10 July 2015

Director
Construction Policy
Market Research Branch
Department of Communications
GPO Box 2154
Canberra ACT 2615

By email: powersandimmunities@communications.gov.au

Dear Sir

Consultation on Current Telecommunication Act Amendments - Low Impact Facilities Determination (LIFD) No 2 of 2015

Thank you for the opportunity to respond to the Consultation Paper dated 12 June 2015 concerning the proposed changes to the LIFD, to support the rollout of the multi-technology mix (MTM) National Broadband Network (NBN) and other next-generation broadband networks.

Endeavour Energy
Endeavour Energy is an electricity distributor in New South Wales. It is responsible for the safe and reliable supply of electricity to 2.2 million people in households and businesses across Sydney's Greater West, Blue Mountains, Southern Highlands and the Illawarra. The Endeavour Energy network spans 24,500 square kilometres and is made up of over 170 major substations, 315,000 power poles and 28,000 smaller substations bound together by 33,000 kilometres of underground and overground cables.

The electricity network assets operated by Endeavour Energy can pose dangers to persons if correct work practices are not followed or equipment is incorrectly installed. In addition the poles themselves can be compromised, and potentially fail, if over loaded or exposed to excessive strain. The maintenance of safe working practices and sound engineering practices are critical to the safety and integrity of the overall network.

Telecommunications infrastructure attached to Endeavour Energy Poles
In addition to supporting the overhead electricity cables used to supply electricity in the distribution area, Endeavour Energy's poles are also used by:

a) Telstra to support the Telstra copper line network (also referred to as the PSTN) used to supply telephone and broadband services;
b) Telstra to support the Telstra hybrid fibre coaxial (HFC) network used to supply Foxtel Pay TV services and broadband services;
c) Optus to support the Optus HFC and fibre optic networks used to supply broadband and telephone services;
d) NBN Co to support various fibre optic lines and related equipment used by NBN Co to implement the NBN;

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e) Other associated telecommunications equipment installed by telecommunications carriers, including antennae for mobile telecommunications services;
f) Endeavour Energy for the attachment of streetlights which Endeavour Energy permits as a service to local government authorities; and
g) Community benefit attachments, such as street signs and video cameras as well as some commercial attachments.

Endeavour Energy, along with the other NSW Government owned electricity distributors (Ausgrid and Essential Energy) has significant experience in dealing with the installation, operation and maintenance of HFC networks on electricity poles. Endeavour Energy estimates that the three distributors have over 230,000 poles and more than 20 years of experience of the impact of HFC on their electricity distribution assets.

Given the extensive existing use of Endeavour Energy's poles for non-electricity purposes it is critical that any additional items are installed in a safe manner and in a way that is consistent with Endeavour Energy's existing technical standards. Endeavour Energy already has a standard relating to the installation of HFC and fibre optic cables and certain other communications assets, and it is Endeavour Energy's strong preference that all new installations be carried out in a manner which is compliant with that standard. A copy of the standard, *Endeavour Energy's standard MCI 0002 for telecommunications installations*, is attached to this letter.

The LIFD

Telecommunications carriers have powers under Schedule 3 of the *Telecommunications Act 1997 (Cth)* (the **Act**) to install "low-impact facilities" without seeking state, territory or local government planning approval and without the need to obtain prior approval from landowners/occupiers. The low impact facilities are specified in the *Telecommunications (Low-impact Facilities) Determination 1997*, and include small radio-communications antennae and dishes that are erected on existing towers and buildings. Certain underground and overhead optical fibre installations undertaken for the NBN are also identified as being low-impact facilities. All low-impact facilities must be installed in accordance with the Act and the Telecommunications Code of Practice 1997 (**Telecoms Code**).

As a carrier, NBN Co is generally able to install low-impact facilities, such as its underground or above ground fibre network, without obtaining prior approval from landowners/occupiers. However, NBN Co is required to notify a landowner of its intention to install a low-impact facility. If a landowner or occupier objects to the installation of a low-impact facility, the landowner/occupier can raise the matter first with the carrier. If unable to resolve the matter directly with the carrier, the matter may be referred to the Telecommunications Industry Ombudsman (TIO). The TIO may investigate any low-impact facility installation proposal following a complaint from a landowner and can issue a direction to the carrier about the installation. Carriers and the landholder must comply with any TIO direction.

Proposed changes to the LIFD

The proposed amendments to the LIFD are designed to allow NBN Co to install a broader range of facilities as "low impact facilities" using powers under Schedule 3 of the Act. The proposed changes that are most relevant to Endeavour Energy are those that relate to the designation of the following items as being "low impact facilities":

a) An increase from 30mm to 48 mm for existing and new HFC cabling;
b) An increase from 30mm to 40 mm for existing and new PSTN cabling;
c) Splice enclosure; and

d) power supply.

Endeavour Energy's comments on the proposed changes to the LIFD General Comments

1. Endeavour Energy's Safety Concerns

Endeavour Energy has safety concerns in regard to any proposal to undertake cable works upon its assets under or near our live electricity Network, particularly HFC and PSTN conductive cables with token insulation. In September 2013 there was a fatality within our Industry when undertaking the removal of uninsulated electrical conductors similar to the steel strand and conductive HFC and PSTN cables. Similar incidents could have occurred during the installation of such conductors. As a consequence of this incident all three NSW Distribution business undertook an immediate review of related work practices and Endeavour Energy suspended all such installation and removal activities during the review. Endeavour Energy's review resulted in the introduction of stringent controls with respect to any future works of this nature, effectively ceasing the practise.

At the time of the incident and the subsequent actions within Endeavour Energy we wrote to Telecommunications Carriers that we had commercial agreements with, informing them of the incident and the review process we were undertaking and requested them to undertake similar reviews into their procedures to ensure all controls relating to any such potential were effective. We also requested their formal assurance that such reviews had occurred within their businesses.

Endeavour Energy obtained varied responses to this request, including an instance of no advice on review action taken, as is the case to date. Subsequently Endeavour Energy has advised the Telecommunications Carriers involved of its view that the existing agreements between the parties no longer appear adequate in a number of areas and particularly those pertaining to WH & S obligations. To date there has been no agreement by a number of the Telecommunications Carriers to review these agreements and address our concerns.

