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SCONE LEVEL CROSSING FEASIBILITY ASSESSMENT

Option identification report

MAY 2012

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Scone level crossing feasibility assessment

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May 2012

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Glossary of Terms

AEP	annual exceedance probability
ARTC	Australian Rail and Track Corporation
CBD	Central Business District
DECCW	Department of Environment Climate Change and Water
DoIT	Department of Infrastructure and Transport
EPBC Act	Environment Protection and Biodiversity Act
km	Kilometre(s)
LHTNS	Lower Hunter Transport Needs Study
m	Metre(s)
MNR	Main Northern Railway
MCDA	Multi Criteria Data Analysis
Mtpa	million tonnes per annum
NEH	New England Highway
NLTN	National Land Transport Network
OEH	Office of Environment and Heritage
RMS	Roads and Maritime Service
TfNSW	Transport for NSW
UHSC	Upper Hunter Shire Council
VMS	Value Management Study

Executive summary

Roads and Maritime Service (RMS), on behalf of the Australian Government, has engaged AECOM to undertake an Options and Feasibility Assessment to consider the impacts of rail operations on the New England Highway (NEH) (Kelly Street) rail level crossing at Scone, NSW, and identify a preferred solution. This project is being funded under the Australian Government's Regional Infrastructure Fund.

The purpose of this Options identification report is to identify current and anticipated impacts of rail operations on the function of the NEH (Kelly Street) rail level crossing on the community of Scone and recommend preferred short and long term options. Potential short term and long term options will then be considered through an options and feasibility assessment.

The NEH forms part of the Sydney-Brisbane Corridor of the National Land Transport Network (NLTN). The Main Northern Railway (MNR) between Newcastle and Werris Creek is also part of the NLTN.

The Kelly Street rail level crossing at Scone is the last remaining level crossing on the NEH, and is located approximately 150 km north-west of Newcastle. Approximately 5,000 people live in the Scone area, with the town bisected by the both the NEH and railway line.

With the future expansion of coal mining in the Gunnedah basin, the frequency of trains through Scone is predicted to significantly increase in the short term. This will further exacerbate the current interface between the railway line, NEH and emergency services, thereby separating the east and west areas of town.

Initial work on the assessment included reviewing previous studies, preparing constraints mapping, liaison with stakeholders and reviewing community feedback from the August 2011 meeting. Subsequently, a range of options were developed and refined in two workshops held with stakeholders.

The workshops used a multi criteria analysis approach to refine options from approximately twenty to four. The workshops included participants from AECOM, RMS, Australian Rail and Track Corporation (ARTC), Upper Hunter Shire Council (UHSC), Department of Infrastructure and Transport (DoIT), and Transport for NSW. The workshops raised positive discussion around the options for the level crossing at Kelly Street.

The four long term options that have been identified for further development and consideration in the Options and feasibility assessment are:

- Option 2.0A – NEH bypass to the west of town (bridge south of Scone).
- Option 2.10 – Realign NEH to Muffett Street (bridge north of Scone).
- Option 3.0A – Road over rail bridge at the Kelly Street rail crossing.
- Option 4.0A – Rail realignment and new railway station to the west of Scone.

In conjunction with ARTC, one potential short term option has been identified to date. This option is the provision of an additional rail level crossing in the vicinity of the Scone Saleyards, south of the existing level crossing. This crossing would be for the use of emergency vehicles only in the event that both the Kelly Street and Liverpool Street crossings were closed for extended periods of time.

Contents

List of Figures

List of Appendices

1 Introduction

1.1 Background

The Kelly Street rail level crossing at Scone is the last remaining level crossing on the New England Highway (NEH). Scone is located approximately 150 km north-west of Newcastle, approximately two hours' drive from Hexham. A local community of around 5,000 people live in and around Scone, which has an international reputation for horse breeding.

The town straddles both the NEH and the Main Northern Railway (MNR), which both run north- south through the town. Scone is topographically constrained to the east by Scone Mountain and Scone Mountain National Park and to the west by Kingdon Ponds, Middle Brook and Dart Brook watercourses. These features provide natural constraints to potential infrastructure development in the area.

The main thoroughfare, Kelly Street (NEH), runs through the heart of Scone's central business district (CBD) to the east of the MNR rail line providing indirect access to the train station and the town services. The town is serviced by two at-grade rail level crossings:

- Kelly Street (NEH), situated to the north of the CBD, which is the last remaining level crossing on the NEH.
- Liverpool Street, which links Scone in an east-west direction, providing the primary east-west arterial connection for Scone and Satur.

