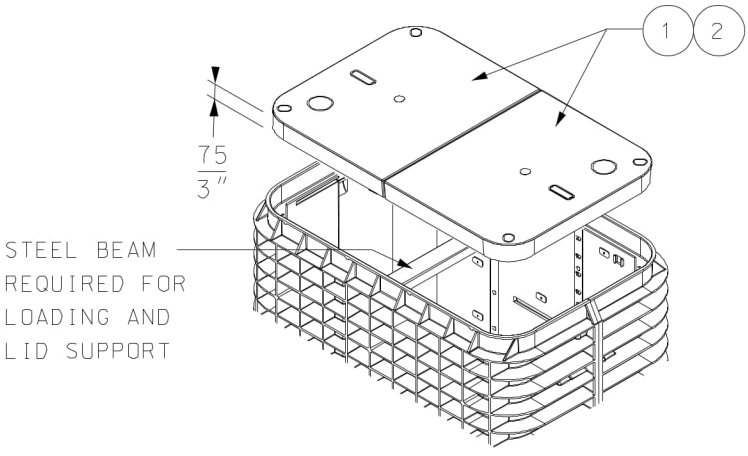
BOX PLAN VIEW 1



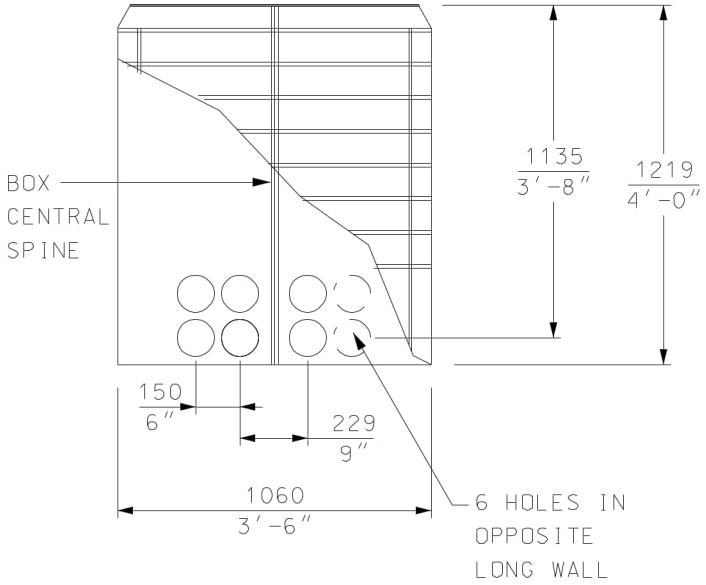
LID PLAN VIEW 1

COMPOSITE POLYMER LID

LOGO PUCK DETAIL



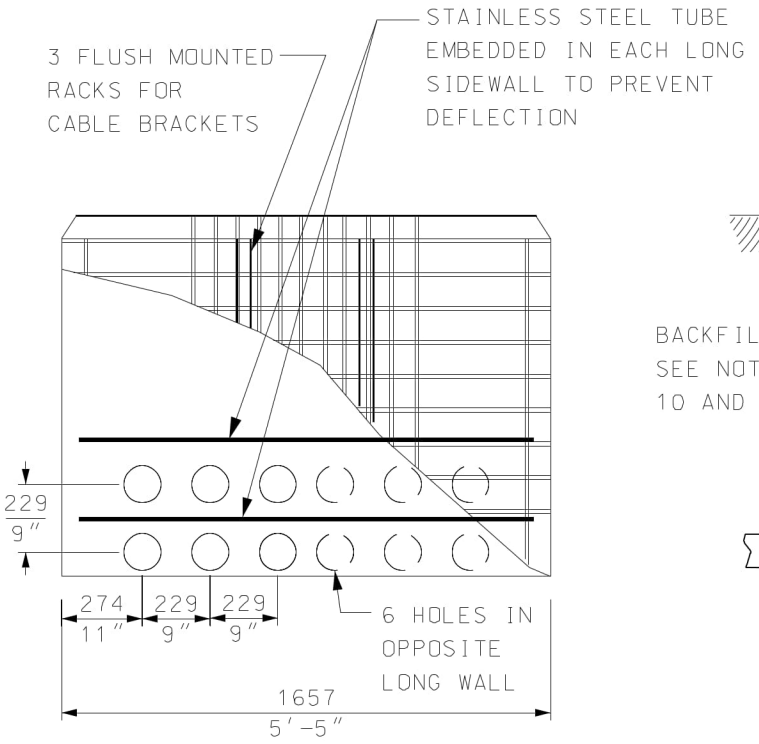
ISOMETRIC VIEW



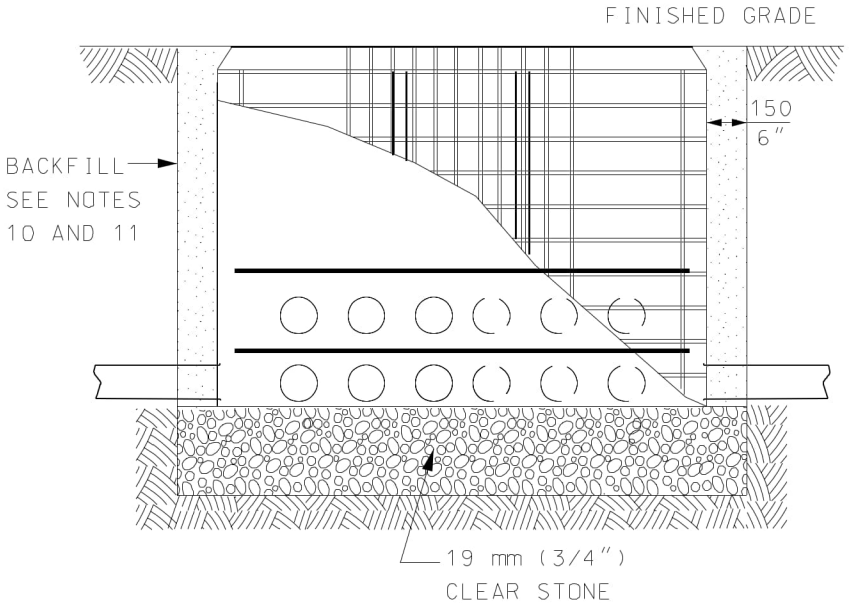
BOX SIDE VIEW - SHORT SIDEWALL

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE/TAP BOX 1 TYPE 'C' - 914 mm (3'-0") x 1514 mm (5'-0") - FOR PRIMARY CABLES				
TORONTO HYDRO	Approved By: B.D. 2022/02/24						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: B.D. 2022-01-31	Scale: N.T.S.	Rev: 1	31-3170	1/3

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BOX SIDE VIEW △1 LONG SIDEWALL



BOX SIDE VIEW INSTALLATION DETAIL



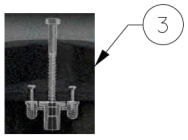
NON-SLIP LID SURFACE



LID LIFTING HOOK ID #9666054

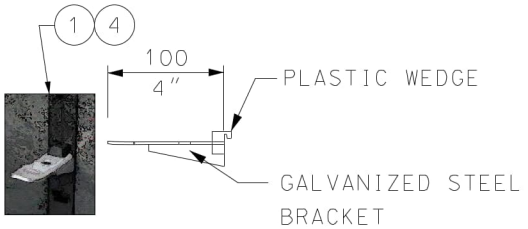


LIFTING PIN ACCESS COVER

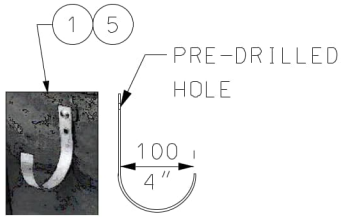


BOLT DOWN KIT

LID DETAIL



STEP BRACKET



HOOK BRACKET

CABLE BRACKETS

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE/TAP BOX △1 TYPE 'C' - 914 mm (3'-0") x 1514 mm (5'-0") - FOR PRIMARY CABLES				
TORONTO HYDRO	Approved By: B.D. 2022/02/24						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: B.D. 2022-01-31	Scale: N.T.S.	Rev: 1	31-3170	2/3

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BOM LEGEND	
A	SPLICE/TAP BOX TYPE 'C'
B	REPLACEMENT ACCESSORIES

1

BILL OF MATERIALS FOR 31-3170					
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	QTY B	
1	1 – 1060x1657x1219 mm HDPE BOX 1 – COMPOSITE POLYMER LID 4 – 8 mm PENTA HEAD BOLTS 4 – WASHERS 2 – 4" STEP BRACKETS (WITH 2 WEDGES) 2 – 4" HOOK BRACKETS		1	–	
2	LID KIT CW 1-915x1514 LID, 2-PENTA BOLTS, 2-RETAINERS, 2-WASHERS		–	1	*
3	BOLT DOWN KIT CW – PENTA LAG W/RETAINERS AND WASHERS (2/PACKAGE)	100001689	–	1	*
4	4" STEP BRACKETS	100001690	–	1	*
5	4" HOOK BRACKETS	100001691	–	1	*

* WHEN REQUIRED

NOTES:

1) FOR LEGACY LID REPLACEMENTS ONLY, REFER TO FOLLOWING STOCK CODES:
   – COVER GREEN HDPE WITH LOCKING ASSEMBLY: ID# 9663405
   – PENTA HEAD BOLT LOCKING ASSEMBLY: ID# 9663408
2) AS SHOWN, BOX COMES WITH PRE DRILLED 125 mm (5") HOLES ON EACH SIDEWALL. IF REQUIRED, A MAX. OF 2 ADDITIONAL HOLES CAN BE DRILLED IN ALL SIDEWALLS BY USING A STANDARD HOLE SAW OR A DRILL BIT. AVOID DRILLING HOLES OR CUTTING AT THE FOLLOWING LOCATIONS:
   – THE BOX'S CENTRAL SPINE (LOCATED IN THE SHORT SIDEWALLS),
   – TOP 300 mm (1'-0") OF THE BOX.
3) BOX SHALL BE INSTALLED IN GRASSY OR PAVED BOULEVARDS. FOR INSTALLATION IN SIDEWALKS, APPROVAL IS REQUIRED FROM THE CITY OF TORONTO. FOR OPERATIONAL REASONS, BOX SHALL NOT BE INSTALLED IN ROADS, DRIVEWAYS OR AREAS WITH CONSISTENT VEHICULAR TRAFFIC.
4) TO REMOVE A FROZEN LID, MANUFACTURER RECOMMENDS HITTING AROUND PENTA BOLT LOCATIONS WITH SLEDGE HAMMER TO LOOSEN BOLTS.
5) LIFTING HOOK SHALL BE USED TO REMOVE LID (ITEM ID# 9666054).

INSTALLATION NOTES:

6) EXCAVATE 150 mm (6") LARGER THAN THE WIDTH AND LENGTH OF THE BOX.
7) EXCAVATE 300 mm (1'-0") DEEPER THAN THE OVERALL DEPTH OF THE BOX. TAMP THE BOTTOM OF THE EXCAVATION TO COMPRESS AND FLATTEN ANY LOOSE SOIL.
8) PLACE 300 mm (1' -0") OF 19 mm (3/4") CRUSHED STONE BEDDING OVER THE ENTIRE FLOOR OF THE EXCAVATION. THE CRUSHED STONE SHALL BE FREE OF SOIL AND OTHER ORGANIC MATTER. THIS PREVENTS SETTLEMENT, AIDS IN DRAINAGE, AND PROVIDES A SOLID BEDDING. AS AN ALTERNATIVE, A DRY MIX OF CEMENT AND CRUSHED ROCK IN A 1:10 RATIO MAY BE USED TO FORM A HIGHER STRENGTH BEDDING.
9) PLACE THE BOX IN THE EXCAVATION AND LEVEL SO THAT THE BOX IS FLUSH WITH FINISHED GRADE BY ADDING/ADJUSTING THE BEDDING.
10) COMPLETE EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 mm (4") FROM FINISHED GRADE. CARE SHALL BE TAKEN SO NOT TO CAUSE EXCESSIVE DAMAGE TO THE BOX'S CELLULAR RIBS DURING THE BACKFILLING PROCESS.
11) BACKFILL THE REMAINING 100 mm (4") TO FINISHED GRADE AS PER SPECIFICATION #CV-CON-01 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

Approved By: B.D. 2022/02/24

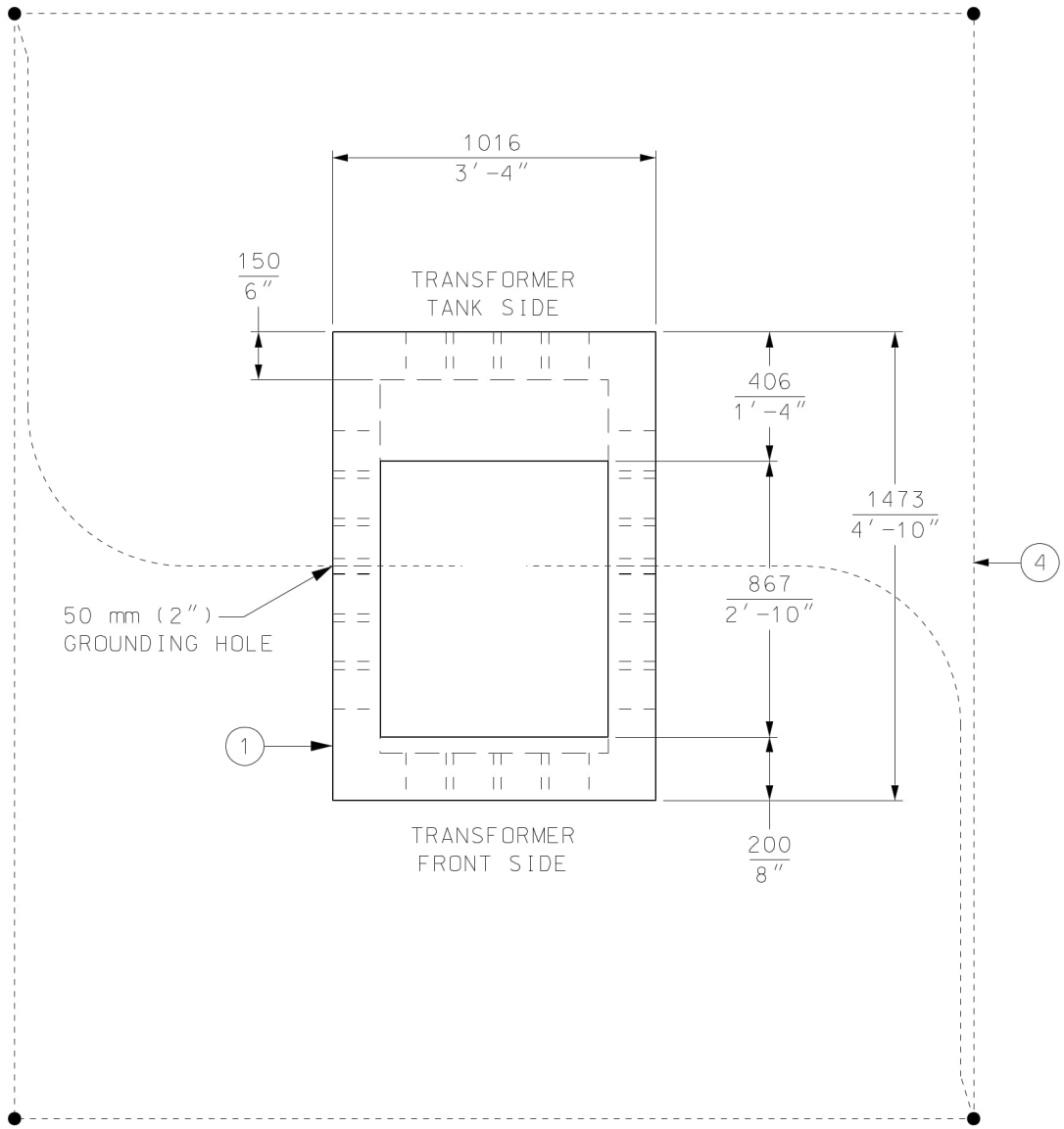
SPLICE/TAP BOX

TYPE 'C' - 914 mm (3'-0") x 1514 mm (5'-0") - FOR PRIMARY CABLES

1

Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
J.D.	B.D.	B.D. 2022-01-31	N.T.S.	1	31-3170	3/3

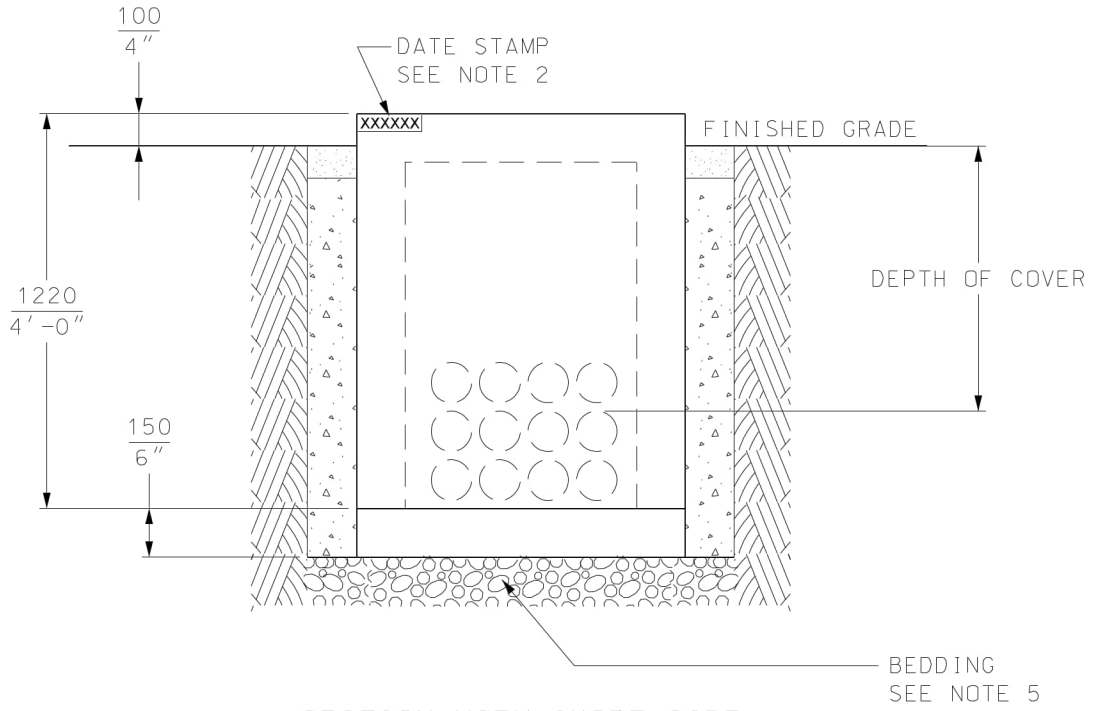
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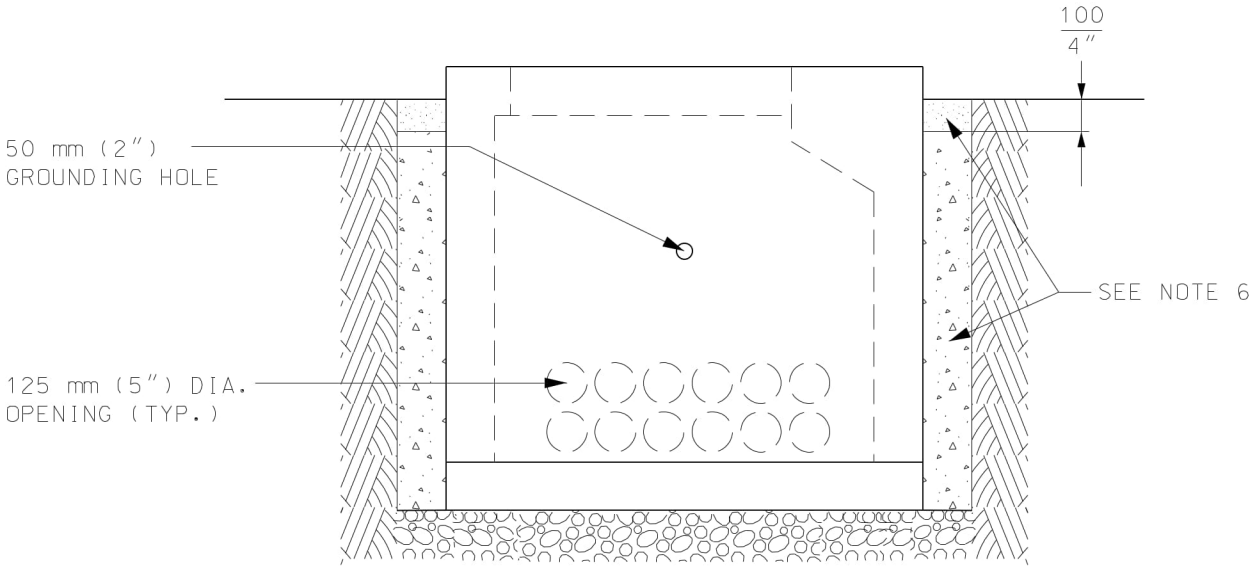
14 PAD-MOUNT PLAN VIEW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS SINGLE PHASE 1016 mm (3'-4") x 1473 mm (4'-10")					14
TORONTO HYDRO	Approved By: B.D. 2023/04/28							
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-07-11	Scale: N.T.S.	Rev: 14	31-4020	1/4	

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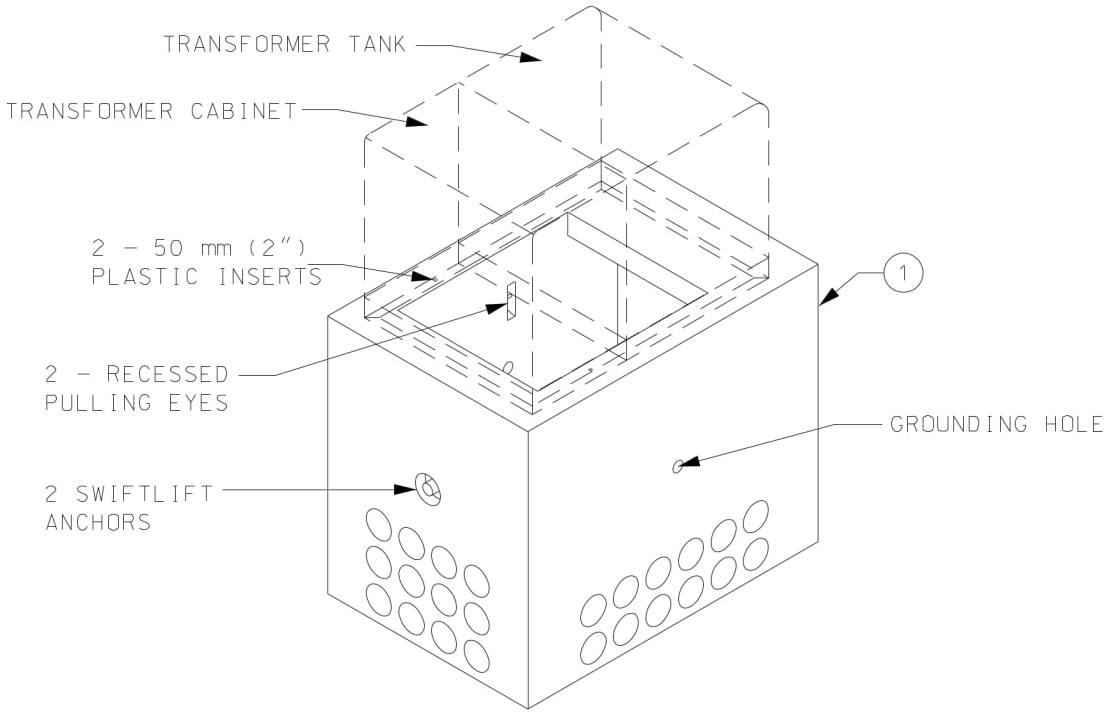
SECTION VIEW SHORT SIDE



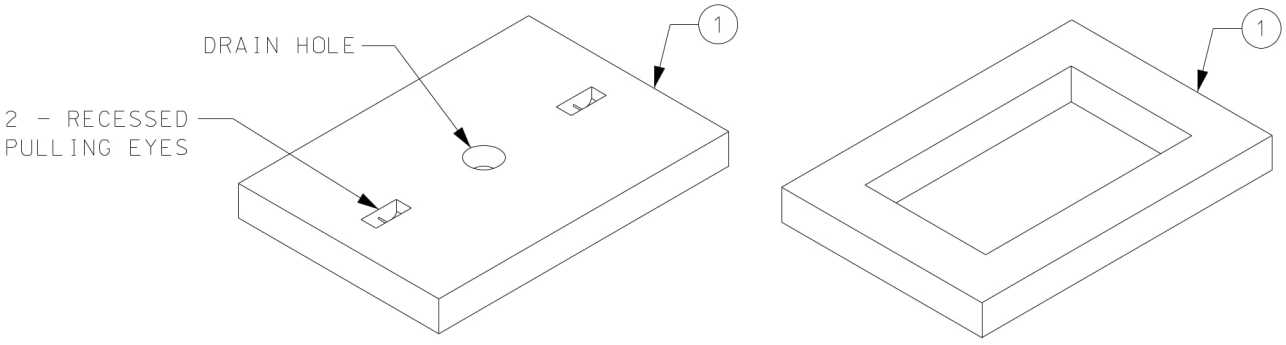
SECTION VIEW LONG SIDE

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS SINGLE PHASE 1016 mm (3'-4") x 1473 mm (4'-10")				14
TORONTO HYDRO	Approved By: B.D. 2023/04/28						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-07-11	Scale: N.T.S.	Rev: 14	31-4020	2/4

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14 PAD ISOMETRIC VIEW



BOTTOM SLAB ISOMETRIC VIEW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS SINGLE PHASE 1016 mm (3'-4") x 1473 mm (4'-10")				14
TORONTO HYDRO	Approved By: B.D. 2023/04/28						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-07-11	Scale: N.T.S.	Rev: 14	31-4020	3/4

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14

BILL OF MATERIALS FOR 31-4020			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A
1	PAD-MOUNT WITH BOTTOM SLAB 1016 (3'-4") X 1473 (4'-10")	100002162	1
	ASSOCIATED STANDARDS		
2	GUARD POSTS (BOLLARDS)	STD. 31-4080	1
3	CLEARANCE ZONE	STD. 31-4100	1
4	GROUNDING REQUIREMENTS	STD. 18-5500	1

NOTES: 14

MATERIALS:

1) CONCRETE SHALL HAVE A MIN. 28-DAY COMPRESSIVE STRENGTH OF 35 MPa. CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST CSA-A23.1. ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.
2) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
3) CONCRETE EXPOSURE CLASSIFICATION SHALL BE C-1.
4) ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.

INSTALLATION:

5) PLACE 19 mm (3/4") CLEAR STONE BEDDING ON UNDISTURBED SOIL CAPABLE OF SUSTAINING 175 kPa AND COMPACT TO 98% STANDARD PROCTOR DENSITY.
6) EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 MM (4") FROM FINISHED GRADE. BACKFILL THE REMAINING 100 MM (4") TO FINISHED GRADE AS PER TORONTO HYDRO CIVIL SPECIFICATION CV-CON-01.
7) FOR VEHICULAR TRAFFIC REFER TO GUARD POSTS (BOLLARDS) STD. 31-4080.
8) FOR CLEARANCE ZONE AROUND PAD-MOUNT REFER TO STD. 31-4100.
9) PAD-MOUNT LOCATION SHALL BE KEPT CLEAR OF OBSTRUCTIONS FOR ACCESS BY TORONTO HYDRO PERSONNEL AND EQUIPMENT.
10) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.
11) CONTRACTOR SHALL PLUG GROUNDING HOLES AND PARGED PRIOR TO BACKFILLING.
12) PRECAST UNITS ARE DELIVERED BY CRANE-EQUIPPED TRUCKS. EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK. MIN. OVERHEAD CLEARANCE OF 5.5 m (18'-0") IS REQUIRED. CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE UNITS INTO EXCAVATION.

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

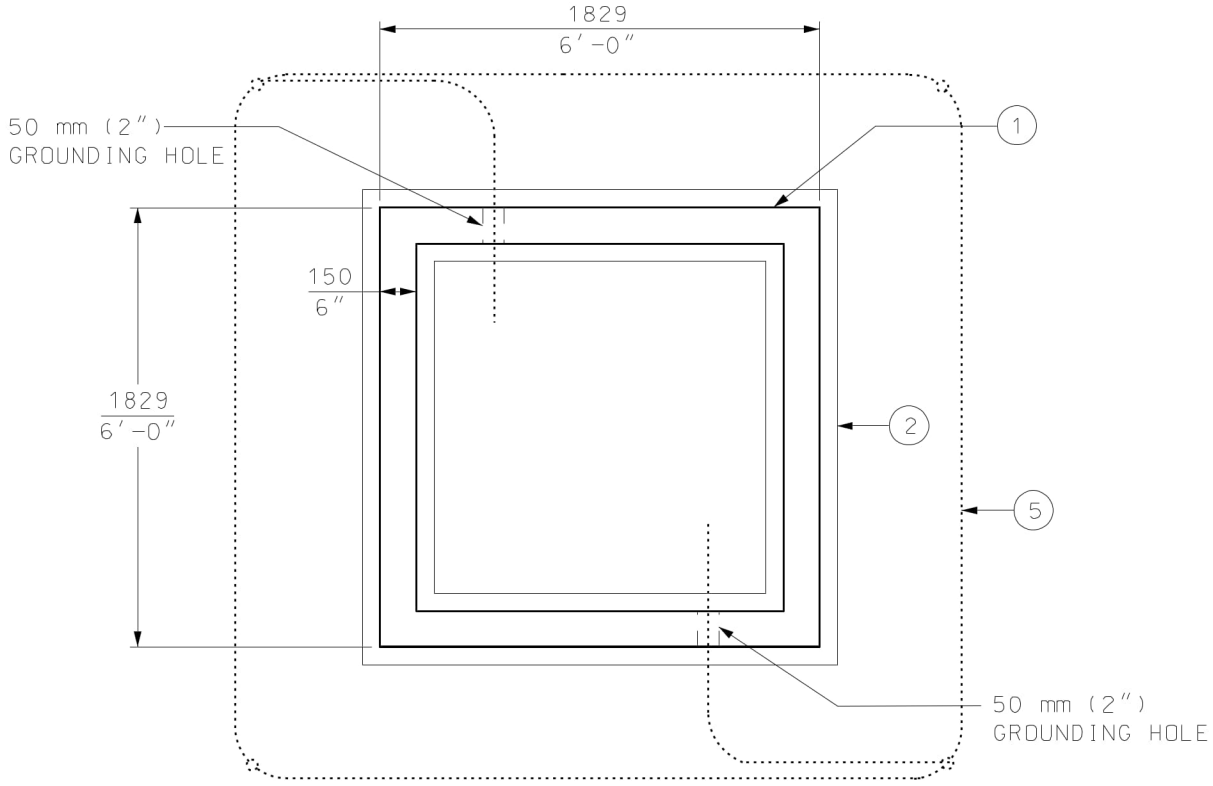
PAD-MOUNTS
SINGLE PHASE
1016 mm (3'-4") x 1473 mm (4'-10")

14

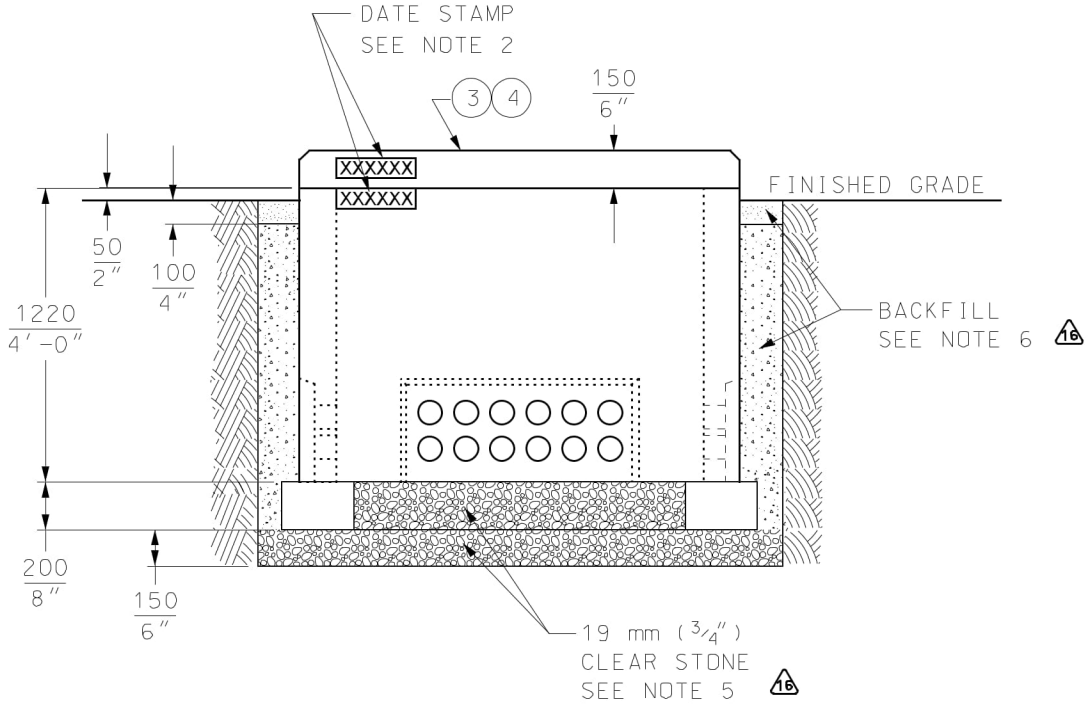
TORONTO HYDRO

Approved By:						
Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-07-11	Scale: N.T.S.	Rev: 14	31-4020	4/4

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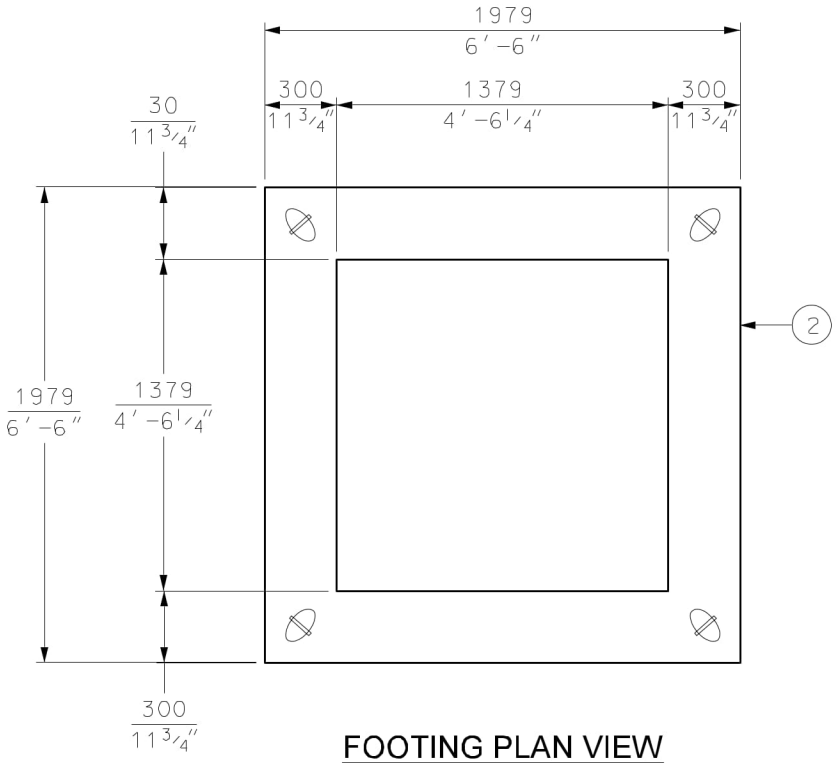
PAD-MOUNT AND FOOTING
PLAN VIEW



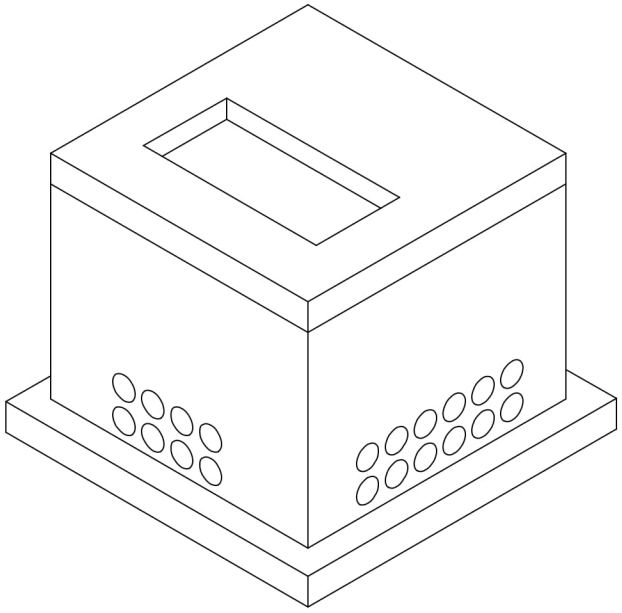
SECTION VIEW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS THREE PHASE PRECAST PAD-MOUNT 1830 mm (6'-0") x 1830 mm (6'-0")					16
TORONTO HYDRO	Approved By:							
	Drafted By: J.D.	Designed By: B.D.	Original Issue: C.P./G.D. 2002-07-11	Scale: N.T.S.	Rev: 16	31-4030	1/3	

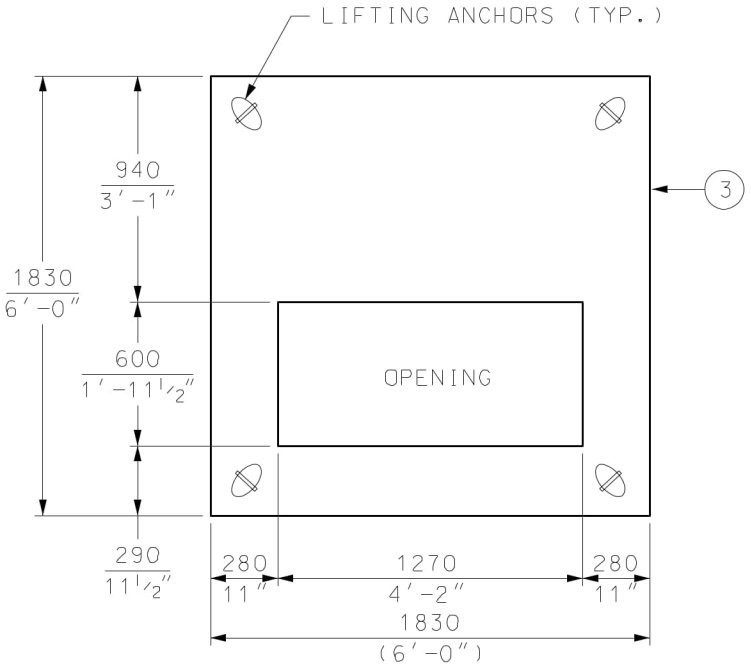
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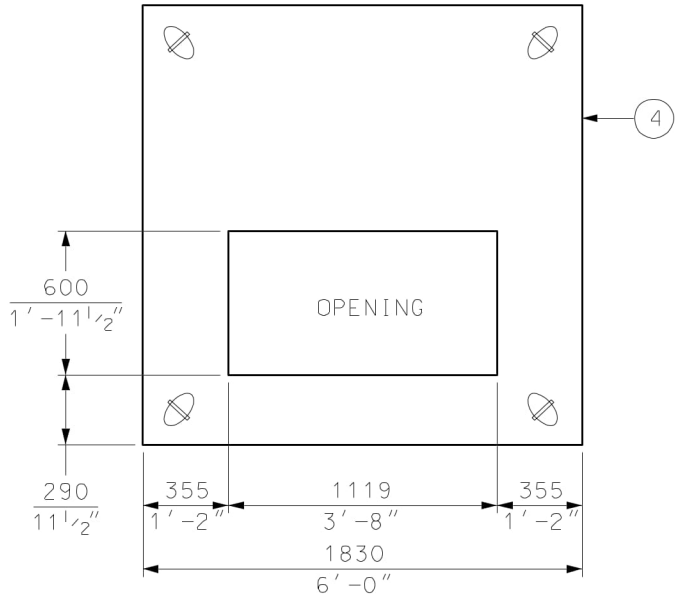
FOOTING PLAN VIEW



ISOMETRIC VIEW



THREE PHASE TRANFORMER LID
PLAN VIEW



METERING LID
PLAN VIEW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS THREE PHASE PRECAST PAD-MOUNT 1830 mm (6'-0") x 1830 mm (6'-0")					16
TORONTO HYDRO	Approved By:							
	Drafted By: J.D.	Designed By: B.D.	Original Issue: C.P./G.D. 2002-07-11	Scale: N.T.S.	Rev: 16	31-4030	2/3	

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BILL OF MATERIALS FOR 31-4030			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY
1	FOUNDATION PAD 1830 mm x 1830 mm x 1220 mm DEEP	3540014	1
2	STRIP FOOTING (FLOOR) 1980 mm x 1980 mm x 200 mm, 300 mm WIDE	9656479	1
3	LID (COVER) 1830 mm x 1830 mm x 150 mm DEEP - FOR THREE PHASE TRANSFORMER PAD	3540022	1
4	LID (COVER) 1830 mm X 1830 mm X 150 mm - FOR THREE PHASE METERING PAD	9662541	1
	ASSOCIATED STANDARDS		
5	GUARD POSTS (BOLLARDS)	STD.31-4080	1
6	CLEARANCE ZONE	STD.31-4100	1
7	GROUNDING REQUIREMENTS	STD.18-5500	1

NOTES:

MATERIALS: 16

1) CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa. CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST EDITION OF CSA-A23.1. ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.
2) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
3) CONCRETE EXPOSURE CLASSIFICATION SHALL BE C-1.
4) ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.

INSTALLATION:

5) PLACE 19 mm (3/4") CLEAR STONE BEDDING ON UNDISTURBED SOIL CAPABLE OF SUSTAINING 175 kPa AND COMPACT TO 98% STANDARD PROCTOR DENSITY.
6) EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 MM (4") FROM FINISHED GRADE. BACKFILL THE REMAINING 100 MM (4") TO FINISHED GRADE AS PER TORONTO HYDRO CIVIL SPECIFICATION CV-CON-01.
7) FOR VEHICULAR TRAFFIC REFER TO GUARD POSTS (BOLLARDS) STD. 31-4080.
8) PAD-MOUNT LOCATION SHALL BE KEPT CLEAR OF OBSTRUCTIONS FOR ACCESS BY TORONTO HYDRO PERSONNEL AND EQUIPMENT.
9) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.
10) CONTRACTOR SHALL PLUG GROUNDING HOLES AND PARGED PRIOR TO BACKFILLING. CONTRACTOR SHALL PLUG TOP SLAB LIFTING ANCHOR OPENINGS WITH CAULKING PRIOR TO PLACEMENT OF TRANSFORMER.
11) PRECAST UNITS SHALL BE DELIVERED BY CRANE-EQUIPPED TRUCKS. EXCAVATION SHALL BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK. MINIMUM OVERHEAD CLEARANCE OF 5500 mm (18'-0") IS REQUIRED. CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE PRECAST UNITS INTO EXCAVATION.
12) CUSTOMER TO PROVIDE 3000 mm (10'-0") OF FLAT LEVEL GROUND SURFACE ON OPERATING SIDE (IN-FRONT) OF TRANSFORMER FOR OPERATIONAL NEEDS.

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

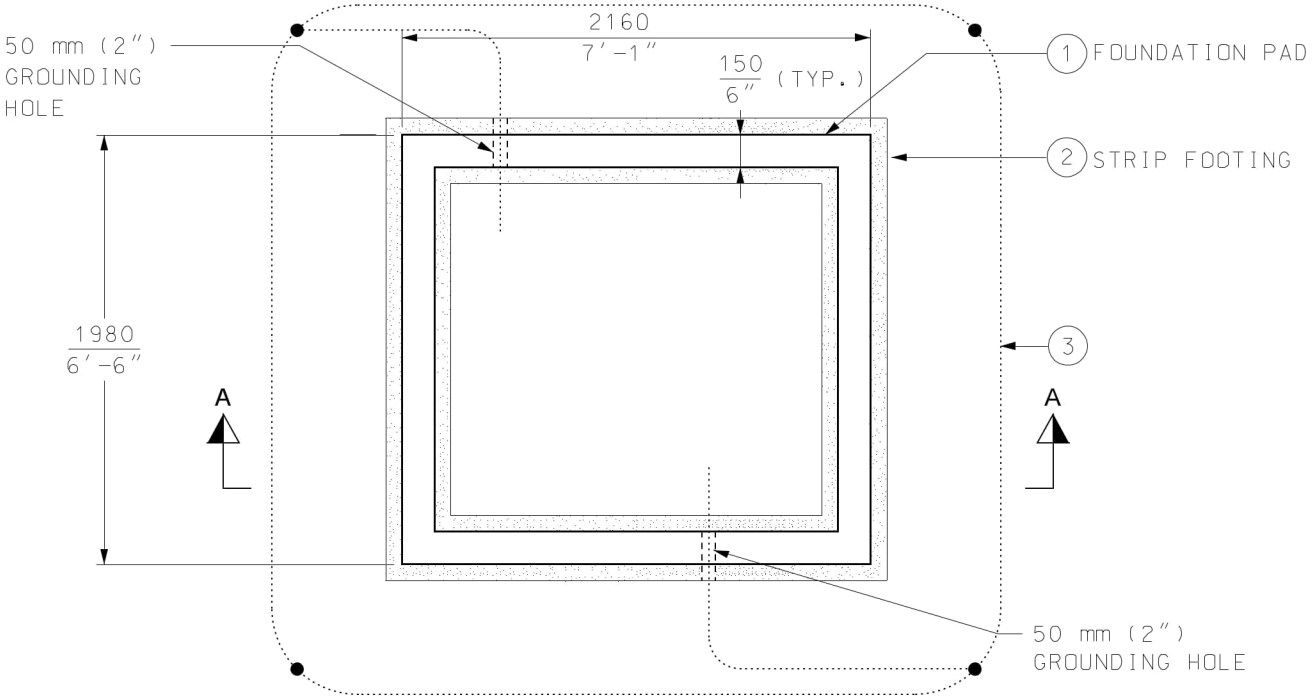
Approved By:

PAD-MOUNTS
THREE PHASE PRECAST PAD-MOUNT
1830 mm (6'-0") x 1830 mm (6'-0")

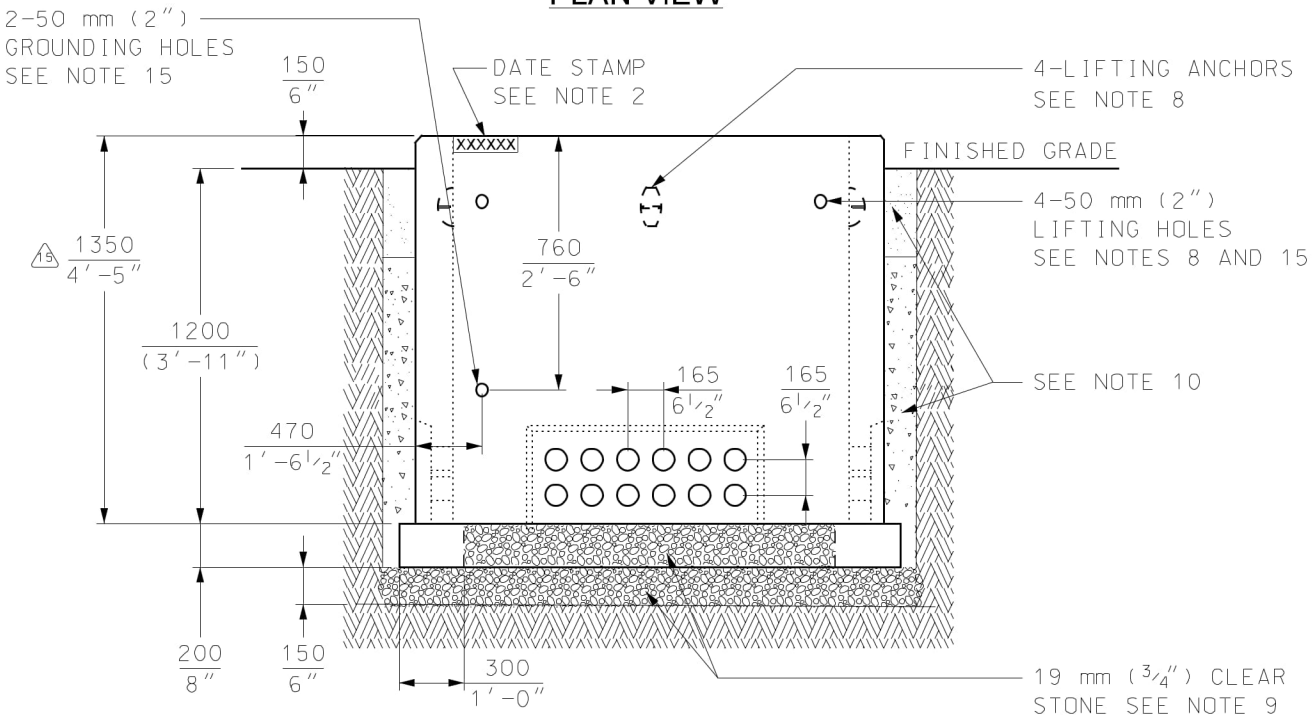
16

Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
J.D.	B.D.	C.P./G.D. 2002-07-11	N.T.S.	16	31-4030	3/3

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PLAN VIEW



SECTION 'A-A'

BILL OF MATERIALS FOR 31-4050

ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A
1	FOUNDATION PAD 1980 mm x 2160 mm x 1350 mm DEEP	3540024	1
2	STRIP FOOTING (FLOOR) 2130 mm x 2310 mm x 200 mm, 300 mm WIDE	9656481	1
	ASSOCIATED STANDARDS		
3	GROUNDING REQUIREMENTS	STD. 18-5500	1

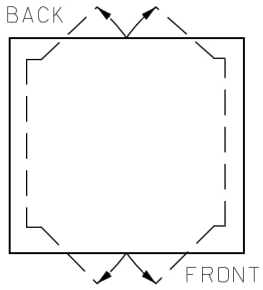
DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

PAD-MOUNTS
THREE PHASE PMH 9/11 SWITCHGEAR
1980 mm x 2160 mm x 1350 mm

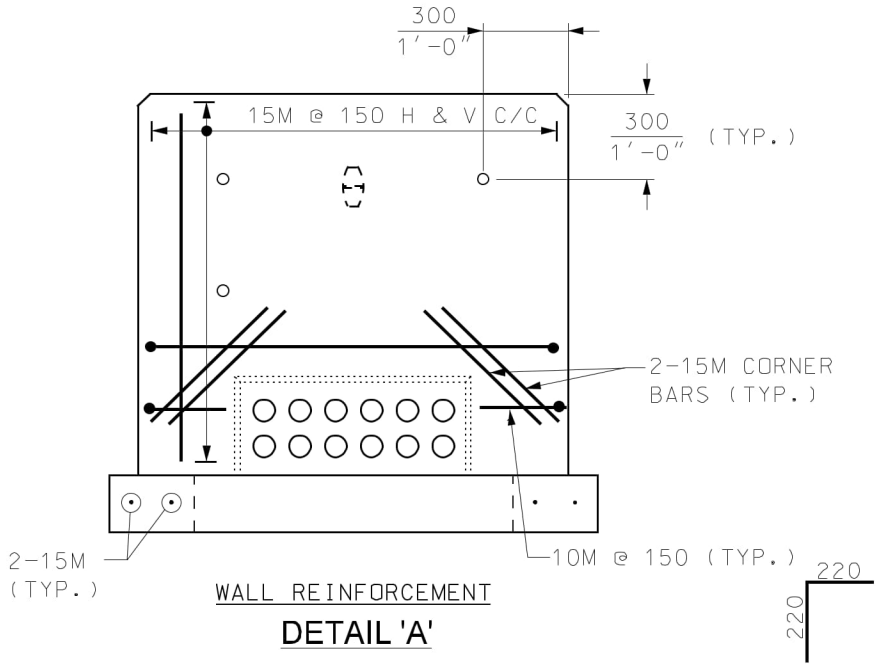
Approved By:	Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
B.D. 2020-09-25	B.D.	B.D.	G.D./C.P. 2002-07-11	N.T.S.	15	31-4050	1/2

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PAD DETAIL

* DOORS TO BE ON LONGER SIDES



WALL REINFORCEMENT

DETAIL 'A'

NOTES:

MATERIALS:

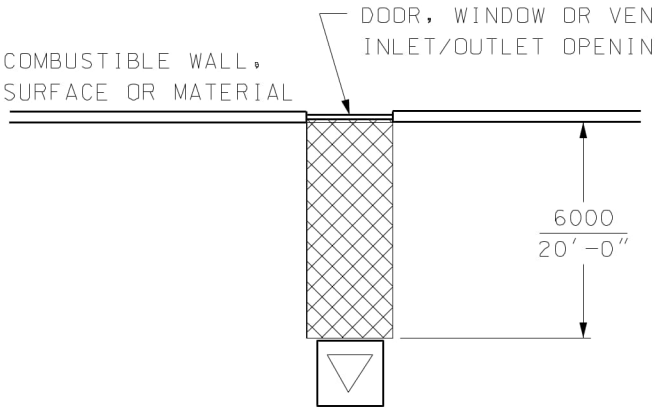
1) CONCRETE SHALL HAVE A MIN. 28-DAY COMPRESSIVE STRENGTH OF 35 MPa. CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST CSA-A23.1. ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.
2) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
3) EXPOSURE CLASSIFICATION TO FREEZING AND THAWING IN A SATURATED CONDITION BUT WITH NO CHLORIDES SHALL BE F-1.
4) ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.
5) CONCRETE COVER ON PRECAST STRIP FOOTING SHALL BE 50 mm (2"), ALL OTHERS SHALL BE 30 mm (1¼"). ALL EXPOSED EDGES SHALL HAVE 25 mm (1") CHAMFER.
6) PROVIDE 90° STANDARD HOOK FOR WALL HORIZONTAL REINFORCING BARS.
7) 4 - 13 mm (½") THREADED INSERTS FOR TRANSFORMER MOUNTING SHALL BE ADDED. THE INSERTS TO BE PLUGGED BY THE MANUFACTURER TO PREVENT ENTRY OF FOREIGN MATTER DURING TRANSIT.
8) LIFTING HOLES CAN BE INSTALLED IN FOUNDATION WALLS FOR MANUFACTURER'S LIFTING PREFERENCE. IN ADDITION, 4-LIFTING ANCHORS FOR LIFTING PURPOSES SHALL BE PROVIDED ON THE INSIDE OF ALL FOUNDATION WALLS AND ON TOP OF STRIP FOOTING AS SHOWN IN THIS STANDARD. LIFTING ANCHORS SHALL BE GALVANIZED. LIFTING ANCHORS SHALL BE CAPABLE OF LIFTING THE PRECAST UNITS AND THIS SHALL BE CERTIFIED BY MANUFACTURER'S PROFESSIONAL ENGINEER.

