Brookfield Rail

Determination of Costs Relevant to Co-operative Bulk Handling's Access Proposal dated 10 December 2013

30 June 2014

Economic Regulation Authority
WESTERN AUSTRALIA

This document is available from the Economic Regulation Authority's website at www.erawa.com.au. For further information, contact:

Economic Regulation Authority
Perth, Western Australia
Phone: (08) 6557 7900

Contents

FINAL DETERMINATION

1. On 17 December 2013, Brookfield Rail (**BR**) submitted to the Economic Regulation Authority (**Authority**) an initial determination of costs for routes subject to an access proposal made by Co-operative Bulk Handling (**CBH**) dated 10 December 2013.

2. BR's determination was provided pursuant to clause 10(2) of Schedule 4 of the *Railway (Access) Code 2000* (**Code**).

3. Pursuant to an agreement between BR and CBH, CBH's proposal was subsequently revised. The Code does not contemplate the revision of access proposals once they have been made. CBH referred to its revised access proposal as a "clarified proposal". CBH's clarified proposal indicated, amongst other things, the exclusion of a number of routes which were subject to the initial proposal. BR provided to the Authority further cost information associated with CBH's clarified proposal on 25 March 2014.

4. In this determination by the Authority, BR's initial determination and the further cost information is referred to as "BR's proposed costs". BR's proposed costs have not been published on the Authority's website.

5. BR's proposed costs have been assessed by the Authority in accordance with the relevant provisions of the *Railways (Access) Act 1998* (**Act**) and the Code.

6. BR's proposed costs are quoted as being current at 30 September 2013.

7. The Authority has considered relevant information contained in submissions on BR's proposed costs made by BR, CBH and other interested parties in response to public consultation.

8. Pursuant to clause 10(3) of Schedule 4 to the Code, the Authority does not approve BR's proposed costs and has made the following four determinations in respect of the costs relevant to CBH's proposal. The Authority's determined costs to apply to the route sections relevant to CBH's Access Proposal are shown in Table 5.[1]

[1] For the purposes of this determination, the Authority has adopted the terminology employed in the *Railways (Access) Code 2000* in reference to the costs which underpin floor and ceiling prices and which are mentioned in section 9(1) of the Code. These costs will be referred to in this determination, respectively, as incremental and total costs. The use of these terms is consistent with the references to incremental and total costs in clause 1 Schedule 4 of the Code. For the purposes of this determination, the Authority considers the terms incremental costs and total costs to be interchangeable with the terms floor cost and ceiling cost as these terms appear in Brookfield Rail's costing principles and initial determination of costs, and in submissions received by the Authority on those costs.

List of Determinations

Determination 1

The Authority has determined the route sections of BR's railway which are relevant to CBH's access proposal as the routes shown in Table 2. Determination of costs by the Authority is on the basis of the routes shown in Table 2.

Determination 2

The Authority has determined costs to apply to the routes relevant to CBH's access proposal on the basis of the Modern Equivalent Asset (**MEA**) specifications shown in Table 3.

Determination 3

The Authority has determined the Gross Replacement Values (**GRV**) attributable to the routes relevant to CBH's proposal as shown in Table 4 in this determination.

Determination 4

The Authority does not approve BR's proposed determination of its costs as provided to the Authority on 17 December 2013 and 25 March 2014. The costs which the Authority has determined will apply to the relevant route sections are shown in Table 5. These costs are current as at 30 September 2013.

REASONS FOR THE FINAL DETERMINATION

Proposal and Context

9. On 10 December 2013, CBH submitted an access proposal to BR.

10. The routes to which access was requested by CBH in its access proposal of 10 December 2013 are listed in Table 1 below, including a reference to the applicable route number as listed in Schedule 1 of the Code ("*Routes to which this Code applies*"):

Table 1 - CBH requested routes

CBH Requested Route	Route described in Schedule 1 within which the requested route is contained	Route Number
Avon Yard - West Merredin	Avon – Kalgoorlie **excludes Koolyanobbing East - Kalgoorlie*	1
West Merredin - Koolyanobbing East		
Kambalda - Esperance	West Kalgoorlie – Esperance **excludes West Kalgoorlie - Kambalda*	5
Avon Yard - York	Avon - Albany	23
York - Narrogin		
Narrogin - Wagin		
Wagin -Katanning		
Katanning - Tambellup		
Tambellup - Redmond		
Redmond - Albany		
York - Quairading	York - Quairading	24
Narrogin - Yilliminning	Narrogin - West Merredin	25
Yilliminning - Bruce Rock		
Bruce Rock - West Merredin		
Yilliminning - Kulin	Yilliminning - Kulin	26
Wagin - Lake Grace	Wagin - Newdegate	27
Lake Grace - Newdegate		
Lake Grace - Hyden	Lake Grace - Hyden	28
Katanning - Nyabing	Katanning - Nyabing	29
Tambellup - Gnowangerup	Tambellup - Gnowangerup	31
West Merredin - Kondinin	West Merredin - Kondinin	32
West Merredin - Trayning	West Merredin - Trayning	33
Avon Yard - Goomalling	Avon Yard - McLevie	34
Goomalling - McLevie		
Goomalling - Amery	Goomalling - Mukinbudin	35
Amery - Wyalkatchem		
Wyalkatchem - Mukinbudin		
Amery - Burakin	Amery - Kalannie	36
Burakin - Kalannie		
Burakin - Beacon	Burakin - Beacon	37

CBH Requested Route	Route described in Schedule 1 within which the requested route is contained	Route Number
Millendon Junction - Moora	Millendon Junction - Geraldton	38
Moora - Dongara		
Dongara - Narngulu		
Narngulu - Geraldton		
Dongara - Arrowsmith	Dongara - Eneabba South **excludes Arrowsmith – Eneabba South*	39
Narngulu - Mullewa	Narngulu - Maya	40
Mullewa - Perenjori		
Perenjori - Maya		
Toodyay West - Miling	Toodyay West - Miling	41
Midland - Millendon Junction	Midland - Avon	44
Millendon Junction - Toodyay West		
Toodyay West - Avon Yard		
Midland – Woodbridge South	Midland - Kwinana	45
Woodbridge South - Forrestfield		
Forrestfield - Kenwick East		
Kenwick East - Cockburn East		
Cockburn East - Cockburn South		
Cockburn South - Kwinana		
All tracks servicing the facilities of CBH on the Standard Gauge network		8
All spur line tracks servicing CBH facilities on the Standard Gauge network		9
All tracks servicing the facilities of CBH on the Narrow Gauge network		42
All spur line tracks servicing CBH facilities on the Narrow Gauge network		43
All spur line tracks servicing customer facilities on the Dual Gauge network		48

11. On 17 December 2013, BR provided its proposed costs to CBH, and to the Authority, for some routes. BR provided its proposed costs aggregated to the route level shown in Schedule 1 of the Code "Routes to which this Code applies". CBH based its requested routes on the route sections shown on the BR website under the heading "access seekers information".

12. On 21 March 2014, CBH provided the Authority with a copy of a "clarified proposal". The clarification entailed the inclusion of the track between Koolyanobbing East and Kalgoorlie and between Kalgoorlie and Kambalda, and the exclusion of the routes numbered in Schedule 1 of the Code as 24, 29, 31 and 33.

13. As part of its clarified proposal, CBH also altered the performance standards required in its proposal. The original proposal required that the 'initial performance standards of the lease' be met. The 'clarified proposal' requires only that current operating standards be met.

14. BR provided advice of its proposed costs relating to CBH's clarified proposal on 25 March 2014.

15. In respect of CBH's clarified access proposal the issue of operating standards relates to some Narrow Gauge (**NG**) 'grain routes' where operating standards have been

limited.[2] These routes have not been maintained to their initial design specification. These routes are listed as whole routes in Schedule 1 of the Code, as routes 25, 26 and 32. The Perenjori - Maya section of route 40 is a route subject to limited standards also. These routes have been referred to as 'Tier 3 routes'.[3]

16. There are other routes which are not referred to as Tier 3 routes which have limited capacity. BR has advised that there may be no capacity on route 41 (Toodyay West – Miling) after 31 December 2015. Route 41 has been previously referred to as a 'Tier 2' route. This route currently has limited capacity, in relation to maximum train lengths and speeds.

17. Initial lease performance standards may be achievable on 'Tier 3' routes if the routes were restored to their Modern Equivalent Asset (**MEA**) specification. CBH's reduction of requested performance standards in its clarified proposal indicates that CBH is contemplating continued use of these routes in their pre-July 2014 condition.

18. BR has advised that no capacity will be made available on the 'Tier 3' routes after 30 June 2014, and that these routes will be closed to train operations for reasons consistent with BR's rail safety obligations after that date. This indicates that BR is not contemplating the continued use of these routes in their pre-July 2014 condition.

19. BR has not provided proposed costs for the 'Tier 3' routes relevant to the proposed access period, which commences 1 July 2014. BR has provided indicative costs relating to access to these routes between 17 March 2014 and 30 June 2014.

20. The 'Tier 3' routes and route 41 remain listed in Schedule 1 of the Code, and therefore remain subject to the provisions of the Code, notwithstanding the advice of BR relating to the availability of capacity on those routes.

21. The term 'Tier 3 route' is not a code-defined term, and there are no special or particular considerations in the Code for 'Tier 3' routes.

Legislative Considerations

22. The Act and the Code establish a framework for negotiation of access to regulated railways in Western Australia.

Code

23. Schedule 4 to the Code sets out the provisions relating to prices to be paid for access. Clauses 7 and 8 of Schedule 4 prescribe the floor and ceiling price tests.

24. In clause 7 the floor price test provides that an operator who is provided with access must pay an amount not less than the incremental costs resulting from its operations on that route and use of that infrastructure. Clause 7 requires that the sum recovered by the railway owner in respect of a route must not be less than the total of the

[2] On some routes, running times are restricted at certain hours where heat may affect track geometry, and speeds are limited for safety reasons.

[3] These routes have been referred to as "Tier 3" routes in government and industry forums and publications. The term Tier 3 route is used to describe both whole routes as mentioned in Schedule 1 and sections of schedule 1 routes, and is not a defined term in the Code.

incremental costs resulting from the combined operations on the route of all operators (agreements under the Code) and other entities (agreements outside the Code) and the railway owner.

25. In clause 8 the ceiling price test provides that an operator provided with access must pay an amount no more than the total costs attributed to that route and associated infrastructure.

26. The results of these tests form a price range to guide negotiations of the access tariff.

27. Pursuant to clause 10(1) of Schedule 4 to the Code, where an access proposal has been made and the Regulator has not determined costs under clause 9 of Schedule 4,[4] the railway owner is to determine the costs referred to in clauses 7 and 8 of Schedule 4 to the Code that are relevant to an access proposal in accordance with the costing principles for the time being approved or determined by the Regulator under section 46.

28. The costs approved or determined by the Regulator under clause 10(3) in respect of an access proposal are the costs that are to apply under clauses 7 and 8 for the purposes of the proposal (see clause 10(4)).

Act

29. In performing its functions under the Code, including that of making a determination under clause 10(3) of Schedule 4 to the Code, the Authority must take into account, as relevant, the matters outlined in section 20(4) of the Act:

(a) the railway owner's legitimate business interests and investment in the railway infrastructure;

(b) the railway owner's costs of providing access, including any costs of extending or expanding the railway infrastructure, but not including costs associated with losses arising from increased competition in upstream or downstream markets;

(c) the economic value to the railway owner of any additional investment that a person seeking access or the railway owner has agreed to undertake;

(d) the interests of all persons holding contracts for the use of the railway infrastructure;

(e) firm and binding contractual obligations of the railway owner and any other person already using the railway infrastructure;

(f) the operational and technical requirements necessary for the safe and reliable use of the railway infrastructure;

(g) the economically efficient use of the railway infrastructure; and

(h) the benefits to the public from having competitive markets.

Incremental and Total Costs

30. The Code does not prescribe how negotiations are to be conducted or the specific terms and conditions to be included in an access agreement. The parties are free to

[4] Determinations made under clause 9 relate to instances where the Regulator considers it likely that a proposal will be made.

negotiate terms, including price, outside the Code. Where negotiations under the Code fail, parties can obtain a binding determination through arbitration.

31. To assist in negotiations on the price of access under the Code, incremental and total costs are determined under Schedule 4. These costs form the lower and upper limits for the negotiation of access charges.

32. Clause 10 of Schedule 4 to the Code requires BR to determine costs in accordance with its costing principles. BR's costing principles, which were approved by the Authority most recently in April 2011, pursuant to section 46 of Part 5 of the Code, provide details on the manner in which BR's costs are to be formulated.

33. As required by clause 10(2) of Schedule 4 to the Code, BR has submitted proposed costs as described in clauses 7 and 8 of Schedule 4 that are relevant to CBH's access proposal. The Authority does not determine prices in respect of a particular proposal. Prices are negotiated between the railway owner and the proponent subsequent to the approval or determination of costs by the Authority. The Authority does not have a role in establishing specific access prices, except where requested to provide an opinion on the issue referred to in clause 13(a) of Schedule 4 to the Code, as described in Section 21 of the Code.

34. The role of the Authority in relation to the determination of costs is to either approve BR's proposed costs, or to make its own determination of costs, as described in clause 10(3) of Schedule 4 to the Code.

35. The total cost approved or determined by the Authority represents the maximum recoverable revenue in respect of the relevant route section. This means that the total cost is the maximum revenue recoverable by BR from all operators and all other entities, including itself, on the relevant route.

36. The incremental cost is determined as the incremental costs resulting from the proponent's proposed operations on the relevant route and use of the infrastructure. Incremental costs is defined in clause 1 of Schedule 4 to the Code, in relation to an operator or group of operators, as the sum of the operating costs and, where applicable, the capital costs and the overheads resulting from the access seeker's operations that the railway owner would be able to avoid in respect of the 12 months following the commencement of access if it were not to provide that access.

37. The total cost is derived from the total costs attributable to the section of a route and use of the infrastructure. Total costs is defined in clause 1 of Schedule 4 to the Code as the total of all operating costs, capital costs and overhead costs attributable to the performance of the railway owner's access-related functions, whether by the railway owner or an associate.

38. The capital cost components of cost and the approach to estimating these costs are not based on actual costs or on the existing network specification but rather are based on the hypothetical Gross Replacement Value (**GRV**) of the railway infrastructure, where GRV is calculated as the lowest current cost to replace existing assets with assets that –

    a) have the capacity to provide the level of service that meets the actual and reasonably projected demand; and

b) are, if appropriate, modern equivalent assets.[5]

39. Further, clause 4 of Schedule 4 provides that the costs referred to in Schedule 4, including capital costs, are intended to be those that would be incurred by a body managing the railways network and adopting efficient practices applicable to the provision of railway infrastructure, including the practice of operating a particular route in combination with other routes for the achievement of efficiencies.

40. Section 2 of the Code defines a "route" as the parts of the railways network to which the Code applies. As previously indicated, the routes to which the Code applies are listed in Schedule 1 of the Code. Section 8(2) of the Code stipulates that a proposal can be made only in respect of a route to which the Code applies.

INFORMATION USED BY THE AUTHORITY

41. The Authority has referred throughout this document to "BR's costing principles". References to BR's costing principles are to the most recent costing principles document which applies to the BR network, and which is published on the Authority's website. This document is titled "WestNet Rail Costing Principles", and is dated April 2011.

Consultants used by the Authority

42. To assist the Authority in reviewing BR's proposed costs, the Authority engaged a consultant, Engenium, to review the asset specification, quantity and unit pricing elements of BR's costing model and to evaluate public submissions, and to provide advice to the Authority.

Public Consultation

43. Clause 10 of Schedule 4 to the Code prescribes a 30 day time period within which the regulator must make an approval or determination of costs. This did not in this case allow sufficient time for public consultation to be sought.

44. In order to enable submissions to be considered by the Authority and in accordance with section 11(2) of the Code, CBH agreed to an extension of the timeline for the making of the determination by the Authority to 7 March 2014. This agreement was provided by CBH on 24 December 2013.

45. On 6 January 2014, and in accordance with clause 11(1) of Schedule 4 to the Code, the Authority issued a notice calling for submissions from interested parties on BR's proposed costs. The closing date for public submissions was 3 February 2013.

46. Eight public submissions were received by 3 February 2013, from:

- Great Eastern Country Zone;
- Joy and Ted Flanigan;

[5] This is described in detail in clause 2 of Schedule 4 of the Code.

- Rik Hughes;
- Rowlie Mellor;
- Shire of Quairading;
- Western Australian Farmers Federation;
- Western Australian Local Government Association (WALGA); and
- Wheatbelt Railway Retention Alliance.

47. These submissions have been published on the Authority's website. Three confidential submissions were received, which have not been published by the Authority.

48. Following requests from interested parties including CBH the Authority extended the time for interested parties to provide public submissions on BR's proposed costs. This extension was notified by the Authority on its website on 3 February 2014, and allowed for submissions to be received until 7 April 2014.

49. In order to accommodate the Authority's consideration of submissions provided until 7 April 2014, CBH agreed, in accordance with section 11(2) of the Code, for an extension of the deadline for the Authority's determination until 28 April 2014. This agreement was provided by CBH on 3 February 2014 and was notified by the Authority on its website on 3 February 2014.

50. CBH provided a confidential submission to the Authority on 20 March 2014. The submission has not been published by the Authority.

51. CBH provided written advice of a clarified proposal on 21 March 2014. BR provided advice of its costs consistent with CBH's clarified proposal on 25 March 2014. BR requested that this advice, which supplemented BR's original determination of costs, be treated as confidential. The advice has not been published by the Authority. BR advised that its proposed costs were not changed as a result of the clarification of the proposal. The Authority has not sought public submissions on this additional material.

52. CBH provided a further confidential submission to the Authority on 7 April 2014. The submission has not been published by the Authority.

53. The deadline for the Authority's determination was further extended until 30 June 2014, with CBH's agreement, in accordance with section 11(2) of the Code. CBH's agreement was provided on 11 April 2014 and was notified by the Authority on its website on 16 April 2014.

