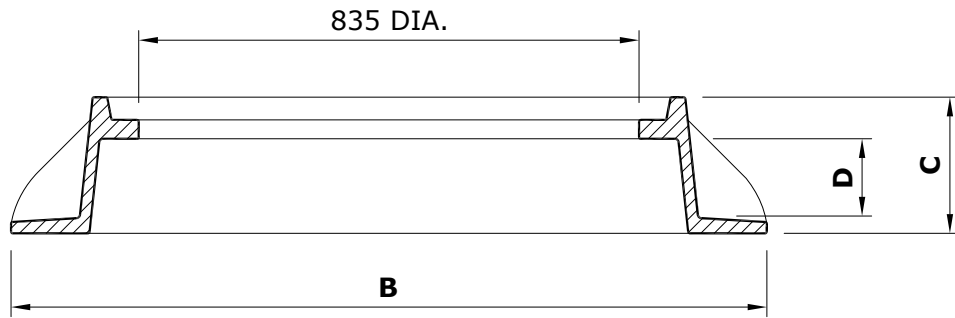
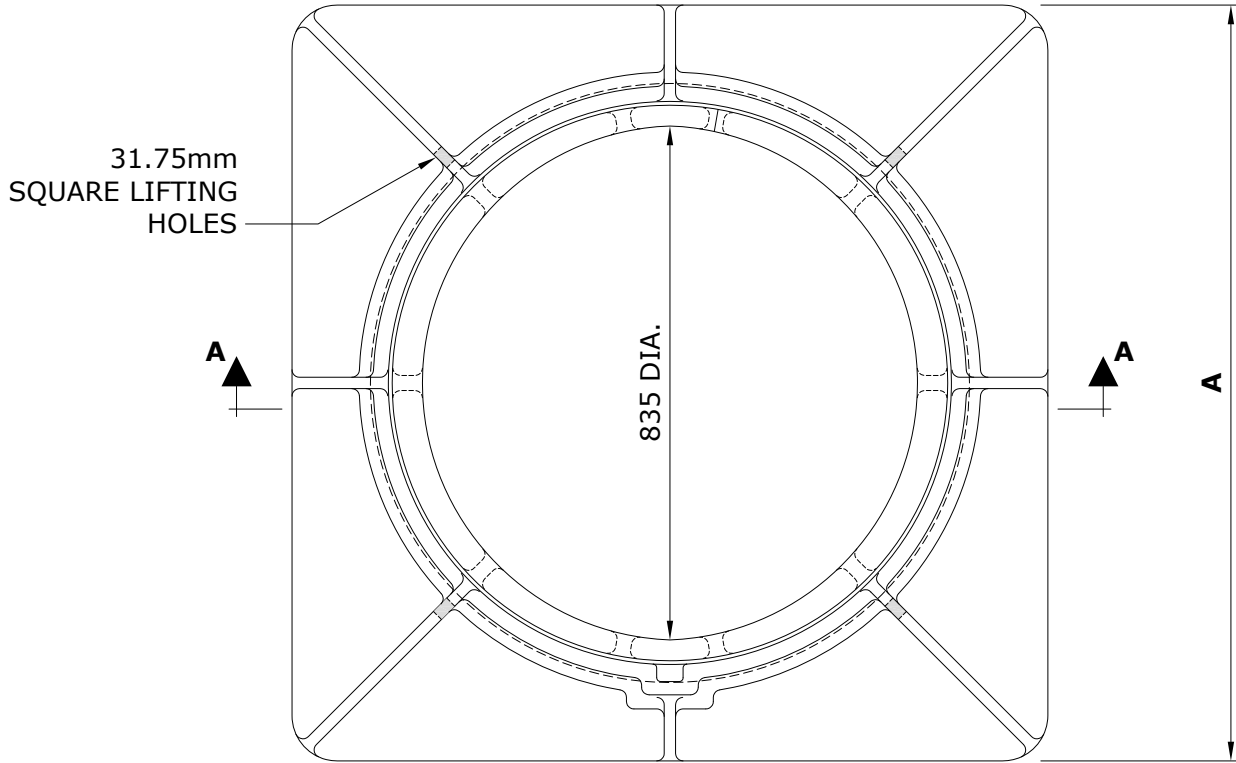


