Orion

Submission on

Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses

Issued by the Commerce Commission

Draft 23 December 2003

11 February 2004

C O N T E N T S

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for

Part 1: Key points

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1. Introduction

This submission relates to the proposed *Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses*, draft dated 23 December 2003, issued by the Commerce Commission. Some references are also made, where appropriate, to the report by Parsons Brinckerhoff Associates Ltd, *Development of a Handbook for optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses*, dated 23 December 2003. The submission is made in response to the Commission's *Invitation for Submissions* paper, issued on 23 December 2003.

Orion's submission is in four parts:

1. Key points.

2. Specific comments on clauses.

3. Appendices.

4. Suggested changes (marked-up) to text in proposed Handbook, in a separate file.

Part 4 has suggestions of changes to grammar, spelling & some wording clarifications only. Parts 1 & 2 have many recommendations of changes to contents of the Handbook.

This Part 1 highlights key points and addresses some issues associated with the proposed Handbook.

2. Purpose and application of ODV

Orion understands that the Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses *(*the *Handbook)* has been prepared pursuant to Part 4A of the Commerce Act 1986 (the Act). Furthermore, as stated in paragraph 6 of the Commission's invitation[1], "the Commission proposes to use such valuations in relation to the targeted control regime and information disclosure regime under subpart 1 and subpart 3 of Part 4A of the Act, respectively." We also understand that, regardless of whether or not ODV is used by an ELB to value its assets in the future, the initial application of the Handbook will determine the regulatory value of an ELB's system fixed assets as at 1 April 2004.

Therefore, Orion considers that the application of the Handbook must result in a credible and realistic ODV, taking full account of the real costs faced by Orion and other ELBs in constructing their distribution networks. If this is not achieved, there will be cost and value distortions in the electricity industry that will impinge on the NZ economy, and there is likely to be a negative reaction by investors to investing in and maintaining electricity distribution assets. These assets are a vital component of the NZ economy.

In Orion's view, the proposed Handbook will not meet the purpose requirements in a number of respects, particularly with respect to many of the per-kilometre replacement costs proposed for lines and cables. They are too low. This submission explains these shortcomings and proposes solutions.

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[1] Commerce Commission, *Regulation of Electricity Lines Businesses Invitation for Submissions on Draft Handbook for Optimised Deprival Valuation of System Fixed Assets and Draft Information Disclosure Regulations,* dated 23 December 2003

3. ENA submission

Orion fully endorses the submission on the proposed Handbook from the Electricity Networks Association (ENA)[2].

4. Handbook scope

Orion considers that the following assets should also be included within the scope of the Handbook:

- lighting sub network and control relays for lighting circuits;
- all land easements that provide the ELB with rights of access to land, whether formally in place or not.

These are covered in detail in sections 4 and 16 respectively of Part 2. Our reasoning is based on the ODV principle in that we would have to replace these assets if we were deprived of them.

5. Valuer and flexibility

The proposed Handbook is more vague on the role of the Valuer than was the previous Handbook. The term "Valuer" is used only in paragraphs 1.6, A.32, A.33 and notes e and g of Table A.1. The previous version of the Handbook had a section 4 "Defining the Valuer(s)" – "For the purposes of this Handbook, the term Valuer(s) refers to any party (or parties) responsible for the preparation of all or any part of the valuation." The proposed Handbook uses the term appropriately but inconsistently, sometimes capitalised and sometimes not.

Orion submits that the drafter of the proposed Handbook has missed an opportunity to provide for the flexibility needed in establishing ODVs of distribution networks under a wide range of circumstances. A professional independent Valuer can exercise judgement, where appropriate. Orion discussed this issue in section 11, Part 1, of its previous submission.[3]

We believe that the replacement costs and asset lives in the Handbook should provide a basis for valuation purposes from which the Valuers of individual line companies can depart. The expertise of the Valuer needs to be recognised and used. Consequently, more reliance should be placed on the Valuer's judgement. The existing Handbook provides for some of this (e.g. clause B34), but there is room for more. Orion submits that the Valuer should have discretion over:

- Unit replacement costs;
- Useful lives;
- Updates of commissioning dates;
- Surrogates used for determining asset quantities;
- Depreciation variations;
- Interpretations on MEAs;
- Interpretations on optimisation.

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[2] Electricity Networks Association, *Submission on the draft Optimised Deprival Valuation Handbook and draft Information Disclosure Requirements,* dated 9 February 2004

[3] Orion New Zealand Limited, *Submission on Assets Valuation Issues Paper by the Commerce Commission,* dated 11 September 2003

In situations where a non-standard method is appropriate, according to the Valuer's judgement, Orion advocates:

- the Valuer may use some discretion;
- the ELB fully discloses the variation, the impact on the valuation and the reasons for it.

Furthermore, there is also the auditor in the process as a further check.
Orion recommends that Valuers must be professionally qualified as members of the NZ Institute of Valuers, for this specialised work on assets valuation. The disclosures will allow the Commission, and other interested stakeholders, to clearly monitor the exercise of the proposed discretion.

Overall, Orion recommends that the Valuer be given formal recognition in the Handbook and be able to exercise discretion, where appropriate.

6. Incompatibilities

The proposed Handbook incorporates a number of incompatible concepts, such as the requirements:

(a) assume brownfields situations;
(b) consider only short planning periods;
(c) optimise nearby cables to a single trench;
(d) represent the behaviour of an ELB that is deprived of its assets.

These requirements, in combination, are completely unrealistic and could only result in denying essential businesses (i.e. ELBs) of the value that they create. This is hardly a reasonable approach by the Commission. We strongly suggest a relaxation of the requirements for (b) and (c) to restore some realism and credibility to the proposed Handbook.

7. Transparency

Considering the consequent wide-ranging impact on Orion's business from the application of the ODV Handbook, and the extensive information disclosure requirements that are imposed on Orion and all other ELBs, Orion submits that the Commission should be transparent in divulging all of the data it has used in proposing the Handbook, particularly in regard to the per-unit replacement costs. Orion requested this information from the Commission, under the Official Information Act 1982, on 15 January 2004. Developments since then have been:

- 23 Jan 04 – telephone conference between Orion and PBA;
- 2 Feb 04 – emailed letter, in response, from the Commission to Orion;
- 5 Feb 04 – Orion received a hard copy of the letter which enclosed an assortment of some correspondence between equipment suppliers and PBA relating to a few distribution transformers and some switchgear;
- 5 Feb 04 – PBA emailed to Orion a copy of a document from the New South Wales Treasury[4] that PBA had referred to.

Considering the short submission period of only 26 working days for ELBs to respond and during a period when staff usually take annual leave, this turnaround of 9 working days was too long.

[4] New South Wales Treasury, *Valuation of Electricity Network Assets. A Policy Guideline for NSW DNSPs* dated May 2003 (Draft)

Orion's request was for copies of all the data sources used by PB Associates and an explanation of the methodology used by PB Associates in calculating the standard replacement costs. We have been trying to understand why the proposed per-km replacement costs are so much lower than what Orion experiences, particularly for cables. While we appreciate receiving some response, we consider that the Commission's response has been inadequate, incomplete and lacks transparency. The Commission has claimed commercial sensitivity for in-house data retained by PB Associates and insufficient time to collate and identify all the relevant data sources available from the 2001 recalibration audit.

