



Telecommunication Workforce Skills and Employment For The Broadband (NBN) Rollout

EXECUTIVE SUMMARY

This paper looks at some of the impacts on skills the roll out of the NBN will have on the telecommunications workforce and identifies some of the challenges from a staff resourcing perspective and some options to enable us to move forward.

The National Broadband Network (NBN) is proposed to be a high speed state of the art digital network, built in the main with fibre to the home. Clearly this is an ambitious project that will lead to major changes in the economic prosperity of the nation. In some areas due to distance and geographical constraints alternate technologies will be used. It is currently proposed to build the network over a period of 8 years. The wholesale network will be open to retailers of telecommunications services ranging from plain old telephone services through to entertainment and services that have not yet been thought of.

The NBN project will need a probable resourcing level of between 20,000 to 30,000 skilled technical and professional staff to meet its projected time lines. These can be a mix of up-skilled staff from the current work force and new entrants. Some trained staff were available in the past from Telstra outsourcing and privatisation, but even if major structural change is forced on Telstra, the need to maintain the “legacy” copper network, particularly the outside cabling, will remain with commensurate staff.

Government has placed the responsibility of rolling out the NBN on the NBN Co. The NBN Co will access the largest proportion of the resourcing for the build from the main contracting companies such as Skilled, Service Stream, Vision Stream, BSA to name a few. These contracting companies will, based on previous experience, contract the work out to a large pool of one man operated and owned contracting companies.

These one man contracting companies are a finite resource which will place pressure on the main contractors and will ultimately be passed on to the NBN and finally the government, in the context of likely delays in the rollout, if skill needs are not met, or, installation quality is compromised.

This paper sets out the *broad situation* and there *may be a need to undertake a more detailed feasibility study* when some critical policy issues are determined. The options will then become clearer, particularly where these resources are, what skills they have and how to up-skill those who are not at the level required. A study should also look at how to develop a sustainable resource supply to the industry to support the emerging new technologies and services and factor in the digital TV and digital radio conversions as there are a number of overlaps.



Some of the key recommendations are.

- A National Digital Economy Co-Ordination Centre should be established to undertake a more collegiate approach to supporting converging technologies and skills in meeting the broadband and the digital economy needs by using industry benchmarks and the co-regulation quality model adopted by ADTIA. An objective would be to work to provide flexibility and national consistency within the existing the Vocational and Training System (VET).
- A national audit should be undertaken to identify current vocational training facilities and teaching resources for ICT and the digital economy and facilitate development actions, including brokering workplace training places in enterprises.
- New entrants should be encouraged into the telecommunications industry by wider use of apprenticeships, cadetships, traineeships, recognition of prior learning, employer incentives and linking uptake to contracts wherever possible.
- There should be a national co-ordinator for the VET (Vocational Education & Training) in schools programs and a listing of schools that meet industry requirements; for example, with trades centres.

