

SUB ASSEMBLY LIST		
PART NUMBER	DESCRIPTION	APPEARANCE *
MHL1000	LIFTER ARM	YELLOW
MHL1100	MANHOLE KEY SLIDE	GREEN
MHL2000	LIFTING JACK	BLUE
MHL5020	ROLLER TUBE	RED
MHL5030	MANHOLE KEY	BLACK/GREY
MHL5040	LANYARD	ORANGE

* NOTE: APPEARANCE COLOUR ONLY USED TO IDENTIFY SUB ASSEMBLIES IN DRAWING

MATERIALS					
PART	MATERIAL	ALLOY/GRADE	SECTION	SIZE	LENGTH
MHL1001, MHL1002, MHL1003, MHL1004	ALUMINIUM	6060 T5	CHANNEL	80x40x3	1860mm
MHL4004	ALUMINIUM	6061 T6	CHANNEL	101.6x50.8x6.37x7.93	76mm
MHL1008	ALUMINIUM	6060 T5	EA	40x3	200mm
MHL1011	ALUMINIUM	6061 T6	EA	50.8x6.35	256mm
MHL5001	ALUMINIUM	6060 T5	CHS	15.88x1.63	204mm
MHL5022	ALUMINIUM	6060 T5	CHS	20x1.6	1000mm
MHL2008	ALUMINIUM	6060 T5	CHS	25x3	85mm
MHL2006	ALUMINIUM	6060 T5	CHS	32x3	620mm
MHL2001, MHL2011	ALUMINIUM	6060 T5	CHS	40x3	650mm
MHL1005, MHL1009	ALUMINIUM	6060 T5	SHS	40x3	200mm
MHL1007, MHL1008, MHL1009	ALUMINIUM	6060 T5	FL	80x6	180mm
MHL1010, MHL1013, MHL1014	ALUMINIUM	5052 H32	PL	4	
MHL1007	ALUMINIUM	5052 H32	PL	6	
MHL2012	STEEL	MILD	CHS	48.3x4	50mm
MHL2002, MHL2013, MHL2014	STEEL	MILD	SOLID FREE MACHINING ROD	Ø50	55mm
MHL2005	STEEL	MILD	SOLID FREE MACHINING ROD	Ø15.88	60mm
MHL2009	STEEL	GRADE 8.8	THREADED ROD	M16x2	685mm
MHL5002	NYLON		SOLID ROD	Ø19	87mm
MHL5003	NYLON		SOLID ROD	Ø25	25mm
MHL5021	RUBBER		STRAIGHT RADIATOR HOSE	Ø70 (Ø2 3/4")	1000mm
MHL5024	RUBBER		SHEET	25THK.	
MHL5023	NITRILE FOAM		NBR TUBE	19IDx19WT	950mm
MHL5026	POLYETHYLENE		ROPE	Ø10	2600mm
MHL5042	NYLON		SEATBELT WEBBING	25mm	1800mm

HARDWARE				
ITEM	MATERIAL	TYPE	SIZE	QTY
BOLT	TITANIUM	SOCKET HEAD	M8x1.25 - 16LNG	2
BOLT	TITANIUM	SOCKET HEAD	M8x1.25 - 25LNG	6
BOLT	TITANIUM	SOCKET HEAD	M8x1.25 - 20LNG	4
BOLT	TITANIUM	SOCKET HEAD	M8x1.25 - 80LNG	5
BOLT	MILD STEEL	SOCKET HEAD SHOULDER (Ø12 x 100LNG SHOULDER)	M10x1.5	1
SCREW	MILD STEEL	SET SCREW	M5x6	12
SCREW	STAINLESS STEEL	SELF TAPPING SCREW	M4x15	16
NUT	TITANIUM	HEX NYLOCK	M8x1.25	15
NUT	MILD STEEL	HEX NYLOCK	M10	1
NUT	MILD STEEL	LONG/COUPLER	M12x1.75	1
NUT	MILD STEEL	LONG/COUPLER	M16x2	1
WASHER	STAINLESS STEEL	SPRING	M8	2
WASHER	STAINLESS STEEL	FLAT	M8, OD22mm	2
WASHER	STAINLESS STEEL	FLAT	M8	18
WASHER	STAINLESS STEEL	FLAT	M10	1
PIN	STAINLESS STEEL	BALL LOCK PIN	Ø6 L=60	1
CARABINER	STAINLESS STEEL	CAPTIVE EYE CARABINER	70mm (20mm GATE)	2

ASSEMBLY DETAILS
MANHOLE LIFTER

ROLLER TUBE

LANYARD

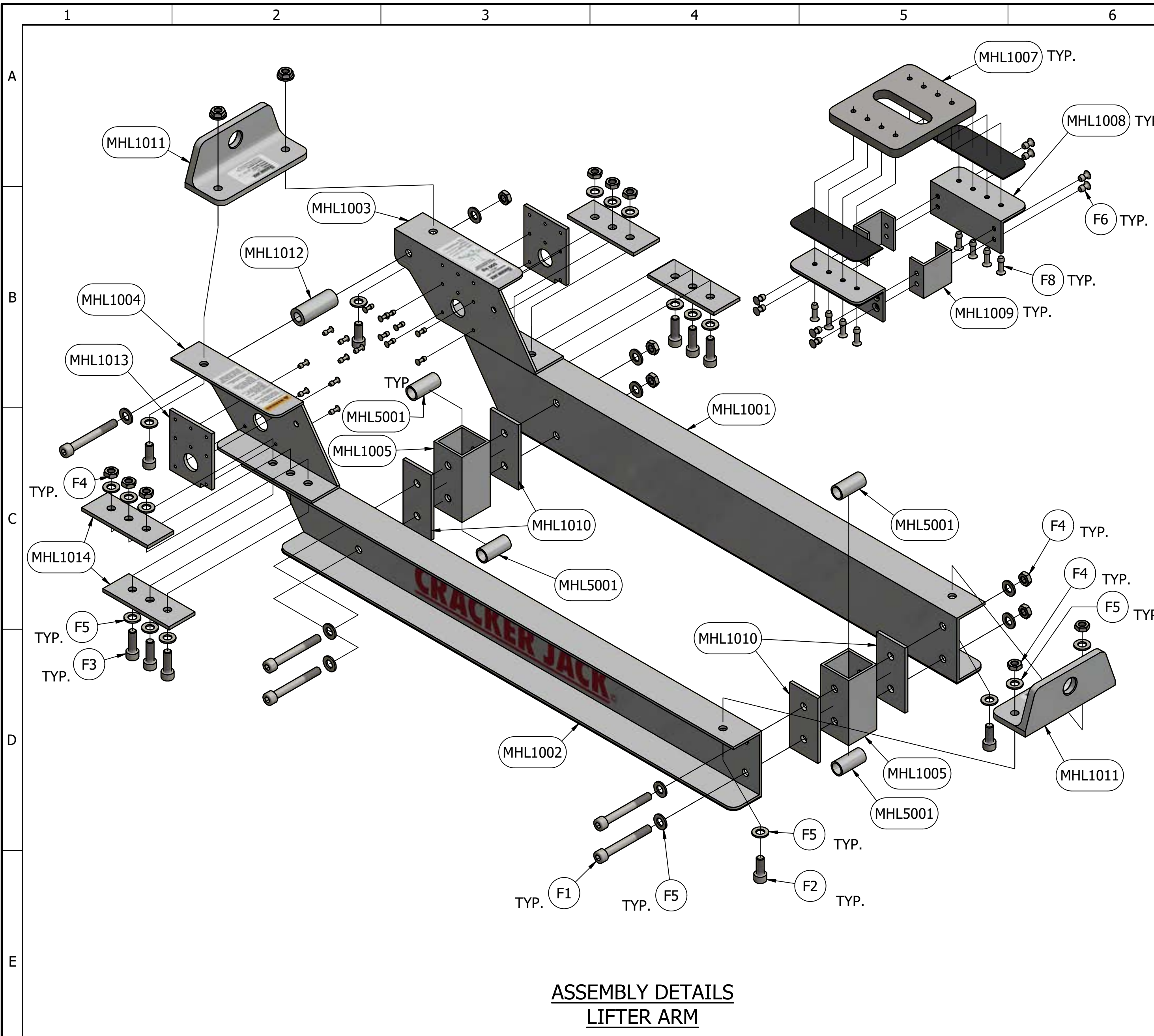
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C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
D	ISSUED FOR CONSTRUCTION - ADDED ROLLER TUBE AND LANYARD	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick

Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
ASSEMBLY DETAILS
EXPLODED DIAGRAM

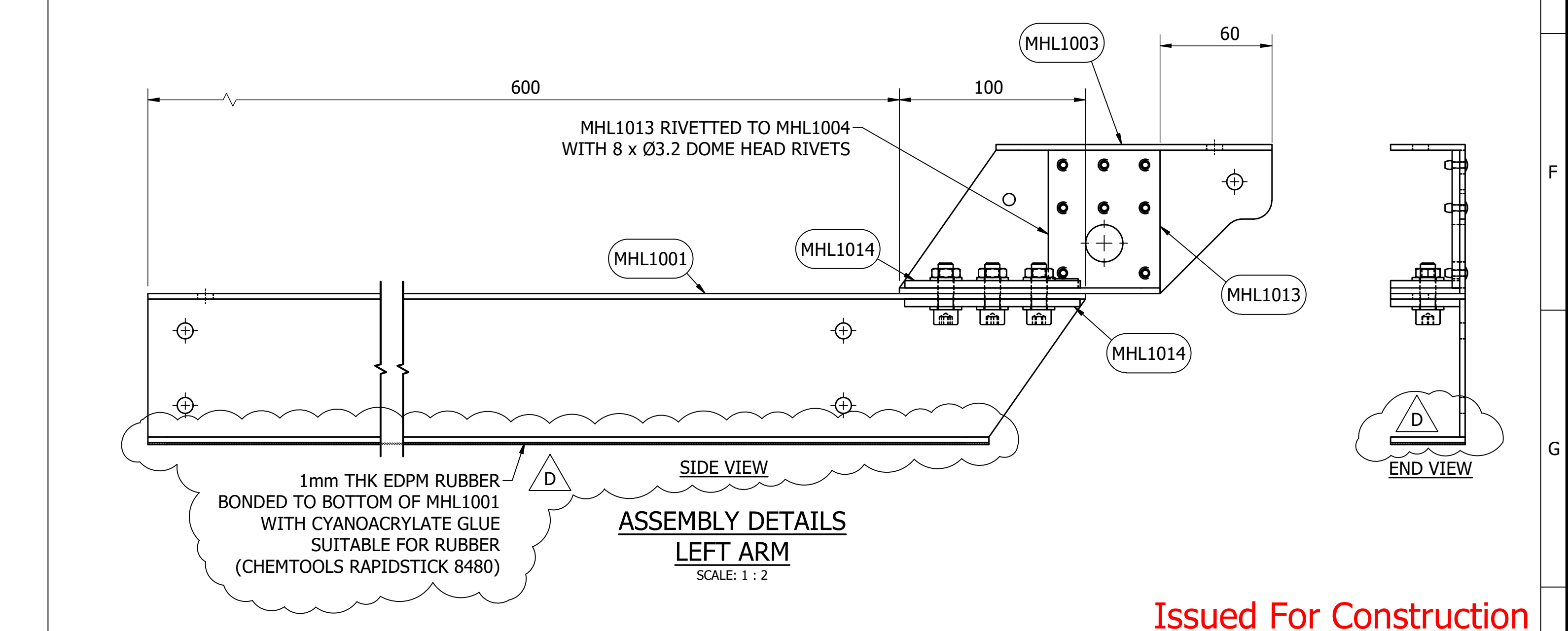
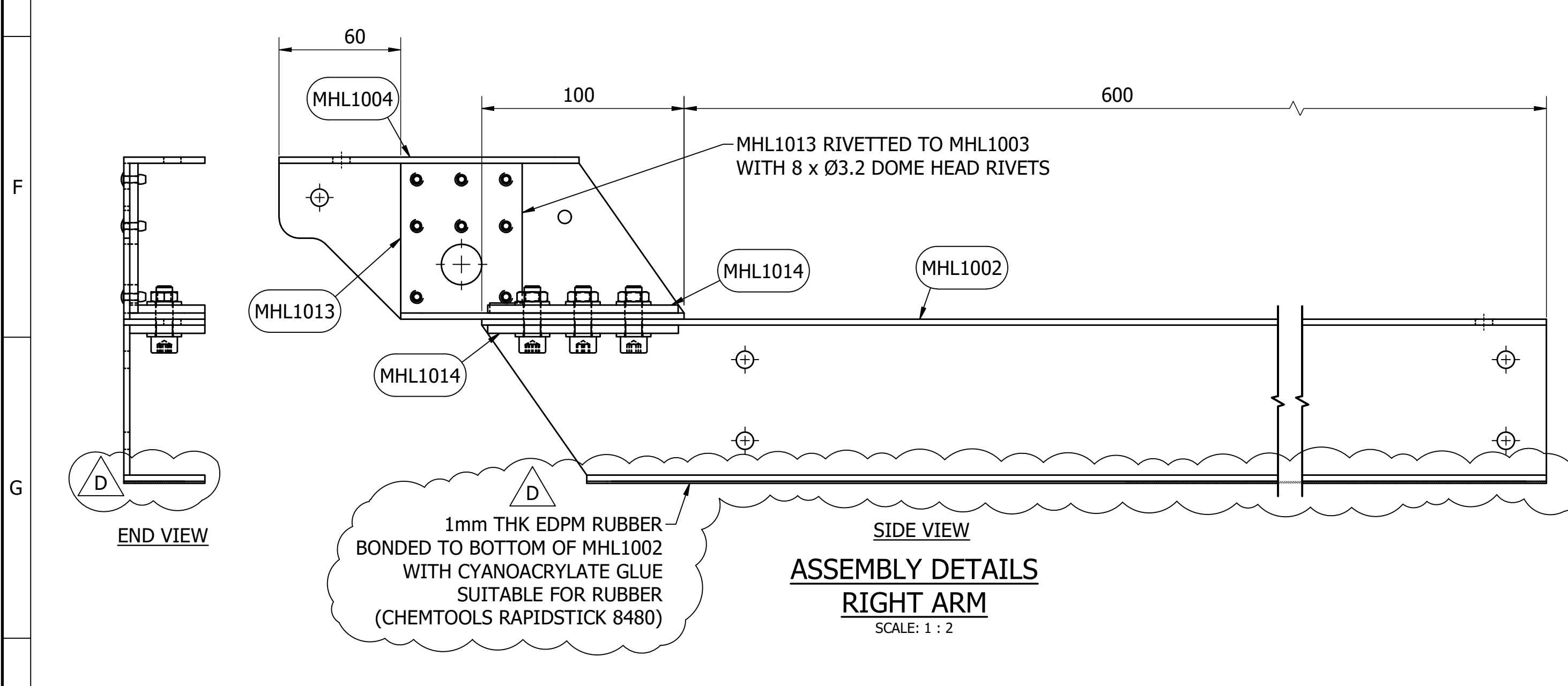
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AI	MHL0001	Rev			D



**ASSEMBLY DETAILS
LIFTER ARM**

PARTS LIST					
PART NUMBER	DESCRIPTION	MATERIAL	MEMBER SIZE	QTY	MASS
MHL1001	LOWER ARM (LEFT)	Aluminum 6060 T5	80x40x3 CHANNEL	1	870 g
MHL1002	LOWER ARM (RIGHT)	Aluminum 6060 T5	80x40x3 CHANNEL	1	870 g
MHL1003	UPPER ARM (LEFT)	Aluminum 6060 T5	80x40x3 CHANNEL	1	187 g
MHL1004	UPPER ARM (RIGHT)	Aluminum 6060 T5	80x40x3 CHANNEL	1	187 g
MHL1005	CENTRE SPACER	Aluminum 6060 T5	40x3 SHS	2	95 g
MHL1007	MANHOLE KEY SLIDE - TOP PLATE	Steel Mild AISI1020	100x10 FL	1	810 g
MHL1008	MANHOLE KEY SLIDE - GUIDE	Aluminum 6060 T5	40x3 EA	2	60 g
MHL1009	MANHOLE KEY SLIDE - GUSSET	Aluminum 6060 T5	40x3 SHS	2	25 g
MHL1010	CENTRE SPACER SHIM	Aluminum 6060 T5	4 PL	4	35 g
MHL1011	HOOK EYE	Aluminum 6061 T6	50.8x6.35 EA	2	215 g
MHL1012	REAR CENTRE SPACER	Aluminum 6060 T5	Ø20 ROUND BAR	1	30 g
MHL1013	PIVOT POINT REINFORCEMENT	Aluminum 5052 H32	4 PL	2	25 g
MHL1014	STIFFENER	Aluminum 5052 H32	4 PL	4	40 g
MHL5001	CRUSH TUBE	Aluminum 6060 T5	15.88x1.63 CHS	4	10 g
F1	M8x1.25 - 80LNG SOCKET HEAD BOLT	TITANIUM GRD5 Ti-6Al-4V		5	33 g
F2	M8x1.25 - 20LNG SOCKET HEAD BOLT	TITANIUM GRD5 Ti-6Al-4V		4	15 g
F3	M8x1.25 - 25LNG SOCKET HEAD BOLT	TITANIUM GRD5 Ti-6Al-4V		6	17 g
F4	M8x1.25 NYLOCK HEXNUT	TITANIUM GRD5 Ti-6Al-4V		15	4 g
F5	M8 FLAT WASHER	STAINLESS STEEL		30	2 g
F6	4.8 COUNTERSUNK HEAD RIVET	ALUMINIUM	GRIP 4.5 - 9.0	8	1 g
F7	3.2 DOME HEAD RIVET	ALUMINIUM	GRIP 4.5 - 9.0	16	1 g
F8	4.8 COUNTERSUNK HEAD RIVET	STEEL	GRIP 12.7 - 15.9	8	1 g

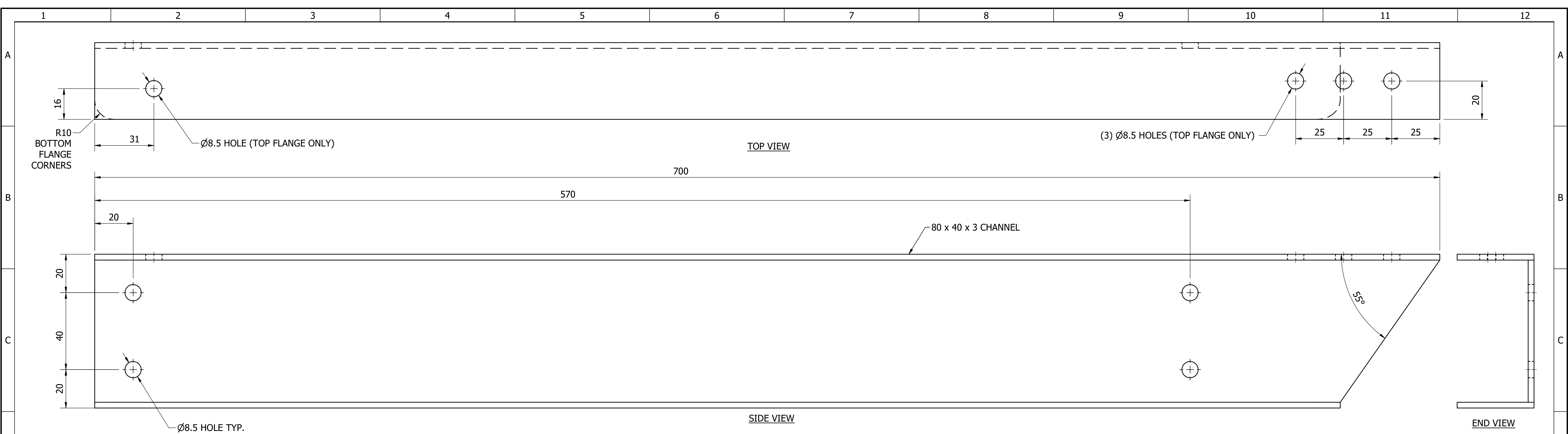
**ASSEMBLY DETAILS
MANHOLE KEY SLIDE**
SCALE: 1 : 2



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C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
D	ISSUED FOR CONSTRUCTION - ADDED EDPM RUBBER STRIP	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick

	Drawn: M. Matusiak	ICON WATER ENGINEERING SERVICES GROUP MANHOLE LIFTER FABRICATION DETAILS LIFTER ARM	Scale: AS SHOWN	Date: 21/03/2019	Sheet No.:
	Designed: E. Nielsen		Project No.: ME18003	Tender No.:	
	Engineering Checked: E. Nielsen		ACT Cadastral information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016		
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Design Authority: K. Danenbergsons	28/01/2020				




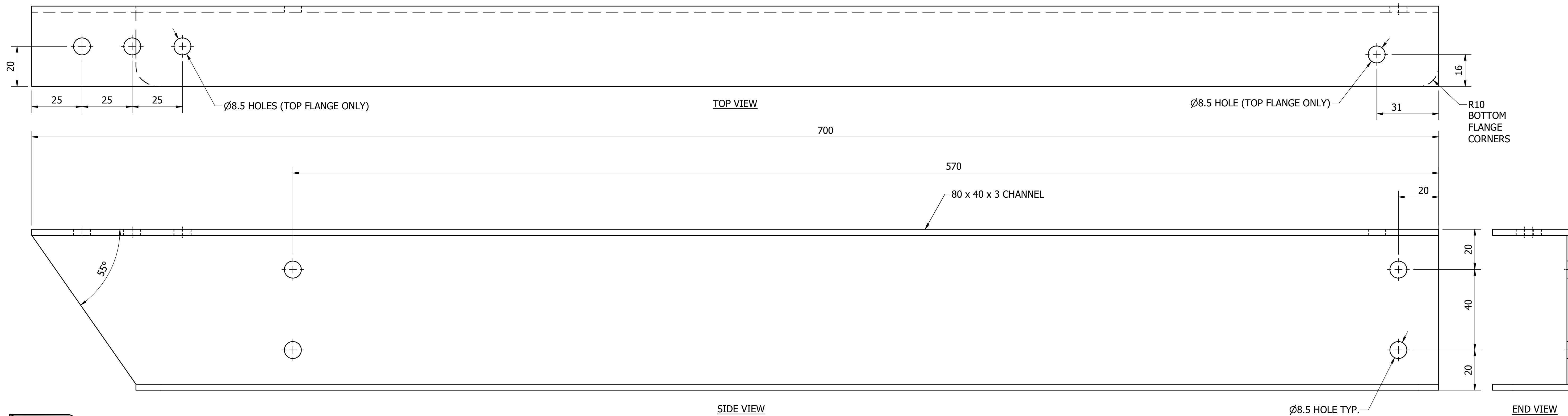
PART - MHL1001
LOWER ARM (LEFT)

SCALE: 1 : 1
 MATERIAL: ALUMINIUM 6060 T5
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 870 g



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A	ISSUED FOR CONSTRUCTION	29/03/2019					Drawn: M. Matusiak Designed: E. Nielsen Engineering Checked: E. Nielsen Verified: Design Authority: K. Danenbergsons	ICON WATER ENGINEERING SERVICES GROUP MANHOLE LIFTER FABRICATION DETAILS LOWER ARM (LEFT)	Scale: AS SHOWN Project No.: ME18003 Date: 21/03/2019 Tender No.:	Sheet No.: ACT Cadastral information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016
B	UPDATED TO REFLECT PROTOTYPE TESTING	11/06/2019								
C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	11/06/2019	E. Nielsen		K. Danenbergsons					
H	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick					
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PART - MHL1002
LOWER ARM (RIGHT)

SCALE: 1 : 1

MATERIAL: ALUMINIUM 6060 T5
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 869 g



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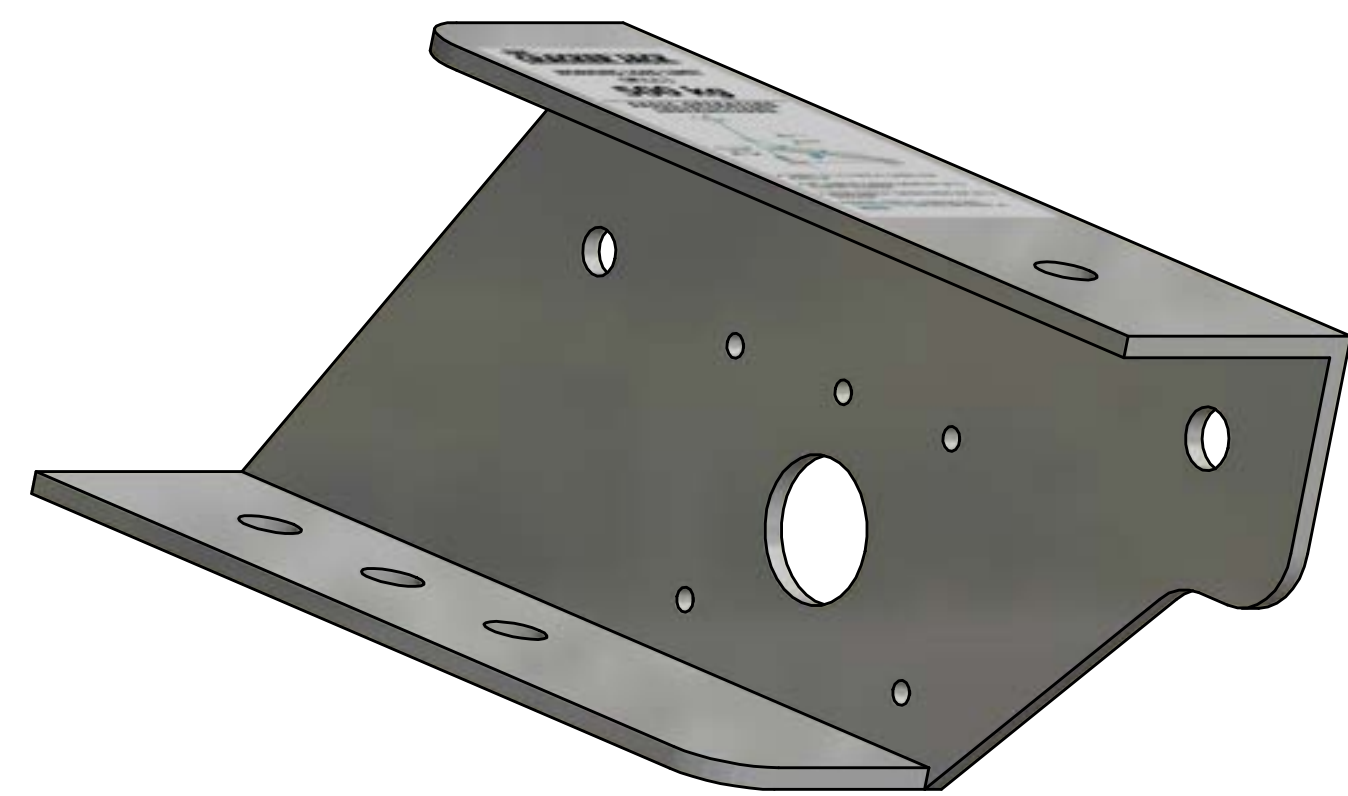
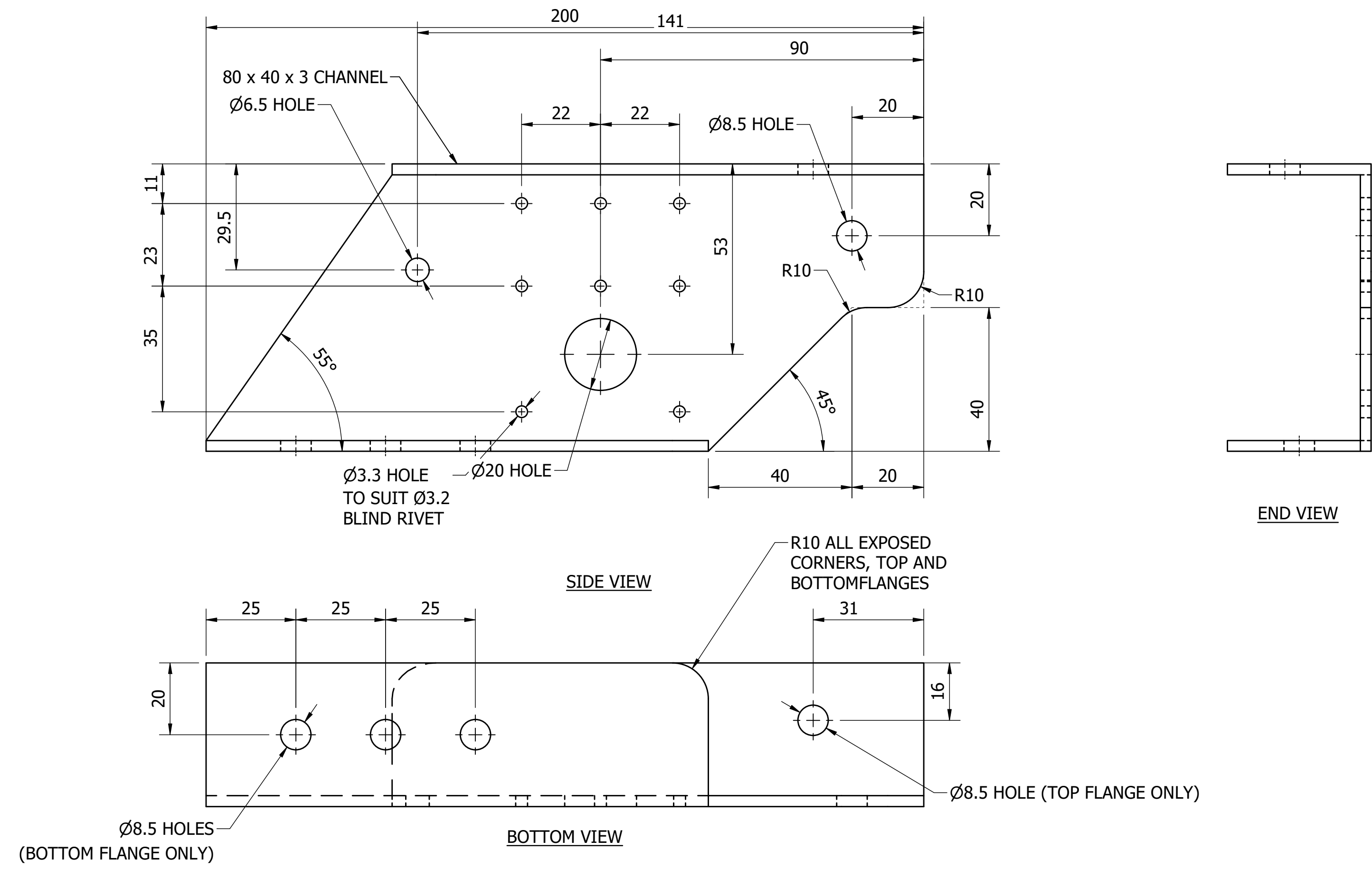
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Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 LOWER ARM (RIGHT)

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**PART - MHL1003
UPPER ARM (LEFT)**

SCALE: 1 : 1
 MATERIAL: ALUMINIUM 6060 T5
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 185 g

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C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
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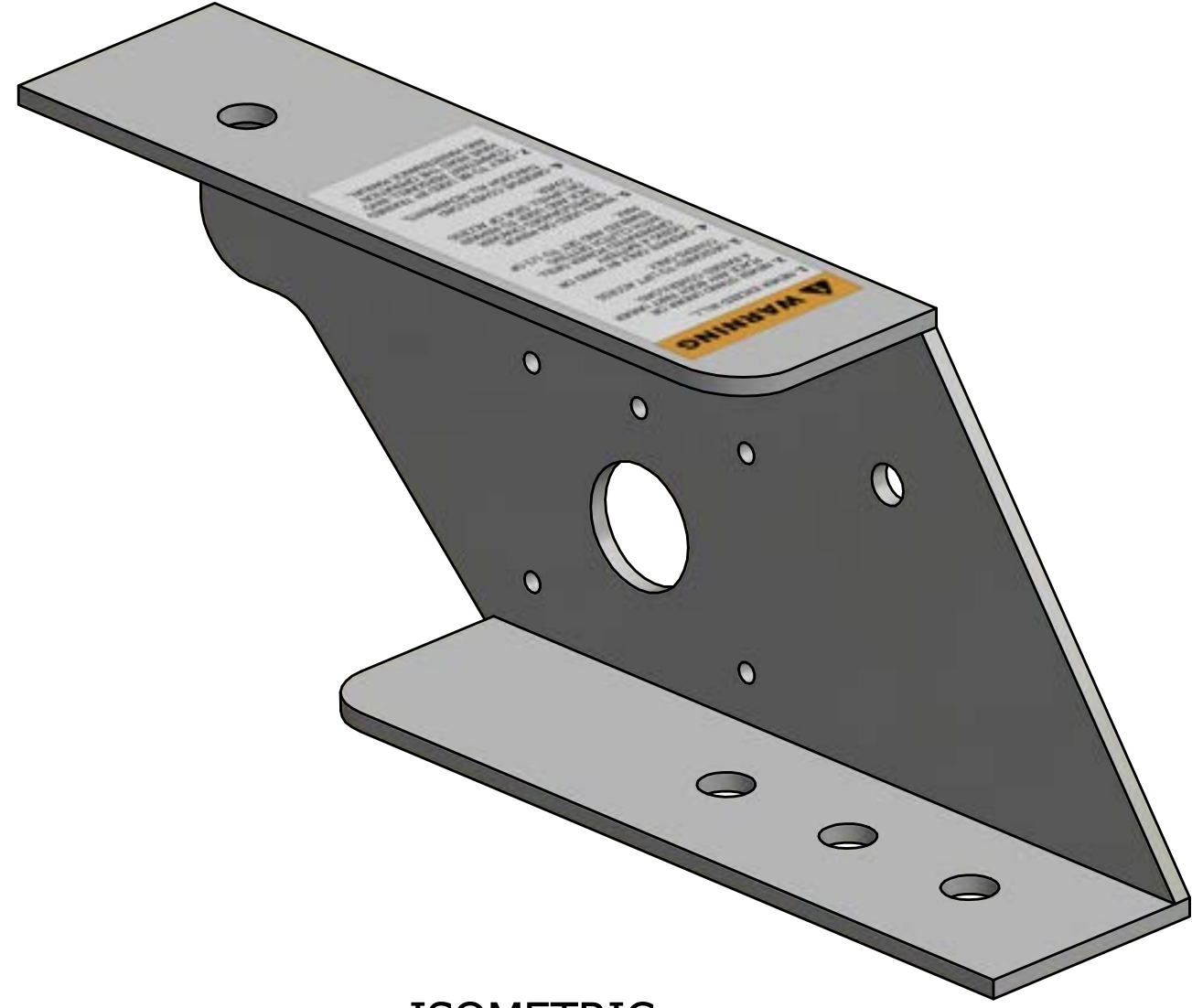
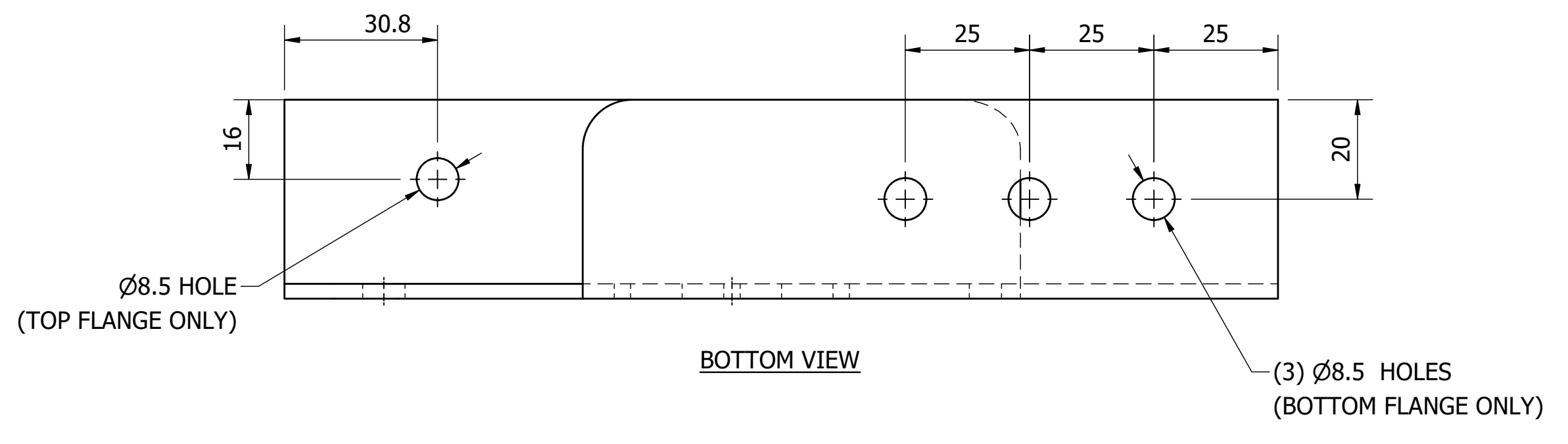
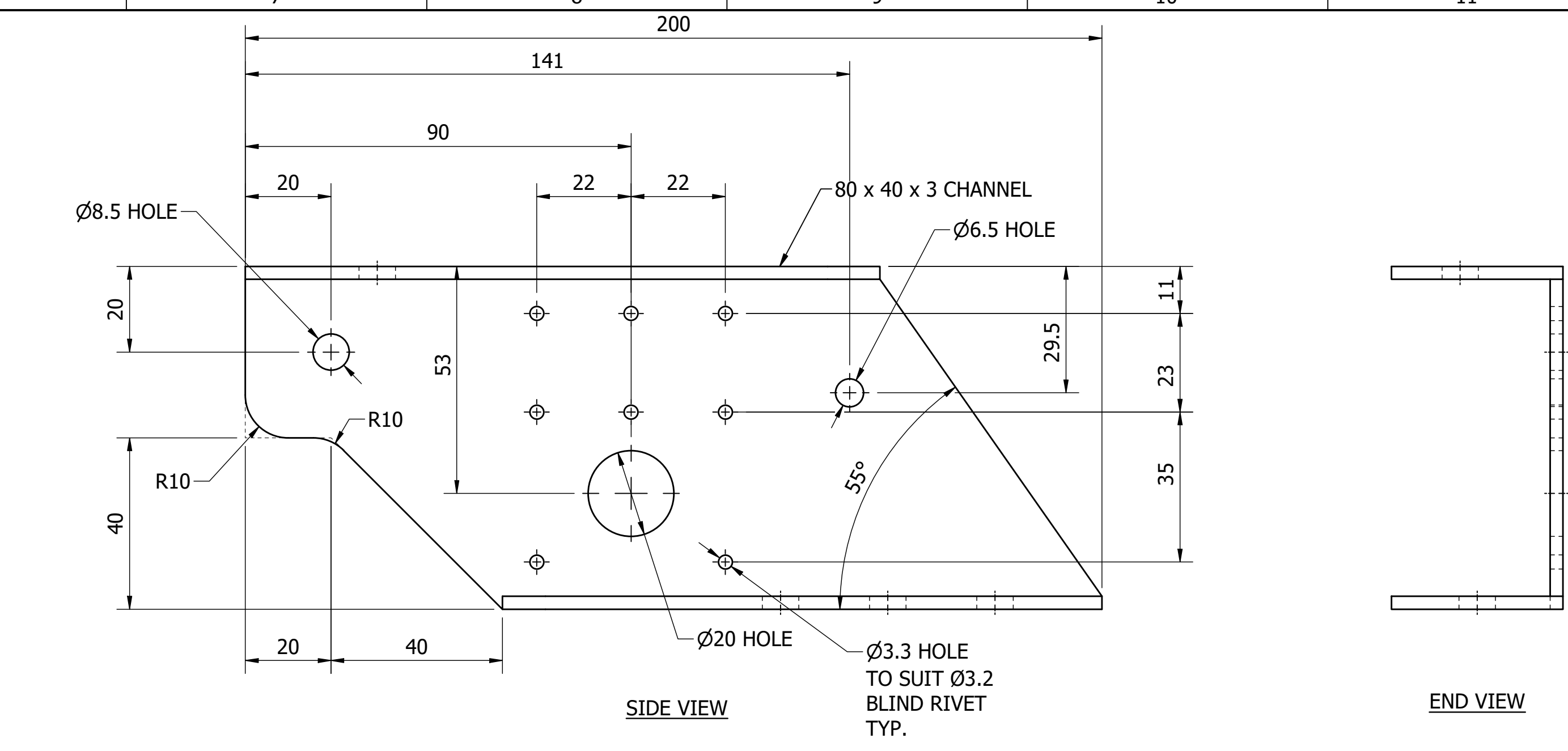
Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 UPPER ARM (LEFT)

