TRANSPOWER NEW ZEALAND LIMITED

Submission to the Commerce Commission on draft handbook for ODV of system fixed assets for ELBs

February 2004

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1. Executive Summary

1. Transpower welcomes the opportunity to make submissions on the Draft ODV Handbook dated 23 December 2003. Transpower has reviewed the Draft ODV Handbook with reference to the current ODV Handbook and in the context of the regulatory objectives of the Commerce Commission.

2. Transpower's submissions in respect of the draft Electricity Information Disclosure Requirements 2004 dated 24 December 2003 are contained in a separate submission.

3. As noted in its submission on the Information Disclosure Requirements, Transpower accepts the Commission's draft decision that all lines businesses prepare a valuation report for their system fixed assets using the Commission's new ODV Handbook for the 2003/2004 disclosure year. In that submission Transpower urges the Commission to confirm its draft decision of December 2002 to allow lines businesses to choose either the ODV or DHC methodology for the purpose of future regulatory valuations. In the meantime, there is ongoing uncertainty on this matter. As a consequence, Transpower's comments are necessarily made on the basis that the Draft ODV handbook (once finalised) may apply to Transpower for the foreseeable future.

4. Transpower's view is that, the ODV Handbook has made improvements in some areas, such as the length of the allowable planning period, but that overall significant work is needed to remove inconsistencies and ensure the new ODV Handbook is workable.

5. In this submission Transpower has identified eleven significant issues. These issues are addressed in detail in Section 3 and summarised below.

    - The proposed economic valuation test is ineffective. The proposals remove economic value tests for the areas of line networks where an economic value test is most likely to impact on asset valuation i.e. rural spur lines. Conversely, the proposals suggest economic testing of those parts of the line network where it is least likely to result in a value write down. Transpower, recommends that the economic value tests as defined and described in the present ODV Handbook (paragraphs 2.16 to 2.19) be retained.

- Transpower welcomes the increase in the planning period for transmission assets from 10 years to 15 years. However, in Transpower's view this time frame is insufficient to ensure that economically sound transmission investments (which are based on planning horizons longer than 15 years) are not subject to optimisation and, thus, potentially disincentivised. To alleviate this risk and disincentive, Transpower recommends that assets subject to regulatory approval from the Electricity Commission or other Crown regulatory body and assets subject to appropriately agreed new investment contracts with customers be excluded from the ODRC regime and that they be included at depreciated historical cost. In addition, Transpower recommends that the planning period for transmission networks be increased from 15 years to 35 years. This is in line with Transpower's actual planning period for significant transmission investments.

- Easement values should be included at replacement cost and not historical cost. This is consistent with the valuation treatment of all other assets under ODV (including land).

- In Transpower's view the inclusion of paragraph 1.11 that allows businesses to depart from the ODV rules in certain circumstances, gives too much discretion to valuers and effectively converts the ODV Handbook from a set of rules to a set of guidelines. This may lead to unexpected and potentially unwanted outcomes. Transpower recommends that discretion only be allowed in situations which have not been explicitly covered by the Handbook provisions.

- Transpower uses a large number of non-standard modern equivalent asset (MEA) building block replacement costs. These building blocks have been in use for several years and most of them were audited in 2001. In Transpower's view it is more efficient to include these non-standard building blocks as part of the standard building blocks in the ODV Handbook rather than disclose them every year in the valuation report. Transpower has included the relevant non-standard building blocks in Appendix 1.

- There is no mention made in the draft ODV Handbook of updating replacement costs. Underpinning the relevance of the ODV methodology is the need to update replacement costs on a regular basis. Given the current proposal of the Commerce Commission that ODV's only be completed every 5 years, Transpower believes that replacement costs should be updated for every ODV Valuation. Otherwise, there will be at least 10 years between replacement cost updates.

- Transpower notes the intended change from a "greenfields" to a "brownfields" approach for determining replacement costs. However, the definition of brownfields is akin to the greenfields approach used in the current ODV Handbook. In Transpower's view, the current greenfields definition should be retained for the 2004 ODV, because it is not feasible in the circumstances to recalculate replacement costs using a brownfields definition. However, replacement costs should be reviewed in due course as part of the move to a genuinely brownfields approach. These new replacement costs should apply to ODV valuations after the 2004 ODV valuation.

- Paragraphs 3.46 and 3.48 in the current ODV Handbook, relating to the optimisation of the system configuration, have been removed in the draft ODV Handbook. In Transpower's view these paragraphs should be retained as they fix the existing transmission line routes. If the transmission line routes are not fixed then, in effect, there are an infinite number of alternative route configurations that need to be considered in determining the optimal configuration. In Transpower's view this is unworkable.

- Current provisions rule out the use of accelerated depreciation for assets that are expected to have a shorter life than the remaining life, for example, assets that are going to be replaced due to a system upgrade or assets that are expected to become stranded or bypassed. Transpower believes that accelerated depreciation should be allowable in these circumstances to allow the costs of investment to be recovered over the economic life of the asset. The application of accelerated depreciation is also consistent with FRS-3.

- Transpower is increasingly being required to make investments for environmental reasons, the additional costs of which are not currently recognised by the Draft Handbook. In particular:
  - Service potential indicators for MEAs need to include environmental factors; and
  - investments in assets that are necessary in order to meet legislated environmental requirements should also be included in the ODV.

- Transpower recommends the inclusion of a section in the draft Handbook detailing the role and expertise required for the different parties involved in preparing an ODV valuation. There is currently very limited guidance on this.

6. In addition to the issues summarised above, Transpower has noted a number of other more minor issues. These are discussed in Section 4.

2. Introduction

7. This is Transpower's submission in response to the Commerce Commission's Draft Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Business (the "draft handbook") dated 23 December 2003.

8. The structure of this submission is as follows:

Section 1:	An Executive Summary
Section 2:	This introductory section
Section 3:	Describes the issues that Transpower views to be of the greatest concern and importance. Transpower has included recommendations on how the ODV Handbook could be improved
Section 4:	Describes other issues and Transpower's recommendations for addressing them

9. Appendix 1 sets out the non-standard building blocks and building block replacement costs that Transpower would like to see included in the ODV Handbook.

3. Significant Issues

10. In this section Transpower outlines the most significant issues with the draft handbook. Section 4 sets out a number of other, more minor issues.

Economic Valuation Tests (para 2.59 and 2.60)

11. Transpower believes that the economic valuation ("EV") tests should be either retained in their current form or removed completely. The current proposals imply that ELBs will have to consult with the Commerce Commission on whether EV tests are necessary for certain assets before the ODV valuation can be completed. Consulting annually in this way would be time consuming. From an ELB's perspective not consulting with the Commerce Commission would expose the ELB to an uncertain valuation outcome.

12. This is not an ideal position and Transpower believes that the certainty gained by either retaining or removing EV tests is more valuable than the benefits from the Commerce Commission having the right to require an EV test. In Transpower's view the 'in between' position adopted in the draft ODV Handbook is the worst of the three possible positions.

13. Transpower's preferred position is to retain EV tests. In Transpower's experience EV tests provide a useful check on the value of rural spur lines. Transpower regularly receives submissions from customers that prompt an EV test of a part of Transpower's transmission network. Typically the submission indicates that the customer could provide a cheaper alternative to the transmission network and yet still achieve the same service, namely secure electricity supply. In response, Transpower performs an EV test and where appropriate reduces the value of the assets in question to the cost of providing the alternative. In this way the economic value test performs a valuable role in ensuring the network is not overvalued, and Transpower supports the continued use EV tests.

14. The EV test ensures that the asset value can be supported by future cash flows. If not the asset values are reduced to a sustainable level. Asset value impairment tests of a nature similar to the EV test are a requirement of the financial reporting standards. Without the EV test it would not be possible to align regulatory and financial asset valuations.

15. That said, if the Commerce Commission decides to continue with the removal of the EV test for rural spur lines, it is submitted that the EV test should be removed completely. This is because whilst the draft ODV Handbook proposes removing EV tests for rural spur lines, EV tests for "high value, non standard assets, such as HVDC links and cable tunnels.[1]" are to be retained. In Transpower's experience it is unlikely that "high value, non-standard" assets will require EV write down, because, by their very nature, those assets would not have been built unless they had a high economic value. The EV test therefore becomes ineffective.

[1] pg 7-21, Parsons Brinckerhoff Associates. Development of a Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses, 23 December 2003

16. A case in point is the HVDC link, which Transpower has subjected to an EV test every year that an ODV has been undertaken. The table below notes the optimised depreciated replacement cost (ODRC) of the HVDC link and the economic value of the HVDC link for the past five years. The table highlights that the economic value of the HVDC link is significantly higher than its ODRC. This outcome is likely to be the same for all assets that are central to a network, i.e. all major interconnecting assets.

	1999 $m	**2000 $m**	**2001 $m**	**2002 $m**	**2003 $m**
Economic Value	723	1,074	1,125	1,088	1,189
ODRC	436	441	397	405	365
$ Surplus	287	633	728	683	824
% Surplus	66%	144%	183%	169%	226%

17. Furthermore if the Commerce Commission is going to reserve the right to require an EV test, Transpower believes that the ODV Handbook should include some guidance on the basis for which the EV test will be required. The draft ODV Handbook currently provides no such guidance.