## **APPENDIX 'E'**

# **MANITOBA HYDRO ENERGY MITIGATION FRAME & COVERS**

# SUBSURFACE CHAMBER FRAME



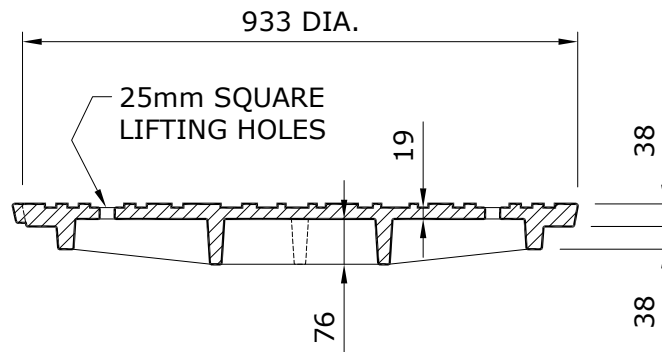
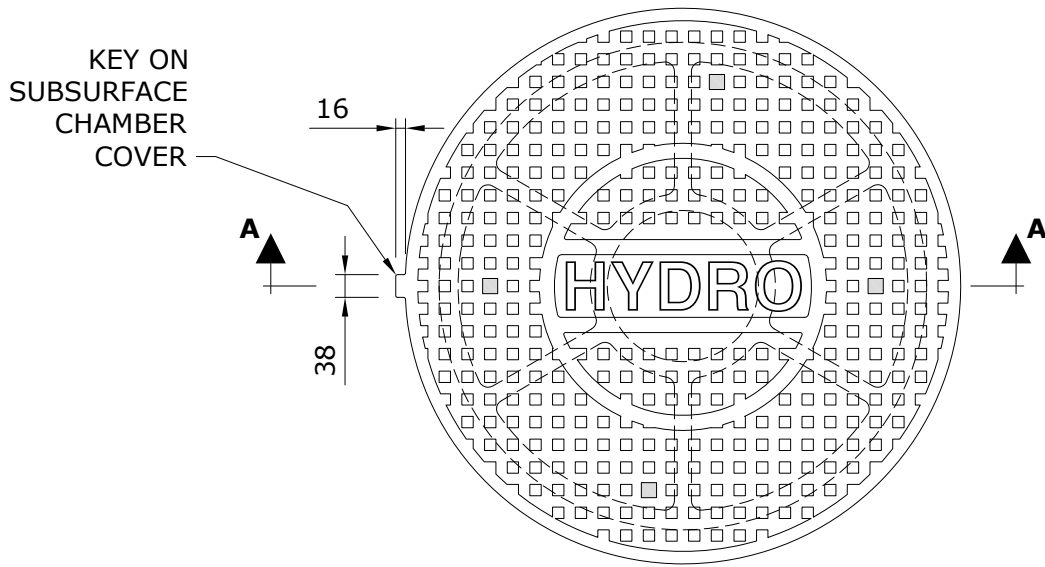
**SECTION A-A**

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>WEIGHT</b>
9" FRAME	1270mm	1270mm	230mm	110mm	738lbs
5" FRAME	1270mm	1270mm	130mm	32mm	562lbs

**NOTE: DIMENSIONS SHOWN ARE MILLIMETRES.**

APPROVED	REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS			
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 17-10-27			<b>SUBSURFACE CHAMBER FRAME, COVER AND LIFTING RINGS</b>			
	21-04	1				
DRAWN C.A.	CHECKED J.R.	DATE 17-10	<b>CD 235-15</b>		SHT 0001 OF 3	REV 01

