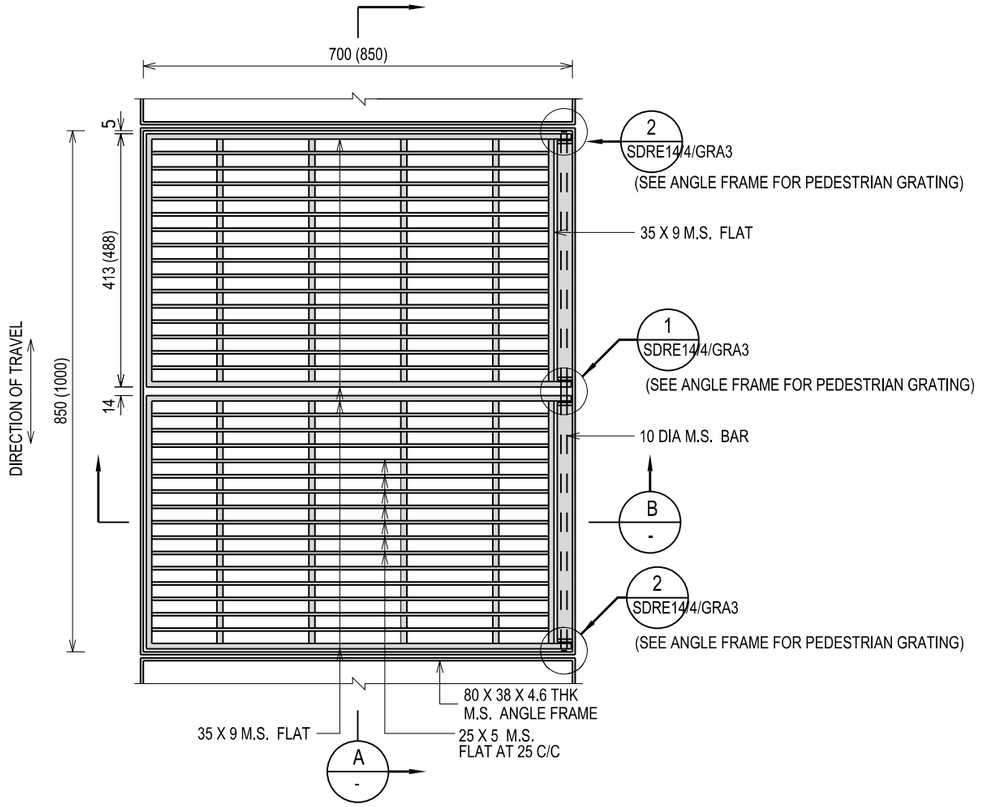
CHAPTER 4

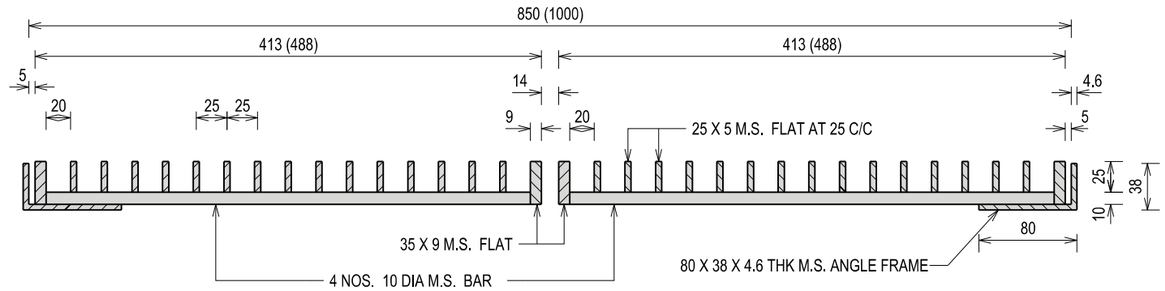
GRATINGS & MANHOLE COVERS

DRAWING TITLE	DRAWING NO.	REVISION
PEDESTRIAN GRATING FOR SUMP / DRAIN - WITHOUT MILD STEEL PLATE	LTA/SDRE14/4/GRA1	C
PEDESTRIAN CONCRETE IN-FILL GRATING FOR SUMP / DRAIN	LTA/SDRE14/4/GRA2	D
FRAME FOR PEDESTRIAN GRATING	LTA/SDRE14/4/GRA3	C
VEHICULAR GRATING FOR MANHOLES (SHEET 1 OF 2)	LTA/SDRE14/4/GRA4	A
VEHICULAR GRATING FOR MANHOLES (SHEET 2 OF 2)	LTA/SDRE14/4/GRA5	A
VEHICULAR GRATING FOR DRAINS (SHEET 1 OF 2)	LTA/SDRE14/4/GRA6	A
VEHICULAR GRATING FOR DRAINS (SHEET 2 OF 2)	LTA/SDRE14/4/GRA7	A
MANHOLE COVER AND FRAME	LTA/SDRE14/4/GRA8	-
ROADSIDE MANHOLE GRATING	LTA/SDRE14/4/GRA9	A



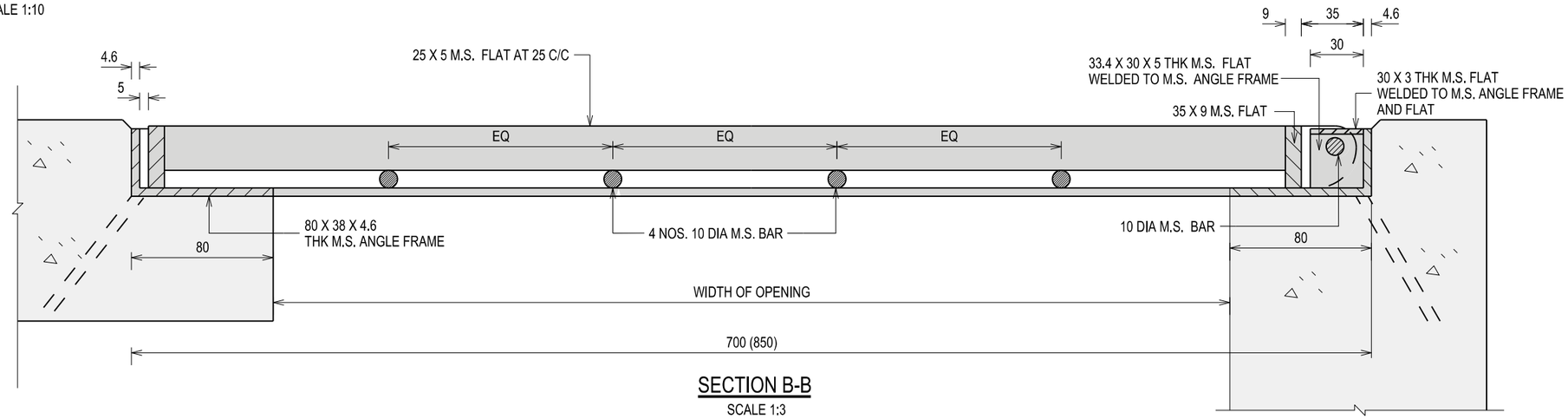
DETAIL OF M.S. PEDESTRIAN GRATING

SCALE 1:10



SECTION A-A

SCALE 1:5



SECTION B-B

SCALE 1:3

NOTES:

1. The type & spacing for M.S. pedestrian gratings shall be as follows:

DRAIN WIDTH (mm)	DRAIN DEPTH (m)	TYPE OF GRATING (mm)	SPACING (m)
600 - ≤ 750	-	700 x 850	6
> 750 - < 2000	≤ 1	850 x 1000	6
	> 1		18
2000 - 4000	-	850 x 1000	(Staggered) 50
	-	1500 x 1500	500

2. The M.S. Grating must be able to be opened more than 106°.
3. Gratings and frames are to be shop fabricated and all weld slags to be removed.
4. The complete assembly except fishtails are to be galvanised by hot-dip galvanising process in accordance with ISO 1461:2009.
5. For internal drain width > 4m, pedestrian grating shall be provided in accordance with PUB's Latest Code of Practice for Surface Water Drainage.
6. For grating of size > 850mm x 1000mm, it shall be designed by Professional Engineer. The grating design / testing shall conform to SS 363.
7. This grating for sump / drain without mild steel plate shall not be used on footpath or cycling paths.