Overall, Orion considers this to be an unreasonable aspect of the process. The basis of the Commission's proposals should be completely transparent for all ELBs.

8. Replacement costs

8.1 Orion's position

Orion has compared its fixed assets valuation as at 31 March 2003, as follows:

Asset class	ODRC per proposed Handbook	Discrepancy	ODRC per FRS-3
	$m	$m	$m
11kV cables	131.6	45.0	176.6
11kV district substations	13.6	3.8	17.4
LV building substations	2.3	1.3	3.6
LV cables	68.7	26.7	95.4
33kV lines	9.4	2.5	11.9
Distribution transformers	50.0	(5.2)	44.8
All other assets, including land	247.9	(0.9)	247.0
Totals	**523.5**	**73.2**	**596.7**

The FRS-3 valuation reflects costs and asset lives experienced by Orion and is put forward as a 'fair' value of Orion's assets. The discrepancies for substations occur as a result of assuming 70 year useful lives, not 50 years, for the buildings. The discrepancy with the 33kV lines cost arises from the different per-km replacement costs. To correct for this discrepancy, Orion recommends a multiplier of up to 1.3 for line costs to recognise the extra costs of coping with wind and snow loading; please refer to Part 2, section 13. The discrepancy with the distribution transformers occurs because Orion had not identified the transformer cost increase when preparing the 2003 FRS-3 valuation. Clearly, the significant discrepancies are with 11kV and LV cables.

The significant discrepancy in value for 11kV and LV cables is Orion's key concern. We have undertaken considerable work to try to understand this discrepancy and details are given in Part 2, sections 13 (Multipliers), 14 (Traffic management) and 17 (Prescribed maximum asset replacement costs).

Factors contributing to the discrepancy for 11kV cables are:

(a) Orion's costings are for 1 - 2km lengths, whereas PBA's costings are for several km lengths;

(b) Orion installs cables amongst the full range of established underground services, such as sewage, water, telecom and cable TV cables. It is expensive to work around these services. PBA's basis is unknown, but could be assume only a restricted range of underground services;

(c) Orion has comprehensive high standards of design and construction. PBA's basis is undefined and unknown;

(d) Orion's 11kV cable has included in its manufacture. This minimises risk of premature failure from water treeing. We believe that PBA's cable costings do not include waterblocking;

(e) Orion has to comply with the high national standards demanded by the "Code of Practice for working on the road", issued by Standards New Zealand. PBA's assumed basis is unknown, but likely to be of a lower standard as this standard has been introduced only recently.

Factors contributing to the discrepancy for LV cables are:

(f) Same as for 11kV cable, factors a, c and e;

(g) PBA has costings for a new suburban subdivision, a "greenfields" situation. Orion's costings are for cable installation within an established urban infrastructure, a "brownfields" situation;

(h) Orion uses screened LV cables in order to comply with supply regulations in the stony and sandy ground experienced in Canterbury. PBA's costings are presumably for the lower cost 4-core LV cable, commonly used in the North Island.

For further details on these factors, please refer to Part 2, sections 13, 14 & 17 and to Appendix B.

The contracting company Alstom New Zealand Limited has recently announced that it is pulling out of the cable laying activity in Christchurch because it has been losing money in the Christchurch market. Alstom has been installing about 25% of Orion's cables. This development illustrates that Orion's cabling costs, derived from competitive contracting, are insufficient to ensure the viability of a reputable contracting company.

Orion recommends that more work be undertaken by PBA to recognise the differences so that the discrepancy is considerably reduced.

The following sections comment on two particular principles underpinning the estimates of replacement costs for the draft ODV Handbook. First, PB Associates has proposed an approach to determining unit replacement costs that is based on a benchmark that is unsound and at odds with the underlying objectives and principles of an ODV valuation.

Second, in the specific case of whether or not to optimise trenches, the draft ODV Handbook proposes an approach that appears to be consistent with a 'greenfields' rather than a 'brownfields' approach to valuation.

These sections confirm the ODV concept, as adopted by the Commission and PB Associates, and explains why a 'best of the best' approach to its application is both unreasonable and impractical. In real life, no company is able to operate with every aspect at an optimum level. It also addresses the specific case of trench optimisation, and the need for consistency with the brownfields approach to valuation.

8.2 The ODV methodology and replacement costs

ELBs are required to conduct ODV valuations of their system fixed assets for the purpose of complying with the disclosure regime that has been in place since 1994. The valuation of system fixed assets, as well as other cost and financial data reported under the disclosure regime, also form an increasingly important element of the threshold and control regime for ELB regulation now being finalised by the Commission. The ODV Handbook was published to assist ELBs in interpreting and applying the ODV methodology.

PB Associates' report defines the ODV methodology as follows:[5]

> *"the value of assets to the business is equal to **the cost the business would incur** if it were deprived of the use of its assets and then took action to restore **its** operating position to the pre-deprival situation by replacing its old asset **base** at the lowest possible cost." (emphasis added)*

This paragraph has been accepted by the Commission and is replicated in its entirety in paragraph 1.2 of the draft Handbook.

PB Associates' definition - along with its explicit reference to what is achievable by a real business making actual investment decisions - is perfectly consistent with that adopted by the Australian Competition and Consumer Commission (ACCC) in the nearest equivalent document concerning the regulation of transmission revenues in Australia. The ACCC defines Optimised Depreciated Replacement Cost (ODRC) – the principal sub-component of ODV – as follows:

> *"…a DORC valuation is actually attempting to measure…the **maximum price that a firm would be prepared to pay** for 'second-hand assets'...given the alternative of installing new assets..."*

The ACCC's definition of ODRC similarly reinforces the point that an ODV valuation should be based on actual transactions in the marketplace – that is, price that a firm would be willing to pay – rather than some theoretical optimum.

In contrast, however, PB Associates is proposing a benchmark for putting this principle into practice that involves a much higher and less realistic threshold. Specifically, PB Associates propose that the benchmark underpinning estimates of unit replacement costs be determined as follows[6]:

> *"The proposed replacement costs represent PB Associates' best estimate of the costs that would be paid by an efficient distribution business using the **most cost effective** methods to establish the optimised design of network, and purchasing **all items** (equipment and services) at **the best possible rates**. This envisages building the network in the most effective fashion, and obtaining the **lowest material and labour costs** by **bulk** (and/or term) **purchases**, but **not paying any premium** for materials or labour for speed of construction." (emphasis added)*

The above benchmark amounts to a 'best of the best of the best' criterion that is at odds with the underlying objective and principles of an ODV valuation.

There is nothing about the ODV concept that requires costs to be determined by reference to a hypothetical optimum across all possible sources of influence on costs. The concept

[5] PB Associates, *Development of a Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses: Draft Report*, 23 December 2003, p.2-3

[6] *Ibid*, p.4-13

simply requires that assets should be valued by reference to their lowest *possible* cost of replacement. For it to have practical relevance, an ODV valuation must be grounded in the reality of what is possible for an efficient entity to achieve.