# SUBSURFACE CHAMBER COVER



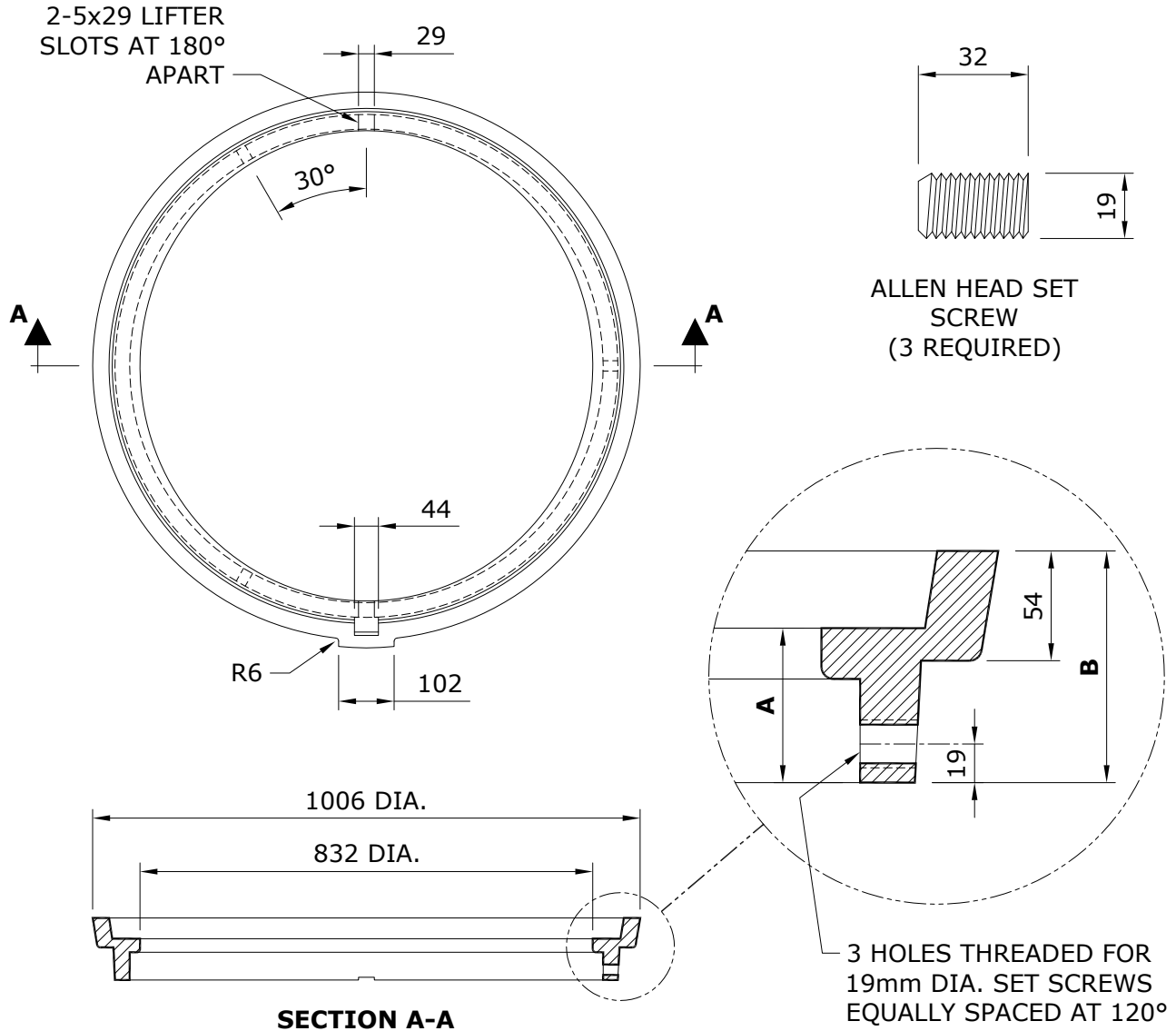
**SECTION A-A**

**NOTES:**

1. WEIGHT 400lbs.
2. SUBSURFACE CHAMBER COVER COMPATIBLE WITH EITHER STANDARD FRAME.
3. DIMENSIONS SHOWN ARE MILLIMETRES.

APPROVED	REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS				
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 17-10-27	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">21-04</td> <td style="width: 10%; text-align: center;">1</td> <td style="text-align: left;">CHANGED MANHOLE TO SUBSURFACE CHAMBER</td> </tr> </table>		21-04	1	CHANGED MANHOLE TO SUBSURFACE CHAMBER	<p><b>SUBSURFACE CHAMBER FRAME, COVER AND LIFTING RINGS</b></p>	
21-04	1	CHANGED MANHOLE TO SUBSURFACE CHAMBER					
DRAWN C.A.	CHECKED J.R.	DATE 17-10	<p><b>CD 235-15</b></p>				
			SHT 0002 OF 3	REV 01			

# LIFTING RING



	A	B	WEIGHT
2" LIFTER RING	76mm	114mm	163lbs
3" LIFTER RING	92mm	130mm	185lbs

**NOTES:**

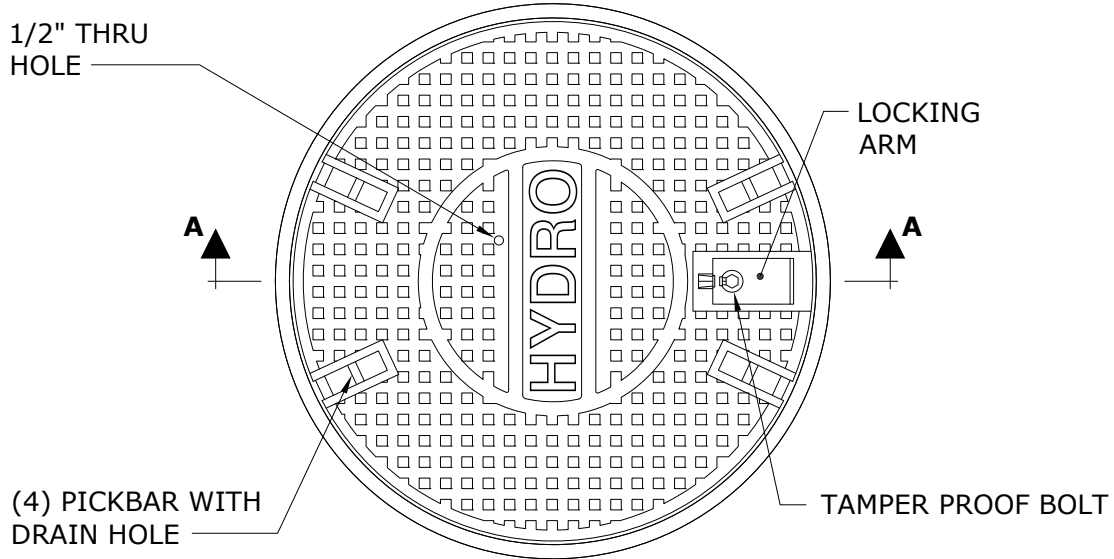
1. MULTIPLE RINGS CAN BE USED TOGETHER IF NEEDED.
2. CANNOT BE USED WITH ENERGY MITIGATION FRAMES.
3. DIMENSIONS SHOWN ARE MILLIMETRES.