INSTALLATION:

9) PLACE 19 mm (¾") CLEAR STONE BEDDING ON UNDISTURBED SOIL CAPABLE OF SUSTAINING 75 kPa AND COMPACT TO 98% STANDARD PROCTOR DENSITY.
10) EXCAVATION SHALL BE BACKFILLED TO FINISHED GRADE AS PER TORONTO HYDRO CIVIL SPECIFICATION CV-CON-01 CLAUSE 5.1.17 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.
11) TORONTO HYDRO INSPECTOR SHALL BE PRESENT DURING THE INSTALLATION, 24-HOUR NOTICE IS REQUIRED PRIOR TO STARTING THE INSTALLATION.
12) FOR VEHICULAR TRAFFIC REFER TO GUARD POSTS (BOLLARDS) STD. 31-4080.
13) PAD-MOUNT LOCATION SHALL BE KEPT CLEAR OF OBSTRUCTIONS FOR ACCESS BY TORONTO HYDRO PERSONNEL AND EQUIPMENT.
14) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.
15) CONTRACTOR TO PLUG ALL HOLES (LIFTING AND GROUNDING) AND PARGED PRIOR TO BACKFILLING.
16) PRECAST UNITS ARE DELIVERED BY CRANE-EQUIPPED TRUCKS. EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK. MIN. OVERHEAD CLEARANCE OF 5.5 m (18'-0") IS REQUIRED. CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE UNITS INTO EXCAVATION.
17) WHEN LOCATING PAD-MOUNT, A 3.0 m (10'-0") AREA OF FLAT GROUND SURFACE IS REQUIRED INFRONT OF THE OPERATING SIDE (DOOR SIDE) OF TRANSFORMER FOR OPERATIONAL NEEDS.
18) THE FOUNDATION SHALL BE ORIENTED WITH THE LONG SIDE (DOOR SIDE OF SWITCHGEAR) PARALLEL TO THE CURB. FOR SCADA-OPERATED SWITCHGEARS ENSURE THAT LOW VOLTAGE AND SWITCHING COMPARTMENTS ARE NOT IN CONFLICT WITH VEHICULAR AND PEDESTRIAN TRAFFIC.

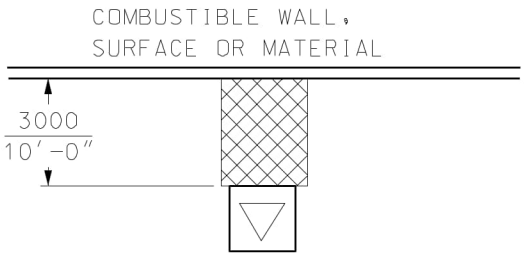
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# PAD-MOUNTS THREE PHASE PMH 9/11 SWITCHGEAR 1980 mm x 2160 mm x 1350 mm				
TORONTO HYDRO	Approved By: B.D. 2020-09-25						
	Drafted By: B.D.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-07-11	Scale: N.T.S.	Rev: 15	31-4050	2/2

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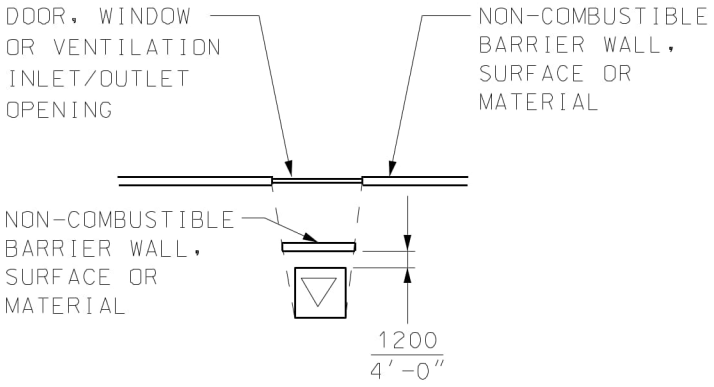
⑤ DETAIL 'A' - PLAN VIEW

SEE NOTE 2A



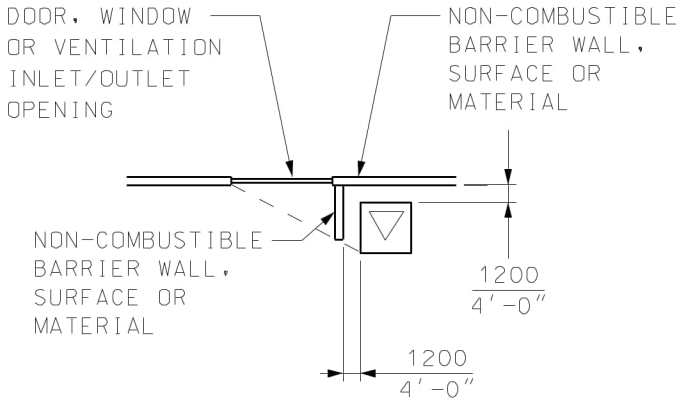
⑤ DETAIL 'B' - PLAN VIEW

SEE NOTE 2B



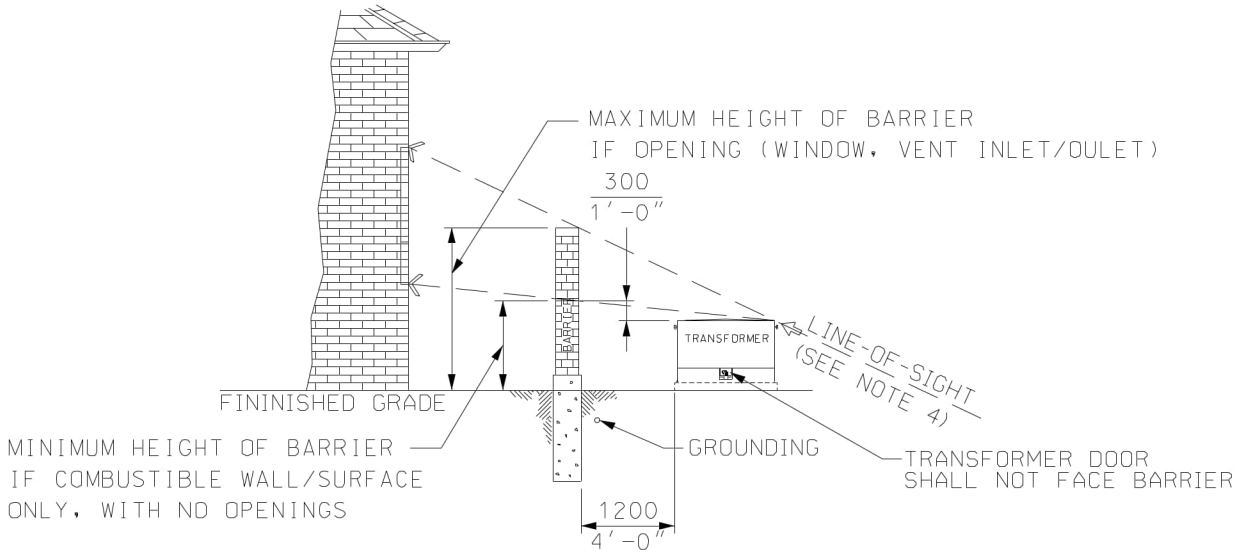
⑤ DETAIL 'C' - PLAN VIEW

SEE NOTE 2C



⑤ DETAIL 'D' - PLAN VIEW

SEE NOTE 2C

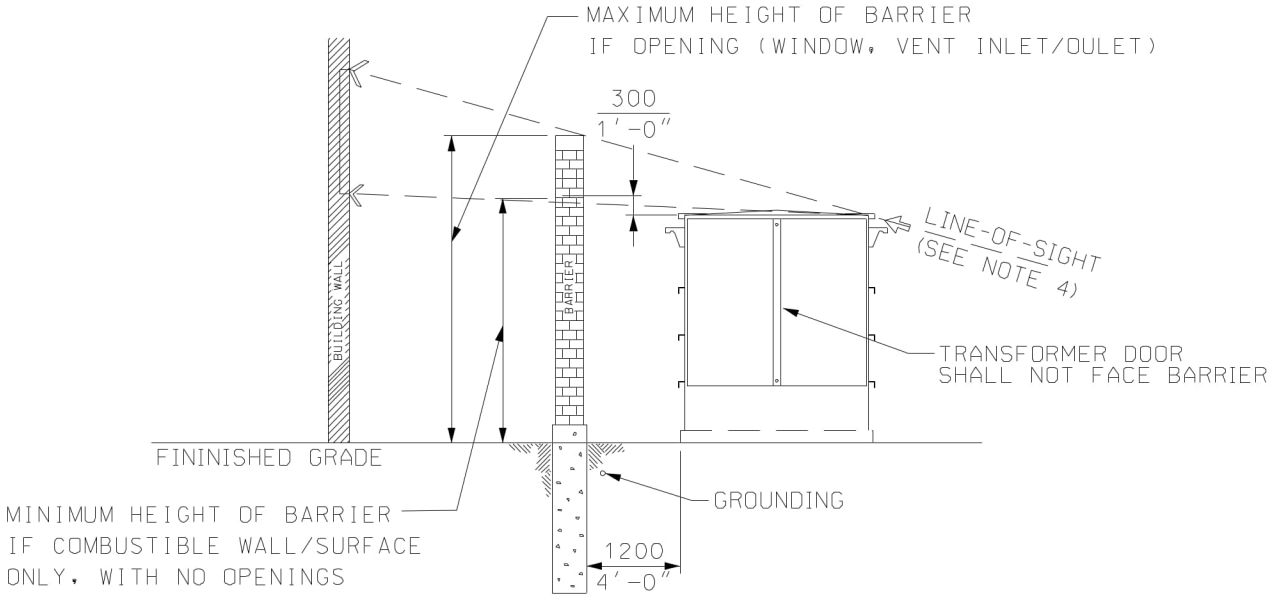


⑤ DETAIL 'E' - SECTION VIEW

SINGLE PHASE PADMOUNT TRANSFORMER, LINE OF SIGHT

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PADMOUNT TRANSFORMERS ⑤ WITHOUT INTERNAL CURRENT LIMITING FUSE AND PRESSURE RELIEF DEVICE ⑤				
TORONTO HYDRO	Approved By: B.D. 2022-01-31						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./L.G. 2004-11-30	Scale: N.T.S.	Rev: 5	31-4070	1/2

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⑤ DETAIL 'F' - SECTION VIEW

THREE PHASE PADMOUNT TRANSFORMER, LINE OF SIGHT

NOTES:

⑤ 1) PADMOUNT TRANSFORMERS WITH AN INTERNAL CURRENT LIMITING FUSE AND PRESSURE RELIEF DEVICE SHALL FOLLOW CLEARANCES AS SPECIFIED IN STD 31-4100.THIS SHALL APPLY TO ALL NEW PADMOUNT TRANSFORMERS.

⑤ 2) PADMOUNT TRANSFORMERS WITHOUT AN INTERNAL CURRENT LIMITING FUSE AND PRESSURE RELIEF DEVICE (WHICH INCLUDES ALL LEGACY PADMOUNT TRANSFORMERS) SHALL FOLLOW CLEARANCES AS SPECIFIED IN THIS STANDARD:
   A) 6000 mm (20'-0") FROM ANY DOOR, WINDOW OR VENTILATION INLET/OUTLET OPENING, OR
   B) 3000 mm (10'-0") FROM ANY COMBUSTIBLE WALL, SURFACE OR MATERIAL ON A BUILDING, OR
   C) IF 3A AND 3B CANNOT BE MET, A BARRIER WITH NON-COMBUSTIBLE SURFACE OR MATERIAL IS CONSTRUCTED BETWEEN THE TRANSFORMER AND ANY DOOR, WINDOW, VENTILATION INLET/OUTLET OPENING.

⑤ 3) NON-COMBUSTIBLE BARRIER SURFACE OR MATERIAL SHALL PROVIDE A MINIMUM OF 3 HOUR FIRE RATING.

⑤ 4) NON-COMBUSTIBLE BARRIER SURFACE OR MATERIAL SHALL EXTEND TO A PROJECTION LINE FURTHEST FROM THE CORNER OF THE TRANSFORMER AS PER DETAILS 'E' AND 'F'.

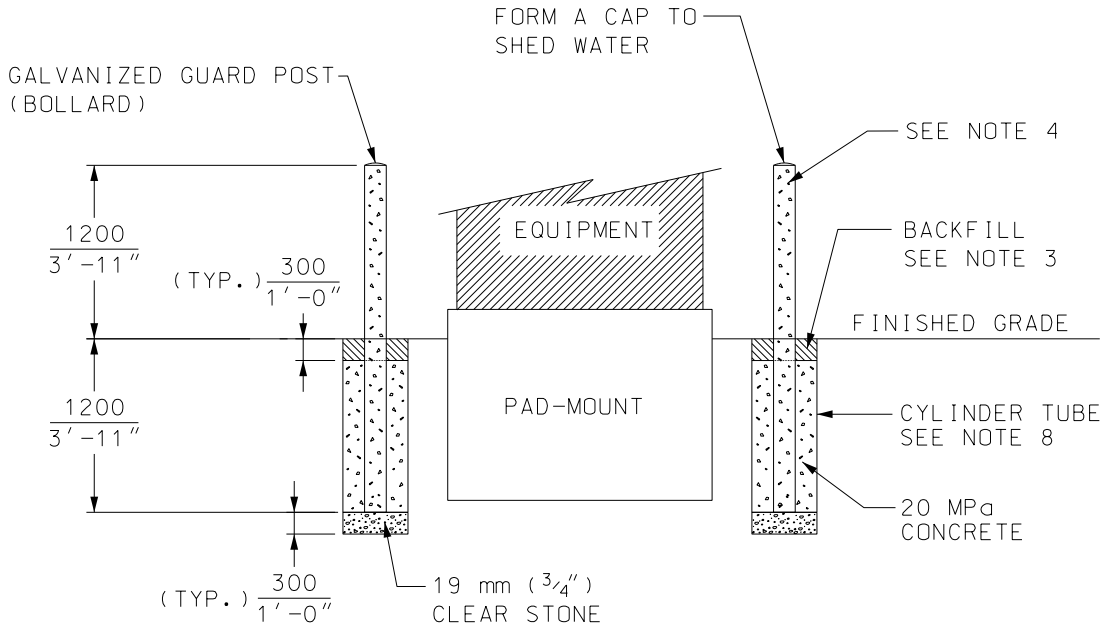
⑤ 5) NON-COMBUSTIBLE BARRIER SHALL BE DESIGNED AND INSTALLED BY CUSTOMER.

⑤ 6) NON-COMBUSTIBLE BARRIER WALL SHALL BE REINFORCED CONCRETE, BRICK OR CONCRETE BLOCK.

7) REFERENCE RULE 26-242 ONTARIO ELECTRICAL SAFETY CODE.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PADMOUNT TRANSFORMERS WITHOUT INTERNAL CURRENT LIMITING FUSE AND PRESSURE RELIEF DEVICE ⑤				
TORONTO HYDRO	Approved By: B.D. 2022-01-31						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: G.D./L.G. 2004-11-30	Scale: N.T.S.	Rev: 5	31-4070	2/2

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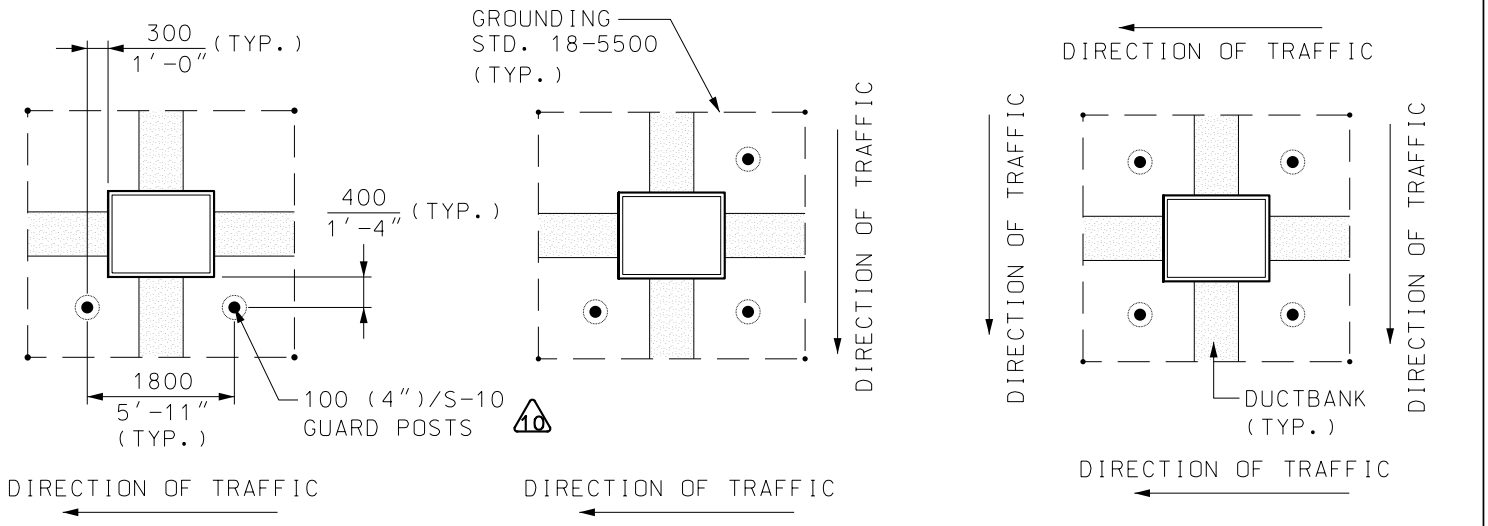
PAD-MOUNT ELEVATION VIEW

NOTES:

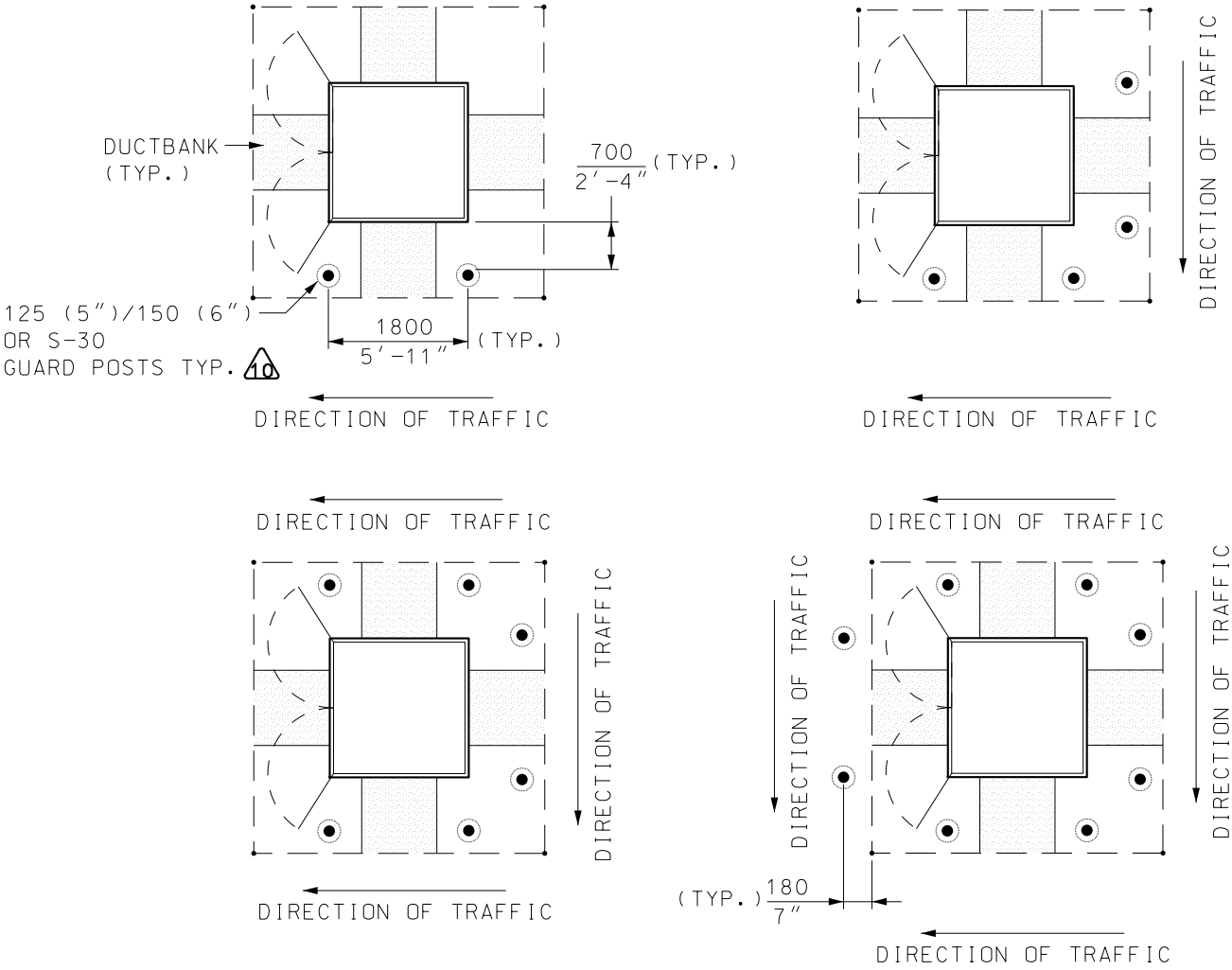
1) INSTALL GUARD POSTS (BOLLARDS) IF THE EQUIPMENT IS LESS THAN 1000 mm (3'-4") FROM THE CURB OR ANYWHERE TORONTO HYDRO DEEMS NECESSARY.
2) NUMBER OF GUARD POSTS AND LOCATIONS SHOWN ARE TYPICAL ARRANGEMENTS. ACTUAL NUMBER OF GUARD POSTS AND LOCATIONS SHALL BE DETERMINED BY TORONTO HYDRO DESIGNER OR INSPECTOR, USING THE FOLLOWING CRITERIA:
   A) GUARD POST INSTALLATIONS SHALL ALLOW EQUIPMENT DOORS TO BE OPENED THROUGH THEIR FULL RANGE.
   B) DISTANCE BETWEEN GUARD POSTS AND OUTSIDE EDGE OF THE PAD-MOUNT SHALL BE AS INDICATED IN THIS STANDARD UNLESS OTHERWISE NOTED.
   C) GUARD POST INSTALLATIONS SHALL ALLOW TORONTO HYDRO PERSONNEL UNIMPEDED ACCESS TO THE EQUIPMENT.
   D) THE MAX. DISTANCE BETWEEN TWO GUARD POSTS SHALL BE AS INDICATED IN THIS STANDARD.
3) BACKFILL REMAINING EXCAVATION AND COMPACT AS PER CIVIL SPECIFICATION CV-CON-01.
4) FILL GUARD POSTS WITH 20 MPa CONCRETE.
5) PAINT GUARD POST WITH SAFETY YELLOW PAINT. FOR PROPER ADHESION OF PAINT, GUARD POST SHALL BE CLEANED AND PRIMED PRIOR TO PAINTING. A REFLECTIVE STRIP IF REQUIRED SHALL BE PLACED AT EACH POST.
6) ALL GUARD POSTS SHALL BE GROUNDED. REFER TO STD. 18-5000 FOR GROUNDING DETAILS. REFER TO STANDARDS 31-4020, 31-4030, 31-4050 FOR PAD-MOUNT CIVIL DETAILS.
7) CONTRACTOR TO INSTALL A CONSTRUCTION JOINT AROUND THE GUARD POSTS EXCEPT IN GRASSY BOULEVARDS.
10 8) MIN. CYLINDER TUBE SIZES:
   - 200 mm (8") FOR 100 mm (4") AND 125 mm (5") GUARD POST
   - 250 mm (10") FOR 150 mm (6") GUARD POST
10 9) USE 100 mm (4") OR ASTM F3016 S-10 RATED REMOVABLE GUARD POSTS FOR 1-PHASE PADS AND 125 mm (5") /150 mm (6") OR ASTM F3016 RATED S-20 REMOVABLE GUARD POST FOR 3-PHASE AND SWITCHGEAR PADS.
10 10) REMOVABLE BOLLARD SHALL ONLY BE USED AT CUSTOMER FACING LOCATION WITH STANDARDS APPROVAL AND TORONTO HYDRO APPROVED PAD LOCK.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS GUARD POSTS (BOLLARDS)				
TORONTO HYDRO	Approved By:						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 10	31-4080	1/4

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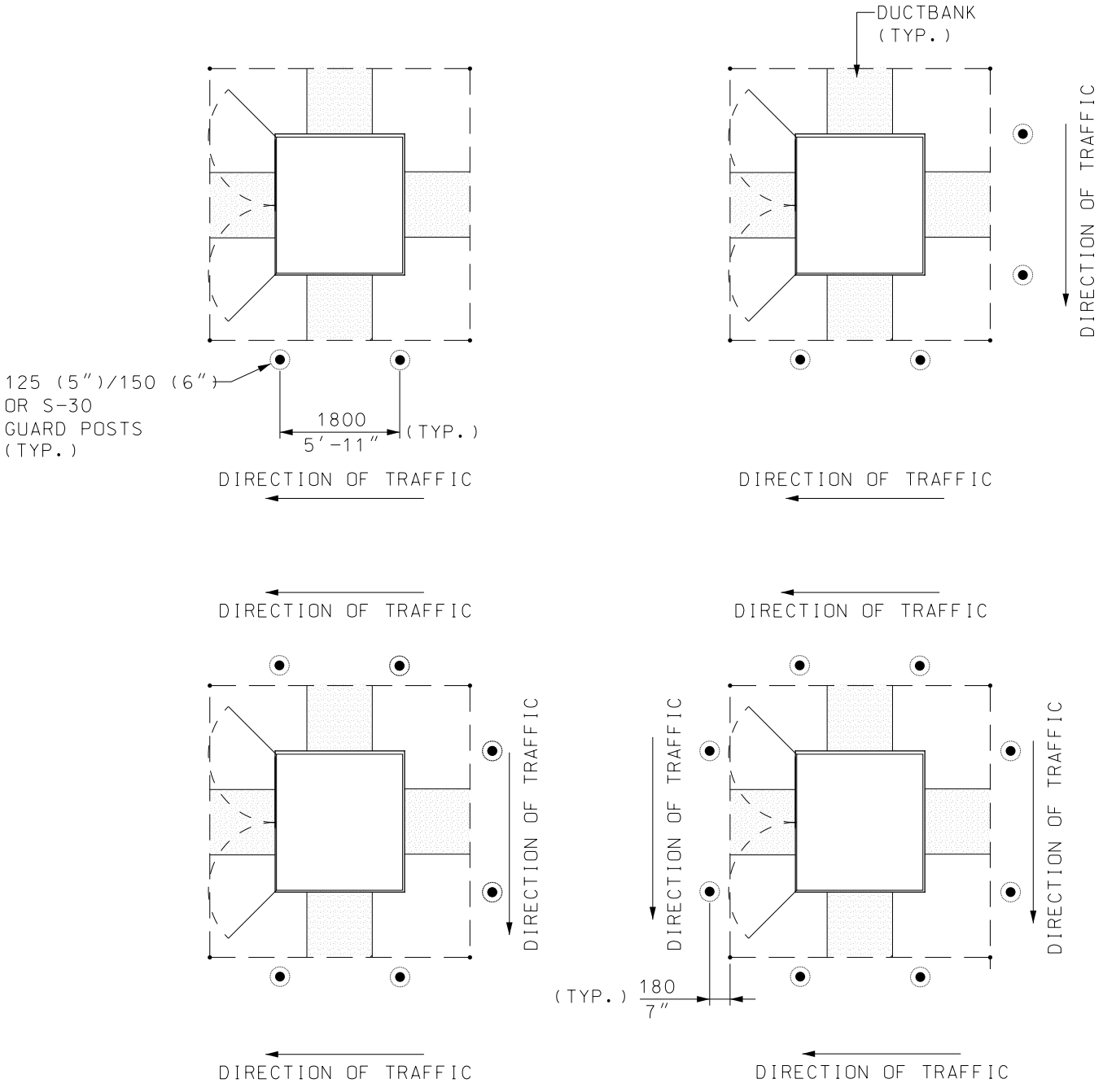
1-PHASE PAD-MOUNT



3-PHASE PAD-MOUNT (<750 KVA) 10

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS GUARD POSTS (BOLLARDS)					
TORONTO HYDRO	Approved By:							
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 10	31-4080	2/4	

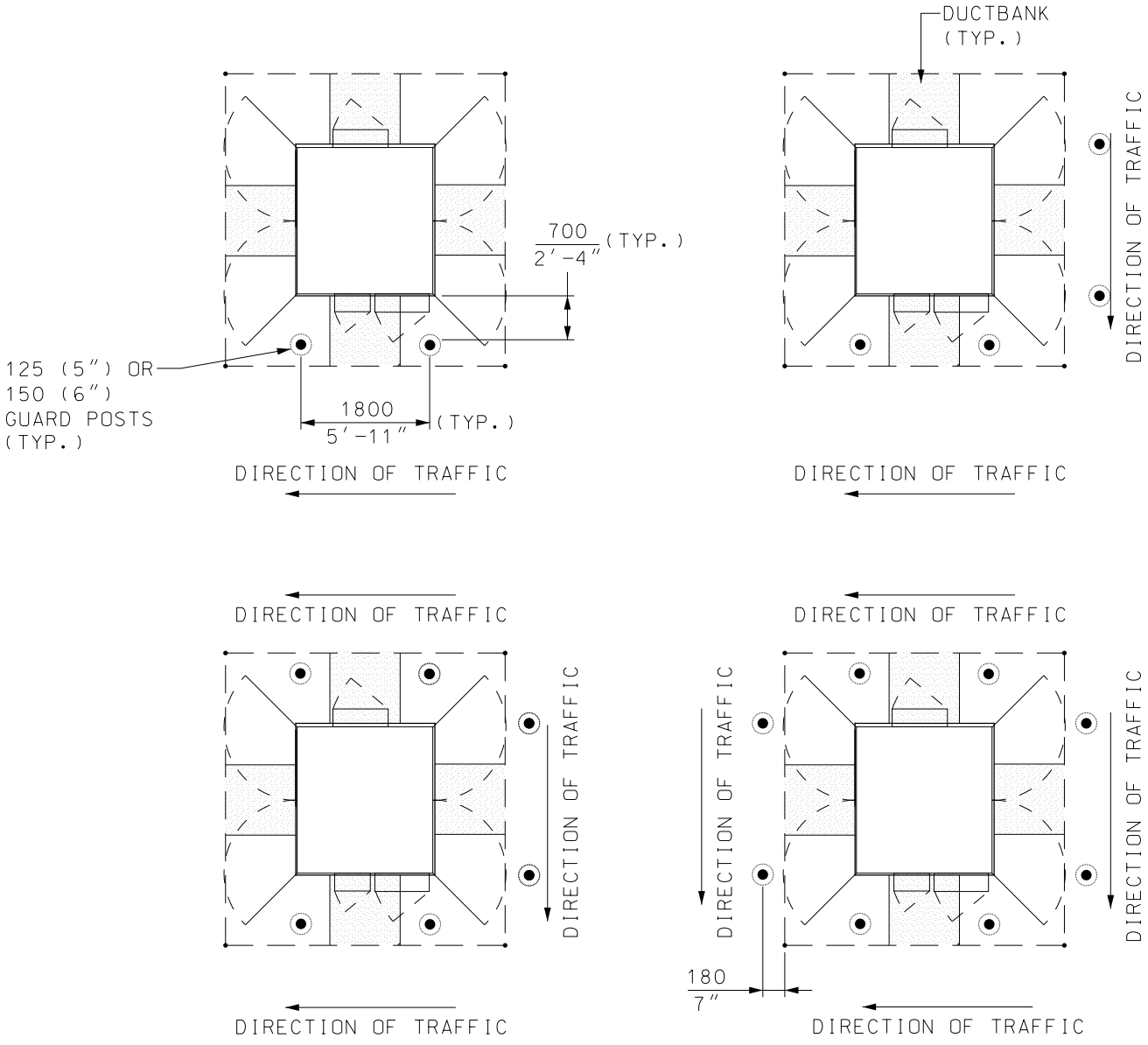
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3-PHASE PAD-MOUNT (≥750 KVA) 10

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS GUARD POSTS (BOLLARDS)					
TORONTO HYDRO	Approved By:							
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 10	31-4080	3/4	

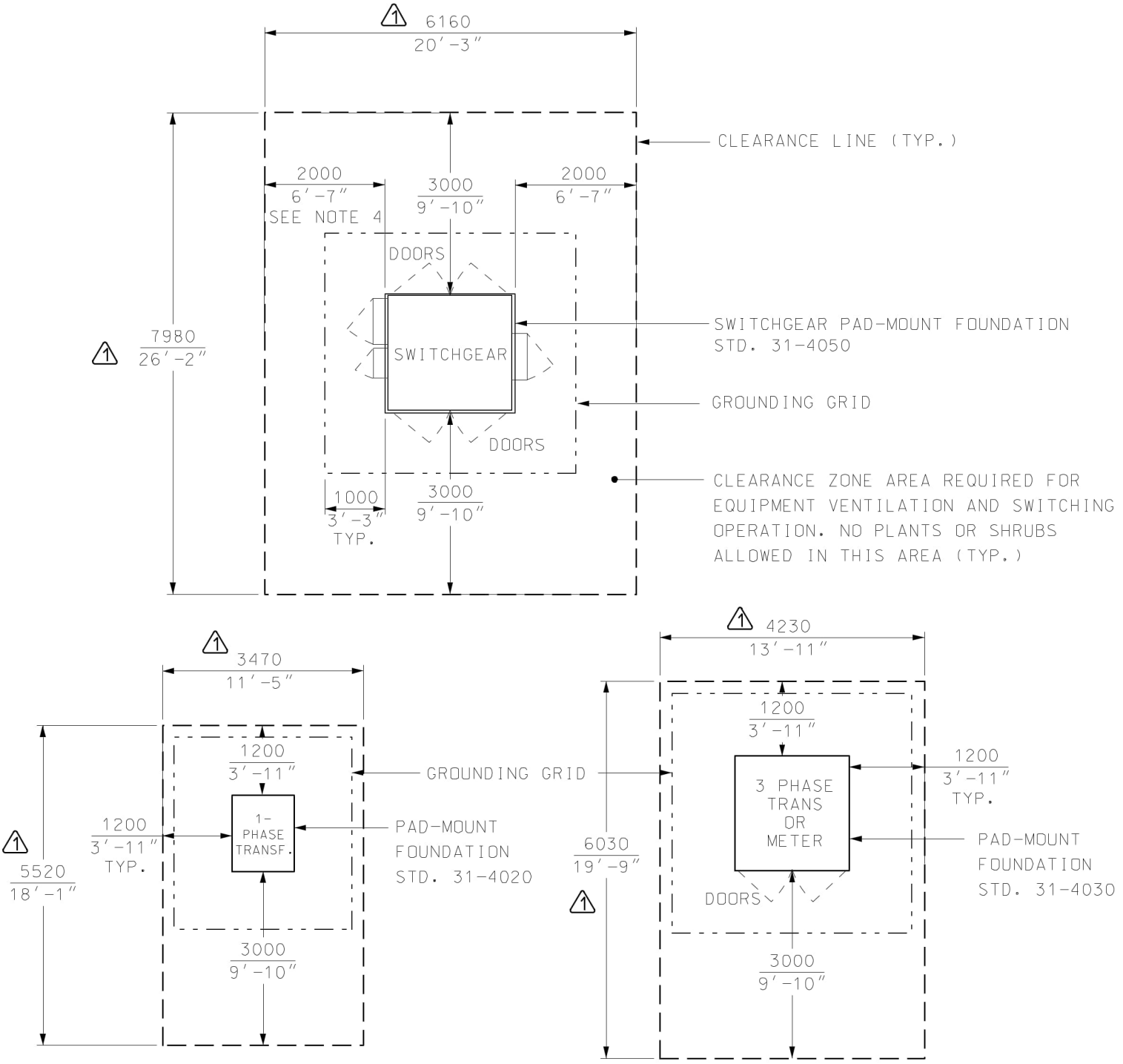
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SWITCHGEAR PAD-MOUNT

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PAD-MOUNTS GUARD POSTS (BOLLARDS)					
TORONTO HYDRO	Approved By:							
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-19	Scale: N.T.S.	Rev: 10	31-4080	4/4	

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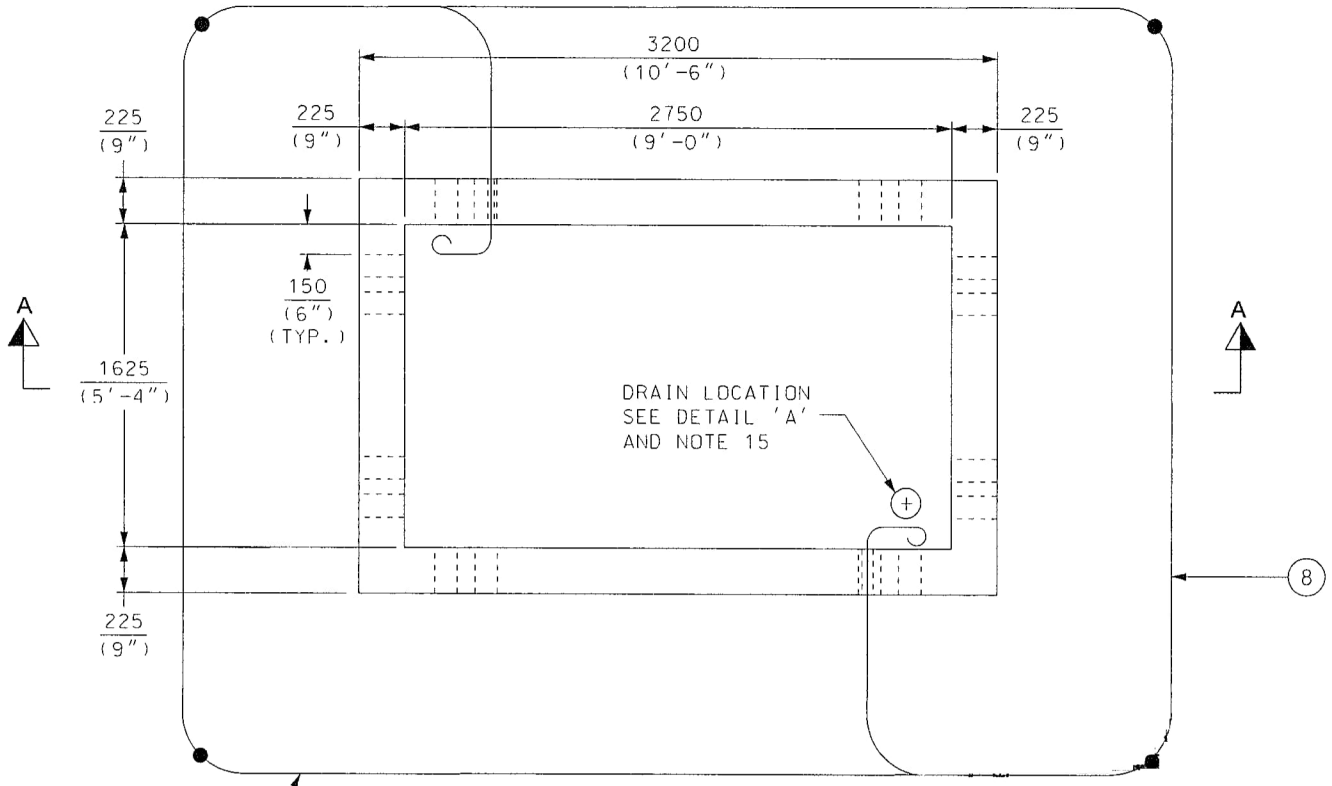


NOTES:

1) ANY AND ALL OBJECTS WITHIN THE CLEARANCE ZONE AREA, ARE SUBJECT TO REMOVAL WITHOUT ANY PRIOR NOTICE SHOULD OPERATIONAL OR EMERGENCY CONDITIONS EXIST.
2) TORONTO HYDRO SHALL NOT BE HELD RESPONSIBLE FOR ANY COSTS ASSOCIATED WITH THE REMOVAL OR RESULTING DAMAGE TO ANY OBJECTS WITHIN THE CLEARANCE ZONE AREA. THE DEVELOPER/OWNER ASSUMES ALL RESPONSIBILITY FOR ENCROACHING WITHIN THE CLEARANCE ZONE AREA.
3) FINAL FINISHED GRADE WITHIN CLEARANCE ZONE SHALL NOT BE ALTERED.
4) IN CASES WHERE THE DESIGN REQUIRES A VALUE LESS THAN THE SPECIFIED LIMITATION, CONTACT STANDARDS AND MATERIALS FOR APPROVAL PRIOR TO IMPLEMENTATION.
5) REFER TO STANDARD 31-4080 GUARD POSTS (BOLLARDS) PLACEMENT FOR DETAILS.
1 6) REFER TO STANDARD 18-5500 FOR PAD-MOUNTED EQUIPMENT GROUNDING DETAILS.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# PAD-MOUNTS ## CLEARANCE ZONE				
TORONTO HYDRO	Approved By: B.D. 2022/01/10						
	Drafted By: J.D.	Designed By: B.D.	Original Issue: B.D. 2019-08-26	Scale: N.T.S.	Rev: 1	31-4100	1/1

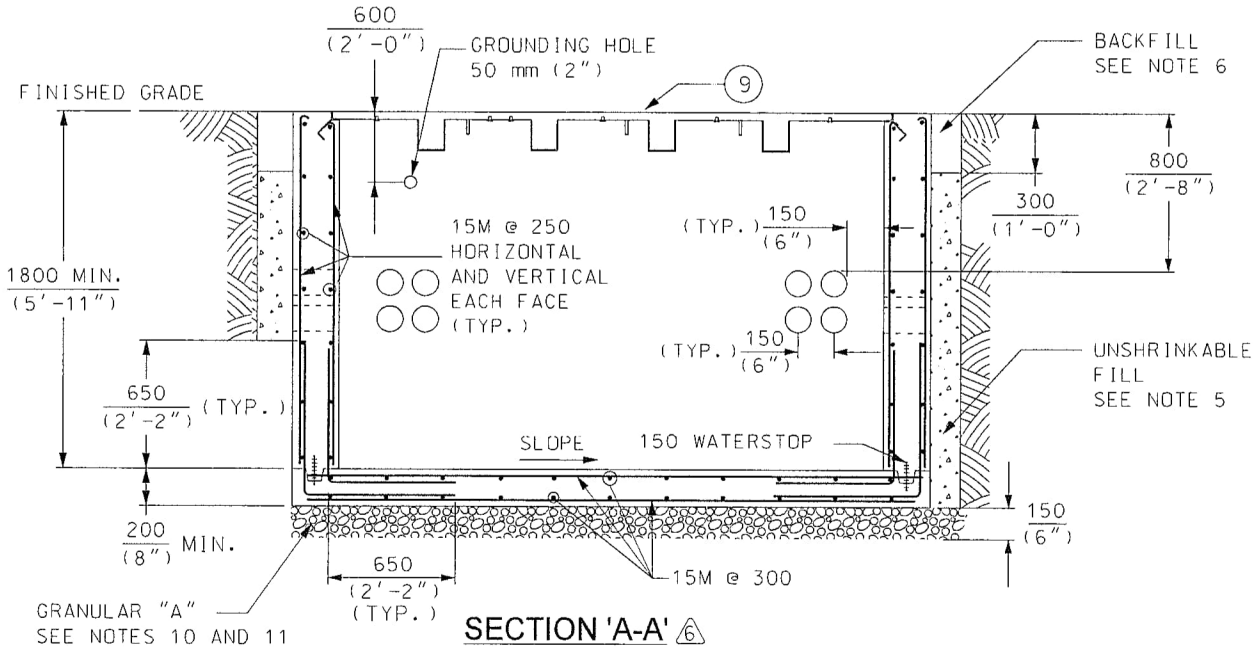
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GROUNDING ALSO APPLIES TO PRECAST OPTION. REFER TO STD. 18-5200

CAST-IN PLACE OPTION 6

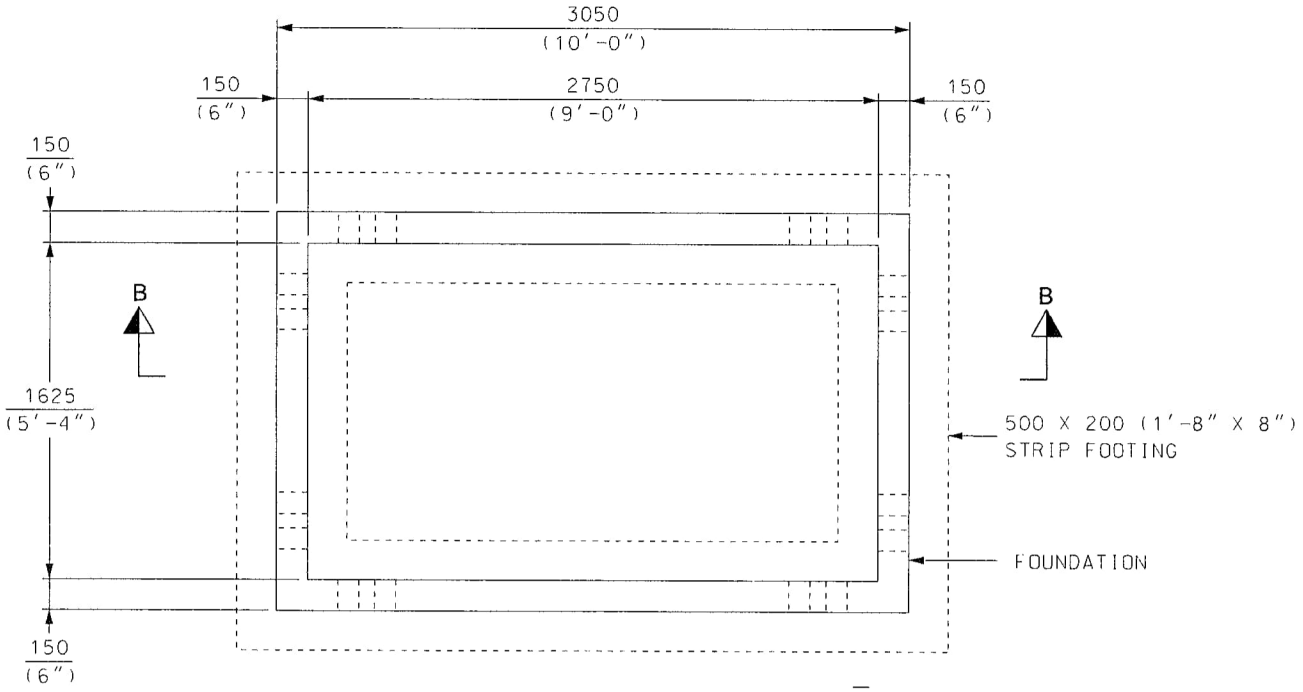
PLAN VIEW



SECTION 'A-A' 6

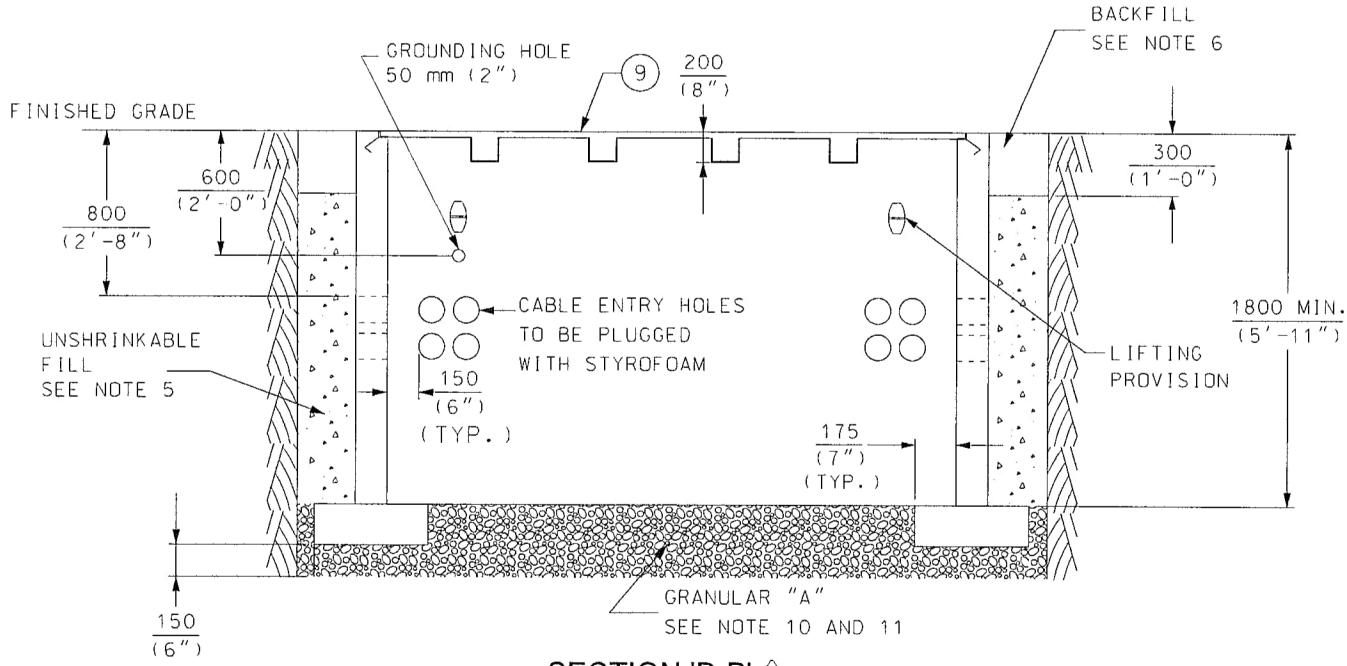
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# SPLICE VAULT 'A' FOR 1000 kcmil CABLES 1625 mm (5'-4") X 2750 mm (9'-0")				
TORONTO HYDRO	Approved By: 2017/02/10						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D./C.P. 2003-05-30	Scale: N.T.S.	Rev: 6	31-5120	1/5