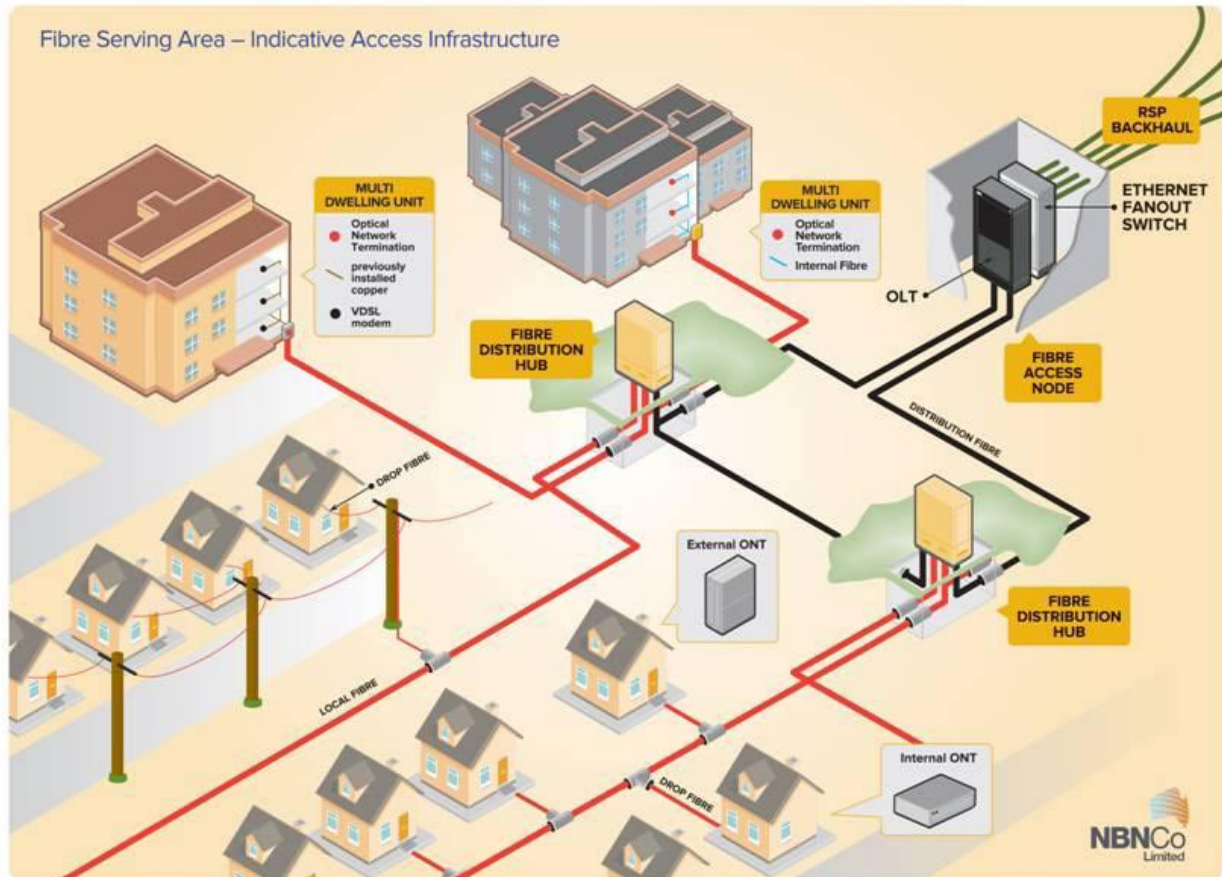
The above recommendations are not intended to be exhaustive, but should be seen as complementary to the general thrust of the paper and in particular, they extract action points from the *Consolidation of Key Points* in Section 7.



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An overview of the Telecommunications NBN environment



1. Overall impact of NBN on the community.

The NBN rollout will impact areas such as:

- Telecommunications and media retail products and services.
- Use of broadband as both as a domestic and business “tool”.
- Facilities in our schools and health services.
- Our increasingly aged population. We could see the broadband network used as a tool for monitoring the security and health of patients in their homes 24 hours per day through “E-health” policies and programs.
- Energy use through Smart Meters for power, water and gas meters allowing energy monitoring and greater efficiencies.
- Industry employment and new workforce skills and training needs, both short-term and future.
- Security alarm monitoring.



2. Impact of the NBN rollout on ICT Employment and Workforce skills

The Telecommunications industry and the NBN partners and contractors will need to re-assess their workforce strategies to include an additional variety of jobs, methods for engaging workers, employment opportunities and recruitment practices.

Some issues are:-

- Quality assurance for the NBN and training may require some form of regulation/self regulation; a model; or, a process that provides national recognition of quality programs.
- Individual and/or company accreditation will be required.
- National “skill sets”, monitoring/audits, professional development and encouragement of “new entrants” to the industry, will all be factors in the quality chain.
- With broadband speeds the introduction of Internet Protocol Television IPTV is a policy option for the future.
- Home wiring/networking quality will need to be addressed as most home installations – the main market for the new network – will only meet copper based service standards, otherwise, this will lead to huge dissatisfaction with the NBN.