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41	MHL1003	Rev	D		

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**PART - MHL1004
UPPER ARM (RIGHT)**

SCALE: 1 : 1

MATERIAL: ALUMINIUM 6060 T5
COATING: N/A
FINISH COLOUR: N/A
MASS: 185 g

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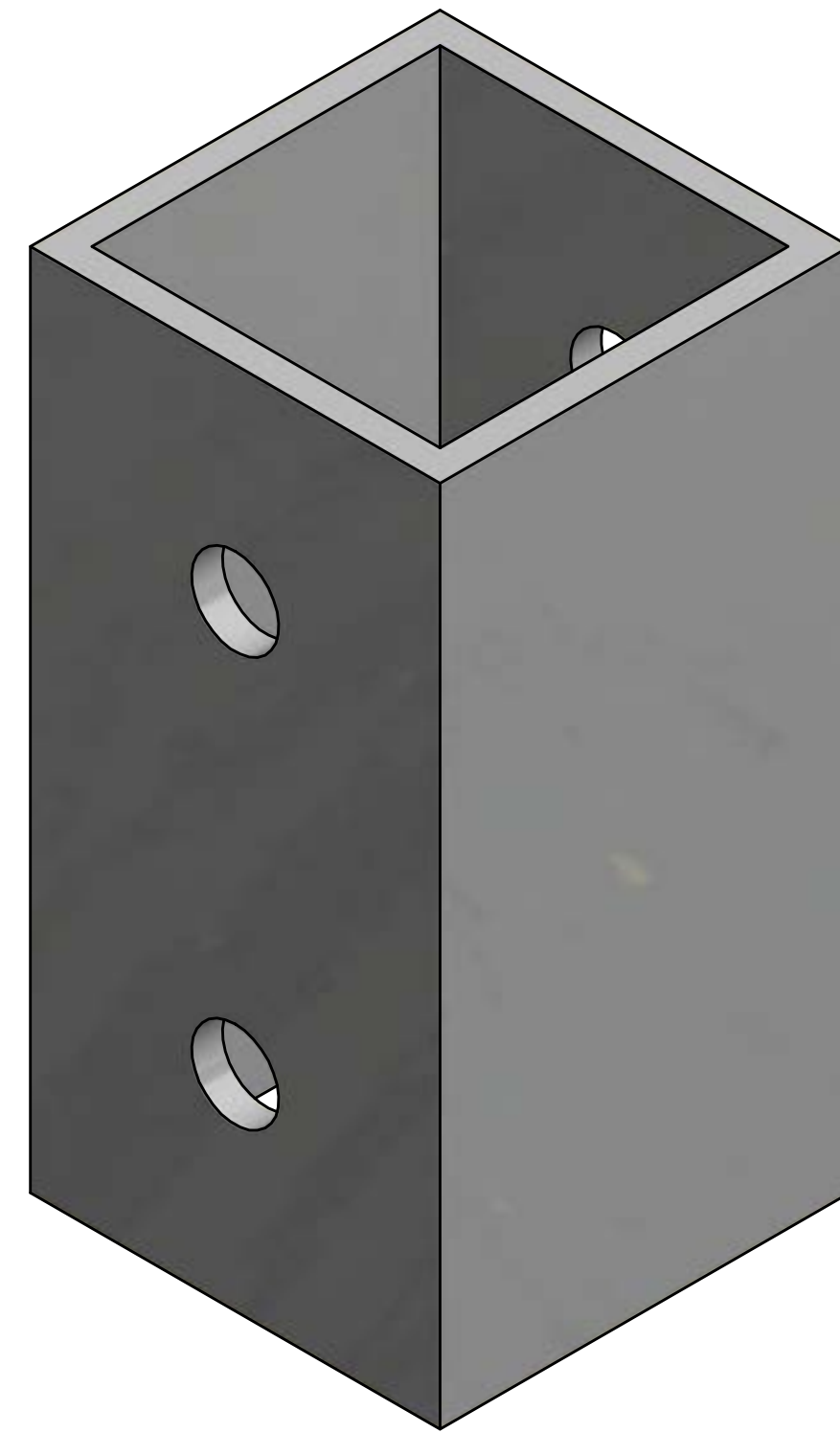


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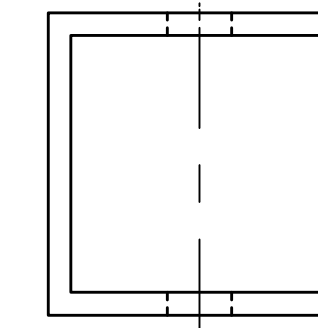
ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
UPPER ARM (RIGHT)

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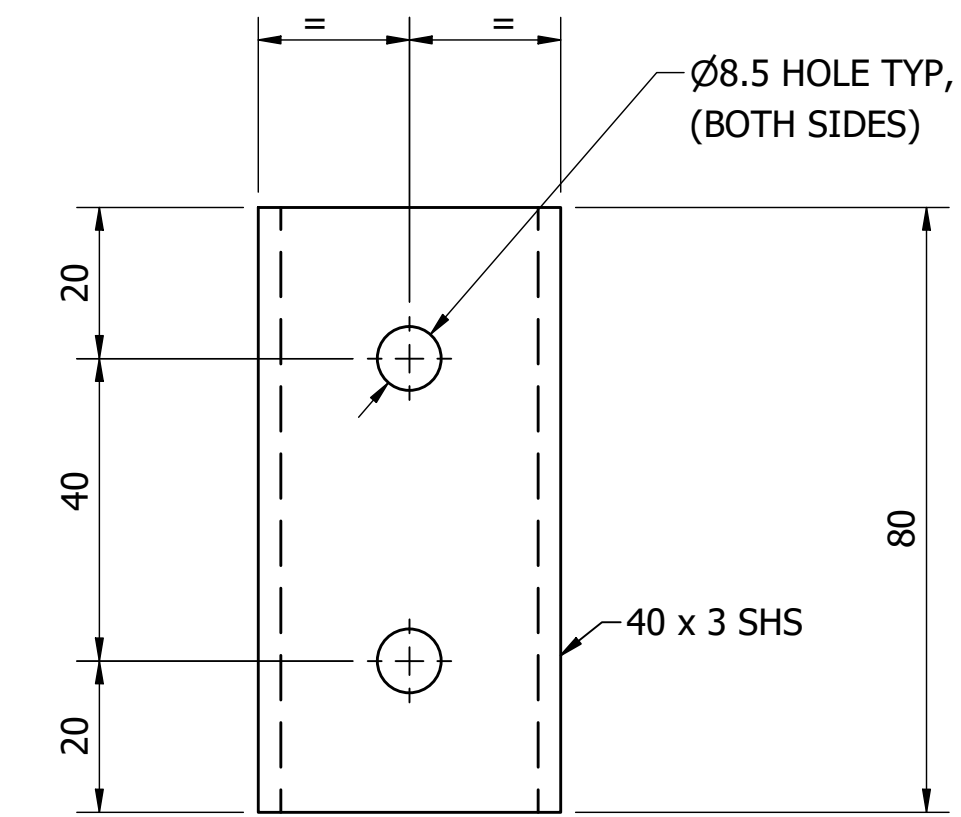
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ISOMETRIC



TOP VIEW



SIDE VIEW

PART - MHL1005
CENTRE SPACER

SCALE: 1 : 1

MATERIAL: ALUMINIUM 6060-T5
COATING: N/A
FINISH COLOUR: N/A
MASS: 100 g

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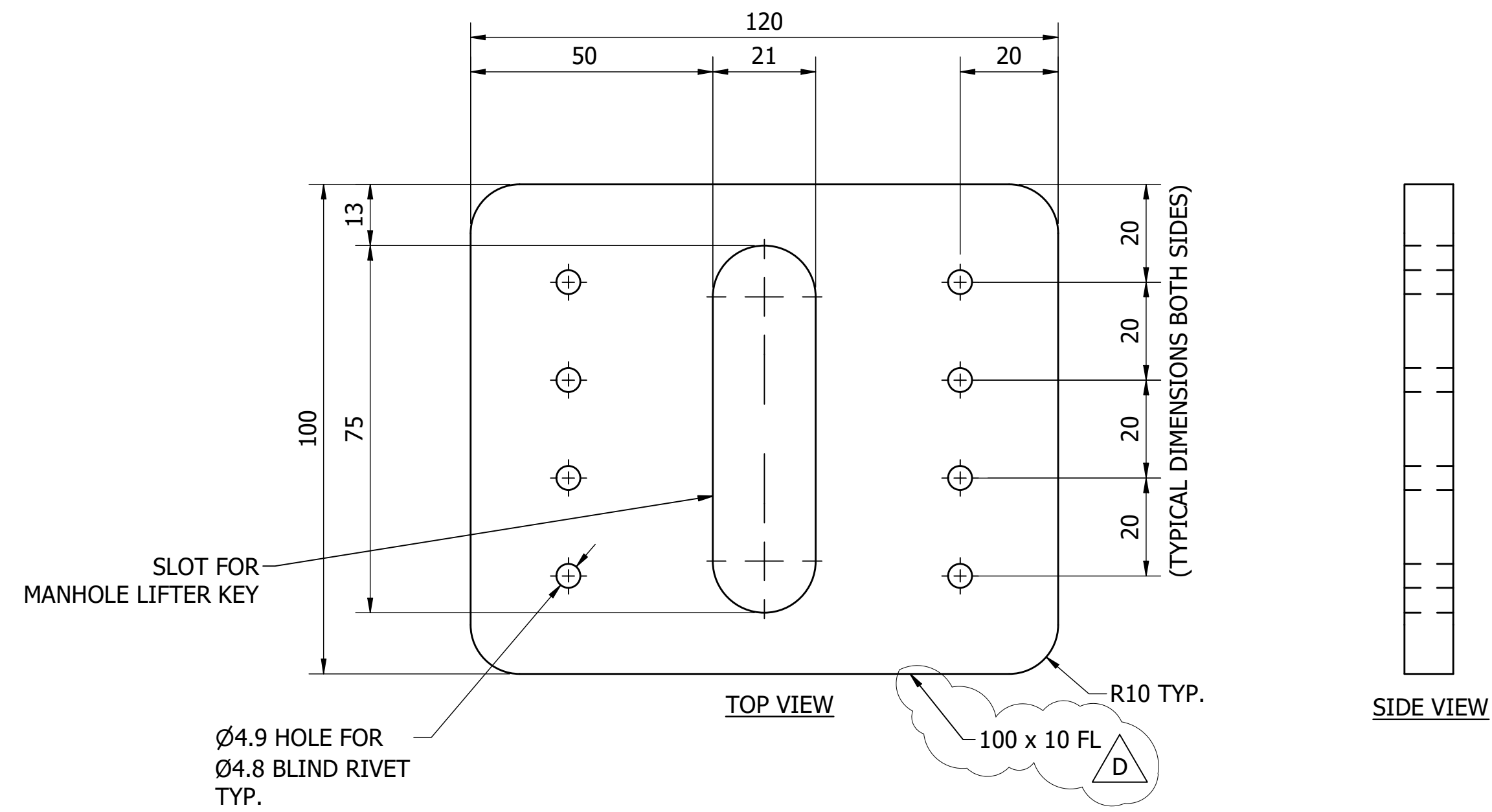
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ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
CENTRE SPACER

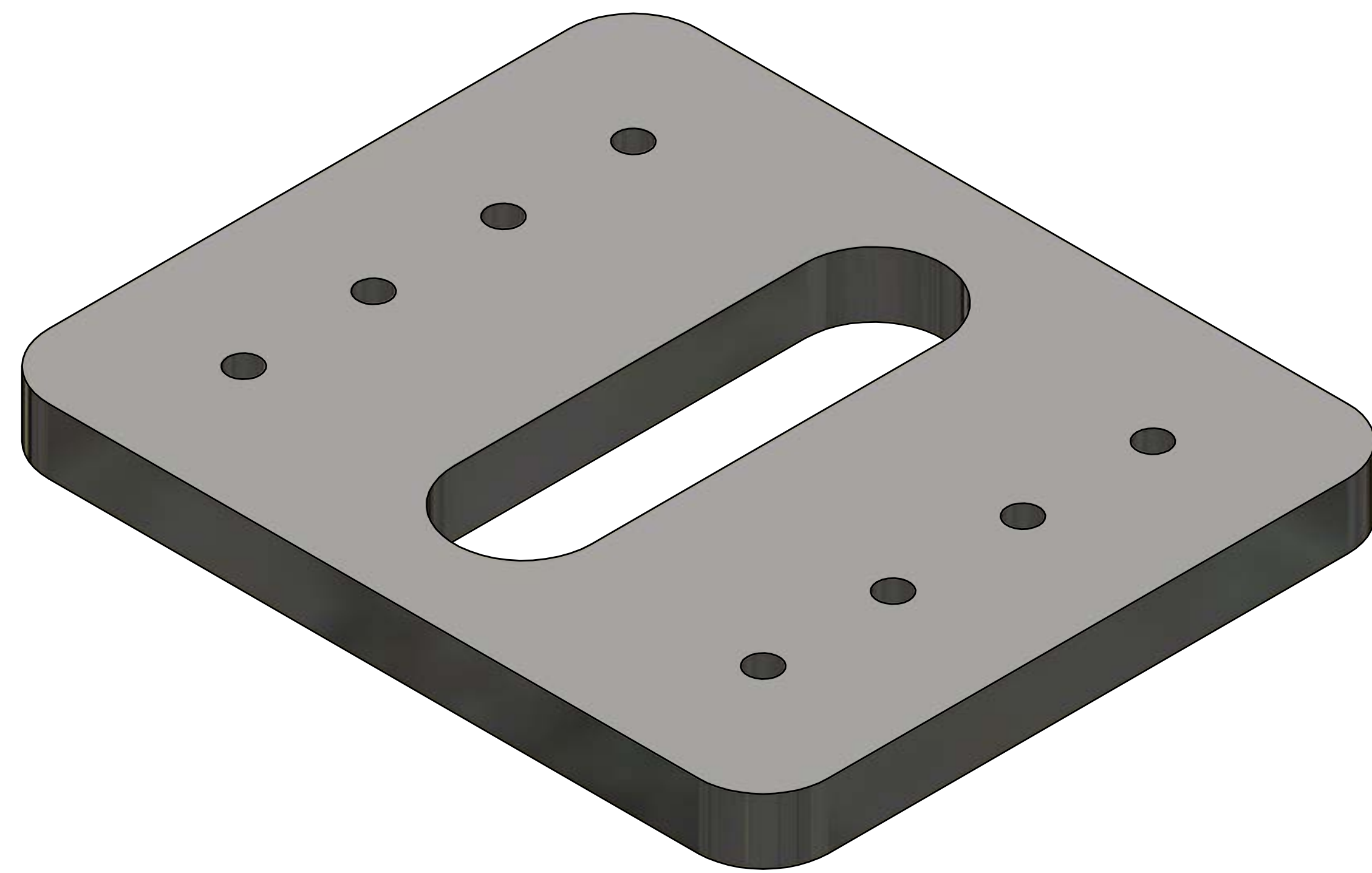
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41	MHL1005	Rev		D	



PART - MHL1007
MANHOLE KEY SLIDE - TOP PLATE

SCALE: 1 : 1

MATERIAL: STEEL, MILD AISI1020
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 810 g



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 MANHOLE LIFTER
 FABRICATION DETAILS
 MANHOLE KEY SLIDE - PLATE

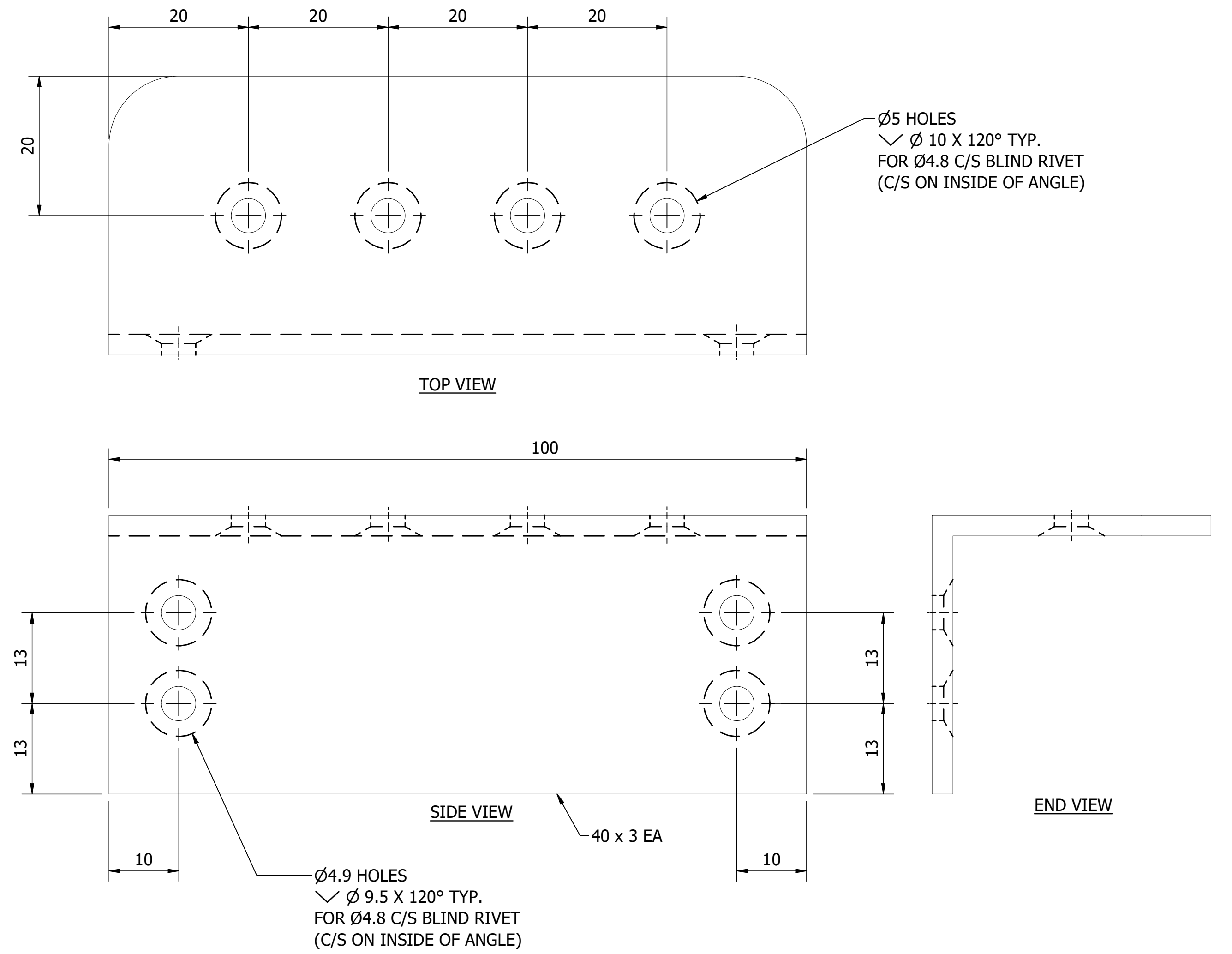
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ISOMETRIC



PART - MHL1008
MANHOLE KEY SLIDE - GUIDE
 SCALE: 2 : 1

MATERIAL: ALUMINIUM 6060 T5
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 60 g

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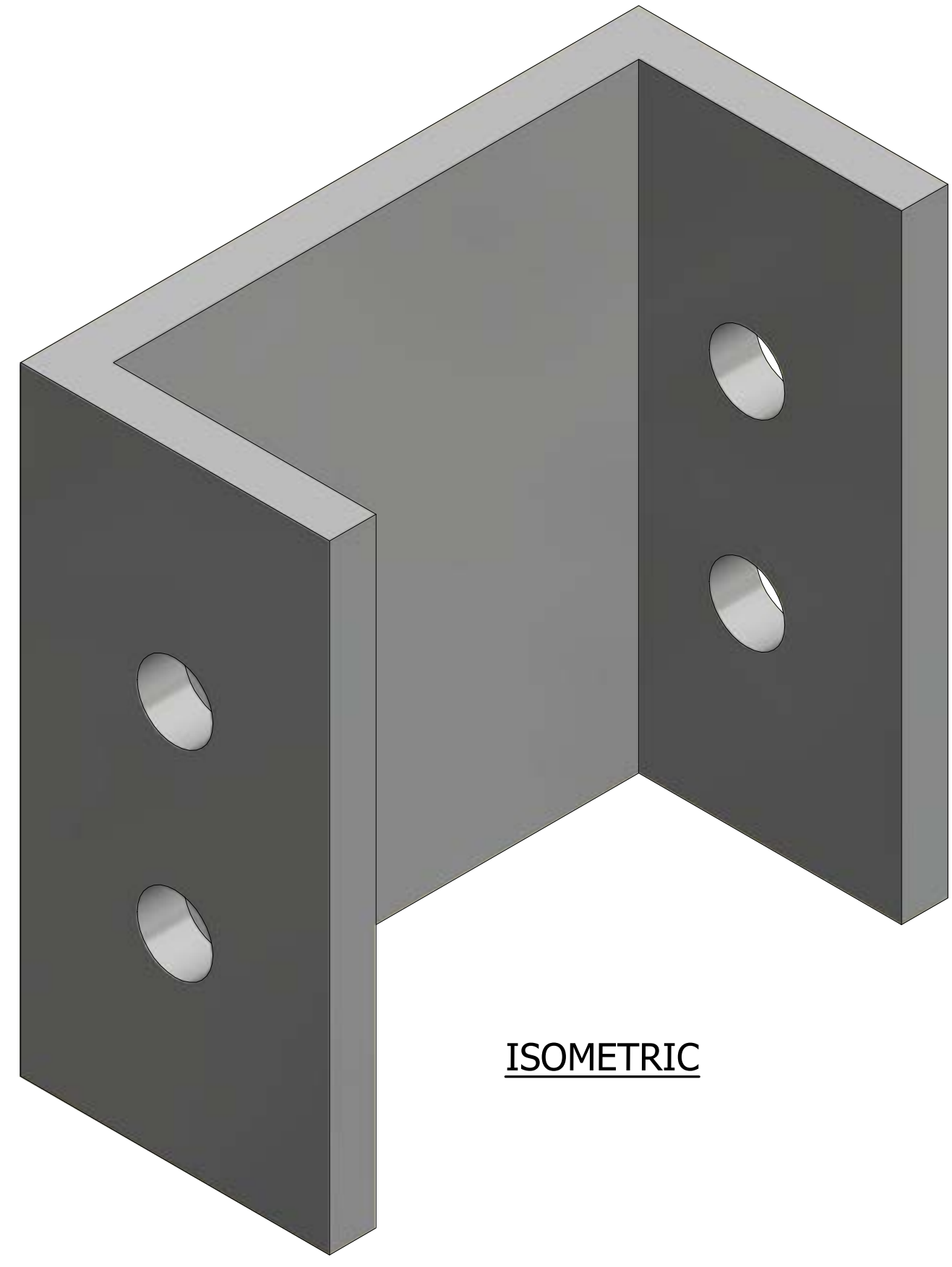
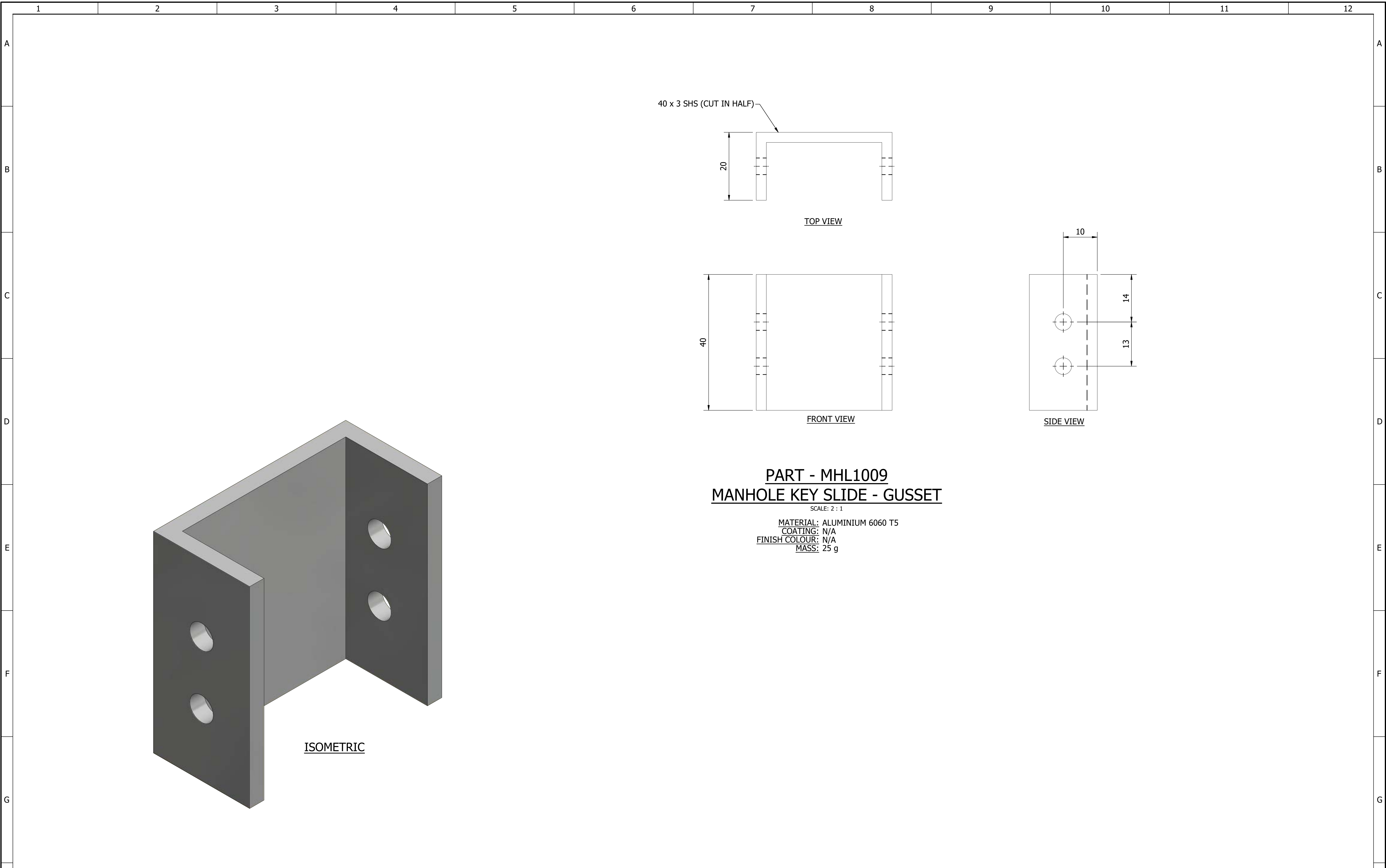


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Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 MANHOLE KEY SLIDE - GUIDE

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41	MHL1008	Rev	C		

1 2 3 4 5 6 7 8 9 10 11 12



ISOMETRIC

PART - MHL1009
MANHOLE KEY SLIDE - GUSSET

SCALE: 2 : 1

MATERIAL: ALUMINIUM 6060 T5
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 25 g

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No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH

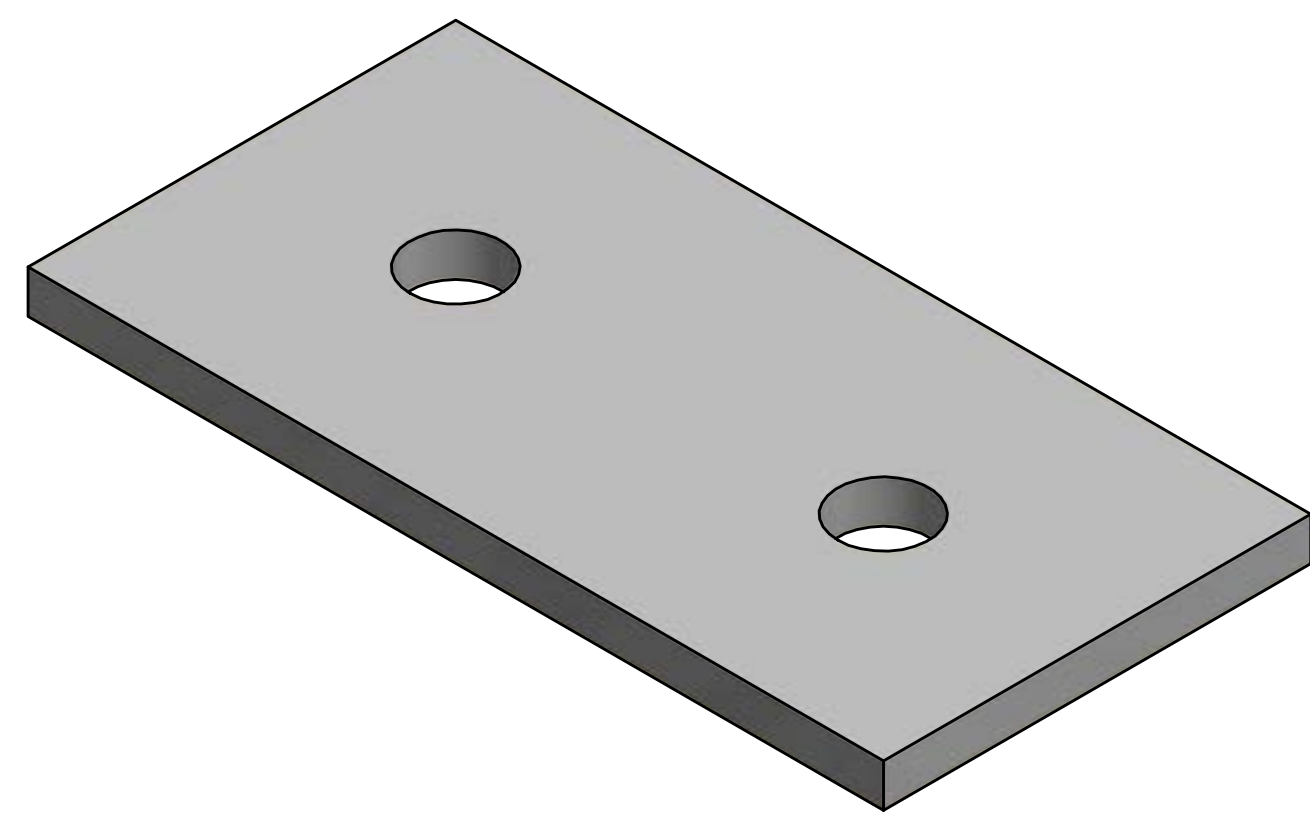
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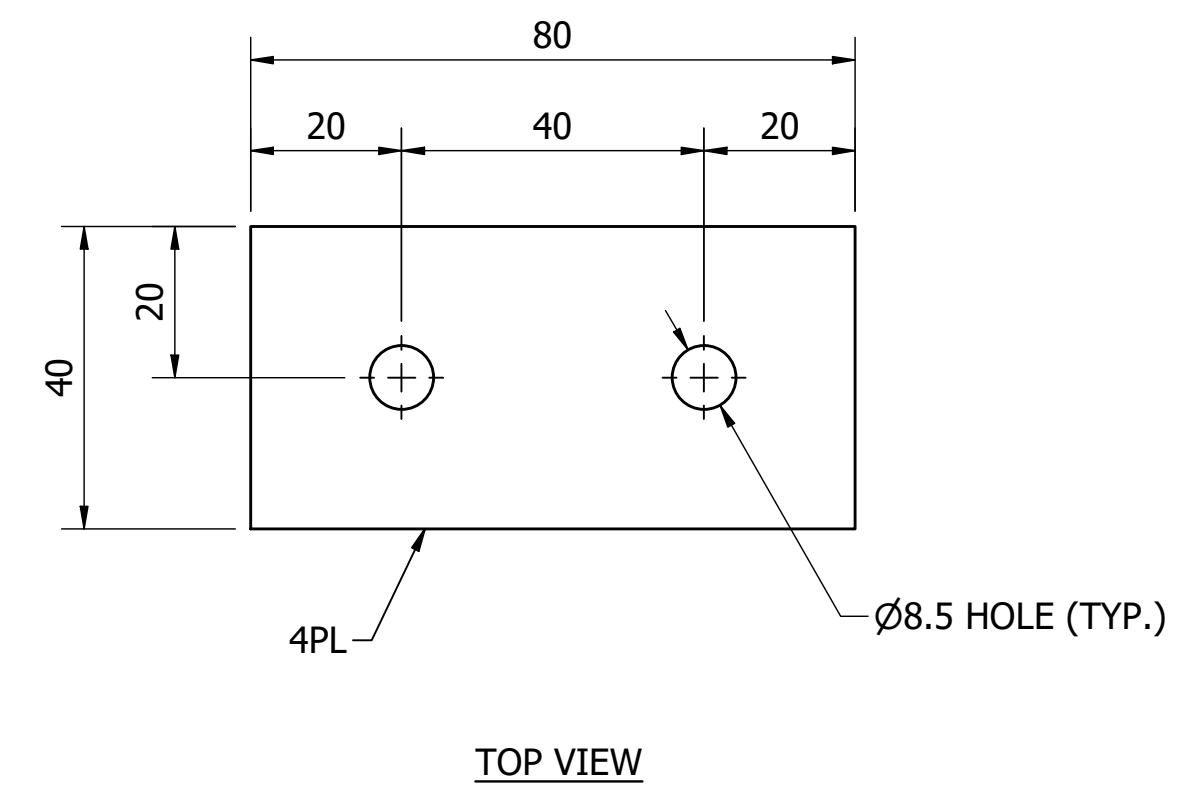
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Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 MANHOLE KEY SLIDE - GUSSET

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ISOMETRIC



PART - MHL1010
CENTRE SPACER SHIM

SCALE: 1 : 1

MATERIAL: ALUMINIUM 5052-H32
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 35 g

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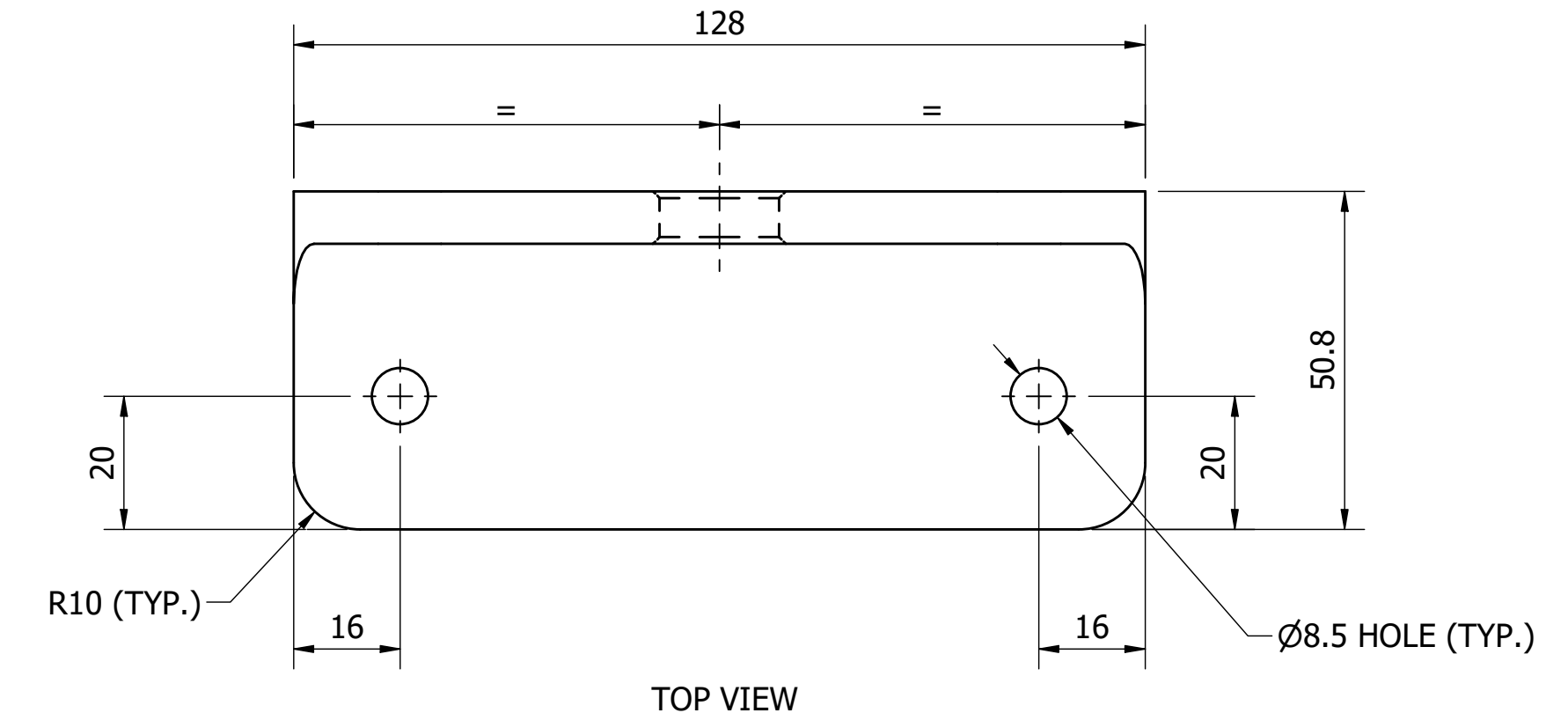
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B	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	29/03/2019	E. Nielsen		K. Danenbergsons
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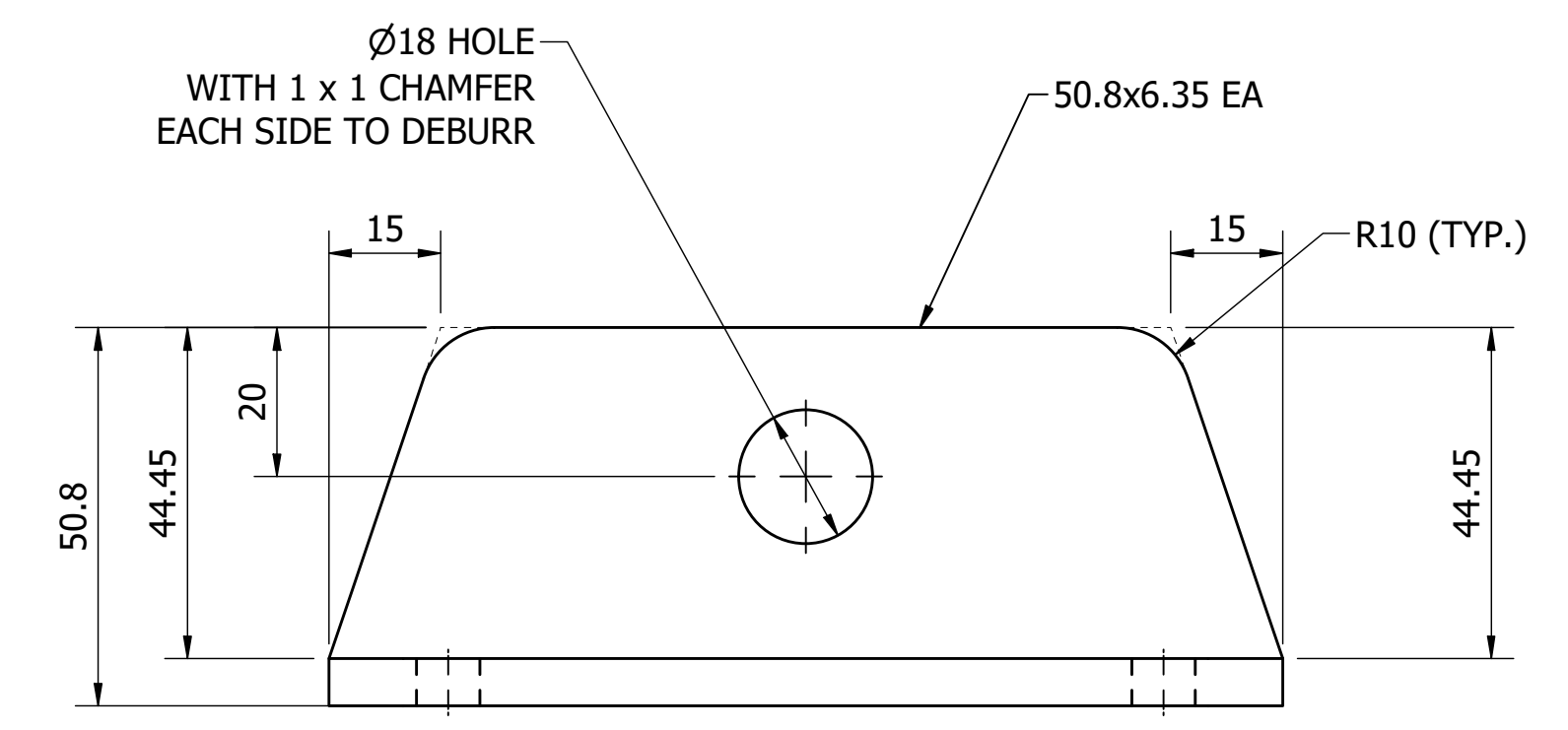
Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
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 MANHOLE LIFTER
 FABRICATION DETAILS
 CENTRE SPACER SHIM

