Mallesons Stephen Jaques

Response to Cost Issues raised in the Optus DTCS Exemption Statement April 2008

23 July 2008

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List of Terms and Abbreviations

ACCC – Australian Competition & Consumer Commission

CBD – Central Business District

Optus Submission - Optus Submission to Australian Competition Commission on Telstra's December 2007 Exemption Applications for Tail End and Inter-Exchange Transmission Capacity Services dated April 2008

POI – Point of Interconnection

PoP – Point of Presence

1 INTRODUCTION

1.1 I have been requested by Mallesons Stephen Jaques to review the Optus Submission to Australian Competition and Consumer Commission on Telstra's December 2007 Exemption Applications for Tail End and Inter-Exchange Transmission Capacity Services and to set out comments and relevant opinions.

1.2 Within the Optus Submission are comments relating to my December 2007 report, Estimated Optic Fibre Cable Installation Costs within CBD Areas.

1.3 I have been asked by Mallesons Stephen Jaques to consider those comments and state whether they cause me to depart from my previous conclusions.

1.4 My qualifications and experience are set out in my previous report and have not been included within this document.

1.5 The issues raised in relation to cost of fibre infrastructure in the Optus submission are as follows:

Paragraph 2.18 – *"…the cost of construction of access fibre infrastructure to buildings in the Melbourne CBD was in the range of* ***CiC .. CiC ends****"*

Paragraph 4.5 – *"Optus considers that the cost estimates provided in the Craig Lordan statement are likely to substantially underestimate the cost of building fibre infrastructure, based on a comparison with recent Optus estimates."*

Paragraph 4.7 – *"In summary, on a per metre basis the costs estimated at Optus' four Melbourne sites were substantially higher than the comparable cost estimates from the Lordan report, as noted below:* ***CiC .. CiC ends****"*

Paragraph 4.11 – *"Further, Optus considers that the estimates in the Lordan statement should not be relied upon for the following reasons:*

(a) Lack of information about build distance between the selected end points, the route taken and unit cost for fibre, subducts, pits, joints etc.

(b) Lordan's cost model for building in lease duct does not appear to allow for break out pits or duct.

(c) Optus considers that Lordan underestimated the number of pits/joints between end points required for the CBD build; it should be one for every 200m rather than one for every 1000m (p7).

(d) Lordan did not take into account the importance of restoration cost (restore paving and building fore courts).

(e) Optus disagrees with Lordan with regards to Directional Boring. Optus experience suggests that Directional Boring is not appropriate for 99% of CBD builds because city authorities and police traffic management do not allow boring machines to be set up and left in place during business normal hours.

(f) Lordan does not take into account of business customers' requirement for redundancy of network infrastructure (to guarantee continuity of service)."

Paragraph 6.7 – *"Optus notes that on a per metre basis the costs estimated at its four Melbourne sites were substantially higher than the comparable cost estimates from the Lordan report, as noted below:* ***CiC*** *..* ***CiC ends****"*

Paragraph 6.8 – *"underestimates since they do not take into account the design and planning upfront costs included in the Lordan study. If Optus was to take this into account then this would increase the cost by between 4 to 6 percentage points. As noted above, these estimates were randomly selected and should be taken as representative of the build costs of access fibre in the Melbourne CBD."*

1.6 In my opinion, for the reasons set out below, it is not valid to compare the results of my previous report with the Optus sample projects on the basis of cost per metre.

Craig Lordan
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Evans & Peck

2 BACKGROUND

2.1 Before addressing the specific issues raised in the Optus Submission, I provide the following comments as background information.

2.2 My previous report, to which the Optus Submission refers, was prepared in response to specific questions posed in a Mallesons Stephen Jaques brief dated 10 Oct 2007. The questions are described in Paragraph 1.2 of my previous report. The two main questions were:

i. The estimated cost of providing a fibre cable to the assumed most expensive building within a CBD;

ii. What would be the 75th percentile of costs in each of these CBDs? .

2.3 The CBD areas to be reviewed were defined in the brief as a list of Telstra exchange areas which are set out in Appendix 1 of my previous report.