REV.	DATE
C	APR 2022
B	SEP 2017
A	OCT 2015

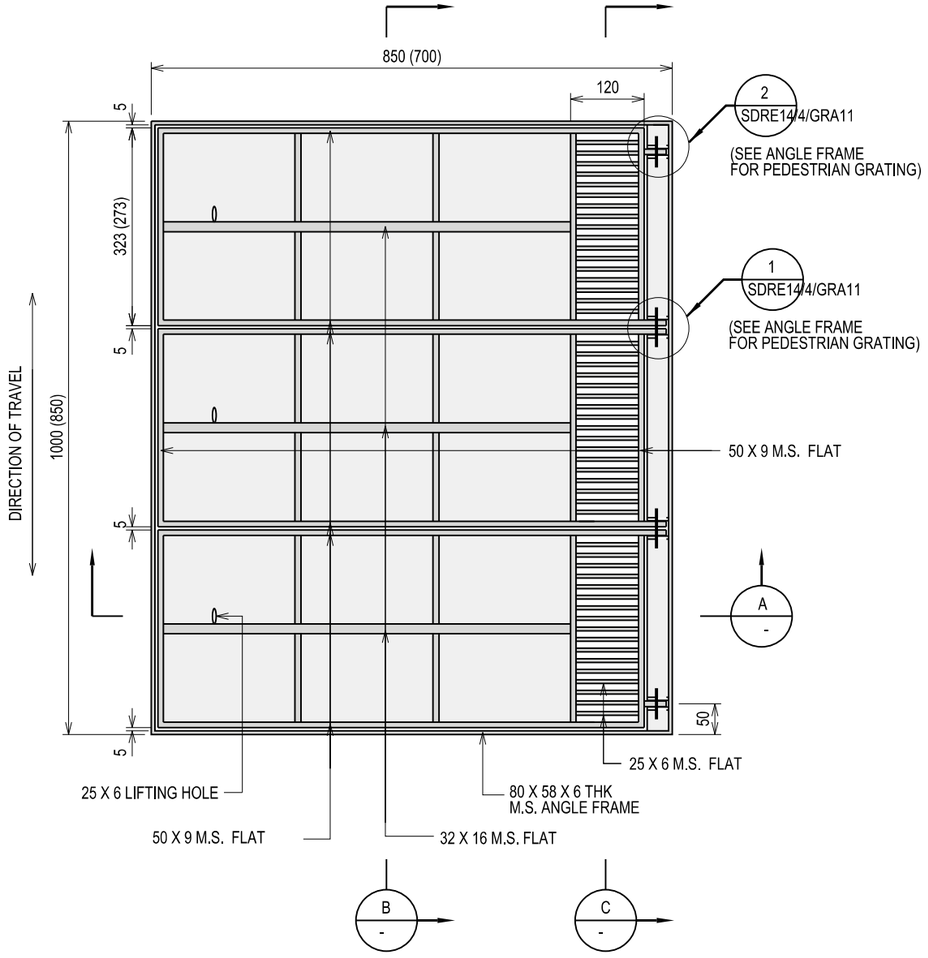
STANDARD DETAIL

PEDESTRIAN GRATING FOR SUMP / DRAIN - WITHOUT MILD STEEL PLATE

Land Transport Authority

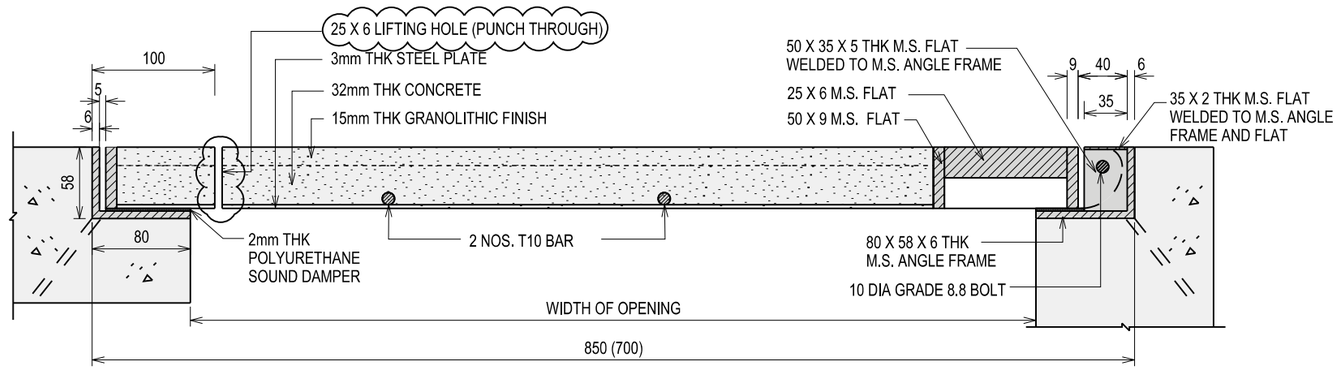
DRAWING NO.	REV.
LTA/SDRE14/4/GRA1	C

DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	1 OF 1



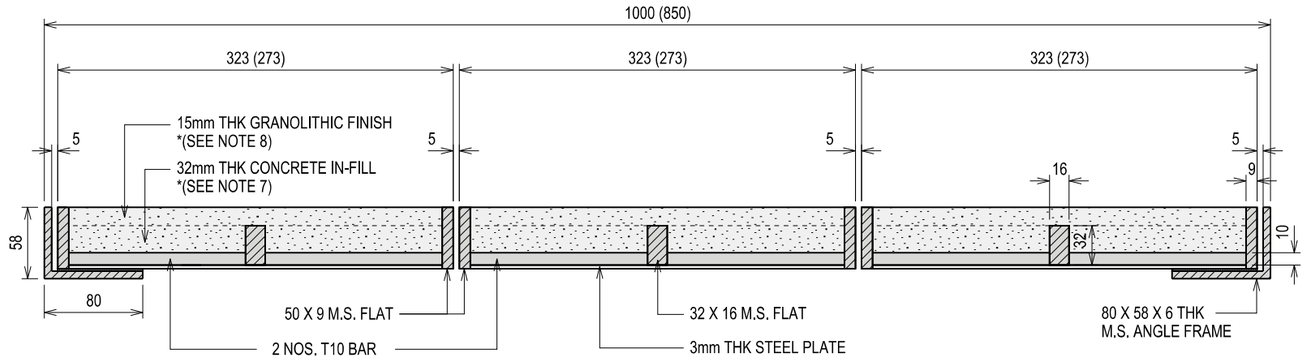
DETAIL OF PEDESTRIAN CONRETE IN-FILL GRATING

SCALE 1:10



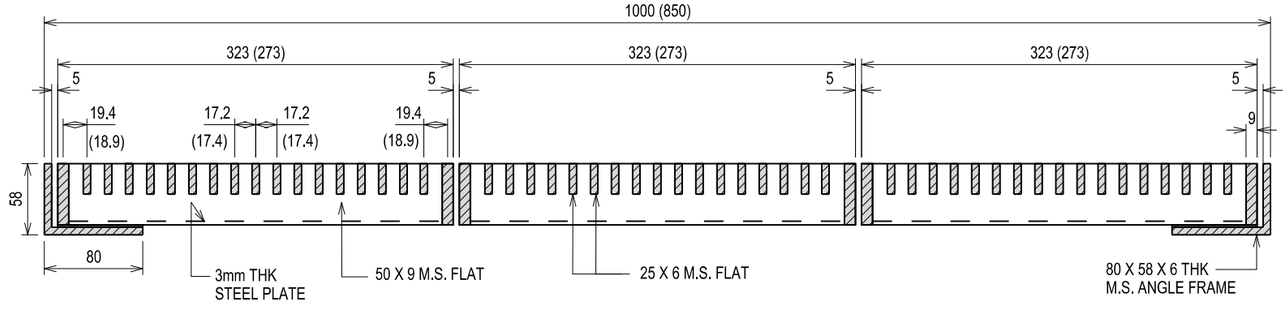
SECTION A-A

SCALE 1:5



SECTION B-B

SCALE 1:5



SECTION C-C

SCALE 1:5

NOTES:

1. The type & spacing for pedestrian gratings shall be as follows:

DRAIN WIDTH (mm)	DRAIN DEPTH (m)	TYPE OF GRATING (mm)	SPACING (m)
600 - ≤ 750	-	700 x 850	6
> 750 - < 2000	≤ 1	850 x 1000	6
	> 1		18
2000 - 4000	-	850 x 1000	(Staggered) 50
	-	1500 x 1500	500

2. The grating must be able to be opened more than 106°.
3. Gratings and frames are to be shop fabricated and all weld slags to be removed.
4. The complete assembly except fishtails are to be galvanised by hot-dip galvanising process in accordance with ISO 1461:2009.
5. For internal drain width > 4m, pedestrian grating shall be provided in accordance with PUB's Latest Code of Practice for Surface Water Drainage.
6. For grating of size > 850mm x 1000mm, it shall be designed by Professional Engineer. The grating design / testing shall conform to SS 363.
7. Light weight concrete of LC 25/30 shall be used for the concrete in-fill.
8. Similar light weight concrete as specified in note 7 may be used as directed by S.O.