NOTICES OF POTENTIALLY ADVERSE MATERIAL AND PROCEDURAL FAIRNESS

54. On 3 April 2014, the Authority wrote to BR, providing an opportunity to respond to material being relied upon by the Authority in its consideration of the replacement costs of ballast, turnouts and communications infrastructure, and operating and overhead costs.

55. BR submitted a response to this material on 11 April 2014. BR requested that this submission be treated as confidential. The submission has not been published by the Authority.

56. On 9 April 2014, BR requested to be provided with a copy of material submitted by CBH. On 14 April 2014 the Authority provided to BR, with CBH's permission, a copy of the CBH's submissions of 20 March 2014 and 7 April 2014.

57. BR submitted a response to this material on 23 April 2014. BR requested that this submission be treated as confidential. The submission has not been published by the Authority.

58. On 5 May 2014, the Authority advised BR that it may determine costs for Tier 3 routes and that it may determine incremental costs in the manner proposed by CBH in its submission.

59. On 14 May 2014, BR submitted a response to the Authority's letter of 5 May 2014 which addressed the matters of the appropriate treatment of Tier 3 routes and the calculation of incremental costs. BR requested that this submission be treated as confidential. The submission has not been published by the Authority.

60. On 6 May 2014, CBH requested to be provided with a copy of material submitted by BR in response to CBH submissions. BR provided a redacted copy of its response to CBH on 13 June 2014.

61. On 26 May 2014, the Authority wrote to BR providing a copy of material adverse to BR in relation to ballast quantities. BR responded with advice relating to the conversion of ballast depths to tonnages on 28 May 2014.

Brookfield Rail's Costing Model

62. BR submitted a costing model which contains its costs for the route sections relevant to CBH's proposal. In doing so, BR met the requirements of section 1.2 of its costing principles.

63. BR has requested the Authority keep all details of its model confidential. The Authority has agreed to the request from BR to keep all details contained in its costing model confidential.

BR Submission – 'Tier 3' Routes

64. BR has provided costs for those routes which will apply up to 30 June 2014. These costs are not relevant to the access period indicated in CBH's proposal. BR has not proposed costs for the routes which will be closed to train operations from 1 July 2014.

65. In its submission of 14 May 2014, BR indicated its view that the Authority could not validly determine costs for these routes.

66. BR has indicated that the routes which were excluded from CBH's clarified proposal of 21 March 2014 have been out of service for some time. These routes are:

- 24 – York to Quairading closed 2013
- 29 – Katanning to Nyabing closed 2007
- 31 – Tambellup to Gnowangerup closed 2007
- 33 – West Merredin to Trayning closed 2013

Authority Assessment – Determination of Costs for 'Tier 3' Routes

67. The Authority notes that the routes which have been previously closed to train operations, and those which BR has indicated will be closed from 1 July 2014, remain listed in Schedule 1 of the Code, as "Routes to which this Code applies".

68. BR has indicated that if capital works are undertaken on the 'Tier 3' routes, capacity may be restored on these routes. BR has referred to such restoration of capacity as being "extension and expansion" works.

69. Section 8(5) of the Code outlines that, even if an extension or expansion is not specified in a proposal, an extension or expansion may be proposed during the course of negotiations on the ground that it would be necessary to accommodate the proposed rail operations

70. Section 9 indicates that the railway owner must provide costs associated with the existing infrastructure and any proposed extension and expansion separately. The Authority notes that CBH, in its initial proposal, proposed the negotiation of extension and expansion works on routes 29 and 31. These two routes have been closed since 2007.

71. The Authority considers that the Code refers to extensions and expansions in the sense of creation of capacity in excess of the existing MEA specification of the route. The Authority considers that restoring capacity on 'Tier 3' routes would not be considered an extension or an expansion in that sense, but more properly a repair or restoration as this would bring capacity back up to the MEA standard.

72. The Authority considers that it may determine costs for the 'Tier 3' routes on the basis that capacity may be made available on these routes.

73. As BR did not provide costs for the 'Tier 3' routes, the Authority has requested Engenium to provide an MEA costing for the infrastructure on those routes. Engenium was asked to provide an MEA for the lowest cost replacement infrastructure sufficient to accommodate the proposed grain operations proposed by CBH.

74. The Authority notes that the costs applicable to these routes could be re-determined under clause 12 of Schedule 4 to the Code if works were undertaken on these routes, which creates capacity that differs to the MEA specification used in this determination.

CBH Submission

75. The CBH submissions provided information which is relevant to the review of BR's proposed costs by the Authority. The responses to the CBH submission provided by BR also contain information relevant to this review. Material relevant to the cost of specific asset classes or activities is discussed under the relevant headings under "Discussion of Cost Elements" in this document. General submission comments are referred to below.

76. CBH's submission of 7 April was accompanied by a technical consultant's report[6] and economic consultant's report[7] incorporating a costing model. This material supporting CBH's submission is referred to as material from 'CBH's technical consultant', 'CBH's economic consultant' or 'CBH's model' respectively, or as CBH's submission.

CBH SUBMISSION – GRV COMPONENTS

77. CBH proposed alternative GRV values for a number of capital asset components. The most significant of these components were earthworks, ballast and turnouts. CBH also proposed lower operating costs than determined by Brookfield Rail. CBH's comments (and BR's responses where appropriate) on these items are summarised under each appropriate heading in the section "Discussion of Cost Elements" in this determination.

78. In addition, CBH nominated three further matters that it considered should be taken into account by the Authority when reviewing BR's proposed costs. These matters are listed at section 3.2 of CBH' submission (7 April 2014) as follows:

- *A GRV 'discount' should be applied on routes where the actual performance is substantially lower than the performance that would result from using lowest cost MEA to reflect the fact that it is not possible to reconstruct the relevant route using MEA (particularly where, in many cases, the relevant routes are 100 years old);*
- *The design construction and project management fees financing charges and working capital principles provided for in the approved costing principles result in costs which are too high and that should not be included in the relevant floor and ceiling costs; and*
- *The fact BR has received government and private contributions to construct part of the network should be taken into account when calculating its capital costs, so that the ceiling price for a route is not set in a way that allows BR to potentially recover costs that it did not incur and which have already been paid for by the government or third parties.*

79. In relation to the first of the dot points above, CBH referred to an Authority decision[8] that it would be appropriate to discount the GRV of an MEA route section where the actual capacity of the section is significantly less than the hypothetical MEA. BR responded to CBH's submission by stating that in previous consideration of this issue, the ERA has consistently taken the view that the access price will reflect the available standard of service.

80. In relation to the second of the dot points above, CBH submitted that the application of design construction and project management (**DCPM**) fees as a percentage of overall costs does not reflect the standard practice for charging of these services, and are in excess of the likely efficient cost of these services.

[6] Indec Consulting – Review of Brookfield Rail Floor and Ceiling Costings and Comment on GRV Calculation.

[7] Frontier – Price Floor and Ceiling Model for Brookfield Rail Services.

[8] Requirements for Railway Owners to Submit Floor and Ceiling Costs August 2011.

81. BR disagreed with this assertion and stated in its response to CBH's submission that DCPM costs are a substantial component of the work associated with a greenfields replacement as envisaged by the Code.

82. In relation to the third of the dot points above, CBH acknowledged that BR's costing principles accommodates consideration of contributed capital by allowing for the equivalent annuity to be included as revenue for the purposes of the Ceiling Price Test.

83. BR noted in its response to CBH's submission that the Code does not include any caveats with regard to funding source in the definition of railway infrastructure to which the Code applies.

Authority Assessment – Discounting GRV

84. BR has advised that there will be no capacity on the Tier 3 routes in the proposed access period in the absence of 'extension and expansion' works. In its submission of 14 May 2014, BR has stated that:

> *Tier 3 routes that are or will be closed to train operations could be re-opened at some later date if an agreement is reached on the necessity for, and required scope of, the extension or expansion upgrade works and the funding of these works, but the routes could not re-open until the works are performed.*

85. In its submission of 14 May 2014, BR provided a cost estimate and a timeframe for restoration of capacity on the four Tier 3 routes subject to CBH's clarified proposal. These estimates were made in 2009 and indicate that the scope of the works considered necessary by BR in order to provide capacity on these routes is significant.

86. BR has indicated that for safety reasons, capacity on these routes will not continue to be made available at the current limited operating standards.

87. Accordingly, the Authority considers that the availability of capacity on these routes is therefore effectively contingent on the infrastructure on these routes being repaired or restored, and therefore that an undiscounted MEA suitable for grain traffic operations, should apply.

88. In respect of the Tier 3 routes, the difference between the approach taken by the Authority for this determination, and the approach the Authority would have taken had BR not declined to provide proposed costs on the basis that these routes would be closed, is that the Authority has had to rely on its own specification of a MEA rather than an MEA provided by BR as the basis for determining costs.

89. This means that in practical terms the costs determined by the Authority in this determination will differ from the costs that would have been determined had BR not declined to provide costs only to the extent of any resulting variation in the MEA.

Authority Assessment – DCPM Fees and Capital Contributions

90. The Authority notes that CBH did not submit an appropriate level or method for estimating DCPM fees as an alternative to the DCPM fees proposed by BR. The Authority accepts BR's inclusion of 20 per cent DCPM fees as allowed for in its costing principles.

91. The Authority considers that BR has made adequate provisions in its costing principles and its over-payment rules to ensure that it is not able to over-recover in

respect of routes which include contributed assets. This means that an annualised amount commensurate with any capital contribution by the government or third party is included as BR revenue when considering the over-payment calculation.

CBH SUBMISSION – CALCULATION OF INCREMENTAL COSTS

92. CBH has submitted that the construction of incremental costs for each route should be by way of calculating incremental costs on an operator basis. BR has provided floor costs as a total for the combined operations of all operators on the route.

93. CBH has submitted that floor costs (incremental costs) refer to the costs specified in clause 7(1) of Schedule 4 to the Code. This clause provides that an operator will not pay less than the incremental costs resulting from its use of the infrastructure.

94. BR has responded to CBH's submission in contradiction to this claim. BR has asserted that the floor (incremental) cost is that referred to in clause 7(2) of the Code which requires that the payments to the railway owner in respect of a route must not be less than the total of all incremental costs resulting from the combined operations of all users on the route.

95. BR in its response to CBH's submission cited an apparent precedent for the calculation of incremental costs at a 'total operator level' in the Authority's determination in relation to costs for The Pilbara Infrastructure (**TPI**) railway in September 2013.

96. In the TPI determination, the Authority noted, at paragraph 342 that:

> *For the purposes of this determination the Authority has decided that floor costs … will be calculated as the total of all current operating and overhead costs associated with all above rail operations on the [existing] route.*

97. The Authority considered incremental costs at an operator level, at paragraph 343:

> *There are means by which a floor cost defined in this way may be apportioned between operators and escalated to a future date if it is necessary to do so, for the purposes of calculating incremental costs as defined in Schedule 4 clause 1 of the Code*

Authority Assessment – Calculation of Incremental Costs

98. The Authority has noted that BR's costing principles contain a reference to the factors to be taken into account when the "floor" is calculated. These are shown in section 5.3 of the costing principles. BR's costing principles state that the following factors will be applied to calculate "the floor":

- the percentage that the incremental traffic represents of the total traffic;
- the existing overall level of traffic (that is, high, or low density traffic use);
- the requirements of the service (e.g. high speed passenger versus low speed freight);
- the nature of the infrastructure (which will influence the operating costs) and the specific requirements of the user; and
- the nature of the train operations and its impact on overhead costs.

99. On 5 May 2014, the Authority notified BR that it may calculate incremental costs at the 'operator level' and invited BR to provide a submission relating to that matter. BR responded to that notification on 14 May 2014. In its response, BR did not provide

any information which would assist the Authority in determining incremental costs specific to CBH's proposed operations.

100. BR's response indicated that data relating to the factors outlined in section 5.3 of its costing principles is needed to calculate incremental costs at the operator level, but did not provide any of that information.

101. BR asserted in its response that the necessary information would only be considered in the course of negotiations subsequent to the determination of costs by the regulator.

102. The Authority notes the definition of "floor" in BR's costing principles, as referring to the incremental costs as defined in clause 1 of Schedule 4 to the Code. Clause 1 states that incremental costs in relation to an operator or group of operators are those costs which the railway owner would be able to avoid if it were not to provide access to that operator or group of operators.

103. The Authority considers that the requirement outlined in section 20 of the *Railways (Access) Act 1998* for the regulator to take into account the railway owner's costs of providing access, and the 'economically efficient use of the railway', means that incremental costs should be calculated on the basis of the avoidable costs incurred by a railway owner in respect of a specific proposal.

104. The Authority has determined incremental costs applicable to CBH's proposed operations, pursuant to section 20 of the *Railways (Access) Act 1998* and clause 1 of Schedule 4 to the Code.

CBH SUBMISSION – REQUESTED ROUTES

105. CBH has noted that BR has provided its proposed costs on the basis of the routes listed in Schedule 1 of the Code, and that this does not coincide with the basis on which CBH disaggregated routes for the purposes of its proposal. CBH submitted that its proposal referred to disaggregated "requested routes" because:

- Each requested route coincides with the location of CBH's receival points and more closely matches the rail operations conducted on the network by CBH;
- CBH has not requested access to all Schedule 1 routes in their entirety;
- BR publishes network information on the basis of route sections which substantially coincide with CBH's requested routes, and CBH expected that it would determine its costs consistently with its previous practice.

106. In its 23 April 2014 response to the CBH submission, BR advised its view that:

> *the ERA is determining the costs for the "whole of the route and associated infrastructure" that "is to be the same for all operators" (Sch.4, Div.2, cl.8 of the Code)*

107. BR's costing principles state (at section 1.3) that:

> *The Costing Principles are a statement of principles, rules and practices that [BR] will apply to calculate Floor and Ceiling costs on a route section basis.*

108. The definitions section of BR's costing principles refers to a list of route sections which are sections of Schedule 1 routes and which correspond to route sections currently defined in BR's costing model.

Authority Assessment – Requested Routes

109. In relation to BR's letter of 23 April 2014, the Authority notes that clause 8 of Schedule 4 to the Code is concerned with the "total costs attributable to that route" for the purposes of administering the over-payment rules, and is not concerned with the determination of costs by the regulator.

110. The Authority notes that BR has previously proposed costs (in 2002, 2005 and 2008) on the basis of route sections of Schedule 1 routes, and that the Authority has provided cost determinations on that basis.

111. The Authority notes that the term 'route' defined in section 3 of the Code includes part of a route, and that the term 'route section' is defined as the sections of the railway network into which the network is divided for management and costing purposes.

112. The Authority considers that CBH is able to propose access on the basis of routes which are sections of Schedule 1 routes, and has reviewed BR's costs on a route section basis, consistent with the requested routes shown in CBH's proposal.

ROUTES RELEVANT TO CBH'S PROPOSAL

113. CBH has based its proposal on route sections as listed on BR's website. BR has proposed costs on the basis of whole routes as listed in Schedule 1 of the Code. Therefore, BR has proposed costs relevant to the routes requested by CBH only where the requested routes coincide with the whole routes shown in Schedule 1 of the Code. This has occurred in relation to three requested routes only:

- Lake Grace – Hyden (route 28)
- Burekin – Beacon (route 37)
- Toodyay West – Miling (route 41)

114. BR did not propose costs to CBH or to the Authority for the remainder of the requested routes (at the requested route level) in CBH's clarified proposal.

115. In accordance with clause 10(2) of Schedule 4 to the Code, BR has provided the Authority, in the form of its costing model, with costs by route section at a level of detail sufficient to enable the determination of costs relevant to the requested routes in CBH's access proposal.

116. The CBH requested routes coincide with the route sections shown on BR's website which are route sections into which the 'network is divided for management and costing purposes', as defined in section 3 and Schedule 2 of the Code. In all cases except for route 45, the route sections shown on BR's website correspond with the route sections defined in its costing model.

117. The relationship between the sections of route 45 shown on BR's website (and requested by CBH) with the sections of route 45 detailed in BR's model is shown in the table below:

Sections of Route 45 (Midland to Kwinana)

Shown on BR website	CBH Requested Route	Shown in BR Costing model
Midland – Woodbridge South	✓	Midland - Forrestfield
Woodbridge South - Forrestfield	✓	
		Forrestfield
Forrestfield – Kenwick East	✓	Forrestfield – Cockburn South
Kenwick East – Cockburn East	✓	
Cockburn East – Cockburn South	✓	
Cockburn South - Kwinana	✓	Cockburn South - Kwinana
		Kwinana
Kwinana – Kwinana CBH	✓	Kwinana – Balloon Loop

118. CBH's requested routes included all spur tracks servicing customer facilities on the dual gauge network (Schedule 1 route 48). Route 48 is taken to include the so-called "Kwinana Balloon Loop" which is shown in the BR costing model, but not on BR's website information. CBH separately included the route section shown on the BR website as "Kwinana-Kwinana CBH" (but not included in BR's costing model) among its requested routes.

119. The "Kwinana Balloon Loop" and "Kwinana-Kwinana CBH" are taken to be the same spur line track, and so is within route 48 described in Schedule 1 of the Code.

120. The BR model does not identify costs separately for spurs servicing customer facilities which are listed in Schedule 1 of the Code as routes 8, 9, 42, 43 and 48. BR has advised that all costs associated with these spurs are included in the costs determined for the route section to which they are attached. The Authority has accepted this approach and has not determined costs separately for these routes.

121. The Authority has included the Kwinana Balloon Loop within route 45 for the purposes of this determination, in order to maintain a consistent approach with the treatment of the spurs classified as routes 8, 9, 42 and 43 in Schedule 1 of the Code.

