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Australian Communications Authority

Estimate of Net Universal Service Costs
for 1998/99 and 1999/2000

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Executive Summary

NUSC estimates for 1998/99 and 1999/2000

1. The Australian Communications Authority (ACA) has estimated the net universal service cost (NUSC) for the 1998/99 and 1999/2000 financial years at the amounts contained in the following table. The rationale supporting these estimates is provided in this report.

Table 1: NUSC estimates for 1998/99 and 1999/2000

Assumption	1998/99	1999/2000
Estimate with consideration of the universal service obligation (USO) funding mechanism.*	\$279,590,517	\$280,503,161
Estimate without consideration of the USO funding mechanism.*	\$426,106,900	\$421,457,461

* Refer to the section 'Impact of the USO cost sharing arrangements' for a discussion of the relevance of the USO funding mechanism to the NUSC.

Weighted average cost of capital

The NUSC estimates in Table 1 are based on the WACC figures shown in Table 2 below. It is the ACA's view that it is a Government policy consideration whether the USO funding mechanism should be taken into account in calculating the WACC.

Table 2: WACC estimates for 1998/99 and 1999/2000

Assumption	1998/99	1999/2000
Estimate with consideration of the universal service obligation (USO) funding mechanism.	7.2%	8.5%
Estimate without consideration of the USO funding mechanism.	10.5%	11.8%

Intangible potential benefits

2. The ACA has considered seven intangible potential benefits to Telstra in being the national universal service provider. The nature of these intangible potential benefits is detailed in this report. The ACA has not been able to develop robust methodologies to assess each of these potential intangible benefits in the time available to complete the report. Overall, the material contained in the report indicates that potential intangible benefits are tenuous and, when taken together, may not be large. Furthermore, the adoption of various recommendations made to the Minister in the ACA's October 1999 report on 'USO costing and assessment arrangements' could address some of the industry concerns that particular benefits potentially received by the USP do not currently form part of NUSC calculations.

Interim telephone services

3. The ACA has considered the additional costs borne by Telstra from the provision of interim telephone services to persons in remote areas who have been waiting for a first connection for six months. The ACA considers that, on the information available, the likely maximum cost of providing interim telephone services is \$1,565,076, but notes that further investigation would be required to provide an accurate estimate of these costs.

INTRODUCTION

4. On 10 November 1999, the ACA received a request from Senator the Hon. Richard Alston, Minister for Communications, Information Technology and the Arts (the Minister) for advice on, among other things, 'factors relevant to the question of estimating net universal service costs for 1998/99 and 1999/2000'. (The Minister's letter is provided at Appendix A.) The Minister requested advice on these matters by 17 January 2000.
5. The ACA's *Net Universal Service Cost Assessment for 1997-98* report (available from the ACA's website at www.aca.gov.au) provides extensive detail on the legislative basis and results of the ACA's NUSC assessment for 1997/98, and the processes undertaken by the ACA in that assessment. That report provides an important context for the current report, as many of the concepts and methodologies referenced in this report are explained in more detail in the earlier report.
6. In order to provide the Minister with the advice requested in the response period specified, the ACA has concentrated its efforts on the most significant and material cost elements of the NUSC for the 1998/99 and 1999/2000 financial years. Although the ACA has not been able to replicate all the processes undertaken in the 1997/98 NUSC assessment in providing this advice, it considers that this report presents a broadly accurate estimate of NUSC costs for 1998/99 and 1999/2000. Where the ACA's NUSC estimate for these years is based on information which is less reliable than in the 1997/98 NUSC assessment, and this information has a material impact on the NUSC amount, this information is identified in this report with explanatory comment.

BACKGROUND

THE UNIVERSAL SERVICE REGIME

7. The current universal service arrangements are specified in the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (the TCPSS Act), which substantially carries over the universal service regime provisions previously contained in the *Telecommunications Act 1997*. In broad terms, the USO is the obligation to provide reasonable access to defined telephone services to all people in Australia, regardless of where they reside or carry on business. The purpose of the USO is to ensure that all people in Australia have access to USO services on an equitable basis. Telstra has been declared the national universal service provider (USP) by the Minister and is therefore responsible for providing the USO throughout Australia.
8. The services currently defined under the USO are the standard telephone service and payphones. The TCPSS Act also contains a digital data service obligation (DDSO) under the universal service regime. DDSO services are comprised of a general digital data service and a special digital data service, and Telstra has been declared as the digital data service provider for both forms of service. Although DDSO services are being provided in the 1999/2000 year, the ACA has not been

requested to provide advice on the costs of provision of DDSO services and there is no analysis of DDSO costs in this report. (Under the TCPSS Act, the ACA is required to perform an assessment of the digital data cost of a digital data service provider subsequent to the 1999/2000 financial year. A digital data service provider must provide the ACA with a claim setting out its digital data cost within 90 days of the end of a financial year. The digital data cost is not a capped amount.)

9. The TCPSS Act provides a scheme under which the total net losses that result from supplying services to certain areas in the course of fulfilling the USO are shared among carriers in proportion to the revenue they earn as carriers, called 'eligible revenue'. Under the scheme the total net cost of providing USO services in loss making areas is calculated, and the contribution (levy debit) for each carrier to fund that loss is assessed. Generally speaking, each carrier that has a levy debit must pay an amount of levy equal to that debit. However, if a carrier has incurred a loss in providing USO services, it is given a credit for that loss, called its levy credit. If the levy credit of a carrier exceeds its levy debit—as was the case with Telstra in 1997/98—the carrier is reimbursed from the amounts that the other carriers pay by way of levy. The universal service levy is imposed on carriers under the *Telecommunications (Universal Service Levy Act) 1997* (the Levy Act).

10. The ACA is required to make an annual assessment of levy debits and levy credits based on claims for levy credits and annual returns of eligible revenue given to the ACA. The ACA's assessment must set out, amongst other things, the NUSC of any USP.

CONTEXT FOR 1998/99 AND 1999/2000 COST AND BENEFIT ADVICE

11. As indicated in the Introduction, this report is not a formal NUSC assessment for the 1998/99 and 1999/2000 financial years. Rather, this paper provides the ACA's response to the Minister's request for advice on the calculation of the NUSC and other specified matters for these years. The following discussion provides the context for the Minister's request for advice.

12. On 28 September 1998, Telstra lodged a claim for fulfilling its USO for 1997/98. The claim was for \$1,827,584,235.35. On 11 June 1999, the *Telecommunications Laws Amendment (Universal Service Cap) Act 1999* (the US Cap Act) received Royal Assent. This Act placed an upper limit on the NUSC for 1997/98 of \$253.32 million and, for 1998/99 and 1999/2000, an upper limit of \$253.32 million plus CPI. However, under the US Cap Act the Minister has the power to determine a NUSC amount other than the capped amount.

13. In October 1999, the ACA assessed the NUSC amount that would have applied for 1997/98, if it were assumed that financial year were not a capped financial year, at \$548,087,665 with a 95% confidence interval of \pm \$71 million. As this amount was above the capped amount for 1997/98, Telstra's NUSC for the 1997/98 financial year was \$253.32 million.

14. On 27 September 1999, the Chairman of Telstra wrote to the Minister requesting that he exercise his discretionary power and determine a NUSC amount for 1998/99 and 1999/2000 based on the ACA's assessment for 1997/98. In

consideration of this request, the Minister has sought specific advice from the ACA on NUSC costs for these years in regard to:¹

- (a) the ACA's estimate of the forward-looking technology mix and the cost of the technology in relation to Telstra's fulfilment of the USO for the 1998/99 and 1999/2000 financial years;
- (b) the ACA's estimate of the weighted average cost of capital (WACC) for the 1998/99 and 1999/2000 financial years in relation to Telstra's fulfilment of the USO for those years;
- (c) having regard to paragraphs (a) and (b) above, the ACA's estimate of Telstra's NUSC for the 1998/99 and 1999/2000 financial years if those costs were not capped; and
- (d) the nature, materiality (in comparison to the NUSC) and, to the extent possible, likely quantum of the benefits to Telstra in being the national USP in the 1998/99 and 1999/2000 financial years.

15. Furthermore, the Minister has requested that the ACA have regard to Government policy concerning the agreement negotiated with Telstra in June 1999 to deliver an 'interim phone service', at PSTN rates, to persons in remote areas who have been waiting for a first connection for six months.

APPROACH TO ESTIMATING USO COSTS & BENEFITS FOR 1998/99 & 1999/2000

16. The legislative process for the ACA to formally calculate the NUSC is described in detail in the *Net Universal Service Cost Assessment for 1997-98*. In brief, this process requires the detailed compilation by Telstra of revenue and cost data that it uses as the basis of its NUSC claim for levy credit. A claim for levy credit must be in a form approved in writing by the ACA, and must be accompanied by a report of an approved auditor that is in a form approved in writing by the ACA.

17. As by default the NUSC for 1998/99 and 1999/2000 is an indexed amount based on the 1997/98 capped amount of \$253.52 million—the index used is the consumer price index for the respective years—Telstra has not been required to either compile the detailed cost and revenue data or have this data audited by an independent auditor. Consequently, the ACA has based its estimate of the NUSC amount for 1998/99 and 1999/2000 on a range of sources, some of which include broad estimates from Telstra. For example, at the ACA's request Telstra has provided estimates of revenue growth for 1998/99 and 1999/2000—using 1997/98 revenue data as the base data—for the major revenue categories, rather than providing the actual revenue data for potential net cost areas (NCAs)² that would be required in a formal claim process. Accordingly, to a significant extent the ACA's estimate of NUSC costs for 1998/99 and 1999/2000 is based on its 1997/98 assessment and estimations of changes to key data inputs which have occurred since the 1997/98 base year.

¹ Refer to Appendix A for the full text of the Minister's request to the ACA.

² Refer to the section 'Treatment of potential Net Cost Areas' for a discussion of NCAs. The *Net Universal Service Cost Assessment for 1997-98* also contains considerable information on the role and filing process for potential NCAs. For example, refer to paragraphs 43, and 86-93. The term 'Potential Net Cost Area' is equivalent to the term 'Potential Net Loss Area', as referenced in the report *Net Universal Service Cost Assessment for 1997-98*.

18. Furthermore, in the context of the limited time available to prepare its advice, the ACA considers that it is prudent to use the concepts and processes utilised in the 1997/98 NUSC assessment. These concepts and processes have been the subject of considerable public and industry consultation and debate during the course of the 1997/98 assessment, and have established a solid precedent on which to base NUSC analysis. The ACA considers that these concepts and processes have been rigorously developed to comply with the legislative intent and government policy for assessing universal service costs. However, where there is a practical need—or a demonstrated case—for the ACA to vary from the precedent concepts and processes, alternatives have been considered and adopted. Where the ACA has deviated from the precedent concepts and processes, the reasons for the deviation are set out in this report.

19. The benefits to Telstra in being the national USP have not previously been considered or assessed by the ACA, and the ACA is not aware of any other organisation in Australia that has completed such an assessment. In the absence of an Australian precedent for an assessment of the benefits of being the national USP, the ACA has had significant regard for international experience in making such an assessment. In particular, the recent work of OFTEL—the United Kingdom’s telecommunications regulator—in assessing the benefits to British Telecom from the provision of universal services was considered as an appropriate basis for discussion and the development of an assessment methodology for these benefits in Australia.

CONSULTANTS

20. In order to assist the ACA to assess the detailed cost and benefit advice requested by the Minister, the ACA engaged a number of consultants. The consultants chosen and the tasks they have performed are as follows:

- a) Gibson Quai Pty Ltd (Gibson Quai) was contracted to prepare a paper recommending the forward looking technology mix and cost of the technology in relation to Telstra’s fulfilment of the USO for the 1998/99 and 1999/2000 financial years;
- b) the Allen Consulting Group (ACG) was contracted to assist the ACA in estimating the WACC for the 1998/99 and 1999/2000 financial years in relation to Telstra’s fulfilment of the USO for those years; and
- c) Ovum Pty Ltd was contracted to assist the ACA in advising on the nature, materiality (in comparison to the NUSC) and, to the extent possible, likely quantum of the benefits to Telstra in being the national USP in the 1998/99 and 1999/2000 financial years.

21. All consultants were familiar with NUSC costing principles, as each consultant had been involved in providing advice to the ACA in relation to various aspects of the assessment of the NUSC amount for 1997/98.

INDUSTRY CONSULTATION

22. The ACA and its consultants have consulted widely with industry and other parties when preparing the advice for the Minister. While the consultation process has been necessarily abbreviated due to the period of time in which the ACA must

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provide its advice, it has been as comprehensive as possible within the two month time period available. All carriers, relevant consumer groups and other organisations with an interest in these matters have had the opportunity to comment on the matters under consideration. A summary of the consultation follows.

Table 3: Summary of Consultation

Date	Consultation
19 November 1999	ACA correspondence to all carriers describing ACA approach, consultants engaged and timetable for consultation. A brief paper prepared by ACG was distributed with the letter and carrier comment sought.
29 November 1999	A matrix of forward-looking technology and costs of technology (including an explanatory paper) was prepared by Gibson Quai and sent to all carriers for comment.
1 December 1999	A paper on the 'potential intangible benefits' in being the USP prepared by Ovum was sent to all carriers for comment—this paper was also made available from the ACA's website.
19 November— 13 December 1999	Various meetings were held between the ACA, its consultants and Telstra, Optus, Vodafone and AAPT to discuss the WACC, forward looking technologies and potential intangible benefits.
3 December 1999	Comments on WACC paper due and received from Telstra, Optus, Vodafone and AAPT.
10 December 1999	Comments on forward looking technologies and cost matrix due and received from Telstra, Optus Vodafone and AAPT.
13 December 1999	Comments on 'potential intangible benefits' due and received from Telstra, Optus Vodafone and AAPT. Comments received from Macrocom on 20 December 1999.
17 December 1999	ACG WACC Report provided to the ACA and distributed to carriers for comment—also placed on ACA website.
20 December 1999	Ovum Report to the ACA on potential intangible benefits received and distributed to carriers for comment—also placed on ACA website.
24 December 1999	Gibson Quai Report to the ACA on forward looking technologies received and distributed to carriers for comment—also placed on ACA website.
7 January 2000	Carrier comments due on WACC, potential intangible benefits and forward looking technologies reports. Comments were received from Telstra, Vodafone, PanAmSat, Orange, C & W Optus and AAPT.

KEY ASSUMPTIONS IN NUSC ESTIMATE FOR 1998/99 AND 1999/2000

Formula used for calculating the NUSC amount

23. The TCPSS Act stipulates that the NUSC is the amount by which avoidable costs exceed revenue foregone in serving NCAs. The following formula applies:

$$\text{NUSC} = \text{Avoidable costs} - \text{Revenue Foregone}$$

24. In its assessment of the NUSC amount for the 1998/99 and 1999/2000 financial years, the ACA has adopted this formula.

Use of the NUSC costing model

25. As with the 1997/98 NUSC assessment, the ACA has utilised the NUSC costing model in its assessment of the NUSC amount for the 1998/99 and 1999/2000 financial years.³ The United States based company Bellcore International Inc. built this model.

26. The NUSC costing model development process involved Bellcore producing papers recommending methodologies for handling components of avoidable costs and revenue foregone. These papers were submitted to the Australian parties who contracted Bellcore to develop the model—Telstra, Cable and Wireless Optus (C&W Optus), Vodafone and AUSTEL (the ACA's predecessor)⁴—as 'deliverables' under the model development contract. The deliverables contain detailed formulas and processes to implement the methodology agreed with the Australian parties.