APPROVED	REVISIONS	MANITOBA HYDRO DISTRIBUTION STANDARDS	
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 17-10-27	21-04   1   CHANGED MANHOLE TO SUBSURFACE CHAMBER	<b>SUBSURFACE CHAMBER FRAME, COVER AND LIFTING RINGS</b>	
DRAWN C.A.	CHECKED J.R.	DATE 17-10	<b>CD 235-15</b>
		SHT 0003 OF 3	REV 01

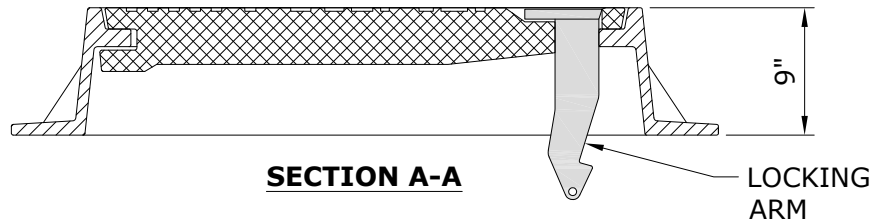
**DESCRIPTION:**

ENERGY MITIGATION SUBSURFACE CHAMBER COVER IS DESIGNED TO DIRECTIONALLY VENT HIGH ENERGY ASSOCIATED WITH AN EXPLOSION OR FAULT IN THE DUCT LINE SYSTEM. COVER VENTS HIGH ENERGY IN THE DIRECTION OF THE LOCKING ARM, RETURNING TO NORMAL SEATED POSITION IN THE FRAME FOLLOWING EVENT. LOCKING ARM MUST ALWAYS BE SECURED WITH PENTA-HEAD TAMPER PROOF BOLT.

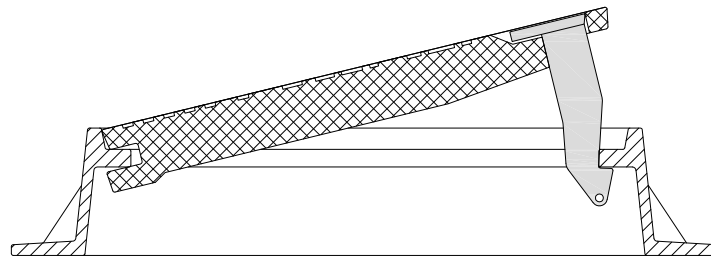
**COVER SHALL BE ORIENTATED IN FRAME SUCH THAT VENTED ENERGY IS DIRECTED AWAY FROM HIGH TRAFFIC PEDESTRIAN AREAS.**



**PLAN VIEW**



**SECTION A-A**



**SECTION A-A \***

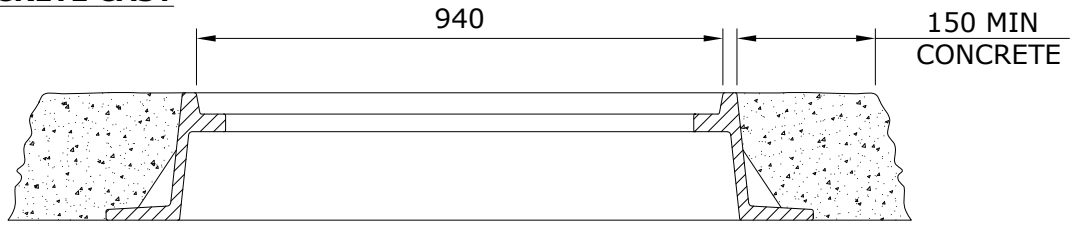
\* IN THE EVENT OF AN EXPLOSION, COVER IS DESIGNED TO LIFT PARTIALLY OPEN AND LATCH ON TO FRAME BY MEANS OF LOCKING ARM MECHANISM.

