TELSTRA CORPORATION LIMITED

Telstra's Ordinary Access Undertaking for the Unconditioned Local Loop Service:

Response to the ACCC's Discussion Paper dated June 2008

PUBLIC VERSION

12 August 2008

Contents

A Introduction

The TEA model is a revolutionary, best-in-world model that accurately calculates the costs of providing ULLS, having regard to millions of data points that detail 584 real exchanges, 7,532,793 real lines, and 7,489,427 network structure points along real network routes. Unlike previous models, the TEA model does not rely on hypothetical and unrealistic assumptions in relation to where the network is placed. Models based on hypothetical assumptions are fundamentally erroneous as they assume cables and conduit run through buildings, across football ovals and through rivers.

Instead the TEA model uses a much more accurate basis from which to calculate costs – Telstra's actual network routes. The TEA model is based upon the best data available, data extracted from a world class engineering database system. It measures distances between real geographic points with extraordinary accuracy. The data is then refined to design a new telephone network with near perfect efficiency, provisioning capacity finely calibrated to match existing demand, and incorporating best-in-use equipment, engineering practices and construction techniques in use today.

Importantly, Telstra has ensured the TEA model is flexible, transparent and all calculations are well documented. If imperfections in the design of the TEA model are discovered by the ACCC, access seekers or Telstra, they are fixed; adjustments are made; the model is improved. Indeed, over the last several weeks, the ACCC and Telstra have discussed the significance of eight bugs found by the ACCC and Telstra in v1.0 of the TEA model. Telstra found that these bugs changed the result of the TEA model by less than 1.5% of the original cost estimate (a reduction of 66c from $49.27 to $48.61). Telstra subsequently released v1.1 of the TEA model to the ACCC and interested parties with these bugs remedied. Telstra repeats in this submission its request for all interested parties to notify Telstra of any issues or concerns they might have with v1.0 or v1.1 of the TEA model. To date, no parties have notified Telstra of any issues nor has Telstra discovered any itself, other than the issues remedied in v1.1 of the TEA model. Notwithstanding, Telstra will respond to any additional issues that arise as they arise.

While improvements have been made and bugs fixed, Telstra expects that different parties will have different views as to the appropriate inputs into the TEA model and that, over time, parties might develop more robust estimates of those inputs. The TEA model accommodates this by ensuring users can enter different inputs for their own runs of the TEA model. However, changes to inputs should not be confused with changes to the construct of the TEA model itself.

To respond to several of the questions in the ACCC's discussion paper, Telstra has taken the opportunity to undertake separate studies to support the original estimates of inputs into the TEA model. Some of those studies have produced more accurate values for the inputs into the TEA model.

In the case of distribution trench sharing, Telstra's default input needs to change such that the cost result will fall (see the discussion on 'trench sharing in the distribution network' in section B.7). Conversely, in the following cases, additional studies detailed in this report show that Telstra's original values understate the cost of ULLS:

- Main network and IEN trench sharing;

- Trench sharing in new estates; and,
- Loading Factor for indirect overheads.

Furthermore, as foreshadowed in Telstra's report on the WACC dated 4 April 2008, Telstra has also updated its default inputs for:[1]

- The cost of equity (updated to 13.93%); and,
- The cost of debt (updated to 8.43%).

Regardless of changes to default inputs, for which different parties are likely to have different views, v1.1 of the TEA model is a robust and transparent model that has the flexibility to allow different users to change inputs and test the impact that such changes have on the cost of ULLS. As such, the TEA model is a suitable model for the ACCC's assessment of Telstra's ULLS Undertaking.

B Telstra's Responses to the ACCC's Questions

B.1 Consistency with the standard access obligations

Do you think Telstra's ULLS description is more limited than the ULLS Declaration to the extent that it would affect the ability of Telstra to meet its SAOs? If so, provide examples of potential situations where you consider the ULLS service as described by Telstra would not fall within the scope of the Declaration for the declared service.

Telstra notes that the ACCC has stated that Telstra's ULLS service description involves the use of a "*continuous metallic twisted pair*". Such a reference has been included in previous undertakings but is not contained in the 2008 Undertaking. This wording has been replaced by a reference to an "*unconditioned Communications Wire*". A Communications Wire is defined in the Undertaking as a copper based wire forming part of a public switched network. This wording reflects the wording in the ULLS Declaration.

Telstra's ULLS service description in the Undertaking is consistent with the service description contained in the ULLS Declaration. There are some aspects of the Telstra service covered by the Undertaking which are more limited than the ULLS Declaration description. For example, the Undertaking only specifies charges for a ULLS connected at an exchange building in a Band 2 exchange. However, these matters do not create any inconsistencies with the SAOs and do not impact on Telstra's ability to meet its SAOs.[2]

There are no situations where Telstra's description of the ULLS service will not fall within the Declaration description. In the event that an access seeker was to seek

[1] Telstra's report *Weighted Average Cost of Capital*.
[2] In its assessment of Telstra's 2005 ULLS Undertaking, the Australian Competition Tribunal noted that there were differences between the description of ULLS in the Undertaking and the service description in the ULLS declaration and concluded that "*[n]othing turns on these differences as the ULLS supplied by Telstra falls within the description of the ULLS in the declarations*": *Telstra Corporation Ltd (No 3)* [2007] ACompT 3, page 17.

access to a form of the declared ULLS which is not covered by the Undertaking then it is open to the access seeker to reach commercial agreement with Telstra on the terms of supply of that different form of the declared service or, if agreement cannot be reached, the access seeker could ask the ACCC to arbitrate.[3]

If you consider that Telstra's Undertaking should specify requirements, relating to the provision of equivalent supply, quality and fault handling of the declared service, provide example(s) of terms that are consistent with the obligation of providing equivalent supply, quality of service and fault handling performance.

As set out in Telstra's Undertaking (at 3.2(a)), the Undertaking does not specify all terms and conditions on which Telstra will comply with the SAOs for ULLS.[4] The ACCC has acknowledged in its discussion paper that this is not necessary and that the absence of terms and conditions about certain matters does not make an undertaking inconsistent with the SAOs.

Further, the absence of terms and conditions specifying how Telstra will satisfy its obligation in respect of equivalent supply, quality and fault handling of ULLS should have no bearing on the ACCC's assessment of the reasonableness of the Undertaking as:

- The Undertaking is not required to be exhaustive;[5]
- Any relevant matters that are not addressed in the Undertaking could be settled by commercial negotiation or, failing that, in appropriate circumstances, by the ACCC in an arbitration; and
- Section 152BV(2)(d) provides that the ACCC must be satisfied that the terms and conditions specified in the Undertaking are reasonable. None of the terms and conditions specified in the Undertaking can be said to be unreasonable due to the absence of terms and conditions regarding equivalence.

Do you think the POI and Network Boundary described in the Undertaking is consistent with the SAO to permit interconnection of facilities? If not, please explain, and propose alternative terms that you consider are consistent with the SAOs.

The description of the POI and the Network Boundary in the Undertaking are consistent with the SAO to permit interconnection of facilities. As noted above, whilst some aspects of Telstra's ULLS service description are more limited than the Declaration description, this does not create any inconsistencies with the SAOs, including the SAO to permit interconnection of facilities.

[3] This has previously been acknowledged by the Commission: ACCC, *Assessment of Telstra's ULLS and LSS monthly charge undertakings Final Decision*, December 2005, page 18; and ACCC, *Assessment of Telstra's ULLS monthly charge undertaking, Final Decision,* August 2006, page 30.
[4] The fact that an undertaking does not specify all terms and conditions is contemplated by the Act: see the note to section 152BS(1) and section 152AY(2)(b)(ii).
[5] *Re Optus Mobile Pty Ltd and Optus Networks Pty Ltd* [2006] ACompT 8 (22 November 2006) at 52 - 53.

Telstra also notes that its descriptions of the POI and Network Boundary in the Undertaking are largely the same as the descriptions in previous ULLS undertakings where the ACCC accepted that Telstra's POI and Network Boundary descriptions are consistent with the Interconnection SAO.[6]

Should the Undertaking contain further terms and conditions relating to the provision, timing and content of billing information? If not, please provide reasons for that view. If so, please propose alternative terms that you consider are consistent with the SAOs.

The terms and conditions in the Undertaking do not include terms dealing with the provision, timing and content of billing information and it is not necessary for the Undertaking to do so. In that regard, Telstra refers to its comments above, that is, the ACCC acknowledges that the Undertaking is not required to be exhaustive and the absence of terms and conditions about certain matters does not make an undertaking inconsistent with the SAOs. Telstra's previous ULLS undertakings have similarly not included terms and conditions in relation to the provision, timing and content of billing information and the ACCC accepted that the Undertakings were not inconsistent with the billing information SAOs.[7]

Further, the absence of terms and conditions in relation to billing does not have the consequence that the terms and conditions which are contained in the Undertaking are unreasonable. In that regard, Telstra repeats the matters discussed above. That is:

- The Undertaking is not required to be exhaustive;[8]
- Any relevant matters regarding the declared ULLS that are not addressed in the Undertaking could be settled by commercial negotiation or failing that, in appropriate circumstances by the ACCC in an arbitration; and
- Section 152BV(2)(d) provides that the ACCC must be satisfied that the terms and conditions specified in the undertaking are reasonable. None of the terms and conditions specified in the Undertaking can be said to be unreasonable due to the absence of terms and conditions regarding the provision, timing and content of billing information.

The non-price terms and conditions in the Undertaking which have not been addressed in the above discussion include availability, cable plant information, industry standards and access seeker obligations, facilities access and end user billing. Telstra notes that all of these terms and conditions have been contained in previous ULLS undertakings and in respect of those undertakings the ACCC accepted

[6] ACCC, *Assessment of Telstra's ULLS and LSS monthly charge undertakings Final Decision*, December 2005, page 19; and ACCC, *Assessment of Telstra's ULLS monthly charge undertaking, Final Decision,* August 2006, page 31. The definitions of the POI and the Network Boundary in the current undertaking include the following two points of difference from those in the undertakings the subject of the 2005 and 2006 Decisions: (1) the insertion of word "associated" in the definition of the POI and (2) the replacement of "Telstra network" with "End User" in part (a) of the Network Boundary definition. These modifications do not provide any basis for a departure from the Commission's previous assessment that Telstra's non-price terms and conditions are consistent with the Interconnection SAO.

[7] ACCC, *Assessment of Telstra's ULLS and LSS monthly charge undertakings Final Decision*, December 2005 page 20; and ACCC, *Assessment of Telstra's ULLS monthly charge undertaking, Final Decision,* August 2006, page 32.

[8] *Re Optus Mobile Pty Ltd and Optus Networks Pty Ltd* [2006] ACompT 8 (22 November 2006) at 52-53.

that the terms and conditions were consistent with the SAOs.[9] There are no circumstances that would warrant a departure from that position.

B.2 Ability to properly assess the TEA model

Is the documentation provided by Telstra sufficiently comprehensive and clear for parties to understand and navigate the TEA model? If not, indicate what other information you require to be able to assess the TEA model.

The documentation provided with the TEA model is comprehensive, very detailed, clear and easy for an access seeker and their advisors to understand. The model documentation includes:

- *Access Network Dimensioning Rules*, which details the engineering rules used to design the network;
- *TEA Model Documentation*, which details the formulas and calculations in used to implement the engineering rules and calculate the monthly ULLS costs; and,
- *TEA Model User Manual*, which provides a detailed description of how to operate the model.

This model documentation provides more than adequate information to evaluate the TEA model and goes beyond the standard that has often been applied by other parties. For instance, the documentation for the ACCC's cost model for mobile networks[10] does not set out the formulas used to provision plant and equipment. Interested parties are, as a consequence, unable to verify how the engineering rules are implemented in that model. Telstra has ensured that its documentation helps interested parties in reviewing the TEA model by setting out and explaining the calculations in the model, including how engineering rules are implemented and indexing the documentation back to the actual model for ease of reference (see, for example, Attachment 1 to *TEA Model Documentation*).

Is the TEA model sufficiently flexible to allow reasonable ranges of values for key parameters to run different scenarios at an appropriately disaggregated level? If not, provide evidence to support your reasons.

The TEA model makes use of Microsoft Excel spreadsheets, which affords users a high degree of flexibility in testing alternative approaches. The user adjustable input variables in the TEA model allow for comprehensive sensitivity testing and analysis. For example, pages 57 to 90 of the *TEA Model User Guide* identify the more than 700 inputs that can be adjusted by the user and explains how these can be changed.

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[9] ACCC, *Assessment of Telstra's ULLS and LSS monthly charge undertakings Final Decision*, December 2005, page 20; and ACCC, *Assessment of Telstra's ULLS monthly charge undertaking, Final Decision,* August 2006 , page 34; ACCC, *Assessment of Telstra's undertakings for PSTN, ULLS and LCS, Draft Decision*, October 2004, page 29.

[10] WIK - Consult GmbH, *Mobile Termination Cost Model for Australia*, January 2007.

Telstra has developed the TEA model to ensure, to the greatest extent possible, that inputs are internally consistent for a reasonable range of these variables. Hence, if a user changes one input within a reasonable range, the other inputs will change to maintain the internal consistency in the model. While Telstra has made efforts to ensure consistency between input values, if those inputs are adjusted to unrealistic values, Telstra does not guarantee that other inputs will remain internally inconsistent.

Furthermore, Telstra met with the ACCC on a number of occasions in advance of releasing the TEA model to discuss the input variables in the TEA model and trusts that the final solution provides the appropriate balance between complexity and flexibility.

Does the TEA model identify all relevant parameters required to assess the cost outcomes? If not, provide evidence to support your reasons.

The TEA model and the related documentation identify all relevant parameters required to assess the cost of ULLS. Appendix A of the *TEA Model User Guide* lists the inputs that can be changed by users of the model in the user interface.

Wherever a parameter has not been described in the inputs sheet it reflects an inherent property of the network and is not expected to be changed. The following examples clarify this point.

One interested party asked whether two parameters in the 'Cost Calculator Distribution' worksheet of the Calc Engine had been inadvertently left out of the inputs sheet. The first parameter (0.88) is in cells D11 to D14. The reciprocal of this parameter (0.12) indicates the proportion of times that only one cable can be hauled through the same conduit at the same time. Since the cost for hauling cable is the same when two cables or one cable is hauled through a conduit, 12% of the time there will be no additional cost for hauling a cable. Applying the .88 factor eliminates the 12% of the costs that can be avoided by hauling two cables at the same time. The value is established by identifying number of times two cables can be hauled at the same time based on the modelled network. Changing this parameter will mean the TEA model is no longer internally consistent. For this reason, the parameter was not made an input. The second parameter (8) is in cell C29 of the same worksheet. The number 8 reflects the number of lead-ins served by a joint. Changing this value would require changes to the engineering rules. In particular, increasing the value to, say 12, would require the TEA model to be changed to add more cable, conduit and trenching to carry the additional 4 lead-ins back to the joint. Hence, a change to that parameter alone would mean the TEA model is no longer internally consistent. For this reason, the parameter was not made an input.

Do you consider the formulas underlying each individual module (and any assumptions behind the use of these formulas and modules) to be sound? If not, provide evidence to support your reasons.

As set out in Telstra's letter to the ACCC dated 15 July 2008, the ACCC and Telstra have identified a number of small bugs in v1.0 of the TEA model. These bugs have been

fixed in v1.1 of the TEA model. The overall impact of the changes made was 66c, reducing the cost estimate from $49.27 to $48.61. Other than as mentioned in this document, Telstra has not been informed of any other errors identified by the ACCC, access seekers or their advisors.

If any party has questions or concerns in relation to the formulas in the TEA model, then Telstra would appreciate those parties raising those questions with Telstra (and the ACCC), so that the model can be expeditiously modified to reflect any necessary changes.