Roads and Maritime Service (RMS), on behalf of the Australian Government, is undertaking an options and feasibility assessment of the NEH (Kelly Street) rail level crossing at Scone, NSW.

1.2 Need for the project

The Lower Hunter Transport Needs Study (LHTNS) identified the rail level crossing on the NEH in Scone as a candidate project for infrastructure improvements within the short term and recommended grade separation.

Current coal train operations from the Gunnedah area through Scone at times divide the town, concurrently closing access at both the NEH and Liverpool Street rail level crossings. There has been public interest in addressing the issue considering the clear potential increase in coal train haulage along the MNR. Indicative contractual volumes through Scone from the Werris Creek-Murulla Section presented by Australian Rail and Track Corporation (ARTC) (*2011-2020 Hunter Valley Corridor Capacity Strategy Consultation Document,* ARTC, March 2011) show approximately 10 Million tonnes per annum (Mtpa) in 2011 increasing to approximately 22 Mtpa in 2020. In addition to these indicative contractual volumes the report indicated that the growth in total coal haulage will be significantly higher with total prospective volume estimates by (ARTC) at approximately 1 Mtpa in 2013, 7.5 Mtpa in 2014, 10.5 Mtpa in 2015, 30 Mtpa in 2016, 36 Mtpa in 2017 and then stabilising at 46 Mtpa from 2018 (refer to Section 3).

1.3 Project objectives

The objective of the project is to identify current and anticipated impacts of rail operations on the function of the NEH (Kelly Street) rail level crossing on the community of Scone and recommend preferred short and long term options.

The feasibility and options assessment will:

- Identify current and anticipated future impacts of the operation of the NEH rail level crossing in Scone on the local community, including police and emergency service providers and the operation of road and rail transport.
- Indentify feasible and reasonable short term and long term strategic options to address any significant adverse impacts.
- Evaluate the strategic options including value management.
- Undertake economic analysis of the strategic options.
- Identify a preferred feasible strategic option for the short and long term.

All long term options investigated give consideration to providing greater accessibility and effeciency for the NEH and the Scone community. All short term options consider the evident risks and the likely response capabilities of police and emergency services.

1.4 Purpose of this report

This report documents the initial option identification phase of the feasibility and options assessment. This phase identified and considered a number of options that were assessed and short-listed to a set of potential options for further investigation and consideration.

The purpose of this report is to:

- Document issues, impacts, and constraints relating to the operation of the railway through Scone on the Kelly Street rail level crossing.
- Describe the potential options identified.
- Evaluate the options.
- Summarise the investigation process that led to the final four options for further investigation including strategic design.
- Detail the next step in the feasibility and options assessment.

The Options identification report (this report) outlines:

- A summary of issues, effects and constraints identified in reviewing the background information and community stakeholder consultation.
- The extent of current and future effects of ARTC rail operations on Scone and the NEH.
- Proposed options identified to address the effects of rail operations through Scone in the short term (0-5 years) including how it addresses the identified issues, and sketches of the proposals. Short term options will address community and stakeholder interests whilst long term options are developed to further alleviate issues separate to the upgrade of the rail level crossing.
- Proposed options identified to address the effects of rail operations through Scone in the long term including how each option addresses identified

issues, sketches of the proposal and indicative costing.

Options identified are consistent with the policy, procedures and design principles outlines in the RMS Urban Design document *Beyond the Pavement.* This document describes how to incorporate urban design principles in RMS projects to achieve:

- Road projects that fit sensitively with the landform and the built, natural and community environments through which they pass.
- Contribute to accessibility and connectivity of communities.
- Contribute to the overall quality of the public domain.

These objectives complement the objectives of the Scone level crossing feasibility and options assessment.

1.5 Current project status

The project to date has covered the identification of various route options which have been developed through community consultation, stakeholder consultation and project team workshops.

RMS engaged with the community in August 2011, with the Terms of Reference for the assessment provided to the public. Community meetings were held in Scone on 25 August 2011 to outline the options and feasibility assessment process, and provide an opportunity for the community to input into the project. The meetings were well received and RMS committed to further community and stakeholder discussions over the course of the feasibility and options assessment.

Two workshops with stakeholders used Multi Criteria Data Analysis (MCDA) platform to capture data, access information and refine options from approximately twenty to five. The workshop included industry participants from RMS, ARTC, Upper Hunter Shire Council (UHSC), and Department of Infrastructure and Transport (DoIT) and raised positive discussion around the options for the level crossing at Kelly Street. The structure and outcome of these workshops is further discussed in the sections below.