The NBN program will lead to high demand for workers in many existing and “new” employment functions. The current work force includes:-

- A pool of approximately 5,000 technical staff that moves between the carriers, customer premises equipment and cabling providers, cable TV providers, data, alarm and other ICT services. These are contractors, or, sub-contractors, usually one man (and a van) businesses.
- More than 63,000 ACMA (Australian Communications Authority) Cabling Provider Rules registered communications/data, lifts and security personnel.
- With over 200 Licensed Carriers in Australia including Telstra and Optus there is a mix of staff skills, most of which are network based.

Anecdotally, an additional 10,000 Cablers and Digital installers, plus up-to 30,000 new positions, will be required in the ICT sectors to meet the needs of the Digital and Broadband rollouts. A range of IT skills are needed in a telecommunications network, however, at this time, the current IT pool may suffice.

3. Telecommunications and IT (ICT) cross sector impact

There could be an increase in total numbers and job functions across ICT as a consequence of the nation having a fast broadband network and the overlapping effects of the digital TV and radio conversions. Antennae installations, home theatre, alarms/CCTV and Pay TV growth in



particular, will utilize some of the same staff pool as telecommunications. Some typical functional areas are listed below.

Cabling–Customer and network: The NBNC Co is to be responsible for the service between the terminating device at the customers’ premises (ONT/NTD) and the Point of Interconnect (POI) in the network itself. Backhaul into the network from the POI is to be competitive, as is the provision of the retail services. The NBNC O has indicated it will use contracting companies extensively and has already called for capability statements.

Contractors will attempt to keep costs to a minimum and “single truck rollouts” for example, will be used wherever possible. Many cabling will work both sides of the network boundary – the Optical Network Termination unit/Network Termination Device – where the ACMA will continue to be responsible for the customer side cabling and the “carrier” for the line-side work. The main cabling areas are:

- Customer Access Network. External cabling to the switching network/exchanges and with optical, co-axial, wireless and copper systems.
- Customer Premises Cabling. This will vary from POTS (plain old telephone service) cabling to structured cabling and wireless networks.
- Customer Premises Equipment installation and servicing. This usually includes cabling and requires an ACMA registration.
- Electronics and Communications systems for alarms and monitoring. Most of these use the telecommunications network to report to monitoring centres.

Skills required will vary from nationally accredited skill sets and Certificate II to IV.

Installation and maintenance of telecommunications apparatus: Commissioning of equipment such as routers, PABX type switches, and complex structured cable systems and technical support and technical help desks will probably grow with an NBN.

Skills required will usually require Certificate IV or higher.

Engineering in the networks: The existing Telcos, Pay TV and IT companies will possibly grow their own needs with the NBN coming into service and the NBNC Co will need network designers and infrastructure and planning technologists. Planning and design for telecommunications systems, RF wireless networks, computer systems and the networks, as well as site surveys and communications buildings are all involved.

Skills required will usually be Diploma or professional (Diploma and above)

Construction of towers and antennae: Rigging work on towers for radio, TV, mobile phones, microwave and other antennae installation and maintenance is a specialised role in telecommunications and general construction certification is insufficient. Some cabling work is also involved with rigging.

Nationally accredited skill sets and certificates at Certificate II to Certificate IV are preferred.



Customer Support: Customer Support/Call Centres will handle sales, connection requests etc. but there will likely be a higher demand for minor technical Help Desks and field support to provide higher level back up for field engineers/ technologists.

Certificate II to Certificate IV in Call Centres/Contact Centres and relevant technical qualifications for the technical help desk will be required.

Likely NBN needs in the near future: Although often seen as the lower end of the skills requirements for a telecommunications system, the cabling and related equipment nearest the customer is nevertheless critical and without a high quality installation here, the best global switching and transport network is wasted.

Skill sets will suffice in most cases, and will need to be combined with the ACMA Cabling Provider Rules Registration (formerly an ACA Licence), when work is also undertaken on the customer side of the network boundary, the ONT/NTD.

