Transport Roads & Traffic Authority

NSW GOVERNMENT

KAPOOKA BRIDGE

Value Management Option Selection Workshop

MAY 2011

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Executive Summary

The existing Kapooka Bridge is located on the Olympic Highway which serves as the major access between Victoria and the NSW Central West, as well as forming part of the Melbourne to Brisbane (Hume to Newell Highway) corridor. The Olympic Highway also serves as a major detour route when closures occur on the Hume Highway.

The Kapooka Bridge crosses the main Sydney to Melbourne railway line approximately eight kilometres south of Wagga Wagga. The existing alignment includes two <50 metre radius (90 degree) curves while the railway overbridge is too narrow for turning trucks and is not suitable for the operation of Higher Mass Limits (HML) heavy vehicles. The bridge also has insufficient clearance over the railway line for double stacking of containers and is only wide enough for a single railway track.

The Roads and Traffic Authority (RTA) has been developing options to replace the existing bridge over the railway line at Kapooka. The route options study to upgrade the Olympic Highway at Kapooka Bridge will investigate the construction of a new bridge to provide greater clearances over the Sydney to Melbourne railway line and realignment of the Olympic Highway to improve road safety and traffic efficiency.

From December 2010 to the end of February 2011, four alignment options for the replacement of the Kapooka Bridge were displayed for community consultation.

Following the community consultation and further investigation and design, the RTA decided to give no further consideration to the Underpass Option and the South Bridge Option.

The options subsequently developed and carried forward for further evaluation in the Value Management (VM) workshop were:-

- *Option 1:* Variation to the displayed North Bridge option with the intersection with Camp Access Road relocated further north to reduce the depth of cutting required on Camp Access Road.
- *Option 2:* Variation to the displayed North Bridge option with the intersection with Camp Access Road swapped to the eastern side of the new Olympic Highway alignment and with Camp Access Road passing underneath the Olympic Highway.
- *Option 3:* Variation to the displayed Two Bridges option with the Olympic Highway alignment to tie in with existing alignment to the east of the existing bridge and the Olympic Highway to divert east of existing alignment to allow for the Kapooka access bridge approach.
- *Option 4:* Variation to the displayed North Bridge option with the intersection with Camp Access Road located immediately north of the new bridge. The new bridge would consist of a three lane bridge including southbound acceleration lane.

The options were developed to a stage where a Value Management Option Selection Workshop was seen as the tool to bring together a range of stakeholders to consider the outcomes of the community consultation and specialist environmental studies.

The workshop involved a discussion of the options in order to gain a shared understanding of which option best met the project objectives.

The outcome from this Value Management Option Selection Workshop is one of several inputs into the selection of a preferred option and is not a decision making forum for the project.

The Australian Centre for Value Management (ACVM) was commissioned by RTA to facilitate and report on the Value Management Option Selection Workshop which was held on Thursday ***19 May 2011***.

A list of participants who attended the workshop is included in ***Appendix 1***.

This report has been compiled by ACVM and seeks to provide an objective overview of the project aspects discussed and the outcomes formulated by the end of the workshop.

Workshop objectives

The objectives of the workshop were to:-

- *Review and confirm amongst the stakeholders the drivers for and objectives of the project.*
- *Agree and weight assessment criteria to evaluate the options.*
- *Agree on the alignment option that best meets the objectives of the project.*
- *Capture sound reasons for this option to be considered as the preferred option.*

Workshop process and activities

The workshop agenda is included as **Appendix 2.**

The workshop started with the participants identifying aspects associated with the replacement of the Kapooka Bridge which were important in the consideration of replacement options. The participants then reflected on and affirmed the project drivers, the project objectives and the site constraints.

Draft option selection criteria developed prior to the workshop were presented to the group for comment and discussion. The participants settled on the key criteria that they believed could be used to differentiate between the options under consideration.

Relative weighting of the assessment criteria was undertaken by the whole group based on a paired comparison assessment process.

The replacement options considered and assessed to date were presented and the short list of options to be compared was agreed.

The participants then evaluated the performance of the options against the weighted criteria. The process involved the group as a whole determining the relative performance of each option against each criterion on a 1 (poor) to 5 (excellent) scale. The assessment was then converted to a numerical score to give a ranking for each option. The comparative estimated cost of the options was then considered to complete the assessment.

Workshop outcomes

By the end of the workshop, the participants had:

- **Confirmed** the *drivers* for the replacement of the Kapooka Bridge were:-
  - The need for improved road and rail safety.
  - The need to address the poor condition of the existing bridge.
  - The need to provide for growth in demand and traffic load capability.