18. Summarising Transpower's position on EV tests, Transpower believes that EV tests (as described in paragraphs 2.16 to 2.19 in the current ODV Handbook) should be retained in the new ODV Handbook. They provide a powerful economic incentive to ensure all parts of the network are valued appropriately. In addition, impairment tests are required for financial reporting purposes and Transpower believes that allowing the alignment of regulatory and financial reporting values is an important goal.

19. That said, if the Commerce Commission is intent on not requiring EV tests for rural spur lines, then Transpower believes that EV tests should be removed from the ODV Handbook completely. The benefits of having an EV test will be lost and in its place will be uncertainty about whether the Commerce Commission requires an EV test or not.

Planning Horizon (para 2.28)

20. Transpower notes that the planning period over which future load growth can be allowed has been extended from 10 years to 15 years for transmission networks. Whilst Transpower welcomes the extension of the planning period, Transpower believes that the period is still too short to ensure appropriate economic investments are not optimised.

21. To ensure that assets resulting from appropriate economic investments are included at their actual cost, Transpower recommends that asset investments subject to regulatory approval or customer approval (via new investment contracts) be exempt from replacement cost and optimisation rules.

22. This is entirely consistent with the Commerce Commission's approach to Electricity Lines Threshold regime, as disclosed in the New Zealand Gazette notice of 6 June 2003. In that gazette, the Commerce Commission states that the following specified services are exempt from the Electricity Lines Threshold regime:

- "goods and services provided under new investment contracts, if the other party agrees in writing that the terms and conditions are reasonable or reflect contestable provision of the goods and services; or

- goods and services provided as a result of new investment if Transpower demonstrates beyond reasonable doubt that the new investment was approved under a process (whether regulatory or otherwise) that provides affected customers to make and approve price-quality trade off and opportunity for competitive provision of new investment by parties other than Transpower."[2]

23. To be consistent with the Electricity Lines Threshold regime, clauses similar to these need to be inserted into the ODV Handbook excluding the above assets from replacement cost tests and optimisation. Those assets should be included at actual cost. Not inserting these clauses would result in an inconsistent regulatory regime. Conceivably, Transpower could build assets following approval from the Electricity Commission, having satisfied a regulatory test, that were then optimised out of the regulatory value.

24. In addition, Transpower recommends a 35 year planning period for transmission networks. This is in line with the planning period that Transpower currently uses when assessing the best options for substantial grid upgrades, such as the one currently being contemplated. Transpower notes PB's comments on the planning period issue, but believes that a 15 year planning period places too many risks on the asset owner.

25. Transpower disagrees with PB's assertion that "there is no fundamental reason why the valuation planning period should align with the optimum engineering planning period"[3]. PB state that planning risk should be shared between owners of ELB's and ELB customers. Whilst in theory this is fine, in reality customers take the majority of the risk regardless of the planning period. Either customers get charged more through a higher WACC based charge because of the greater risks ELB's are facing, or customers pay for the planning mistakes of ELB's directly. Since capital costs are a significant component of customer charges, the best way to minimise those charges is to minimise the capital costs. This means that aligning the ODV planning period with the optimal engineering planning period will provide the best result for customers in the long run.

Valuation of Easements (A.29)

26. The draft ODV Handbook requires easements to be valued at cost, provided that the easements have not been expensed and that the easements are not 'statutory easements' protected by the Electricity Act 1992. In Transpower's view easements that have been purchased and that are recorded in the asset register should be valued at replacement cost. This is consistent with how all other ELB system fixed assets have been valued and in particular, aligns the treatment of easements with the treatment for land. Transpower can see no logical reason why easements should be viewed any differently.

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[2] pg 1691, New Zealand Gazette: Commerce Act 2003 (Electricity Lines Threshold) Notice, 6 June 2003

[3] pg 5-19, Parsons Brinckerhoff Associates. Development of a Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses, 23 December 2003

27. Easements are a legitimate business expense just like towers, conductors and transformers. Without easements, ELBs are unable to operate. Furthermore, obtaining easements is becoming harder, taking longer and costing more. This should be reflected in the replacement cost of the system fixed assets and the costs should be transparent to users of the regulatory valuation. Therefore, under the principles of ODRC, Transpower believes that easements should be valued like any other system fixed asset, i.e. at replacement cost.

28. Easement replacement costs should be obtainable through the advice of professional land valuers.

Rules vs Guidelines (para 1.11)

29. Allowing ELB's to not follow the draft ODV Handbook effectively reduces the Handbook from a set of rules to a set of guidelines. In effect lines businesses have been given a clause that they can use to avoid following the Handbook.

30. In Transpower's view this will make auditing ODVs very difficult as what is not possible or what is inappropriate is subjective in nature.

31. Whilst the aims of the paragraph are sound, Transpower believes that the application of the paragraph may lead to unexpected and potentially unwanted outcomes. Therefore, Transpower recommends that the paragraph be amended so that discretion can only be exercised in situations that are not directly covered by the Handbook provisions.

Building Block Replacement Costs for Non-Standard MEA's (para 2.15)

32. Paragraph 2.15 of the draft ODV Handbook requires the valuation report to describe in some detail the basis for the replacement costs that have been arrived at. Transpower uses a large number of non-standard building blocks and so meeting the requirements of the handbook in this regard would be time consuming and costly.

33. In addition the purpose of requiring the basis of non-standard building block replacement costs in the valuation report is unclear. Transpower can see no reason for including this type of information in the valuation report if it has been reviewed and accepted by external auditors.

34. Transpower has two recommendations relating to this issue.

    - First, Transpower recommends that the commonly used non-standard building blocks be added to the standard building blocks contained within the ODV Handbook. Appendix 1 contains a list of the building blocks that Transpower believes should be included within the ODV Handbook. Most of Transpower's non-standard building blocks are for components that have different capacities or configurations than the standard building blocks. These building blocks have not been changed for several years. In addition, many of the building block costs were audited by Parsons Brinckerhoff during the Commerce Commission's 2001 ODV audit.
    - Second, to avoid the valuation report becoming too large, Transpower recommends that the justification for the use and cost of non-standard building blocks (in addition to those to be added to the ODV Handbook) be kept available for the auditors only. The building blocks themselves would still be disclosed within the report. This approach is consistent with the proposed approach for refurbished assets as outlined in A.37 of the draft ODV Handbook.

Updating Replacement Costs

35. The current draft ODV Handbook makes no mention of updating replacement costs. Ensuring replacement costs are up to date is critical to ensure the ODV valuations are themselves up to date. This is because every 10% change in replacement costs corresponds to a 10% change in the final ODV valuation.

36. In Transpower's view, replacement costs should be updated for every valuation. The current Commerce Commission proposal is for an ODV valuation to undertaken every 5 years. Under this scenario not updating the replacement costs for each valuation would result in replacement costs remaining the same for a minimum 10 years. This is too long.

Brownfields vs Greenfields Replacement Costs (para 2.13)

37. The draft ODV Handbook indicates that MEA replacement costs should be determined on a brownfields basis. However, the definition of brownfields is more akin to the greenfields approach that is used in the current ODV Handbook. Requiring costs for whole substations, circuits or feeders is effectively a greenfields approach. From Transpower's perspective, there is an option of either changing the definition of brownfields to something more appropriate, or the current greenfields approach should be retained.

38. Transpower recommends that for the 2004 ODV the current greenfields approach to calculation of replacement costs should be retained. The main argument for retaining the greenfields approach is one of practicality. Moving to a true brownfields approach would require the reassessment of all building block replacement costs. Transpower does not believe that there is time to achieve this before the new ODV Handbook is going to be released.

39. However, Transpower supports the concept of the brownfields approach. Therefore, Transpower recommends the definition of brownfields in the draft ODV Handbook be replaced with something more appropriate. In particular, Transpower believes that the additional costs of investment alongside existing infrastructure should be taken into consideration. Applying a true brownfields approach will require all replacement costs to be reviewed on that basis (as noted above). The new replacement costs can then be applied to valuations after 2004.

40. Transpower notes that the building block costs for transmission assets are unchanged. Transpower understands that the RC analysis undertaken by PB was rudimentary at best. Whilst Transpower is somewhat surprised that there have been no changes to transmission assets when distribution company replacement costs have increased approximately 20%, Transpower accepts the transmission building block replacement costs for the 2004 ODV because it is not practical to review the replacement costs prior to July 2004. That said, Transpower is strongly of the view that a detailed review should be undertaken that can then be applied to valuations after 2004.

41. For clarity, Transpower supports the use of a brownfields approach for optimisation.

Optimisation of the System Configuration (paras 2.36 and 2.37)

42. The section on optimising the system configuration has been significantly reduced, with paragraphs 3.46 and 3.48 being removed from the current ODV Handbook. The removal of paragraph 3.48 causes Transpower particular concern, as that paragraph required the routes of high voltage lines to be fixed.

43. In Transpower's view this was a common sense requirement for two reasons. First, not fixing the routes of transmission lines effectively opens up the need to investigate an infinite number of alternative routes. Transpower acknowledges that the current routes may not be the optimal configuration, but from a practical view point it is almost impossible and certainly very time consuming and costly to consider alternative routes.