Do you consider the reactions of the model to changes in values of key inputs to be consistent based on your experience, economic intuition and financial principles? If not, provide evidence to support your reasons.

Changes to the results of the model are consistent with Telstra's experience, economic intuition and financial principles.

Do you consider there are any internal inconsistencies in the model or the formulas? If so, provide evidence to support your reasons.

Telstra has invested significant time and resources into ensuring that the TEA model conforms to accepted TSLRIC+ modelling principles. This includes ensuring that the model design and assumptions reflect real-world information about the environment in which the network must exist. Only by reflecting the real-world environment in which Telstra operates can a reasonably accurate estimate of the TSLRIC+ of the network be obtained. Telstra has investigated, in detail, the realities which underlie the assumptions and approaches adopted in the model[11] and aligned them with TSLRIC+ principles to ensure that the TEA model is accurate, coherent and internally consistent.

As discussed above, Telstra has made several small corrections to v1.0 of the TEA model. With these changes, Telstra believes there are no internal inconsistencies in v1.1 of the TEA model. However, if any party to this proceeding identifies areas where the model can be improved, Telstra stands ready to make such changes, if appropriate.

B.3 Telstra's proposed ULLS monthly charge

Do you consider the TEA model capable of producing reasonable TSLRIC cost estimates having regard to the legislative criteria set out in section 152AH?

The document *Telstra's ULLS Undertaking is Reasonable* demonstrates that TSLRIC+ based prices are reasonable with respect to the legislative criteria set out in s152AH of the TPA (see section C.2) consistent with the ACCC's view on this matter. That report

[11] See for example the statements of [CIC] and [CIC] on the Cable Plant and Record database (CPR2) from which copper route lengths are extracted.

and *TEA Model Overview* demonstrate that the TEA model complies with TSLRIC+ principles. In particular, the TEA model reflects:

- Total Service – the TEA model estimates the band 2 costs of all elements of a CAN that are, or are able to be, acquired by access seekers when they purchase the declared ULL service (as defined in the Undertaking) from Telstra;

- Long-run Incremental Costs – the TEA model identifies afresh all the network elements that are required for the supply of ULLS (as defined in the Undertaking) and measures their current cost, taking into account sharing of costs common to other services or providers and including a contribution to operations and maintenance and indirect costs; and,

- Forward-looking efficient costs – the TEA model is based on the ongoing costs of supplying ULLS using efficient means of supply and technologies that are currently in widespread commercial use.

The *Access Network Dimensioning Rules* document sets out the engineering rules for a new, forward-looking copper network. The selection of each design rule is supported by the statement of [CIC]. Those costs for plant and equipment used in the TEA model are detailed in the statements of [CIC], [CIC] and [CIC]. Other related efficient cost inputs are explained in the statements of [CIC] and [CIC] and Telstra's *Operations and Maintenance and Indirect Cost Factor Study*.

While different parties might have different views as to whether any particular input into the TEA model reflects TSLRIC+ principles, the TEA model itself is capable of producing reasonable TSLRIC+ cost estimates. In any event, Telstra considers that the default values (updated as described in this document) when used in the TEA model are capable of, and do, produce a reasonable TSLRIC cost estimate having regard to the legislative criteria as set out in section 152AH.

Do you consider the model takes account of existing and future demand? Do you consider this relevant in considering whether the cost model is capable of producing reasonable TSLRIC cost estimates?

The TEA model calculates the forward-looking efficient investment cost of the CAN and divides that cost by the current number of active lines. The investment cost is then annualised over the future lives of the assets. The TEA model does not take into account the forecast decline in future demand. This is conservative for the following reasons.

First, the number of active lines is expected to fall. Over the period 2003-04 to 2006-07, demand for existing access lines on Telstra's network (retail and wholesale basic access, and ULLS) has fallen on average by [CIC]% per year. This is consistent with ACMA findings in a recent report on fixed to mobile convergence that the number of Australian fixed voice lines (across all fixed networks) peaked in 2004 and has been in

steady decline since then.[12] Given the CAN is made up of mostly fixed costs, the unit cost of the CAN would be expected to increase as demand falls.

Conversely, it can be expected, and it has been Telstra's experience, that there will be some new estates that are developed in the second and third years of the Undertaking period.[13] Additional new estates would likely be provisioned at a lower incremental cost than the average cost of all lines. However, even if all SIOs in new estates were to be provisioned with full copper paths, the effect of new estates in the second and third years of the Undertaking period on the average cost of ULLS would be far outweighed by the effect of continuing decline in demand for existing Band 2 access lines over the same years. In 2006/07, the number of lots developed in Band 2 green-field new estates as a percentage of total band 2 SIOs was CIC %.[14] However, over the period 2003-04 to 2006-07, demand for existing access lines on Telstra's network (retail and wholesale basic access, and ULLS) has fallen on average by CIC % per year, after accounting for new estates added over the same period. This trend is expected to continue over the period of the Undertaking. Thus, even if the CAN in new estates was costless (whereas in fact the only saving available in new estates is in the cost of the trenching) the average cost of ULLS would still increase by CIC % due to the declining demand.[15]

Second, the preponderance of costs associated with the provision of CAN services, including ULLS, are inherent in the material and placement costs of conduit and copper cables. The average cost of constructing a replacement network can only be expected to rise if the costs of labour and copper increase. Consequently, it is reasonable to expect the unit TSLRIC+ of ULLS to increase or at the most remain stable in 2009 and 2010.

Third, since Telstra's Undertaking is based upon 2008 construction costs which are levelised over the life of the plant for a network to meet current levels of demand, they are reasonable and conservative for the timeframe the Undertaking will be in place.

Should the ACCC consider the assessment of only one part of the ULLS monthly charge (that is, not specify the ULLS specific charge)?

The TEA model estimates only the network costs of ULLS and not specific costs. The TSLRIC+ costs of the network as calculated by the TEA model alone exceeds the monthly charge which is the subject of the Undertaking. In view of the regulatory regime and the desire to avoid an industry 'rate shock', Telstra has made a commercial decision to provide an Undertaking for a $30 monthly charge in order to secure some price certainty. Hence, the quantum of ULLS specific costs makes no difference to the assessment of the reasonableness of Telstra's ULLS Undertaking.

However, should it be necessary to assess ULLS specific costs, for the recent pricing principles and indicative prices for ULLS, the ACCC calculated ULLS specific costs at

[12] ACMA (2008), *Fixed-mobile convergence and fixed-mobile substitution in Australia,* July 2008.
[13] For an example of the existence of new estates in the trench sharing context, see the statement of CIC].
[14] Statement of CIC], paragraphs 1 and 4 of Annexure CIC -4.
[15] All other things constant, if the denominator of a fraction (number of lines) decreases by CIC % then the fraction (or average cost) will increase by CIC %.

$2.45 per month. Telstra does not agree with that estimate and considers that the ACCC's modelling of ULLS specific costs has some serious shortcomings, as has been set out in submissions for other proceedings.

Therefore, if the ACCC is concerned to be able to calculate the network and ULLS-specific cost components of the ULLS, it can do so using the TEA model and its specific costs model. In any event, the fact that Telstra has not included a specific costs component in its cost calculations is no bar to the ACCC considering and accepting the Undertaking.[16]

B.4 Network design and engineering rules

Do you consider the model applies best-practice, forward-looking engineering practices to determine plant and equipment requirements for providing ULLS? In discussing this issue, interested parties are asked to address the relevant statutory criteria in their comments.

The TEA model applies best-in-use and forward-looking engineering practices and determines the efficient quantities of plant and equipment that are necessary for a ULLS network. The engineering rules applied in the design of the efficient network are set out in the *Access Network Dimensioning Rules* and the application of those rules is documented in *TEA Model Documentation*.

In addition to the abovementioned submissions, accompanying this submission is the statement of [CIC]. That statement shows, by detailed reference to each of the engineering rules, that those rules reflect a best practice, forward-looking engineering approach that would be adopted by a network constructor building such a network today.

Since the TEA model calculates best-practice, forward-looking and efficient costs, prices based on such calculations are consistent with the statutory criteria.[17]

Is a model based on the actual existing Telstra network likely to generate cost estimates that are forward looking and efficient (and therefore in line with the section 152AH criteria)?

The concept of TSLRIC+ is meaningless in any practical sense unless it takes into account the unchangeable physical constraints within which the service must be provided and which any competitor or network builder would undoubtedly face. A CAN must reach end-user customers in fixed locations across the network. It must do so taking its surrounding physical environment as given. While the long-run nature of TSLRIC+ may require the factors of production to be variable, the practical geographic constraints facing the network are not variable. A TSLRIC model that does not take these factors into account will not reflect the efficient costs of supply nor would it reflect the actual services supplied.

The TEA model is based on the actual conduit routes between end-user customers and pillars, and between pillars and local exchanges. This approach takes into account

[16] *Re Optus Mobile Pty Ltd and Optus Networks Pty Ltd* [2006] ACompT 8 (22 November 2006) at [52] - [53].
[17] See, for example, ACCC (1997), *Access Pricing Principles – Telecommunications: A Guide*, July 1997, ACCC (2007), *Unconditional Local Loop Service (ULLS) Final Pricing Principles*, November 2007, and ACCC (2008), *Unconditioned Local Loop Service Pricing Principles and Indicative Prices*, June 2008

the necessity to place telecommunications facilities within rights of way, invariable practical and geographic constraints of building a CAN, and the costs that an efficient firm could actually achieve. To the extent that there are actual conduit routes that would not be rebuilt today, the process by which data for all cable routes is extracted from Telstra's Cable Plant Record System (CPR2) ensures that such routes are removed.

The plant and equipment in the TEA model reflect the minimum amounts required to implement the best-practice, forward-looking engineering rules for a safe and reliable network (not necessarily actual existing plant and equipment).[18]

Would these estimates differ from those of a hypothetical efficient forwardlooking [sic] network?

The objective of TSLRIC+ pricing principles is to set prices at levels that would occur in a competitive market. These costs are not some hypothetical construct that ignores real world constraints of the environment in which new entrant firms operate. Rather, in the interests of sensible and accurate decision making, those costs must, when possible, reflect the actual and real environment in which the new entrant would build and operate a reliable network with the same service potential as Telstra serving the customers actually using the declared service.

Cost estimates from a model of a hypothetical network would likely differ from a model based on a real world network design. However, this is irrelevant for three reasons.

First, using a hypothetical network design and reality-defying algorithms such as the Minimum Spanning Tree and Steiner Node approaches in a TSLRIC model will only provide hypothetical and reality-defying results. Such results, while hypothetical, are unlikely to reflect the forward-looking, efficient costs of supplying real services. For instance, TSLRIC estimates derived from hypothetical models assume that trenches, conduit and cable can run through buildings, rivers, parks, harbours and other obstacles.[19] Therefore, current prices will not accurately reflect the efficient costs of a new operator unless trenches, conduit and cable are, in fact, able to run through buildings, rivers, parks and harbours. They certainly are not.

Second, the TSLRIC+ principle was selected by the ACCC as best satisfying the statutory criteria in sections 152AH and 152AB. That is because TSLRIC+ is intended to model, as best it can, the price which an efficient competitor, with a new optimal network, would charge for ULLS (or the price to which competition would tend towards). Since any competitor, including the most efficient, could not deploy a network disregarding the constraints of the real world, nor recover its costs of supply if it did not charge for the costs of deploying a network in the real world, a TSLRIC model which takes account of the physical environment in which a network would be deployed is inherently superior to a hypothetical model designed in ignorance of the circumstances in which competitors would compete. Thus, it is inherently more likely

[18] See the statement of [CIC] and *Access Network Dimensioning Rules*.
[19] *Telstra's Undertaking is Reasonable,* Attachment 1.

to be consistent with the statutory criteria and, therefore, promote competition. Hypothetical models have their uses, but only as a proxy for the real world in the absence of real world data.

Third, in assessing Telstra's Undertaking, it is not the ACCC's statutory task to find an alternative model (hypothetical or otherwise) that can be used to derive a different or the same result as the TEA model.

Do you consider Telstra has used the appropriate network assets to model an efficient forward-looking network that provides ULLS? Comment on whether the TEA model includes costs that are legitimately incurred in the efficient and forward-looking provision of the ULLS. Is there over-provisioning of elements in the network?

The TEA model includes the necessary and appropriate network assets to model an efficient, forward-looking network that can provide ULLS. In his statement, [CIC] explains in detail the function of each network element used in the TEA model, and why the way in which that element is provisioned pursuant to the engineering rules represents the most efficient approach currently available. It is evident that there is no over-provisioning.

Provisioning of cable (and, indirectly, conduit) is achieved in the TEA model through the use of fill factors that define the maximum provisioning capacity of a cable. Separate "fill factors" are applied to the main network cables and distribution network. The default values for the fill factors are 90% for main cable and 60% for distribution cable. This implies, for example, that when a 100-pair distribution copper cable reaches a point along a conduit route where it is servicing 60 active lines, then another cable must be installed to service additional active lines on the same conduit route. Hence, a lower fill factor will tend to increase the number of cables needed and increase the costs of providing the service and *vice versa*.

As illustrated in the table below, the default fill factor for main cable in the TEA model is higher than international regulatory precedent, which implies that, all other things the same, the TEA model results in a lower cost. The default fill factor for distribution cable is consistent with international regulatory precedent. Attachment 1 contains the sources for this information.

Table 1: Summary of main and distribution cable fill factors

Country	*Regulator*	*Main cable fill factor*	*Distribution cable fill factor*
Australia	TEA model	90%	60%
United States	FCC	65 – 80%	50 – 75%
	State Regulators	70 – 80%	~ 50%
New Zealand	NZCC	80%	40 – 60%
Europe	Various	75 – 80%	65 – 80%

As [CIC] has explained at paragraphs 211-215 of his statement, the fill factor is particularly important in light of Telstra's Universal Service ("**USO**") obligations. It is only by means of an appropriate pre-provisioning that the tight time frames for connection of services and rectification of faulty services can be met. If Telstra were

required to install new cable and equipment for each new customer or to accommodate faulty pairs in cables, the USO timeframes could not be met. In any event, even without USO obligations, the fill factors represent an efficient balance between the need to serve all current end-users and the capacity for demand to change in magnitude and in location.

Pillars are dimensioned below their theoretical maximum capacity to allow for maintenance of faulty terminal units.[20] By way of further explanation, up to 9x100-pair terminal strips can theoretically be installed in a 900-pair pillar. However, if all 9 were installed, maintenance staff would not be able to access the inner circumference of the pillar without removing one of the terminal strips and disconnecting large numbers of customers. To allow access without service disruption, only 8x100-pair terminal strips are installed in a 900-pair pillar. Thus the working capacity of a pillar is 800 pairs, to be shared between the main network and the distribution network. Similarly, only 8x200-pair terminal strips are installed in an 1800-pair pillar, allowing for a working capacity of 1600 pairs. The logic which informs this requirement is set out at paragraphs 244-248 and following of [CIC's] statement.

The TEA model also includes the lead-ins necessary to connect customer premises to the distribution network. The engineering rules relating to lead-ins are described in *Access Network Dimensioning Rules* and in the statement of [CIC].

In previous proceedings, the ACCC has stated that "*lead-in costs are a legitimate expense and that those costs should be recovered*".[21] However, the ACCC went on to conclude that the recovery of the cost of lead-ins should not be via the ULLS monthly charge because Telstra separately levies a once off new service fee ($299 GST inclusive) for connections at premises where a telephone service had not previously been connected at the premises or where the connection requires a technician to visit and undertake cabling work. The ACCC concluded that this new service fee would be sufficient to meet the costs of installing lead-ins.