APPROVED	REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS		
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 16-04-29			<b>ENERGY MITIGATION SUBSURFACE CHAMBER COVER</b>		
	21-04	2			CHANGED MANHOLE TO SUBSURFACE CHAMBER
	17-11	1			ADDED 9" DIMENSION
DRAWN C.A.	CHECKED J.R.	DATE 16-04	<b>CD 235-20</b>		
			SHT 0001 OF 7	REV 02	

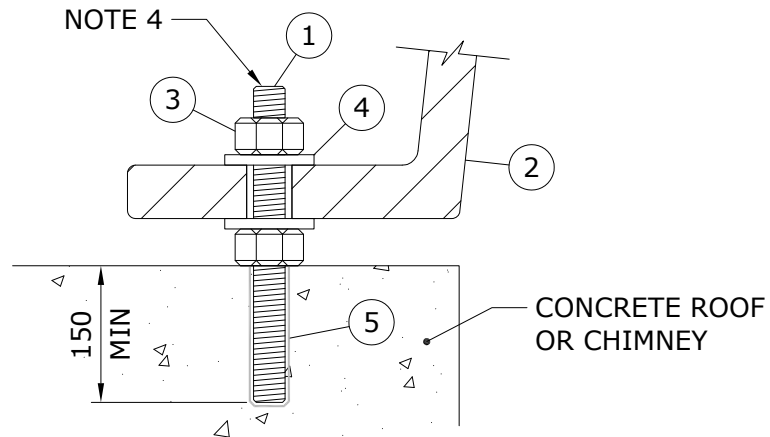
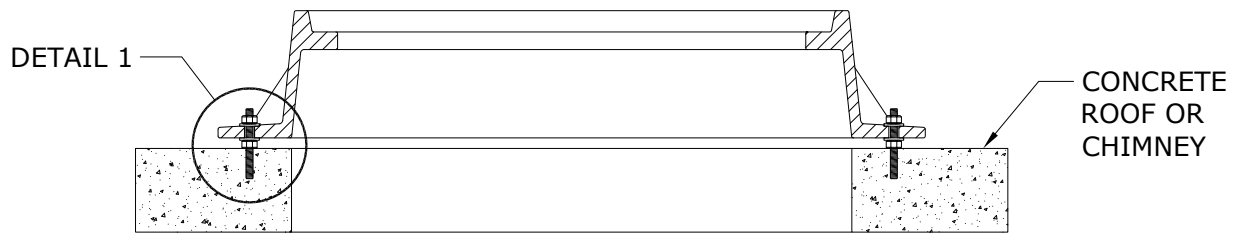
**FRAME INSTALLATION**

LIFTER RINGS SHALL NOT BE USED. ANY ROAD WORK WILL REQUIRE FRAME TO BE LEVELED.

**CONCRETE CAST**



**ASPHALT, BRICK, SODDED AREAS**



**DETAIL 1**

**NOTE:**  
DIMENSIONS SHOWN  
ARE MILLIMETRES.

APPROVED	REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS	
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 16-04-29	21-04	2	CHANGED MANHOLE TO SUBSURFACE CHAMBER	
	17-11	1	ADDED 940mm DIMENSION	
DRAWN C.A.			CHECKED J.R.	
			DATE 16-04	
<b>CD 235-20</b>			SHT	
			0002 OF 7	
			REV	
			02	

**MATERIAL LIST**

<u>ITEM No.</u>	<u>DESCRIPTION</u>
1.	ROD, THREADED, HOT DIPPED GALVANIZED, 3/4"
2.	FRAME
3.	NUT, HOT DIPPED GALVANIZED, 3/4"
4.	WASHER, HOT DIPPED GALVANIZED, 3/4"
5.	EPOXY, CONCRETE

**NOTES:**

- EXTRA ANCHORING NOT REQUIRED WHEN FRAME IS CAST IN CONCRETE. MINIMUM 150mm RADIUS AROUND FRAME.
- FRAME SHALL BE ANCHORED TO CONCRETE ROOF OR CHIMNEY IN A MINIMUM OF 4 (FOUR) LOCATIONS ON FRAME FLANGE.
- THREADED ANCHOR ROD AND HARDWARE SHALL BE HOT DIPPED GALVANIZED.
- CUT ROD ENDS SHALL BE TREATED WITH ANTI-CORROSION COATING.
- ANCHOR ROD SHALL BE INSTALLED INTO SOUND CONCRETE, MINIMUM OF 150mm DEPTH, WITH A BORE DIAMETER OF 7/8".
- ANCHOR ROD SHALL BE SECURED WITH CONCRETE EPOXY.
- ENERGY MITIGATION COVER WEIGHT 235lbs.
- ENERGY MITIGATION FRAME WEIGHT 312lbs.