27. The ACA has adopted the general principles of the Bellcore deliverables in its assessment of the NUSC amount for the 1998/99 and 1999/2000 financial years, using 1997/98 NUSC assessment data as the benchmark for analysis. The most significant area of analysis for the 1998/99 and 1999/2000 financial years has been in the costs of the customer access network (CAN), which in the 1997/98 assessment accounted for 73 per cent of the avoidable costs component of this assessment.⁵

Definition of avoidable costs

28. The ACA has adopted the same approach to defining avoidable costs as was utilised in its assessment of Telstra's 1997/98 NUSC claim, through the adoption of the principles of the Bellcore deliverables. The most significant elements of avoidable costs are the:

- opportunity cost of capital;
- installed costs of technology;
- depreciation rates;
- mix of technologies; and
- operating expenses.

29. An important concept underpinning the avoidable cost approach is that of determining costs on a forward-looking basis. This concept is explained in Bellcore deliverable 3g (which contains a methodology for costing of the CAN):

³ Further information on this model is provided in the *Net Universal Service Cost Assessment for 1997-98*, particularly paragraphs 53-64.

⁴ Development of the NUSC costing model commenced during the period of the *Telecommunications Act 1991*, when these three parties were the only carriers in operation.

⁵ Refer to paragraph 600 of the *Net Universal Service Cost Assessment for 1997-98*.

CAN costs are based on the forward-looking technologies of service delivery. That is, the way the service would be provisioned today, using best practice engineering rules, regardless of the existing means of delivery.⁶

Forward-looking costs are based on a view of the CAN as it could be provided using the currently available technology, regardless of embedded facilities and equipment.⁷

30. The avoidable costs approach used in determining the NUSC amount requires the costing of that part of the telecommunications network which would be needed specifically to service the USO requirements. In this sense, the historic costs of the universal service provider are not the basis for deriving the costs. Rather, the basis for deriving the costs are those that would be borne by the most efficient operator in delivering the stipulated services and represent the true opportunity cost of meeting the USO.

Treatment of potential Net Cost Areas

31. The definition of NCAs is an important determinant of the NUSC amount. As a general guide, the smaller the number of services in operation (SIO) in a NCA the greater the likelihood the NCA will be loss-making. For example, if the definition of a potential NCA corresponded to that of a state of Australia, this NCA would—under the avoidability approach—be profitable, as the profits from the urban areas of the state would be considerably greater than the losses from any non-urban areas which were unprofitable. At the other extreme, it would be theoretically possible to define each SIO as a potential NCA, which would identify not only loss making SIOs in non-urban areas, but also some loss-making SIOs in urban areas. However, the principle adopted by the ACA in defining NCAs in the 1997/98 assessment was to identify areas where it was possible a profit-driven telecommunications carrier may not provide services, on the basis that these areas may be loss making. Under this principle it would clearly be inappropriate to define a potential NCA at an SIO level, as a profit-driven carrier will provide services in most urban areas even though some of these services may be loss making.

32. In estimating the NUSC for the 1998/99 and 1999/2000 financial years, the ACA has generally applied the definition of NCAs that were ‘declared’ NCAs in the 1997/98 assessment. In general terms, the range of types of NCAs is:

- a) small exchange service areas (ESAs);
- b) built-up areas (BUAs);
- c) non-built-up areas (NBUAs);
- d) radio services (defined as the ‘premises to which radio services were supplied’); and
- e) payphones.

33. The ACA recognises that the radio services NCA, defined as the ‘premises to which radio services were supplied’, is somewhat confusing in concept. It is derived

⁶Bellcore Deliverable 3g, page 2.

⁷Bellcore Deliverable 3g, page 10.

from Telstra's actual technology deployment, but must be considered in the context of an area rather than a technology. Consequently, in the ACA's 1997/98 NUSC assessment these areas were costed on the basis they were served exclusively by satellite technology, rather than terrestrial radio technology, as satellite technology was considered to be the most cost-effective means of providing services to these areas.

34. Consequently, a new type of NCA has been added to this list for 1998/99 and 1999/2000, this being 'satellite services' as supplied in exchange areas. The ACA has 'declared' satellite services as potential NCAs for 1998/99 and 1999/2000. The satellite service NCA classification is a more accurate representation of the technology costing applied to these areas.

35. Under the formal NUSC assessment process, the USP must lodge proposed NCAs with the ACA within 60 days of the beginning of the financial year (section 49, TCPSS Act). The ACA must consider the list of proposed areas, make adjustments if necessary, then declare the remaining areas to be NCAs for that financial year (section 50, TCPSS Act). Telstra submitted its proposed NCAs—which included areas providing satellite services—for the 1998/99 and 1999/2000 financial years. All areas proposed by Telstra were subsequently declared by the ACA.

36. In its *Net Universal Service Cost Assessment for 1997-98*, the ACA rejected a number of areas claimed by Telstra which were not contained in the NCA Declaration, on the basis that under the *Telecommunications Act 1997* only declared NCAs may be used when calculating the NUSC. It is the ACA's view that it was largely an administrative oversight from Telstra that led to the ACA rejecting these areas. In estimating the NUSC amount for the 1998/99 and 1999/2000 financial years, the ACA has accepted information from Telstra which conforms with the definitions of NCAs contained in paragraphs 32 and 33 and broadly corresponds with declared NCAs for these years, although the formal legislative requirement of matching this information to declared NCAs has not been undertaken. There are some additional potential NCAs included in the ACA's NUSC estimates for 1998/99 and 1999/2000 that were not considered in the 1997/98 assessment. The ACA considers that all potential NCAs included in these estimates are reasonable.

ACA rationale for definition of potential NCAs in 1997/98 NUSC assessment

37. The rationale for defining potential NCAs under the categories set out in paragraph 32 was discussed in the *Net Universal Service Cost Assessment for 1997-98*, and is again summarised in this section. In broad terms, an ESA is Telstra's exchange service area, where an exchange is a point of convergence of telephone cables that has a specified set of number ranges. ESAs with less than 150 SIOs are costed as a single geographic area.

38. Once an ESA has 150 or more SIOs, there is the prospect that the rural township may be profitable, whereas there may be net costs associated with the supply of services to customers outside of this township. If these customers were costed together as a single unit, it could mean that the net costs of supplying services to one group of customers were partially offset by the profits in serving others, resulting in a possible understatement of the NUSC. As a result, the concept of a BUA and NBUA was developed.

39. A BUA is the area that a lay person would describe as the rural township. It includes contiguous, readily recognisable town blocks, recreation areas and other land normally associated with township activities. A NBUA is that part of an ESA outside the boundary of the BUA. Guidelines for defining these areas were developed in 1997 based on Australian Bureau of Statistics' (ABS) definitions of urban centres and localities.

40. Other defined NCAs are 'radio services' and payphones. The logic for costing these services separately is that they may have revenue and cost characteristics significantly different from that of the supply of the STS in small ESAs, BUAs and NBUAs.

41. The ACA's 1997/98 NUSC assessment found that the NCAs with the greatest NUSC amount were NBUAs, followed by small ESAs, radio (satellite) services, payphones and then BUAs. BUAs accounted for only around \$2 million of the overall assessed amount of \$548 million. However, on a per SIO basis, the most costly NCAs were radio services (defined as 'the premises to which radio services were supplied'), which—as set out in the 1997/98 report—were costed by the ACA on the basis that the most cost-efficient forward looking technology for these areas was geo-stationary satellite technology.

Carrier concerns with NCA definitions

42. The previous section contained a discussion of the rationale behind the ACA's definition of NCAs for the 1997/98 assessment. The ACA notes that these definitions are one of the most contentious aspects of the NUSC assessment and have been the subject of considerable industry debate. The ACA also notes that these definitions were debated and decided in the first half of 1997, during the early phase of the development of the NUSC costing model. Only carriers operating at that time—Telstra, Optus and Vodafone—were involved in the debate, as these were the parties who had contracted Bellcore to develop this model.

43. During the consultation phase of the ACA's consideration of NUSC estimates for the 1998/99 and 1999/2000 years, a number of submissions to the ACA have suggested that the ACA's NCA definitions are inappropriate.

44. Vodafone has argued that:

there is no quantitative evidence to support the view that the approach taken in 1997/98 to the definition and stratification of PNLAs was commercially optimal. In the light of the 'technology mix' methodology adopted by the ACA in its 1997/98 NUSC determination, the need for a special radio stratum is questionable, as is the splitting of ESAs into built-up and non-built-up areas (the rationale for splitting an ESA was that the infrastructure costs for a built-up area were different from the infrastructure costs of a non-built-up area. The technology mix approach takes account of this). If an ESA was not split up, then the total revenue from that ESA would automatically be included in the NUSC calculation.⁸

⁸ Vodafone/ACA communication, 6 January 2000.

45. Similarly, AAPT has maintained:

The current economic model treats the BUA and NBUA as separate groups of customers, with the only relationship being the same as with any other ESA as determined through the revenue foregone calculation. However, there is a much stronger community of interest between BUA and NBUA customers and if the NBUA customers were not served then the economic activity of the BUA customers would decline dramatically (both in terms of calls made/received and probably also in the number of lines).

This notion of "network externality" is well recognised in any networking business, but is particularly relevant to smaller rural communities where much of the economic activity of the BUA is dependent upon the presence of customers in the NBUA.

The current economic model fails to recognise the strength of this relationship in rural communities because it treats all ESAs (including the sub-ESAs) in the same way. Accordingly, by disaggregating certain rural ESAs into separate BUA and NBUA groups of customers the model fails to reflect the true relationship between these customer groups. As such it overestimates the true profitability of the BUA group, by attributing to it profits which depend upon the NBUA group being served. That is, it overestimates the NUSC of serving the NBUA by not attributing to this group that share of BUA profits which is incorrectly attributed to the BUA group.⁹

46. The fundamental principle underlying the NUSC assessment is that of determining the costs which would have been avoided by the USP if it did not have the obligation to provide defined USO services, as discussed in paragraph 31. Vodafone has argued that it would be 'commercially optimal' to combine NBUAs and BUAs. The ACA is required to determine whether a profit-motivated carrier would not provide services in any areas of Australia, and it is the ACA's view that many customers in NBUAs would in theory not be served by such a carrier, due to the losses the carrier would incur through such a policy. A substantial number of NBUAs in rural and remote areas of Australia were determined to be loss-making by the ACA in its 1997/98 NUSC assessment, which the ACA considers adds support to its position.

47. In reference to Vodafone's position that a 'radio services' NCA should not be treated as a separate NCA, the ACA considers this argument has merit where, as the result of an ACA assessment, the forward looking technology utilised for costing of services to the 'radio services' NCA is the same as that used for the costing of services to the majority of services in the related NBUA NCA. However, due to time constraints the NUSC estimates contained in this report have not utilised this analysis. In any case, the ACA considers that this modification to the NCA definition would have a very marginal effect in decreasing the NUSC amount. This conclusion is based on the overwhelming majority of NBUA NCAs and 'radio services' NCAs having been calculated as unprofitable for the 1998/99 and 1999/2000 financial years.

⁹ AAPT response to the Ovum 'Intangible Benefits' discussion paper, 13 December 1999.

However, including a 'radio services' NCA in a NBUA NCA may reduce the NUSC in the few situations where a loss making 'radio services' NCA is included in a profitable NBUA, and this NBUA remains profitable after this inclusion.

48. Notwithstanding the arguments presented above, the ACA considers that if the NUSC approach to determining USO costs is to remain a feature of the universal service regime, the appropriate definition of a NCA needs to be reconsidered. The ACA's position is based on the materiality of this definition to the assessed NUSC amount. This position is particularly pertinent to new carriers, such as AAPT, who have not previously been involved in the debate on this definition.

49. In reference to AAPT's arguments, the potential benefits derived from the concept of 'network externality' are discussed in the Network Effects section of this report.

Statistical issues

50. The ACA's *Net Universal Service Cost Assessment for 1997-98* contains considerable analysis of statistical issues associated with the 1997/98 NUSC assessment. In order to construct its 1997/98 NUSC claim, Telstra used sampling processes to calculate most revenue and cost inputs to the USO costing model. This means that there was a significant level of statistical uncertainty associated with the ACA's assessment of \$548,087,665, which, as referenced in paragraph 13, was measured at a 95% confidence interval of \pm \$71 million.¹⁰

51. The ACA notes that the estimates of the NUSC amount for the 1998/99 and 1999/2000 financial years must contain a greater level of statistical uncertainty than its 1997/98 NUSC assessment. This is a consequence of utilising a number of inputs—particularly revenue inputs—which are broad estimates. The ACA has not quantified the confidence intervals for the 1998/99 and 1999/2000 financial years and notes that there is not a linear relationship between changes in the NUSC amount and the confidence interval.

52. The ACA has utilised the same stratification of NCAs that was adopted in the 1997/98 NUSC assessment.

Assessment of revenue foregone

53. Subsection 57(2) of the TCPSS Act explains that the NUSC is the amount by which avoidable costs exceed revenue foregone in NCAs. It states that:

revenue foregone means an amount equal to so much of the revenue earned by the person during that financial year as it is reasonable to expect that the person would not have earned during the financial year if the person had not supplied services to net cost areas during that financial year.

¹⁰ A detailed discussion of statistical issues associated with the 1997/98 NUSC assessment is contained in the August 1999 report from the Statistical Consulting Centre, University of Melbourne, entitled *Statistical issues arising in the determination of the Net Universal Service Cost, 1997/98*. This report is available from the ACA's website at the following address: www.aca.gov.au/issues/report/nusc_03.htm

Estimate of Net Universal Service Costs for 1998/99 and 1999/2000

54. In the *Net Universal Service Cost Assessment for 1997-98*, the ACA used the Bellcore deliverables as the method for calculating revenue foregone, and this methodology has been adopted in the NUSC estimates for the 1998/99 and 1999/2000 financial years. However, as noted in paragraph 17, as actual revenue data in the format required is not available for these years, Telstra has provided estimates of revenue variations for 1998/99 and 1999/2000—using 1997/98 revenue data as the base data—for the major NUSC revenue categories. The ACA considers that, given the time in which to estimate the NUSC for these years, this method represents the most practical and effective method of estimating revenue.

55. Data provided by Telstra for the 1998/99 financial year is contained in the following table:

Table 4: Telstra NCA revenue variation from 1997/98 financial year

Product	1998/99 actual variation
STD Revenue	-1.0%
Local Call Revenues	+2.4%
Access Revenues	+5.0%
IDD Revenues	-20.0%
Fixed to Mobile Revenues	+18.7%
Interconnect	+6.0%
Other Revenues - estimates	0.0%
Payphones	-8.0%

56. Telstra has stated that the data in this table is from Telstra's audited 1998/99 results. Although this information relates to the revenue variation in Telstra products across Australia, rather than variation of products specifically in NCAs, Telstra has stated that there 'is no evidence that NLAs [NCAs] revenues are growing at a different rate.'¹¹ However, the ACA considers that the rate of variation may differ in NCAs, because of the lower/slower take-up of alternative providers in rural and remote areas compared with metropolitan areas.

