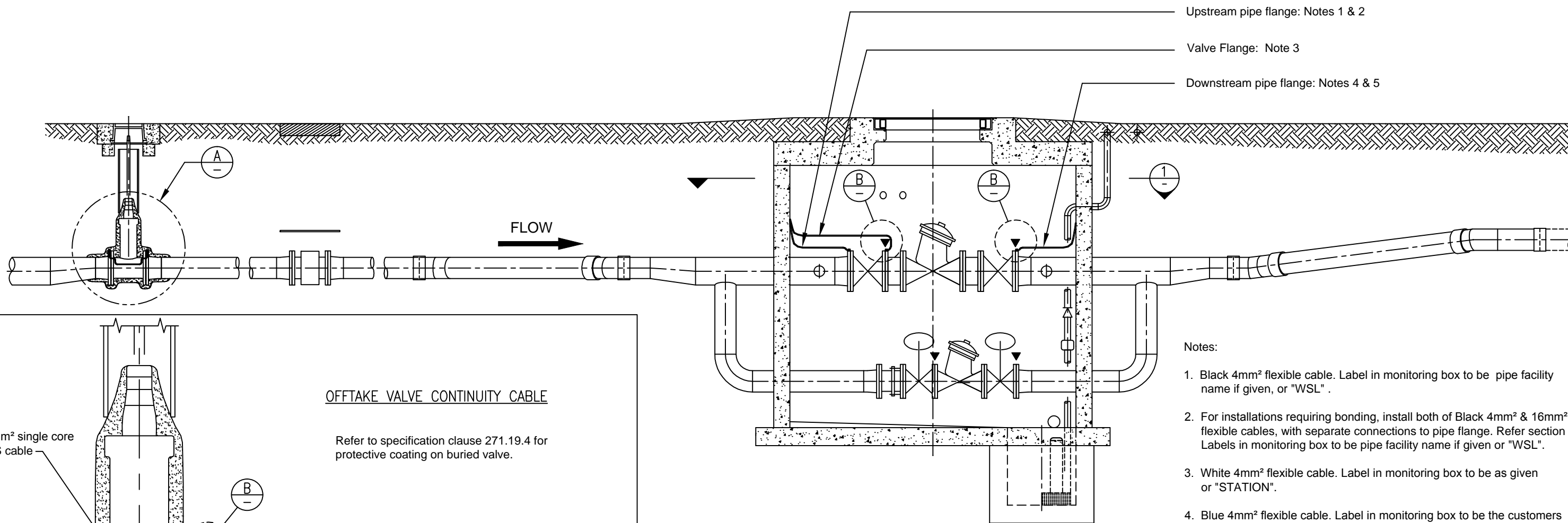


Drawing Index

Name	Doc.No	Document Description
2001979.087E.pdf	2001979.087	WATER RETICULATION STANDARD BULK WATER METER UPGRADES CHAMBER DESIGN CATHODIC PROTECTION BONDING AND MONITORING INSTALLATION
2001979.089.pdf	2001979.089	WATER RETICULATION STANDARD STEEL PIPE CATHODIC PROTECTION FLUSH TEST STATION
2001979.090.pdf	2001979.090	WATER RETICULATION STANDARD GROUND MARKER PLAQUE CATHODIC PROTECTION ANODE DESIGN AND INSTALLATION DETAILS
2001979.091B.pdf	2001979.091	WATER RETICULATION STANDARD CATHODIC PROTECTION DETAILS ELECTRICAL CONNECTIONS TO PIPEWORK
2001979.094.pdf	2001979.094	WATER RETICULATION STANDARD STEEL PIPELINE CATHODIC PROTECTION PILLAR MOUNT TEST STATIONS
2001979.095B.pdf	2001979.095	WATER RETICULATION STANDARD STEEL PIPELINE CATHODIC PROTECTION DETAILS OF INSULATED FLANGE ASSEMBLIES
2001979.113.pdf	2001979.113	WATER RETICULATION STANDARD CATHODIC PROTECTION PILLAR TEST STATION DETAIL
2001979.133A.pdf	2001979.133	CATHODIC PROTECTION POWER SUPPLIES TR CONCRETE PLINTH WITH ASPHALT INSULATION PAD

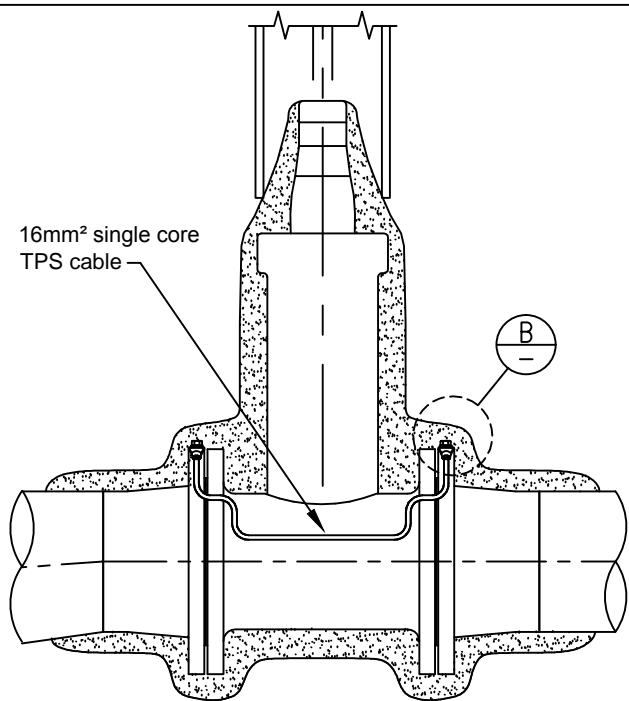


Upstream pipe flange: Notes 1 & 2
 Valve Flange: Note 3
 Downstream pipe flange: Notes 4 & 5

- Notes:
1. Black 4mm² flexible cable. Label in monitoring box to be pipe facility name if given, or "WSL".
 2. For installations requiring bonding, install both of Black 4mm² & 16mm² flexible cables, with separate connections to pipe flange. Refer section A. Labels in monitoring box to be pipe facility name if given or "WSL".
 3. White 4mm² flexible cable. Label in monitoring box to be as given or "STATION".
 4. Blue 4mm² flexible cable. Label in monitoring box to be the customers name or "CUSTOMER".
 5. For installations requiring bonding, install both of Blue 4mm² & 16mm² flexible cables. Refer section A. Label in monitoring box to be the customers name or "CUSTOMER".

OFFTAKE VALVE CONTINUITY CABLE

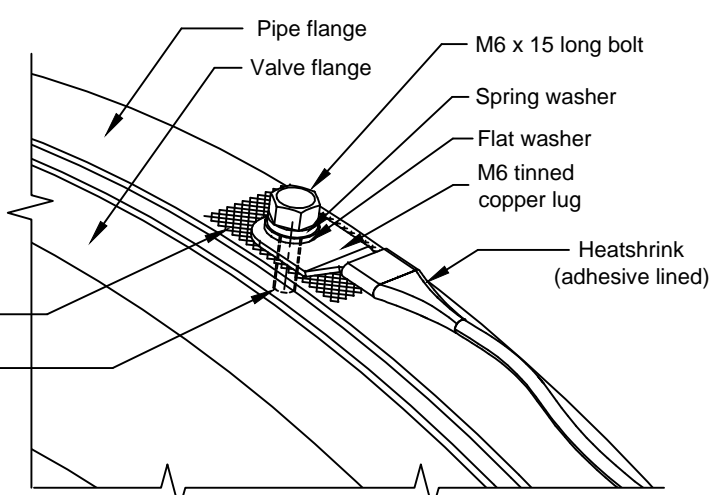
Refer to specification clause 271.19.4 for protective coating on buried valve.



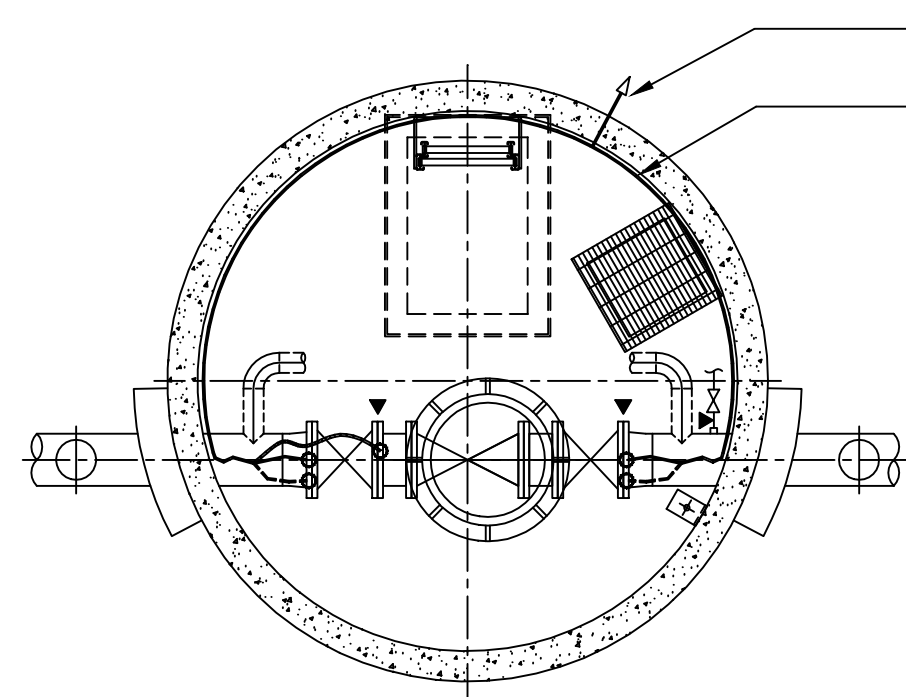
DETAIL A
NTS

BOLTED CONNECTION TO FLANGE

- Notes:
- Boilts and washers to be galvanised or zinc plated mild steel.
 - Cover gap between flanges during drilling & tapping to keep out steel filings.
 - Prepare steel surface under lug with grit paper to clean steel finish.
 - Minimum 15mm deep M6 bolt hole to be drilled & tapped in flange edge central between flange bolt holes
 - Clean all debris from pipe, flanged joint & bolts before coating.
 - Coat bolted lug assembly with Polyken 937 brushable mastic or to Watercare Specification 281.