APPROVED		REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS		
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 16-04-29				<b>ENERGY MITIGATION SUBSURFACE CHAMBER COVER</b>		
		21-04	2			CHANGED MANHOLE TO SUBSURFACE CHAMBER
		17-11	1			ADDED NOTES 7 & 8
DRAWN C.A.	CHECKED J.R.	DATE 16-04	<b>CD 235-20</b>		SHT 0003 OF 7	
					REV 02	

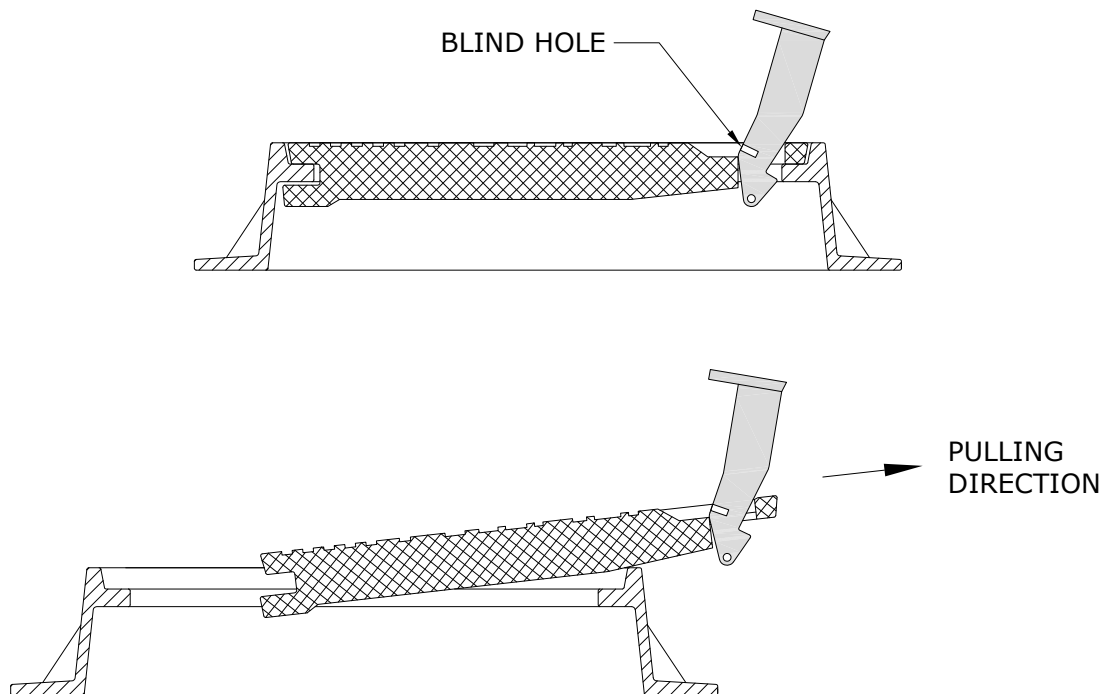
**OPERATING COVER**

**INSTALLATION**

- LOCKING COVER SHALL BE SECURED WITH PENTA-HEAD TAMPER PROOF BOLT.
- PENTA-HEAD TAMPER PROOF BOLT AND THREADS SHALL BE CLEANED, WITH APPROVED ANTI-SEIZE TAPE APPLIED.
- COVER SHALL BE ORIENTATED SUCH THAT VENTED ENERGY IS DIRECTED AWAY FROM HIGH TRAFFIC PEDESTRIAN AREAS.

**REMOVAL**

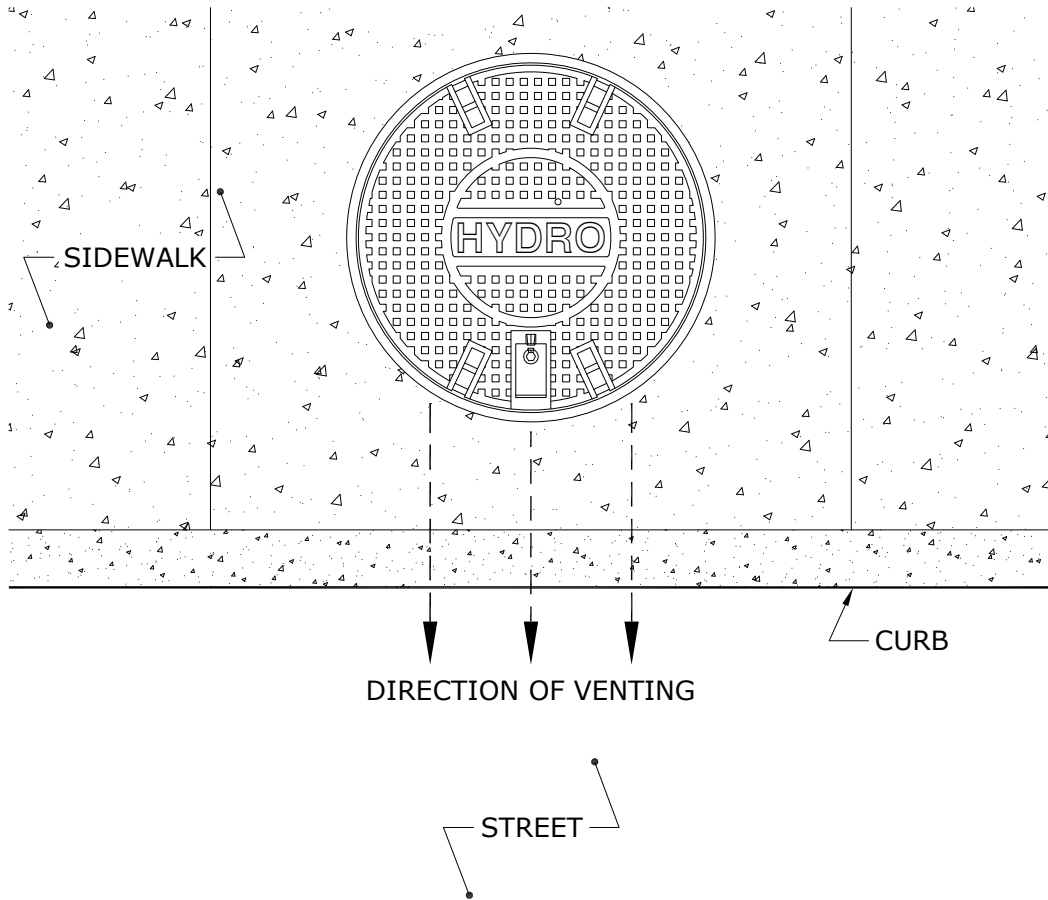
- PENTA-HEAD TAMPER PROOF BOLT MUST BE REMOVED.
- LOCKING ARM MUST BE LIFTED FROM COVER TO ALLOW REMOVAL OF COVER FROM FRAME.
- BLIND HOLE IN ARM CAN BE USED TO SECURE ARM IN LIFTED POSITION.
- APPROVED LIFTER TOOL IS PREFERRED FOR REMOVAL.