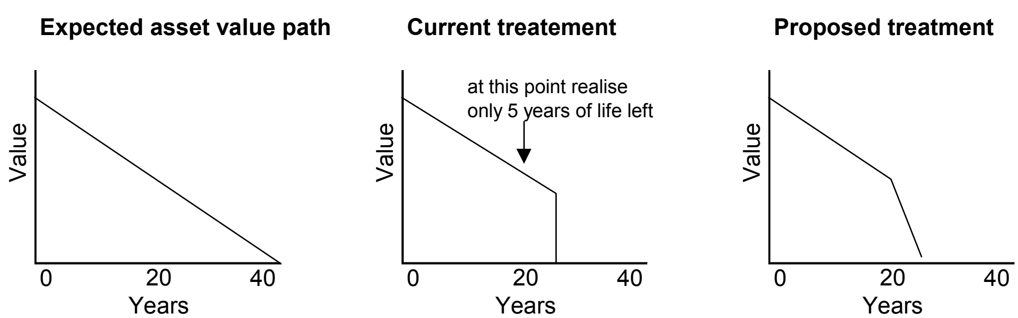
44. Second, Transpower has legal access to the current transmission line routes, whereas any other route would require resource consents and negotiation with current land owners to get route access. In effect, if the national grid were to be rebuilt, the cheapest option would be to use the current transmission routes because of the costs involved in getting resource consents and easements for any new routes.

45. Transpower therefore recommends that paragraphs 3.46 and 3.48 be reinstated in the draft ODV Handbook.

Early Retirement of Assets and Assessing the Remaining Life (para 2.53)

46. Paragraph 2.53 states "when an asset may be retired early from service because it may become redundant as part of development of the system, this should not be taken into account in assessing the remaining life of that asset." This sentence appears to rule out the use of accelerated depreciation.

47. In Transpower's view where an asset has a shorter life than previously expected, because it is being replaced due to an upgrade of the system, the depreciation on the asset should be accelerated. For example, say an asset that was 20 years old and that had a physical remaining life of a further 20 years is going to be replaced in 5 years time because the system is being upgraded. Under the current and proposed methodology, the asset would continue to be depreciated as if there were 20 years remaining life and then when the asset was replaced, 15 years of value would be written off. This situation is shown diagrammatically below.



48. Transpower proposes that the remaining life of the asset should be reset to the length of time that the asset is expected to be used. This has the effect of aligning the economic and financial lives of the assets and ensures that the economic cost of the asset can be recovered smoothly over its economic life. Transpower is unclear of the rationale behind the current treatment in the ODV Handbook.

MEA Service Potential Indicators (para 2.12)

49. Transpower believes that the list of indicators that can be used to determine the service potential of an MEA is missing an important indicator, namely environmental factors. Transpower is increasingly being required to make investments that conform to environmental constraints, which are not covered by the list of indicators included in paragraph 2.12. For example, Transpower has been required to build noise mitigating assets even though an MEA asset would not require noise mitigation.

50. Transpower recommends that compliance with resource consents and other environmental requirements be added as an indicator of service potential. This would emphasise the need for MEA's to enable sustainable development by ensuring the costs of environmental compliance are included in building blocks.

51. In addition assets required to be built for legal reasons should be included in the ODV value. These assets should be included where it is more cost effective to build a new asset required for an old asset to meet legal requirement instead of replacing the old asset with a MEA that also meets the legal requirement.

52. For example, say an asset has 20 years remaining of a 50 year life. The MEA costs $50,000, so the ODV value of the asset is $20,000. It becomes apparent that the old asset no longer meets certain legal requirements, however, that requirement can be met through spending a further $10,000 (either on the asset or through a new asset). Under the draft ODV Handbook the MEA of the existing asset is not required to meet these legal requirements.

53. In this situation, there are two options. These are either spending $10,000, knowing that the $10,000 will be written off or spending $50,000 to replace the existing asset with its MEA. The current ODV Handbook strongly encourages replacing the $50,000 asset, even though spending $10,000 may be a more cost effective option. The difference is that ELB's get a $50,000 asset when replacing the old asset, but under current regulatory rules get nothing for implementing the more cost effective solution.

Role of Experts

54. Transpower believes that the ODV Handbook should contain provisions on the role and expertise of the different parties involved in preparing an ODV valuation. Each valuation requires parties with different skills and abilities, all of which are specialised. Those involved in preparing the ODV valuations include engineers, valuers, reviewers and auditors.

55. Transpower believes that there should be a section in the ODV Handbook outlining for each role requirements around the minimum level of expertise. This would ensure that each ODV valuation is carried out to a suitable standard as well as providing guidance to ELBs on the Commerce Commission expectations with regards to valuation quality.

56. Transpower notes that the current ODV Handbook provides some of this guidance. For example paragraph 3.46 states that the “optimisation of the system configuration should be undertaken in conjunction with the ELB’s Planning Engineer or other suitably qualified person”. Transpower believes that it would be useful for this type of information to be retained in the draft ODV Handbook.

4. Other Issues

57. In this section Transpower has noted in tabular form the issues that Transpower views of lesser significance compared to those discussed in more detail in the previous section. For ease of cross-referencing to the draft ODV Handbook Transpower has noted the section to which the issue relates, along with a brief description of the issue and Transpower's recommended solution. The issues vary in nature between editorial issues, operational issues and compliance issues.

Para Ref	Issue Description	Transpower's Suggested Solution
1.5	The beginning of this paragraph implies that the system can be optimised to provide a higher service potential so long as it would not cost more. This wording creates difficulty for engineers undertaking valuations because it places no real limits on the range of optimised configurations that should be considered.	Transpower suggests that the capability of the system be capped at its physical capability. This approach is consistent with the "brownfield" approach that the Commerce Commission has advocated in the draft Handbook. In addition it is transparent, easy to apply, and is also consistent with a "lay persons" interpretation of this clause.
2.3	The reference to quantity is irrelevant because the paragraph relates to individual assets not classes of assets. In other words, by definition the quantity of assets must be one.	The reference to quantity should be removed.
2.4	This paragraph requires the asset database to be updated on an ongoing basis. Given the Commerce Commissions proposal that ODV valuations only need to be performed every 5 years, this requirement is irrelevant. In addition, for asset valuations to be undertaken it is necessary to ensure that at the valuation date the asset database has correctly recorded all of the assets.	Transpower recommends that the sentence relating to the frequency of the updates be deleted, or alternatively the wording could be changed to "updated immediately prior to each ODV valuation".
2.6	The definition of system fixed assets as tangible assets rules out the introduction of notional assets contemplated in paragraph 2.37 on optimisation of the network.	The definition of system fixed assets should exclude the word tangible.
2.6	The draft ODV Handbook does not include a definition of what a finance lease is.	Transpower assumes that the definition to be used is the accounting definition as described in Accounting Standards SSAP18. It is recommended that the appropriate definition be included in the ODV Handbook.
2.7	The wording of bullet point 7 "consumer-based meters and load control relays" could be read to be referring to all load control relays.	Bullet point 7 should be clarified to make it clear that it is referring to consumer based load control relays. It is recommended that the following wording be adopted, "consumer-based meters and consumer-based load control relays".

Para Ref	Issue Description	Transpower's Suggested Solution
2.6 / 2.7	The handbook says nothing about the treatment of Transpower's revenue meters, which are not consumer meters. It is therefore unclear whether the ODV Handbook intends to include or exclude these assets.	Transpower proposes that transmission revenue metres be explicitly included as system fixed assets. Transmission revenue meters are different in nature to consumer meters and are an integral part of monitoring the performance of the network. It is recommended that the following wording be added to paragraph 2.6. "Furthermore, Transpower's revenue meters are to be included in the system fixed asset for the ODV valuation."
2.8	The paragraph makes reference to the Commission's current requirements, but does not state what these requirements are or where these requirements can be found.	The paragraph should be more specific – either stating what those requirements are or where they can be found.
2.23(a)	Transpower notes that the words "service potential" have been added to the equivalent clause in the current ODV Handbook. As defined in paragraph 2.12, service potential has no reference to capacity. As a result, the service potential requirement may be so limiting that no asset would be optimised because it would be impossible to find an alternative asset that provided the same service potential.	Transpower submits that the current basis for optimisation, namely, quality and security of supply, provide a more workable set of criteria for conducting optimisations.
2.23(b)	This paragraph does not elaborate on the conditions under which a point of connection should be considered to be by-passed. The approach currently described in the draft ODV Handbook Appendix B does not identify how the load might be supplied from adjacent points of supply.	Transpower suggests that an economic by-pass test be described in the appendix on optimisation.
2.23(c)	The requirement for the number and current demand of existing customers to be assumed fixed is inconsistent with the concept of load growth (and thus with the requirements of paragraphs 2.25 – 2.28 of the draft handbook). Load growth needs to come either from existing customers demanding more or the number of customers increasing.	The paragraph should remove the words "current demand" so that the draft handbook requirements are internally consistent, and to ensure that future load requirements can be reflected in the optimised network.
2.23(e)	It is not clear what these boundaries are, or how they might apply to a national carrier like Transpower.	The paragraph should be rephrased to either exclude Transpower, or to make it clear what the boundaries are for Transpower.
2.24	The HVDC link is not included in the list of network assets subject to optimisation.	Include HVDC as an asset to be optimised.
2.25	It is possible that the maximum forecast load may not occur at the end of the forecast period. If load is forecast to decline, then the maximum forecast load will occur at some stage during the forecast period.	Transpower recommends that the words "at the end of" are changed to "at any time during".