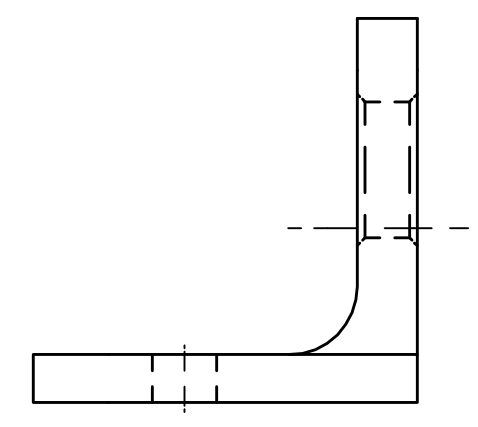
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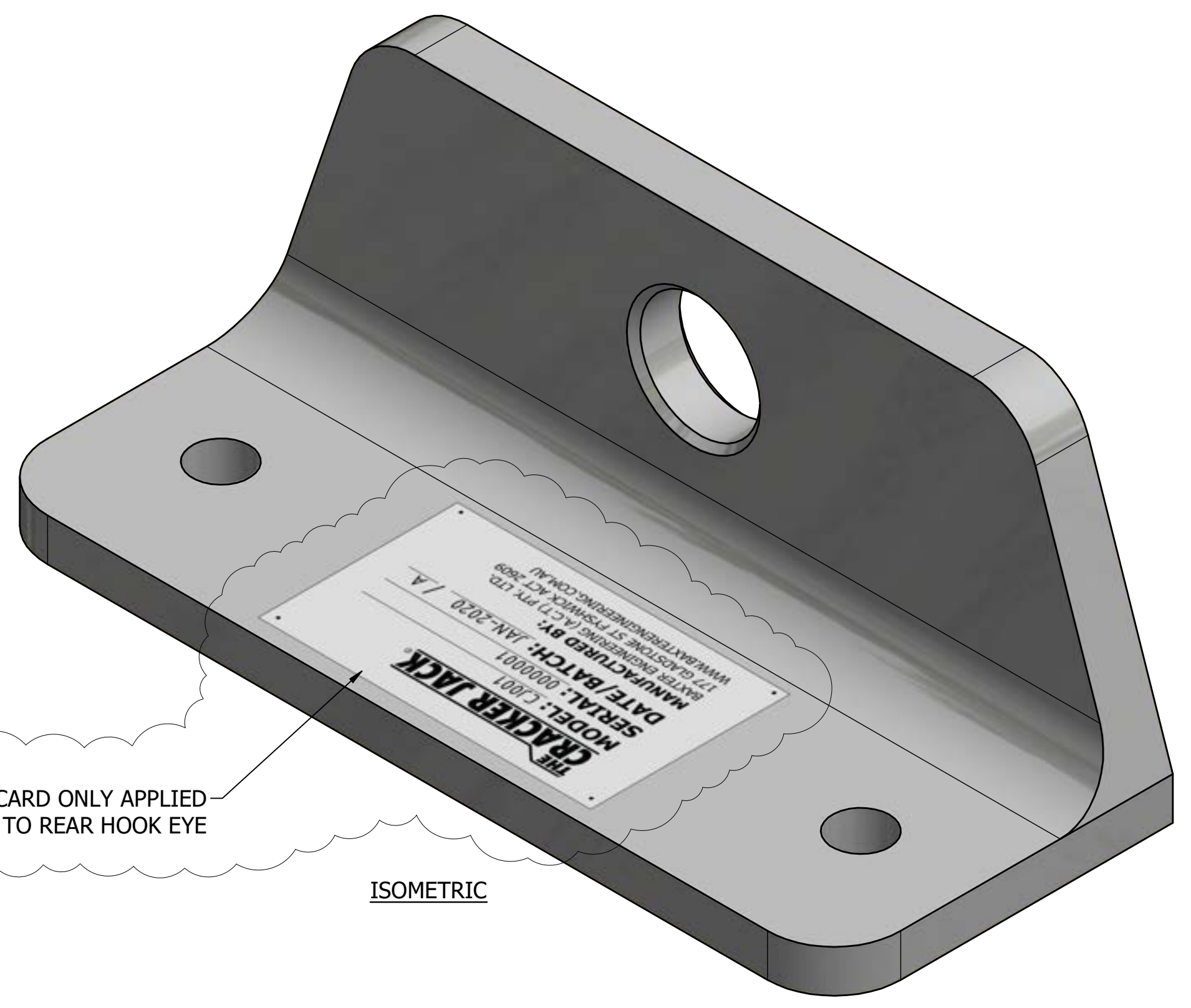
TOP VIEW



FRONT VIEW



SIDE VIEW



ISOMETRIC

PLACARD ONLY APPLIED TO REAR HOOK EYE

PART - MHL1011
HOOK EYE

SCALE: 1 : 1

MATERIAL: ALUMINIUM 6061 T6
COATING: N/A
FINISH COLOUR: N/A
MASS: 215 g

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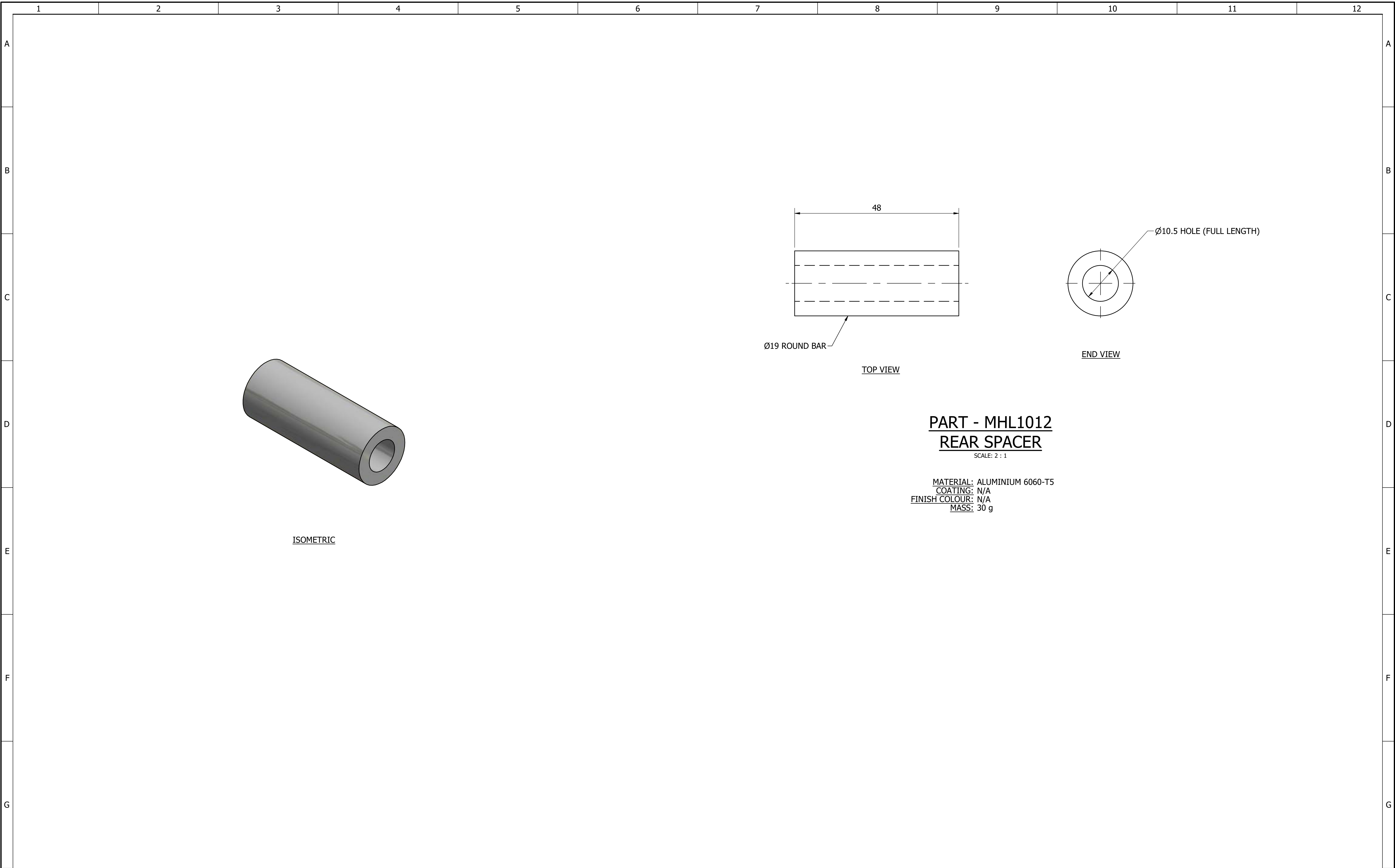
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ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
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PART - MHL1012
REAR SPACER

SCALE: 2 : 1

MATERIAL: ALUMINIUM 6060-T5
COATING: N/A
FINISH COLOUR: N/A
MASS: 30 g

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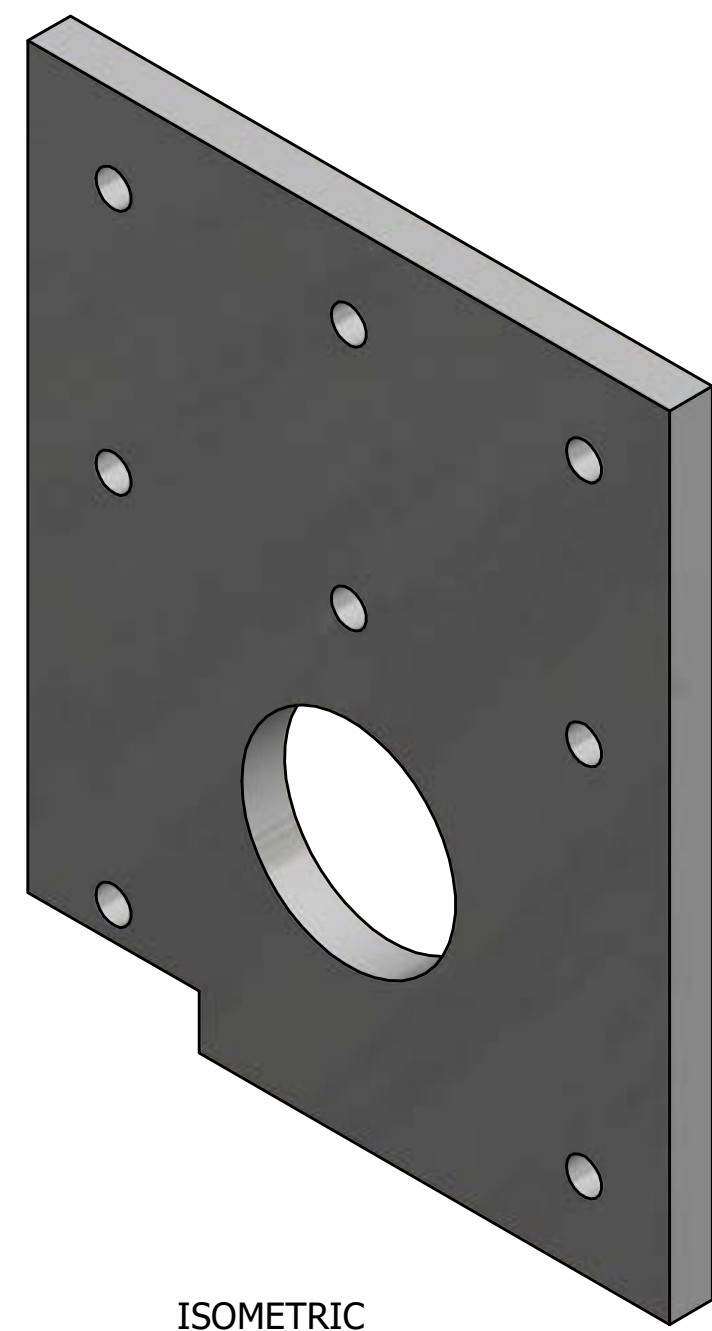
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C	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick



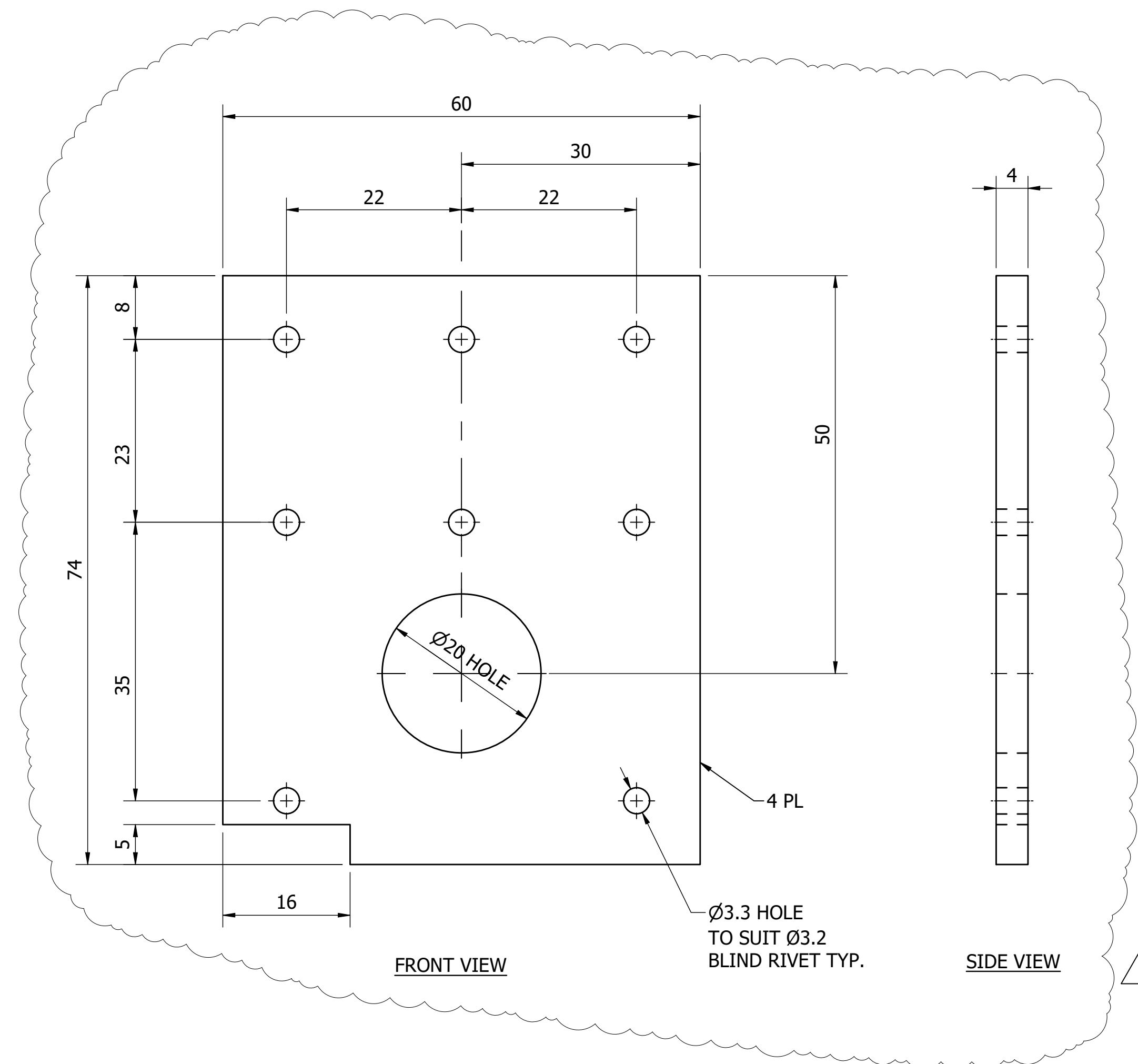
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Designed:	E. Nielsen
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REAR SPACER

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PART - MHL1013
PIVOT REINFORCEMENT

SCALE: 2 : 1

MATERIAL: ALUMINIUM 5052 H32
COATING: N/A
FINISH COLOUR: N/A
MASS: 50 g



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B	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
C	ISSUED FOR CONSTRUCTION - RIVET HOLE PATTERN CHANGED	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick



Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

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MANHOLE LIFTER
FABRICATION DETAILS
PIVOT REINFORCMENT

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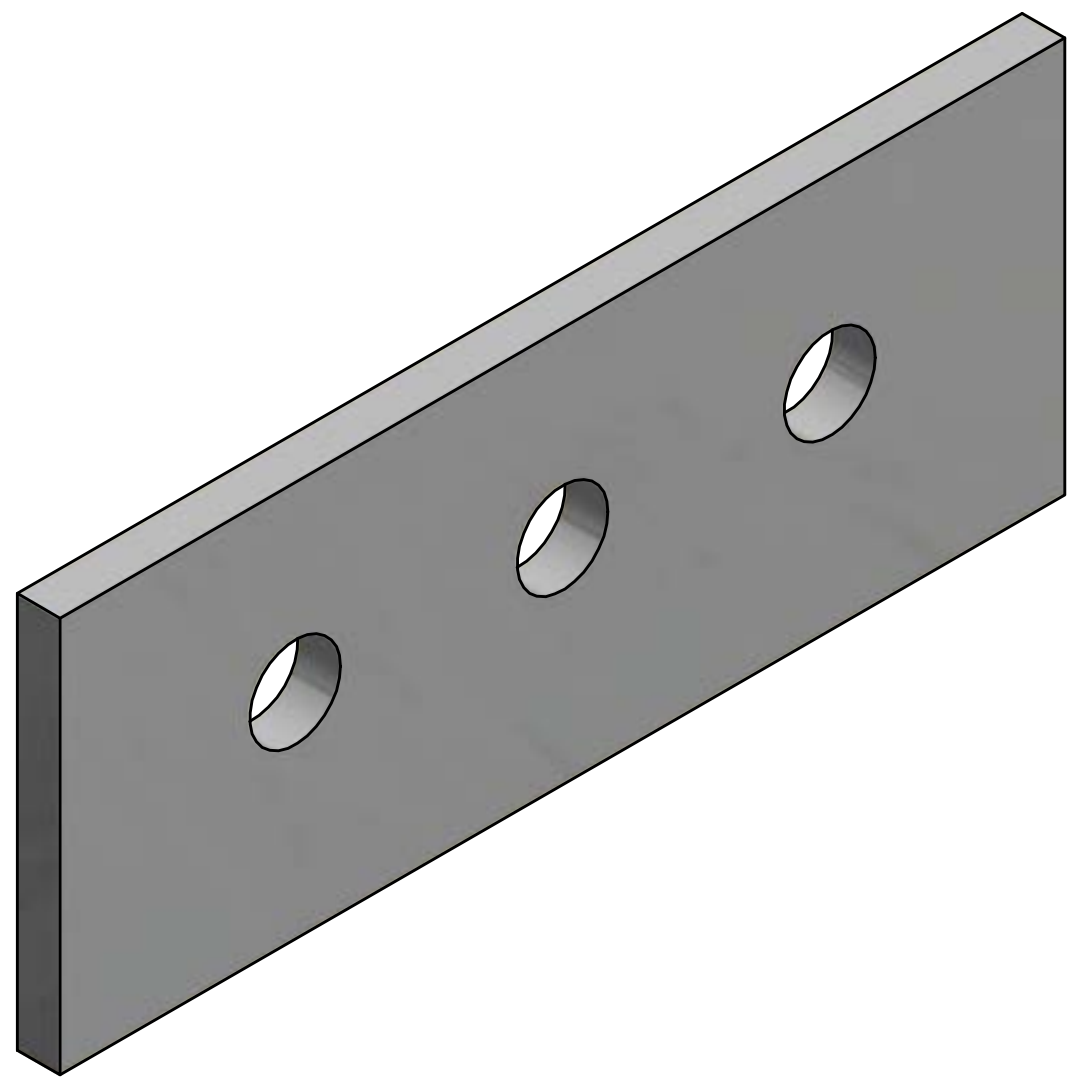
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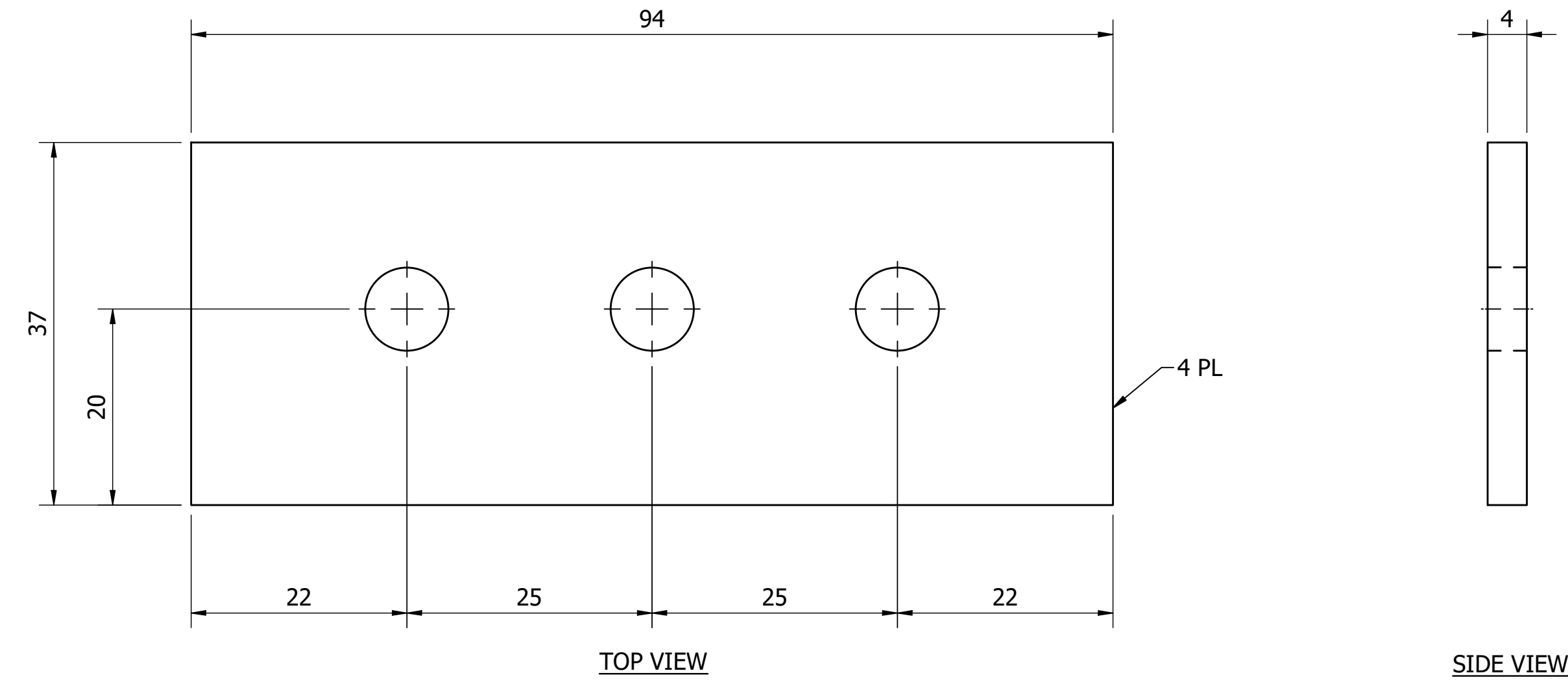
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H



ISOMETRIC



PART - MHL1014
CHANNEL JOINT STIFFENER

SCALE: 2 : 1

MATERIAL: ALUMINIUM 5052-H32
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 40 g

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C	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick

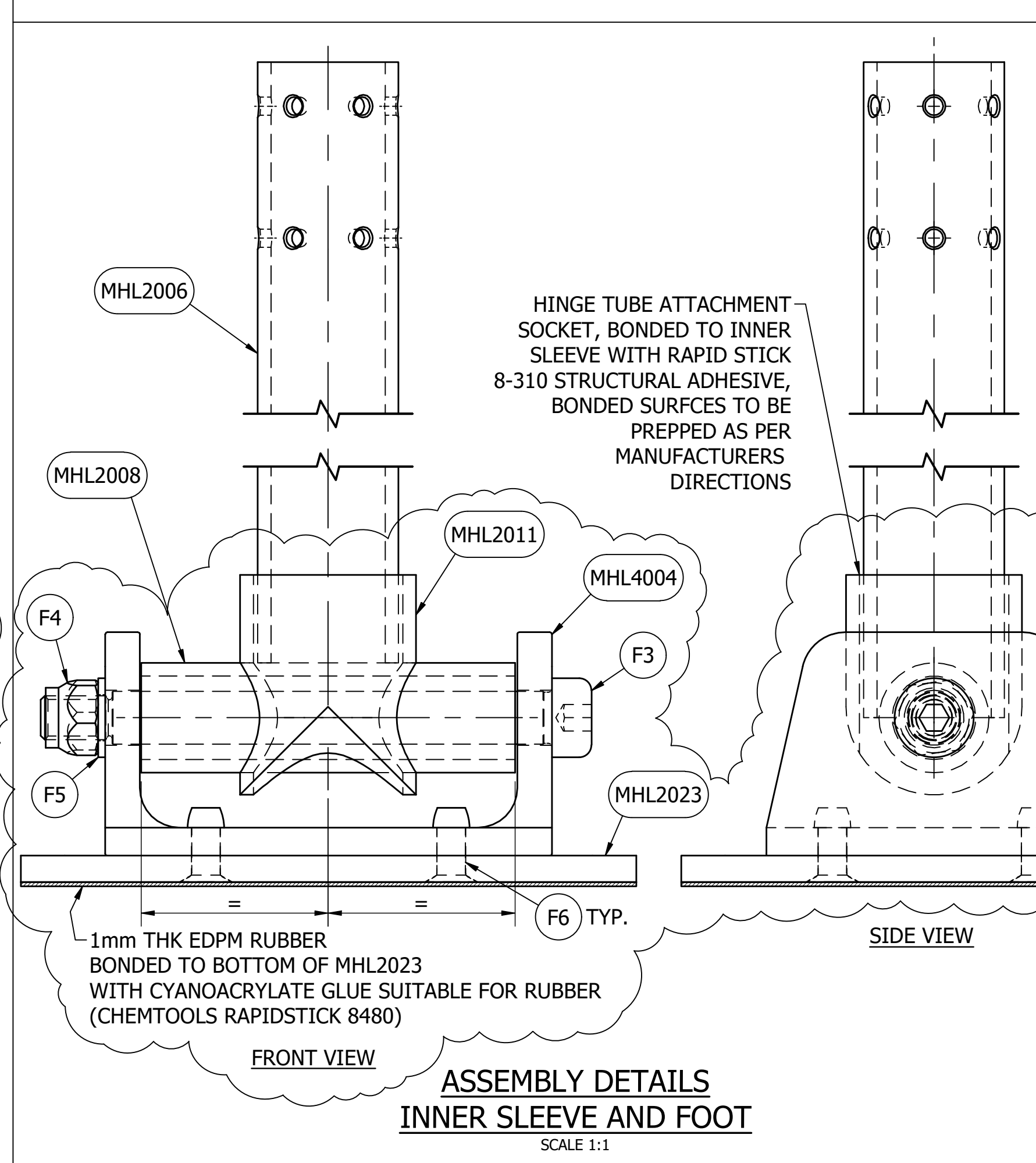
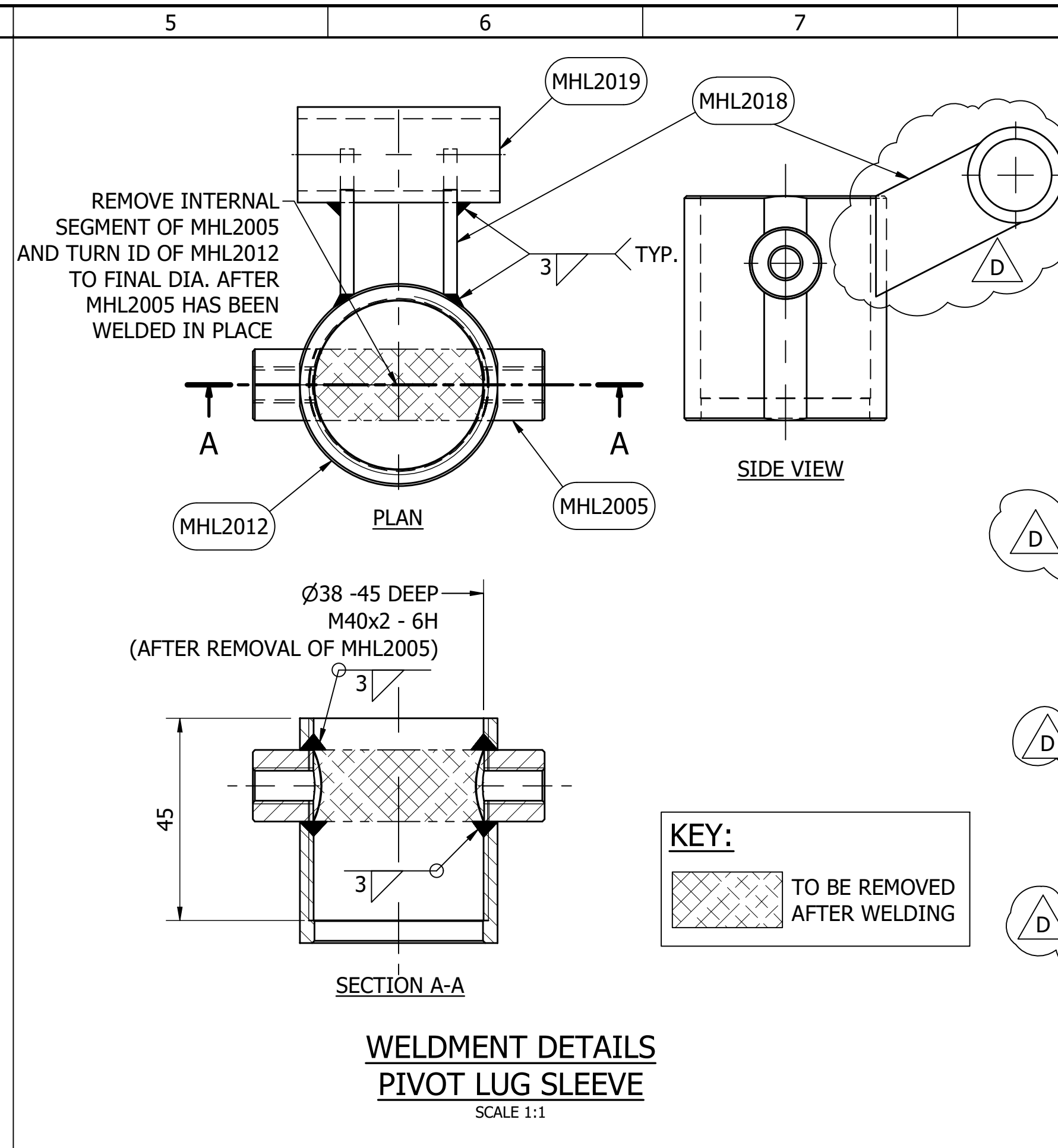
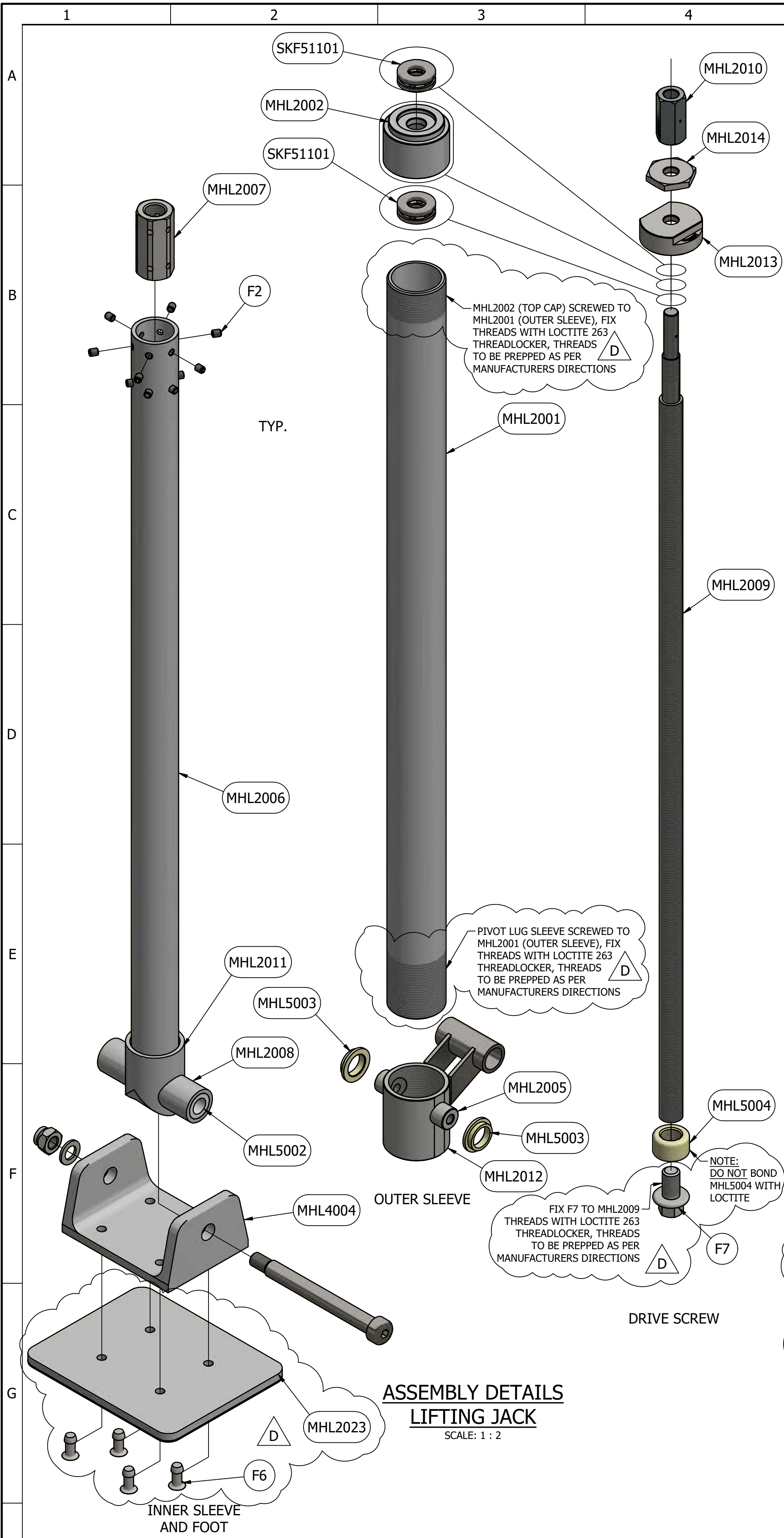


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Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

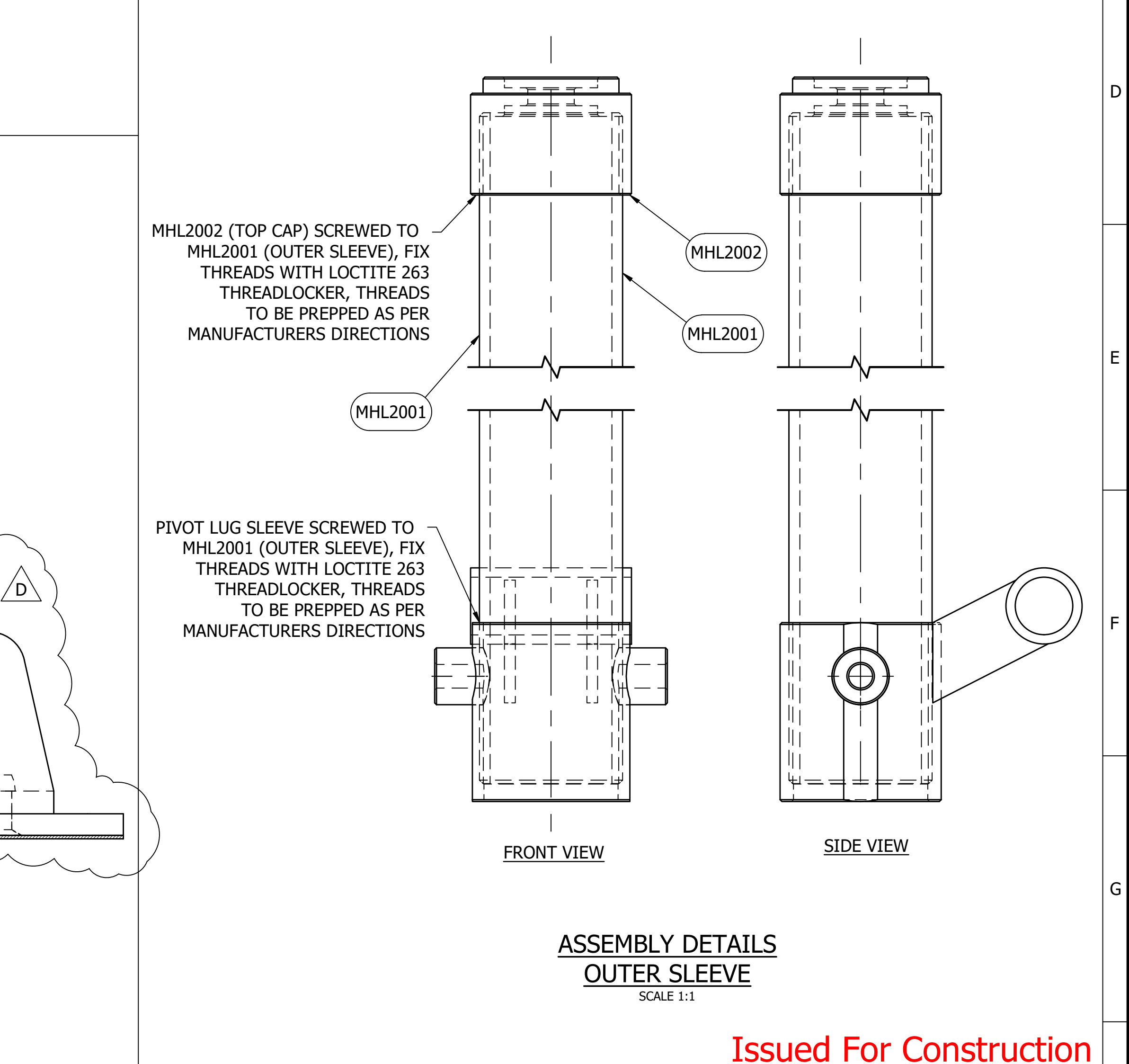
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 MANHOLE LIFTER
 FABRICATION DETAILS
 CHANNEL JOINT STIFFENER