For a number of reasons, Telstra considers that the cost of lead-ins should be recovered in the ULLS monthly charge on a forward looking basis.

First, the new service connection fee, together with other categories of connection fee, are regulated via the retail price controls and the available evidence is that these fees do not generate sufficient revenue to recover the costs of effecting connection (including lead-in costs, where relevant). For the 2004/05, 2005/06 and 2006/07 years, installation revenue for retail and wholesale end user access under-recovered costs by CIC%, CIC% and CIC%, respectively. Furthermore, over those years, the extent of this under-recovery far outweighs the component of costs specifically associated with installing lead-ins, meaning installation revenue is insufficient to pay for lead-in work after all other costs are accounted for.

Second, as a matter of principle, it is appropriate to recover lead-in costs via the ULLS monthly charge because installing a lead-in results in a piece of telecommunications infrastructure that Telstra owns and is responsible for, and that will provide service

[20] *Access Network Dimensioning Rules*, page 10.
[21] ACCC (2007), ULLS Access dispute between Primus and Telstra (monthly charges), Statement of Reasons for Final Determination, December 2007, (Public Version), paragraph 508.

for a considerable period of time (25 years). The infrastructure character of lead-ins can be readily distinguished from the churn-related character of other costs associated with connection, such as jumpering and customer service, which may have to be repeated when the customer taking service at a particular property changes, or when the customer elects to move from one service provider to another. Of note, a lead-in at a particular property can benefit a succession of customers over the life of the lead-in whereas churn related connection activities bring benefits only to an individual customer.

Third, Telstra has not collected $299 in service fees for every lead-in in band 2, a sum totalling approximately two billion dollars (nor would it be possible for a new entrant building a competitive CAN to collect such a sum from service fees). Consequently, it is unreasonable to eliminate billions of dollars of Telstra's investments from an appropriate recovery mechanism on the premise that those costs have been recovered elsewhere.

For these reasons, both in practice and in principle, the TEA model includes the cost of lead-ins in its estimate of the TSLRIC+ for ULLS.

Do you consider that the manner in which Telstra has optimised the distribution and main cable routes is appropriate to model an efficient and forward-looking model?

The main and distribution conduit routes in the TEA model are efficient, given the real topographical and demographic constraints of connecting customers to the CAN. The TEA model includes only routes necessary to connect network serving structure points to pillars and, when multiple routes are identified, only the route that minimises distance is selected. Likewise in the main network, only routes necessary to connect pillars and main-fed building terminals to the exchange building are identified and selected.

The TEA model adopts the current location of pillars and the existing DA design in the network. This ensures that the network assumed in the TEA model is able to provide the following different forms of ULLS:

- The Full-Loop ULLS – a metallic path from an end-user's premise to the exchange currently used by access seekers; and

- The Sub-Loop ULLS – a metallic path from an end-user's premise to the pillar potentially relied upon by competing proponents for the National Broadband Network (NBN).

If the TEA model did not use the current location of pillars, then the results would not accurately reflect the cost relativities between supplying both types of ULLS (Full-Loop and Sub-Loop). By way of further explanation, if, for example, a party other than Telstra wins the current Government tender for the NBN, they will need to acquire from Telstra Sub-Loop ULLS at all ESAs to which they intend to roll out a fibre to the node (FTTN) network. The prices for Sub-Loop would need to reflect the actual pillar location as the actual pillar location would be the location where the NBN provider will interconnect with Telstra. At the same time, other parties will acquire Full-Loop ULLS from Telstra. If Sub-Loop ULLS pricing is based on actual pillar

placement and Full-Loop ULLS pricing is based on hypothetical pillar placement, then the relative cost of each will be distorted.

B.5 Cost valuation

Do you consider the cost estimates reflect the 'replacement' cost of network assets, that is do they:

- reflect the most efficient technology,
- reflect the competitive market rates for relevant plant and equipment.

The cost estimates from the TEA model reflect the efficient cost of replacing the CAN using forward-looking, best-practice engineering standards and placement procedures and best-in-use equipment. Informed by 35 years of experience in telecommunications network engineering, and with a sound knowledge of current efficient network design practice, [CIC] has explained why the engineering rules reflect current efficient best practice for designing a CAN in band 2 today.

The rates for plant and equipment in the TEA model reflect Telstra's own external contractor rates for the various construction and installation tasks covered by procurement contracts.[22] CIC [redacted]

CIC [redacted]

CIC [redacted]

[22] Statement of [CIC], at paragraph 7.

CIC [redacted]

In all cases the prices included in the *Access Network Modelling Costing Information* and the cost input worksheets of the TEA model represent efficient competitive market prices for the goods and services that they include. Therefore, the TEA model, in using those rates, calculates the current market price of constructing the network as deployed in the model in accordance with the dimensioning rules.

The rates set out the in the CIC [redacted] contracts are highly commercially sensitive. Telstra procures many millions of dollars worth of goods and services pursuant to those contracts annually. Therefore, the averaged prices have not been provided to access seekers, but only to their advisers and to the ACCC, subject to confidentiality undertakings.

A builder of a CAN would also incur overhead directly related to the deployment of the network, which it is appropriate to capitalise. This includes the cost of network planning and supervision. Accordingly, Telstra has quantified those costs and adopted a factor approach to incorporate them in the TEA model. Those costs are based on Telstra's most recent experience in augmenting the CAN. Accordingly, they are efficient, forward-looking costs. The statements of [CIC] and [CIC] detail the process involved in quantifying and calculating the appropriate factor.

The model does not appear to determine the forecasted network cost estimates for each year of the Undertaking. What do you consider would be appropriate price trends for these cost estimates?

Price trends are not an input into the TEA model. In any case, if the ACCC considers that price trends are important for its assessment of Telstra's Undertaking, Telstra refers the ACCC to Australian Bureau of Agricultural Research in Economics (ABARE) statistics. ABARE reports that, as at the end of the December 2007, copper prices were US$7,239 per tonne and forecasts that by the end of June 2009 copper prices will be US$7,275.[23] This reflects a compound average growth rate of 0.33% per annum. See also the discussion above concerning allowances for existing and future demand.

Comment on the appropriateness of the value for the loading factor for indirect overheads.

Telstra incurs indirect overheads on account of planning, management, supervision and logistical support associated with capital works undertaken by third party contractors. The contractor prices for network assets used in the TEA model do not incorporate these overheads. Costs of this kind will also be incurred where the network construction is undertaken by an internal workforce rather than a contractor.

[23] http://www.abareconomics.com/interactive/08ac_june/excel/Statistics.xls, see table 17.

In practice, detailed designs for changes to a telecommunications network need to be undertaken. This needs to take into account the particular requirements of the environment in which the changes are to be made. Detailed design drawings of the layout of the network on a street by street basis need to be provided to the construction contractor before construction work can commence. Once construction work does commence, it is not simply a matter of handing the drawings over to the contractors. There is a need for ongoing management and co-ordination of the works. The construction of a CAN (particularly a complete replacement of the CAN) requires significant management and co-ordination including:

- Identifying the work required and planning how that work can be allocated to contractors (or an internal workforce);
- Communicating the scope and detail of the required work to the contractors (or an internal workforce);
- Managing the commercial aspects of the contract relationship including receiving invoices and processing accounts payable (where work is carried out by the internal workforce the network contractor will need to handle what would otherwise be the contractor's internal accounts payable);
- Verifying that the work is being carried out correctly and at an acceptable standard of quality (for the internal workforce, the constructor would also need to provide direct supervision which would otherwise be the responsibility of the contractor);
- Dealing with queries from contractors (or the internal workforce) in relation to particular aspects of the work or practical difficulties that arise in the carrying out of the work; and,
- Managing the legal aspects of the contractor relationship including potential disputes.

In constructing new CAN deployments Telstra currently incurs costs of these kinds. These costs are ultimately recorded in Telstra's accounts as capital items against the network capital build to which they relate. Hence, these indirect overheads are not accounted for in the O&M or indirect expense factors applied in the TEA Model. Because they are allocated to network capital build, they are not accounted for in the indirect capital or network support factors either.

CIC [redacted]

Once the factor has been determined, it is applied against the efficient, optimised network created by the dimensioning rules. In that way, by application of the capitalisation factor, an efficient amount of overhead is included in costs, rather than adopting an absolute amount taken direct from Telstra's accounts. Telstra, therefore,

considers that the factors determined from the above process and applied against the efficient asset base are appropriate for use in the TEA model and are reasonable.

B.6 Trenching costs

Comment on Telstra's approach of deriving trenching costs. Having regard to the reasonableness criteria under section 152AH, do you consider that trenching costs should take account of the different surfaces (and therefore different construction activities) in estimating the cost of the ULLS? If Telstra were to lay copper today, would it face trenching costs that take account of different surfaces? Provide reasons to support your submissions.

Telstra's approach to deriving trenching costs involves multiplying (i) the competitive contractor rates that Telstra is charged for breakout, placement and reinstatement in different ground surface types (concrete, asphalt, turf etc) by (ii) the length of trenches that requires such activities.

In relation to the contractor rates, the[CIC] contracts specifically provide separate rates for breakout and reinstatement of different ground surfaces (see pages 23 to 29 of *Access Network Modelling Costing Information*). For the reasons explained above, those rates reflect current efficient market rates.

In relation to the lengths of trenches, Telstra uses ratios to determine what proportion of trench length is located in different ground surface types within band 2. The TEA model has five distinct sets of ratios, one for each of five density groups. Every DA in band 2 is assigned one of these sets of ratios based upon the density of the DA. The values for these ratios are discussed in response to the question in the ACCC's *Discussion Paper* below.

Before addressing the statutory criteria, it is important to note that breakout, placement and reinstatement costs would certainly be an unavoidable component of cost if a competitor (or Telstra) were to completely replace a copper access network today. Except in new estates, Telstra would need to breakout or bore under footpaths, driveways, roads and verges to place cable. Additionally, breakout, placement and reinstatement costs for different ground surface types are real costs that are incurred by Telstra and other CAN operators on an ongoing basis. For example, in 2006/07 alone, Telstra's contractors broke out over[CIC] square metres of pavement, bored over[CIC] metres of trench under roads and over[CIC] metres across roads.

Indeed, Telstra's statutory obligations to undertake reinstatement works are clear and numerous. As a general matter, Telstra is obliged by the *Telecommunications Act 1997* (Cth)[24] to "*take all reasonable steps to ensure that* [it] *causes as little detriment and inconvenience, and does as little damage as practicable*" when engaging in much of its facilities installation activity.

There is also a requirement to "*take all reasonable steps to ensure that the land is restored to a condition that is similar to its condition before the* [facilities installation]

[24] *Telecommunications Act* 1997 (Cth), Schedule 3, section 8.

activity began" [25]. This obligation to restore land applies, amongst other activities, to the installation of low-impact facilities, which includes underground conduit or cable.

Legislative instruments such as the *Telecommunications Code of Practice 1997* and the *Telecommunications (Low-impact Facilities) Determination 1997* reinforce the obligations contained in the *Telecommunications Act 1997* (Cth) and impose additional obligations with respect to, amongst other things, reinstatement of land following installation of low impact facilities.

As a practical matter, carriers (including Telstra) seeking to install infrastructure need to obtain local government planning permission and comply with relevant state and territory planning laws. In some cases, a carrier may install a limited range of facilities without seeking planning approval, however, reinstatement obligations still apply.

If a carrier fails to comply with its reinstatement obligations, it is exposed to potential compensation claims and/or court action by affected parties. Claims/legal action may be brought by any person who suffers financial loss or damage because of anything done by a carrier in relation to:

(a) any property owned by the person; or,

(b) any property in which the person has an interest.[26]

The quantum of such compensation may include, without limitation, claims for compensation in relation to damage of a temporary character as well as of a permanent character and the taking of sand, soil, stone, gravel, timber, water and other things[27].[28]

Reinstatement obligations apply to a 'carrier' as defined in the *Telecommunications Act 1997* (Cth). As such, any other CAN builder would be required to fulfil the same obligations as Telstra.

These legislative requirements cannot be disregarded in calculating the efficient cost of constructing a CAN. They exist in the real world and apply to all carriers. Any efficient competitor would face those costs and would have to recover them. It is appropriate that a TSLRIC model embodies them.

Having regard to the statutory criteria, it is also reasonable for trenching costs to take into account different ground surface types for the following reasons.

Competition is promoted when wholesale prices do not discriminate between access seekers and the downstream operations of the access provider.[29] Breakout, placement and reinstatement costs differ depending on the type of ground surface in which

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[25] *Telecommunications Act* 1997 (Cth), Schedule 3, section 9.
[26] *Telecommunications Act* 1997 (Cth), Schedule 3, section 42.
[27] *Telecommunications Act* 1997 (Cth), Schedule 3, section 42(2).
[28] The TEA model does not include any compensation to third parties for not reinstating surfaces. However, if a party changes an input in the TEA model such that it reflects no reinstatement, then they would have to add the cost associated with such compensation.
[29] ACCC (1997), *Access Pricing Principles - Telecommunications, a guide* (July 1997) at pages 15-16, 30.

trenches are laid. This is true irrespective of whether the ultimate end-user purchases from an access seeker or a Telstra retail business unit. Consequently, ULLS prices that reflect such costs do not discriminate. Competition in related markets is also promoted when prices reflect the cost of a new entrant supplying ULLS. This ensures that new entrants face incentives to partake in efficient facilities based competition. As discussed above, breakout, placement and reinstatement activities in different ground surface types result in costs that would be unavoidable for a new entrant (or Telstra) building a CAN today.

To **encourage efficient investment** in CAN infrastructure, it is necessary for actual or potential CAN operators to be able to recover the costs of new investments.[30] In relation to ULLS, this will be achieved if prices reflect the cost of such investments, including the costs of breakout, placement and reinstatement in different ground surface types. As discussed above, these costs are necessarily incurred by a CAN operator when making incremental investments in trenching on an ongoing basis. If ULLS prices do not reflect such investment costs, then they are not TSLRIC+ and those prices will not promote efficient ongoing investment in CAN infrastructure.

To encourage the ***efficient use of infrastructure***, prices must be set so that the value that access seekers place on using that infrastructure is at least as high as the resource cost associated with its provisioning and use over the long run.[31] If ULLS prices do not reflect the resource costs of breakout, placement and reinstatement in different ground surfaces, then those prices will not promote efficient use of CAN infrastructure.

Given that Telstra does face different costs for breakout, placement and reinstatement in different ground surfaces, a cost that reflects these differences will promote **Telstra's legitimate business interests**.

Similarly, **access seekers' interests** are promoted when the ULLS price is set so that access seekers are not discriminated against relative to Telstra's retail business units. Accounting for breakout, placement and reinstatement costs in the ULLS price will not harm access seekers' interests since these costs are part of the efficient costs incurred in building the CAN both for the supply of services to access seekers and Telstra's retail business units.

While the ACCC's question is specific to accounting for the different costs of different ground surfaces, it is notable that the TEA model also accounts for the different costs associated with excavating or boring trenches and with trenching in rock or materials other than rock.[32] For the same reasons as above, accounting for differences in the cost of boring vs. excavation and trenching in rock vs. materials other than rock is reasonable having regard to the statutory criteria.

Comment on the appropriateness of the application of input ratios that identify the percentage of instances of different types of terrain, and probable occurrence of various

[30] ACCC (1997), *Access Pricing Principles - Telecommunications, a guide* (July 1997) at pages 8, 17.
[31] ACCC (1997), *Access Pricing Principles - Telecommunications, a guide* (July 1997) at page 18.
[32] See *Access Network Modelling Costing Information*, page 23.

types of placement activities where a plant is built.