Para Ref	Issue Description	Transpower's Suggested Solution
2.27	The reference to a load outside of the boundaries of the existing business is difficult to understand. Is it referring to geographic boundaries or does it simply mean "not currently supplied/suppliable".	The boundary issue noted in paragraph 2.23 should be clarified. In addition, how allowances will be made for anticipated load shifts (for example new dairy factories etc) should be explicit.
2.33	This paragraph states the "take into account" relevant decisions of the Electricity Commission and contractual relations with customers in relation to quality of supply. This is too weak and these regulatory and contractual requirements should be enforceable.	Transpower recommends that any regulatory or contractual requirements relating to quality of supply should "prevail" as opposed to "taken into account".
2.34	This paragraph is not consistent with paragraph 2.23 (a). Paragraph 2.34 allows a higher "security" of supply when there is a contractual arrangement, while 2.23 (a) allows a higher "quality" of supply.	The two paragraphs should be consistent with each other. In Transpower's view the term "quality" of supply should be used, because it has a wider meaning than "security". Security of supply is a subset of quality of supply (as defined in paragraph 2.31).
2.39	This paragraph proposes optimising out assets that are providing an improved quality of supply, if the quality of supply they are providing is greater than that which currently *exists*. Logically if the assets exist no optimisation would be required.	Reference to quality of supply should be in respect of assets that provide a quality of supply higher than the *standard*. This is consistent with the intent of paragraph 2.20(a).
2.55	The paragraph refers to a calculation in paragraph 2.47. The calculation is actually in paragraph 2.48.	Change the reference to 2.48.
2.60	The paragraph refers to a requirement in paragraph 2.58. The requirement is actually in paragraph 2.59.	Change the reference to 2.59.
2.63 (11)	This paragraph refers to the "date of installation" whereas assets are included in the asset registers at their date of commission, not their date of installation. In addition, paragraphs 2.51 and 2.52 refer to the date of commissioning when calculating asset remaining lives.	To ensure consistency, "installation" should be replaced with "commissioning."
	Throughout the draft ODV Handbook different terms have been used to mean transmission lines including "transmission lines", "primary distribution circuits", "high voltage distribution network" and "transmission network".	Transpower recommends that consistent language be used throughout the document where possible.
A.3	The fact that a low price may be achievable on one day does not mean that a low price can be achieved every day. Low prices could be achieved through abnormal exchange rates or through the fact the contractors do not have much work and are looking to fill the order book.	Some reference to sustainability needs to be included in this paragraph to ensure replacement costs are at a level that can be achieved consistently over the period that the handbook will apply.
A.3	The paragraph does not explain why the cost of land use consents, easements and compensation are excluded.	The paragraph should indicate that these costs are rightly included in land or easements.
A.4	The paragraph does not refer to the	The paragraph should also refer to A.11

Para Ref	Issue Description	Transpower's Suggested Solution
	multipliers included in paragraph A.11.	which includes Transpower multipliers.
A.5	It is not clear whether this paragraph refers also to the allowances in paragraph A.20 or not.	The paragraph should state whether this also applies to the allowance in A.20.
Table A.10	The table containing the interest during construction factors has got the factors round the wrong way. The rate for substation assets should be 4.8% and for transmission lines 4.0%. These corrected rates are the rates that Transpower currently applies in its ODV valuation, as derived and disclosed in the Transpower ODV Valuation reports (Appendix 2 of the 2003 report).	Reverse the rates in the table so that the correct rates are included in the ODV Handbook.

Appendix 1

ODV Building Block Costs

The following tables list the building block costs used by Transpower in the current ODV valuation process. These building block costs are taken from Transpower's 2003 ODV Report, Appendix 1, Section 1.2.

AC Substations – Establishment Building Block Costs

AC Substations - Establishment Building Block Costs			
Type	**Description**	**Cost (NZ$000)**	**No. of times building block used**
ARG	Argyle (1)	19.32	1
BEN	Benmore AC (1)	2056.05	1
CYD	Clyde (2)	269.71	1
HAY	Haywards AC (3)	12,561.65	1
MNI	Motunui (1)	865.91	1
RPO	Rangipo (1)	353.32	1
TWI	Tiwai (1)	1008.46	1
WIL	Wilton (1)	7066.91	1
Major	accommodating on average 14x220kV, 19x110kV, 15x33kV bays, roadways, buildings (60000 sq m)	3,184.75	3
Medium	accommodating on average 6x220kV, 6x110kV, 15x33kV bays, roadways, buildings etc. (26,000 sq m)	1,203.07	24
Small	accommodating on average 6x110kV, 15x33kV bays, roadways and buildings (10,000 sq m)	1,072.82	40
Rural	accommodating on average 2x66kV, 6x33/11 bays, roadways and buildings	973.34	89

AC Substations - Buildings Building Block Costs

AC Substations - Buildings Building Block Costs			
Type	**Description summary**	**Cost (NZ$000)**	**No. times building block used**
CSM	Cashmere	33.95	1
MNI	Motunui	827.20	1
TWI	Tiwai	1807.30	1
WIL	Wilton	1195.70	0
Major ID	Facilities associated with 33/11 kV indoors switchgear and control facilities plus OD equipment (850 sq m)	365.81	8
Major OD	Facilities associated with major outdoor switchyard station with average of 14x220kV, 19x110kV15x33kV bays etc. (525sq m)	175.91	1
Medium OD	Facilities associated with outdoor switchgear station with average of 6x220kV, 6x110kV, 15x33kV bays etc. (375sq m)	143.40	7
Rural ID	Facilities associated with a rural indoor switchgear station with average of 2x66kV, 6x33/11kV bays etc.(60 sq m)	244.86	31
Rural OD	Facilities associated with a rural outdoor switchgear station with average of 2x66kV, 4x33/11kV(21 sq m)	112.95	28
Small OD	Facilities associated with outdoor switchgear station with average of 6x110kV, 15x33kV bays etc.(300sq m)	121.65	5

Additional building blocks have been created to cover a full range of control buildings which have no provision for 33kV or 11kV equipment. Building blocks have also been created for buildings to house an indoor switchboard only. These are given in the following two tables.

AC Substation Control Room Buildings			
Building Block ID	**Description**	**Cost (NZ$000)**	**No. Times building block used**
BC5	Accommodating outdoor switchgear protection, control facilities and support systems for up to 5 x 220 kV or 110 kV or 66 kV circuits.	117.87	20
BC10	Accommodating outdoor switchgear protection, control facilities and support systems for up to 10 x 220 kV or 110 kV or 66 kV circuits.	130.35	12
BC15	Accommodating outdoor switchgear protection, control facilities and support systems for up to 15 x 220 kV or 110 kV or 66 kV circuits.	142.02	7
BC20	Accommodating outdoor switchgear protection, control facilities and support systems for up to 20 x 220 kV or 110 kV or 66 kV circuits.	153.02	3
BC25	Accommodating outdoor switchgear protection, control facilities and support systems for up to 25 x 220 kV or 110 kV or 66 kV circuits.	163.48	0
BC30	Accommodating outdoor switchgear protection, control facilities and support systems for up to 30 x 220 kV or 110 kV or 66 kV circuits.	173.47	1
BC35	Accommodating outdoor switchgear protection, control facilities and support systems for up to 35 x 220 kV or 110 kV or 66 kV circuits.	183.05	0
BC40	Accommodating outdoor switchgear protection, control facilities and support systems for up to 40 x 220 kV or 110 kV or 66 kV circuits.	192.29	1

AC Substation Switchgear Room Buildings			
Building Block ID	**Description**	**Cost (NZ$000)**	**No. Times building block used**
BSK5	Accommodating indoor switchgear for up to 5 x 11 kV bays.	88.99	0
BSK10	Accommodating indoor switchgear for up to 10 x 11 kV bays.	111.43	0
BSK15	Accommodating indoor switchgear for up to 15 x 11 kV bays.	130.33	0
BSK20	Accommodating indoor switchgear for up to 20 x 11 kV bays.	146.99	0
BSK25	Accommodating indoor switchgear for up to 25 x 11 kV bays.	162.09	0
BSK30	Accommodating indoor switchgear for up to 30 x 11 kV bays.	175.99	0
BSK35	Accommodating indoor switchgear for up to 35 x 11 kV bays.	188.96	0
BSK40	Accommodating indoor switchgear for up to 40 x 11 kV bays.	201.16	0
BSH5	Accommodating indoor switchgear for up to 5 x 33 kV bays.	150.1	11
BSH10	Accommodating indoor switchgear for up to 10 x 33 kV bays.	193.44	28
BSH15	Accommodating indoor switchgear for up to 15 x 33 kV bays.	229.29	12
BSH20	Accommodating indoor switchgear for up to 20 x 33 kV bays.	260.61	3
BSH25	Accommodating indoor switchgear for up to 25 x 33 kV bays.	288.81	3
BSH30	Accommodating indoor switchgear for up to 30 x 33 kV bays.	314.68	1
BSH35	Accommodating indoor switchgear for up to 35 x 33 kV bays.	338.75	1
BSH40	Accommodating indoor switchgear for up to 40 x 33 kV bays.	361.34	1

