

TECHNICAL BULLETIN

TB 0168

Transmission design and release of MDI0047

Associated with the release of MDI0047, existing standard MDI0012 *Overhead and underground transmission mains* is being marked obsolete. This technical bulletin describes transitional arrangements and provides a number of new references for transmission mains design.

Overhead Transmission Mains Design

The new standard MDI0047 *Overhead transmission mains design* is based on AS/NZS 7000 and replaces the overhead component of MDI0012 which was based on ENA C(b)1.

Any project definition (or method of supply / design brief) issued after the release of this technical bulletin shall reference MDI0047 instead of MDI0012. Where a PD has already been issued referencing MDI0012, the design may be certified to MDI0012 or MDI0047. For projects not initiated via a PD, certification to MDI0012 is permitted until May 1st 2015, after this date designs will only be certified to MDI0047.

As MDI0012 does not specify the requirements for limit state design, any designs based on MDI0012 but using limit state principals shall adhere to the load factors and strength factors specified in MDI0047.

The partner standard MDI0031 *Distribution Overhead Design* contains a number of requirements that are also relevant to transmission design. Such content will ultimately be moved into a new standard covering requirements common to both overhead distribution and transmission design. In the interim, the clauses from MDI0031 listed below shall be deemed applicable to transmission designs:

<u>Section</u>	<u>Title</u>
2.1	General requirements
2.2	Easements
2.3	Network records
2.4	Quality of materials
2.5	Approved materials
2.6	Environmental requirements
3.1	Regulations
3.4	Telstra assets
3.5	Equipment/asset numbering
3.7	Attachment of broadband communications cables
3.11	Tree trimming for new construction
3.19	Footpath allocation for Endeavour Energy assets
3.2	Information sourced from Endeavour Energy
3.21	Design methods (except as otherwise specified in MDI0047)
3.22	Vibration damping (due to larger diameter of transmission conductors, dogbone style dampers should be used in place of spiral dampers)
3.24	Conductor selection
4.2	Waterway crossings

Contact: Justin Byrnes

Phone: 9853 6484

Date: 12 December 2014

Authorised by: Jude Perera, Manager Primary Systems

51 Huntingwood Drive, Huntingwood NSW 2148

Telephone: 131 081 Fax: (02) 9853 6000

Postal address: PO Box 811 Seven Hills NSW 1730.



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- 4.3 Transgrid under crossings (the span limit of 100m is waived for transmission however the span length should still be minimized)
- 4.4 Other assets on Endeavour Energy poles
- 4.6 Overhead lines near aircraft landing fields
- 4.7 Overcrossing markers
- 5.6 Conductor/cable tensions (only paragraph 5&6 relating to conductor creep)
- 5.8 Aerial marker balls
- 5.11 Changing head loads on nailed or re-buttet poles
- 8.1 Lighting design

Underground Transmission Mains Design

With the removal of MDI0012, an interim arrangement is necessary for underground transmission mains design until a new standard is published.

The majority of content in the underground section of MDI0012 is already covered in other standards. Content not covered in other standards is attached to this technical bulletin so that it remains accessible. The tables below provide a reference or explanation for each item.

MDI0012 - Underground sections

MDI0012 Section number/name	New reference
5.2.1 Cable sheath bonding design	MDI0045 <i>Cable sheath bonding design</i>
5.2.2 Cable construction	ETS0004 <i>11kV to 132kV single core power cables</i> Networks NSW Cable Specification
5.2.3 Trench details	Content included below
5.2.4 Cable route labelling	Content included below
5.2.5 Overhead to underground termination structures	MDI0047 <i>Transmission overhead design</i>
5.2.6 Construction drawings	SAD0001 <i>Project drawings standards</i>
5.2.7 Testing	MMI0025 <i>Tests for transmission/sub-transmission underground cables</i>
5.2.8 Underground pilot cable	New specification to be developed

Additional underground transmission references

Cable ratings	MDI0046 <i>Transmission underground cables – continuous current ratings</i>
Underboring	ETS0081 <i>Installation of conduits using trenches techniques</i>

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Trench details (MDI0012 clause 5.2.3)

To maintain a high level of security for the underground transmission network, it is Endeavour Energy's policy to install its underground transmission feeders within roadways (approximately 1.2m from the face of the kerb). Cross-sections of Endeavour Energy's standard trench details are shown on Drawing No. 290689D.