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1 2 3 4 5 6 7 8 9 10 11 12



PARTS LIST					
PART NUMBER	DESCRIPTION	MATERIAL	MEMBER SIZE	QTY	MASS
MHL2001	OUTER SLEEVE	Aluminum 6060 T5	40x3 CHS	1	565 g
MHL2002	TOP CAP BEARING HOUSING	Steel, Mild	Ø50 MACHINING RND. BAR	1	50 g
MHL2005	PIVOT LUG	Steel, Carbon	DN 15.88 ROUND BAR	1	55 g
MHL2006	INNER SLEEVE	Aluminum 6060 T5	32x3 CHS	1	455 g
MHL2007	THREADED NUT	Steel, Mild	M16x2 G4.6 50mm LONG NUT	1	130 g
MHL2008	HINGE TUBE	Aluminum 6060 T5	25x3 CHS	1	50 g
MHL2009	DRIVE SCREW	Steel, Carbon	M16x2 G8.8 THREADED ROD	1	820 g
MHL2010	DRIVE NUT	Steel, Carbon	M12x1.5 G4.6 40mm LONG NUT	1	50 g
MHL2011	HINGE TUBE ATTACHMENT SOCKET	Aluminum 6060 T5	40x3 CHS	1	35 g
MHL2012	LUG ATTACHMENT SLEEVE	Steel, Mild	48x5 CHS	1	115 g
MHL2013	TOP CAP BEARING COVER/LOCK NUT	Steel, Mild	Ø50 FREE MACHINING BAR	1	80 g
MHL2014	LOCK NUT	Steel, Mild	Ø50 FREE MACHINING BAR	1	30 g
MHL2018	LOCK TUBE SUPPORT	Steel, Carbon	20x3 FL	2	12 g
MHL2019	LOCK TUBE	Steel, Carbon	21 x 2 CHS	1	54 g
MHL2023	FOOTING PLATE	Aluminum 6061 T6	6 PL	1	260 g
MHL4004	HINGE BRACKET	Aluminum 6061 T6	101.6x50.8x6.35x7.93 CHANNEL	1	260 g
MHL5002	HINGE BUSH	Nylon, Moly.	OD19, ID12 x 87 LNG	1	20 g
MHL5003	FLANGED BUSH	Nylon, Moly.	OD20, ID15.88 x 5.5 THK. FLANGE OD25 x 2 THK	4	1 g
MHL5004	DRIVE SCREW LOWER BUSH	Nylon, Moly.	OD 20, ID M16x2-THREAD	1	10 g
F1	SHEAR WIRE (NOT SHOWN)	Steel, Black Annealed	Ø1.57	1	
F2	HEX SOCKET SET SCREW	Steel, Mild	M5x6	12	1 g
F3	SOCKET HEAD SHOULDER SCREW	Steel, Mild	Ø12x100 LNG SHOULDER M10x1.5 THREAD	1	114 g
F4	NYLOCK HEX NUT	Steel, Mild	M10	1	13 g
F5	FLAT WASHER	Steel, Mild	M10	1	2 g
F6	6.48 COUNTERSUNK HEAD RIVET	Steel, Mild	GRIP 9.6 - 12.7	4	5 g
F7	FLANGE HEAD BOLT	Steel, Mild	M12x1.75 20 LNG	1	47 g
SKF51101	THRUST BALL BEARINGS SINGLE DIRECTION SKF	Steel, Mild	ID12, OD26, 9THK	2	20 g



No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
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C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
D	ISSUED FOR CONSTRUCTION - CHANGES TO LOCK TUBE	12/05/2020	E. Nielsen	K. Danenbergsons	C. Patrick

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Drawn: M. Matusiak
 Designed: E. Nielsen
 Engineering Checked: E. Nielsen
 Verified:
 Design Authority: K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 LIFTING JACK

Scale: AS SHOWN
 Date: 20/03/2019
 Project No.: ME18003
 Tender No.:
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Rev: D
 MHL2000

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A A

B B

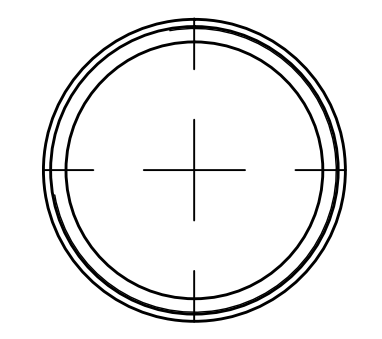
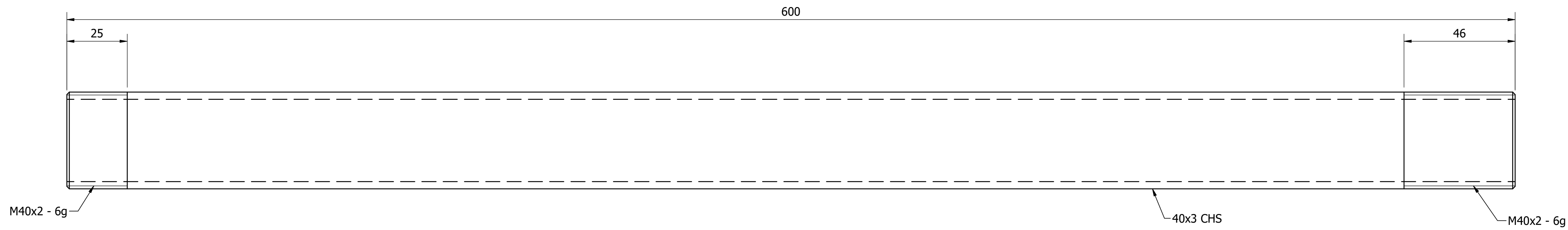
C C

D D

E E

F F

G G



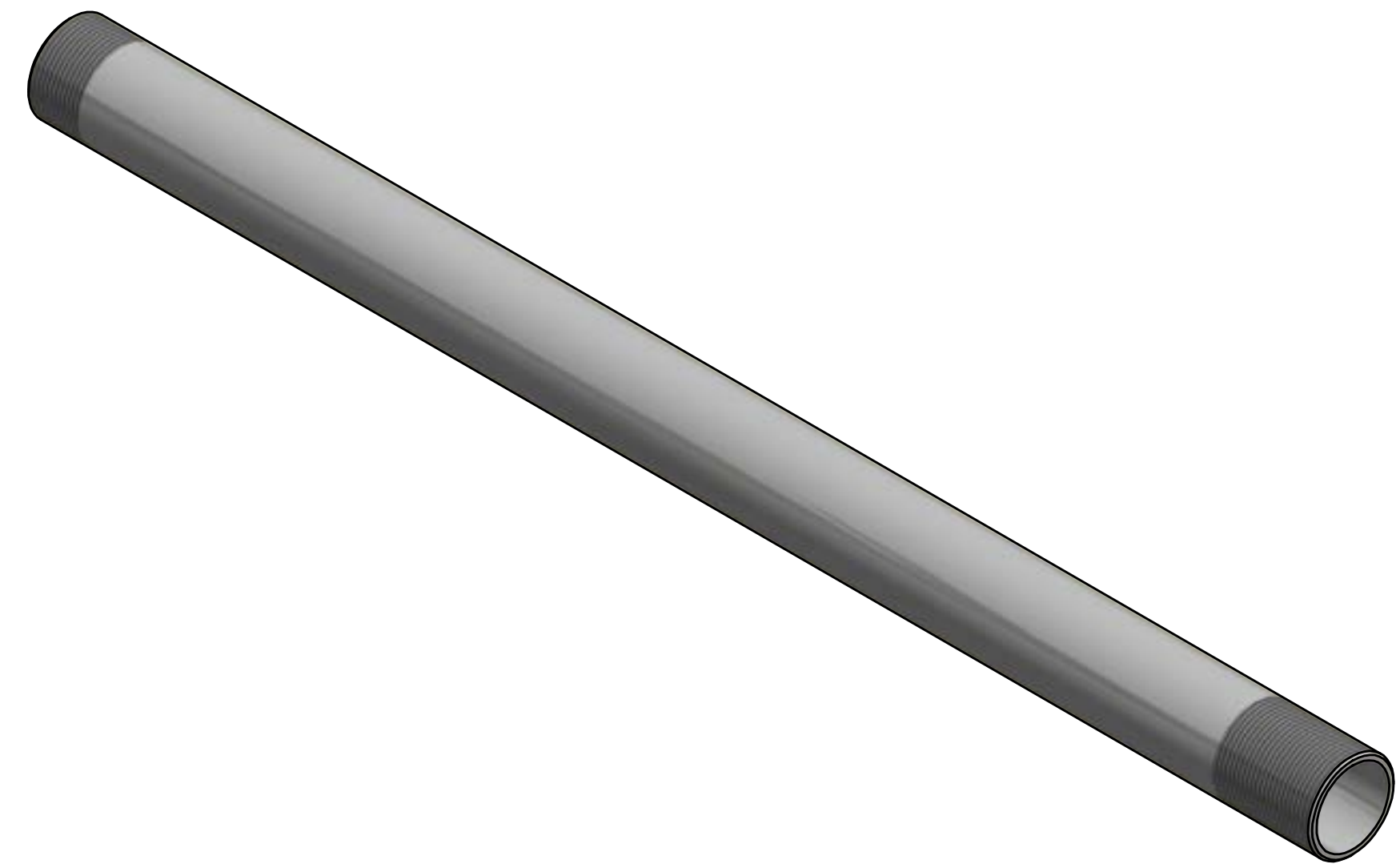
SIDE VIEW

END VIEW

**PART - MHL2001
OUTER SLEEVE**


SCALE: 1 : 1

MATERIAL: ALUMINIUM 6060-T5
COATING: N/A
FINISH COLOUR: N/A
MASS: 565 g



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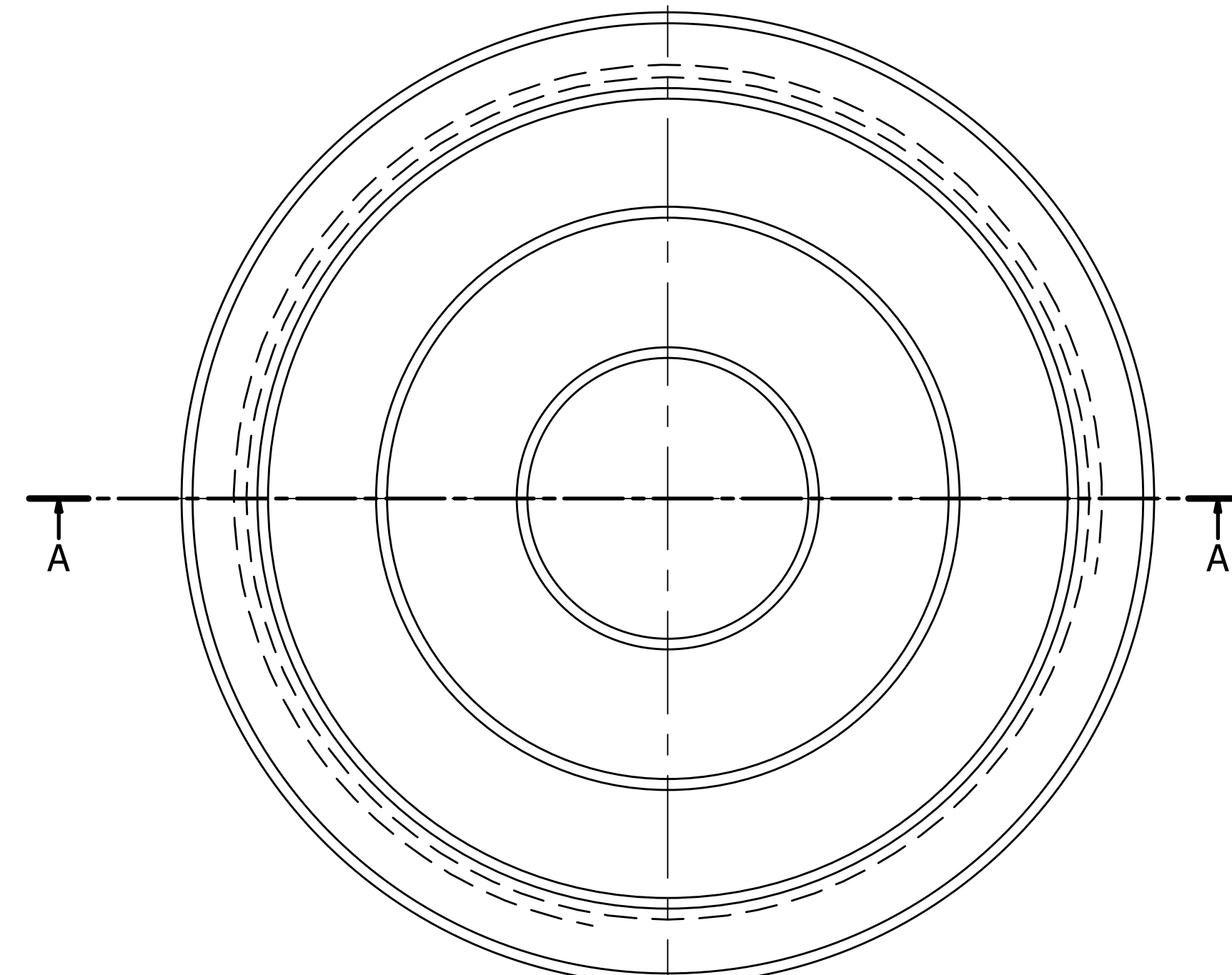
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B	JACK SLEEVE CHANGED FROM SQUARE TO CIRCULAR SECTION	5/06/2019										
C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons							
D	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick							
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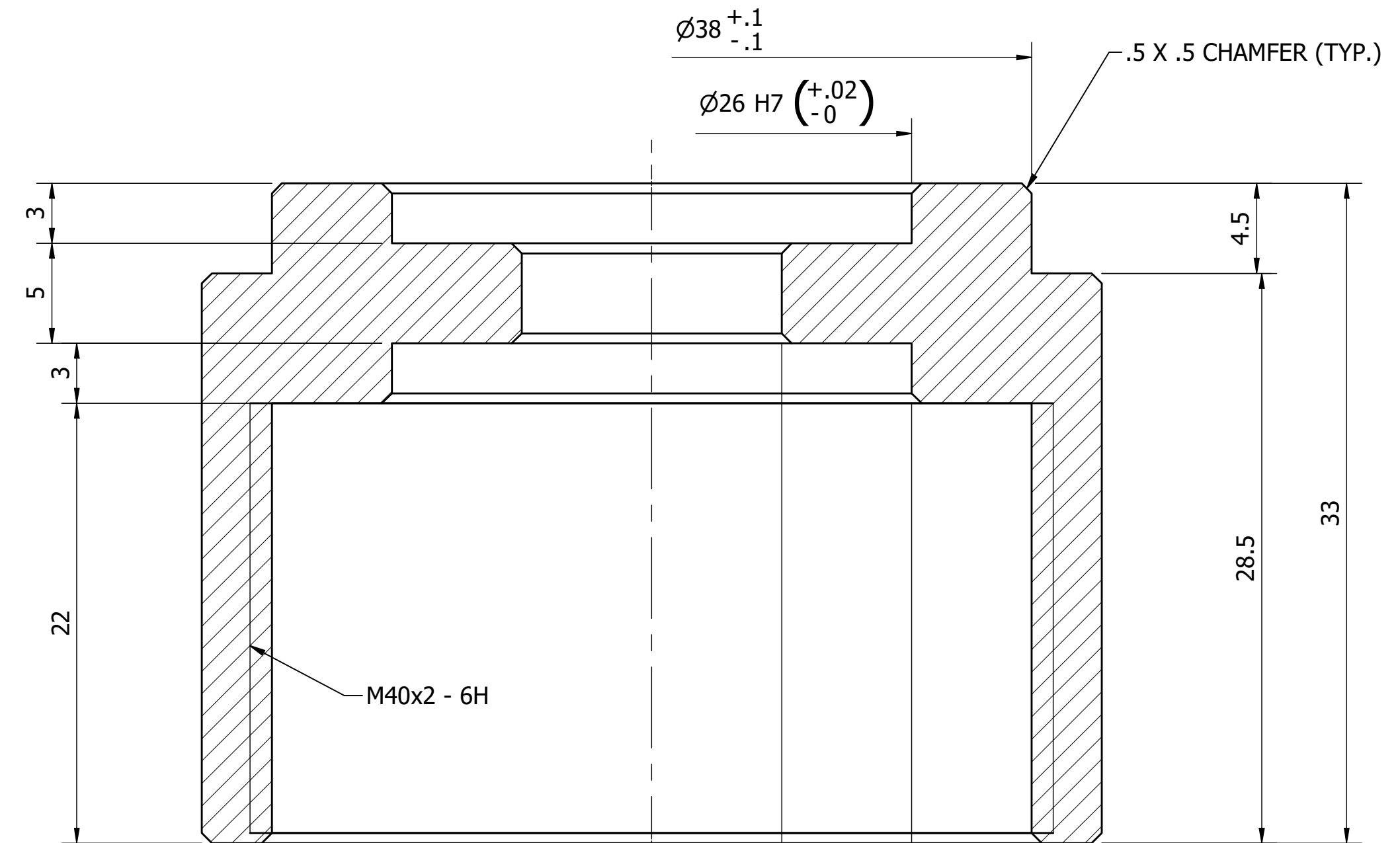
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TOP VIEW

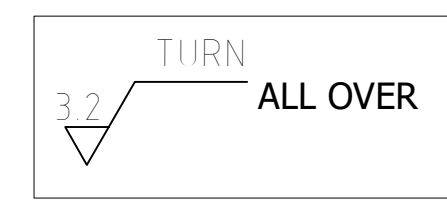


SECTION A-A

PART - MHL2002
TOP CAP BEARING HOUSING

SCALE: 2 : 1

MATERIAL: Ø50 MILD STEEL MACHINING BAR
COATING: N/A
FINISH COLOUR: N/A
MASS: 50 g



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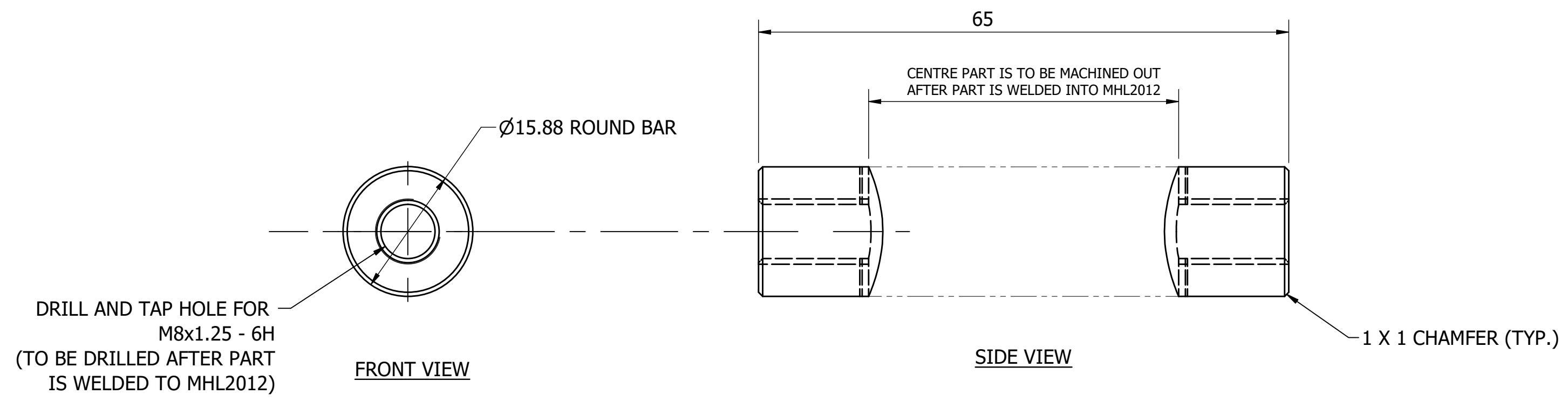
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MANHOLE LIFTER
FABRICATION DETAILS
TOP CAP

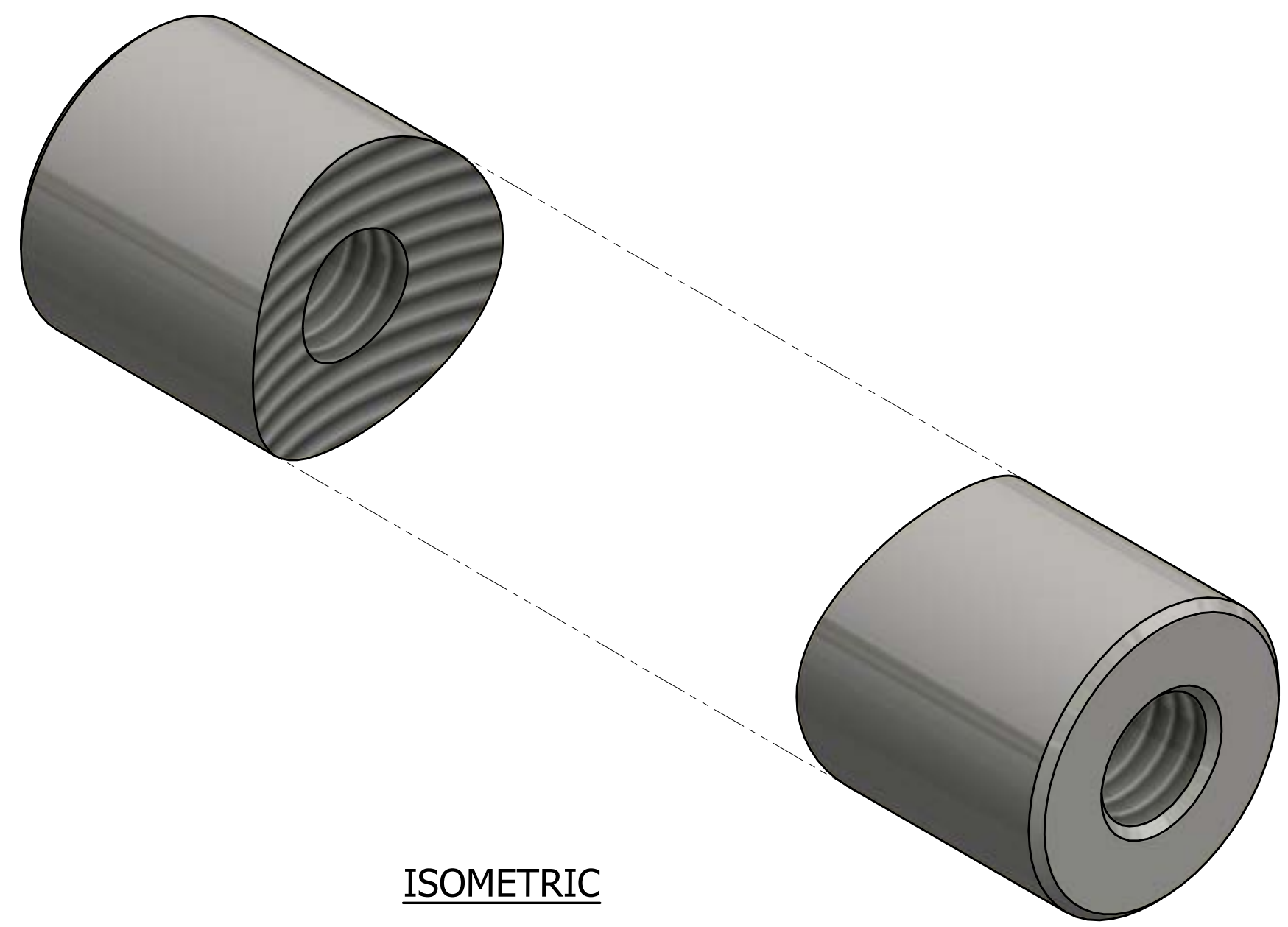
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41	MHL2002	Rev	D		



PART - MHL2005
PIVOT LUG

SCALE: 2 : 1

MATERIAL: CARBON STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 55 g (115 g BEFORE MACHINING)



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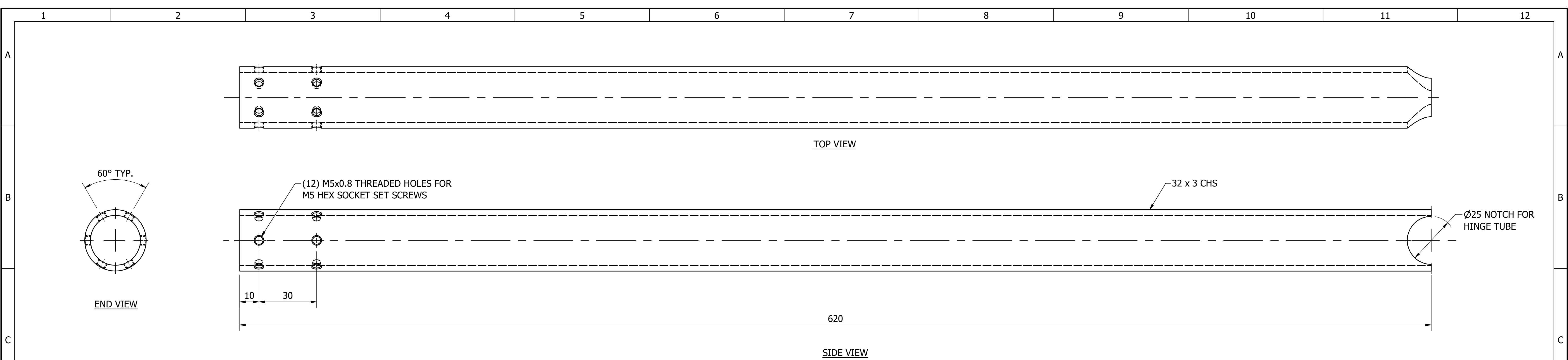
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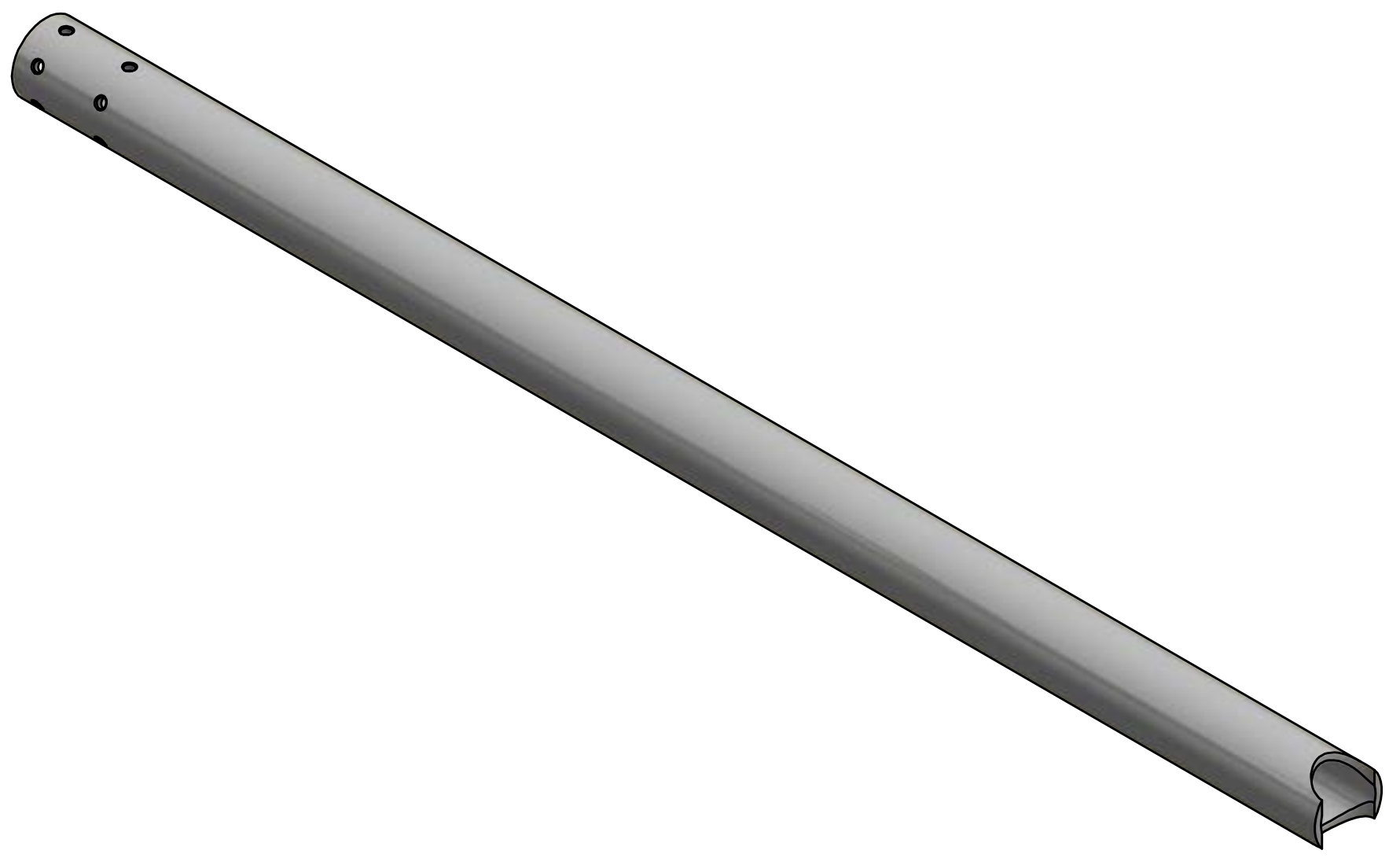
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Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
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Design Authority:	K. Danenbergsons

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
PIVOT LUG

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PART - MHL2006
INNER SLEEVE
 SCALE: 1 : 1
 MATERIAL: ALUMINIUM 6060-T5
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 455 g

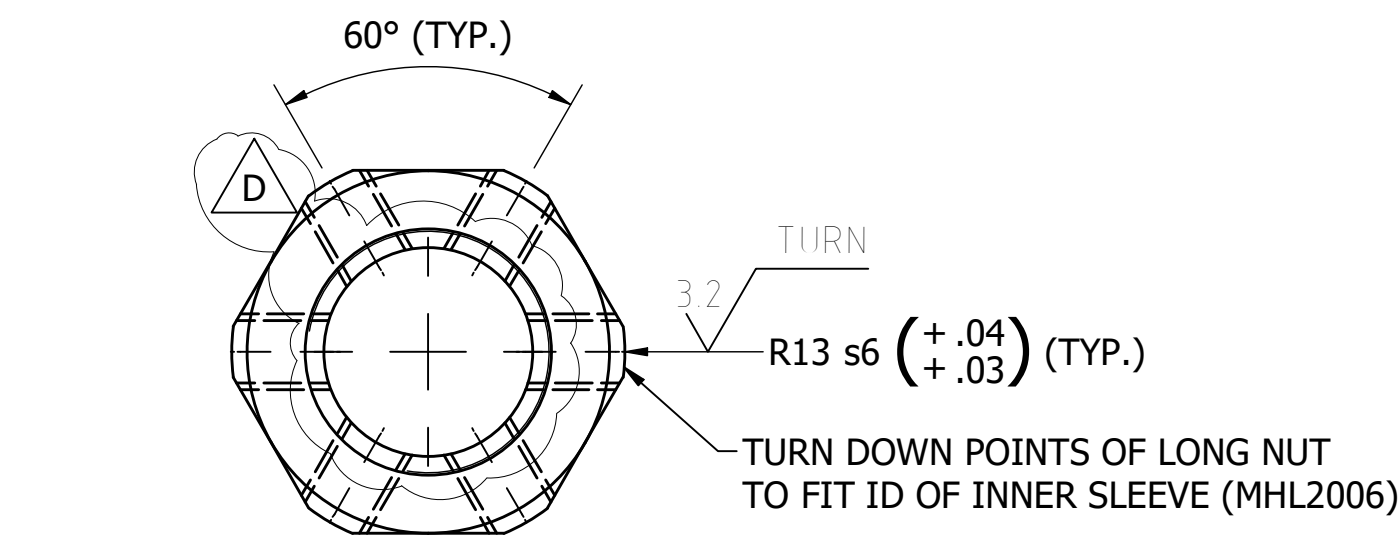


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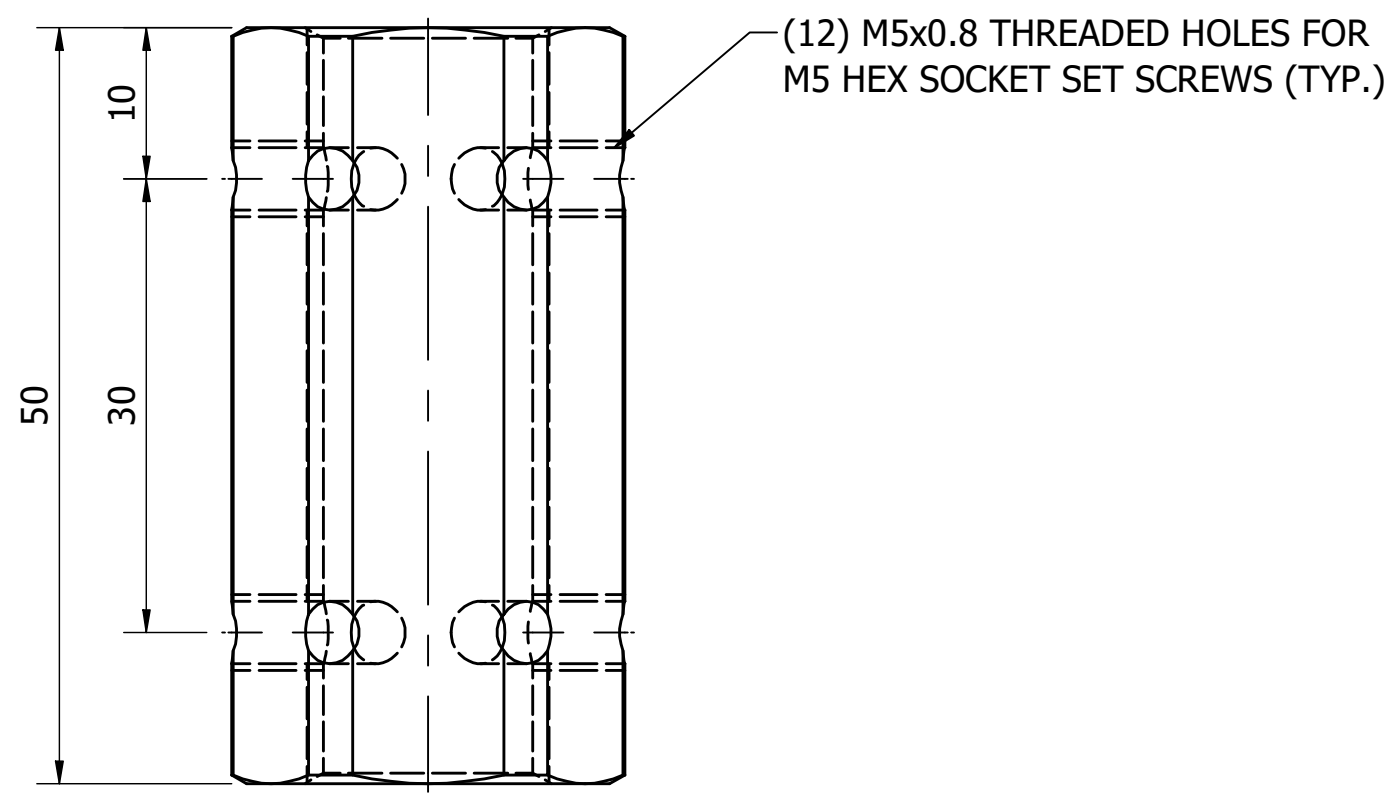
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C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons					
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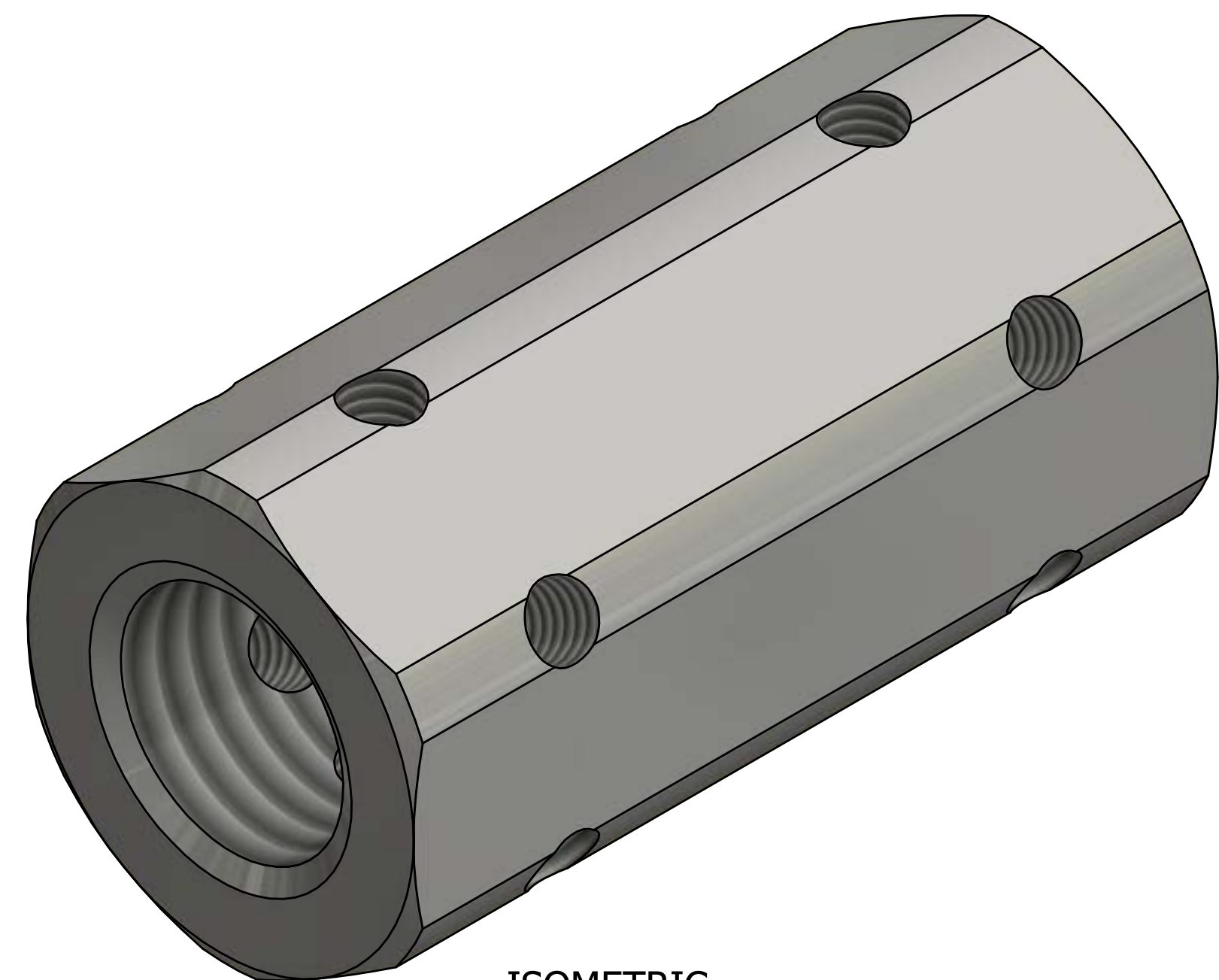
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TOP VIEW



FRONT VIEW



ISOMETRIC

**PART - MHL2007
THREADED NUT**

SCALE: 2 : 1

MATERIAL: CARBON STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 130 g

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C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
D	ISSUED FOR CONSTRUCTION - M5 HOLES CHANGED TO FULL DEPTH	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick
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Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
THREADED NUT