2.4 Cost estimates, to provide a response to the questions described in Paragraph 1.2 of my previous report, and repeated in Paragraph 2.2 above, were developed using a cost model which was comprised of unit rates for both the fixed and distance variable components of installing optic fibre.

2.5 The unit costs I have used in my cost estimates are my understanding of those prevailing within the telecommunication industry. In the course of preparing the Estimated Optic Fibre Cable Installation Costs within CBD Areas report I tested my unit rate assumptions with telecommunication construction contractors.

2.6 The cost estimates provided in my previous report have been presented as indicative average costs to connect buildings within the CBD area and, as noted in Paragraph 3.18 of my December 2007 Report, it is likely that the actual cost of installation for each situation will exhibit a level of variation from the estimated average costs presented.

2.7 In my opinion, the cost to install fibre in a CBD environment is likely to vary significantly from building to building for a variety of reasons.

2.8 It is my experience, and I understand generally accepted within the telecommunication industry, that the most significant component of fibre installation cost is the provision of civil infrastructure, including excavation, conduits and pits.

2.9 Civil infrastructure costs are dependent on a number of factors including the ease of access for machinery, hardness of the ground, underground obstacles and the surface which must be removed and reinstated. The installation of civil and fibre infrastructure also requires traffic management personnel and, for a CBD environment, the work is normally restricted to non business hours.

2.10 Where the footpath or forecourt is of a very expensive material to purchase or install, such as granite, the cost of installing civil infrastructure is significantly increased.

2.11 The costing exercise conducted for the previous report made the assumption (on the basis of map review, aerial photos and available local knowledge) that the occurrence of very high cost to reinstate surfaces such as granite and the like, would not be the norm across all buildings within a CBD area and, in fact, this would be the exception to the general rule. The assumption was that surfaces of pavers or bitumen are far more common than high cost surfaces.

2.12 Additionally, in many densely occupied areas, laneways and alternative installation routes may be available.

2.13 For the installation of cable within an existing conduit, it is my experience that the costs are more stable and predictable due to the lack of civil variables.

2.14 It is noted that future contractor installation charges are expected to rise due to pressure from increasing fuel costs, shortage of labour resources and increases in material charges. The charges applied for work will also be dependent on the network owner's contract structure, price model and volume of work being offered to contractors. Reductions in contractor unit prices are normally available when increased volume of activity is committed.

2.15 Examples of very high cost civil infrastructure installations will always occur but, in my opinion, they are the exception rather than the norm when considering all buildings within a CBD.

3 INCREMENTAL NETWORK DEVELOPMENT

3.1 In my opinion, there are a number of potential factors which may have contributed to the variance between the results in my previous report and the sample projects considered in the Optus Submission.

3.2 In my opinion, it is likely that the design parameters used for the development of the Optus sample project cost estimates will differ from those specified for the development of the estimated costs to install fibre to buildings within various CBDs presented in my previous report. In line with my understanding of general industry practice, it is expected that the Optus sample projects would have been specified on the basis of developing a future orientated fibre distribution network.

3.3 Based on my experience the normal industry approach is to connect fibre to a new customer building by extending the existing fibre network rather than installing a new cable from the POI.

3.4 The long term approach to the development of a fibre distribution network is to install large fibre count cables from the POI along a route. Typically, many points to access the available fibres (joints) are also installed during construction. As highlighted in the Optus Submission, the standard Optus practice appears to be to install a joint (access point) every 200 metres. It should be noted that a joint every 200 metres is not required for the hauling and installation of the cable but is rather an option to enable additional building connections.

3.5 By installing surplus fibre capacity, joints and access pits at the time of construction, the carrier will have fibre network capacity within approximately 100 metres of every building along that route.

3.6 Any customer request for fibre capacity along that route can be connected quickly and with a short distance of fibre infrastructure installation.

3.7 A potential example scenario which considers the connection of three buildings along a route is discussed in paragraphs 3.8 to 3.9.

3.8 The theoretical approach to develop a cost per building assumes that a small fibre cable is to be installed from the POI to each of the three buildings. Each

fibre cable installation is assumed to be a separate cost item, including the civil and fibre cable installation. The result is that fibre cables would run in parallel for common sections of the route.