- **Identified** and **weighted** qualitative assessment criteria to be used to differentiate and evaluate the options. The assessment criteria used were:-
  - *Safe ingress and egress for road traffic to Camp Access Road.*
  - *Minimise road user costs and whole of life costs.*
  - *Safety and utility for road traffic using the Olympic Highway.*
  - *Minimise the extent of impacts of property acquisition.*
  - *Minimise the impact on property usage and residents, including noise, land use, visual, individual environmental amenity and provide safe access.*
  - *Safety and convenience for cyclists and pedestrians.*
  - *Minimise environmental impacts including ongoing impacts.*
  - *Minimise impacts to Aboriginal and non Aboriginal cultural heritage.*

- *Minimise the risks and costs associated with the disturbance of the contaminated land and public utility adjustments required.*

- **Identified** an alternative option labelled as ***Option 2B***. Option 2B included all the features of Option 2 as presented but with a slip lane from Camp Access Road to the new Olympic Highway, eliminating the right hand turn movement for traffic travelling from Kapooka Military Base to Wagga Wagga.
- **Evaluated** the options against the weighted criteria (***refer Section 3***) and completed a sensitivity assessment through a re-evaluation of the criteria weightings.

Conclusions

The conclusions drawn at the completion of the evaluation exercise in relation to the individual options as assessed were:-

Option 1: Revised North Bridge option (Kapooka access west of highway)

Option 1 is deemed to have the highest level of impact on property as it would involve the removal of a residential dwelling, while other options would require land acquisition but leave the existing residences. This option is also deemed to have the lowest overall amenity, particularly for Camp Access Road traffic, due to the length of high cut on both sides of the road. No beneficial trade offs in relation to safety are identified with this option. It was considered that it is unlikely that Option 1 will be considered further given its poor score relative to other options.

Option 2: Option 2 (Kapooka access east of highway)

Option 2 as shown is unlikely to be pursued further unless the option enhancement of providing a slip lane proves to be technically possible and/or less costly. The revised option 2B is deemed to offer larger road safety benefits through eliminating the Kapooka to Wagga cross traffic movement. The inclusion of a seagull intersection would be an option to enhance safety for Option 2.

Option 2B: Option 2 (Kapooka access on east with slip lane for Kapooka to Wagga traffic)

Option 2B offers significant safety advantages in relation to vehicle turning movements as it would eliminate the cross highway traffic movement for Kapooka to Wagga traffic and subsequently remove a conflict point. Provision for safe access for cyclists is improved with the addition of a slip lane as cyclists would use the shoulder without crossing traffic. This option will be further developed.

Additional investigations required in relation to Option 2B include:-

- Consideration of the culvert capacity and drainage design for the underpass.
- More detailed consideration of the bridge details including clear spans across the underpass.

Option 3: Revised Two Bridges option

Option 3 to be retained as a remote possibility but is unlikely to be pursued further given the ongoing maintenance costs of two bridges over the rail line and the relatively low score from the assessment. Option 3 might be reconsidered if the costs for Options 2B or 4 escalate significantly.

Option 4: Revised North Bridge option with deviation east

Option 4 provides a good overall level of performance when compared to the capital cost and will be further developed in conjunction with Option 2B. The wider highway alignment was deemed to have better outcomes in terms of sight distance and grade in comparison to joining the existing highway alignment.

Additional investigations required in finalising the selection of the preferred option include:

- Further geotechnical investigations in relation to road and bridge alignments.
- Utility impacts and costs.
- Soil contamination and the need for remediation of the former fuel depot site.

- More detailed discussions with ARTC in regard to the duplication of the railway line.
- Discussions and considerations in relation to biocertification impacts on the land east of the highway.
- Consideration of the Option 2 slip lane option.
- Impacts of lighting intersections on adjacent property residents.

Section 1. Kapooka Bridge Project Status

Project description

The RTA's route options study aims to select an option for the construction of a new bridge and realignment of the Olympic Highway at Kapooka. The new bridge will replace the existing structure over the Sydney to Melbourne railway line. From December 2010 to the end of February 2011, four alignment options for the replacement of the Kapooka Bridge were displayed for community consultation.