57. For the 1999/2000 financial year, Telstra has provided similar data to the ACA on expected revenue growth of its products from the previous year. As Telstra has argued that this information is commercially sensitive, it has not been included in this report. It should be noted that Telstra's revenue projections indicate a further fall in some significant revenue products, which has the potential to increase the NUSC amount for this year.

Assessment of avoidable costs

58. The key components of avoidable costs are discussed in the following sections.

¹¹ Telstra-ACA communication, 23 December 1999.

THE OPPORTUNITY COST OF CAPITAL

59. As noted in paragraph 20, the ACG was asked to estimate the WACC for USO costing purposes for the 1998/99 and 1999/2000 financial years. Two estimates of the WACC for each of these years were required from ACG:

- (1) taking into account the existence of USO cost sharing arrangements, and
- (2) ignoring the impact of USO cost sharing arrangements.

60. The ACG recommended the following parameters and WACC values for 1998/99 and 1999/2000:

Table 5: CAPM parameters and WACC including impact of USO fund

Parameter	1998/99	1999/2000
Gearing Ratio	10.1%	10.1%
Risk Free Rate	5.4%	6.6%
Market Risk Premium	5.5%	5.5%
Asset Beta including impact of USO fund	0.1	0.1
Debt Beta	0.15	0.15
Equity Beta (β)	0.1	0.1
Debt Premium	0.8%	0.8%
Corporate Tax Rate	36%	36%
Imputation Factor (γ)	0.5	0.5
Post Tax WACC	4.6%	5.4%
Pre Tax WACC	7.2%	8.5%

Table 6: CAPM parameters and WACC excluding impact of USO fund

Parameter	1998/99	1999/2000
Gearing Ratio	10.1%	10.1%
Risk Free Rate	5.4%	6.6%
Market Risk Premium	5.5%	5.5%
Asset Beta excluding impact of USO fund	0.6	0.6
Debt Beta	0.15	0.15
Equity Beta (β)	0.64	0.64
Debt Premium	0.8%	0.8%
Corporate Tax Rate	36%	36%
Imputation Factor (γ)	0.5	0.5
Post Tax WACC	6.7%	7.6%
Pre Tax WACC	10.5%	11.8%

61. Carriers were given an opportunity to comment on these parameters. Very few new issues were raised for these financial years that were not previously raised and considered in relation to the 1997/98 financial year. The ACA supports the values in Tables 4 and 5 and the underlying rationale but wishes to add the following comments.

Impact of the USO cost sharing arrangements

62. The ACA ignored the impact of cost sharing arrangements in its 1997/98 NUSC assessment, as it considered it was legally constrained to do so by the ACA's *Net Universal Service Cost Avoidable Costs Determination 1998*. This Determination applies only to the 1997/98 year. The ACA is not similarly constrained in providing its advice to the Minister for the 1998/99 and 1999/2000 financial years.

63. The ACA made the following comments about USO cost sharing arrangements in its report to the Minister dated October 1999:

It is possible to mount arguments both ways about the treatment of the existence of the USO funding mechanism in calculating the WACC. The issue is, essentially, a policy matter. The question revolves around the appropriate perspective on costing the USO, and, as a consequence of this, the appropriate perspective on measuring risks associated with the fulfilment of the USO.

If the approach adopted is that the existence of the funding mechanism is a reasonable factor for a carrier to take into account in deciding whether or not to become a USP, then the WACC should reflect this approach. If, on the other hand, the existence of the USO funding mechanism is not relevant for costing purposes, for example if the chosen perspective is that the USP would not

provide the services absent the obligation, then the WACC should be calculated without reference to the funding arrangements.¹²

64. If the Minister decided that cost-sharing arrangements should be taken into account, then the WACC figures provided in Table 5 should be used for USO costing purposes. However, if the Minister decides that cost-sharing arrangements are not a relevant consideration, then the WACC figures provided in Table 6 should be used for costing purposes.

65. Further details about the relevance of cost sharing arrangements in calculating the WACC are contained in the ACA's report *Net Universal Service Cost Assessment for 1997-98*.

Gearing ratio

66. The gearing ratio measures the market value of debt as a percentage of the market value of debt plus equity. The ACG has recommended a ratio of 0.101 for both 1998/99 and 1999/2000, which is a reasonable estimate in the circumstances. This is also the ratio used by the ACA in its 1997/98 NUSC assessment.

67. Some parties have argued that the gearing ratio should be 0.40 or higher which will significantly reduce the WACC for these years. Although a debt ratio of 0.101 might seem low, there has been no rigorous study to suggest that the optimal capital structure would have a different gearing ratio. Also, as the gearing level goes up, the equity beta will increase to reflect the additional risk of holding equity, resulting in a net negligible impact on the WACC. As a result, a gearing ratio of 0.101 is acceptable for costing purposes for both the 1998/99 and 1999/2000 financial years.

Risk free rate

68. The risk free rate is commonly measured based on the 10 year Commonwealth bond rate over the period in question. The ACA supports the ACG values of 5.4% and 6.6% for 1998/99 and 1999/2000 respectively on the basis that the approach used by ACG for estimating the risk free rate for these years is consistent with the method used in the ACA's 1997/98 NUSC assessment.

69. The theoretical case for why it is desirable to calculate the risk free rate as a year average has not changed from 1997/98. No convincing arguments have been raised for departing from the approach recommended by ACG for 1998/99 and 1999/2000.

Market risk premium

70. The market risk premium is a measure of the additional return that an investor in a diversified equity portfolio would require over and above the risk free rate. Estimating the premium is a difficult exercise and has traditionally relied on analysis of returns over long periods of time. In recent years, there have been claims that the market risk premium has fallen well below the traditional estimate of 6.0%.

¹² ACA Report on USO Costing and Assessment Arrangements, October 1999, pages 4-5.

However, quantifying the premium requires some judgment and there does not appear to be any consensus as to the new level of the premium.

71. The ACA believes that the market risk premium has probably fallen and that a premium of 5.5% for 1998/99 and 1999/2000 is reasonable. It is consistent with a draft ACCC decision in May 1999¹³ and a final IPART decision in April 1999¹⁴. This premium is marginally below the figure of 6.0% that was used in the 1997/98 NUSC assessment. It is still well above some of the more recent aggressive estimates of the premium which range to as low as 0%.

72. Estimates of the market risk premium of 0% coming from the United States appear to rely heavily on the assumption that the stock market in that country will continue its recent surge. This assumption could be proven wrong at any time, especially if the Internet bubble bursts, taking stock prices down with it in that country.

73. Telstra has referred to a survey of financial economists conducted by Ivo Welch of UCLA in which it claimed that the median estimates of the market risk premium in the United States is about 7% to 8%. However, a more recent version of Welch's paper¹⁵ suggests that this is not true. The median actual forecasts of the market risk premium for horizons 1 to 30 years by the 200⁺ financial economists was somewhat lower—6% to 7%. The 1 year forecast was 6%. Also, Welsh himself in another paper on the same subject states that

I personally consider the consensus estimate of financial economists of a 6% equity risk premium—and certainly the estimates of almost a third of the profession of 8%—to be too high...I find a 3% (geometric) equity risk premium ... and a 5% arithmetic equity risk premium estimate to be more comfortable to recommend to my students for use in capital budgeting and investment allocation decisions¹⁶.

74. A market risk premium of 5.5% appears prudent for USO costing purposes for 1998/99 and 1999/2000. It remains to be seen whether there is evidence for further movement of the premium in future years.

Equity beta

75. The equity beta is used to quantify the non-diversifiable risks and asymmetric risks associated with holding equity. As outlined in the ACG report, valuing the equity beta is a difficult exercise and requires consideration of many risks, which can result in positive and negative benefits to the universal service provider. There is also the policy issue covered earlier as to whether or not USO cost sharing arrangements should be taken into account in calculating the WACC.

¹³ ACCC, *Draft Decision on the Access Arrangement by AGL Pipelines (NSW) Pty Ltd for the Central West Pipeline*, 10 September 1999, page 38.

¹⁴ IPART, *Aspects of the NSW Rail Access Regime*, Review Report No. 99-4, 28 April 1999, page 57.

¹⁵ *Views of Financial Economists on the Equity Premium and on Other Professional Controversies*, Ivo Welsh, 15 December 1999.

¹⁶ *A Note on the Equity Size Puzzle*, Ivo Welsh, 1999, page 6.

76. As indicated earlier, most arguments raised about the equity beta were considered in relation to the 1997/98 financial year. As a result, they will not be repeated here. Telstra claimed that it was inappropriate to count universal presence and enhanced brand recognition as upside asymmetric risk since they were being separately analysed by Ovum for possible offset against the net universal service cost. ACG has since confirmed that, as the ACA was explicitly estimating them, it has “excluded such benefits in consideration of how upside asymmetric risks might affect beta. Hence, there was no double counting.”¹⁷

77. A further argument raised by Telstra is that the decision to cap the NUSC amount for 1997/98 is tangible evidence that regulatory risk is significant and should be reflected in a higher equity beta. However, regulatory risks can go both ways and it is possible that Telstra can benefit from regulatory decisions as well. For example, use of the statutory tax rate as the effective tax rate, selection of the market risk premium, the installed cost of technologies, and so forth.

78. The ACA believes that the equity beta values of 0.1 and 0.64 are reasonable estimates for scenarios where USO cost sharing arrangements are and are not taken into account. The ACA believes that it is a policy matter for Government to decide whether or not to take into account USO cost sharing arrangements in calculating the WACC.

Debt premium

79. The debt premium is firm specific and has been calculated as the margin that Telstra must offer above 10-year government bonds to attract bondholders of similar maturity bonds. The debt premium of 0.8% for the 1998/99 and 1999/2000 financial years for Telstra has been calculated based on an analysis of returns and the method used to arrive at this figure is consistent with the approach used in the 1997/98 NUSC assessment. A debt premium of 0.8% is considered reasonable for USO costing purposes for the 1998/99 and 1999/2000 financial years.

Corporate tax rate

80. As indicated in the ACG report and the ACA’s 1997/98 NUSC assessment, the effective tax rate should be used in calculating the WACC for USO costing purposes. However, estimating this figure is extremely difficult and so the statutory tax rate is an appropriate alternative.

81. Carrier estimates of the effective tax rate ranged from 20% by C & W Optus to 32.86% by Vodafone. The problem with these estimates is that they are sometimes based on Telstra as a whole rather than the USO business. Also, the C & W Optus estimate makes “no allowance in the model for inflation, the inclusion of which raises the effective tax rate (since inflation reduces the real value of depreciation allowances based on historical cost). The model is also sensitive to the choice of the discount rate.”¹⁸

¹⁷ Email from ACG, 11 January 2000.

¹⁸ ACG, *Cost of Capital for Delivering Universal Service Obligations: Estimates for 1998/99 and 1999/2000*, 17 December 1999, page 25.

82. The ACA also notes that the Victorian Office of the Regulator-General (ORG) used 25% as the effective tax rate in its draft determination of the access arrangements for gas distribution in March 1998. However, after receiving submissions criticising the financial modelling used to estimate the effective tax rate over 50 years, ORG reverted to the statutory tax rate.

83. Estimating the effective tax rate is clearly very difficult. In the absence of better data, the ACA believes that the statutory tax rate of 36% should be used for 1998/99 and 1999/2000. This is the same rate that was used in respect of the 1997/98 financial year.

Imputation factor

84. The imputation factor is a measure of the value of imputation credits to shareholders. The ACG has recommended an imputation factor of 0.5 for both 1998/99 and 1999/2000. This is the same value used by the ACA in the 1997/98 NUSC assessment. The ACA has not received any new arguments that would lead it to change its views from the 1997/98 financial year.

SUMMARY

85. If the Minister forms the view that USO cost sharing arrangements should be taken into account in considering the risks associated with USO provision, then the WACC for 1998/99 and 1999/2000 should be 7.2% and 8.5% respectively.

86. However, if the Minister forms the view that USO cost sharing arrangements are not a relevant consideration, then the WACC for 1998/99 and 1999/2000 should be 10.5% and 11.8% respectively.

LEVELISATION OF COSTS

87. In the *Net Universal Service Cost Assessment for 1997–98*, the ACA considered the problems associated with calculating avoidable costs based on the assumption of brand new assets each year. If depreciation costs and the opportunity cost of capital were calculated each year and it was assumed for costing purposes that a brand new forward-looking technology was installed each year, then there would be an overstatement of avoidable costs each year. This is because depreciation costs and/or the opportunity cost of capital will generally be higher in the first year and will diminish over time. In order to avoid an overstatement of avoidable costs, the ACA adopted the following formula for converting capital costs into an effective annuity. The total capital return required for a particular year (A_t) is calculated according the formula:

$$A_t = \frac{P \times (WACC - INF + TECH) \times (1 + INF - TECH)^{T-1}}{(1 - (1 + INF - TECH)^n) / (1 + WACC)^n}$$

Where

P is the price of the asset in year one;

WACC is the weighted average cost of capital;

INF is the expected change in the general level of prices in the economy over the life of the asset;
TECH is the effect on prices of technological change over the life of the asset¹⁹;
T is the year of operation (starting with T=1); and
n is the average asset life in years.

88. The ACA sees no reason to depart from the levelisation approach used for the 1997/98 year. The NUSC estimates in this report have therefore been prepared based on the formula shown above.

Technology selection and installed costs

BACKGROUND

89. The ACA has selected technologies suitable for use in calculating the NUSC for the 1998/99 and 1999/2000 financial years using the same broad methodology as adopted for the 1997/98 NUSC assessment. In addition, the principal consultant commissioned by the ACA to advise on the selection of technologies for the 1997/98 year—Gibson Quai—was also commissioned to advise on appropriate technologies and the costs of these technologies for the following two years. A draft Gibson Quai report entitled *USO Forward Looking Technologies for 1998/99 and 1999/2000* was issued for industry comment on 24 December 1999. The final Gibson Quai Report was provided to the ACA on 13 January 2000.

90. For reasons specified in the *Net Universal Service Cost Assessment for 1997-98*²⁰, the relevant dates for selection and costing of technologies for the 1998/99 and 1999/2000 financial years are 1 July 1998 and 1 July 1999.

91. The ACA advised Gibson Quai to adopt the same technology selection principles which had been utilised by the ACA in its *Net Universal Service Cost Assessment for 1997-98*.²¹ Gibson Quai also adopted these principles in its report (produced in conjunction with Ovum) to the ACA related to the 1997/98 assessment, entitled *ACA USO Forward Looking Technologies Study: Final Position Paper*.

92. In summary, NUSC technologies are selected on the basis that the USP supplies carriage services using the most cost effective technology and production practices that:

- a) are available; and
- b) are suitable for Australian conditions; and
- c) are reasonably suitable for integration with the person's existing telecommunications network; and

¹⁹ A positive tech value suggests that the price of the technology is expected to drop over the life of the asset. A negative tech value suggests that the price of the technology is expected to increase over the life of the asset.

²⁰ Refer to paragraphs 265-267 of the *Net Universal Service Cost Assessment for 1997-98*.

²¹ Refer to paragraphs 263-283 of the *Net Universal Service Cost Assessment for 1997-98*.

- d) comply with Australian regulations, codes and standards applying to the supply of carriage services.