Cable route labelling (MDI0012 clause 5.2.4)

Transmission, subtransmission and major pilot cable routes shall be clearly labelled in accordance with the following requirements:

- (a) Where cables are installed in the road shoulder or footpath allocation, the kerb shall be labelled by means of a suitable painted sign - red lettering on white background - on the kerb as follows:
 - at 50m intervals along the cable route;
 - at road intersections;
 - at either end of road crossings; and,
 - wherever significant route deviations occur.
- (b) Where cables are installed off-road, the route shall be labelled by means of 1320mm x 100mm x 100mm steel reinforced concrete posts (Endeavour Energy stock code 1553338). The posts shall be painted yellow and have an appropriate warning message moulded into the face of the post. The posts shall be located at intervals of approximately 150m along the cable route and wherever significant route deviations occur.
- (c) Where cables are installed under, for example, paved car parking areas, 340mm x 340mm concrete marker blocks shall be installed. The blocks shall be installed flush with the paved surface, at intervals of 50m along the cable route and wherever significant route deviations occur. The blocks shall be painted yellow and shall have an appropriate warning message moulded into the top surface.
- (d) Wherever cables are installed off-road and the route crosses, for example, a creek, river, or railway line, a sign post on either bank shall be installed. The sign post shall consist of an aluminium post 3000mm in length and an aluminium sign plate 750mm x 500mm, with an appropriate warning message.

Contact: Justin Byrnes

Phone: 9853 6484

Date: 12 December 2014

Authorised by: Jude Perera, Manager Primary Systems

51 Huntingwood Drive, Huntingwood NSW 2148

Telephone: 131 081 Fax: (02) 9853 6000

Postal address: PO Box 811 Seven Hills NSW 1730.



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MDI0012 – Underground drawings

Drawing no.	Title	New reference
011986 S1	Footpath allocation for roads built before 1 January 1991	MCI0005, MCI0006, MDI0031
011986 S2	Footpath allocation for roads built after 1 January 1991	MCI0005, MCI0006, MDI0031
240860	11/33kV Underground Cable Cross-Section	ETS0004 and NSW Cable Specification
240861	66kV Underground Cable Cross-Section	ETS0004 and NSW Cable Specification
240862	132kV Underground Cable Cross-Section	ETS0004 and NSW Cable Specification
077161	33kV Type 50A - Underground to Overhead Arrangement	MDI0047
078385	33kV Type 50B - Underground to Overhead Arrangement	MDI0047
057110	132kV Type 80C - Underground to Overhead Arrangement	MDI0047
265088 S1	66kV Type 70C - Underground to Overhead Arrangement	MDI0047
290689	Cable Trench Cross Section for 33, 66 or 132kV Cables	See attachment
297263 S1	Cable Trench Cross Section – ZS Trf. Cables One/Phase	SDI531
297263 S2	Cable Trench Cross Section – ZS Trf. Cables Two/Phase	SDI531
297263 S3	Cable Trench Cross Section – ZS Trf. Cables Three/Phase	SDI531
297263 S4	Cable Trench Cross Section – ZS Trf. Cables Four/Phase	SDI531
297280	Transmission Cable Cat Hole Cross Section	See attachment
297281	Transmission Cable Joint Bay for 33, 66 or 132kV Cables	See attachment
303319	Underground HV cable route marker post	See attachment