Section 2.1 of the Department's consultation paper, *Amending carrier powers and immunities to support multi-technology rollouts of high-speed broadband* dated 12 June 2015 (Consultation paper) states within the Act's purpose:

"Schedule 3 supports the fast and efficient rollout of infrastructure by allowing it to be done nationally under a uniform streamlined process, rather than multiple state, territory and local government requirements."

Endeavour Energy is concerned with the potential misapplication of the concepts of "fast" and "streamlined" and their substitution with "hasty" and "shortcut" with respect to Work Health & Safety (WH&S) issues.

In this regard Endeavour Energy does not support the introduction of any amendments related to the Legislation pertaining to Electricity Infrastructure that do not mandate the full and demonstrable consideration of all relevant Electricity Industry WH&S practices and requirements to at least an equivalent level as well as clear accountability in this regard of the Telecommunications entity when exercising their rights under such legislation.

2. *Endeavour Energy considers the potential risks posed by the installation of MTM Cabling assets are not insignificant*

The Consultation Paper, notes that the types of facilities proposed as low-impact "are those considered to be essential to the effective and efficient operation of telecommunications networks in providing services to the public, but are considered to be of low visual impact and unlikely to cause significant disruption to the community during installation or operation." (emphasis added).

Endeavour Energy does not agree that the installation of larger Cables or bundles of MTM cables would be unlikely to significantly disrupt the community. If the HFC and PSTN cabling assets (MTM cables) are not properly installed and maintained there could be significant detriment caused to the safety of persons, the integrity of the electricity poles and the continuity of electrical supply.

The MTM cabling assets now proposed for inclusion as low impact facilities are materially different to the existing fibre optic assets and this needs to be recognised.
Whilst the installation of fibre optic cables upon electricity poles carries a potential risk to electricity network integrity and safety these risks are mitigated to some extent when the fibre optic cables and systems:

a) are not electrically conductive;
b) are not electrically connected to the electricity network itself;
c) involve the installation of a limited range of ancillary equipment (eg fibre splice enclosures);
d) have a low breaking strain, which means they are less likely to cause damage to a pole where a fibre optic cable was snagged by a crane or passing vehicle, etc; and
e) are likely to have a lower impact on pole loadings, once assessed and are therefore less likely to result in overloading a pole beyond its engineering limits.

By contrast the MTM cables:

f) are electrically conductive;
g) are electrically connected to the electricity network, typically including being bonded to the neutral wire for earthing, rather than to a separate earth electrode;
h) involve a wide range of equipment (including amplifiers, optical node devices, power supplies etc.);
i) will have a high breaking strain, which means they are far more likely to cause damage to a pole if snagged by a crane or passing vehicle, etc; and
j) have (with the associated assets) a greater size profile, tensioning requirement and weight characteristics and are therefore likely to have a much higher impact on pole loadings and therefore more likely to result in overloading poles beyond their engineering limits, which in the worst case may cause the pole to fail potentially impacting person or property.

It is important to note that when the LIFD was amended in 2011 the Minister took into account a submission made by the Energy Networks Association which recommended that aerial cable installations be confined to non-conductive (ie fibre optic cables) and the LIFD amendments accordingly restricted aerial cables (refer to Part 4A, Item 4(g)) to non-conductive cables. The Explanatory Statement issued with the 2011 Amendment to the LIFD states (at page 2):

> *"As a result of the consultation process two key changes were made to the Amending Determination. Firstly, in response to the Energy Networks*

Association's (ENA) proposal that aerial cabling be required to be non-conductive, the Amending Determination now requires cabling to comply with the electrical properties set out in the relevant standard set by the Institute of Electrical and Electronics Engineers. This amendment has been made in consultation with the ENA and NBN Co. Requiring aerial cabling to meet this standard will ensure that, subject to other relevant requirements including occupational health and safety standards, it can be placed as close to existing electrical cabling as possible…."

What this means is that in 2011 the Government turned its mind to whether conductive cables (e.g. HFC) should be able to be installed as low impact facilities. It decided not to allow conductive cables to be installed as low impact facilities, and made changes to the Amending Determination to exclude them. Presumably it did so because it took into account concerns about safety and network integrity. Given that the Government reached these conclusions in 2011 it is not clear why the Government now considers that larger diameter conductive cables or bundles of conductive cables are acceptable for installation as low impact facilities.

In reality, the potential risks posed by the installation of MTM cabling assets are significantly greater than optic fibre assets. It would be a mistake to assume that, because optic fibre cables are currently designated as low impact facilities, that the MTM cabling assets can simply be treated in the same way. In Endeavour Energy's view, MTM cabling assets should only be able to be installed as low impact facilities where the practical mitigations proposed in the next section of this letter are also properly established and maintained.

3. *The LIFD and Telecoms Code do not currently provide adequate controls for the installation of HFC assets*

The existing HFC networks installed on Endeavour Energy poles by Telstra and Optus were mostly installed prior to the current *Telecommunications Act 1997* (Cth) in compliance with commercially negotiated contracts under which Endeavour Energy was able to exercise some contractual control over the materials, installation methods, attachment points, maintenance requirements and safe working practices of the relevant carriers.

If the LIFD is amended as proposed, NBN Co would be able to install larger diameter HFC cables and other assets on Endeavour Energy poles using its statutory powers in circumstances where Endeavour Energy would have little practical control over the materials, installation methods, attachment points, maintenance requirements and safe working practices followed by NBN Co.

The potential risks associated with installing the HFC assets are not significantly mitigated by the installation requirements of the Telecoms Code. The Telecoms Code, last amended in 2002, does not specifically address how carriers should mitigate the risks posed by the installation of overhead cables on electricity poles and certainly does not address the heightened risks posed by the installation of larger diameter electrically conductive MTM cabling assets (as described above).