122. The Authority has approved or determined costs for the routes shown in Table 2 below, as being the routes identified in BR's costing model, and relevant to CBH's proposal:

Table 2 - Routes relevant to CBH's clarified proposal of 21 March 2014

Route relevant to CBH proposal	Route number in Schedule 1 within which the requested route is contained
Avon Yard - West Merredin	1
West Merredin - Koolyanobbing East	
Koolyanobbing East - Kalgoorlie	
Kambalda - Esperance	5
West Kalgoorlie - Kambalda	
Avon Yard - York	23
York - Narrogin	
Narrogin - Wagin	
Wagin -Katanning	
Katanning - Tambellup	
Tambellup - Redmond	
Redmond - Albany	
Narrogin - Yilliminning	25
Yilliminning - Bruce Rock	
Bruce Rock - West Merredin	
Yilliminning - Kulin	26
Wagin - Lake Grace	27
Lake Grace - Newdegate	
Lake Grace - Hyden	28
West Merredin - Kondinin	32
Avon Yard - Goomalling	34
Goomalling - McLevie	
Goomalling - Amery	35
Amery - Wyalkatchem	
Wyalkatchem - Mukinbudin	
Amery - Burakin	36
Burakin - Kalannie	
Burakin - Beacon	37
Millendon Junction - Moora	38
Moora - Dongara	
Dongara - Narngulu	
Narngulu - Geraldton	
Dongara - Arrowsmith	39
Narngulu - Mullewa	40
Mullewa - Perenjori	
Perenjori - Maya	
Toodyay West - Miling	41
Midland - Millendon Junction	44
Millendon Junction - Toodyay West	
Toodyay West - Avon Yard	
Midland - Forrestfield	45
Forrestfield – Cockburn South	
Cockburn South - Kwinana	
Kwinana Balloon Loop (s.48)	

Final Determination

Determination 1

The Authority has determined the route sections of BR's railway which are relevant to CBH's access proposal as the routes shown in Table 2. The determination of costs by the Authority is on the basis of the routes shown in Table 2.

DISCUSSION OF COST ELEMENTS

The Modern Equivalent Asset

123. Determinations of costs for railway infrastructure must, in accordance with Schedule 4 to the Code proceed from the establishment of a capital replacement value of the infrastructure from which an annual cost (an annuity) is calculated. The Code requires that replacement values must reflect the Modern Equivalent Asset (**MEA**) value, if appropriate, and current market-tested unit rates for materials.

124. The term 'modern equivalent assets' is not defined in the Code. The capital replacement value from which the annual capital cost is calculated is referred to in the Code as the Gross Replacement Value (**GRV**). GRV is referred to in the Code at clause 2 Schedule 4 as

> *the gross replacement value of the infrastructure calculated as the lowest current cost to replace existing assets with assets that have the capacity to provide the level of service that meets the actual and reasonably projected demand and are, if appropriate, modern equivalent assets.*

125. Modern equivalent assets reflect an optimised network that is re-configured using current modern technology. The MEA excludes any unused or underutilised assets and allows for potential cost savings that may have resulted from technological improvement.

126. The operating standards that BR will apply for determining the GRV are outlined in its costing principles at section 2.3 of its costing principles as:

- *For that part of the standard gauge network that is part of the DIRN[9] (Kalgoorlie to Kwinana), as defined by the Australian Transport Council standards in place at January 2002*
- *For the Standard Gauge branch lines and the Narrow Gauge main and branch lines the standards that [BR] is required to maintain the tracks at in accordance with the lease obligations entered into in December 2000*

127. BR's costing principles outline that a "greenfields" assumption is utilised for estimating a GRV on an MEA basis, and costs relating to 'constructing around rail traffic', surface restoration and other surface diversions are excluded from the GRV.

[9] Defined Interstate Railway Network.

It is also assumed that the optimised network is provided by rail track within the existing corridor of land. In other words, the existing rail track alignment of the network will be considered as efficient.

128. BR is required to provide a set of assumptions that it intends to adopt when calculating a GRV on a MEA basis for all routes. These are to include assumptions on rail weight, ballast depth, sleeper types (and spacing), fastener type, signalling type, passing loop lengths, network construction rates, turnouts and formation costs.

129. BR's costing principles outline that BR considers that the majority of the existing track configuration (that is, sleeper type, rail weight etc) can be adopted as the MEA. Where the ceiling cost calculated for a specific route section using MEA is significantly higher than the existing infrastructure calculation, the Authority may determine that it is not appropriate to apply the MEA. Under these conditions, the pre-existing infrastructure may be used in determining the ceiling costs if the existing infrastructure meets current and anticipated operating operational and safety standards and if the infrastructure components are available in the market.

130. BR has outlined in its costing model or supporting documentation[10] the specifications of MEA assets for each route section underpinning its GRV calculation.

131. In its report to the Authority[11] Engenium has concluded that the MEA specification of the routes for which BR has provided proposed floor and ceiling costs should be accepted.

132. Engenium has also recommended to the Authority MEA specifications for the requested routes for which BR did not propose floor and ceiling costs. These routes are route numbers 25, 26, 32 and the Perenjori – Maya section of route 40.

133. In relation to the routes for which BR did not provide proposed costs, the Authority notes that the MEA recommended by Engenium varies from the assets currently on the ground on those routes. In particular, Engenium has recommended the specification of all steel sleeper construction as the lowest cost replacement for the current 1-in-4 timber and steel sleeper configuration of those routes.

134. Engenium has advised that the use of timber sleepers is becoming limited in Western Australia due to the availability of supply in large quantities and cost when compared with steel sleepers. Steel sleepers will minimise the cost of an MEA replacement as track laying costs would be lower compared to a mixed sleeper specification and would require less ballast.

135. Engenium has confirmed that steel sleeper use is appropriate for relatively low axle loads, low speeds and low tonnages.

136. Taking the above matters into account, the Authority has decided to adopt the MEA specifications shown in Table 3 below for the purposes of this determination.

[10] Brookfield Report for Review of Unit Prices for Clause 9 Ceiling Price Review December 2013.

[11] "Economic Regulation Authority (WA) Review of Brookfield Rail's 2013 Floor and Ceiling Costs for Certain Rail Lines.

Table 3 – MEA Standard for Routes Relevant to CBH's Proposal

Route No.	Schedule 1 Route	Route Relevant to CBH's Proposal	Rail Weight (kg/m)	Sleeper type and spacing	Ballast Depth (mm)	Signals and Communications
1	Avon to West Kalgoorlie	Avon Yard – West Merredin	60	Concrete 1500/km	300	Centralised Train Control
		West Merredin – Koolyanobbing East				
		Koolyanobbing East – West Kalgoorlie				
5	West Kalgoorlie to Esperance	West Kalgoorlie - Kambalda	50	1 in 4 Steel (and Timber) 1,490 /km	250	Train Order System with Self Restoring Points
		Kambalda - Esperance				
23	Avon to Albany	Avon Yard - York	41 50	1 in 2 Steel (and Timber) 1,320 /km	200	Train Order System with level crossings
		York - Narrogin				
		Narrogin - Wagin				
		Wagin - Katanning				
		Katanning - Tambellup				
		Tambellup - Redmond				
		Redmond - Albany				
25	Narrogin to Merredin (provided by Engenium)	Narrogin - Yilliminning	41	Steel 1,320 /km	150	Train Order System
		Yilliminning – Bruce Rock				
		Bruce Rock - Merredin				

Route No.	Schedule 1 Route	Route Relevant to CBH's Proposal	Rail Weight (kg/m)	Sleeper type and spacing	Ballast Depth (mm)	Signals and Communications
26	Yillimining – Kulin (provided by Engenium)	Yillimining - Kulin	41	Steel 1,320 /km	150	Train Order System
27	Wagin to Newdegate	Wagin – Lake Grace	41 50	1 in 4 Steel (and Timber) 1,320 /km	200	Train Order System
		Lake Grace - Newdegate				
28	Lake Grace to Hyden	Lake Grace – Hyden (2 specs)	41 50	1 in 4 Steel (and Timber) 1,320 /km	200	Train Order System
32	West Merredin to Kondinin (provided by Engenium)	West Merredin - Kondinin	41	Steel 1,320 /km	150	Train Order System
34	Avon Yard to McLevie	Avon Yard - Goomalling	41	1 in 2 Steel (and Timber) 1,320 /km	200	Train Order System with level crossings
		Goomalling - McLevie				
35	Goomalling to Mukinbudin	Goomalling - Avery	41	1 in 2 Steel (and Timber) 1,320 /km	200	Train Order System with level crossings
		Avery - Wyalkatchem				
		Wyalkatchem - Mukinbudin				
36	Amery to Kalannie	Amery - Burakin	41	1 in 2 Steel (and Timber) 1,320 /km	200	Train Order System with level crossings
		Burakin - Kalannie				

Route No.	Schedule 1 Route	Route Relevant to CBH's Proposal	Rail Weight (kg/m)	Sleeper type and spacing	Ballast Depth (mm)	Signals and Communications
37	Burakin to Beacon	Burakin - Beacon	41	1 in 2 Steel (and Timber) 1,320 /km	200	Train Order System
38	Millendon Junction to Geraldton	Millendon Jn - Moora	41	Steel, Timber and some Concrete 1,340 /km	200	Train Order System with level crossings
		Moora - Dongara				
		Dongara - Narngulu				
		Narngulu - Geraldton				
39	Dongara to Eneabba	Dongara - Arrowsmith	41	1 in 2 Steel (and Timber) 1,320 /km	200	Train Order System with level crossings
40	Narngulu to Maya	Narngulu - Mullewa	41 50 60	Concrete 1,600/km	300	Centralised Train Control and Train Order Systems with Self Restoring Points and level crossings
		Mullewa - Perenjori				
		Perenjori – Maya (provided by Engenium)	41	Steel 1,320 /km	150	Train Order System
41	Toodyay West to Miling	Toodyay West - Miling	41	1 in 2 Steel (and Timber) 1,500 /km	200	Train Order System with level crossings
		Midland – Millendon Jn	50		200	

Route No.	Schedule 1 Route	Route Relevant to CBH's Proposal	Rail Weight (kg/m)	Sleeper type and spacing	Ballast Depth (mm)	Signals and Communications
44	Midland to Avon	Millendon Jun – Toodyay West	60	Concrete 1,500 /km		Centralised Train Control
		Toodyay West – Avon Yard				
45	Midland to Kwinana	Midland - Forrestfield	50 60	Concrete 1,500 /km	300	Centralised Train Control
		Forrestfield – Cockburn South				
		Cockburn South - Kwinana				
		Kwinana Balloon Loop (s.48)				

137. As shown in the table above, Engenium has provided ballast tonnages associated with the MEA specification for routes which BR did not include in its determination.

Final Determination

Determination 2

The Authority has determined costs to apply to the routes relevant to CBH's access proposal on the basis of the Modern Equivalent Asset (**MEA**) specifications shown in Table 3.

Asset Unit Costs

138. This section contains assessments of asset unit costs under the following headings, which correspond to the asset categories included in Brookfield Rail's costing model:

- Rail
- Rail Welding
- Sleepers
- Ballast
- Turnouts
- Tracklaying
- Bridges
- Culverts
- Level Crossings
- Earthworks
- Signage
- Fencing
- Walkways
- Access Roads
- Signalling and Communications – Communications
- Signalling and Communications – Centralised Train Control
- Signalling and Communications – Self restoring points
- Signalling and Communications – level crossings

139. In relation to the asset categories listed above, Engenium has provided advice to the Authority in relation to the technical specification, MEA quantities and unit costs.

140. References to 'BR's Costing Principles' are to the costing principles approved by the Authority for WestNet Rail in April 2011, prior to the company's name change to Brookfield Rail in August 2011.

141. Engenium has provided unit costs current at 30 June 2013 prices, consistent with the basis on which unit costs have been assessed by BR for input to its costing model.

The BR costing model escalates the 30 June 2013 unit costs to a 30 September basis for the purposes of calculating costs.

BR Costing Principles and Proposed GRV

142. BR's costing principles (section 2.2) nominate the assets included in the capital costs calculation that are directly engaged in the provision of rail infrastructure services. These are defined as railway infrastructure under section 3 of Part 1 of the Code and include:

- land;
- railway track and associated track structures;
- tunnels and bridges;
- train control systems, signalling systems and communication systems;
- associated plant, machinery and equipment.

143. BR's costing principles (section 2.2) prescribes that assets that support operating functions not be included in the asset base for capital cost calculations. BR's costing principles prescribes that such assets will be included in the operating cost or overhead costs calculations, as appropriate.

144. BR's costing principles (section 2.3) prescribes a maximum allowance for design construction project management (**DCPM**) costs of 20 per cent of the total cost of the infrastructure, and must be based on an economic life of 50 years.

145. BR's costing principles (section 2.5) nominates the Weighted Average Cost of Capital (**WACC**) as determined by the Authority to be used as the interest rate for assessing the financing (interest) charges capitalised over the construction period. A 50 year economic life assumption is to be used in amortising financing costs.

Engenium advice and treatment of indirect costs

146. Engenium has provided an assessment of some capital items (and associated GRV) with reference to confidential information provided by BR. These assessments are based on industry standards or recent project experience. The assessments appear under separate headings for each category of capital item below.

147. Engenium has adopted the convention that if a cost determined by BR is assessed to be within +/- 10 per cent of the unit cost check undertaken by Engenium, then the BR proposed cost will be considered to be within a reasonable range.

148. Engenium has advised that this convention is based on the estimating range when costing a project from detailed design for construction.

149. If the costs proposed by BR fall outside this range then Engenium has sought further detail from BR to explain the variation. If the costs proposed by BR fall within this range, but a more appropriate approach exists for determining a rate, then that approach has been used.

150. Engenium's assessments of direct costs appear under relevant capital item headings in this section. General observations relating to indirect costs appear directly below.

INDIRECT COSTS – DESIGN CONSTRUCTION PROJECT MANAGEMENT (DCPM) MARGIN AND CONTRACTORS PRELIMINARIES

151. BR's costing model has provided for a DCPM margin of 20 per cent on all capital items before financing charges. That is, all asset values are summed, and uplifted as a total by 20 per cent. The financing charges are then calculated on the uplifted amount and then added to arrive at a total GRV. The inclusion of an DCPM margin of 20 per cent as a separate line item is consistent with BR's costing principles.

152. Engenium has concluded that the 20 per cent margin for DCPM which has been proposed by Brookfield Rail is an acceptable rate.

153. Engenium has advised that BR has included contractor's indirect costs of 1-2 per cent across its asset costings. Engenium has concluded that this is a reasonable rate for this class of indirect cost. As indicated in paragraph 91 the Authority has decided that the inclusion by BR of 20 per cent as DCPM costs is appropriate.

RAIL

BR Proposal

154. BR has advised that unit rates for rail were obtained from OneSteel for AS41 (41kg/m), AS50 (50kg/m) and AS60 (60kg/m) plain carbon (PC) rail and 50kg/m and 60kg/m head hardened (HH) rail. The costs are for 27.5m lengths delivered to the flash-butt welding facility in Midland because this facility forms the backbone of rail construction. BR advised that this is a consistent approach to that taken for the 2009 determination of costs.

155. BR has advised that it has examined overseas rail supply, and that while overseas suppliers continue to be active suppliers into the Australian market, recent experience with overseas supply has not been satisfactory and that technically the Chinese product does not strictly comply with the Australian Standard. Japanese products have also been extensively used on heavy haul railways in the Pilbara but at more expensive prices for premium alloy products that are not required for BR's purpose.

156. BR has advised that during the construction process the rail would be transported by rail on converted flat top wagons and due to their weight would fully utilise the capacity of the wagons. Transport costs are estimated at $0.10 per tonne kilometre. BR has advised that this estimate is drawn from the "review of the Victorian Rail Access Regime Final Report volume II: Detailed Analysis and Discussion of Issues" February 2010, Essential Services Commission of Victoria.

157. Brookfield Rail has proposed per unit costs for rail as shown in the table below. Engenium has advised the October 2013 unit rates provided by One Steel (Adelaide) indexed to June 2013, also shown in the table below.

Rail Type	BR proposed ($/tonne)	One Steel Oct 13 price indexed to Jun 13 ($/tonne)
41 kg/m PC Rail	1,450	1,450
50 kg/m PC Rail	1,250	1,220
60 kg/m PC Rail	1,200	1,160
50 kg/m HH Rail	1,450	1,440
60 kg/m HH Rail	1,400	1,390

158. BR has advised that the costing for rail welding is based on the 27.5m lengths of delivered rail being welded into 110m metre strings at the welding facility in Midland, each string requiring three flash-butt welds. Site welds to join the strings are made using mobile flash-butt welding.

159. BR has advised that this construction method is different from the standard specified in previous cost determinations, as mobile flash-butt welding has proven itself to be cost effective and provides more consistent results than the Thermit welding process previously specified and has recently been used on The Pilbara Infrastructure (**TPI**) railway construction, Middlemount (Queensland) and Bauhinia (Queensland) construction. BR has therefore based its welding costs on utilisation of factory flash-butt welding and mobile flash-butt welding for this determination.

160. BR has advised that as the factory flash-butt welding is mainly a labour cost (involving handling shorter lengths, welding and handling longer lengths) the welding cost determined in 2009 has been indexed by the ABS Wages Price Index 6345 applicable to manufacturing in Western Australia which is a composite of series A2713174T and series A2638869C for a rate of 16 per cent uplift.

CBH Submission

161. CBH's technical consultant indicated that all dual gauge and standard gauge lines would be renewed in 60 kg rail whist the narrow gauge lines would be made in 41 kg rail. The CBH costing model included rail GRV amounts hardcoded and the derivation of these numbers was not apparent from the model spreadsheet. CBH indicated that 'the 2013 OneSteel price' was used to cost the rail in its model.

162. CBH has advised that its costing for rail includes the material cost of rail and transport. CBH's consultant did not indicate transport costs, or welding costs.

Engenium Recommendation

163. Engenium has advised that the steel products ABS price index shows a movement of minus 7.67 per cent over the period June 2008 to June 2013. Engenium has

concluded that the Rail costs shown as indexed One Steel rates should be used in place of the rates proposed by Brookfield.

164. Engenium has advised that the cost of flash-butt welding determined by Brookfield Rail is in line with recent Engenium project estimates, and has concluded that the Brookfield Rail welding cost should be accepted. This cost is $464 per weld.

Authority Assessment

165. The Authority has decided to not accept BR's proposed rail costs and to adopt the October 2013 OneSteel rail price indexed back to June 2013 price as provided by Engenium for each rail type.

166. The Authority has noted that the CBH cost modelling for rail GRV is also based on 2013 OneSteel Prices. The Authority is not able to ascertain whether CBH has included rail welding costs in its rail cost estimation.