REV.	DATE
D	APR 2024
C	APR 2019
B	SEP 2017
A	OCT 2015

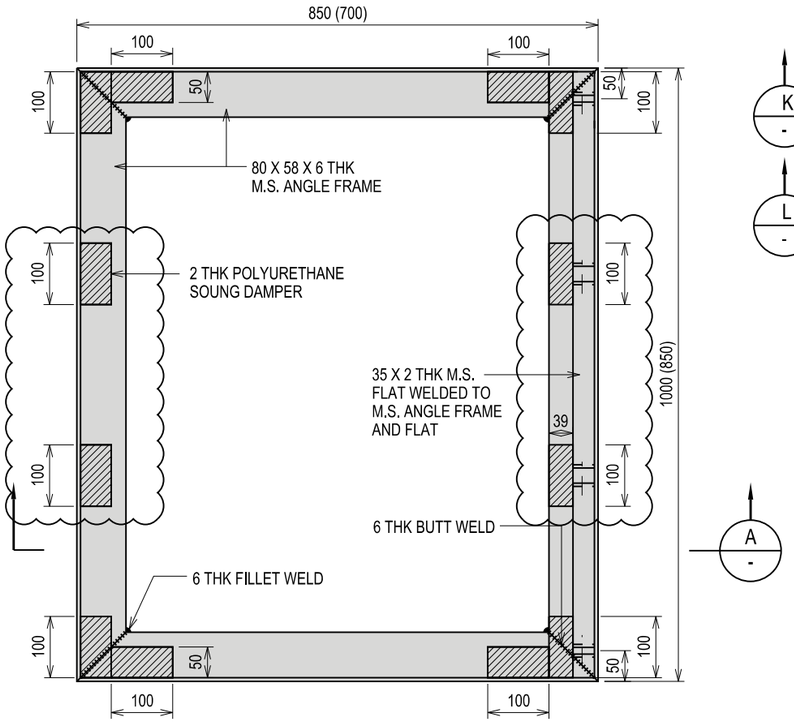
STANDARD DETAIL

PEDESTRIAN CONCRETE IN-FILL GRATING FOR SUMP / DRAIN

Land Transport Authority

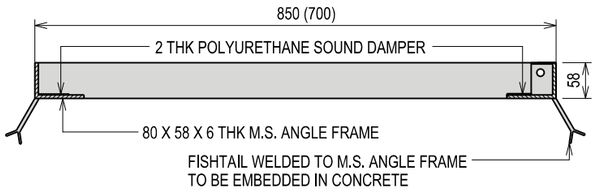
DRAWING NO.	REV.
LTA/SDRE14/4/GRA2	D

DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	1 OF 1



PLAN OF M.S. ANGLE FRAME

SCALE 1:10

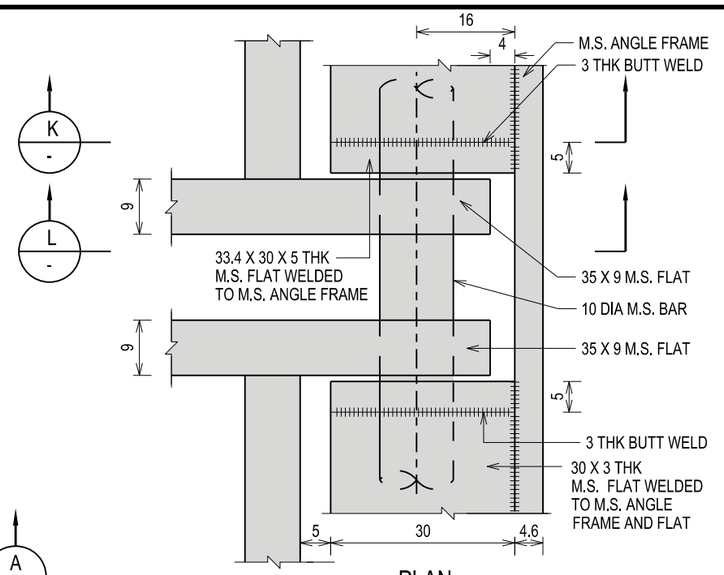


SECTION A-A

SCALE 1:10

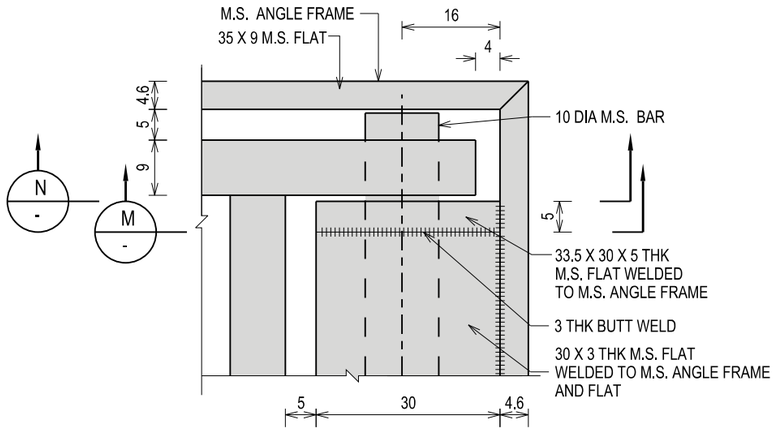
POLYURETHANE SOUND DAMPER

PHYSICAL PROPERTIES	TEST METHODS	REQUIREMENTS
ELONGATION	ASTM D-412:2006a	>= 650%
TEAR STRENGTH	ASTM D-624:2006a	>= 16N/mm
TENSILE STRENGTH	ASTM D-412:2006a	>= 2.5N/mm²



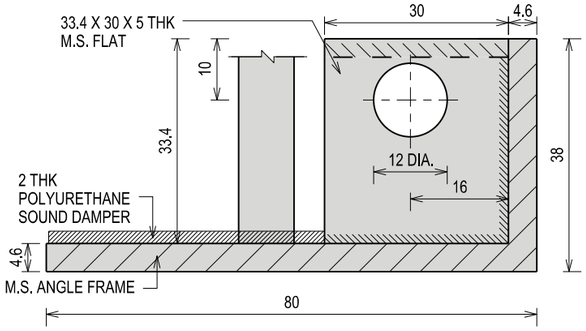
PLAN

SCALE 1:1



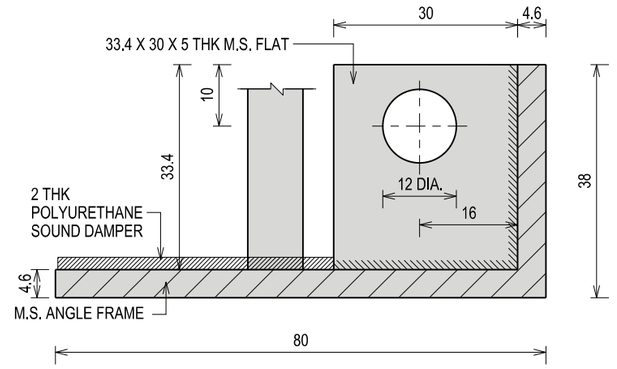
PLAN

SCALE 1:1



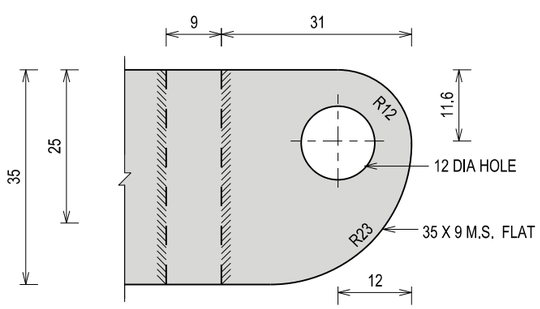
SECTION K-K

SCALE 1:1



SECTION M-M

SCALE 1:1

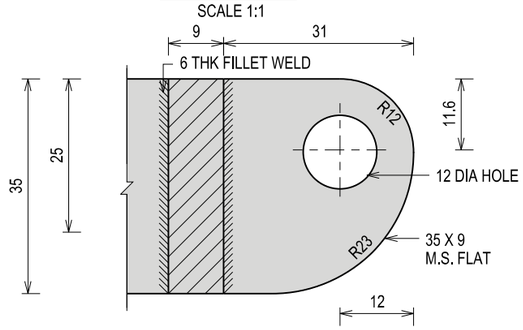


SECTION L-L

DETAIL 1

REF DWG NO: SDRE14/4/GRA1&2

SCALE 1:1



SECTION N-N

DETAIL 2

REF DWG NO: SDRE14/4/GRA1&2

SCALE 1:1

1. M.S. fishtail is to be welded to M.S. angle frame and placed at all corners.
2. All the flats and angles are to be fillet welded throughout.
3. The peel strength of the adhesive shall not be less than 35N/cm, test done in accordance to ASTM D3330. The applied sound damper shall not peel off within the 5 years warranty period.