Endeavour Energy recommends that if the LIFD is to be amended to include the larger diameter MTM cabling assets, the Telecoms Code needs to be also revisited and special provision needs to be made for the way in which those assets must be installed and maintained. In particular the Telecoms Code needs to specifically require installations to meet and comply with technical standards. Those technical standards need to specify mandatory equipment specifications, pole loading assessment requirements, electrical connection requirements, required attachment points, compliance with WH&S requirements of the

relevant utility and related matters. (Endeavour Energy notes that clause 4.7 of the Telecoms Code has little practical effect because the Australian Communications Media Authority has not "recognised" any industry standard for the installation of telecommunications lines and equipment on electricity poles.) If that is not practicable then the Telcoms Code needs to be amended to require compliance with the relevant utility's standards for aerial infrastructure.

Specific Comments

1. *Regulation 11.2 Increase the diameter of designated fixed line from 30 mm to 48 mm*

The consultation paper indicates a requirement where *"in some limited circumstances overhead cabling of up to 48mm would be required"*. The augmentation of existing or the installation of new MTM cabling installed on Endeavour Energy poles, being single cables or bundles of cables, would have a substantive volume increase.

a) An increase from 30 mm to 48 mm for existing and new HFC cable which translates to 2.56 times that of the original 30mm bundle with corresponding increase in breaking strain.
b) An increase from 30 mm to 40 mm for existing and new PSTN cable which translates to 1.78 times the original 30mm bundle with corresponding increase in breaking strain.
c) An increase from 30 mm to 40 mm also represents (for either cable) a significant increase in sail area of attached conductors which carries with it an increase in loading due to wind.

In addition to the limited circumstances highlighted above, there is the compounding effect of multiple LIFD installations on Endeavour Energy's aerial assets. As indicated above Endeavour Energy will, once NBN assets are added, have three communications carriers on its poles. When taken in total this does not represent a Low Impact to either Endeavour Energy or any other party and the legislation does not address this situation.

There would be a requirement to ensure a redesign was carried out in **each limited circumstance**. Without this redesign there is no assurance that risks to personnel, the public and property (including through bush fire) are mitigated.

Proposed amendment 23 Schedule part 4A Above Ground Facilities (for fixed line networks)

The descriptions of the following items do not address the impact of potentially multiple devices of the same or different types being installed on a single pole or cable:

a) splice enclosure; and
b) power supply.

The descriptions do not address the length or shape of the Splice Enclosure. The shape of a device will impact on the access to the pole for electrical maintenance with corresponding WH&S impacts.

Power supplies require the largest size of enclosure attached to electricity distribution poles and are installed low on the pole, typically at 4m from the ground where the visual impact is significantly higher. The existing power supplies are a part of the existing HFC networks, however there is likely to be a significant increase in number of power supplies installed because the National Broadband Network will have greater capacity for data transfer, which is being installed to cater for the predicted increase in customer numbers using broadband and an increase in data usage by most customers.

These items have a greater size profile and weight characteristics and are therefore likely to have a much higher impact on pole loadings and therefore more likely to result in overloading poles beyond their engineering limits, which in worst case may cause the pole to fail potentially impacting person or property.

Schedule 3 powers in general

On the Broader matter of Schedule 3 powers under the *Telecommunications Act 1997* (Cth), Endeavour Energy wishes to express its concerns over the unintentional utilities service inequities created under the provisions of the Act as they currently stand.

Endeavour Energy recognises the community benefits that can be afforded by sharing existing utility assets where appropriate and recognises the obvious synergies and opportunities that exist with respect to telecommunications assets and electricity assets. However under the current construct of the Act, telecommunications infrastructure owners are placed at a distinct advantage in view of their powers under the legislation in the event that negotiations do not proceed as they desire. The Act sets out the minimum compensation that is payable in the event that negotiations do not conclude in an agreement, setting these at damages and loss incurred to the facility owner only. There is no provision for additional costs or loss of opportunity through the presence of encumbrances placed on the facilities both during installation and over time from increased operating costs, nor even to cover the administrative costs of claiming damage and loss.

Unfortunately the minimum standard for compensation called for under the Act sets the negotiation position when trying to strike commercial agreements between telecommunications infrastructure owners and power utilities. Put simply, why pay more than you have to if the Act enables such a position. This then leads to potential cross subsidies and inequities for the utilities, with power users subsidising telecommunications users. It most certainly undermines any user pays philosophy.

Through the current Australian Energy Regulator (AER) determination process the AER incorporated a new regime for assessing the shared assets revenue derived by power utilities under their existing commercial telecommunications agreements with a view to offering a price reduction to customers formulated off the additional revenues derived under these agreements. The share asset guideline development process amongst other things, contemplated an allocative capital utilisation return to power user customers on the basis of the utility benefit passed to the telecommunications utilities through their benefit of the assets.

Unfortunately this most equitable position was dropped in the final guideline once it was demonstrated to the AER that power utilities would be unable to achieve such an equitable return for use of our assets under the current provisions of the Act and the existing Schedule 3 provisions. Currently no price reduction is proposed to be passed to power utility customers under the shared assets regime due to the trivial extent of the revenue returns achieved under the *Telecommunications Act 1997* (Cth).

It is therefore requested that the community benefit and sharing provisions between parties with respect to facility owner compensation under the Act and Schedule 3 be reviewed and possibly removed in order to provide for equitable distribution of commercial utility derived from shared electrical network facilities. In particular, the rights under the Act need to reflect the equitable base position for the use of facilities and full cost recovery both current and future for the facility owner and an equitable capital allocative approach so as not to create a cross subsidised advantage for one utility at the expense of the other.

Conclusions
Endeavour Energy submits that the proposed changes should only be considered low impact when they conform to existing industry practice that has been adhered to for all HFC deployments. In the event that the timelines do not allow the Telecoms Code to be amended to incorporate a need to comply with prevailing industry practice, we submit that the legislation for these specific changes should require compliance with the relevant power utility's standards for aerial infrastructure.

We would be pleased to participate in the any trials and subsequent build out of the National Broadband Network on our poles on the basis we have outlined above. Please contact Mr Jim Battersby of Endeavour Energy on 02 9853 6162 if you require any further information on this submission.