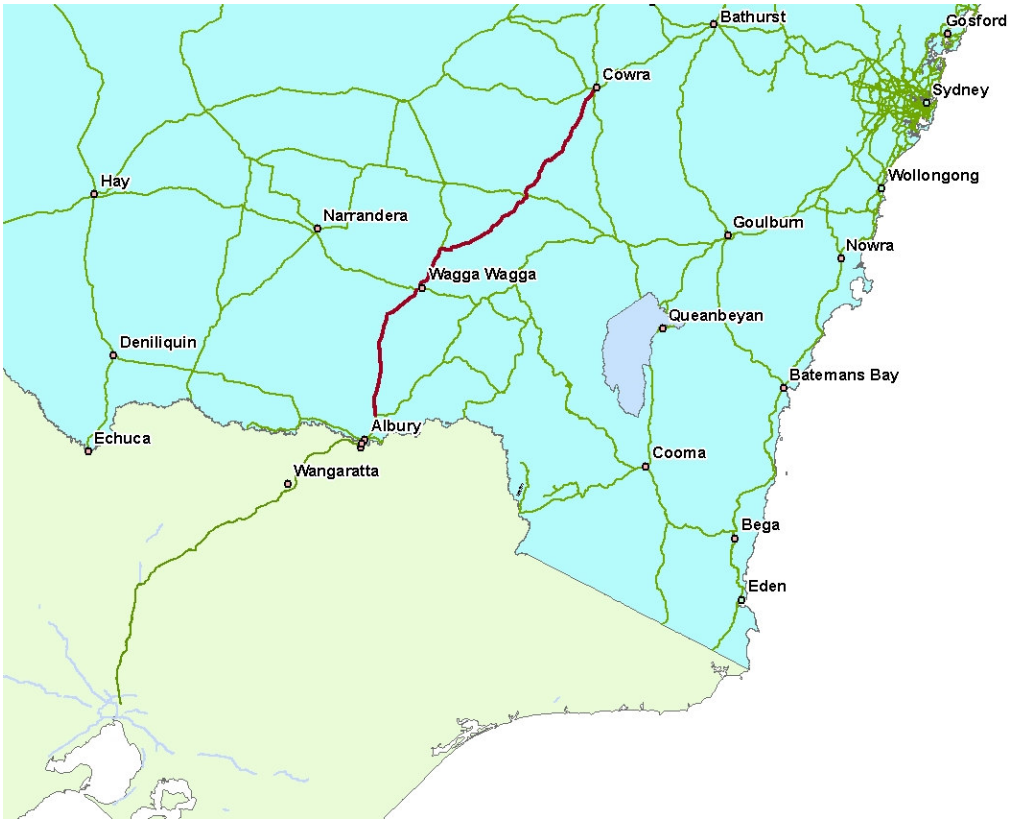
Project issues

Strategic importance of the Olympic Highway

- Provides access between Victoria and Central West NSW and Brisbane.
- Provides a major detour route when incidents close the Hume Highway.

Project location

- Eight kilometres south of Wagga Wagga.
- Crossing the Sydney to Melbourne railway line.
- Access to Kapooka Military Area.

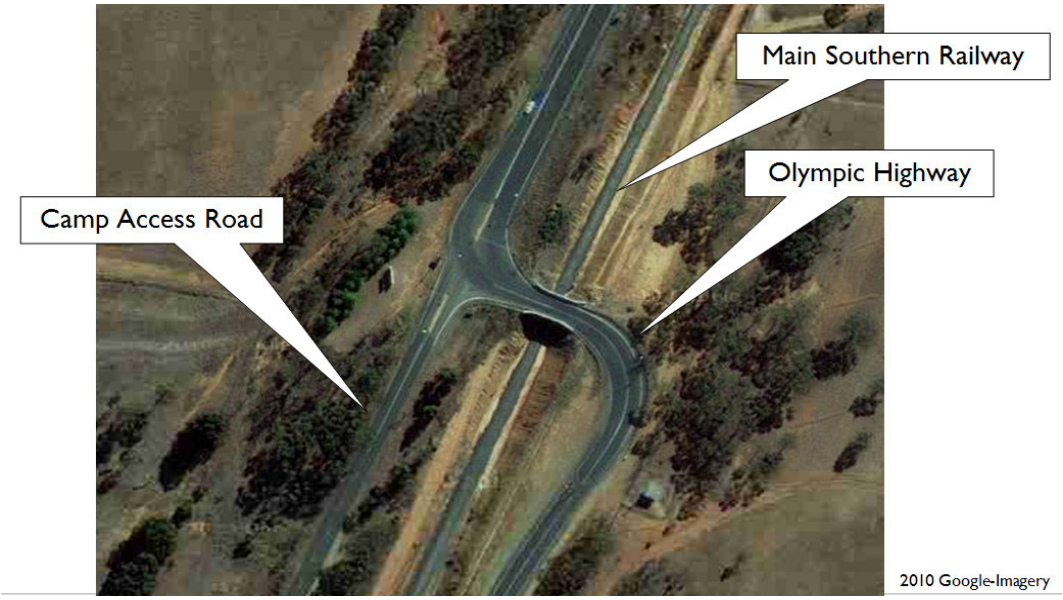


Project status

- Community consultation on four alignments completed.
- Environmental constraints mapping completed.
- Aboriginal cultural investigations completed.

- Major utilities located.