REV.	DATE
C	APR 2019
B	SEP 2017
A	OCT 2015

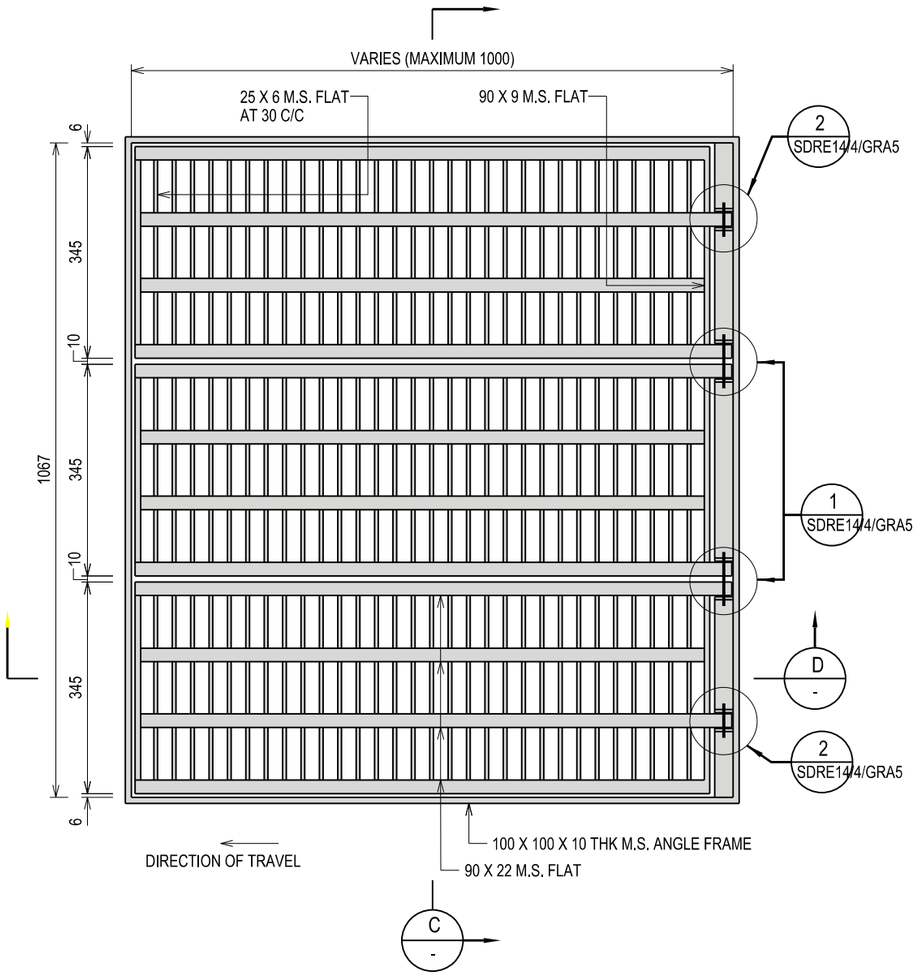
STANDARD DETAIL

FRAME FOR
PEDESTRIAN GRATING

Land Transport Authority

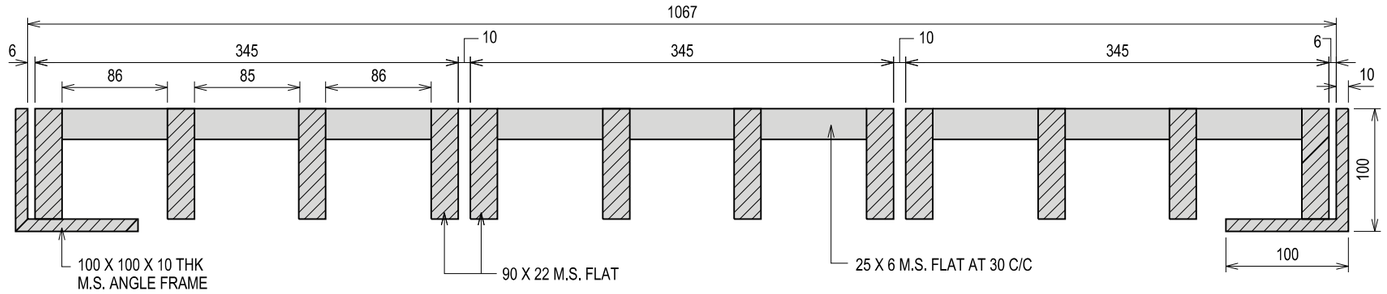
DRAWING NO.	REV.
LTA/SDRE14/4/GRA3	C

DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	1 OF 1



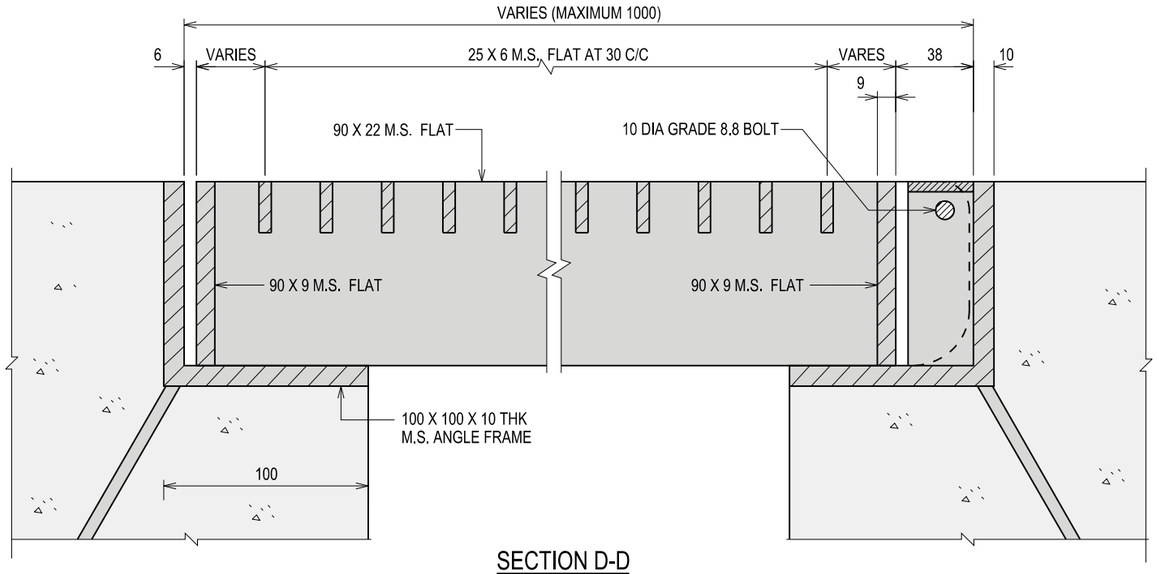
DETAIL OF M.S. VEHICULAR GRATING

SCALE 1:10



SECTION C-C

SCALE 1:5



SECTION D-D

SCALE 1:3

NOTES:

1. The M.S. Grating must be able to be opened more than 106°.
2. Gratings and frames are to be shop fabricated and all weld slags removed.
3. The complete assembly except fishtails are to be galvanised by hot-dip galvanising process in accordance with ISO 1461:2009.
4. Fishtail is to be welded to M.S. angle and placed at all corners of the M.S. frame.
5. All the flats and angles are to be fillet welded throughout.
6. It shall not be used on carriageway along expressway, arterial road & junctions unless under exceptional situation, subject to approval from LTA.

REV.	DATE
A	SEP 2017

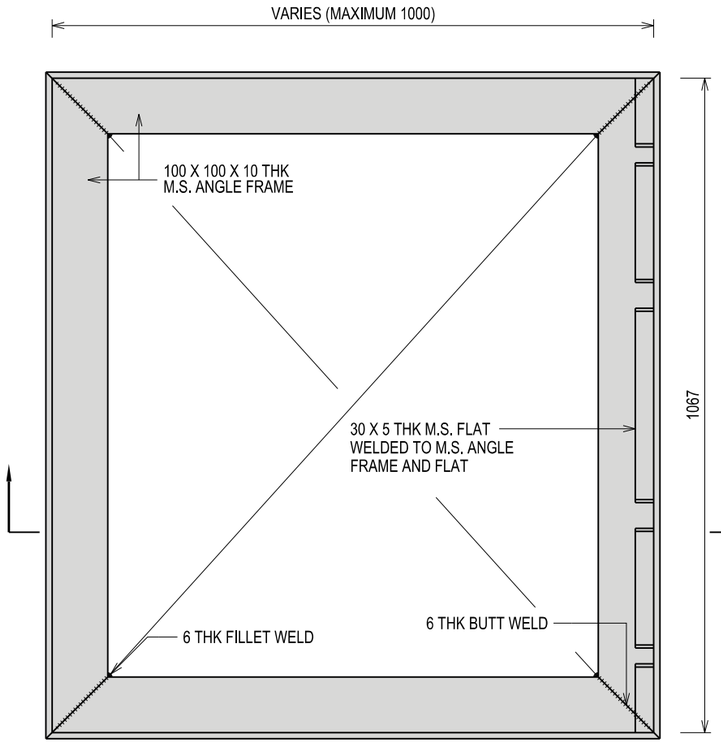
STANDARD DETAIL

VEHICULAR GRATING FOR MANHOLES (SHEET 1 OF 2)