Yours sincerely,

Jim Battersby
Chief Engineer

Enclosed: Endeavour Energy standard MCI 0002 for telecommunications installations

Mains Construction Instruction

Attachment of communication cables to Endeavour Energy poles

IMPORTANT DISCLAIMER

As the information contained in this publication is subject to change from time to time, Endeavour Energy gives no warranty that the information is correct or complete or is a definitive statement of procedures. Endeavour Energy reserves the right to vary the content of this publication as and when required. You should make independent inquiries to satisfy yourself as to correctness and currency of the content. Endeavour Energy expressly disclaims all and any liability to any persons whatsoever in respect of anything done or not done by any such person in reliance, whether in whole or in part, on this document.

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Amendment no. 8

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MCI 0002 Attachment of communication cables to Endeavour Energy poles

Contents

1.0 PURPOSE

To set out in detail the requirements for the attachment of communication cables to Endeavour Energy poles.

2.0 SCOPE

This construction Standard covers the attachment of both narrowband and broadband (integral bearer and self-supporting) communication cables to Endeavour Energy poles which may carry one or more of high voltage, low voltage, street lighting circuits or customer services, in either open wire, covered conductor (CCT) or aerial bundled cable (ABC) construction.

These cables are generally installed to provide communication services, including cable television (CATV), telephone and interactive data services.

3.0 REFERENCES

- Company Policy 9.6.9 - Facilities Access (Shared Infrastructure)
- ENA National Electricity Network Safety Code (DOC 01-2008)
- Endeavour Energy Network Management Plan 2009-2014
- ENA National Guideline for Safe Approach Distances to Electrical Apparatus (NENS 04-2006)
- Endeavour Energy Electrical Safety Rules
- Company Procedure GAM 0089 – Authorisations Governance and Management
- Division Procedure GNV 1062 – Granting dispensation from Network Standards
- Service and Installation Rules for NSW -2012
- Lighting Construction Instruction LCI 0001 – Public lighting construction
- Mains Design Instruction MDI 0031 – Overhead distribution: Design standards manual
- AS/NZS 3000:2007 - Wiring rules

4.0 ABBREVIATIONS AND DEFINITIONS

ABC	aerial bundled cable
Authorised person	A person with technical knowledge or sufficient experience who has been approved and authorised in writing by the Company to perform the function requiring authorisation as described in Annexure A of GAM 0089.
BCC	Broadband communications cables. These include optical fibre cables and coaxial cables used for the provision of cable television and other information services.
ADSS	all dielectric self-supporting
CATV	Cable television, that is, television provided by means of Broadband cable.
EWP	elevated work platform (bucket truck)
FAA	Facilities Access Agreement
HV	high voltage, which refers to voltages of 11kV and above
LV	low voltage, which refers to voltages up to 1000 volts
IBC	Integrated bearer cable – an overhead cable used for telephone lines consisting of a metallic supporting strand or strands and a variable number of metallic telephone pairs.
Instructed person	A person adequately advised by an Authorised Person or who has sufficient training and experience in the safety requirements for the work being

	undertaken to enable them to avoid the dangers which electricity may create
NENS	National Electricity Network Safety codes, issued by ENA
Ordinary person	A person without sufficient training or experience to enable them to avoid the dangers which electrical apparatus may create.
PSTN	Public switched telephone network (narrowband)
SL	street lighting
UGOH	underground to overhead transition structure
MEN	multiple earth neutral
XLPE	cross-linked polyethylene cable

5.0 ACTIONS

5.1 Communications cable owner's responsibility

It shall be the responsibility of the communication cable owner to enter into a Facilities Access Agreement with Endeavour Energy and to negotiate a suitable attachment point on Endeavour Energy's poles.

The communications cable owner shall be responsible for the design, installation, operation, maintenance, repair, augmentation, alteration and removal of the communications cable.

The communications cable owner shall be responsible for all costs associated with the above, including all costs incurred by Endeavour Energy.

5.2 Training

Personnel working on Endeavour Energy poles near live mains must be *authorised persons* (Accredited Service Providers) with appropriate accreditation for:

- pole top work; and,
- working with optic fibre cables.

Suitable familiarisation training for personnel working on Endeavour Energy's poles for the attachment of communications infrastructure would include but not limited to:

- Awareness and knowledge of this Standard
- Identification of mains type and voltages.
- Awareness and knowledge of the hazards associated with pole top work.
- Pole sounding and testing including suspect and condemned pole identification.
- Pole top safety and working with fibre optic cables.
- Safe working distances as defined by NENS 04-2006.
- Stress and load assessment and control, for poles.
- Awareness and knowledge of the hazards associated with stringing communication cables beneath energised electricity conductors.

Required training may be obtained from industry training centres, including Endeavour Energy upon request and at an appropriate charge.

Authorisation as an ASP level (1) is required for work on the Endeavour Energy distribution network and level (2) for work on or near the Endeavour Energy network service cables.

5.3 Tools and equipment

All tools and equipment shall be kept in good working condition so that they are safe to use at all times. Tools, plant and equipment that require inspection shall be current in their period of inspection and tagged/logged accordingly.

EWPs used by communication cable owners and their contractors must be rated in accordance with standards issued by Standards Australia.

A copy of the Electrical Test Certification for the EWP must be available with all EWPs used for work on or near Endeavour Energy's assets.

5.4 Clearances/separations and attachment

Clearances for communications cables (attached to Endeavour Energy poles) over ground, at structures and between communication cable and electrical infrastructure, as well as safe working distances for staff, shall not be reduced from those specified in this standard unless agreed to in writing for specific sites by the Endeavour Energy Networks Mains, Manager.

In the case of poles carrying 11kV or 22kV mains only, the minimum safe working distance defined by Endeavour Energy for instructed personnel is 1.2 metres. To provide for the possible future installation of low voltage conductors, Endeavour Energy requires a minimum separation of two (2) metres to non-conductive ADSS cable and three (3) metres to all other communication cables, both at the structure and mid-span.

Before any communication cable (excluding customer service drops/lead-ins) is attached to an Endeavour Energy pole, a full detailed assessment of the pole strength is to be performed. The proposed additional communication cable load, when combined with the existing electrical network conductor load, shall not exceed the rating of the pole.