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PRECAST OPTION 6

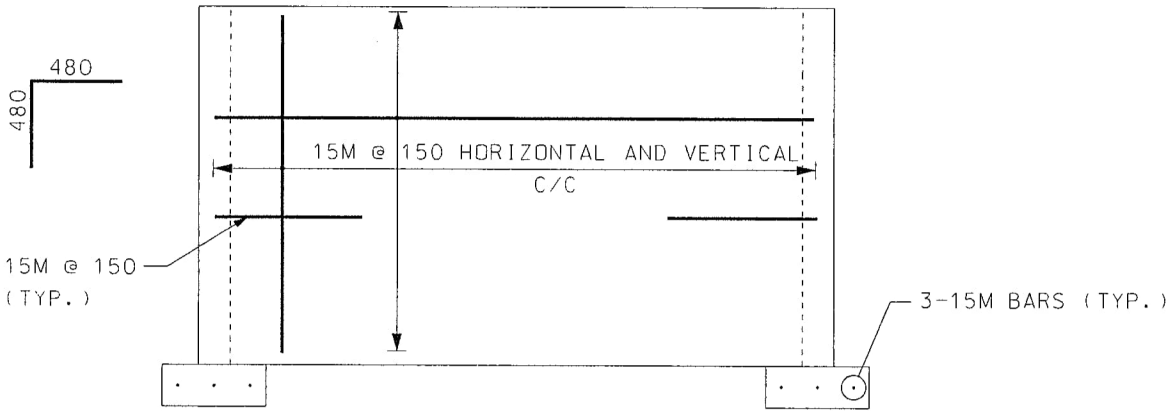
PLAN VIEW



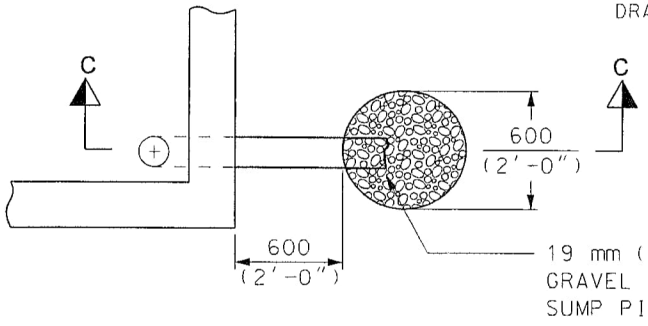
SECTION 'B-B' 6

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE VAULT 'A' FOR 1000 kcmil CABLES 1625 mm (5'-4") X 2750 mm (9'-0")				
TORONTO HYDRO	Approved By: 2017/02/10						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D./C.P. 2003-05-30	Scale: N.T.S.	Rev: 6	31-5120	2/5

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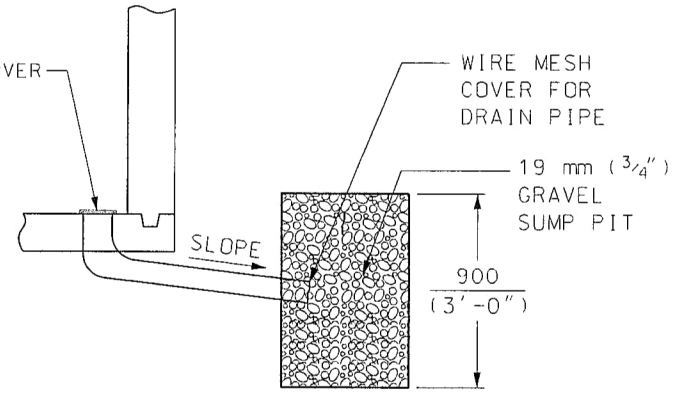


PRECAST OPTION STRUCTURE REINFORCING DETAIL 6



DETAIL 'A' 6

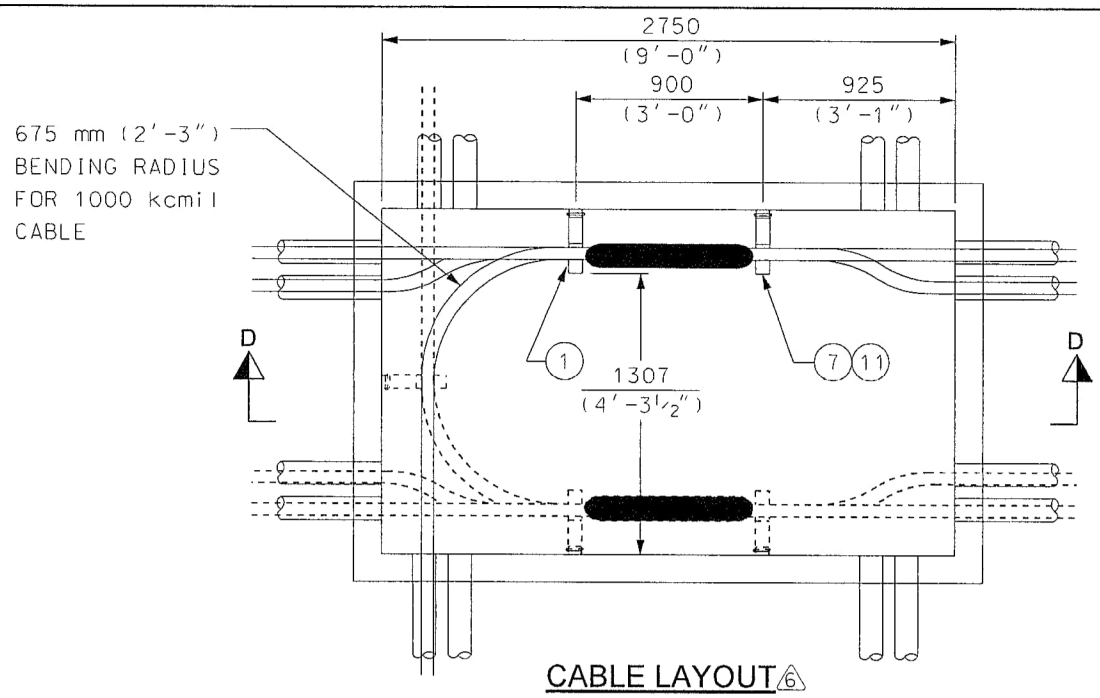
ALTERNATIVE DRAIN PIT FOR CAST-IN PLACE OPTION



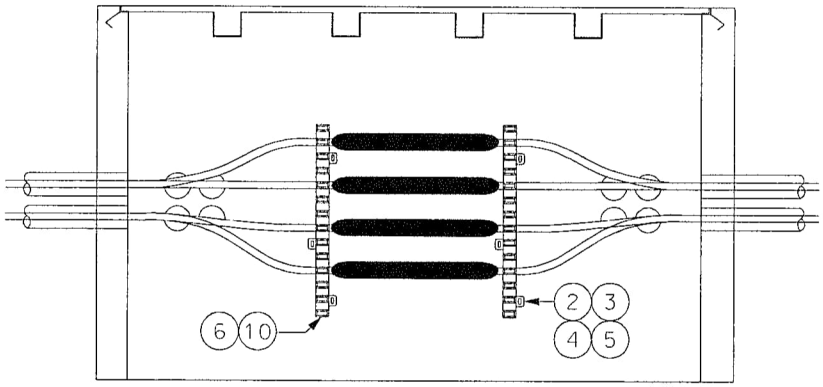
SECTION 'C-C' 6

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE VAULT 'A' FOR 1000 kcmil CABLES 1625 mm (5'-4") X 2750 mm (9'-0")				
TORONTO HYDRO	Approved By: 2017/02/10						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D./C.P. 2003-05-30	Scale: N.T.S.	Rev: 6	31-5120	3/5

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CABLE LAYOUT 6



SECTION 'D-D' 6

BILL OF MATERIALS FOR 31-5120			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A
1	TIE CABLE TY-RAP 14.6" LENGTH	2320047	6
2	ANCHOR DROP-IN FOR 1/2" BOLTS 2" LONG	2500018	6
3	BOLT MACHINE HEX 1/2" X 2" STAINLESS STEEL	2550245	6
4	WASHER ROUND FOR 1/2" STAINLESS STEEL BOLT	2530036	6
5	WASHER LOCK 1/2" STAINLESS STEEL	2530128	6
6	CABLE RACK TYPE C	7360300	4 6
7	CABLE ARM 2 WAY TYPE C	7340303	16 6
	ASSOCIATED STANDARDS		
8	GROUNDING REQUIREMENTS	STD. 18-5200	1
9	SPLICE VAULT COVER	STD. 31-8310	1
10	CABLE RACK	STD. 31-8260	1
11	CABLE ARMS	STD. 31-8270	1
12	SUPPORT OF CABLES ON CABLE ARMS	STD. 16-4540	1
13	TYPICAL DRAIN CONNECTION TO SEWER	STD. 31-7100	1

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

Approved By: 2017/02/10

SPLICE VAULT 'A'
FOR 1000 kcmil CABLES
1625 mm (5'-4") X 2750 mm (9'-0")

Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
B.D.	J.D.	G.D./C.P. 2003-05-30	N.T.S.	6	31-5120	4/5

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NOTES:

GENERAL NOTES:

1) DESIGN IN ACCORDANCE WITH CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6-06, CL-625-ONT LIVE LOADING.
2) CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa. CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST CSA-A23.1, ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2. EXPOSURE CLASSIFICATION TO BE C-1 DUE TO EXPOSURE TO CHLORIDES WITH OR WITHOUT FREEZING AND THAWING CONDITIONS. ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.
3) CONCRETE COVER SHALL BE:
   A) BARS AT INSIDE FACES.....40 mm (1½")
   B) BARS AT OUTSIDE FACES.....50 mm (2")
   C) CONCRETE PLACED AGAINST THE EARTH.....75 mm (3")
4) ALL EXPOSED EDGES SHALL HAVE 25 mm CHAMFER.
5) EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 300 mm (1'-0") FROM FINISHED GRADE.
6) BACKFILL THE REMAINING 300 mm (1'-0") TO FINISHED GRADE AS PER SPEC. #CV-CON-01 CLAUSE 5.1.17.
7) TORONTO HYDRO INSPECTOR SHALL BE PRESENT DURING THE INSTALLATION, 24-HOUR NOTICE IS REQUIRED PRIOR TO STARTING THE INSTALLATION.
8) FOR VEHICULAR TRAFFIC REFER TO GUARD POSTS (BOLLARDS) STD. 31-4080. LOCATION SHALL BE KEPT CLEAR OF OBSTRUCTIONS FOR ACCESS BY TORONTO HYDRO PERSONNEL AND EQUIPMENT.
9) SPLICE VAULT 'A' CAN BE USED TO ACCOMMODATE THE INSTALLATION OF 1000 kcmil CABLES WITH THE FOLLOWING CONDITIONS:
   - EDGE OF DUCTS ENTER AND EXIT THE VAULT 150 mm (6") FROM THE ADJACENT WALL TO ELIMINATE THE INTRODUCTION OF BENDS IN THE CABLES,
   - NO LOOPING OF CABLES INSIDE THE VAULT,
   - SPLICES ARE DONE ALONG THE LONGER WALLS,
   - MAXIMUM OF TWO CIRCUITS.
10) ANY SOFT SPOTS ENCOUNTERED UNDER VAULT SHALL BE REMOVED AND FILLED WITH MASS CONCRETE OF 15 MPa MINIMUM STRENGTH TO UNDERSIDE OF FLOOR SLAB. IF NOT ENCOUNTERED, PLACE 150 mm (6") GRANULAR "A" BEDDING AND COMPACT TO 95% STANDARD PROCTOR DENSITY.
11) DO NOT PLACE FLOOR SLAB IN FROZEN GROUND.
12) STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD G40.21 LATEST EDITION GRADE 300W.
13) ALL EXPOSED STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED AS PER CSA SEC. G164 LATEST EDITION.
14) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.

CAST-IN-PLACE OPTION:

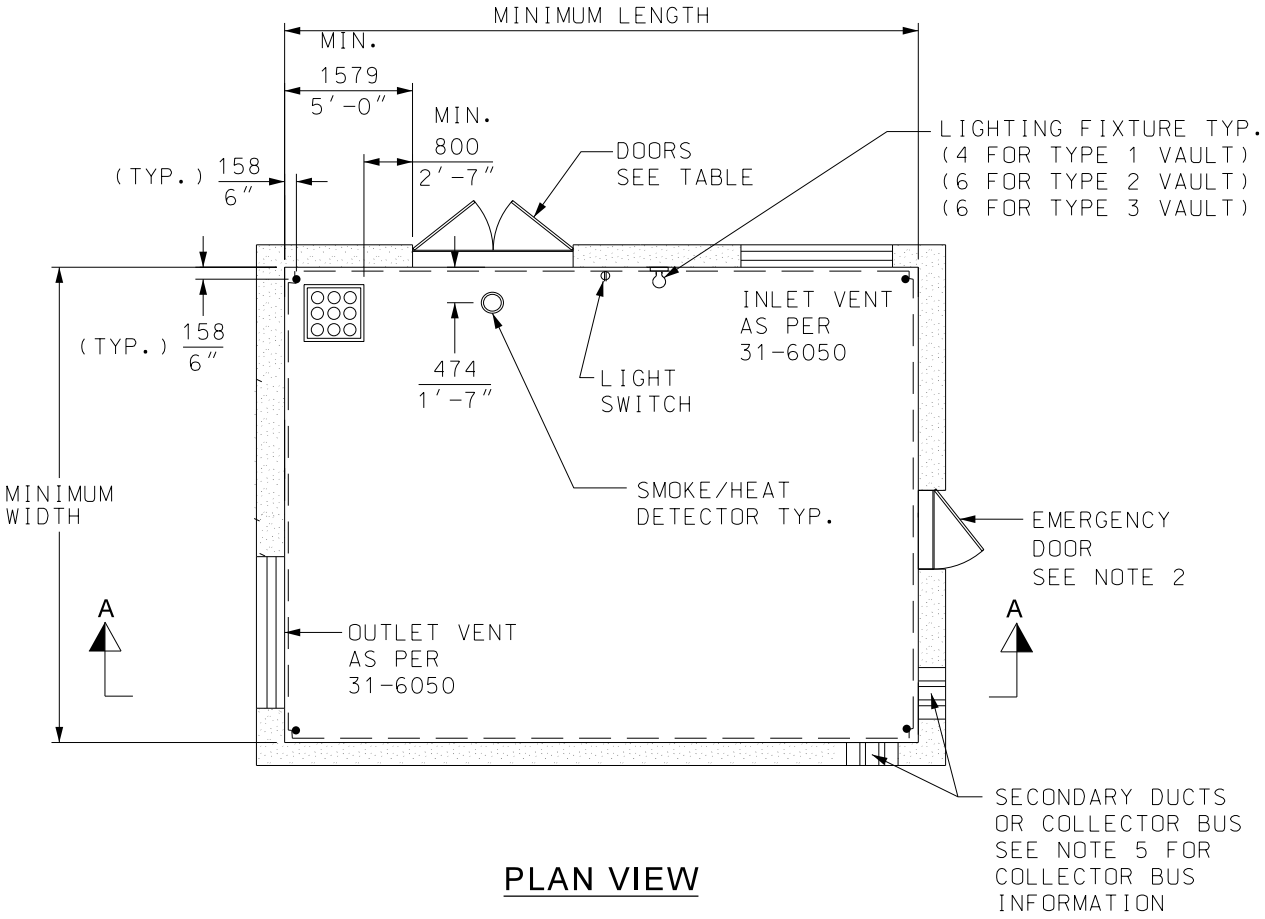
15) VAULT SHALL BE DRAINED AS FOLLOWS:
   OPTION 1 - DRAIN INTO CITY'S SEWERS AS PER STD. 31-7100.
   OPTION 2 - DRAIN INTO A TO GRAVEL SUMP PIT AS SHOWN IN THIS STANDARD.
16) LOCATION OF DRAIN PIPE SHALL BE DETERMINED AS PER PROJECT'S SITE CONDITIONS.

PRECAST OPTION:

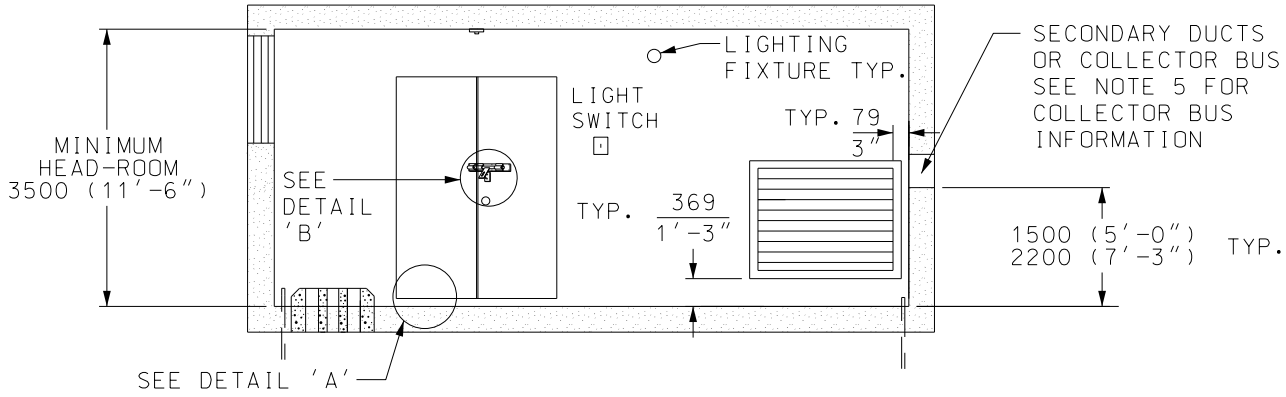
17) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
18) PROVIDE 90° STANDARD HOOK FOR WALL HORIZONTAL REINFORCING BARS.
19) LIFTING HOLES CAN BE INSTALLED IN FOUNDATION WALLS FOR MANUFACTURER'S LIFTING PREFERENCE.
20) 4-LIFTING ANCHORS FOR LIFTING PURPOSES BY OTHERS SHALL BE PROVIDED ON THE INSIDE OF ALL FOUNDATION WALLS AND ON TOP OF STRIP FOOTING AS SHOWN IN THIS STANDARD. LIFTING ANCHORS SHALL BE GALVANIZED. LIFTING ANCHORS SHALL BE CAPABLE OF LIFTING THE PRECAST UNITS.
21) CONTRACTOR TO PLUG ALL HOLES (LIFTING AND GROUNDING) AND PARGED PRIOR TO BACKFILLING.
22) PRECAST UNITS ARE DELIVERED BY CRANE-EQUIPPED TRUCKS. EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK. MINIMUM OVERHEAD CLEARANCE OF 5500 mm (18'-0") IS REQUIRED. CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE PRECAST UNITS INTO EXCAVATION.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE VAULT 'A' FOR 1000 kcmil CABLES 1625 mm (5'-4") X 2750 mm (9'-0")				
TORONTO HYDRO	Approved By: 2017/02/10						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D./C.P. 2003-05-30	Scale: N.T.S.	Rev: 6	31-5120	5/5

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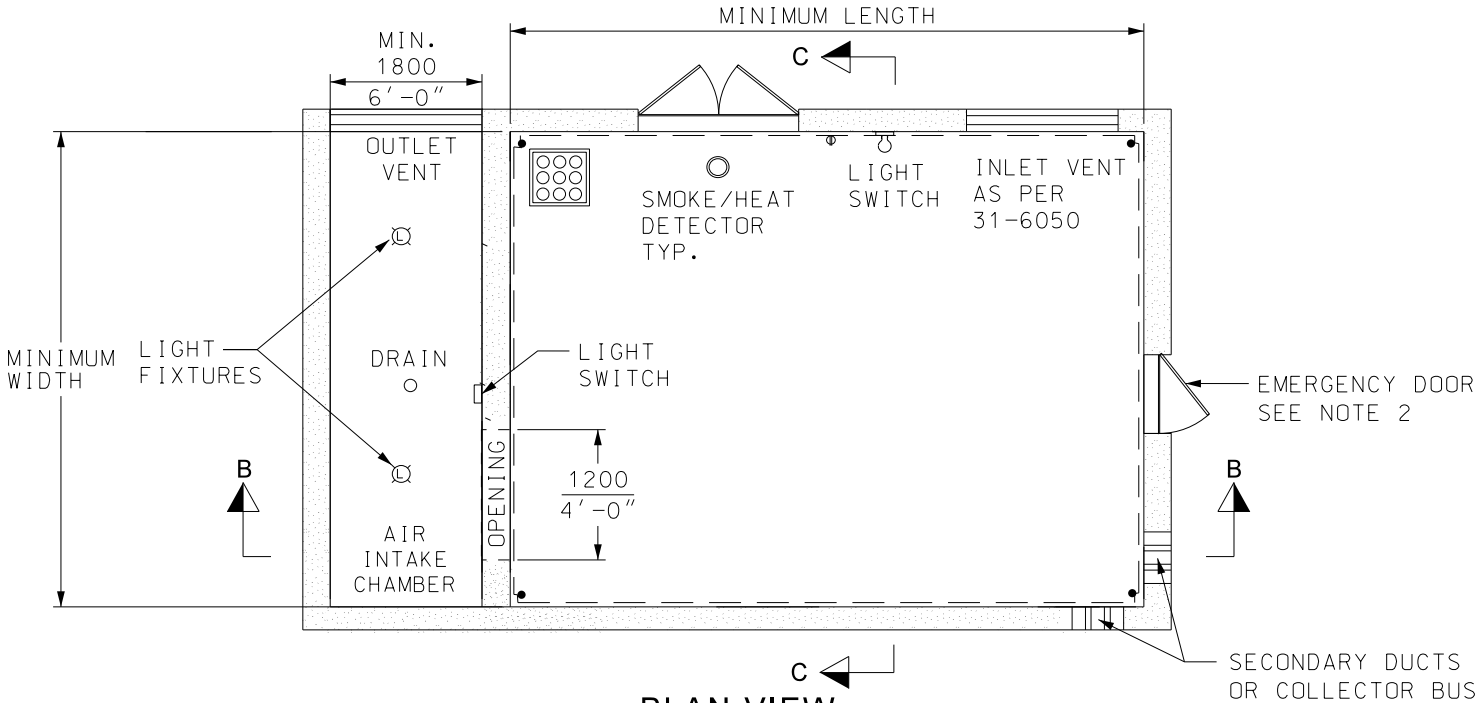
PLAN VIEW



SECTION 'A-A'

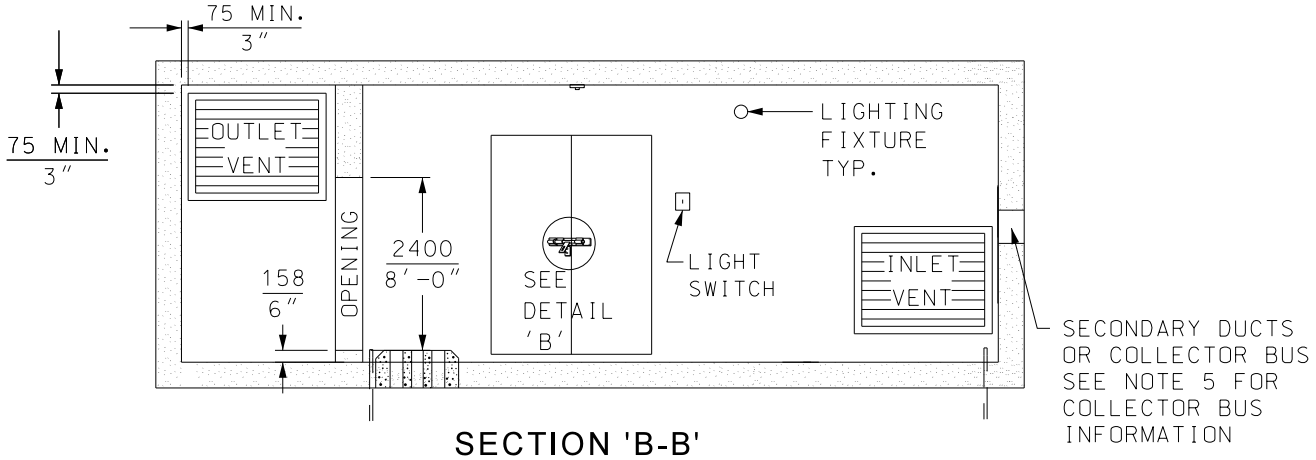
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES ABOVE GRADE - WALK-IN VAULT					
TORONTO HYDRO	Approved By: 23-10-2026 A.P.							
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P. 2003-11-27	Scale: N.T.S.	Rev: 12	31-6020	1/4	

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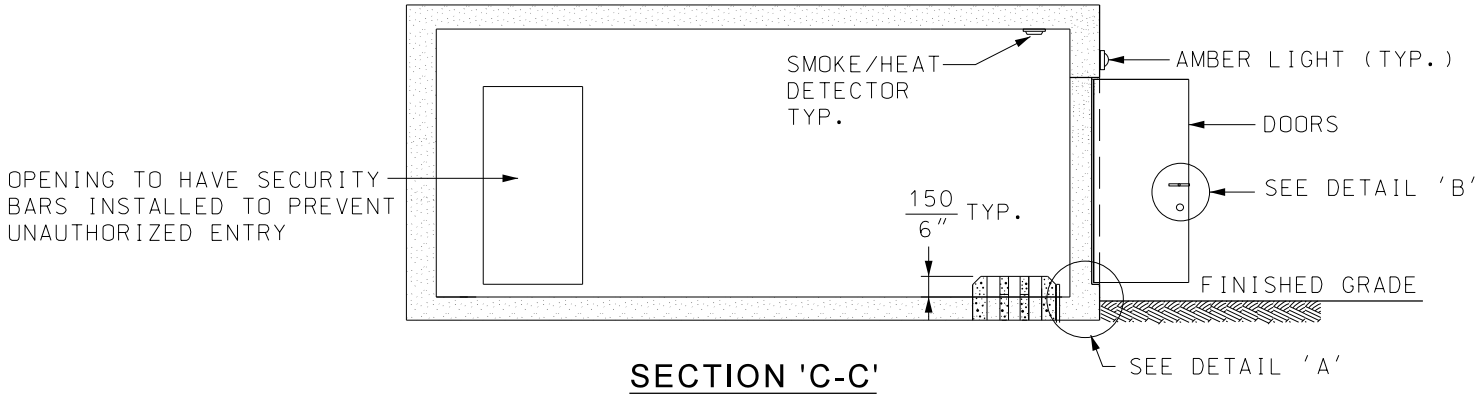


PLAN VIEW

ALTERNATIVE VENTILATION



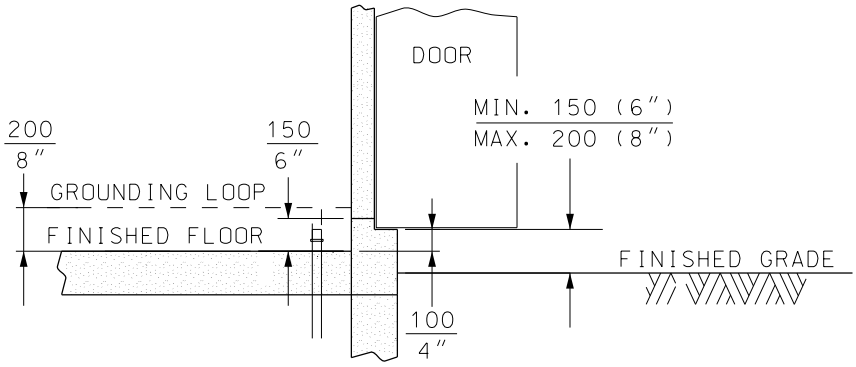
SECTION 'B-B'



SECTION 'C-C'

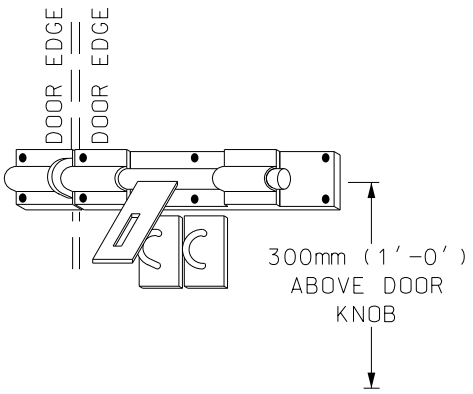
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES ## ABOVE GRADE - WALK-IN VAULT				
TORONTO HYDRO	Approved By: 23-10-2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P. 2003-11-27	Scale: N.T.S.	Rev: 12	31-6020	2/4

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DETAIL 'A'

DOOR AND GROUNDING DETAIL



DETAIL 'B'

DOOR PAD BOLT

250 mm (10") BOLT

12

ABOVE GRADE - WALK-IN VAULT SIZES					
TYPE	TX. RATING	MIN. LENGTH	MIN. WIDTH	INDIVIDUAL DOOR	ELECTRICAL EQUIPMENT
1*	UP TO 1000 kVA	7000 (23'-0")	5000 (16'-5")	1200x2400 HIGH (4'x8')	REFER TO SECTION 13 & NOTE 6 STANDARDS FOR DETAILS
2*	1000 - 2000 kVA	7000 (23'-0")	6000 (20'-0")	1200x2400 HIGH (4'x8')	
3	2000 - 4000 kVA	10000 (32'-10")	8000 (26'-3")	1200x3000 HIGH (4'x10')	

* LIVE FRONT EQUIPMENT SHALL USE 6000 mm X 8000 mm

ABOVE GRADE - WALK-IN VAULT MIN. LOADING (SUSPENDED SLAB)				
TYPE	TX. RATING	ROOM AREA	DEAD LOAD (APPROXIMATE)+	LIVE LOAD
1	500 - 1000 kVA	35 m	17,110 kg	REFER TO ONATRIO BUILDING CODE FOR DETAILS
2	1000 - 2000 kVA	42 m		
3	2000 - 4000 kVA	80 m	30,200 kg	

+ DEAD LOAD = TOTAL AGGREGATE WEIGHT OF ELECTRICAL EQUIPMENT X 1.2 SAFETY FACTOR
(ELECTRICAL EQUIPMENT = TRANSFORMERS WITH OR WITHOUT PROTECTORS)

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

Approved By: 23-10-2026 A.P.

Drafted By: A.P. | Designed By: A.P.

Original Issue: C.P. 2003-11-27

CUSTOMER-OWNED STRUCTURES

ABOVE GRADE - WALK-IN VAULT

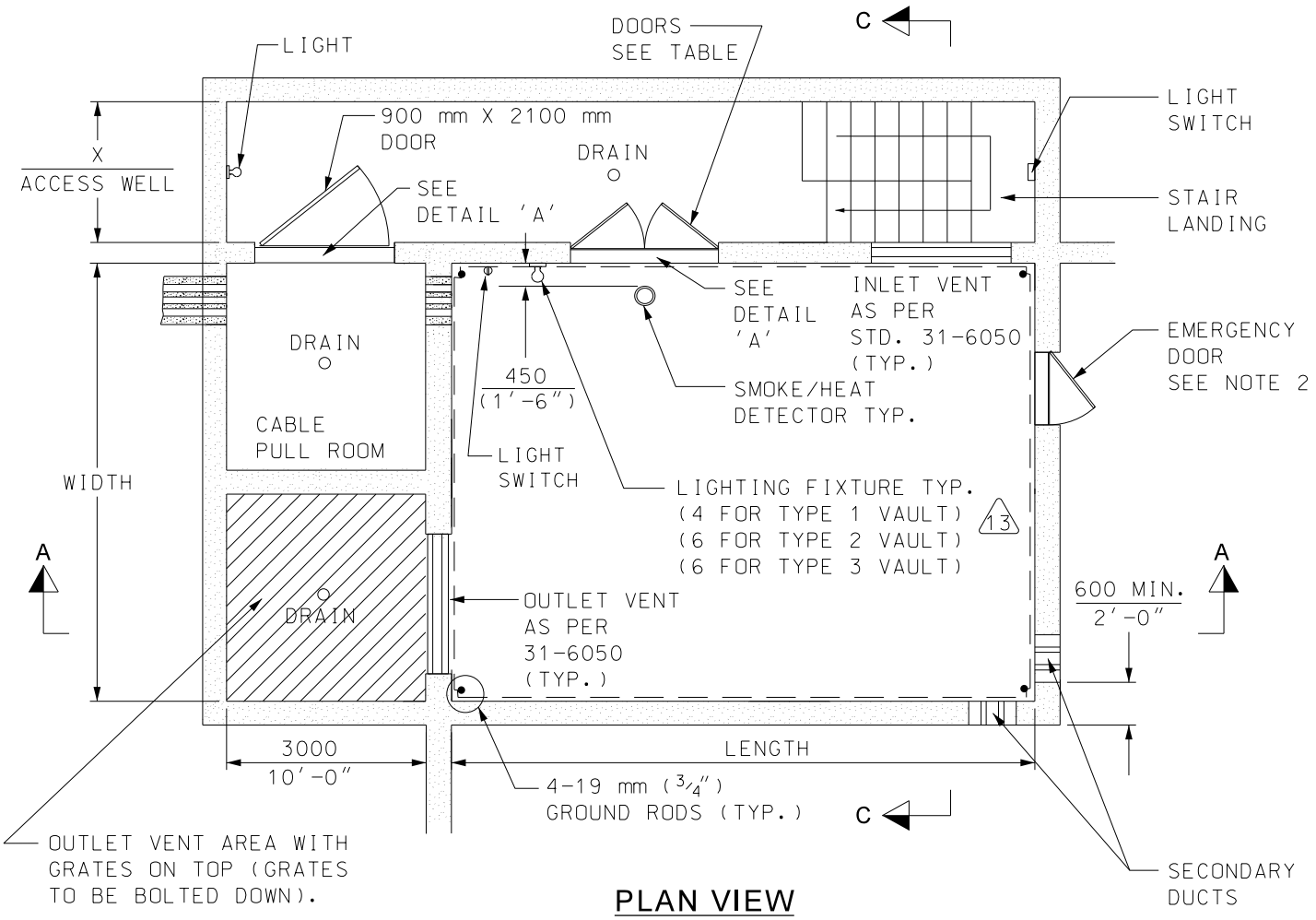
Scale:	Rev:		
N.T.S.	12	31-6020	3/4

NOTES:

1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE LATEST REVISION OF TORONTO HYDRO REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF CUSTOMER-OWNED STRUCTURES DOCUMENT CONDITION OF SERVICE REF. 5.
2) EMERGENCY DOOR IS REQUIRED IN NEW TRANSFORMER VAULTS, LOCATION OF WHICH SHALL BE APPROVED BY TORONTO HYDRO REPRESENTATIVE. EMERGENCY DOOR SHALL HAVE PANIC HARDWARE INSTALLED TO ALLOW DOOR TO OPEN FROM THE INSIDE. THERE SHALL BE NO METHOD OF OPENING AN EMERGENCY DOOR FROM THE OUTSIDE.
3) LOCATION OF ELECTRICAL LIGHT FIXTURE CAN BE INSTALLED AS SHOWN OR AN ALTERNATE LOCATION CAN BE CHOSEN PROVIDED ADEQUATE SPACE AND CLEARANCE IS PROVIDED TO ALLOW FOR PROPER OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT.
4) DOORS, LOUVER, SECURITY BARS AND ANY METAL PRODUCT SHALL BE GROUNDED BY CONNECTING 2/0 FLEX STRANDED COPPER TO THE GROUNDING LOOP. CONNECTION SHALL BE BY USING PARALLEL GROOVE CLAMPS AND GROUNDING LUG.
5) FOR ADJACENT ELECTRICAL ROOMS, COLLECTOR BUSES OR BUS STUBS CAN BE INSTALLED INSTEAD OF DUCTS AT A MINIMUM HEIGHT OF 2134 mm (7'-0") ABOVE FINISHED FLOOR WITH 600 mm (1'-11 5/8") CLEARANCE ON EITHER SIDE TO ALLOW PROPER TERMINATION OF CABLES. COLLECTOR BUS TO BE INSTALLED AS PER SECTION 13 AND ALLOW PROPER UNHINDERED OPERATION AND ACCESS OF EQUIPMENT. SEE STD. 15-1500 FOR COLLECTOR BUS DETAILS.
6) FOR SUSPENDED SLAB DESIGN, DEFINED LOAD CAPACITY IS TO BE A MINIMUM. THE VAULT DESIGN MUST COMPLY WITH THE MOST RECENT VERSION OF THE ONTARIO BUILDING CODE (OBC) AND BE SEALED BY A PROFESSIONAL ENGINEER OF ONTARIO. INCREASED CAPACITY MAY BE REQUIRED DEPENDING ON EXTERNAL FACTORS OR JOINT USE EQUIPMENT ROOMS.
7) ALL LISTED kVA RATINGS ARE AGGREGATED.
8) SAFETY FACTOR (S.F.) OF 1.2 SHALL BE ASSUMED IN THE DEAD LOAD CALCULATIONS
9) FOR SCENARIOS WITH TRANSFORMER CAPACITY GREATER THAN 4 MVA, CUSTOMER TO ATTAIN EQUIPMENT SHOP DRAWINGS AND DETERMINE THE REQUIRED LOADING OUTSIDE OF THE LISTED REQUIREMENTS.
10) GROUND RODS SHALL BE A MINIMUM 3000 mm (10'-0") APART.

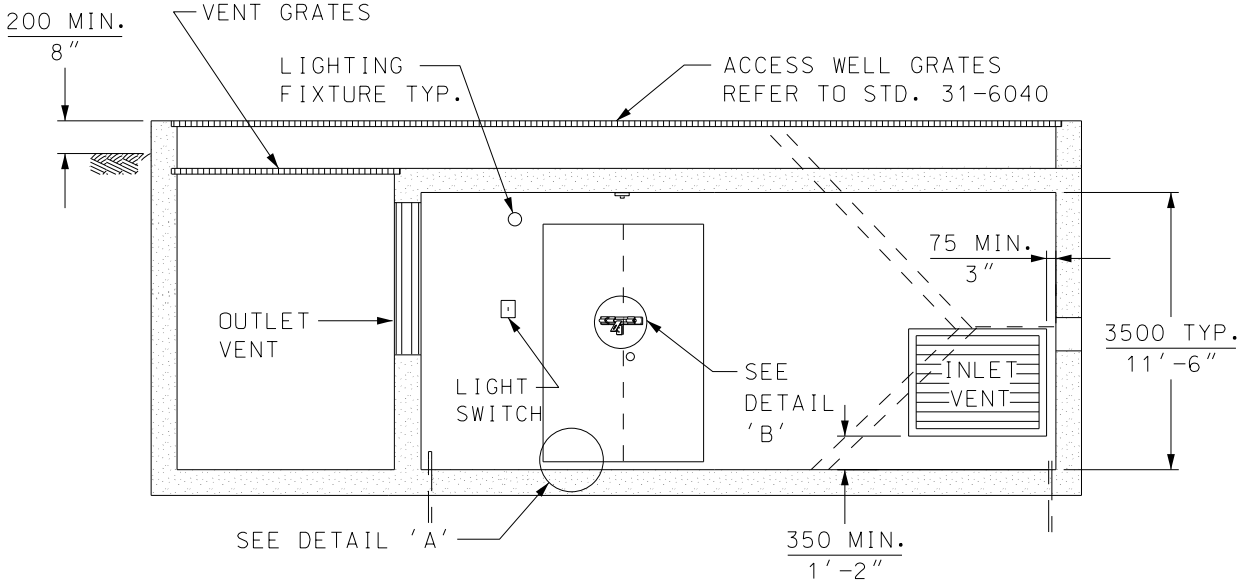
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PLAN VIEW

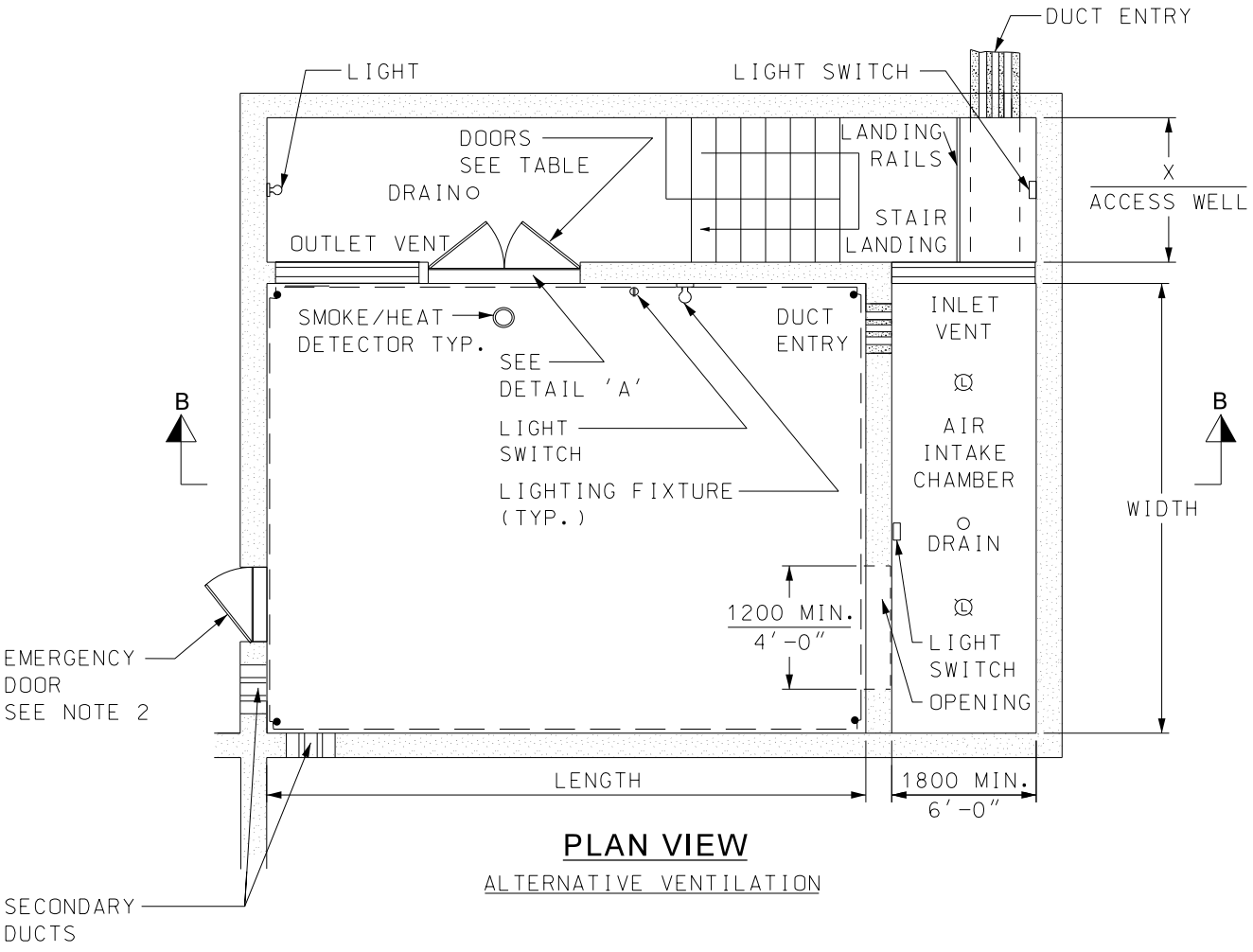
NATURAL CROSS-VENTILATION



SECTION 'A-A'

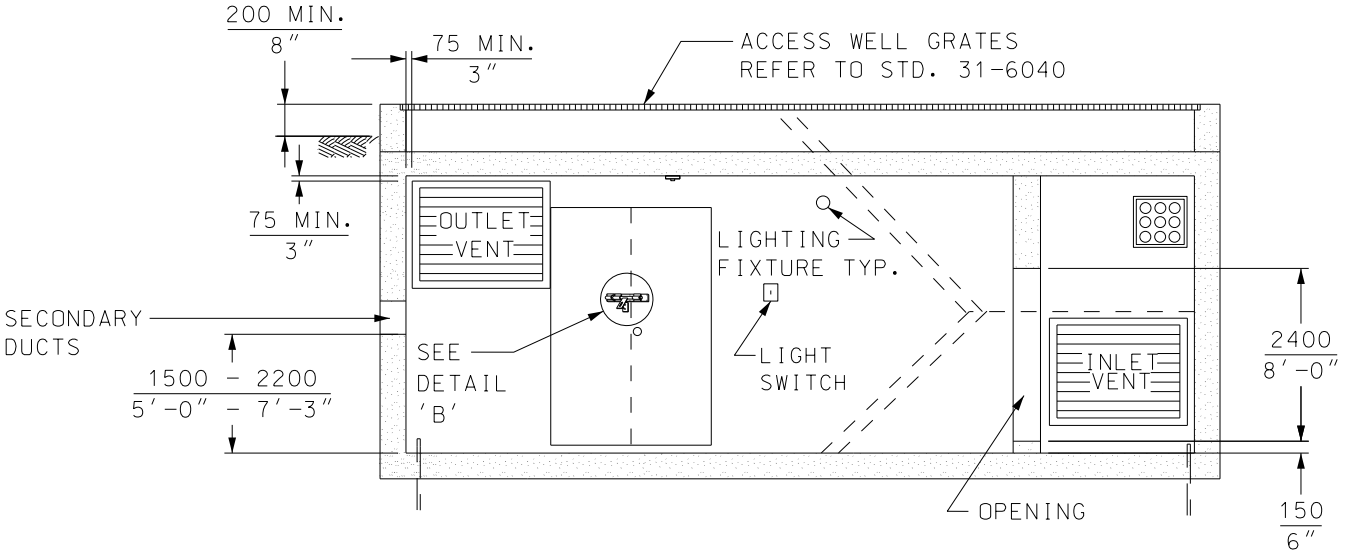
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES BELOW-GRADE WALK-IN VAULT				
TORONTO HYDRO	Approved By: 23-10-2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P. 2003-11-27	Scale: N.T.S.	Rev: 14	31-6030	1/4

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PLAN VIEW

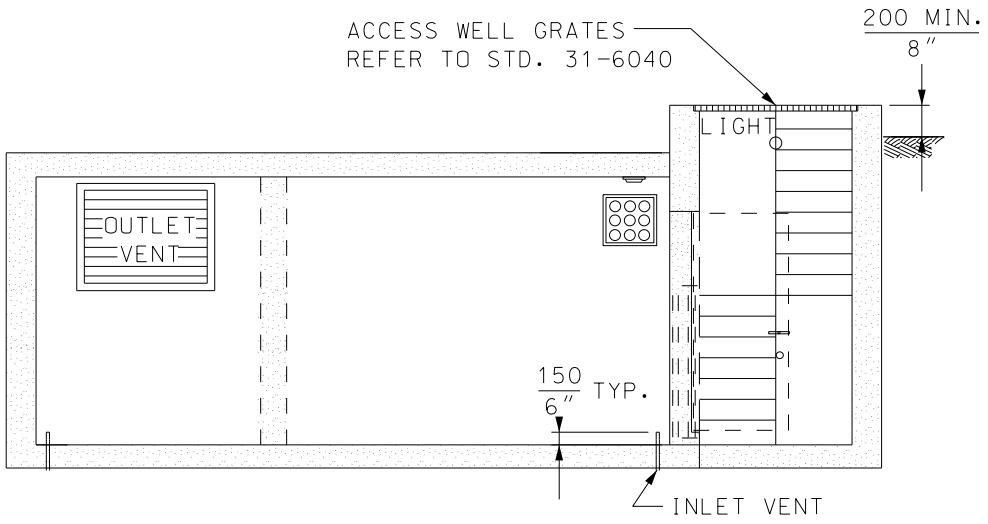
ALTERNATIVE VENTILATION



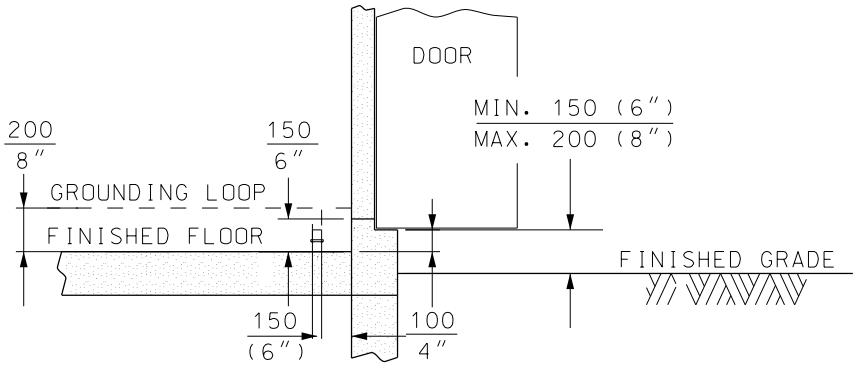
SECTION 'B-B'