Aerial view of the existing Kapooka Bridge



Previously displayed options

- Four options were displayed for community consultation from December 2010 to the end of February 2011:
  - Underpass option.
  - South Bridge option.
  - North Bridge option.
  - Two Bridges option.

Consultation outcomes

The community consultation highlighted the following factors to be considered for a preferred option:

- Impact on environmentally sensitive land and threatened species habitat.
- Safety for vehicles exiting Kapooka Military Area and through traffic (particularly heavy vehicles) on the Olympic Highway.
- Impact on surrounding residents, particularly the noise impact from trucks braking or changing gears.
- High cost of utility relocation.
- Loss of property value.
- Large extent of cut and fill for some options.

As a result of the community consultation, environmental reports and technical considerations, the Underpass and South Bridge options were no longer considered favourable alignments by the RTA.

Reasons for not proceeding with the Underpass option included:

- Of the four options, this option had the greatest impact on private property as it would require significant acquisition of productive grazing land.
- The proposed alignment involved significant amounts of excess cut material which would need to be disposed of at high cost.

- Drainage from the low point of the underpass was considered difficult to implement without significant infrastructure.
- Further road safety improvements were considered necessary to improve the sight distance for vehicles travelling under the railway line.

The South Bridge option was considered not suitable for further investigation due to:

- Significant noise and visual impact on the Kapooka Military Base residential area.
- The construction difficulties posed by the difference between the existing road level and the proposed road.
- The large numbers of trees required along the existing Olympic Highway and Camp Access Road reserves.

Environmental reports

Specialist environmental reports have identified the following constraints to the project:

- Sensitive archaeological landform located to the west of the existing bridge.
- High vegetation sensitivity, particularly to the north and east of the existing bridge.
- Biodiversity conservation zone located to the east of the existing bridge.
- High potential for contamination of land from the former fuel depot.
- Noise sensitivity for residents close to alignment options.

Technical considerations

Technical project issues to be considered relate to road safety design criteria and construction. These considerations include:

- Providing for safe sight distance at intersections and across the bridge(s).
- Providing a safe road alignment suitable for a 100 km/h posted speed limit.
- Limiting the height of cut and fill to reduce the overall cost and ongoing maintenance requirements.
- Maintaining vertical and horizontal clearances to meet railway traffic and maintenance requirements.
- Relocation of major utilities including high pressure gas, water and optical fibre.
- Providing for safe intersection design.
- Providing for cyclists.

Section 2. Analysis Phase

What's important statements

The participants initially reflected on what they considered to be important in the replacement of the Kapooka Bridge. Individual statements were consolidated into subgroup responses and were presented and discussed. The items listed are reproduced below:-

Group 1

- Limit the loss of valued environmental amenity.
- Limit the land take and loss of amenity.
- Safe access to Kapooka and for local properties.
- Safety for through traffic.
- Maintain rail clearances, including vertical clearances, and for possible track duplication.
- Minimise disruption to road and rail traffic and local residents during construction.
- Preservation of landholder privacy.
- Proceed with the work as soon as possible.

Group 2

- Improve safety for all road users.
- Maintain rail clearances for now and the future.
- Address the constraints of the utilities and fuel depot.
- Ensure the preferred option is constructible.
- Improve road efficiency.
- Minimise the impact on the environment.
- Minimise the impact on land owners.
- Ensure the option is cost competitive.

Group 3

- Ensure safe access for property owners.
- Address the noise from high speed traffic on property owners.
- Locate the road to minimise noise impacts on the married quarters at Kapooka.
- Consider the impacts of the options on possible subdivision of land holdings.
- Consider the impacts to critically endangered vegetation communities that are State and Federally listed.
- Minimise impacts on squirrel gliders habitat (State listed species).
- Minimise the impacts of threatened woodland species.
- Minimise the cumulative impacts from future rail augmentation.
- Provide connectivity for fauna under road.
- Consider the impacts of possible contamination of the fuel depot.
- Minimise the removal of other fauna habitats.

Group 4

- Reduce road accidents at the site.
- Maintain access for the surrounding properties, Army Base and quarry.
- Reduce the possibility of catastrophic rail accidents.
- Reduce travel times on Olympic Highway.
- Minimise environmental impacts including those on the community.
- Reduce impacts on agriculture.

- Minimise need for property acquisition as far as practicable.
- Raise standards to comply with the rest of the highway.
- Provide a safer bridge for future maintenance, operation and inspections.
- Ease of construction.
- Minimise disturbance to road users, rail and property owners.
- Provide a visually pleasing outcome.
- Achieve a value for money outcome.
- Have an option that is simple to construct.
- Have an option that is safe to construct and maintain.
- Minimise impacts on nearby properties including noise, views to and from properties.