A consistent theme emerging from economic and other studies of relative efficiency – including of entities providing price-regulated infrastructure services – is that trade-offs exist in the relative performance of entities across the various components of total cost. For example, it is common for firms that have relatively low labour costs to have relatively high capital input costs (and vice versa), even though firms exhibiting both combinations of cost performance may each be rated efficient overall.

In the case of system fixed assets, for example, such a trade-off could be expected to reveal itself in the balance between materials and labour costs, eg, more expensive equipment (or materials) may give rise to savings on installation (the labour component), etc. Similarly, when considering the cost of replacing all components of its network, an efficient ELB would almost certainly find it necessary to pay a premium to achieve higher than average speeds of construction for some parts of its network – such as the replacement of those network elements that may cause undue traffic disruption.

This principle is consistent with guidelines developed by the New South Wales Treasury on the valuation of electricity network assets in the context of its significant policy and shareholder role in the electricity supply industry. Those guidelines state clearly that, for the purposes of deriving an ODRC valuation of network assets, replacement costs should be determined by reference to what would be incurred in the normal course of business:

> *Guidance in determining replacement costs is provided in Statement of Accounting Practice SAP1 "Current Cost Accounting"…GCRC [gross current replacement cost] of a modern equivalent asset is defined as: "the minimum that it would cost,* ***in the normal course of business****, to replace the existing asset with a technologically modern equivalent new asset with the same service potential, allowing for any differences in the quantity and quality of output and in operating costs."*[7]

In our view, therefore, the relevant sections of the Handbook should be amended so that the concept of the efficient ELB is applied by reference to *practicable outcomes* in terms of unit replacement cost. Such an amendment is necessary to bring the derivation of unit costs into line with the underlying concept of an ODV valuation, and with the benchmarks applied in determining unit replacement costs in other jurisdictions, as discussed below.

8.3 Replacement costs in other jurisdictions

No other replacement cost valuations of which we are aware have been based on the hypothetical optimum required by PB Associates' benchmark for unit costs. Rather, in all examples we have been able to find, the benchmark for determining replacement costs is consistently established by reference to *industry practice*.

Booz Allen Hamilton was employed by the New South Wales utilities' regulator, the Independent Regulation and Pricing Tribunal (IPART) to review the valuation of certain assets of the Rail Access Corporation (now Rail Infrastructure Corporation ('RIC")) in New South Wales. An integral component of that involved a review of the replacement costs of various assets in the NSW rail network. Replacement costs were assessed "using only efficient costs and modern engineering equivalent rail assets".[8] However, there was no

[7] New South Wales Treasury, *Valuation of Electricity Network Assets A Policy Guideline for NSW DNSPs*, May 2003 (Draft)
[8] Booze Allen Hamilton/IPART, *Valuation of Certain Assets of the Rail Access Corporation*, 14 May 2001, p.41

assumption that replacement cost must be the *lowest* cost. In fact, Booz Allen Hamilton states:

> *….**reasonable rates** have been selected recognising the terrain, track configuration and **material supply constraints**.[9] (emphasis added)*

And:

> *It is simply **unreasonable to select the lowest common denominator** for track costs and then apply this to the network.[10] (emphasis added)*

Booz Allen Hamilton noted that there were divergent views on replacement costs and, further, that replacement costs would vary depending on what task was being undertaken:[11]

> *…replacement costs… vary widely depending on assumptions made relating to the scale of the purchases and the nature of the construction task. As current data covering these matters is not readily available, pricing has been drawn from a number of sources, compared with similar work being undertaken elsewhere, and sense-checked with both confidential sources and older publicly available data adjusted for inflation.*

Booz Allen Hamilton obtained much of their information from current industry sources, including suppliers, and reviewed their costs with reference to industry practice. The report notes, for example:

> *…costs were obtained from industry sources… These costs were also verified by comparing with estimates developed from first principles.[12]*

The costs established by Booz Allen Hamilton were *not* compared to industry *best* practice. Finally, in their discussion of replacement costs for bridges, Booz Allen Hamilton note:

> *…the practical issues to hand is development of **credible** replacement costs"*[13] (emphasis added).

PB Associates' replacement costs, in contrast, are based on a hypothetical situation that would appear to have only limited practical application.

A consortium of GHD, Arthur Andersen and Worley International were engaged to carry out a DORC valuation of the network assets of six distribution network service providers ('DNSPs') in NSW as part of a pricing determination for IPART. The review included an analysis of the unit costs used by DNSPs to obtain a DORC value. The resulting report for one of the DNSPs stated:

> *Prime costs were reviewed using comparisons with international figures and also using information supplied by the Distributors.[14]*

The review made no reference to obtaining the lowest possible costs.

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[9] *Ibid*, p.41
[10] *Ibid*, p.42
[11] *Ibid*, p.42
[12] *Ibid*, p.44
[13] *Ibid*, p.49
[14] NSW Treasury, *NSW Electricity Supply Industry ODRC Valuation of Network Assets: Report on Australian Inland Energy*, February 1999, p.10
http://www.ipart.nsw.gov.au/submiss/asset_valuation99/nsw%20treasury%20-%20australian%20inland%20energy%20-%20s3266.pdf

PB Associates has also previously adopted this method of using costs from comparable industry situations. PB Associates carried out a review of Powerlink's transmission network asset valuation on behalf of the ACCC. Powerlink had based its valuation of replacement costs on industry practice, and added on additional costs where it thought appropriate, for example, where lines were to be installed in rugged terrain. PB Associates noted that this was a reasonable approach, however, it placed a caveat on the review noting "It was therefore not possible, in the time available, for us to reach any conclusion on the efficiency of the replacement costs proposed by Powerlink".[15]

8.4 Where MEAs are not supplied in the Handbook

The Handbook specifies that where a modern equivalent asset (MEA) is not valued within the Handbook, the replacement cost would normally be the asset that:

- can be purchased or constructed using current technology at the time of valuation;
- has an equivalent service potential to that of the existing asset; and
- has the lowest lifetime cost.

The Handbook subsequently notes:[16]

> *"Equipment purchase costs should be based on costs quoted by manufacturers or suppliers in a competitive environment. Construction cost estimates should be based on knowledge of the work involved and efficient industry practice with competitive costs, such as would be charged by* ***efficient industry practice*** *with competitive costs, such as would be charged by efficient private contractors. Alternatively, costs may be based on* ***competitive quotes by turnkey private contractors"****. (emphasis added)*

In keeping with the underlying concept of ODV, where unit costs have not been determined, the handbook supports the adoption of a *competitive price* based on efficient industry practice. Again, these high level principles reinforce the conclusion that – in developing benchmarks to put these principles into practice - PB Associates has adopted an unnecessarily stringent benchmark for determining unit replacement costs.