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES BELOW-GRADE WALK-IN VAULT					
TORONTO HYDRO	Approved By: 23-10-2026 A.P.							
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P. 2003-11-27	Scale: N.T.S.	Rev: 14	31-6030	2/4

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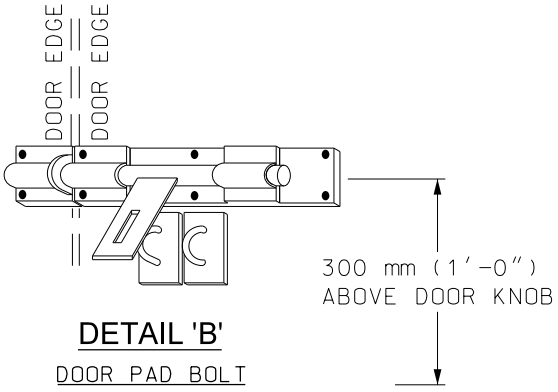


SECTION 'C-C'



DETAIL 'A'

DOOR AND GROUNDING DETAIL



DETAIL 'B'

DOOR PAD BOLT

250 mm (10″) BOLT

14

BELOW GRADE – WALK-IN VAULT SIZES						
TYPE	TX. RATING	MIN. LENGTH	MIN. WIDTH	ACCESS WELL	INDIVIDUAL DOOR	ELECTRICAL EQUIPMENT
1*	UP TO 1000 kVA	7000 (23′-0″)	5000 (16′-5″)	1900 (6′-3″)	1200x2400 HIGH (4′x8′)	REFER TO SECTION 13 & NOTE 6 STANDARDS FOR DETAILS
2*	1000 – 2000 kVA	7000 (23′-0″)	6000 (20′-0″)	1900 (6′-3″)	1200x2400 HIGH (4′x8′)	
3	2000 – 4000 kVA	10000 (32′-10″)	8000 (26′-3″)	3000 (10′-0″)	1200x3000 HIGH (4′x10′)	

* LIVE FRONT EQUIPMENT SHALL USE 6000 mm X8000 mm, EXCLUDE 4 kV STANDARD

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES BELOW-GRADE WALK-IN VAULT				
TORONTO HYDRO	Approved By: 23-10-2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P. 2003-11-27	Scale: N.T.S.	Rev: 14	31-6030	3/4

ABOVE GRADE – WALK-IN VAULT MIN. LOADING (SUSPENDED SLAB)				
TYPE	TX. RATING	ROOM AREA	DEAD LOAD (APPROXIMATE)+	LIVE LOAD
1	500 – 1000 kVA	35 m	17,110 kg	REFER TO ONATRIO BUILDING CODE FOR DETAILS
2	1000 – 2000 kVA	42 m		
3	2000 – 4000 kVA	80 m	30,200 kg	

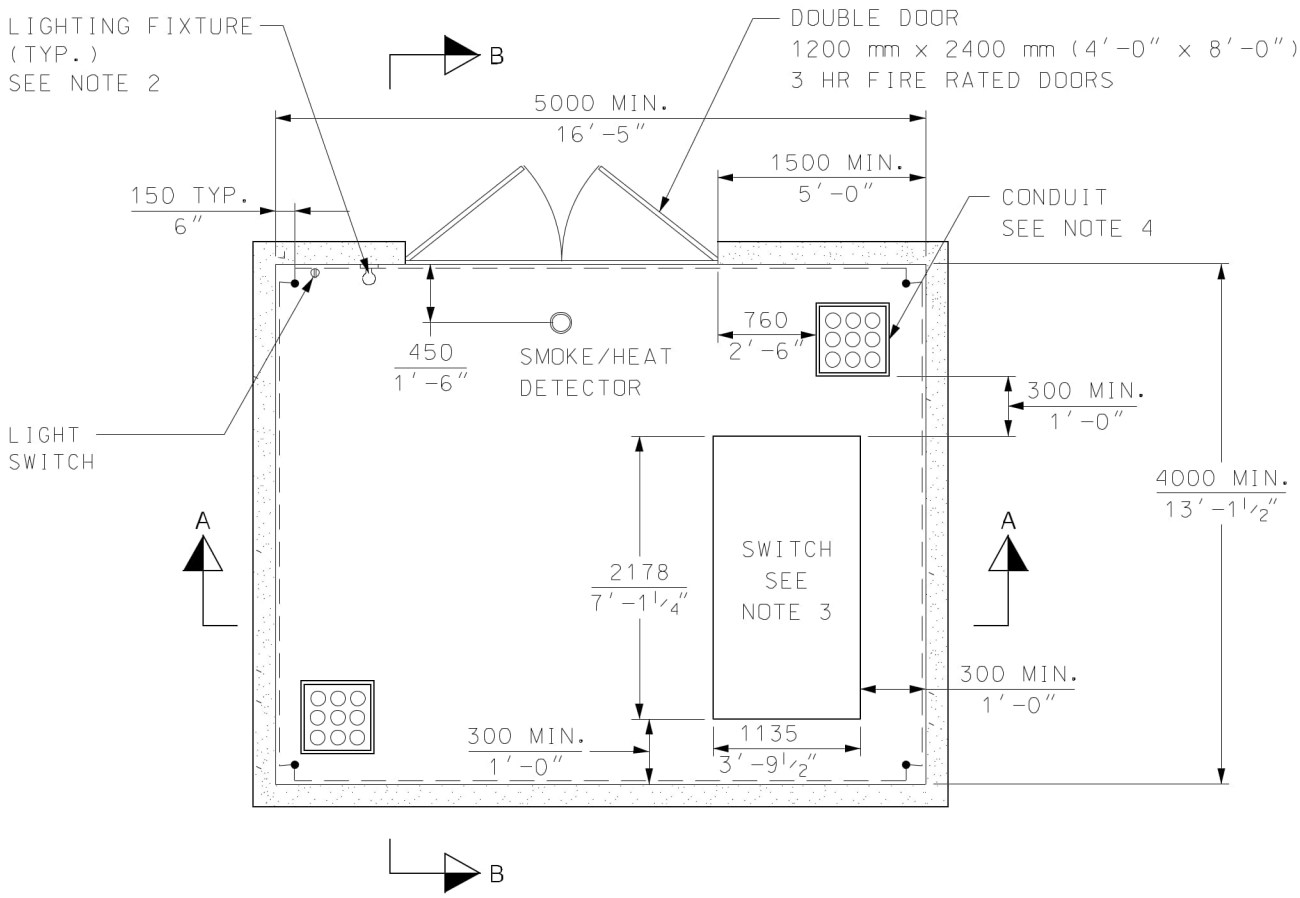
+ DEAD LOAD = TOTAL AGGREGATE WEIGHT OF ELECTRICAL EQUIPMENT X 1.2 SAFETY FACTOR
(ELECTRICAL EQUIPMENT = TRANSFORMERS WITH OR WITHOUT PROTECTORS)

NOTES:

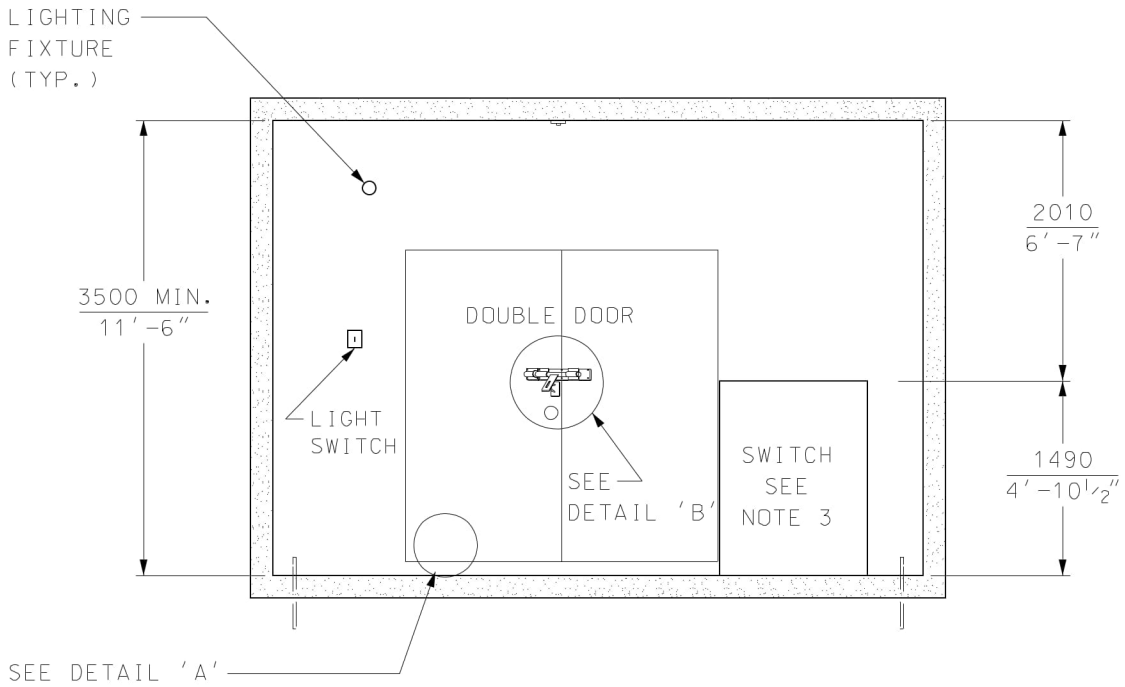
1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE LATEST REVISION OF TORONTO HYDRO REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF CUSTOMER-OWNED STRUCTURES DOCUMENT CONDITION OF SERVICE REF. 5.
2) EMERGENCY DOOR IS REQUIRED IN NEW TRANSFORMER VAULTS, LOCATION OF WHICH SHALL BE APPROVED BY TORONTO HYDRO REPRESENTATIVE. EMERGENCY DOOR SHALL HAVE PANIC HARDWARE INSTALLED TO ALLOW DOOR TO OPEN FROM THE INSIDE. THERE SHALL BE NO METHOD OF OPENING AN EMERGENCY DOOR FROM THE OUTSIDE.
3) LOCATION OF ELECTRICAL LIGHT FIXTURE CAN BE INSTALLED AS SHOWN OR AN ALTERNATE LOCATION CAN BE CHOSEN PROVIDED ADEQUATE SPACE AND CLEARANCE IS PROVIDED TO ALLOW FOR PROPER OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT.
4) DOORS, LOUVER, SECURITY BARS AND ANY METAL PRODUCT SHALL BE GROUNDED BY CONNECTING 2/0 FLEX STRANDED COPPER TO THE GROUNDING LOOP. CONNECTION SHALL BE BY USING PARALLEL GROOVE CLAMPS AND GROUNDING LUG.
5) FOR ADJACENT ELECTRICAL ROOMS, COLLECTOR BUSES OR BUS STUBS CAN BE INSTALLED INSTEAD OF DUCTS AT A MINIMUM HEIGHT OF 2134 mm (7′–0″) ABOVE FINISHED FLOOR WITH 600 mm (1′–11 5/8″) CLEARANCE ON EITHER SIDE TO ALLOW PROPER TERMINATION OF CABLES. COLLECTOR BUS TO BE INSTALLED AS PER SECTION 13 AND ALLOW PROPER UNHINDERED OPERATION AND ACCESS OF EQUIPMENT. SEE STD. 15-1500 FOR COLLECTOR BUS DETAILS.
6) FOR SUSPENDED SLAB DESIGN, DEFINED LOAD CAPACITY IS TO BE A MINIMUM. THE VAULT DESIGN MUST COMPLY WITH THE MOST RECENT VERSION OF THE ONTARIO BUILDING CODE (OBC) AND BE SEALED BY A PROFESSIONAL ENGINEER OF ONTARIO. INCREASED CAPACITY MAY BE REQUIRED DEPENDING ON EXTERNAL FACTORS OR JOINT USE EQUIPMENT ROOMS.
7) ALL LISTED kVA RATINGS ARE AGGREGATED.
8) SAFETY FACTOR (S.F.) OF 1.2 SHALL BE ASSUMED IN THE DEAD LOAD CALCULATIONS
9) FOR SCENARIOS WITH TRANSFORMER CAPACITY GREATER THAN 4 MVA, CUSTOMER TO ATTAIN EQUIPMENT SHOP DRAWINGS AND DETERMINE THE REQUIRED LOADING OUTSIDE OF THE LISTED REQUIREMENTS.
10) GROUND RODS SHALL BE A MINIMUM 3000 mm (10′–0″) APART.

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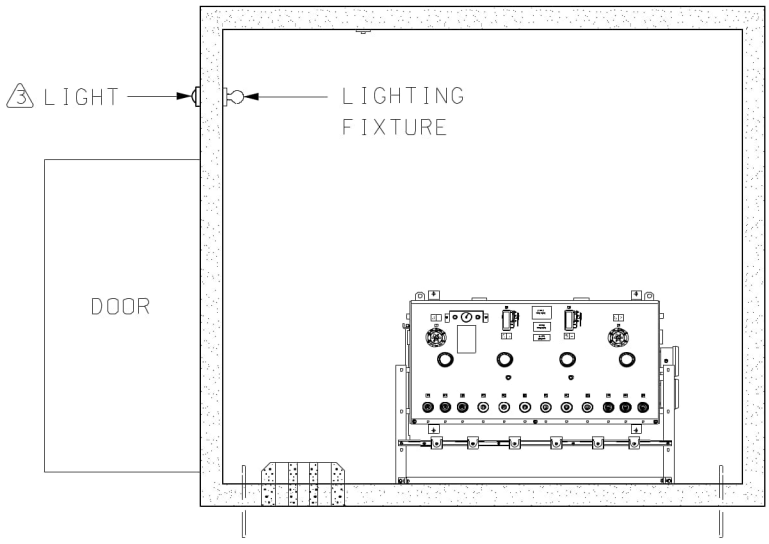
PLAN VIEW



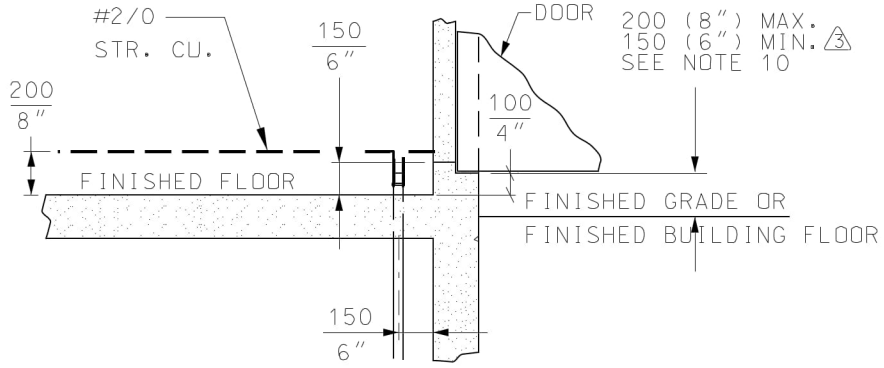
SECTION 'A-A'

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES ABOVE-GRADE WALK-IN OR BELOW GRADE SWITCHING VAULT				
TORONTO HYDRO	Approved By: B.D. 2020-09-25						
	Drafted By: B.D.	Designed By: B.D.	Original Issue: J.D. 2013-02-11	Scale: N.T.S.	Rev: 3	31-6035	1/2

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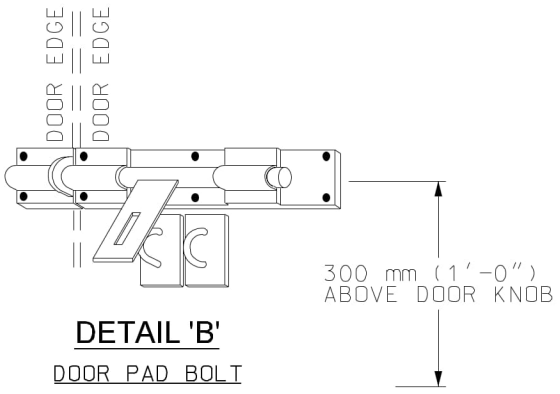


SECTION 'B-B'



DETAIL 'A'

DOOR AND GROUNDING DETAIL



DETAIL 'B'

DOOR PAD BOLT

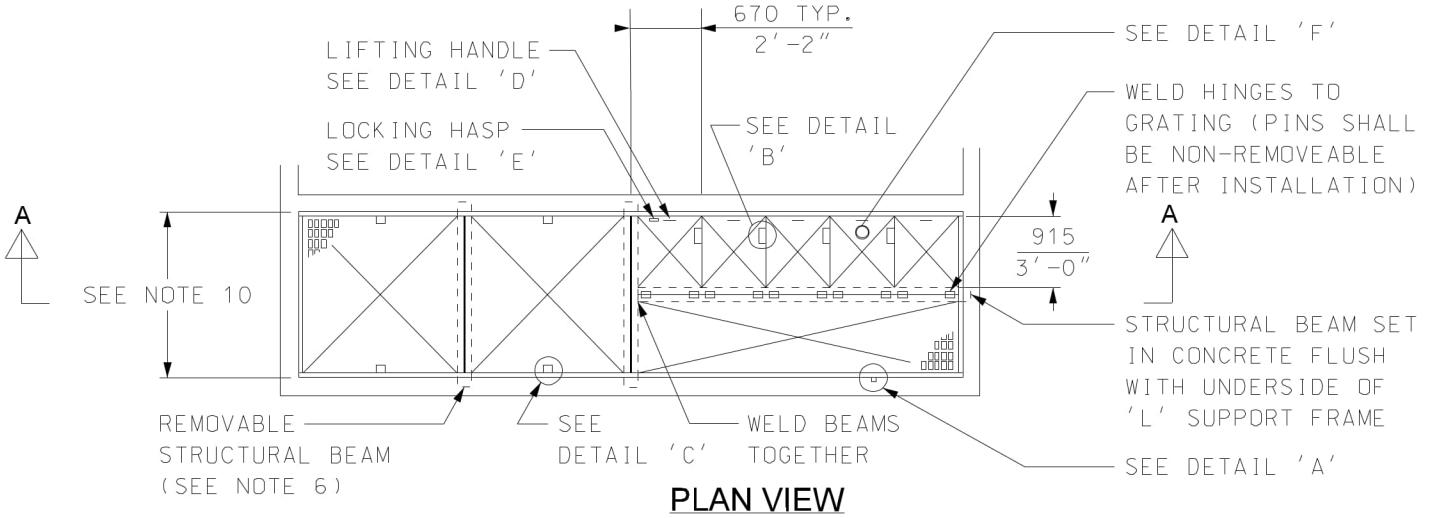
250 mm (10") BOLT

NOTES:

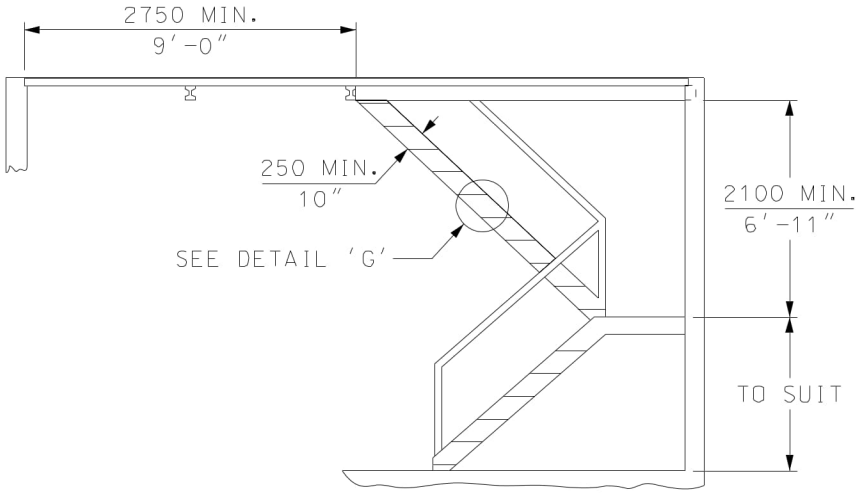
1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE TORONTO HYDRO REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF CUSTOMER-OWNED STRUCTURES DOCUMENT.
2) LIGHTING SHALL BE INSTALLED AS PER CUSTOMER-OWNED STRUCTURES DOCUMENT. LIGHTING SHALL BE LOCATED SO THAT THERE IS ADEQUATE SPACE FOR THE RELAMPING OR MAINTENANCE.
3) LOCATION OF ELECTRICAL EQUIPMENT CAN BE INSTALLED AS SHOWN OR AN ALTERNATE LOCATION CAN BE CHOSEN PROVIDED ADEQUATE SPACE AND CLEARANCE IS PROVIDED TO ALLOW FOR PROPER OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT. REFER TO STD. 13-7840 FOR SWITCH DIMENSIONS.
4) LOCATION OF INCOMING AND OUTGOING CONDUIT ONLY SHOWN FOR GUIDELINE PURPOSES.
5) SWITCH VAULTS DO NOT REQUIRE VENTILATION.
6) REFER TO STD. 31-6040 FOR BELOW GRADE VAULT STAIR AND ACCESS WELL DETAILS.
7) IF REQUIRED, AN EMERGENCY DOOR CAN BE INSTALLED WITH APPROVAL FROM TORONTO HYDRO.
8) EMERGENCY DOOR SHALL HAVE PANIC HARDWARE INSTALLED TO ALLOW DOOR TO OPEN FROM THE INSIDE. THERE SHALL BE NO METHOD OF OPENING AN EMERGENCY DOOR FROM THE OUTSIDE.
9) DOORS, LOUVER, SECURITY BARS AND ANY METAL PRODUCT SHALL BE GROUNDED BY CONNECTING #2/0 FLEX STRANDED COPPER TO THE GROUNDING LOOP. CONNECTION SHALL BE BY USING PARALLEL GROOVE CLAMPS AND GROUNDING LUG.
3 10) HEIGHT OF CURB AT EXTERIOR THRESHOLD OF DOOR SHALL BE MINIMUM 150 mm (6") AND MAXIMUM 200 mm (8") WHEN FACING EXTERIOR FINISHED GRADE. IF VAULT EXIT IS WITHIN BUILDING, MINIMUM 100 mm (4") CURB SHALL BE MAINTAINED.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES ABOVE-GRADE WALK-IN OR BELOW GRADE SWITCHING VAULT				
TORONTO HYDRO	Approved By: B.D. 2020-09-25						
	Drafted By: B.D.	Designed By: B.D.	Original Issue: J.D. 2013-02-11	Scale: N.T.S.	Rev: 3	31-6035	2/2

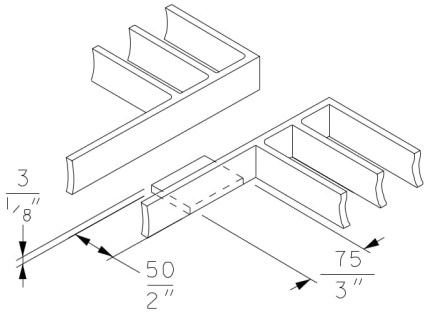
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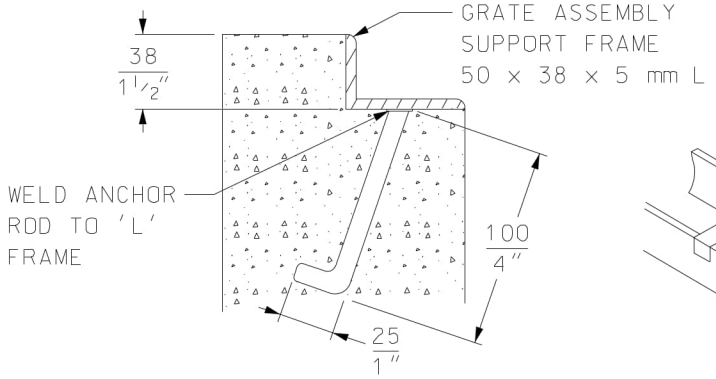
PLAN VIEW
ACCESS WELL COVER ASSEMBLY



SECTION 'A-A'

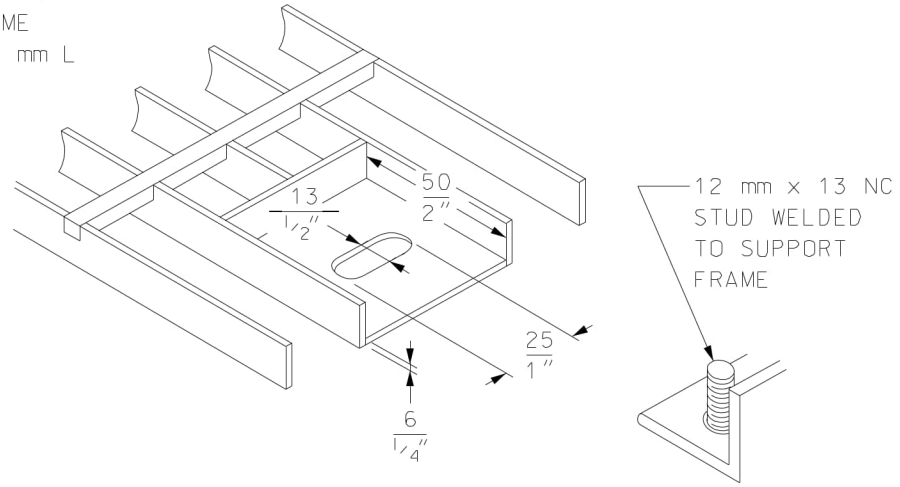


DETAIL 'B'
HOLD DOWN PLATES



ANCHOR ROD MATERIAL SHALL BE 10M REINFORCING STEEL SPACED AT 1.0 m (3'-4") MAX. COMPLETELY AROUND FRAME.

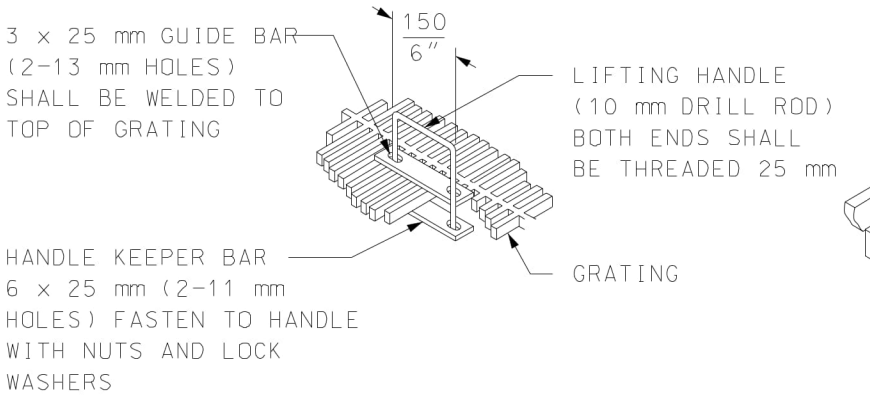
DETAIL 'A'
ANCHOR ROD



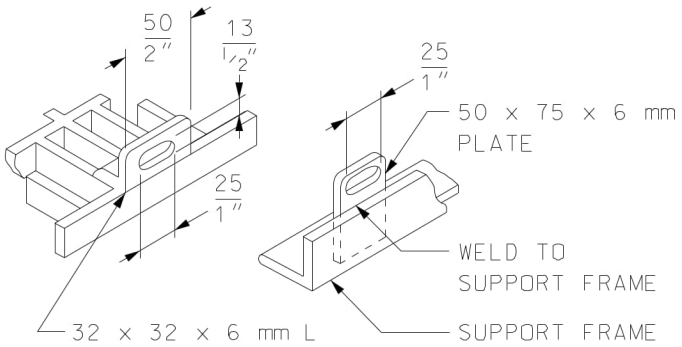
DETAIL 'C'
BOLT PAD FOR STUD AND PENTA-HEAD NUT 4

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES STAIR AND ACCESS WELL DETAIL FOR BELOW-GRADE VAULTS				
TORONTO HYDRO	Approved By: B.D. 2019-03-22						
	Drafted By: N.H.	Designed By: B.D.	Original Issue: G.D./C.P. 2003-11-27	Scale: N.T.S.	Rev: 4	31-6040	1/2

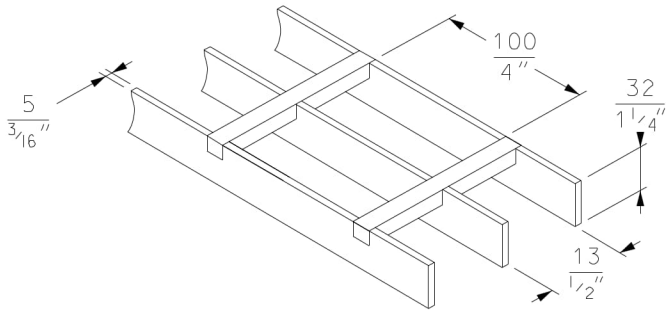
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DETAIL 'D'
GRATE LIFTING HANDLE

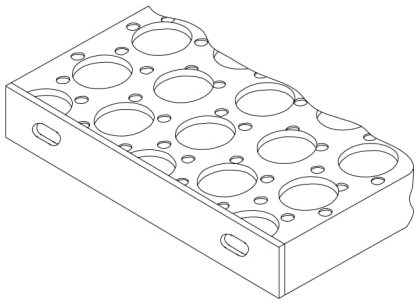


DETAIL 'E'
TYPICAL GRATE LOCKING HASP



WEIGHT 9 lbs/SQ. FT. MAX. (4)

DETAIL 'F'
TYPICAL GRATING



DETAIL 'G'
SAFETY GRIP STAIR TREAD

NOTES:

(4) 1) ACCESS WELL COVER (GRATINGS AND BEAMS) SHOWN IN THIS STANDARD ARE FOR TYPICAL VAULTS LOCATED IN PEDESTRIAN TRAFFIC ONLY. CUSTOMER'S ENGINEER SHALL BE RESPONSIBLE FOR DESIGN OF OVERALL COVER (GRATINGS AND BEAMS) BASED ON VAULT LOCATION AND LOADING REQUIREMENTS. ALL SHOP DRAWINGS SHALL BE STAMPED BY CUSTOMER'S ENGINEER OR MANUFACTURER PRIOR TO BEING ACCEPTED BY TORONTO HYDRO FOR INSTALLATION.

2) ALL METAL COMPONENTS SHALL BE HOT DIPPED GALVANIZED AS PER CSA G-164. CLEANED, PRIMED AND PAINTED AFTER WELDING.

(4) 3) ACCESS WELL SHALL BE COMPLETE WITH STANDARD GRATING TYPE 'BB-6' AS MANUFACTURED BY BORDEN METAL PRODUCTS AS APPROVED EQUIVALENT.

4) LOCKING HASPS FOR GRATING SHALL BE SUPPLIED BY OWNER AS PER DIAGRAM. LOCKS SHALL BE SUPPLIED BY TORONTO HYDRO.

5) PENTA-HEAD NUTS ARE REQUIRED FOR GRATING.

6) BEAM SHALL BE SEATED IN A SUITABLE SADDLE (METAL OR CONCRETE) WITH NO FASTENING DEVICES (BOLTS).

(4) 7) CUSTOMER'S ENGINEER SHALL BE RESPONSIBLE FOR DESIGN OF STAIRS, HANDRAIL AND GUARDS AS PER ONTARIO BUILDING CODE REQUIREMENTS FOR AN EXIT STAIR.

8) STAIRS, HANDRAIL AND GUARDS SHALL BE OF ALL METAL CONSTRUCTION WITH WELDED JOINTS AND SHALL BE HOT DIPPED GALVANIZED AS PER CSA SPEC. G-164.

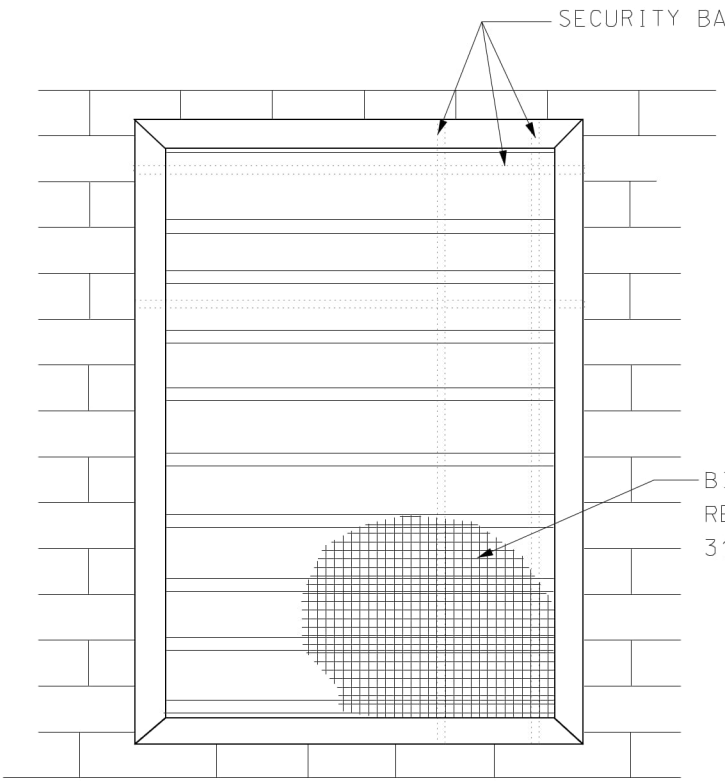
9) STAIR TREADS AND LANDING SHALL BE AMICO-ISG SAFETY GRIP GRATING OR APPROVED EQUIVALENT.

10) REFER TO STD. 31-6030 FOR ACCESS WELL DETAILS. WIDTH OF GRATING SHALL SUIT THE WIDTH OF ACCESS WELL.

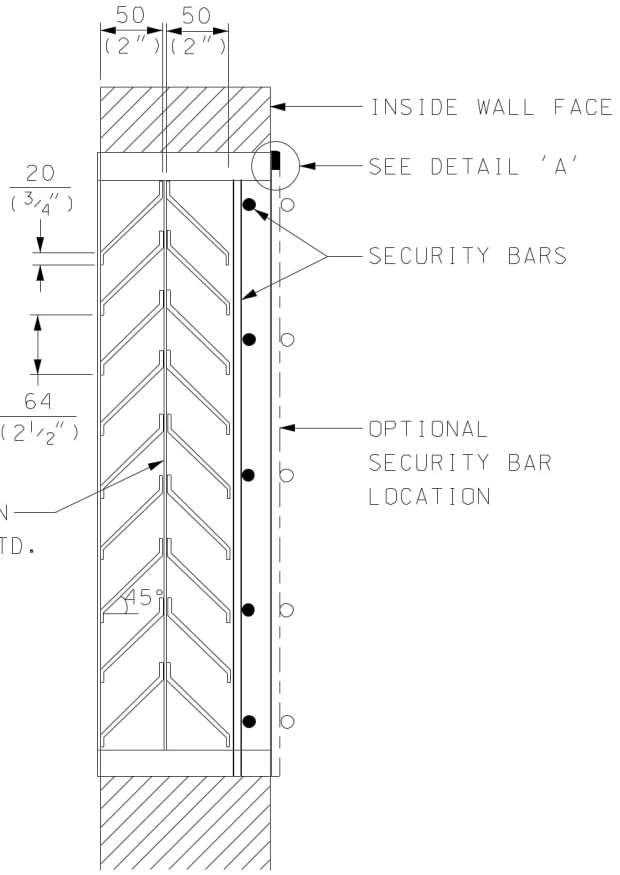
11) ALL GRATINGS SHALL BE BOLTED DOWN.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES STAIR AND ACCESS WELL DETAIL FOR BELOW-GRADE VAULTS				
TORONTO HYDRO	Approved By: B.D. 2019-03-22						
	Drafted By: N.H.	Designed By: B.D.	Original Issue: G.D./C.P. 2003-11-27	Scale: N.T.S.	Rev: 4	31-6040	2/2

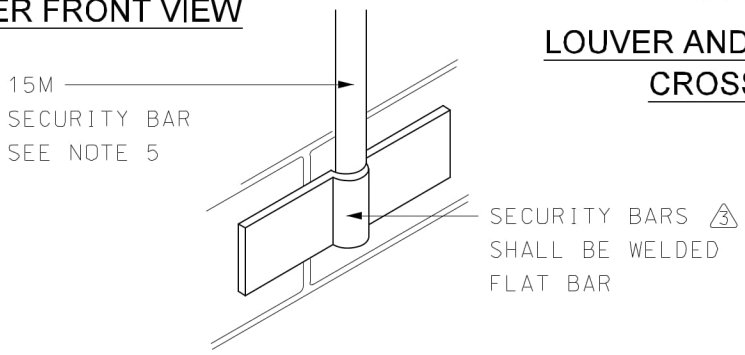
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LOUVER FRONT VIEW



LOUVER AND SECURITY BARS
CROSS SECTION



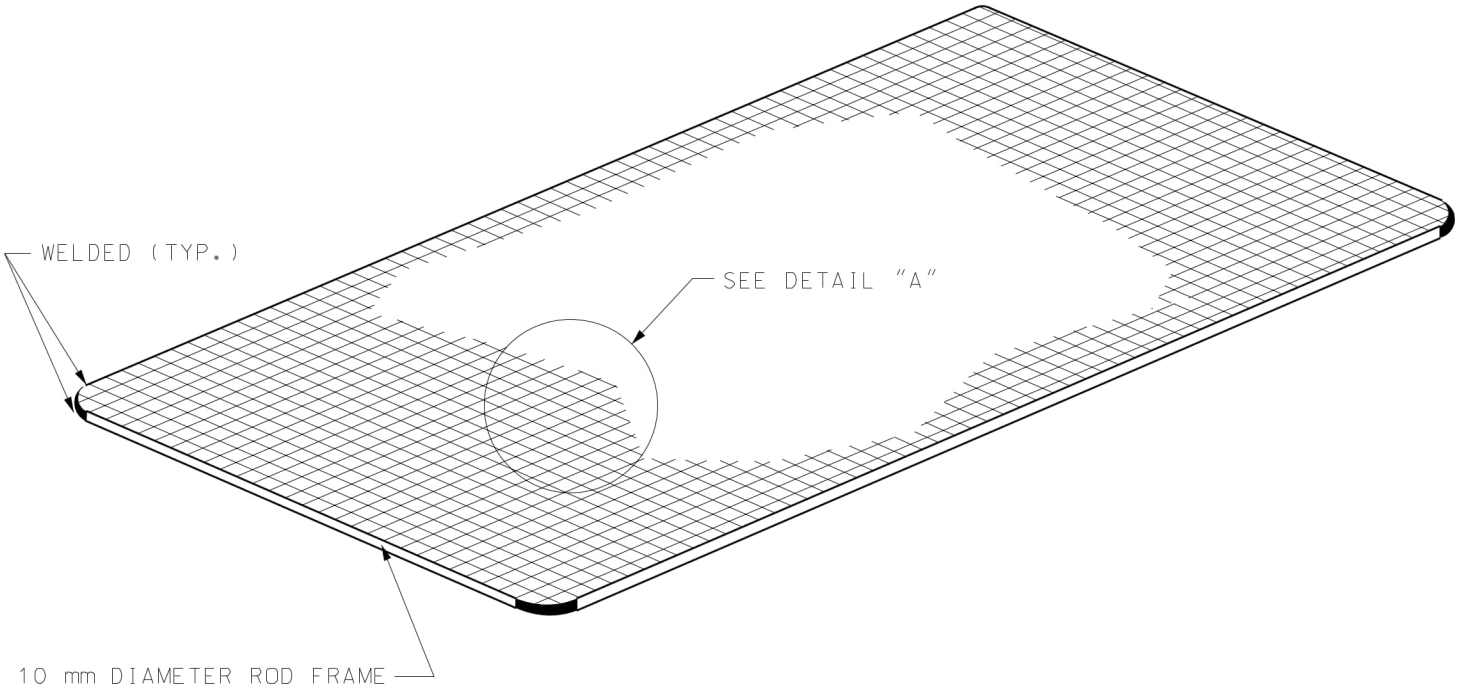
DETAIL 'A'

NOTES: 3

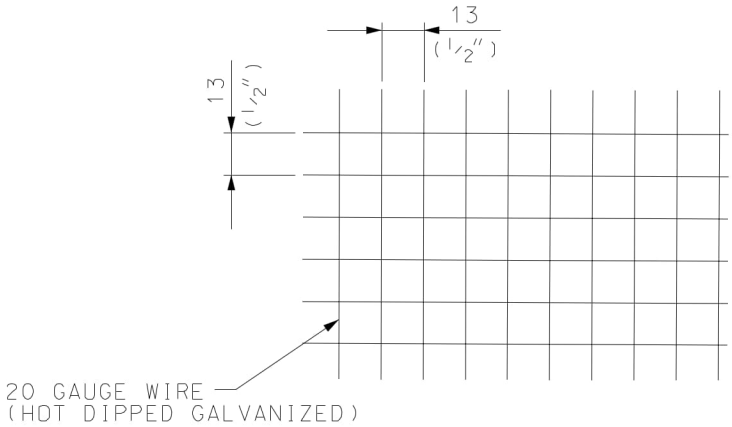
1) VAULTS SHALL BE PROVIDED WITH A NATURAL CROSS VENTILATION SYSTEM TO PREVENT THE AMBIENT TEMPERATURE IN THE VAULT FROM EXCEEDING 40 DEG. CELSIUS.
2) NET AREA OF VENTILATION OPENINGS (INLET AND OUTLET) SHALL NOT BE LESS THAN 20 cm^2 (3 in^2) PER kVA.
3) VENT OPENINGS SHALL HAVE 64 mm (2 1/2") SPACED GABLED DOUBLE LOUVER VENT. CONSTRUCTION SHALL BE OF MINIMUM 16 GAUGE STEEL USING 13 mm (1/2") SQUARE MESH BIRD SCREEN.
4) SHOP DRAWINGS SHALL BE REVIEWED AND ACCEPTED BY TORONTO HYDRO BEFORE FABRICATION.
5) 15M SECURITY BARS SHALL BE MOUNTED ON WALL, SPACED AT 200 mm (8") CENTERS WITH WELDS AT INTERSECTING POINTS. AS AN ALTERNATIVE, SECURITY BARS CAN BE LAGGED INTO TRANSFORMER VAULT WALL.
6) ALL STEEL SHALL BE OF METAL CONSTRUCTION WITH WELDED JOINTS.
7) ALL STEEL SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION AS PER CSA G-164.
8) LOUVER, SECURITY BARS SHALL BE GROUNDED BY CONNECTING #2/0 FLEX STRANDED COPPER TO THE GROUNDING LOOP. CONNECTION TO THE METAL PRODUCTS SHALL BE BY USING PARALLEL GROOVE CLAMPS AND GROUNDING LUG.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES LOUVER DETAILS FOR VENT OPENINGS				
TORONTO HYDRO	Approved By: J.D. 2014-02-04						
	Drafted By: K.H.	Designed By: J.D.	Original Issue: C.P. 2003-11-27	Scale: N.T.S.	Rev: 3	31-6050	1/1

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ISOMETRIC VIEW



DETAIL "A"

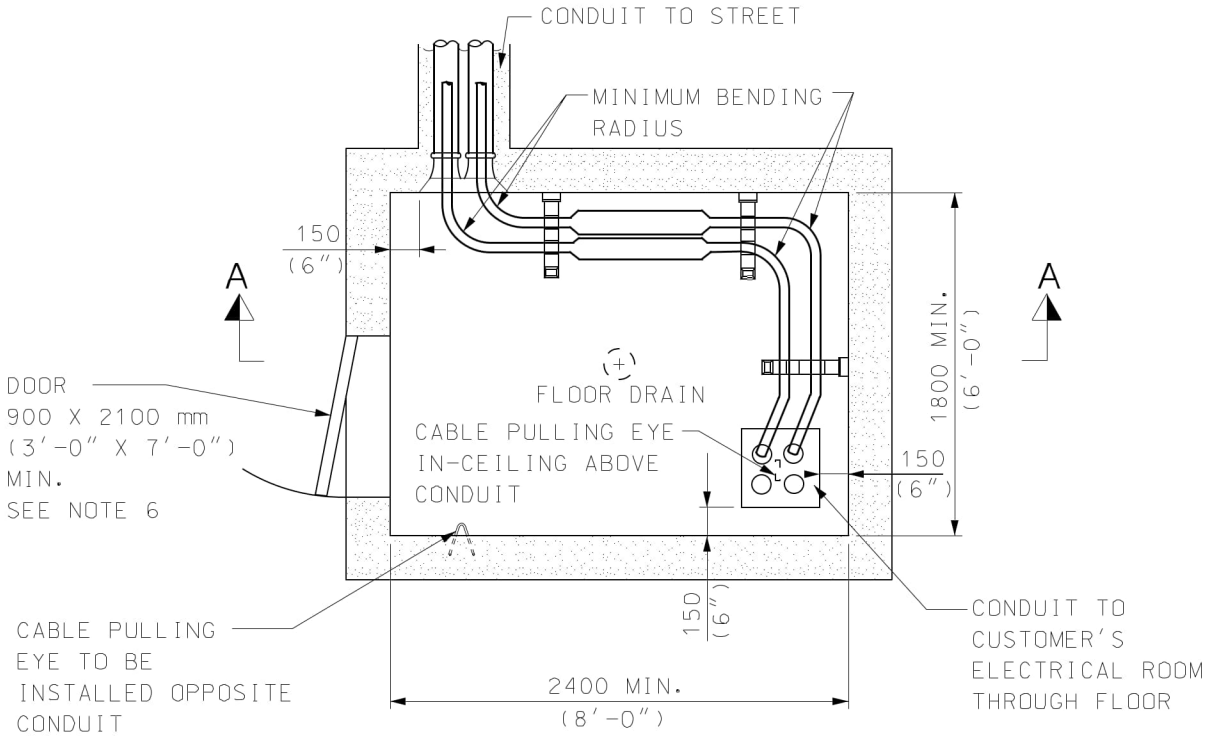
13 mm (1/2") WELDED WIRE MESH

NOTES: (2)

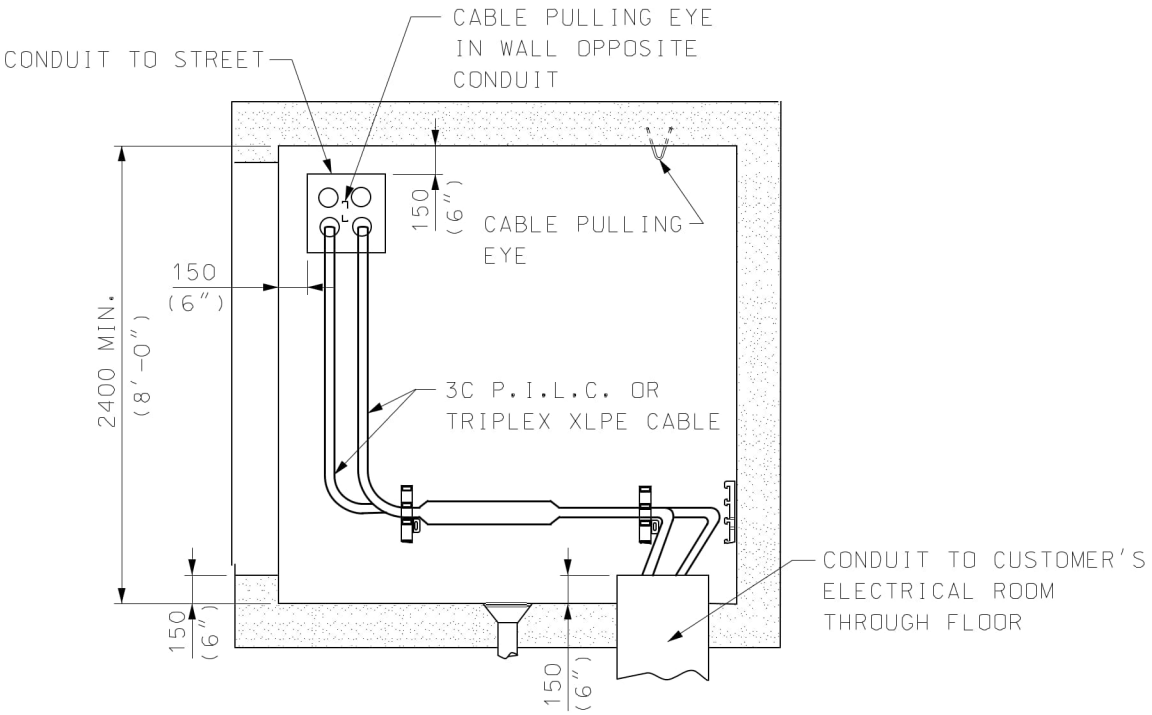
1) BIRD SCREEN TO BE OF METAL CONSTRUCTION WITH WELDED JOINTS.
2) BIRD SCREEN AND ALL MOUNTING TO BE HOT DIPPED GALVANIZED AFTER FABRICATION AS PER CSA G-164.
3) SHOP DRAWINGS MUST BE REVIEWED AND ACCEPTED BY TORONTO HYDRO BEFORE FABRICATION.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES BIRD SCREEN DETAILS				
TORONTO HYDRO	Approved By: J.D. 2013-02-12						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: C.P. 2003-11-27	Scale: N.T.S.	Rev: 2	31-6060	1/1

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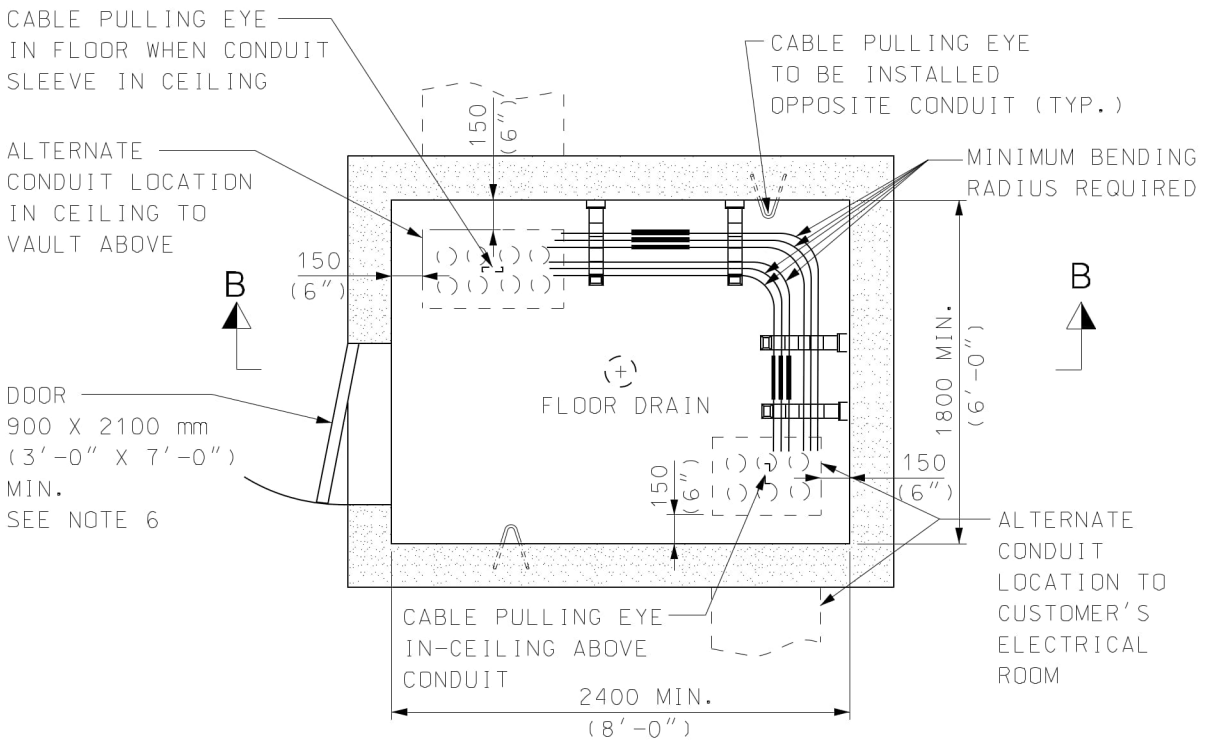
PLAN VIEW
ROOM FOR HIGH-VOLTAGE CABLES