The pole identification disc (where attached), includes the strength rating of the pole, however where this information is not available (disc missing), the pole strength shall be calculated in accordance with MDI 0031 Clause 5.12.3. The calculation is to assume the following timber pole maximum fibre stress values:

f_0 = 12.75 MPa (maximum extreme fibre stress at 5^o C and no wind); and,

f_1 = 21.25 MPa (maximum extreme fibre stress at 15^o C and 500 Pa wind pressure)

It must be noted that the drilling of a timber pole for the purpose of internal decay assessment shall only be carried out by inspectors authorised by Endeavour Energy.

Where the communication cable owner or its representative has doubt concerning the condition of a pole, a special pole inspection can be arranged by contacting the OLI/GLI Technical Co-ordinator.

5.4.1 Ground Clearances for communications cables

The following communication cable ground clearances are required by Endeavour Energy.

Type of crossing	Minimum clearances (m)
Designated high load route	6.0m
Any part of a road carriageway and land where vehicular traffic may traverse	5.5m
Commercial driveways	5.0m
Residential driveways	4.6m
Land which is not normally traversed by vehicular traffic	4.5m
Waterways, railways and other utilities crossings.	Refer MDI 0031

5.4.2 Separation from Endeavour Energy infrastructure

The separations between communication infrastructure and Endeavour Energy's infrastructure measured at the pole and midspan is set out below.

Table 1: Separation between communication cables and Endeavour Energy conductors and equipment

Electrical network conductors and equipment		**Position**	**Conductors**							**Equipment**	
			LVABC and SL *(XLPE insulated)*		**Bare LV and SL** *(bare or PVC insulated)*		**11/22/33kV**		**66kV and above**	**Street light and service leads/tails, brackets, fittings, conduits, down earths, chokes, stay fittings and bearer wires**	**Pole-mounted electrical switches / fuses / connection boxes**
			Pole	Midspan	Pole	Midspan	Pole	Midspan			
Pole mounted BCC equipment	Conductive BCC cable	Position B	1.5m		1.5m		3.0m		On application to Network Mains Manager Cable manufacturer's recommendations for attachment, including circuitry separation to be included	50mm	600mm
	Endeavour Energy ADSS cable	Position A	0.3m	0.1m	0.5m	0.1m	2.0m				300mm
		Position B	1.5m		1.5m						
		Position C (Above)	0.2m	0.1m	0.2m	0.1m					
	Other ADSS cable	Position A	0.3m	0.1m	0.5m	0.1m	2.0m				300mm
		Position B	1.5m		1.5m						
	Telstra - PSTN	Position B	1.5m		1.5m		3.0m				600mm

Position A – Preferred attachment point

Position B - Optional attachment position to provide for EWP access

Position C - This position is for Endeavour ADSS attached ABOVE the LV mains where the standard "below" attachment points are not possible. Approval is required from the Network Mains Manager for use of this position. Negotiations with Endeavour Energy are required for other communication cable owners proposing to utilise this position.

5.4.2.1 Midspan Separation

Midspan separation clearances are to be determined under worst case operating conditions.

Where the communication cables are installed below the electrical network conductors, clearances are to be determined with the electrical network at maximum operating temperature and the communication cable at 5°C.

Where approval is given for an ADSS cable to be installed above the LV network, the 0.1m midspan clearance must be maintained with both circuits at 5°C.

Additionally communication cables must be installed to ensure their relevant position to the electrical network conductors is maintained and crossing between phase conductors of the electrical network is not permitted.

5.4.2.2 EWP Access Window

The attachment of an ADSS cable 300mm below LVABC or 500mm below bare LV/SL is permitted provided a 1.5m EWP access window is available directly below the ADSS cable.

Where the access window is already unavailable due to the attachment of an existing communication cable, the above attachment positions may be used provided midspan separation clearances are maintained and a minimum 300mm separation to other communication cables is maintained.

Additionally, for an attachment above the LV (Table 1, Position C), a minimum 1.5m midspan clearance to 11/22/33kV conductors located above the ADSS cable must be maintained with the electrical network at maximum operating temperature and the ADSS at 5°C.

5.4.2.3 HV only poles

For HV only poles, where the Facilities Access Manager confirms in writing that no low voltage conductors will be installed, a communication cable may be installed 500mm less than the values shown in Table 1 for 11/22/33 kV assets (see Drawing no. 078518).

5.4.2.4 Historic points of attachment

Endeavour Energy has agreements with Optus, Telstra and others that stipulate various construction separations. Some existing conductive cables (mainly Optus) are installed with 750mm separation. This option is now available only where Endeavour Energy provides written approval.

Telstra has a long-standing arrangement with Endeavour Energy to install twisted pair telephone cables on power poles, and this arrangement continues with cables installed at least 1.2m below Endeavour Energy's low voltage network conductors. For all future installations, this clearance has been increased to 1.5m to provide for EWP access.

The only additional qualification is that new twisted pair cables must be installed at least 300m away from the new Optus Broadband cable.

5.4.3 Overhead electricity mains ground clearance

Refer to Mains Design Instruction MDI 0031, clause 5.2, Table 1.

It must be noted that due to historic practices, minimum ground clearances in the above table may not be reflected at older legacy construction sites.

Where such locations are identified, communication cable designers shall determine if remediation work to the existing overhead mains will provide suitable ground and midspan separation clearances. Remediation works to be considered covers all available options including conversion of public lighting mains to direct LV photo-electric controlled luminaries, conductor re-tensioning and service main alterations. All proposed remediation work is to be submitted to the Facilities Access Manager at the design stage for approval.

Where satisfactory ground clearance or midspan separation cannot be achieved through remediation work to the overhead mains, the replacement of the Endeavour Energy pole may be the only solution and a proposed design drawing is to be submitted for approval.

Design and ensuing remediation works and/or pole replacement shall be the responsibility, inclusive of all applicable costs of the communication cable owner.

5.4.4 Spacing of construction on poles

In general, communications cables will be located lower than electricity supply cables.