APPROVED		REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS					
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 16-04-29		21-04 1 CHANGED MANHOLE TO SUBSURFACE CHAMBER		<b>ENERGY MITIGATION SUBSURFACE CHAMBER COVER</b>					
						DRAWN C.A.		CHECKED J.R.	
				<b>CD 235-20</b>		SHT 0004 OF 7		REV 01	



**TYPICAL SIDEWALK INSTALLATION**

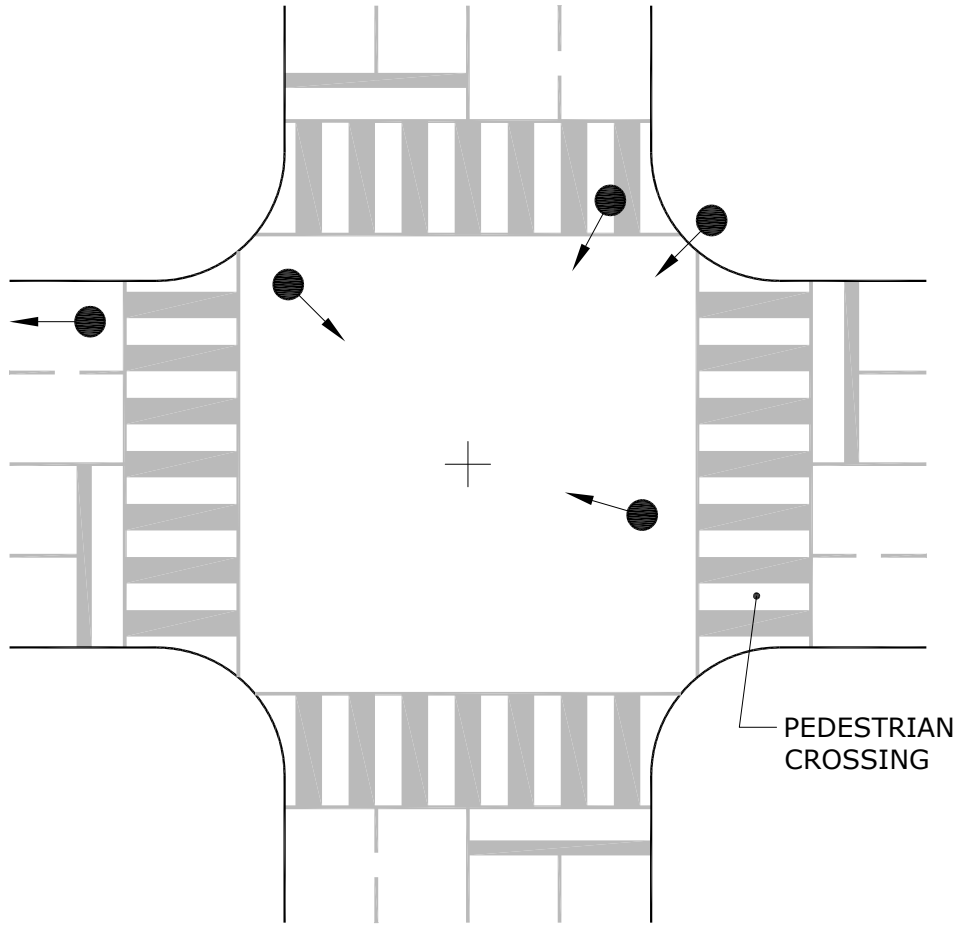


**NOTE:**

SUBSURFACE CHAMBER COVER TO BE POSITIONED IN A MANNER WITH LOCKING ARM FACING STREET FOR VENTING.