*Nationally accredited Skill Sets will be required for; optical fibre jointing; hauling optical fibre cable in conduits; aerial optical fibre cable and DU/LU housing installation and installation of pole mounted FDH's; lead-in cables to premises; FTTH/FTTP testing and commissioning; design and planning of the FTTH/FTTP access network; civil works – installing pits pipes and FDH; central office FTTP/FTTH infrastructure; and customer premises cabling upgrades. **Note:** In some of these activities, higher level certificates may also be required, depending on the experience of the operative. (Refer to attachment).*

Core skill needs for the NBN rollout: Even experienced customer premises cablers, including those under the ACMA Cabling Provider Rules (CPR), which number more than 63,000, may require up-skilling, or, refresher skills training and many of these will be working both sides of the network boundary, in the future. Some likely “core skills” areas for attention are:-

- OH&S. Particularly for construction sites, underground cabling and pipe awareness, lead-in cable, wireless, and new optical fibre techniques.
- Fibre Optics. Basic principles e.g. splicing/jointing applications and safety.
- Coaxial Cable. Basic applications and safety.
- Antennae/Satellite. Basic applications, installation practices and safety.
- Power safety. Power infrastructure is often used for telecommunications equipment mounting. Grid fed power to some equipment types and mains power supply for optical network termination units, are also an issue and suitably qualified telecommunications staff will need to be given nationally accredited courses to gain limited electrical qualifications, if they are to install basic 240v power supply points to supply ONTs.
- Testing and commissioning of NTD/ONT operation and cabling. Both external and internal situations will need to be covered.



- Customer relations. More customer interface is likely and role/relationships of NBNCo, retail service providers and traditional carriers will require some explanation to customers at installation of the network termination device, which itself will often be an issue regarding location on or in the building.

4. Historical employment practices of the Telecommunications industry and the new contracting era with a systemic national training decline!

In the recent past, most telecommunications technical training was centred on the skill needs, technical standards and installation programs of the main telecommunications carrier(s) who were providing end to end, universal service. Today this is no longer providing a pool of staff for the industry at large.

Contracting: By its very nature, contracting mitigates against training as contract cycles – typically two years plus two – usually cannot match funding and training delivery timetables for certificate based training delivery. Short training programs are usually product and enterprise skill-based and rely on staff already having a core set of skills. Accordingly, availability of staff with essential core skills is a growing problem.

Privatisation of most electrical, gas and transport statutory authorities, who also previously trained staff in telecommunications and related fields, has exacerbated the problem.

As the demand increases for additional skilled workers, recruitment from the existing pool of ex-Telstra, electrician, vendor companies and former statutory authority trained staff (e.g. gas and electricity) is no longer a solution.

Social issues also have an impact: Some of the immediate recognised areas of difficulty include:-

- Ageing of the workforce.
- More enterprises today are recognising staff value and retaining their own workforce by incentives.
- Loss of technical skilled staff to other work areas for a variety of reasons e.g. mining and resource development in WA and Queensland.
- Difficulties for regional areas in retaining skilled staff when contracts, salaries and conditions are usually better in the main city centres.
- Often there are image problems with young people and potential new entrants not being attracted to the telecommunications, IT and technical and engineering career streams.
- The need to ensure sufficient staff are retained to support the existing copper network and HFC network as these systems are to be retained for the foreseeable future.



In short, current skill shortages are affecting many technical and engineering areas already. This has many implications and the need to boost the numbers and skills to meet the demands of the NBN rollout is apparent and will need to at least match the rollout timetable.

Trials: In the case of the Tasmanian “trial” the partners are Aurora Electrical Company, NBN Tassie and the Tasmanian Government. This “trial” will probably mainly use the Aurora Power Pole infrastructure and assets and thus may have implications on who can actually undertake the work, with electrical staff probably the most common.

There are five mainland trial sites and the situation will be different to Tasmania. On the mainland, the NBNC Co rollout will only use power-poles for overhead cabling where conduit/ducts (from Telstra, or, other infrastructure owners) are not available as the policy is to keep cable underground wherever possible as has been the case for telecommunications historically.

5. Recognition and training demands can be met!

There is no need to re-invent the wheel, to use the old saying! National competency benchmarks for telecommunications training are already endorsed; telecommunications training programs are well developed; and relevant skill sets, or, certifications, may be achieved through classroom, distance learning, the Recognition of Prior Learning processes, short courses, Vendor programs and Professional Development.