DETAIL B
NTS



SECTION 1
NTS

Cables in Duct D to monitoring box.
 Cable(s) in conduit inside chamber. Refer Watercare Specification 505.

- Key:
- ▼ Insulated flange joint, or insulated coupling.
 - M6 drilled and tapped, bolted lug connection(s) to flange edge. Refer Detail B

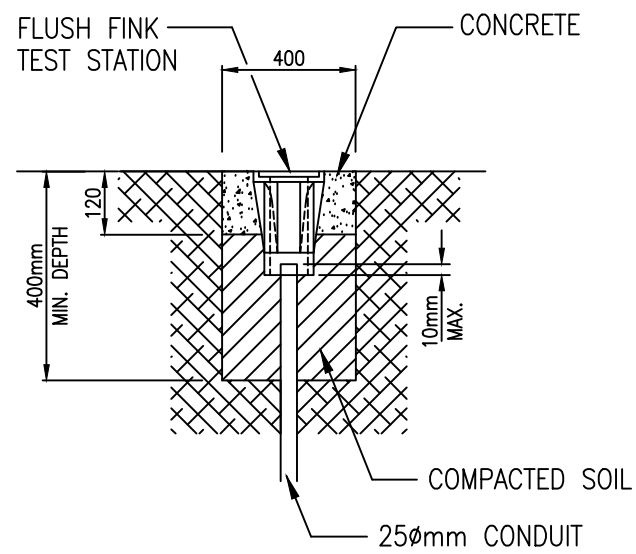
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D	3/08	CABLE CHANGES	G.B.	M.S.	DRAWN	G.B.	12-07	
C	2/08	VIEWS CHANGED	G.B.	M.S.	DWG. CHECKED	I.M.	12-07	
B	12/07	NOTES AMENDED	G.B.	M.S.	PROJECT LEADER			
A	12/07	VIEWS AMENDED	G.B.	M.S.	A.M. APPROVED	D.B.	12-07	

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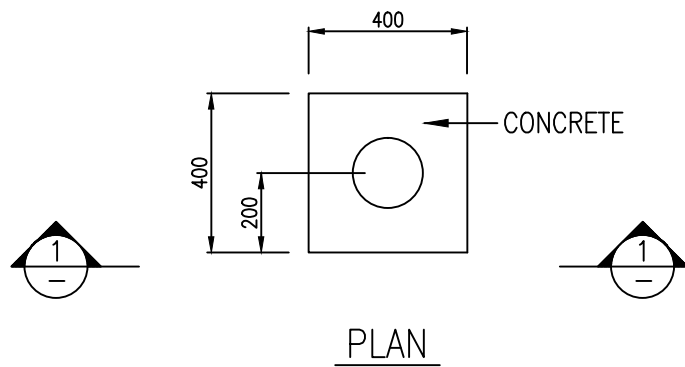


BULK WATER METER UPGRADES
 CHAMBERS, VALVES & PIPEWORK
 CATHODIC PROTECTION BONDING AND MONITORING INSTALLATION

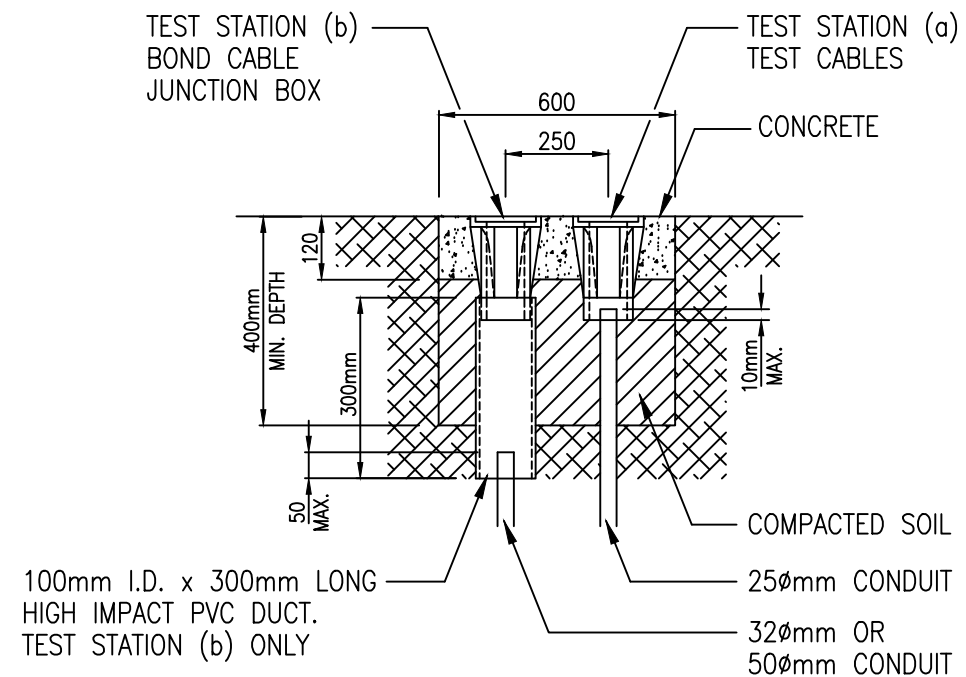
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ORIGINAL SCALE A3	CONTRACT No.
N.T.S.	-
DRAWING No.	ISSUE
2001979 .087	E



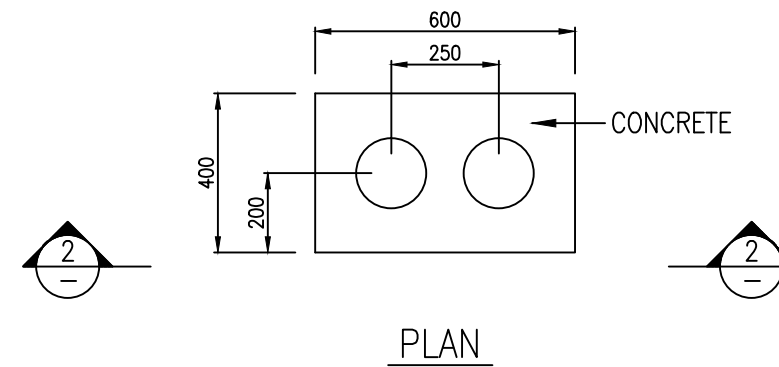
SECTION 1
Scale N.T.S.



PLAN
SINGLE FLUSH FINK TEST STATION



SECTION 2
Scale N.T.S.



PLAN
DOUBLE FLUSH FINK TEST STATION

NOTES.