8.5 Application of brownfields principle to cable trenches

The draft ODV Handbook states at Appendix B, page 49, that:

> *"Cables running close together, or on the same side of any road or street must be optimised to a single trench except where this would not meet the ELB's quality of supply requirements."*

This requirement appears to contradict that of paragraph 2.13 of the draft ODV Handbook, which states explicitly that:

> *"Replacement costs should be determined on a 'brownfields' basis."*

The question of whether any ODV valuation exercise is undertaken on a 'greenfields' or 'brownfields' basis amounts to deciding on the degree of optimisation that should be applied when determining the replacement cost of the entire network. There are two important dimensions to this choice, i.e., whether or not the network replacement cost should be determined in the context of the existing infrastructure within which the network sits (roads,

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[15] PB Associates, *Powerlink Network Asset Valuation Review, Prepared for the ACCC*, 19 April 2001, p.17 http://www.accc.gov.au/content/item.phtml?itemId=341567&nodeId=file3f57f40672fc9&fn=Asset%20valuation%20report.pdf

[16] Commerce Commission, *Handbook for Optimised Deprival valuation of System Fixed Assets of Electricity Lines Businesses: Draft*, 23 December 2003, p.9

buildings, traffic management constraints, etc), and whether or not the entire network is to be replaced at once.

The draft ODV Handbook adopts the use of a 'brownfields' approach, and this is consistent with virtually all other valuation exercises of this type. The principal reason for adopting a brownfields valuation is that this is the only principle that is consistent with the underlying concept of ODV, i.e., the actions that an existing business would take were it to be deprived of some element if its infrastructure.

An important dimension of this principle is that it does not envisage the simultaneous replacement of an entire network. Not only would such a scenario have only limited practical relevance to the valuation task at hand, but also the determination of replacement costs would become much more problematic - since the demand on potential suppliers would be so significant as to cause much higher replacement costs to the incurred.

For these reasons, the extent of optimisation is limited to that implied by the need to strip out excess capacity, and to use modern equivalent assets. A brownfields valuation does not extend to optimisation of the basic configuration of the network, which will almost always have developed in response to the incremental demands placed upon it over a long period of time.

It follows that a brownfields valuation approach should not seek to optimise the configuration of cable trenches in circumstances where two different trenches may have been placed in relatively close proximity at different stages of the network development. Such circumstances are only likely to arise where either the first trench was already at capacity (and so cannot carry a second or larger cable), or there is some service- or reliability-related reason to use different trenches.

Please refer also to Part 2, section 21, which has further discussion regarding the sharing of trenches.

Recommendation
Orion therefore recommends that the requirement for optimisation of trench configuration be deleted from the draft Handbook.

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Part 2: Specific comments on clauses

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In order of occurrence of clauses in the proposed draft Handbook.

1. The Optimised Deprival Valuation Methodology (clauses 1.3 to 1.8)

These clauses tend to indicate that a greenfields approach is required and conflict with clause 2.13 and 2.18 which specifically provide for the use of a "brownfields" approach and the use of the existing network as a starting point.

Orion agrees that a "brownfields" approach is more appropriate. We therefore recommend that the Commission modifies clauses 1.3 to 1.8 to ensure compatibility with clauses 2.13 and 2.18.

2 Alternative if application of rules not possible or appropriate (clause 1.11)

We agree with this clause, which recognises that if a strict application of the rules is not possible or appropriate, the valuation is to be undertaken consistent with the deprival philosophy.

3. Assets to be included in the Valuation

Works under construction (WUC) (clause 2.7)

In its submission[17], Orion specifically asked for WUC to be included in the ODV valuation (section 5, part 1 and in answer to Q30). If WUC are to be excluded, we consider that the value of WUC must be included as part of other business assets and be recognised in the calculation of ROI. These represent part of the total funds employed by the business, and some return should be allowed. To do otherwise discourages investment. This would also apply to the other non-system fixed assets that Orion listed in its submission[17] (section 5, part 1).

Street lighting sub-network (clause 2.7, clause A.25, PBA report, S3.2)

Clause 2.7 excludes "street light control relays and circuits or other equipment used exclusively for street light control" and clause A.24 implies valuing street lighting mains only where the LV reticulation is not available.

The PBA report[18], section 3.2, states "Circuits used to supply electricity to the point of connection of street lights are system fixed assets and should be included."

We submit that the intention stated in the PBA report has not been accurately implemented in the proposed Handbook. In particular, Orion mostly employs a fifth core or wire within its low voltage (LV) cables and lines for supplying street lights. We have always valued this lighting sub-network at its marginal cost of incorporation within the LV network.

Therefore, we ask that clause A.25 be modified to clarify that all circuits used to supply electricity to the point of connection of street lights are to be included in the valuation.

Furthermore, we do not agree with the exclusion of lighting control relays. As far as we know, all ELBs provide the facility to switch street lights, usually via ripple control. Their use per lighting connection or per lighting circuit involves considering many factors, such as the

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17 Orion New Zealand Ltd, *Submission on Assets Valuation Issues Paper by the Commerce Commission,* dated 11 September 2003

18 Parions Brinckerhoff Associates Ltd*, Development of a Handbook for optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses,* Draft report prepared for Commerce Commission, 23 December 2003

engineering, total cost, consistency of switching times, public safety and security of supply to the lights. Retailers are not involved. Therefore, this reality should be recognised and all plant up to the light itself should be recognised as part of an ELB's system fixed assets. We agree that the light fittings themselves and the lighting standards should be excluded, where these are owned by another party.

4. MEA definition (clause 2.12)

We welcome the clarification defining a MEA which concurs with Orion's view that the MEA relates to an asset, rather than to a configuration of assets and agree with clause 2.12.

5. "Brownfields" (clause 2.13)

We welcome the recognition of a "brownfields" basis for per-unit replacement costs which assumes construction occurs around all existing infrastructure and development. We support this approach as it is the reality faced by an ELB, a new entrant, and an ELB that is "deprived" of its assets. However, we are concerned that this "brownfields" approach has not always been recognised in the per-unit replacement costs, which appear rather low, particularly for cables. Refer further to our point 17 that follows.

We agree with clause 2.13.

6. Optimisation framework (clause 2.18)

We welcome the confirmation that a greenfields approach is not required and clarification of the basis given for the optimisation framework whereby the "rules allow the existing network to be used as a starting point".

We agree with clause 2.18.

7. Optimisation of high voltage distribution feeders (clause 2.25 and 2.26)

As Orion has already submitted[17] in answering Q29, paragraph (6), we remain concerned with the proposal for existing and forecast loads to still be published for every HV distribution feeder. Orion has approximately 950 of these. The result is many pages of numbers which will be meaningless to readers. There is minimal, if any, value in having this information to compare with previous valuation reports. Many values will change as a result of changes in configurations (eg normally-open switching points), changes in customer loads, and variations in weather patterns. These differences could give rise to unnecessary questions from the few readers who might choose to make comparisons without the appropriate background information. We regard this as an inefficient use of an ELB's limited resources which will ultimately result in increased costs to the consumer, for no benefit.

Therefore, as previously submitted, we suggest restricting this publication to loadings for grid exit points and district (zone) substations.