93. As well as meeting the requirements of a voice grade telephone service, the data rate capability required of a technology is 2.4 kbit/s. In the 1998/99 and 1999/2000 financial years, this was the only data capability required of the standard telephone service under Australian standards.²²

TECHNOLOGIES ACCEPTED AND REJECTED BY GIBSON QUAI

94. In its *Net Universal Service Cost Assessment for 1997-98*, the ACA accepted the Gibson Quai analysis concerning the technologies that met the technology selection principles. These technologies were:

- a) copper cable in the CAN;
- b) two terrestrial radio solutions;
 - i) wireless local loop (WLL);
 - ii) point-to-multipoint microwave; and
- c) a satellite solution.

95. Gibson Quai has found—and the ACA agrees—that these technologies continue to meet the selection principles for the 1998/99 and 1999/2000 financial years.

96. New technologies examined by Gibson Quai in the 1998/99 and 1999/2000 period were:

- a) Global System for Mobile Communications (GSM) 900/1800—with the enhanced full rate codec—suitability as of 1 July 1998; and
- b) Code Division Multiple Access (CDMA)—suitability as of 1 July 1999.

97. Gibson Quai also considered Low Earth Orbiting (LEO) satellites and concluded that this technology was not suitable as of 1 July 1999. Although Gibson Quai noted that Iridium was providing services via LEO technology prior to 1 July 1999, it assessed this technology as not proven or robust (measures used to ascertain whether technologies are suitable for Australian conditions) as of this date. In making this conclusion, Gibson Quai stated that:

There is considerable evidence of call drop out associated with the system operation and the Consultants have concerns about the Iridium Satellite system's operational performance under the degree of stress that might be imposed if it was used to deliver the USO.²³

98. Gibson Quai also noted that the Globalstar LEO satellite was not available as of 1 July 1999.

²² Refer to paragraphs 278-283 of the *Net Universal Service Cost Assessment for 1997-98* for a discussion of the rationale for this data rate capability.

²³ Gibson Quai, section 3.5.

Rejection of CDMA as an appropriate USO technology

99. In relation to CDMA availability as of 1 July 1998, Gibson Quai stated that:

CDMA is a mobile radio access technology. However, it was not considered to be available for supply on a commercial basis as at the 1 July 1998 because spectrum was not available on that date.²⁴

100. The ACA notes that decisions concerning spectrum deployment and availability would have been made differently if Telstra had been seeking to deploy CDMA on a large scale as of 1 July 1998. Consequently, the ACA considers that in this circumstance the actual lack of available spectrum for CDMA services as of 1 July 1998 should not be a factor in a decision on whether this technology is suitable or not. However, it is noted that Gibson Quai rejects CDMA on other grounds as of this date, as it was 'not proven for supply on a commercial basis' (measure used to ascertain whether technologies are suitable for Australian conditions).

101. Gibson Quai have also raised a potential problem with the suitability of CDMA as a forward-looking technology as of 1 July 1999:

CDMA could have been deployed at the 1st July, 1999 - Nevertheless, the Consultants have some concern in relation to the CDMA codec and its ability to deliver a service which meets the performance requirements laid down by the ACA Standard TS 027. At the time of issue of this Report, the Consultants have been unable to establish a conclusive position on whether CDMA complied with the appropriate standards at 1st July, 1998 or 1st July 1999.²⁵

102. The ACA notes that although TS027 has now been replaced by the ACIF standard G502: 1998, G502 does not contain a direct reference to CDMA standards.

103. The ACA notes that, in its response to the Gibson Quai draft report *USO Forward Looking Technologies for 1998/99 and 1999/2000*, Orange have argued that CDMA does conform to USO service requirements.²⁶

104. The ACA considers that, in the context of estimating the NUSC for the 1998/99 and 1999/2000 financial years, the technical compliance of CDMA does not require further investigation, as it has accepted the Gibson Quai conclusion that CDMA is a more expensive technology than GSM in NCAs. On the cost issue, Gibson Quai states:

Analysis of the installed cost of CDMA including a new network and comparison of those costs with GSM indicates that GSM is considerably less expensive than CDMA.²⁷

105. C & W Optus, AAPT and Orange (Hutchison Telecommunications) commented on Gibson Quai's exclusion of CDMA on cost grounds for 1999/2000. C & W Optus,

²⁴ Gibson Quai, Table 3.1

²⁵ Gibson Quai, section 3.4.

²⁶ Orange, USO Review.

²⁷ Gibson Quai, section 4.3.8.

noting the extended coverage capabilities of CDMA from a base station in comparison with GSM, argued that:

Attention needs to be brought to the fact that key differences between CDMA and GSM may affect selection in particular areas given different characteristics in range and capacity that can be achieved ie. capability to service more than one ESA from a CDMA or GSM base station.²⁸

106. AAPT also commented generally on the ability of a wireless network design to optimally serve more than one ESA, stating that:

In respect of the GSM analysis undertaken by Gibson Quai, AAPT notes that the “green fields approach” adopted (as described in 4.7.3) is likely to underestimate the potential application of GSM as the most appropriate forward looking technology for USO provision. In this respect, AAPT notes and agrees with the following comments made in section 7.3 [of the Gibson Quai report] regarding the most cost efficient technology:

3. *With sufficient SIO numbers and in favourable radio terrain, terrestrial radio will be more cost effective than either cable or satellite. If radio was considered for several contiguous PNLAs, it could be expected to play a larger role.*
4. *The approach to costing using sample PNLAs with only limited characterising data and using strata to scale up the full population, best suits a cable technology outcome and is positively biased against terrestrial radio as an outcome. If a wireless technology were in use the PNLAs nominated would most likely be of different dimensions.*
6. *The use of terrestrial radio technologies to service customers in more than one ESA would also potentially provide a lower cost solution as technologies such as GSM can cover multiple ESAs.*

107. It should be noted that under the NUSC costing methodology, Gibson Quai was required to cost ESAs on an individual basis. Gibson Quai argues that in the sample ESAs, CDMA and GSM network designs were similar with GSM providing a lower cost base.

108. The ACA’s *Net Universal Service Cost Assessment for 1997-98* provides considerable information on the use of sample ESAs as the basis of the NUSC costing methodology. The report explains that costs were determined for sample exchanges on the basis of least cost technologies, and subsequently applied to all potential NCAs based on stratification of the sample exchanges. This methodology does not allow for potential cost reductions derived through the capability of a radio technology base station to serve adjacent ESAs.

²⁸ C & W Optus response to the draft *USO Forward Looking Technologies for 1998/99 and 1999/2000* prepared by Gibson Quai Pty Ltd, p.5.

109. Allowing for the different coverage characteristics of wireless technologies—in comparison with copper cable technologies—to be factored into cost calculations is potentially one modification that could be made to improve the NUSC costing model. No methodology currently exists for performing this analysis.

110. Orange—which is providing CDMA as a WLL service—offered the following comments on Gibson Quai's CDMA cost analysis relating to the 1999/2000 year:

[Orange] regrets that it has been unable to provide costing data relating CDMA to GSM technology. However the Gibson Quai assessment is probably reasonable.²⁹

111. Nonetheless, industry expects there will be cost reductions in CDMA technology over time and the ACA agrees with the C & W Optus argument that the consideration of CDMA as a USO technology 'should be revisited in a future study'.³⁰

112. Telstra, which is currently deploying a CDMA mobile network, did not offer comment on CDMA costs, as it has rejected CDMA as a suitable technology for 1999/2000 on the basis that:

Telstra was not able to roll out a CDMA network that would meet both Government and customer expectations of service before 1 July 1999.³¹

113. The ACA notes that Telstra's argument is somewhat disingenuous, as it commenced rolling out its own CDMA mobile network in August 1999. Conversely, information obtained from the Telstra website indicates that CDMA technology has already achieved a significant penetration rate throughout the world:

CDMA is currently operating in a number of countries including the USA, Canada, South Korea, Hong Kong, Japan and Singapore. According to the CDMA Development Group, there are currently around 30 million customers using CDMA networks throughout the world. Of these customers, 30 per cent are based in North America, 64 per cent in the Asia Pacific region, and six per cent in Latin America and throughout the rest of the world.

114. On the basis of cost information relevant to the 1999/2000 year and the requirements of the costing methodology contained in the NUSC costing model, the ACA considers that Gibson Quai's rejection of CDMA for this year is an appropriate decision.

Suitability of GSM as a fixed radio access application

115. The ACA's *Net Universal Service Cost Assessment for 1997-98* discussed the debate on whether GSM, utilising the RPE-LTP full rate codec for voice coding, met the relevant voice quality service standards for USO services. Gibson Quai concluded

²⁹ Orange, USO Review.

³⁰ C & W Optus response to the draft *USO Forward Looking Technologies for 1998/99 and 1999/2000* prepared by Gibson Quai Pty Ltd, p.2.

³¹ Telstra Response to Gibson Quai Draft *USO Forward Looking Technologies For 1998/99 and 1999/2000 Paper*.

that this codec did not meet the requirements of AUSTEL's TS027 *End-to-end Network Performance Standard*, which was assumed to have applied at 1 July 1997. However, Gibson Quai found that GSM would have met the relevant voice quality service standard applicable as of 1 July 1998, if it employed the enhanced full rate codec. In September 1997, Ericsson introduced this codec to a GSM 900 network in Asia, which the ACA considers to be the starting date for the acceptance of this technology as a forward-looking technology.

116. In its response to the Gibson Quai explanatory paper and cost matrix on USO forward looking technologies for 1998/99 and 1999/2000 (the 'Gibson Quai cost matrix'), issued for industry comment on 20 November 1999, Telstra raised a concern about the end to end performance of GSM.

The issue that seems to have been neglected in GQ's consideration of this technology is that in a WLL environment, there are **two access network portions** when establishing a WLL to WLL call. Based on the voice coding requirements as detailed in section 2.3.2 [of the Gibson Quai Cost matrix], Wireless CAN Design Parameters, each access network portion will incur a QDU factor of 3.5 or an EIF [Equipment Impairment Factor] of 7. As such any **WLL to WLL call will generate a QDU or EIF factor in excess of the national requirement** for the access network.

Whilst it could be argued that WLL to fixed services may not exceed the national requirement, the reality is that a high proportion of calls are local and all calls made from WLL to WLL services would be prohibited under TS 027.

117. The ACA and Gibson Quai have examined the issue raised by Telstra and found it lacking in substance. There is no reference in TS027 to the required QDU or EIF factor pertaining to a WLL to WLL call. However, the Australian Network Performance Plan is now specified in ACIF G502: 1998. As noted in section 4.6.1 of the Gibson Quai report, this is the relevant standard to apply for the 1998/99 and 1999/2000 years. The overall end-to-end EIF requirement for the GSM to GSM connection type is specified in table 7.6.8 of G502: 1998. When using the GSM enhanced full rate codec, EIF requirements are met. No other carrier argued that GSM was an unsuitable forward-looking technology.

Assessment of GSM technology costs

118. As GSM fixed line services were not costed in the 1997/98 NUSC assessment, this section contains a discussion of comments received on Gibson Quai's costs for this technology.

119. In response to the ACA's request for cost data for populating the Gibson Quai cost matrix, the only carriers to provide GSM cost data were Vodafone and C & W Optus. Telstra did not provide GSM cost data. However, it claimed that GSM costs were 'substantially higher' (presumably than services provided by copper cable), justifying its position with the following comments:

Estimate of Net Universal Service Costs for 1998/99 and 1999/2000

GQ has indicated that at a high level, the cost per mobile SIO can be estimated from various industry reports including knowledge gained through providing consultative services and information contained in their databases.

Telstra is of the view that it can be seen fairly readily that the cost of providing fixed access services by GSM (regardless of technical feasibility) is substantially higher and can be discounted as a USO option.

Given GQs judgement about high level costs, it would appear unnecessary for Telstra to provide cost information. Telstra would like to also recommend that in future it may be better for the consultants to provide cost information for the industry to review.³²

120. The Gibson Quai GSM unit cost data for the 1998/99 and 1999/2000 financial years is contained in Table 7 and Table 8, below.

³² Telstra Response to Gibson Quai *USO Forward looking technologies Cost Matrix Explanatory Paper*.

Table 7: GSM Technology Input Table 1998/99

GSM				
Satellite Coverage percentage			10%	
Estimated Number of SIOs			50,000	
	Sub Unit Cost	Unit Cost	Max SIO per Unit	Asset Life Years
	\$	\$		
Capital Cost (CAN)				
Mast/tower (40 metre ave) & civil works		90,000		20.00
Land		25,000		0.00
Building		25,000		20.00
Preplanning, surveys		40,000		10.00
Installation radio equipment		25,000		10.00
Power supply		20,000		10.00
Radio, antennas, feeders & <50 SIOs		106,000		10.00
<100 SIOs		125,000		10.00
<150 SIOs		145,000		10.00
<200 SIOs		170,000		10.00
<300 SIOs		205,000		10.00
Links to BSC/MSC		50,000		10.00
Integration	33,187,500	664		10.00
CPEs				
Analogue handset		112		10.00
GSM fixed unit		1,200		10.00
Power supply & battery backup		100		5.00
Installation		250		10.00
Special antenna		100		10.00
Operating Costs per SIO:				
Operating		300		
Switch		500		

Table 8: GSM Technology Input Table 1999/2000

GSM				
Satellite Coverage percentage			10%	
Estimated number of SIOs			52,000	
	Sub Unit Cost	Unit Cost	Max SIO per Unit	Asset Life Years
	\$	\$		
Capital Cost (CAN)				
Mast/tower (40 metre ave) & civil works		94,050		20.00
Land		27,750		0.00
Building		25,750		20.00
Preplanning, surveys		41,200		10.00
Installation radio equipment		25,750		10.00
Power supply		18,000		10.00
Radio, antennas, feeders & <50 SIOs		94,5000		10.00
<100 SIOs		112,500		10.00
<150 SIOs		130,500		10.00
<200 SIOs		153,000		10.00
<300 SIOs		184,500		10.00
Links to BSC/MSC		46,000		10.00
Integration	35,510,625	683		10.00
CPEs				
Analogue handset		105		10.00
GSM fixed unit		1,080		10.00
Power supply & battery backup		90		5.00
Installation		258		10.00
Special antenna		90		10.00
Operating Costs per SIO:				
Operating		309		
Switch		475		

121. Carriers provided the following comments on Gibson Quai's GSM costs, in response to the draft *USO Forward Looking Technologies for 1998/99 and 1999/2000*. Although Telstra provided a number of arguments associated with the technical difficulties of integrating GSM with its network and the unsuitability of GSM as a USO technology in the nominated years, it did not provide specific

comment on the Gibson Quai's GSM unit costs. (The ACA notes that although only a brief period was provided for comment on the Gibson Quai draft report, one of the reasons the report was circulated to industry was to provide the opportunity for comment on Gibson Quai's costs, as proposed by Telstra in the quote contained in paragraph 118.)

122. C & W Optus argued that:

the GSM costs appear to be overstated by some \$700 per service on an annualised basis predominantly due to the excessive switching costs (\$500) and the transmission costs to the MSC [main switching centre]³³

123. The Gibson Quai analysis is based on the assumed level of traffic that would be generated by a fixed service as opposed to a mobile service. The level of fixed traffic assumed is considerably greater than with mobile services, leading to an increased allowance for switching costs. Gibson Quai have provided the ACA with the assumptions supporting its switching costs, which the ACA consider to be reasonable in order to ensure the standard of service required of the standard telephone service in USO areas.