1. TEST STATIONS SET IN CONCRETE AS SHOWN.
2. LOCATE TEST STATIONS OUT OF CARRIAGEWAY, IN THE ROAD BERM OR FOOTPATH

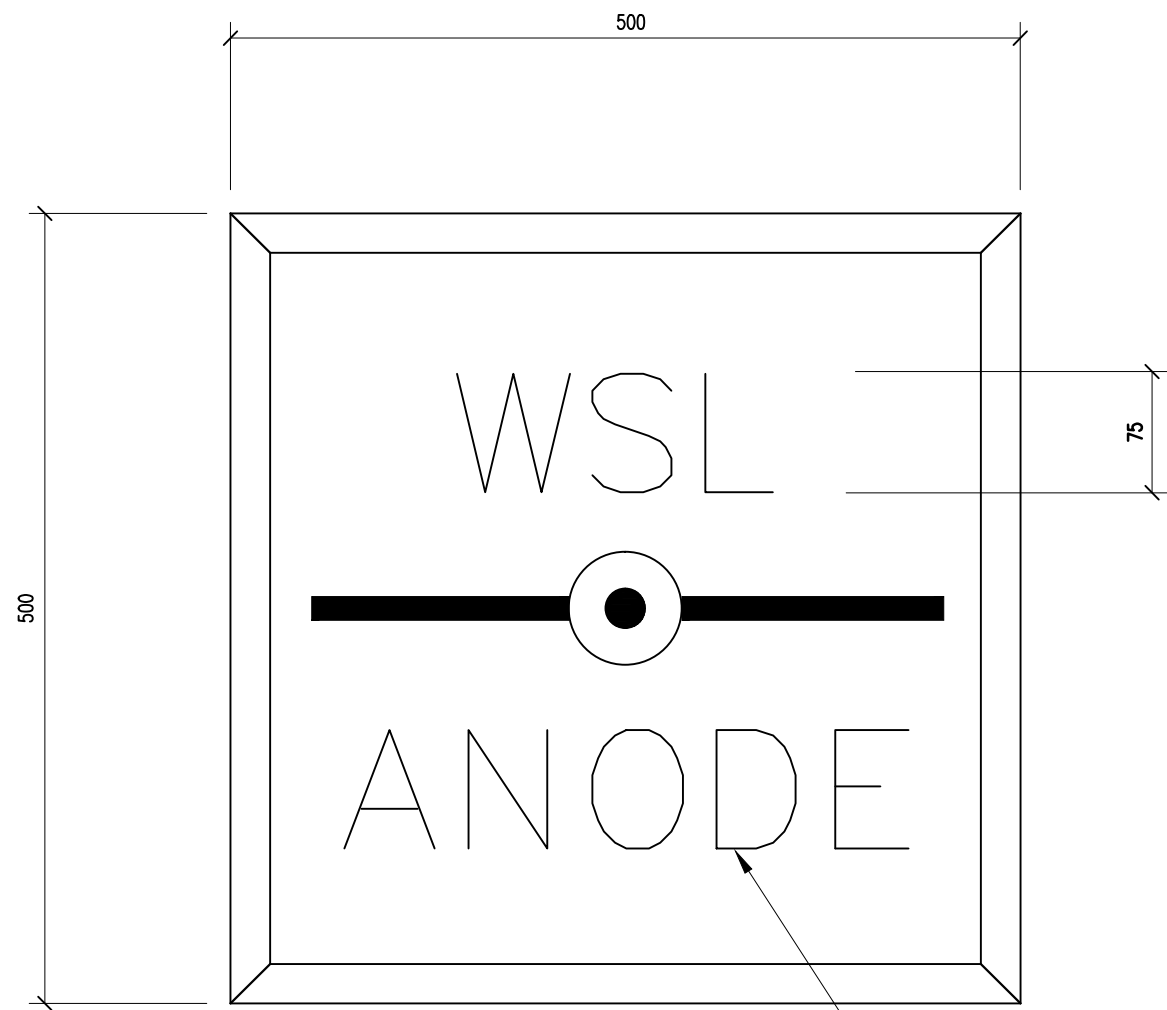
ISSUE	DATE	AMENDMENT	BY	APPD.	BY	DATE

DESIGNED	M.S.	5/07	M. BOURNE
DES. CHECKED	J.V.	5/07	
DRAWN	L.C.	5/07	OPERATIONS
DWG. CHECKED	I.M.	5/07	A.SPITAL
PROJECT LEADER	M.S.	5/07	
A.D. APPROVED	D.B.	5/07	ASSET MANAGEMENT

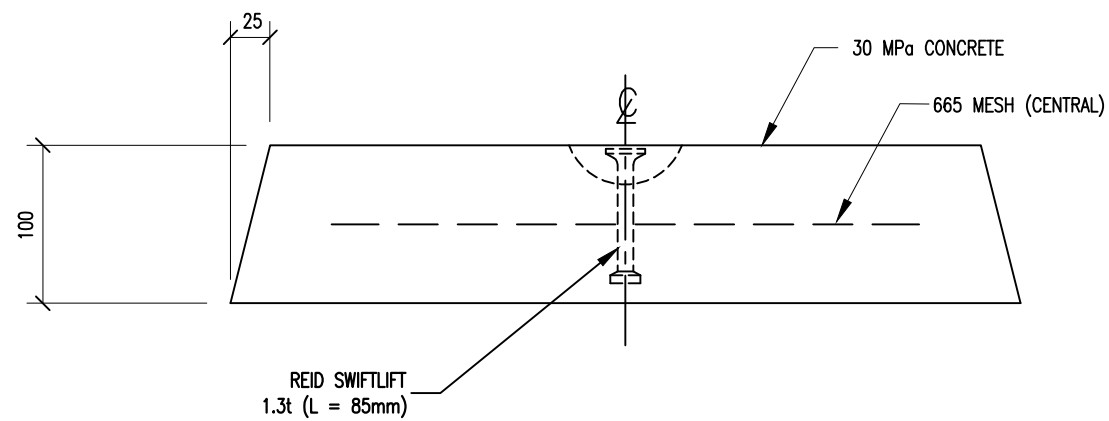


RETICULATION STANDARD
STEEL PIPELINE CATHODIC PROTECTION
FLUSH TEST STATION

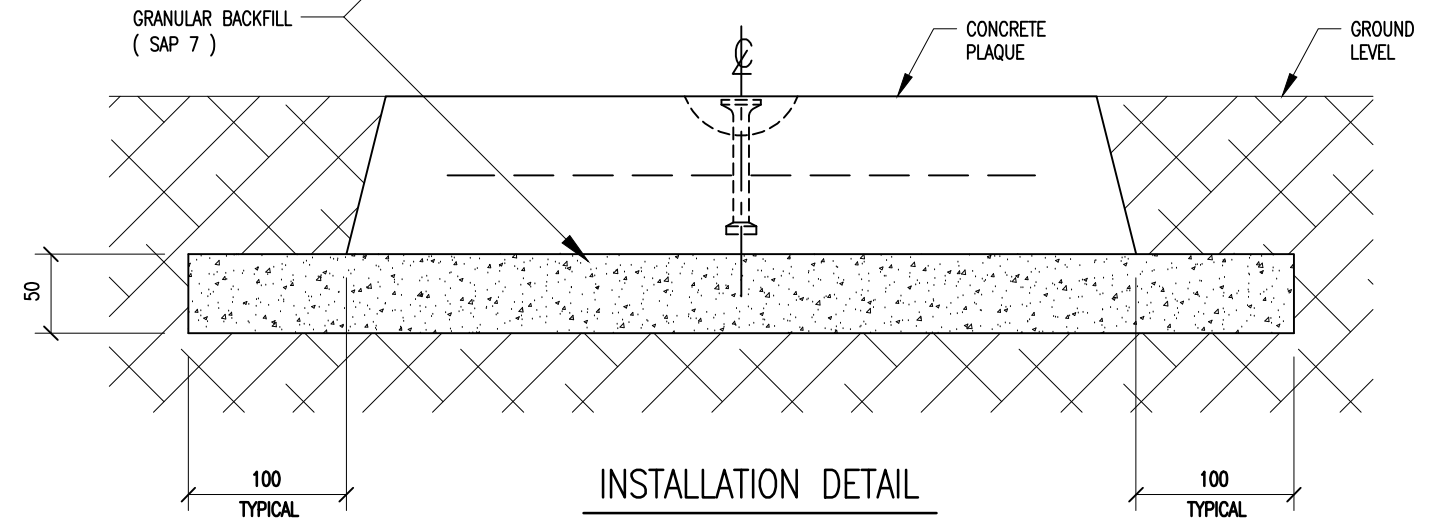
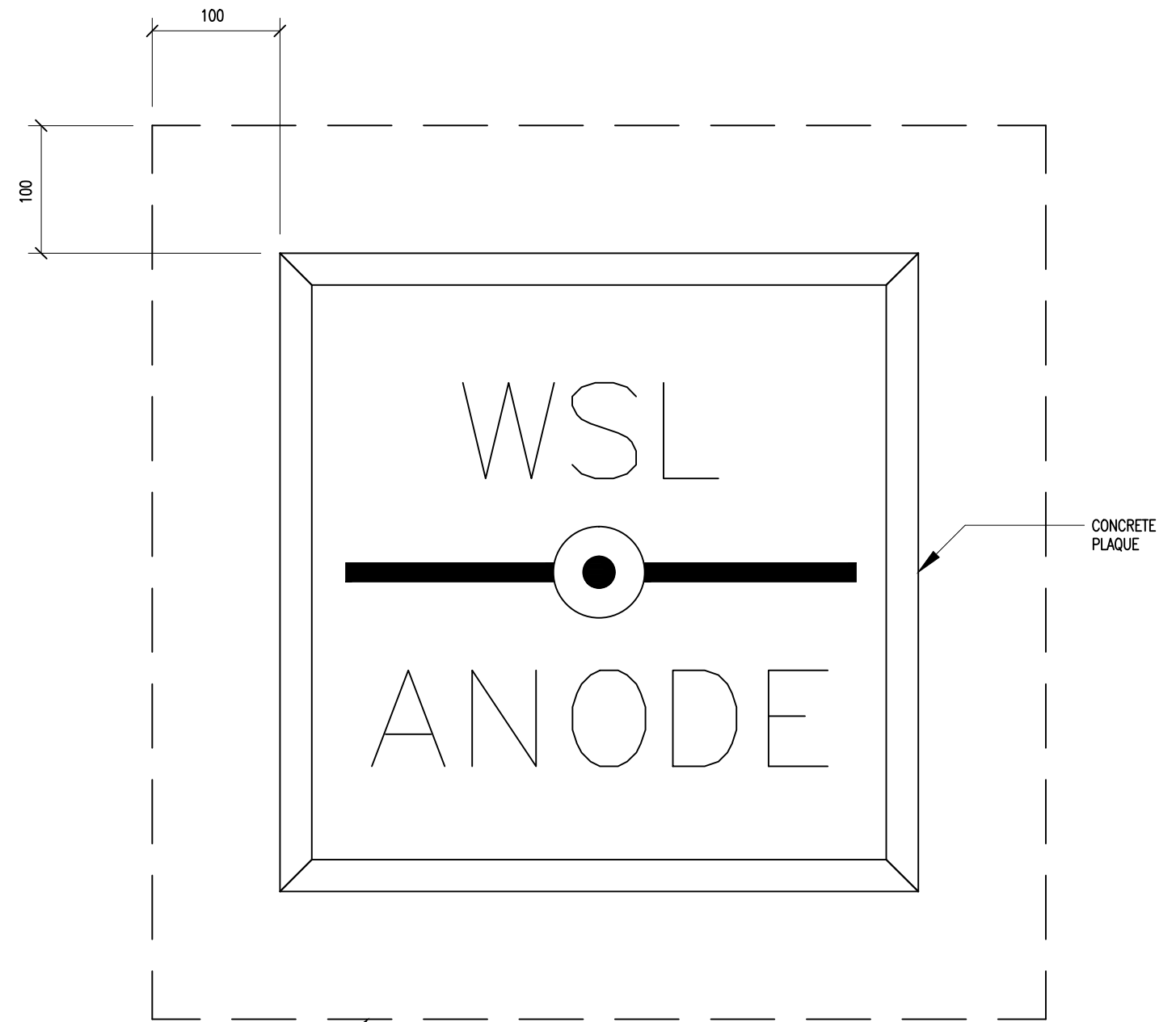
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ORIGINAL SCALE A1 N.T.S.	CONTRACT No. -
DRAWING No. 2001979	ISSUE .089