The only exception to this requirement shall be a non-conductive system where the cable is permitted to be located above the LV, service mains and SL conductor. All proposals for this arrangement are to be submitted to the Network Mains Manager for approval.

The minimum separation between conductive communications cables and service cables is set out in clause 5.4.6.

For Endeavour Energy owned ADSS systems attached to the LV crossarm, no angle construction greater than 50° line deviation, termination or strain construction is permitted.

For low voltage ABC construction, the minimum distance between the bottom of the lowest suspension/tension clamp and the communication catenary king bolt shall be as set out in Drawing no. 078521. An additional allowance may be required (at the discretion of Endeavour Energy) for a second ABC to be installed where a single ABC exists.

The communications cable shall be installed on the road side of the pole, except for poles on which a pole mounted transformer has been constructed (see clause 5.8.3), unless otherwise agreed for specific sites by the Facilities Access Manager. Approval may be given by the Network Mains Manager for the attachment on the property side where road clearance may not be met under conductor blow-out conditions if attached on the roadside.

To provide for future distribution assets to be installed on existing transmission only poles, the maximum attachment height above ground for BCC is 8.0m. The BCC shall be installed on the roadside of the pole with provision on the property side of the pole for future Endeavour Energy communication cable installation. Any departure from these requirements must be approved by the Facilities Access Manager.

The major cross sectional diameter of the bundled communications cables and catenary shall not exceed 30mm and the maximum combined mass of the communications catenary and BCC will be 650 grams/metre unless agreed to in writing by the Facilities Access Manager for specific sites.

5.4.5 Separation from metallic fittings on poles

Some Endeavour Energy poles carry unearthed, single insulated, metallic fittings, which are capable of becoming *alive* through the breakdown of primary insulation (such as steel conduit, light fittings, SL outreach brackets and lantern choke boxes).

Communications staff must be aware of the possibility of metallic fittings on wooden poles becoming alive and must employ safe working procedures when working near unearthed, pole mounted, metallic fittings. Such procedures shall include a voltage test to ensure the work can be safely performed.

The minimum separation between any unearthed metal on the pole and communications equipment shall be 50mm in any direction.

On poles redressed for communications equipment, metallic fittings shall not be installed within 50mm of the area reserved for communications infrastructure.

5.4.6 Separation from service cables

The minimum separation between service cables and conductive aerial communications conductors is 600mm in any direction (refer to *Service and Installation Rules for NSW,* clause 3.5.3.1 and Drawing no. 078520). A minimum vertical separation of 300mm is required between service cables and non-conductive communication cables however, where the non-conductive communication cable is located on the opposite side of the pole to the service cable attachment, an attachment position level with the service conductors is acceptable.

5.4.7 Separation on conductive poles

Endeavour Energy has installed non-conductive (wood) poles as well as conductive poles (for example, steel reinforced concrete) in the electricity transmission, sub-transmission and distribution systems.

Hazardous voltages can be present on these conductive poles/columns during abnormal system conditions including earth faults, lightning strikes and the like.

When communication equipment is installed on:

- Transmission (33kV) conductive poles, communication equipment must be insulated to a minimum of 22kV (BIL 125kV).
- Separately earthed 11kV or 22kV conductive poles (rural and non-urban) the communication equipment must be insulated to a minimum of 6.6kV.
- Common earthed 11kV, 22kV or LV conductive poles, the earth of the communication equipment (metallic sheath, catenary wire and the like) can be bonded to the pole along with LV neutral for Optus installations only. Other BCC installers must maintain the insulation level to 6.6kV for these conductive poles.

Endeavour Energy accepts that Optus uses a 22kV insulator on all conductive poles to avoid confusion over earthing details.

Communication staff must allow for the possibility of potential rises on these poles and must use appropriate installation methods and employ safe working procedures when working on or near them.

5.4.8 Maximum number of cables/conduits

The maximum number of cables/conduits permitted on an Endeavour Energy pole shall be in accordance with the following table:

Table 2: Maximum number of cables/conduits on a pole

Conduits/cables to a maximum of 70 mm diameter			**Conduits/cables greater than 70 mm diameter**
Line Pole	Substation Pole	Air Break Switch Pole	All poles *(except substation poles)*
3	1- LV cable 0 – Communication cables	1	1*

** No additional communication conduits/cables permitted in conjunction with the installation of a conduit/cable greater than 70 mm diameter*

To permit the possible future installation of a pole "nail" (pole reinstatement process), all conduits shall be located such that the critical load axis is avoided.

For an in-line pole, the critical axis is at a right angle to the conductors and for angle poles, the critical axis is directly behind the combined load direction.

5.5 Non-conductive networks

Before the attachment of a non-conductive BCC to the clearances set out in this instruction, it shall be the responsibility of the BCC system owner to satisfy Endeavour Energy that the system is non-conductive and provide a systems impact statement.

In all cases, the non-conductive system can come no closer than 300mm to another BCC.

5.6 Special situations

5.6.1 Endeavour Energy joint use with Telstra

It is the responsibility of the BCC owner to maintain at least 300mm separation to all existing communications cable infrastructure at all times, whilst also maintaining the separation to Endeavour Energy's mains, as set out in clauses 5.4.2 and 5.4.6. The need to negotiate with existing communications cable owners to relocate any of their equipment shall be the responsibility of the BCC owner.

5.6.2 Underground cable–overhead transition (UGOH) poles

Low voltage or 11kV cables usually rise up the *down traffic* side of the pole, terminate through heat shrink fittings, and do not pose any particular problem for the attachment of a steel catenary cable to the traffic side of the pole. To provide additional protection however, a 600mm section of *U guard* is to be fitted to Endeavour Energy UGOH cables as part of the make ready activity, centred on the BCC attachment point.

For these poles, it is imperative to maintain a clearance of 150mm from parts with single insulation or covering.

5.6.3 Pole mounted substations

The problems associated with pole-mounted substations are similar to those experienced on an overcrowded pole where there is a great deal of hardware attached.

In these cases, the platform crossarm is to be extended one (1) metre, so that the communication catenary and/or the non-conductive cable passes next to the lower half of the transformer, away from the pole, preferable on the property side of the pole (see Drawing no. 078618).