Contact: Justin Byrnes

Phone: 9853 6484

Date: 24 October 2014

Authorised by: Jude Perera, Manager Primary Systems

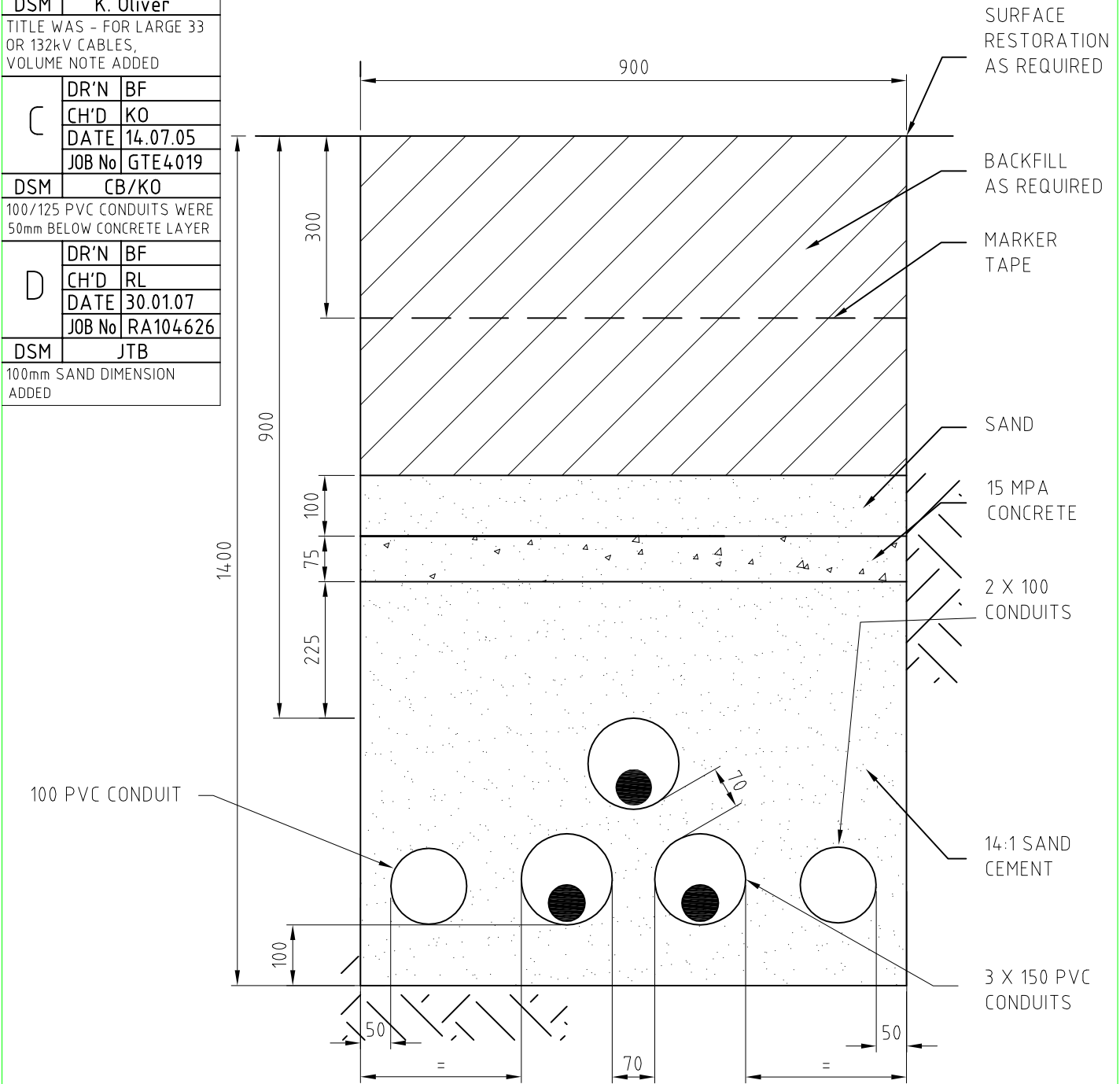
51 Huntingwood Drive, Huntingwood NSW 2148

Telephone: 131 081 Fax: (02) 9853 6000

Postal address: PO Box 811 Seven Hills NSW 1730.