As set out in *TEA Model Documentation* (page 48), the TEA model requires a number of input ratios to be applied to trench lengths. These ratios apply to:

- Breakout, the cost of which depends on whether this activity is carried out in the following ground surfaces:
    - Pavement less than 75mm thick
    - Pavement between 75 and 150mm thick
    - Pavement between 150 and 200mm thick
    - Brick or concrete pavers
- Placement, the costs of which depend on whether this activity involves:
    - Excavating road crossing trenches
    - Excavating other types of trenches
    - Directional boring under nature strips, footpaths and driveways
    - Directional boring under roads
    - Trenches provided by other parties (developers of new estates)
- Reinstatement, the cost of which depends on whether this activity is carried out in the following ground surfaces:
    - Unreinforced concrete (of three different thicknesses)
    - Reinforced concrete (of three different thicknesses)
    - Asphalt (of three different thicknesses)
    - Brick or concrete pavers
    - Turf (grass)
    - Kerbing (guttering)

The placement, breakout and reinstatement ratios used in the TEA model were the product of a series of meetings between numerous subject matter experts. Representatives of Telstra's engineering department and the modelling team conducted several meetings to come to a consensus on the appropriate factors for use in the TEA model. In addition to their extensive knowledge of Telstra's network and service territory, the team relied on the following types of data and analysis to derive the default values in the TEA model. In particular, the team:

- Reviewed numerous network planning maps for typical serving areas that would fall into density classifications used in the TEA model to try to

estimate the types and quantity of different driveways, roads and footpaths the company would encounter when replacing the network;

- Analysed the largest, smallest and average lot size that would be found in each of the density groupings and estimated what proportion of the average lot frontage would be traversed by driveways and footpaths; and,

- Estimated, based on standard block sizes, the proportion of a total cable run that would need to traverse existing streets and roads.

Based on their expert knowledge and the supporting analysis, the team determined the placement factors used in the model.

What should the surface barrier assumption be?

A new entrant replacing (or overbuilding) Telstra's network today would have to negotiate all the streets, footpaths and driveways that traverse the conduit routes. Therefore, the ground surface ratios in the TEA model must reflect the actual ground composition. The ground surface ratios in the TEA model were determined as discussed above.

B.7 Trench sharing

If Telstra were laying the copper today, would Telstra be able to avail itself of the existing conduits laid by gas, electric or water utilities? Are there limitations that Telstra might face in its ability to share with other utilities?

Telstra does share developer-provided trenches with other utilities in green-field new estates. The TEA model accounts for this by excluding the cost of trenching in new estates.

Outside of new estates, if a carrier were installing the copper network today, it would not make any cost savings as a result of sharing with the existing infrastructure of other utilities. This is because the costs of "re-opening" an existing trench owned by a gas, electricity or water utility are the same as digging a new trench.[33]

In any case, the ability to share with other utilities outside of new estates is minimal for four reasons.

First, there is a timing issue. Unless the carrier and the utility are planning to lay their infrastructure at the same time, there is no cost saving. It costs as much to "re-open" an existing trench as to dig a new one.

[33] See the statement of [CIC] at paragraph 18.

Second, there are separation requirements. There are regulatory and safety standards that are designed to ensure the safety of the users of the various networks. These standards may require separation between electricity, gas and telephone cable runs requiring trenches to be wider and/or deeper than standard trenches, negating the benefits of any sharing.

Third, there can only be sharing where the carrier and the utility intend laying infrastructure along the same route.

Finally, there are other difficulties that are unique to particular utilities. For example, the damage that burst water pipes can cause to telecommunications cable means that carriers and water utilities almost never share trenches. In the case of the electricity network, if the voltage carried over an electricity cable sharing a trench or conduit with a telecommunications cable surges or develops a fault, the voltage in the copper cable could become dangerously high and electrocute anyone working on the copper cable. This risk is still present even if the separations mandated by codes and regulations are complied with.

The [CIC] statement explains the practical obstacles involved in trench and conduit sharing.

Is it appropriate to have regard to Telstra's historical trench sharing figures under a forward-looking network?

As a matter of principle, the treatment of trench sharing under a forward looking network model must reflect the cost that would be faced by a new entrant constructing a CAN with the same service potential as Telstra's. The new entrant basis for pricing is well supported by the Tribunal's comments in relation to what constitutes reasonable prices. In the context of the appropriate scale for a mobile network, the Tribunal has stated:[34]

> *The starting point in assessing the submissions on this issue is, as throughout this proceeding, the principle that prices should be based on the forward looking costs of an efficient operator. The basic objective is to set prices that promote economic efficiency, which is the outcome that could be expected in a competitive market. It is because mobile termination has been declared as a service that inherently lacks the discipline of competitive forces that it is subject to Pt XIC of the Act.*
>
> *Of course, the basis of reasonable prices in terms of s 152AH must proceed from the terms of that section, and it is those terms that direct the assessment process towards considerations of efficiency and competitive outcomes.*
>
> *What outcomes would eventuate in a competitive market? In such a market, pricing above the costs that would be incurred by a new entrant having access to the latest and most cost effective technology would invite the entry of such an operator. Regardless of the actual costs, capital equipment and modes of operation of the incumbent operators, competition would force them to price as if they were using the*

[34] Re Vodafone Network Pty Limited Vodafone Australia Limited [2007] ACompT 1 at [68]ff.

latest technology. This would extend beyond the age and type of their capital equipment even to the design of their networks.

The ACCC should interpret this passage from the Tribunal as requiring that a reasonable price is one that would be based on the costs of a new entrant with Telstra's service potential in a competitive market, not the historical costs incurred by an operator. Even if a historical-cost approach to trench sharing was to be considered, then it would be appropriate to dimension all parts of the TEA model (including variables in the model) on a historical-cost basis. The results from a model that is half based on forward-looking costs and half on historical costs is arbitrary, capricious, would make little sense and is certainly not TSLRIC+. However, Telstra acknowledges that the ACCC has argued strongly in the past that historical costs are not consistent with the statutory criteria so even a model based completely on historical costs is not likely to be considered reasonable by the ACCC.

In recent ULLS proceedings, the ACCC has accepted that trench sharing should be treated on a new entrant basis, but argued that a new entrant would not be able to construct the CAN in one period, and hence the TSLRIC should reflect the accumulated cost saving due to trench sharing in new estates over a period of years (presumably the amount of time that it would take a new entrant to build an entire network with Telstra's service potential). The ACCC estimated this accumulated cost saving by having regard to Telstra's historical trench sharing over a 10 year period.

The ACCC considers that the concept of a forward-looking network needs to be related to realities of deployment of the network. The ACCC considers that, in the real world, construction of a network would be planned a significant time in advance with other operators and utilities, and would allow a new entrant to progressively make use of open trenches in new estates at no cost. Accordingly, the best available proxy for trench sharing in new estates is the cumulative (or historical) trench sharing measure.[35]

Against this background, Telstra makes the following points.

First, an approach that assumes a new entrant would progressively roll out its network beginning at the start of the Undertaking period would necessarily mean that that new entrant would leave many users unserved at the start of the Undertaking period and potentially throughout the course of the Undertaking. Such an assumption is inconsistent with the Standard Access Obligations, which require the service provider to supply an active declared service.

Second, an approach that assumes that a new entrant commenced rolling out its network some years ago and finished rolling out its network at the start of the Undertaking period is inconsistent with the notion of a forward looking costing. It is also inconsistent with the Tribunal's interpretation of the statutory criteria quoted above.

If the ACCC considers that such an approach is appropriate on the basis that "*in the real world, construction of a network would be planned a significant time in advance*",

[35] ACCC, ULLS Access dispute between Primus and Telstra (monthly charges), Statement of Reasons for Final Determination, December 2007, (Public Version), paragraph 442.

then the capital, depreciation and other costs over the 'advance' period from when the network began to be built to the time it was finished (start of the Undertaking period) should be accounted for. The TEA model does not include such costs. However, a conservative approximation of such costs is possible using the TEA model. For instance assume that a new entrant would build network only in those newly developed DAs over the ten years prior to beginning supply. The average investment cost (excluding trenching) of developing an entire DA in band 2 is $885.85 per line.[36] The compounded cost of holding $885.85 per line of capital over ten years, ignoring depreciation and the initial investment cost, is $1,935.03 per line.[37] This is greater than the trenching investment costs saved by virtue of being able to share trenches with the developers of those new estates. Consequently, it would be inefficient for a new entrant to build a network over a ten-year period to take advantage of open trenches in new estates.

Third, even if the historical cost approach to the treatment of trench sharing in new estates is adopted, Telstra's historical trench sharing figures will have little or no relevance in informing an appropriate figure to use under a forward looking network. This is because ULLS can only be provided over a full metallic pathway and this is now only available for [redacted]% ([redacted]%) of SIOs being developed in new estates in Band 2 (this translates to approximately [redacted]% of Band 2 SIOs).[38] Since February 2007, Telstra has been servicing new estates according to a New Estates Deployment Standard that is designed to support ADSL services. The practical effect of this is that [redacted]% of SIOs developed in new estates in Band 2 are estimated to be provisioned at least in part by fibre, and therefore cannot be included for the purposes of a ULLS TSLRIC+ estimate. The approach based on cumulative historical trench sharing is, therefore, wholly inappropriate. Indeed, even if it is assumed that the [redacted]% per year of Band 2 SIOs that will be developed in new estates and served by a full copper path will stay at the same level for ten years (the period of time that the ACCC has previously used in its proxy calculation) then this would add up to only [redacted]% of Band 2 SIOs – less than half the 1% allowed for trench sharing in new estates in the TEA model. Thus, even assuming ten years of trench sharing in new estates on a forward looking basis, there is less than 1% sharing over the course of the ten years.

Fourth, the TEA Model includes the efficiencies of scope and scale in estimating the cost of ULLS. If the ACCC were to estimate the cost of a provider beginning with a small market share and building share over a decade or more, these economies would not be achievable. Besides, putting aside the appropriateness of such an approach, a study measuring the impact on cost of beginning with a small market share and building share over time involves far more complexity than simply changing the percentage of lines placed in developer provided trenches.

Taken together, these points demonstrate that the ACCC should not have regard to historical trench sharing figures under a forward-looking network. In principle, such an approach would be inconsistent with the available guidance from the Tribunal in relation to using a new entrant base for pricing and, in practice, would be wholly inappropriate given that only a negligible proportion of SIOs in new estates are now provisioned with a full copper path.

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[36] This is calculated by taking the Total Distribution Investment in the Investment Summary worksheet of the Calc Module, after setting trench sharing in new estates to 100%.
[37] $1,935.03 = $885.85 x (1+12.28%)^10 years - $885.85.
[38] Statement of [redacted] at Annexure [redacted]-4

The new estates trench sharing input in the TEA model is based on the proportion of trenches that would be open to a new entrant and able to be shared with the developers of those new estates in the first year of the Undertaking, as a proxy for what would be available to a new entrant, not on the basis of historical costs. Indeed, the proportion used (1.0%) yields a very conservative TSLRIC estimate given that the actual proportion was only [CIC] % in band 2 in 2006/07,[39] and that the proportion that will be provisioned with copper going forward will be an order of magnitude lower ([CIC] %).

The TEA model adopts a forward-looking approach that tends to understate costs and is, therefore, reasonable. Adopting a historical cost approach to estimating the extent of trench sharing in new estates would not be consistent with the statutory criteria and with TSLRIC+.

Has Telstra taken account of all trench sharing activities in the copper network? Comment on the trench sharing default parameter values. Are these appropriate values?

Consistent with the forward-looking TSLRIC+ methodology, the TEA model takes into account any costs that can be avoided in construction of the CAN by accounting for the sharing of trench and conduit costs with other parties. The different forms of trench and conduit sharing accounted for in the TEA model are as follows:

- Trench costs are shared between the CAN and the inter-exchange network (IEN);
- Main cable trench costs are shared between ULLS (copper-fed) and non-ULLS (fibre-fed) services;
- Trench costs are shared between Telstra and parties who lease conduit space in Telstra's network;
- Trench costs are shared with developers of new estates; and,
- Trench sharing in the distribution network.

These forms of sharing are discussed in further detail below.

Trench sharing between CAN and IEN

Telstra's IEN network, which connects all exchanges together, traverses each ESA. Typically, each exchange building is connected to the IEN with two routes to provide redundancy. Segments of the IEN can make use of the same trenches as are used by segments of the CAN. Hence, there is the potential for the CAN and IEN cables and conduits to share the same trenches and for savings to be made as a result in the costs of trenching for construction of both the CAN and IEN. When estimating the

[39] Statement of [CIC] at paragraph 1 and 4 of Annexure [CIC]-4

degree to which this sharing is possible, one must account for the fact that only two IEN routes traverse each ESA. The potential for sharing is, consequently, somewhat limited.

Both the CAN and IEN are part of the same PSTN network and would, therefore, be expected to be built together for the purposes of an efficient, forward looking cost model. Consequently, Telstra determines the amount of sharing that takes place between the CAN and the IEN and allocates the cost of that shared trenching between the CAN and the IEN. It is assumed that 10% of trenches and conduit in the main network are shared by main and IEN cables. Telstra expects that this estimate overstates the actual extent of trench sharing and is an example of how the TEA model understates costs. For those lengths of trenches that are shared, Telstra allocates 50% of shared trench costs to the CAN and 50% to the IEN. The TEA model subtracts the proportion of trench and conduit costs allocated to the IEN from the costing of the CAN. Consequently, the default value of the input into the TEA model to account for IEN/main sharing is 5% (50% of 10%).[40]

This approach is different to the way IEN/main trench sharing has been discussed in the past. Previously the IEN/main trench sharing variable represented the proportion of trenches that were shared not the proportion of cost allocated to IEN. This might cause some confusion in this process and so Telstra intends to change the TEA model in the next release to make the approach consistent with past practice.

Main cable trench sharing between ULLS and non-ULLS DAs

DAs that are not fed by copper in Telstra's current CAN (and are instead fed by fibre) are not included in the costing of ULLS as calculated by the TEA model.[41] This is because fibre cannot support ULLS as defined in the current service declaration which provides that ULLS is "*the use of unconditioned communications wire*", where "*communications wire is a copper based wire forming part of a public switched telephone network*". However, in some cases, the fibre main cables that feed the non-ULLS DAs share the same main trench as the copper main cables that feed ULLS DAs.

As described in paragraph 144 of the *TEA Model Documentation*, to account for this sharing the TEA model estimates the costs of the entire Main Network for each Exchange, including both fibre routes and copper routes. These total costs are then divided by all CAN lines in each exchange to develop an average Main Network cost per line.

This approach assures that the cost of the main cable network are shared proportionately by all DAs in each ESA, irrespective of whether they are fibre fed or copper fed. A consequence of this approach to sharing main network costs is that a small proportion of optical fibre, multiplexing and fibre termination costs are allocated to ULLS. Conversely, some amount of copper ULLS main network costs are spread over the fibre-only fed DAs. This is expected to offset the effect of some part of the fibre costs being shared. The important consideration is that the costs of

[40] The process by which CAN and IEN trench sharing is implemented is discussed in section D.1.2 of TEA Model: Model Documentation. The relevant calculations are carried out in cells P209:S217 in the Cost Calculator-Main worksheet.
[41] Some DAs are fed by both copper and fibre. Those DAs are included in the ULLS costing.

trenching, conduit and placement for the Main Network are shared equitably amongst all CAN lines in the ESA.