Scale:	AS SHOWN	Date:	20/03/2019	Sheet No.:	
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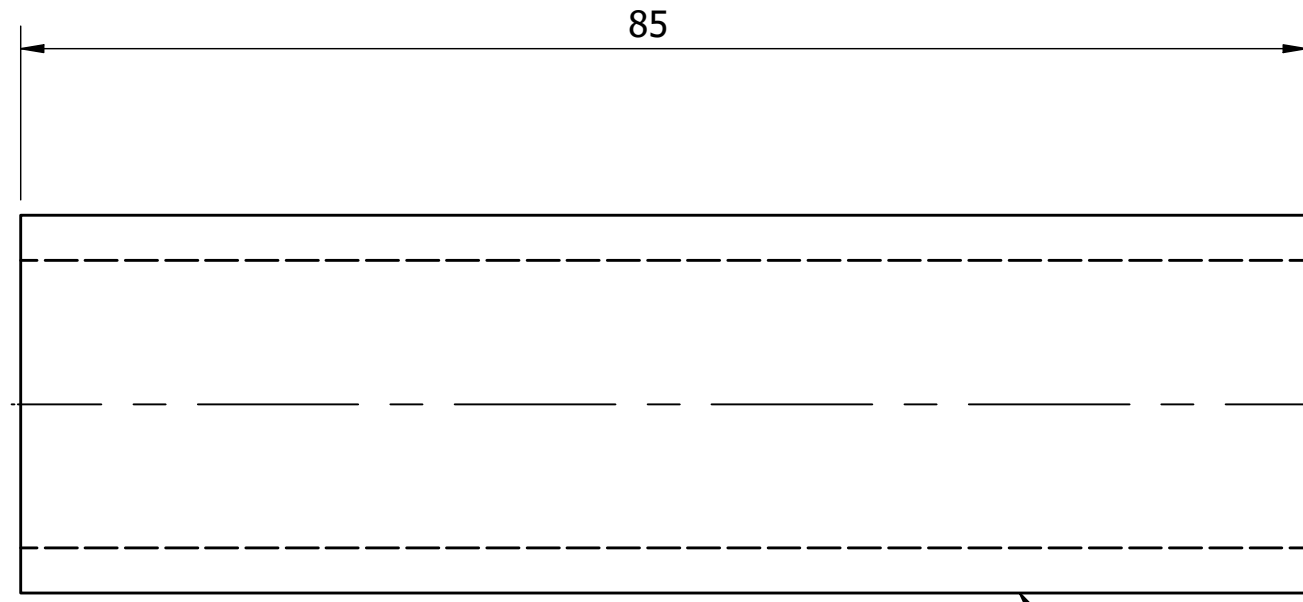
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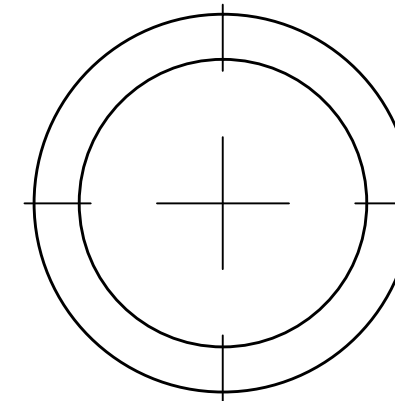
E

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SIDE VIEW



END VIEW

25 x 3 CHS

PART - MHL2008
HINGE TUBE

SCALE: 2 : 1

MATERIAL: ALUMINIUM 6060-T5
COATING: N/A
FINISH COLOUR: N/A
MASS: 50 g



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D	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick
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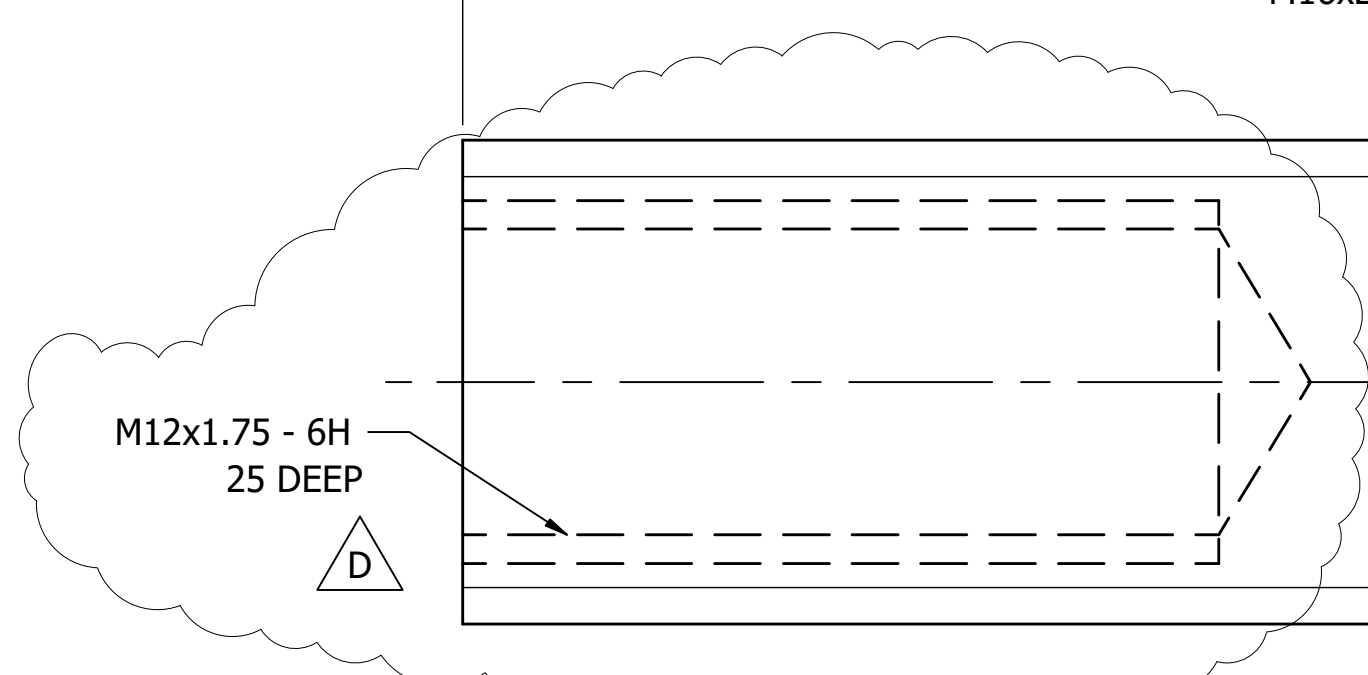
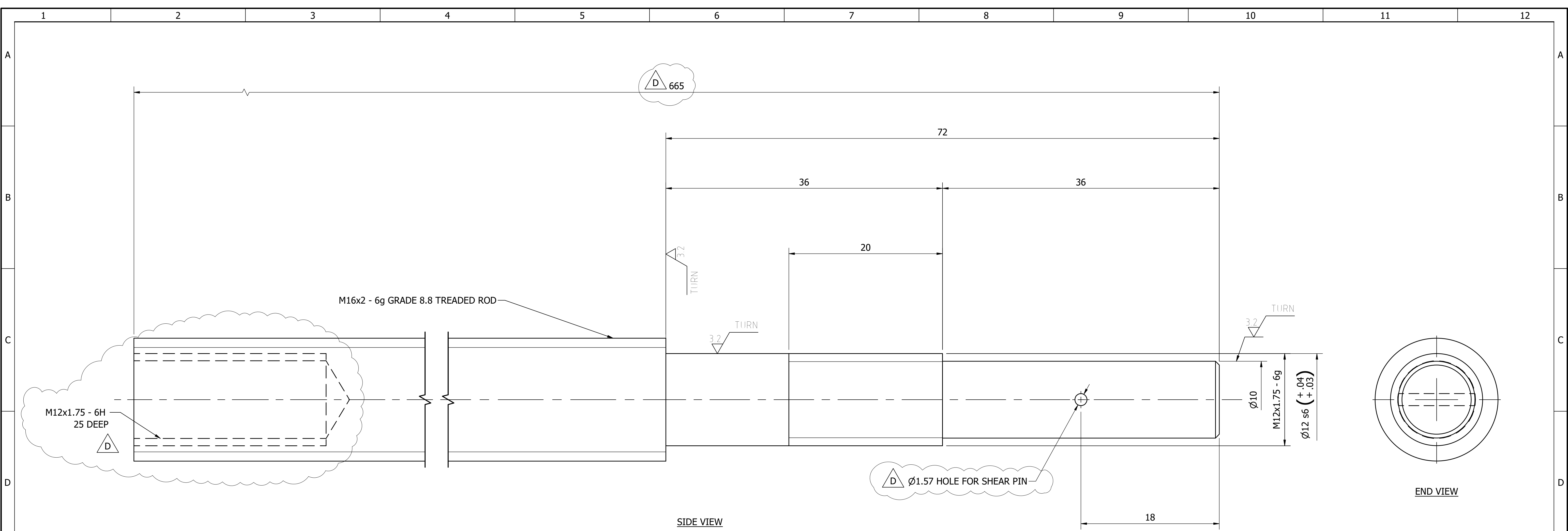


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Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

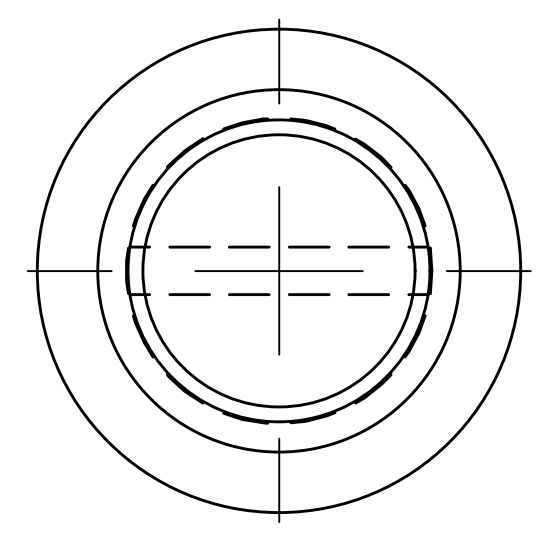
ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
HINGE TUBE

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41	MHL2008	Rev	D		

1 2 3 4 5 6 7 8 9 10 11 12



SIDE VIEW



END VIEW

**PART - MHL2009
DRIVE SCREW**

SCALE: 4 : 1

MATERIAL: CARBON STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 1.02 kg



ISOMETRIC

Issued For Construction

A	ISSUED FOR CONSTRUCTION	29/03/2019			
B	JACK SLEEVE CHANGED FROM SQUARE TO CIRCULAR SECTION	5/06/2019			
C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
D	ISSUED FOR CONSTRUCTION - SHORTENED DRIVE SCREW	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick
No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH

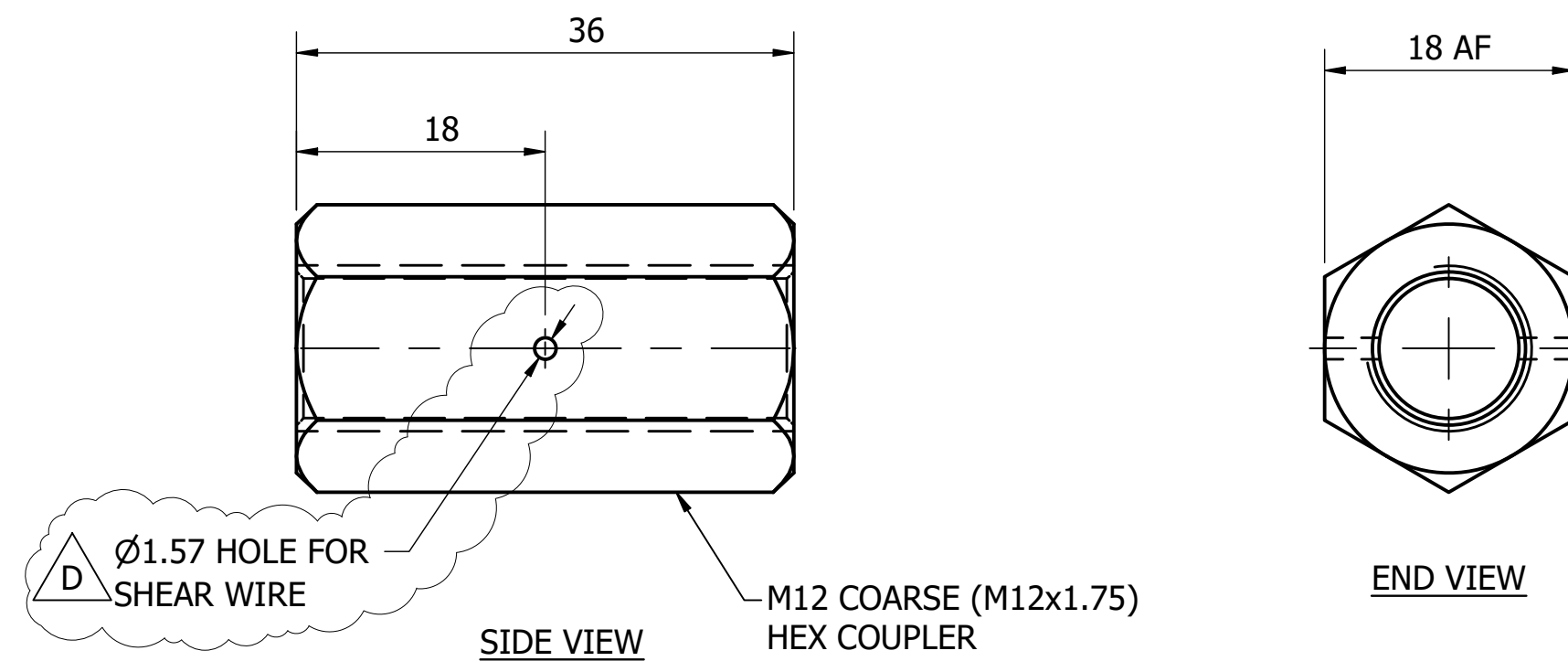
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Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
DRIVE SCREW

Scale:	AS SHOWN	Date:	20/03/2019	Sheet No.:	
Project No.:	ME18003	Tender No.:			
ACT Cadastral Information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016					
41	MHL2009	Rev	D		



**PART - MHL2010
DRIVE NUT**

SCALE: 1 : 1

MATERIAL: STEEL, MILD, GRADE 4.4
COATING: ZINC PLATED
FINISH COLOUR: N/A
MASS: 50 g



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Issued For Construction

A	ISSUED FOR CONSTRUCTION	29/03/2019			
B	JACK SLEEVE CHANGED FROM SQUARE TO CIRCULAR SECTION	5/06/2019			
C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
D	ISSUED FOR CONSTRUCTION - SHEAR WIRE HOLE REVISED	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick
No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH

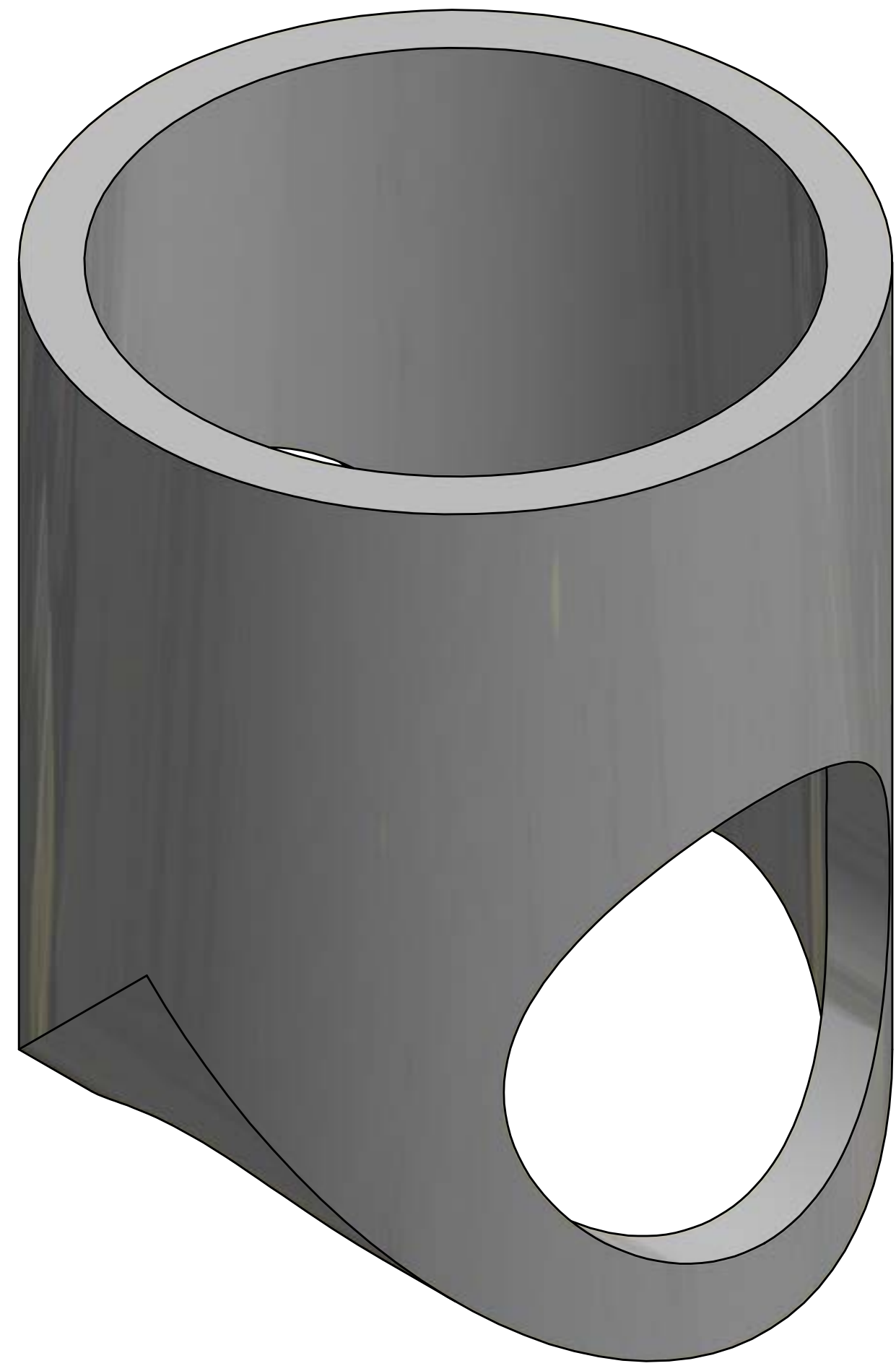
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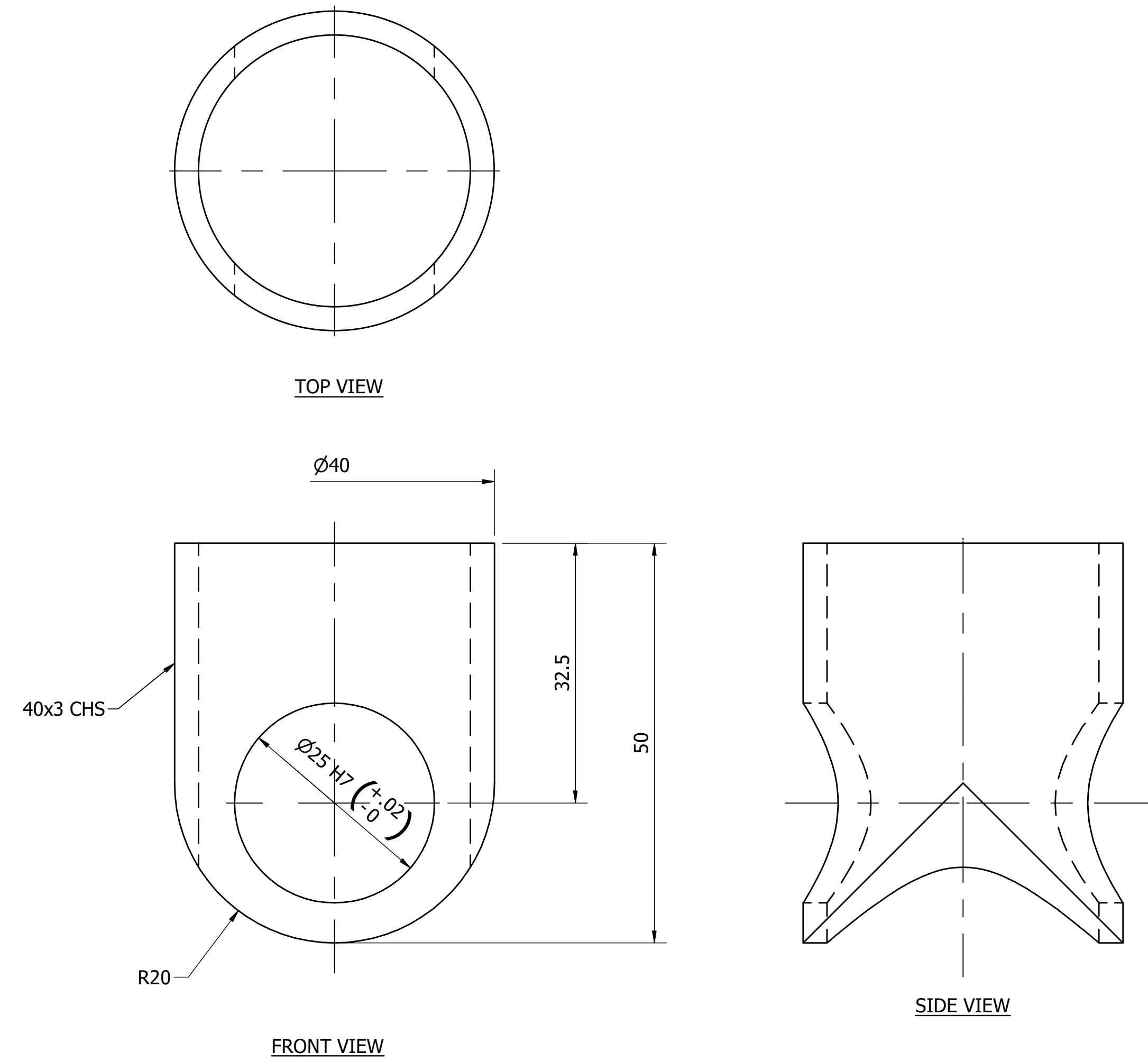
Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
DRIVE NUT

Scale:	AS SHOWN	Date:	20/03/2019	Sheet No.:	
Project No.:	ME18003	Tender No.:			
ACT Cadastral Information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016					
41	MHL2010	Rev	D		



ISOMETRIC



PART - MHL2011
HINGE TUBE ATTACHMENT SLEEVE

SCALE: 2 : 1
 MATERIAL: ALUMINIUM 6060-T5
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 35 g

Issued For Construction

No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	ISSUED FOR CONSTRUCTION	29/03/2019			
B	JACK SLEEVE CHANGED FROM SQUARE TO CIRCULAR SECTION	5/06/2019			
C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
D	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick

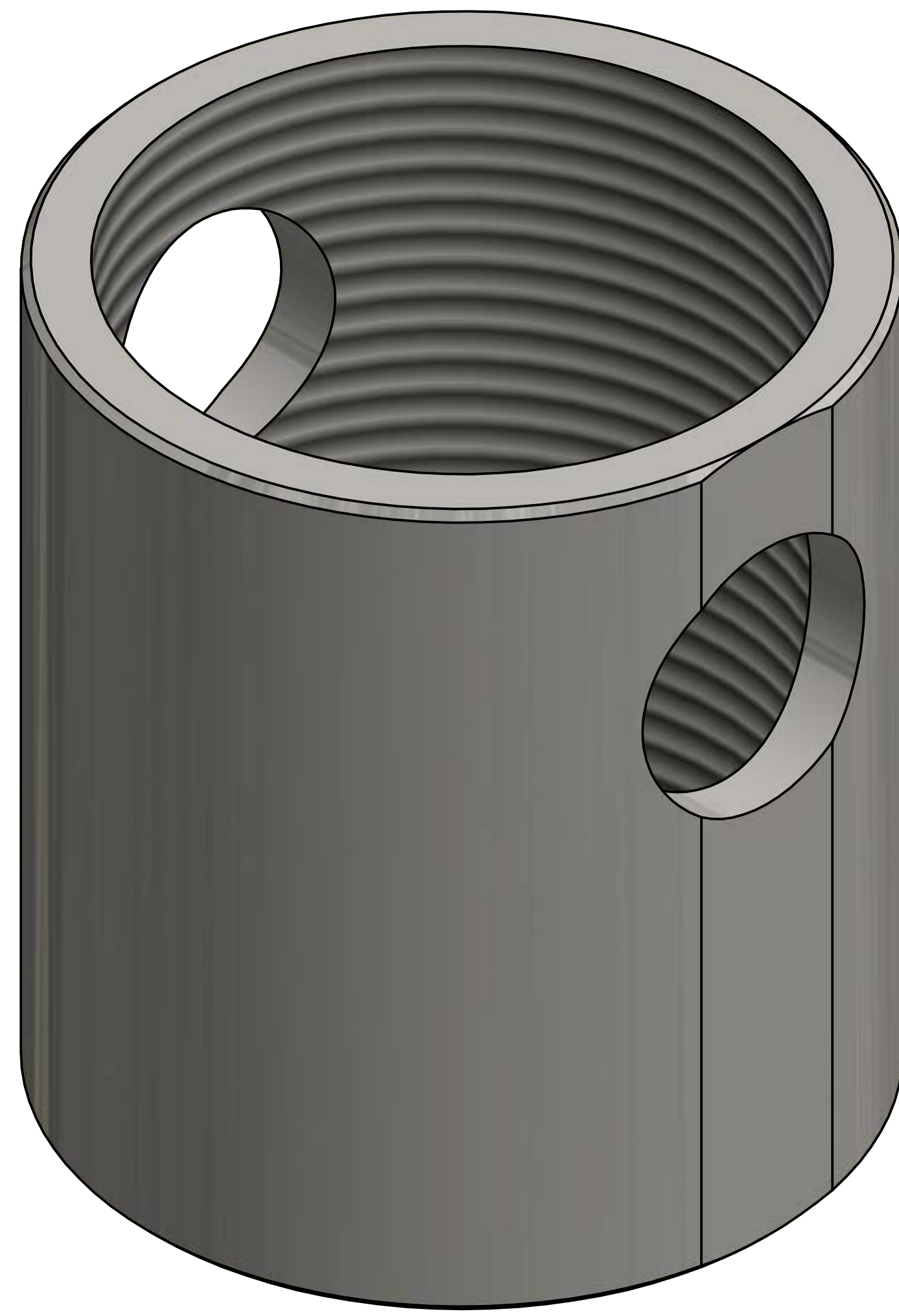
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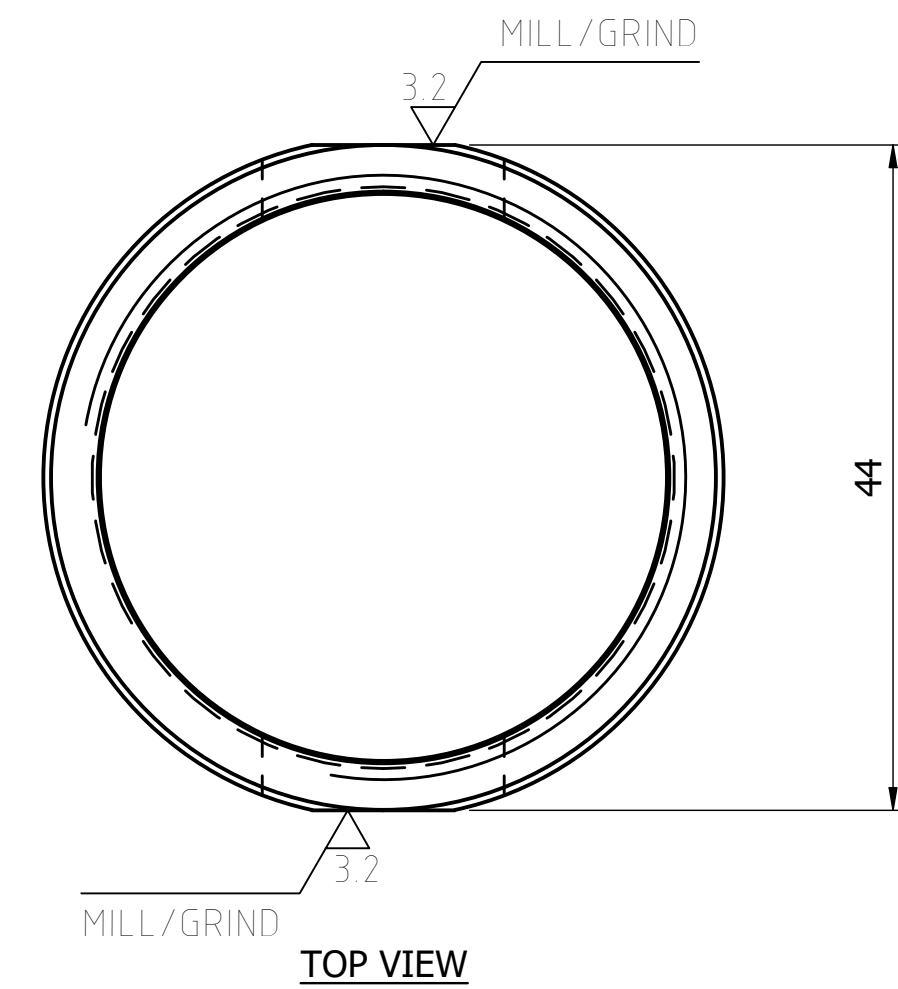
Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 HINGE TUBE ATTACHMENT SLEEVE

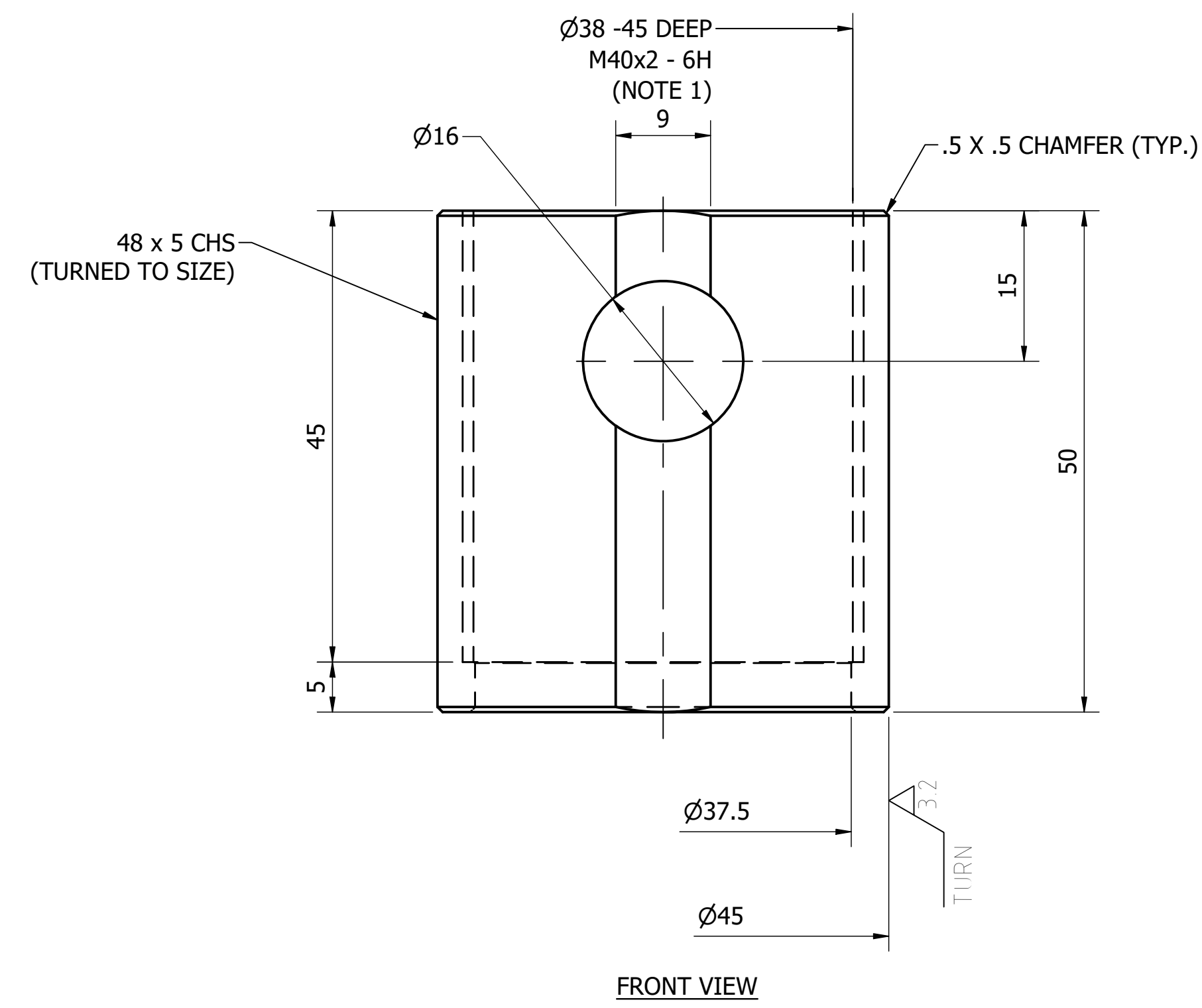
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Project No.:	ME18003	Tender No.:			
ACT Cadastral Information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016					
41	MHL2011	Rev	D		



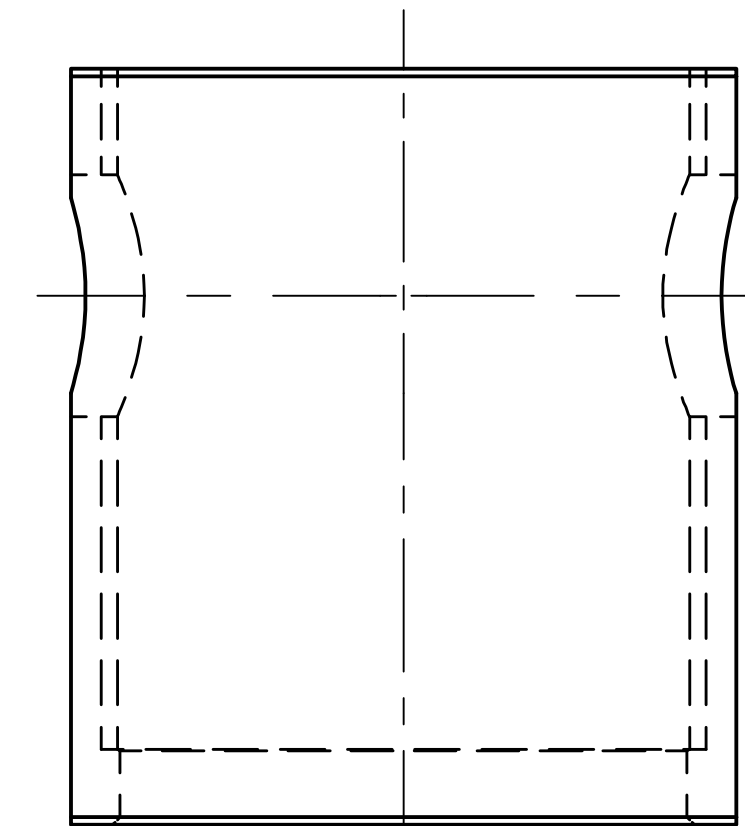
ISOMETRIC



TOP VIEW



FRONT VIEW



SIDE VIEW

NOTES:

1. FINAL INTERNAL DIAMETER TO BE TURNED AND THREAD CUT AFTER MHL2005 HAS BEEN WELDED IN POSITION REFER DETAIL ON DRAWING MHL2000.