Land Transport Authority

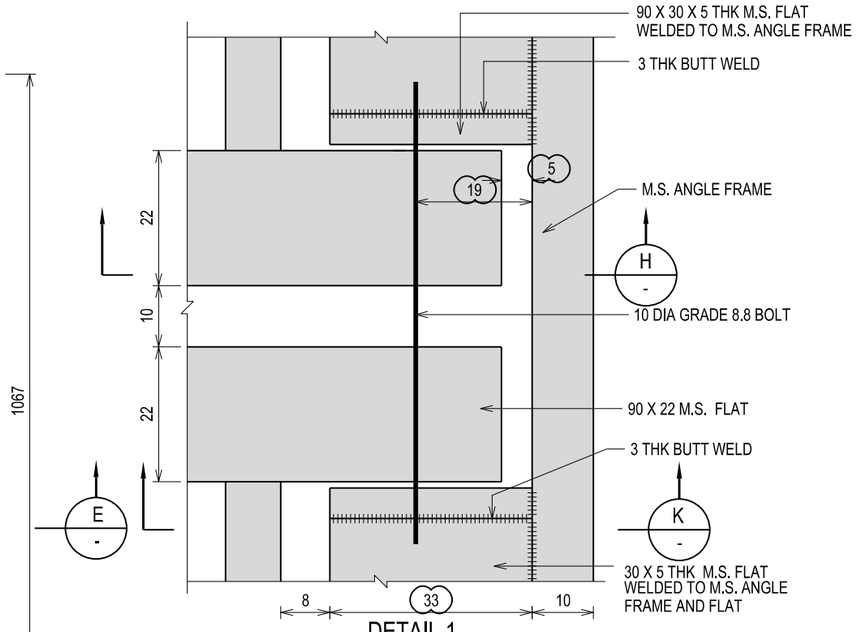
DRAWING NO.	REV.
LTA/SDRE14/4/GRA4	A

DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	1 OF 2



PLAN OF M.S. ANGLE FRAME

SCALE 1:10

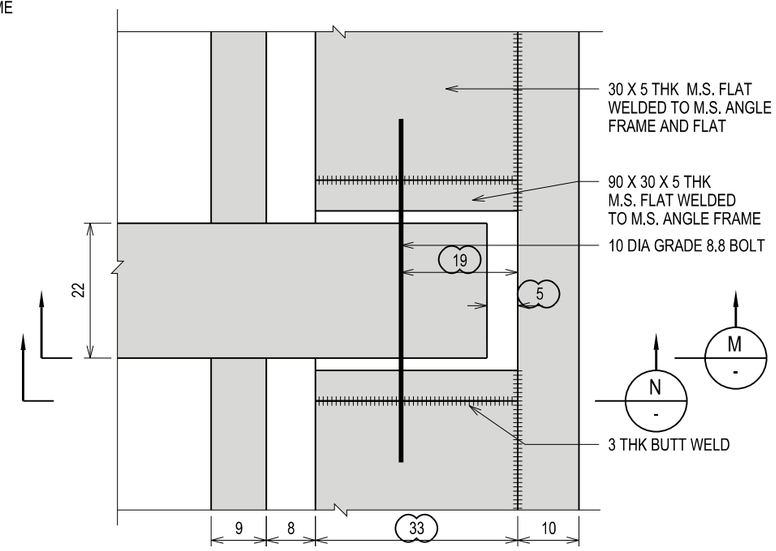


DETAIL 1

PLAN

REF DWG NO: SDRE14/4/GRA4

SCALE 1:1

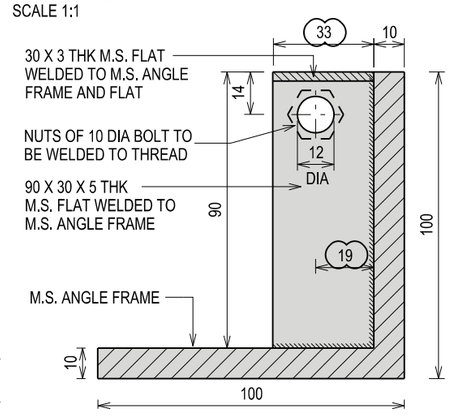


DETAIL 2

PLAN

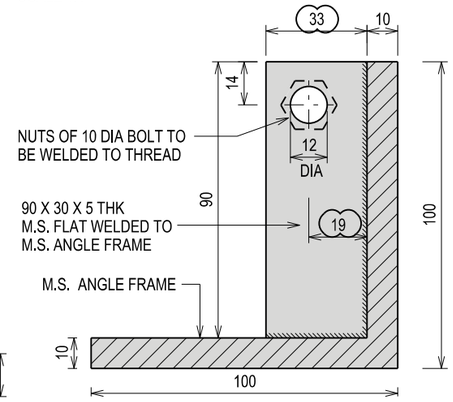
REF DWG NO: SDRE14/4/GRA4

SCALE 1:1



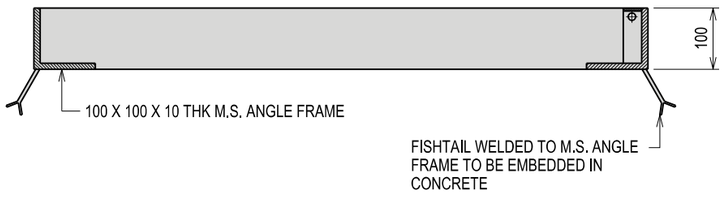
SECTION K-K

SCALE 1:2



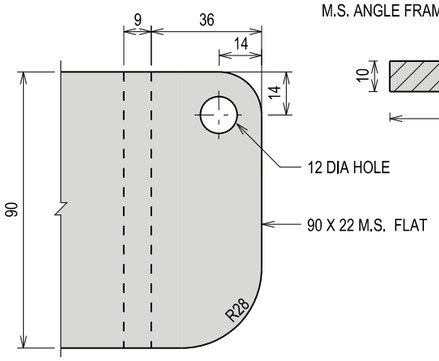
SECTION N-N

SCALE 1:2



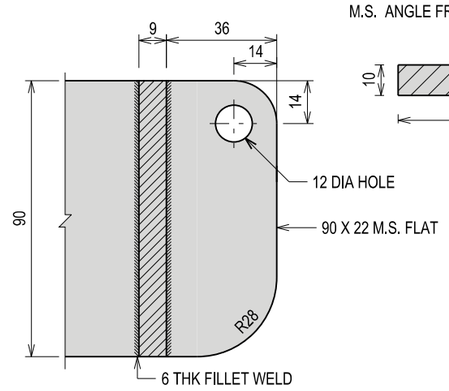
SECTION E-E

SCALE 1:10



SECTION H-H

SCALE 1:2



SECTION M-M

SCALE 1:2

REV.	DATE
A	SEP 2017

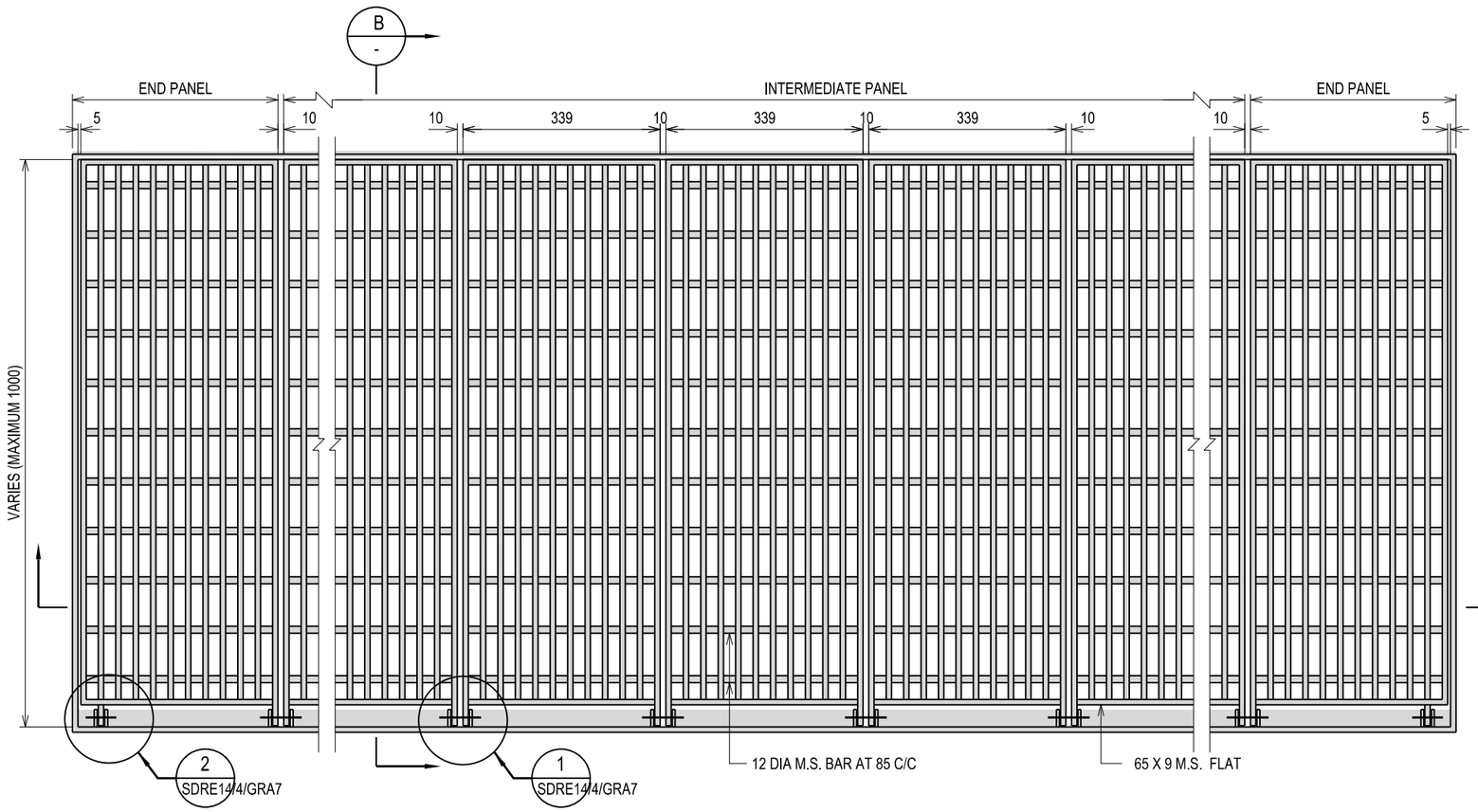
STANDARD DETAIL

VEHICULAR GRATING
FOR MANHOLES
(SHEET 2 OF 2)