The earlier section on functions, skills and qualifications sets out the national skill sets and qualifications that will most likely be needed. The numbers for each category are not able to be accurately estimated as yet due to some policy uncertainties, but the work functions should be reasonably accurate.

The nationally endorsed Telecommunications Training Packages ICT02 and ICT10, and supporting vendor programs, are all as current as can be expected in a high technology environment.

Funding of training: Clearly, some costs are always borne by enterprises and individuals. However, national Telecommunications Training Package certificates and Skill Sets qualifications may be funded through both Federal and State Government funded programs such as “Productivity Places Program” (PPP), Recognition of Prior Learning, Traineeship and Cadetship programs.

Legacy and copper cabling work: As the NBN rollout occurs there is still essential work that needs to continue on existing telecommunications infrastructure and legacy copper cabling. These skills cannot be ignored even as more people move into the new area of Fibre. Current training arrangements will likely maintain the status quo.



6. Quality Assurance

The ACMA mandate technical standards and customer premises work registration requirements, while carriers are responsible for the network itself. Others, such as the Communications Alliance (CA) co-ordinate the industry on codes of practice, many common issues and committees work on technical standards that are then sold by Standards Australia. Currently, CA is playing a major role on the NBNCo network architecture and related developments with input from industry and associations like ATUG (Australian Telecommunications Users Group).

However, NBN activities may require an industry approved quality assurance model similar to others such as being developed in the digital TV and related sector. A code of practice and some industry co-regulation, possibly with some Government regulator support, may also be needed to provide national consistency in training quality and indirectly customer service on the NBN. The elements of this model may include monitoring, approved industry benchmarks and programs, industry/government approved qualifications, clearer career pathways and professional development to safeguard the consumer and the industry.

The telecommunications/communications industry, in co-operation with the Department of Broadband “Digital Switchover Taskforce” has already developed aspects of a ‘Quality Assurance’ program and it is being implemented within the Digital sector as part of the Digital TV and radio rollout.

A role for the NBN Co. and Government Departments in regards to “Employment, Skills Training and Quality Assurance” is to provide consistent national policy on the industry’s workforce planning and to support the implementation of skills training and the required resources for the long term. Short term fixes such as 457 Visas have been shown to be counterproductive.

National co-ordination: The establishment of a single national co-ordinating body with widespread industry representation, responsible for advice on telecommunications skills and training policies and centres of excellence, is a real option. The national training system already has telecommunications training providers and facilities throughout Australia delivering vendor, general telecommunications, enterprise specific, cabling training and ACMA/DEEWR competencies.

This can be a separate activity from that of the industry skills councils who are currently more focussed on training package development and maintenance. This can be part of the NBN and government social agenda.

7. Consolidation of key points

- The NBN rollout is planned to take place over an 8 year period. This will require immediate, medium and longer term workforce resourcing strategies. The NBN will



deploy and access a range of technologies, some new, others existing and legacy systems. The necessary mix of workforce sourcing and skilling options is as diverse as the technologies on which people will work and must cater for existing workers (telecommunications, electrical and other “technical” occupations) as well as new entrants, both experienced and young workers.