8. Planning periods for Optimisation (clause 2.28)

We note that only the planning periods for transmission and subtransmission have been increased. Comparisons (in years) are:

Network plant	Current	Proposed	Orion submitted[17] (question 26)
Subtransmission (& primary distribution)	10	15	30
Zone substations	10	10	30
HV & LV distribution	5	5	15
Distribution transformers	0	0	5

PBA's report[18] (section 5.3) presents the Commission's argument that longer planning periods place too much financial risk on existing customers. Then, at the end of the 3rd paragraph in section 5.3, the report states "one would expect the weighted average cost of capital (WACC) to be set to reflect the level of risk that the regulator was asking ELBs to carry." Orion would therefore expect that the Commerce Commission will recognise this in its assessment of WACC and that an appropriate margin over WACC will be allowed to cover the financial loss resulting from assets being utilised less than planned or expected. This seems to be an unnecessarily complicated approach that will result in consumers providing more or less the same return to the ELB, anyway.

Longer planning periods are also justified because of air pollution control measures being introduced by Environment Canterbury which will require the removal of approximately 6,000 existing open fires and 45,000 non-complying solid fuel burners over the next 20 years or so. Orion anticipates an additional load of about 60MW, depending on the level of conversion to electrical heating, as a result of these pollution control measures. This development is documented in sections 3.2.4 and 3.3.2 of Orion's Asset Management Plan.

However, more fundamentally, the proposed short planning periods do not comply with the deprival principle behind the valuation methodology because a prudent ELB, if deprived of the network assets, would rebuild them using similar planning periods to those submitted by Orion in answering Q26. Contrary to the assertion in the opening sentence of the 3rd paragraph in section 5.3 of PBA's report[18], this is the fundamental reason why the valuation planning period should align with the optimum engineering planning period.

Therefore, we disagree with the length of the proposed planning periods and recommend that the Commission extends the planning periods to those that Orion previously submitted.

9. Optimisation of network engineering (clause 2.40)

Orion would like this clause redrafted in a manner that better conveys its intent. Orion would like clarification that this new additional consideration for optimisation to "compare the engineering inherent in existing network assets with the design and construction practices that the ELB would use if it were replacing the existing asset base" is another way of requiring "consideration of how Orion would build the assets today", implying the use of the same voltages, configurations and asset types that Orion uses now. However, it is far from clear that this is the intent. The PBA report (section 5.2) indicates that this addition is intended to eliminate any "over engineering". This is probably already covered in Orion's optimisation, but some issues of interpretation could arise.

Therefore, we recommend some redrafting of the middle part of clause 2.40 to clarify its intent.

10. Depreciation – residual lives (clause 2.55)

Orion welcomes the provision for assets still in service to be deemed to have a residual life of up to three years, regardless of their age. However, Orion questions the proposed implementation. As explained in our submission[17] in answering Q20, *"once the minimum remaining life was reached, there would be no further depreciation associated with that asset for so long as the asset remained in use, with the difference between remaining book value and disposal proceeds (or cost) taken as an adjustment in the asset's final year of use."*

This is how Orion implemented this provision previously, when it was part of the valuation rules. In such situations the assets are not "fully depreciated" and the valuation process needs to recognise this.

Therefore, we recommend changing the heading for this clause to "Minimum residual Life" and prescribing the applicable depreciation of assets in these situations.

11. Economic value adjustment (clause 2.59)

Orion welcomes the removal of the requirement for an economic value adjustment, subject to the Commission reserving a right to require an EV test, if it considers the adjustment would be material.

12. Valuation reports (clause 2.63)

It would be useful if there were cross-references to the sections within the Handbook that prescribe the details of information to be included in the report. We have suggested these reference links in the marked-up version of the Handbook with this submission in Part 4.

13. Multipliers (clauses A.10, A.15 and A.16)

Orion notes that the range of allowed multipliers and their values have not changed. The present range of multipliers does not adequately recognise local differences in conditions. Appendix B "Comparison of replacement costs per unit" and Appendix C "Basis for cable costing – Handbook vs Orion" illustrate the wide range of different conditions and consequent costs experienced by ELBs. Some of these differences would sensibly be recognised via more multipliers and greater range for each multiplier.

Orion's overhead line costs in most of its rural area are greater than average because of having to construct for high wind and snow loadings. Orion has 70-80m spans, as stated in clause A.10, but a stronger than average design is required. This includes stronger poles and the use of smooth body conductors costing approximately an extra $5-6 per metre. This may explain why Orion's costs are higher than those proposed in the Handbook. We therefore recommend the introduction of two new multipliers in clause A.10, one for areas with significant wind loading and the other for areas with significant snow loading.

The New Zealand loadings standard NZS 4203:1992[19] identifies areas in New Zealand with significant wind and snow loading. Figure 5.4.1 shows parts of Canterbury exposed to nor-westers with basic wind speeds of up to 47 metres per second (170km/h) and figure 6.3.2 puts Canterbury in Zone 4, the zone with the most severe open ground snow load in NZ. Suitable ranges for both multipliers would be 1.1 to 1.3.

[19] Standards New Zealand, *Code of practice for General Structural Design and Design Loadings for Buildings,* published 14 December 1992.

Regarding the multiplier for cables laid in business districts in clause A.15, we recommend:

- including a quantitative criterion to identify business districts, such as including all arterial routes carrying 10,000 vehicles or more per day;
- increasing the range of the multiplier to 1.15 to 2.2 times the costs in Table A.1.

Regarding the range, in our previous submission[17], in our answer to Q10, Orion advised that the appropriate average multiplier was 1.6, rather than the Handbook's maximum of 1.25. We note that other submitters have also advised that larger multipliers are appropriate, such as 2.2 (Powerco)[20]. The high cost arises from the high standard of reinstatement that is demanded by the local councils who set the standards in the high-density business districts. For Orion, these extra costs range from $45/m on the grass verge only, to $75/m in the sealed footpath to $200/m to reinstate a class 1 top level road. Note that these exclude the cost of traffic management.

Apart from the exceptions discussed above, Orion agrees with the multipliers otherwise proposed in clauses A.10, A.15 and A.16.

14. Traffic management (clause A.20)

We note that the proposed Handbook proposes allowances of $800 per km for overhead line and $4,000 per km for underground cable where reticulation is constructed in roads with extensive traffic management provisions. In our previous submission[17], Orion did not quantify the costs associated with traffic management. We have now completed some analysis and the results are given in Appendix C "Underground cable costing contract, November 2003." After rounding, these traffic management costs to Orion range from $10,000 per km to meet Christchurch City Council requirements to $30,000 per km to meet Transit NZ requirements. The results show that these traffic management costs do not depend very much on the cable size or whether it is a single or double cable installation.

Orion disagrees with the proposed $4,000/km traffic management cost and therefore recommends that this allowance be increased to $10,000/km to meet local council requirements and to $30,000/km to meet Transit NZ's requirements.