Trench sharing between Telstra and third parties

Other service providers are able to, and do, lease conduit space throughout Telstra's CAN and IEN. Accompanying this submission is a statement by [CIC], which describes the extent and limitations of this type of sharing. Telstra's policy is to lease conduit space whenever it is requested, providing sufficient conduit capacity is available.[42]

The TEA model subtracts from the annualised CAN cost the annual revenue received by Telstra from service providers for leased conduit space. Telstra does not record whether the leased conduit space is in trenches reserved for the IEN, the CAN or shared between them. Telstra's records also do not specify the band in which the leased conduit is located. Hence, Telstra allocates the leased revenue between the bands. Only those revenues allocated to the band 2 CAN are deducted from the cost of ULLS band 2 lines.

The total gross revenue received by Telstra in the 2006/07 year for conduit leasing was $[CIC].[43] This figure includes all conduit lease revenue received by Telstra from service providers. [CIC]

Sharing the cost of trenches with developers of new estates

When provisioning some new estates, the property developer incurs (or shares with the network provider a proportion of) the costs of trenching to install conduit up to the property boundary.[44]

For greenfield estate developments the developer will usually provide a trench for services parallel to the footpath at the developer's expense. Telstra's contractors will install conduits in the trenches and will also install pits as necessary. Starter pipes will be installed from the conduit to each property boundary which will allow for the lead in conduit to be connected once construction of the house is complete.[45]

Telstra tries to maximise its use of shared trenches in new estates in order to save costs. Typically it is able to install most of its conduit in the common trench. There is no standard requirement for the placement of the starter pipe at the property boundary and so this will be located at a position that allows maximum use of the

[42] Statement of [CIC] at paragraphs 11-18.
[43] Statement of [CIC] at paragraph 26.
[44] Statement of [CIC] at paragraphs 35-38.
[45] Statement of [CIC] at paragraph 41.

common trench. However, where Telstra uses a developer's trench, there will still be, in most cases, some trenching required from the common trench to the boundary of the end-user's premises.[46] Telstra has conservatively not included these costs in the model.

The TEA model accounts for any cost sharing with developers of new estates by including only the costs of placing conduit in an open trench and hauling cable through the conduit for CAN lines in new estates. Telstra does not include the costs of trenching or breakout and reinstatement costs. The proportion of distribution conduit lengths in new estates is a variable in the model.

The Telstra CAN has been extended to pass the following number of lots in new estates in 2006/07:[47]

Total number of SIOs in band 2 (a)	[CIC]
Total number of SIOs in new estates in all bands (b)	[CIC]
Percentage of new estates that are in band 2 (c)	[CIC]%
Number of new estates SIOs that are in Band 2 (d = b x c)	[CIC]
Percentage of new estates SIOs that are located at least 1.5 km from the exchange (and therefore serviced with fibre) (e)	[CIC]
Number of new estates SIOs that are in Band 2 and at least 1.5 km from the exchange (and therefore serviced with fibre) (f = d x e)	[CIC]
Number of new estates SIOs that are in Band 2 and less than 1.5 km from the exchange (and therefore serviced entirely by copper) (g = d - f)	[CIC]
Percentage of all SIOs in Band 2 that are in new estates and serviced entirely by copper (h = g / a)	[CIC]%

Telstra has conservatively adopted a figure of 1%, which overstates the amount of trench sharing in new estates in band 2 and understates cost.

Accompanying this response is the statement of [CIC] which sets out the extent to which Telstra shares, and is capable of sharing, trenches with other utilities. In order for a telecommunications provider to share its trenches with a utility company (such as water, sewerage, gas, or electricity) it is necessary, not only that they require a trench on a common alignment[48], but also that the trench is open and available to both parties at the time of their respective construction work.[49] In a forward looking sense, the deployment of a utility's network would only occur simultaneously (in time and place) with the deployment of a CAN in the case of new housing estate developments. Any savings derived from sharing trenches with other utilities are, therefore, captured in the deduction made for sharing in new estates.

Outside of new estates, the network build requirements of other utilities are wholly exogenous and independent of the actions of Telstra. For the purposes of estimating the forward-looking cost of the CAN, a network builder must take the real world 'as it comes' and not assume that other companies would rebuild their own networks to

[46] Statement of [CIC] at paragraph 41.
[47] Figures taken from Confidential Annexure A to the statement of [CIC].
[48] Statement of [CIC], at paragraphs 18-21.
[49] Statement of [CIC], at paragraphs 7-9.

maximise sharing opportunities. In practice, the opportunities for trench sharing with other utilities are made impractical by considerations such as:

- The necessity to comply with the separation requirements between telecommunications and other utilities' infrastructure which may negate any cost saving or make such sharing practically impossible;[50]

- The health and safety issues resulting from sharing trenches between the CAN and gas/electricity supplies; [51] and,

- The risk of damage to the CAN that may be caused by trench sharing with other utilities.[52]

Consequently, outside of new estates, there is no opportunity for a network builder to share trenches with utility companies.

Trench sharing in the distribution network

Telstra has calculated a 6.1% factor to account for the sharing of trenching between the least distance cable routes provisioned by the TEA model. This factor represents a precise measurement of trench sharing in the CAN designed by the TEA model. In the TEA model's network design, the primary trench sharing is between Main cable routes and Distribution cable routes. However, a small amount of trenching is also shared between separate Distribution cable routes serving neighbouring DAs.

In calculating the amount of trench sharing inherent in the TEA model, Telstra examined every route segment, which the TEA model selected in its design of least distance cable routing, to determine whether the segment was used in more than one route. The length of each segment shared by more than one route was recorded and the total cumulative length of all shared trenching was tabulated. If more than two routes shared any segment, the length of that segment was counted multiple times (that is, [number of routes sharing segment – 1] X segment length). The cumulative length of all shared segments was divided by the total length of all distribution routes calculated by the TEA model to derive the sharing factor of 6.1%.

Telstra has added the 6.1% trench sharing factor to the 1% of trenching provided by developers of new estates to derive a total estimate of the amount of cable and conduit placed in open trenches of 7.1%. It is assumed that no excavation or reinstatement is necessary when placing facilities in these circumstances, because the trench was excavated and reinstated either by the developer of a new estate or in order to place facilities for the route with which the trench is shared.

B.8 Operations and maintenance and indirect cost factors

The RAF does not distinguish between costs across Bands. The RAF also provides revenue and cost data for a range of Telstra's networks (fixed and mobiles). As the Undertaking is for only

[50] Statement of [CIC], at paragraphs 2-17.
[51] Statement of [CIC], at paragraphs 21, 67, 70, 72.
[52] Statement of [CIC], at paragraphs 23-24, 27, 68.

Band 2 and relates only to the CAN, is the approach used by Telstra to estimate costs using the total value of all the services in the RAF reasonable?

The O&M and indirect cost factors in the TEA model are derived from Telstra's RAF, which is based on national costs and takes into account all the services that Telstra supplies. Telstra considers that this is reasonable and appropriate for the following reasons.

First, while the RAF does not distinguish between bands, the O&M expenses derived in the TEA model are likely to reflect differences in the actual O&M expenses between different geographic areas. This is because the TEA model applies the O&M factors to the direct investment cost. Therefore, a greater amount of O&M expense will be allocated to geographic areas where direct investment is higher (for example, regional and rural areas).

Second, the O&M and indirect factors used in the TEA model reflect economies of scope (and scale) associated with supplying many different networks (including customer access, inter-exchange and transmission networks). As shown in *Operations and Maintenance and Indirect Cost Factor Study*, the O&M factors, for example, are calculated by dividing O&M expenses associated with different asset categories (and networks) by the direct capital associated with the same categories. If the TSLRIC of the CAN was costed on a standalone basis, it could be expected that the O&M expenses and O&M factors would be significantly higher than those used in the TEA model.

Third, the O&M factors derived, if applied across services in different geographic areas consistently, ensure that there is no double counting or undercounting of O&M expenses in different cost models. If different O&M factors were applied to different geographic areas, one would have to ensure that the basis for deriving differences between geographic areas was the same as the basis for deriving differences between direct investment costs between geographic areas. This is difficult when, for example, ULLS assets are defined by ULLS bands, switching is defined by a different set of calling bands and transmission assets traverse many geographic bands.

Telstra notes that the ACCC applies national O&M factors in many of the cost models it uses:

- The NERA model;
- The PIE II model;
- The MTAS model developed by WIK; and,
- The Transmission model developed by Gibson Quai.

Do you consider that the O&M costs for the distribution and main network should include only those costs associated with the copper network (that is, properly exclude provision of the service on the fibre network)?

The meaning of this question is unclear. It is interpreted as asking whether the O&M factors should be applied to the Optical Fibre Cables and Multiplexing Systems asset

categories in the TEA model, and the resulting amounts should be included in the estimate of the monthly cost.

As discussed above, the average investment cost of the main network is calculated by dividing the investment cost for copper and fibre main network routes by the total CAN lines in each ESA. An outcome of this approach is that some fibre main network investment costs are allocated to ULLS lines and some ULLS main network investment costs are allocated to fibre-fed lines.

The O&M factors are applied to the fibre investment costs allocated to ULLS lines. This is a pragmatic and reasonable approach as it is consistent with the calculation of the O&M factors, which are based on all services provided by Telstra (including fibre-based services). If this O&M amount was to be excluded from the TEA model, then the O&M on ULLS investments that is allocated to fibre-fed DAs would need to be included.

Comment on Telstra's approach to calculating O&M expense and indirect cost factors. In particular, provide views on Telstra's approach to using:

- the total sum of the cost to all RAF products;
- the total sum of all directly attributable, attributable and non-attributable costs for all these products;
- the total sum of the cost to Internal and External Wholesale Businesses.

In determining the O&M and indirect factors, it is appropriate for Telstra to use the total sum of the cost to all RAF products and to both internal and external wholesale businesses. If different O&M factors were developed for internal as opposed to external businesses, then different prices would result for the same underlying services provided to access seekers and Telstra retail business units.

It is appropriate to include directly attributable, attributable and non-attributable costs. The distinction between these categories is based on whether an explicit activity-based accounting metric exists for the allocation of these costs to different services. The distinction is not based on whether or not the costs are related to or incurred as a result of the supply of a service. In particular,

- Directly attributable costs are those costs which have a one-to-one relationship with services.
- Attributable costs are those costs which are part of a pool of costs common to a set of different services and are identifiable to a particular service via a verifiable cause-and-effect relationship. That is, a metric, typically usage, can be used to attribute the common costs between services.
- Non-attributable costs are those costs which are part of a pool of common costs, but are not identifiable to any particular service within that common pool through a verifiable cause-and-effect relationship. Thus,

non-attributable costs might be incurred directly as a result of the supply of a service, but no verifiable metric exists to attribute the common costs between services that require the common costs to be incurred. An example of this type of cost is the cost of the CEO and legal costs.

Thus, O&M and indirect factors should be calculated on the basis of the sum of directly attributable, attributable and non-attributable costs.

Comment on whether Telstra should be using historical or current costs in factor cost estimates. Comment on whether the historical O&M and indirect costs used to calculate factor percentages reflect efficient costs. Are Telstra's historic cost estimates for the ULLS reasonable? In discussing this issue, interested parties are asked to address their comments in accordance with the relevant statutory criteria.

It is appropriate to use the historic cost accounts to calculate factors. The treatment of O&M and indirect costs in the TEA model should be consistent with the treatment of assets. Assets in the TEA model have long lives and depreciate accordingly. Over the life of assets, O&M and indirect costs related to each asset category can be expected to change (for example O&M might increase as an asset deteriorates). Telstra accounts for this by using O&M and indirect cost factors calculated from the historical cost accounts that reflect the average age of assets. It would be inappropriate to calculate O&M and indirect cost factors on the assumption that all assets are brand new in every year of the relevant assets' lives as this would disregard the increase in O&M and indirect costs that can be expected over those lives and understate costs.

Are the categories used to calculate O&M and indirect cost factors appropriate?

The categories used to calculate O&M factors are appropriate for the current purpose as they reflect a sound grouping of assets in the network and are consistent with the asset categories in the TEA model and the RAF. For instance, for ULLS, the asset categories used in the TEA model correspond to the RAF asset categories as follows.

TEA Asset Category	**RAF Asset Category**
CAN ducts and pipes	CAN ducts and pipes
CAN copper cables	CAN copper cables
Multiplexing systems	CAN pair gain systems
Optical fibre cables	Inter-exchange cables

Multiplexing systems in the TEA model most closely correspond to pair gain systems in the RAF. Optical fibre cables in the TEA model correspond to Inter-exchange cables in the RAF as Telstra's inter-exchange cables are fibre optic. The RAF does not have a separate asset category for fibre optic cable in the CAN.

The RAF asset categories used to calculate indirect factors do not include any communications plant and equipment. Consequently, they are appropriate.

Are the adjustments applied to the O&M and indirect costs appropriate? For instance, is the forward-looking adjustment for Investment Costs in Ducts and Pipes and Copper Cables appropriate?

The adjustments applied to the O&M and indirect factors are appropriate and explained in *Operations and Maintenance and Indirect Cost Factor Study*. The forward-looking adjustment for investment costs in ducts and pipes and copper cables is required since Telstra's historic cost of these assets is less than the TSLRIC of those assets. Therefore, if the adjustment is not made, O&M costs would be overstated in the TEA model.

The reason that Telstra's historic cost is less than TSLRIC for some assets is because Telstra's historic cost accounts exclude any assets that are beyond their accounting lives but still in use. For example, the earliest record of assets in the 2005/06 historic cost accounts were:

- CIC for main cable
- CIC for main cable ducts and pipes
- CIC for distribution cable
- CIC for distribution cable ducts and pipes

Any assets purchased prior to these dates but still in use are not included in Telstra's historic cost accounts.

Do you consider that Telstra is more efficient under a TEA model design where the level of O&M expenses calculated in the TEA model is approximately 10 per cent below Telstra's actual O&M expenses allocated to ULLS in the RAF?

To ensure the statutory criteria are met, Telstra must recover its efficiently-incurred costs (including operations, maintenance and indirect costs) over the long run. Since the TEA model levelises costs over the lifetime of relevant assets, the appropriate O&M and indirect factors are those which reflect those costs over the assets' lives. It is expected that O&M would increase over the relevant assets' lives as those assets deteriorate. Hence, for example, the O&M factor applied to Distribution Ducts and Pipes should reflect the average efficiently-incurred O&M expenses that would be incurred over CIC years (being the asset life of ducts and pipes).

Telstra has calculated the O&M and indirect factors from the 2005/06 RAF accounts. Thus, the factors reflect O&M and indirect costs at a point throughout the assets lives.

B.9 Cost of capital

Having regard to the regulatory criteria in section 152AH of the Act, is Telstra's range of WACC values appropriate and should the upper value of that range be extended by more than the lower value? Are the costs of under-estimating the WACC greater than those of over-estimating the WACC (i.e. are there any asymmetric costs)? Provide evidence, where possible, to support your submission.

As with many variables, there is a range of values that are reasonable in the context of the legislative criteria. The Tribunal has commented on how to assess an Undertaking that depends on a value for which parties have different views:

> *In considering whether Telstra's estimates of its costs are reasonable we are not driven to considering whether the Commission's or other party's views or assessment of those costs are more reasonable. Nor do we enquire whether Telstra's method or approach in estimating its costs is the correct or appropriate approach. If Telstra's method or approach in estimating its costs is reasonable having regard to the statutory matters set out in ss 152AH and 152AB then the matter rests…put shortly, our enquiry is whether the method employed by Telstra at each level of determining the costs of its LSS is reasonable having regard to the statutory matters identified in s 152AH and the objectives set out in s 152AB.*[53]

This is very relevant for the assessment of the WACC used in the TEA model. As discussed in Telstra's submission entitled *Weighted Average Cost of Capital*, there are a range of reasonable values for the WACC. The range is driven by, among other things:

- The fact that many of the inputs into the calculation of the WACC are unobservable in practice and, therefore, subject to judgement.