- In accessing a “common” pool of labour for NBN activities, it is wise to be mindful of the overlaps but also potential skilling synergies with digital television and radio implementation.
- Still on the supply side, there are existing and likely future pressures on the various sources of the NBN workforce which may mitigate against achieving targeted outcomes. These include competition from other industries (e.g. Mining), non-release from core occupational work (e.g. electricians on construction sites and smart meter installations), long lead times for training, (e.g. apprenticeships), low entry rates of young people due to poor industry image, changes in the “training model” for the telecommunications industry and of course, the demographics inherent in an ageing occupational workforce.
- Taking no action to plan strategically, develop and deploy an NBN workforce in some structured way, is not an option. The downside of a less than optimally planned national workforce is likely to result in pockets of labour shortages and skills shortages, risks to NBN rollout costs, timeframes and infrastructure quality (including potential re-work) as well as the inability of the infrastructure to deliver the promised benefits at the applications end.
- However, the good news is that the basic and specialist competencies, skills sets and qualifications are already in place to service any source of potential NBN worker. Furthermore, there can also be adequate training providers bought on-stream to deliver skills formation to suit the demand. What is needed however may be increased and comprehensive support to enable the expansion of training delivery and capability building to occur in a relatively short time period.
- There is also a need to ramp up and highlight the national priority for this industry training in what has traditionally been a relatively low training industry in recent times. In parallel with this amplification of priority, it will be necessary to work closely with State and Territory jurisdictions to ensure such priority is reflected in their own training and workforce development plans and funding models. It is unlikely that cost effective training will be delivered in “thin” or difficult markets without support and negotiation.
- Importantly, NBN workforce training can potentially be delivered under any number of pre-existing national and regional employment and training initiatives such as Productivity Places Program (PPP) and its offshoot, Enterprise Based PPP (EBPPP) to mention several programs. However, the same effort in raising the NBN priority within these programs would also be important, as other industries competing priorities continue to be a significant danger. Additionally, the wholesale “fee for service” training model could also serve the NBN workforce strategy alongside publicly funded programs such as those mentioned above.



- Notwithstanding the above, there is a critical need for a driver, champion or co-ordinating body to progress a national skills formation strategy for the NBN workforce. Such a body would harness and leverage existing training infrastructures and organisations. The difficulties of ensuring the rollout of quality national infrastructure such as NBN should not be discounted given the prevailing client (NBN Co), contractor (e.g. Skilled and others) and sub-contractor (e.g. micro installer business) model of technical installation and maintenance prevailing in this industry.
- Options for a national co-ordinator include utilising existing skills councils, industry associations, professional bodies, regulators (ACMA) or establishing a unit within the NBN Co to assume this role. The latter option has particular benefits due to the overarching responsibility of the NBN Co to deliver on the Government's NBN imperative irrespective of the "ownership" of the NBN workforce. The NBNC Co division assigned this responsibility could operate at a leadership standards setting level and co-ordinate actions with pre-existing organisations which have narrower or partial operational standards responsibilities.
- Alternatively, an industry association model using experience from the ADTIA (Australian Digital and Television Industry Association) which was formed specifically to handle such issues could be a useful consideration. This model is part of the digital Switchover Taskforce (Federal Government) activities. Such a co-ordination unit would be responsible for establishing and monitoring standards for telecommunications/NBN workforce planning, development and resourcing, on-the-job quality assurance, as well as skills formation and training quality.

The TITAB is a member of the Communications Alliance, the Australian Telecommunications Users Group, the Australian Electrical and Communications Association, Registrar Co-Ordinating Committee and a number of industry committees and we will continue to be part of the NBNC Co consultation process.

Ongoing NBNC Co consultations with all industry stakeholders and current telecommunications industry liaison work by the Communications Alliance, with input from the Australian Telecommunication Users group (ATUG), will assist us all in arriving at a proper national solution. Hopefully this paper will also be a useful input to the discussions. Please contact the TITAB National Office for any clarification.

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Sources: A range of source material has been used for this paper, including the NBNC Co discussion paper of December 2009; industry responses to the NBNC Co discussion papers; CA (Communicational Alliance); discussion papers on architecture and related issues for NBN; request for capability statements and some overseas papers.



Section 3 Attachment

NBN installation skill sets for Fibre Serving Areas (FTTP) network

The competencies come mainly from Certificate III in Telecommunications with one from Certificate IV in Telecommunications Engineering and one from Certificate IV in Telecommunications Network Planning.
By combining several skill sets, a full Certificate III in Telecommunications can be achieved.