15. Easements (clauses A.28 & A.29)

We note that the proposed provisions for valuing easements have not changed from the previous Handbook. Orion considers this a serious error in PBA's assessment of the handbook. Orion has previously submitted, in answering Q25 in our submission[17], that the value of all easements should be included and that we would submit further on these costs later in the process. In Appendix D please find a letter from Ernst & Young which provides the case for inclusion of the value of easements. These are tangible assets, representing a subset of the property rights attached to land and are clearly a cost faced by an existing ELB, a prudent ELB that is deprived of its assets or by an ELB that is a new entrant to the market.

[20] Powerco, *Development of the ODV Handbook – Powerco's response to the Issues paper, 14 September 2003,* dated 14 November 2003

16. Prescribed maximum asset lives (Table A.1)

The extensions to maximum asset lives proposed (in years) are:

Asset	Current ODV	Proposed for new ODV Handbook	Orion submitted
Zone substation buildings	40	50	70
Pole-mounted distribution subs	40	45	--
Ground-mounted distribution subs	40	45	--
Wood pole lines (CCA treated)	45	45	50
11kV OCBs (unsealed)	45	45?	50

Orion agrees with the reasoning given for extending the asset useful lives for distribution substations given in PBA's report[18] second last paragraph of section 4.3.7.

PBA's reasons for extending the life of network buildings to 50 years are valid. However, PBA has missed the point that the 50 year standard design life now required by many local authorities when issuing building consents is a minimum of 50 years, not a maximum.

We therefore again submit that the Commission prescribes a realistic maximum asset life of at least 70 years for zone substation buildings because ELBs (including the prudent ELB that is deprived of its assets) generally design for longer lives such as 70 years as advised by Orion and other ELBs in their submissions. Orion's practice now is to replace switchgear, with 45 year life, twice in the life of a substation building. Therefore, the building life is at least 90 years. We recommend increasing the maximum building life to 100 years to cater for all practices.

Regarding the maximum lives of wood pole lines, we further submit that these be extendable to 50 years where the poles are treated with CCA. In our previous submission[17], in answering Q7, we provided the evidence in section 2.1 of Appendix C of our submission of the research of the Forest Research Institute of Rotorua that has shown that CCA-treated wooden poles will have a service life of well over 50 years.

Regarding the maximum lives of unsealed 11kV circuit breakers, we further submit that these lives be extendable to 50 years where justifiable from results of a sophisticated aging detection programme employing regular partial discharging checks. For Orion, this applies to units manufactured by South Wales or AEI/GEC. We advised this in our previous submission[17], in answering Q7. It is also unclear where these devices are included in the proposed Table A.1.

17. Prescribed maximum asset replacement costs (Table A.1)

We note that most of the proposed per-unit replacement costs are much less than Orion and others submitted. Some key examples of disparities that will impact on Orion are:

Asset		Current ODV ($/m)	Proposed for new ODV Handbook ($/m)	Orion submitted ($/m)
11kV cables	heavy	120	125	160
	medium	90	97	125
	light	65	77	100
LV cables	heavy	55	72	100
	medium	55	63	---
11kV lines	heavy	24	30	34
	medium	22	27	28
	light	20	25	24

Appendix A shows the range of replacement costs for cables and lines that have been submitted and proposed. These are base costs, before any multipliers or allowances for traffic management.

The range shows that some ELBs experience significantly higher costs than other ELBs. Generally, the values proposed for the Handbook are at the low end of the range. It would appear that the Commission has made some unrealistic assumptions. We have discussed this in Part 1. Further, the conditions and standards of design and construction have not been specified in any detail in the proposed Handbook or in PBA's report[18]. This lack of transparency makes it difficult to compare and rationalise these wide ranges in value. Overall though, it is difficult to understand why PBA would propose these low values, having been advised by ELBs of the costs they face, especially when the Handbook prescribes maximum values to use.

In trying to understand the differences in cable costs, Orion has had informal discussions with PBA. The results are summarised in Appendix B. For 11kV cables, buried in suburban areas in average ground conditions (note c of Table A.1), most of the cost implications are unknown because of a lack of data. However, it is very likely that Orion's costs are higher as a result of the more stringent conditions that apply in Orion's area.

Appendix C "Underground cable costing project, November 2003" has full costing data for 11kV cables. Orion included a part of this table in its previous submission[17], but it has been updated / corrected because the proportion of unknown trenching in the footpath is 90%, not 50%. This has reduced the costs and these revised costs are also shown in the table for cables in Appendix A. However, note that the costs are still significantly higher than those proposed in the Handbook.

Appendix B also has a table for LV cables. Note k of Handbook Table A.1 indicates that the values are based on costs for suburban subdivisions. Presumably, this would be a greenfields situation, which is not valid under a brownfields basis for establishing replacement costs. This is most likely the key reason why Orion's costs are significantly more than proposed in the Handbook.

Accordingly, Orion disagrees with the low per-km replacement costs for cables and lines that have been proposed and consequently recommends that the Commission reconsiders these costs, especially when they are supposed to be realistic maxima that can apply to ELBs in New Zealand in 2004.

18. Text Nomenclature (Appendix B)

Appendix B, is in two parts – 'Optimisation of Network Configuration' and 'Optimisation of Network and Engineering'. Each part has sections identified as (a), (b), etc. This makes it difficult to refer to individual sections and therefore Orion suggests renumbering these sections so that each section or paragraph can be referenced uniquely. The method used in Appendix A could be suitable.

19. Disclosed quality of supply criteria (Appendix B – Optimisation)

Throughout Appendix B there are the same numerous references as in the previous Handbook to the ELB's "Disclosed Quality of Supply (QoS) Criteria" which have to be the reference point when considering most aspects of optimisation. The proposal does not prescribe any further guidance on how the ELB should state its QoS criteria.

In principle, Orion agrees with this approach but, as we stated in our previous submission[17] in answering Q16 at top of page 21, there needs to be some further clarification of what is expected. There is a very wide range of the extent that these criteria are published by ELBs, from none at all to the comprehensive QoS statement that Orion has published.

We therefore recommend that the Commission provides further guidance on the extent to which ELBs are required to stipulate their QoS criteria.

20. Primary distribution circuits (clause B(b))

The proposal acknowledges "primary distribution circuits" and includes these with subtransmission. This clarifies and concurs with Orion's view that its primary 11kV distribution should be regarded as subtransmission. We also note that this recognition is clearly given in clause 2.24(c) and its associated footnote.

We agree with clauses B(b) and 2.24(c).

21. Sharing of trenches (Appendix B(d))

We question the validity of the proposed new provision for optimising high voltage distribution – "cables running close together, or on the same side of any road or street must be optimised to a single trench except where this would not meet the ELB's quality of supply requirements."