124. Vodafone generally supported Gibson Quai's GSM costs, stating that:

While we have different estimates of some of the component costs, the Gibson Quai estimate of the overall cost of providing a GSM service is in line with our experience.³⁴

125. Orange stated that:

The assessment of the integration costs for GSM to provide fixed type services (5.8) and the equipment assumptions ignore the developments taking place for the deployment of CDMA and GSM as wireless local loop services by Hutchison and One.Tel. There is no reason why the handset needs to be a fixed unit rather than a normal handset and therefore cost more like \$600 than \$1200. The integration cost from experience is significantly less than \$35M though [Orange's] arrangements with its vendor do not enable us to separate out the actual cost.³⁵

126. The rationale for utilising a fixed service (rather than a mobile handset) was also challenged by Vodafone. However, the ACA has based its 1998/99 and 1999/2000 cost estimates on the same assumptions that were adopted in the 1997/98 NUSC estimates, which rejected use of a mobile handset. After industry consultation in relation to the 1997/98 NUSC assessment, Gibson Quai identified a list of 'USO Service Functional Requirements' that are referenced in its *ACA USO Forward Looking Technologies Study: Final Position Paper*. For example, the ability to connect a standard two wire analogue telephone and to receive dial tone formed part

³³ C & W Optus response to the draft *USO Forward Looking Technologies for 1998/99 and 1999/2000* prepared by Gibson Quai Pty Ltd, p.1.

³⁴ Vodafone email response to GQ draft report, entitled *Estimate of 1998/98 & 1999/2000 NUSC amounts*.

³⁵ Orange, USO Review.

of these functional requirements, as well as a reliable continuing power supply. The ACA considered these criteria appropriate for the 1997/98 NUSC assessment. As with a number of other issues identified in this report, if USO costing is to be performed in subsequent years these USO service functional requirements would need to be reassessed by the ACA, in consultation with industry.

127. On the basis of the best available information—and for the reasons specified in this section—the ACA considers Gibson Quai’s GSM costs to be appropriate for USO costing for 1998/99 and 1999/2000.

INSTALLED COSTS OF COPPER CABLE AND SATELLITE SERVICES

128. The section of this report, ‘Levelisation of costs’ and the same titled section in the *Net Universal Service Cost Assessment for 1997-98* discuss the need to levelise costs in order to prevent a potential over-statement of capital costs in the NUSC assessment. An element of the equation to levelise costs is the ‘TECH factor’, which is defined as the effect on prices of technological change over the life of the asset.

129. In assessing the installed costs of copper cable and satellite services, Gibson Quai has generally applied a TECH factor to the ACA’s technology cost assessment made in 1997/98, in order to determine the costs of these technologies in the 1998/99 and 1999/2000 financial years. This methodology is acceptable to the ACA, as are the TECH factors utilised by Gibson Quai in its cost assessment.³⁶ A detailed assessment of these costs was provided in the *Net Universal Service Cost Assessment for 1997-98*.

INSTALLED COSTS OF PAYPHONES

130. As with the installed costs of copper cable and satellite services, Gibson Quai derived its payphone costs on the basis of the assessed costs of payphones in 1997/98, with some modifications for inflationary changes relevant to the 1998/99 and 1999/2000 years. These modifications are identified in the ‘TECH factor and Inflation’ section of the Gibson Quai report.³⁷ Payphone costs were assessed by the ACA in its *Net Universal Service Cost Assessment for 1997-98*, and the 1998/99 and 1999/2000 costs only vary marginally from the 1997/98 costs. Gibson Quai’s payphone costs are acceptable to the ACA.

ASSET LIVES, OPERATING EXPENSES AND SWITCH COSTS

131. In its NUSC estimate for 1998/99 and 1999/2000 financial years, the ACA has adopted the asset lives, operating expenses and switching costs recommended by Gibson Quai. A discussion of the appropriateness of Gibson Quai’s GSM switching costs is contained in paragraphs 122 and 123.

132. Where a technology was costed for the 1997/98 NUSC assessment, Gibson Quai has adopted the asset life data contained in the ACA’s *Net Universal Service Cost Assessment for 1997-98*. Gibson Quai’s GSM asset life data is broadly consistent

³⁶ Gibson Quai, section 5.3 ‘TECH Factor and Inflation’.

³⁷ Gibson Quai, section 5.3 ‘TECH Factor and Inflation’. Also refer to section 5.11 ‘Public Telephones’.

with its WLL and Point to Multipoint Microwave data, although asset lives are slightly lower—12 years compared with 10 years—for a number of categories (for example, customer equipment). The ACA notes that, in responses received to the Gibson Quai issues matrix, there was a general industry consensus that 10 years was an appropriate asset life for equipment items.

ACA DECISION ON SUITABLE TECHNOLOGIES

133. The Gibson Quai report *USO Forward Looking Technologies for 1998/99 and 1999/2000* provides the rationale for its selection of the NUSC technologies, which the ACA does not intend to replicate in this report. Given the discussion above and for the purposes of the 1998/99 and 1999/2000 NUSC estimates the ACA has adopted the Gibson Quai recommendations on suitable technologies. (Refer to the section ‘Discussion of significant issues in technology selection’ for the ACA’s analysis of some significant issues in relation to technology selection.)

134. In summary, the Gibson Quai findings were that three technologies (copper, GSM and satellite) can be used to service all USO requirements in the 1998/99 and 1999/2000 period. This differs from the 1997/98 period as GSM has replaced WLL and Point to Multipoint microwave as the most economical terrestrial radio solution.

Installed costs of technologies applied to Net Cost Areas

135. As discussed in paragraph 133, in its estimate of NUSC costs for the 1998/99 and 1999/2000 financial years the ACA has adopted Gibson Quai’s installed costs of technologies. These costs are identified in Chapter 5 of the Gibson Quai report *USO Forward Looking Technologies for 1998/99 and 1999/2000* and are not repeated here.

136. The Gibson Quai installed costs produced the following annual cost per SIO for the small, built-up and non built-up NCAs.

Table 9: Average Annual Cost per SIO by NCA (\$)

YEAR	WACC	Small	NBU	BU
1998/99	7.2%	2312	1811	732
1998/99*	10.5%	2593	2075	844
1999/2000	8.5%	2289	1826	766
1999/2000*	11.8%	2560	2061	883

* Excludes consideration of the USO funding mechanism (refer paragraph 60).

Discussion of significant issues in technology selection

137. This section identifies some key technology selection issues identified by carriers.

Level of traffic assumed in Gibson Quai cost assessment

138. Telstra argued in a number of areas in its response to the Gibson Quai cost matrix that Gibson Quai had erred in the level of traffic assumed in its cost assessment, maintaining that the consultants have underestimated the level of traffic occurring in potential NCAs. The relevance of any traffic level underestimate would be that various equipment costs would consequently be understated. For example, in relation to IRT Central Station Equipment costs, Telstra stated:

G&Q has made a fundamental error in calculating the number of services which can be connected to a Central Station (CS)³⁸. For 30 trunk circuits, and a GOS of 0.01 (min), the offered track must be greater than 20.3 - 21.0 Erlangs. LRIC principles applied in Australia and internationally are used to determine the relevant volumes of traffic.

The network is designed to carry the volume of traffic that the actual network carried in the year for which the network is being designed. In the case of NUSC, the relevant volume of traffic is all PSTN traffic carried by Telstra's network in PNLAs in 1997-98 and Telstra has determined this to be 130mE, as this reflects the actual traffic in rural and remote areas. Telstra recommends that the ACA discuss this matter with the ACCC for clarification and consistency with the NERA model.

Using the ACA's figure of 200 services on a CS, a customer would receive a GOS of less than 0.01. In its Preliminary View³⁹, the ACA states:

"The technology must also be capable of satisfying a reasonably foreseeable minimum level of demand for services in the area."

In miscalculating this data, the ACA have not meet the GOS of 0.01 and will increase the probability of these systems reaching congestion much earlier, ie the Central Station would run into congestion sooner than the asset life of 12 years.⁴⁰

139. Subsequent to receiving Telstra's comments on the Gibson Quai cost matrix, the ACA sought further information from Telstra to support its argument that traffic levels in potential NCAs were greater than the Gibson Quai assumed level. This information was provided to Gibson Quai, which has advised the ACA that it is of no practical value in consideration of traffic levels in potential NCAs. Gibson Quai has noted that the Telstra information was not supported by actual traffic study figures and the nature of the busy hour data information was not qualified (eg. timed consistent busy hour, busiest hour, average busy hour). Traffic level calculations can vary considerably, depending on the nature of the busy hour data adopted. The ACA has also examined the Telstra data and has concluded that it is extraneous to the consideration of this issue. The ACA notes that it is incumbent on Telstra—as the

³⁸ ACA Prelim View, para 368

³⁹ ACA Prelim View, para 38

⁴⁰ *Telstra Response to USO Forward Looking Technologies Cost Matrix Explanatory Paper*, section 6.1.3.

principal carrier in rural and remote areas with considerable information on traffic data for these areas—to provide appropriate information to support its arguments.

140. In order to test the potential significance of increased traffic levels to the estimated NUSC amount, the ACA advised Gibson Quai to perform sensitivity analysis on varying the level of traffic to the 130mE traffic level proposed by Telstra.⁴¹ As noted in the following quote, Gibson Quai has concluded that an increase in traffic levels has a minimal effect on USO costs.

The Sensitivity Analysis indicates the following:-

- (a) An increase in traffic levels from 100mE to 130mE per SIO has a minimum impact on the average annual costs of SIOs within the sample ESAs.

As expected, the traffic increase has no effect on the BU ESAs because they are all fed by cable. As for the small and NBU ESAs, the increase in average annual costs from the 100mE case is 2.3% for smalls and by 1.3% for NBU in the 1998/99 year, whilst the increase in average annual costs of SIOs in the 1999/2000 assessment above the 100mE case is 4.2% for smalls and 2.6% for NBU.⁴²

141. As suggested by Telstra, information was sought and obtained from the ACCC on actual traffic levels pertaining to rural and remote areas. However, no conclusions on traffic levels in these areas could be derived from this data. On the basis of the information available to it, the ACA supports Gibson Quai's analysis of appropriate traffic levels for potential NCAs. In its NUSC estimate for the 1998/99 and 1999/2000 financial years, the ACA has assumed a busy hour traffic level of 100mE.

Proportion of satellite services requiring various forms of power supply

142. In its *Net Universal Service Cost Assessment for 1997-98*, the ACA noted a significant cost element in the provision of satellite services was the cost of supplying reliable power to maintain telephone operability. After making an assessment of the circumstances in which it was reasonable for the customer or Telstra to supply the power requirements of a service, the ACA based its costing on the following categories of power supply:

- a) Category 1: In circumstances where it is unreasonable to require Telstra to provide this power, the customer would provide electrical power where the customer has access to reliable reticulated 240V AC power provided for residential or business requirements. Telstra would be required to provide a

⁴¹ In section 2.3.2 of the *Telstra Response to USO Forward Looking Technologies Cost Matrix Explanatory Paper*, Telstra states:

The telecommunications network must be designed to carry the volume of traffic that the actual network carried in the financial year being considered. In the case of the NUSC, the relevant volume of traffic is all PSTN traffic carried by Telstra's network in PNLAs in 1998/1999 and 1999/2000. Telstra has determined this to be between 130 – 150 mE, as this reflects the actual traffic in rural and remote areas.

⁴² Gibson Quai, section 6.4.

voltage smoothing device (ie uninterruptible power supply (UPS) or voltage rectifier) and battery back-up which would enable 24 hours standby);

- b) Category 2: In situations where there is generated power at the customer or business premises, typically generated by the customer, an additional battery back-up allowance of 48 hours standby is to be provided by Telstra because of the more unreliable nature of this power.
- c) Category 3: In cases where there is no power or the power supply is subject to frequent and/or prolonged outages, Telstra would be required to supply the power for the standard telephone service, as well as appropriate power back-up. The systems typically required to provide this power would be solar power systems with a seven day back up.

143. Category 3 is significantly more expensive than the other categories due to the high cost of solar power systems, with Category 2 also relatively expensive compared to Category 1.

144. For the costing of satellite services, 95% of customers were assumed to be in Category 1, with 4.5% in Category 2 and 0.5% in Category 3. The *Net Universal Service Cost Assessment for 1997-98* noted that these proportions broadly corresponded with similar analysis provided by Telstra's consultant, Arthur D Little.⁴³ In its response to the Gibson Quai cost matrix, however, Telstra challenged the proportion of 95% assumed by the ACA, arguing that from 'its experience Telstra estimates that only 23% of Customers fit this category'.⁴⁴

145. The ACA asked Telstra to provide information supporting the 23% figure it had asserted. The information Telstra subsequently provided to the ACA was for fewer than 1000 satellite services actually installed around Australia, disaggregated into three satellite technologies. Although this data did not enable the ACA to define the actual percentage of services in Category 1, it did indicate a range of (C-I-C) of services in this category, depending on the satellite technology deployed. (The Table, which Telstra has classified as commercial-in-confidence, is provided as Appendix B.)

146. The ACA considers that the data provided by Telstra is not applicable when testing the reasonableness of the ACA's assessment of the relative proportions of satellite customers in the three categories. In the 1997/98 NUSC assessment, the proportions in the respective categories applied to approximately 115,000 services supplied by satellite technology. Telstra's actual satellite services—well under 1000 in number—are provided in the most remote areas, where it would be anticipated that the vast majority would be in Category 2 or 3. Such areas could not by any means be considered to be representative of the areas to which the assumed 115,000 services would be supplied in the ACA's analysis.

147. In order to test the potential cost significance of altering some of the power assumptions for satellite services, the ACA requested Gibson Quai to perform sensitivity analysis on these inputs. Gibson Quai increased:

⁴³ Refer paragraph 450.

⁴⁴ *Telstra Response to USO Forward Looking Technologies Cost Matrix Explanatory Paper*, section 5.

the number of customers on solar power and the customers on 48 hour battery back-up to 5% each, thus leaving the remainder (90%) on 24 hour battery back-up.⁴⁵

148. This increase had the following impact:

An increase in cost of CPE battery for satellite customers causes the average cost per SIO in small ESAs to increase by 0.86% in 1998/99 and 2.3% in 1999/2000. It also caused the average cost per SIO in NBU ESAs to increase by 2.18% in 1998/99 and no increase in 1999/2000.

There is no increase in BU SIOs because they are fed by cable.⁴⁶

149. The ACA considers these cost increases are relatively minor in the context of the modelled assessment process, with no material effect on the overall NUSC estimates. Based on the best available information, in its NUSC estimates for the 1998/99 and 1999/2000 financial years the ACA has used the same proportions of satellite services requiring various forms of power supply as was used in the 1997/98 NUSC assessment.

Payphone integration with satellite technology

150. In its response to the Gibson Quai cost matrix, Telstra argued that in the 1997/98 NUSC assessment the ACA had not demonstrated that Telstra payphones would work on the satellite technology utilised in this assessment, of which the Optus satellite was a representative example.⁴⁷ However, a number of precedents indicate the ability to integrate payphone and satellite technology. For example, C&W Optus has advised that its MobileSat system has a payphone cash card system that has been operable since 1995, and both Gibson Quai and C & W Optus have advised the ACA that coin-operated satellite payphones work in other jurisdictions.⁴⁸

151. The ACA sees no reason why payphones could not be integrated with geostationary satellite technology. In its response to the Gibson Quai cost matrix, Telstra quotes a C & W Optus document that states its 'new satellite technology readily supports a payphone interface'.⁴⁹ In a briefing to ACA staff in February 1999, Telstra advised it was currently operating some satellite payphones. The range of evidence supports the ability to integrate payphones with satellite technology.