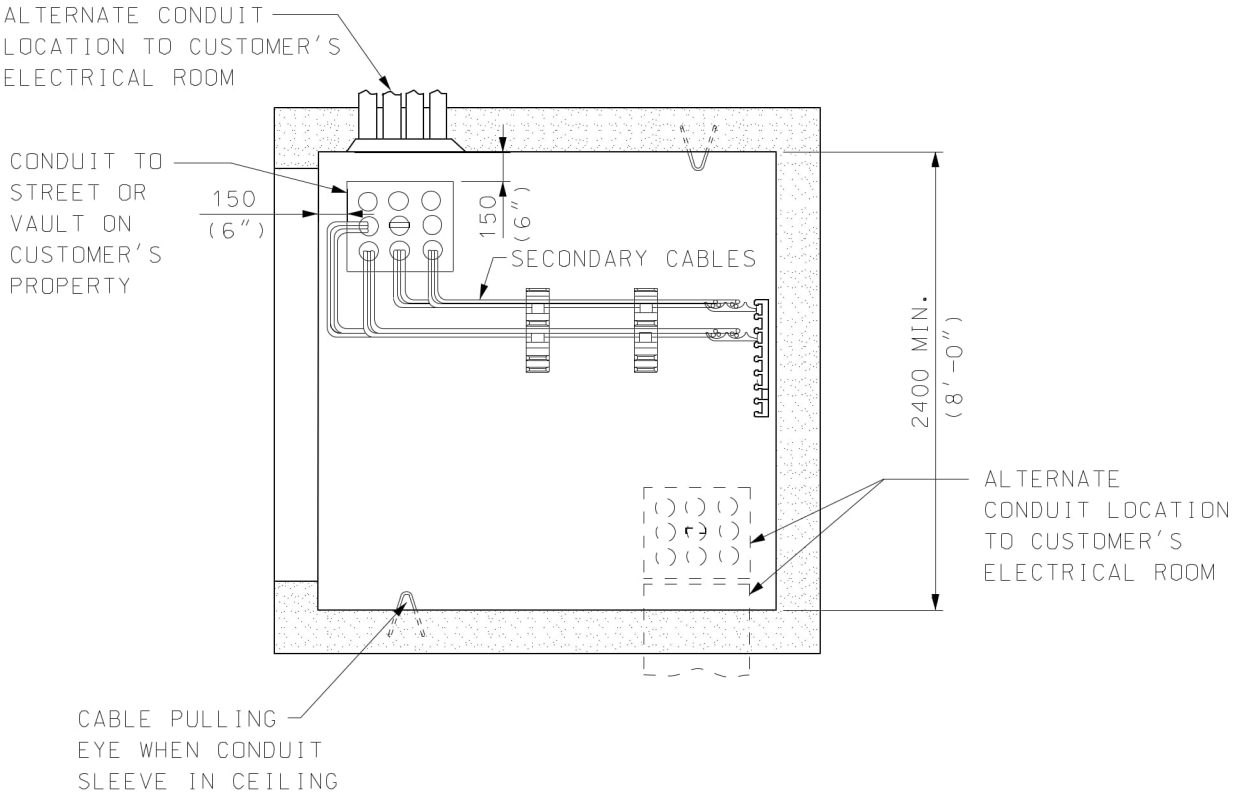
SECTION "A-A"

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES CABLE PULL ROOMS TYPICAL INSTALLATION OF HIGH AND LOW VOLTAGE CABLES				
TORONTO HYDRO	Approved By: J.D. 2013-02-11						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: G.D./C.P. 2004-07-30	Scale: N.T.S.	Rev: 3	31-6070	1/3

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PLAN VIEW
ROOM FOR LOW-VOLTAGE CABLES



SECTION "B-B"

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES CABLE PULL ROOMS TYPICAL INSTALLATION OF HIGH AND LOW VOLTAGE CABLES				
TORONTO HYDRO	Approved By: J.D. 2013-02-11						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: G.D./C.P. 2004-07-30	Scale: N.T.S.	Rev: 3	31-6070	2/3

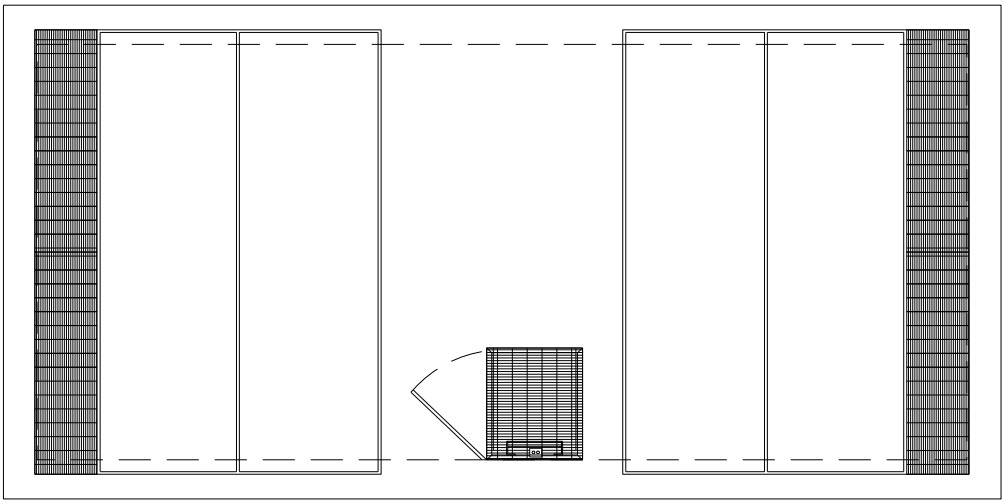
NOTES: (3)

1) WHEN HIGH VOLTAGE PRIMARY CABLES OR LOW VOLTAGE SECONDARY CABLES ARE ROUTED THROUGH THE CABLE PULL ROOM, THE FOLLOWING POINTS ARE TO BE CONSIDERED IN DETERMINING THE CONSTRUCTION REQUIREMENTS AND GENERAL LAYOUT:
   A) IN ALL CASES, IT SHALL BE POSSIBLE TO MAKE CABLE JOINTS IN THE ROOM.
   B) JOINTS IN CABLE SHALL BE HORIZONTAL.
   C) THE WALL ON WHICH THE CABLE JOINT IS TO BE RACKED SHALL BE LONG ENOUGH TO ACCOMMODATE THE JOINT AND TWO CABLE BENDS. THE CABLE JOINT MUST BE AT LEAST 300 mm (1'-0") FROM THE FLOOR.
2) THE WALLS OF THE ROOM SHALL BE AT LEAST 2400 mm (8'-0") LONG AND 1800 mm (6'-0") WIDE, AND THE MINIMUM HEADROOM SHALL BE 2400 mm (8'-0"). LARGER DIMENSIONS ARE REQUIRED WHEN:
   A) STEPS, RAILINGS, COLUMNS ARE LOCATED IN THE "CLEAR" WORKING AREA.
   B) MORE THAN 2 CIRCUITS ARE INSTALLED.
   C) CONDUITS ARE LOCATED SUCH THAT THE CABLES SHALL ENCIRCLE THE PULL ROOM. HEADROOM DIMENSIONS TO INCREASE IN SUCH CASES.
3) CABLE PULLING EYES ARE TO BE INSTALLED AND LOCATED AS PER STD. 31-8210.
4) THE CONDUIT ENTRANCES SHALL BE LOCATED NEAR THE CORNERS OF THE ROOM AND BE AS FAR APART AS POSSIBLE AND SHALL BE OFFSET FROM EACH OTHER. ALSO, THE DUCTS THAT GO TO THE STREET MUST SLOPE AWAY FROM THE PULL ROOM.
5) LIGHTING AND DRAINAGE MUST BE PROVIDED BY THE CUSTOMER. LIGHT TO BE LOCATED IN THE CENTER OF ROOM.
6) PULL ROOM TO BE EQUIPPED WITH A DOOR AND FRAME HAVING A FIRE RATING OF 1.5 HOURS.
7) WHERE POSSIBLE, THE DOORWAY SHALL BE LOCATED OPPOSITE A DUCT FACE AND POSITIONED SO THAT IT DOES NOT INTERFERE WITH JOINTING OR CABLE INSTALLATION.
8) PADLOCK HASP TO BE PROVIDED FOR DOOR (OR PROVISION FOR TORONTO HYDRO CYLINDER LOCK - 29 mm (1'-1/4") DIAMETER CYLINDER).
9) NO FOREIGN EQUIPMENT OR PIPES ARE ALLOWED IN THE PULL ROOM.
10) CABLE RACKS AND ARMS WILL BE SUPPLIED AND INSTALLED BY TORONTO HYDRO AND CHARGED TO THE CUSTOMER.
11) 24 HR. ACCESS IS REQUIRED.
12) THE ABOVE REQUIREMENTS ARE TO BE SHOWN ON THE CUSTOMER'S DRAWINGS FOR TORONTO HYDRO'S REVIEW AND ACCEPTANCE.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES CABLE PULL ROOMS TYPICAL INSTALLATION OF HIGH AND LOW VOLTAGE CABLES				
TORONTO HYDRO	Approved By: J.D. 2013-02-11						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: G.D./C.P. 2004-07-30	Scale: N.T.S.	Rev: 3	31-6070	3/3

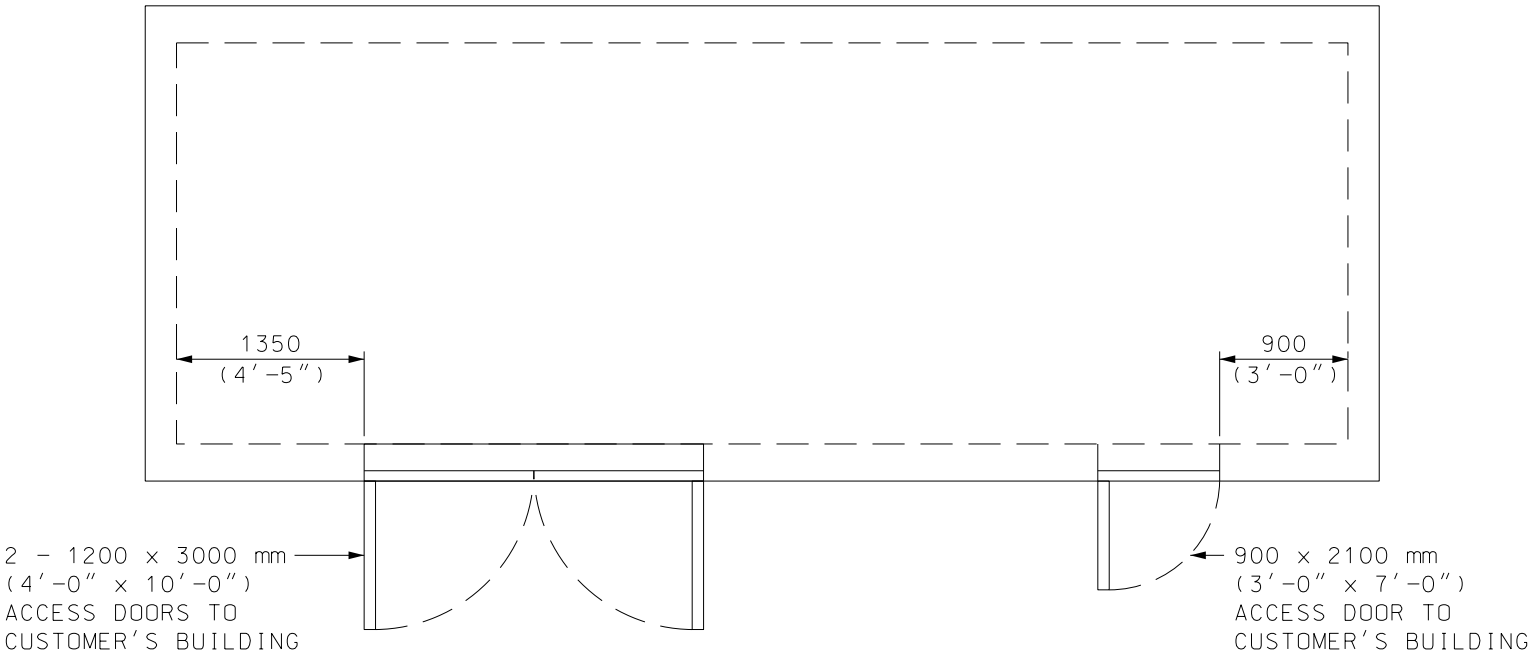
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BELOW GRADE - TOP ENTRY

13-2010 – 4.16 kV (MAX. 3 – 167 kVA TRANSFORMERS) ELECTRICAL EQUIPMENT LAYOUT
13-4020 – 13.8 kV COMPACT RADIAL (MAX. 1000 kVA TRANSFORMER) ELECTRICAL EQUIPMENT LAYOUT
13-4040 – 13.8 kV COMPACT LOOP (MAX. 1000 kVA TRANSFORMER) ELECTRICAL EQUIPMENT LAYOUT
31-5110 – CIVIL STRUCTURE – 3000 x 6700 x 3660 mm (10′-0″ x 22′-0″ x 12′-0″)
31-5170 – CIVIL STRUCTURE – 2290 x 6400 x 3660 mm (7′-6″ x 21′-0″ x 12′-0″)

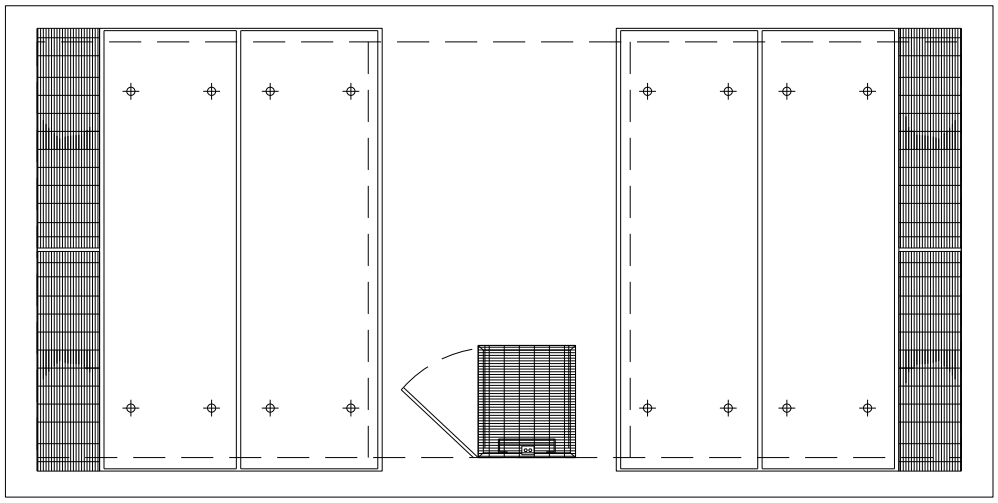


ABOVE GRADE - WALK-IN VAULT △5

13-2010 – 4.16 kV (MAX. 3 – 167 kVA TRANSFORMERS) ELECTRICAL EQUIPMENT LAYOUT
13-4040 – 13.8 kV COMPACT LOOP (MAX. 2000 kVA TRANSFORMER) ELECTRICAL EQUIPMENT LAYOUT
13-5010 – 13.8 kV NETWORK (MAX. 2000 kVA TRANSFORMERS)
CIVIL STRUCTURE – 3000 x 8530 x 3660 mm (10′-0″ x 28′-0″ x 12′-0″)

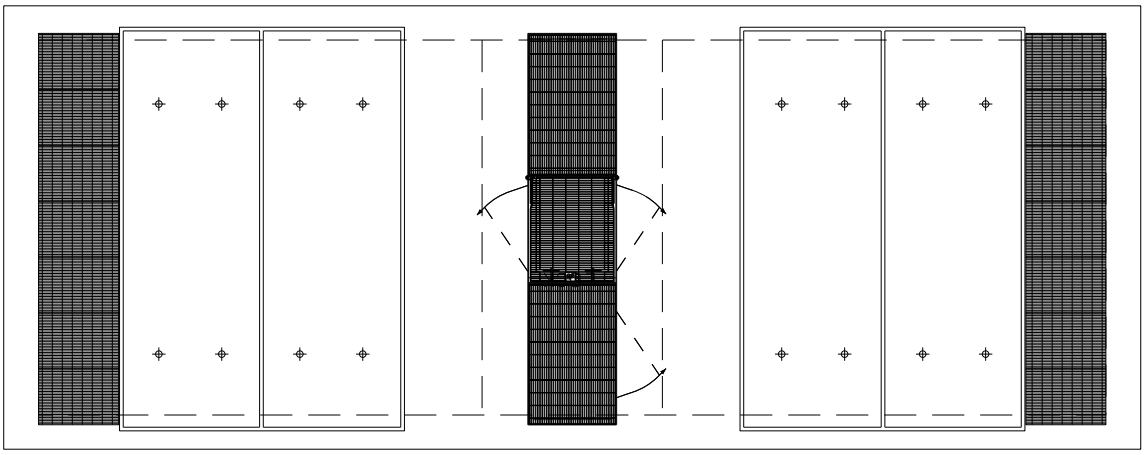
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES 4.16 kV - 13.8 kV TRANSFORMER VAULTS					
TORONTO HYDRO	Approved By: A.P. 2026-01-01							
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P./G.D 2003-11-27	Scale: N.T.S.	Rev: 5	31-6080	1/2

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BELOW GRADE - TOP ENTRY

13-5010 - 13.8 kV NETWORK (MAX. 2000 kVA TRANSFORMERS) ELECTRICAL EQUIPMENT LAYOUT
31-5180 - MAX. 750 kVA TRANSFORMERS - 2290 x 6700 x 3660 mm (7'-6" x 22'-0" x 12'-0")



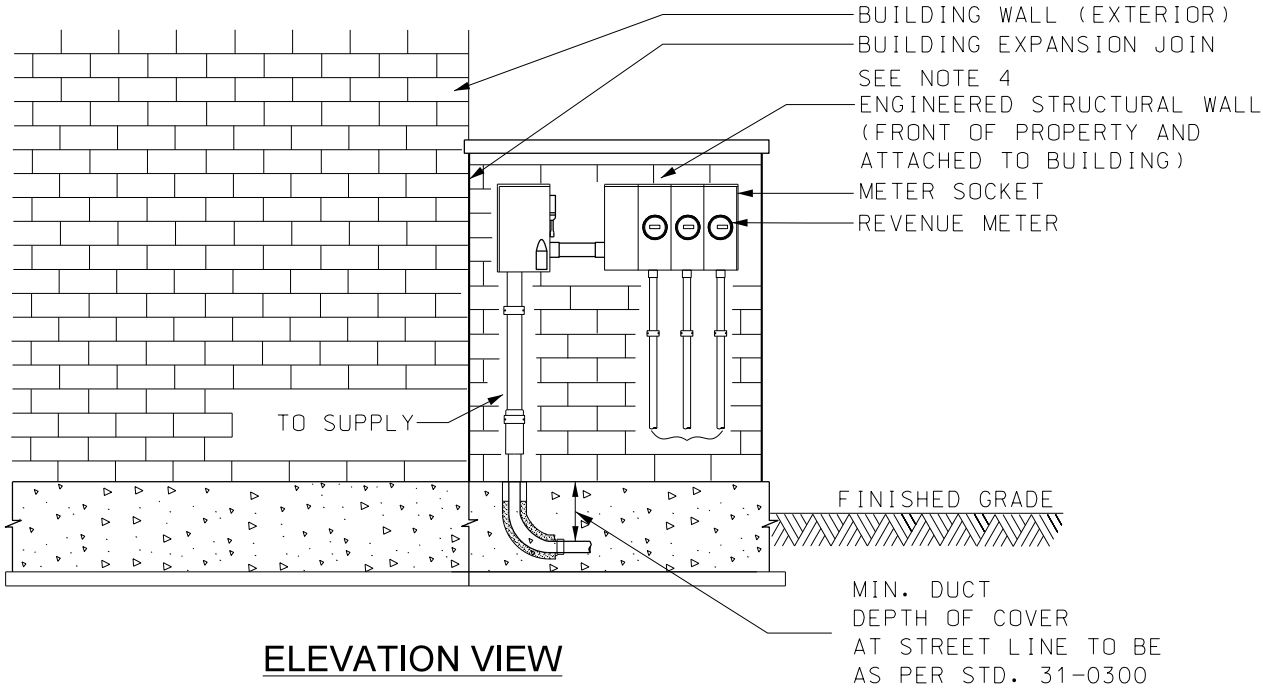
BELOW GRADE - TOP ENTRY

13-5010 - 13.8 kV NETWORK (MAX. 2000 kVA TRANSFORMERS) ELECTRICAL EQUIPMENT LAYOUT
31-5130 - MAX. 2000 kVA TRANSFORMERS - 3000 x 8530 x 3660 mm (10'-0" x 28'-0" x 12'-0")

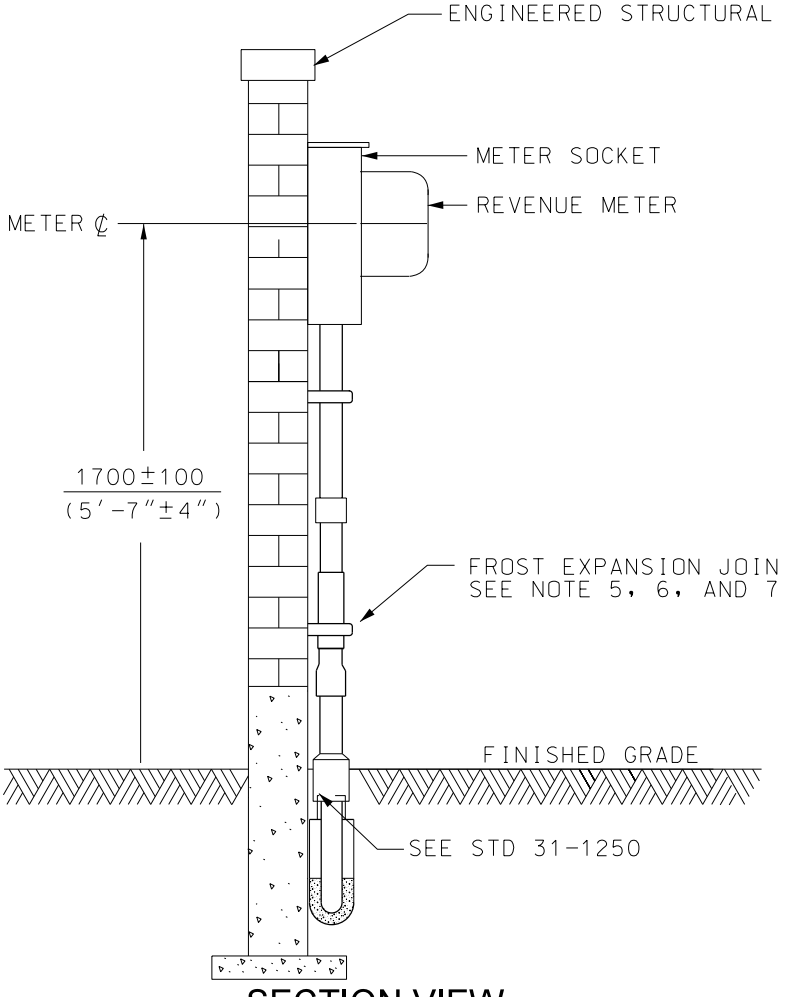
NOTE:
1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH STD. 31-6000 AND STD. 31-6010.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES 4.16 kV - 13.8 kV TRANSFORMER VAULTS					
TORONTO HYDRO	Approved By: A.P. 2026-01-01							
	Drafted By: A.P.	Designed By: A.P.	Original Issue: C.P./G.D 2003-11-27	Scale: N.T.S.	Rev: 5	31-6080	2/2

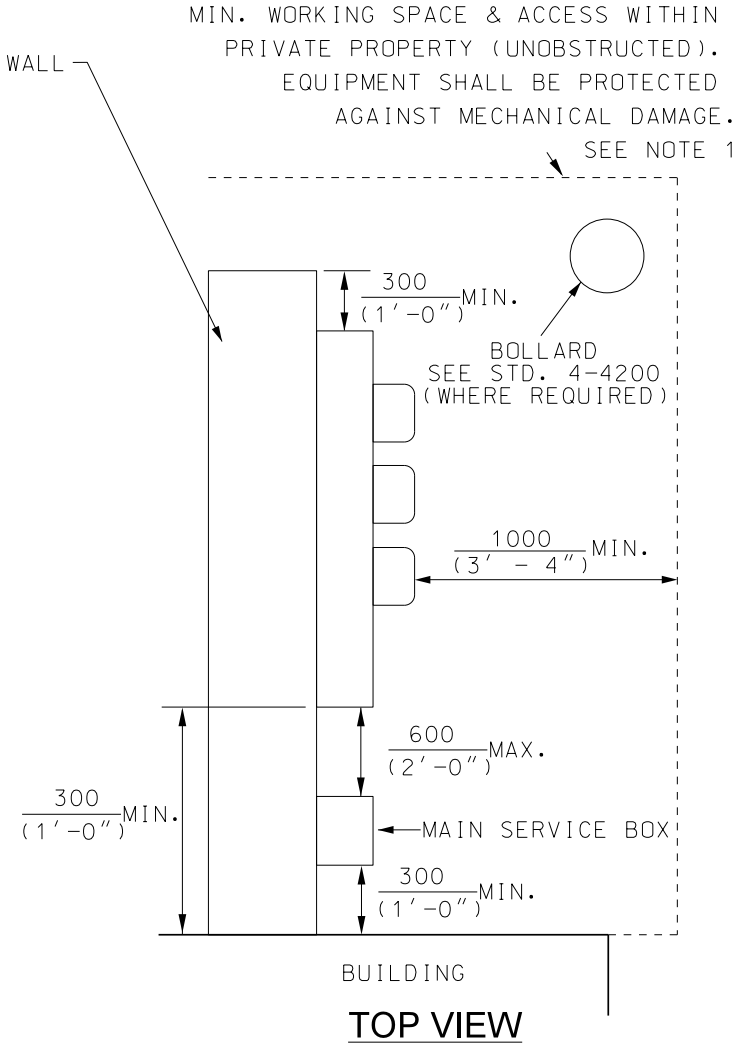
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ELEVATION VIEW



SECTION VIEW



TOP VIEW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES ENGINEERED STRUCTURAL WALL FOR RESIDENTIAL SECONDARY SERVICE				
TORONTO HYDRO	Approved By: 23-10-2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue:	Scale: N.T.S.	Rev: 0	31-6100	1/2

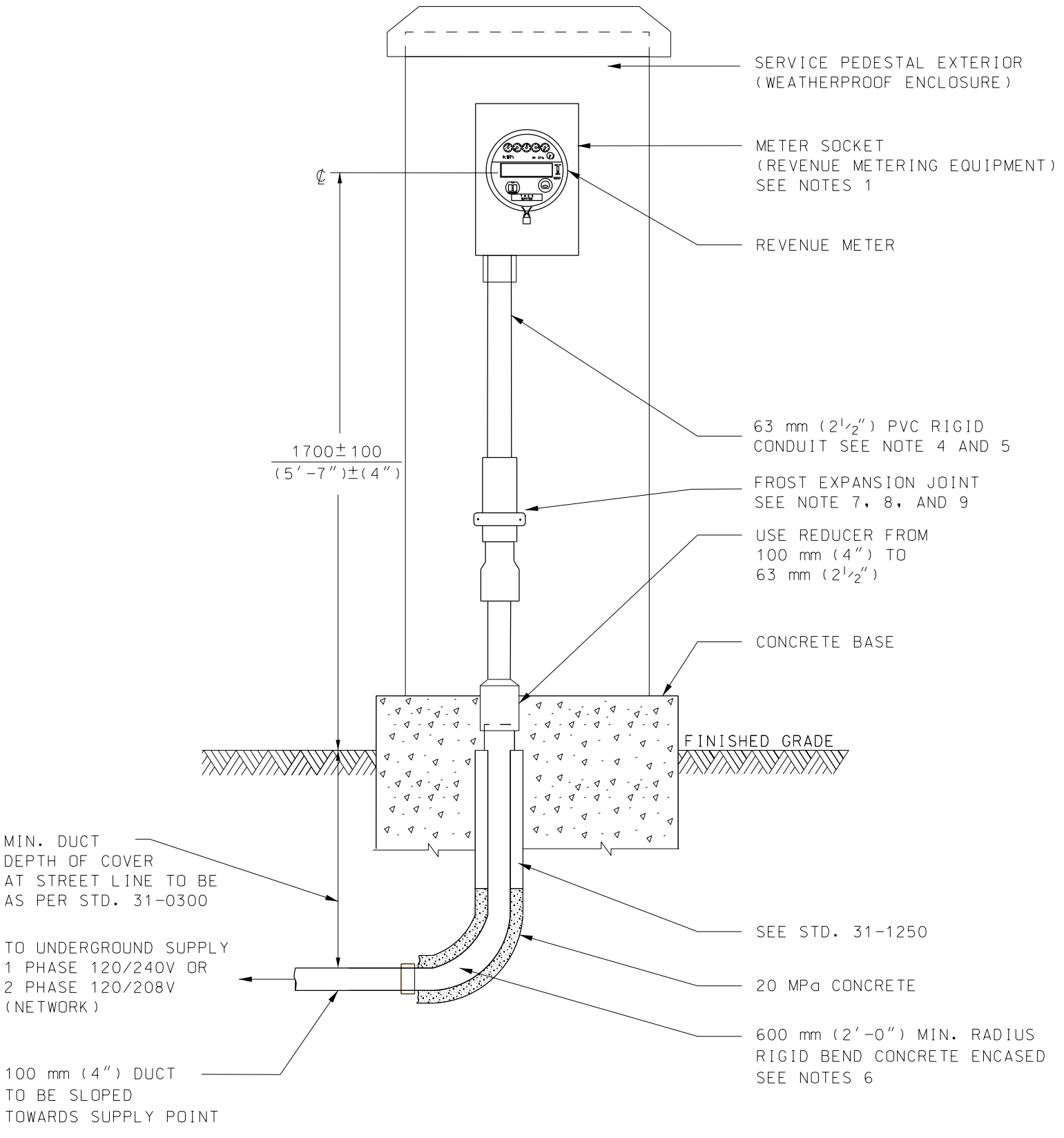
NOTES:

1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE LATEST REVISION OF TORONTO HYDRO CONDITION OF SERVICE REFERENCE 5 – REQUIREMENTS THE DESIGN AND CONSTRUCTION OF CUSTOMER-OWNED STRUCTURES AND REFERENCE 6 – METERING REQUIREMENTS 750 VOLTS OR LESS.
2) THE CUSTOMER SHALL SUBMIT P. ENG. STAMPED DRAWING FOR THE ENGINEERED STRUCTURAL WALL AND FOUNDATION. DESIGN SHALL ACCOUNT FOR ALL APPLICABLE METERING EQUIPMENT, CABLES, CONDUITS, ASSOCIATED APPURTENANCES, AND APPLICABLE LOADING CONDITIONS. P. ENG. STAMPED DRAWING SHALL BE APPROVED BY TORONTO HYDRO PRIOR TO INSTALLATION.
3) THE ENGINEERED STRUCTURAL WALL FOUNDATION SHOULD HAVE MINIMUM DEPTH OF 1.2m (4′) BELOW GRADE TO PREVENT FROST HEAVING.
4) A BUILDING EXPANSION JOINT SHALL BE PROVIDED, UNLESS OTHERWISE APPROVED BY THE CUSTOMER'S STRUCTURAL ENGINEER, BETWEEN THE BUILDING AND THE ENGINEERED STRUCTURAL WALL TO ACCOMMODATE DIFFERENTIAL MOVEMENT DUE TO SETTLEMENT, THERMAL EXPANSION, AND/OR FROST HEAVE.
5) INSTALL FROST EXPANSION JOINT ABOVE GRADE TO ALLOW FOR CABLE AND GROUND MOVEMENT. INSTALL FROST EXPANSION JOINT IN ITS HALFWAY POSITION. LEAVE 1500 mm (5′–0″) CABLE COIL INSIDE OF TAP BOX OR CABLE CHAMBER.
6) WHILE INSTALLING FROST EXPANSION JOINT. FOLLOW MANUFACTURER'S INSTALLATION THOROUGHLY TO AVOID SEPARATION FROM PIPE.
7) FROST EXPANSION JOINT SIZE SHALL BE BASED ON SIZE AND TYPE OF SERVICE. FOR 200A SERVICE, 63 mm ($2\frac{1}{2}$″) FROST EXPANSION JOINT SHALL BE INSTALLED. FOR 400A SERVICE, 100 mm (4″) FROST EXPANSION JOINT SHALL BE INSTALLED.
8) THE CUSTOMER SHALL BE RESPONSIBLE FOR ENSURING THE DESIGN COMPLIES WITH ALL APPLICABLE CODES, STANDARDS, BY-LAWS, AND REGULATORY REQUIREMENTS.

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DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CUSTOMER-OWNED STRUCTURES ENGINEERED STRUCTURAL WALL FOR RESIDENTIAL SECONDARY SERVICE				
TORONTO HYDRO	Approved By: 23-10-2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue:	Scale: N.T.S.	Rev: 0	31-6100	2/2

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DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES SERVICE PEDESTAL FOR SECONDARY SERVICE TO PARKS AND UTILITIES				
TORONTO HYDRO	Approved By: 23-10-2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue:	Scale: N.T.S.	Rev: 0	31-6110	1/2

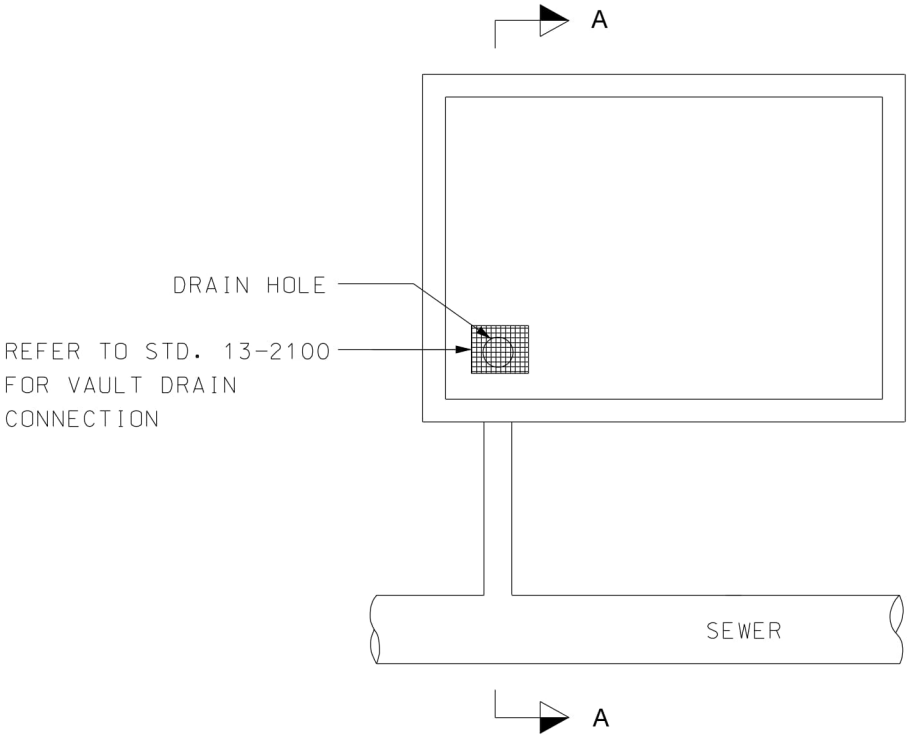
NOTES:

1) ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF TORONTO HYDRO CONDITIONS OF SERVICE, INCLUDING REFERENCE 5 – REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF CUSTOMER-OWNED STRUCTURES AND REFERENCE 6 – TORONTO HYDRO METERING REQUIREMENTS 750 VOLTS OR LESS, AS WELL AS THE ONTARIO ELECTRICAL SAFETY CODE.
2) THE ENGINEERED SERVICE PEDESTAL FOUNDATION SHALL HAVE A MINIMUM DEPTH OF 1.2 m (4'-0") BELOW GRADE TO PREVENT FROST HEAVING.
3) THE CUSTOMER SHALL SUBMIT P. ENG. STAMPED DRAWINGS FOR THE ENGINEERED SERVICE PEDESTAL FOUNDATION. THE DESIGN SHALL ACCOUNT FOR ALL APPLICABLE METERING EQUIPMENT, CABLES, CONDUITS, ASSOCIATED APPURTENANCES, AND APPLICABLE LOADING CONDITIONS.
4) ALL PVC RIGID CONDUIT AND FITTINGS INSTALLED ABOVE GRADE SHALL BE SCHEDULE 80.
5) ALL ELECTRICAL MATERIALS, RIGID CONDUITS, AND FITTINGS SHALL BE CSA CERTIFIED.
6) ALL BENTS SHALL BE CONCRETE ENCASED.
7) INSTALL FROST EXPANSION JOINT ABOVE GRADE TO ALLOW FOR CABLE AND GROUND MOVEMENT.INSTALL FROST EXPANSION JOINT IN ITS HALFWAY POSITION. LEAVE 1500 mm (5'-0") CABLE COIL INSIDE OF TAP OR CABLE CHAMBER.
8) WHILE INSTALLING FROST EXPANSION JOINT. FOLLOW MANUFACTURER'S INSTALLATION THOROUGHLY TO AVOID SEPARATION FROM PIPE.
9) FROST EXPANSION JOINT SIZE SHALL BE BASED ON SIZE AND TYPE OF SERVICE. FOR 200A SERVICE, 63 mm (2 $\frac{1}{2}$") FROST EXPANSION JOINT SHALL BE INSTALLED.
10) THE CUSTOMER SHALL BE RESPONSIBLE FOR ENSURING THE DESIGN COMPLIES WITH ALL APPLICABLE CODES, STANDARDS, BY-LAWS, AND REGULATORY REQUIREMENTS.

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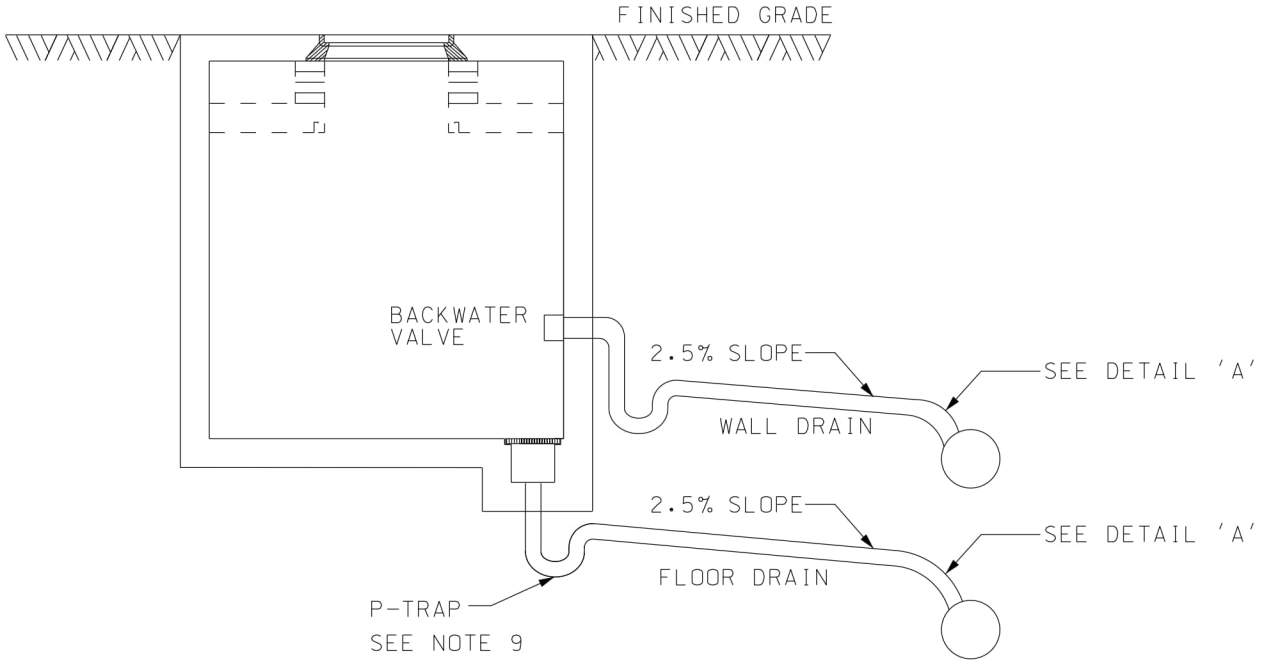
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# CUSTOMER-OWNED STRUCTURES SERVICE PEDESTAL FOR SECONDARY SERVICE TO PARKS AND UTILITIES				
TORONTO HYDRO	Approved By: 23-10-2026 A.P.						
	Drafted By: A.P.	Designed By: A.P.	Original Issue:	Scale: N.T.S.	Rev: 0	31-6110	2/2

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PLAN VIEW

CABLE CHAMBERS AND TRANSFORMER VAULTS
DRAIN CONNECTION TO SEWER

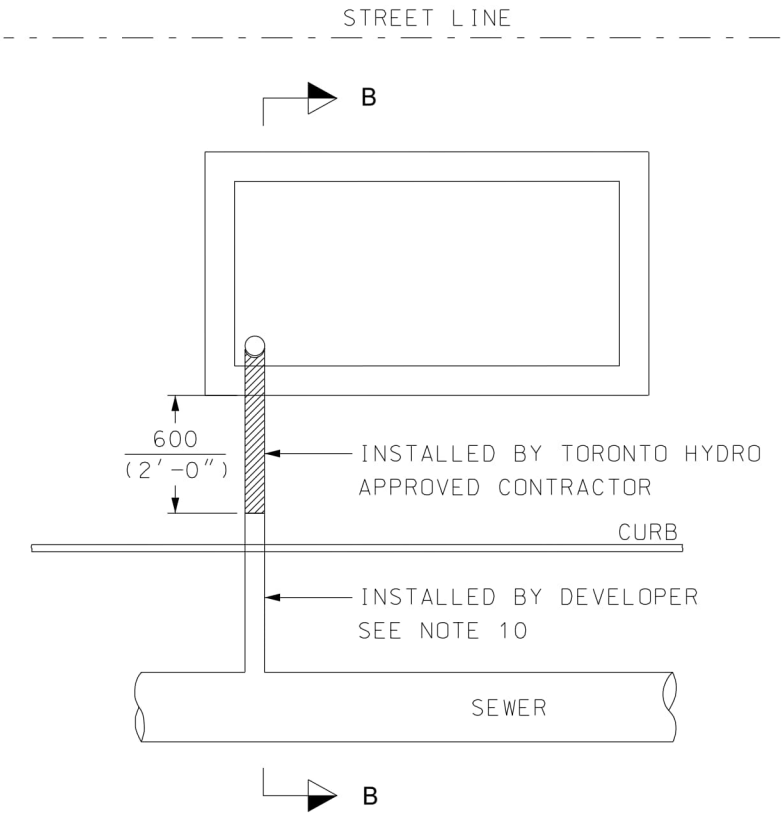


SECTION 'A-A'

ONLY 1 DRAIN SHALL BE INSTALLED

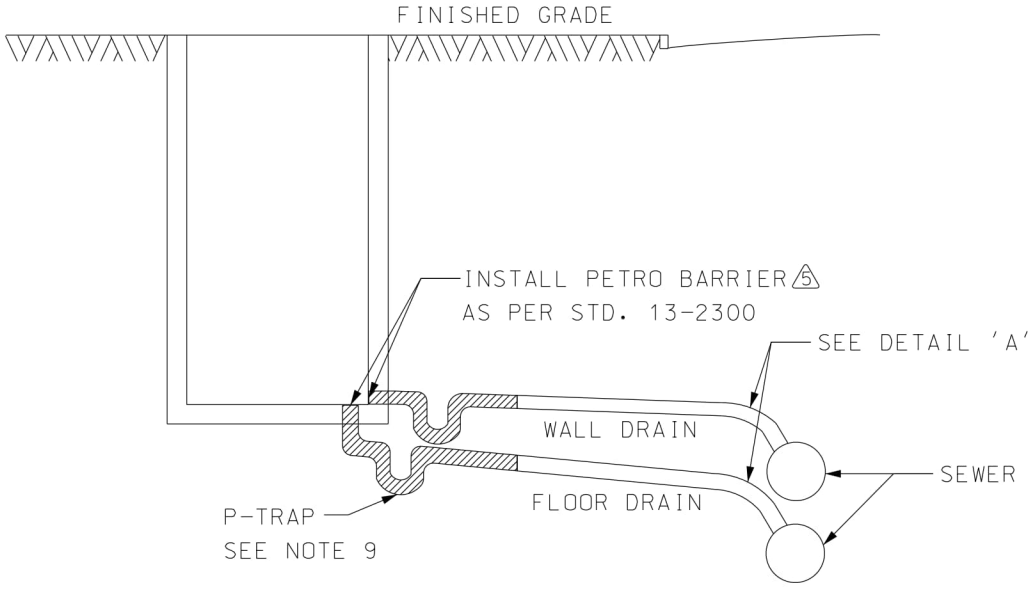
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DRAINING STRUCTURES				
TORONTO HYDRO	Approved By: J.D. 2018-03-07						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D. 2007-10-19	Scale: N.T.S.	Rev: 5	31-7100	1/5

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PLAN VIEW

SUBMERSIBLE VAULTS DRAIN CONNECTION TO SEWER

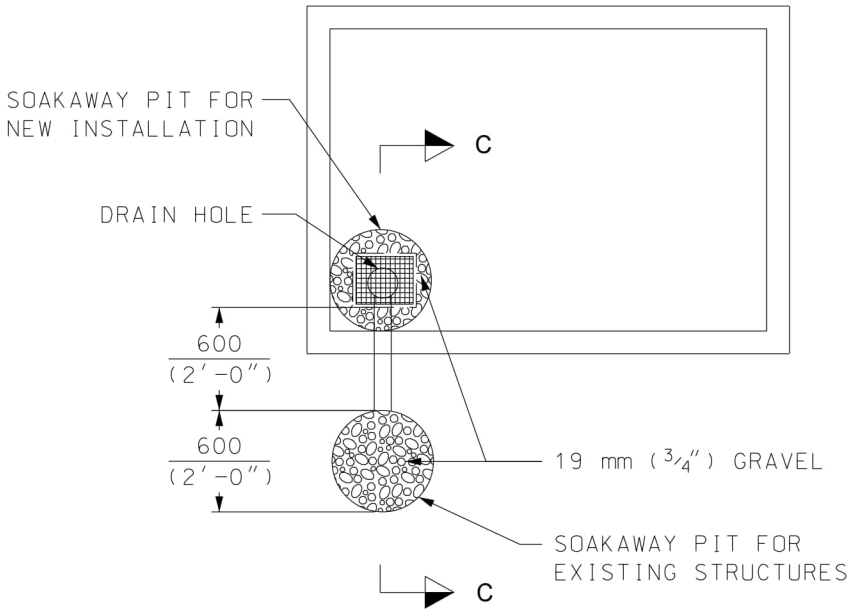


SECTION 'B-B'

ONLY 1 DRAIN SHALL BE INSTALLED

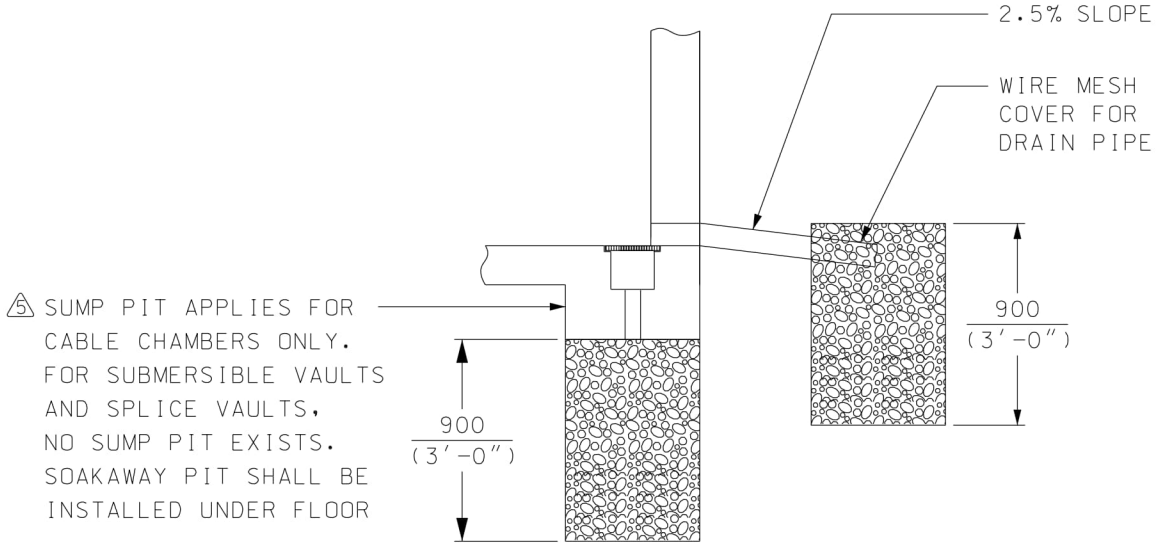
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TORONTO HYDRO	Approved By: J.D. 2018-03-07						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D. 2007-10-19	Scale: N.T.S.	Rev: 5	31-7100	2/5

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PLAN VIEW

SOAKAWAY PIT CONNECTION FOR CABLE CHAMBERS,⑤
SPLICE VAULTS AND SUBMERSIBLE VAULTS

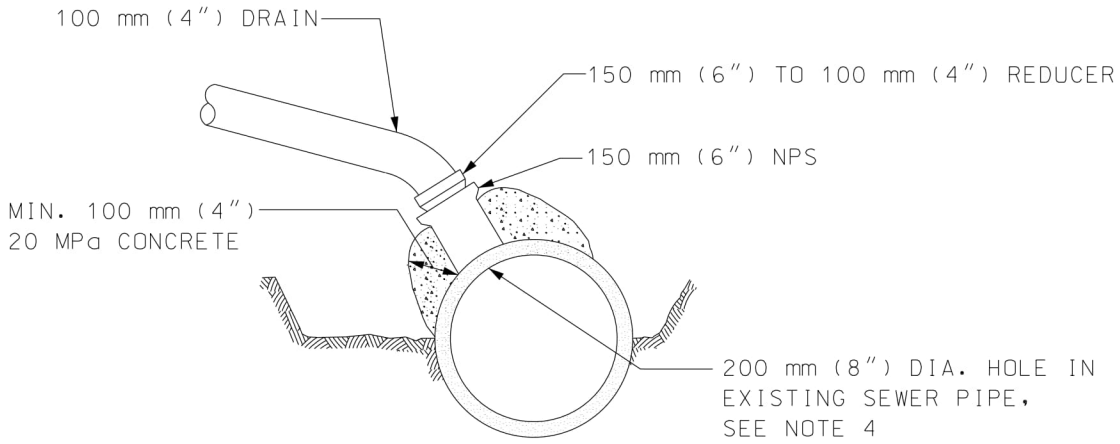


SECTION 'C-C'

ONLY 1 DRAIN SHALL BE INSTALLED

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DRAINING STRUCTURES				
TORONTO HYDRO	Approved By: J.D. 2018-03-07						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D. 2007-10-19	Scale: N.T.S.	Rev: 5	31-7100	3/5

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DETAIL 'A'

* DRAIN CONNECTION TO SEWER OPTIONS			
STRUCTURE	OPTION 1	OPTION 2	COMMENTS
CABLE CHAMBERS	STORM SEWER OR COMBINED SEWER WHEN STORM SEWER NOT PRESENT	SANITARY SEWER SEE NOTE 13	OIL CONTAINMENT NOT REQUIRED
SWITCHING VAULTS			
TRANSFORMER VAULTS	STORM SEWER OR COMBINED SEWER WHEN STORM SEWER NOT PRESENT	SANITARY SEWER SEE NOTE 13	OIL CONTAINMENT REQUIRED
SUBMERSIBLE VAULTS			

* SEE NOTE 15

△5

DRAINAGE ORDER OF PRIORITY 1, 2, AND 3				
	CABLE CHAMBER	SWITCH VAULT	SUB VAULT	NETWORK/URD/ CRD VAULT
DRAIN TO SEWER	1	1	1	1
SOAKAWAY PIT (NO SEWER CONNECTION)	2	2	2	–
NO DRAIN PROVISION	3	3	–	–

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DRAINING STRUCTURES				
TORONTO HYDRO	Approved By: J.D. 2018-03-07						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D. 2007-10-19	Scale: N.T.S.	Rev: 5	31-7100	4/5

NOTES

1) DRAIN CONNECTION TO SEWER IS THE PREFERRED OPTION AS PER TABLE SHOWN ABOVE.