This is not compatible with the "brownfields" concept proposed in clause 2.13. ELBs regularly lay extra cables for reinforcement or to meet new consumer requirements. Existing cables are infrastructure that the ELB has to work around when laying new cables. There are many reasons why cables are not laid in a common trench, such as different operating voltages, safety of contractors working in the vicinity and cables can be laid many years apart. This optimisation provision would have the bizarre effect of abruptly reducing the value of existing cables when a new cable is laid nearby. Furthermore, the proposed Handbook requirements of:

a) Assume brownfields situations;

b) Consider only short planning periods;

c) Optimise nearby cables to a single trench;

d) Represent the behaviour of an ELB that is deprived of its assets, or a new entrant to the market

are **incompatible**. These requirements, in combination, are completely unrealistic and could only result in denying essential businesses (i.e. ELBs) of the value that they create. This is hardly a reasonable approach by the Commission. We strongly suggest a relaxation of the requirements for (b) and (c) to restore some realism and credibility to the proposed Handbook.

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for

Part 3: List of Appendices

Appendix A: Comparisons of replacement costs per unit

Cables ($/m/cable)

Voltage	Size Desc	Size Range	Configuration	Current Handbook	Proposed Handbook	PWC for 19 ELBs	Powerco	Vector Feb 04 [5]	Vector [4]	Orion FRS-3	Orion Nov 2003	Orion Nov 2003 revised
11kV	Extra Heavy	Above 300mm^{2}Al	On own							$185 [1]	$179	$159
11kV	Heavy	Above 240mm^{2}Al to 300mm^{2}Al	On own	$120	$125	$126	$137	$130	$140	$160	$162	$142
11kV	Medium	Above 50mm^{2}Al to 240mm^{2}Al	On own	$90	$97	$100	$92	$100	$105	$125	$149	$129
11kV	Light	Up to 50mm^{2}Al	On own	$65	$77	$81	$82	$77	$76	$100 [2]	$118	$98
11kV	Heavy		Dble circuit	$85	$85	$85	$110		$99	$115	$113	$102
11kV	Medium		Dble circuit	$67.5	$67.5	$70	$75		$79	$90	$99	$89
400V	All	All	On own	$55			$80	$63		$100		
	Heavy	Above 240mm^{2}Al	On own		$72	$75						
	Medium	Up to 240mm^{2}Al	On own		$63	$65						
400V	All	All	With 11kV	$25			$40			$45 [3]		
	Heavy	Above 240mm^{2}Al	With 11kV		$40	$52						
	Medium	Up to 240mm^{2}Al	With 11kV		$32	$37						

[1] Derived by adding additional cost of conductor ($75/m - $52/m = $23/m) to cost of heavy 11kV cable .

[2] Note these are based on rural u/g reinforcement examples where a different trenching technique is used.
A multiplier of 0.4 was applied to the contract prices for the rural examples tested.

[3] Meritec data.

[4] Applied Vector's 16.4% average increase submitted (18 Nov 03) for 11kV cables. Expressed as 14.1% undervalued by previous Handbook.

[5] Advised by Vector for use in submission to Commerce Commission. Apply to suburban areas, average ground conditions, route fully trenched.

Lines ($/m/line)

Voltage	Size Desc	Size Range	Configuration	Current Handbook	Proposed Handbook	PWC for 19 ELBs	Powerco	Vector [4]	Orion FRS-3
66kV	Wolf conductor on steel towers.		dcst	$69	$69	$69			
66kV	Wolf conductor on steel towers.		scst	$92	$92				
	Single pole wood line construction			$45	$45				$60
33kV	Heavy	150mm^{2}Al to 300mm^{2}Al	Single circuit @ 33kV	$40	$56	$64	$60	$44	$61 [1]
33kV	Light	Less than 150mm^{2}Al	Single circuit @ 33kV	$35	$40	$48	$42	$38	$55
11kV	Heavy	Above 150mm^{2}Al to 240mm^{2}Al	On own	$24	$30	$32	$40	$37	$34 [2]
11kV	Medium	> 50mm^{2}Al, < 150mm^{2}Al	On own	$22	$27	$29	$34	$34	$28
11kV	Medium	> 50mm^{2}Al, < 150mm^{2}Al	Underbuilt (33kV)	$9	$14	$15	$22	$14	$20
11kV	Light	Up to 50mm^{2}Al	On own	$20	$25	$27	$22	$30	$24
11kV	SWER		On own	$17	$21	$21			
400V	All	All	On own	$38					$42 [3]
	Heavy	Above 150mm^{2}Al	On own		$45	$48	$56		
	Medium	Up to 150mm^{2}Al	On own		$42	$42	$30		
400V	All	All	Underbuilt (11kV)	$12					$23
	Heavy	Above 150mm^{2}Al	With 11kV		$24	$26	$28		
	Medium	Up to 150mm^{2}Al	With 11kV		$21	$22	$18		

[1] Based on light cost $55/m + extra $6/m for heavy conductor.

[2] Based on medium cost $28/m + extra $2/m x 3 for heavy conductor.

[3] Meritec data.

[4] Used Vector's average increases submitted (18 Nov 03) of 9% for 33kV lines and 52.4% for 11kV lines. Expressed as 8% for 33kV lines & 34.4% for 11kV lines undervalued by previous Handbook.

Appendix B: Basis for cable costing – Handbook vs Orion - 11kV cables

Understood basis for Handbook costing	Orion's practice and basis for costing	Reason for difference	Cost implication
Jobs are several km at a time.	Many small jobs, but basis for costing projects averaged 1km per contract and for separate quotes (Nov 03) averaged 2km ($300,000 project).	Only data available to Orion, but representative of scope of current work.	Unknown
Underground reticulation for suburban areas in average ground conditions.	Same as for Handbook, except Orion's working environment has the full range of other services including water, wastewater, stormwater, telephone and cable TV.	Local conditions.	Possibly 5% extra cost.
No common specification.	Cable is buried according to Orion's comprehensive network standards.[21] [22] [23] [24] [25]	High standard of engineering required to allow Orion to meet its targeted high reliability performance. Orion has had an undesirable experience with cables of lower standard.	Unknown.
No water-blocking.	Purchased cable has waterblocking included in manufacture.	To minimise risk, XLPE cables have previously failed prematurely (after 20 years) as a result of water treeing within the cable. Waterblocking minimises water entry and maximises cable life. Even with advances in technology, XLPE cables have an estimated life of only 45 years. If they fail, full cable replacement is necessary.	Unknown.
Reinstatement of ground not defined.	Compliance with the new high national standards demanded by 'Code of practice for working in the road'; issued by Standards New Zealand, effective from November 2003 for CCC. Local council requirements are also of a significantly higher standard than previously.	High quality standard of city streets has to be maintained. Numerous cycleways with a special non-skid surface need to be reinstated at greater cost than the adjoining road surface. Contractor has to provide a warranty on the performance of the back-filling for typically 2 years.	$200/m in road; $75/m in footpath; $45/m in grass verge.
Unknown productivity.	Contractors generally achieve less productivity now, for the same work, than they did a few years ago.	Much higher health, safety & environmental standards to comply with.	High.