APPROVED		REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS	
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 16-04-29		21-04   1   CHANGED MANHOLE TO SUBSURFACE CHAMBER		<b>ENERGY MITIGATION</b> <b>SUBSURFACE CHAMBER COVER</b>	
		DATE 16-04		<b>CD 235-20</b>	

**TYPICAL INTERSECTION INSTALLATION**



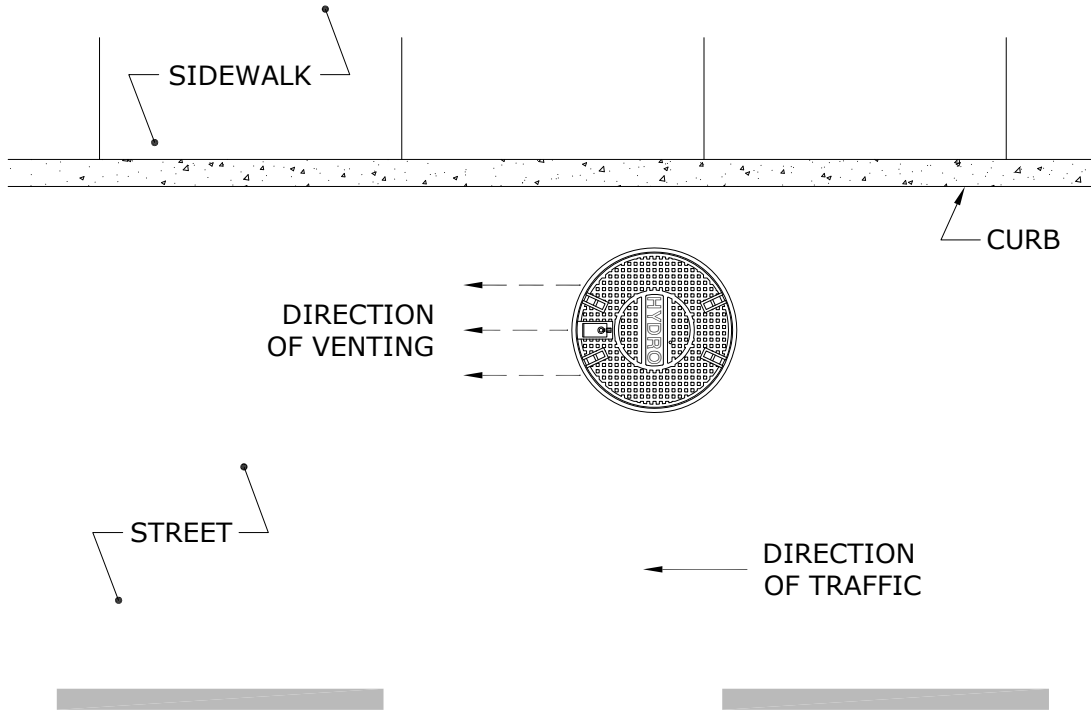
← ● SUBSURFACE CHAMBER AND DIRECTION OF VENTING

**NOTES:**

1. ORIENTATE COVERS TO VENT AWAY FROM HIGH TRAFFIC PEDESTRIAN AREAS WHEN COVER IS WITHIN 10m OF INTERSECTION.
2. FOR COVERS INTERNAL TO ROADWAY INTERSECTION, ORIENTATE COVERS TO VENT TOWARDS THE CENTER.

APPROVED		REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS	
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 16-04-29		21-04 1 CHANGED MANHOLE TO SUBSURFACE CHAMBER		<b>ENERGY MITIGATION SUBSURFACE CHAMBER COVER</b>	
		DATE 16-04		<b>CD 235-20</b>	
				SHT 0006 OF 7	REV 01

**TYPICAL ROADWAY INSTALLATION**



**NOTE:**

VENT IN DIRECTION OF TRAFFIC WHEN COVER IS FURTHER THAN 10m FROM INTERSECTION, CROSSWALK, BUS STOP OR OTHER HIGH TRAFFIC PEDESTRIAN AREA.

APPROVED		REVISIONS		MANITOBA HYDRO DISTRIBUTION STANDARDS	
ORIGINAL DRAWING SEALED BY J.J.D. RINGASH 16-04-29		21-04 1 CHANGED MANHOLE TO SUBSURFACE CHAMBER		<p align="center"><b>ENERGY MITIGATION</b></p> <p align="center"><b>SUBSURFACE CHAMBER COVER</b></p>	
DRAWN C.A.	CHECKED J.R.	DATE 16-04	SHT 0007 OF 7		REV 01