12mm x 3mm DEEP LETTERING



DESIGN DETAIL



INSTALLATION DETAIL

ISSUE	DATE	AMENDMENT	BY	APPD.	DATE

DESIGNED	M.S.	06/07
DES. CHECKED		
DRAWN	L.C.	06/07
DWG. CHECKED	I.M.	06/07
PROJECT LEADER	M.S.	06/07
A.M. APPROVED	A.S.	06/07

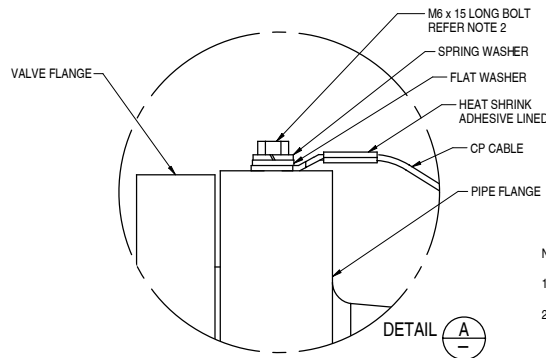
M. BOURNE
OPERATIONS

A. SPITTAL
ASSET MANAGEMENT

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RETICULATION STANDARD
GROUND MARKER PLAQUE
CATHODIC PROTECTION ANODE

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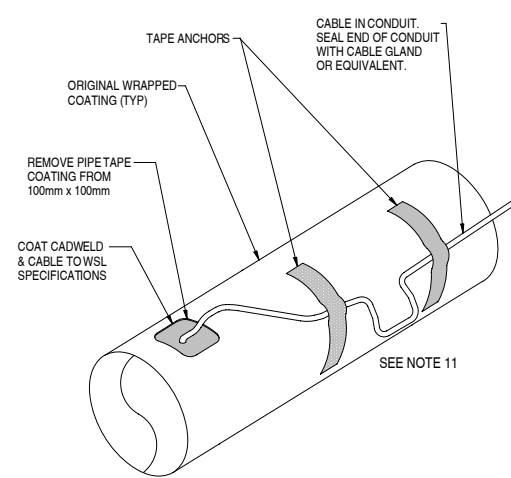


NOTES:

- BOLTS & WASHERS TO BE ALL ZINC COATED MILD STEEL.
- MINIMUM 15mm DEEP M6 BOLT HOLE TO BE DRILLED & TAPPED IN FLANGE EDGE CENTRAL BETWEEN FLANGE BOLT HOLES.
- PREPARE STEEL SURFACE UNDER LUG WITH GRIT PAPER TO CLEAN STEEL FINISH.
- COVER GAP BETWEEN FLANGES DURING DRILLING & TAPPING TO KEEP OUT STEEL FILINGS.
- CLEAN ALL DEBRIS FROM PIPE, FLANGE JOINTS & BOLTS.
- COAT BOLTED ASSEMBLY AND SURROUNDING SURFACE WITH POLYKEN 937 BRUSHABLE MASTIC.

TAKE CARE AT INSULATED FLANGES NOT TO BRIDGE INSULATING WASHERS OR GASKETS WITH ZINC RICH PRIMERS.

1 TAPPED CONNECTION TO FLANGE DETAIL



2 CADWELD CONNECTION DETAIL

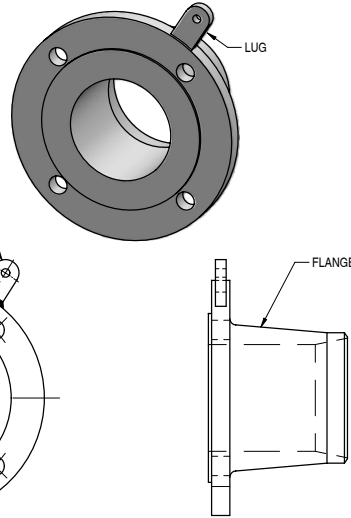
NOTES:

- CABLES GREATER THAN 19mm² MUST BE SEPARATED AND CONNECTED WITH MULTIPLE CADWELDS. CADWELDS MUST BE SEPARATED BY 50mm OR GREATER.
- CADWELD CARTRIDGE CA15F33 SHALL BE USED FOR ALL CONNECTIONS. MULTIPLE CARTRIDGE CHARGES SHALL NOT BE USED IF A CADWELD MUST BE REPEATED. A NEW PIPE SURFACE MUST BE PREPARED AT LEAST 50mm FROM THE ORIGINAL WELD ATTEMPT. MORE THAN ONE WELD ATTEMPT ON THE SAME SPOT IS NOT PERMITTED.
- CADWELDS MUST BE 50mm OR GREATER FROM EXISTING WELDS IN PIPE.
- REMOVE PIPE COATING FROM AN AREA 100mm x 100mm OR LARGER IF REQUIRED. FOR TAPE WRAP FOLLOW STRESS RELIEF PROCEDURE. FOR ALLOTHER EXISTING COATINGS REMOVE SHARP CORNERS WHICH COULD PROMOTE SPLITTING OF COATING.
- CLEAN SURFACE OF PIPE BY WIRE BRUSH AND FILE TO OBTAIN WHITE METAL FINISH.
- STRIP CABLE END AND TWIST CONDUCTORS TO FIT CADWELD MOLD.
- FOLLOW MANUFACTURERS CADWELDING PROCEDURES TO MAKE CONNECTION.
- TEST STRENGTH OF CONNECTION BY LIGHTLY TAPPING WITH 0.5kg HAMMER.
- REMOVE ALL WELD SLAG AND SPATTER, SHARP EDGES AND BURRS WITH METAL FILE.
- WIPE PIPE SURFACE WITH CLEAN, OIL FREE RAGS TO REMOVE ANY LOOSE DUST AND ENSURE THE SURFACE IS DRY.
- FOR BURIED CADWELD CONNECTIONS FOLLOW WATERCARE REPAIR PROCEDURE (27710). USE MASTIC FILLER AROUND CADWELD AND CABLE. EXTEND FILLER BEYOND END OF REPAIR WRAP. FOR CADWELD CONNECTIONS IN CHAMBERS AND ABOVE GROUND, RECOAT CADWELD AREA WITH POLYKEN 937 BRUSHABLE MASTIC OR APPROVED EQUIVALENT.
- SECURE CABLE WITH TWO TAPE ANCHORS USING PIPE WRAP TAPE OR PLASTIC CABLE TIES. MINIMUM 500mm LONG. LEAVE MINIMUM 200mm CABLE SLACK BETWEEN TAPE ANCHORS. FIRST TAPE ANCHOR TO BE ADJACENT TO EDGE OF REPAIR COATING.

NOTES:

- DRILL & TAP HOLE IN LUG, M6 OR M8 AS SPECIFIED BY ENGINEER.
- BOLTS & WASHERS TO BE ALL ZINC COATED MILD STEEL.
- PREPARE STEEL SURFACE UNDER CRIMPLUG WITH GRIT PAPER TO CLEAN STEEL FINISH.
- COAT BOLTED ASSEMBLY & SURROUNDING SURFACE TO WATERCARE SPECIFICATION 281 OR APPROVED EQUIVALENT. TAKE CARE AT INSULATED FLANGES NOT TO BRIDGE INSULATING WASHERS OR GASKETS WITH ZINC RICH PRIMERS.
- 316L STAINLESS STEEL LUG MAY BE SPECIFIED BY ENGINEER. FOLLOW NOTES IN DETAIL 4 FOR WELDING PROCEDURE. REPAINT FLANGE TO SPECIFICATION 281. PAINT MUST OVERLAP ONTO LUG BY MINIMUM 10mm. BOLTS, WASHERS AND CRIMP LUGS MUST ALL BE 316 STAINLESS STEEL.