[21] Orion Design Standard NW70.52.01 *Underground cable design*, issued 25/03/02
[22] Orion Technical Specification NW72.22.02 *Excavation, backfilling & restoration of surfaces*, issued 28/02/02
[23] Orion Technical Specification NW72.22.01 *Cabling, installation & maintenance*, issued 30/07/03
[24] Orion Technical Specification NW71.12.03 *Cables and associated plant recording,* issued 13/11/01
[25] Orion Equipment Specification NW74.23.04 *Distribution cable 11kV,* issued 18/07/01

Appendix B: Basis for cable costing – Handbook vs Orion - LV cables

Understood basis for Handbook costing	Orion's practice and basis for costing	Reason for difference	Cost implication
Jobs are several km at a time.	Many small jobs, but basis for costing projects is 0.9km per contract.	Best data available to Orion, but representative of size of current projects.	Unknown
Suburban subdivisions.	Contracts for costing applied to LV cable installation in established urban infrastructure.	To determine the real costs faced by an ELB deprived of its assets (or the costs of a new entrant).	Large. A new greenfields subdivision is unrealistic.
No common specification.	Cables are buried according to Orion's comprehensive network standards as for 11kV cabling[21] [22] [23] [24] [26].	High standard of engineering required to allow Orion to meet its targeted high reliability performance.	Unknown.
No screen. Standard 4 core PVC cable.	Screened cable always used.	To comply with Electricity Supply Regulation 62(3) which requires effective earth fault protection. In high earth resistant areas (e.g. stony or sandy ground), such as in Canterbury, the earthed screen provides a reliable path to earth that is needed for the fault current to operate the earth fault protection. This technique improves safety, removes the need for additional protection (e.g. Mag Slab) to prevent mechanical entry to a live cable and is required where there is close proximity to Telecom cables. It is widely used in the South Island whereas North Island practice is to use a 4 core LV cable.	Unknown. 4-core cable needs to be installed in a plastic duct, but the cost of the 4-core cable plus ducting is less than the screened cable by approximately $6/m.
Reinstatement of ground probably excluded.	Full ground reinstatement and sealing of roads and footpaths.	Installation in established infrastructure.	High.
Unknown productivity.	Contractors generally achieve less productivity now, for the same work, than they did a few years ago.	Much higher health, safety & environmental standards to comply with.	High.

[26] Orion Equipment Specification NW74.23.11 *Distribution cable Low Voltage,* issued 21/02/02

Appendix C: Underground cable costing contract, November 2003

11 kV Underground Cable Costing Contract, November 2003

Results from Connetics Tender

				Single				Double			
				EH	H	M	L	EH	H	M	L
Location	Road Level	Ground Condition	Components	400mm2 Al	300mm2 Al	185mm2 Al	35mm2 Al	400mm2 Al	300mm2 Al	185mm2 Al	35mm2 Al
Urban	1	Average	Cable	66.00	51.93	39.62	15.09	132.00	103.86	79.24	30.18
			Labour (Laying)	6.50	5.00	4.00	3.00	13.00	10.00	8.00	6.00
			Joint (excl terminating joints)	5.56	4.90	4.70	0.00	11.12	9.80	9.40	0.00
			Trenching & Reinstatement	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00
			Total $/m	**158.06**	**141.83**	**128.32**	**98.09**	**236.12**	**203.66**	**176.64**	**116.18**
		Rocky	Cable	66.00	51.93	39.62	15.09	132.00	103.86	79.24	30.18
			Labour (Laying)	6.50	5.00	4.00	3.00	13.00	10.00	8.00	6.00
			Joint (excl terminating joints)	5.56	4.90	4.70	0.00	11.12	9.80	9.40	0.00
			Trenching & Reinstatement	142.00	142.00	142.00	142.00	142.00	142.00	142.00	142.00
			Total $/m	**220.06**	**203.83**	**190.32**	**160.09**	**298.12**	**265.66**	**238.64**	**178.18**
	2 (Council)	Average	Cable	66.00	51.93	39.62	15.09	132.00	103.86	79.24	30.18
			Labour (Laying)	7.25	5.50	4.50	3.00	14.50	11.00	9.00	6.00
			Joint (excl terminating joints)	5.56	4.90	4.70	0.00	11.12	9.80	9.40	0.00
			Trenching & Reinstatement	89.60	89.60	89.60	89.60	89.60	89.60	89.60	89.60
			Total $/m	**168.41**	**151.93**	**138.42**	**107.69**	**247.22**	**214.26**	**187.24**	**125.78**
		Rocky	Cable	66.00	51.93	39.62	15.09	132.00	103.86	79.24	30.18
			Labour (Laying)	7.25	5.50	4.50	3.00	14.50	11.00	9.00	6.00
			Joint (excl terminating joints)	5.56	4.90	4.70	0.00	11.12	9.80	9.40	0.00
			Trenching & Reinstatement	159.20	159.20	159.20	159.20	159.20	159.20	159.20	159.20
			Total $/m	**238.01**	**221.53**	**208.02**	**177.29**	**316.82**	**283.86**	**256.84**	**195.38**
	3 (Transit)	Average	Cable	66.00	51.93	39.62	15.09	132.00	103.86	79.24	30.18
			Labour (Laying)	9.00	7.50	6.50	5.50	18.00	15.00	13.00	11.00
			Joint (excl terminating joints)	5.56	4.90	4.70	0.00	11.12	9.80	9.40	0.00
			Trenching & Reinstatement	104.60	104.60	104.60	104.60	104.60	104.60	104.60	104.60
			Total $/m	**185.16**	**168.93**	**155.42**	**125.19**	**265.72**	**233.26**	**206.24**	**145.78**
		Rocky	Cable	66.00	51.93	39.62	15.09	132.00	103.86	79.24	30.18
			Labour (Laying)	9.00	7.50	6.50	5.50	18.00	15.00	13.00	11.00
			Joint (excl terminating joints)	5.56	4.90	4.70	0.00	11.12	9.80	9.40	0.00
			Trenching & Reinstatement	189.20	189.20	189.20	189.20	189.20	189.20	189.20	189.20
			Total $/m	**269.76**	**253.53**	**240.02**	**209.79**	**350.32**	**317.86**	**290.84**	**230.38**
Additional costs for traffic mamagement		Average 1 -> 2	**$/m**	10.35	10.10	10.10	9.60	11.10	10.60	10.60	9.60
		Average 1 -> 3	**$/m**	27.10	27.10	27.10	27.10	29.60	29.60	29.60	29.60

				Single
				35mm2 Al
Rural	1	Average	Cable	15.09
			Labour (Laying)	5.50
			Joint (excl terminating joints)	0.00
			Trenching & Reinstatement	72.90
			Total $/m	**93.49**
		Rocky	Cable	15.09
			Labour (Laying)	5.50
			Joint (excl terminating joints)	0.00
			Trenching & Reinstatement	142.00
			Total $/m	**162.59**

Assumptions

One joint per 300m of cable.	300
Segment length (m) (for calculating through-jointing cost)	2000
giving Number of Joints	6
Proportion of urban footpath trenching	0.9
Proportion of rural footpath trenching	0.9

Appendix D: Treatment of easements in ODV valuations, by Ernst & Young

(Separate PDF file)

Part 4: Suggested changes (marked-up) to text in proposed Handbook

(separate file)