AC Substations – Power Transformer Building Block Costs

AC Substations - Power Transformer Building Block Costs											
HV	LV	TV/ MVA	Vector	Phase	MVA 3ph	OLTC	NER	Tfmer Cost (NZ$000)	Infra Cost (NZ$000)	Total Cost (NZ$000)	No. times building block used.
220	110		A	3	300	Y	N	2765.05	227.44	2992.49	2
220	110		A	3	220	Y	N	2752.91	213.19	2966.10	1
220	110		A	3	200	Y	Y	2422.37	113.44	2535.81	3
220	110		A	3	200	Y	N	2422.37	113.44	2535.81	6
220	110	11/60	A	F1	200	Y	N	5108.82	1058.52	6167.33	3
220	110	11/60	A	T1	200	Y	N	3831.61	793.89	4625.50	1
220	110		A	3	180	Y	N	2144.87	227.44	2372.31	1
220	110		A	3	120	Y	Y	1900.78	227.44	2128.22	2
220	110	11/60	A	3	100	N	N	1731.42	227.44	1958.86	7
220	110		A	3	100	Y	N	1738.98	113.44	1852.42	4
220	110	11/60	A	F1	100	Y	N	2757.95	1058.52	3816.47	2
220	110	33/30	A	3	70	Y	Y	1576.37	227.44	1803.81	2
220	110	11/30	A	3	60	N	N	1524.69	227.44	1752.13	2
220	110	11/30	A	3	60	Y	N	1524.69	227.44	1752.13	1
220	110	11/30	A	3	50	N	N	1262.02	227.44	1489.46	1
220	110	11/30	A	3	50	N	N	1262.02	227.44	1489.46	1
220	110	11/30	A	F1	50	N	N	571.48	264.63	836.11	2
220	66	11/60	S_S	3	200	Y	N	2810.38	236.99	3047.37	1
220	66		S_S	3	200	Y	Y	2876.38	236.99	3113.37	2
220	66	11/60	S_S	3	100	N	Y	1914.46	236.99	2151.45	2
220	66		S_S	3	100	Y	Y	1966.16	236.99	2203.15	1
220	55		TR	F1	18	Y	N	790.52	30.28	820.79	1
220	55		TR	F1	18	Y	Y	856.52	30.28	886.80	3
220	55		TR	F1	15	Y	Y	814.59	30.28	844.87	4
220	33		S_D	3	200	Y	N	2788.05	490.37	3278.42	3
220	33		S_D	3	150	Y	N	2293.00	422.32	2715.32	1
220	33		S_D	3	150	Y	Y	2369.00	422.32	2791.32	2
220	33		S_D	3	140	Y	Y	2189.17	422.32	2611.49	2
220	33		S_D	3	130	Y	N	2175.44	404.42	2579.86	2
220	33		S_D	3	120	Y	Y	2057.88	384.51	2442.39	4
220	33		S_D	3	110	Y	N	2005.06	352.82	2357.88	2
220	33		S_D	3	100	Y	N	1952.24	321.12	2273.36	4
220	33		S_D	3	100	N	Y	2028.24	321.12	2349.36	2
220	33		S_D	3	100	N	Y	2028.24	321.12	2349.36	3
220	33		S_D	3	80	Y	N	1566.90	334.06	1900.96	1
220	33		S_D	3	80	Y	Y	1616.90	334.06	1950.96	2
220	33		S_D	3	50	Y	Y	1433.48	272.39	1705.87	2
220	33		S_D	3	50	Y	Y	1433.48	272.39	1705.87	2
220	33		S_D	3	50	Y	Y	1433.48	272.39	1705.87	2
220	33		S_D	3	50	N	N	1341.02	272.39	1613.41	4
220	33		S_D	3	50	Y	N	1367.48	272.39	1639.87	2
220	33		S_D	F1	50	N	N	2499.28	395.52	2894.80	1
220	33		S_D	T1	50	N	N	1693.01	422.88	2115.89	1
220	33		S_D	F1	40	Y	N	3567.71	768.20	4335.91	1
220	33		S_D	3	30	N	N	1021.66	273.10	1294.76	2
220	33		S_D	3	20	N	N	888.40	267.09	1155.49	2
220	33		S_S	3	20	N	N	1021.88	257.70	1279.58	2

AC Substations - Power Transformer Building Block Costs											
HV	LV	TV/ MVA	Vector	Phase	MVA 3ph	OLTC	NER	Tfmer Cost (NZ$000)	Infra Cost (NZ$000)	Total Cost (NZ$000)	No. times building block used.
220	33		S_D	3	10	Y	N	753.08	264.77	1017.85	2
220	33		S_D	3	5	N	N	660.70	264.77	925.47	2
220	22		S_D	3	50	Y	N	1354.50	278.05	1632.54	2
220	16	33/60	S_D	T1	240	Y	Y	3901.02	105.27	4006.29	2
220	11		S_D	3	100	Y	Y	2002.52	478.64	2481.16	2
220	11		S_D	3	70	Y	Y	1615.70	405.32	2021.02	2
220	11		S_D	3	50	Y	N	1291.82	356.44	1648.26	2
220	11		S_D	3	40	Y	N	1163.00	332.00	1495.00	3
220	11		S_D	3	12	Y	N	801.85	263.57	1065.42	2
220	11		S_D	3	10	Y	N	776.07	258.68	1034.75	1
110	66		D_S	3	50	Y	N	1035.73	116.25	1151.98	2
110	66	11/10	A	F1	20	N	N	1508.76	315.32	1824.08	2
110	50		D_S	3	30	N	N	730.84	104.21	835.05	2
110	50		D_S	F1	15	N	N	1307.44	191.00	1498.44	1
110	33		D_S	3	120	Y	N	1576.28	227.00	1803.28	2
110	33		D_S	3	120	N	N	1652.28	227.00	1879.28	1
110	33		D_S	3	100	Y	N	1415.22	213.06	1628.28	4
110	33		D_S	3	100	Y	Y	1491.22	219.47	1710.69	1
110	33		D_S	3	100	N	N	1359.47	219.47	1578.94	2
110	33		D_S	F1	90	N	N	2903.89	356.58	3260.47	1
110	33		D_S	3	90	Y	N	1331.88	209.89	1541.76	2
110	33		D_S	3	80	Y	N	1248.53	188.78	1437.31	2
110	33		D_S	3	60	Y	N	1081.84	186.51	1268.35	4
110	33		D_S	T1	50	N	N	1426.71	239.55	1666.26	1
110	33		D_S	3	50	N	N	904.24	180.68	1084.92	7
110	33		D_S	3	50	Y	Y	1177.63	125.88	1303.51	2
110	33		D_S	F1	50	Y	N	2290.64	335.34	2625.98	1
110	33		D_S	3	40	Y	N	915.15	173.23	1088.38	3
110	33		D_S	3	40	Y	Y	991.15	173.23	1164.38	4
110	33		D_S	3	40	N	N	814.98	173.01	987.99	3
110	33		D_S	F1	40	N	N	1741.40	310.48	2051.88	2
110	33		D_S	T1	30	Y	N	1213.16	219.43	1432.60	1
110	33		D_S	F1	30	N	N	1572.20	292.56	1864.76	3
110	33		D_S	3	30	Y	N	871.25	161.96	1033.22	7
110	33		D_S	3	30	N	N	654.20	161.96	816.16	11
110	33		D_S	3	25	N	N	790.13	163.28	953.41	2
110	33		D_S	F1	25	Y	N	1851.53	239.37	2090.91	1
110	33		D_S	F1	20	N	N	1419.64	292.68	1712.32	4
110	33		D_S	3	20	N	N	699.05	160.61	859.66	10
110	33		D_S	3	20	N	N	699.05	160.61	859.66	1
110	33		D_S	3	20	Y	N	748.45	159.96	908.41	3
110	33		D_S	T1	20	Y	N	1083.90	211.50	1295.40	1
110	33		D_S	3	18	Y	N	731.78	158.63	890.41	2
110	33		D_S	3	15	Y	N	672.97	160.61	833.57	2
110	33		D_S	3	12.5	Y	N	685.94	155.00	840.94	4
110	33		D_S	3	10	N	N	665.10	153.30	818.40	1
110	33		D_S	T1	10	N	N	499.46	228.78	728.25	1
110	33		D_S	3	7.5	N	N	527.02	153.30	680.32	1
110	22		D_S	3	70	Y	N	1338.43	197.68	1536.11	2