3.9 The alternative general industry approach is to install civil infrastructure and a high fibre count cable whenever fibre network is installed. Depending on the timing of customer requests, either the fibre and infrastructure will be installed from POI to the first building, then extended to the second building and finally to the third building, or alternatively fibre installed, with multiple access points, from POI to the third building with connection to the first building and the second building provided by short installations (typically less than 100 metres) from the previously provided access points.

3.10 My previous report estimates were developed using defined parameters of installing the minimum fibre count possible from POI to the building requiring service. Although it was always understood that it was unlikely to be how a carrier would develop a CBD fibre network, it was believed to be the most representative way of isolating the cost to connect an individual building. It is still my opinion that this method is the best approach to isolating the cost of supplying optic fibre from POI to a building.

3.11 The key parameters used in my previous report were the use of minimum fibre count cable and no allowance was made for future growth opportunities.

3.12 It is likely that any carrier fibre network developed within a CBD would be installed to cater for future potential multiple customer connections whilst servicing the known requirement. Any new building connection would be an extension of the existing network and provide future capacity for additional building connections.

3.13 The impacts of developing fibre infrastructure to accommodate potential future demand include the use of higher fibre count cable, installation of multiple joints as access points to allow for future connections of new customers, potentially additional conduit, and additional cable via an alternative path to provide service redundancy.

3.14 The cost impacts of network infrastructure designed and costed to general industry practice are:

i. higher material cost for fibre;

ii. additional joints;

iii. additional pits;

iv. potentially additional conduit;

v. and increased labour costs for jointing and terminating of additional fibres.

3.15 In my opinion, my previous report remains a valid approach to understanding the cost of connecting fibre to an individual building within a CBD. If the standard carrier distribution fibre network model had been used for the cost analysis, assumptions would need to have been made regarding the apportionment of costs from each cable section against individual connections. When the long term view is taken, investment is made for the current requirement plus potential future requirements with the exact value of each component difficult to quantify.

3.16 The general industry approach has developed in the pursuit of the most cost effective long term solution whilst the single cable from POI to each building model is impractical and inefficient when multiple connections are anticipated.

3.17 As the provision of additional capacity at every installation has become the industry norm, it is reasonable to assume that the long term average cost to connect buildings is lower using this approach than the simple single cable per connection model. I would still expect a lower average cost is despite individual projects or buildings exhibiting higher construction costs at the time of installation.

3.18 The incremental development of the long term network requires different design parameters with the aim of minimising future investment. The benefit of investing in additional and spare infrastructure on each project is the potential avoidance of future investment. My previous report approach was to cost the fibre build from POI to the building rather than the incremental approach. In my experience the incremental approach delivers a lower total cost model in the longer term.

Distance

3.19 In my experience the cost of fibre cable installation is not linear in terms of the metres installed. Typically, the cost per metre is greater for shorter distances than for longer distance installations.

3.20 The cost to install fibre infrastructure is comprised of both fixed costs and costs which are distance dependent.

3.21 For example, a proportion of the design work, mobilisation to site, termination of fibre and final testing activities will be constant irrespective of whether the installation distance is 20 metres or 2500 metres.

3.22 Activities which are closely related to the installation distance include excavation, conduit installation, surface restoration and the supply and installation of fibre.

3.23 As the total cost to install optic fibre cable is dependent on both fixed and distance variable costs, the effective cost per metre increases as the installation distance decreases. The impact is particularly significant when short distances of installation are proposed.

3.24 To illustrate the impact of installation distance on the cost per metre, the cost model used in the development of my previous report has been used to calculate the estimated installation cost for varying distances. For an installation in the Melbourne CBD area, the cost per metre is estimated to be 55% greater for an installation of 200 metres as compared to an installation of 2000 metres. This variation occurs by only changing the distance to be installed with all other parameters constant.

3.25 Due to the impact of distance on the cost per metre as described in paragraph 3.24, it is my view that a cost per metre analysis quoted in the Optus Submission is not a valid basis for comparison.

4 OPINIONS IN RELATION TO ASSERTIONS IN PARAGRAPH 4.11 OF OPTUS SUBMISSION

4.1 Paragraph 4.11(a) of the Optus Submission cites the lack of information relating to unit rate costs for fibre, subducts, pits and joints.