- That there is uncertainty in the economic and finance literature as to whether the CAPM model, used commonly in regulatory proceedings such as this, takes too narrow a view of the complexities of financial markets and inaccurately calculates a firm's cost of equity.

Telstra has calculated a range of WACC values that reflects the uncertainty in the inputs into the calculation of WACC. Any value less than the upper value of this range and more than the lower value of the range should be considered as within the range of probability and, therefore, considered reasonable for the purposes of assessing Telstra's Undertaking. The upper value of the range of reasonable WACC values is 13.91%.

The TEA model does not apply the upper value. Instead, it takes a point estimate from within the range of reasonable values for the WACC, which reflects Telstra's best estimate of each of the inputs into the WACC calculation. Telstra submits that the point estimate value that should be included in the TEA model is 12.28%. This point estimate is reasonable as it lies below the upper value of the range of reasonable WACCs and above the lower value of the range.

The expert report of Professor Bowman, accompanying this submission, confirms that the WACC values derived by Telstra are reasonable, however, he concludes that the range of reasonable values is likely to be wider.

The ACCC queries whether the upper value of the range of reasonable WACC values should be extended from the point estimate by more than the lower value. The upper value of the range would be extended from the point estimate by the same amount as the lower value if the point estimate was based on the simple average of the upper

[53] Re Telstra Corporation Limited [2006] ACompT 4 (2 June 2006) at [62]-[64]. See also Re Optus Mobile Pty Limited and Optus Networks Pty Limited [2006] ACompT 8 (22 November 2006) at [108].

and lower values for each WACC parameter. The reason why this is not the case is because, in determining the point estimate, Telstra relies on WACC parameters that are observable, rather than simple averages of the upper and lower values of the WACC parameters. For example, the upper and lower values for the market risk premium are 8% and 5.5%, respectively. The simple average of this range is 6.75%. However, the parameter value used for the point estimate of the WACC (7%) reflects the weight of evidence on the market risk premium not the simple average of the high and low points.

The ACCC also queries whether there are asymmetric consequences to setting a WACC that is too high against setting it too low. The social losses from setting a WACC that is too low (for example, the delayed investment in fibre network to replace copper, delayed introduction of new services such as high-speed FTTN data and video calling etc) far outweigh the deadweight loss associated with setting the WACC too high. Telstra has made many submissions on this.[54]

In any case, while Telstra considers that this is an important consideration in the selection of the WACC from a range of reasonable alternatives, Telstra has chosen a WACC value that is based on the best available evidence of a point estimate of the WACC without considering the asymmetric consequences of that selection. This adds to the conservative nature of Telstra's estimate of CAN costs.

How should the WACC inputs be calculated? Provide evidence, where possible, to support your submission.

A reasonable approach to calculating the WACC inputs is set out in Telstra's report *Weighted Average Cost of Capital*. That approach and its outcome has been endorsed by Professor Bowman.

Advise whether you consider Telstra preferred WACC parameter values are appropriate. Provide evidence to support your submission.

Telstra's evidence to support the reasonableness of the WACC parameters is contained in *Weighted Average Cost of Capital*. This evidence is supported by the expert report of Professor Bowman.

Are there any other issues concerning the appropriate WACC, which the ACCC should consider?

The ACCC should consider the effect that applying too low a WACC has on incentives for Telstra (or a new entrant) to invest in the CAN and/or new technologies and

[54] Telstra Corporation Limited ULLS undertaking weighted average cost of capital ("WACC") submission, dated 4 April 2008; Report on the appropriate weighted average cost of capital for the services provided over the CAN, prepared for Telstra, Robert G Bowman dated May 2007; Report on the appropriate weighted cost of capital for ULLS and LSS (public version) prepared for Telstra by Robert G Bowman, dated December 2005; Telstra's submission in support of the ULLS monthly charges undertaking, dated 23 December 2005; Report on the appropriate weighted average cost of capital for the ULLS network (public version) prepared for Telstra by Robert G Bowman, dated December 2005.

services. The fact that there has been no investment in FTTN infrastructure or by cable companies such as Optus under the ACCC's WACC is a stark illustration that the ACCC's past setting of the WACC has restricted investment in the CAN and competing facilities-based networks. Telstra encourages the ACCC to reconsider its previous parameters for the WACC and keep in mind that it needs to allow prices in the market that promote dynamic efficiency by encouraging investment and the introduction of new technologies and services.

B.10 Calculating annualised and unitised ULLS costs

Is Telstra's method of calculating annualising and unitising network costs appropriate? Provide reasoning to support your submission.

The approach to annualisation and unitisation adopted in the TEA model is set out in section D of *TEA Model Documentation*. Telstra adopts a building block approach to calculating annualised capital costs. The building block approach involves applying a straight line depreciation profile to determine the return of capital in each year and applying a standard WACC to determine the return on capital.

The TEA model levelises the annual costs derived from the building block approach over the life of the relevant assets. This eliminates any variability in the total annual costs over time. It ensures cost recovery, not just over the Undertaking period, but over the long run.

The TEA model unitises costs over the current number of all active lines. This is a conservative approach as there is forecast to be a [CIC redacted] in the number of active lines every year over the period of the Undertaking. Given that a large proportion of the costs of the CAN are fixed, a decline in active lines will result in higher unit costs.

Is assuming end of year cash flows an appropriate assumption? Provide reasoning to support your submission.

Prior to lodging the TEA model Telstra shared the annualisation methodology with the ACCC. That methodology was based on averaging the end of year and beginning of year cashflows. The ACCC correctly advised that such an approach would not result in a present value (PV) of costs equal to the original investment cost. To solve for this, Telstra altered the methodology to apply an end of year approach to calculating cashflows consistent with the examples that the ACCC provided to Telstra.

In any case, Telstra's approach to calculating the capital costs is reasonable, as this approach results in the present value of the annualised capital costs (properly excluding tax expenses) equalling the initial investment cost. Hence, there is no over or under recovery of investment cost.

B.11 Depreciation

Comment on the appropriateness of Telstra's default depreciation schedule. Do the values appropriately reflect the expected decline in the economic value of the underlying assets? Provide evidence where possible, with reference to the reasonableness criteria set out in

section 152AH of the Act.

A price based on a depreciation profile that is a close approximation to economic depreciation promotes competition, encourages economically efficient investment in infrastructure and encourages economically efficient use of infrastructure. While economic depreciation is difficult to measure, a number of factors (set out in section 4.3.1 of the expert report of Henry Ergas) indicate that economic depreciation is front-loaded (that is, depreciation is higher in early years relative to later years).

Acknowledging the difficulty in measuring economic depreciation, straight-line depreciation should be considered as reasonable with respect to the statutory criteria for the following reasons.

First, straight line depreciation is a common (if not universal) method of depreciation adopted by telecommunications firms in Australia.

Second, the ACCC considers straight-line depreciation appropriate in other industries (for example, aviation, electricity, gas, rail or water industries) for assets that are similar in nature to Telstra's ducts and pipes and copper cables. Attachment 2 surveys the ACCC's approaches to depreciation in other industries.

Third, the ACCC's economics advisors commented in 1999 that:[55]

> *"Straight line depreciation is a reasonable proxy for assets where there is little technological change (eg trenches, accommodation and copper cable; sum of digits depreciation is a reasonable proxy for assets where there is significant technological change (eg switches, line cards, transmission electronics, optic fibre).*

Fourth, Mr Ergas concludes in his expert report accompanying this document that straight line depreciation is a reasonable approach and consistent with the legislative criteria.[56]

Fifth, the Australian Government adjusted the method of calculating depreciation for tax purposes closer to economic depreciation by allowing firms to front-load their depreciation profiles. The Government stated:[57]

> *"The Government will increase the diminishing value rate from 150 per cent to 200 per cent for depreciating assets. The new rate will apply to eligible assets acquired on or after 10 May 2006, regardless of the asset's effective life.*
>
> *This measure provides a direct benefit to Australian businesses of $3.7 billion over the next four years. Importantly, it ensures that Australian businesses have the right incentive to undertake investment in new plant and equipment that is necessary for them to keep pace with new technology and remain competitive. It will also improve resource allocation by aligning depreciation deductions for tax purposes more closely with the actual decline in the economic value of assets.*

[55] NERA (1999), *Estimating the Long Run Incremental Cost of PSTN Access: Final Report for ACCC*, January 1999, at page 12.
[56] Report of Henry Ergas, section 4.3.1.
[57] The Honourable Peter Costello MP, *Continuing Tax Reform*, 9 May 2006, pages 30-31.

> *"The diminishing value method is intended to approximate the actual decline in value of an asset and the true cost to taxpayers of the asset as an input cost. Where depreciation deductions are less than this actual cost, taxpayers may hold assets longer than necessary to maximise the tax benefit from their investment. As a consequence, the rate of change of the increase in capital stock will be lower than it would otherwise be without the tax-induced distortion. This has a negative impact on productivity and economic growth.*
>
> *Where possible, all forms of investment should be taxed neutrally so that the tax system does not divert investment away from the most productive assets. If the tax system biases investment decisions, this will lead to an inefficient allocation of resources and impede productivity and economic growth.*
>
> *Ensuring, as far as possible, that depreciation for tax purposes aligns with the way assets actually decline in value ensures the tax system is neutral with respect to investment incentives.*
>
> *The measure will provide a substantial benefit to both individuals and businesses. It will encourage additional and more efficient investment in all eligible plant and equipment, which will strengthen prospects for economic and employment growth through capital deepening and improved resource allocation.*

Sixth, straight line depreciation also has the significant benefit that it is objective and verifiable. It does not rely on forecasts and predictions like other methods (for example, the tilted annuity method), which may not be fulfilled and could result in an under or over recovery of cost. Applying the tilted annuity to main network ducts and pipes, for example, would require forecasting copper price trends for the next 40 years, being the life of such assets.

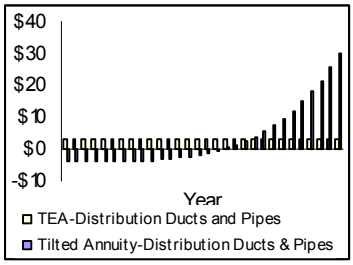
The TEA model applies a straight line depreciation profile to calculate depreciation costs. All costs are then levelised to produce an average ULLS cost that is constant over time.

In the past a tilted annuity has been used to depreciate CAN assets. Tilted annuities applied to CAN assets have the effect of substantially back-loading depreciation into later years of the assets' lives, beyond what results from the TEA model's application of straight-line depreciation and levelisation. A tilted annuity is unreasonable as it is a poor proxy for economic depreciation. Below is an illustration of the straight line depreciation profiles for four major asset categories in the TEA model. These assets make up 89% of the total investment cost in the TEA model. They are compared to the depreciation profiles that are derived from the tilted annuity as applied most recently in the ACCC's ULLS pricing principles.[58]

[58] ACCC (2008), *Unconditioned Local Loop Service: Pricing Principles and Indicative Prices*, June 2008.

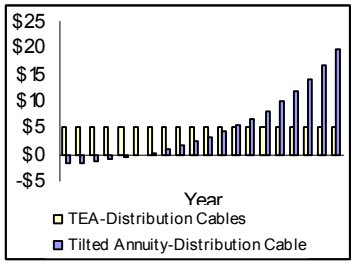
Figure 1: Deprecation profiles used in TEA and the tilted annuity

(a) Distribution Ducts and Pipes



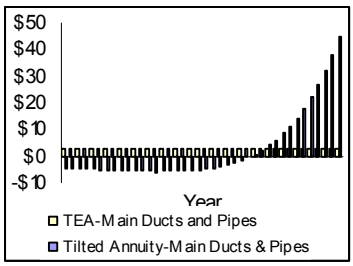
Asset price trend: +5.11%

(b) Distribution Cables



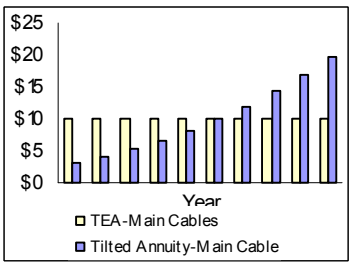
Asset price trend: +4.13%

(c) Main Ducts and Pipes



Asset price trend: +5.02%

(d) Main Cables



Asset price trend: +4.46%

The obvious characteristic in the figures above is that the tilted annuity profiles substantially backload depreciation into later years relative to straight line depreciation. In all cases except Main Cables, depreciation is so back-loaded under a tilted annuity, that there is a negative depreciation expense (income) accrued by the CAN owner in the first several years of the asset's life. A tilted annuity is particularly questionable where, as here, it seems likely that Telstra will lose customers in the future and have lower revenues from the CAN to pay any depreciation charges back-loaded into the future.

Telstra provides the expert report of Henry Ergas that shows that accepted economic theory would not reasonably lead to the use of a tilted annuity to calculate depreciation in the way that the ACCC has done in the past (Section 4.4 of Mr Ergas' report).

For these reasons, previous practices that involve using a tilted annuity are unreasonable.

B.12 Reasonableness of the non-price terms and conditions

Do you consider that these non-price terms and conditions ensure access seekers have the ability to reasonably access the ULLS? Provide reasoning to support your submission.

The non-price terms and conditions contained in the Undertaking allow reasonable access to the ULLS for access seekers.

Telstra notes that there is no requirement under the Act that non-price terms and conditions *ensure* access seekers have the ability to reasonably access the ULLS.[59] Rather, the criteria require that the non-price terms and conditions are consistent with the SAOs and are reasonable. Telstra has addressed consistency with the SAOs above and the discussion below addresses the reasonableness of the non-price terms and conditions.

Are non-price terms and conditions contained in the Undertaking consistent with the reasonableness criteria set out in section 152AH of the Act? Provide reasoning to support your submission.

The non-price terms and conditions contained in the Undertaking have also been included in previous ULLS undertakings submitted by Telstra,[60] for example, the December 2004 ULLS Undertaking ("2004 Undertaking"). The ACCC found these non-price terms and conditions to be reasonable in its assessment of the 2004 Undertaking, stating that:

> "*In the course of its consideration the ACCC has not identified any concerns relating to the non-price terms and conditions which would lead it to the view that those non-price terms and conditions were not reasonable.*[61]

There has not been any change in circumstances that would cause a departure from the ACCC's previous acceptance of these non-price terms and conditions.

[59] In order to determine whether non-price terms and conditions *ensure* reasonable access would require an Undertaking to include the full suite of non-price terms and conditions. As acknowledged by the ACCC, it is not necessary for an undertaking to address all relevant matters.

[60] There are some differences in the description of the ULLS in the Undertaking as compared with previous Undertakings, however, these do not give rise to any reason for a departure from the ACCC's previous assessment of the non price terms and conditions as being reasonable.

[61] ACCC, *Assessment of Telstra's ULLS and LSS monthly charge undertakings Final Decision*, December 2005, p 36.

Attachment 1 Cable fill factors

This attachment summarises publicly available data and information on feeder and distribution cable fill factors adopted by regulators in overseas jurisdictions for modelling purposes. The first section summarises determinations made by United States regulators and the second section summarises regulatory determinations made in other overseas jurisdictions, in particular, New Zealand and Europe.

United States of America

In the United States, the Federal Communications Commission (FCC) and state regulators have made determinations as to appropriate feeder and distribution cable fill factors.

The FCC has developed a model known as the Hybrid Cost Proxy Model (HCPM). The model was developed in the context of the Federal Universal Service Support funding mechanism. Table 1 summarises the default copper feeder and distribution cable sizing factors contained in the HCPM. The default copper feeder fill factors represent an average of the default fill factors embodied in two other models, the HAI and BCPM models. The table shows that, depending upon the density zone:

- Default feeder cable fill factors used in the HCPM range from 65% to 80%; and
- Default distribution cable fill factors used in the HCPM range from 50% to 75%.