Skills Set No:	Description	National Competency Standard(s) from Telecommunications Training Package ICT02 vers: 3	Application in the FTTP roll out (Figure 1 refers)
Skills set 1	Optical Fibre Jointing	ICTTC170A- follow OHS and environment policy & procedures ICTTC140B-use hand & power tools *ICTTC065D- splice carrier/service provider optic fibre cable (note 3)	Required for splicing terminations on optical fibre entrance cables at the Central Office, at the FDH and at the LU (depending on the LU type used) and at the ONT (depending on type used). Required for splicing at the FAP and at the DU's ICTTC065C addresses these splicing skills
Skills set 2 (Note 1)	Hauling optical fibre cable in conduits	ICTTC170A- follow OHS and environment policy & procedures *ICTTC064D-haul underground cable (note 2)	Required for underground cable installation in conduits for: * main run fibre cables *spur runs from FAP to FDH * connecting cables between FDH and underground Distribution joints (DU's) and in some instances to LU's
Skills set 3	Aerial Optical Fibre cable & DU/LU housing installation & installation of pole-mounted FDH's	ICTTC170A- follow OHS and environment policy & procedures ICTTC140B-use hand & power tools *ICTTC134C- Fix aerial cable (note 2) ICTTC153B- Work safely near power infrastructure	Required where there are available poles for attaching aerial optical fibre cable on poles between FAP and FDH, between FDH and DU and between DU and LU
Skills set 4	Install lead-ins to premises	ICTTC170A- follow OHS and environment policy & procedures ICTTC140B-use hand & power tools *ICTTC068C- Install a telecommunications service to a building (note 2) *ICTTC021D- Install aerial cable (note 2)	Required for taking optical fibre cable from pole or pit into customer premises using underground or aerial cable and terminating it at customer's ONT; install ONT at customer premises



		*CTTC019D – install underground cable (note 2) ICTTC153B- work safely near power line infrastructure	
Skills set 5	Test and Commission FTTP installations	* ICTTC077C-Commission an electronic unit (note 3) *ICTTC057D- test cable bearers (Note 3)	Required for end to end testing/commissioning from Central Office to ONT at customer premises and testing from central office to FDH and FDH to ONT
Skills set 6	Design and plan FTTP access network	*ICTTC151B-Plan the access network (note 4)	Required for all parts of the FTTP access network
Skills set 7 (Note 2)	Civil works – install pit and pipe and FDH (ground-based pad-mounted)	ICTTC170A- follow OHS and environment policy & procedures ICTTC140B-use hand & power tools ICTTC130C- prepare site for support installation ICTTC133C- Construct underground telecommunications infrastructure *ICTTC131C- Install an above ground equipment enclosure (note 2)	Required in new estate (green fields) installation and may be required selectively in legacy network areas especially in replacement of damaged conduits. ICTTC130C addresses the preparations and approvals required before commencing a civil works such as installing pits and conduits. ICTTC133C addresses the skills involved in installation of pits and conduits. The FDH is an above-ground equipment enclosure for the optical splitters It is a passive, non-powered enclosure and may be mounted on a pad or on a pole but more likely on a pad and may be included in the civil works ICTTC131C addresses this skill.
Skills set 8	Central Office FTTP infrastructure	ICTTC170A- follow OHS and environment policy & procedures ICTTC140B-use hand & power tools *ICTTC054D- provide infrastructure for telecommunications network equipment (note 5)	Addresses the installation of OLT, WDM, ODF equipment within the Central Office feeding the FTTP network
Skills set 9	Customer Premises cabling	ICTTC170A- follow OHS and environment policy & procedures ICTTC140B-use hand & power tools ICTTC137C- install, maintain & modify customer premises communications cabling: ACMA Open Rule ICTTC009D- Place, secure and terminate	Required to distribute the "triple play" services provided from the ONT into/through the customer's premises. Where this distribution requires between building cable installation as in retirement villages or multi-building campuses, underground cable, including optical fibre cable, may be required.



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		structured cabling & certify installation ICTTC011D – Place, secure and terminate coaxial cabling *ICTTC010C- Place, secure and terminate customer premises optical fibre cable (note 3) *ICTTC019D-install underground cable (note 2)	
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Note 1: Skills set 2 and 7 may be combined by some civil works contractors/contracts

Note 2: Competency would benefit from modification to specifically address optical fibre cabling

Note 3: All competencies which involve handling of optical fibre connectors/OF patching require an new element addressing the cleaning of connectors and maintenance of protection on unused connectors including those on patch cords and the unused ports on patch panels

Note 4: The competency requires substantial updating to properly address an FTTP access network

Note 5: This competency requires a substantial update to properly address Central Office OLT/WDM/ODF equipment installation requirements and would need to take into account manufacturers installation requirements.