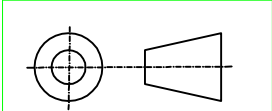


AMENDMENTS		
A	ORIGINAL ISSUE	
J R No.		DA
B	DR'N	BF
	CH'D	RL
	DATE	28.06.05
	JOB No	DTE5008
DSM	K. Oliver	
TITLE WAS - FOR LARGE 33 OR 132kV CABLES, VOLUME NOTE ADDED		
C	DR'N	BF
	CH'D	KO
	DATE	14.07.05
	JOB No	GTE4019
DSM	CB/KO	
100/125 PVC CONDUITS WERE 50mm BELOW CONCRETE LAYER		
D	DR'N	BF
	CH'D	RL
	DATE	30.01.07
	JOB No	RA104626
DSM	JTB	
100mm SAND DIMENSION ADDED		



TRENCH DETAILS

VOLUME PER LINEAL METRE	
EXCAVATE:	1.26M ³
DISPOSAL:	0.765M ³
14:1 SAND CEMENT:	0.63M ³
CONCRETE:	0.067M ³
SAND:	0.067M ³
BACK FILL:	0.495M ³



DRAWN	N.C.
DATE	09.01.04
CH'D	K.O.

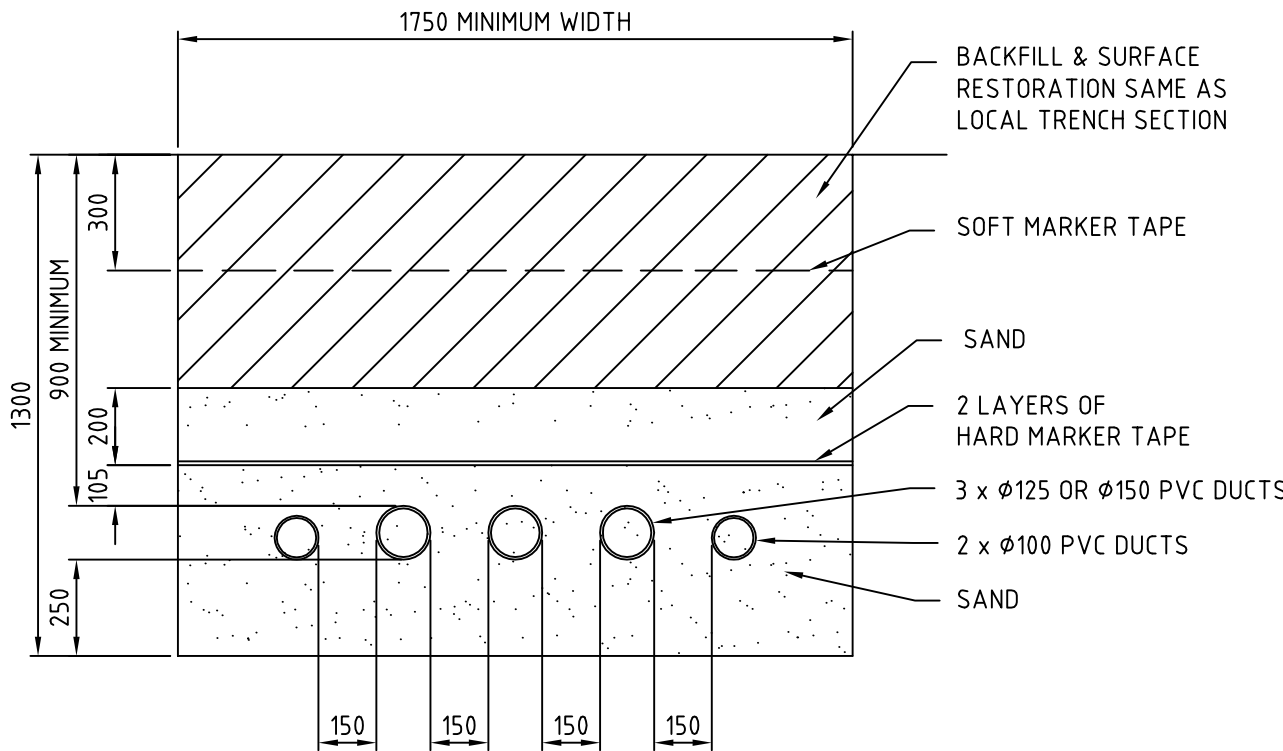
CABLE TRENCH CROSS SECTION
FOR 33, 66, OR 132kV CABLES