4.2 The unit rates are based on my experience and knowledge of the industry and on occasion have been tested with contractors specialising in the construction of infrastructure for telecommunication carriers.

4.3 Unit Rates are typically the basis of a contractual relationship between Carrier and Contractor and the basis of competitive bidding. It is always a prerequisite when testing unit rates with external sources that this information not be shared.

Breakout Pit and Duct

4.4 Paragraph 4.11(b) of the Optus Submission asserts that the cost model for building using lease ducts does not include break out pits or duct.

4.5 The modelling of estimated costs for lease duct does not include a cost for a breakout pit but does include an estimated cost for the installation of duct from the nearest lease pit to the building.

4.6 A breakout pit has not been assumed on the basis that existing conduit networks are likely to be in close proximity to many of the CBD buildings. The estimated lease costs provided in my previous report assumed the availability of conduit to the nearest provider pit.

4.7 It is noted that the use of leased conduit and pits, where the infrastructure is available, may be an economic option for a carrier when compared to the high costs of conduit installation. The cost of ongoing conduit lease charges would need to be included in any economic comparison.

4.8 In my opinion, there is a high potential for variability of installation cost for the conduit between the closest pit and the building due to the reinstatement requirements and potential distance from the pits. The pit to building conduit component of the costing may contribute to examples of cost variation above

and below the assumed average. As stated in clause 4.16 of my previous report, only bitumen and paving have been included in the cost development. Higher cost forecourts of granite, and the like, would increase the cost of fibre installation if they cannot be avoided.

4.9 The cost modelling completed for this exercise did assume a shorter and lower cost installation between the last pit and the building for the connection of 75% of the buildings as compared to that assumed for the highest cost building.

Number of pits / joints

4.10 Paragraph 4.11(c) of the Optus Submission asserts that the number of pits [1] and joints [2] is underestimated at one per 1000 metres rather than one per 200 metres. This statement is not correct as my original modelling assumes a joint every 1000 metres but includes allowance for a significantly greater number of pit installations for hauling points. The modelling used for the development of estimated costs presented in my previous report included an allowance for a pit approximately every 200 metres.

4.11 My previous report, paragraph 4.4, states that a joint has been assumed every 1000 metres. From a technical perspective, it is my experience, that optic fibre cable can easily be installed for lengths of greater than 1000 metres without the requirement for a joint provided suitable hauling points are available.

4.12 Paragraph 4.4 of my previous report highlights that, in my opinion, a carrier would install additional joints during the cable installation to cater for future opportunities as described in the Optus Report. Typically, a carrier would install strategically placed joints at approximately 200 metre separations, throughout the fibre network. This allows for the lower cost connection of additional buildings as and when required.

Restoration Costs

4.13 Paragraph 4.11(d) of the Optus Submission states that my previous report did not take into account the restoration cost of paving and building forecourts.

[1] Pit is a normal industry term for a below ground chamber with removable lids which is either used for hauling cable through conduits, for the placing of joints between cables, or for both.

[2] Joints are the sealed physical enclosure in which two or more cables are interconnected. In the case of fibre cables each fibre is spliced together and stored inside the joint.

4.14 The estimated costs presented in my previous report included an allowance for the cost of surface restoration but the allowance was limited to certain surface types.

4.15 Surface restoration costs are a highly variable component of installing underground infrastructure in a CBD environment. This issue was addressed a number of times in my previous report, including at paragraphs 4.14 and 4.15. As stated in paragraph 4.16 of my previous report, the estimated costs presented assume bitumen or paving.

4.16 It is agreed that the occurrence of a more expensive surface in a forecourt or building entry would increase the cost of installation because of the additional cost of reinstatement.

4.17 In my opinion, there will be examples in each CBD area where a cost to connect an individual building is significantly affected by the cost to reinstate a surface. In my experience, the occurrence of very high cost reinstatement requirements would affect significantly less than 25% of the buildings within the CBD areas considered in the report.

Directional Boring

4.18 Paragraph 4.11(e) of the Optus submission asserts that directional boring would not be appropriate for 99% of CBD builds because of restrictions in relation to access.

4.19 In my opinion, the application of directional boring would be very limited in the higher density areas of the nominated CBDs. The modelling used to develop the estimated costs assumes that no directional boring is possible in the denser areas.