POSITION TO SUIT ACCESS & MAINTENANCE



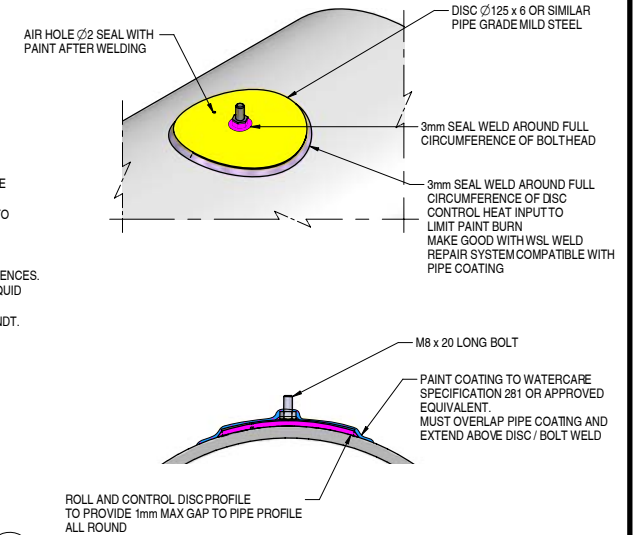
LUG DETAIL
SCALE 1 : 2

3 BOLTED WELD LUG CONNECTION DETAIL

SCALE 1 : 2

NOTES:

- BOLTS TO BE 316L STAINLESS STEEL.
- WELDING OF 316L STAINLESS BOLT TO MILD STEEL DISC TO BE TO AS/NZS 1554:1994, PART 6, LEVEL 2, CLASS B. PICKLE & PASSIVATE OR LIGHT ELECTROPOLISH WITH CARE TO AVOID AFFECTING MILD STEEL PLATE. MUST BE LEFT WITH PAINTABLE FINISH.
- NDT BY LIQUID PENETRATION ON 100% OF WELD CIRCUMFERENCES. WHERE SEVERAL BOLTS ARE BEING INSTALLED PERFORM LIQUID PENETRATION NDT ON MINIMUM OF FIRST WELDED BOLT CONNECTION. ALL WELDS ON ALL LUGS TO BE 100% VISUAL NDT.
- PLATE AND WELD MUST NOT OVERLAP PIPE WELDS OR WELD HEAT AFFECTED ZONE.



4 WELDED BOLT CONNECTION DETAIL

SCALE 1 : 5

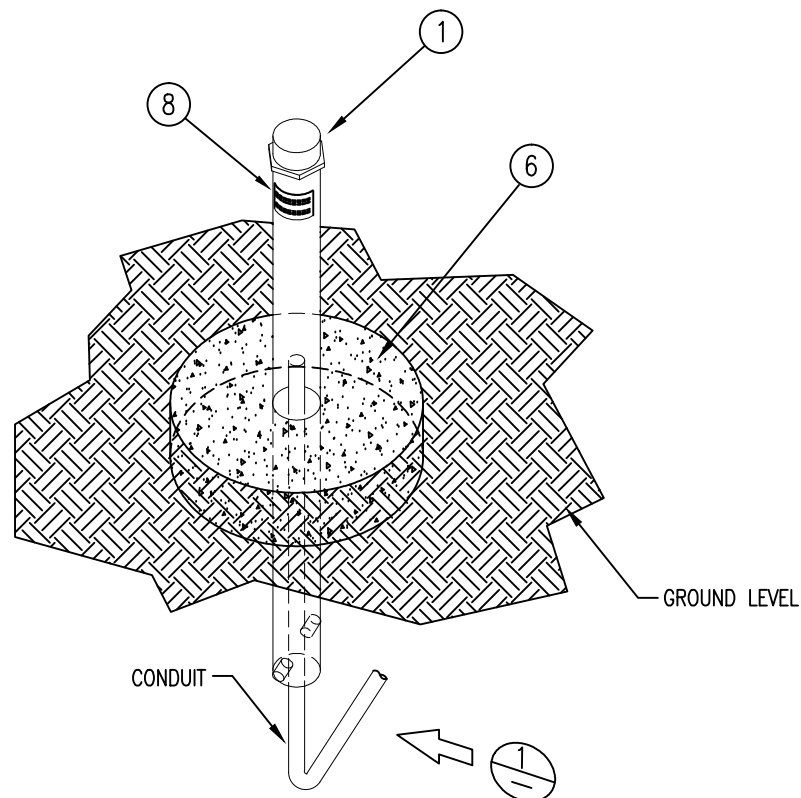
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A	04/07	NOTES & SIZES CHANGED	JVH	MS	

DESIGNED	M.S.	1-07
DES. CHECKED		
DRAWN	J.V.H.	1-07
DWG. CHECKED		
PROJECT LEADER	D.B.	1-07
A.D. APPROVED		

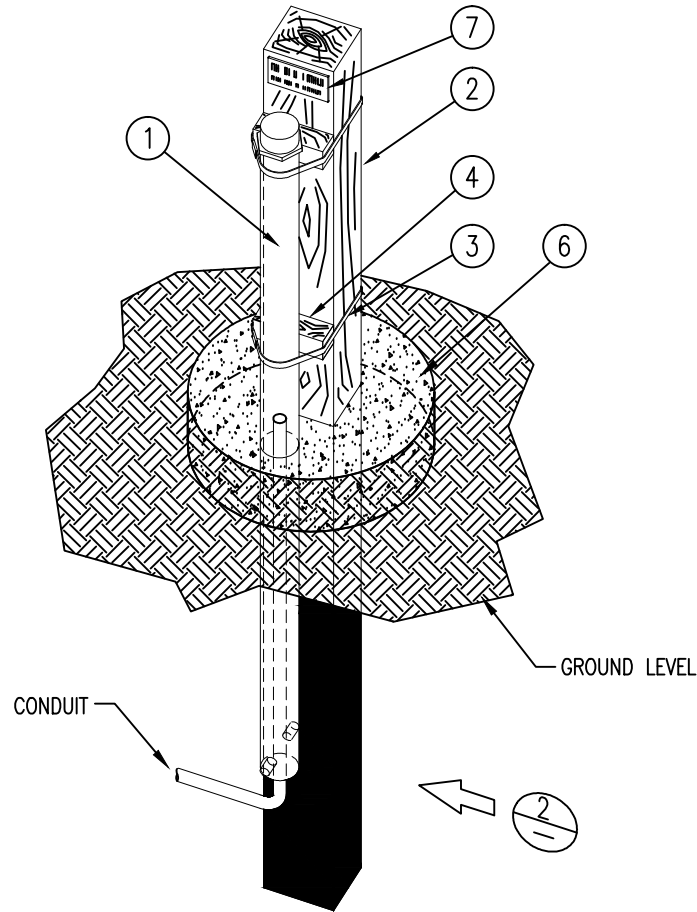
waterCare
services limited

DESIGN GUIDELINE
CATHODIC PROTECTION DETAILS
ELECTRICAL CONNECTIONS TO PIPEWORK

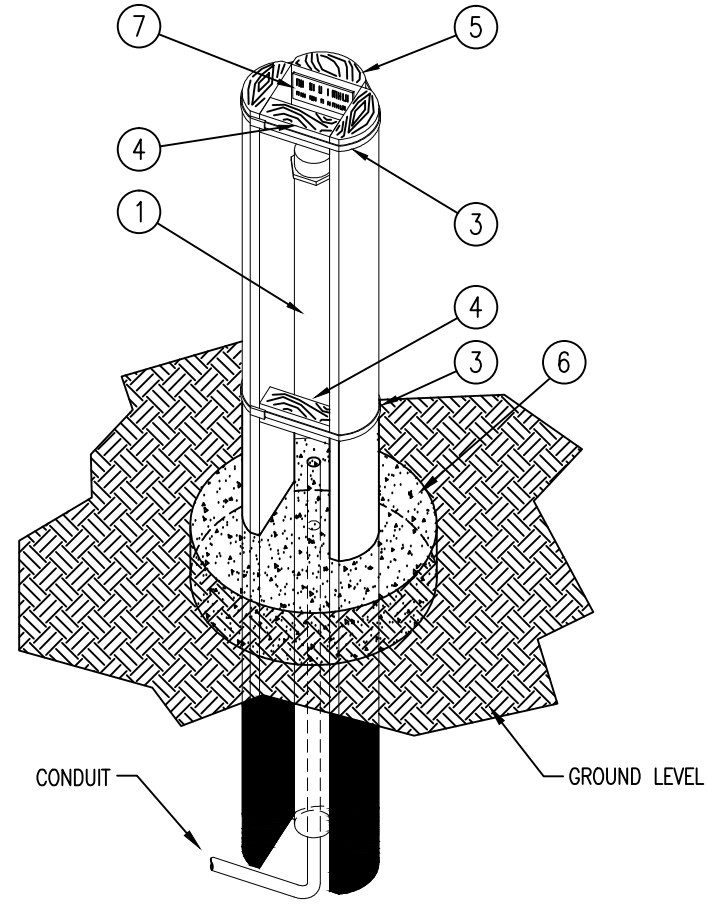
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AS SHOWN			
DRAWING No.	2001979	ISSUE	B
	.091		