Table 1: HCPM Copper Feeder and Distribution Cable Sizing Factors

Density Zone	Feeder	Distribution
0-5	65%	50%
5-100	75%	55%
100-200	80%	55%
200-650	80%	60%
650-850	80%	65%
850-2,550	80%	70%
2,550-5,000	80%	75%
5,000-10,000	80%	75%
10,000+	80%	75%

Source: Rebuttal Testimony of William C. Palmer on behalf of SBC Michigan, before the Michigan Public Service Commission, in the matter, on the Commission's own motion, to review the costs of telecommunications services provided by SBC Michigan, Public Version, March 22, 2004, Case No. U-13531.

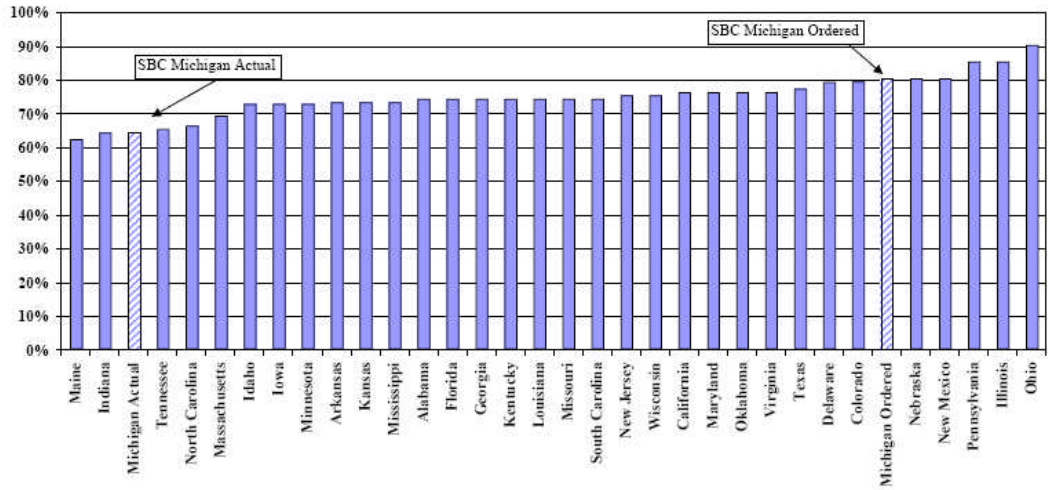
As to determinations made by state regulators, Figure 1 and Figure 2 reproduce two graphs contained in the Rebuttal Testimony of William C. Palmer on behalf of SBC Michigan, before the Michigan Public Service Commission in March 2004. These figures summarise, respectively, copper feeder fill factors and distribution fill factors ordered by a large number of United States state regulatory authorities. Although the testimony does not contain the data underlying these two graphs, visual inspection

of these graphs makes it apparent that, in those regulatory determinations surveyed by Palmer:

- Ordered copper feeder factors have ranged from 60 – 90%. The majority of ordered fill factors appear to have been between 70 – 80%.

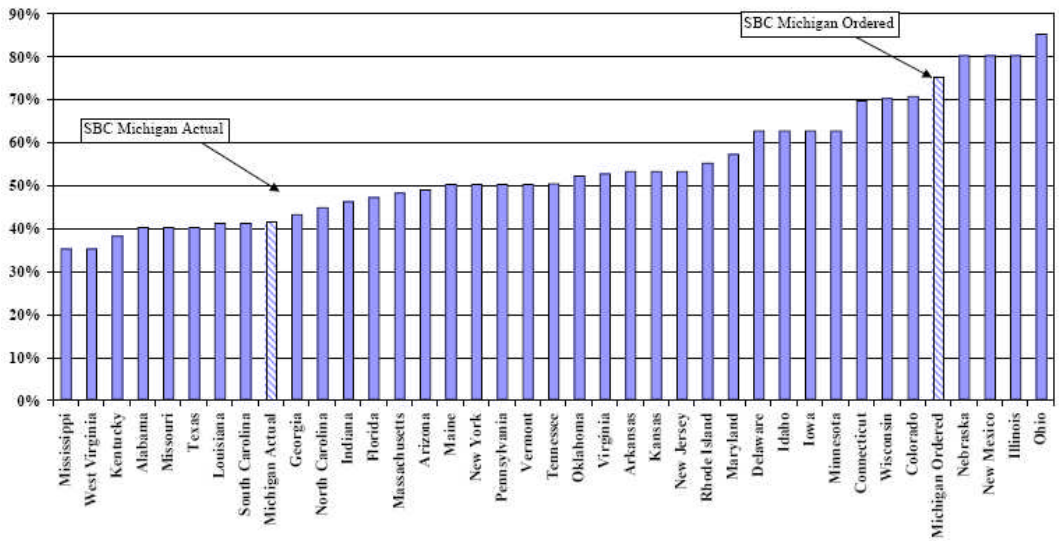
- The range of ordered distribution fill factors appears to have been very broad, between around 35 – 85%. However, the majority of ordered fill factors appear to have been around 50%.

Figure 1: Copper Feeder Fill Factors Ordered by State Commissions*



Source: Rebuttal Testimony of William C. Palmer on behalf of SBC Michigan, before the Michigan Public Service Commission, in the matter, on the Commission's own motion, to review the costs of telecommunications services provided by SBC Michigan, Public Version, March 22, 2004, Case No. U-13531, Schedule WCP.

Figure 2: Distribution Fill Factors Ordered by State Commissions*



Source: Rebuttal Testimony of William C. Palmer on behalf of SBC Michigan, before the Michigan Public Service Commission, in the matter, on the Commission's own motion, to review the costs of telecommunications services provided by SBC Michigan, Public Version, March 22, 2004, Case No. U-13531, Schedule WCP.

Table 2 presents a summary of additional research on fill factors ordered by state regulators and other regulatory authorities. This research broadly corroborates those figures presented in the Palmer Testimony, in that:

- The majority of determined copper feeder fill factors appear to be around 75%; and,

- The majority of determined distribution fill factors appear to be around 50%.

Table 2: Fill factors determined by United States state commissions (and other regulatory authorities)

State/General	Date	Feeder	Distribution	Source
California Public Utilities Commission	1996	76%	38%	California Public Utilities Commission, *Opinion Establishing Revised Unbundled Network Element Rates for Pacific Bell Telephone Company DBA SBC California*, Decision 04-09-063, September 23, 2004, citing "OANAD proceeding" (D.96-08-021, pp. 29-32.)
Missouri Public Service Commission			40%	Evaluation of the United States Department Of Justice, *In the Matter of Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Missouri*, CC Docket No. 01-88, May 9, 2001.
Louisiana Public Services Commission	2001	74%	41%	Supplemental Reply Affidavit of D. Daonne Caldwell, *Joint Application by BellSouth Corporation, BellSouth Telecommunications, Inc., and BellSouth Long Distance, Inc. for Provision of In-Region, InterLATA Services in Georgia and Louisiana*, CC Docket No. 02-35, ¶11.
Louisiana Public Services Commission	1997	75%	42.9%	Supplemental Reply Affidavit of D. Daonne Caldwell, *Joint Application by BellSouth Corporation, BellSouth Telecommunications, Inc., and BellSouth Long Distance, Inc. for Provision of In-Region, InterLATA Services in Georgia and Louisiana*, CC Docket No. 02-35, ¶10.
Florida Public Service Commission			47%	Rebuttal Testimony of James R. Smallwood, On Behalf of SBC Michigan, *In the matter, on the Commission's own motion, to review the costs of the telecommunication services provided by SBC Michigan, Before The Michigan Commerce Commission*, Case No. U-13531, Recurring Cost Issues, Public Version, March 22, 2004, citing Final Order, In re: *Investigation into the pricing of unbundled network elements*, Order No. PSC-01-1181-FOF-TP, Docket No. 990649-TP (May 25, 2001), p. 165
Georgia Public Services Commission	1997	69.5%	48%	Supplemental Reply Affidavit of D. Daonne Caldwell, *Joint Application by BellSouth Corporation, BellSouth Telecommunications, Inc., and BellSouth Long Distance, Inc. for Provision of In-Region, InterLATA Services in Georgia and Louisiana*, CC Docket No. 02-35, ¶9.
New York Public Service Commission	1997		50%	For instance, see Memorandum Opinion And Order, *In the Matter of Joint Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-*

State/General	Date	Feeder	Distribution	Source
				Region, InterLATA Services in Kansas and Oklahoma, CC Docket No. 00-217, FCC 01-29 (Adopted: January 19, 2001; Released: January 22, 2001), ¶80; and Memorandum Opinion And Order, *Application of Verizon New England Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a Verizon Enterprise Solutions) And Verizon Global Networks Inc., For Authorization to Provide In-Region, InterLATA Services in Massachusetts*, CC Docket No. 01-9, FCC 01-130 (Adopted: April 16, 2001; Released: April 16, 2001), ¶32.
Vermont Public Service Board	2000	80%	50%	State Of Vermont Public Service Board, Order, *Investigation into New England Telephone and Telegraph Company's (NET's) tariff filing re: Open Network Architecture, including the unbundling of NET's network, expanded interconnection, and intelligent networks in re: Phase II, Module 2 – Cost Studies*, Docket No. 5713 (Order entered: 2/4/2000).
Virginia State Corporation Commission	1998	77%	50%	Order, Ex Parte: To determine prices Bell Atlantic-Virginia, Inc. is authorized to charge Competitive Local Exchange Carriers in accordance with the Telecommunications Act of 1996 and applicable State law, Virginia State Corporation Commission, Case No. PUC970005, May 22, 1998
Rhode Island Division of Public Utilities and Carriers		75%	50%	Memorandum Opinion and Order, *In the Matter of Application by Verizon New England Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a Verizon Enterprise Solutions), Verizon Global Networks Inc., and Verizon Select Services Inc., for Authorization To Provide In-Region, InterLATA Services in Rhode Island*, CC Docket No. 01-324, FCC 02-63 (Adopted: February 22, 2002 Released: February 22, 2002), ¶56.
Maine Public Utilities Commission		62% (for rural areas)	50%	Examiners' Report, *Investigation of Total Element Long-Run Incremental Cost (TELRIC) Studies and Pricing of Unbundled Network Elements*, Maine Public Utilities Commission, Docket No. 97-505, January 18, 2002.
Washington Utilities and Transportation Commission	2005	72.22% for the average segment fill, and 60.04% at the head of the route (VzCost)	50%	Washington State Utilities And Transportation Commission, *Twenty-Fourth Supplemental Order Establishing Recurring Costs and Rates for Unbundled Network Elements, Transport, and Termination; Establishing Deveraged Zone Loop Rates*, In the Matter of the Review of Unbundled Loop and Switching Rates; the Deaveraged Zone Rate Structure; and Unbundled Network Elements, Transport, and Termination (Recurring Costs), Docket No. UT-023003, February 9, 2005.

State/General	Date	Feeder	Distribution	Source
		HM 5.3 produces an achieved fill of 76.5%		
Public Service Commission of Wisconsin	2004	65%	50%	Public Service Commission of Wisconsin, *Petition of Wisconsin Bell, Inc., d/b/a SBC Wisconsin, to 6720-TI-187, Establish Rates and Costs for Unbundled Network Elements*, Final Decision, Date Mailed: October 13, 2004.
Washington Utilities and Transportation Commission	1998	65% (US West) 65% (GTE)	50% (US West) 60% (GTE)	Washington Utilities and Transportation Commission, *In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale* (Docket No. UT-960369); *In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale for US West Communications Inc.* (NO. UT-960370); *In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale for GTE Northwest Inc* (NO. UT-960370): Eighth Supplemental Order, Interim Order Establishing Costs For Determining Prices In Phase II; And Notice Of Prehearing Conference, May 11, 1998.
California Public Utilities Commission	2004	76%	51.6%	California Public Utilities Commission, *Opinion Establishing Revised Unbundled Network Element Rates for Pacific Bell Telephone Company DBA SBC California*, Decision 04-09-063, September 23, 2004
California Public Utilities Commission	2006	76%	52%	California Public Utilities Commission, *Opinion Establishing Unbundled Network Element Rates and Price Floors for Verizon California and Modifying Decision 99-11-050 Regarding Monopoly Building Blocks*, Decision 06-03-025, March 15, 2006.
Kansas Corporation Commission			53%	For instance, see Memorandum Opinion And Order, *In the Matter of Joint Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Kansas and Oklahoma*, CC Docket No. 00-217, FCC 01-29 (Adopted: January 19, 2001; Released: January 22, 2001), ¶80; and Memorandum Opinion And Order, *Application of Verizon New England Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a*

State/General	Date	Feeder	Distribution	Source
				Verizon Enterprise Solutions) And Verizon Global Networks Inc., For Authorization to Provide In-Region, InterLATA Services in Massachusetts, CC Docket No. 01-9, FCC 01-130 (Adopted: April 16, 2001; Released: April 16, 2001), ¶32.
New Jersey Board of Public Utilities	Max. 2002	75%	53%	AT&T's Initial Post-Hearing Brief, *Investigation by the Department of Telecommunications and Energy on its own Motion into the Appropriate Pricing, based upon Total Element Long-Run Incremental Costs, for Unbundled Network Elements and Combinations of Unbundled Network Elements, and the Appropriate Avoided Cost Discount for Verizon New England, Inc. d/b/a Verizon Massachusetts' Resale Services in the Commonwealth of Massachusetts*, D.T.E. 01-20, Part A (UNE Rates), Redacted - Public Version, March 5, 2002, citing Ex. ATT-8, excerpt from New Jersey UNE Rates Order at 4-5.
Public Utilities Commission of Ohio		61.97% - 69.14%	55.92% - 60.43%	Public Utilities Commission of Ohio, *In the Matter of the Review of SBC Ohio's TELRIC Costs of Unbundled Network Elements*, Case No. 02-1280-TP-UNC, November 3, 2004.
Utah Public Service Commission	2002		60%	Testimony Of Timothy J Gates on Behalf of The Commission Staff, In the Matter of Determining Prices for Unbundled Network Elements (UNES) in Qwest Corporation's Statement of Generally Available Terms (SGAT), Before The Public Utilities Commission Of The State Of South Dakota, Redacted Public Version, Docket No. TC01-098, June 16, 2003.
Colorado Public Utilities Commission	2002	79.17%	70.49%	Testimony Of Timothy J Gates on Behalf of The Commission Staff, In the Matter of Determining Prices for Unbundled Network Elements (UNES) in Qwest Corporation's Statement of Generally Available Terms (SGAT), Before The Public Utilities Commission Of The State Of South Dakota, Redacted Public Version, Docket No. TC01-098, June 16, 2003.
Michigan Public Service Commission		80%	75%	Testimony Of Timothy J Gates on Behalf of The Commission Staff, In the Matter of Determining Prices for Unbundled Network Elements (UNES) in Qwest Corporation's Statement of Generally Available Terms (SGAT), Before The Public Utilities Commission Of The State Of South Dakota, Redacted Public Version, Docket No. TC01-098, June 16, 2003.
Indiana Utility		~ 80%	~ 75%	Testimony Of Timothy J Gates on Behalf of The Commission Staff, In the Matter of

State/General	Date	Feeder	Distribution	Source
Regulatory Commission		["very similar" to Michigan]	["very similar" to Michigan]	Determining Prices for Unbundled Network Elements (UNES) in Qwest Corporation's Statement of Generally Available Terms (SGAT), Before The Public Utilities Commission Of The State Of South Dakota, Redacted Public Version, Docket No. TC01-098, June 16, 2003.
Ohio Public Utility Commission		~ 80% ["very similar" to Michigan]	~ 75% ["very similar" to Michigan]	Testimony Of Timothy J Gates on Behalf of The Commission Staff, In the Matter of Determining Prices for Unbundled Network Elements (UNES) in Qwest Corporation's Statement of Generally Available Terms (SGAT), Before The Public Utilities Commission Of The State Of South Dakota, Redacted Public Version, Docket No. TC01-098, June 16, 2003.
Wisconsin Public Service Commission		~ 80% ["very similar" to Michigan]	~ 75% ["very similar" to Michigan]	Testimony Of Timothy J Gates on Behalf of The Commission Staff, In the Matter of Determining Prices for Unbundled Network Elements (UNES) in Qwest Corporation's Statement of Generally Available Terms (SGAT), Before The Public Utilities Commission Of The State Of South Dakota, Redacted Public Version, Docket No. TC01-098, June 16, 2003.