167. The Authority has noted that CBH is unable to unbundle the aggregate costs in the costing material provided to it by BR, and that the CBH submission therefore does not provide specific comment on the derivation of BR modelled costs

168. The Authority notes that the CBH model does not provide a formula calculation or breakdown of GRV rail costs by requested route, and so the Authority is unable to relate the CBH model to the BR costs which are the subject of this review, except as a point of difference.

169. The Authority has considered the above matters and Engenium's analysis and decided to accept BR's rail welding costs.

SLEEPERS

BR Proposal

170. BR has advised that a number of sources of data were used for its determination of sleeper costs, including recent BR orders, a OneSteel October 2013 quotation and indexation of the previous 2009 determination for comparison. Indexation indices were sourced from the ABS Producer Price Index 6427015 series A2312240V for steel products.

171. BR has advised that since the 2009 determination, the Producer Price Index indicates a drop in prices of around 8 per cent but that this has not been reflected in either recent BR tenders or the OneSteel quote. The steel sleeper manufacturing process involves manual handling and manufacturing type work especially for the fastening, as well as transport costs to Midland from South Australia.

172. BR has advised that the increase in determined steel sleeper costs since 2008 is approximately 15 per cent or approximately the same uplift associated with labour costs over the period.

173. BR has advised that it has contacted the Shanghai Suyu Railway Fastener Company and Tata Steel (UK) to seek alternative supplies. BR advised that it failed to receive a response from the Chinese supplier, and that Tata provided a quotation for delivery to Fremantle without fasteners which was substantially greater than OneSteel's quote.

174. BR advised that it obtained quotes for concrete sleepers from suppliers, including Humes in Perth, in quantities applicable to the configuration of the line. For dual

gauge (**DG**) concrete sleepers this was an order of 300,000 sleepers, for standard gauge (**SG**) concrete sleepers this was an order of 750,000 sleepers and for narrow gauge (**NG**) concrete sleepers this was an order of 300,000 sleepers.

175. BR has noted that the real price of concrete sleepers has fallen since 2008, as demand for this product has fallen since that time and because internal cost reductions have made the supply of the product more competitive.

176. BR has also investigated the alternatives to local supply of concrete sleepers. BR has advised that New Zealand rail builders have received concrete sleepers from China and Ecuador over the last 5 years, but with less than satisfactory results on quality and damage en-route. BR advised that domestic concrete sleeper supply has now been established in New Zealand.

177. BR has advised that concrete and steel sleeper systems are supplied with fastening components and track fixing jewellery, as part of the assembly is incorporated in the manufacturing process. For timber sleepers, costs for fastening systems have been obtained separately and applied to the timber sleepers to produce an all-inclusive cost.

178. BR advised that the unit rate obtained for timber sleepers has referenced recent BR orders for large quantities (200,000) obtained for a major project to improve the grain lines in 2011. BR has noted that the timber sleeper suppliers were stretched to their limit over that two year supply period, and that the quality of supply fell over that period. Except for limited use on the Kalgoorlie to Esperance route, BR has advised that it has migrated to a 1 in 2 steel/timber pattern on the remaining parts of the network because of this.

179. BR has advised that for comparison purposes it has indexed the 2008 determined and 2011 order costs by the Producer Price Index series A2328166C reflecting the furniture market in Perth. Timber sleepers, being of Jarrah wood are highly valued in the furniture market. BR advised that it has experimented with sourcing timber sleepers from Red Gum in Victoria. BR reports that high transport costs and more rapid deterioration of these sleepers has mandated that local jarrah sleepers continue to be sought by BR.

180. BR advised that SG sleepers, being a large sleeper, have increased slightly in cost, but that the cost of NG sleepers has remained constant in real terms. BR has noted that for the 2009 determination costs were derived from small orders discounted to account for economies of scale. For this determination BR advised that it has been able to draw on experience with recent larger orders, and that these economies appear to have been confirmed.

181. BR has assumed that sleepers will be transported by rail at a unit rate for concrete and timber sleepers of $0.10 per tonne kilometre and $0.08 per tonne kilometre for steel sleepers, as they stack better. BR has argued that although road transport may be marginally cheaper in some circumstances, rail-based delivery is assumed throughout as large rail-based machinery is used in construction.

CBH Submission

182. CBH has indicated that sleepers and sleeper transport should be costed on the basis of the 2009 WNR costing model escalated to 2013 prices.

183. The CBH costing model included sleeper GRV amounts hardcoded and the derivation of these numbers from numbers and spacing was not apparent from the model spreadsheet.

Engenium Recommendation

184. Engenium has concluded that all sleeper costs determined by Brookfield Rail are reasonable on the following basis:

	BR determined rate ($ per sleeper)	Engenium Notes
Concrete		
Narrow Gauge (NG)	120	Less than the adjusted 2008 rate and within 10 per cent of the quoted Oct 2013 price
Standard Gauge (SG)	140	
Dual Gauge (DG)	170	
Steel		
NG M7.5 Non-insulated	93	Within 10 per cent of One Steel Oct 2013 price indexed to Jun 2013
NG M8.5 Insulated	120	
SG M7.5 Non-insulated	108	
SG M8.5 Insulated	130	
Timber		
NG	119	Within 10 per cent of the 2009 determined cost indexed to Jun 2013
SG	103	

185. Engenium has concluded that the transport costs for sleepers proposed by BR, being 10 cents per tonne kilometre for concrete and timber sleepers and 8 cents per tonne kilometre for steel sleepers, are reasonable, as these costs are similar to sleeper transport costs currently estimated by Engenium.

Authority Assessment

186. The Authority has considered submissions received and Engenium's analysis and has decided that the sleeper costs and transport costs proposed by BR will be accepted. The Authority notes that some of BR's proposed sleeper costs are less than the indexed rates determined in 2009, and that the proposed transport costs for sleepers are higher than the indexed 2009 rate, but that Engenium has concluded that these costs are reasonable.

BALLAST

BR Proposal

187. BR has assumed a maximum haulage distance for ballast of 100 kilometres, and an average haul distance of 50 kilometres. BR has advised that it has taken this approach because haul costs increase to a point which hampers efficient construction costs above that distance. BR has advised that recent construction of the TPI railway in the Pilbara adopted this approach. BR has advised its view that establishment of quarries constitutes an "overhead" and that there is a trade-off between close quarry spacing and cost of supply.

188. BR advised that it has therefore used its proposed ballast supply costs (2008) as a guide for appropriate supply costs, which includes transport. Ballast supplies are sourced from the same quarries as road gravel used in base-courses and bitumen mixes, and therefore BR has adopted the Roads and Bridges indices from the Producer Price Indices series A2333769K as an uplift.

189. BR has advised that where actual quarries do not exist due to the hypothetical nature of this costing exercise, or where quarries have existed but are now out of production for ballast, BR has interpolated against existing quarries and known rates and applied a Regional Index derived from the Rawlinson's Australia Construction Handbook. Using individual quarry costs BR has created a supply matrix for each route using the sleeper and ballast configuration to arrive at a weighted unit cost per tonne and a tonnage requirement. The weighted cost takes into account that certain routes will be supplied from a number of different sources.

190. BR has advised its view that the costs determined in 2009 by the Authority for ballast transport ($0.09 per tonne kilometre) did not explicitly consider loading and remote working for the locomotives that require provisioning and fuelling.

191. BR has applied a wastage rate of 5 per cent in the application of ballast.

192. BR has determined a transport cost of $0.18 per tonne kilometre based on the utilization of hoppers on BR's recent mid-west project and also by indexing a benchmark provided by the Queensland Competition Authority (**QCA**) in its Working Paper 5 dated 2000, of $0.10 per tonne kilometre. On the basis of an average haul distance of 50 kilometres, BR has determined a transport cost for ballast of $9 per tonne.

193. BR has proposed rates for the price of ballast at relevant quarry locations as shown in the table below:

Ballast Quarry Location	BR proposed rate ($/tonne)
Perth Metro	38
Merredin incl. eastern grain lines	42
Geraldton	35
Perenjori and Three Springs	45
Albany to Narrogin	41
Darrine	50
Kalgoorlie	30
Norseman	45
Esperance	55

CBH Submission

194. CBH's consultant mentioned previous work[12] undertaken by Indec Consulting and PriceWaterhouseCoopers which indicated a price for ballast 20 per cent lower than WNR's 2009's publicly available information.

195. CBH's technical consultant advised that there should be no volumetric difference between the amount of ballast used in a dual gauge or standard gauge track profile.

196. CBH's submission also proposed the approximation of replacement cost of the small fines/sand ballast mixture used on some NG grain lines, by applying 50 per cent of the crushed rock ballast cost which would otherwise apply.

197. CBH submitted that the ballast transport cost determined in 2009 for WNR was reasonable and that for this determination, ballast transport costs should be consistent with escalated 2009 costs.

198. The CBH costing model included ballast cost amounts hardcoded and the derivation of these numbers was not apparent from the model spreadsheet.

[12] No citation provided.

Engenium Recommendation

199. Engenium has made conclusions for acceptable ballast prices on the basis of production of large project quantities to receive competitive rates. Rates are ex-quarry.

200. Supplier quotes were obtained by Engenium for supply of ballast at Perth and at Kalgoorlie. These quotes were current at March 2014.

201. Engenium has compared the March 2014 quoted prices with the ballast rates determined by the Authority for BR in 2009 indexed to June 2013 and has advised that they are within 10 per cent in all cases.

202. Engenium has concluded that the ballast cost determined by the Authority in June 2009 and indexed to June 2013 prices are a reasonable basis for ballast costs. These prices are shown below:

Ballast Quarry Locations	2014 Quotes ($/tonne)	2009 ERA-Determined Price ($/tonne)	2009 Price Indexed to Jun 2013 ($/tonne)
Perth Metro	25	24	27
Kalgoorlie	26	23	26

203. For locations where ballast quotes could not be obtained from local quarries, Engenium has concluded that the regional indices contained in the BR model should be applied to the Perth Metro price to establish regional prices for this determination. These prices are indicated in the table below:

Ballast Quarry Locations	Regional Index	Engenium indicated price ($/tonne)
Merredin	1.20	32
Geraldton	1.20	32
Perenjori & Three Springs	1.20	32
Albany to Narrogin	1.20	32
Darrine	1.28	35
Norseman	1.38	37
Esperance	1.38	37

204. Following its review of ballast quantities used in BR's costing model, Engenium has concluded that the conversions used by BR to relate depth of ballast to a measure of tonnes per kilometre should not be accepted in all cases.

205. Engenium has advised that BR has based its calculations on a conversion rate of 1.65 tonnes/m^3. Engenium has concluded that a conversion rate of 1.60 tonnes/m^3 should be used for this purpose. Engenium has concluded that the 5 per cent allowance for wastage adopted by BR is an appropriate amount.

206. In its response to the Authority's notification of adverse material of 28 May 2014, BR identified some errors in its initial calculation of tonnage amounts, and provided some revised outcomes. The table below shows the BR proposed tonnages per kilometre and indicates where these were revised by BR. Engenium has concluded that the tonnes per kilometre indicated in the last column of this table are reasonable.

Description of Ballast application	BR proposed tonnes per kilometre	Engenium indicated tonnes per kilometre
NG Concrete Sleeper 300mm ballast	3,129 (revised to 3,130 by BR)	2,732
DG Concrete Sleeper 300mm ballast	3,664 (revised to 3,620 by BR)	3,500
SG Concrete Sleeper 300mm ballast	3,506 (revised to 3,505 by BR)	3,500
SG 1 in 2 steel/timber 250 mm ballast	2,800	2,800
SG 1 in 4 steel/timber 200 mm ballast	2,366	2,366
NG 1 in 2 steel/timber 200 mm ballast	2,546 (revised to 1,987 by BR)	1,987
NG 1 in 2 steel/timber 150 mm ballast	2,286 (revised to 1,663 by BR)	1,663
Steel Sleeper 200mm ballast	not specified	1,275
Steel Sleeper 150mm ballast	not specified	974

207. BR proposed a rate of 18 cents per tonne kilometre for the transport of ballast. The current rates quoted by Engenium for March 2014 range between 11 and 21 cents per tonne kilometre, and Engenium advises that BR's proposed transport cost fits adequately within this range. On this basis, Engenium has concluded that 18 cents per tonne kilometre is reasonable as a ballast transport cost.

Authority Assessment

208. The Authority notes that the BR proposed ballast costs in 2008 were much higher than the ballast costs determined by the Authority in 2009.

209. The Authority notes Engenium's provision of ballast quotes delivered at Perth and Kalgoorlie for March 2014, and notes the movement in the producer price index (series A2333769K) of +0.3 per cent over the June 2013 – March 2014 period.

210. On this basis, the costs determined by the Authority for ballast in 2009 escalated to June 2013 fall well within 10 per cent of the 2014 quotes provided by Engenium indexed back to June 2013.

211. The Authority has noted CBH's submission that the volumes of ballast required for SG and DG formations should be the same, which agrees with the Engenium advice.

212. The Authority notes CBH's submission that the transport costs determined in 2009 are reasonable. The Authority also notes Engenium's conclusion that BR has correctly included costs not considered in 2009, and that the transport costs proposed by BR fall within current quoted transport rates sourced by Engenium.

213. The Authority has considered the above matters and Engenium's analysis and has decided to adopt the costs indicated by Engenium as appropriate in relation to the material cost of ballast and ballast transport.

TURNOUTS

BR Proposal

214. BR has advised that it has sourced quotes for turnouts from the same suppliers as in 2008, and has made a comparison with 2008 indexed costs. The costs of turnouts proposed by BR are for manufacture and delivery to Perth. Installation costs were obtained from recently performed works in the mid-west. BR has advised that it has also included the cost of transport to site of steelworks components manufactured in the eastern states and the concrete bearers manufactured in Perth. BR advised that the transport cost is significant and requires specialised trucks and remote site access. The cost of cranes in Perth is included in the transport cost and the cost of cranes at site is included in the installation costs. BR advised that the installation costs are typical of current costs across the whole network.

215. BR advised that its turnout installation regime has altered since the 2008 review due to supply costs of non-standard rail and bearer combinations which are applicable to the NG network. Timber bearers are now difficult to acquire and the quality of long timbers is such that considerable manual work is required to straighten them and move them into alignment.

216. Also, BR advised that its suppliers indicate that 41 kg/m rail for turnouts are now no longer contemplated because die and pattern for turnout manufacture has been standardised over the last 5 years, and 60 kg/m on concrete bearer turnouts are now the standard and that specification has been adopted by BR.

217. BR has proposed turnout costs disaggregated into supply and transport costs. Engenium has advised that, as there is considerable variances in the supply and transport costs for turnouts, Brookfield Rail's proposed costs for turnouts have been assessed by Engenium on a combined supply and delivery basis.

218. Brookfield Rail's proposed costs for turnouts supply (including delivery) and installation are shown in the table below:

Turnout Type	BR proposed supply cost incl delivery ($ each)	BR proposed cost installation ($ each)
NG 1:12 60kg tangential switch blades on concrete sleepers	180,000	165,000
NG 1:10 60kg on concrete sleepers	170,000	150,000
SG 1:12 60kg tangential switch blades on concrete sleepers	225,000	165,000
DG 1:16 60kg tangential switch blades on concrete sleepers	485,000	185,000

CBH Submission

219. CBH's technical consultant referred to 60 kg turnout costs determined in 2009 as being high and advised that this cost should be reduced by 10 per cent for this determination, as the 2009 determination was made at the height of steel prices.

220. CBH's technical consultant advised that it considered the 2009 41 kg turnout cost to be less than half the price of a 47 kg turnout, that the 41 kg cost should not be less than half and that it had recommended a commensurate increase in the cost of 41 kg turnouts over the 2009 determination cost.

221. The CBH costing model included turnout cost amounts hardcoded and the derivation of these numbers was not apparent from the model spreadsheet. CBH's technical consultant advised that the cost of transport, assembly and installation of turnouts is included in the unit costing prepared for CBH.

Engenium Recommendation

222. Engenium has obtained quotes for the supply and delivery of turnouts and are shown below:

Turnout Type	Engenium Quote including delivery ($ each)
NG 1:12 60kg tangential switch blades on concrete sleepers	168,000
NG 1:10 60kg on concrete sleepers	113,000
SG 1:12 60kg tangential switch blades on concrete sleepers	177,000
DG 1:16 60kg tangential switch blades on concrete sleepers	289,000

223. Engenium has concluded that the BR proposed cost for NG 1:12 turnouts is reasonable on the basis that the BR cost is within 10 per cent of the Engenium quote. Engenium has concluded that the cost proposed by BR for supply and delivery of NG 1:10 turnouts is not reasonable and that a cost of $113,000 is reasonable based on the supplier quote. Engenium has concluded that the cost proposed by BR for supply and delivery of SG 1:12 turnouts is not reasonable and that a cost of $190,000 is reasonable based on the supplier quote. Engenium has concluded that cost proposed by BR for supply and delivery of DG 1:16 turnouts is not reasonable and that a cost of $289,000 is reasonable based on the supplier quote received for a “type 3D” DG 1:16 turnout.

224. Engenium has concluded that the costs proposed by BR for installation are reasonable on the basis that these are similar to the rates currently used by Engenium. The costs considered reasonable by Engenium for supply and delivery of turnouts, and installation are shown below:

Turnout Type	Engenium indicated supply and delivery cost ($ each)	Engenium indicated installation cost ($ each)
NG 1:12 60kg tangential switch blades on concrete sleepers	180,000	165,000
NG 1:10 60kg on concrete sleepers	113,000	150,000
SG 1:12 60kg tangential switch blades on concrete sleepers	190,000	165,000
DG 1:16 60kg tangential switch blades on concrete sleepers	289,000	185,000

Authority Assessment

225. The Authority has considered the above submissions and Engenium's analysis and has decided to adopt the costs indicated by Engenium as reasonable for the cost of supply and installation of turnouts.

TRACKLAYING

BR Proposal

226. BR has advised that for concrete sleepered track it is assumed that the track would be laid using a track laying machine which is now the standard method across Australia. This method consists of laying sleepers and rail onto the formation with the machine and then using a ballast train to lay the first layer of ballast between and to the shoulders of the sleepers. The track is then lifted through the ballast with a resurfacing machine. A second 'drop' of ballast is added and the resurfacing machine levels and aligns the track. For 300mm ballast used under concrete sleepers on both SG and NG track, this process is repeated three times. Other machines profile and consolidate the ballast.