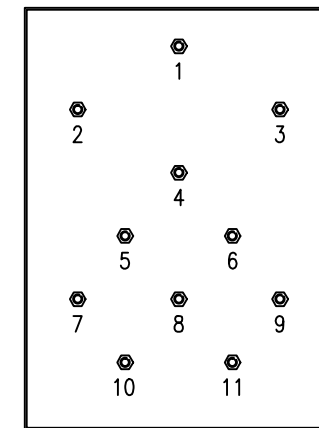
DETAIL **A** ISOMETRIC VIEW
Scale 1:20 "BIG FINK" FREE STANDING



DETAIL **B** ISOMETRIC VIEW
Scale 1:20 "BIG FINK" SINGLE SUPPORT POST



DETAIL **C** ISOMETRIC VIEW
Scale 1:20 "BIG FINK" TRIPLE SUPPORT POST

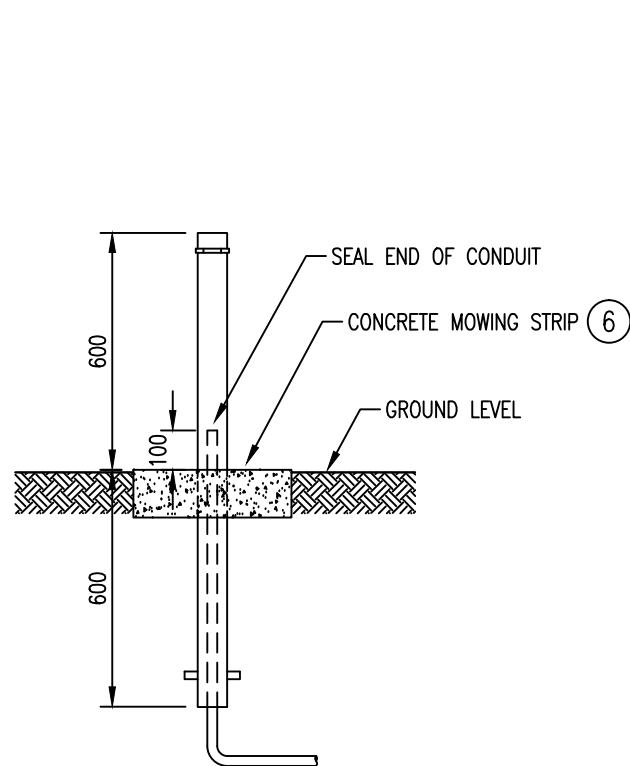


SEE NOTE 2

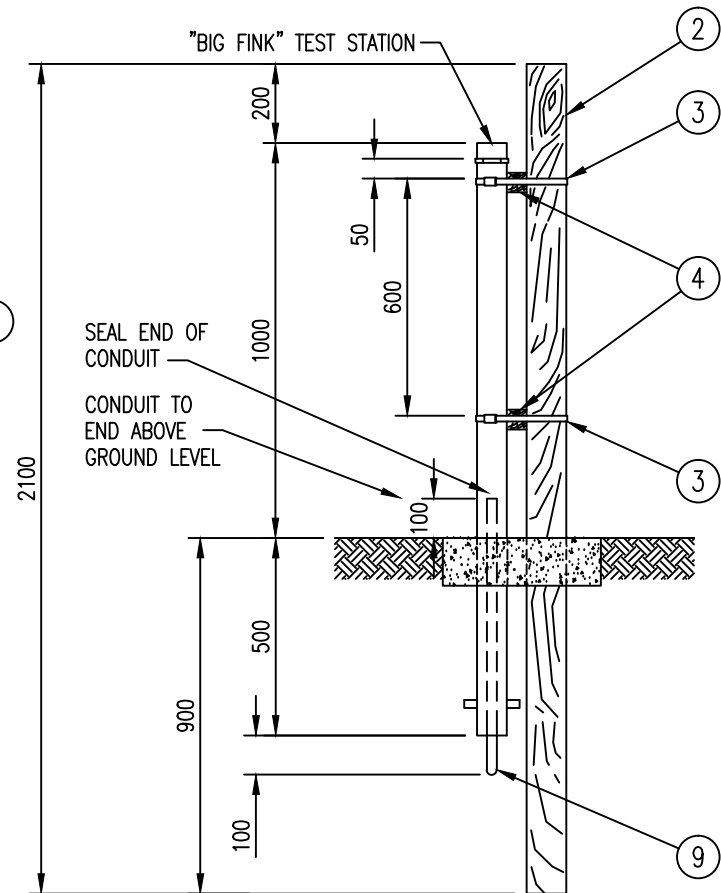
DETAIL **D** "BIG FINK"
Scale NTS TERMINAL BOARD

WATERCARE
CATHODIC PROTECTION
CP SITE ###

DETAIL **E** LABEL
Scale NTS



VIEW **1**
Scale 1:20 "BIG FINK" FREE STANDING



VIEW **2**
Scale 1:20 "BIG FINK" SINGLE POST

ITEM	MATERIAL
1	BIG FINK TEST STATION
2	HALF ROUND OR 100mm SQUARE, x 2.1m LONG, GROUND TREATED TIMBER
3	15mm WIDE STAINLESS STEEL BANDIT STRAP
4	100mm x 50mm x 50mm TREATED TIMBER SPACERS
5	HALF ROUND, 2.1m LONG, GROUND TREATED TIMBER
6	CONCRETE MOWING STRIP, EITHER ROUND OR SQUARE, MIN 400mm x 120mm THICK. NOT REQUIRED IN FARMLAND UNLESS INDICATED IN SITE SPECIFIC DESIGN.
7	60 x 40 ENGRAVED ID TAG, TO READ 'WATERCARE', 'CATHODIC PROTECTION' 'CP SITE ###'. ###"NUMBER" TO BE SPECIFIED BY ENGINEER. SECURE TO POST WITH STAINLESS STEEL SCREWS
8	60 x 40 FLEXIBLE ID TAG, TO READ 'WATERCARE', 'CATHODIC PROTECTION' 'CP SITE ###'. ###"NUMBER" TO BE SPECIFIED BY ENGINEER. SECURE TO SHAFT WITH POP RIVETS OR EPOXY GLUE.
9	CUT OFF CONDUIT ABOVE GROUND LEVEL UNLESS SPECIFIED IN DETAILED DESIGN.

NOTES:

- FREE STANDING TO BE USED FOR SUBURBAN ROADSIDES, WHERE TEST STATION IS TO BE UNOBTRUSIVE.
- SINGLE SUPPORT POST TO BE USED IN INDUSTRIAL & SEMI RURAL AREAS WHERE THERE MAY BE A RISK OF DAMAGE FROM ANIMALS, VEHICLES, LAWNMOWERS OR VANDALISM.
- TRIPLE SUPPORT POST TO BE USED IN RURAL & HEAVY INDUSTRIAL AREAS, OR WHERE VEHICLES, MACHINERY OR ANIMALS ARE PRESENT OR VANDALISM IS LIKELY.
- TEST STATIONS LOCATED ADJACENT TO ROADS SHALL BE ACCESSIBLE FROM THE ROAD SIDE OF THE FENCE.
- STANDARD BIG FINK IS SUPPLIED WITH TERMINAL BOARD, CAP, 5 x M6 TERMINAL BOLTS (IN POSITIONS 2-6), PE SUPPORT DUCT AND ANCHOR.
- LEAVE MINIMUM 100mm CABLE SLACK IN TEST STATION.
- TRIPLE SUPPORT POST INSTALLATION TO HAVE SAME VERTICAL DIMENSIONS AS SHOWN FOR SINGLE POST.
- CUT TEST STATION DUCT TO LENGTH.

ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	M.S.	12/08	OPERATIONS	ASSET MANAGEMENT
-	10-09	FOR ISSUE	G.B.	M.S.	A.M. APPROVED	A.S.	12/08		