Non-conductive BCC is to be supported from the transformer standing crossarm for all

urban and rural constructed substations (see Drawing no's 249489 and 240383). Coastal design substations will require the cable to be attached to the pole directly below the transformer (see Drawing no. 303376). Where these attachment positions are not practical, an alternative position may be considered upon application to the Network Mains Manager.

The coastal design substation will also require a minimum 1.5m loop of cable to be incorporated at the pole to allow for transformer replacement.

5.6.4 Endeavour Energy aerial service cables

Generally, Endeavour Energy aerial service cables are attached to the pole below LV mains. These cables are usually insulated; however the minimum clearance between overhead service mains and aerial communication conductors is 600mm, in accordance with the *Service and Installation Rules for NSW*.

The following situations, however, will require attention by those installing the communications cables if it is anticipated that BCC staff will be required to work within 500mm of such wiring:

1. If there is exposed live metal, such as uninsulated split bolt connections between mains and aerial service cables, those installing the communications cable shall cover the exposed metal with a suitable insulating tape and a weatherproofing tape.
2. If the insulation on the service cables has deteriorated to the point that conductors are exposed, the overhead service to the customer will need to be replaced with a multi-core aerial bundled conductor. This type of insulation failure must be reported to the Facilities Access Manager who will advise the appropriate depot to arrange the necessary replacement. Communication cable work within 500mm of deteriorated service cables is not to be performed unless suitable insulating covering is applied to the affected cables.
3. If the number of services taken from a pole is large, and/or the connections between service conductors and the mains are untidy, the aerial service cables may impact upon the desired BCC location. If practical, those installing the communications cable may rearrange the services and tidy up the construction. Standard Endeavour Energy notification / outage processes shall be followed.

In the determination of the make ready work, the quality of the aerial service main cable insulation is to be considered.

5.6.5 Communications associated equipment

Communications associated equipment must not be located:

- On concrete and steel street light columns.
- On conductive poles without explicit written permission from the Facilities Access Manager Energy for each pole. Each concrete pole shall be assessed separately.
- Above the electrical network conductors.

5.7 Attachment of communication hardware

The general arrangement for the attachment of the BCC infrastructure is to clamp a steel catenary cable to a king bolt on the pole.

The communications cable, network amplifiers, and service tap boxes (which service individual customers) are attached to the catenary at a distance approximately 1.2 metres from the pole.

For non-conductive systems, the cable shall be supported by LV ABC hookbolts and suspension clamps mounted, either on the LV crossarm (Endeavour Energy ADSS only) or the pole, in the positions shown on Drawing no. 078518.

Cable terminations/strain constructions shall be attached to the poles, at the positions shown in Drawing no. 078518, by means of either LV ABC hookbolts or eyebolts.

On conductive mains poles, facilities for the installation of a king bolt may not exist. In these instances, the communication cable will be attached in a manner agreed to by the Facilities Access Manager, such as stainless steel strapping around the pole (see Figure 1).

Steel and concrete street lighting columns are not to be used for the attachment of a span or spans of BCC or equipment.

Figure 1: Typical stainless steel banding

5.7.1 Attachment of line power supplies

At a number of points in the communications system, it is necessary to provide line power supplies to drive amplifiers. Any devices that are required for the cable TV network will need to be powered by the low voltage electricity system, and will be subject to a special supply agreement with Endeavour Energy.

It is critical that the location of these devices is recorded in Endeavour Energy's network data and mapping systems (including the LV layer).

5.7.2 Earthing of communication equipment

When BCC is installed adjacent to electricity aerial mains, items such as the metallic sheath and catenary are required to be earthed at regular intervals. The BCC installer must design, install and maintain the earthing system to be adequately safe, sufficiently robust and well configured to maintain safety from hazardous voltages.

Endeavour Energy permits BCC (including sheath and catenary) to be connected to the MEN system (LV neutral) to form one earthing system for electricity and BCC systems.

This earth sharing arrangement is only allowed in common earthed areas where the LV neutral (MEN) is completed with a large number of customer connections to bring the MEN resistance to below one (1) Ohm.

Any situation that would not comply with this earthing requirement shall be brought into line with this Standard or removed at the expense of the BCC installer.

5.7.3 Mechanical protection of communications UGOH cables

Mechanical protection is required on wood poles for all of the applicants' cables forming part of an overhead to underground connection, as follows:

- Suitable mechanical protection (*U guard*) is required to be attached to the pole from a depth of 300mm below ground to 3m above ground level. This protects the applicant's cable and minimises disruption to Endeavour Energy's pole inspection procedures.
- Connection pits in the ground near poles must be a minimum of 500mm from pole.

Mechanical protection (*U guard*) is required to protect telecommunications cables that run up the pole where a ladder or pole platform may be placed for work on the pole, its equipment or mains. This is required from 1m below the highest electricity mains on the pole to at least 1.8m below the lowest electricity mains on the pole.

5.7.4 Electrical hazards

Electrical hazards that could be associated with the installation of communications infrastructure include:

- earth return paths through coaxial cable screen due to open circuit neutrals or shared return paths during LV short circuits;
- elevated neutral voltages;
- power voltage injection;
- voltage backfeed through communications system power supply transformers; and,
- down earths on poles.

Appropriate design, safety, training and risk management practices shall be implemented to prevent the exposure of these potential hazards to all staff, the community and equipment.

5.7.5 Identification of BCC

The BCC owner shall at each pole, clearly identify the cable by an acceptable indicator. Where a sign is installed for this purpose it shall be manufactured in accordance with Drawing no. 291664, marked and installed as follows:

1. Up to a six (6) letter word or acronym identifying the owner of the cable (no telephone contact number). Endeavour Energy would be contacted first and a message relayed to the owner or its maintenance contractor, as appropriate.
2. A clear code to indicate the nature of the BCC, for example, NC for a non-conductive cable, and C for a conductive cable.
3. Mounting could be by hanging from the termination bolt or hook, provided the tag could not become loose. Attachment using cable ties is not acceptable. Attachment to wood poles could be by 12mm diameter x 75mm long galvanised coach bolt into the pole, approximately 100mm below the cable. Alternative mounting on the hook or cable clamp bolt will be considered.
4. The preferred sign material is a sticker on aluminium sheet with an edge sealer.
    - *Scotchcal Reflective* Class 2 from *Artcraft* suppliers. Individual numbers and letters, 30mm high, are required.
    - *3M* edge sealer 3950 from *Blackwoods*, catalogue no. 00734349.