227. On lines with timber and steel in combination, a manual process is required; however, the logistics are simplified due to the lighter weight of the sleepers. The sleepers are first laid manually and then a train with long lengths of rail reverses over the track, with the rail being pulled off its end for the new section. Adjustment such as welding and de-stressing of the rail are then performed.

228. The most significant portion of the cost for laying DG track is therefore the track laying machine, and for timber and steel sleepered track is labour. DG track attracts higher costs again as the third rail has to be laid in a separate operation. The use of steel and timber sleepers significantly reduces transportation and handling costs, however is more manually-intensive.

229. Overall, the process is similar to road building, where tarmac is laid on pre-prepared earthworks. BR has therefore used the Producer Price Index series A2333769 for road and bridge construction to index previous costs for comparison purposes.

CBH Submission

230. CBH's technical consultant advised that the WNR GRV costs be adopted as they are of the right magnitude for other similar railways.

231. The CBH costing model included tracklaying costs hardcoded and the derivation of these numbers was not apparent from the model spreadsheet.

Engenium Recommendation

232. Engenium has compared the tracklaying costs proposed by BR with the tracklaying costs currently quoted by Engenium and has concluded that these costs are reasonable.

233. Engenium's current tracklaying quotes are based on a tracklaying machine being used for greenfields projects with concrete sleepers, and a manual process being used for lines with timber and steel sleepers.

234. The tracklaying costs proposed by BR and considered by Engenium to be reasonable are shown in the table below:

Track Construction Items	Tracklaying cost cost ($ per metre)
NG: 300 mm ballast. Concrete sleepers	150
NG: 150-200 mm ballast. Steel concrete and timber sleepers	125
SG: 300 mm ballast. Concrete sleepers	165
SG: 200 mm ballast. Steel and timber sleepers	125
SG: 250 mm ballast. Steel and timber sleepers	125
DG: 300 mm ballast. Concrete sleepers	190

Authority Assessment

235. The Authority has noted CBH's agreement with tracklaying costs determined in 2009 for WNR.

236. The Authority has also considered Engenium's analysis and has decided to accept BR's proposed tracklaying costs.

BRIDGES

BR proposal

237. BR has advised that bridges have individual site-specific influences such as ground conditions, piling requirements, hydrology and geotechnical factors that significantly affect construction costs.

238. The method used in previous WNR determinations was to categorise bridges according to span and width according to the number of tracks and gauge. BR has continued using that method for this determination.

239. BR has reviewed bridge costs and has advised that over the last 5 years costs for bridge building have increased significantly. New safety standards now require compulsory walkways for worker safety and waterway standards now require more slender substructure components and clearances for superstructure.

240. BR has quoted publicly available material relating to the replacement of the Murrumbidgee River rail bridge at Wagga Wagga and a 2007 Booz Allen Hamilton report for the "ARTC Standard Gauge Rail Network DORC" which evidences linear rates of over $25,000 per metre at that time, which is twice the cost determined for bridge construction in previous (WNR) determinations in real terms.

241. BR has provided an indexation method based on cost indices for Producer Price Indices 6427017 non-residential building construction and A2333769 road and bridge construction.

CBH Submission

242. CBH's technical consultant advised its view that many of the simple and medium bridges included in BR's costings for the NG network, would cross short shallow waterways, and that a modern equivalent asset would most likely be in the form of a large culvert.

243. CBH's technical consultant has advised its view that the GRV values for 'simple' and 'medium' bridges should be 'accepted on this basis', which the Authority takes to mean as the bridge costs are less than equivalent large culverts.

244. CBH's technical consultant has advised its view that the cost of standard gauge bridges was understated in the BR cost assessment, on the basis that an average narrow gauge bridge with similar axle loadings to the Brookfield network on the New Zealand network would have a cost to the order of $43,000/m^2 versus the BR value of $2,980-4,335/m^2. CBH's technical advisor recommended complex bridge costs in the BR proposal be increased by a factor of 5 to provide a more reasonable value.

245. The CBH costing model included bridge costs hardcoded and the derivation of these numbers was not apparent from the model spreadsheet.

Engenium Recommendation

246. BR's proposed bridge construction costs have been assessed by Engenium on the basis of a cost per square metre by category of bridge. Engenium has adopted this approach as it is consistent with previous cost determinations made by the Authority, and that Brookfield Rail appears to have escalated the 2009 determined costs as a basis for 2013 proposed costs.

247. Engenium has concluded that BR's proposed bridge costs are reasonable on the basis that it is not practical to obtain individual quotes for each particular bridge on the network, and that the escalation factors used by BR for bridge costs by type are reasonable. The costs proposed by BR are shown by bridge type category in the table below. The escalation factors applied to the 2009 determined costs are also shown alongside each bridge type:

Bridge Type	Escalation relative to 2009 determined costs	Bridge cost ($ per square metre)
Simple < 12m span, 4.0m wide	1.128	3,516
Simple < 12m span, 8.0m wide	1.128	3,363
Simple < 12m span, 3.6m wide	1.128	3,363
Medium 12-20m span 4.0m wide	1.128	4,280
Medium 12-20m span 8.0m wide	1.128	4,127
Medium 12-20m span 3.6m wide	1.119	3,974
Complex >20m span 4.0m wide	1.302	5,197
Complex >20m span 8.0m wide	1.302	5,044
Complex >20m span 3.6m wide	1.302	4,891

Authority Assessment

248. The Authority has noted CBH's comments in relation to the reasonableness of BR's proposed bridge costs.

249. The Authority has considered the above submissions and Engenium's analysis and has decided to accept BR's proposed bridges costs.

CULVERTS

BR's Proposal

250. BR advised that, as with bridges, culverts are installed in many different configurations and sizes to suit a range of sites. In the 2009 determination of costs for WNR, the Authority required that WNR cost culverts on the basis of three standardised sizes –

small, medium and large. BR has observed this requirement in its determination and has used the Rawlinson's Australian Construction Handbook 2013 to estimate the component prices of culverts in these categories.

251. Brookfield Rail have provided costs for culverts in the following categories:

- Small: 0 - 1 m^2 (nom 0.5 m^2) 750 mm x 600 mm single box
- Medium: 0 - 5 m^2 (nom 2 m^2) nest of 5 x 750 mm pipes
- Large: 5 - 20 m^2 (nom 10 m^2) nest of 6 x 1200mm x 1200mm boxes

252. Brookfield Rail has provided proposed costs for culverts broken down into the supply cost, foundation cost and headwall cost components. All costs incorporate installation. These costs are shown below:

Culvert Type	Supply Cost ($ per 10 m)	Foundation Cost ($ per 10 m)	Headwall Cost ($ per culvert)	Total Cost ($ per culvert)
small	5 640	742	1,291	7,673
medium	19,650	3,708	3,476	26,834
large	67,200	3,707	190,000	78,026

CBH Submission

253. CBH's technical consultant advised that it had compared WNR culvert costs to the figures from Rawlinson's (2013 edition, page 680), and that these aligned closely for small diameter culverts, but that the Rawlinson's figures were lower for larger culvert sizes.

254. CBH's technical consultant advised its view that the Rawlinson's figures do not adequately account for the transport and installation of large culverts to more difficult sites, and assumes minimal excavation is required, which is unlikely to be the case with large culverts.

255. CBH's technical consultant therefore recommended that the culvert costs determined in 2009 for WNR be escalated to determine 2013 BR culvert costs.

256. CBH's technical consultant indicated that it had calculated culvert costs on the basis of the material cost of the culvert and the installation indexed on the basis of the difficulty of installation by line. The CBH costing model included culvert costs hardcoded and the derivation of these numbers was not apparent from the model spreadsheet.

Engenium Recommendation

257. Engenium has assessed the above costs against the 2013 Rawlinson Handbook and has concluded that these costs are reasonable.

Authority Assessment

258. The Authority has noted CBH's comments in relation to the reasonableness of the culvert costs determined for WNR in 2009.

259. The Authority has considered Engenium's analysis and has decided to accept BR's culvert costs.

LEVEL CROSSINGS SURFACE TREATMENTS

BR Proposal

260. BR advised that it has standardised the treatment for its public level crossings and now uses only bitumen, as it provides a safer and lower maintenance surface. BR advised that it has indexed the 2008 cost determination for level crossing surfaces as shown in the table below, and that this aligns with the current Rawlinson's estimates.

261. BR continues to use gravel and other surfaces for occupational crossings, and the costs for these components are also shown in the table below.

Level Crossing Cost Items	Escalation relative to 2009 determined costs	Cost ($ per square metre)
Bitumen	1.13	96
Concrete	1.13	115
Gravel	1.13	92
Metal Dust	1.12	38
Other Level Crossing Surfaces	not categorised in 2009	38
Rock Ballast	1.14	31
Timbered	1.14	54

CBH Submission

262. CBH's technical consultant advised that level crossing do not materially contribute to the GRV cost, and therefore that the escalated 2009 WNR determined cost be adopted for this determination.

Engenium Recommendation

263. Engenium has concluded that Brookfield Rail's proposed level crossing surface costs are reasonable on the basis that the escalation factors used by Brookfield Rail for are reasonable.

Authority Assessment

264. The Authority has considered Engenium's analysis and has decided to accept BR's proposed level crossing surface costs.

EARTHWORKS

BR Proposal

265. BR has advised that typical specification for earthworks are for a 1.5 metre height (including a 0.23 metre capping layer) with a batter profile of 1.5 (vertical to horizontal).

266. On this basis, BR estimated that for a 6 metre formation (NG), the volume in the bulk formation is 9.08 m^3 per metre of track and the capping layer is 1.42 m^3 per metre. For a 6.5 metre formation (SG) the volumes are 9.72 m^3 and 1.53 m^3 per metre.

267. BR has used wastage rates of between 9.0 per cent and 12.7 per cent to arrive at total volumes of 10.0 m^3 and 1.6 m^3 for NG and 10.6 m^3 and 1.7 m^3 for SG.

268. BR has established earthworks costs for the Perth area and applied regional indexes indicated by Rawlinson's to establish earthworks costs on a regional basis.

269. BR has determined 2013 Perth costs as equal to the costs underpinning the 2009 determination escalated by 12.85 per cent, as per the indexation method shown by Rawlinsons.[13] BR has reported the costs underpinning the 2009 determination as $20.71 per cubic metre for formation and $45.04 per cubic metre for capping.

270. On this basis, BR has proposed earthworks costs as follows; formation works $23.37 per cubic metre, capping $50.82 per cubic metre.

CBH Submission

271. CBH's technical consultant has advised its view that there should be only two formations for earthworks; being for NG and SG/DG routes.

272. CBH's technical consultant has recommended that earthworks be considered as the purchase, transport laying and compacting of a 100 mm capping layer on top of a pre-existing formation and the construction of cess drains either side of the capping layer.

273. CBH's technical consultant did not include any formation (bulk earthmoving) works in its cost assessment.

[13] Rawlinsons Australian Construction Handbook 2013 pp. 613-614.

274. The CBH costing model included earthworks hardcoded and the derivation of these numbers was not apparent from the model spreadsheet.

Engenium Recommendation

275. Engenium has concluded that the proposed BR earthworks rates are reasonable.

276. Engenium considers that an argument may be put for a 1.0 metre (or lower) formation height for some lower traffic, lower axle load routes, however, Engenium considers that this argument is subjective.

277. Engenium has also indicated that the quotes it sourced for earthworks (formation and capping) were significantly higher than BR's proposed costs.

Authority Assessment

278. The Authority is satisfied that Engenium has considered the earthworks formations proposed and that its recommendation to accept a 1.5 metre high formation on all routes is appropriate.

279. The Authority has considered CBH's proposed costing which excludes bulk earthmoving costs associated with formation.

280. The Authority has noted the previous cost determinations for WNR, which are predicated on acceptance of a 1.5 metre high formation on all routes, but not including the construction of cuttings and embankments.[14]

281. The Authority has had regard to the fact that earthworks costs in 2009 were determined on a cost per kilometre basis, not a cubic metre basis. WNR's proposed earthworks costs for that determination were approved by the Authority. The Authority has confirmed that the costs per cubic metre underpinning WNR's costs proposed for the previous determination were escalated for this determination, and are $20.71 per cubic metre for formation and $45.04 per cubic metre for capping.

282. The Authority notes that CBH's technical consultant did not refer to the 2009 determination of earthworks costs in its report.

283. The Authority notes that the escalation of 12.85 per cent proposed by BR on the basis of the Rawlinson's index, coincides with the escalation over the same period in the Producer Price Index (Series A2333769K) for road and bridge construction for WA.

284. The Authority has considered the above matters and Engenium's analysis and has decided to accept BR's proposed earthworks costs.

SIGNALLING AND COMMUNICATIONS

BR Proposal

285. A signalling and communications system is a complex arrangement comprising many specialised components. BR has advised that due to the specialised nature of the

[14] The Code allows the inclusion of cutting and embankment costs made only after the commencement of the Code at Schedule 4 clause 2(2).

engineering functions, there is limited availability of suitable contractors to provide design and installation services.

286. BR has provided the comparison shown in the table below of indexed rates and benchmarks in support of its 'adopted rates' which are shown on the last two rows of the table.

$'000/km	Type of signalling system	Centralised Traffic Control	Train Order System,/Remote control passing loops with Interlocking	Train Order System, Junctions Interface, voice only
Estimation Method	Characteristics of Route (density)	High	Moderate	Low
2008 Determn indexed to 2013	Signals	224.147	36.260	11.998
	Comms	56.470	45.530	35.474
QCA 2000 indexed to 2013	Signals	200.961		
	Comms	38.001		
ARTC 2007 indexed to 2013	Signals	100.384	57.795	
	Comms	22.035	12.974	
Bottom up valuation 2013	Signals	259.823	52.989	8.854
	Comms	78.689	17.973	4.812
Adopted Rate (rounded)	Signals	260.000	53.000	9.000
	Comms	79.000	18.000	5.000

287. BR has advised its view that the indexed 2008 determination provides a reasonable benchmark, and that the indexed 2000 QCA costs may provide a general trend only due to the long indexation period. BR has noted that some bottom up costs are higher, and some lower, than the benchmarks indicated. BR advised that it would expect Centralised Traffic Control (**CTC**) costs to be higher than benchmarks, as there is a small amount of track using CTC on the Brookfield network, while the lower cost Train Order System covers the majority of the network.

288. Brookfield Rail has provided level crossing signalling costs for three types of installations. The costs proposed by Brookfield Rail are shown in the table below.

Level Crossing Signalling type	Site replacement cost proposed by BR ($)
Predictor based	312,289
Three track	313,797
Three track boom gate	335,965

CBH Submission

289. CBH's technical consultants advised that WNR 2009 determined costs be escalated as the basis for this determination of signalling and communications costs.

Engenium Recommendations

290. Engenium has concluded that the costs proposed by Brookfield Rail for CTC are reasonable, as these costs are close to Engenium's estimated rates. Engenium has based this conclusion on a sample of costs for replacement of CTC facilities at two sites, as shown below

CTC Locations	Site replacement cost proposed by Brookfield Rail ($)
Grass Valley	2,777,100
Keysbrook	2,548,805

291. Engenium has advised that Brookfield Rail has proposed costs for self-restoring points infrastructure based on two discreet classes of self-restoring points, being solar and/or wind powered, and mains powered. Engenium has advised that at each location, costs will typically comprise components of each of these types of installations. Brookfield Rail has proposed a cost for solar/wind powered installations of $535,685 each, and a cost for mains powered installations of $568,439 each. Engenium has provided a supplier quote of $605,000 for a solar powered unit. On this basis, Engenium has concluded that the costs for self-restoring points proposed by Brookfield Rail are reasonable.

292. Engenium has advised that Brookfield Rail utilises a variety of asset protection devices, including RailBam, out of gauge detectors and wheel condition monitors. Engenium advises that each of these devices are installed under specialised contracts and that it is difficult to obtain comparative stand-alone costings for these devices. On the basis that the total cost of these devices is a small proportion of the total GRV, Engenium has concluded that the costs proposed by Brookfield Rail for asset protection devices are reasonable.

293. Engenium has concluded that the signalling and communications costs proposed by Brookfield Rail are reasonable.

Authority Assessment

294. The Authority has considered CBH's submission and Engenium's analysis and has decided to accept BR's proposed signalling and communications costs.

MISCELLANEOUS UNIT COSTS

BR proposal

295. BR provided costing information relating to a range of miscellaneous items, as detailed below.

SIGNS

296. The specification of signage is dependent on the line and there are various requirements depending on the route. Signs include: whistle (for level crossings), kilometre marker, road signs for public and access road use, barriers for road and level crossing definition, bridge and culvert markers and rare flora markers.

297. For the initial determination of costs for WNR in 2002, an amount of $2,000 per kilometre was determined as a nominal figure for signage, and BR has escalated that initial figure for each subsequent determination. For this determination, BR has escalated the 2008 determined cost by the indexation factor shown for non-building construction work (WA) as Producer Price Index 6427 table 17 series A2333763W.

298. The cost for signage determined on this basis by BR is $3,230 per kilometre.

FENCING

299. BR has provided fencing costs directly from the Rawlinsons Construction Handbook 2013. BR has determined costs on this basis as Rawlinsons is a definitive survey of general items such as fencing which can be supplied by general tradesmen and subject to a wide competitive environment. BR has advised that the Rawlinson's rates are applicable to Perth and that the regional indices shown in Rawlinson's apply.

300. Fencing costs are $36.50 per metre of chain link fence (1.8m chainlink with 3 strands barbed wire). Gate costs are $930 per vehicle gate and $500 per personnel gate. With one vehicle and personnel gate per kilometre, fencing costs including gates is $75,860 per kilometre.

301. Pallisade fencing is required around secure installations such as signal equipment. The costing for this is $540 per metre.