4.20 However, several of the exchange areas which were identified for analysis extend beyond what would normally be defined as a high density area. For example, Batman Exchange[3] extends beyond the high rise building precinct through industrial areas and rail yards. Directional boring may be a very effective installation technique in these areas.

[3] Shown in Figure 3 of my previous report.

4.21 The cost modelling assumed a limited application of directional boring techniques in those areas that, from a map study, appear to be suitable for the use of directional boring. Even when directional boring was included in the installation cost calculation, it only comprised a minor percentage of the total distance of installation.

4.22 In my opinion, the use of directional boring does not impact the costing of normal sites as there has been very little use in the cost modelling, and therefore not a point of conflict in terms of the cost of installation.

Network Redundancy

4.23 The Optus submission states that my previous report does not take into account "business customers' requirement for high service availability and redundancy of network infrastructure".

4.24 The Optus statement in relation to the inclusion of network redundancy is correct. The estimated cost to connect fibre infrastructure to buildings does not make any allowance for the installation of redundant network infrastructure.

4.25 My previous report was produced in response to specific defined parameters which, in summary, were the cost to install the lowest cost fibre option from POI to a building within one of the nominated CBDs.

4.26 The cost modelling did not allow for the installation of alternative fibre infrastructure to provide redundant infrastructure and therefore a higher level of availability.

4.27 In my opinion the provision of a second building entry and alternative diverse fibre infrastructure would significantly increase the cost of installation for any carrier providing service.

5 SUMMARY AND CONCLUSIONS

5.1 In my opinion, the Optus Submission statement that my previous report costs "are likely to substantially under estimate the cost of building fibre infrastructure" is incorrect. In my opinion, the costs presented still represent valid cost values for the connection of fibre to buildings within the selected CBDs.

5.2 The Optus Submission has drawn the conclusion that the building connection costs are underestimated by comparing the cost per metre, derived from the estimated building connection costs presented in my previous report to the cost per metre of four sample Melbourne fibre installation projects.

5.3 As discussed in this document, it is likely that the Optus Sample Projects reflect the cost of installing fibre network infrastructure to satisfy the current building connection and capacity for future building requirements. In my opinion, it is not valid to compare the cost of installing fibre infrastructure designed to form part of a long term network to the cost of a single building fibre connection estimate.

5.4 I have assumed that the Optus sample projects align with general industry practice and will be a network extension which includes higher fibre counts, multiple joints and potentially redundant cable infrastructure as part of a long term network whilst the cost model assumes a single small cable from POI to building.

5.5 In my opinion, the impact of distance on the cost per metre as described in Paragraph 3.24 of this report, and the assumed difference in architecture and design parameters used to estimate the cost of the Optus sample projects and that used in my December Report means that any direct comparison of cost per metre is invalid.

5.6 As a carrier network is generally developed on the basis of incremental investment, it is my opinion that the only valid use of actual installation costs to calculate the average cost to connect a building would be to sum the cost of all installed fibre infrastructure within a CBD and then divide by the number of buildings connected.

5.7 It is accepted that there will be examples of network installations which are very high cost due to the location and surface conditions but it is my opinion that, when considering all buildings within a CBD, the instances of very high cost surfaces would be limited. Based on my experience, the incidence of very high cost surfaces that cannot be avoided by seeking alternative entry paths is much lower than 25% of the buildings within each CBD.

5.8 It should also be noted that the costs of installation are highly dependent on the contractor charges paid by the carrier. Contractor charges typically vary with factors such as volume of work, contractual terms and competitive process. It is likely that all contractor charges will increase due to future increases in material, consumable and labour costs.

Appendix 1 Additional Excerpts from Optus Submission

Paragraph 6.5 – "*Some information about the four sites (including the approximate build / lease mix for the ducts used, the build distance, the build cost and the cost per metre) is provided below:* ***CiC***

.. ***CiC end***"

Paragraph 6.6 – "*In order to assess the accuracy of the cost estimates from the Lordan report, Optus has extracted from the report costs comparable to the four sites above in terms of the build mix, and expressed them in terms of cost per metre,25 as follows:* ***CiC***

.." ***CiC ends***