5.8 Situations requiring pole preparation (make ready)

Some of Endeavour Energy's aerial facilities will require redressing or replacement before they will be suitable for the attachment of communication infrastructure. The communication cable owner is responsible for all costs associated with this make ready work.

5.8.1 Bare SL mains below the low voltage mains

Where a bare street lighting main runs below the low voltage mains and the minimum mounting height cannot be achieved, the street lighting main must, if possible, be raised. If sufficient clearance cannot be achieved through the lifting of the SL wire, the bare SL wire may be replaced with an insulated wire at the communication cable owner's cost.

In situations where satisfactory clearance cannot be achieved with an overhead street light conductor in place, the street light circuit may be removed and modified with the inclusion of photo electric cells controlling the existing street light lantern in accordance with LCI 0001. Detailed project plans must be submitted and approved before any street light circuit modification.

5.8.2 Movement or replacement of street lighting fitting

If BCC clearances cannot be maintained from street lighting fittings, the street lighting fittings may be relocated or replaced at the communication cable owner's cost. Approval must be obtained from the Facilities Access Manager for the proposed relocation or replacement of any street lighting fitting.

5.8.3 Present pole unsuitable

If clearance requirements or mechanical loadings through the attachment of communication infrastructure require a pole replacement, the cost of the pole replacement shall be met by the BCC owner. Likewise, any requirement to straighten a leaning pole prior to the attachment of communication infrastructure shall be the responsibility of the communication cable owner.

Generally, the installation of a communication cable onto the electrical network shall utilise the existing poles. The installation of additional network poles, including stay poles is to be avoided and will only be approved if no practical alternative arrangement is available. Requests for such poles must be submitted to the Facilities Access Manager for approval.

5.8.4 Endeavour Energy's requirements

Any structural upgrading proposed by the applicant must allow for any future proposal that Endeavour Energy may have for that structure.

Endeavour Energy's right to install a structure on public land is dependent upon its use for electricity distribution. Undergrounding of all electrical circuits may require removal of the pole, or transfer of its ownership to the carrier.

5.8.5 Pole movement after the installation of communication cables

The variable nature of pole footings may prevent their accurate assessment at the time of assessing a pole's suitability for carrying communication cables. Where corrective action is required to any pole following the installation, all costs are to be borne by the communication cable owner.

5.9 General requirements

5.9.1 Network records

The annual rental received by Endeavour Energy is determined from Endeavour Energy's network data and mapping records, which contain details of the communications networks attached to the network poles.

Endeavour Energy is to be informed when attachments occur to ensure correct rental assessment. In this respect, the communication cable owner shall provide a GIS layer of the proposed alteration/addition in a form compatible with the Endeavour Energy GIS.

5.9.2 Tree trimming

Communication cabling does not require any specific clearance to trees and Endeavour Energy has no commercial arrangement with communication cable owners in respect of tree trimming for their cables.

It is therefore of prime importance that Endeavour Energy's crews do not make allowance for communication cable's in the extent of the tree trimming undertaken, unless payment for such work is negotiated separately.

5.9.3 Aesthetics

Communication cable owners have presented the installation of their systems as having no significant impact on the visual amenity of the areas involved.

Endeavour Energy is aware that its overhead electricity network will be implicated in any adverse community reaction (by association) with the erection of communication infrastructure and accordingly, Endeavour Energy staff involved in this exercise are to strive to ensure the completed network is as aesthetically pleasing as possible.

Endeavour Energy can influence this outcome through prudence in the assessment of make ready requirements.

Endeavour Energy staff shall ensure that the communication cable owner has informed the local council and residents before proceeding with the installation.

5.9.4 Pole replacement

The conditions as stated in the agreements between various communication cable owners and Endeavour Energy set out the process to be followed by both Endeavour Energy staff and the various communication cable owners' staff. In general, Endeavour Energy staff are not permitted to interfere with the communications equipment and cabling and the communication cable owner will make arrangements for the relocation of their assets where reasonable notice of the proposed works is given.

5.9.5 Network augmentations and changes

Each communication cable owner has a different approach to assets on poles that will be relocated or removed under augmentation or undergrounding works. Each communication cable owner must be approached early in the design process and before construction commences when proposing these works.

5.10 Drawings

- 078518 F BCC Cable installation on pole with bare mains
- 078520 E BCC Cable installation near service mains
- 078521 D BCC Cable installation on pole with ABC mains
- 078522 E BCC Cable power inserter installation details
- 078616 C BCC Cable neutral connection to bare LV
- 078617 C BCC Cable neutral connection to ABC LV
- 078618 E BCC Cable mounting on pole substation
- 240383 G Overhead 11/22kV Rural/Semi rural substation general arrangement
- 249489 F Overhead 11/22kV urban substation general arrangement
- 291664 B Communication cable pole mounting identification label fabrication detail
- 303376 C Overhead 11/22kV Coastal substation general arrangement

6.0 AUTHORITIES AND RESPONSIBILITIES

The **Chief Engineer** is responsible for approving this Standard.

The **Manager Primary Systems** is responsible for reviewing this Standard and making recommendations to the Chief Engineer.

The **Network Mains Manager** shall be responsible for updating this Standard in accordance with Company Policy and Procedures.

Endeavour Energy's **Regional Managers & Communications Strategy Manager** shall be responsible for ensuring that all works are carried out in accordance with this Standard.

Endeavour Energy's **Network Facilities Access Manager** is responsible for coordinating enquiries and proposals with Network Planning, Network Connections and others for the attachment of Broadband communications cables to Endeavour Energy poles.

7.0 DOCUMENT CONTROL

Documentation content coordinator: Network Mains Manager

Documentation process coordinator: Branch Process Coordinator