WALKWAYS

302. Walkways are provided as access next to the track to provide drivers and other operations personnel with a safe walking environment for inspecting trains at times of breakdown or incident. The walkway is provided in addition to a standard width formation in the same material as the capping and would be constructed at the same time but may not be adjacent to the actual formation.

303. For a 600mm walkway the volume of material required per kilometre of track is 138m^3. The walkway build cost is drawn from Rawlinsons Construction handbook for 2013, and is $7,013 per kilometre. The unit rate for materials is that of capping

material and is applicable to Perth area construction. For regional areas, the regional indices from Rawlinsons are applied.

ACCESS ROADS

304. BR has advised that it has costed access roads on the basis that they would be constructed at the same time as the earthworks, formation and capping, and that a unit rate that reflects that construction method is therefore most appropriate. It is assumed that the basic road foundation is provided as part of the normal construction of the railway formation and that any improvement to make the surface more weatherproof will be in the form of selective base course such as that provided for capping.

305. On the basis that the depth of capping is 50mm over a width of a 3 metre lane, the volume per kilometre of track is then 150 m^3 and the unit rate is the same as the earthworks capping rate adopted. On this basis, the cost per kilometre has been determined by BR as $7,623. For non-metropolitan areas, this rate is adjusted by the Rawlinson's regional indices.

CBH Submission

306. CBH's technical consultant advised that it had prepared estimates for fencing which were 50 per cent lower than the BR proposed costs on the basis that the earlier WNR costs per kilometre were four times the ARTC costs per kilometre.

307. CBH's technical consultant advised that the 2009 WNR determination of costs for access roads was within Rawlinsons estimates and advised that escalated WNR costs should be used.

308. CBH's technical consultant advised that the 2009 WNR GRV for Shunters Paths / Walkways was considered low and should be increased by 60 per cent.

309. The CBH costing model included costs for these miscellaneous items hardcoded and further explanation of their derivation was not apparent from the model spreadsheet.

Engenium Recommendations

310. Engenium has concluded that costs proposed by Brookfield Rail for the assets described above under miscellaneous unit costs are reasonable. Engenium advises that the escalation rate used for signage is appropriate, that fencing costs align with current Rawlinson's estimates, and that walkway and access roads costs are reasonable in respect of the capping layer costs for earthworks which Engenium has concluded is reasonable.

Authority Assessment

311. The Authority has considered CBH's submission and Engenium's analysis and has decided to accept BR's proposed miscellaneous unit costs.

FINANCE COSTS DURING CONSTRUCTION

BR Proposal

312. BR's costing principles allow for the inclusion of a financing charge during railway construction to be included as a capital cost in the GRV calculation. The costing

principles indicate that this charge is to cover BR's cost of capital and related financing charges during the construction period.

313. BR's costing principles indicate that BR will apply the WACC determined by the Authority to the construction cash flows to calculate the financing charge, and supposes an average construction rate of one kilometre per day.

314. BR has included a financing cost as a capital item in the BR costing model. The BR financing cost model assumes that the build will be funded 65 per cent from equity and 35 per cent from debt sources.

315. The BR financing cost model is based on a complete build of the entire BR active network and the construction rate used by BR is 2.5 kilometres per day. The construction is assumed to take place one route at a time until the entire network is built. On this basis, it would take 51 months to complete, and financing charges are calculated for that period.

316. BR has included a period of 24 months prior to the commencement of construction for planning and approvals activities associated with the build. BR has assumed that debt is committed but not drawn on during this phase.

317. As a result of having debt funding committed, BR has included a commitment fee which is incurred monthly on the total amount of debt committed each month until completely drawn down. Each month the cumulative amount of the commitment fee incurs an interest cost.

318. Interest is incurred separately on the amount of debt funding as and when it is drawn down. The BR model assumes that the first 65 per cent of funding will be from equity and the final 35 per cent of funding will be from debt.

319. BR's proposed finance costs are calculated by applying the WACC to the average monthly drawdown of the total track cost over a construction period of 51 months. BR has used the nominal pre-tax cost of debt 5.3 per cent as determined by the Authority in its 2013 Weighted Average Cost of Capital Determination, which applies for 2013-14.[15]

Authority Assessment

320. Engenium was not referenced to provide advice on the BR's proposed financing component of capital costs.

321. The Authority has included consideration of financing costs in the calculation of GRV for each route relevant CBH's proposal, consistent with previous determinations by the Authority. The Authority has not adopted the method proposed by BR for this determination in calculating the cost of these charges.

322. The Authority has determined financing costs on the basis of the 2013-14 Weighted Average Cost of Capital (**WACC**) of 7.00 per cent, as indicated in BR's costing principles. The calculation of the WACC assumes a benchmark financing structure, which reflects the costs of debt and equity funding.

[15] Economic Regulation Authority, 2013 Weighted Average Cost of Capital – Public Transport Authority, Brookfield Rail and The Pilbara Infrastructure, www.erawa.com.au, 9 July 2013.

323. Therefore, the Authority does not consider it appropriate to calculate financing costs from construction cash flows using a notional debt-funded proportion of GRV, but from 100 per cent of GRV.

324. The Authority has not included a period for planning and approvals before the construction of the routes, or financing charges associated with such a period. The 'hypothetical' replacement of infrastructure which already exists is on the basis that all routes are fully designed and optimised. As the costs associated with all land corridors in place at the commencement of the Code are not included in the infrastructure capital cost, as detailed in clause 2(5) Schedule 4 to the Code, it is assumed that all necessary approvals are already in place.

325. The Authority has calculated financing charges on the basis of the 2.5 kilometres per day construction rate proposed by BR, and on the basis that work commences concurrently on each of the 18 Schedule 1 routes which contain the routes requested by CBH.

326. The Authority considers, for the purposes of this 'hypothetical' exercise, that this assumption strikes a practical compromise between a scenario requiring that the entire network be built sequentially – as proposed by BR – and the implausible scenario involving concurrent work on each of the 44 CBH requested routes, as would be envisaged if financing costs were calculated individually for each of those routes.

327. The Authority considers that in view of the assumptions regarding rail-based tracklaying, that it is not appropriate to calculate financing charges on an individual route section basis.

328. The Authority notes that construction financing was calculated on a concurrent Schedule 1 route basis in the Authority's 2009 determination of costs for WNR, as proposed by WNR in that instance.

329. In order to enable calculation of financing charges over Schedule 1 routes built concurrently, and consistent with previous determinations, these costs have been calculated on a monthly basis, as proposed by BR.

330. Funding is drawn down on a month-ahead basis, and interest is charged on the cumulative amount drawn down, consistent with BR's proposed method.

TOTAL GROSS REPLACEMENT VALUE

331. The Authority has recalculated the GRV of asset categories where alternative asset values or MEA specifications have been accepted by the Authority in place of those proposed by BR.

332. The GRV outcomes for each category are summed and a 20 per cent uplift for DCPM is calculated based on that sum for each route.

333. Financing costs during construction are calculated for each route based on the total GRV of asset categories including DCPM, and these costs are included in the GRV totals.

334. The outcome of these calculations is shown in Table 4 below.

Final Determination

Determination 3

The Authority has determined the Gross Replacement Values (**GRV**) attributable to the routes relevant to CBH's proposal as shown in Table 4 in this determination.

Table 4 – Summary of GRV Outcomes for Routes Relevant to CBH's Proposal

Route / GRV ($)	Earthworks	Ballast	Sleepers	Rail & Turnouts	Tracklaying	Bridges & Culverts	Signals Comms [a]	Miscellaneous [b]	DPCM	Finance Cost	Total GRV
Avon Yard - West Merredin	[redacted]										
West Merredin - Koolyanobbing East	[redacted]										
Koolyanobbing East - West Kalgoorlie	[redacted]										
West Kalgoorlie - Kambalda	[redacted]										
Kambalda - Esperance	[redacted]										
Avon Yard - York	15,104,116	3,192,543	5,107,502	5,689,507	5,994,707	10,894,957	2,866,546	844,622	9,938,900	1,385,064	61,018,463
York - Narrogin	55,322,856	11,656,257	18,796,651	27,322,181	21,952,678	11,947,139	6,524,597	2,605,844	31,225,641	4,616,378	191,970,222
Narrogin - Wagin	20,365,455	4,287,559	6,948,617	10,141,602	8,081,222	3,858,962	1,448,538	901,751	11,206,741	1,719,431	68,959,880
Wagin - Katanning	22,989,103	4,799,395	7,884,771	16,707,534	9,122,312	2,699,270	3,614,607	1,023,941	13,768,187	1,819,557	84,428,677
Katanning - Tambellup	18,108,868	3,793,448	6,221,663	11,184,464	7,185,785	2,925,806	1,319,988	769,886	10,301,982	1,468,159	63,280,050
Tambellup - Redmond	47,727,695	10,023,507	16,411,128	22,063,386	18,938,840	3,596,605	4,330,586	2,410,025	25,100,355	4,037,729	154,639,857
Redmond - Albany	10,792,611	2,276,336	3,726,158	6,375,180	4,282,619	1,245,808	3,405,492	565,724	6,533,986	884,439	40,088,352
Narrogin - Yilliminning	9,454,644	979,166	3,039,974	4,778,833	3,751,700	1,203,610	356,274	440,212	4,800,883	448,705	29,254,000
Yilliminning - Bruce Rock	58,775,973	6,087,104	18,898,377	29,708,211	23,322,910	7,482,391	2,214,824	2,736,633	29,845,285	2,789,431	181,861,139
Bruce Rock - West Merredin	19,431,063	2,012,368	6,247,715	9,821,396	7,710,446	2,473,644	732,210	904,718	9,866,712	922,173	60,122,446
Yilliminning - Kulin	39,283,573	4,068,603	12,640,669	20,304,988	15,588,126	2,977,047	2,227,820	1,795,259	19,777,217	670,940	119,334,241
Wagin - Lake Grace	47,541,083	9,996,582	16,739,616	22,687,036	18,864,790	6,642,774	1,766,922	2,088,554	25,265,471	1,722,381	153,315,210
Lake Grace - Newdegate	26,619,926	4,940,334	9,416,643	14,786,312	10,563,060	2,084,982	510,367	1,253,962	14,035,117	944,154	85,154,858
Lake Grace - Hyden	37,355,976	7,844,634	13,221,598	18,882,102	14,823,235	3,601,167	232,246	1,472,837	19,486,759	661,086	117,581,641
West Merredin - Kondinin	58,944,708	6,100,949	18,961,326	34,179,930	23,552,546	3,837,260	460,550	2,416,597	29,690,773	2,014,511	180,159,150
Avon Yard - Goomalling	22,066,574	4,703,886	7,508,104	11,412,233	8,797,819	10,098,150	3,338,912	1,136,226	13,812,381	1,182,434	84,056,720
Goomalling - McLevie	57,843,525	12,221,597	19,649,560	30,858,061	22,952,905	5,767,739	3,597,073	2,429,445	31,063,981	3,011,847	189,395,732

Route / GRV ($)	Earthworks	Ballast	Sleepers	Rail & Turnouts	Tracklaying	Bridges & Culverts	Signals Comms [a]	Miscellaneous [b]	DPCM	Finance Cost	Total GRV
Goomalling - Amery	13,647,574	2,883,558	4,625,922	6,484,932	5,415,498	1,119,279	738,796	619,663	7,107,044	497,647	43,139,911
Amery - Wyalkatchem	12,813,202	2,707,266	4,347,190	6,976,941	5,084,410	1,317,242	868,995	599,824	6,943,014	461,064	42,119,148
Wyalkatchem - Mukinbudin	50,953,620	10,765,848	17,346,284	26,282,233	20,218,920	1,970,992	2,090,624	2,040,890	26,333,882	1,781,328	159,784,623
Amery - Burakin	31,921,053	6,744,510	10,841,265	16,617,840	12,666,602	2,207,361	2,182,501	1,478,767	16,931,980	577,352	102,169,231
Burakin - Kalannie	8,540,704	1,804,542	2,907,050	4,392,355	3,389,039	538,354	503,403	371,719	4,489,433	149,367	27,085,967
Burakin - Beacon	29,204,957	6,170,634	9,951,447	14,837,027	11,588,827	1,353,495	293,539	1,243,586	14,928,703	506,454	90,078,669
Millendon Junction - Moora	56,644,432	11,968,244	20,603,262	23,683,084	22,477,093	11,376,523	6,796,874	2,795,949	31,269,092	4,817,446	192,431,998
Moora - Dongara	102,656,965	21,652,232	35,579,739	50,183,501	40,735,339	11,435,298	7,450,505	4,492,715	54,837,259	8,447,812	337,471,366
Dongara - Narngulu	23,356,554	4,934,941	8,013,982	10,365,766	9,268,121	1,148,197	2,594,598	1,096,413	12,155,715	1,963,800	74,898,087
Narngulu - Geraldton	[redacted]										
Dongara - Arrowsmith	31,353,493	6,624,592	10,761,261	12,838,454	12,441,388	3,285,006	2,075,404	1,243,080	16,124,536	547,023	97,294,237
Narngulu - Mullewa	[redacted]										
Mullewa - Perenjori	[redacted]										
Perenjori - Maya	23,354,333	2,280,508	7,187,422	10,166,437	11,720,451	1,204,898	506,659	870,084	11,458,158	388,717	69,137,666
Toodyay West - Miling	55,295,551	11,683,243	21,225,328	27,501,765	21,941,843	11,682,739	2,159,111	2,356,070	30,769,130	2,087,678	186,702,458
Midland - Millendon Junction	[redacted]										
Millendon Junction - Toodyay West	[redacted]										
Toodyay West - Avon Yard	[redacted]										
Midland - Forrestfield	[redacted]										
Forrestfield - Cockburn South	[redacted]										
Cockburn South - Kwinana	[redacted]										
Kwinana - Balloon Loop	4,467,425	1,430,434	3,084,561	8,167,668	2,360,899	-	51,872	110,214	3,934,615	186,217	23,793,906

a. Signals Comms includes: CTC, TCS/TOS System, Self Restoring Points, Asset Protection, Level Crossing Protection, Major Comms Sites (share) and Local Comms Sites.

b. Miscellaneous includes: Level Crossing Surface, Walkways, Signage, Access Roads and Fences.

Annualised Costs - Capital Costs

BR's Costing Principles

335. Section 2.6 of BR's costing principles outlines the method that BR will use to calculate annuities associated with replacement values of capital items. BR has undertaken to use the PMT formula provided by MS Excel with the following inputs:

- Rate: to be set at the relevant WACC as defined in the Code
- Nper: expressed in years and based on the relevant economic life of the track sections
- Pv: the GRV of the relevant route section
- Fv: the salvage value, if any, which remains at the end of economic life
- Type: to be set as an 'annuity due' by inputting "1"

336. The economic lives of assets are explained in section 2.4 of BR's costing principles and shown in tabular form in section 7.1 of BR's costing principles.

337. BRs costing principles state at section 2.4 that:

> There may be circumstances where the economic life of an asset is dependent on the life of a specific business such as a mine. If assets are included in the GRV specifically to service a time-limited project then the annuity will be calculated on that life. WestNet will advise the ERA of the reasons for the shorter life assumption.

BR's Proposal

338. BR has applied a WACC of 7.00 per cent in the calculation of its capital annuity charge for its floor and ceiling costs.

339. BR has applied the asset lives indicated in its costing principles to each class of asset in its costing model.

340. BR truncated the economic life of the Narngulu to Tilley section of route 40 to a maximum of 30 years, as the basis for its proposed costs for those routes. BR has not provided an explanation or commentary explaining the rationale for this.

Authority's Assessment

341. Engenium was not asked to assess BR's proposed means of annualising its capital costs.

342. The Authority has calculated annual capital costs in a manner corresponding to the method used by BR in its costing model, and utilising a WACC of 7.00 per cent in the annuity calculation.

343. The Authority has not limited the economic lives of assets on route 40 on the basis that there is no evidence before the Authority that the economic lives of the mines served by that infrastructure are limited to 30 years or that no further mining or other freight tasks will be served by those routes beyond a 30 year time frame.

344. There is no evidence that the demand by CBH for services on these routes is limited to a 30 year time frame.

Annualised Costs - Operating and Overhead Costs

BR's Costing Principles –Operating and Overhead Costs

345. BR's costing principles (section 3.1) state that operating costs are efficient costs of maintaining the MEA network.

346. BR's costing principles (section 3.2) state that BR will test whether the operating costs used for determining floor and ceiling costs are efficient in the following manner:

- benchmarking will be used where it is available and comparable;
- for certain processes and activities, unit costs from competitive tendering may be used;
- if the maintenance programs are based on accepted industry standards for maintenance which describe the scope and frequency of the activity then this may be considered to be efficient;
- actual costs may be used where consumption and scope are efficient; and
- actual costs may also be used where the costs come from a competitive market or are regulatory costs.

347. BR's costing principles (section 3.2) state that in measuring efficiency, BR recognises that these costs change over time especially as a result of innovation and technological change.

348. BR's costing principles (section 3.3) state that Major Periodic Maintenance (**MPM**) activities are not included in operating costs, as these activities are assumed to extend the life of assets. BR's costing principles indicate that relevant maintenance activities are categorised as 'cyclical' and 'routine' maintenance.

349. Section 3.3 of BR's costing principles outlines four categories of operating costs:

- Routine maintenance for track, signals and communications
- Cyclical maintenance for track, signals and communications
- Network Management Costs; and
- Working Capital.

350. BR's costing principles indicate that track maintenance levels and frequency comply with the Australian Standard AS4292 which specifies safety requirements of the Railway Safety Management System, and also with the Codes of Practice for both the narrow gauge and standard gauge networks.

351. The costing principles describe in general terms what activities are included in routine and cyclical maintenance, and the inspection process which underlies routine maintenance.

352. BR's costing principles defines Network Management Costs as those costs directly associated with operational management of the Network as defined in part (b) of the definition of 'Operating Costs" in Schedule 4 to the Code.

353. BR's costing principles provide for the inclusion of Working Capital as an operating cost, calculated by multiplying one-half of the total capital annuity by the WACC.

354. BR's costing principles indicate that track and signalling maintenance costs are directly allocated to route sections based on the nature and population of the infrastructure. Centralised train control costs will be apportioned directly to routes based on train control resources managing traffic over each route. Allocation of non sector-specific operating costs is according to train movements or GTKs as outlined in table 7.2 of BR's costing principles. In general terms, network management functions are allocated by train movements, and management of maintenance related functions are allocated by GTKs.