**PART - MHL2012
LUG ATTACHMENT SLEEVE**

SCALE: 1 : 1

MATERIAL: MILD STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 115 g

Issued For Construction

No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
	ISSUED FOR CONSTRUCTION	5/06/2019			
B	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
C	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick

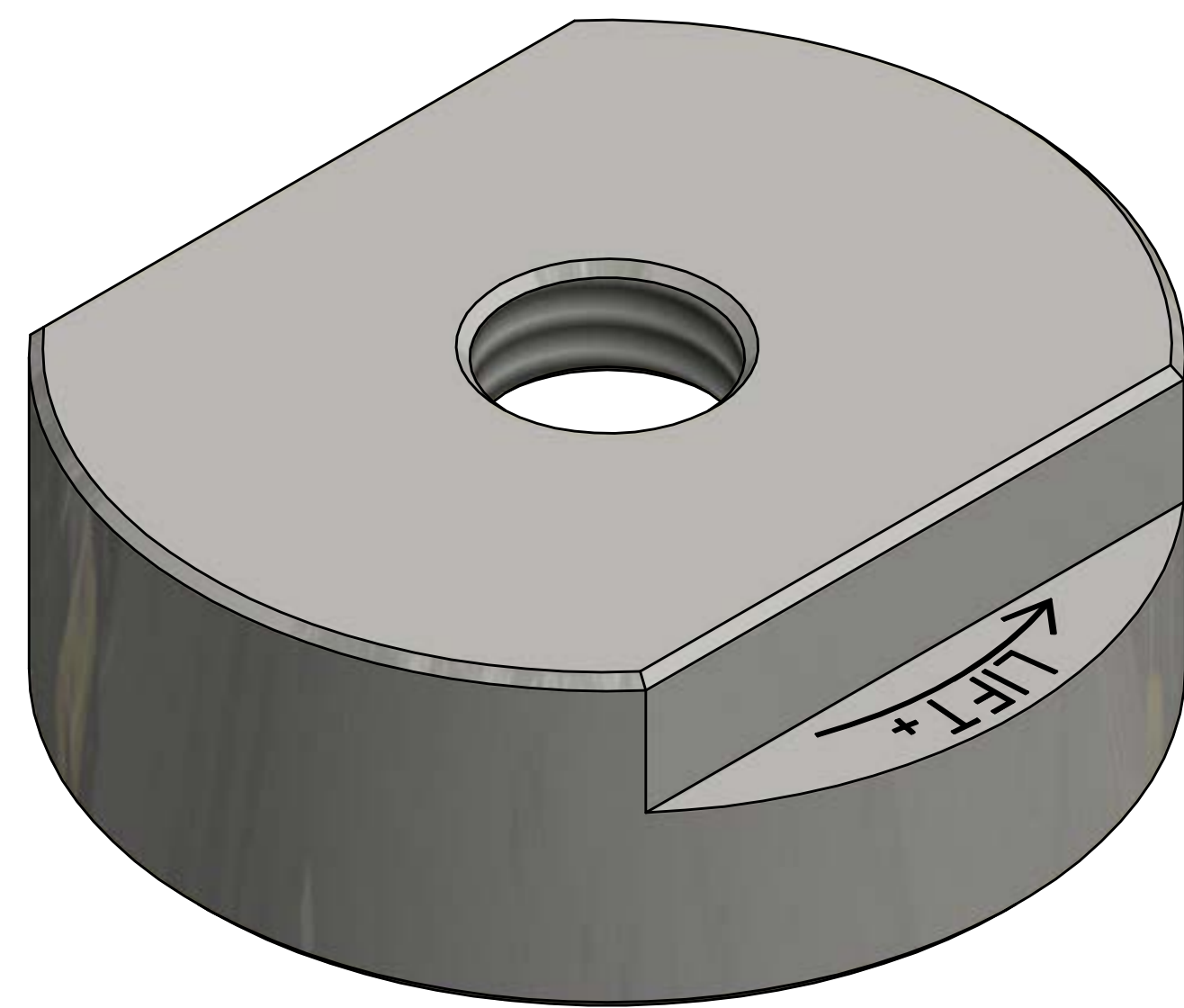
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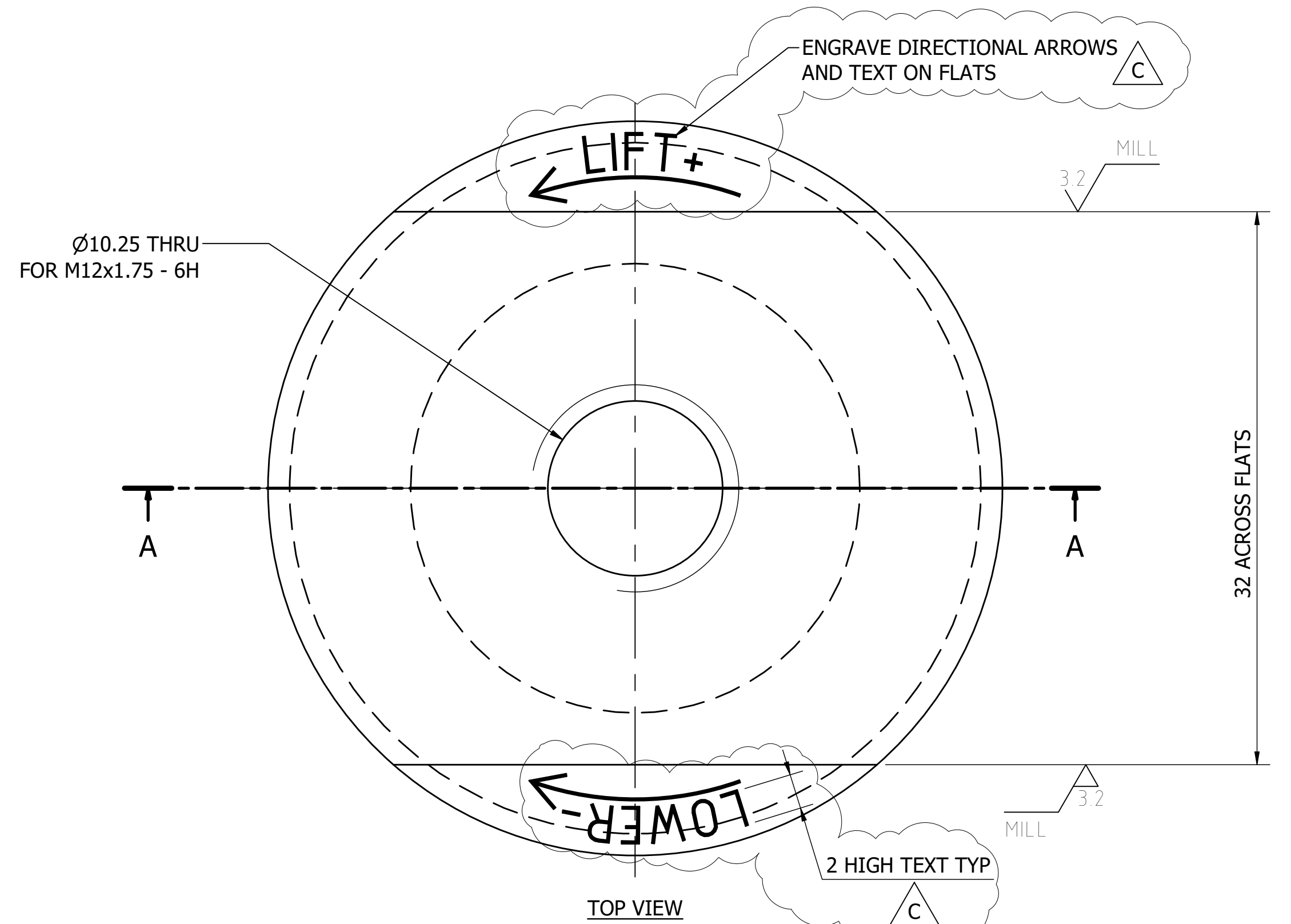
Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
LUG ATTACHMENT SLEEVE

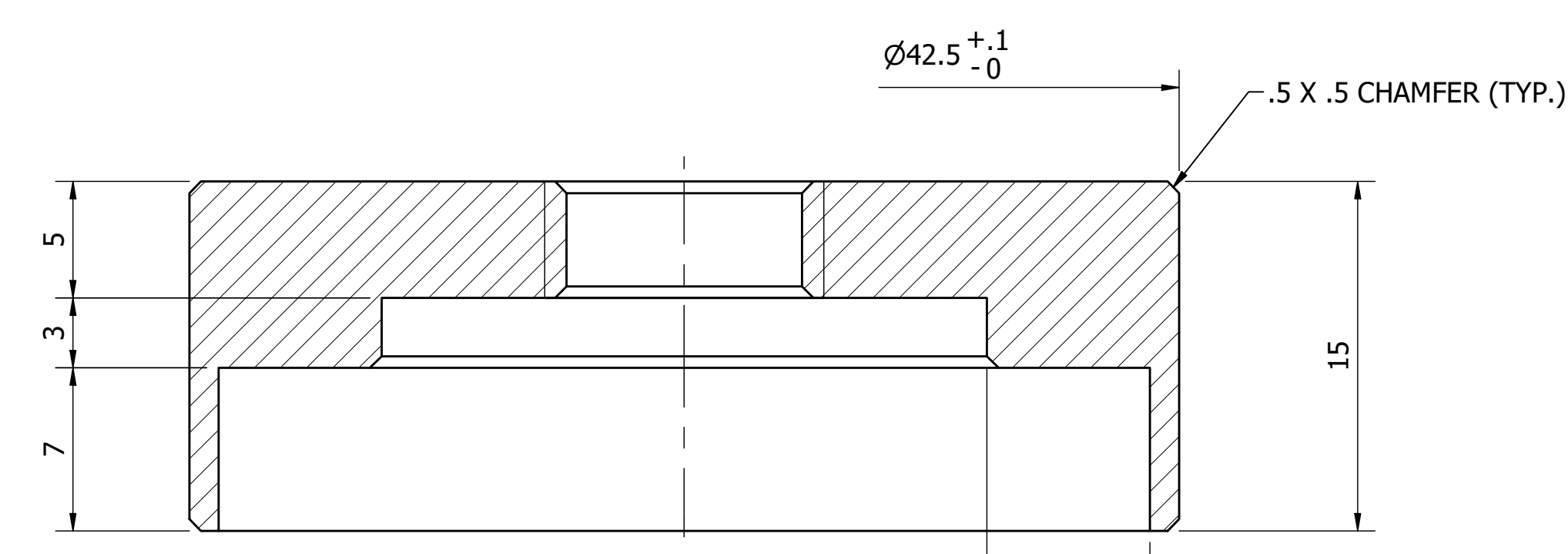
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Project No.:	ME18003	Tender No.:			
ACT Cadastral Information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016					
41	MHL2012	Rev	C		



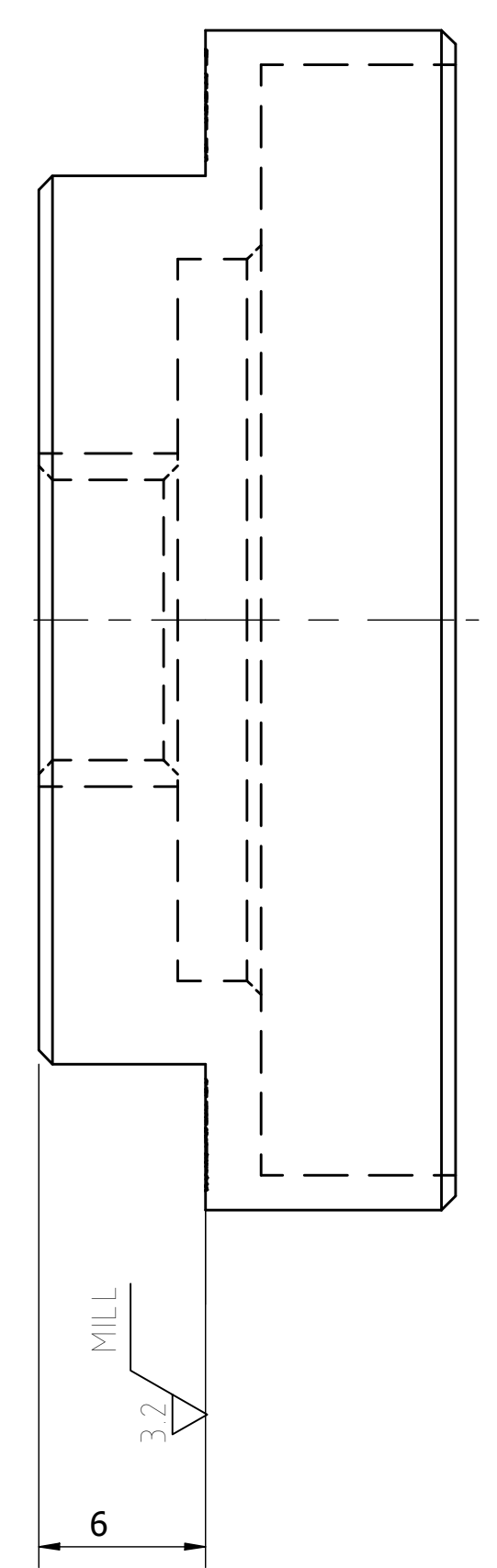
ISOMETRIC



TOP VIEW



SECTION A-A



SIDE VIEW

PART - MHL2013
TOP CAP BEARING COVER/LOCKNUT

SCALE: 2 : 1

MATERIAL: Ø50 MILD STEEL MACHINING BAR
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 80 g

Issued For Construction

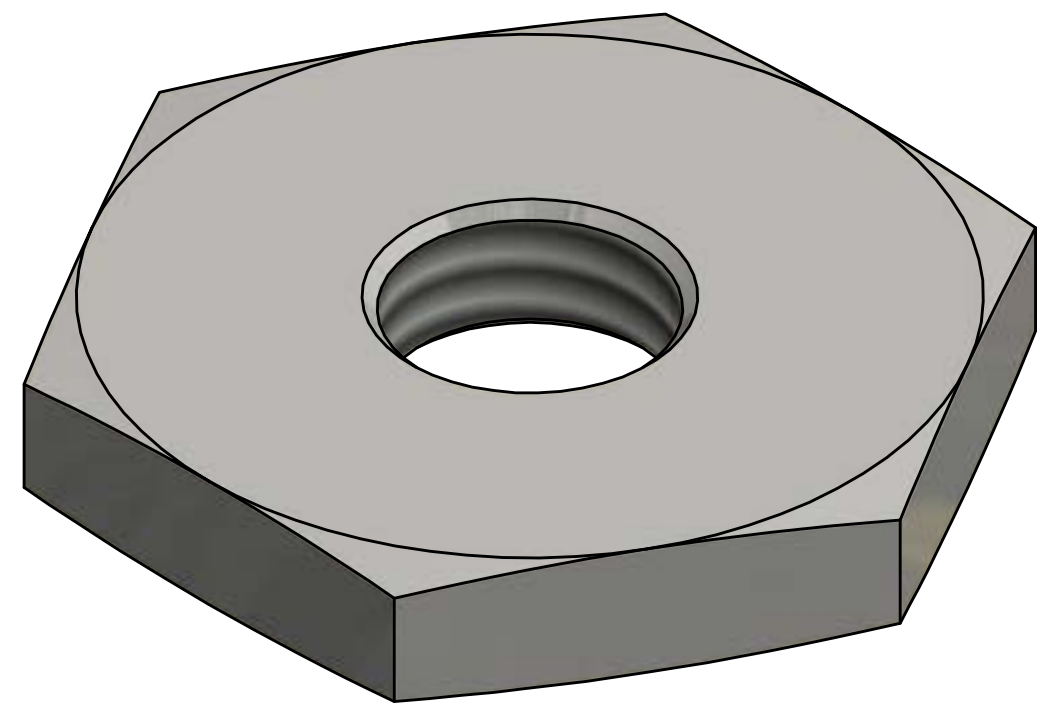
No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	ISSUED FOR CONSTRUCTION	5/06/2019			
B	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
C	ISSUED FOR CONSTRUCTION - ADDED DIRECTION ENGRAVING	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick



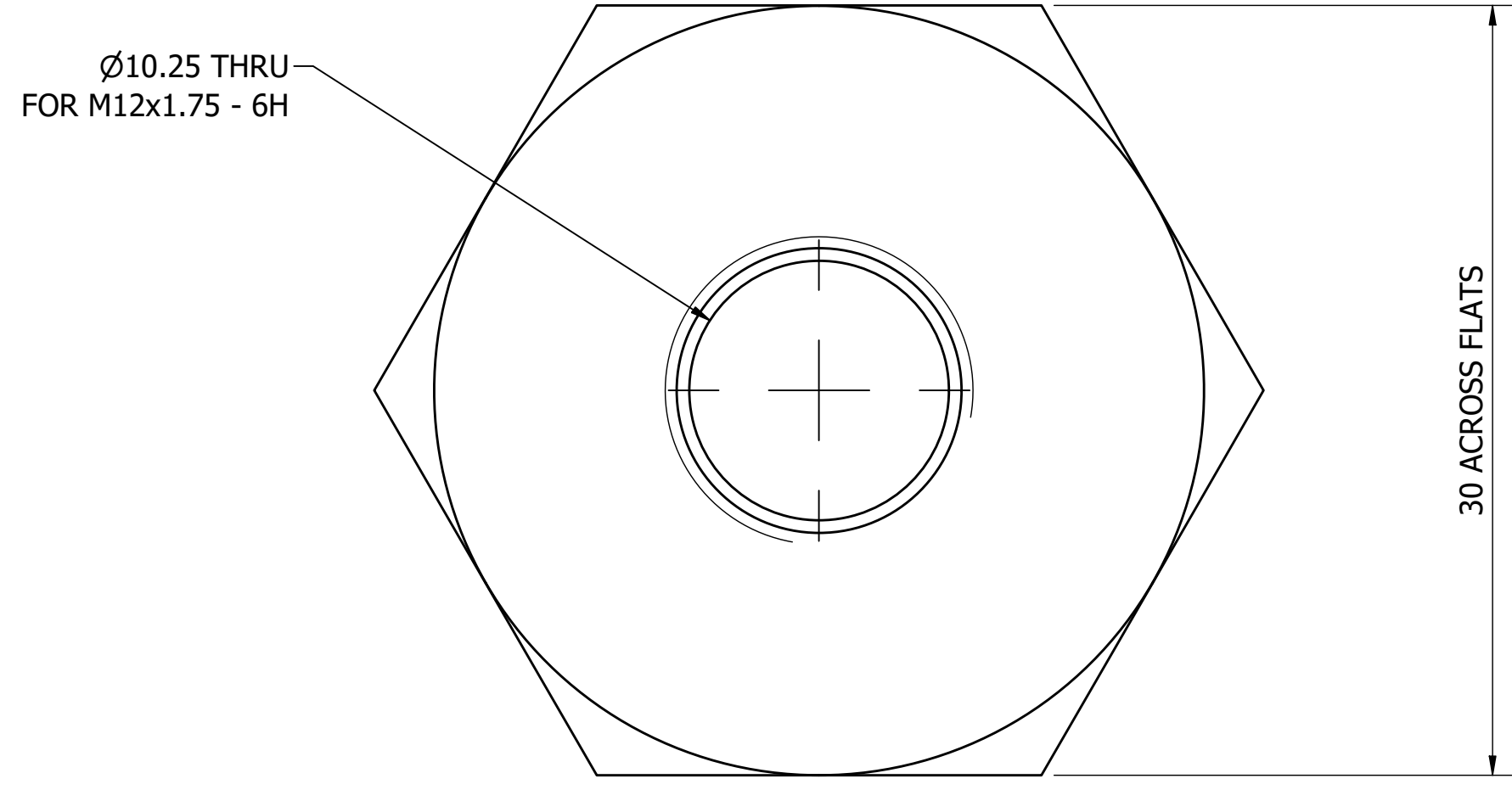
Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 TOP CAP BEARING COVER / LOCKNUT

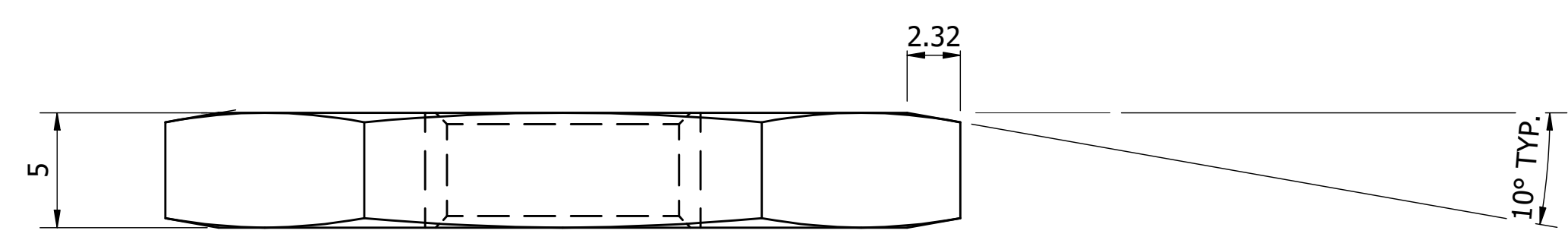
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Project No.:	ME18003	Tender No.:			
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Rev	A1	MHL2013			C



ISOMETRIC



TOP VIEW



FRONT VIEW

PART - MHL2014
TOP CAP LOCKNUT
 SCALE: 2 : 1

MATERIAL: Ø50 MILD STEEL MACHINING BAR
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 30 g

Issued For Construction

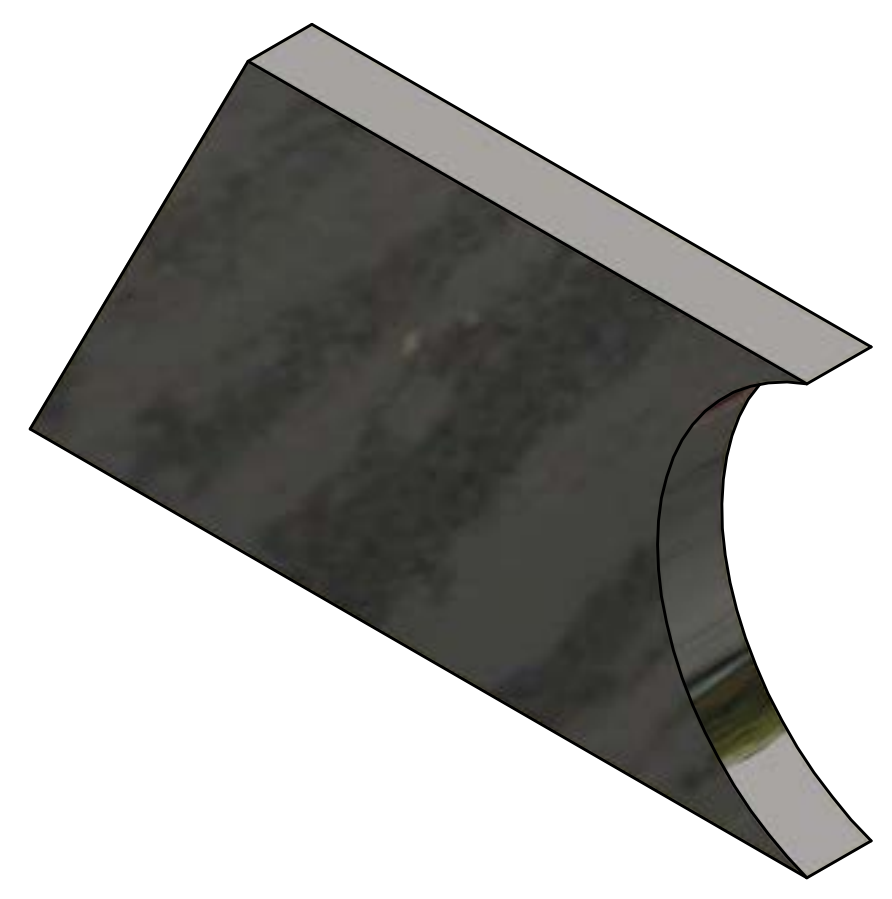
No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	ISSUED FOR CONSTRUCTION	5/06/2019			
B	ISSUED FOR CONSTRUCTION	15/01/2020	E. Nielsen		K. Danenbergsons
C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick



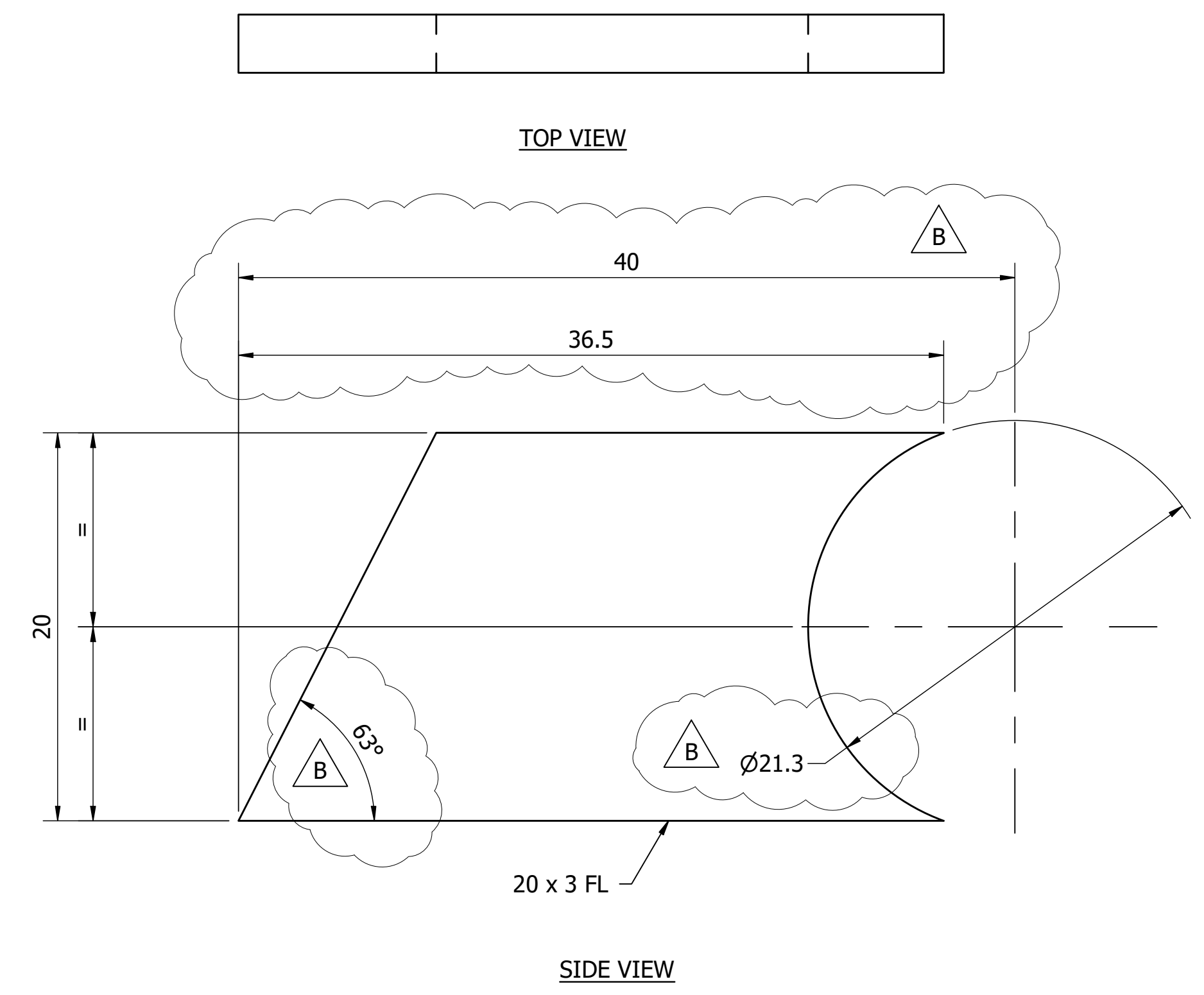
Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 LOCKNUT

Scale:	AS SHOWN	Date:	5/06/2019	Sheet No.:	
Project No.:	ME18003	Tender No.:			
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AI	MHL2014	Rev	C		



ISOMETRIC



PART - MHL2018
LOCK TUBE SUPPORT
 SCALE: 2 : 1

MATERIAL: CARBON STEEL
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 20 g

Issued For Construction

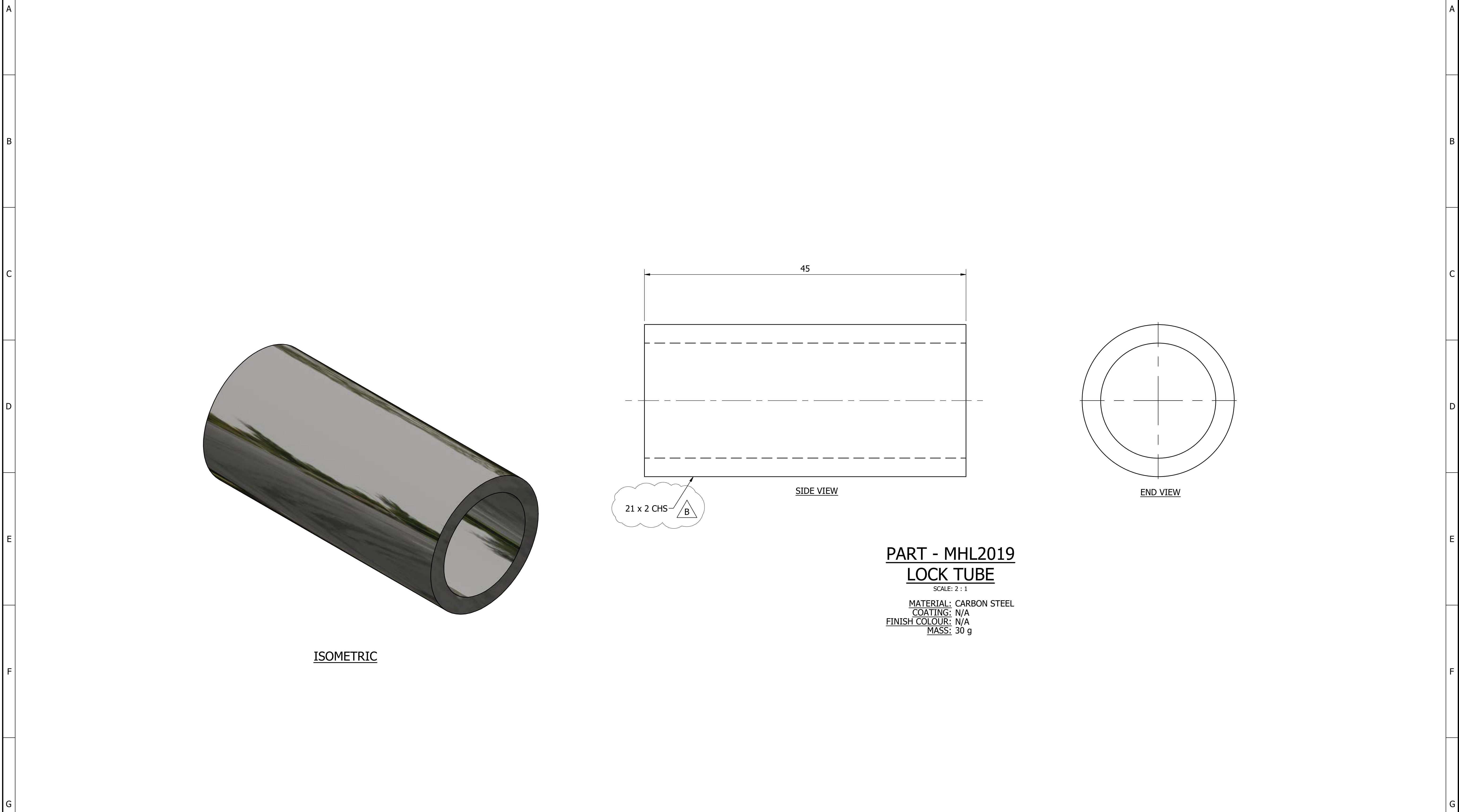
No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	ISSUED FOR CONSTRUCTION	15/01/2020	E. Nielsen		K. Danenbergsons
B	ISSUED FOR CONSTRUCTION (MODIFICATIONS TO LOCK TUBE)	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick



Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 LOCK TUBE SUPPORT


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Project No.:	ME18003	Tender No.:			
ACT Cadastral information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016					
Rev	41	MHL2018			B



ISOMETRIC

SIDE VIEW

END VIEW

21 x 2 CHS 

**PART - MHL2019
LOCK TUBE**

SCALE: 2 : 1

MATERIAL: CARBON STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 30 g

Issued For Construction

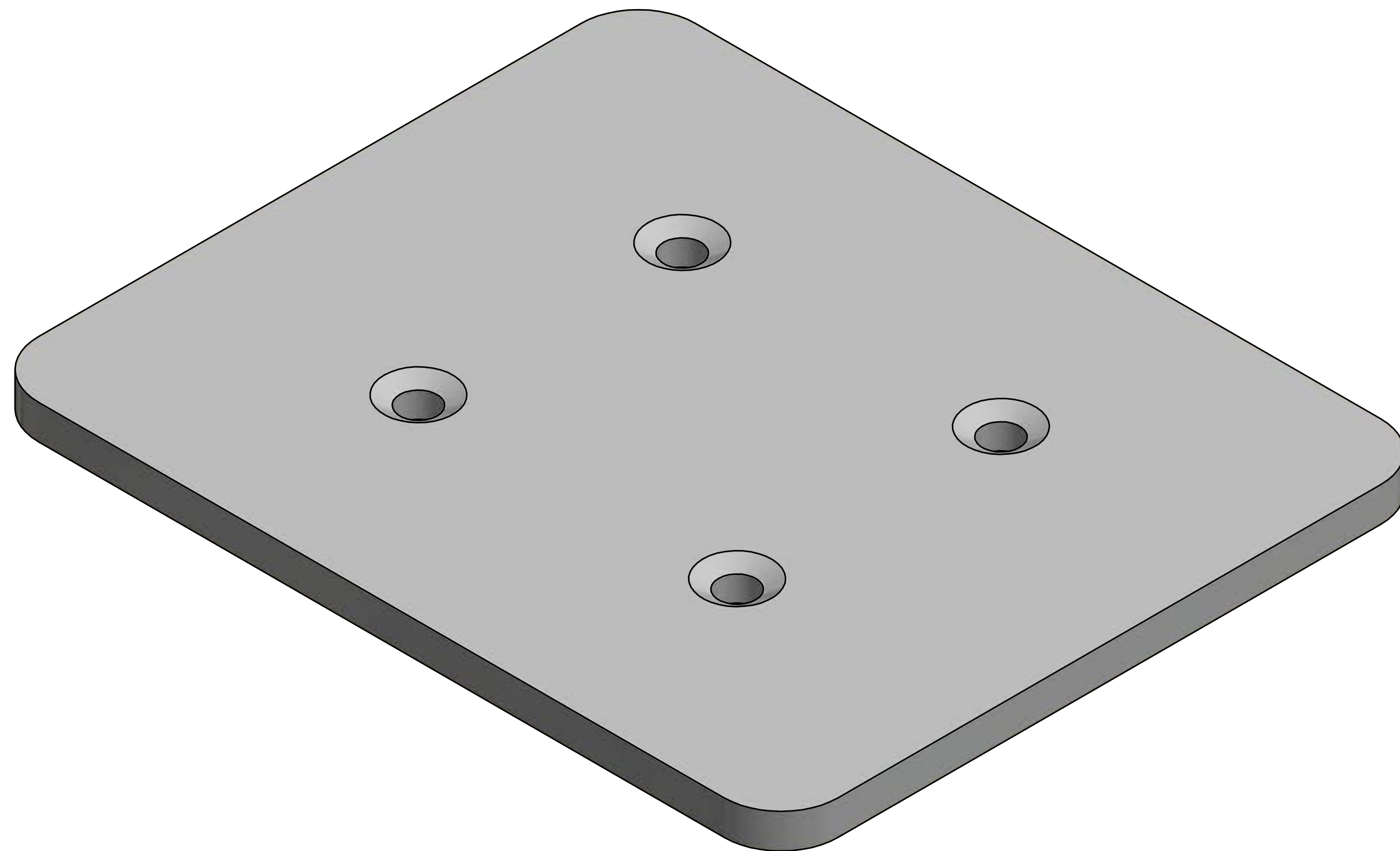
No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	ISSUED FOR CONSTRUCTION	5/06/2019	E. Nielsen		K. Danenbergsons
B	ISSUED FOR CONSTRUCTION (TUBE SIZE CHANGE TO 20x2 CHS)	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick



Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

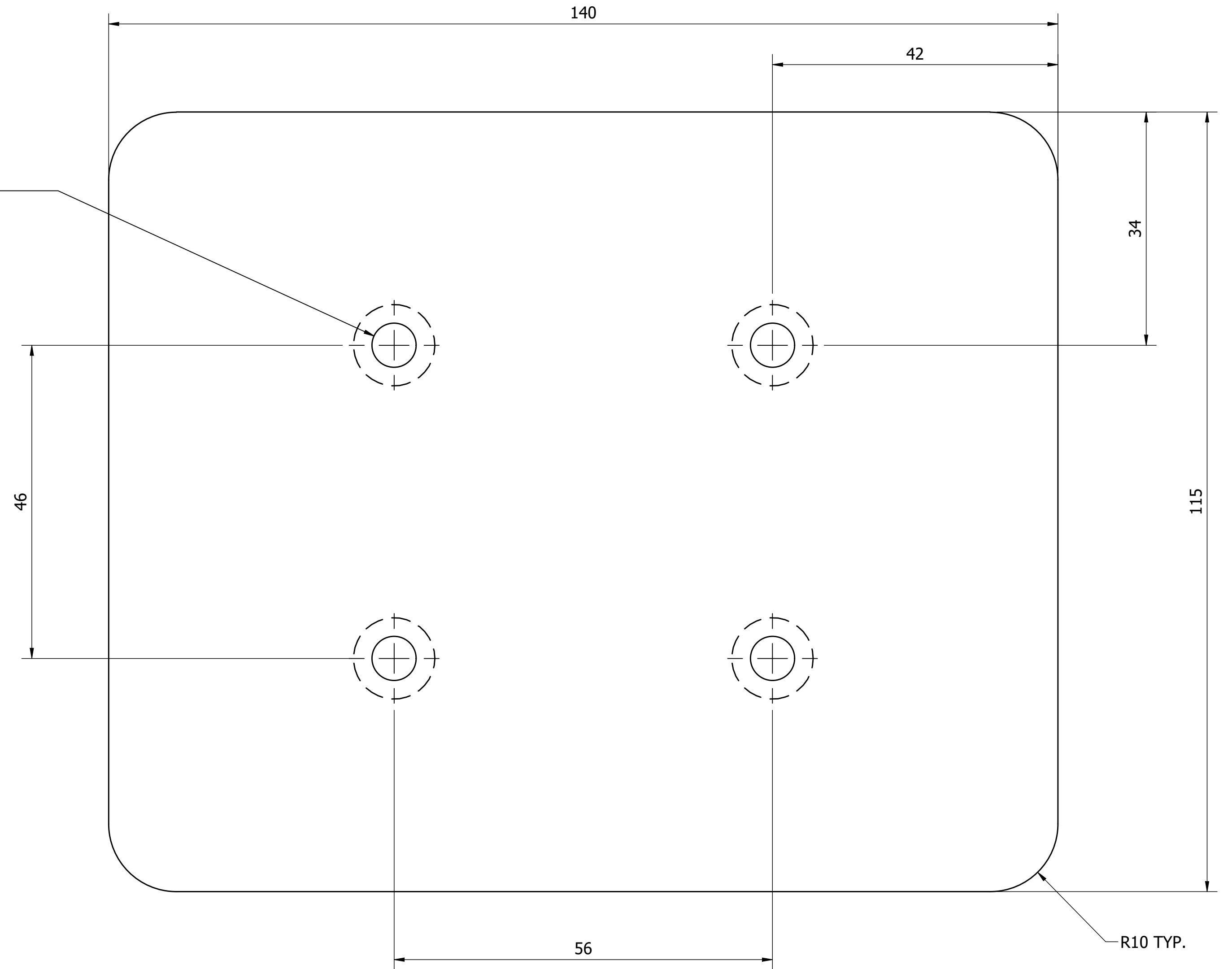
ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
LOCK TUBE

Scale:	AS SHOWN	Date:	15/01/2020	Sheet No.:	
Project No.:	ME18003	Tender No.:			
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41	MHL2019	Rev	B		

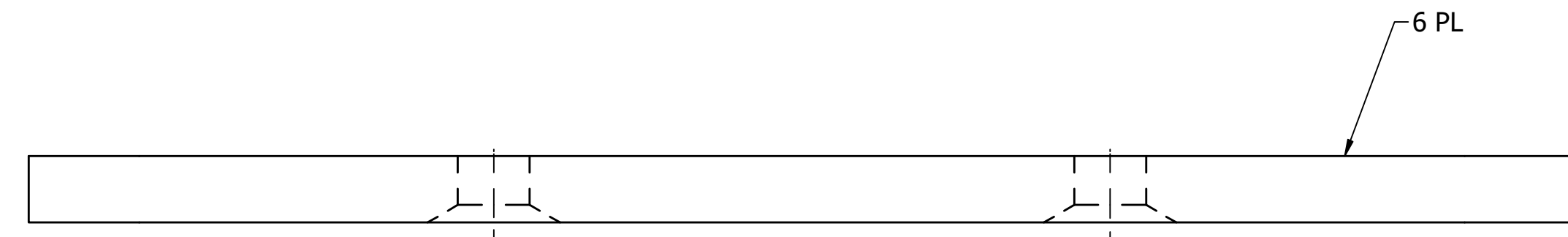


ISOMETRIC
(UNDERSIDE SHOWN)

HOLE
Ø6.5 THRU
✓ Ø12 X 120°
TYP.