AC Substations - Power Transformer Building Block Costs											
HV	LV	TV/ MVA	Vector	Phase	MVA 3ph	OLTC	NER	Tfmer Cost (NZ$000)	Infra Cost (NZ$000)	Total Cost (NZ$000)	No. times building block used.
110	22		D_S	3	50	Y	N	1039.92	153.59	1193.51	1
110	11		D_S	3	60	Y	N	1082.95	239.78	1322.73	3
110	11		D_S	3	50	Y	N	984.23	216.92	1201.15	1
110	11		D_S	3	40	Y	Y	945.11	199.40	1144.51	2
110	11		D_S	3	30	Y	N	773.98	181.87	955.85	2
110	11		D_S	3	30	Y	Y	839.98	181.87	1021.85	2
110	11		D_S	3	28	N	N	707.67	176.62	884.29	1
110	11		D_S	3	27	Y	N	742.45	176.62	919.07	1
110	11		D_S	3	25	Y	N	721.42	173.11	894.53	9
110	11		D_S	3	20	Y	N	688.74	147.78	836.52	9
110	11		D_S	F1	20	Y	N	1444.32	290.28	1734.60	1
110	11		D_S	3	10	Y	N	563.74	146.82	710.56	11
110	11		D_S	3	10	Y	Y	629.74	146.82	776.56	2
110	11		D_S	T1	10	Y	N	980.29	209.66	1189.95	3
110	11		D_S	F1	10	N	N	1201.20	279.56	1480.76	1
110	11		D_S	3	5	Y	N	511.18	138.06	649.24	3
110	11		D_S	3	4	Y	N	490.16	134.56	624.72	1
110	11		D_S	3	3	Y	N	490.16	134.56	624.72	1
110	11		D_S	3	1	Y	N	455.66	142.28	597.94	1
66	33		D_S	3	60	Y	N	947.25	166.27	1113.53	2
66	33		D_S	3	40	Y	N	743.18	163.50	906.68	2
66	33		D_S	3	20	Y	N	539.10	160.73	699.83	4
66	33		D_S	3	16	Y	N	498.28	160.18	658.46	1
66	33		D_S	3	10	Y	N	437.06	159.35	596.41	1
66	33		D_S	3	10	N	N	391.23	159.00	550.23	1
66	11		D_S	3	70	Y	N	1075.33	186.73	1262.06	2
66	11		D_S	3	60	Y	N	977.63	179.25	1156.88	2
66	11		D_S	3	30	Y	N	684.55	156.80	841.35	5
66	11		D_S	3	20	Y	N	586.86	149.31	736.17	3
66	11		D_S	3	10	Y	N	489.16	141.83	630.99	3
66	11		D_S	F1	10	Y	N	919.24	281.36	1200.60	1
66	11		D_S	3	5	Y	N	440.31	138.09	578.40	1
66	11		D_S	3	1	N	N	221.41	140.33	361.74	2
66	11		D_S	3	1	Y	N	162.47	148.28	310.75	1
66	11		D_S	3	0.5	Y	N	396.35	134.72	531.07	1
50	11		D_S	3	10	Y	N	489.16	141.83	630.99	2
50	11		D_S	3	7.5	Y	N	418.50	140.33	558.83	2
50	11		D_S	3	3	N	N	261.39	148.28	409.66	1
33	22		D_S	3	45	Y	N	455.45	155.43	610.88	2
33	22			AUTO	45			564.02	155.43	719.45	1
33	11		D_S	3	12.5	Y	N	467.30	144.74	612.03	2
33	11		D_S	3	10	N	N	372.76	151.43	524.19	1
33	11		D_S	3	10	Y	N	365.86	151.77	517.63	3
33	11		D_S	3	7.5	Y	N	355.54	150.85	506.39	1
33	11		D_S	3	5	Y	N	345.22	149.93	495.15	2
33	11		D_S	3	4.5	N	N	322.08	143.74	465.81	1
33	11		D_S	3	3	Y	N	317.75	143.74	461.48	1
33	11		D_S	3	2	N	N	127.50	151.77	279.27	2

AC Substations - Oil Containment Building Block Costs

AC Substation - Oil Containment Building Block Costs			
Capacity (m^3)	Description	Cost NZ$000	No. building blocks used
10	Oil Containment System	68.78	10
15	Oil Containment System	75.24	4
20	Oil Containment System	76.83	6
25	Oil Containment System	80.52	12
35	Oil Containment System	85.79	2
40	Oil Containment System	88.43	24
45	Oil Containment System	91.07	10
50	Oil Containment System	93.60	8
60	Oil Containment System	98.98	2
65	Oil Containment System	101.62	1
70	Oil Containment System	104.26	2
80	Oil Containment System	109.53	3
90	Oil Containment System	118.46	3
115	Oil Containment System	128.00	1
160	Oil Containment System	149.02	1

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AC Substations – Switchgear, Metering, Bus Zone Protection

	Switchgear Building Block Costs						
Type	Description	Bus Cost $000	CB Cost $000	Infra Cost $000	Prot Cost $000	Total Cost $000	Times used
B01	220 kV 1.5 CB two TL diameter	864.33	747.02	267.52	257.3	2,136.17	9
B02	220 kV 1.5 CB one TL and one cct diameter	946.99	680.66	267.52	151.04	2.046.21	4
B03	220 kV 1.5 CB two cct diameter	941.02	614.3	267.52	44.79	1,867.62	4
D00L	220 kV trans line, no bus	146.16	194.73	290.5	122.96	754.35	5
D01L	220 kV trans line, single bus	224.01	194.73	290.5	126.12	835.37	93
D02L	220 kV trans line, dual bus	373.87	194.73	290.5	126.12	985.22	90
D03L	220 kV trans line, triple bus	572.17	194.73	290.5	126.12	1183.52	5
D00F	220 kV feeder, no bus	203.82	271.13	93.4	14.93	583.27	5
D01F	220 kV feeder, single bus	278.63	271.13	93.4	14.93	658.08	93
D02F	220 kV feeder, double bus	428.96	271.13	146.86	14.93	861.88	90
D03F	220 kV feeder, triple bus	579.29	271.13	198.53	14.93	1063.87	5
D10	220 kV connection cct, no bus	68.23	194.73	75.87	22.96	361.78	3
D11	220 kV connection cct, single bus	146.08	194.73	75.87	26.12	442.8	71
D12	220 kV connection cct, dual bus	295.94	194.73	75.87	26.12	592.65	36
D13	220 kV connection cct, triple bus	494.24	194.73	75.87	26.12	790.96	3
D140	220 kV connection cct, no cb, no bus	54.61	0	124.07	14.93	193.61	3
D141	220 kV connection cct, no cb, single bus	129.44	0	124.07	14.93	268.42	3
D30	220 kV generator, no bus	68.23	0	0	0	68.23	3
D31	220 kV generator, single bus	146.08	0	0	3.16	149.24	60
D32	220 kV generator, double bus	295.94	0	0	3.16	299.1	16
D33	220 kV generator, triple bus	494.24	0	0	3.16	497.4	16
D41	220 kV line termination bay	88.63	0	20.54	106.25	215.43	22
D42	220 kV line termination bay, t off, no cb, no bus	143.24	66.36	124.07	106.25	439.93	6
D43	220 kV line terminVbay, t off, no cb, single bus	218.05	66.36	124.07	106.25	514.74	5
D50	220 kv bus section	136.45	194.73	80.7	6.32	418.2	21
D51	220 kV bus coupler, adjacent buses	696.92	194.73	82.06	6.32	980.02	22
D52	220 kV bus coupler, outside buses	774.78	194.73	82.06	6.32	1057.88	4
D53	220 kV bus section disconnector, single	54.61	0	24.33	0	78.94	11
D54	220 kV bus section disconnector, double	109.22	0	27.74	0	136.96	30
D55	220 kV earth switch	45.42	0	6.62	0	52.04	30
D59	220 kV bus CVT	0	66.36	8.15	0	74.51	7
D80	220 kV capacitor bank cct, no bus	54.61	230.2	80.07	14.93	379.81	7
D81	220 kV capacitor bank cct, single bus	129.42	230.2	80.07	14.93	454.62	2
D82	220 kV capacitor bank cct, dual bus	279.75	230.2	133.31	14.93	658.19	8
D83	220 kV capacitor bank cct, triple bus	430.08	204.77	181.61	14.93	831.39	8
E00L	110 kV transmission line, no bus	108.66	111.34	125.93	57.36	403.29	18
E01L	110 kV transmission line, single bus	178.96	111.34	125.93	60.52	476.75	206
E02L	110 kV transmission line, dual bus	370.25	111.34	125.93	60.52	668.04	36
E00F	110 kV feeder, no bus	180.68	113.68	57.74	14.93	367.03	18
E01F	110 kV feeder, single bus	220.88	113.68	57.74	14.93	407.23	206
E02F	110 kV feeder, double bus	324.95	113.68	81.67	14.93	535.23	36
E10	110 kV connection cct, no bus	50.55	111.34	66.76	22.96	251.62	5
E11	110 kV connection cct, single bus	120.85	111.34	66.76	26.12	325.08	161
E12	110 kV connection cct, dual bus	312.15	111.34	66.76	26.12	516.37	19