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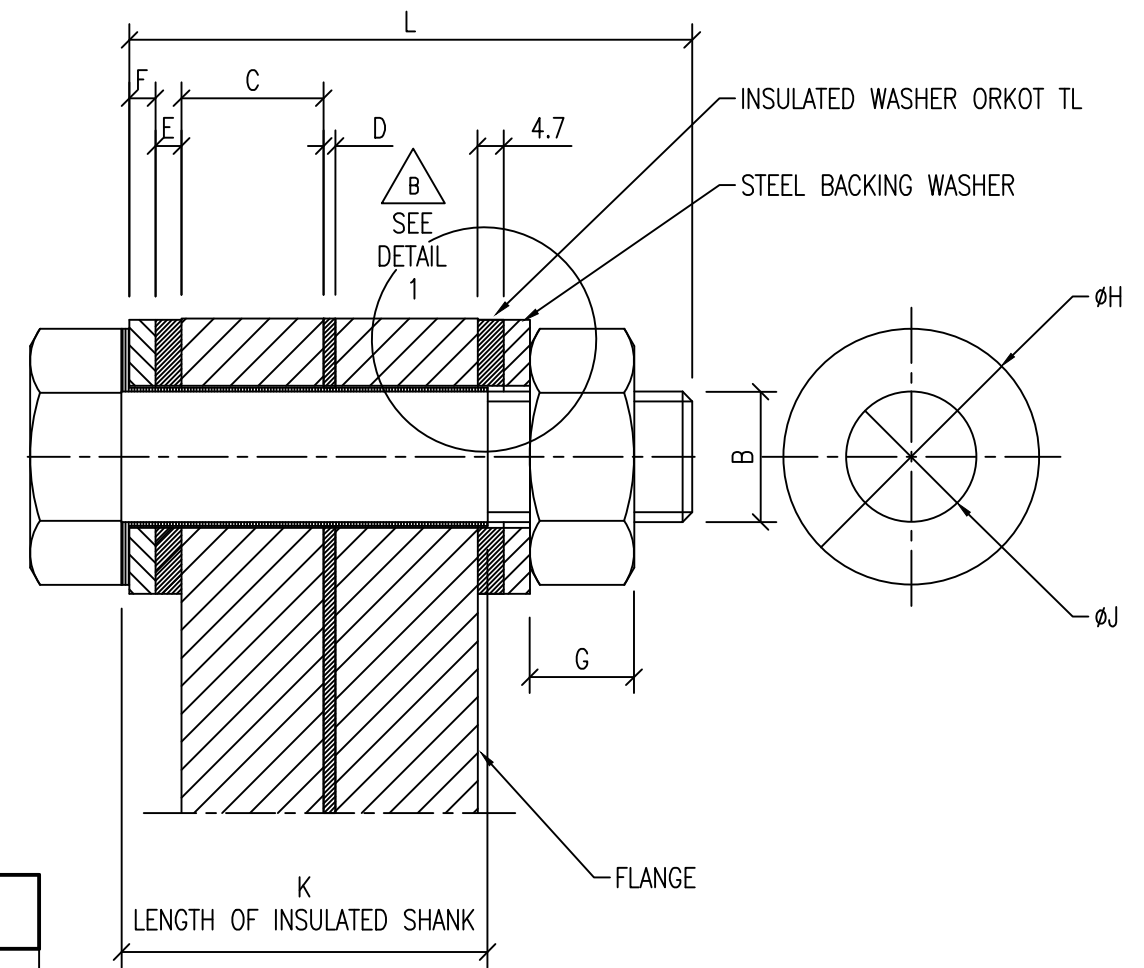


RETICULATION GUIDELINE
CATHODIC PROTECTION
BIG FINK PILLAR TEST STATIONS

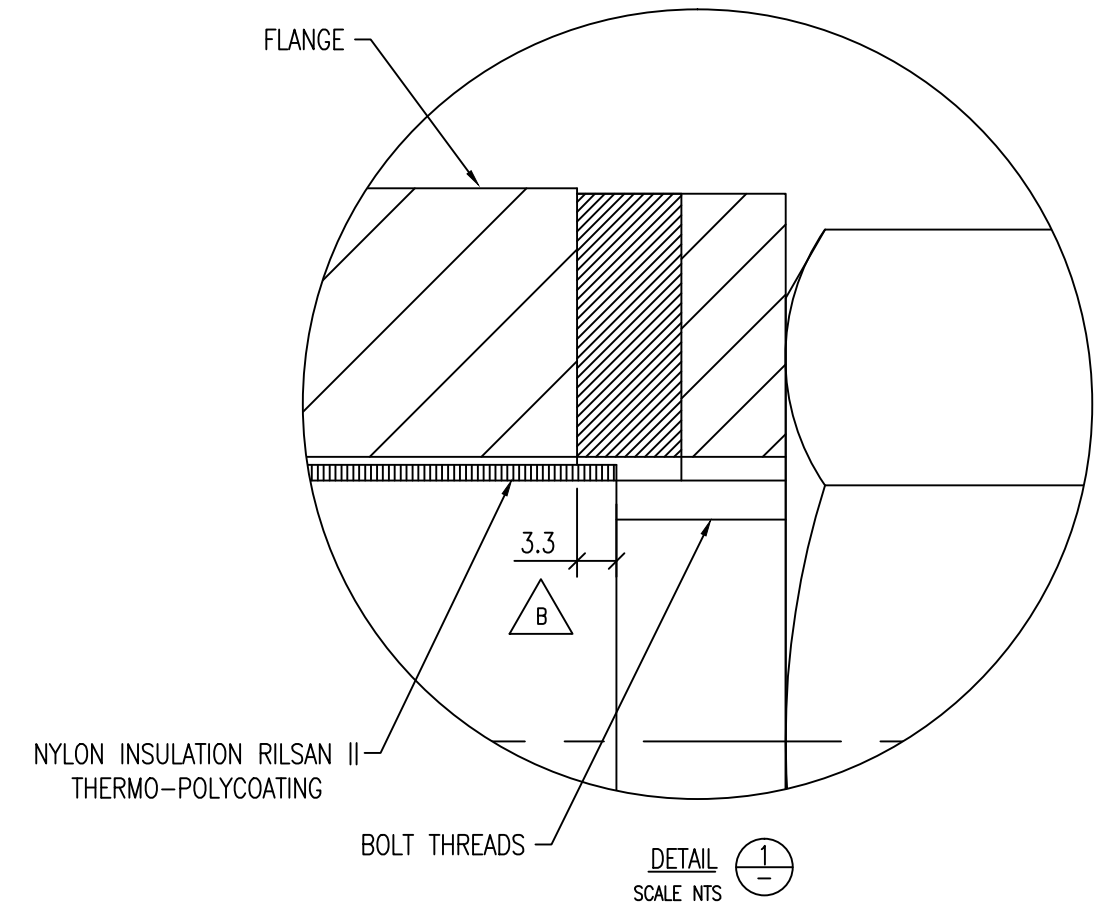
CAD FILE 2001979.094	DATE 12-10-09
ORIGINAL SCALE A3	CONTRACT No.
AS SHOWN	
DRAWING No. 2001979	ISSUE .094

NOTES:

1. INSULATED FLANGE JOINT BOLT DIMENSIONS TO BS EN1092-1:2002 PN16 IN ACCORDANCE WITH WSL STD SPECIFICATIONS 206 & 209.
2. TAP NUTS ARE OVERSIZE IN ACCORDANCE WITH WSL STD SPECIFICATION 209 TABLE 2.
3. HOT DIP GALVANISE STEEL BACKING WASHERS FOR MILD OR H.T. STEEL BOLTS.
4. STAINLESS STEEL BACKING WASHERS FOR SS BOLTS



DIMENSIONS (mm)									
	NOMINAL FLANGE SIZE	100	200	300	400	450	500	600	NOTES
A	OUTSIDE DIAMETER	220	340			640	715	840	
	PITCH CIRCLE DIAMETER	180	585			585	650	770	
	No HOLES x DIAMETER	8 x Ø18	20 x Ø30			20 x Ø30	20 x Ø33	20 x Ø36	
B	BOLT DIAMETER	M16	M20			M27	M30	M33	
	THREAD PITCH	2.0	2.5			3.0	3.5	4.0	
	FLANGE TYPE	11	11			11	01	01	
C	FLANGE THICKNESS	20	24			34	55*	55*	* ACTUAL THICKNESS 60mm (NO 55mm PLATE AVAILABLE FOR MFR OF FLANGES)
D	GASKET THICKNESS	3	3			3	3	3	
E	INSULATED WASHER THICKNESS	4.7	4.7			4.7	4.7	4.7	
	INSULATED WASHER I/D	19	23			31	33	36	
	INSULATED WASHER O/D	31	38			51	58	65	
F	STEEL WASHER THICKNESS	4	4			5	5	6	
G	NUT WIDTH (0.8 x DIA)	12.8	16			22	24	29	
H	STEEL WASHER I/D	18	22			30	33	36	
J	STEEL WASHER O/D	30	37			50	55	60	
K	INSULATION LENGTH	56	64			85	137	138	
L	BOLT LENGTH (MIN)	70	80			127	156	160	LENGTH UNDER HEAD



B

ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	M.L.	08-08	DES. CHECKED	T.C.	08-08	DRAWN	G.B.	08-08	DWG. CHECKED	I.M.	08-08
B	2:11	BOLT COATING LENGTH REDUCED	G.B.	T.A.C.												
A	7:09	NOTES, DIM ADDED	G.B.	T.A.C.												