Group 5

- Provide some certainty and timeframe to resolve property issues with landowners.
- Provide a safe intersection with Kapooka Camp road.
- Provide a "trouble free bridge' to reduce delays, and risk to rail.
- Design to comply with relevant RTA urban design principles.
- Ensure the option is easy to construct.
- Consider whole of life costs.
- Manage the utilities and land contamination.

Project drivers

The project drivers for the replacement of the Kapooka Bridge were presented to the participants and effectively endorsed. The agreed drivers were:-

Road and rail safety

- Poor approach alignment.
- Heavy vehicle crash history.
- Risk of truck or debris falling onto rail.
- Bridge width – heavy vehicles cross centreline.
- Poor visibility in fog.
- Relationship to Camp Access Road intersection.
- Low rail clearances both horizontal and vertical.

Bridge condition

- Ongoing maintenance costs to NSW government (Country Rail Infrastructure Authority).
- Only HML restriction on the Olympic Highway.

Growth in demand

- Increased traffic from Kapooka Military Area expansion.
- Increased traffic from growth within Wagga Wagga and Albury.
- Increased freight demand.
- Cyclist and pedestrian demand to Kapooka Military Area.

Project objectives

The project objectives listed for the Kapooka Bridge were:-

- Improved road safety for all road users.
- Improved road geometry and alignment for traffic efficiency including HML compliance.
- Improved rail safety and efficiency by removing obstructions and improving clearances.
- Improved access for pedestrians and cyclists.
- Minimise impacts on the local community – particularly noise, privacy and amenity.
- Reduce ongoing maintenance costs to NSW government.
- Minimise negative environmental impacts.

Site constraints

The site constraints impacting on options selection as presented included the following items:-

Environmental

- Squirrel glider habitat.
- Aboriginal heritage.
- Impact on Box gum woodland.

Contamination

- Former fuel depot

Utilities

- Kapooka Military Area services.
- Major gas line.
- Water main on western side.
- Rail signalling.
- Optic fibre.

Topography

- Railway cuttings.
- Undulating, some steep hills.

Land use

- Kapooka Military Area.
- Small scale agricultural.
- Quarry.
- Future land use – possible subdivisions.

Railway corridor

- Vertical clearance.
- Track duplication.

Possible evaluation criteria

An initial suite of option evaluation criteria was identified and each criterion was subsequently debated. It was noted that there was a need to ensure that each criterion:-

- Was discrete.
- Would enable differentiation between options.

The evaluation criteria eventually endorsed by the participants as being appropriate for option evaluation are noted below:-

#	***Criteria***
A	Safe ingress and egress for road traffic to Camp Access Road.
B	Minimise road user costs and whole of life costs.
C	Safety and utility for road traffic using the Olympic Highway.
D	Minimise the extent of property acquisition.
E	Minimise the impact on property usage and residents, including noise, land use, visual, individual environmental amenity and provide safe access.
F	Safety and convenience for cyclists and pedestrians.
G	Minimise environmental impacts including ongoing impacts.
H	Minimise impacts to Aboriginal and non Aboriginal cultural heritage.
I	Minimise the risks and costs associated with the disturbance of the contaminated land and public utility adjustments required.

Weighting of assessment criteria

Relative weighting of the assessment criteria was carried out by the whole group using a paired comparison approach. The process involves assessing the relative importance of each criterion. A weighting is then assigned to each preference, ie a weighting of 3 assigned for a major preference, a weighting of 2 for a medium preference and a weighting of 1 for a minor preference. If the group is unable to differentiate between the two criterions under consideration they are given equal weight.

There was extensive discussion during this process which allowed the group to understand and appreciate various perspectives. The group's workings and their weightings of the assessment criteria are shown below:

Scoring matrix

	B	**C**	**D**	**E**	**F**	**G**	**H**	**I**
A	3A	A/C	2A	2A	3A	3A	3A	3A
	B	3C	2D	2E	2F	1G	1H	2I
		C	2C	3C	1C	3C	3C	3C
			D	1E	2F	2G	D/H	2D
				E	2F	E/G	E/H	2E
					F	3F	3F	3F
						G	G/H	3G
							H	H/I

#	*Criterion*	*Raw score*	*Weighted score*
A	Safe ingress and egress for road traffic to Camp Access Road.	19.5	26
B	Minimise road user costs and whole of life costs.	0	0
C	Safety and utility for road traffic using the Olympic Highway.	18	24
D	Minimise the extent of impacts of property acquisition.	4.5	6
E	Minimise the impact on property and residents, including noise, land use, visual, individual environmental amenity and provide safe access.	6	8
F	Safety and convenience for cyclists and pedestrians.	15	20
G	Minimise environmental impacts including ongoing impacts.	7	9
H	Minimise impacts to Aboriginal and non Aboriginal cultural heritage.	3	4
I	Minimise the risks and costs associated with the disturbance of the contaminated land and public utility adjustments required.	2.5	3
	Totals	75.5	100

Section 3. Assessment Phase

Alignment options considered at the workshop

Variations to the North Bridge and Two Bridges options were discussed at the Value Management Option Selection Workshop. These options are identified below and plans of the options are attached. Note that option numbering does not reflect the RTA's order of preference.