	Switchgear Building Block Costs						
Type	Description	Bus Cost $000	CB Cost $000	Infra Cost $000	Prot Cost $000	Total Cost $000	Times used
E20	110 kV incomer, no bus (not used)	50.55	111.34	66.76	22.96	251.62	2
E21	110 kV incomer, single bus (not used)	120.85	111.34	66.76	26.12	325.08	2
E22	110 kV incomer,double bus (not used)	312.15	111.34	66.76	26.12	516.37	1
E140	110 kV connection cct, no cb, no bus	49.73	0	79.06	14.93	143.72	2
E141	110 kV connection cct, no cb,single bus	89.93	0	79.06	14.93	183.92	5
E30	110 kV generator, no bus	50.55	0	0	0	50.56	1
E31	110 kV generator, single bus	120.85	0	0	3.16	124.12	19
E32	110 kV generator, double bus	312.15	0	0	3.16	315.31	4
E41	110 kV line termination bay	72	0	14.54	53.13	139.67	39
E42	110 kV line termination bay, t off, no cb, no bus	121.73	0	79.06	53.13	253.92	20
E43	110 kV line termin bay, t off, no cb, single bus	161.93	0	79.06	53.13	294.12	17
E50	110 kV bus section	101.11	111.34	64.65	6.32	283.42	10
E51	110 kV bus coupler	653.64	111.34	65.65	6.32	836.95	5
E53	110 kV bus section disconnector, single	49.73	0	17.99	0	67.72	22
E54	110 kV bus section disconnector,double	99.46	0	1.69	0	101.15	100
E59	110 kV VT	0	46.11	0	0	46.11	137
E80	110 kV capacitor bank cct, no bus	49.73	150.25	52.03	14.93	266.94	137
E81	110 kV capacitor bank cct, single bus	89.93	150.25	52.03	14.93	307.14	2
E82	110 kV capacitor bank cct, dual bus	194	150.25	77.5	14.93	436.67	2
F00L	66 kV transmission line, no bus	102.19	116.08	114.16	57.36	389.79	5
F01L	66 kV transmission line, single bus	163.35	116.08	114.16	60.52	454.11	57
F021L	66 kV transmission line, dual bus, 3500/2000 a	340.07	116.08	114.16	60.52	630.83	17
F022L	66 kV transmission line, dual bus, 3500/1000 a	340.07	116.08	114.16	60.52	630.83	17
F023L	66 kV transmission line, dual bus, 2000/1000 a	340.07	116.08	114.16	60.52	630.83	17
F00F	66 kV feeder, no bus	168.92	119.02	61.59	14.93	364.46	5
F01F	66 kV feeder, single bus	206.27	119.02	61.59	14.93	401.82	57
F021F	66 kV feeder, dual bus 3500/2000 A	316.85	119.02	109.16	14.93	559.96	17
F022F	66 kV feeder, dual bus 3500/1000 A	316.85	119.02	81.9	14.93	532.7	17
F023F	66 kV feeder, dual bus 2000/1000 A	316.85	119.02	81.63	14.93	531.25	17
F10	66 kV connection cct, no bus	48	116.08	58.44	22.96	245.48	1
F11	66 kV connection cct, single bus	109.16	116.08	58.44	26.12	309.8	35
F121	66 kV connection cct, dual bus 3500/2000 a	285.88	116.08	58.44	26.12	486.52	2
F122	66 kV connection cct, dual bus 3500/1000 a	285.88	116.08	58.44	26.12	486.52	2
F123	66 kV connection cct, dual bus 2000/1000 a	285.88	116.08	58.44	26.12	486.52	2
F140	66 kV connection cct, no cb, no bus	46.42	0	76.41	14.93	137.76	2
F141	66 kV connection cct, no cb, single bus	83.78	0	76.41	14.93	175.11	5
F20	66 kV incomer, no bus (not used0	48	116.08	58.44	22.96	245.48	5
F21	66 kV incomer, single bus (not used)	109.16	116.08	58.44	26.12	309.8	5
F22	66 kV incomer, dual bus (not used)	285.88	116.08	58.44	26.12	486.52	5
F30	66 kV generator, no bus	48	0	0	0	48	5
F31	66 kV generator, single bus	109.16	0	0	3.16	112.33	4
F322	66 kV generator, dual bus	285.88	0	0	3.16	289.04	1
F41	66 kV line termination bay	68.2	0	14.15	53.13	135.48	7
F42	66 kV line termination bay, t off, no cb, no bus	114.62	0	76.41	53.13	244.15	5

	Switchgear Building Block Costs						
Type	Description	Bus Cost $000	CB Cost $000	Infra Cost $000	Prot Cost $000	Total Cost $000	Times used
F43	66 kV line termination bay, t off, no cb, single bus	151.97	0	76.41	53.13	281.51	2
F501	66 kV bus section 3500 A	92.84	119.02	65.31	14.93	292.1	2
F502	66 kV bus section 2000 A	92.84	119.02	52.91	14.93	279.7	2
F50	66 kV bus section	96	116.08	63.81	0	275.9	2
F511	66 kV bus coupler, 3500 A	613.26	116.08	62.57	0	791.2	3
F512	66 kV bus coupler, 2000 A	613.26	116.08	62.57	0	791.2	3
F53	66 kV bus section disconnector, single	46.42	0	13.07	0	59.49	5
F54	66 kV bus section disconnector, double	92.84	0	15.66	0	108.5	24
F59	66 kV VT	0	38.96	0	0	38.96	35
F80	66 kV capacitor bank cct, no bus	46.42	155.49	58.83	14.93	275.66	35
F81	66 kV capacitor bank cct, single bus	83.78	155.49	58.83	14.93	313.02	2
F821	66 kV capacitor bank cct, dual bus, 3500/2000 A	168.73	155.49	100.92	14.93	440.06	3
F822	66 kV capacitor bank cct, dual bus, 3500/1000 A	168.73	155.49	77.48	14.93	416.63	3
F823	66 kV capacitor bank cct, dual bus, 2000/1000 A	167.55	155.49	77.48	14.93	415.45	3
F99	66 kV double bus structure term.	48.62	0	8	0	56.86	3
G00L	50 kV transmission line, no bus	102.19	116.08	110.9	57.36	386.53	1
G01L	50 kV transmission line,single bus	161.89	116.08	110.9	57.36	446.23	8
G00F	50 kV feeder, no bus	168.92	119.02	61.59	14.93	364.46	1
G01F	50 kV feeder, single bus	206.27	119.02	61.59	14.93	401.82	8
G10	50 kV connection cct, no bus	48	116.08	57.74	22.96	244.78	1
G11	50 kV connection cct,singleo bus	107.7	116.08	57.74	22.96	304.48	2
G20	50 kV incomer, no bus (not used)	48	116.08	57.74	22.96	244.78	2
G21	50 kV incomer, single bus (not used)	107.7	116.08	57.74	22.96	304.48	2
G50	50 kV bus section (not used)	96	116.08	63.05	0	275.13	1
G59	50 kV VT	0	0	38.96	0	38.96	2
H00	33 kV od feeder, no bus	54.42	89.9	53.94	22.96	221.22	4
H01	33 kV od feeder, single bus	78.6	89.9	53.94	22.96	245.4	78
H02	33 kV od feeder, dual bus	116.75	89.9	53.94	22.96	283.55	78
H20	33 kV od incomer, no bus	28.86	96.98	53.94	22.96	202.74	2
H21	33 kV od incomer, single bus	49.74	96.98	53.94	22.96	223.62	42
H22	33 kV od incomer, dual bus	87.89	96.98	53.94	22.96	261.77	2
H50	33 kV outdoor bus section	51.12	89.9	53.94	0	194.96	3
H51	33 kV outdoor bus coupler	99.48	89.9	53.94	0	243.33	4
H53	33 kV bus section disconnector, single	23.24	0	10.5	0	33.74	2
H54	33 kV bus section disconnector,double	46.48	0	11.3	0	57.78	2
H60	33 kV recloser, pole mounted	0	45.21	0	0	45.21	2
H61	33 kV recloser, substation environment, no bus	52.21	41.1	43.76	0	137.08	14
H62	33 kV recloser, substation environmt, single bus	76	41.1	43.76	0	160.87	14
H80	33 kV od capacitor bank cct, no bus	23.24	134.63	43.76	14.93	216.56	356
H81	33 kV od capacitor bank cct, single bus	47.03	134.63	43.76	14.93	240.35	1
H99	33 kV cct termination, transv. Bus	0	0	5.01	0	5.01	1
K11	11 kv od feeder, single bus	0	58.48	0	22.96	81.44	1
K12	11 kv od feeder, dual bus (not used)	0	75.7	0	22.96	98.66	1
K21	11 kV od incomer, single bus	0	71.28	0	22.96	94.25	4