△5 2) FOR CABLE CHAMBERS, SPLICE VAULTS AND SUBMERSIBLE VAULTS, IF SEWER IS NOT AVAILABLE TO DRAIN, SOAKAWAY PIT SHALL BE USED AS ALTERNATIVE METHOD TO DRAIN. FOR SUBMERSIBLE VAULTS, PETRO BARRIER WILL STILL NEED TO BE INSTALLED, SEE STANDARD 13-2300 FOR DETAILS.

△5 3) FOR CABLE CHAMBERS AND SPLICE VAULTS, IF SEWER CONNECTIONS AND SOAKAWAY PITS ARE NOT FEASIBLE, STRUCTURES SHALL BE CONSTRUCTED WITHOUT DRAINAGE PROVISION.

4) SEWER CONNECTIONS FROM TORONTO HYDRO STRUCTURE TO CITY SEWERS SHALL BE 150 mm (6") NPS IN SIZE WITH A 150 (6") X 100 mm (4") REDUCER CONNECTION TO 100 mm (4") DRAIN. THE SEWER CONNECTIONS SHALL BE DRILLED OR CORED, NOT MANUALLY BROKEN WITH HAMMER AND CHISEL. SEWER CONNECTIONS SHALL NOT BE MADE DIRECTLY UNDERNEATH ANY DUCT RUN. NO HORIZONTAL BENDS IN THE DRAIN LINE ARE ALLOWED.

5) ALL DRAIN LENGTHS, BENDS AND COUPLINGS SHALL BE 100 mm (4") DIA. METER PVC.

6) IN A SUBMERSIBLE VAULT, FLOOR DRAIN CONNECTION IS PREFERRED. IF THE SEWER IS AT A HIGHER ELEVATION, DRAIN CAN BE INSTALLED IN WALL. DRAIN SHALL BE LOCATED IN THE SECONDARY CABLES COMPARTMENT ONLY. SEE NOTES 10 AND 11.

7) ENTIRE DRAIN LENGTH SHALL BE INSTALLED ON BEDDING OF 75 mm (3") OF GRANULAR 'A' MATERIAL.

8) ALL CONNECTIONS TO SEWERS SHALL BE INSTALLED TO CITY OF TORONTO STANDARDS AND APPROVED ON SITE BY THE AUTHORIZED REPRESENTATIVE OF THE CITY OF TORONTO.

9) P-TRAPS WITH 90° ELBOWS ARE REQUIRED FOR EVERY DRAIN TO SEWER CONNECTION AND SHALL BE AT LEAST 100 mm (4") NPS, PVC.

10) IN NEW DEVELOPMENTS, DEVELOPER SHALL INSTALL 100 mm (4") DRAIN PIPE FROM SEWER AND TO TERMINATE PIPE 600 mm (2'-0") FROM SUBMERSIBLE VAULT WALL AND TO PLACE A CAP AND MARKER POST FOR FUTURE CONNECTION.

11) IN NEW DEVELOPMENTS, DEVELOPER SHALL INSTALL THE SEWER PIPE AT A REQUIRED DEPTH SO THAT THE PROPOSED DRAIN FROM TORONTO HYDRO STRUCTURE TO THE SEWER WILL HAVE A 2.5% SLOPE.

12) 100 mm (4") PVC BACKWATER OR CHECK VALVES SHALL BE INSTALLED IN ALL VAULTS AND CABLE CHAMBERS WHENEVER THE WALL DRAINPIPE CONNECTION IS AT OR ABOVE THE CHAMBER FLOOR. THE VALVES SHALL BE POSITIONED VERTICALLY ABOVE THE CHAMBER OR VAULT SUMP PIT IN THE WALL ON THE SIDE OF THE CONNECTING DRAIN TO THE CITY SEWER.

13) THE VALVE SHALL BE A MINIMUM OF 450 mm (1'-6") AND A MAXIMUM OF 1500 mm (4'-11") ABOVE THE FLOOR, BUT NEVER HIGHER THAN THE INVERT LEVEL OF THE LOWEST DUCT ENTERING THE VAULT OR CHAMBER. THE VALVE SHALL BE IN GOOD WORKING CONDITION WHEN INSTALLED.

△5 14) APPLICATIONS FOR DRAIN CONNECTION TO SEWER (OPTION 1 OR 2) SHALL BE APPROVED BY CITY OF TORONTO ENVIRONMENTAL MONITORING AND PROTECTION (EM&P) DESIGNATED STAFF. EM&P REVIEW WILL INCUR EXTRA TIME FOR APPROVAL BASED ON THE COMPLEXITY AND SIZE OF THE PROPOSED INFASTRUCTURE.

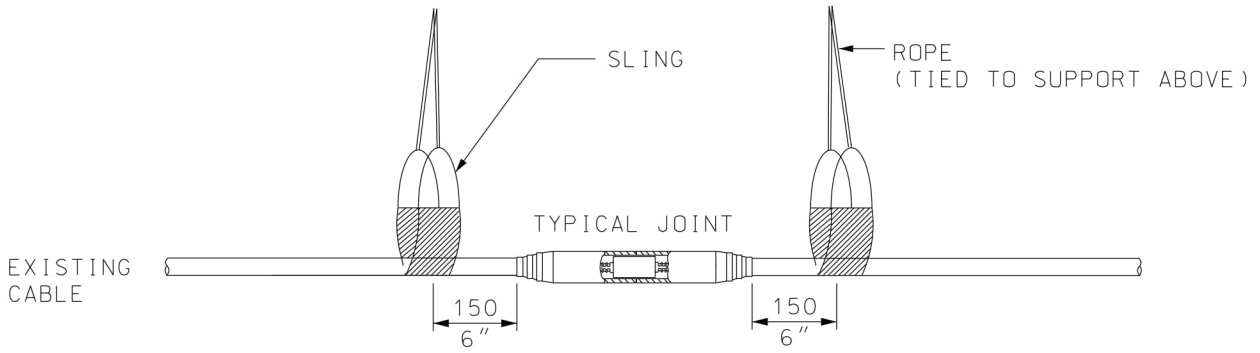
15) CONNECTION TO ANY SEWER SYSTEM:

- THE JOINING OF ANY DUCT BANK, WHICH DRAIN TO A VAULT, WILL BE EXECUTED IN ACCORDANCE TO THE MANUFACTURER'S RECOMENDATIONS TO ACHIEVE WATER TIGHTNESS USING MECHANICAL COUPLINGS, GLUED CONNECTIONS, OR OTHER BEST AVAILABLE TECHNOLOGIES.

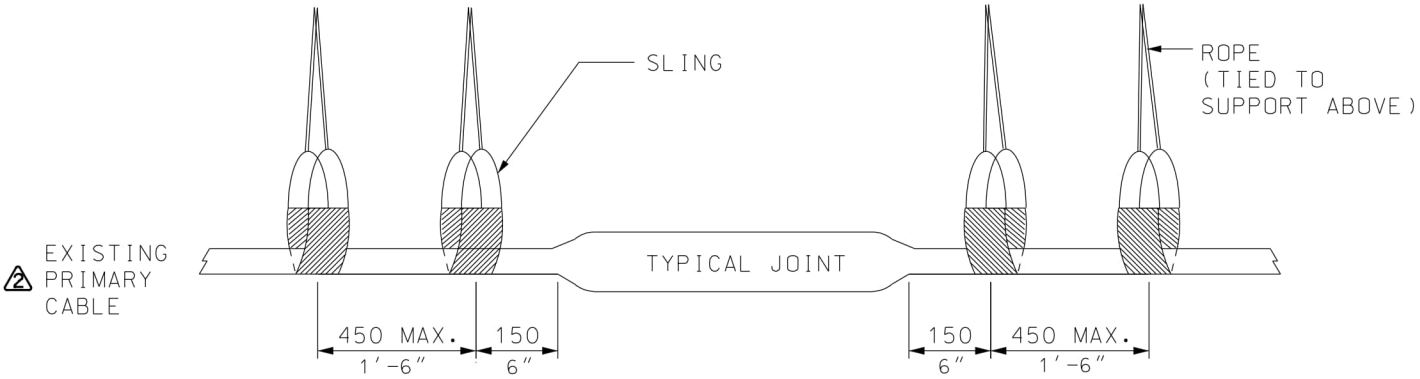
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DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			DRAINING STRUCTURES				
TORONTO HYDRO	Approved By: J.D. 2018-03-07						
	Drafted By: B.D.	Designed By: J.D.	Original Issue: G.D. 2007-10-19	Scale: N.T.S.	Rev: 5	31-7100	5/5

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△2 CABLES < 750 V OR FIBRE COMMUNICATION



CABLES > 750 V

△2

BOM LEGEND	
A	CABLE SLINGS TO SUPPORT CABLES >750 V
B	CABLE SLINGS TO SUPPORT CABLES <750 V OR FIBRE COMMUNICATION

BILL OF MATERIALS FOR 31-7400

ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	QTY B
1	CABLE SLING 6″ X 18″ REINFORCED WITH 1″ NYLON STRAP	9662943	4	2

△2

NOTES: △2

1) ENSURE CABLE, JOINTS AND GROUNDING INTEGRITY PRIOR AND AFTER INSTALLATION OF TEMPORARY CABLE SUPPORTS. PCB SAMPLING IS REQUIRED PRIOR TO COMMENCING THE WORK IF CONTAMINATION IS SUSPECTED.
2) SEPARATE SUPPORT SLINGS ARE REQUIRED WHEN SUPPORTING CABLES > 750V OR < 750V OR FIBRE COMMUNICATION WITHIN THE STRUCTURE UNTIL PERMANENT SUPPORTS (CABLE RACKING) ARE INSTALLED.
3) AT NO TIME DIFFERENT CABLE TYPES SHALL BE SUPPORTED ON SAME SUPPORT SLING.
4) CONTRACTOR IS RESPONSIBLE TO VERIFY IF THIRD PARTY COMMUNICATION CABLES WITHIN THE STRUCTURE REQUIRE SPECIFIC OR ADDITIONAL SUPPORT REQUIREMENTS.
5) AT ALL TIMES WHEN INSTALLING THE TEMPORARY CABLE SUPPORT SLINGS, THE EXISTING CABLE'S ROUTE AND JOINT ELEVATION SHALL BE MAINTAINED TO AVOID ADDING UNNECESSARY MECHANICAL STRESSES.
6) REFER TO STD. 16-1280 FOR CABLE TESTING IF CABLES ARE TO REMAIN IN PLACE AND NOT REPLACED.

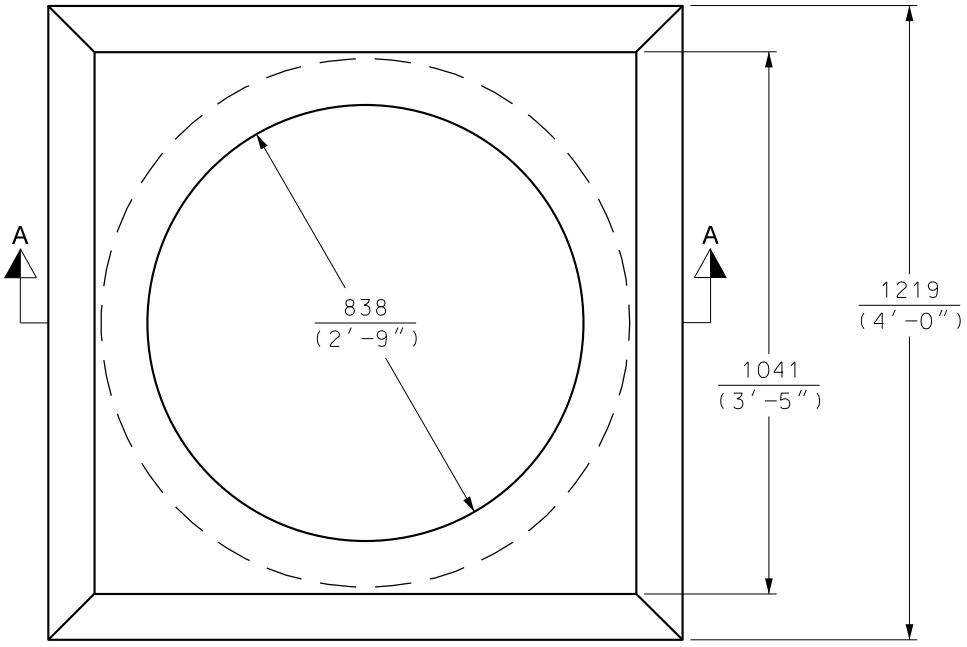
DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

TORONTO HYDRO

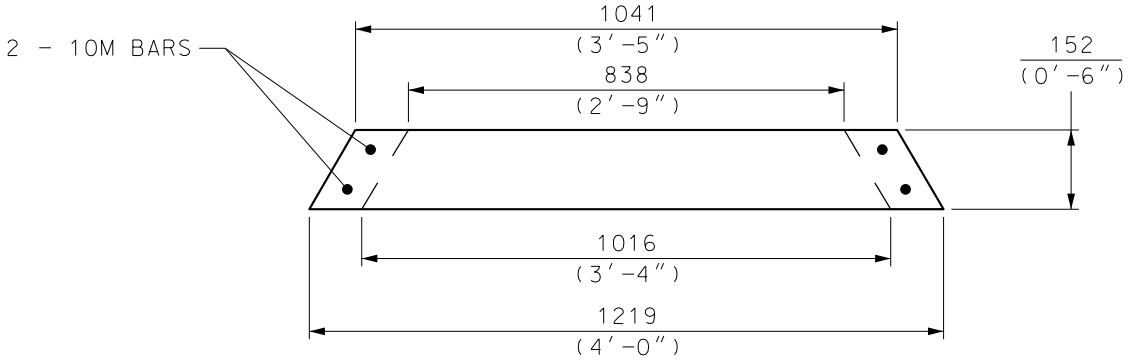
TEMPORARY SUPPORT OF CABLES △2
IN REBUILD STRUCTURES (CABLE CHAMBERS, VAULTS)

Approved By:	Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
B.D. 2024/03/06	J.D.	B.D.	J.D. 2013-05-31	N.T.S.	2	31-7400	1/1

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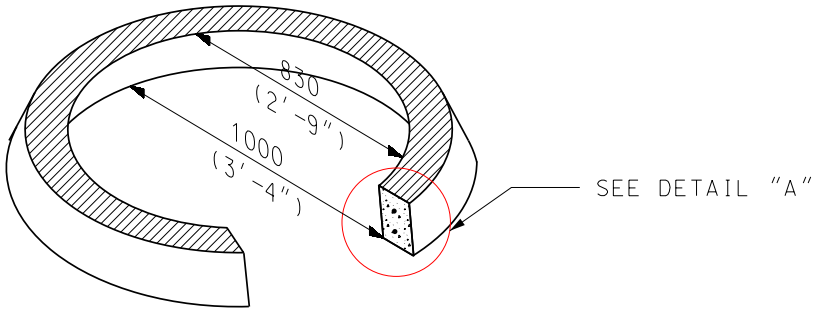
PRECAST ENERGY MITIGATING RISER 3



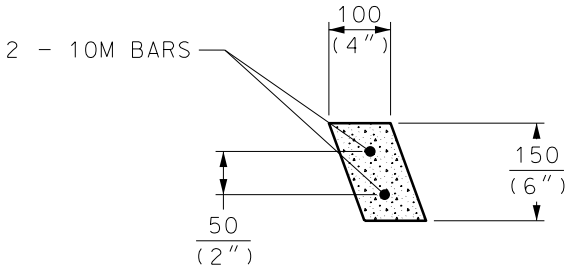
SECTION A-A 3

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PRECAST CONCRETE RISER MATERIAL FABRICATION					3
TORONTO HYDRO	Approved By: A.P. 2026-01-01							
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-20	Scale: N.T.S.	Rev: 3	31-8200	1/2	

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PRECAST CHIMNEY RISER



DETAIL "A"

△3

BOM LEGEND	
A	ENERGY MITIGATING LID (31-2270)
B	STANDARD LID (31-8250)

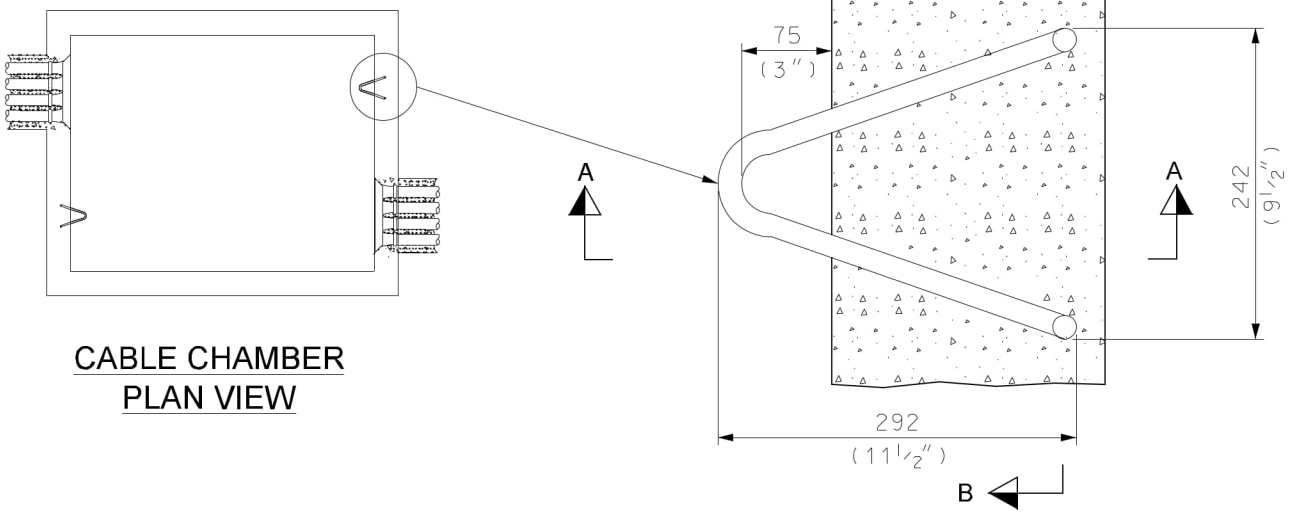
△3

	BILL OF MATERIALS FOR STD 31-8200			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	QTY B
1	PRECAST ENERGY MITIGATING RISER	XXXXXX	1	–
2	PRECAST CHIMNEY RISER	3540016	–	1
	ASSOCIATED STANDARDS			
3	ENERGY MITIGATING CABLE CHAMBER FRAME AND LID		1	–
4	CABLE CHAMBERS-FRAME AND LID		–	1

NOTES:
1) SHALL BE DESIGNED IN ACCORDANCE WITH CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6-06, CL-625-ONT LIVE LOADING.
2) CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa.
△2 3) CONCRETE SHALL CONFORM TO LATEST CSA-A23.1. ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.

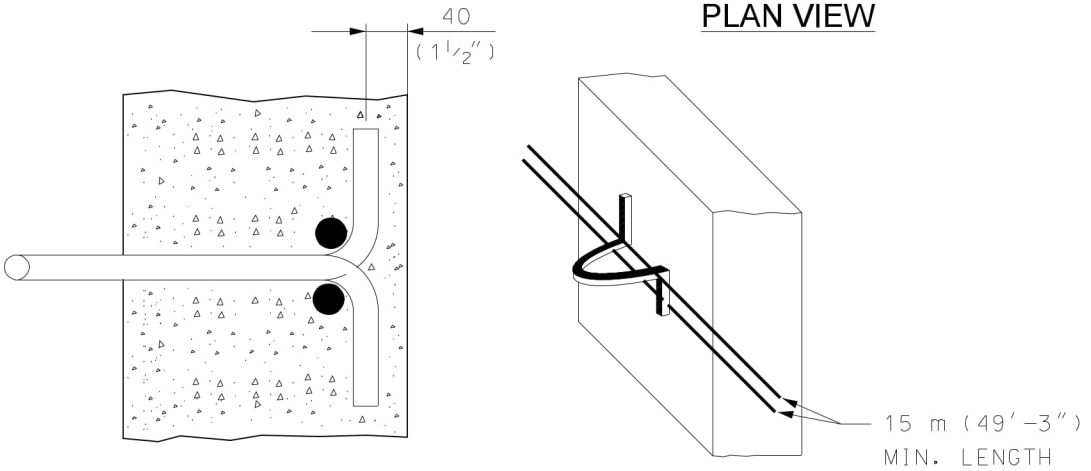
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			PRECAST CONCRETE RISER MATERIAL FABRICATION △3				
TORONTO HYDRO	Approved By: A.P. 2026-01-01						
	Drafted By: A.P.	Designed By: A.P.	Original Issue: G.D./L.G. 2000-12-20	Scale: N.T.S.	Rev: 3	31-8200	2/2

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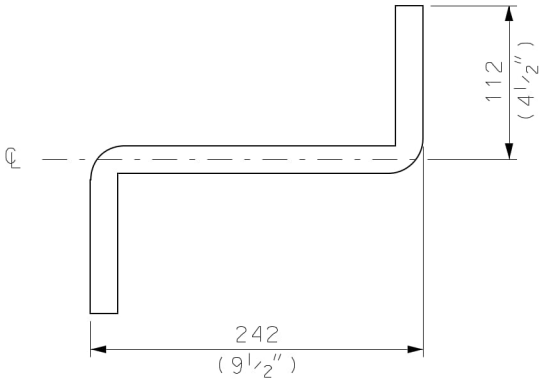


CABLE CHAMBER
PLAN VIEW

PLAN VIEW



SECTION "A-A"



SECTION "B-B"

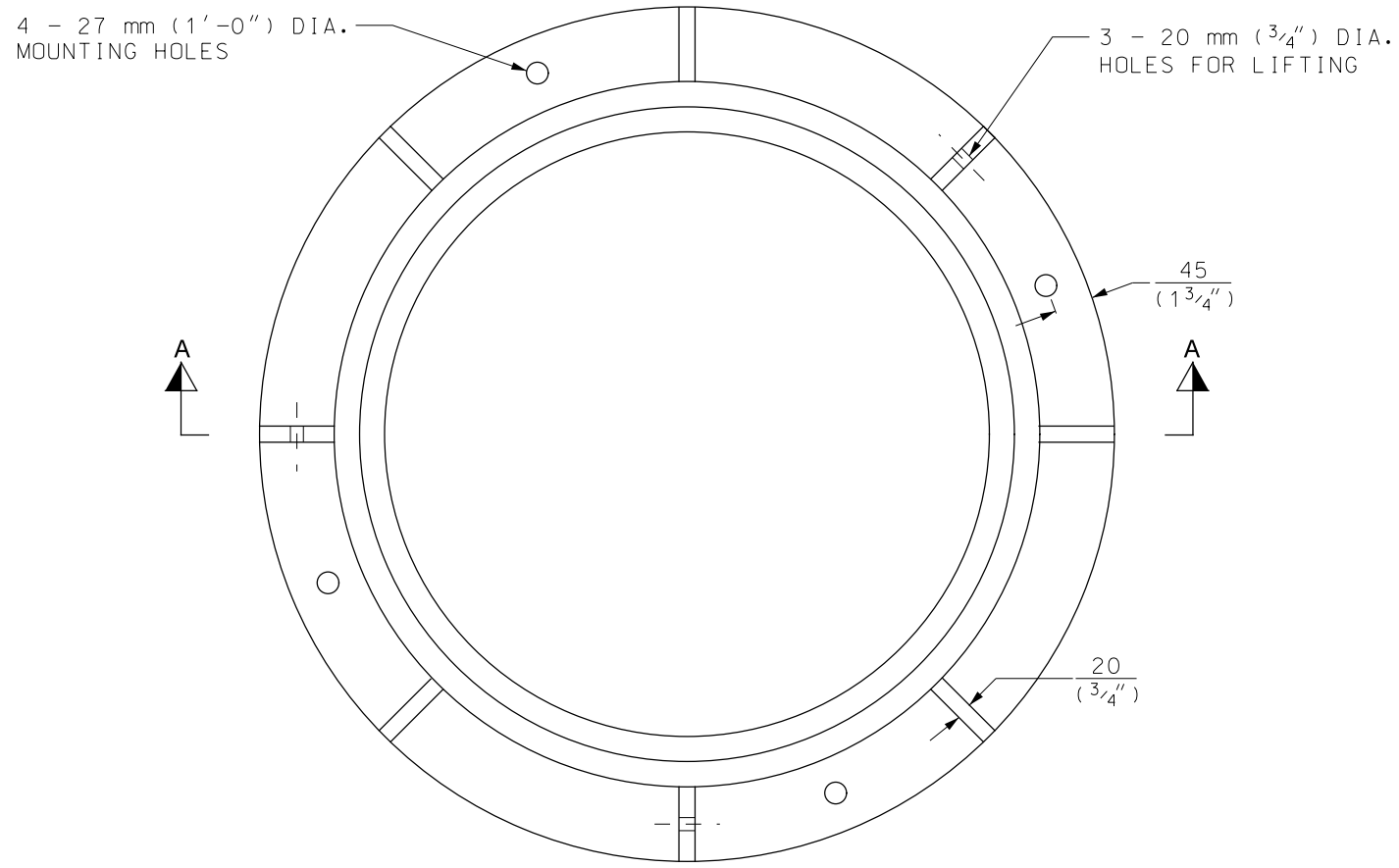
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NOTES: ⚠2

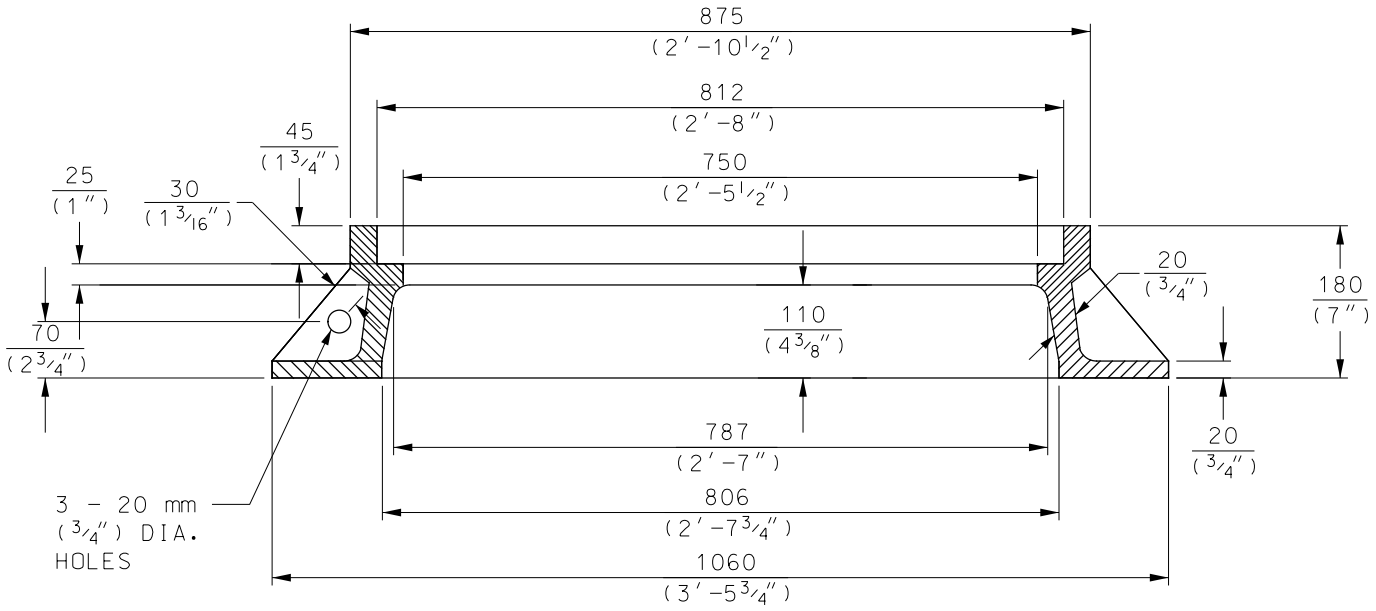
1) MAXIMUM PULLING FORCE – 40 kN
2) MATERIAL IS MILD STEEL, 20 mm (¾″) DIAMETER DEVELOPED LENGTH 775 mm (2′-7″).
3) ALL PARTS TO BE GALVANIZED IN ACCORDANCE WITH LATEST CSA STD. G-164, Fu=400 MPa MIN., Fy=250 MPa MIN.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# MATERIAL FABRICATION CABLE PULLING LOOP FOR POURED & PRECAST CONCRETE WALLS				
TORONTO HYDRO	Approved By: J.D. 2012-11-05						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: J.D. 2000-12-20	Scale: N.T.S.	Rev: 2	31-8210	1/1

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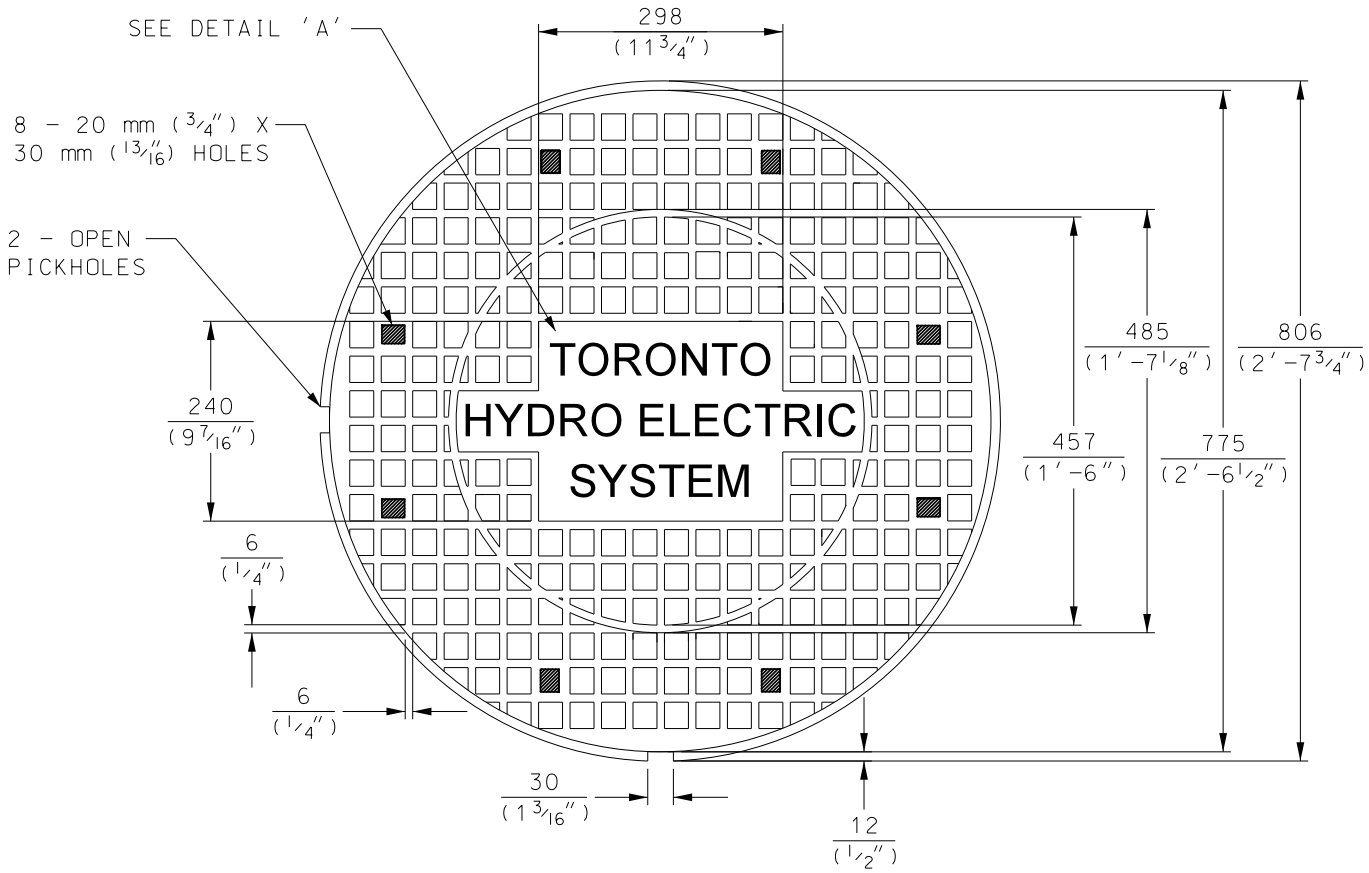
CABLE CHAMBER FRAME 5



SECTION 'A-A' 5

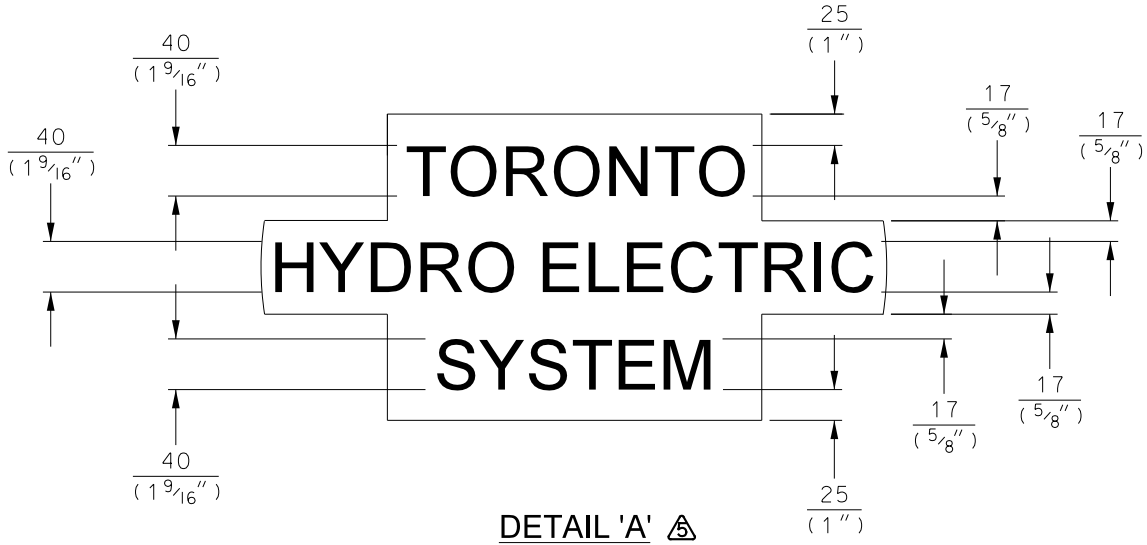
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CABLE CHAMBER FRAME AND LID UNDERGROUND CONSTRUCTION MATERIALS				5
TORONTO HYDRO	Approved By: A.P. 2025-01-29						
	Drafted By: J.D.	Designed By: A.P.	Original Issue: G.D. 2004-03-31	Scale: N.T.S.	Rev: 5	31-8250	1/4

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TOP VIEW

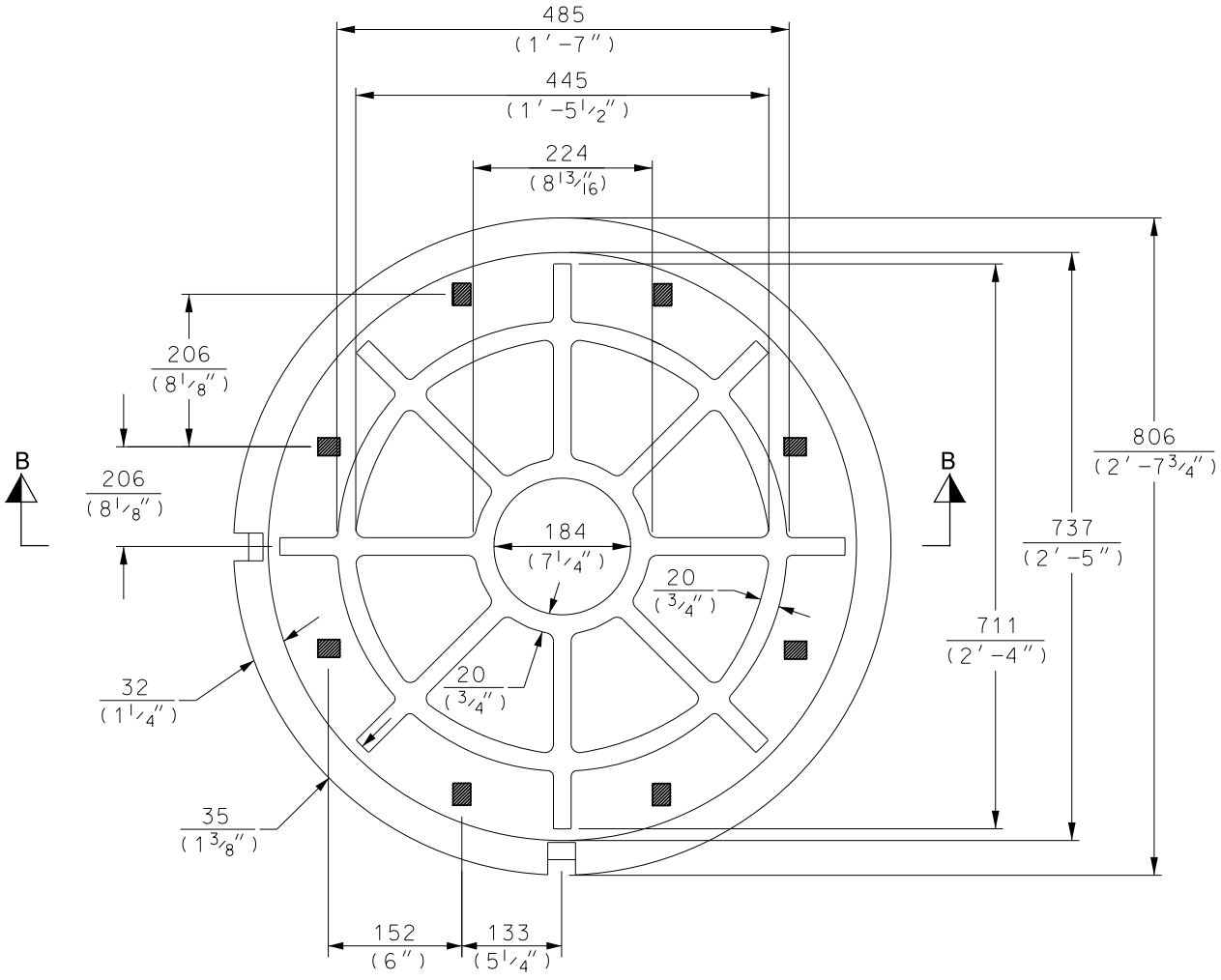
CABLE CHAMBER LID 5



DETAIL 'A' 5

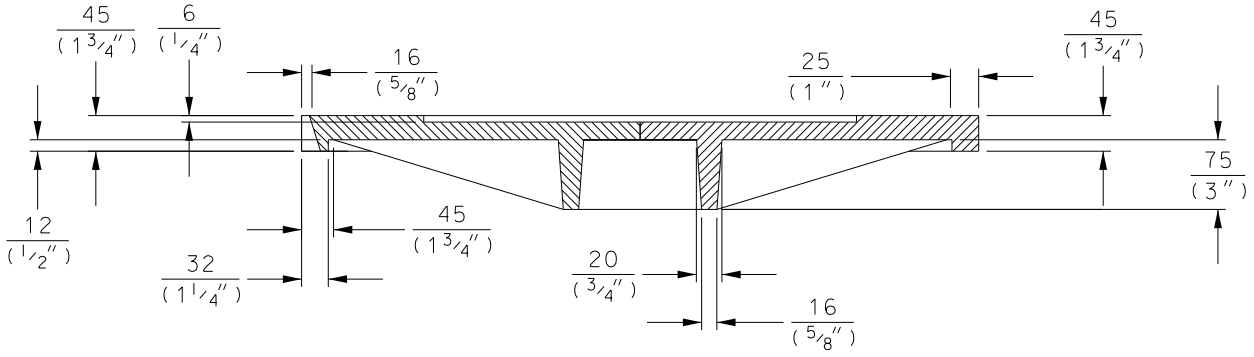
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CABLE CHAMBER FRAME AND LID UNDERGROUND CONSTRUCTION MATERIALS					5
TORONTO HYDRO	Approved By: A.P. 2025-01-29							
	Drafted By: J.D.	Designed By: A.P.	Original Issue: G.D. 2004-03-31	Scale: N.T.S.	Rev: 5	31-8250	2/4	

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BOTTOM VIEW

CABLE CHAMBER LID 5



SECTION 'B-B' 5

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			CABLE CHAMBER FRAME AND LID UNDERGROUND CONSTRUCTION MATERIALS 5				
TORONTO HYDRO	Approved By: A.P. 2025-01-29						
	Drafted By: J.D.	Designed By: A.P.	Original Issue: G.D. 2004-03-31	Scale: N.T.S.	Rev: 5	31-8250	3/4

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5

BILL OF MATERIALS FOR 31-8250			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A
1	CABLE CHAMBER CAST IRON LID AND 7" FRAME	9662442	1
2	CABLE CHAMBER 7" CAST IRON FRAME	3530116	1
3	CABLE CHAMBER CAST IRON LID	3530505	1

NOTES: 5

1) DESIGN LOAD SHALL BE IN ACCORDANCE WITH CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6, CL-625 ONT LIVE LOADING.
2) GREY CAST IRON, CLASS 200 MPA, MASS=150 kg (330 lbs).
3) WORKMANSHIP AND FINISH SHALL BE AS PER ASTM A48. PAINT BOTH SIDES BLACK WITH ASPHALT OR PITCH.
4) CABLE CHAMBER LID DESIGN SHALL MEET NON-SLIP REQUIREMENTS AS OUTLINED IN THE STANDARD PRACTICE FOR SAFE WALKING SURFACES DOCUMENT ASTM F1637 AND THE CITY OF TORONTO ACCESSIBILITY DESIGN GUIDLINES.