Option 1: Revised North Bridge option (Kapooka access west of highway)

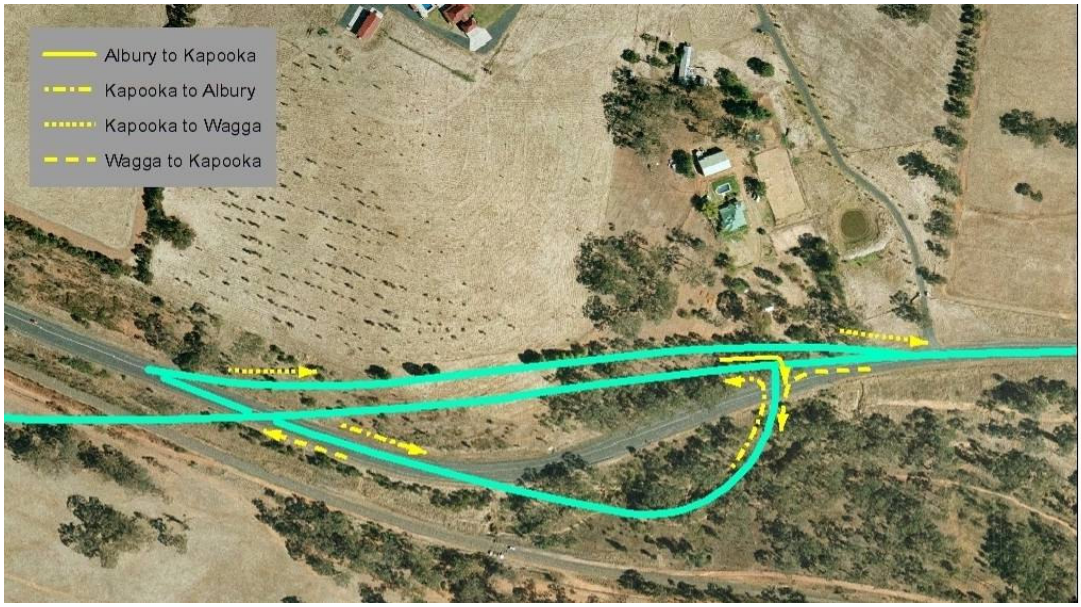
This option is a revised version of the North Bridge option. In this option, the intersection with Camp Access Road has been moved to the north to improve the intersection sight distance and reduce the depth of the Camp Access Road excavation.

Option 2: Revised North Bridge option (Kapooka access east of highway)

This option is a second revised version of the North Bridge option. In this option, the intersection with Camp Access Road has been changed to the eastern side of the existing Olympic Highway alignment. Camp Access Road would continue underneath the new highway alignment.

Option 2B: Option 2 (Kapooka access on east with slip lane for Kapooka to Wagga traffic)

This option is similar to Option 2, however traffic travelling north on Camp Access Road to Wagga Wagga would use a slip lane merging with the new Olympic Highway alignment to the north of the new eastern side Camp Access Road intersection. This would remove the need for Wagga Wagga bound Camp Access Road traffic to cross southbound Olympic Highway traffic.



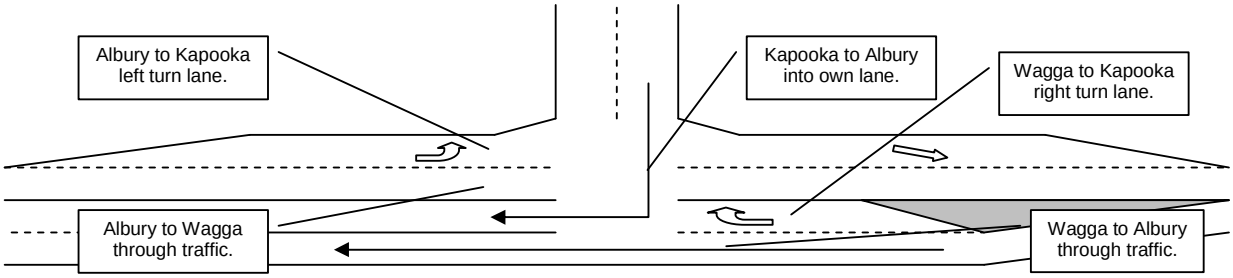
Option 3: Revised Two Bridges option

This option is a revised version of the Two Bridges option. In this option, the Olympic Highway would cross the railway line to the north of the existing bridge. Camp Access Road would cross over a second bridge south of the existing bridge. This alignment proposal more closely follows the existing alignment rather than diverting to the east.