ORIGINAL SCALE	1:10	APPROVED	C.BROWN
A4	290689	D	
SHEET No 1 OF 1 SHEETS			

AMENDMENTS		
A	ORIGINAL ISSUE	
Job No.		DTE5008
B	DR'N	B.F.
	CH'D	R.L.
	DATE	07.07.07
	JOB No	RA104826
DSM	J. Broadhead	
NOTE 3,4,6 & END VIEW MODIFIED		
C	DR'N	B.F.
	CH'D	R.L.
	DATE	26.08.09
	JOB No	RA104826
DSM	J. Broadhead	
HARD MARK TAPE WAS ELECTRIC BRICKS, Ø100 DUCTS RELOCATED		

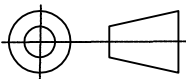
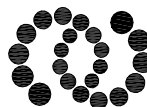
CAT HOLE CONDUIT DETAIL NOTES

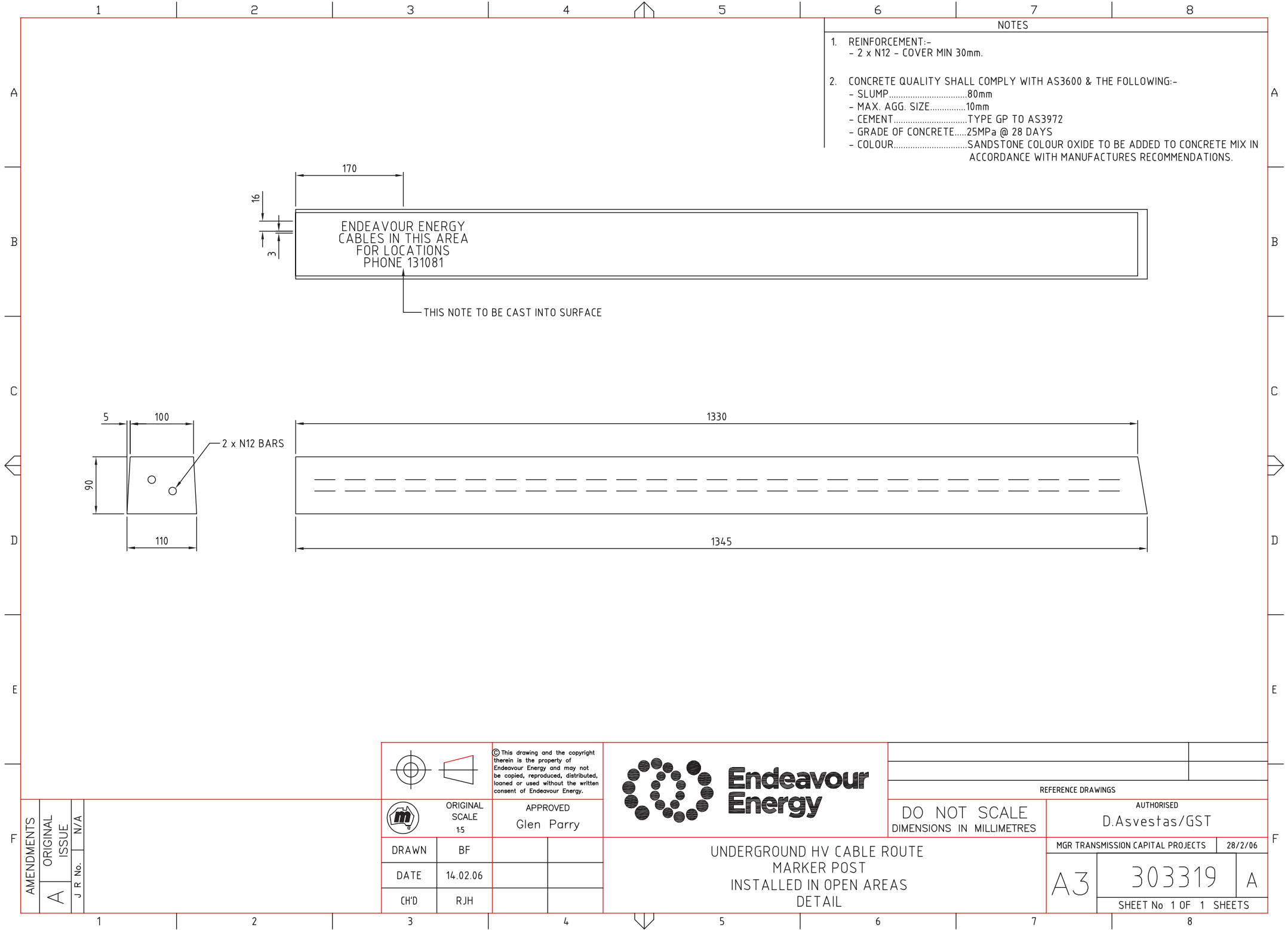
1. THE TRANSITION OF THE CONDUITS FROM THE INDICATED TRENCH PROFILE TO THE HORIZONTAL PROFILE SHALL OCCUR OVER 6m.
2. THE CONDUITS ASSOCIATED WITH THE CAT HOLE SHALL BE IN HORIZONTAL FORMATION FOR A MINIMUM OF 3m.
3. THE CAT HOLE EXCAVATED OPENING SHALL BE A MINIMUM OF 3m IN LENGTH.
4. THE MINIMUM WIDTH OF THE CAT SHALL BE 1750m OR AS DETERMINED BY THE EDGE OF THE CATE HOLE WALL BEING 500mm AS MEASURED FROM THE EDGE OF THE NEAREST CONDUIT WHICH EVER IS THE GREATEST.
5. CONDUITS TO BE CONTINUOUS FOR THE ENTIRE LENGTH OF THE CAT HOLE.
6. IF CAT HOLE IS INSTALLED IN ROAD CARRIAGEWAY, BACKFILL ABOVE CONCRETE PROTECTION STRIP AS PER LOCAL TRENCH.
7. FOR FURTHER DETAILS OF CAT HOLE, REFER TO THE TRANSMISSION DESIGN INSTRUCTION.
8. CAT HOLE EXCAVATION ADJACENT TO CONDUITS SHALL BE SUPPORTED BY SAND FILLED HESSIAN BAGS TO PREVENT TRENCH COLLAPSE.
9. DEPTH OF CAT HOLE WILL DEPEND ON DEPTH OF INSTALLED CONDUITS.