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

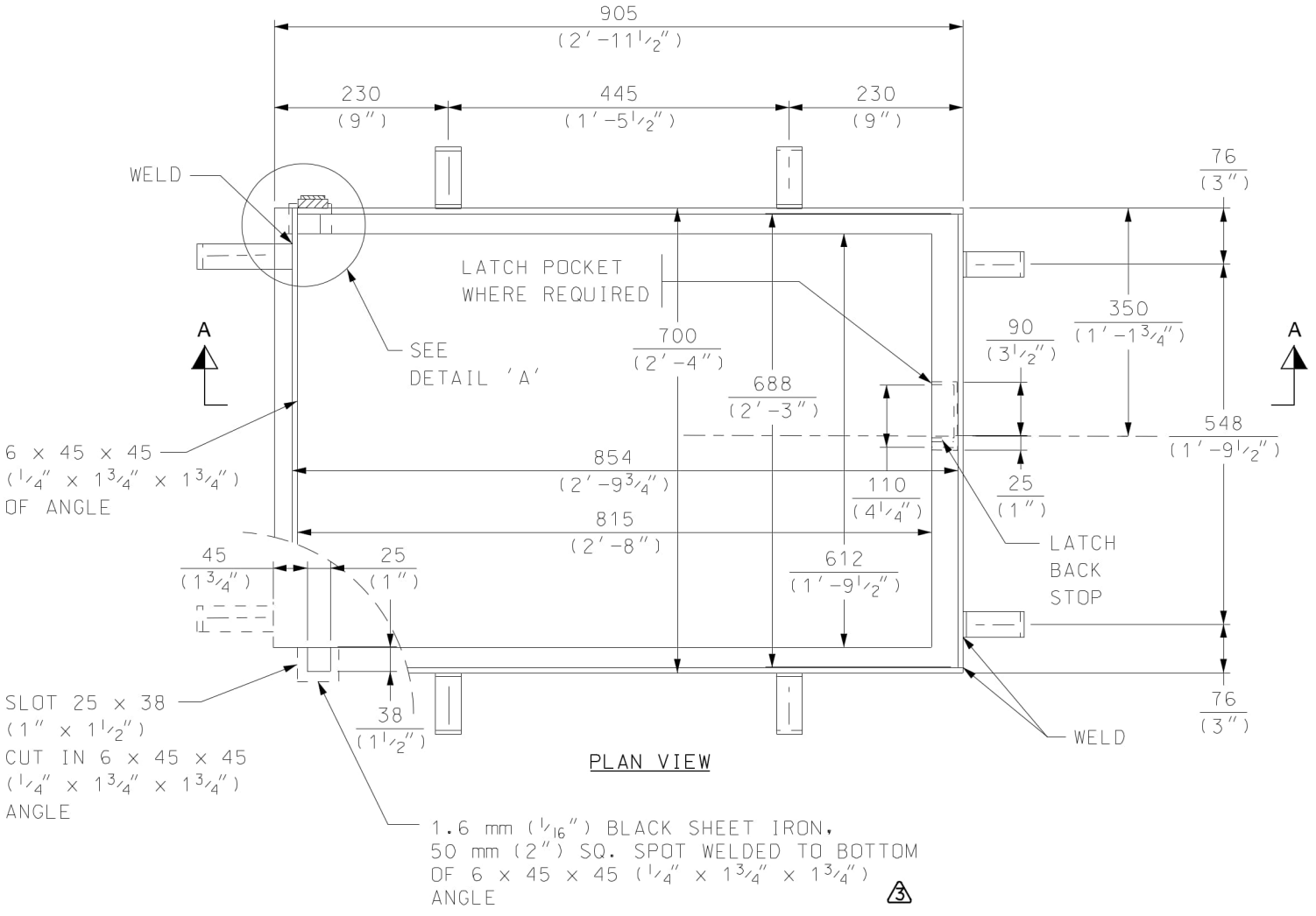
TORONTO HYDRO

CABLE CHAMBER
FRAME AND LID
UNDERGROUND CONSTRUCTION MATERIALS

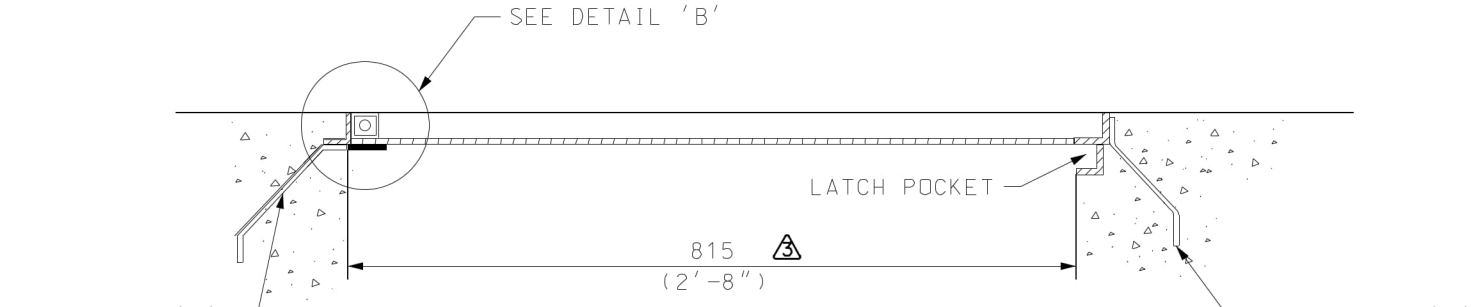
5

Approved By:	Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
A.P. 2025-01-29	J.D.	A.P.	G.D. 2004-03-31	N.T.S.	5	31-8250	4/4

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PLAN VIEW



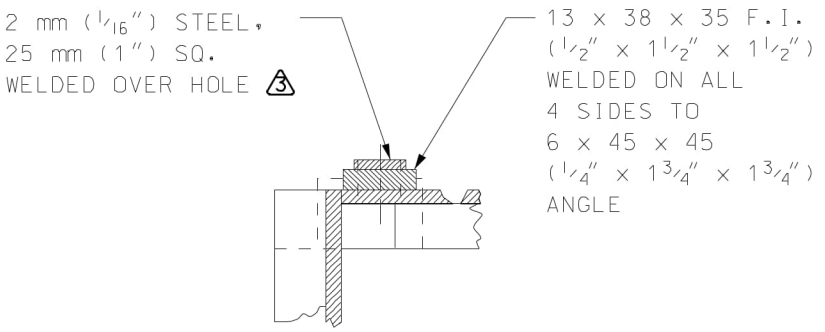
SECTION 'A-A'

ID # 3530022

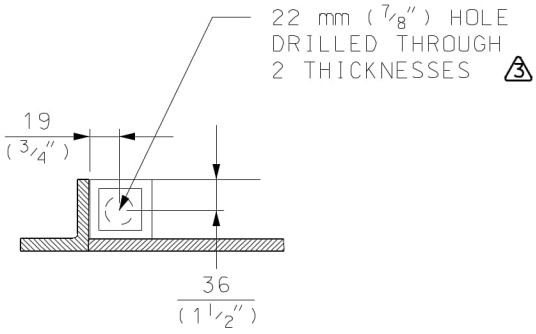
NOTE:
1) FRAME SHALL BE GALVANIZED IN ACCORDANCE WITH THE LATEST C.S.A. STANDARD G-164.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			LADDERWAY GRID FRAME FOR TRANSFORMER VAULT				
TORONTO HYDRO	Approved By: J.D. 2015-09-21						
	Drafted By: K.K.	Designed By: J.D.	Original Issue: G.D./L.G. 2002-11-15	Scale: N.T.S.	Rev: 3	31-8320	1/2

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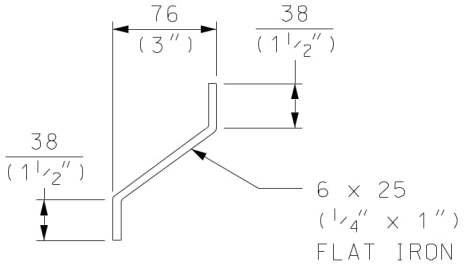


DETAIL 'A'

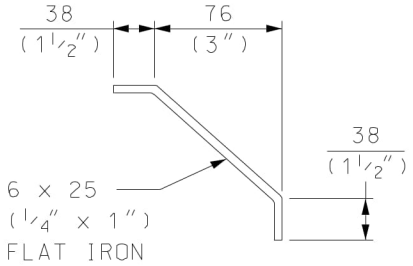


DETAIL 'B'

DETAILS OF HOUSING FOR HINGE PIN



DETAIL 'C'
6 REQUIRED

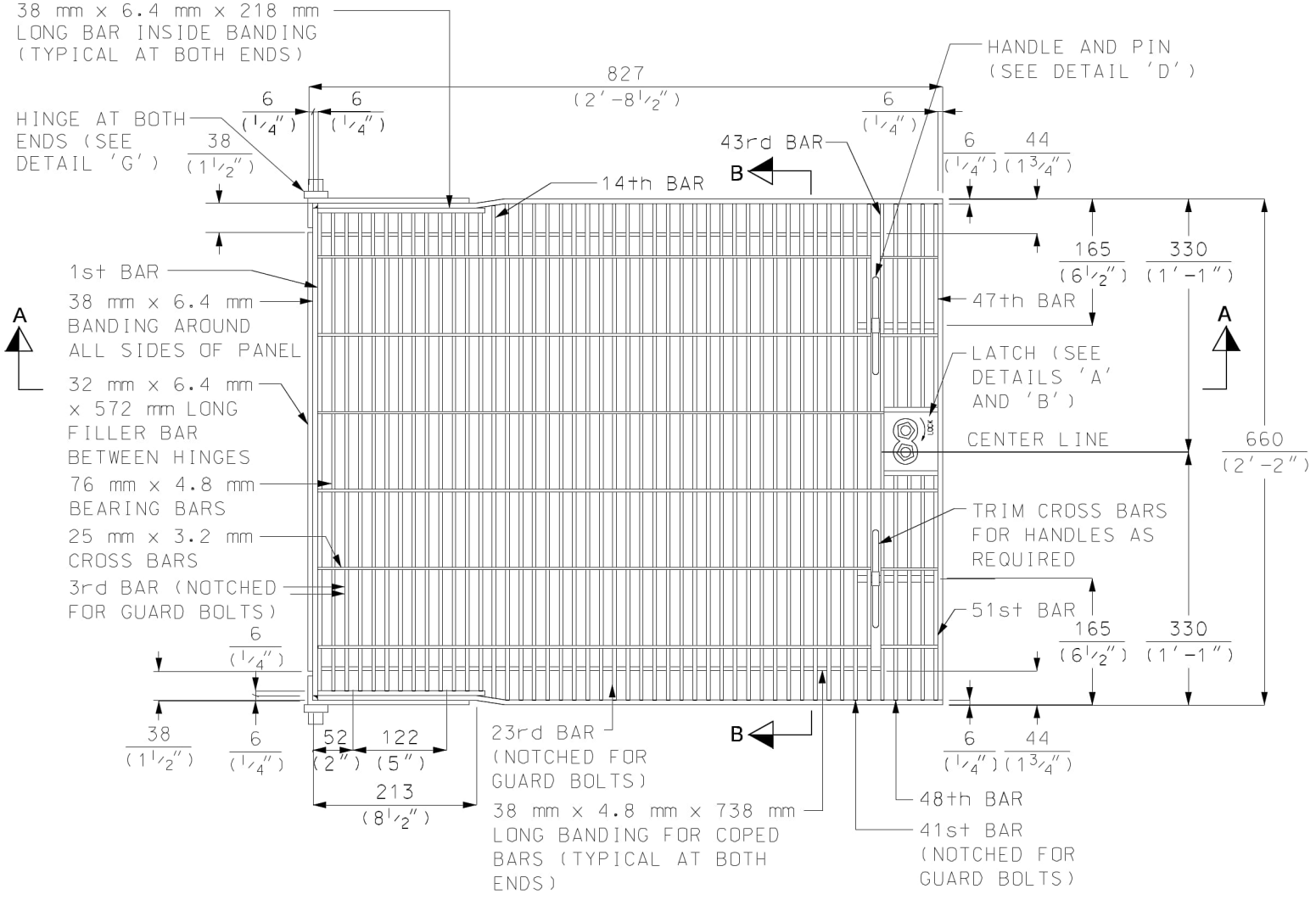


DETAIL 'D'
2 REQUIRED

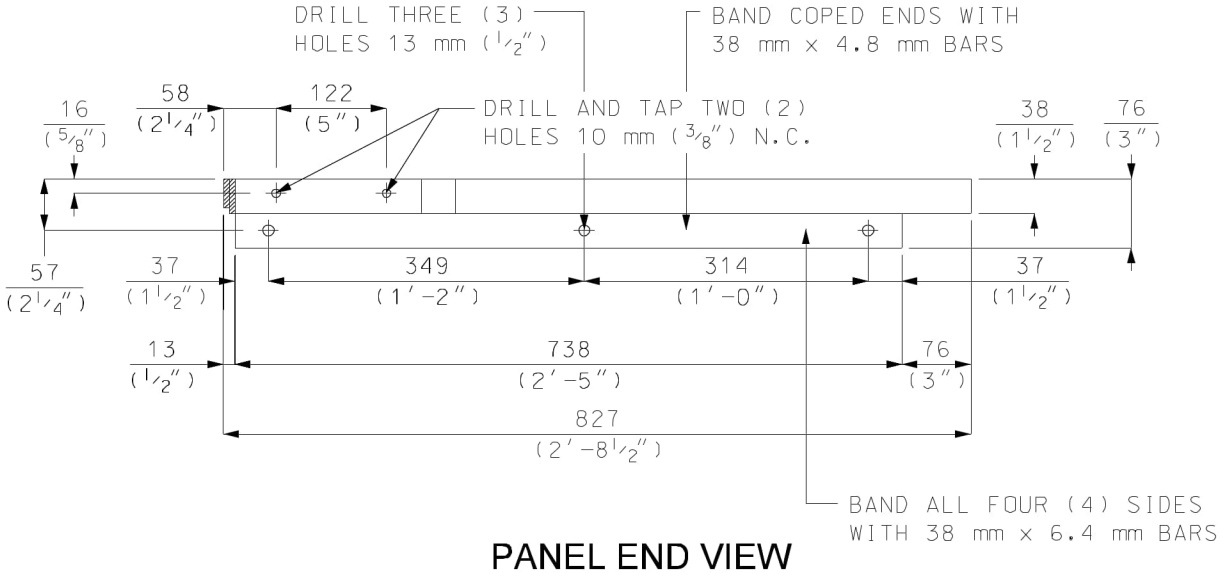
DETAIL OF ANCHORS

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			LADDERWAY GRID FRAME FOR TRANSFORMER VAULT				
TORONTO HYDRO	Approved By: J.D. 2015-09-21						
	Drafted By: K.K.	Designed By: J.D.	Original Issue: G.D./L.G. 2002-11-15	Scale: N.T.S.	Rev: 3	31-8320	2/2

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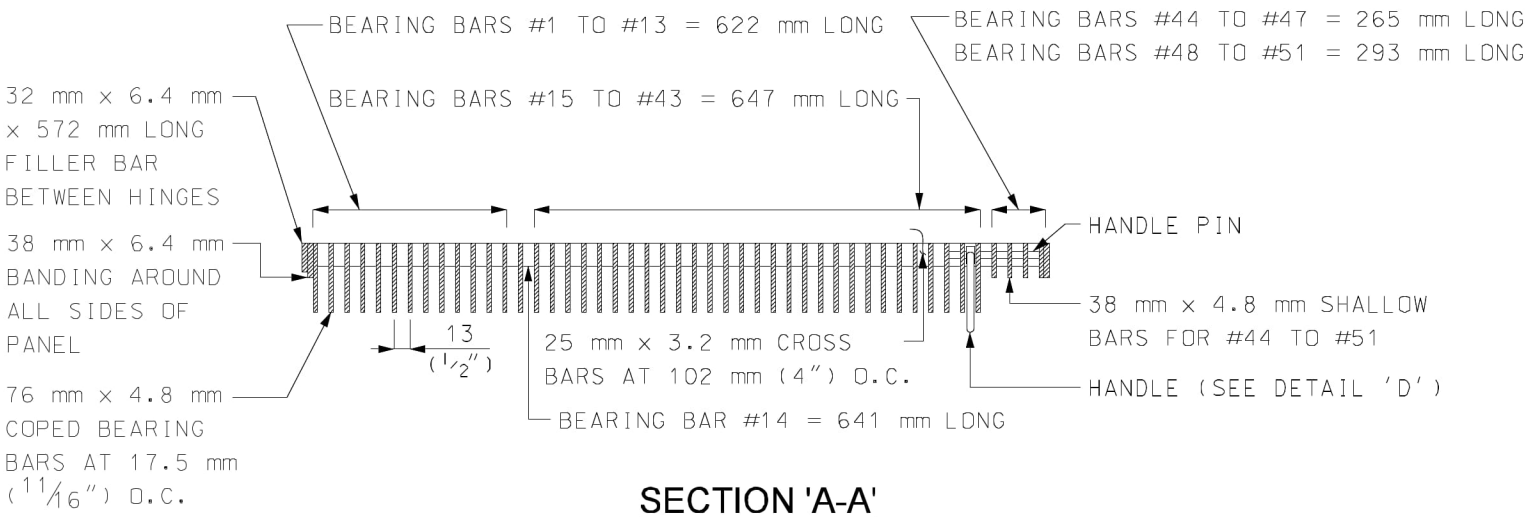
PANEL DETAIL PLAN



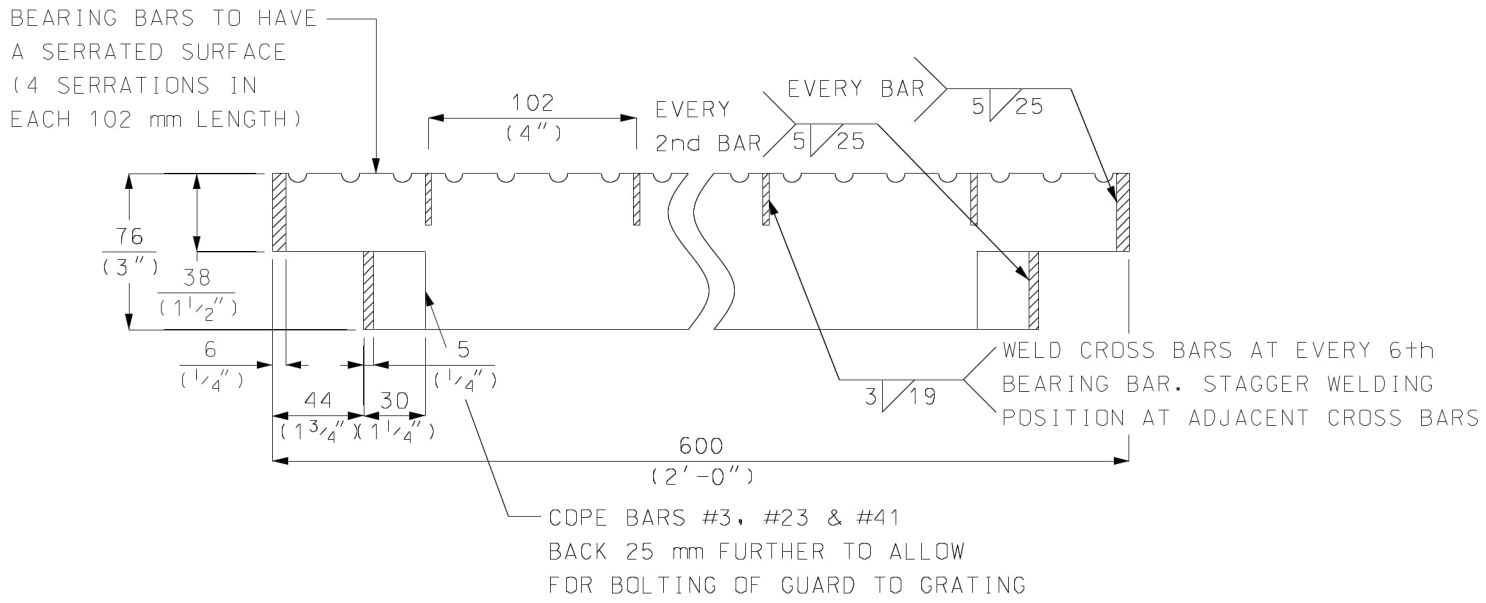
PANEL END VIEW

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction							
TORONTO HYDRO	Approved By: J.D. 2014-03-19		# ALUMINUM LADDERWAY GRID				
	Drafted By: S.A.K.	Designed By: J.D.	Original Issue: G.D./C.P. 2002-11-15	Scale: N.T.S.	Rev: 4	31-8330	1/4

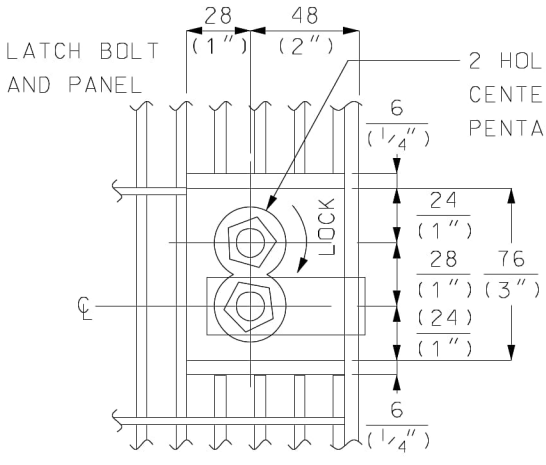
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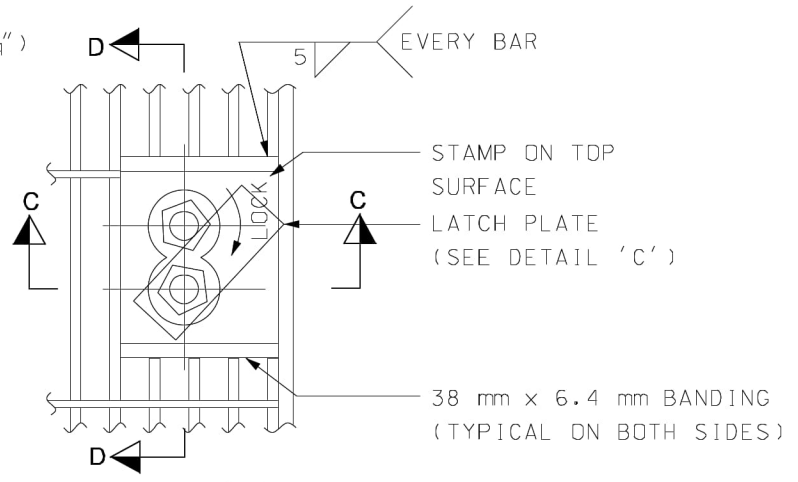
SECTION 'A-A'



SECTION 'B-B'



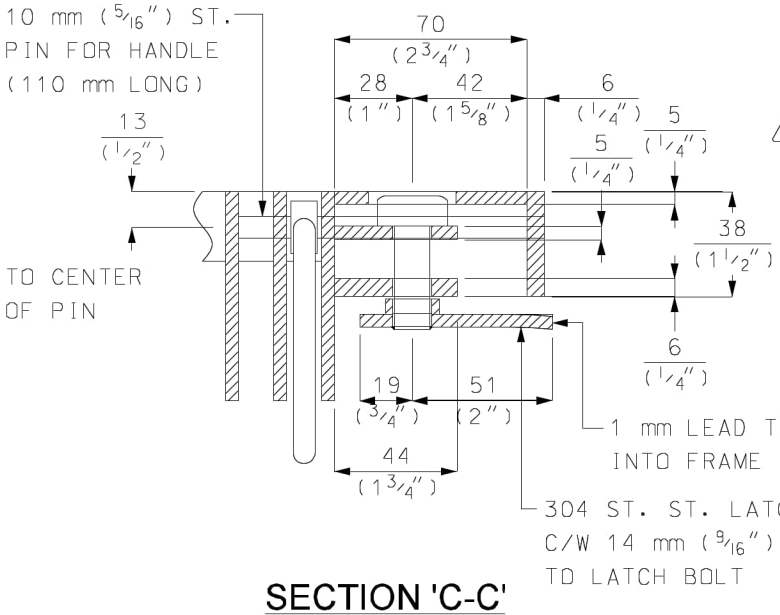
DETAIL 'A'



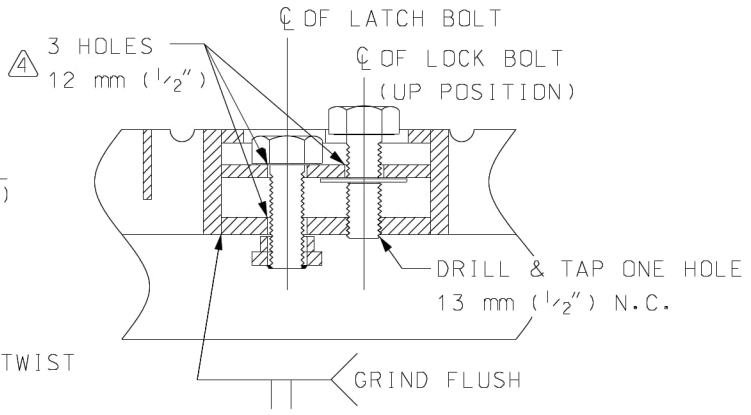
DETAIL 'B'

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			ALUMINUM LADDERWAY GRID				
TORONTO HYDRO	Approved By: J.D. 2014-03-19						
	Drafted By: S.A.K.	Designed By: J.D.	Original Issue: G.D./C.P. 2002-11-15	Scale: N.T.S.	Rev: 4	31-8330	2/4

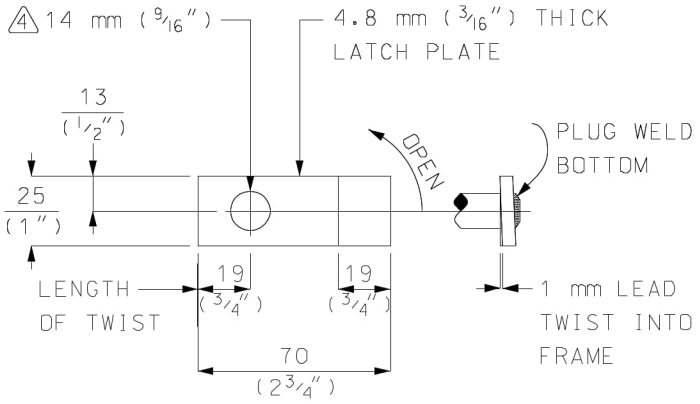
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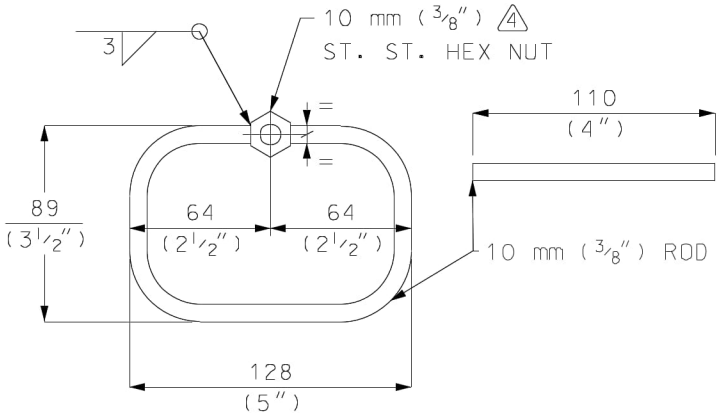
SECTION 'C-C'



SECTION 'D-D'



DETAIL 'C'

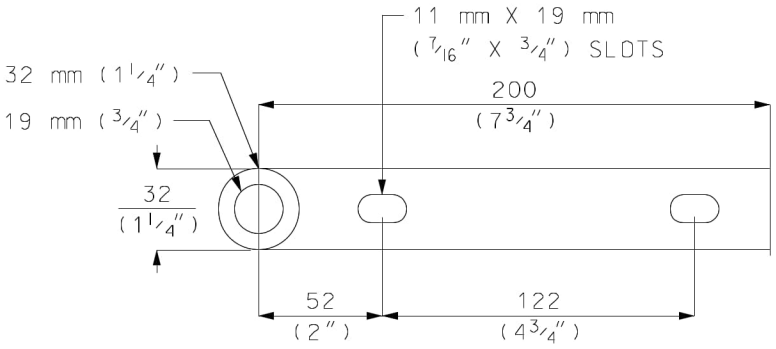


DETAIL 'D'

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			ALUMINUM LADDERWAY GRID				
TORONTO HYDRO	Approved By: J.D. 2014-03-19						
	Drafted By: S.A.K.	Designed By: J.D.	Original Issue: G.D./C.P. 2002-11-15	Scale: N.T.S.	Rev: 4	31-8330	3/4

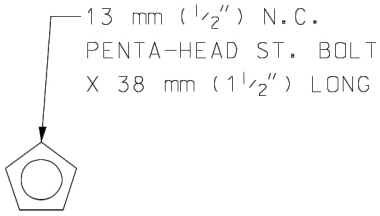
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TOP VIEW



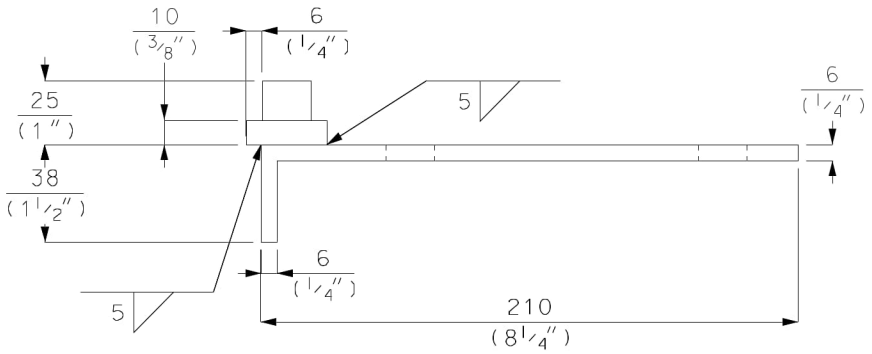
DETAIL 'E'

TOP VIEW



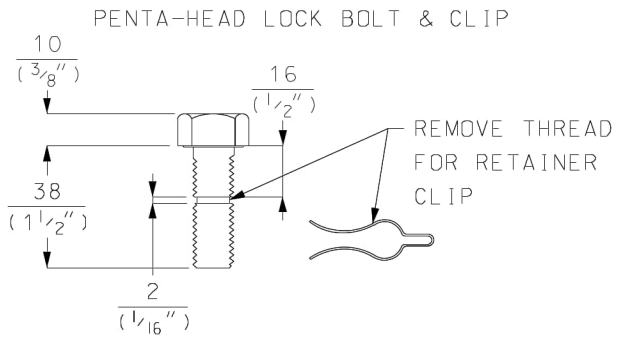
DETAIL 'F'

FRONT VIEW



DETAIL 'G'

FRONT VIEW



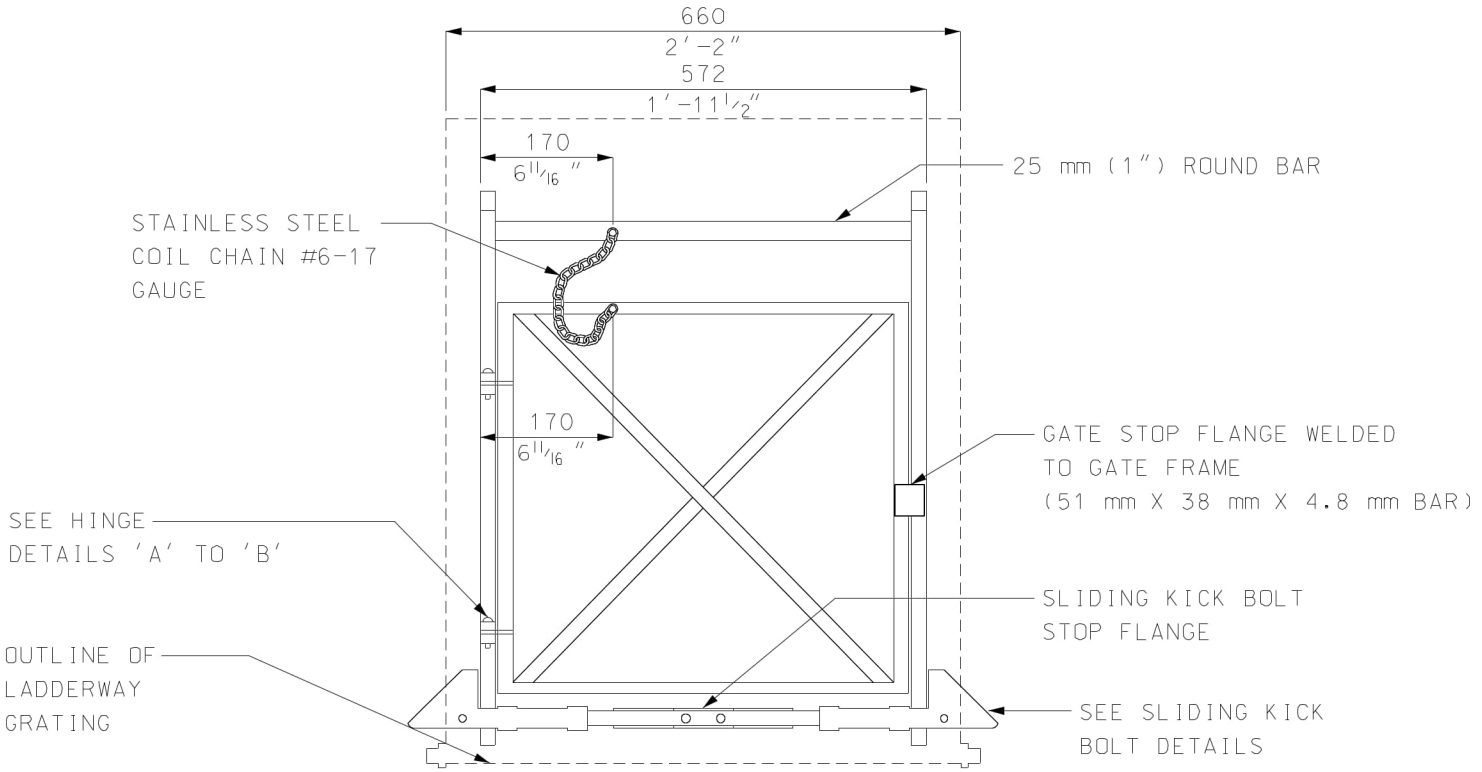
DETAIL 'H'

NOTES:

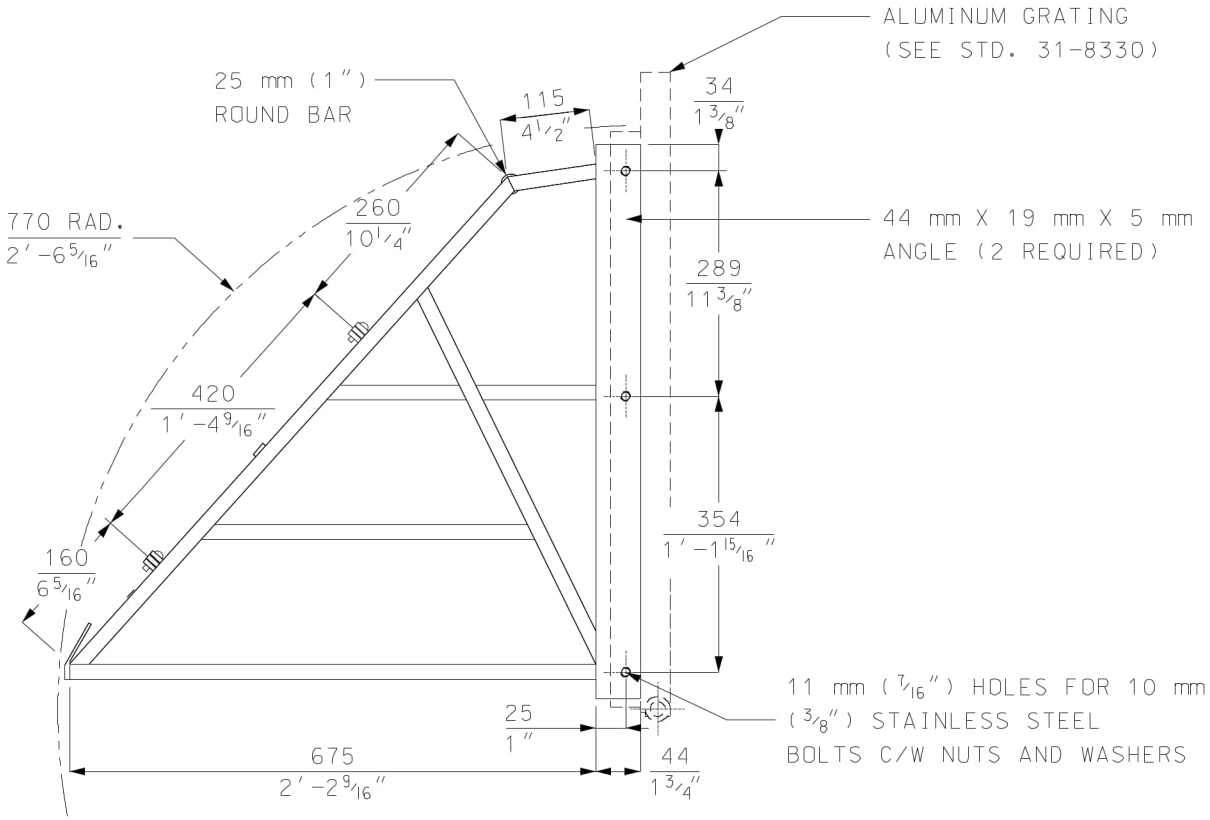
1) BEARING BAR MATERIAL SHALL BE 6061-T6 ALUMINUM. CROSS BARS SHALL BE NOTCHED AND HYDRAULICALLY PRESSED INTO DOVETAIL SLOTS IN BEARING BARS TO PROVIDE A POSITIVE WEDGED CONNECTION.
2) DESIGN SHALL MEET CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6-06, CL-625-ONT LIVE LOADING.
3) HINGE BOLTS, PENTA-HEAD LATCH BOLTS, LATCH PLATE, AND HANDLES SHALL BE 304 MILL FINISH STAINLESS STEEL.
4) ALUMINUM GRID FINISH SHALL BE CLEAN ANODIZED TO AA-C22A31 STANDARD.
5) ALL STAINLESS STEEL ITEMS SHALL BE INSTALLED AFTER ANODIZING.
6) REFER TO STD. 31-8340 FOR ALUMINUM LADDERWAY GRATING GUARD.
7) DESIGNED ACCORDING TO STANDARD PRACTICE FOR SAFE WALKING SURFACES, F1637-09 AND CITY OF TORONTO ACCESSIBILITY DESIGN GUIDELINES, LATEST REVISION.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			ALUMINUM LADDERWAY GRID				
TORONTO HYDRO	Approved By: J.D. 2014-03-19						
	Drafted By: S.A.K.	Designed By: J.D.	Original Issue: G.D./C.P. 2002-11-15	Scale: N.T.S.	Rev: 4	31-8330	4/4

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GUARD FRONT VIEW 6

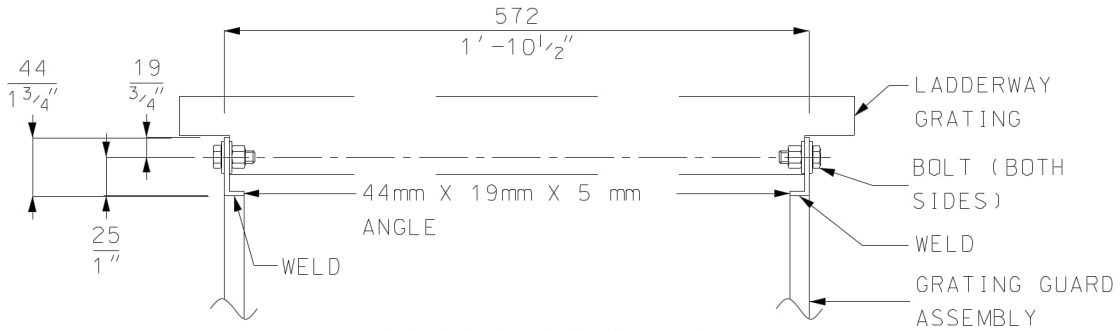


GUARD SIDE VIEW 6

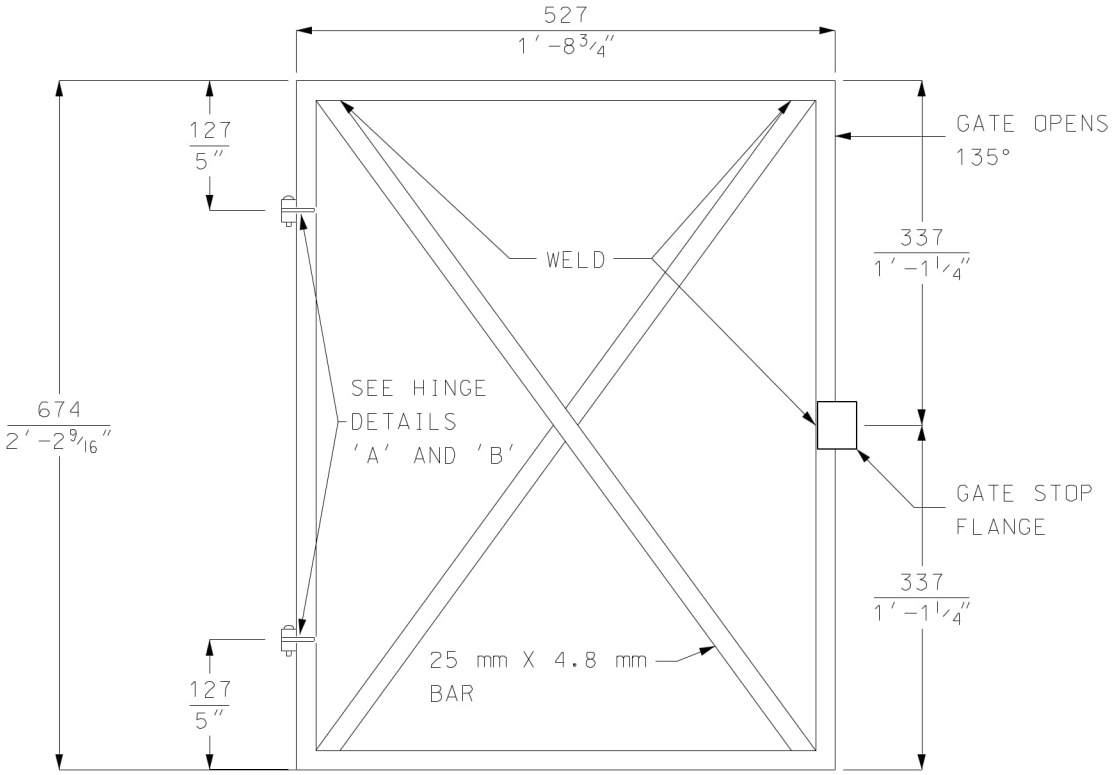
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction							6
TORONTO HYDRO	Approved By: B.D. 2020-05-15						
	Drafted By: A.M.E.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-11-15	Scale: N.T.S.	Rev: 6	31-8340	1/3

STEEL LADDERWAY GRATING GUARD

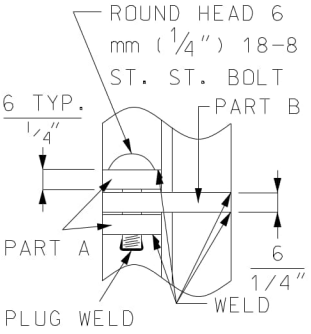
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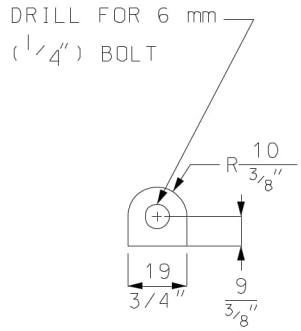
GUARD TOP VIEW 6



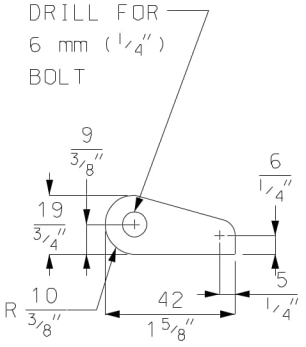
GATE 6



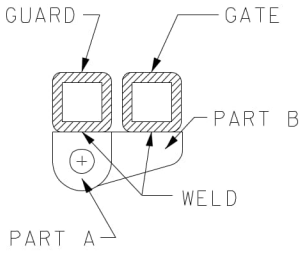
DETAIL 'A' 6



DETAIL 'B' 6



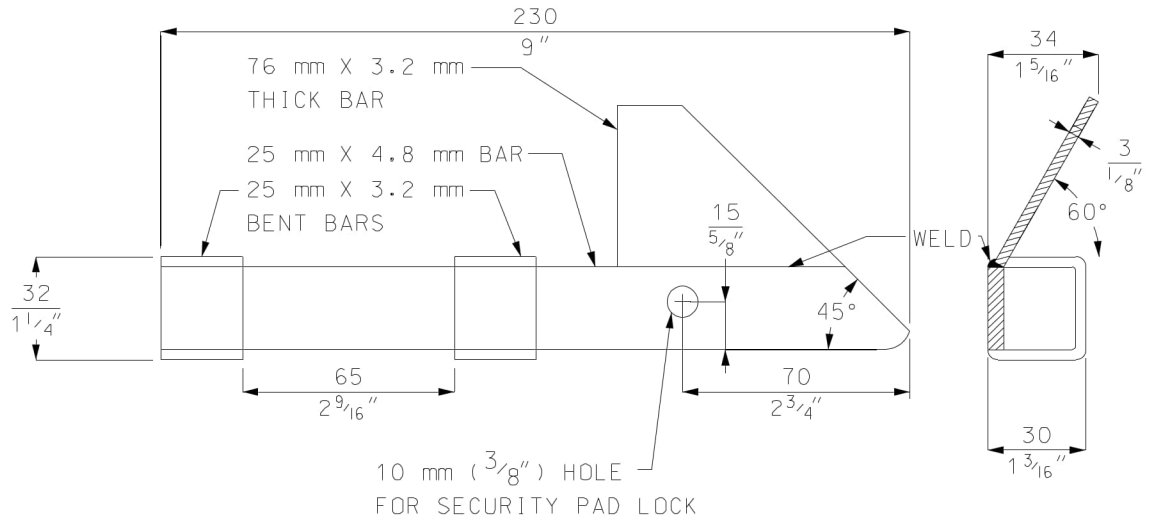
DETAIL 'C' 6



DETAIL 'D' 6

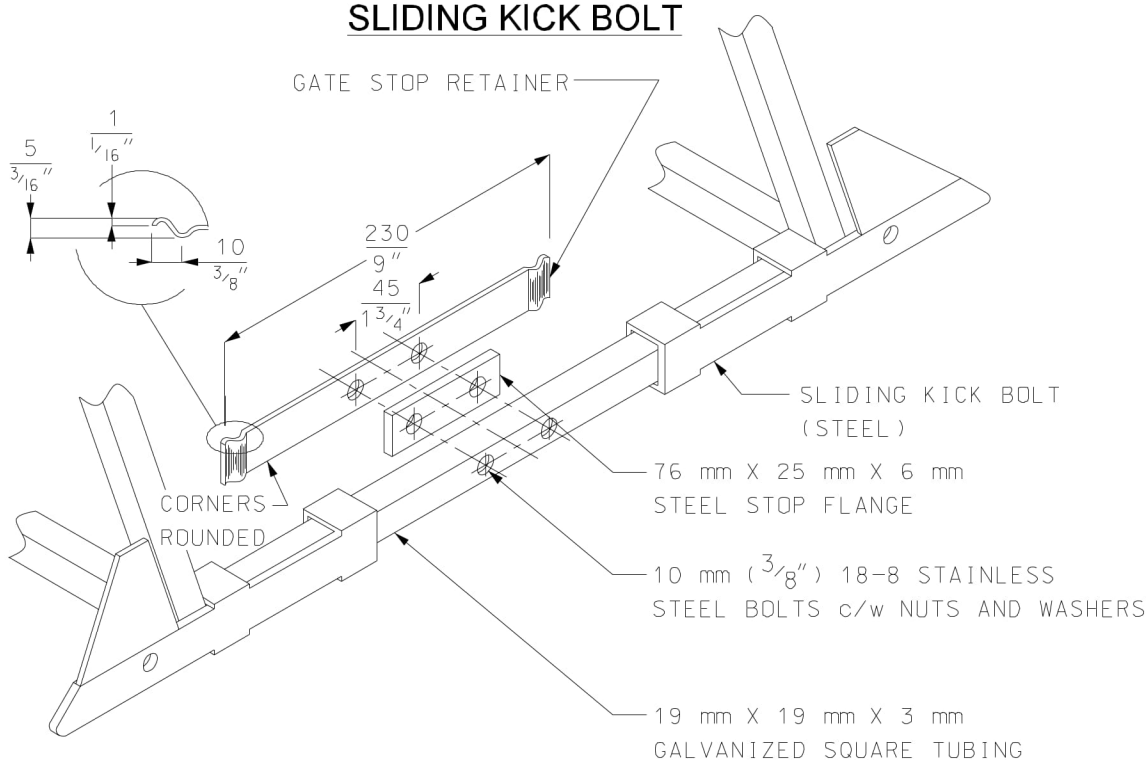
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction						6	
TORONTO HYDRO	Approved By: B.D. 2020-05-15		STEEL LADDERWAY GRATING GUARD				
	Drafted By: A.M.E.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-11-15	Scale: N.T.S.	Rev: 6	31-8340	2/3

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ELEVATION SECTION

SLIDING KICK BOLT



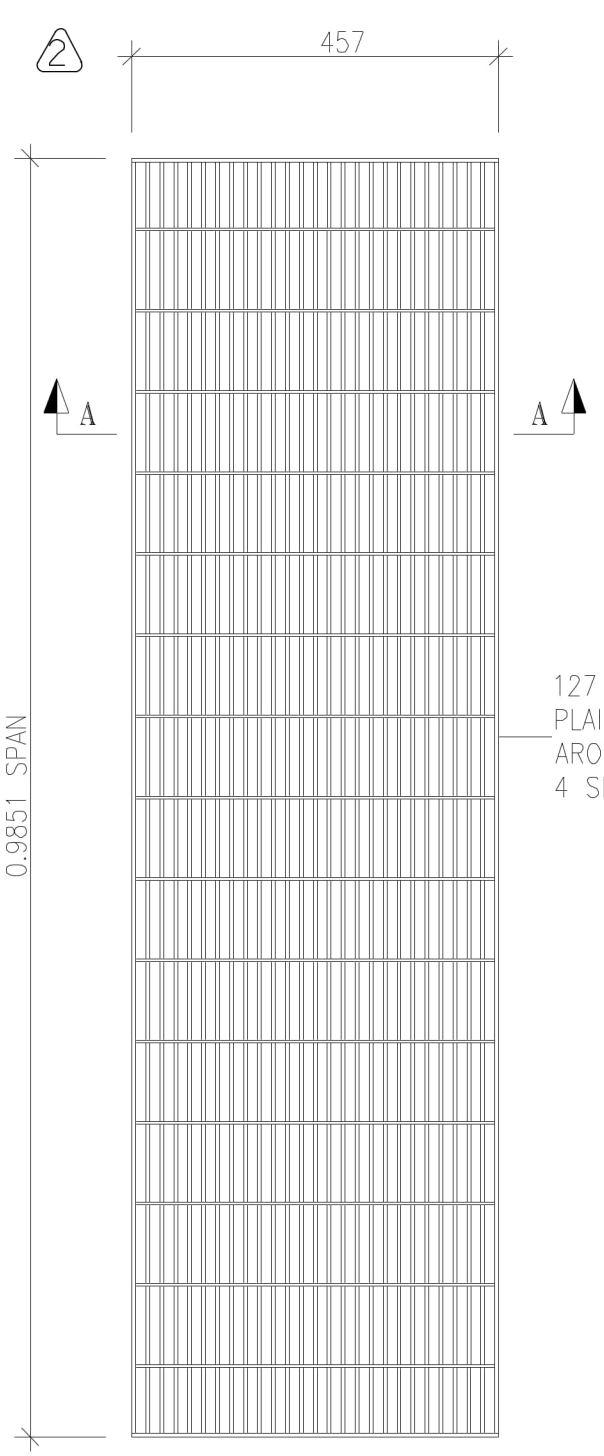
SLIDING KICK BOLT ASSEMBLY 6

NOTES: 6

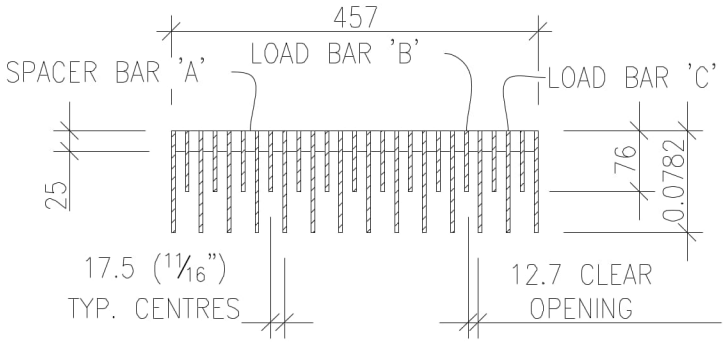
1) GUARD AND GATE TO BE FABRICATED OF 19 mm X 19 mm X 3.2 mm GALVANIZED CARBON STEEL SQUARE TUBING.
2) WELD ALL JOINTS.
3) WHERE POSSIBLE, DRILL/PUNCH ALL HOLES, WELD ALL HINGES AND GATE STOP FLANGE PRIOR TO GALVANIZING.
4) ETCH SURFACE AND APPLY "TIGER DRYLAC COATING" IN "SAFETY ORANGE GL/SM" TO GUARD AND GATE.
5) LADDERWAY GRATING GUARD TO BE ORDERED IN COMBINATION WITH ALUMINUM GRATING. LADDERWAY GRATING KIT ITEM ID# 9663631.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction							6
TORONTO HYDRO	Approved By: B.D. 2020-05-15		STEEL LADDERWAY GRATING GUARD				
	Drafted By: A.M.E.	Designed By: B.D.	Original Issue: G.D./C.P. 2002-11-15	Scale: N.T.S.	Rev: 6	31-8340	3/3

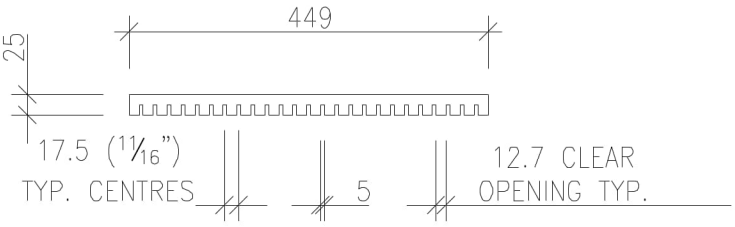
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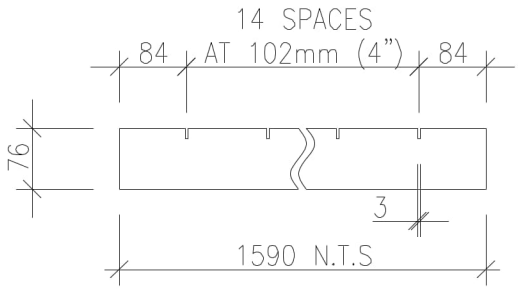
PANEL DETAIL PLAN
ITEM I.D. #9663696



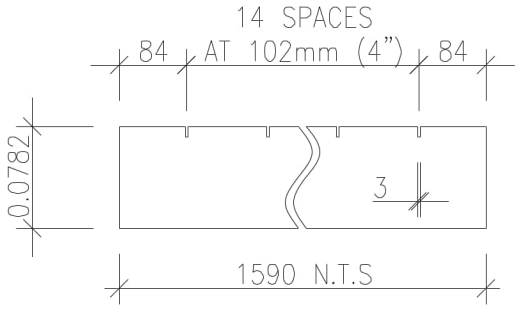
SECTION A–A



SPACER BAR 'A'



LOAD BAR 'B'



LOAD BAR 'C'

BILL OF MATERIAL		
DESCRIPTION	QTY.	LENGTH
127 X 4.8mm	2	459
127 X 4.8mm	2	1590
S.B. 'A' 25 X 3.2mm	15	449
L.B. 'B' 76 X 4.8mm	13	1590
L.B. 'C' 127 X 4.8mm	12	1590
WEIGHT 172KG (380LBS)		

Notes:

1. All dimensions are in millimeters unless noted otherwise.
2. Grid to be galvanized in accordance with latest CSA G-164 standard.
3. Spacer Bars: To be raised 1mm tack weld joints.
4. Load Bars 'B': Weld on one side only at each end.
5. Load Bars 'C': Deep weld at each location.
6. Maximum opening of 13mm between load bars.