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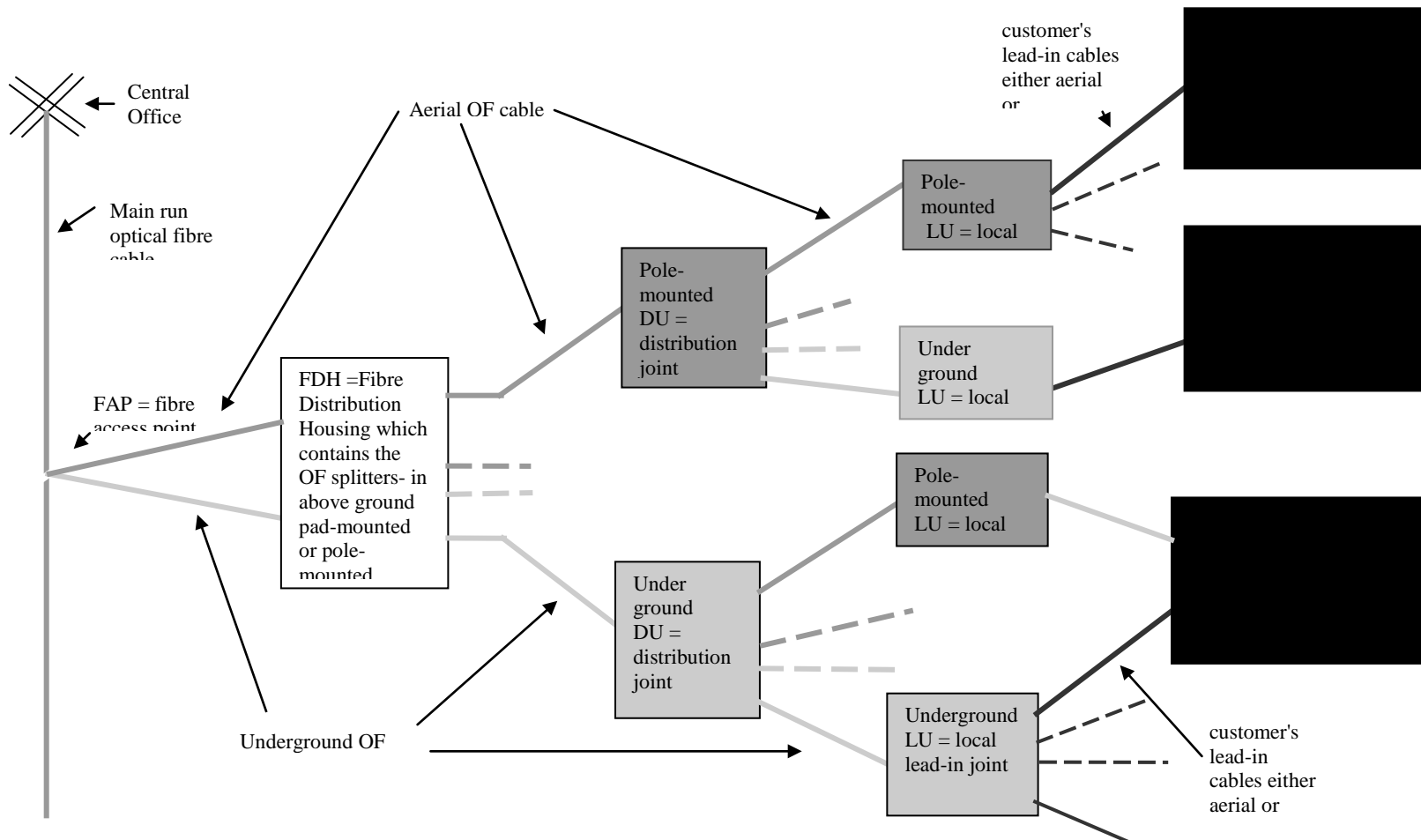


Figure 1 – Fibre Serving Area (FSA) infrastructure placement showing aerial and underground cable



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