TOP VIEW



FRONT VIEW

**PART - MHL2023
FOOTING PLATE**

SCALE: 2 : 1

MATERIAL: ALUMINIUM 5052-H32
COATING: N/A
FINISH COLOUR: N/A
MASS: 260 g

Issued For Construction

No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	ISSUED FOR CONSTRUCTION	12/05/2020	E. Nielsen	K. Danenbergsons	C. Patrick

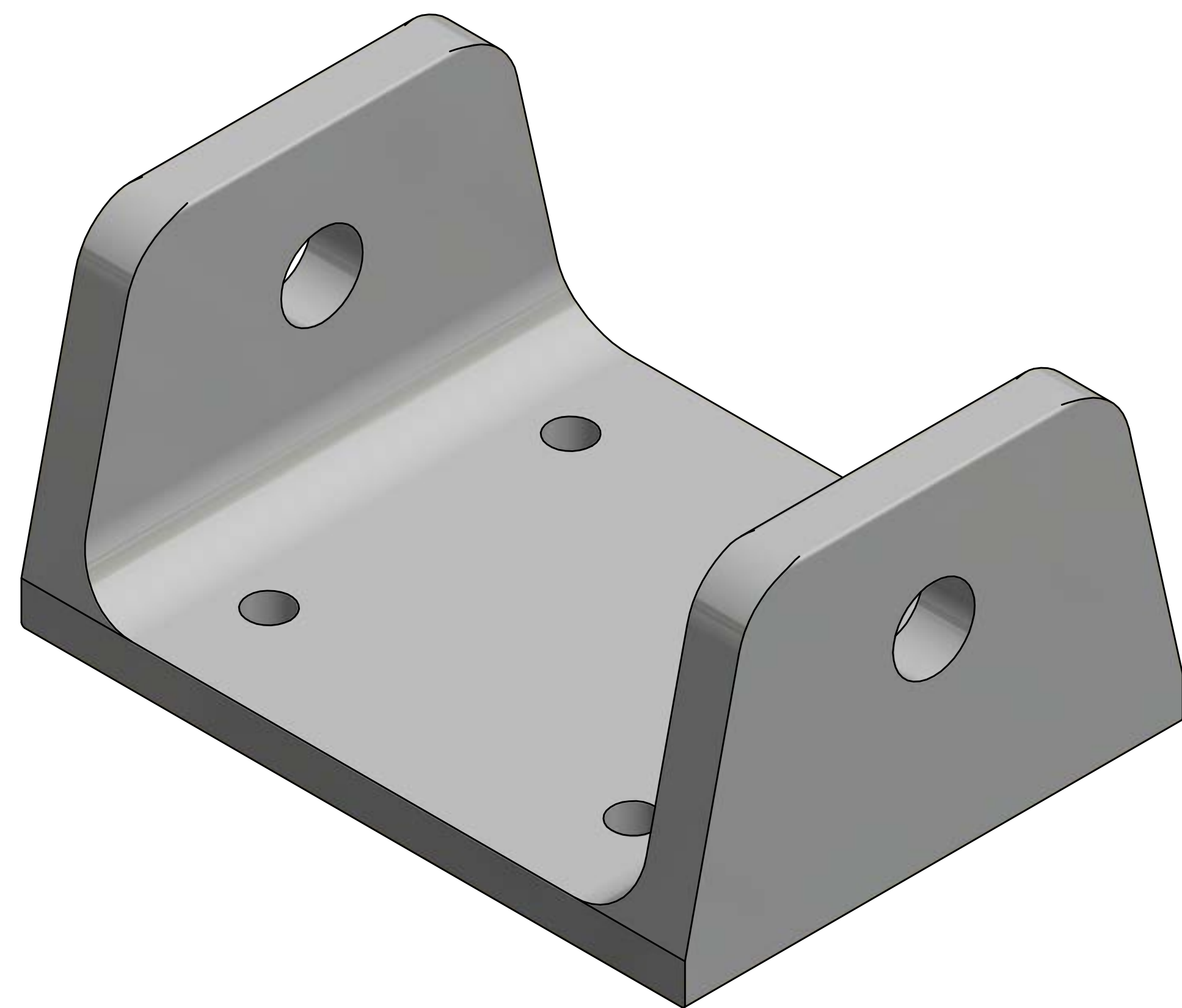
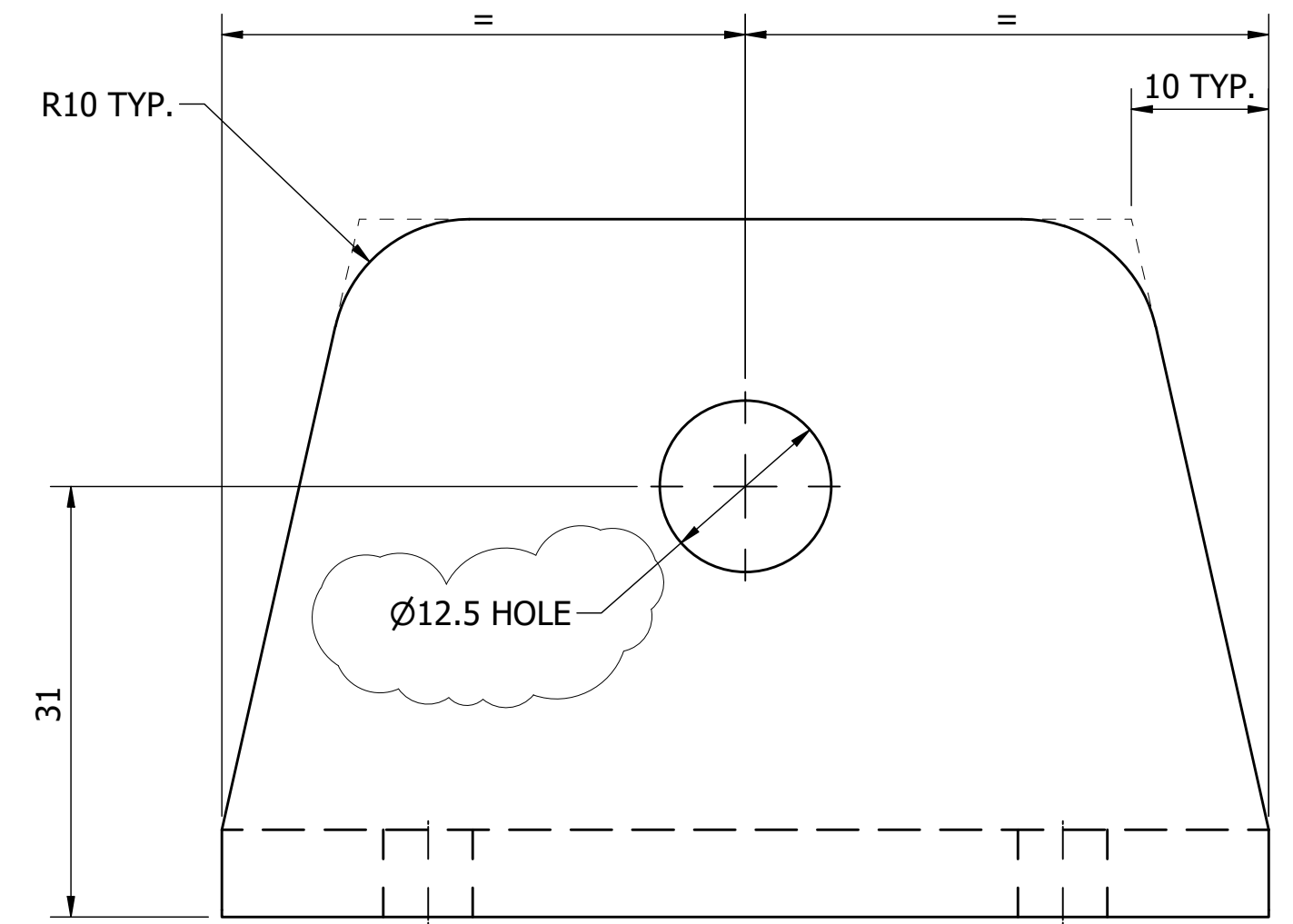
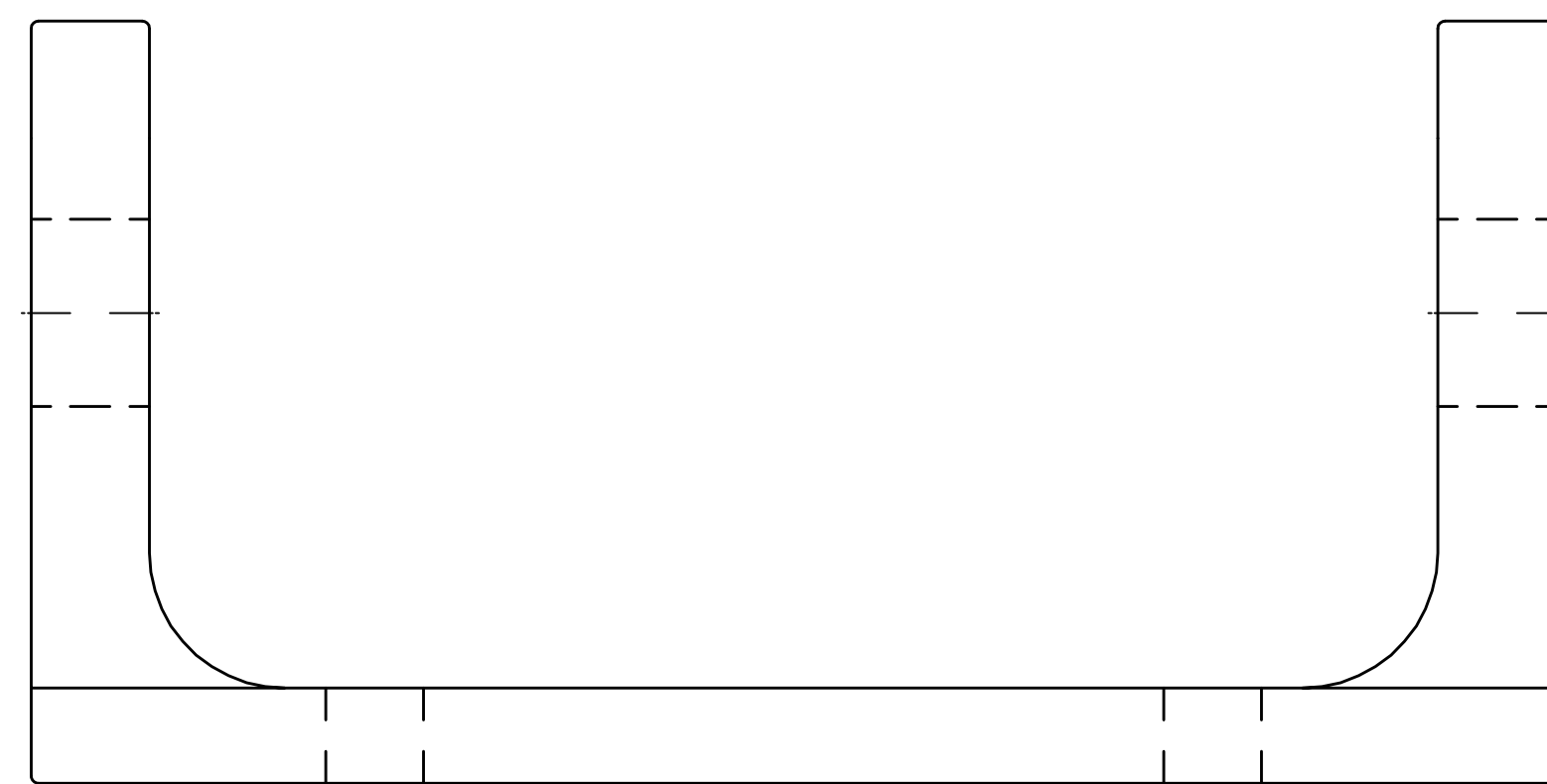
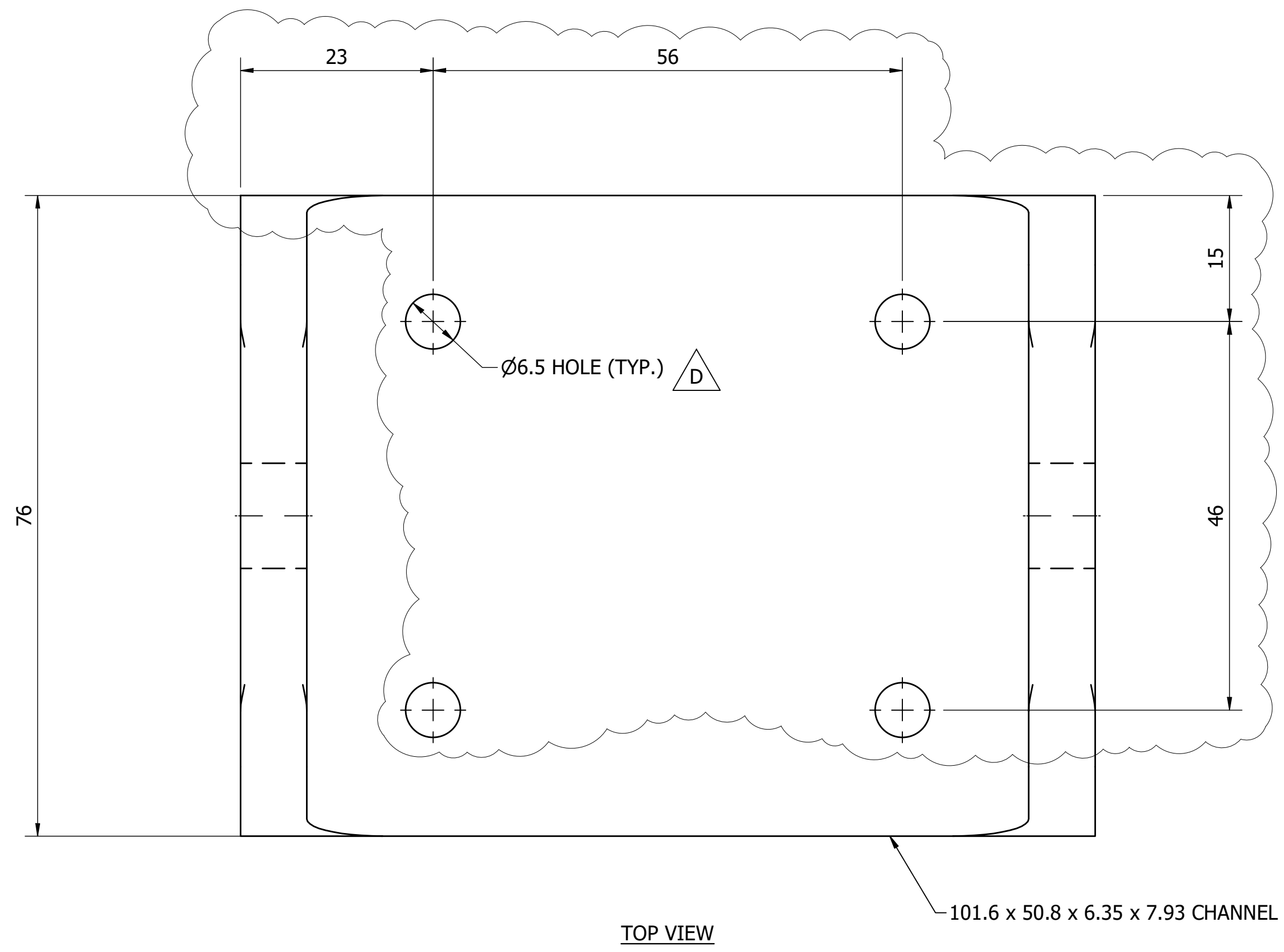
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Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	
Verified:	
Design Authority:	

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
FOOTING PLATE

Scale:	AS SHOWN	Date:	12/05/2020	Sheet No.:	
Project No.:	ME18003	Tender No.:			
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Rev	A1	MHL2023			A



**PART - MHL4004
HINGE BRACKET**

SCALE: 2 : 1

MATERIAL: ALUMINIUM 6061-T6
COATING: N/A
FINISH COLOUR: N/A
MASS: 236 g

Issued For Construction

No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	ISSUED FOR CONSTRUCTION	29/03/2019			
B	UPDATED TO REFLECT PROTOTYPE TESTING	11/06/2019			
C	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
D	ISSUED FOR CONSTRUCTION - ADDED HOLES FOR BASE PLATE	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick

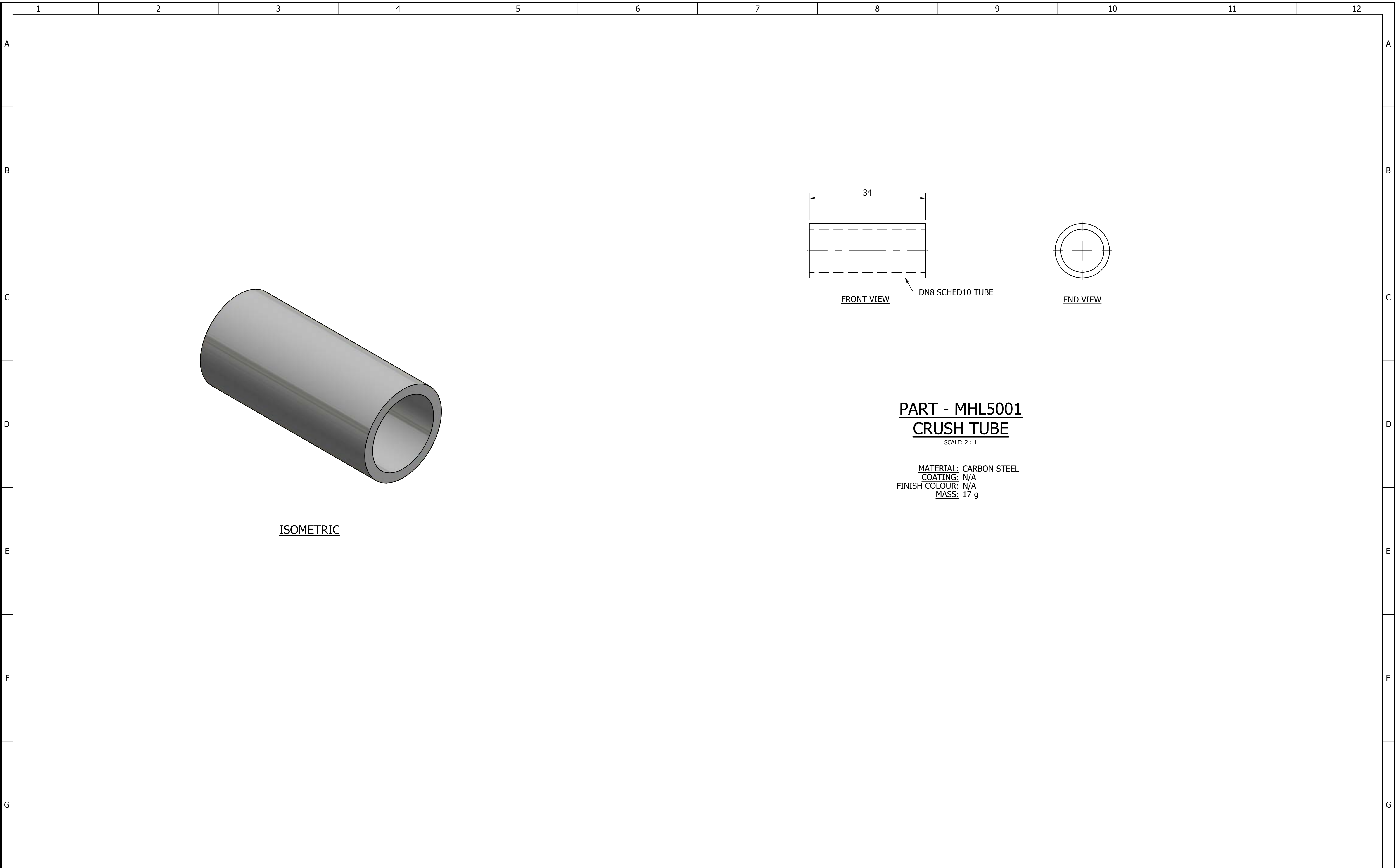
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Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
FABRICATION DETAILS
HINGE BRACKET

Scale:	Date:	Sheet No.:
AS SHOWN	22/03/2019	
Project No.:	Tender No.:	
ME18003		
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41	MHL4004	Rev D

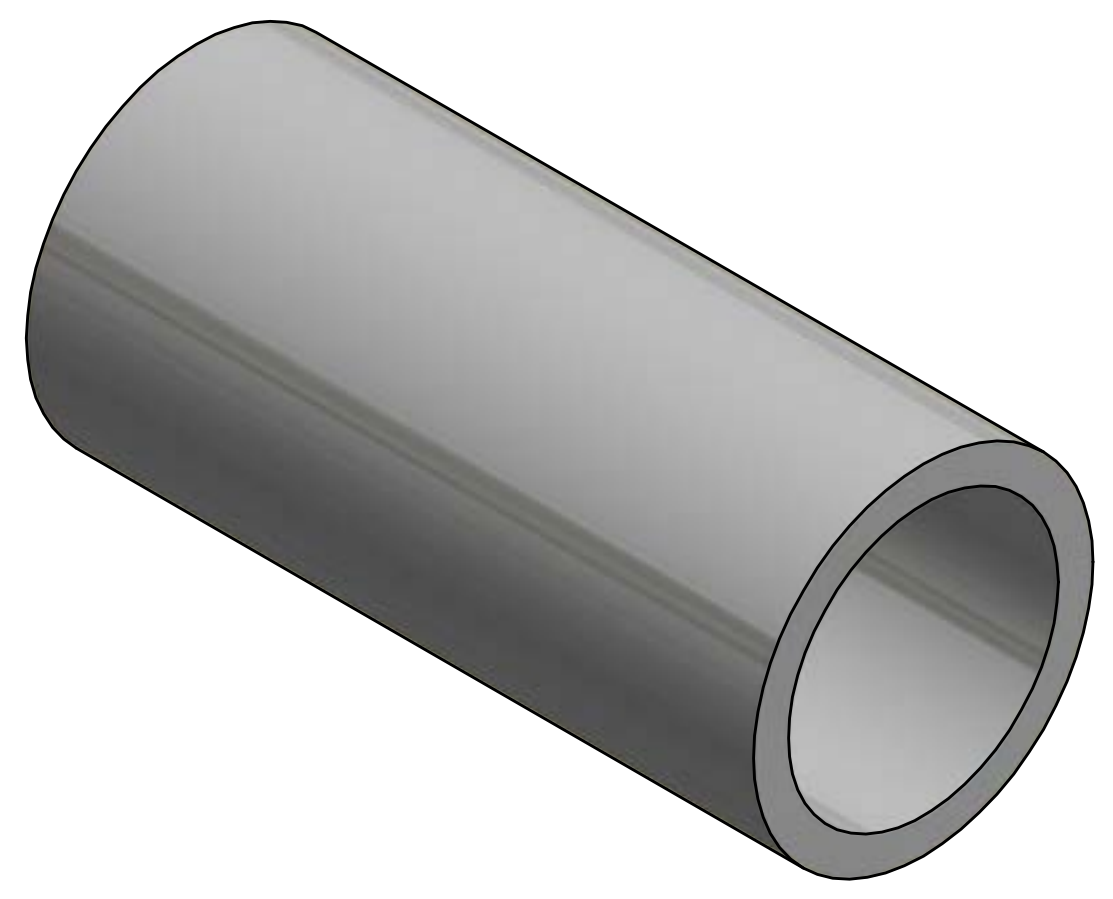


34
 FRONT VIEW
 DN8 SCHED10 TUBE

END VIEW


PART - MHL5001
CRUSH TUBE
 SCALE: 2 : 1

MATERIAL: CARBON STEEL
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 17 g

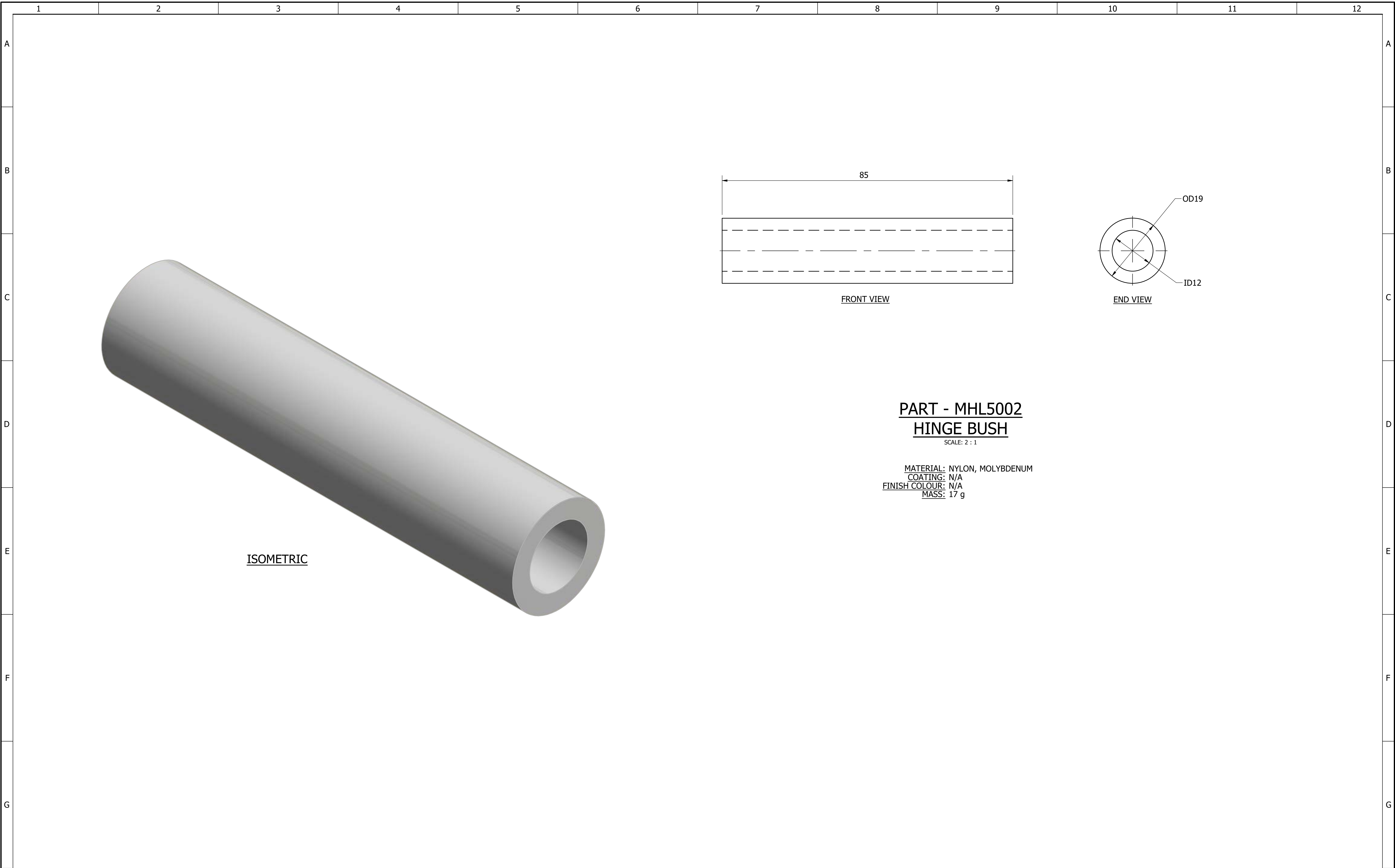


ISOMETRIC

Issued For Construction

A		ISSUED FOR CONSTRUCTION	29/03/2019					Drawn: M. Matusiak Designed: E. Nielsen Engineering Checked: E. Nielsen Verified: Design Authority: K. Danenbergsons	ICON WATER ENGINEERING SERVICES GROUP MANHOLE LIFTER FABRICATION DETAILS CRUSH TUBE	Scale: AS SHOWN	Date: 22/03/2019	Sheet No.:		
B		ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen	K. Danenbergsons					Project No.: ME18003	Tender No.:			
C		ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick				ACT Cadastral Information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016				
No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH					41	MHL5001	Rev C		

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PART - MHL5002
HINGE BUSH

SCALE: 2 : 1

MATERIAL: NYLON, MOLYBDENUM
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 17 g

ISOMETRIC

Issued For Construction

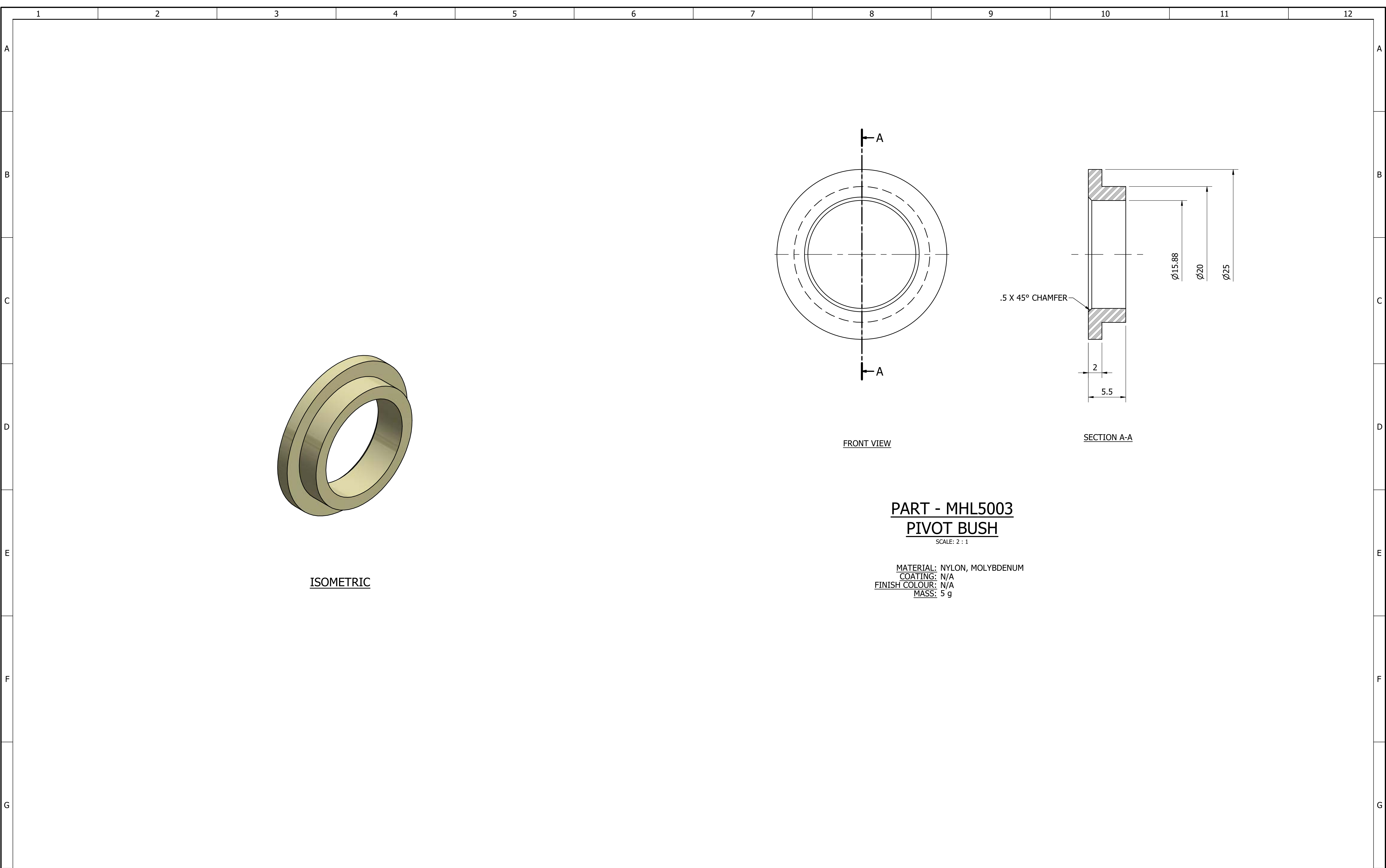
No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	ISSUED FOR CONSTRUCTION	29/03/2019			
B	ISSUED FOR CONSTRUCTION - INC. MARKUPS FROM TESTING	15/01/2020	E. Nielsen		K. Danenbergsons
C	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick



Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 HINGE BUSH

Scale:	AS SHOWN	Date:	22/03/2019	Sheet No.:	
Project No.:	ME18003	Tender No.:			
ACT Cadastral Information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016					
Rev	41	MHL5002			C

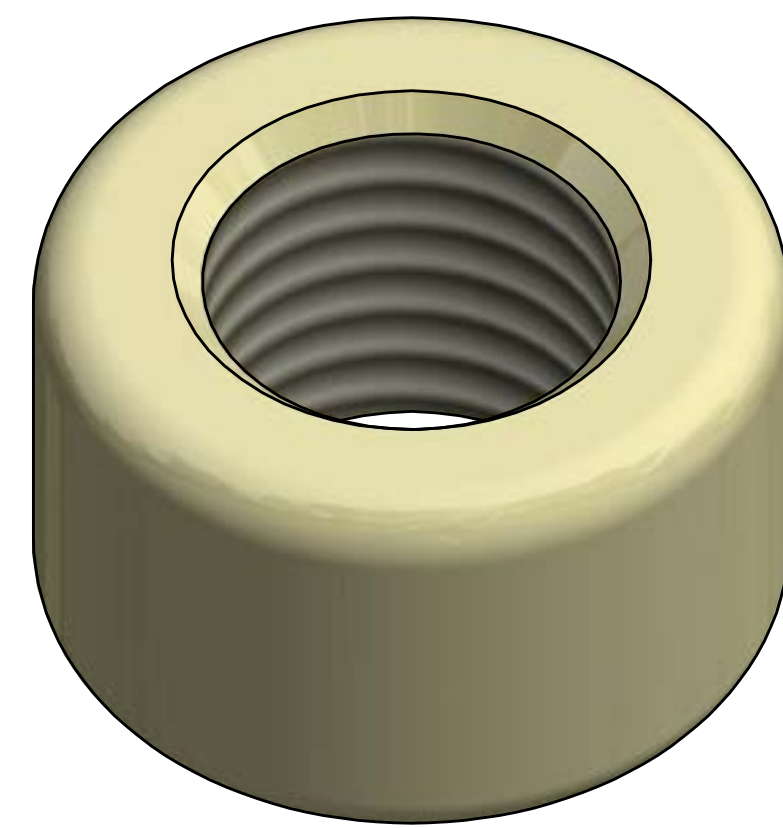


PART - MHL5003
PIVOT BUSH
 SCALE: 2 : 1

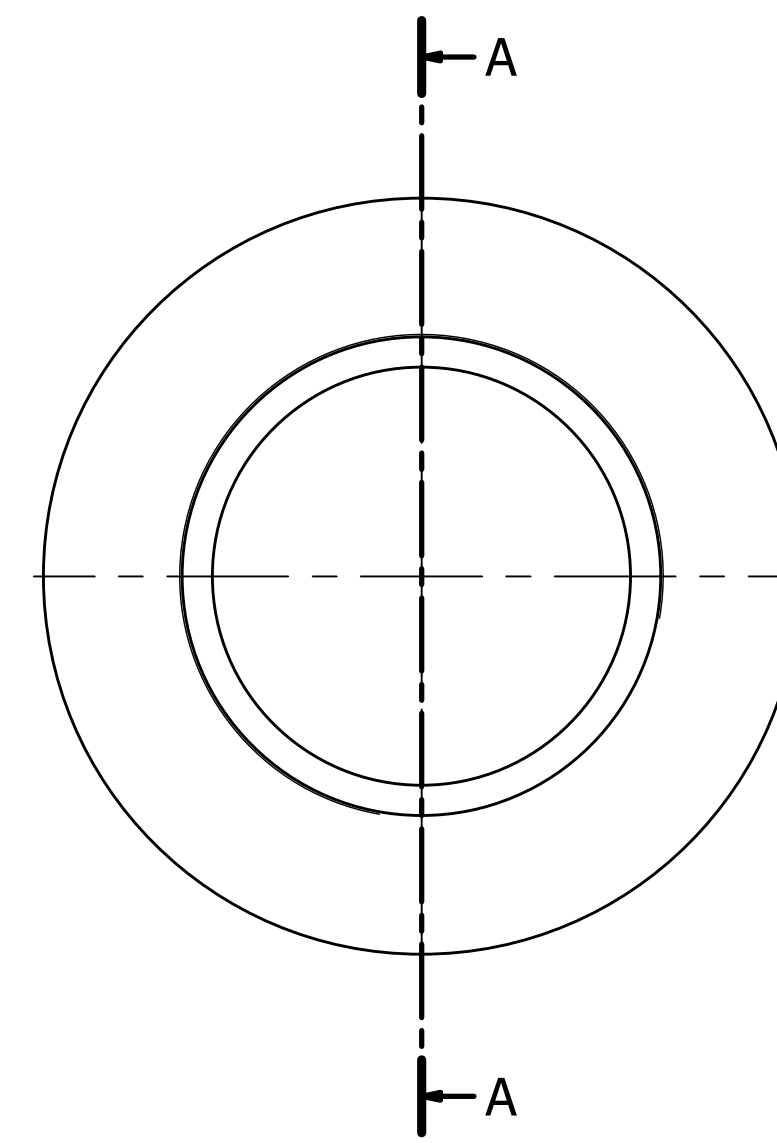
MATERIAL: NYLON, MOLYBDENUM
 COATING: N/A
 FINISH COLOUR: N/A
 MASS: 5 g

Issued For Construction

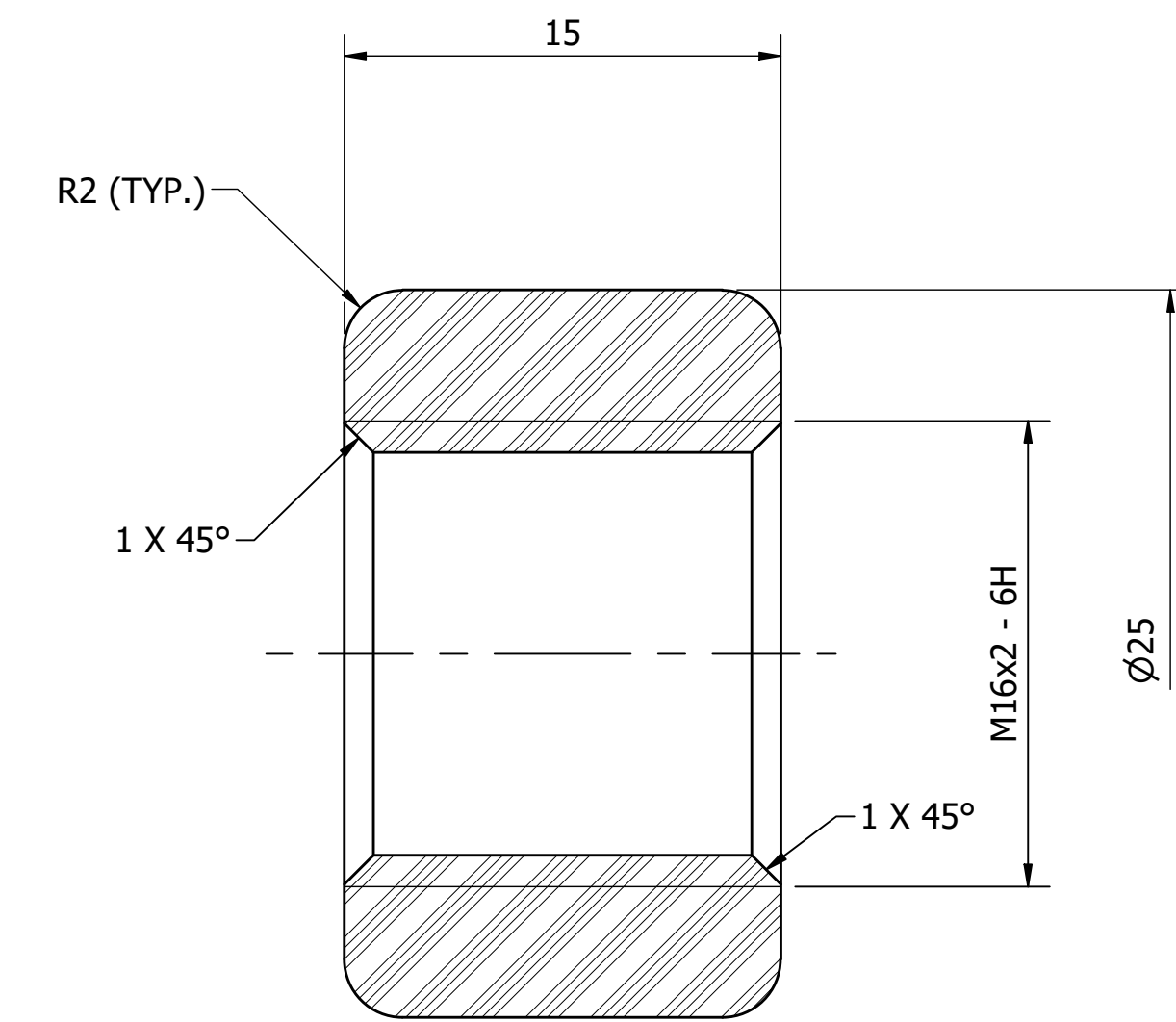
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Rev	41	MHL5003			C																																																																			



ISOMETRIC



TOP VIEW



SECTION A-A

PART - MHL5004
DRIVE SCREW LOWER BUSH

SCALE: 2 : 1

MATERIAL: NYLON, MOLYBDENUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 10 g

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Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen
Verified:	
Design Authority:	K. Danenbergsons

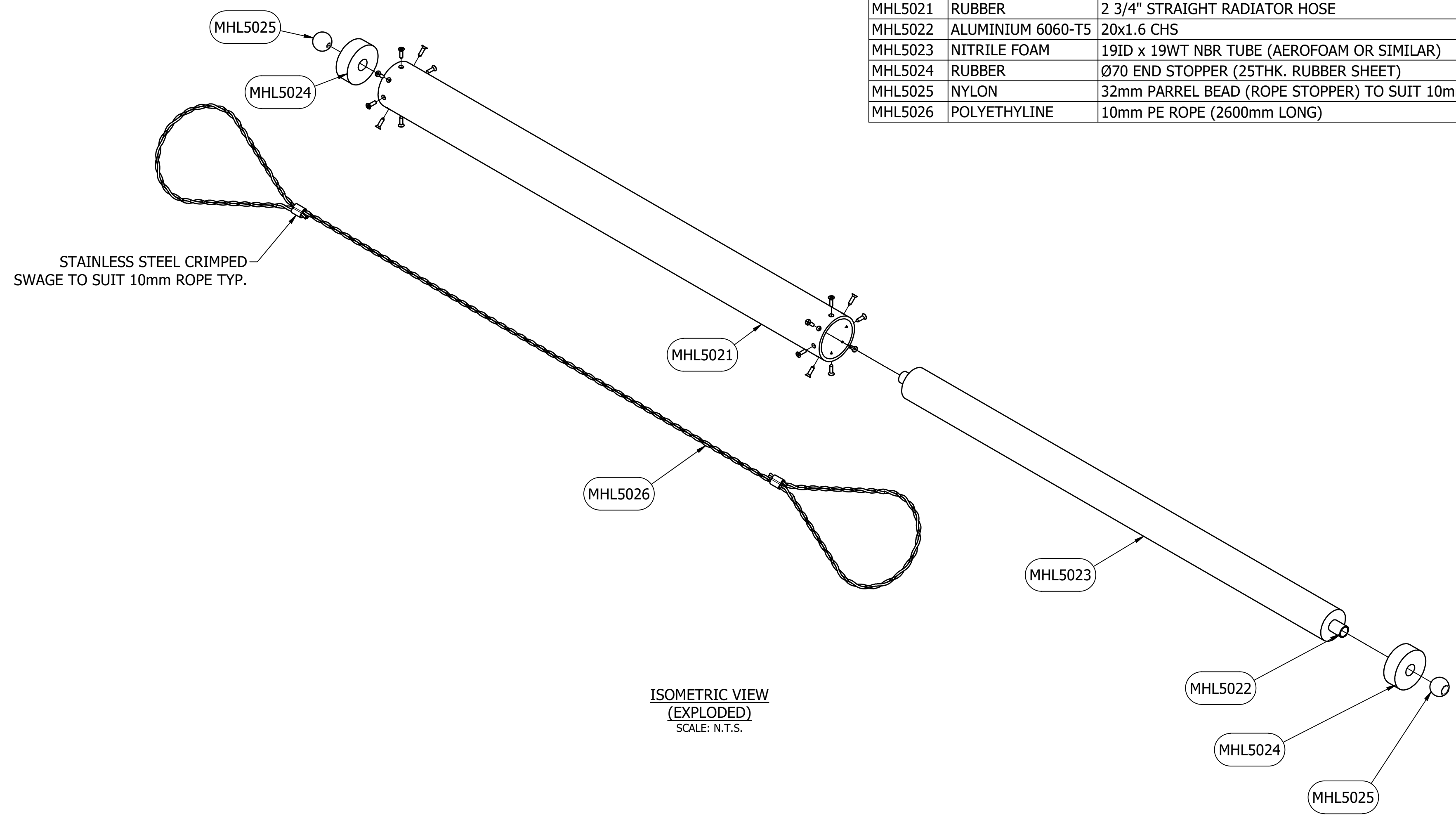
ICON WATER
 ENGINEERING SERVICES GROUP
 MANHOLE LIFTER
 FABRICATION DETAILS
 DRIVE SCREW LOWER BUSH

Scale:	AS SHOWN	Date:	21/03/2019	Sheet No.:	
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Rev	A1	MHL5004			C

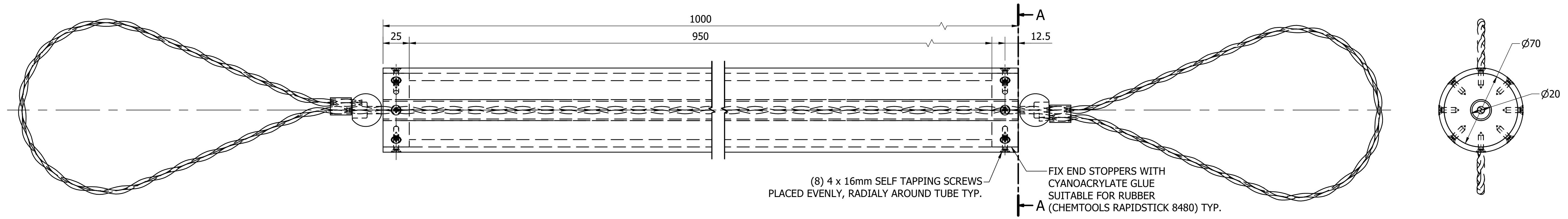
PARTS LIST				
PART NUMBER	MATERIAL	DESCRIPTION	QTY	MASS
MHL5021	RUBBER	2 3/4" STRAIGHT RADIATOR HOSE	1	250 g
MHL5022	ALUMINIUM 6060-T5	20x1.6 CHS	1	65 g
MHL5023	NITRILE FOAM	19ID x 19WT NBR TUBE (AEROFOAM OR SIMILAR)	1	85 g
MHL5024	RUBBER	Ø70 END STOPPER (25THK. RUBBER SHEET)	2	15 g
MHL5025	NYLON	32mm PARREL BEAD (ROPE STOPPER) TO SUIT 10mm ROPE	2	15 g
MHL5026	POLYETHYLENE	10mm PE ROPE (2600mm LONG)	1	150 g



ISOMETRIC VIEW
(ASSEMBLED)
SCALE: N.T.S.