Other overseas jurisdictions

This sub-section summarises regulatory determinations made in New Zealand and Europe. Table 3 presents the fill factors for feeder and distribution plant adopted by the New Zealand Commerce Commission for the purpose of TSO modelling. Table 4 presents fill factors used in European models, as summarised by Marsden Jacob Associates and Europe Economics.

Table 3: TSO Model Utilisation factors for feeder and distribution plant

Density	*Feeder*	*Distribution*
0	80%	40%
5	80%	40%
100	80%	40%
200	80%	40%
650	80%	60%
850	80%	60%
2550	80%	60%
5000	80%	60%
10000	80%	60%

Sources: Commerce Commission, Draft Determination for TSO Instrument for Local Residential Telephone Service for period between 1 July 2005 and 30 June 2006, 9 July 2007, Table 27. See also, similar determinations for previous years: Draft Determination for TSO Instrument for Local Residential Telephone Service for period between 1 July 2004 and 30 June 2005, 9 July 2007; Final Determination for TSO Instrument for Local Residential Service for period between 1 July 2003 and 30 June 2004, 23 March 2007; and Determination for TSO Instrument for Local Residential Service for period between 1 July 2002 and 30 June 2003, 24 March 2005.

Table 4: Fill factors used in European bottom-up models

	Feeder side cable	*Distribution side cable*
Danish hybrid model	75%	75%
Swedish hybrid model	80%	60%
Bottom-up model for European regulator (confidential)	75%	65%

Source: Marsden Jacob Associates and Europe Economics, Comments on Discussion Paper Telstra's Undertaking in relation to Unconditioned Local Loop Service, Public Version, 3 May 2006, Table 4.

Attachment 2 ACCC Industry Depreciation Survey

This attachment contains a review of the industries regulated by the ACCC with regard to the nature of the assets involved and the approach to depreciation taken by the ACCC. The aviation (airports), electricity, gas, rail and water industries are reviewed below.

In summary and as outlined in the table below, the ACCC has used or endorsed straight line depreciation for most regulated industries except telecommunications despite similarities in the characteristics of the assets being regulated.

Table 1: Summary of depreciation methods in regulated industries

Industry	ACCC determination
Aviation	Straight line depreciation
Electricity	Straight line depreciation
Gas	Straight line depreciation (in greenfields guideline)
Rail	Straight line depreciation
Water	Straight line depreciation recommended as starting point

Aviation (Airports)

Major assets, particularly capitalised civil works, in the airport aspect of the aviation industry are similar in nature to those in telecommunications. For example, this can be seen in an airports industry consulting document for the ACCC regarding electricity cabling, where both copper and ducting are major inputs, and where the asset life is deemed to be at least 40 years:[62]

> *Generally most high voltage distribution cable is comprised of copper conductors... Cables are buried direct into the ground but are ducted under runways and roads, etc...*
>
> *These cables should last in excess of 40 years...*

More broadly, earthworks necessary in airport construction and extension is similar to trenching in that it involves substantial amounts of labour, fuel and earthworks equipment.

Sydney Airport

In 2000, Sydney Airports Corporation Ltd (SACL) proposed using straight line depreciation for aeronautical assets (other than land):[63]

[62] Opus International Consultants, *Sydney Airport 2000 Valuation Review for the Australian Competition and Consumer Commission (ACCC), Peer Review Report*, 9 February 2001, page 62.
[63] SACL, *Draft Aeronautical Pricing Proposal*, December 1999, page xiii.

> *SACL has adopted straight line depreciation as a fair indicator of both accounting and economic depreciation, ie the amortisation of cost over time and the loss of earning potential.*

This was reiterated in its revised proposal:[64]

> *Depreciation and the useful lives of fixed assets remain unchanged in the Revised Draft Proposal, subject to the outcome of detailed reviews of individual assets.*

The revised proposal calculated depreciation using prime cost:[65]

> *The Revised Draft Proposal… calculates depreciation using prime cost.*

The prime cost method of depreciation is essentially the same as the straight line method of depreciation in that 100% of the purchase price (prime cost) of the asset is divided by the economic life of the asset.

The ACCC, based on the recommendation of its expert advisers, approved the use of straight line depreciation for non-land asset valuation:[66]

> *The Commission's draft decision is not to object to the non-land asset valuation proposed by SACL…*

No tilt was applied to the depreciation profile.

Melbourne airport

In August 2000, the ACCC released its final decision to approve APAM's (Australia Pacific Airports Melbourne Pty Ltd) proposal to use straight line depreciation of the capital base.[67] No tilt was applied to the depreciation profile.

Electricity

Major assets in the electricity industry are similar in nature to those in other network industries. For example, underground cabling requires ducting and trenching:[68]

> *'Circuits' includes… underground cables…*

These assets are also long-lived:[69]

> *Transmission assets have long effective lives, far exceeding the term of the most traded Australian bond with the longest maturity period (i.e. 10 years).*

Copper is also a major input and a significant source of costs.[70]

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[64] SACL, *Revised Draft Aeronautical Pricing Proposal*, September 2000, page 73.
[65] SACL, *Revised Draft Aeronautical Pricing Proposal*, September 2000, page 140.
[66] ACCC, *Sydney Airports Corporation Ltd. – Aeronautical Pricing Proposal: Draft Decision*, February 2001, pages 16-17. This position was also reaffirmed in its Final Decision, dated May 2001.
[67] ACCC, *Melbourne Airport – Multi-User Domestic Terminal: New Investment, Decision*, August 2000, page 15.
[68] ACCC, *Decision: NSW and ACT transmission network revenue cap – EnergyAustralia 2004-05 to 2008-09*, 27 April 2005, page 162.
[69] ACCC, *Decision: NSW and ACT transmission network revenue cap – EnergyAustralia 2004-05 to 2008-09*, 27 April 2005, page 75.

In the ACCC's 1999 Draft Statement of Principles for the Regulation of Electricity Transmission Revenues, the ACCC discussed the use of a tilted annuity approach to calculating the capital charge as a means of taking into account technological advancement and general price increases.[71] However, no decision was made at the time as to the use of this approach when actually calculating capital costs. Subsequently, in 2003, the ACCC made an initial decision not to use the tilted annuity approach (although it reserved the right to enforce this adoption if the ACCC felt it was warranted):[72]

> *The Commission always has the discretion to adopt an annuity depreciation scheme which can respond to the associated pricing changes in replacement cost taking account of general price increases and technological change in a manner which mimics competitive market behaviour. However, the Commission's initial view is that factors such as technological change do not have major impacts in the electricity industry. Therefore, a straight-line approach for the electricity industry is easier to implement and gives rise to clearer incentives for efficient investment then alternatives such as annuity depreciation.*

This position was not changed in the ACCC's draft and final decisions, and was reiterated in its revised draft statement of regulatory principles:[73]

> *For depreciation the ACCC will adopt… a straight-line depreciation approach. The ACCC has the discretion to adopt an annuity depreciation scheme which can respond to changes in demand and costs i.e. the stranding of assets.*

Recent decisions on transmission prices have used straight-line depreciation to model economic depreciation:[74]

> *The ACCC used a straight-line depreciation method (based on the remaining life per asset class of existing assets and the standard life for new assets) to model economic depreciation.*

Most recently, in its 2008 final decision on regulatory guidelines for electricity distribution networks, the Australian Energy Regulator (AER), a constituent part of the ACCC, used straight line depreciation as the default method in its post-tax revenue model (PTRM). Distribution network service providers (DNSPs) do, however, have the option of using other methods that comply with the National Electricity Rules (NER):[75]

> *The PTRM is configured to use the straight-line method as the default position for calculating depreciation. DNSPs are able to amend the PTRM to incorporate depreciation profiles other than the straight-line method, subject to assessment in accordance with clause 6.5.5 of the NER.*

GAS

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[70] ACCC, *Final Decision: NSW and ACT Transmission Network Revenue Cap – TransGrid2004-05 to 2008-09*, 27 April 2005, pages 103-105.
[71] See ACCC, *Draft Statement of Principles for the Regulation of Electricity Transmission Revenues*, May 1999, page 61.
[72] ACCC, *Discussion Paper 2003 – Review of the Draft Statement of Principles for the Regulation of Transmission Revenues*, 28 August 2003, page 29.
[73] ACCC, *Draft Decision - Statement of Principles for the Regulation of Transmission Revenues*, 18 August 2004, page 16.
[74] ACCC, *Decision – NSW and ACT transmission network revenue cap EnergyAustralia 2004–05 to 2008–09*, 27 April 2005, page 144.
[75] AER, *Electricity distribution network service providers – Post-tax revenue model handbook*, June 2008, page 11.

Major assets, particularly capitalised civil works, in the gas industry are similar in nature to those in telecommunications. These assets are typically long-lived assets, and many gas pipelines are built underground and require trenching. In fact, the ACCC considers that network industries like electricity and gas are similar enough to have comparable regulatory frameworks:[76]

> *The Commission believes that consistency can be achieved between the gas and electricity industries because they have a number of similar characteristics (i.e. long lived assets, network industries, low rates of technological change and so on). Therefore, the Commission's experience with respect to regulation of the gas industry is of particular relevance to the Commission's regulatory task in electricity transmission.*

In its draft greenfields guideline for natural gas transmission pipelines, the ACCC did not adopt any particular position regarding the depreciation profile to be adopted in the calculation of access prices in this industry, although it indicated that a straight-line depreciation schedule would be acceptable, and indeed, is to be taken as the default standard:[77]

> *Standard straight-line depreciation over the economic life of the asset has typically been the methodology used when depreciating a pipeline's capital base. However, provided that the principles of the code are adhered to, a service provider is able to use an alternative approach.*
>
> *For example, the ACCC's CWP final decision provided for the use of economic depreciation as part of the service provider's NPV/price path methodology to determine total revenue. Economic depreciation was calculated in the following manner:*
>
> *Economic depreciation = total revenue – operating costs – return on capital*
>
> *...*
>
> *Part IIIA does not specify any particular depreciation methodologies. Consequently a prospective service provider has equal flexibility in tailoring an appropriate depreciation methodology to meet its requirements.* [Emphasis added]

RAIL

Major assets in the rail industry are similar in nature to those in telecommunications. In fact, the rail assets for which straight line depreciation is applied include signalling and communications equipment:[78]

> *The ACCC's preliminary view is that the depreciation charges for signalling and communications equipment... do not raise any objections under Part IIIA of the Act.*

[76] ACCC, *Draft Statement of Principles for the Regulation of Transmission Revenues*, 27 May 1999, page 3.
[77] ACCC, *Draft greenfields guideline for natural gas transmission pipelines*, June 2002, pages 31-32.
[78] ACCC, *Draft Decision: Access Undertaking – Interstate Rail Network, Australian Rail Track Corporation*, April 2008, page 167.

These assets are long-lived assets with an asset life of 30 years.[79]

In its 2008 draft decision on ARTC's access undertaking for the Interstate Rail Network, the ACCC considered that applying straight line depreciation to rail assets is appropriate:[80]

> *The use of straight line depreciation is common regulatory practice. It simplifies regulatory modelling and should not overcompensate access service providers. However, straight line depreciation can result in RAB values deviating from true economic values and create incorrect pricing for long lived assets. In addition, non-economically based depreciation might give asset owners incentives to destroy assets and replace them to increase their RABs once the assets are fully, or close to fully, depreciated from a regulatory accounting perspective. Despite these concerns, in the context of ARTC interstate rail network the ACCC does not consider the use of straight line depreciation to be an issue. ARTC currently recovers well below their revenue ceilings, their regulatory RAB values deviating from economic values should not change their pricing and ARTC should have the incentive to minimise costs as opposed to maximising its RAB values.*

Similarly in 2002, the ACCC also accepted the ARTC's use of straight-line depreciation:[81]

> *ARTC has proposed to depreciate its depreciable assets on a straight-line basis. ARTC favours this method on the basis of its ease-of-use and transparency. ARTC notes that the use of the straight-line method of depreciation has been employed in access regulation for a number of other industries.*
> *...*
> *The Commission's conclusion is therefore that the depreciation charges and the assumptions regarding the "steady state" assets included in ARTC's Undertaking form a reasonable basis for determining a rate of return of capital.*

WATER

Major assets in the water industry, particularly capitalised civil works (e.g. trenches and underground conduits) are similar in nature to those in telecommunications. For example, sewerage networks are a system of underground conduits that transport sewage and wastewater. The ACCC defines a sewer as:[82]

> *An artificial conduit, usually underground, for conveying wastewater and sewage. A system of sewers can be referred to as a sewerage or reticulation network.*

Sewers can include a host of various underground transportation networks such as cliff-face discharge sewers, deep-ocean out-falls and reticulation networks (sewerage networks).

These assets are also deemed to be long-lived assets:[83]

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[79] ACCC, *Draft Decision: Access Undertaking – Interstate Rail Network, Australian Rail Track Corporation*, April 2008, page 167.
[80] ACCC, *Draft Decision, Access Undertaking – Interstate Rail Network, Australian Rail Track Corporation*, April 2008, pages 166-167.
[81] ACCC, *Decision, Australian Rail Track Corporation Access Undertaking*, May 2002, pages 151-152.
[82] ACCC, *Access dispute between Services Sydney Pty Ltd and Sydney Water Corporation: Arbitration report*, 19 July 2007, page 7.
[83] ACCC, *Access dispute between Services Sydney Pty Ltd and Sydney Water Corporation: Arbitration report*, 19 July 2007, page 79.

> *The Tribunal noted that access seekers require sufficient certainty in relation to access terms in order to undertake the significant investment associated with "the substantial nature and long life of the assets which a new entrant, other than a pure reseller would need to invest in".*

To date, the ACCC has not taken a firm position regarding the depreciation profile to be adopted in the calculation of access prices in this industry, although giving some support for the straight line depreciation approach taken by IPART in water pricing, as seen in the access dispute between Services Sydney and Sydney Water:[84]

> *Similarly, Sydney Water's Cost of Service model applies a depreciation schedule to the relevant treatment and disposal assets. Depreciation is a standard component of a building block approach and therefore the Commission considered that depreciation of the asset base should be included in the calculation of avoidable costs. Whilst* ***the exact nature of the depreciation schedule to be adopted for determining final access prices is a matter for further negotiation between the parties****, an appropriate starting point would appear to be the depreciation schedule adopted by IPART for the purpose of determining Sydney Water's retail prices.* [Emphasis added]

However, the ACCC has been conducting formal consultation since April 2008 on the development of its advice on water market rules and water charge rules. This process is expected to be completed in June 2009.[85]

[84] ACCC, Access dispute between Services Sydney Pty Ltd and Sydney Water Corporation – Arbitration report, 19 July 2007, page 81.

[85] ACCC, *Revised timelines for the provision of advice to the Minister for climate change and water under the Water Act 2007*, available at http://www.accc.gov.au/content/index.phtml/itemId/837811. Accessed on 12 August 2008.