Option 4: Revised North Bridge option with deviation east

This option is a revised version of the North Bridge option including a highway alignment similar to the original Two Bridge option. In this option, a single bridge would be built over the railway line, with the Olympic Highway diverting further to the east around the rear of the former fuel depot site. The

intersection for Camp Access Road would remain on the western side of the highway with Wagga Wagga to Kapooka traffic turning right. This option would consist of a three-lane bridge and include an acceleration lane for traffic exiting Camp Access Road, turning right and continuing towards Albury.



Following on from the overview of options the participants started the process of assessing options. The assessment details follow.

Assessment of the options

The options identified as Options 1, 2, 2B, 3 and 4 were assessed using the weighted assessment criteria. The options were assessed relatively and on a qualitative basis of how each option met each criterion on a scale of 5 through to 1. The best performing option was generally given the highest rating and the other options were given a rating based on its relative performance against that criterion. The group assessed the options against each criterion using an 'on balance' approach. The aggregated score for each option was determined by adding the individual criterion scores. The results are shown in the table on the next page.

Order of capital cost estimates

Strategic cost estimates have been derived for the options under consideration. The estimates, which are preliminary in nature and include a 70 per cent contingency allowance, were used as an indicator of relativity.

Option	Strategic Capital Cost $ M
Option 1:	$51
Option 2:	$49
Option 2B (estimated on the day)	$50
Option 3:	$46
Option 4:	$43

The strategic cost estimate was then overlayed on the evaluation matrix and the combined information used to draw some conclusions.

Assessment of the options

The options identified as Options 1, 2, 2B, 3 and 4 were assessed using the weighted assessment criteria. The options were assessed relatively and on a qualitative basis of how each option met each criterion on a scale of 5 through to 1. The best performing option was generally given the highest rating and the other options were given a rating based on its performance against that criterion. The group assessed the options against each criterion using an 'on balance' approach.

The aggregated score for each option was determined by adding the individual criterion scores. A preliminary estimate of the capital cost was then overlayed on the evaluation matrix and the combined information used to draw some conclusions

Options	***Wt***	***Option 1***		***Option 2***		***Option 2B***		***Option 3***		***Option 4***	
		No.	∑	*No.*	∑	*No.*	∑	*No.*	∑	*No.*	∑
Safe ingress and egress for road traffic to Camp Access Road.	26	1	26	3	78	4	104	2	52	2	52
Minimise road user costs and whole of life costs.	0	2	0	1	0	1	0	1	0	3	0
Safety and utility for road traffic using the Olympic Highway.	24	2	48	2	48	2	48	2	48	4	96
Minimise the extent of impacts of property acquisition.	6	1	6	5	30	4	24	2	12	2	12
Minimise the impact on property and residents, including noise, land use, visual, individual environmental amenity and provide safe access.	8	1	8	4	32	4	32	2	16	2	16
Safety and convenience for cyclists and pedestrians.	20	3	60	3	60	5	100	3	60	3	60
Minimise environmental impacts including ongoing impacts.	9	2	18	2	18	1	9	4	36	2	18
Minimise impacts to Aboriginal and non Aboriginal cultural heritage.	4	4	16	4	16	4	16	2	8	4	16
Minimise the risks and costs associated with the disturbance of the contaminated land and public utility adjustments required.	3	2	6	2	6	2	6	1	3	3	9
Total Weighted Score			***188***		***288***		***339***		***235***		***279***
Estimated Capital Cost ($ M)			***51***		***49***		***50[1]***		***46***		***43***
Total Score / Est. Capital Cost			***3.7***		***5.9***		***6.8***		***5.1***		***6.5***

[1] Cost estimated on the day.

Section 4. Conclusion and next steps

The Value Management Option Selection Workshop process involved all relevant stakeholders discussing, confirming and then evaluating the assessment criteria. Assessment criteria evaluation involved discussion in small groups, as well as a whole, to determine which of the options presented best met the agreed criteria.

The conclusions drawn at the completion of the assessment phase in relation to the individual options were:-

Option 1: Revised North Bridge option (Kapooka access west of highway)

Option 1 is deemed to have the highest level of impact on property as it would involve the removal of a residential dwelling where other options would require land acquisition but leave the existing residences. This option is also deemed to have the lowest overall amenity, particularly for Camp Access Road traffic due to the length of high cut on both sides of the road. No beneficial trade offs in relation to safety are identified with this option. It was considered that it is unlikely that Option 1 will be considered further given its poor score relative to other options.