152. Gibson Quai has advised that the cost of the integration of payphones with satellite technology has been included in its cost estimates for the 1998/99 and 1999/2000 financial years.

⁴⁵ Gibson Quai, section 4.4.2.

⁴⁶ Gibson Quai, section 6.4.

⁴⁷ *Telstra Response to USO Forward Looking Technologies Cost Matrix Explanatory Paper*, section 1.3.

⁴⁸ C&W Optus, Gibson Quai, ACA communications.

⁴⁹ From C & W Optus Submission to DCITA on Competitive Selection of the USO.

Availability of MESH DAMA software for satellite services

153. MESH DAMA software reduces voice delay for satellite services by assigning a channel to each user allowing them to communicate directly with each other through the satellite. This software effectively reduces the number of satellite hops to one, thereby assuring that the voice delay occurring on satellite calls conforms to the relevant standards. In its comments on the Gibson Quai cost matrix, Telstra has maintained an argument it made in the consultation phase of the 1997/98 NUSC assessment, which was that MESH DAMA software ‘was not available for PSTN services’⁵⁰ in the 1998/99 and 1999/2000 years. (Telstra acknowledges that MESH DAMA was available for use on private satellite networks over the respective years.)

154. In its *Net Universal Service Cost Assessment for 1997-98*, the ACA stated that it saw ‘no reason why it would not have been feasible to introduce MESH DAMA software as of 1 July 1997, on a forward looking basis, given the common availability of this software.’ The ACA sees no reason to deviate from this conclusion, and notes that it is more feasible with each passing year for the introduction of this software.

155. Telstra has also maintained that ‘MESH DAMA does not work across more than one transponder’ on a satellite.⁵¹ However, C & W Optus—a satellite operator—and Gibson Quai have disputed this conclusion and advised that this software will work across transponders on the same satellite. The significance of this issue is that the failure of the software to work across more than one transponder might introduce an unacceptable call delay were some satellite calls made utilising different transponders on the satellite.

156. The ACA has confirmed that one limitation of MESH DAMA software—that it does not operate between multiple satellites—is not relevant to the NUSC estimates for the 1998/99 and 1999/2000 financial years. C & W Optus has advised that its B series satellite can handle between 200,000 to 300,000 users, the number of users being dependent on call activity. These numbers are well above the number of services utilising satellite technology for both the 1998/99 and 1999/2000 years.

Antenna Sizes for Satellite Technology

157. Gibson Quai utilised the following antenna sizes in its assessment of satellite costs.

Based on the ACA’s USO assessment for 1997/98 the Consultants have assumed that 25% of NCA customers require 2.4 metre diameter antennas and the remaining 75% require 1.8 metre diameter antennas.⁵²

158. C & W Optus have challenged the use of these antennae sizes, stating that:

⁵⁰ *Telstra Response to USO Forward Looking Technologies Cost Matrix Explanatory Paper*, section 5.

⁵¹ *Telstra Response to USO Forward Looking Technologies Cost Matrix Explanatory Paper*, section 5.

⁵² Gibson Quai, section 4.4.2

CWO's trial undertaken earlier in the year utilised 1.2m dishes at each of the consumer locations and at the various demonstration sites in the capital cities including the demonstration that we provided to the Minister for Communications.

CWO strongly recommends that the antenna size is minimised to that which meets the overall communication performance objectives. CWO used its extensive experience and design tools, including its rainfall models in its design for the USO network. This results in antenna sizes smaller than those proposed by the ACA. The CWO design both covers the antenna size, its direct cost and also lowers the installation cost. CWO's installation costs are based on both a large-scale deployment model and from data it has obtained in its trial.

CWO is separately providing design information to the ACA consultants supporting its sizing claim.⁵³

159. The ACA acknowledges the C & W Optus argument that small antenna sizes would lower both capital and installation costs. However, as stated in the *Net Universal Service Cost Assessment for 1997-98*,⁵⁴ the ACA has based its analysis of antenna sizes on its interpretation of the impact of Australian rainfall on service availability and performance. The larger antenna sizes have been utilised to ensure that customers would receive the required grade of voice service. Although C & W Optus provided rainfall data in support of its claims, this data did not provide sufficient detail to lead the ACA to vary its assessment of this matter.

Post-processing adjustments to NUSC model outputs

160. In order to derive its estimates of the NUSC amounts for the 1998/99 and 1999/2000 financial years, the ACA has been required to perform a number of post-processing activities. A significant area of post-processing was in relation to removing some switch and junction costs per SIO for non-copper cable technologies, which are not dealt with effectively by the NUSC costing model.⁵⁵ Also, where potential NCAs were considered in 1998/99 and 1999/2000 that had not been assessed in 1997/98, it has been necessary to extrapolate the results for the 1997/98 NCAs to the new NCAs on the basis of the average cost and revenue per SIO per strata. The ACA notes that although these post-processing adjustments are unlikely to have biased the 1998/99 and 1999/2000 NUSC estimates, they have increased the level of statistical uncertainty in these estimates, as referenced in paragraphs 50 - 52.

Intangible potential benefits

BACKGROUND

161. The concept of calculating the potential benefits of being the universal service provider (USP) has been implemented in the United Kingdom, however, this concept

⁵³ C & W Optus response to the Gibson Quai cost matrix—satellite attachment.

⁵⁴ Refer to paragraphs 430-439 of the *Net Universal Service Cost Assessment for 1997-98* for a more detailed discussion of this issue.

⁵⁵ Paragraph 607 of the *Net Universal Service Cost Assessment for 1997-98* also provides comment on post-processing performed for the 1997/98 NUSC assessment.

has not been a component of the NUSC calculation in Australia. The legislative basis for calculating the NUSC in Australia does not provide for the potential benefits of being the USP as a relevant component of the calculation of the NUSC.

162. The Minister has specifically requested advice on the nature, materiality (in comparison to the net universal service cost) and, to the extent possible, the likely quantum of the potential benefits to Telstra in being the national universal service provider in the 1998/99 and 1999/2000 financial years. To facilitate its consideration of the potential intangible benefits, the ACA commissioned Ovum Pty Ltd to advise on the nature, materiality and likely quantum of these benefits.

METHODOLOGY

163. The methodology adopted by the ACA and its consultants was as follows.

- a) International precedents in assessing the intangible benefits of being a USP were researched. The only country identified in which a substantial study has been conducted is the United Kingdom. In 1995 OFTEL commissioned Analysys to undertake such a study. OFTEL published the results in 1997⁵⁶, and a further report⁵⁷, taking account of industry comment, was published in 1999.
- b) Consultation was undertaken with carriers and other interested parties to obtain a preliminary assessment of the scope of intangible benefits and sources of relevant information.
- c) A discussion paper prepared by Ovum was circulated for comment to carriers and other interested parties.
- d) A report was developed, taking into account all of the responses received to the discussion paper.

164. If a decision were made that future costing arrangements should take account of intangible benefits there would be merit in undertaking a more detailed and comprehensive study of how these benefits may be assessed. In the limited time available for the ACA to prepare this advice to the Minister, the ACA's assessment was made using the best available information and resources. The advice could be considerably refined and a greater level of confidence and accuracy obtained through a full investigation and consultation process.

MATERIALITY

165. The issue of how the ACA should assess materiality was raised in the Ovum Report for carrier comment. Initially, Ovum proposed that materiality needs to be considered relative to the ACA's 1997/98 NUSC assessment, determined by the ACA at \$548 million. In its discussion paper, Ovum sought industry comment on whether 1% of this amount—or \$5 million—should be used as the benchmark for determining materiality. Formal and other responses did not comment on the issue of materiality, although the Telstra response noted that a figure of that sort must be completely arbitrary.

⁵⁶ OFTEL, *Universal Telecommunications Service Statement*, July 1997

⁵⁷ OFTEL, *Universal Telecommunications Services (Consultative Document)*, July 1999

166. Ovum reconsidered the approach to materiality expressed in the discussion paper. It considered that a more useful approach to materiality is to assess the likely worth of spending further resources to better refine an estimate. This means that if a benefit can be identified and readily calculated from available information or informed assessments, then that benefit should be determined and used as appropriate. If, however, a benefit is:

- not readily calculated,
- is likely to be small relative to the NUSC amount, and
- a substantial resource commitment is likely to be required to assess it,

then the benefit might be characterised as not material.

167. There were no carrier responses on this approach to materiality raised by Ovum. In the absence of any carrier objections to the approach, the ACA has used the second approach to materiality proposed by Ovum for the purpose of assessing potential intangible benefits. In relation to measuring whether a benefit is likely to be small relative to the NUSC amount, 1% of the NUSC amount has been used.

CONCEPT OF INTANGIBLE POTENTIAL BENEFITS

168. For the purposes of this report, the ACA has taken the concept of intangible potential benefits to mean those benefits that accrue to a carrier through being the USP that are not already counted in the revenue foregone calculations in the NUSC costing model. A number of responses to the Ovum discussion paper made the important point that the assessment of benefits needs to be made having regard to the treatment of avoidable costs and revenue foregone in this model. A number of responses also noted that some of the categories of benefits included in this discussion paper were not intangible at all, and should have been included in the NUSC model calculations. These responses are discussed more fully under the appropriate benefit category heading, later in this report.

169. The benefits involved are considered *potential* benefits as, consistent with the NUSC assessment methodology, it is not relevant whether Telstra is realising those benefits in the absence of any legal barrier to it doing so. In its response Telstra argued that the discussion should be about actual benefits, not potential benefits, since this was the basis on which the cost model proceeded. The ACA disagrees with this interpretation of the cost model.

170. Under the current USO costing approach, concepts underlying the NUSC calculation, such as the choice of technologies that a forward-looking efficient carrier might employ, are key elements in the NUSC assessment, not Telstra's actual costs of providing services under its USO. The assessment of intangible benefits should be calculated using consistent concepts to the NUSC assessment and be based on potential benefits available to an efficient, forward-looking carrier.

CATEGORIES OF INTANGIBLE POTENTIAL BENEFITS

171. The categories of intangible potential benefits of being a USP covered in this report are:

1. **Life cycle effects**—the benefit of serving unprofitable areas because of the potential for these areas to become profitable over time.
2. **Ubiquity**—the benefit of having an overall presence through being the USP, which will be reflected in a latent preference for the USP when customers move to other areas.
3. **Brand enhancement and corporate reputation**—the benefit that results from being positively regarded as a result of being the USP.
4. **Payphone advertising**—the benefit of having payphones for corporate identification and advertising in uneconomic locations.
5. **Volume discounts**—the additional increment of discount on purchases for total operations that might be attributed to the volumes purchased for USO operations.
6. **Non-USO services**—the benefit of being able to provide non-USO services in NUSC areas, because of the infrastructure put in place as a result of USO operations.
7. **Network effects**—the effects of community of interest between customers in BUAs and NBUAs served by the same exchange or network node. These effects may lead to a benefit of increased profitability in serving the BUAs because service is provided to uneconomic NBUAs, compared to the result that would be realised if the NBUAs were not served.

172. These benefits were identified as a result of international research on benefits identified in the United Kingdom, potential benefits proposed by the ACA and Ovum and carrier comment on the potential benefits to Telstra in being the USP for the relevant years. The benefits 1 – 4 above were identified in the United Kingdom, benefits 5 and 6 were proposed by the ACA and Ovum and the ‘Network effects’ benefit identified by AAPT.

Life Cycle Effects

173. The life cycle effect provides a potential benefit from serving unprofitable areas because of the potential that those areas may become profitable. For this to be of potential commercial benefit to a USP, there needs to be a likelihood that the USP will continue to serve customers in these areas when they become profitable.

174. Some relevant considerations in assessing life cycle effects include:

- some NCAs might never be expected to be profitable, so there is no potential commercial benefit in serving them;
- some NCAs are borderline in terms of profitability and, even without the USO, it might make commercial sense for a carrier to continue to serve them at a loss given the reasonable prospect of future profitability; and
- the latency and loyalty effects which may arise when an area becomes economic (if ever) and the availability of choices of service provider that a customer might have through, for example, pre-selection capabilities.

Methodology for assessing life cycle effects

175. Ovum considers that the potential life cycle benefit arises from the continuing adherence of customers in NCAs when the USP franchise is terminated. On termination, the former USP would write off or down its capital investments in NCAs. It would continue to incur operating expenses and some selected capital investments determined commercially. The Ovum approach differs significantly to the approach used by OFTEL in the UK as Ovum considered that the OFTEL methodology is not transferable to the Australian universal service regime. The carrier submissions to the ACA did not challenge Ovum's view on the transferability of the OFTEL methodology.

176. Ovum calculated the value of the benefit by determining the net cash flow that would result, assessed on a Net Present Value (NPV) basis over the assumed period of decline of the benefit. The NPV was then converted into an annuity using an appropriate WACC value for the USP. Ovum's calculation of this annuity amount for the 1998/99 and 1999/2000 financial years is detailed in its report to the ACA and will not be reproduced here. Ovum calculated that the annualised value of the life cycle effects range from \$32 million to \$66 million for 1998/99 and \$36 million to \$73 million for 1999/2000. For each year the range incorporates the different WACC figures calculated by the ACG (taking into account the USO funding and otherwise).

177. In response to the Ovum report, AAPT noted that:

[t]he fact that unprofitable areas may become profitable, and vice-versa, is a feature of the USO arrangements which can, and should, be taken into account when determining the NUSC. It is a feature that can be characterised as part of the risk of being the USP. As such it is not an intangible benefit but a feature which is best addressed in the WACC."

178. Ovum agreed that the commercial risk of the USP losing the franchise and the business associated with it would be most appropriately accounted for in the WACC calculations.

179. Telstra provided a comprehensive response to the Ovum methodology for calculating life cycle benefits and raised a number of serious concerns with the methodology. Telstra represented that the Ovum approach did not take account of the fact that life cycles are not uniform, monotonic and different life cycles of different customers are likely to offset each other over time. Further, Telstra considers that the year-by-year application of the Bellcore NUSC model already captures many of the benefits associated with life cycle effects and Ovum have failed to identify a benefit over and above what is already captured. Telstra also identifies a number of empirical problems in the analysis, and considers that the methodology operates at too high a level and should be applied on a NCA by NCA basis. In view of the concerns highlighted in its analysis, Telstra considers that the Ovum methodology lacks sufficient rigour and considers it would be inappropriate to deduct a crudely quantified life cycle benefit from a more rigorously determined NUSC estimate.

180. C & W Optus agreed with the Ovum methodology and considered that the period of eight years for the decline of the benefit is appropriate. C & W Optus therefore considered that the quantum of the benefit should be the higher amount in the range proposed by Ovum, namely \$57.3 million. The ACA considers that C & W Optus' response on the Ovum analysis of life cycle effects has not subjected the methodology used to rigorous analysis.

181. The ACA considers that to the extent that there are potential life cycle benefits through service areas becoming profitable over time, in the absence of the USO those benefits could be captured by a carrier by delaying the timing of its entry into a particular area until it believed that profits could be made. Therefore, the fact that market entry has been earlier because of the USO does not necessarily mean that any potential future profits earned can be ascribed to it being the USP.