ISOMETRIC VIEW
(EXPLODED)
SCALE: N.T.S.



TOP VIEW

END VIEW A-A

ROLLER TUBE
SCALE: 1 : 2
MATERIAL: VARIES (REFER PARTS LIST)
COATING: N/A
FINISH COLOUR: N/A
MASS: 1.7 kg

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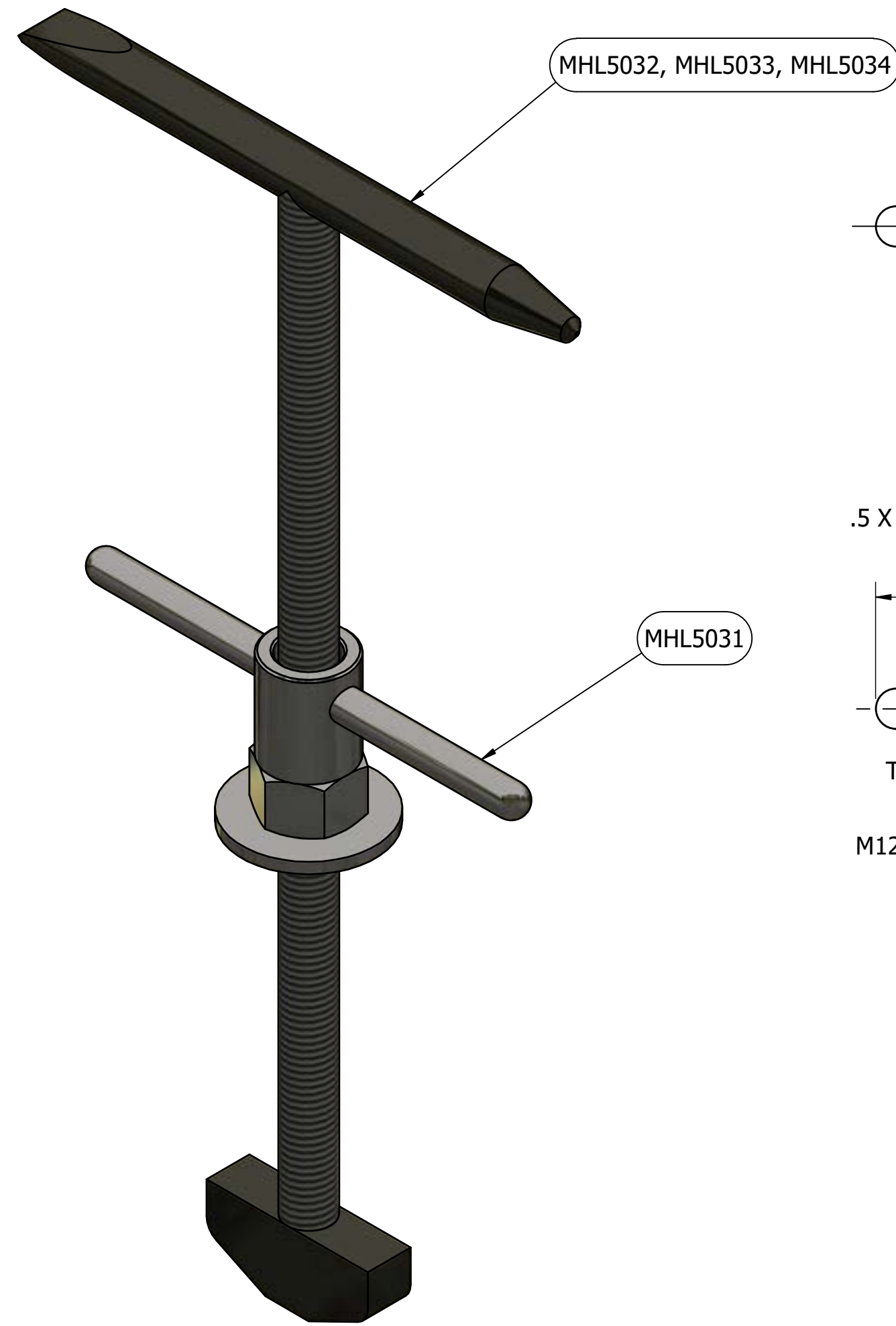
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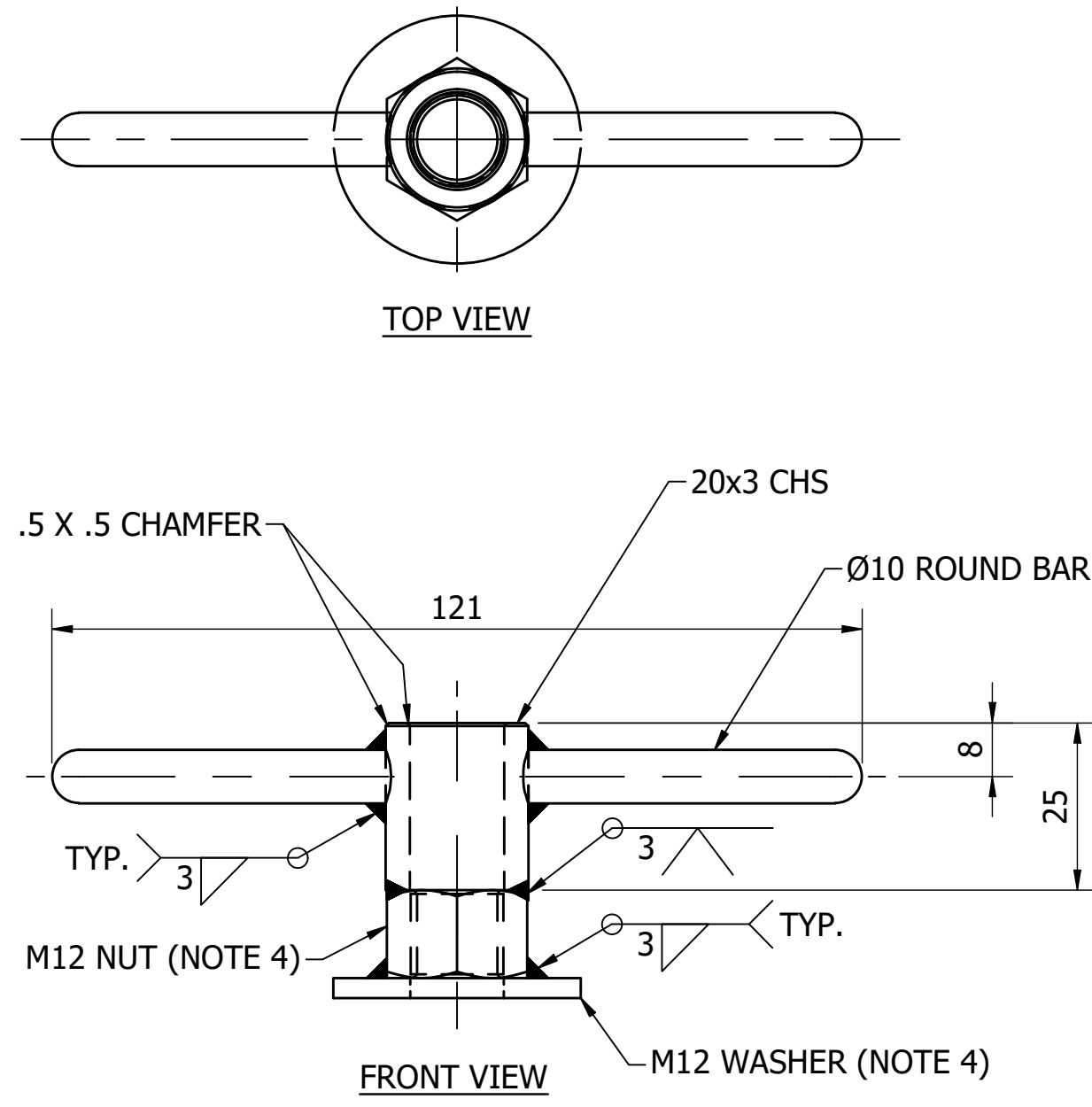
Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen 26/06/2020
Verified:	K. Danenbergsons 26/06/2020
Design Authority:	C. Patrick 26/06/2020

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
ROLLER TUBE
FABRICATION DETAILS

Scale:	AS SHOWN	Date:	25/03/2020	Sheet No.:	
Project No.:	ME18003	Tender No.:			
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AI	MHL5020	Rev	A		



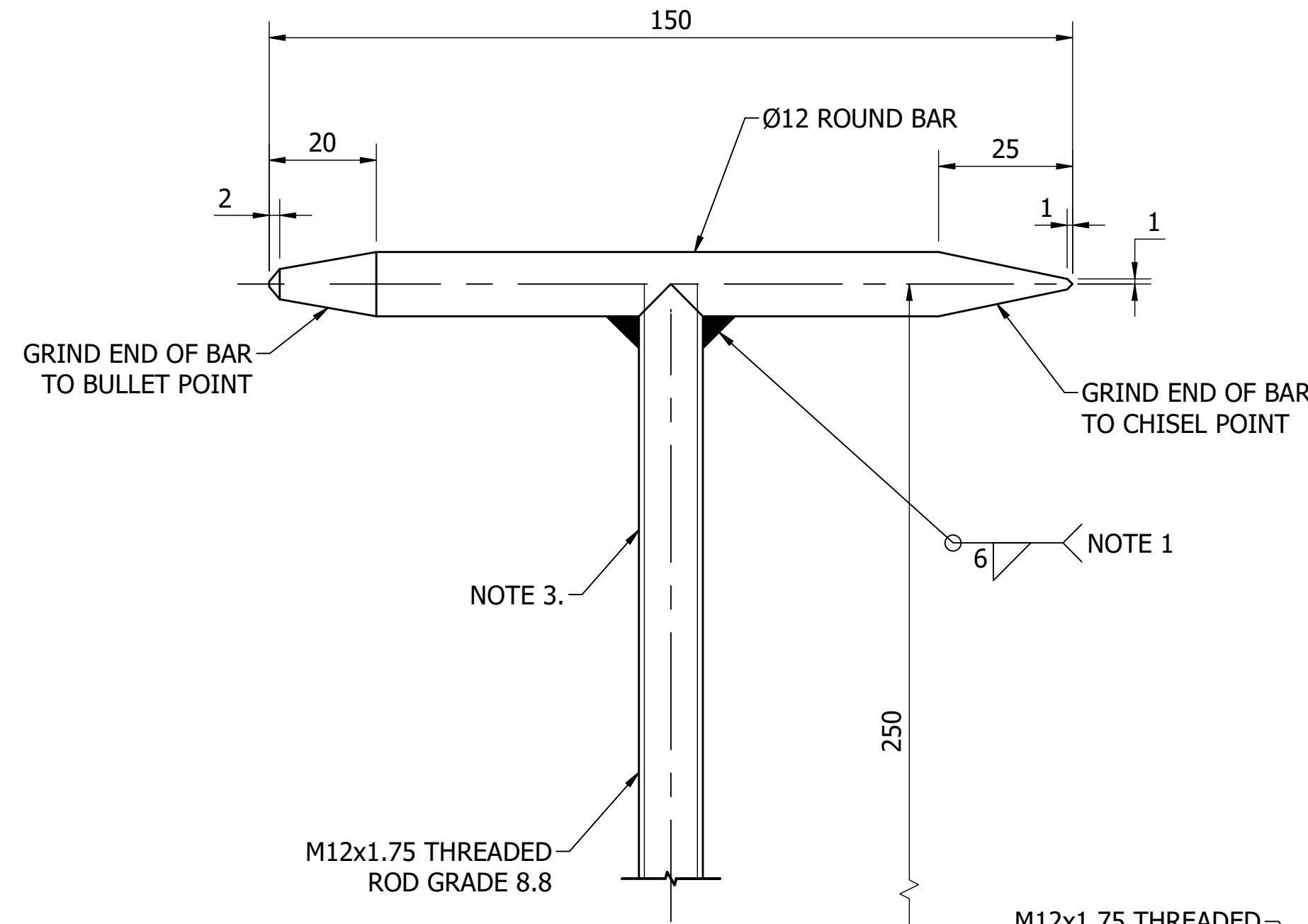
ISOMETRIC VIEW
NOT TO SCALE



PART - MHL5031
WING NUT

SCALE: 1 : 1

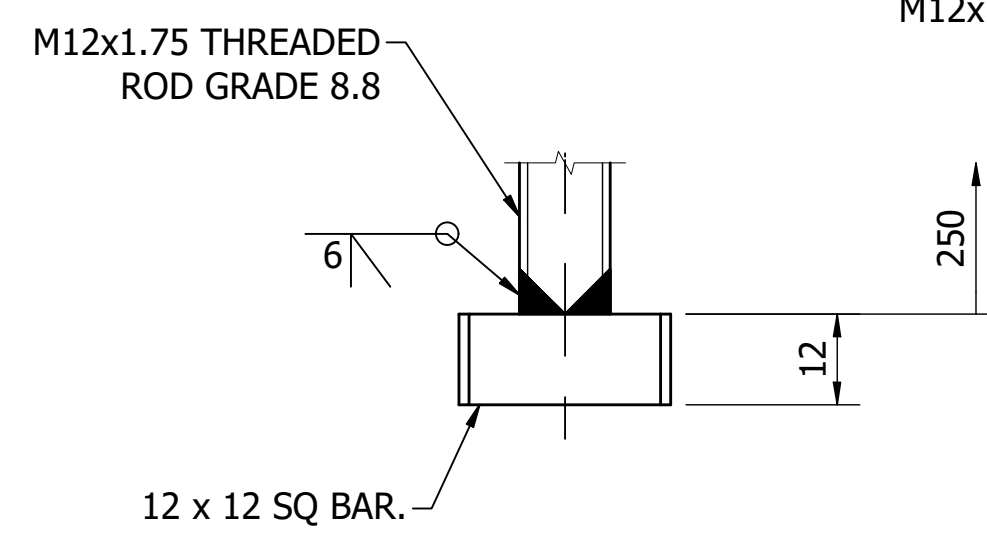
MATERIAL: MILD STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 130 g



PART - MHL5032
T-KEY CENTRE LIFT

SCALE: 1 : 1

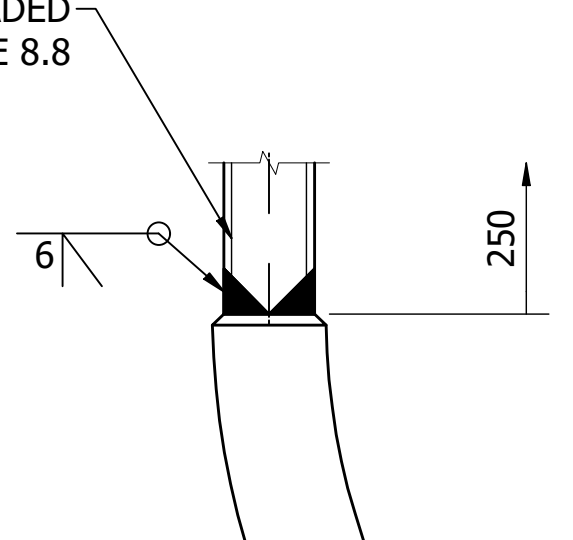
MATERIAL: AS NOTED
COATING: NIL
FINISH COLOUR: N/A
MASS: 400 g



PART - MHL5033
T-KEY GATIC

SCALE: 1 : 1

MATERIAL: AS NOTED
COATING: NIL
FINISH COLOUR: N/A
MASS: 350 g



PART - MHL5034
T-KEY HOOK

SCALE: 1 : 1

MATERIAL: AS NOTED
COATING: NIL
FINISH COLOUR: N/A
MASS: 500 g

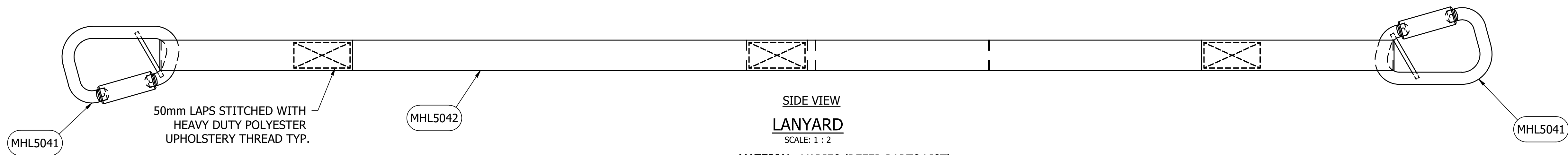
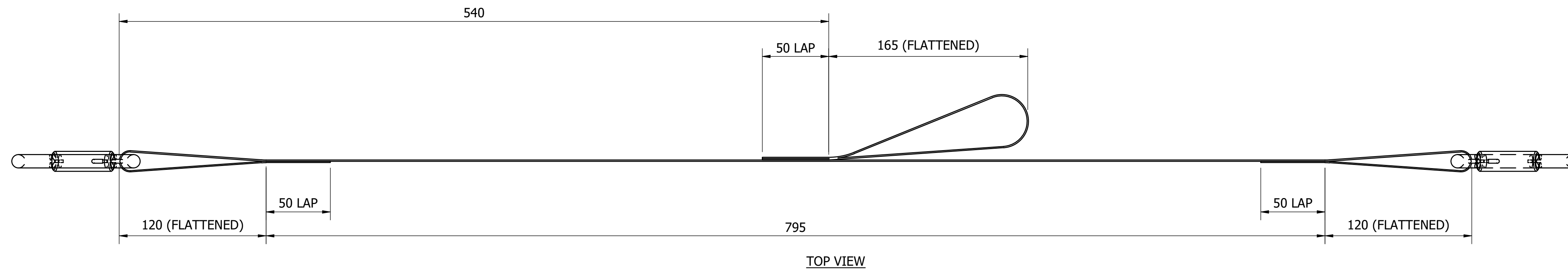
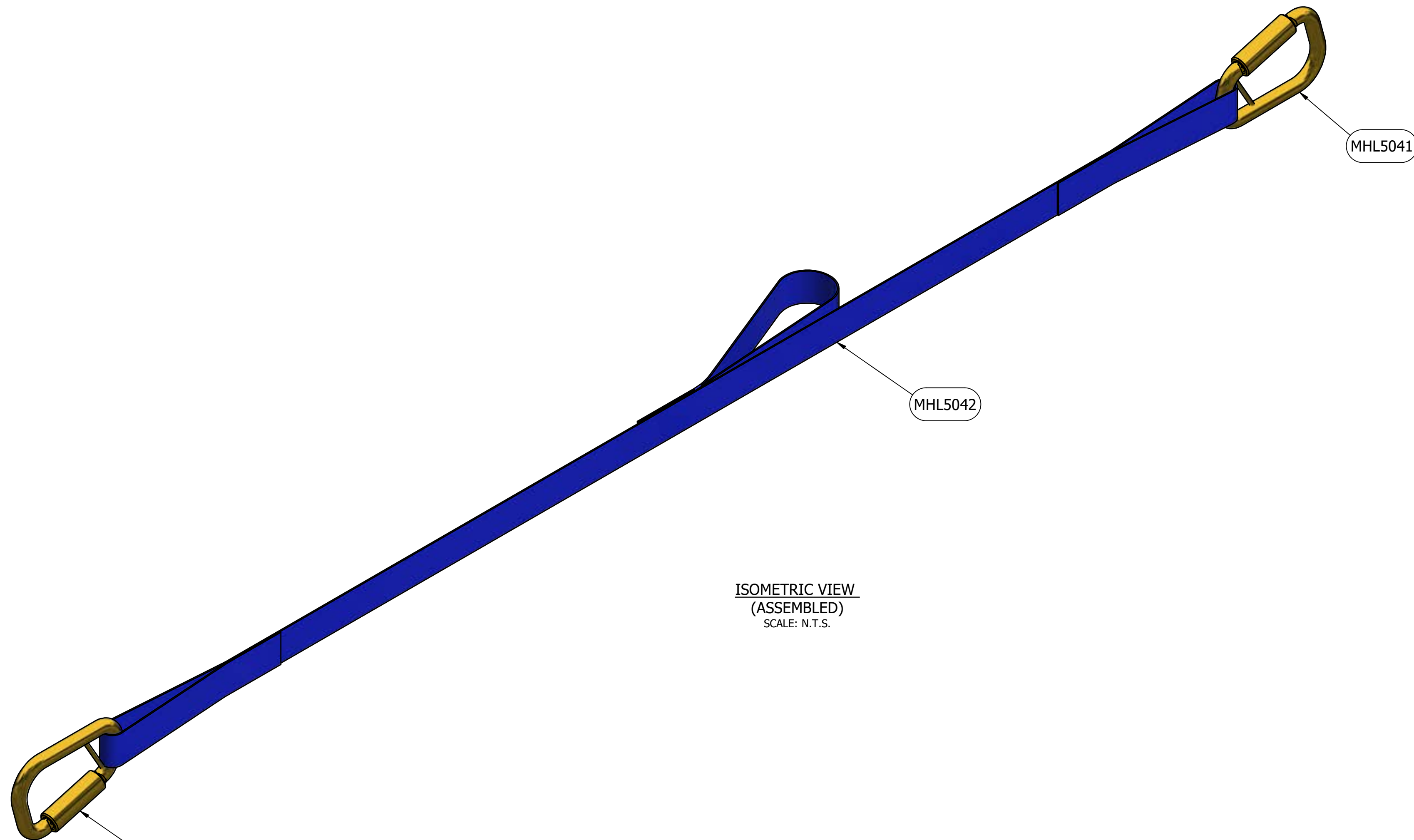
HOOK DESIGN AS PER
HALL METAL FABRICATIONS
MANHOLE HOOK (NOTE 2).

- NOTES:
- MHL5031 (WING NUT) TO BE INSTALLED ON TO THREADED ROD PRIOR TO WELDING OF T-HANDLE TO THREADED ROD.
 - FOR HOOK PLEASE CONTACT HALL METAL FABRICATIONS PH. (02) 6230 2600. FABRICATOR TO CHECK EQUIVALENCE TO AISI 4140.
 - UPPER PART OF KEY IS THE SAME FOR MHL5032, MHL5033, AND MHL5034.
 - NUTS TO AS1252 AND WASHERS TO AS1237(A1)
 - HANDLE TO BE MADE FROM AISI 4140 ROUND BAR.
 - GATIC AND CENTRE LIFT ATTACHMENTS TO BE MADE FROM 400 GRADE PLATE STEEL TO AS3678.

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<table border="1"> <tr> <td>No.</td> <td>DESCRIPTION</td> <td>DATE</td> <td>ENG CHECKED</td> <td>VERIFIED</td> <td>DESIGN AUTH</td> </tr> <tr> <td>A</td> <td>ISSUED FOR CONSTRUCTION</td> <td>26/06/2020</td> <td>E. Nielsen</td> <td>K. Danenbergsons</td> <td>C. Patrick</td> </tr> </table>					No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH	A	ISSUED FOR CONSTRUCTION	26/06/2020	E. Nielsen	K. Danenbergsons	C. Patrick			<table border="1"> <tr> <td>Drawn:</td> <td>M. Matusiak</td> </tr> <tr> <td>Designed:</td> <td>E. Nielsen</td> </tr> <tr> <td>Engineering Checked:</td> <td>E. Nielsen 26/06/2020</td> </tr> <tr> <td>Verified:</td> <td>K. Danenbergsons 26/06/2020</td> </tr> <tr> <td>Design Authority:</td> <td>C. Patrick 26/06/2020</td> </tr> </table>			Drawn:	M. Matusiak	Designed:	E. Nielsen	Engineering Checked:	E. Nielsen 26/06/2020	Verified:	K. Danenbergsons 26/06/2020	Design Authority:	C. Patrick 26/06/2020	<p>MHL5030 ENGINEERING SERVICES GROUP MANHOLE LIFTER FABRICATION DETAILS MAINTENANCE HOLE ATTACHMENT KEYS</p>			<table border="1"> <tr> <td>Scale:</td> <td>AS SHOWN</td> <td>Date:</td> <td>21/03/2019</td> <td>Sheet No.:</td> <td></td> </tr> <tr> <td>Project No.:</td> <td>ME18003</td> <td>Tender No.:</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="6">ACT Cadastral information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016</td> </tr> <tr> <td>Rev</td> <td>A1</td> <td>MHL5030</td> <td></td> <td></td> <td>A</td> </tr> </table>		Scale:	AS SHOWN	Date:	21/03/2019	Sheet No.:		Project No.:	ME18003	Tender No.:				ACT Cadastral information supplied by the ACT Environment & Sustainable Development Directorate. © ACT Gov. 2016						Rev	A1	MHL5030			A
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Rev	A1	MHL5030			A																																																							

PARTS LIST				
PART NUMBER	MATERIAL	DESCRIPTION	QTY	MASS
MHL5041	STAINLESS STEEL	CAPTIVE EYE CARABINER (3M DBI SALA R-119 OR SIMILAR)	2	175 g
MHL5042	NYLON	SEATBELT WEBBING 25mm WIDE 1800mm LNG.	1	50 g



LANYARD
SCALE: 1 : 2
MATERIAL: VARIES (REFER PARTS LIST)
COATING: N/A
FINISH COLOUR: N/A
MASS: 400 g

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No.	DESCRIPTION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
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Drawn:	M. Matusiak
Designed:	E. Nielsen
Engineering Checked:	E. Nielsen 26/06/2020
Verified:	K. Danenbergsons 26/06/2020
Design Authority:	C. Patrick 26/06/2020

ICON WATER
ENGINEERING SERVICES GROUP
MANHOLE LIFTER
LANYARD
FABRICATION DETAILS

Scale:	AS SHOWN	Date:	7/04/2020	Sheet No.:	
Project No.:	ME18003	Tender No.:			
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AI	MHL5040	Rev	A		



OPERATION AND MAINTENANCE MANUAL

MODEL NO. CJ001
ACCESS COVER LIFTING SYSTEM

Issue B, 16 June 2020

Document No. ME18003-REP-002B

Document management

Document authorisation table

Issue	Date	Author	Reviewer(s)	Approver
A	30/04/20	E. Nielsen	K. Danenbergsons	N/A
B	16/06/20	E. Nielsen	K. Danenbergsons	C. Patrick

Version control table

Issue	Date	Reason for issue
A	30/04/20	Issued for internal review.
B	16/06/20	Review comments addressed from Issue A. Issued for final review and approval.

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2	Introduction	4
3	Components	5
4	Specifications	6
5	Operation & Maintenance Instructions	7

1 Important Information



Failure to comply with these instructions or using this device for unintended purposes could result in serious injury or death.



The **CJ001 model Cracker Jack** is an **advanced prototype**, its testing is still in progress. Check it is fit for purpose before each use.



Designed for lifting access covers that can be lifted by one or two people using hand tools.



Icon Water has proof load tested the CJ001 model Cracker Jack to verify that the working load limit (W.L.L) is 500 kg when a safety factor of 1.5 is applied, which in general follows the requirements of BS EN 1494:2000+A1:200. Departures to this standard and the justification for such departures can be found in the design report ME18003-REP-003A in section 7.



A site-specific risk assessment shall be carried out prior to every use.

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Disclaimer

Icon Water developed the “Cracker Jack” device solely for its own purposes and local conditions.

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You must (a) carefully evaluate the accuracy, completeness and relevance of the design for Your own purposes and conditions (b) exercise Your own skill and care with respect to use of the design and device (c) obtain any specialist advice where appropriate to Your circumstances and (d) accept full responsibility for any use of the design and device.

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2 Introduction

The CJ001 model Cracker Jack (CJ) is an advanced prototype lifting system for maintenance access covers (MACs).

It is designed for lifting covers that would be lifted with one or two people using hand tools. It was designed to be operated using a battery powered drill. Figures 1 and 2 below show the system in use.



Figure 1 Cracking a MAC Using the CJ



Figure 2 Removing a MAC Using the CJ

3 Components

THE CJ is made up of the components shown in figure 3. Note: More detailed information is in the design drawings (doc. no. MHL0001C to MHL5004B LIFTER FABRICATION SET IFC).

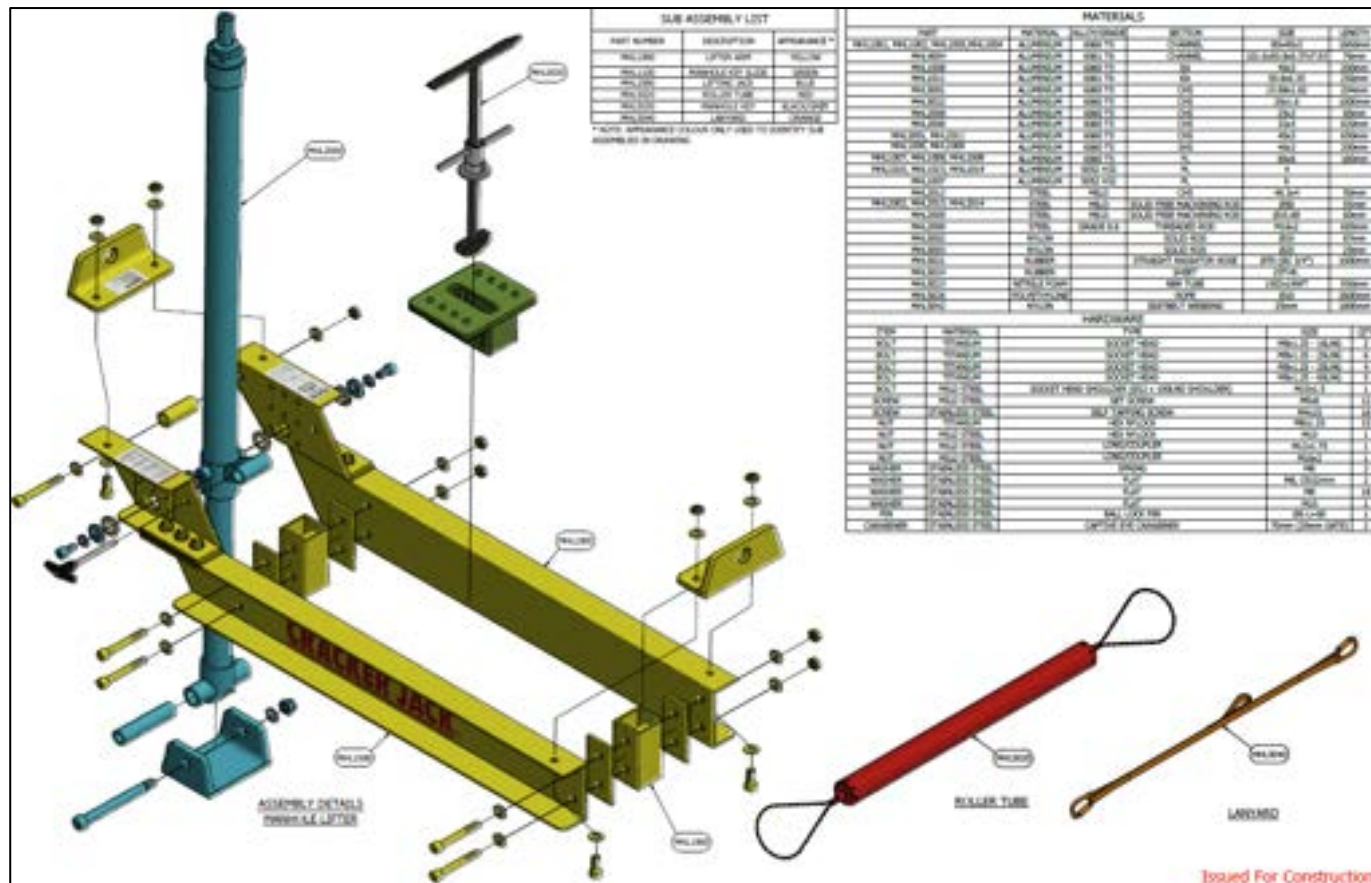


Figure 3 Major Components of the CJ001 model Cracker Jack

4 Specifications

CJ1001 SPECIFICATIONS	
Description	Rating
Working Load Limit (W.L.L)	500 kg
Max. Travel	550 mm
Max. Input Speed	550 rpm
Max. Input Torque	8 N.m
Weight of Total Assembly	9.0 kg
Height [H] (full extension in working position)	1100 mm
Length [L] (in working position)	900 mm
Width [W] (in working position)	80 mm
H x L x W (folded up)	160 x 900 x 80 mm
Max. Load on User during 70 kg lid removal (on flat hard ground)	20 kg
Max. Operating Gradient	±30%
Max. diameter of circular lid that can be lifted	800 mm
Max. size of rectangular lid that can be lifted	600 mm x 600 mm
Types of Lids Device Works On	Circular/Square/Rectangular Gatic Centrelift Edge Style Lift

5 Operation & Maintenance Instructions

IMPORTANT SAFETY WARNINGS

- Never exceed the W.L.L. of 500 kg
- Designed to lift maintenance access covers only
- When used on slopes or gradients the CJ and user shall always remain on the uphill side of the maintenance access cover and associated structure



- Never stand under or place a body part under a raised maintenance access cover/load



- Operate only by hand or using a battery operated power drill with the clutch setting enabled and set to ½ maximum torque



- Observe cover/load through all movements during operation
- Only to be used by trained and competent personnel who have read the Operation and Maintenance manual
- A site based risk assessment to be carried out prior to every use including an inspection of the CJ to check there is no damage and it is fit for use
- Never work over the top of an open maintenance access hole.

IMPORTANT SAFETY WARNINGS CONT.



- Only to be maintained, commissioned, and disposed of by trained, competent and qualified personnel who have read the Operation and Maintenance Manual
- No modifications to the CJ shall be carried out which adversely affect the compliance of this system with relevant standards
- Check markings on nameplate are legible and in line with specification & design
- CJ to be disposed of in accordance with local regulations after 10 years from date of manufacture

LIFTING A MAC & INSPECTING

1. Turn Ipad and camera on. Connect [camera & torch to selfie stick](#) & Ipad/device.



2. Unpack CJ by removing [end of lanyard](#) from roller [tube rope](#) and [CJ](#).

3. Remove [safety pin](#) and [stand tube up](#) readying device for use. [Insert safety pin back through CJ](#).



4. Inspect for physical damage, check compliance plate is attached, the device is in date (within 10yrs from date of manufacture) and the [shear wire](#) is in place.



5. Place CJ on top of MAC and connect CJ to MAC using the appropriate [connection tool](#).



6. [Turn nut](#) on connection tool until the bottom of the CJ is firmly against top of cover.
7. Take [battery operated drill](#). Check torque clutch setting is engaged and set to ½ max, set speed to 1, attach 18mm socket to drill and set drive direction to anticlockwise.



- Attach drill to CJ and apply drive in anticlockwise direction. Observe load and confirm that MAC cover is lifting. Raise MAC **only as high as necessary** to either **inspect** using the [camera and selfie stick](#) or **remove** by [placing the roller tube under the cover](#) (just forward of centre).



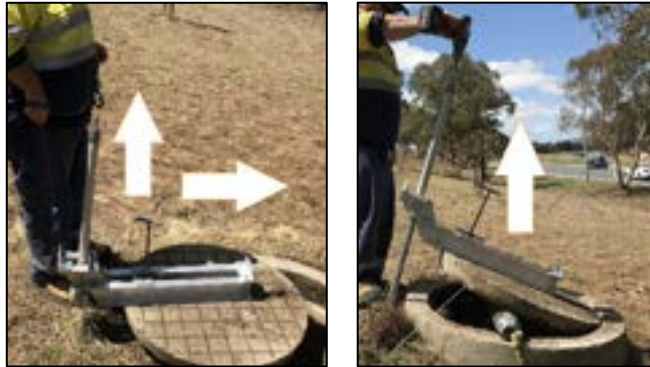
- If inspecting inside maintenance access hole, view image of access hole on Ipad/device. **The user shall never place hand or body part under raised load/maintenance access cover.**

REMOVING A MAC

- If removing the MAC for access then lower CJ back onto roller tube until the foot is no longer touching the ground. Attach lanyard and remove lid from MAC by pulling the lanyard backward and easing the cover onto the ground. Remain a safe distance from lid at all times. When placing cover on ground if possible rest it on the edge of its frame.






- To put MAC back onto its frame, lift lid from rear attachment point using lanyard and slide lid forwards onto structure. Raise cover as per step 8. above, then remove roller tube from beneath access lid, and lower lid back onto its frame.



NOTE: There are no special storage or handling requirements associated with the use of this device.

INSPECTION & MAINTENANCE SCHEDULE

Task	Frequency	
	Every use	Yearly
Check top cap assembly is secure. 	X	
Check pivot lug and connection to arm is secure, square to tube and check arms for any damage at connection to pivot lug or safety pin hole. Check safety pin is OK. 	X	

<p>Check for damage and any signs of bending or failure e.g. bowed lifting arm, elongated outer tube, cracking</p> 	X	
Listen for abnormal vibration during use.	X	
Check nameplate readability and that the lifter is in date (10 yrs from date of manufacture)	X	
Disassemble all components and check for wear		X
Check drive nut (part no. MHL2007) & drive screw (part no. MHL2009) grease for contamination.		X
<p>Re-grease running components using a lithium based grease to NLGI 2.</p> <p>Bearings (part no. SKF51101)</p> <p>Drive nut (part no. MHL2007)</p> <p>Drive screw (part no. MHL2009)</p>		X
Check torque of all bolts is 12 N.m		X
Check torque of M8x1.25 pivot lug bolt is enough to stop arm dropping suddenly (suggest 6 N.m)		X
Re-instate red Loctite on top cap thread.		X
Replace shear wire (1.57 mm black annealed tie wire)		X