Option 2: Option 2 (Kapooka access east of highway)

Option 2 as shown is unlikely to be pursued further unless the option enhancement of providing a slip lane proves to be technically possible and/or less costly. The revised option 2B is deemed to offer larger road safety benefits through eliminating the Kapooka to Wagga cross traffic movement. The inclusion of a seagull intersection would be an option to enhance safety for Option 2.

Option 2B: Option 2 (Kapooka access on east with slip lane for Kapooka to Wagga traffic)

Option 2B offers significant safety advantages in relation to vehicle turning movements as it would eliminate the cross highway traffic movement for Kapooka to Wagga traffic and subsequently remove a conflict point. Provision for safe access for cyclists is improved with the addition of a slip lane as cyclists would use the shoulder without crossing traffic. This option will be further developed.

Additional investigations required in relation to Option 2B include:-

- Consideration of the culvert capacity and drainage design for the underpass.
- More detailed consideration of the bridge details including clear spans across the underpass.

Option 3: Revised Two Bridges option

Option 3 to be retained as a remote possibility but is unlikely to be pursued further given the ongoing maintenance costs of two bridges over the rail line and the relatively low score from the assessment.

Option 3 might be reconsidered if the costs for Options 2B or 4 escalate significantly.

Option 4: Revised North Bridge option with deviation east

Option 4 provides a good overall level of performance when compared to the capital cost and will be further developed in conjunction with Option 2B. The wider highway alignment was deemed to have better outcomes in terms of sight distance and grade in comparison to joining the existing highway alignment.

Additional investigations required in finalising the selection of the preferred option:

- Further geotechnical investigations in relation to road and bridge alignments.
- Utility impacts and costs.
- More detailed discussions with ARTC in regard to the duplication of the railway line.
- Discussions and considerations in relation to biocertification.
- Consideration of the Option 2 turn out option.

The outcomes of the Value Management Option Selection Workshop will assist the RTA in determining which option is preferred and will be further developed for implementation.

The RTA would like to thank the participants at the workshop for the generous contribution of their time and energy in this valuable step in the project development process.

Appendix 1. Participants

Tim Wilson (Project Development Manager)	RTA South West Region
Steve Warrell (Regional Manager)	RTA South West Region
Rodney Job (Lead Road Designer)	RTA South West Region
Lachlann Croker (Road Designer in Training)	RTA South West Region
Wayne Walgers (Technical Services Manager)	RTA South West Region
Phil Bain (Road Design Manager)	RTA South West Region
Michial Sutherland (Senior Environmental Officer)	RTA South West Region
Chew Leong (Project Manager, Project Services)	RTA South West Region
Jeff Rheinberger (Project Services Manager)	RTA South West Region
Lee Kok (Supervising Geotechnical Scientist)	RTA South West Region
Ragavan Vythilinkam (Bridge Engineer)	RTA South West Region
Ross Dearden (Senior Projects Manager)	RTA Development Program Branch
Michelle Forwood (Mgr Environmental Planning and Assessment)	RTA Environment Branch
Josie Stokes (Snr Environ Officer - Biodiversity)	RTA Environment Branch
Max Hosgood	Wagga Council
Tony Phelps	Wagga Council
Michael Irons	ARTC
Dennis Harrison	CRIA
Bruce Rosler	Kapooka Military Area
Russ Mullins	Kapooka Military Area
Paul Pulver	Freight Industry
Peter Andrews	Urban Designer
Jennie McDermott	Land Owner
Geoff Kidd (pm only)	Land Owner
Peter Jeal	Land Owner
Kris Coulter	Land Owner
Robert Hartwig	Land Owner
Robert Taylor	Land Owner
Kerry Delaney	Land Owner
Sally Cox	Land Owner
Chris Laird	ACVM facilitator

Appendix 2. Workshop Agenda

8.45 am	**Coffee**	
9.00 am	**Introduction**	
	• Welcome and Strategic Context	Steve Warrell
	• Description of the workshop process	Chris Laird
	• Workshop Objectives	All
	Information Phase	
	Presentation #1:- *Project background and overview, strategic context, project history, and current status (10-15 mins)*	Tim Wilson
	Analysis Phase	
	• Identify what important in relation to the Kapooka Bridge • Review / confirm the drivers for the project • Review / confirm the project objectives • Identify givens or constraints • Identify and weigh assessment criteria to evaluate the options	All
12.30 pm	**Lunch**	
	Review and Assessment of Options	
	Presentation # 2:- *Overview of the options considered including alignments and relevant technical features*	Tim Wilson
	Assessment	
	• Analysis of the options • Other options worthy of consideration • Evaluation of options using assessment criteria and project objectives	All
	The Way Forward	
	• Recommend an option/direction to progress the project	All
	• Summary of workshop outcomes and decisions	All
	• Where to from here?	Steve Warrell
5.00 pm	**Close**	TBA