+ This document is a working appraisal of the proponent's cost benefit analysis of the proposal. As the project has developed, more information has been provided, which may supersede or respond to questions arising from earlier assessments. This working appraisal was prepared in January 2011 as an input into the Project Assessment Brief prepared by the Office of the Infrastructure Coordinator.

WORKING ASSESSMENT FOR BENEFIT COST RATIO MODERATION (2010/11 Submissions)	
Project name	Majura Parkway (Federal Highway – Monaro Highway)
Brief project description	The project involves the upgrade of the existing road link between the Federal Highway and the Monaro Highway and consists of construction of an 11.5 km limited-access four-lane road and grade separated interchanges with the Federal Highway, Fairbairn Avenue and Monaro Highway.
Reported BCR @ 7%DR	3.32
Capital cost total – undiscounted, outturned	$288 million
% costs bid for (where relevant)	$144 million
Source documents for review	December 2010 Submission to Infrastructure Australia Majura Parkway February 2011 Feedback Session on the ACT Submission for the 2011 Infrastructure Pipeline
Date of review	24 Jan 2011
Review conducted by	
Key changes from previous submissions	The key changes to the submission include: • Further explanation as to why the Do Nothing base case was used • Further information on the demand modelling outputs have been provided • Maintenance cost have been updated from $28 million to $46 million based on recent Whole of Life cost analysis • Further information on how benefits for generated traffic are calculated have been provided

OVERALL SUMMARY

Overall summary (2-3 paragraphs on overall robustness of analysis and major points raised)

The overall appraisal appears to be robust. The main concern is the use of a Do Nothing base case. The base case assumes a Do Nothing scenario where travel time goes from 15 mins in 2009 to 40 mins in 2031. The option of upgrading the existing road could represent a more reasonable base case, .although the submission notes that upgrading of the existing road and associated linkages to a standard capable of accommodating heavy vehicles would have a similar capital cost to the project case as a result of extensive pavement improvements and linkages required to support the outcome (although a detailed breakdown of these capital costs has not been provided in the submission). Additional information provided by the ACT government in the feedback session provides further explanation for using a Do Nothing base case. ACT state that the associated costs and negative impact of upgrading the existing road would be larger than the proposed project case. Other supporting evidence given is that upgrading the existing road could trigger Federal Environmental assessments that would impact on the outcome of the proposal. Furthermore, it would only represent a short term solution and would cause congestion on other parts of the network. The arguments given for not using the upgrade of the existing road appear to be reasonable.

Other concerns include the treatment of accident costs and how the residual value is calculated. There could be double counting in the accident costs calculation. Accident costs are included in both the calculation of accident cost savings and the benefits from diverted traffic. This could result in the accident cost savings been counted twice in the BCR. However, any double counting would have a minor impact on the BCR because accident cost reduction benefits represent only around 1% of the total benefits. The residual value has been calculated by using the present value of the future benefits from year 30 to 40. Ideally the residual value for the road and bridge component should be calculated separately using different economic life assumptions. This is particularly relevant given that residual value represents 10% of the total benefit. Removing this benefit would reduce the BCR from 3.32 to approximately 3.0. This however could be difficult to do given that the residual value is calculated using present value of benefits from year 30 to 40. Additional information provided by the ACT also shows that bridge capex cost of the project represents approximately 30% of construction costs. Based on this it appears reasonable to assume a project life of 40 years.

Additional information provided by the ACT show that the maintenance costs has been updated from 28 million to 46 million (a 65% increase). This difference is likely to result in a 65% increase in the present value of maintenance costs. This would result in the present value of maintenance cost increasing from $9.5 million to $15.5 million. Preliminary estimates indicate that this would cause the BCR to go from 3.32 to 3.25. Further information on the demand modelling outputs has also now been provided. This provides clarity on the AM peak share of the traffic under the project case and base case.