355. BR's costing principles state that the BR costing model will allocate operating costs to the route level, and that subsequent allocation to the route section level will be determined by the ERA as part of the floor and ceiling cost determination.

356. Overhead costs are categorised as 'WestNet' [BR] overheads, and Corporate overheads.

357. BR's costing principles state that the BR costing model will allocate overhead costs to the route level, and that subsequent allocation to the route section level will be determined by the ERA as part of the floor and ceiling cost determination.

BR's Proposal – Maintenance Costs

358. BR has providing costings for maintenance activities separately from other operating costs and overheads costs in its costing model.

359. BR has advised its view that it is difficult to compare maintenance costs for its network with other networks as there are no other networks of similar type.

360. Maintenance costs have been derived on the basis of heavy, medium and light duty track. It is assumed that the asset is new and is maintained to achieve the defined economic life. Maintenance comprises two components, routine and cyclical.

361. Routine maintenance comprises inspections which provide data on defects which require attention in the short term and also data that provides longer term trends that are used to program the cyclic maintenance. The short term maintenance is known as 'corrective' and is mainly carried out using manual labour because mobilizing large scale equipment for small tasks is uneconomic. Cyclic maintenance does warrant the use of large scale machinery because it is an activity which operates over large distances and is preventative in nature which brings the railway back to being functionally new.

362. Inspections are time based activity and the frequency of inspections has been determined by considering the frequency and weight of trains. Inspection includes visual as well as machine-based measuring systems. The activities are:

- 3-7 day visual inspection by road/rail vehicle
- 1-4 weekly visual inspection and cleaning of signal equipment
- 3-6 monthly measurement of track geometry by machine
- 3-12 monthly ultrasonic inspection of rail integrity
- Spot inspections following especially wet or hot weather

- Periodic inspection of access roads, drainage and fences.

363. Corrective maintenance that may occur as a result of inspections are:

- Manual track geometry correction (not using machines)
- Replacement of sleeper fastenings in turnouts or joints
- Replacement of small sections of rail by welding
- Repair of fences, tree lopping
- Replacement of small electrical items in signals and communications equipment.

364. Cyclic activities involve the use of machinery or large campaigns of activity and include:

- Track geometry resurfacing
- Grinding to restore head shape
- Ballast cleaning (to improve interlocking)
- Vegetation removal
- Resurfacing level crossings
- Repairs to access roads
- Replacement of timber sleepers
- Replacement of worn curve rail
- Replacement/overhaul of signals and communications equipment.

365. These activities are programmed into a notional 'levelised' program which leads to a 'levelised' expenditure profile. As the asset configuration is such as to be relevant for the load and frequency of trains it carries (heavy use requiring heavy construction and light use requiring light construction) the periods where inspection and levelised cyclic maintenance are applicable to these asset types are assumed equal.

366. BR has advised that it has assumed for the first 7 years of the asset life a solely inspection-based program and cost is applicable. This is because this is the period beyond which deterioration of track geometry occurs due to formations and ballast losing their initial strength. It is typically after 7 years that intervention occurs to prevent more serious deterioration, in particular that requiring grinding to correct head profiles.

367. BR has referred to the ARTC review of maintenance costs included in its submission to the ACCC in 2007. This review relied in part on the 2006 Worley Parsons report for the Essential Services Commission Victoria, "Maintenance Costing Benchmarking for the Victoria Freight Network". This report benchmarked direct costs from around Australia in relation to the determination of efficient costs for maintenance.

368. That report considered a bottom up approach combined with benchmarks to arrive at a 'suggested rate' for long term direct cost sustainable maintenance and included inspections, corrective maintenance and cyclic maintenance. The results of this study with appropriately indexed rates for "applicable WA routes" show those routes which align with the Victorian routes in both configuration and traffic. These results have been presented by BR as shown below.

Victorian Routes	Applicable WA routes shown hierachically	"Suggested" maintenance cost per km per year ($2006)	Indexed maintenance cost per km per year ($2013)
Regional Fast Rail Network	Perth – Kalgoorlie SW Main Esperance Midwest Iron Collie-Brunswick Great Southern Avon – Goomalling Kalgoorlie – Leonora Grain Network	21,400	24,471
Class 2&3 freight only lines		15,815	18,085
Class 4&5 freight only lines		9,894	11,314

369. BR also made reference to QCA analysis which recommended early life-cycle costs of $11,000 per km per year for Aurizon (June 2012). BR has used these results to estimate the component of life cycle costs which are early life costs on the heavy duty portions of the Brookfield network, such as the EGR which carries significant tonnages at speeds of up to 160 kph.

370. For medium duty track, such as main trunk routes and regional freight lines, the traffic task is lower and not every line will have signalling (except for level crossings) and the safeworking function is performed by radio or partially by CTC. The frequency of inspection is lower and the consequences of applying speed restrictions to avoid urgent repairs are lower. For medium duty track, BR has estimated early life maintenance costs as 75 per cent of that for heavy duty track.

371. For light duty track, BR inspections are easier to conduct and less frequent and repairs can be performed with a smaller workforce that attend to repairs on a geographic basis, avoiding inefficiency in travel costs. These tracks do not have signalling, and perform safeworking functions by radio and level crossings are not fitted with lights or boom gates. For these lines, BR has estimated early life maintenance costs as 50 per cent of that for heavy duty track.

372. Longer term cyclic costs relate to a mature asset where resurfacing is occurring and preventative maintenance is used to reduce overall maintenance costs. BR has used the total "suggested" maintenance costs shown above and subtracted the early life costs indicated above to arrive at an estimate of cyclic maintenance requirements applicable to the life of the asset beyond 7 years.

373. BR's model summarises track maintenance costs by region. Regional Track Maintenance costs are allocated by route length to each route section. Relevant regional track maintenance costs are:

Track Maintenance Costs proposed by BR

Route No.	Route Relevant to CBH's Proposal	Regional Track Maintenance regime
1	Avon Yard – West Merredin	'Eastern Goldfields' $22,680 / km
	West Merredin – Koolyanobbing East	
	Koolyanobbing East – West Kalgoorlie	
5	West Kalgoorlie - Kambalda	'Esperance Line' $19,268 / km
	Kambalda - Esperance	
23	Avon Yard - York	'Great Southern Railway' $13,103 / km
	York - Narrogin	
	Narrogin - Wagin	
	Wagin - Katanning	
	Katanning - Tambellup	
	Tambellup - Redmond	
	Redmond - Albany	
27	Wagin – Lake Grace	'Other Grain Lines' $10,695 / km
	Lake Grace - Newdegate	
28	Lake Grace – Hyden (2 specs)	'Other Grain Lines'
34	Avon Yard - Goomalling	'Avon-Goomalling' $16,607 / km
	Goomalling - McLevie	'Other Grain Lines'
35	Goomalling - Avery	'Other Grain Lines'
	Avery - Wyalkatchem	
	Wyalkatchem - Mukinbudin	
36	Amery - Burakin	'Other Grain Lines'
	Burakin - Kalannie	
37	Burakin - Beacon	'Other Grain Lines'
38	Millendon Jn - Moora	'MR (Midland Rail) Line' $13,103 / km
	Moora - Dongara	

Route No.	Route Relevant to CBH's Proposal	Regional Track Maintenance regime
	Dongara - Narngulu	
	Narngulu - Geraldton	
39	Dongara - Arrowsmith	'Other Grain Lines'
40	Narngulu - Mullewa	'Midwest Iron' $19,268 / km
	Mullewa - Perenjori	
41	Toodyay West - Miling	'Other Grain Lines'
44	Midland – Millendon Jn	'Eastern Goldfields'
	Millendon Jun – Toodyay West	
	Toodyay West – Avon Yard	
45	Midland - Forrestfield	'Eastern Goldfields'
	Forrestfield – Cockburn South	
	Cockburn South - Kwinana	
48	Kwinana Balloon Loop	Eastern Goldfields

Engenium advice – Track Maintenance Costs

374. Engenium has established an appropriate index for the purpose of comparing maintenance rates with the maintenance rates from the 2008 WestNet Rail cost model. The ABS Producer Price index recommended by Engenium for maintenance is the Building Construction for Roads and Bridges (series A2333769K) which shows an escalation between June 2008 and June 2013 of 12.83 per cent.

375. On the basis of a comparison with the maintenance rates from the 2008 WestNet Rail cost model, Engenium has concluded that the maintenance regime proposed by BR to apply to 'Eastern Goldfields', "Esperance Line' and 'Mid-West Iron' routes is reasonable.

376. Engenium has concluded that the maintenance regime proposed by BR to apply to 'Great Southern', 'Midland' and 'Avon-Goomalling' is not reasonable and that a reasonable rate would be based on the '19 Tonne Axle Load Rate' from the 2008 WestNet Rail costing model, escalated by 12.83 per cent.

377. Engenium has concluded that the maintenance regime proposed by BR to apply to 'Other Grain Lines' is not reasonable and that a reasonable rate would be based on 'Other Axle Load' rate from the 2008 WestNet Rail costing model, escalated by 12.83 per cent.

378. Engenium has analysed the maintenance estimates provided by BR and has concluded that a reasonable regional maintenance cost structure is as summarised below:

Regional Cost Regime	$ / km	Comment
Eastern Goldfields	22,680	Engenium concluded reasonable. This rate is less than the indexed rate from the 2008 WNR cost model.
Esperance Line	19,268	Engenium concluded reasonable. This rate is 26 per cent higher than the indexed rate, however BR has reported a 47 per cent increase in the applicable freight task.
Mid-West Iron	19,268	Engenium concluded reasonable. The proposed rate is a new rate accepted as comparable to the Esperance Line.
Avon-Goomalling	16,607	Engenium concluded not reasonable. The proposed rate is 35 per cent higher than the indexed rate and BR has not reported an increase in the freight task. Engenium indicated rate: $12,230.
Great Southern MR (Midland) Rail	13,103	Engenium concluded not reasonable. The proposed rate is 7 per cent higher than the indexed rate. Engenium indicated rate: $12,230.
Other Grain Lines	10,695	Engenium concluded not reasonable. The proposed rate is 52 per cent higher than the indexed rate and BR has not reported an increase in the freight task. Engenium indicated rate: $7,030.

Authority's Assessment – Maintenance

379. The Authority has considered Engenium's analysis and has decided that the regional maintenance cost indicated by Engenium to be reasonable (as per the above table) will be used for this determination.

BR's Proposal – Other Operating and Overhead Costs

380. BR has determined other (non-maintenance) operating costs separately from track maintenance activities. Other (non-maintenance) costs appear to be in two categories: head office operations functions, and regional operations functions. Head office operations functions are the oversight management of access functions, control and communications management and other head office operations management. Regional operations functions are those based in regional depots associated directly with 'perway' maintenance and signalling and switching functions.

381. Head office overheads are the 'corporate level' functions associated with finance and human resources management and commercial management.

382. BR has aggregated the costs associated with head office operating and overhead functions at the network level ~~w~~ithin one table in its model, which contains hardcoded numbers. These costs are allocated to each route section on a GTK basis. The total of these costs is shown as [redacted] million, at the whole of network level. These costs as proposed by BR are shown below.

BR Proposed Other Operating and Overhead Costs (Head Office)	
Head Office Operating Costs	$
Access Management	[redacted]
Control and Communications Management	[redacted]
Communication Systems	[redacted]
Infrastructure Services	[redacted]
Perway Management	[redacted]
Total HO Other Operating	[redacted]
Overhead Costs (Head Office)	
Finance	[redacted]
Administration	[redacted]
Commercial Team	[redacted]
Corporate Relations	[redacted]
Property	[redacted]
General Management	[redacted]
Human Resources	[redacted]
Information Technology	[redacted]
Insurance	[redacted]
Legal	[redacted]
Standards & Compliance	[redacted]
Strategic Development	[redacted]
Total Overheads	[redacted]
Total Other Operating and Overhead Cost	[redacted]

383. BR has also included an additional class of non-maintenance operating costs in the model, which are associated with regional operations. These include 'regional signalling supervisor' (**RSS**) and 'perway' management functions at the regional centres. These costs are shown below.

BR Proposed Other (non-maintenance) Operating Costs (Regional) ($)	
RSS Picton (South)	[redacted]
RSS Merredin (Central)	[redacted]
RSS Midland (West)	[redacted]
RSS Kalgoorlie (East)	[redacted]
Perway Avon	[redacted]
Perway Northam	[redacted]
Perway Geraldton	[redacted]
Perway Kalgoorlie	[redacted]
Perway Midland	[redacted]
Perway Narrogin	[redacted]
Perway Picton	[redacted]
EFIC Insurance (allocated to routes 39 and 40 only)	[redacted]
Total Other Operating (Regional)	[redacted]

384. The regional other operating costs are not allocated from a network level to all routes on a GTK basis, but are allocated to regions and then to routes on the basis of train numbers and GTKs.

385. In its submission to the Authority of 11 April 2014 (response to adverse material), BR responded to a query relating to head office-level operating and overheads costs. BR compared the proposed operating and overhead costs for 2013 with overhead and operating cost outcomes from the 2006 and 2009 determinations.

386. The cost information provided by BR in its letter of 11 April 2014 is summarised in the table below:

$	2006 ERA Approved	2009 PwC Recommended	2013 Proposed (based on 2014 BR budget)
GTK (M)	19 332	23 532	[redacted]
Operating	11,092,427	12,180,160	[redacted]
Overheads	16,193,526	17,713,130	[redacted]
Total Operating and Overheads	27,285,953	29,893,290	[redacted]

387. In its letter to the Authority of 11 April 2014, BR advised that in 2014 its network now transports almost double the volume, in GTK terms as it did in 2009, which has impacted on the complexity and scale of the required overhead and operating functions.

388. BR advised that its workforce had increased from [redacted]. BR also advised that it has created a new supply chain management team that works directly with each customer.

Engenium advice – Operating and Overhead Costs

389. Engenium has advised that the appropriate escalator for operating and overhead costs between June 2009 and June 2013 is 10.65 per cent based on the Consumer Price Index (**CPI**).

390. On this basis, Engenium concluded that the network-level other operating and overhead costs proposed by BR are reasonable, as BR has provided data showing that its operating and overhead costs per GTK has increased by 10.8 per cent over the 2009-2013 period.

CBH Submission

391. CBH has submitted costs for operating (including maintenance) and overheads activities in relation to the network it has specified for consideration in its submission.

392. These suggested costs do not in themselves constitute a comment on the costs proposed by BR for these functions, and CBH has indicated that it has not been provided with sufficient information on the breakdown of BR's operating and overheads costs to provide meaningful comment.

393. CBH's technical consultant indicated that the network management and train control portions of its suggested operating costs are based on the 2009 WestNet Rail costs escalated by the ABS wage index for Western Australia.

Authority's Assessment –Other Operating and Overheads Costs.

394. The Authority has considered the analysis of Engenium and its conclusion that the other operating and overhead costs proposed by BR are reasonable.

395. The Authority notes Engenium's advice that the appropriate escalator for head office operating and overheads costs is the 'All Groups CPI Australia' (serial A2325846C). The Authority notes that the uplift in this index between the quarters June 2009 to September 2013, is 11.95 per cent.

396. The Authority is not able to comment on the costings provided by CBH, as they do not relate to the determination of operating and overhead costs by BR, except as a point of comparison. The Authority has noted limitations in the level of detail provided to CBH by BR.

397. The Authority has noted that the method employed by CBH's consultant to establish network management and train control elements of operating and overhead costs is by way of escalation of 2009 determined costs.

398. The Authority has noted Engenium's conclusion that the proposed increase in total non-maintenance operating and overhead costs is reasonable on the basis of the increase in the freight task on the BR network. However, for reasons explained in paragraphs 402 to 405, the Authority has decided not to accept BR's proposed operating and overhead costs as reasonable.

399. The Authority notes that the 2009 WNR costing model[16] includes all regional operating functions in its proposed amount for operations and overheads.

400. The Authority therefore considers that the 2006 and 2009 Operating and Overheads totals provided to the Authority by BR on 11 April 2014 (shown in the table below paragraph 386 above) include the costs associated with regional (non head office) operating functions. However, the 2013 cost of [redacted] does not include these functions. The BR cost model indicates that the costs associated with regional (non head office) operating functions is [redacted] for 2013 (for the quarter ending 30 September).

401. The Authority notes that the PwC recommended total for operating and overheads for June 2009 was $30,002,542, as shown in Table 12 of the Authority's Determination published on 30 June 2009 (and not $29,893,290 indicated in BR's letter of 11 April 2014). On this basis, the Authority considers that the appropriate comparison of approved and proposed operating and overheads costs including regional operations is:

[16] The 2009 WNR costing model is available on the Authority's website. The costs shown in this model were proposed for 2008 and escalated to 2009 for the making of the determination.

$	2006 ERA Approved	2009 PwC Recommended (ERA Approved)	BR proposed September 2013
Operating	11,092,427	12,196,7890	[redacted]
Overheads	16,193,526	17,805,753	[redacted]
Total Operating and Overheads	27,285,953	30,002,542	[redacted]

402. Further, the Authority notes that, according to the data provided by BR on 11 April 2014, GTKs on the BR network have not doubled since 2009 as indicated in BR's letter of 11 April 2014 but, rather, have increased by just over half.

403. The Authority does not consider that head office overhead and operating costs would increase in line with the freight task on the network. The Authority notes the information provided by BR relating to additional resources utilised in customer service. The Authority does not consider that these additional functions would require an increase in full time employees to the extent indicated by BR (an increase of more than 40 per cent).

404. The Authority also notes that the corporate structure of BR has changed with its change of ownership in 2011, and that Brookfield Rail is now part of a much larger international organisation.

405. The Authority considers that increases in operations costs associated with greater freight tasks would be concentrated in regional operations centres, and that head office functions would be impacted to a much lesser degree.

406. The Authority has decided that head office other operating and overheads costs will be determined on the basis of 2009 costs escalated by 11.95 per cent. The Authority has decided to accept BR's proposed regional other operating costs. The Authority's reasoning is described in the paragraphs below.