182. The current methodology for calculating the NUSC relies on comparisons of avoidable costs and revenue foregone for a single year to identify NCAs. The ACA's advice to the Minister on 22 October 1999 concerning current arrangements and how they could be improved identified the desirability of using the concept of future revenue and cost streams to identify NCAs and not just revenues and costs for one year. To the extent that there are any potential benefits through life cycle effects under the current approach, adoption of the approach suggested would remove them.

183. After consideration of the Ovum Report and carrier responses the ACA considers that there may be some potential benefits for Telstra from life cycle effects. However, the ACA has a number of concerns regarding the methodology for quantifying these benefits. The primary concern of the ACA relates to whether it is appropriate to assign a value to a particular year for a benefit that may not eventuate, or may only partially eventuate. This concern is accentuated by the lack of certainty as to when (or if) the USP franchise may be terminated. The ACA is concerned that the Ovum methodology is somewhat simplistic in assuming that the USP will be terminated and has no regard for the timing of when this may occur. Further, the ACA agrees with Telstra's concerns regarding the methodology proposed by Ovum.

184. In order to quantify this potential benefit and to assign a value for that benefit to a particular year, a far more robust methodology would need to be developed. In the timeframe in which this advice was prepared it was not possible to develop such a methodology. In the absence of such a methodology, the ACA cannot recommend a quantum or indicate the likely materiality of life cycle benefits for the 1998/99 and 1999/2000 financial years. Were formal assessments of a NUSC required in future years, the ACA's preferred approach is to remove the possibility of potential life cycle effects by using different criteria to identify genuine NCAs rather than attempt to quantify any potential benefits that might arise under the current approach.

Ubiquity

185. The benefits of ubiquity arise from having an overall presence through being a USP, and having, thereby, the potential of leveraging that ubiquitous presence in dealings with customers.

186. A summary of the Ovum analysis of the different ways in which benefits could be derived from ubiquity is contained in the following points.

- When customers move from NUSC areas to other areas, they will continue with the USP as their service provider in NCAs. This is the use of ubiquity adopted in the OFTEL study.⁵⁸ It was ultimately considered to be insignificant by OFTEL.⁵⁹
- Through being able to market the organisation to business customers as being able to serve them in any location Australia-wide. This claim may be more critical in the case of government and business customers with extensive branch networks or with operations that are inherently likely to be in sparsely populated or remote locations. Ovum was unable to quantify this potential benefit. However, it considered this benefit may be material.

Methodology for assessing ubiquity benefits

Value of moving customers

187. Ovum considered that assessing the quantum of the annual benefit of this aspect of ubiquity might have the following steps.

- Assess the numbers of customers who have moved from NCAs to other areas in the relevant years.
- Assess from Telstra or other sources the number of such customers who have pre-selected Telstra for long distance and other pre-selectable calls.
- Compare that proportion with the level of Telstra pre-selections generally in non-NUSC areas. The difference provides an indication of the quantum of ubiquity benefits derived from these customers.

188. Using this methodology Ovum assessed the annual value for the ubiquity benefit associated with customers moving to non-NCAs at \$2.5 million per annum for each of the years in question. A detailed description of the calculation is contained in Ovum's report.

189. C & W Optus agreed with Ovum's methodology for calculating the ubiquity benefits arising from the value of moving customers, however, it considered Ovum's estimates to be conservative. It calculated the potential benefit using the same methodology as Ovum but with different estimates of the extent of pre-selection that it considered more accurately reflected the likely quantum. C & W Optus calculated this potential benefit at \$10 million.

190. Telstra's response to Ovum's analysis noted that the quantum of the benefit calculated by Ovum failed the materiality test. Further, while Telstra did not dispute Ovum's methodology for calculating the benefit, it had serious concerns with the assumptions and estimates used in the calculations. Essentially, Telstra considered

⁵⁸ OFTEL, *Universal Telecommunications Service Statement*, July 1997

⁵⁹ OFTEL, *Universal Telecommunications Services (Consultative Document)*, July 1999

the data used in the calculation was unsubstantiated and out-of-date and the assumptions underlying the estimates tended to inflate the likely benefit, compared to Telstra estimates.

191. While none of the carriers questioned Ovum's methodology, it was noted by several carriers that the data used by Ovum in its calculation consisted of estimates and dated information. C & W Optus was the only carrier to attempt to substantiate the quantum of the benefit, however, the ACA cannot establish that the data used by C & W Optus is any more robust than that used by Ovum.

192. After consideration of the Ovum Report, carrier responses to that report and the OFTEL findings, the ACA considers that, while Telstra may obtain some benefit from ubiquity, the quantum of the benefit calculated by Ovum is immaterial and there is no substantiated case, using more reliable data than that used by Ovum, which indicates that any benefit from serving widespread customers is likely to be material.

Brand enhancement and corporate reputation

193. There is a general view that a carrier that is a USP will be positively regarded in the market, because the community at large will recognise this as a community service. As a result, having the status of a USP enhances the brand image and overall corporate reputation of the carrier. Because businesses go to some lengths and expend considerable resources on establishing and maintaining their corporate images, the benefit from being a USP is assumed to have commercial value.

194. All respondents to the Ovum Report recognised that brand enhancement and corporate reputation were important in business operations, and therefore had high value. The issue is whether—and in what manner—being a USP contributes to the enhancement of Telstra's brand image and reputation. Telstra 'recognises that such a positive effect is possible but doubts that it is material'.

195. Ovum considered that the use by Telstra in its promotion and advertising of imagery drawn from rural and provincial Australia clearly indicates that Telstra regards its national reach as important. C & W Optus indicated that its market research showed that Telstra had a marked advantage in certain aspects of brand personality such as being 'Familiar' and 'Genuine Australian'. Ovum considered that these are two characteristics that derive from and are reinforced by being the USP: firstly, Telstra's own advertising reinforces and builds on this perceived strength; and secondly, being identified as the USP provides legitimacy for the use of rural and nationwide imagery.

Methodology for assessing brand enhancement and corporate reputation benefits

196. Telstra believed that the quantum of benefit should be determined by:

ascertaining the reduction in advertising and promotion generated by the fact that Telstra does not have to promote itself as ubiquitous because widespread knowledge that it is the USP achieves this.⁶⁰

⁶⁰ Telstra, *Intangible Benefits for USO Costing 1998-99 and 1999-00 Telstra Submission to ACA*,

197. This is the approach adopted in the initial OFTEL study.⁶¹

198. Ovum saw no evidence that suggested that Telstra as a USP spends less than it might otherwise do if it were not a USP. However, it considered that the real point about brand enhancement is the ability of the USP to leverage from its NCA operations, to gain brand and corporate advantage elsewhere.

199. Ovum's methodology for assessing brand enhancement was to determine the proportion of the Telstra advertising budget that promotes and builds on rural and related themes, and therefore trades on the virtue and legitimacy of being a USP. On the basis that Telstra is seeking to at least get its advertising money back, Ovum considers this amount represents the lower end of the estimate of benefit that Telstra seeks to achieve, and presumably considers that it has achieved at least these returns through such advertising in the past.

200. Ovum developed a view of the quantum of benefit based on its own estimates, as follows:

- Telstra has an advertising and promotions budget in the order of \$250 million of which 70% relates to the promotion and advertising of specific goods and services.
- Of the balance (\$75 million) which has a corporate element, at least 20%—or \$15 million—contains themes and messages that refer to Telstra's national role and service to all Australians, including those in rural and remote locations.
- \$15 million represents a rough quantification of the minimum annual benefit that Telstra would obtain from the enhancement to its brand and reputation from being USP.

201. Telstra's response to Ovum's methodology raised some valid concerns, particularly the concern that the Ovum methodology does not appear to measure the benefit accruing to Telstra from being a USP as opposed to the benefit Telstra would obtain from being a large carrier with a national network. As indicated previously, Telstra also considers that the approach used by OFTEL—which would measure the reduction in advertising and promotion expenditure generated by Telstra's ubiquitous coverage—is the appropriate method of measuring this benefit. Finally, Telstra's own estimates suggest that the Ovum estimates are significantly overstated. The ACA notes, however, that the Telstra estimates were not sufficiently detailed to allow an assessment of the reasonableness or accuracy of these estimates.

202. C & W Optus submitted that the Ovum estimate of a \$15 million benefit to Telstra was very low. In support of its submission, C & W Optus submitted details of its own market research on the value of brand enhancement and corporate reputation to Telstra. In addition, C & W Optus submitted that Telstra benefits internationally from its status as USP, and that this should be factored into the calculation of this benefit.

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⁶¹ OFTEL, *Universal Telecommunications Service Statement*, July 1997

203. After consideration of the Ovum Report and the carrier comments received, the ACA has a number of concerns with the methodology used by Ovum to calculate the benefits of brand enhancement and corporate reputation. A primary concern is, as raised by Telstra, it is not apparent that regard is had for the benefit Telstra would obtain from being a national carrier with a national network, even if it was not the USP. The ACA is not convinced of the conceptual merit of using expenditure as a proxy for potential benefits in the manner proposed. The net effect from the application of such a concept would be zero to the extent that the expenditure is offset by corresponding benefits. Furthermore, were it argued that the benefit could be achieved without incurring the expenditure, an obvious question would be why an entity would incur that expenditure in the first place. A detailed investigation of whether Telstra has reduced advertising and promotion expenditure due to its status as USP would be required in order to settle this matter. OFTEL valued this benefit at £50 million for BT in the United Kingdom⁶² and the ACA is not convinced that there are sufficient differences between Australia and the United Kingdom to indicate that Telstra does not receive at least some benefit.

204. In the context of these concerns with the Ovum methodology, the ACA is unable at this time to advise the Minister on a substantiated quantum of benefits from brand enhancement and corporate reputation. However, the ACA considers that this is a potential intangible benefit to Telstra.

Payphone advertising

205. Telstra is required to provide public payphones as part of its USO. It may claim the losses incurred on uneconomic payphones as part of its USO net levy credit claim.

206. Ovum considered that the potential benefits derived from payphone advertising are comprised of two parts:

- (i) Telstra marks its payphone equipment with its corporate insignia, and thereby is recognised as the provider of the service; and
- (ii) Telstra may use available space on payphones for its own advertising—this advertising can be valued on the basis of the rates that apply to third parties.

207. Telstra has argued that it is legally constrained in terms of advertising on payphones either for third parties or on its own behalf. It maintains that its access to land for the purposes of establishing public payphones is on the basis that the facility will be low impact and contain no commercial advertising other than advertising related to the supply of the standard telephone service.

208. The ACA agrees with Telstra's representation, as it is consistent with Part 5 of the Schedule to the *Telecommunications (Low-impact Facilities) Determination 1997*. While not all of Telstra's uneconomic payphones would have been installed since the commencement of this determination, on a forward-looking basis, Telstra's representation is reasonable.

⁶² OFTEL, *Universal Telecommunications Services (Consultative Document)*, July 1999

Methodology for assessing payphone advertising benefits

Benefits from corporate logos and insignia on payphones

209. Ovum considered that the minimum value of the benefit to Telstra of corporate logos and insignia on payphones may be determined in a similar way to brand enhancement. The minimum return that Telstra would seek by way of such benefits is the cost of affixing the logos and insignia.

210. C & W Optus has provided a cost of \$350 per payphone for re-spraying payphones with another company's logo. Ovum considered this estimate to be reasonable. Using the same argument it applied in relation to advertising—that Telstra would at least be seeking to recoup its advertising expenditure from this form of payphone advertising (refer paragraph 199)—Ovum estimated the annual benefit of logo and insignia on uneconomic payphones for 1998/99 and 1999/2000 to be \$1.2 million for each year.

Benefits from payphone advertising

211. In the event that the legal restriction on advertising (ie. standard telephone service only) represented by Telstra is correct, Ovum initially considered that there was no benefit to Telstra from payphone advertising. Upon clarification of the legal issues concerning the installation of payphone facilities, and having regard to the different value of advertising due to payphone locations, Ovum revised its view. It estimated the average advertising value of payphones to be \$500 per payphone per annum. However, Ovum qualified its estimate by stating that the value could be nil if the protection of low-impact status was lost and Telstra had to pay commercial rental. The total range of the value of this benefit estimated by Ovum is \$0 to \$8.5 million for each financial year.

212. C & W Optus submitted that, despite the legal restriction, Telstra can advertise its standard telephone services which may increase the revenues to Telstra from these services. C & W Optus estimated the potential rents from this advertising to range between \$100 and \$1,000 per annum per payphone, depending on the location of the payphone. The total benefit using C & W Optus' calculations ranges between \$1.7 million and \$17 million per annum.

213. In the absence of a commercial rate for payphone advertising due to the legal restrictions and variance in the potential rates that may apply according to payphone location and design, it is difficult to ascertain a robust quantum of any benefit accruing to Telstra from payphone advertising. In the context of the definition of materiality and the difficulty in substantiating the quantum of any benefit to Telstra, the ACA does not consider that any benefit from payphone advertising based on reasonable assumptions is likely to pass the materiality test.

Volume discounts

214. The potential benefits from volume discounts are the cost savings that Telstra makes in its non-NUSC operations by virtue of the increment of the volume contributed to its purchase levels by NUSC operations.

215. The discounts that Telstra might be able to achieve in the purchase of plant and equipment, and of goods and services, relevant to the provision of services in non-NUSC areas is included in the NUSC costing model calculations. However, the basic NUSC calculation does not take into account the contribution, if any, of purchase volumes in NUSC areas to achieving incremental discounts in non-NUSC areas.

216. AAPT noted that benefits of this type should not be considered intangible, but should be included as part of the revenue foregone calculations in the NUSC model.

Methodology for assessing Volume discount benefits

217. Ovum’s approach to the assessment of the benefits of volume discounts was to consider major items purchased by Telstra for its network operations, and assess whether maximum volume purchase discounts are exhausted before the amount purchased for NCA use is taken into account. The major items considered in this analysis and the likely benefits or materiality of any benefits were:

Table 10: Materiality of Volume Discounts by Capital Item

Item	Materiality
Cable	No benefit
Vehicles	No benefit
Switching equipment	Immaterial ⁶³
Terrestrial radio and tower equipment	No benefit

218. Telstra’s response to Ovum’s analysis noted that the likely potential benefits from volume discounts were not material. Telstra also disputed Ovum’s representation that it may not be using best practice in its purchasing activities.

219. C & W Optus submitted that the Telstra response on volume discounts for vehicles, which associated discounts with the type of vehicle (four wheel drive) rather than the brand of vehicle does not reflect normal practice. It represented that a discount would apply to the total purchases per brand. Due to the time restriction in preparing this report, the ACA was unable to test this representation with Telstra.

220. C & W Optus also questioned the representation that as terrestrial radio equipment used in NCAs is not used in other areas, discounts in non-USO areas would not be apparent. C & W Optus represented that the purchase of terrestrial radio equipment in NCAs is likely to attract volume discounts on other equipment purchased from the same vendor. The ACA was also unable to test this representation with Telstra before finalising this report.

⁶³ Ovum was unable to substantiate any material benefit from volume discounts on switching equipment, however due to the commercial in confidence nature of Telstra contracts with vendors, was unable to verify this matter. Ovum considered that the benefit may be material, but was unable to substantiate this position.

221. On the basis of the Ovum Report and the carrier responses to that report, at this time the ACA does not consider there is a substantiated case that there are any material benefits to Telstra from volume discounts accruing from USO activities.