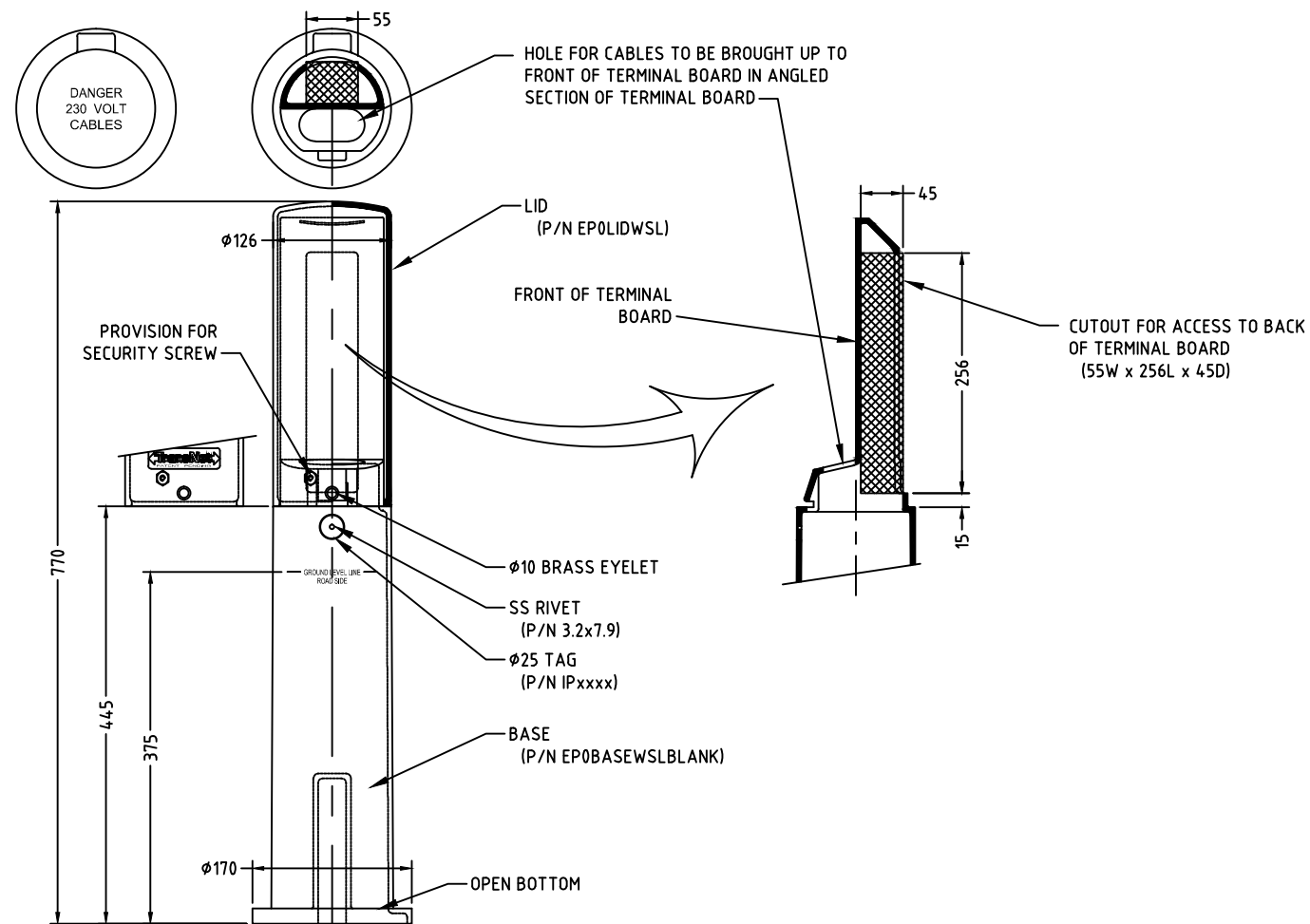
T. HAWKE
OPERATIONS

A. STEWART
ASSET MANAGEMENT



WATER RETICULATION STANDARD
CATHODIC PROTECTION
DETAILS OF INSULATED FLANGE ASSEMBLIES

CAD FILE 2001979.095B	DATE 3/02/2011
ORIGINAL SCALE A3 NTS	CONTRACT No. -
DRAWING No. 2001979	ISSUE B
.095	



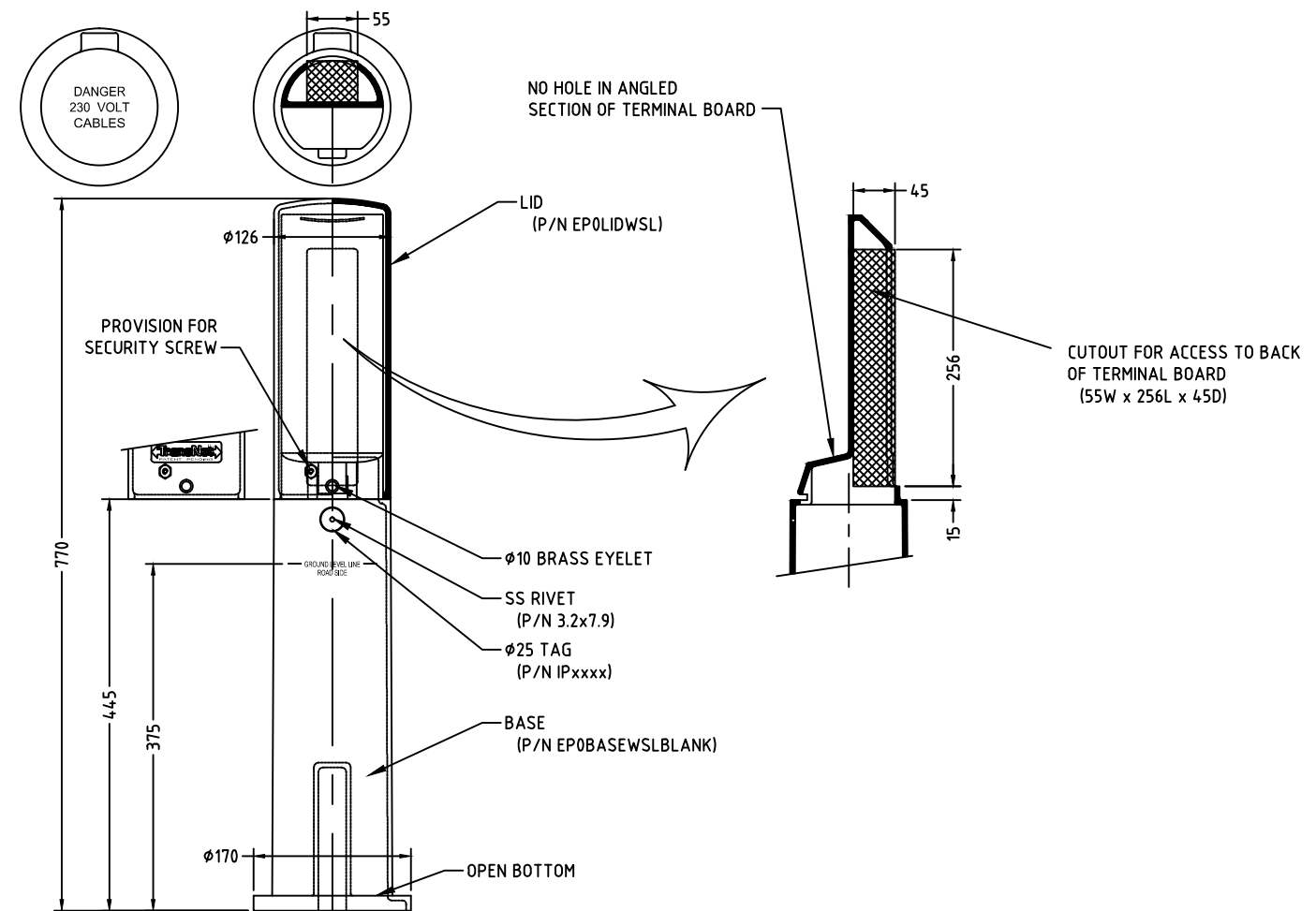
DETAIL 1
STANDARD PILLAR TEST STATION

NOTES

1. THIS IS THE PREFERRED STANDARD TEST STATION TYPE.
2. INCLUDES CUTOUT TO BRING CABLES TO FRONT OF TERMINAL BOARD.
3. SUPPLIED IN LIGHT BLUE ULTRA- UV STABILISED POLYETHYLENE.

ORDERING INFORMATION

1. ORDER FROM IDEAL ELECTRICAL LTD, OR FROM WATERCARE SERVICES STORES, IF FREE ISSUE ITEM.
2. SPECIFY: WATERCARE SERVICES LTD. STANDARD TRANSNET ECOPILLAR
3. ORDER CODE: EPOWSLSTD_S



DETAIL 2
STANDARD PILLAR TEST STATION – BLANK TERMINAL BOARD WITH NO CABLE CUTOUT

NOTES

1. REFER DETAIL 1 FOR PREFERRED TEST STATION TYPE.
2. TO BE USED ONLY WHERE TERMINALS OR ER PROBE HEAD MUST BE MOUNTED ON ANGLED SECTION OF BOARD, DUE TO REQUIRING GREATER THAN 45mm DEPTH.
3. SUPPLIED IN LIGHT BLUE ULTRA- UV STABILISED POLYETHYLENE.

ORDERING INFORMATION

1. ORDER FROM IDEAL ELECTRICAL LTD, OR FROM WATERCARE SERVICES STORES, IF FREE ISSUE ITEM.
2. SPECIFY: WATERCARE SERVICES LTD. BLANK TRANSNET ECOPILLAR
3. ORDER CODE: EPOWSLBLANK_S

DESIGNED	M.S.	10-09			
DES. CHECKED					
DRAWN	I.M.	10-09			
DWG. CHECKED					
PROJECT LEADER	I.M.				
A.M. APPROVED					
ISSUE	DATE	AMENDMENT	BY	APPD.	BY
-	10-09	FOR ISSUE			
1	10-09	FOR ENGINEERS APPROVAL			

OPERATIONS	
ASSET MANAGEMENT	



RETICULATION STANDARD
CATHODIC PROTECTION
PILLAR TEST STATION

CAD FILE 2001979.113	DATE 13-10-09
ORIGINAL SCALE A1	CONTRACT No.
N.T.S.	-
DRAWING No.	ISSUE
2001979 .113	-