407. The table below shows the two components of other operating costs, being head office and regional functions, totalled and then added to head office overhead costs to arrive at total other operating and overhead costs. These are shown for June 2009, with BR-proposed and Authority-determined outcomes for September 2013. Other operating costs for 2009 are disaggregated on the basis that the regional operating costs in 2009 were those shown as 'perway' costs in the 2009 WNR cost model ($3,668,744). Regional Train control costs were not identified separately in the 2009 BR cost model. Other operating head office costs for 2009 are taken to be the difference between the 'perway' (regional) operations costs and the total operating costs determined for 2009.

408. Other operating costs (head office) of June 2009 are escalated by 11.95 per cent, based on the ABS series recommended by Engenium for this function, for a September 2013 cost of $9,547,146. Regional operations costs [redacted] proposed by BR are accepted and added to head office operations for a total other operating cost of [redacted] 2009 overheads (head office) are escalated by 11.95 per cent for a total cost of $19,933,540.

$	2009 Determined	2013 BR proposed	2013 Determined
Other Operating (H/O)	8,528,045	[redacted]	9,547,146
Other Operating (Regions)	3,668,744	[redacted]	11,085,386
Total Other Operating	12,196,789	[redacted]	20,632,532
Increase from 2009		[redacted]	+ 69%
Overheads (H/O)	17,805,753	[redacted]	19,933,540
Increase from 2009		[redacted]	+ 12%
Total Other Operating and Overheads	30,002,542	[redacted]	40,566,072
Increase from 2009		[redacted]	+ 35%

409. The Authority notes that the determination of total other operating and overheads costs allows for a 35 per cent increase in these costs over the 2009-2013 period. The Authority considers that in accepting an apparent three-fold increase in regional other operations costs and constraining head office costs for operating and overheads to a CPI increase results in an increase in total other operating and overheads cost more consistent with the increase in GTKs over the same period.

410. As indicated above the Authority notes that the overall increase in other operating and overheads costs has been determined to be 35 per cent which aligns more closely with the roughly 50 per cent increase in GTKs over the period than does the more than [redacted] per cent increase proposed by BR.

411. The Authority notes that these operations and overheads costs are network-level costs which apply to all routes on the network and are not allocated entirely to the routes relevant to CBH's access proposal.

412. Consequently, the operating and overheads costs proposed by BR to be allocated to the routes subject to CBH's proposal were [redacted]. The amounts determined by the Authority for those routes (that is, not including the Tier 3 routes) total $35,326,730.

413. The Authority accepts the method proposed by BR for the calculation of the working capital component of operating costs and has recalculated working capital by this method, using the capital costs and the current WACC determined by the Authority.

Incremental Costs

BR's Proposal

414. BR has provided incremental costs in a manner consistent with a reference to incremental costs shown in clause 7(2) of Schedule 4 to the Code. Clause 7(2) requires that the total of all payments to the railway owner by all entities that are

provided with access to a route must not be a sum that is less than the total of all incremental costs resulting from the combined operations on the route of all operators and other entities and the railway owner.

415. BR has not calculated incremental costs with reference to the factors listed in section 5.3 of its costing principles.

416. BR has provided avoidable costs for each route calculated as the aggregated incremental costs of all users on each route. That is, BR has calculated avoidable costs as the sum of 94.39 per cent of maintenance costs and 100 per cent of non-maintenance operating and overhead costs, and excluding all working capital, for each route section.

417. BR has excluded 5.61 per cent of maintenance costs from its calculation of incremental costs on all routes. An avoidable maintenance cost of 94.39 per cent is hard-coded in BR's cost model, and is explained by way of the following note:

> 94% is used as max % of maintenance in floor to represent care and maintenance costs (5.6% of Maintenance equivalent to $600/k/pa on Grain lines)

418. It is apparent from this text that the calculation of avoidable maintenance costs in BR's costing model is predicated on the "care and maintenance" regime in place for "closed" grain routes. This avoidable cost proportion does not appear to have been calculated or estimated in relation to routes which will remain in service, yet has been applied to all routes.

CBH Submission

419. CBH indicated in its submission that BR's overhead costs are fixed, and should therefore not be considered avoidable.

420. CBH submitted that the definition of incremental costs in the Code allows for the inclusion of operating costs and where applicable overheads and capital.

421. CBH has submitted that the danger of determining an incremental cost which is too high is that it provides an asymmetric benefit to the railway owner in terms of constraining the price range of negotiations.

422. BR, in its submission of 14 May 2014 submitted that the CBH operations are significant in terms of sole user routes over a large part of the network, and that it is incorrect for CBH to assert that in the absence of CBH as an operator the nature of BR's operations would remain unchanged.

423. BR also submitted that the grain task is significantly more complex and demanding of BR's resources, across all levels of the business, than any other freight task, including those which account for significantly greater annual tonnage transported.

Authority Assessment

424. For the purposes of this determination, and as established in paragraph 103, the Authority has decided to calculate incremental costs consistent with the definition of incremental costs contained in clause 7(1) of Schedule 4 to the Code. Clause 7(1) requires that:

> *An operator that is provided with access to a route and associated railway infrastructure must pay for the access not less than the incremental costs resulting from its operations on that route and use of that infrastructure.*

425. The floor price test of clause 7(2) of Schedule 4 to the Code requires that BR not recover less than the total of all incremental costs due to all users on each route in total.

426. If BR is to recover all incremental costs from all users, then all incremental costs should be allocated across all users, and not considered on a marginal or merit-order basis.

427. The definition of incremental cost in the Code is at Clause 1 of Schedule 4 and is framed in terms of the costs that the railway owner would be able to avoid in respect of the 12 months following the proposed commencement of access if it were not to provide access to that operator.

428. In the case of CBH relinquishing its out-of-code arrangement with BR in contemplation of an access agreement under the Code, incremental costs associated with CBH's operations may be considered in terms of the costs BR would avoid if CBH ceased operations on its network.

429. The Authority notes that although CBH does not currently have, and has never had, an access agreement under the Code, grain has been hauled on the relevant routes for many years. The scope of operation and overhead functions undertaken by BR in respect of grain traffic will not change if CBH and BR make an access agreement.

430. The Authority has noted CBH's submission that all overheads costs should be considered fixed, and acknowledges CBH's observation that the railway owner is advantaged by an incremental cost which is too high.

431. The Authority has also noted BR's submission relating to the complexity and extent of CBH's operations across the network and accepts that not all overheads costs can reasonably be considered fixed. The Authority does not accept CBH's submission that all overheads costs are unavoidable.

432. For the 2009 determination, BR based avoidable costs on a hard-coded proportion of track maintenance equal to 77.5 per cent. In the 2009 BR cost model, the following explanation was provided in the form of a note:

> As the level of traffic impacts maintenance requirements and the differentiating factor between the ceiling and floor price calculations is line traffic, a switch has been built into the maintenance calculation to allow the user to switch the full traffic assumption off for the floor price calculation

433. For the 2009 determination, the Authority approved this scheme on the basis of BR's advice that 22.5 per cent of track maintenance comprises activities such as routine mechanical inspections, fencing and firebreak maintenance which are unavoidable costs, and are required regardless of the level of traffic on the route.

434. BR has not provided an explanation for the change in this proportion from 77.5 per cent to 94.39 per cent, except that the latter proportion represents avoidable costs under a 'care and maintenance' regime for 'closed grain routes'. The Authority does not consider this an appropriate scheme for consideration of avoidable costs on operating routes.

435. The Authority considers that the 'care and maintenance regime' for closed grain routes comprises minimal corridor vegetation management (slashing) and less frequent visual inspections. Unavoidable costs for operating routes involves more frequent inspections and a higher level of maintenance required to ensure safe operations and serviceable infrastructure.

436. The Authority therefore has determined that for the purposes of this determination, 77.5 per cent is the appropriate proportion of maintenance costs to be included in avoidable costs (i.e. variable).

437. The Authority considers that not all overhead costs should be considered variable (i.e. avoidable) and that a fraction of all head office functions would be required regardless of the level of operations. The Authority considers that, at a minimum, the proportion of overheads which would be fixed will be the same as the proportion of operating costs which are fixed. This is because overheads are a management function required to oversee operations.

438. Similarly, the Authority expects that the regional operations costs, identified as 'perway' and 'RSS' in the BR model also cannot be considered 100 per cent fixed. The Authority recognises that the fixed component of regional operations costs will possibly not be the same as the fixed component of overheads costs. The Authority does not have a benchmark for the proportion of the non-maintenance components of operating and overheads costs which may be considered fixed, except for the proportion established by BR in 2009 for the fixed component of maintenance costs.

439. On this basis, the Authority has determined that 77.5 per cent of other operating (head office and regional) and overheads costs as well as maintenance costs will be considered variable, and therefore included in total avoidable costs.

440. BR did not propose to include working capital in unavoidable costs, and the Authority has not included working capital in its calculation.

441. In the absence of further data relating to the list of factors shown in section 5.3 of BRs costing principles, the Authority has calculated incremental costs relevant to CBH's proposed operations on each route by calculating a share of total avoidable costs for each route, and multiplying that by CBH's share of GTKs on that route.

442. The Authority is mindful that BR's costing principles contemplates the calculation of an operator's incremental costs and, as indicated in the paragraph above, section 5.3 shows a list of factors relevant to that calculation. The Authority has presented BR with an opportunity to provide the Authority with information relevant to that list of factors, and BR has not provided further detail.

443. In the absence of detailed information from BR the Authority has relied on route GTK data derived from information on BR's website and its costing model, and GTK movements indicated in CBH's costing model, to calculate avoidable cost shares.

444. GTK shares have been calculated by the Authority for each route section based on the total GTK information provided on BR's website for the years 2009-10, 2010-11 and 2011-12 and the total GTK information provided by CBH in its costing model for each route section for the same three year period.

445. The Authority has estimated CBH GTKs for the Koolyanobbing – Kalgoorlie and Kalgoorlie to Kambalda sections on the basis of two movements per year of a 250,000 tonne empty train over those sections. The Authority has estimated the CBH

GTK's for the Eneabba-Arrowsmith section as zero on the basis that CBH has indicated access to this route for the purposes of parking trains only.

Determination of Costs Relevant to CBH's Proposal

446. Based on the assessments outlined in the previous sections, the Authority's determination of costs relevant to CBH's access proposal, current at 1 July 2013, is shown in Table 5 of this document (see below).

447. Table 5 shows the components of annual cost, being the capital annuity, maintenance, other operating/overheads and working capital, which are summed to arrive at total costs for each route. Incremental cost for each route is calculated as the sum of maintenance and other operating/overhead costs and multiplied by the CBH share in Gross Tonne Kilometres.

448. These costs are determined as current at 30 September 2013, consistent with the currency of BR's proposed costs. At the time CBH made its access proposal, (December 2013), the September quarter was the most recent quarter for which ABS price indexes were available. In the circumstances, the Authority has decided that for the purposes of negotiations for access commencing 1 July 2014, the costs determined by the Authority as current at 30 September 2013 may be brought up to 30 June 2014 (or 1 July 2014) levels by the application of the CPI index for June 2014, and the Authority approved WACC for 2014-15, when these become available.

Final Determination

Determination 4

The Authority does not approve BR's proposed determination of its costs as provided to the Authority on 17 December 2013 and 25 March 2014. The costs which the Authority has determined will apply to the relevant route sections are shown in Table 5. These costs are current as at 30 September 2013.

449. In making this determination, and in particular when exercising its discretions under the Code, the Authority has been mindful of the matters it must consider which are prescribed in section 20(4) of the Act, which include a range of conflicting objectives. Ultimately, the Authority's determination has involved a balancing of the section 20(4) objectives in a way that it believes best achieves the object of encouraging the efficient use of, and investment in, railway facilities by facilitating a contestable market for rail operations, consistent with the object of the Act and the Code.

450. The Authority has been required to exercise its discretion in relation to a number of areas where inadequate information has been provided by BR, or where time constraints associated with the legislative deadline for the making of this determination has had an impact on the Authority's ability to obtain further information. In a number of instances, this discretion has been exercised in favour of BR, and has resulted in an upside bias to the Authority's determination of costs.

451. On the other hand, the Authority's decisions to not allow the inclusion of some costs were guided by considerations in section 20(4)(g) and (h) of the Act, that is, the economically efficient use of the railway infrastructure and the benefits to the public from having competitive markets.

452. In this determination, the Authority has concluded that, because the Tier 3 routes are listed in Schedule 1 of the Code, CBH is entitled to seek access to the Tier 3 routes.

453. The Authority has also concluded that access can only be provided to the Tier 3 routes if capacity is restored on these routes. The Authority is aware that the restoration of capacity will need to be funded in some way. However, the manner in which this funding is provided is not relevant to this determination, and is appropriately a matter to be negotiated.

454. The Code defines GRV in clause 2 of Schedule 4 in terms of a Modern Equivalent Asset (**MEA**) 'if appropriate'. The Authority considers that it is appropriate to assume an MEA specification for determination of the total costs of the Tier 3 routes. The maximum capital cost that an access seeker would be prepared to pay is the cost that would be incurred in constructing a similar route. The MEA determined by the Authority for these routes is the lowest possible capacity specification suitable for grain traffic.

455. The Authority has calculated the incremental costs for Tier 3 routes in the same way as it has for all other routes in this determination.[17] This assumes that the routes are operational.

456. In making this determination, the Authority is mindful that clause 12 of Schedule 4 to the Code allows it to re-determine BR's floor and ceiling costs in respect of these route sections at any time if the Authority considers there may have been a material change in any of the circumstances that existed at the time this determination was made. Such circumstances may include the completion of further extension or expansion works by BR, or changes in the level of general prices or asset-specific prices.

[17] The Authority has determined that incremental costs will be calculated as 77.5 per cent of all operating and overheads costs (excluding working capital).

Table 5 – ERA Determination of Costs relevant to CBH's proposal

Route / ($)	Capital Cost Annuity	Maintenance	Other Operating and Overhead	Working Capital	Total Cost	CBH GTK (%)	Incremental Cost
Avon Yard - West Merredin	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
West Merredin - Koolyanobbing East	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Koolyanobbing East - West Kalgoorlie	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
West Kalgoorlie - Kambalda	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Kambalda - Esperance	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Avon Yard - York	4,256,901	500,119	86,252	122,152	4,965,424	89.97%	408,861
York - Narrogin	13,521,364	1,666,883	396,612	388,296	15,973,156	100.00%	1,599,209
Narrogin - Wagin	4,842,579	620,853	161,913	138,853	5,764,198	100.00%	606,644
Wagin - Katanning	6,019,430	657,006	187,864	173,734	7,038,035	100.00%	654,774
Katanning - Tambellup	4,476,587	530,123	151,780	128,783	5,287,273	100.00%	528,475
Tambellup - Redmond	10,878,006	1,457,944	417,425	311,668	13,065,043	100.00%	1,453,412
Redmond - Albany	2,878,354	319,353	91,434	83,159	3,372,301	12.41%	39,512
Narrogin - Yilliminning	2,011,552	166,244	39,321	57,962	2,275,080	100.00%	159,313
Yilliminning - Bruce Rock	12,505,066	1,033,479	244,443	360,327	14,143,316	100.00%	990,390
Bruce Rock - West Merredin	4,134,117	341,663	80,812	119,122	4,675,714	100.00%	327,418
Yilliminning - Kulin	8,232,098	674,189	159,457	239,658	9,305,402	100.00%	646,076
Wagin - Lake Grace	10,843,280	841,833	294,030	315,549	12,294,692	100.00%	880,294
Lake Grace - Newdegate	6,063,766	461,466	161,178	176,728	6,863,139	100.00%	482,549
Lake Grace - Hyden	8,299,382	655,583	228,977	242,724	9,426,667	100.00%	685,534
West Merredin - Kondinin	12,410,441	994,428	235,084	359,218	13,999,171	100.00%	952,872
Avon Yard - Goomalling	5,941,945	674,922	94,587	172,428	6,883,882	100.00%	596,369
Goomalling - McLevie	13,450,191	991,000	284,509	389,991	15,115,691	100.00%	988,520

Route	Capital Cost Annuity ($)	Maintenance ($)	Other Operating and Overhead ($)	Working Capital ($)	Total Cost ($)	CBH GTK (%)	Incremental Cost ($)
Goomalling - Amery	3,053,279	244,093	70,319	88,840	3,456,531	100.00%	243,669
Amery - Wyalkatchem	2,990,882	226,149	65,149	87,132	3,369,313	100.00%	225,757
Wyalkatchem - Mukinbudin	11,233,324	873,731	251,706	326,528	12,685,289	100.00%	872,213
Amery - Burakin	7,235,652	558,880	161,003	211,748	8,167,283	100.00%	557,909
Burakin - Kalannie	1,909,992	144,588	41,653	55,855	2,152,088	100.00%	144,337
Burakin - Beacon	6,323,157	506,998	146,057	184,726	7,160,937	100.00%	506,117
Millendon Junction - Moora	13,543,845	1,769,305	381,718	388,503	16,083,372	89.67%	1,494,854
Moora - Dongara	23,865,096	3,102,631	659,434	685,281	28,312,443	68.41%	1,994,433
Dongara - Narngulu	5,287,290	721,245	153,294	151,589	6,313,418	89.20%	604,579
Narngulu - Geraldton	[redacted]						
Dongara - Arrowsmith	6,781,859	566,654	152,874	197,850	7,699,238	0.00%	-
Narngulu - Mullewa	[redacted]						
Mullewa - Perenjori	[redacted]						
Perenjori - Maya	4,728,025	401,458	94,890	137,402	5,361,774	100.00%	384,670
Toodyay West - Miling	13,168,126	966,736	278,499	383,008	14,796,367	100.00%	965,056
Midland - Millendon Junction	[redacted]						
Millendon Junction - Toodyay West	[redacted]						
Toodyay West - Avon Yard	[redacted]						
Midland - Forrestfield	[redacted]						
Forrestfield - Cockburn South	[redacted]						
Cockburn South - Kwinana	[redacted]						
Kwinana - Balloon Loop	1,727,490	229,447	196,340	50,695	2,203,973	100.00%	329,985