	Switchgear Building Block Costs						
Type	Description	Bus Cost $000	CB Cost $000	Infra Cost $000	Prot Cost $000	Total Cost $000	Times used
K22	11 kV od incomer, dual bus (not used)	0	87.55	0	22.96	110.51	4
K40	11 kV capacitor bank cct, interconnector tertiary	12.5	210.2	124.6	31.4	378.7	20
K50	11 kV od bus section	0	67.09	0	22.96	90.05	1
K51	11 kV od bus coupler (not used)	0	79.58	0	22.96	102.54	1
K60	11 kV recloser, pole mounted	0	36.43	0	0	36.44	8
K61	11 kV recloser, substation environment	0	45.94	0	0	45.94	6
H61	33 kV id incomer, dual bus	0	0	108.54	22.96	131.5	14
H62	33 kV id feeder, dual bus	0	0	104.44	22.96	127.4	14
H63	33 kV id bus coupler	0	0	105.84	22.96	128.8	14
H71	33 kV indoor incomer single bus	0	0	69.81	22.96	92.77	127
H72	33 kV id feeder, single bus	0	0	63.81	22.96	86.77	57
H73	33 kV id bus section	0	0	76.61	22.96	99.57	64
H75	33 kV id feeder, single bus, cable tails	0	0	63.81	39.26	103.07	356
J61	22 kV id incomer, dual bus	0	0	101.24	22.96	124.2	6
J62	22 kV id feeder, dual bus	0	0	96.94	22.96	119.9	6
J63	22 kV id bus coupler	0	0	97.74	22.96	120.7	6
J71	22 kV id incomer, single bus	0	0	61.49	22.96	84.45	7
J72	22 kV id feeder, single bus	0	0	60.29	22.96	83.25	23
J73	22 kV id bus section	0	0	64.69	22.96	87.65	5
J75	22 kV id feeder, single bus, cable tails	0	0	60.29	35.76	96.05	5
K615	11 kV 25 kA id incomer, double bus	0	0	87.71	22.96	110.67	1
K617	11 kV 40 kA indoor incomer double bus	0	0	252	22.96	274.96	1
K625	11 kV 25 kA id feeder, dual bus	0	0	84.41	22.96	107.37	3
K627	11 kV 40 kA indoor feeder double bus	0	0	172.2	22.96	195.16	3
K635	11 kV 25 kA id bus coupler	0	0	84.81	22.96	107.77	3
K637	11 kV 40 kA indoor bus coupler	0	0	210	45.92	255.92	3
K715	11 kV 25 kA id incomer, single bus	0	0	50.51	22.96	73.47	67
K717	11 kV 40 kA indoor incomer single bus	0	0	122.61	22.96	145.57	14
K725	11 kV 25 kA id feeder, single bus	0	0	46.51	22.96	69.47	266
K727	11 kV 40 kA indoor feeder single bus	0	0	72.61	22.96	95.57	20
K735	11 kV 25 kA id bus section	0	0	48.11	22.96	71.07	40
K737	11 kV 40 kA indoor bus section	0	0	75.61	45.92	121.53	40
K751	11 kV 40 kA id feeder, single bus, cable tails	0	0	72.61	31.49	104.1	40
K752	11 kV 25 kA id feeder, single bus, cable tails	0	0	34.36	31.49	65.85	40
K9	16 kV 40 kA id incomer, single bus	0	0	415.34	0	415.34	2
P8d	220 kV revenue metering	0	0	18.67	27.25	45.92	132
P8e	110 kV revenue metering	0	0	16.83	27.25	44.08	21
P8f	66 kV revenue metering	0	0	15.18	27.25	42.43	32
P8h	33 kV revenue metering	0	0	2.98	27.25	30.23	172
P8j	22 kV revenue metering	0	0	1.95	27.25	29.2	1
P8k	11 kV revenue metering	0	0	2.13	27.25	29.38	21
P8a	Indoor revenue metering	0	0	2.13	27.25	29.38	132
P41	Busbar protection, 1 zone	0	0	0	111.49	111.49	2
P42	Busbar protection, 2 zone	0	0	0	130.51	130.51	2
P43	Busbar protection, 3 zone	0	0	0	177.33	177.33	2
P44	Busbar protection, 4 zone	0	0	0	210.25	210.25	2
P45	Busbar protection, 5 zone	0	0	0	243.17	243.17	2
220 NZR	220kV Railways Traction Supply	295.94	128.52	68.28	26.12	518.86	7
55 NZR	55kV Railways Traction Supply	59.46	107.99	212.99	85.55	465.99	7
GIS CYD1	220kV GIS Clyde#1(Bus Section only)	957.96	0	0	0	957.96	5
GIS CYD2	220kV GIS Clyde #2	2,040.21	0	0	0	2,040.21	4
GIS MNI	220kV GIS Motunui	797.17	0	0	0	797.17	5
GIS RPO1	220kV GIS Rangipo #1 (Bus Section only)	591.8	0	0	0	591.8	2
GIS RPO2	220kV GIS Rangipo #2	1,549.01	0	0	0	1,549.01	2
GIS TWI	220kV GIS Tiwai	1,739.54	0	0	0	1,739.54	14
GIS WIL	220kV GIS Wilton	1,703.11	0	0	0	1,703.11	6

AC Substations - Miscellaneous Plant

AC Substations - Miscellaneous Plant Building Block Costs			
Type	**Description**	**Total Cost (NZ$000)**	**No. times building block used**
110KV_CABL_360A	110kV_CABL_360A	2,406.11	1
110KV_CABL_525A	110KV_CABL_525A	1,392.72	1
ACTISL	Islington Static Var compensator	6,062.80	1
ATCADD	ATC Addington	212.86	1
ATCBRY	ATC Bromley	152.96	1
ATCPAP	ATC Papanui	178.31	1
CABLR	Cable cost for Rangipo	2,841.15	1
CABLR_WIL	WILTON 220KV CABLE	3,152.27	1
CAPAC1	Capacitor cost per 1 MVAR	23.83	1
CAPAC2	Capacitor cost per 2 MVAR	31.66	5
CAPAC3	Capacitor cost per 3 MVAR	39.49	3
CAPAC4	Capacitor cost per 4 MVAR	47.32	1
CAPAC5	Capacitor cost per 5 MVAR	55.15	13
CAPAC5.1	Capacitor cost per 5.1 MVAR	55.93	4
CAPAC12	Capacitor cost per 12 MVAR	109.96	1
CAPAC20	Capacitor cost per 20 MVAR	172.60	1
CAPAC30	Capacitor cost per 30 MVAR	250.90	7
CAPAC40	Capacitor cost per 40 MVAR	329.20	3
CAPAC50	Capacitor cost per 50 MVAR	407.50	3
CAPAC60	Capacitor cost per 60 MVAR	485.80	3
CAPAC70	Capacitor cost per 70 MVAR	564.10	2
CAPAC75	Capacitor cost per 75 MVAR	603.25	2
CAPAC100	Capacitor cost per 100 MVAR	799.00	2
CONDI	Condenser cost for Islington	6,490.00	2
CONDS	Condenser Cost for Stoke	5,281.82	1
MISCH	Miscellaneous equipment at Haywards	3,829.41	1
REACB	Reactor cost for Bromley	379.55	1
REACT_PEN	Reactor cost for Penrose	443.99	2
REACT5	Reactor cost per MVAR 5	112.60	2
REAFA	Fault limiting reactor Addington	115.31	3
REAFB	Fault limiting reactor Bromley	118.01	3
REAFP	Fault limiting reactor Papanui	130.31	4
REAFW	Pseudo Fault Limiting Reactor For Whirinaki	300.00	1
SYNBFW	Pseudo Synchronous Bus For Whirinaki	100.00	1

AC Transmission Line Building Blocks

AC Transmission Line Building Block Costs								
BB No.	kV	Configuration	Rating	Conductor	Temp.	Cost/km (NZ$000's)	No. km	No. of times building block used
1.1	33	dcp	220	1/mink	50	51.53	23.4	1
8	33	scp	410	1/hyena	75	41.03	15.0	1
3	33	dcp	360	1/coyote	50	66.21	17.5	1
2	33	dcp	315	1/hyena	50	61.98	78.4	3
4	33	dcp	525	1/wolf	75	74.40	68.3	4
5	33	scp	220	1/mink	50	37.29	408.2	8
1.10	50	dcp	220	1/mink	50	58.05	71.9	2
17.1	66	dcp	360	1/coyote	50	77.72	32.9	1
13	66	dcst	410	1/hyena	75	114.37	25.5	1
14	66	dcst	525	1/wolf	75	137.48	13.0	1
15	66	dcst	640	1/goat	50	170.65	6.1	1
15.2	66	dcst	980	1/zebra	75	178.98	8.7	1
23	66	scp	360	1/coyote	50	46.77	53.2	1
24	66	scp	410	1/hyena	75	44.28	5.5	1
15.1	66	dcst	750	1/zebra	50	177.93	17.0	2
22	66	scp	315	1/hyena	50	44.64	185.6	2
18	66	dcp	525	1/wolf	75	90.07	84.1	3
17	66	dcp	290	1/mink	75	65.92	224.7	5
21	66	scp	220	1/mink	50	40.84	249.9	7
39	110	dcst	1680	2/goat	75	296.05	9.4	1
28	110	dcst	360	1/coyote	50	128.81	300.3	3
31	110	dcst	640	1/goat	50	176.57	103.3	1
32	110	dcst	750	1/zebra	50	194.99	96.5	2
49	110	scp	360	1/coyote	50	53.48	289.9	3
45	110	scst	410	1/hyena	75	92.98	15.2	1
29	110	dcst	410	1/hyena	75	125.92	192.2	1
33	110	dcst	840	1/goat	75	180.55	95.8	2
43	110	scst	315	1/hyena	50	91.57	22.2	1
47.1	110	scst	980	1/zebra	75	145.66	17.3	2
51a	110	scp	525	1/wolf	75	57.02	145.9	3
41	110	dcp	315/360	1/wolf	50	97.00	701.7	18
27	110	dcst	315	1/hyena	50	123.14	191.6	6
34	110	dcst	980	1/zebra	75	195.41	161.5	4
50	110	scp	410	1/hyena	75	53.91	225.7	7
42	110	dcp	525	1/wolf	75	100.14	83.0	7
30	110	dcst	525	1/wolf	75	141.18	160.6	10
48	110	scp	315	1/hyena	50	51.41	998.5	13
64	220	scst	1280	2/goat	50	210.85	265.2	1
58	220	dcst	1680	2/goat	75	324.31	173.3	2
62	220	scst	750	1/zebra	50	146.96	639.7	2
55	220	dcst	1280	2/goat	50	319.92	248.7	6
63	220	scst	980	1/zebra	75	149.87	470.4	5
61a	220	scst	640	1/goat	50	132.34	1118.0	7
59	220	dcst	1960	2/zebra	75	362.80	566.8	8
53	220	dcst	750	1/zebra	50	210.54	713.0	9
54	220	dcst	980	1/zebra	75	212.97	1718.3	28
39.1	110	dcst	1280	2/goat	50	295.26	29.1	1