Land Transport Authority

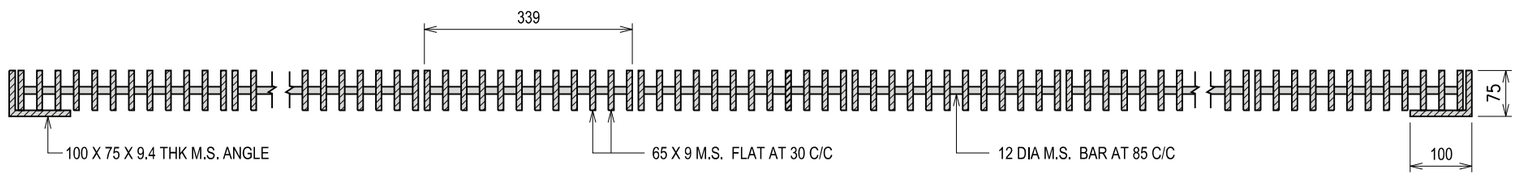
DRAWING NO.	REV.
LTA/SDRE14/4/GRA5	A

DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	2 OF 2



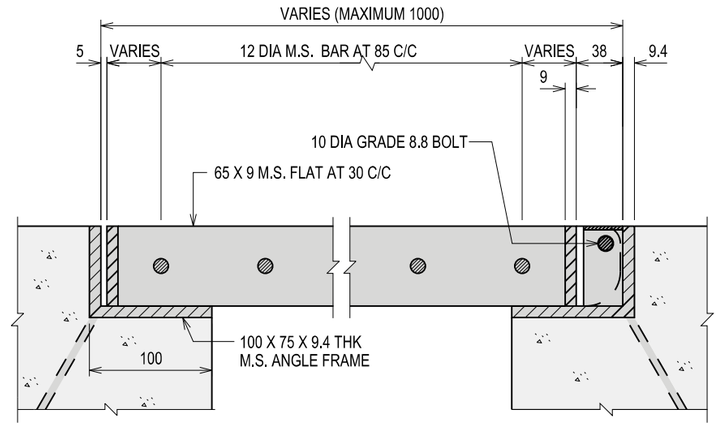
DETAILS OF M.S. VEHICULAR GRATING FOR DRAIN

SCALE 1:10



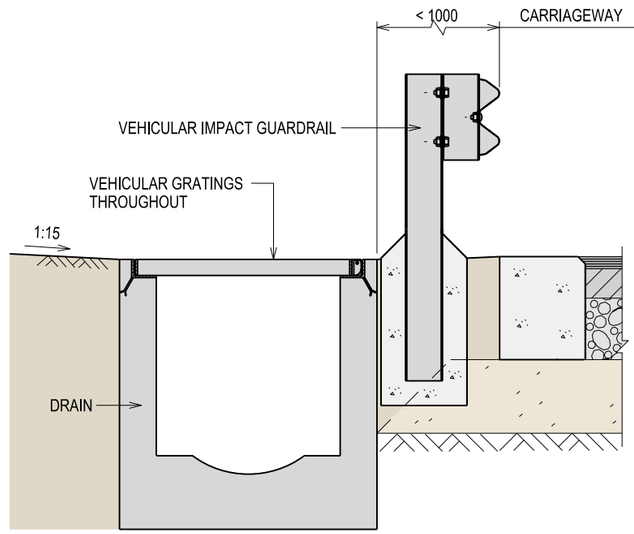
SECTION A-A

SCALE 1:10



SECTION B-B

SCALE 1:5



DRAIN BEHIND VEHICULAR IMPACT GUARDRAIL
(CENTRE MEDIAN / SIDETABLE)

SCALE 1:25

NOTES:

1. The M.S. Grating must be able to be opened more than 106°.
2. Gratings and frames are to be shop fabricated and all weld slags removed.
3. The complete assembly except fishtails are to be galvanised by hot-dip galvanising process in accordance with ISO 1461:2009.
4. Fishtail is to be welded to m.s. angle and placed at all corners of the M.S. frame.
5. All the flats and angles are to be fillet welded throughout.
6. Vehicular grating to be provided for open drain located less than 1m behind the vehicular impact guardrail.

REV.	DATE
A	SEP 2017

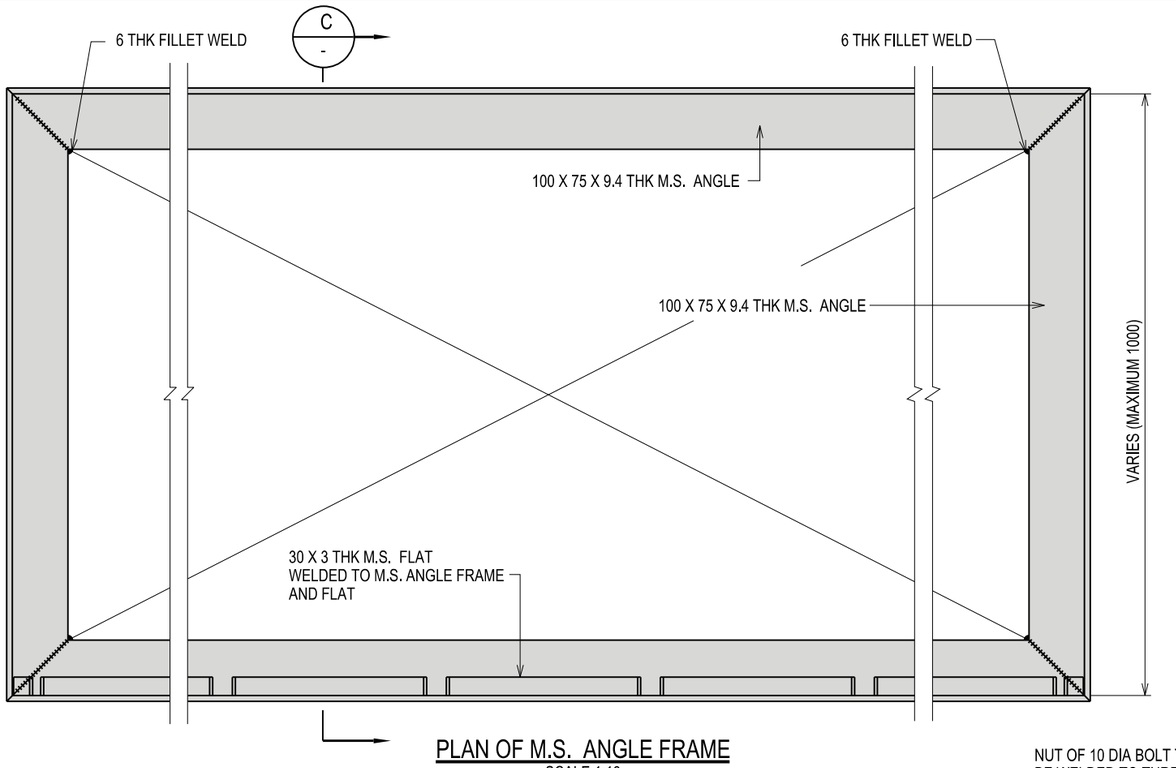
STANDARD DETAIL

VEHICULAR GRATING FOR DRAINS (SHEET 1 OF 2)

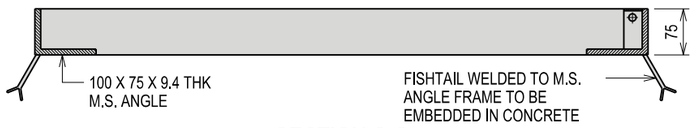
Land Transport Authority

DRAWING NO.	REV.
LTA/SDRE14/4/GRA6	A

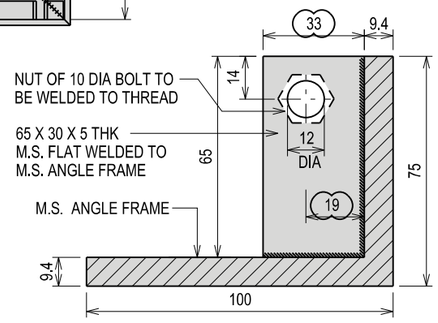
DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	1 OF 2