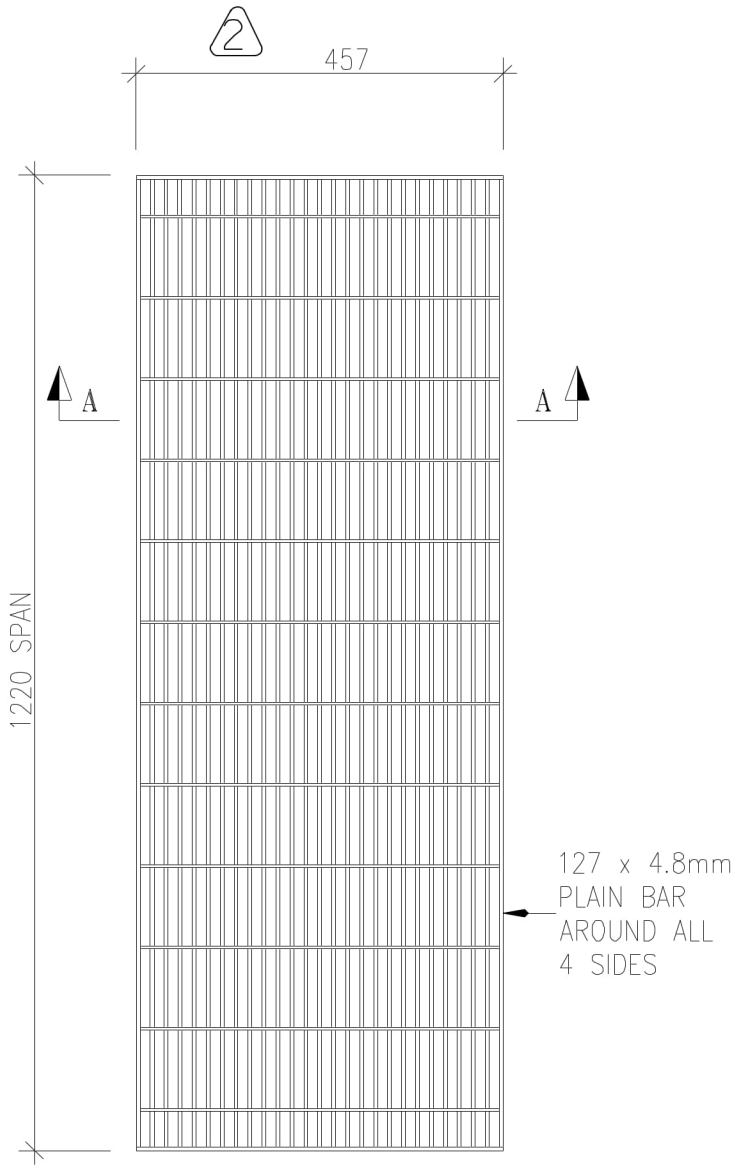
DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction - Material Fabrication

VAULT EXHAUST VENT GRID:
1600 x 457 x 127mm

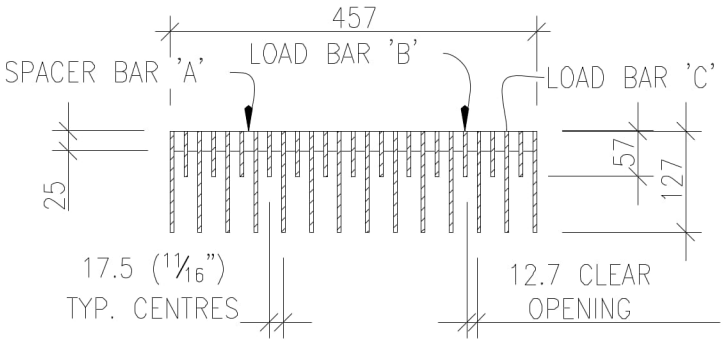
TORONTO HYDRO

Approved By:						
J.D. 2011-10-11						
Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
S.P.	J.D.	G.D. C.P. 2002-11-25	N.T.S.	2	31- 8350	1/1

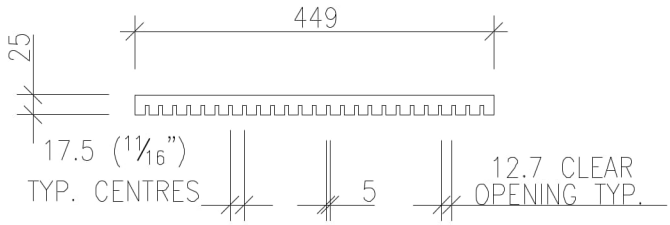
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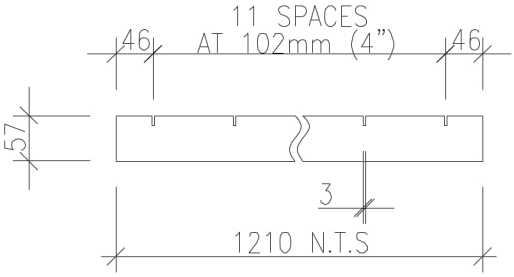
PANEL DETAIL PLAN
ITEM I.D. #9663691



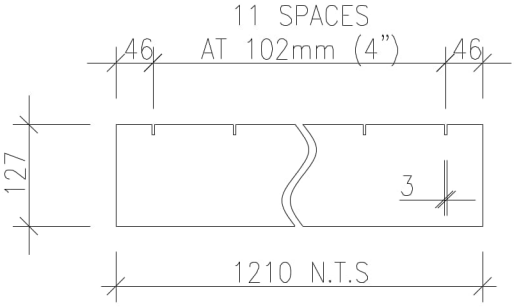
SECTION A–A



SPACER BAR 'A'



LOAD BAR 'B'



LOAD BAR 'C'

Notes:

1. All dimensions are in millimeters unless noted otherwise.
2. Grid to be galvanized in accordance with latest CSA G-164 standard.
3. Spacer Bars: To be raised 1mm tack weld joints.
4. Load Bars 'B': Weld on one side only at each end.
5. Load Bars 'C': Deep weld at each location.
6. Maximum opening of 13mm between load bars.

BILL OF MATERIAL		
DESCRIPTION	QTY.	LENGTH
127 X 4.8mm	2	459
127 X 4.8mm	2	1210
S.B. 'A' 25 X 3.2mm	15	449
L.B. 'B' 76 X 4.8mm	13	1210
L.B. 'C' 127 X 4.8mm	12	1210
WEIGHT 121KG (267LBS)		

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction - Material Fabrication

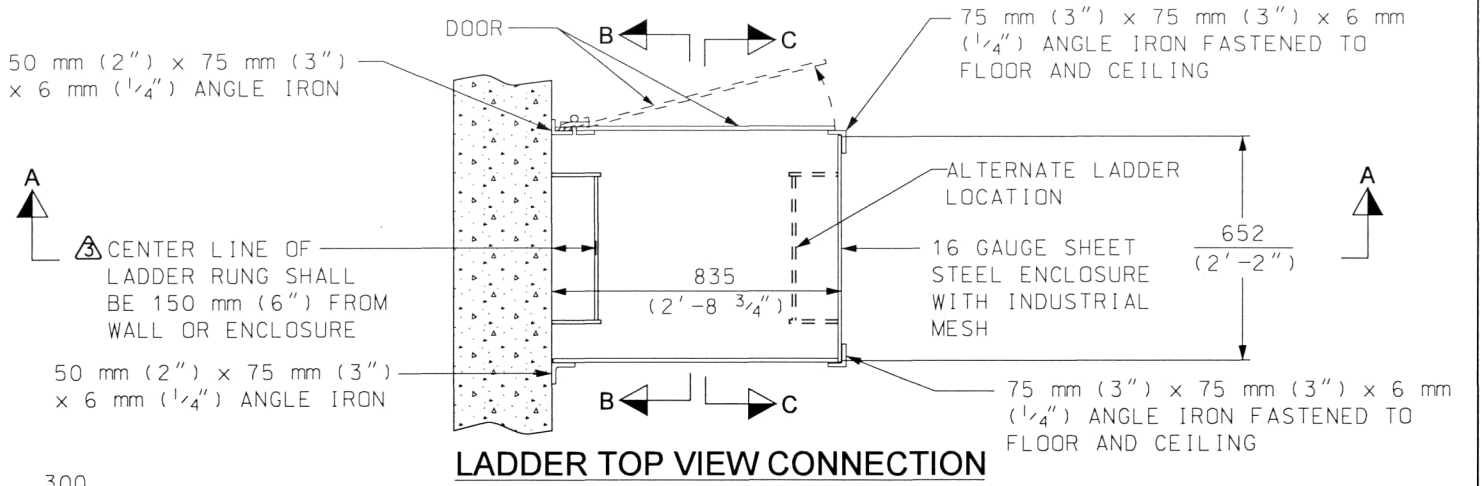
TORONTO HYDRO

Approved By: J.D. 2011-10-11

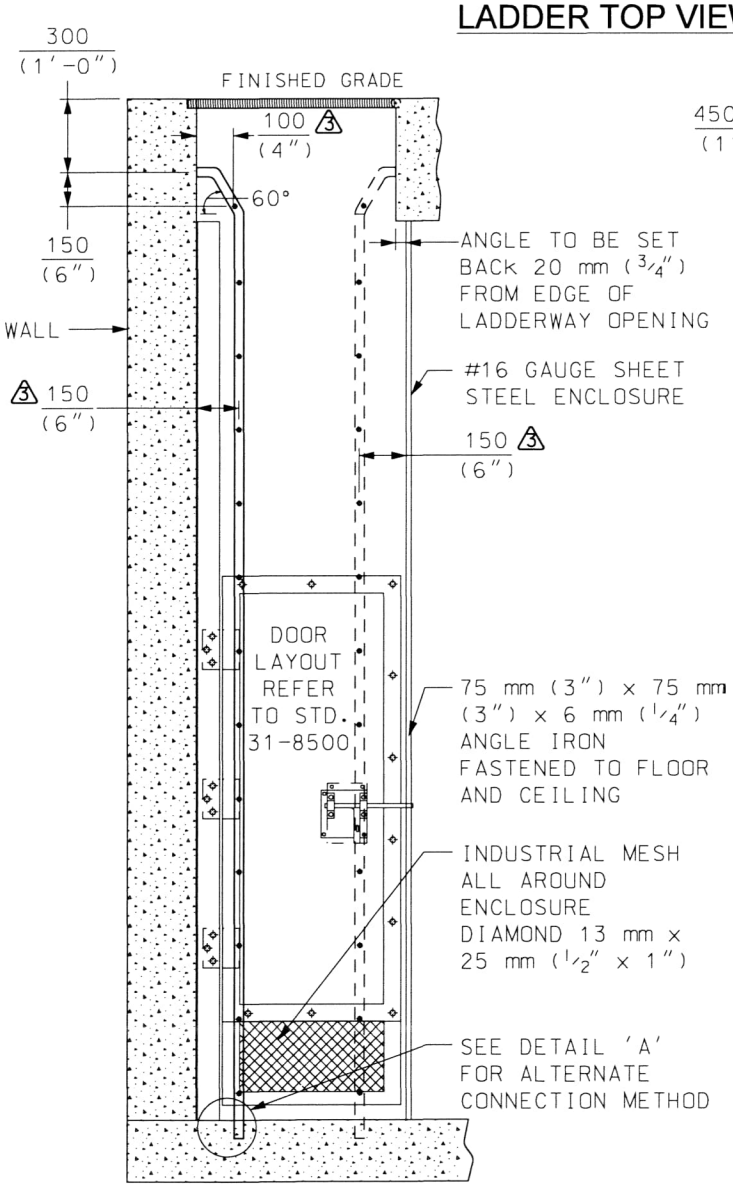
VAULT EXHAUST VENT GRID: 1220 x 457 x 127mm

Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
A.S.	J.D.	G.D. C.P. 2002-11-25	N.T.S	2	31- 8360	1/1

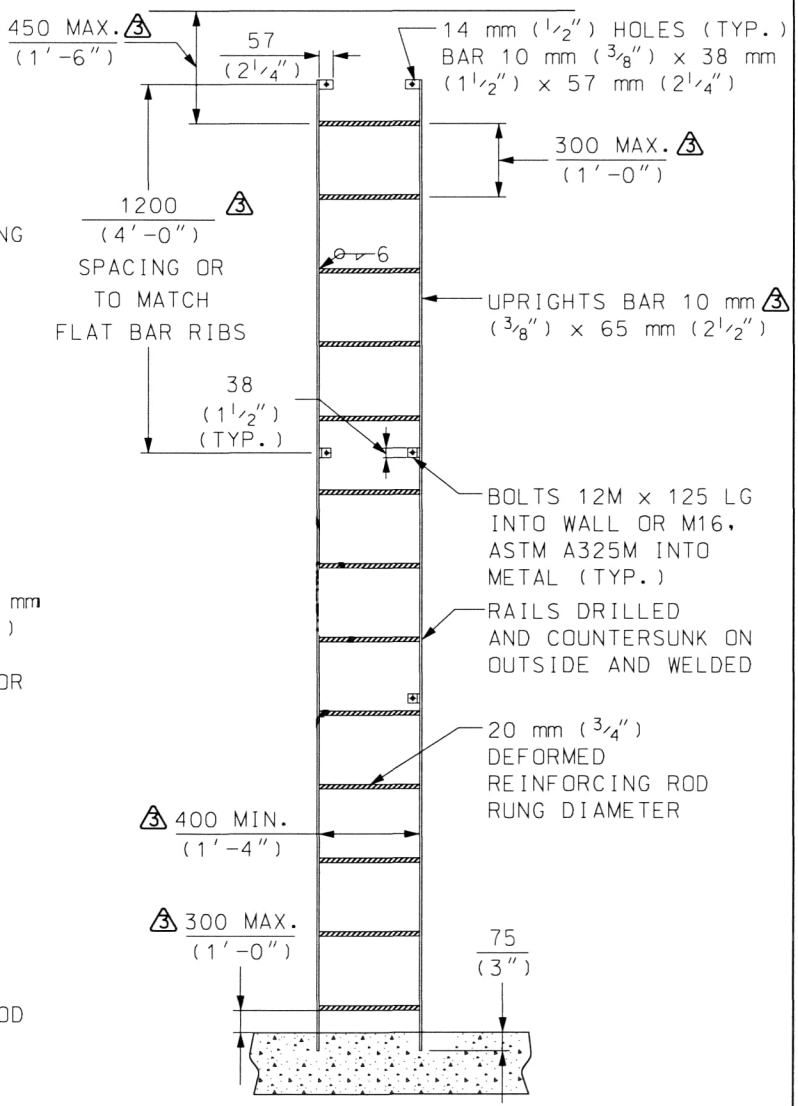
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LADDER TOP VIEW CONNECTION



SECTION 'A-A'

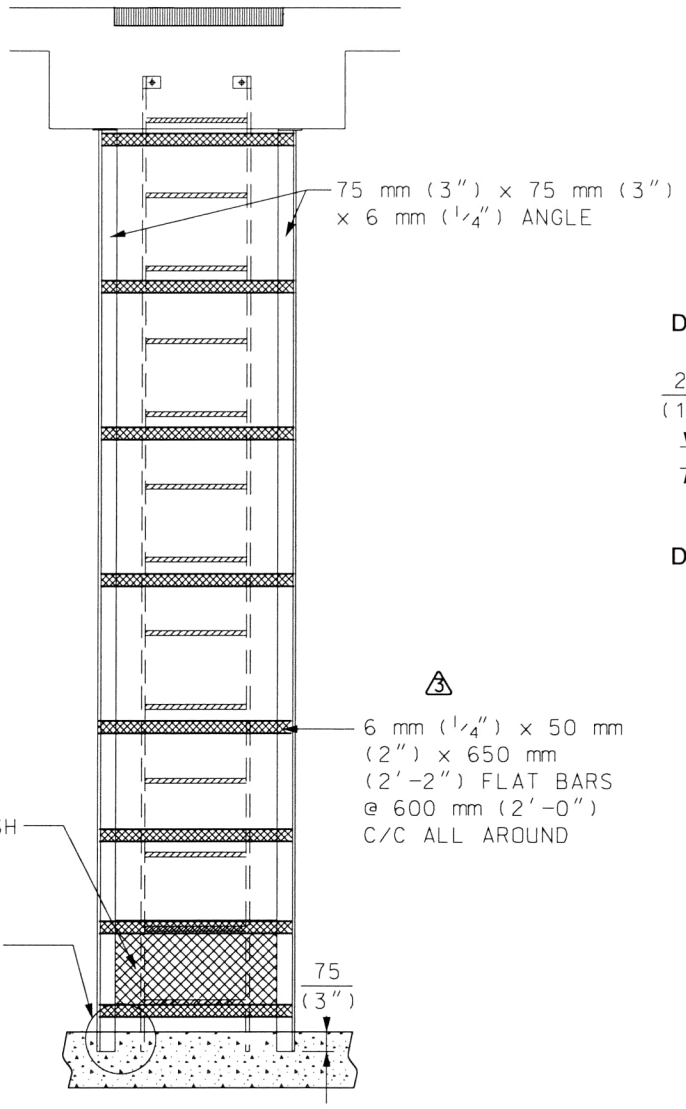


SECTION 'B-B'

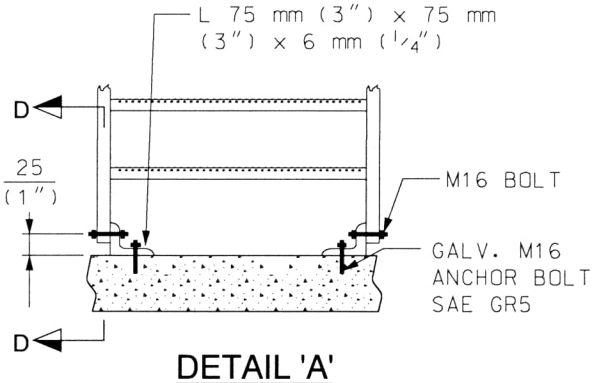
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction							
TORONTO HYDRO	Approved By: 2015/11/16						
	Drafted By: B.W.	Designed By: J.D.	Original Issue: G.D. 2000-12-19	Scale: N.T.S.	Rev: 3	31-8390	1/2

VAULT
TRANSFORMER VAULT LADDER

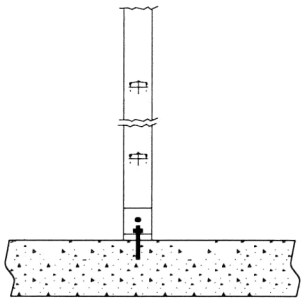
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SECTION 'C-C'



DETAIL 'A'



SECTION 'D-D'

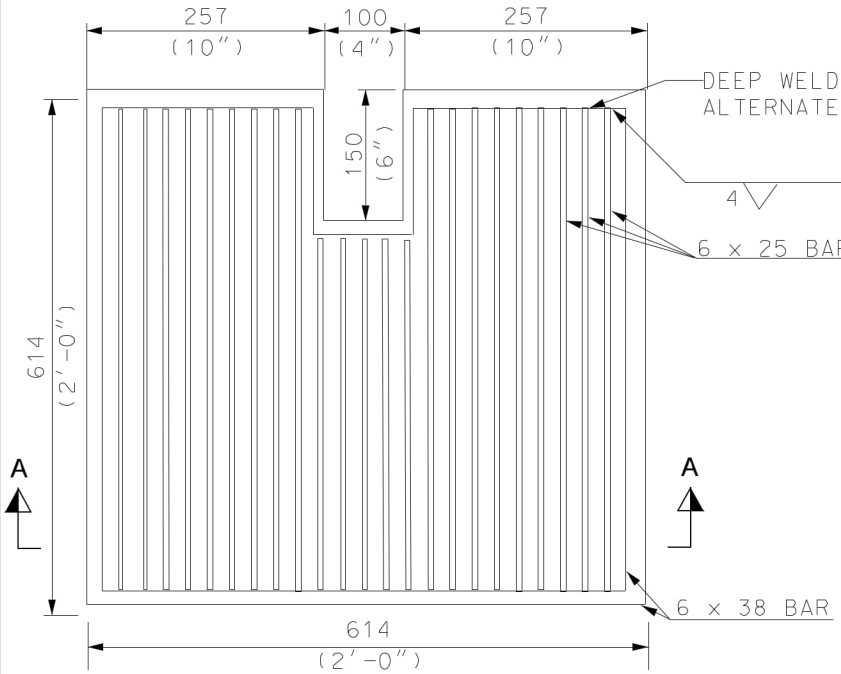
ID # 3530018

NOTES:

1) ALL MATERIAL SHALL BE GALVANIZED IN ACCORDANCE WITH CSA-G-164, EXCEPT HINGES WHICH ARE STAINLESS STEEL.
2) STEEL ELEMENTS SHALL BE IN ACCORDANCE WITH CAN3-G312.2-M GRADE 260W.
3) REBARS SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.19 (R2014) GRADE 400W.
4) LOCATION OF LADDER AND DOOR SHALL BE DETERMINED AS PER CONSTRUCTION DRAWING.
5) DOOR AND ENCLOSURE ONLY INSTALLED IN VAULTS WITH HEADROOM GREATER THAN 2200 mm (7'-3").
6) INDUSTRIAL MESH MOUNTED ON ALL OPEN SIDES OF THE ENCLOSURE.

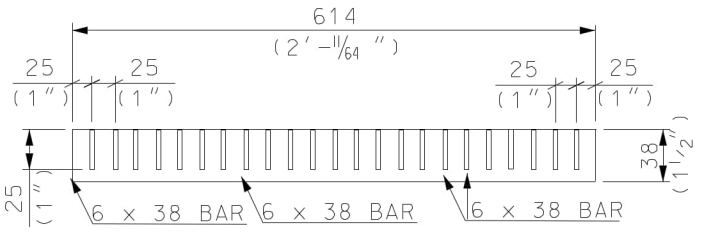
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			VAULT TRANSFORMER VAULT LADDER				
TORONTO HYDRO	Approved By: 2015/11/16						
	Drafted By: B.W.	Designed By: J.D.	Original Issue: G.D. 2000-12-19	Scale: N.T.S.	Rev: 3	31-8390	2/2

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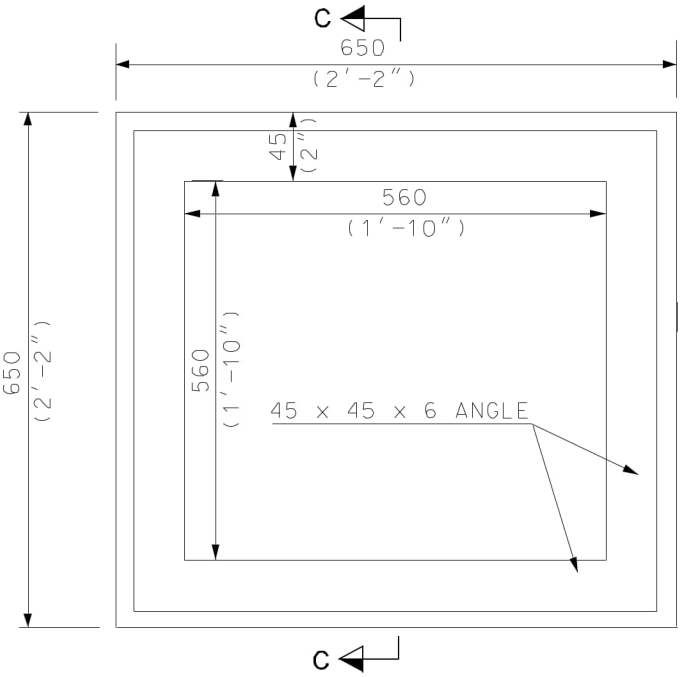


PLAN OF SUMP HOLE GRID

⚠ID# 3530046

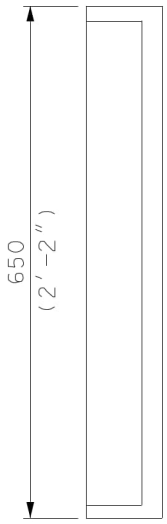


SECTION A - A



PLAN OF SUMP HOLE FRAME

⚠ID# 3530530



SECTION B - B

⚠NOTES:

1) UNIFORM LOADING OF 10 kPa.
2) ALL MATERIALS TO BE STEEL WITH Fu = 400 MPa MINIMUM AND Fy = 250 MPa MINIMUM.
3) TO BE GALVANIZED AS PER LATEST EDITION OF CSA STANDARD G-164.
4) ALL WELDS TO CONFORM TO LATEST EDITION CSA STANDARD W59.

BILL OF MATERIAL		
GRID		
MATERIAL	LENGTH	QTY.
5 x 38 BAR	611	2 PCS.
5 x 38 BAR	621	1 PC.
5 x 38 BAR	115	1 PC.
5 x 38 BAR	253	2 PCS.
5 x 38 BAR	459	3 PCS.
3 x 25 BAR	605	5 PCS.
3 x 25 BAR	611	2 PCS.
FRAME		
MATERIAL		LENGTH
45 x 45 x 6 BAR		2642

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

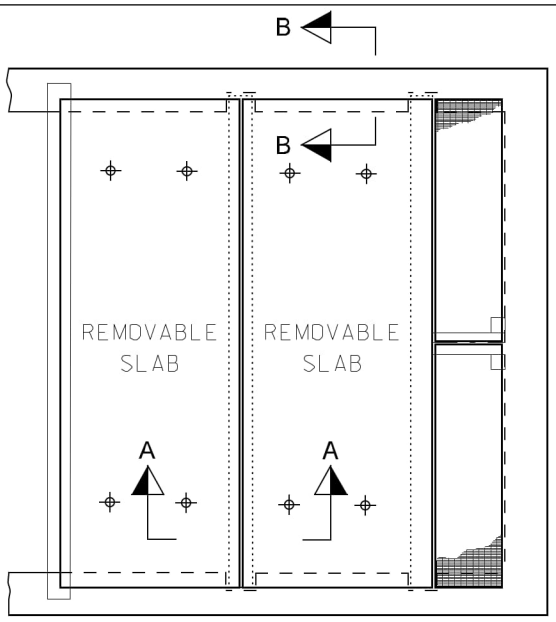
VAULT SUMP HOLE GRID & FRAME:

650 mm x 650 mm x 38 mm

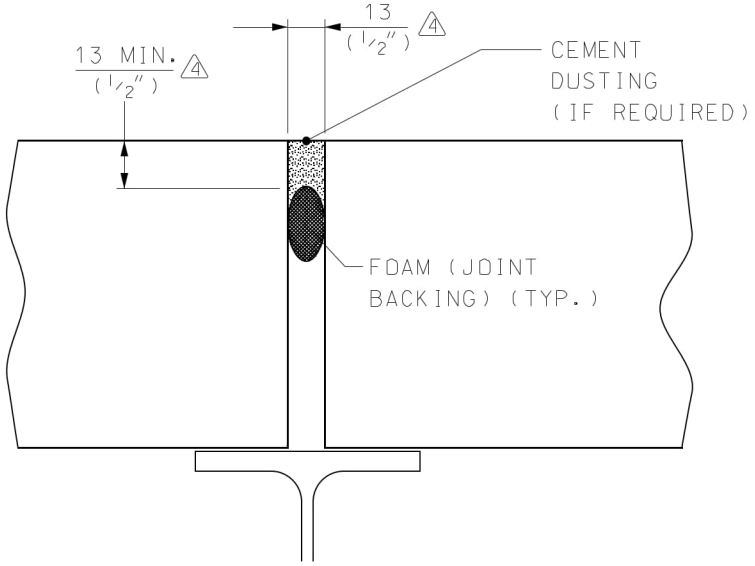
TORONTO HYDRO

Approved By:						
J.D. 2012-03-24						
Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
H.M.	J.D.	G.D. 2002-11-15	N.T.S.	1	31-8400	1/1

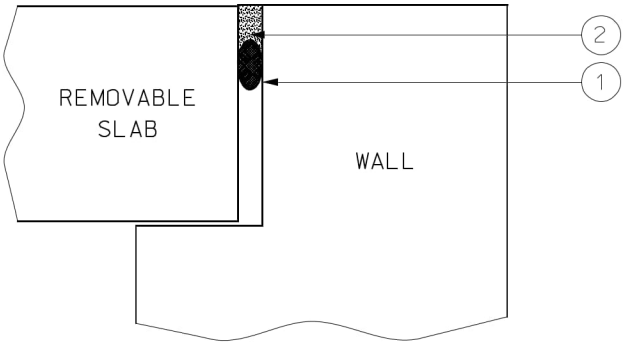
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VAULT TOP VIEW



SECTION 'A-A'



SECTION 'B-B'

BILL OF MATERIALS FOR 31-8410				
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	
1	FOAM 7/8" DIA. X 850' GAP FILLER FOR VAULT SLABS	9664496	1	4
2	COMPOUND JOINT SEALANT 2 PART 5.7 L CONTAINER GREY IN COLOUR	8940080	1	4

NOTES:

1) NEW CONSTRUCTION: CONCRETE JOINT INTERFACES SHALL BE CLEAN, DRY AND FREE OF DUST AND LOOSE MATERIAL. A THOROUGH WIRE BRUSHING OR GRINDING MAY BE REQUIRED. THE PRESENCE OF FORM RELEASE AGENTS, OR OTHER CONTAMINANTS SHALL REQUIRE GRINDING TO EXPOSE SOUND, VIRGIN CONCRETE.
2) REMEDIAL APPLICATIONS: ALL PREVIOUS SEALANTS, MASTICS OR JOINT FILLERS SHALL BE REMOVED BY ROUTING OR SAW CUTTING. JOINT INTERFACES SHALL BE GRINDED TO EXPOSE SOUND, VIRGIN CONCRETE.
3) SEALANT SUPPORT: FOAM (JOINT BACKING) SHALL BE USED TO CONTROL SEALANT DEPTH. FOAM (JOINT BACKING) SHALL BE ROUND.
4) MIXING: IF REQUIRED, THE SEALANT SHALL BE THOROUGHLY MIXED IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS ON CONTAINER LABEL, BEFORE APPLICATION.
5) APPLICATION: THE SEALANT SHALL BE APPLIED DIRECTLY FROM THE CONTAINER INTO JOINTS OR BY STANDARD CAULKING GUN.
4 6) IF EXISTING JOINT IS LARGER THAN THE SPECIFIED 13 mm (1/2"), LARGER GAP FILLERS ARE AVAILABLE: FOAM 1" DIA. GAP FILLER (9664495) AND FOAM 1 1/4" DIA. GAP FILLER (9664494)

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

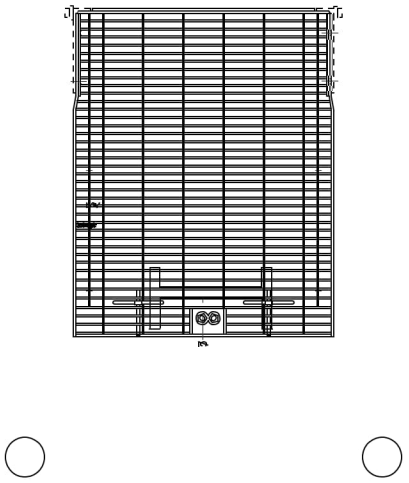
TORONTO HYDRO

MATERIAL FABRICATION

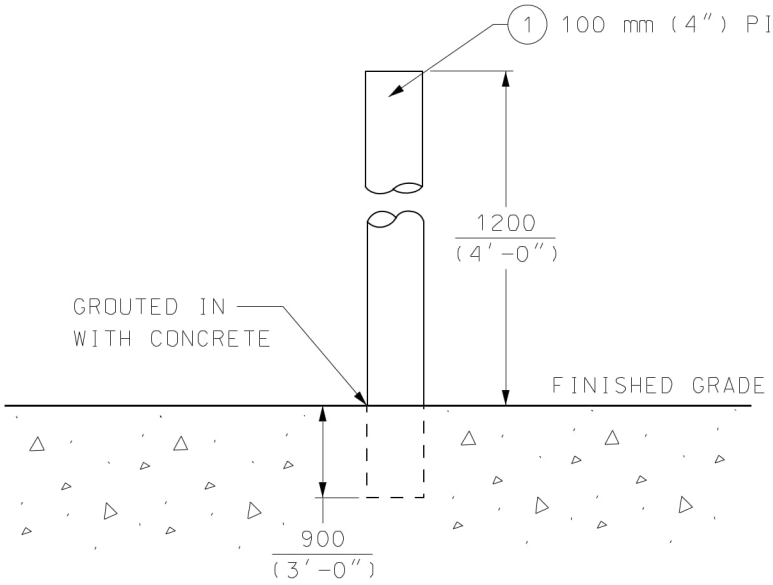
CAULKING OF REMOVABLE SLABS

Approved By:						
B.D. 2018-08-31						
Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
U.K.	B.D.	G.D./C.P. 2002-11-15	N.T.S.	4	31-8410	1/1

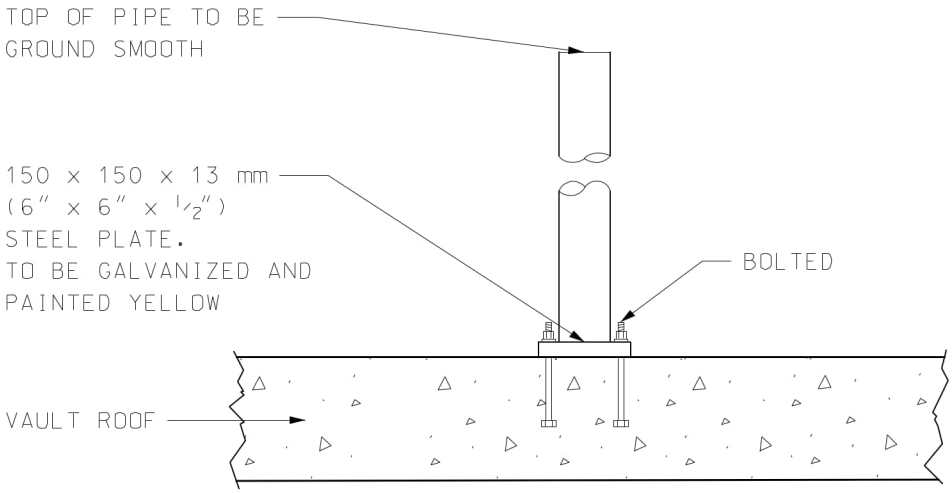
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LADDERWAY
PLAN VIEW



PIPE BARRIER EMBEDDED IN PAVED AREA



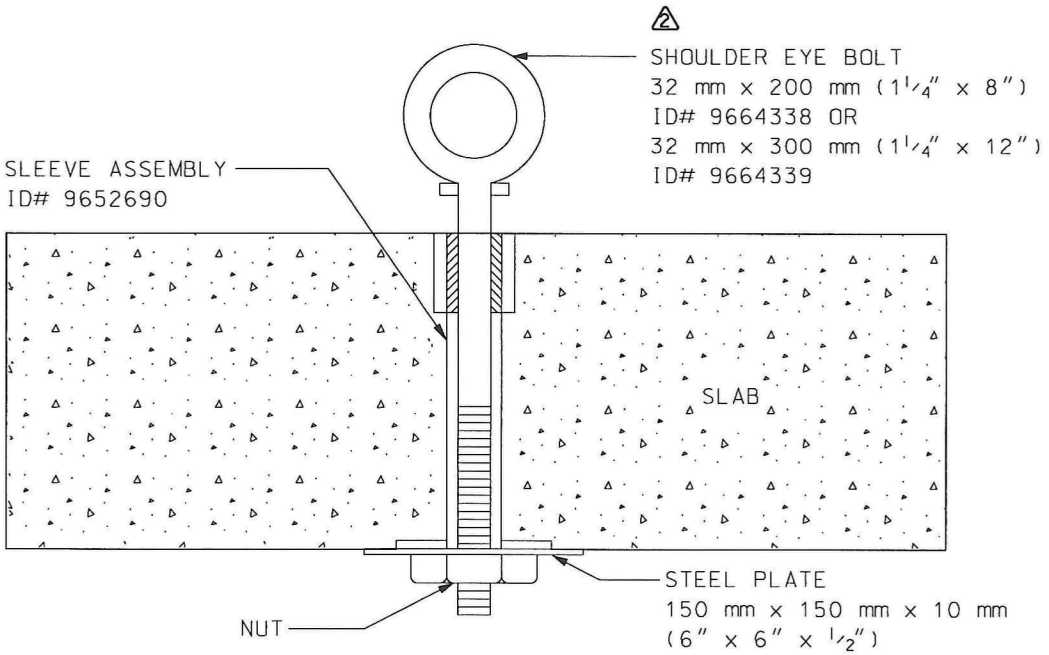
PIPE BARRIER BOLTED TO ROOF

BILL OF MATERIALS FOR 31-8450			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY
1	100 mm (4″) PIPE	9652745	4

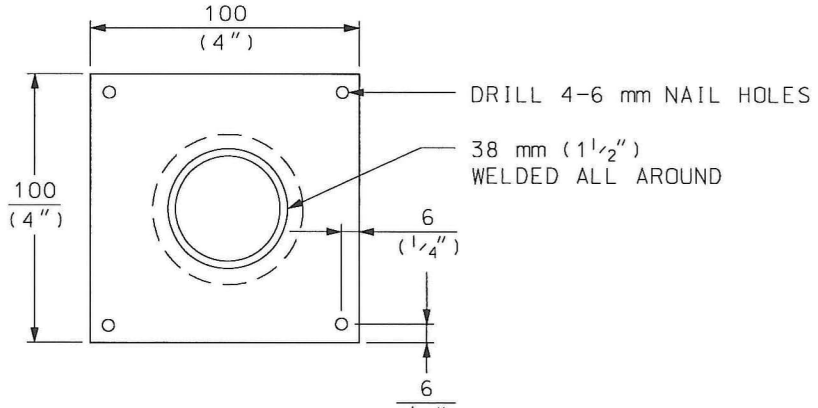
NOTES: ⚠1
1) PIPE SHALL BE FILLED WITH CONCRETE WHEN INSTALLED.
2) PIPE SHALL BE GALVANIZED AND PAINTED YELLOW.
3) ALL HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH CSA-G-164.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction							
TORONTO HYDRO	Approved By: J.D. 2013-11-07		LADDERWAY PIPE BARRIER				
	Drafted By: K.H.	Designed By: J.D.	Original Issue: G.D./C.P. 2002-11-15	Scale: N.T.S.	Rev: 1	31-8450	1/1

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SECTION SHOWING METHOD OF LIFTING



STEEL BASE PLATE

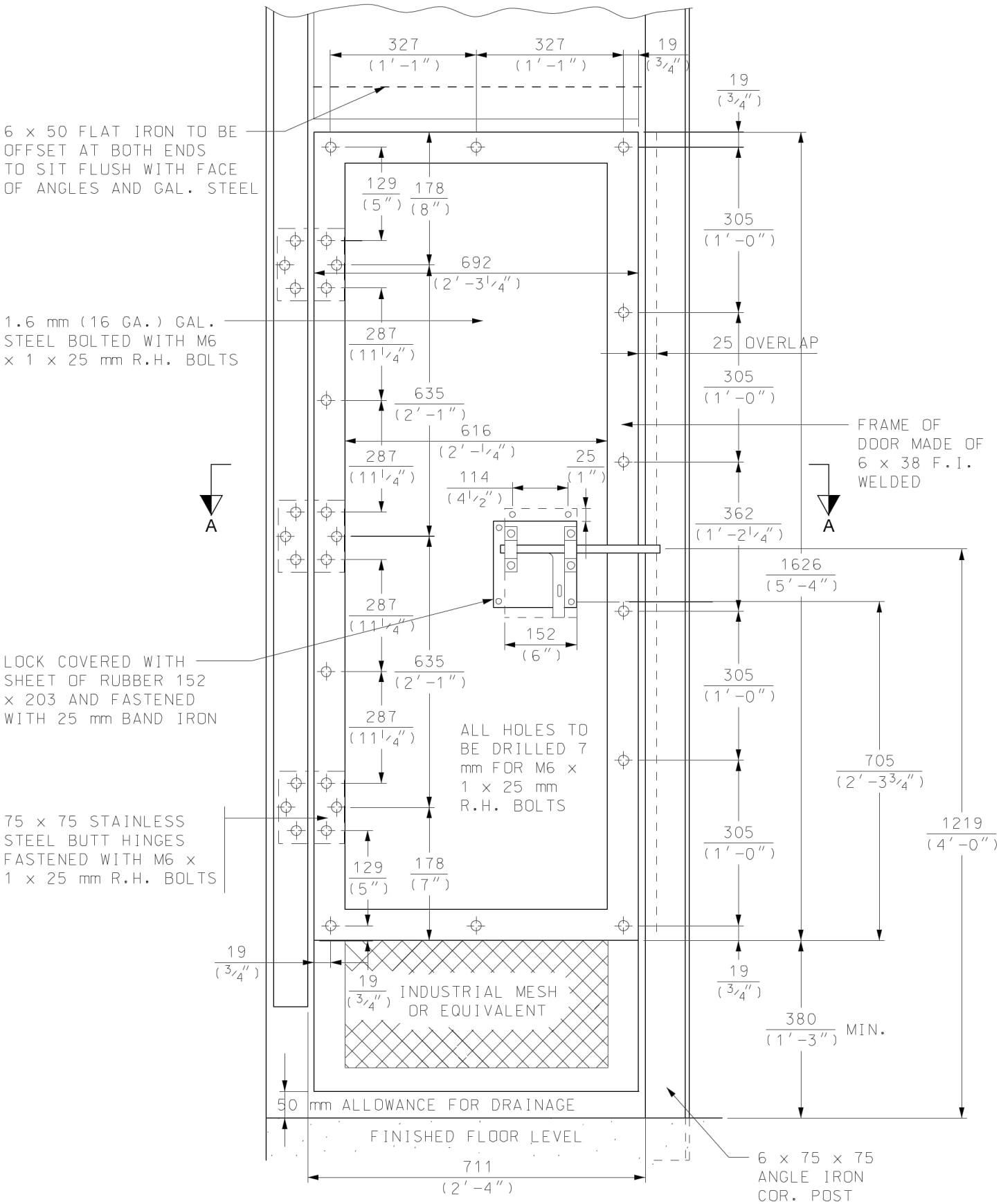
100 mm (4") x 100 mm (4")
x 2 mm (1/16")

NOTES:

1) ASSEMBLY SHALL BE GALVANIZED IN ACCORDANCE WITH CSA-G-164.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			MATERIAL FABRICATION SLEEVE - LIFTING FOR REMOVABLE CONCRETE SLAB				
TORONTO HYDRO	Approved By: 2016/05/25						
	Drafted By: D.C.	Designed By: J.D.	Original Issue: G.D. 2002-11-15	Scale: N.T.S.	Rev: 2	31-8470	1/1

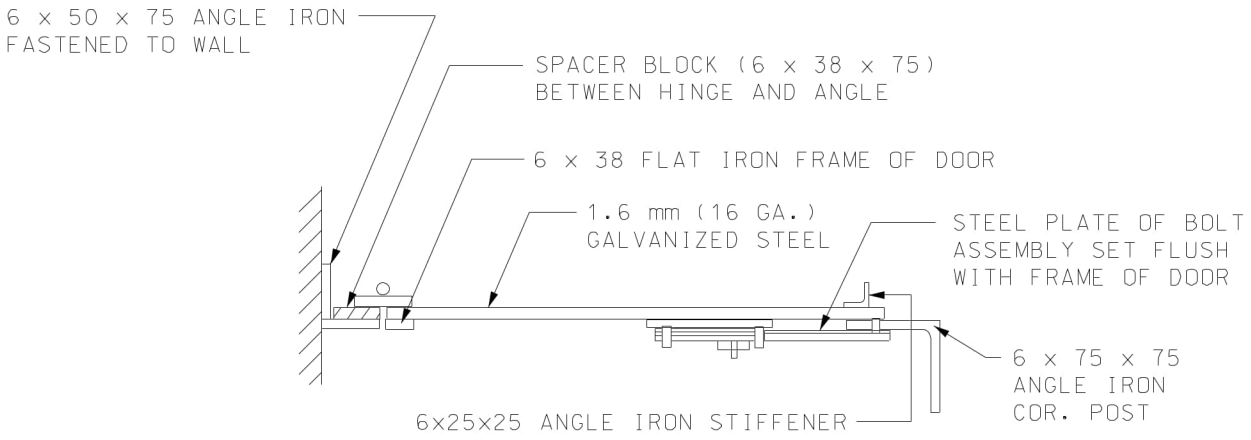
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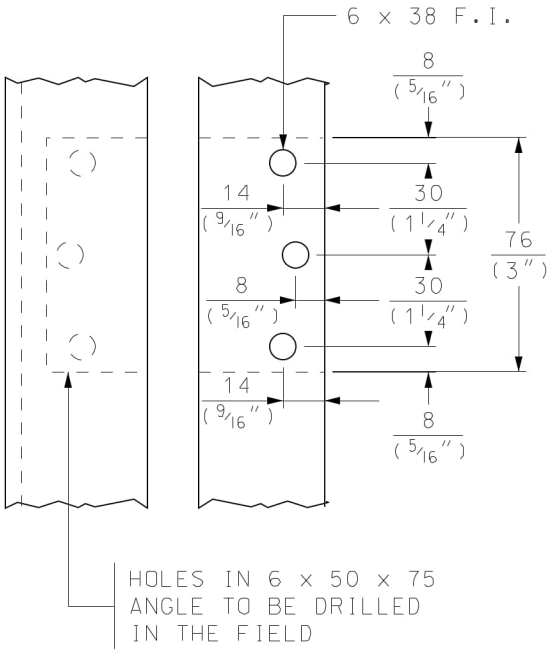
SECTION A-A

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# MATERIAL FABRICATION DOOR FOR TRANSFORMER VAULT				
TORONTO HYDRO	Approved By: J.D. 2013-11-07						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: G.D./L.G. 2002-11-15	Scale: N.T.S.	Rev: 1	31-8500	1/3

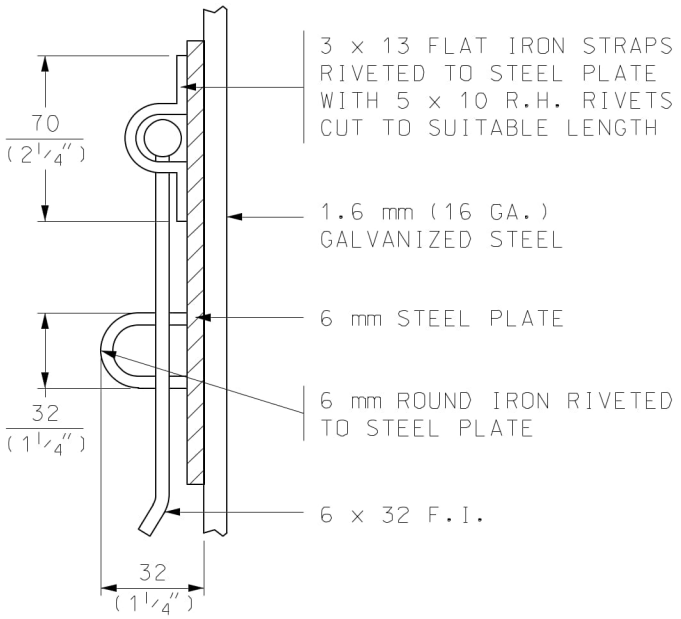
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SECTION A-A



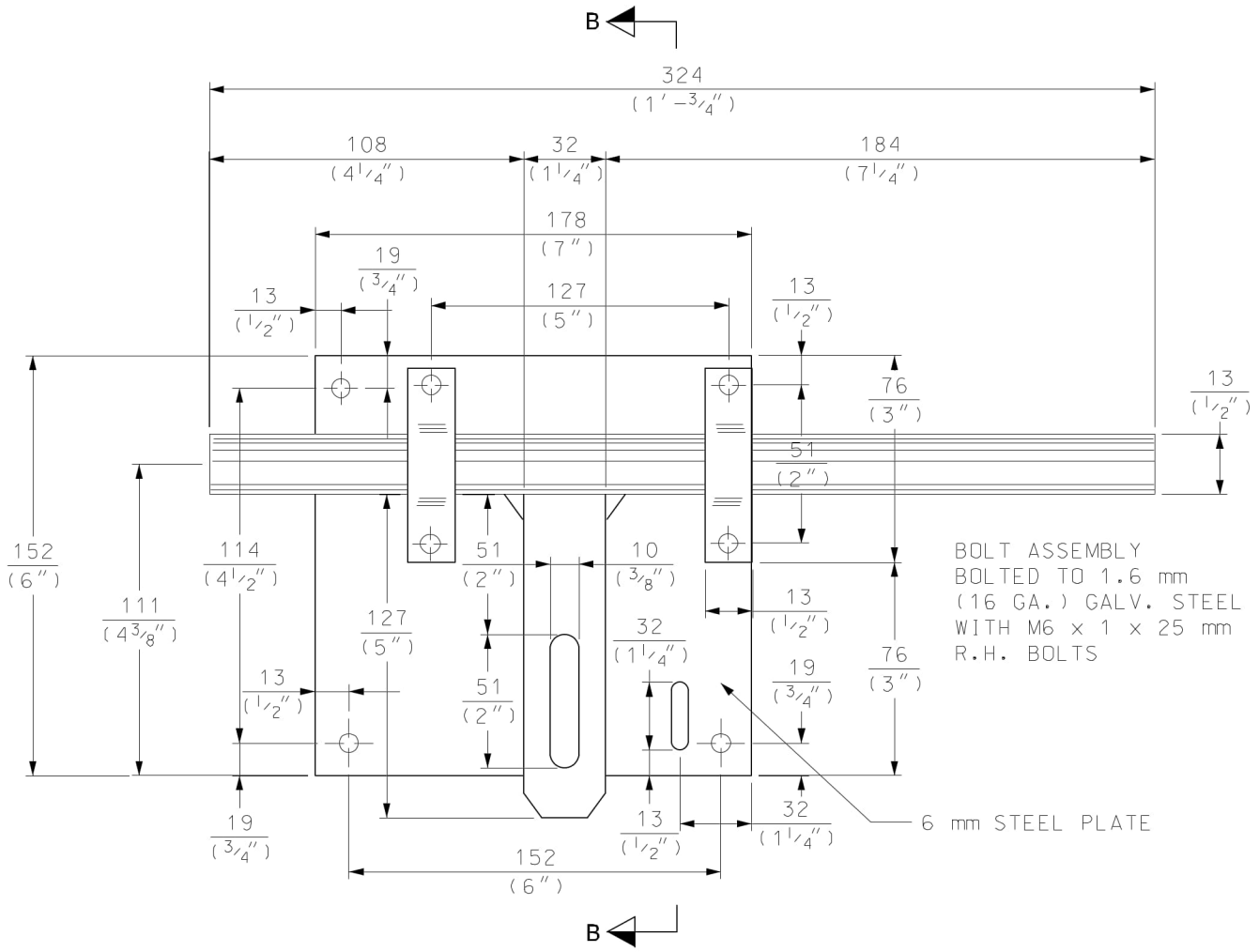
DETAIL OF HINGE



SECTION B-B

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			# MATERIAL FABRICATION DOOR FOR TRANSFORMER VAULT				
TORONTO HYDRO	Approved By: J.D. 2013-11-07						
	Drafted By: D.L.	Designed By: J.D.	Original Issue: G.D./L.G. 2002-11-15	Scale: N.T.S.	Rev: 1	31-8500	2/3

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DETAIL OF BOLT

BILL OF MATERIALS	
DESCRIPTION	QTY.
6 mm x 38 mm FLAT IRON	5944 mm
6 mm x 32 mm FLAT IRON	127 mm
6 mm x 50 mm FLAT IRON	705 mm
13 mm ROUND IRON	229 mm
6 mm ROUND IRON	89 mm
6 mm x 25 mm x 25 mm ANGLE IRON	1626 mm
6 mm STEEL PLATE 152 mm x 178 mm	1 PC
3 mm x 13 mm F.I. STRAPS, 95 mm LONG	2 PCS
75 mm x 75 mm HEAVY BUTT HINGES	1 1/2 PR
5 mm x 16 mm R.H. RIVETS	4
1.6 mm GALV. STEEL, 1626 mm x 717 mm	1 PC
M6 x 1 x 25 mm R.H. BOLTS	52
RUBBER SHEET, 152 mm X 203 mm	1 PC
25 mm BAND IRON	152 mm
6 mm F.I. SPACER BLOCKS 38 mm x 75 mm	3 PCS

DISTRIBUTION CONSTRUCTION STANDARD
Civil Construction

MATERIAL FABRICATION

DOOR FOR TRANSFORMER VAULT

TORONTO HYDRO

Approved By:						
J.D. 2013-11-07						
Drafted By:	Designed By:	Original Issue:	Scale:	Rev:		
D.L.	J.D.	G.D./L.G. 2002-11-15	N.T.S.	1	31-8500	3/3