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	1. Reported information (lift text directly if possible)	2. Supporting information provided (list key documents, not content)	3. Extra information required / requested / received	4. Benchmark / Questions / Things to look for	5. Assessment of variance or methodological weaknesses	6. Notes re: degree of variation to BCR (any calculation / reasoning)	7. One line summary of argument / rating	8. Rating
Guidance	"Cut and paste" text from proforma if possible	List supporting materials not included in proformas but included with bids (formally and informally)	List all information requested by IA: please note which materials were, and were not provided by jurisdictions. Also list areas to follow up / potential questions	See below	Insert the explanation of any differences or issues with theory, methodology or data used by the jurisdiction	Use this column, if required, to explain any reasoning for making an assessment of the scale of impact on the BCR, using figures if possible	Please insert one sentence summary of argument and conclusion reached	Significantly overstated; slightly overstated; broadly neutral; slightly understated; significantly understated.
Robustness of demand forecast								
1. Has demand been modelled in a robust and 'bottom-up' manner?	Strategic transport modelling of the whole Canberra and Queanbeyan urban area, using TransCAD, was initially conducted to produce the demand matrix used for micro-simulation modelling of the study area in Paramics.			• Has demand been modelled by a reputable transport modelling organisation? • Evidence of use of a city wide travel model which adds the proposal as a new option & measures diversions • How close to capacity is the service in the high AM peak hour • Have different fare levels & elasticity been evaluated & will service offer customer VFM against alternatives?	The demand forecast has been estimated using a bottom-up approach.	Demand modelling for different scenarios have not been conducted.	The demand forecast have been estimated using a bottom-up approach	Broadly neutral
2. Are the underpinning residential, employment and economic growth figures robust?	The ACT Government, through ACTPLA and TAMS, has provided the consultant with the latest updates on land use projections for the forecast years 2006, 2011, 2021 and 2031.			• Are current State or ABS projections used? • Are central growth forecasts used? • Are the transport demand forecasts directly linked to this data?	The land use figures used are from the ACT government.	This is envisaged to have a moderate impact on the BCR.	Land use projections are consistent with ACT government forecasts	Broadly neutral
3. Achievability of the demand forecast?	Vehicle kilometres travelled is estimated to increase from 24,505 kilometres (AM peak) in 2011 to 33,940 kilometres in 2031 for the base case. For the project case, vehicle kilometres travelled is estimated to increase from 37,009 kilometres in 2011 to 62,795 kilometres in 2031.			• Is the forecast justified by an in-depth analytical paper? • Is the forecast endorsed by independent Expert Peer Review? • Does forecast feature a gradual ramp-up (i.e. >4yrs)? • What % of patronage is induced demand (should typically be <20%) • Forecast patronage has been benchmarked to be broadly consistent with outcomes achieved on similar services? • Has the proponent factored the costs of greenhouse gas emissions into their economic planning, including obligations under the Carbon Pollution Reduction Scheme?	The substantial different in vehicle kilometres travelled in the base case and project is due to the Do Nothing base case. Further information was provided in the feedback session, explaining why the Do Nothing base case was used. The ACT government states that the upgrade of the existing road was not considered because it believed that the associated cost and negative impact would be larger than the proposed project case. Another supporting argument given is that the upgrade of the existing road could trigger Federal Environmental assessments that would impact on the outcome of the proposal. Furthermore, it would only represent a short term solution and would cause congestion on other parts of the network. The explanations appear to be reasonable.	The Do Nothing base case has a significant effect on the BCR	Substantial difference between base case and project case vehicle kilometres travelled due to using a Do Nothing base case	Broadly neutral based on information provided in the new submission

4. Sensitivity of BCR to demand	No sensitivity analysis for changes in overall demand has been conducted			• Does a 30% drop in demand significantly alter the BCR?	Ideally the submission should include sensitivity analyses for different demand scenarios. The submission uses a decrease in total benefits instead.	Sensitivity analysis for different demand scenarios has not been conducted.	Decrease in total benefits has been used as a sensitivity test instead of changes in demand.	Insufficient information
5. Is the base case realistic and fundable?	The base case used in the appraisal is a Do-Nothing Option. The feedback session provides further explanation as to why the upgrade of the existing road has not been considered as the base case or one of the options.			• What is Base Case patronage growth – is it in line with historical trends? • From the available information, is the base case capex and patronage a likely scenario, or is it overly loaded or light?	The submission states that the Do Nothing Case is not considered a viable option. The Do Nothing Case is not viable as the travel time is expected to increase from around 15 mins in 2009 to around 40 mins in 2031. A more realistic base case could be the upgrade of the existing road. This could have the following advantages: 1) it could represent a more realistic base case and 2) it would compare constructing the new road to upgrading the existing road. In the feedback session, the ACT government states that the upgrade of the existing road was not considered because it believed that the associated cost and negative impact would be larger than the proposed project case. Another supporting argument given is that the upgrade of the existing road could trigger Federal Environmental assessments that would impact on the outcome of the proposal. Furthermore, it would only represent a short term solution and would cause congestion on other parts of the network.	The Do Nothing base case has a significant effect on the BCR. ACT provided a reasonable explanation as why the Do Nothing base case was used in the feedback session.	The ACT government has provided a reasonable argument to why it used the Do Nothing as the base case.	Broadly neutral
6. Does hourly patronage profile match conventional AM & PM peak flows	1825 AM Peak and annualisation factor is used in the submission. The expansion factor is estimated by applying the existing peak hour to daily flow ratio. Recent 24 hour traffic count data collected for Canberra Airport Group along Majura Road provides a basis for estimating the peak hour to daily traffic flow. Further information provided by the ACT government in the feedback session shows share of the AM peak traffic under the project case and base case.			• Is the model scaled up to full year in a justifiable manner (e.g. annual patronage is normally 250-300 times AM high peak hour)?	In the submission, hourly patronage profile was not explicitly shown. The submission only indicates that the annualisation factor is 1825, but does not indicate the time or length of the AM peak analysed. Furthermore, the annualisation factor used is derived from data related only to one road rather than the whole network and may therefore be deceiving. The ACT government provided further details in the feedback session that shows the share of the AM peak traffic in the base case and option case.	The annualisation factor is envisaged to have a large impact on the BCR		Broadly neutral