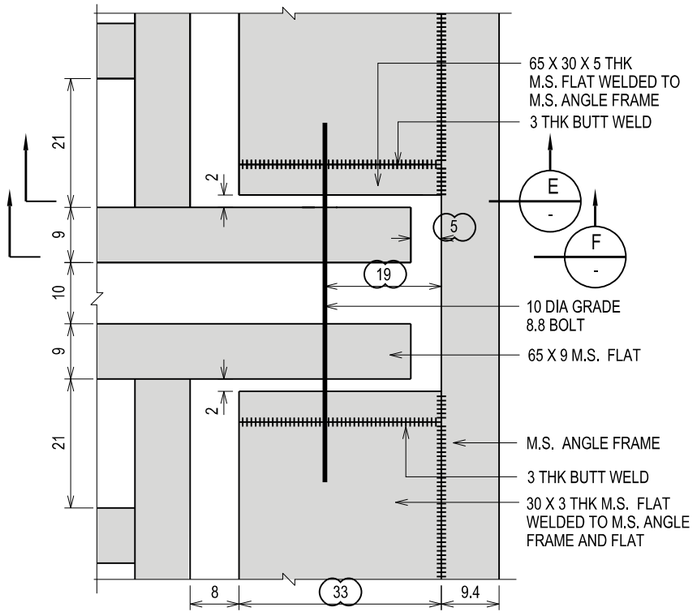
PLAN OF M.S. ANGLE FRAME
SCALE 1:10



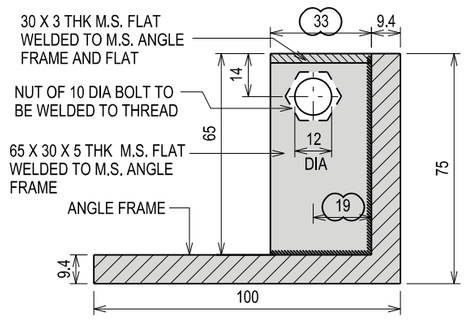
SECTION C-C
SCALE 1:10



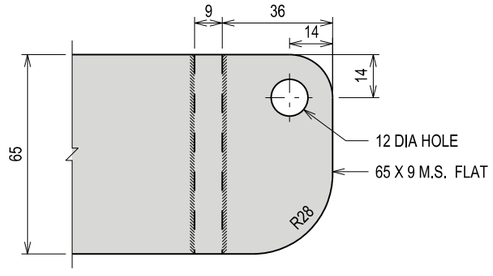
SECTION G-G
SCALE 1:2



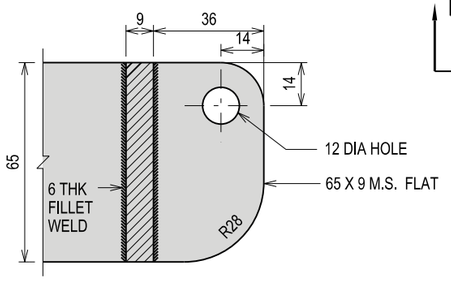
DETAIL 1
(PLAN)
REF DGW NO: SDRE14/4/GRA6
SCALE 1:1



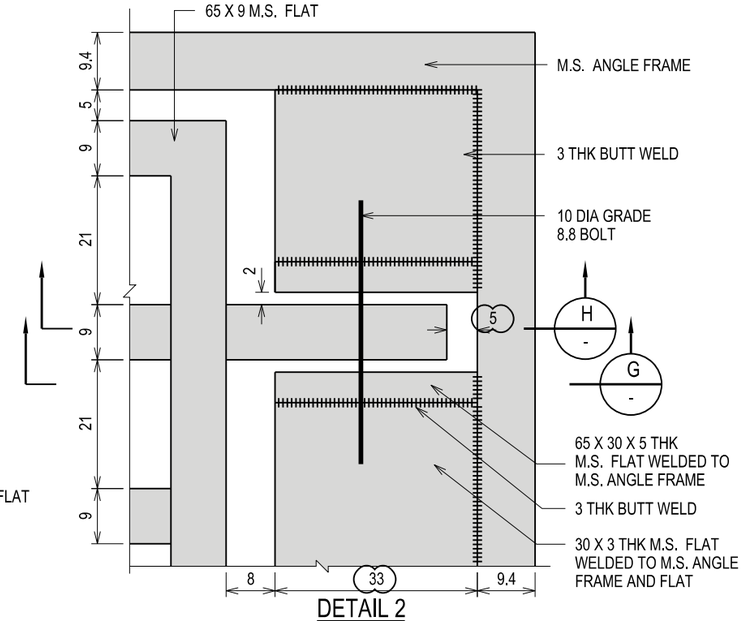
SECTION E-E
SCALE 1:2



SECTION F-F
SCALE 1:2



SECTION H-H
SCALE 1:2



DETAIL 2
(PLAN)
REF DGW NO: SDRE14/4/GRA6
SCALE 1:1

REV.	DATE
A	SEP 2017

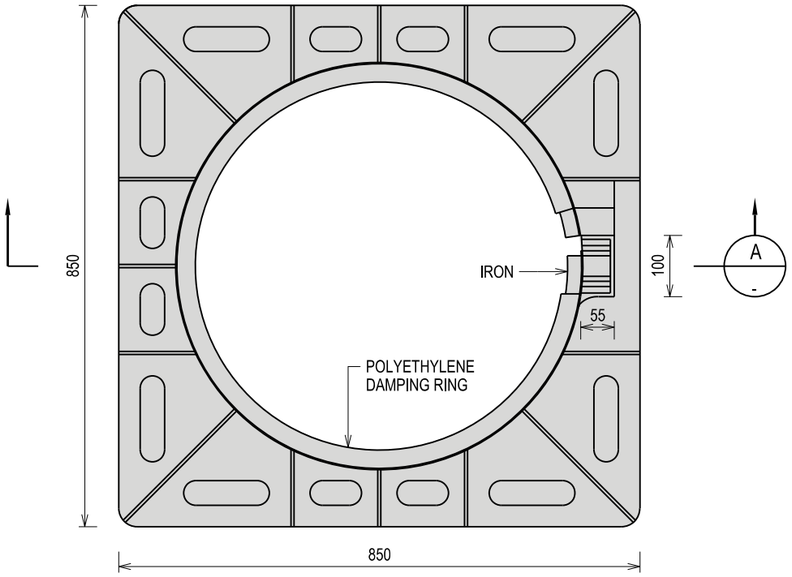
STANDARD DETAIL

VEHICULAR GRATING
FOR DRAINS
(SHEET 2 OF 2)

Land Transport Authority

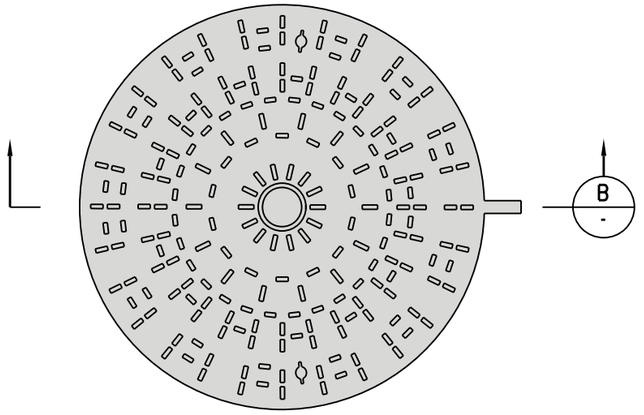
DRAWING NO.	REV.
LTA/SDRE14/4/GRA7	A

DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	2 OF 2



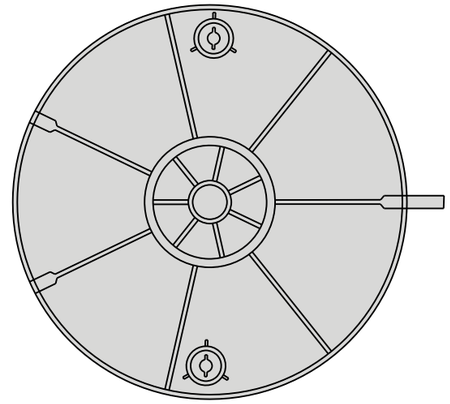
PLAN OF DUCTILE CAST IRON MANHOLE FRAME

(WEIGHT OF FRAME = 38 kg)
SCALE 1:10



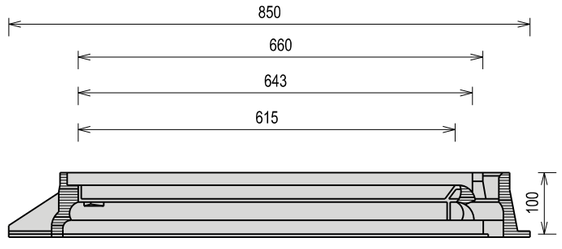
PLAN OF DUCTILE CAST IRON MANHOLE COVER

(WEIGHT OF COVER = 32 kg)
SCALE 1:10



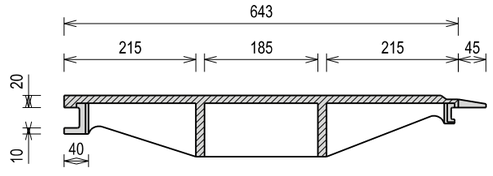
UNDERSIDE OF DUCTILE CAST IRON MANHOLE COVER