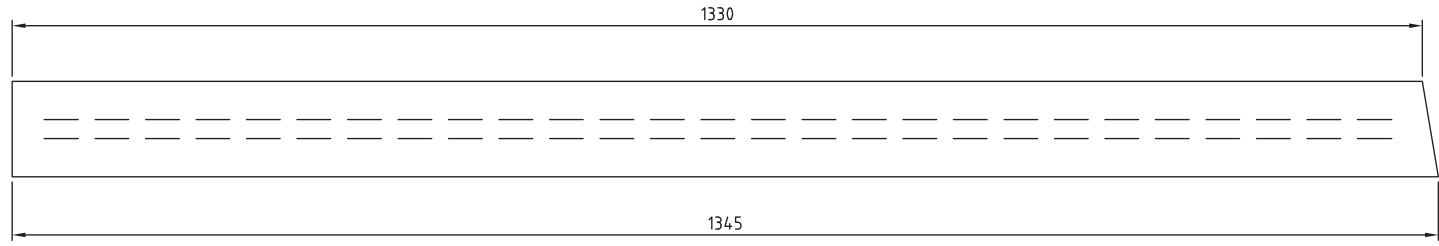
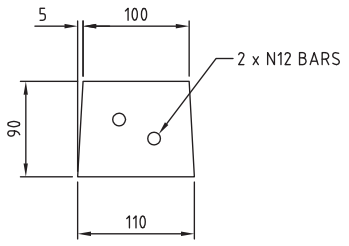
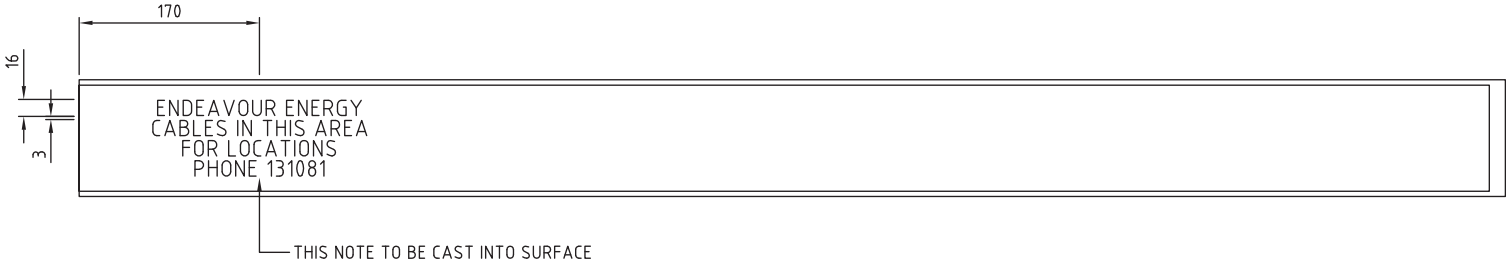
END VIEW CAT HOLE

VOLUME PER LINEAL METRE	
EXCAVATE:	6.83M³
DISPOSAL:	3.64M³
SAND:	3.12M³
BACK FILL:	3.18M³
BRICKS:	0.53M³

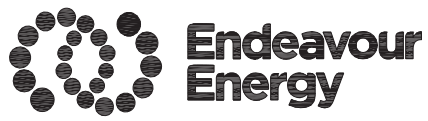
		 Endeavour Energy		ORIGINAL SCALE 1:20		APPROVED C. Brown	
DRAWN	BF	TRANSMISSION CABLE CAT HOLE CROSS SECTION		MGR TRANSMISSION CAP PROJECTS		29.06.05	
DATE	28.06.05			A4	297280		C
CH'D	RL				SHEET No 1 OF 1 SHEETS		



- NOTES
1. REINFORCEMENT:-
- 2 x N12 - COVER MIN 30mm.
 2. CONCRETE QUALITY SHALL COMPLY WITH AS3600 & THE FOLLOWING:-
- SLUMP.....80mm
- MAX. AGG. SIZE.....10mm
- CEMENT.....TYPE GP TO AS3972
- GRADE OF CONCRETE.....25MPa @ 28 DAYS
- COLOUR.....SANDSTONE COLOUR OXIDE TO BE ADDED TO CONCRETE MIX IN ACCORDANCE WITH MANUFACTURES RECOMMENDATIONS.



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	ORIGINAL SCALE 1:5	APPROVED Glen Parry	
DRAWN	BF		
DATE	14.02.06		
CH'D	RJH		



UNDERGROUND HV CABLE ROUTE
MARKER POST
INSTALLED IN OPEN AREAS
DETAIL

DO NOT SCALE
DIMENSIONS IN MILLIMETRES

REFERENCE DRAWINGS			
AUTHORISED D.Asvestas/GST			
MGR TRANSMISSION CAPITAL PROJECTS			28/2/06
A3	303319		A
SHEET No 1 OF 1 SHEETS			