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Robustness of cost base								
7. Robustness of capex forecasts	The capex cost for the project $288 million. This is a P90 cost estimate of the project design and construction costs			• Is the capex estimate supported by significant in depth work? • Was it produced by a reputable independent organisation?	The estimate is subject to further detailed design. However the P90 offers a conservative estimate of the cost.	This is envisaged to have a medium to large impact on the BCR.	The capex cost could change subject to further detailed design	Broadly neutral
8. Robustness of opex forecasts	In the original submission, the cyclic maintenance was assumed to occur every 5 years and was estimated at 0.5 of the construction cost for the first application and then 1% for the remaining application. Similarly for annual maintenance, its cost was estimated as 0.125% of construction for the initial years of application prior to the first cyclic maintenance, and is then raised to 0.25% of the construction cost. In years that the cyclic maintenance is applied, annual maintenance is assumed to be 0. Updated information provided by the ACT government shows that recent Whole of Life costing of the project indicates that the expected maintenance costs are expected to be $46.298 million instead of the $28.076 million.	No supporting information was given in the original submission		• Is the opex estimate supported by significant in depth work? • Was it produced by a reputable independent organisation?	No supporting information was giving given in the original submission. However, maintenance cost represents only a small proportion of the costs. The 18.222 million difference in maintenance cost would have a small impact on the overall economic performance of the project. The ACT government notes that this difference is much smaller than the increased costs in the sensitivity test 6 which gave a BCR of 2.77.	This is envisaged to have a small on the BCR	Increase in maintenance cost unlikely to have a large impact on the BCR	Broadly neutral
9. Consequential costs	No evidence of consideration of consequential costs.			• Are consequential costs to other parts of the network or other stakeholders taken into account? • E.g. land acquisition, higher costs due to the need to maintain service continuity & / or constructing around live traffic	No evidence of consideration of consequential costs.	N/A	N/A	N/A
10. Revenue treatment	No revenue generated directly from the project			• Is the treatment according to ATC guidelines and in line with best practice?	N/A	N/A	N/A	N/a
11. Construction cost inflation	No construction cost inflation has been indicated	N/A	N/a	• Is the construction cost inflated by a margin above CPI (e.g. construction cost CPI)?		N/A	N/A	Broadly neutral

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Key methodological questions								
12. Inflation rate	No inflation rate has been indicated	N/A	N/A	• What inflation rate is assumed and are any costs or benefits escalated by a different rate? • Do values reflect realistic real wages growth (e.g. 1.5% per year)?	N/A	N/A	N/A	No moderation of BCA required
13. Time period used	30 years			• Is the period of assessment valid given the lifespan of the project assets?	The analysis timeframe starts at the first year of construction instead of the first year of operation, thus the actual timeframe assessed is only 28 years. The method used to calculate the residual value means that this has little impact on the BCR.	The method used to calculate the residual value means that this has little impact on the BCR.	The method used to calculate the residual value means that the time period of analysis has little impact on the BCR.	broadly neutral
14. Residual value	The economic life of the project has been assumed to be 40 years. The feedback session provides further explanation to this assumption.			• Are residual values given when appropriate? • Are the values used justified?	This assumption has been made as the ATC guidelines recommend a 30 year life for road projects and a 'much longer life for bridges'. Ideally the residual value should be calculated separately for the road and bridges using different economic life assumptions. The residual value (valued at $705 million in 2042) is calculated using the present value of benefits from year 30 to 40. The 2010 submission shows that the bridge capex cost represents a significant proportion of the project's construction cost (around 30%). Based on this, it appears reasonable to use a 40 year life for the project.	The residual value of the project is around 10% of the project. This is calculated as the net present value of the benefits from year 30 to 40.	The 40 year life is based on the project having a significant bridge component.	Broadly neutral
15. Start and end timing, and phasing	Construction starts in 2013 with the project opening at 2015.			• Does benefit stream period start at the commencement of operation and cost stream at first expenditure? • Are construction costs ramped up in according with standard construction timetables?	No information has been provided.	No information on phasing has been provided	More information needed	More information needed
16. Benefits allocation	The benefits identified are as follows: 66% VOC saving (includes time savings), 1% accident cost savings, 16% generated traffic benefits, 2% environmental cost savings, 5% carbon cost savings, and 10% residual value			• Is the rule of half correctly applied (e.g. to benefits from existing PT users who change modes)? • Are all significant benefits identified? • Are all beneficiaries identified (e.g. benefits of roads to non road users?)	The magnitude of the benefits appears to be within expectation.	N/A	The benefit allocation of the project appears to be within expectation	Broadly neutral
17. Sensitivity analysis – risks? (Capital costs – Construction duration – Operating costs – Discount rate at 10% - changes in oil price)	Sensitivity analysis has been conducted for changes in heavy vehicle mix, changes in discount rate, increases in costs, decreases in benefits, a worse case where costs increases and benefits decreases, and changes in the value of carbon			• Do the reported sensitivity tests, for instance to the price of oil, suggest significant risks surrounding the central case? • How significant are +/-20% construction cost variations? • Does economic viability become negative at a 10% discount rate?	The submission conducts a wide range of sensitivity analysis. The BCR are all above 2.17 even for the worst case scenario.	This is expected to have a small impact on the BCR.	BCR is above 2.17 even for worst case scenario	Broadly neutral