SCALE 1:10



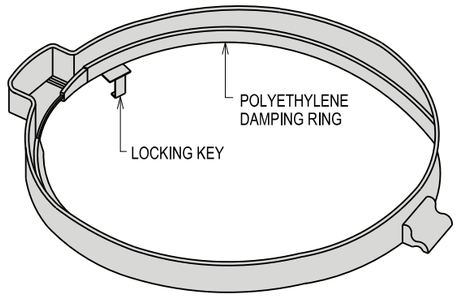
SECTION A-A

SCALE 1:10



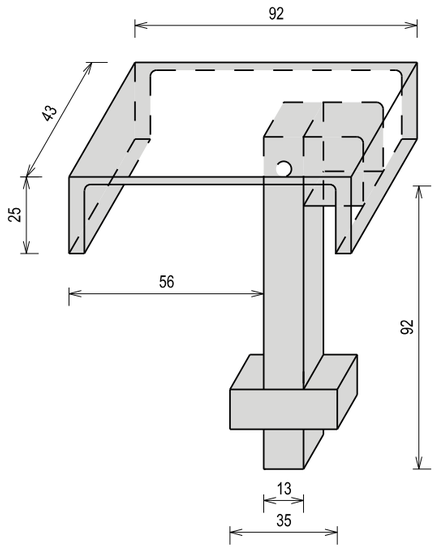
SECTION B-B

SCALE 1:10



RAISING RING

(FOR USE WHEN RAISING MANHOLE ONLY)
SCALE 1:10



KEY FOR MANHOLE COVER

NTS

NOTES:

1. Ductile cast iron manhole covers and frames shall comply with B.S. EN 124 - GT 45 square.
2. Manhole frame and cover shall be supplied coated with black bituminous compound.

REV.	DATE

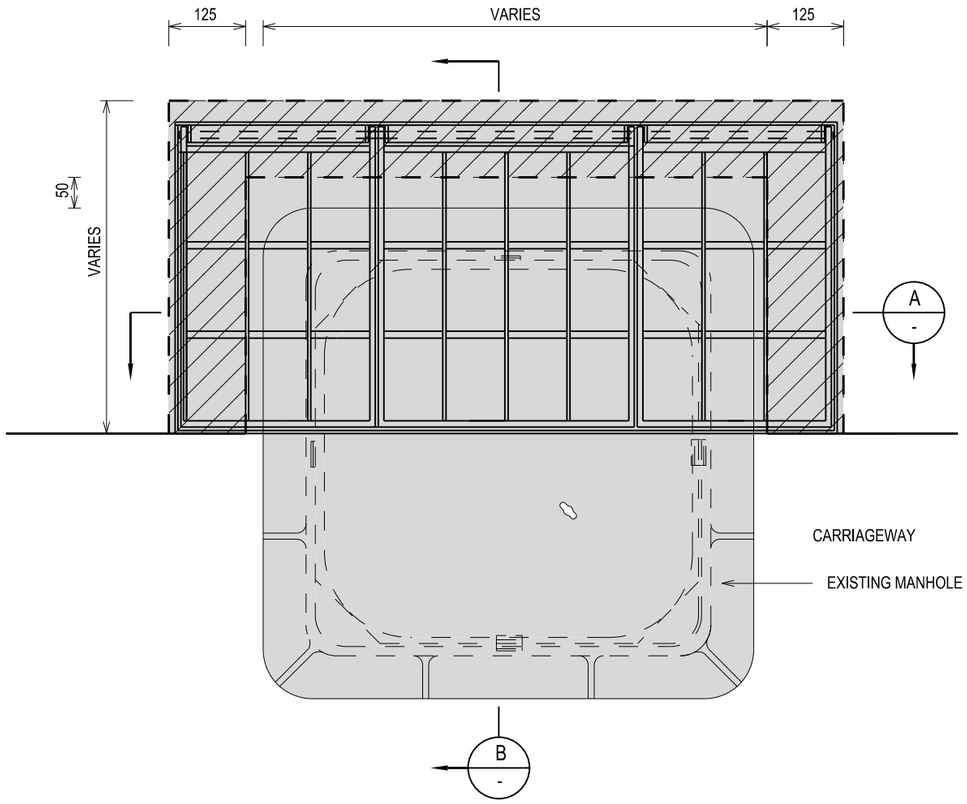
STANDARD DETAIL

MANHOLE COVER AND FRAME

Land Transport Authority

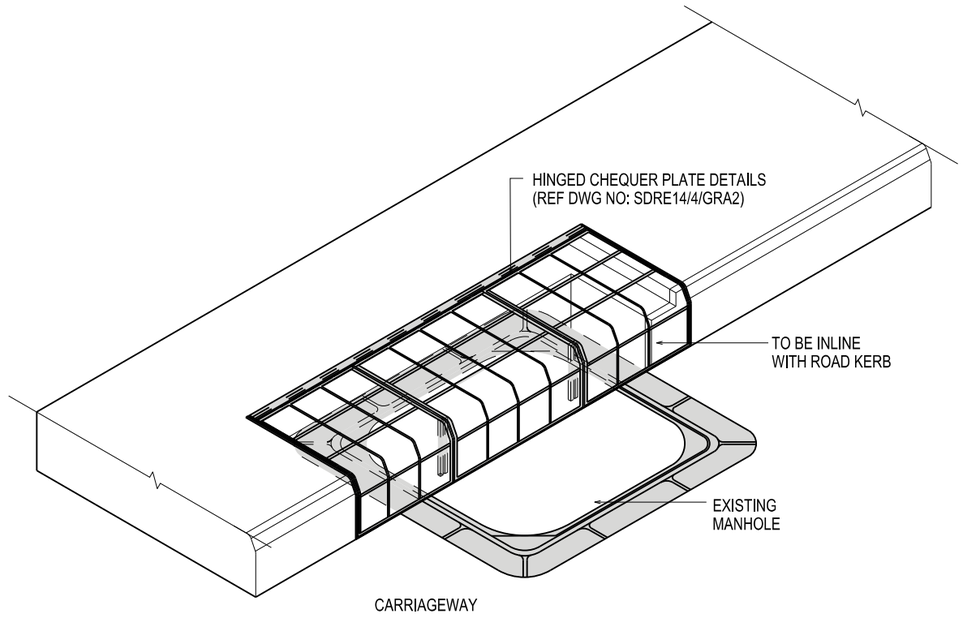
DRAWING NO.	REV.
LTA/SDRE14/4/GRA8	-

DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	1 OF 1



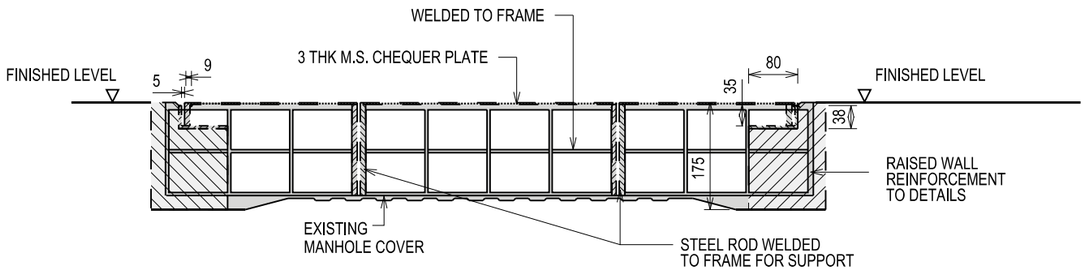
PLAN

SCALE 1:10



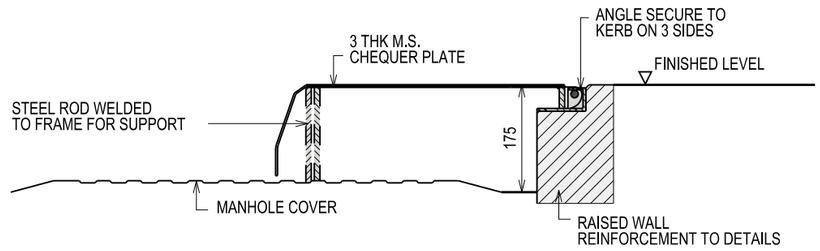
ISOMETRIC VIEW

SCALE 1:20



SECTION A-A

SCALE 1:10



SECTION B-B

SCALE 1:10

NOTES:

1. Dimensions of cover shall be determined on site and to be designed by professional engineer.

REV.	DATE
A	OCT 2015

STANDARD DETAIL

ROADSIDE MANHOLE GRATING

Land Transport Authority

DRAWING NO.	REV.
LTA/SDRE14/4/GRA9	A

DATE OF ISSUE	SCALE	SHEET NO.
1st APR 2014	AS SHOWN	1 OF 1