Non-USO services

222. Conceptually, this is the benefit that accrues to Telstra in being able to provide non-USO services in NCAs, by virtue of having a presence and infrastructure already in place in these areas. The most important aspect of this benefit is that arising from having an established customer relationship. Represented in other terms, the potential benefit is in not being required to provide such non-USO services on the basis of stand-alone costs, but in sharing substantial common and overhead costs.

223. The non-USO services for which Telstra gains benefit from its status as USP identified by Ovum are:

- value-added services such as messaging and 'Easycall' services;
- facsimile;
- internet; and
- mobile services

224. AAPT considers that these benefits should be included in the calculation of revenue foregone in the NUSC model. Ovum agreed with AAPT's view.

Methodology for assessing non-USO service benefits

225. Ovum considered that the information required to assess the net revenue contribution of non-USO services in NUSC areas should be available from Telstra's own accounts. While Telstra does not keep management accounts in terms of USO categories and NCAs, it has provided information extracted for the first half of the 1998/99 financial year in relation to its Commercial and Consumer Group (CCG)—the organisational unit within Telstra responsible for residential and business customers with less than three lines per site.

226. Ovum used the CCG data—and pro-rated it to correlate to NCAs—to assess the net annual value of the benefits from non-USO services for the full year at:

- \$2.9 million for 1998/99; and
- \$3.8 million for 1999/2000.

227. A detailed description of the calculation is contained in Ovum's Report.

228. Telstra's response to Ovum's analysis included concerns about the relationship of non-USO benefits to eligible revenue calculations. Telstra represents that if non-USO benefits to Telstra are used, then non-USO benefits to other carriers should be used (via eligible revenue calculations) to ensure equitable treatment of all carriers. Telstra was also concerned that some items identified by Ovum were already included in the revenue foregone calculations contained in the NUSC costing model and to include them as benefits would cause double-counting errors. Ovum has responded to

this concern and has clarified that the items identified by Telstra have not been included in the Ovum calculation. Finally, Telstra represented that mobile revenue would not be foregone if Telstra was not the USP, therefore this should not be considered as a relevant non-USO revenue.

229. Vodafone submitted a detailed assessment of the value realised by Telstra from its ability to provide certain value added and other network non-USO services in NCAs. These services include Easycall services (eg. call waiting) which Vodafone estimates to have an annual benefit of \$12 million. Ovum did not accept the assumptions behind the Vodafone estimate's in relation to margin and penetration and, absent any specific information from Telstra, assessed the annual benefit at around \$6 million. Telstra has advised that Easycall services are designed to encourage call completion and that the benefit has been fully covered in the revenue-foregone calculations of the NUSC model. In addition, Telstra has advised that Easycall achieved a negative contribution in its product accounts for the period July to December 1998.

230. Vodafone has assessed the annual value to Telstra of voice messaging services at \$8.4 million. The calculation is based on an assumed penetration of 40 per cent based on American experience. C & W Optus calculated this benefit to be in the order of \$20 million using the same methodology as Vodafone but with different estimated customer revenues. Telstra has advised that Messagebank had a negative contribution in the product accounts for the period July to December 1998.

231. In addition, Telstra submitted that the Easycall and Messagebank services revenue contributions are already accounted for in the figures used in the Ovum assessment.

232. In relation to the provision of Internet services in NCAs, Telstra claims the penetration of its BigPond offering would generate no material benefit from being the USP in these areas. C & W Optus provided data from its own market research that indicates the take-up rate of facsimiles and modems in rural and remote areas to be far greater than the ABS data used by Ovum. C & W Optus recommended that its data was the most recent analysis of these take-up rates and should therefore be used to calculate this benefit.

233. The remaining major category of non-USO service advantage that Telstra may obtain in NCAs from being the USP is in the mobile service market. Vodafone has prepared a calculation of the benefit that would be gained by Telstra in this market, which was the range \$21 – \$32 million per annum. Vodafone's assessment is based on representations that the only reason Telstra is the sole mobile operator in some NCAs is due to the economies of scope in providing mobile services to its fixed line customers, where there is more than one mobile operator Telstra has a higher market share due to being the fixed line provider and Telstra has lower advertising costs and churn rates due to its status as the fixed line provider. C & W Optus has indicated that it agrees with Vodafone's estimates and that they are in line with C & W Optus' calculations.

234. Vodafone subsequently submitted a further benefit to Telstra in relation to its mobile network. This benefit arises due to GSM becoming an appropriate forward-

looking technology for provision of USO services. Vodafone represents the benefit to be the difference in cost in providing GSM mobile coverage where GSM infrastructure is installed for provision of USO services compared to providing GSM mobile coverage where no such infrastructure exists. Essentially Vodafone represents that where GSM infrastructure is used (on a forward looking basis) to efficiently provide USO services it would only require an increase in capacity to provide GSM mobile coverage which is significantly cheaper than a greenfields construction of GSM infrastructure.

235. Ovum reviewed the method adopted by Vodafone, and considered that the method and the assumptions were reasonable, pending better data that might be available from Telstra. Ovum based this conclusion on:

- Vodafone's extensive experience in assessing customer values and churn rates for mobile customers; and
- its own estimates of mobile penetration and share rates in the Australian market.

236. The ACA considers that there is a reasonable argument that Telstra derives potential benefits from non-USO services which can be attributed to its status as the USP. However, the ACA has a number of concerns with the suggested methodologies for measuring these benefits. These concerns include:

- the reliance on unsubstantiated estimates;
- a lack of detailed consideration of the benefits of being the USP as opposed to being a large carrier with a national network; and
- conceptual concerns about attributing benefits arising from forward looking technologies where there is no certainty of when or if they may be realised to nominated financial years.

237. Of the intangible potential benefits considered, the ACA considers that non-USO benefits are likely to be the most significant. However, at this time the ACA does not consider there is a robust methodology to quantify this potential benefit and cannot recommend a quantum for potential benefits arising from non-USO services.

Network Effects

238. 'Network effects' is the name given by AAPT to the benefits accruing to Telstra by virtue of the community of interest that exists between customers in BUAs and NBUAs served by the same exchange or other network node. It argues that the benefit arises because in serving uneconomic customers in NBUAs Telstra is creating greater opportunity for economic activity with customers in the BUAs. If Telstra were not to serve the NBUA customers, then the profitability of BUA customers would be less.

239. AAPT contends that the current NUSC model 'fails to recognise the strength of this relationship in rural communities' because it disaggregates certain rural ESAs into separate BUA and NBUA groups. Essentially, AAPT considers there is a second order revenue effect arising from the dependence of BUA customers on NBUA

customers. This second order revenue effect is additional to the first order revenue effects measured by revenue foregone in the NUSC model.

240. The ACA notes the general concept of network effects, but is not convinced that these network effects are material in the context of the USO. While Telstra may earn additional revenue in BUAs as a result of providing service to NBUAs, if Telstra did not provide service to NBUAs, it would forego the additional revenue in BUAs, however, it would also avoid the losses (or its share of the losses) made in the NBUA. Without the USO, there may simply be a change in the locus of economic activity, not necessarily a net reduction in the profitability of the BUA (eg. more people live in the BUA and commute to work in the NBUA). The ACA also notes that none of the carriers other than AAPT commented on, or questioned the Ovum quantum of nil benefit, for this potential benefit.

CONCLUSIONS

241. The assessment of intangible potential benefits is a new concept in Australia and while the OFTEL experience in the United Kingdom has some value in generating discussion of these benefits in Australia, fundamental regulatory, geographic and demographic differences between Australia and the United Kingdom limit the transferability of the OFTEL methodology and outcomes to Australia. In the two months available to assess the intangible potential benefits in Australia, there has been considerable debate and discussion of appropriate methodologies to quantify these benefits. While the issues have been substantially progressed, there has not been sufficient time to develop a robust methodology to quantify the identified potential benefits with any certainty.

242. Specifically, in relation to the Minister's request for advice on the nature, materiality and likely quantum of the potential benefits to Telstra in being the national universal service provider in the 1998/99 and 1999/2000 financial years, the ACA has concluded the following:

- **Life cycle effects:** The ACA has concluded that there may be some potential benefit but the extent of that benefit is not readily quantifiable. Were formal assessments of a NUSC required in future years, the possibility of potential life cycle effects is best removed by using different criteria to identify NCAs.
- **Ubiquity:** The likely quantum of ubiquity benefits is \$2.5 million per annum and is not material.
- **Brand enhancement and corporate reputation:** The ACA has concluded that there is a potential material benefit but the extent of that benefit is not readily quantifiable at this time.
- **Payphone advertising and logo display:** The ACA has concluded that any potential benefit is likely to be minor and in the context of the difficulty in substantiating the quantum of any benefit to Telstra, is not likely to be material.
- **Volume discounts:** The ACA has concluded that there is not a substantiated case at this time that there are any material benefits to Telstra from volume discounts.

- **Non-USO services:** The ACA has concluded that there is a potential material benefit but the extent of that benefit is not readily quantifiable at this time.
- **Network effects:** The ACA is not convinced that network effects are a material benefit for USO costing purposes.

243. Overall the material contained in the report indicates that potential intangible benefits are tenuous and, when taken together, may not be large. Furthermore, the adoption of various recommendations made to you in the ACA's October 1999 report on 'USO costing and assessment arrangements' could address some of the industry concerns that particular benefits potentially received by the USP do not form part of NUSC calculations.

Costs of provision of interim telephone service (1999/2000)

244. As referenced in paragraph 15, the Minister has requested that the ACA provide him with advice on the costs of the provision of interim telephone services for the 1999/2000 year, as referenced in the following paragraph of the Minister's letter to the ACA Chairman (provided at Appendix A).

In preparing your advice, please have regard to Government policy concerning the agreement negotiated with Telstra in June 1999 to deliver an 'interim phone service', at PSTN rates, to persons in remote areas who have been waiting for a first connection for six months. The Government recognises that this may be a new cost to Telstra, above and beyond the cost of the services included at the time the legislated cap on the USO cost for 1999/2000 was imposed. The Government intends that this should be taken into consideration in considering net universal service costs. This policy was publicly announced on my behalf by the acting Minister, Mr McGauran, in a media release of 6 July 1999.

245. The ACA asked Gibson Quai to advise it on the cost of these services. The Gibson Quai analysis, based on information provided by Telstra, is provided in section 8 of its report. (The Telstra information, which is considered to be commercial-in-confidence, is provided at Appendix C.) In its analysis, Gibson Quai has assumed that the costs of interim services apply only to NCAs (as assessed in 1997/98), and has calculated a net cost of \$1,565,076 for provision of these services. The limitation of the Telstra interim service cost data to NCAs is considered a reasonable approach, as the context of the Minister's request is that 'this should be taken into consideration in considering net universal service costs.'

246. The ACA has reservations with the data provided by Telstra:

- it assumes a constant rate of *(C-I-C)* interim SIOs installed per month over the year, with the actual number of SIOs installed for the year to date not provided; and
- total costs for provision of these services includes an average capital outlay for each Minisat in use. However, the investment amount has not been converted into depreciation and an opportunity cost of capital.

247. After consideration of the Telstra data and the Gibson Quai analysis, the ACA considers that the \$1,565,076 amount can only be considered as an upper ceiling on the costs of provision of interim services. Further information will be required from Telstra to more accurately assess these costs.

Appendix A

MINISTER'S REQUEST FOR ADVICE ON NUSC COSTS FOR 1998/99 AND 1999/2000 (LETTER DATED 5 NOVEMBER 1999)

Mr A J Shaw PSM
Chairman
Australian Communications Authority
PO Box 78
BELCONNEN ACT 2616

Dear Mr Shaw

Thank you for your letter of 22 October 1999, providing me with a report on the impact of the 1997/98 Universal Service Obligation (USO) assessment on competition in the industry, the most appropriate method for calculating the net universal service cost, and the appropriateness of the USO costing model.

The Government is currently reviewing long-term future funding arrangements for the USO and a decision is expected in early 2000. Any new arrangements will commence on 1 July 2000 and apply for the financial years 2000/01 on. The ACA's report will provide valuable input into the Government's review.

In the interim, the net universal service cost for 1998/99 and 1999/2000 is fixed by statute at \$253.32 million, indexed for inflation. However, the Minister has a power to determine an alternate amount for those years. The Chairman of Telstra has written to me requesting that I exercise that power and determine a net universal service cost amount for 1998/99 and 1999/2000 based on the ACA's assessment for 1997/98. I am currently considering that request.

Clearly there are a number of factors which might be relevant to that consideration, including the estimated net universal service cost for 1998/99 and 1999/2000, the Government's decisions on long-term funding arrangements for the USO, the likely impact on the industry of any interim amounts for 1998/99 for 1999/2000 and the views of the industry and the public.

In relation to the first of these - that is, the estimated net universal service cost for 1998/99 and 1999/2000 - you have previously advised that the future cost is not simply the 1997/98 cost indexed for inflation. The cost will vary as new technologies come on line and as the cost of capital, including interest rates, changes. There are also policy decisions to be made about how to calculate factors such as the cost of capital and how to account for potential ubiquity and other benefits accruing to the USP.

Therefore, in order to assist me in making a decision on Telstra's request, I would be grateful if the ACA could provide me with advice by 17 January 2000 on factors

Estimate of Net Universal Service Costs for 1998/99 and 1999/2000

relevant to the question of estimating net universal service costs for 1998/99 and 1999/2000, in particular:

- a) the ACA's estimate of the forward-looking technology mix and the cost of the technology in relation to Telstra's fulfilment of the universal service obligation for the 1998/99 and 1999/2000 financial years;
- b) the ACA's estimate of the weighted average cost of capital for the 1998/99 and 1999/2000 financial years in relation to Telstra's fulfilment of the universal service obligation for those years;
- c) having regard to paragraphs (a) and (b) above, the ACA's estimate of Telstra's net universal service costs for the 1998/99 and 1999/2000 financial years if those costs were not capped; and
- d) the nature, materiality (in comparison to the net universal service cost) and, to the extent possible, likely quantum of the benefits to Telstra in being the national universal service provider in the 1998/99 and 1999/2000 financial years.

In preparing your advice, please have regard to Government policy concerning the agreement negotiated with Telstra in June 1999 to deliver an 'interim phone service', at PSTN rates, to persons in remote areas who have been waiting for a first connection for six months. The Government recognises that this may be a new cost to Telstra, above and beyond the cost of the services included at the time the legislated cap on the USO cost for 1999/2000 was imposed. The Government intends that this should be taken into consideration in considering net universal service costs. This policy was publicly announced on my behalf by the acting Minister, Mr McGauran, in a media release of 6 July 1999.

Your views on other relevant matters would also be welcome. In early 2000 I intend to draw on the various reports of the ACA, the decisions of the Government on long-term future funding arrangements and the Government's consultations with the public and the industry, in order to decide whether to agree to Telstra's request and vary the net universal service cost for 1998/99 and 1999/2000.

Yours sincerely

RICHARD ALSTON
Minister for Communications,
Information Technology and the Arts

TELSTRA COMMERCIAL-IN-CONFIDENCE INFORMATION

Appendix B

SIOs AND POWER SUPPLY ASSUMPTIONS

Table 11: Telstra data on percentage of services requiring forms of power supply

This data is commercial-in-confidence and has been removed.

TELSTRA COMMERCIAL-IN-CONFIDENCE INFORMATION

Appendix C

INTERIM SATELLITE SERVICES FOR REMOTE CUSTOMERS

This data is commercial-in-confidence and has been removed.