18. Other methodological issues?	None identified			• Any there any other issues regarding the accuracy of methodology used that may significantly impact on the comparability of the BCR?	None identified	None identified	None identified	Broadly neutral
Values benchmarking								
19. Value of time savings: business, non business, freight; and Vehicle operating costs	The value of time and the VOC for existing traffic is calculated together using the Road User Cost (RUC) values by Austroads Generated traffic benefits are derived by calculating the consumer surplus of the diverted traffic. In the feedback session, additional information and algorithms have been provided in relation to the calculation of VOC and accident costs for generated traffic.	Austroads		• Are the values used recommended by the ATC? • Are these constant real through analysis period or do they factor in real growth (i.e. caution if real growth is >2%)	The consumer surplus for generated traffic is calculated by obtaining the difference in perceived price (assumed to be the sum of VOC and AC) for the base and project case. The inclusion of accident cost (AC) may be double counting the benefits as they are already included in accident costs. However, double counting accident costs would only have a small impact on the BCR. Additional information was provided by the ACT government in the feedback session. This shows how the calculations have been conducted. The methodology appears to be robust.	This is expected to have a small impact on the BCR.	Accident costs could be double counted in the BCR	Broadly neutral/slight overstate
20. Value of carbon emissions	The price of carbon is assumed to raise from $10/tonne CO@-e in 2011 to $80/tonne CO2-e in 2040 (2011 dollars)	Not sourced		• Is there a nexus with the patronage forecast? • Are the values used recommended by the ATC? • Has the proponent calculated the direct emissions of their proposal? (i.e. include all carbon emissions from the construction or operation of the structure • Has the proponent calculated indirect emissions of their proposal?	The reduction in carbon emissions was calculated using the total fuel consumption for the Canberra and Queanbeyan urban area from the strategic transport model using Austroads fuel consumption equations.	This is expected to have a small impact on the BCR.	The method that has been used could result in double counting of the benefits	Broadly neutral/slight overstate
21. Death/injury/crash costs, physical fitness and health impacts.	Accident costs are calculated using an accident cost per Million VKT by road type.	The parameters are sourced from the Economic Analysis Manual with the base case accident rate based on historic data		• Are the values used recommended by the ATC?	The approach is reasonable. There is an accident cost saving as the new road is assumed to be a freeway, which in general has a lower accident cost per million vehicle kilometres when compared to other road types.	This is expected to have a small impact on the BCR.	This appears to be reasonable	Broadly neutral
22. Noise, particle emissions and other environmental pollutants (NOX, NMVOCs, SOX, CH4, N2O) Noise impacts	The externality values are calculated for diverted traffic only. The values used are sourced from the RTA's Economic Analysis Manual.			• Are the values used recommended by the ATC?	The submission states that it is hard to calculate the externality costs for existing traffic. The submission states that externality costs are a function of not only kilometres travelled but also speed. Externalities increases with vehicle kilometres but decreases with speed. Thus it would be inappropriate to use the RTA values to calculate the change in externality costs. Externalities are calculated for diverted traffic as it is assumed to be diverted from more urbanised areas. The externality costs are assumed to be higher in urban areas were average travel speed is lower.	This approach makes economic sense however it is not a common approach. The common approach is to estimate the externality costs based on vehicle kilometres travelled. If the common approach was taken, this would likely have a negative impact on the BCR. However, externalities only account for 2% of the benefits and a change in approach would not have a significant impact on the BCR.	The approach taken is reasonable but it is not the conventional approach	Broadly neutral