Following these workshops the strategic design for the five selected options were developed to 20 per cent completion and presented and discussed in a workshop with stakeholders. One option has subsequently been discounted as the design highlighted unforseen issues, and subsequent revision of the multi criteria analysis of the option confirmed that this option is not as strong as the other short-listed options.

There has been regular consultation with ARTC on their proposed rail works for the Scone passing loop and other network planned developments. ARTC have also been consulted for input on the options being developed and how these may impact on their operations or provide opportunities.

2 Constraints identification

2.1 Identification of study area

The rail level crossing at Kelly Street, Scone is the only rail level crossing on the NEH. The options and feasibility assessment of upgrade options to address the impact of the railway through Scone is not limited to the existing crossing. The study area that has been adopted for assessment of options encompasses all of Scone and considers the general area from the Scone Mountain and Scone National Park to the east; across to Middle Brook west of Scone, refer to Appendix A. From north to south the study area covers the greater Scone limits extending approximately 3 km to the north and south of the town centre.

This approach ensured that a wide range of options could be considered including at the existing crossing, town bypass options, NEH realignment through Scone and alternate options for rail alignments. These options were considered in terms of scale from 'macro' scale i.e. a town bypass, to 'meso' scale which is within Scone, then to 'micro' scale i.e. alterations to existing Kelly Street rail crossing.

2.2 Background information

The identification of current and future constraints that may impact on the development of route options was undertaken through a review of various documents and databases relevant to the study area. These included:

- Scone Local Environment Plan 1986 (Schedule 4).
- State Heritage Inventory.
- State Heritage Register.
- Register of the National Estate.
- Australian Heritage Database.
- Australian Heritage Inventory.
- Roads and Traffic Authority S1.70 Register.
- Department of Environment Climate Change and Water (DECCW) Atlas of NSW Wildlife.
- *Environment Protection and Biodiversity (EPBC) Act* Protected Matters Search Tool.

Documents and planning strategies relevant to the study area were also reviewed, which included:

- ARTC 2011 – 2020 Hunter Valley Corridor Capacity Strategy Consultation Document, March 2011.
- Scone Floodplain Management Study and Plan.
- Scone Local Environment Plan 1986.
- Lower Hunter Transport Needs Study 2009.

2.3 Community consultation

A Community and stakeholder meeting was held by RMS on 25 August 2011 in Scone. The meeting highlighted the Terms of Reference document for the Scone options and

feasibility assessment and discussed the planning and decision making process for the assessment. The meeting also flagged opportunities for future community involvement.

Upper Hunter Shire Council took the opportunity to present their initial findings on potential options and preference for a road over rail bridge at the Kelly Street crossing.

The participation of Council in the option identification process provided an insight into the community perspective on what options might be acceptable. The meeting highlighted that the community accepted the broad terms of reference for the assessment, and welcomed cross modal options.

The community highlighted issues relating to the existing road network through Scone, impacts on adjoining landowners, funding opportunities, the frequency of rail operations, heavy vehicles through Scone CBD, social and visual impacts. The community also suggested a range of potential options for consideration including various road and rail bypass options.

2.4 Summary of key issues

Provided below is a summary of key issues relevant to the study area which were considered during the development of the route options. Appendix A contains a map of key constraints used in the workshop.

2.4.1 European heritage

A number of heritage items of State and local significance are listed within the relevant databases and heritage listings. A review of the Scone LEP identified 31 listed heritage items and two conservation zones. The majority of these items were located within the Scone CBD, including sites on Kingdon, Kelly and Guernsey Streets. Three items are also located on the State Heritage Register, being the Railway Station, Old Court Theatre and Scone Civic Theatre.

Potential options were analysed and modified to minimise or negate potential impacts on these items. Subsequently any impact was considered in determining the relative suitability of the option for further consideration.

2.4.2 Surface water and flooding

Immediately to the west of Scone there are the floodplains of Kingdon Ponds and Middle Brook Creek. This constraint did not automatically preclude any options aligned through the area, as it is an engineering constraint that can be quantified and managed with further design and development of options.

2.4.3 Topographical constraints

The mountain range immediately to the east of Scone (including Scone Mountain) is another engineering constraint for bypass options east of town. This constraint did not automatically preclude any options aligned through the area. It was considered an engineering and environmental constraint that could be designed should an option through this area be adopted.

2.4.4 Land ownership and use

Options were developed maximising land already owned or controlled by RMS, Council or other government bodies. Options were refined based on the land ownership constraints to limit the level of land acquisition required and optimise the land already available. The options were assessed against whether they were likely to be compatible with current and future surrounding land use.

2.4.5 Environmental

Options were developed minimising the impact on environmental constraints. Options

were evaluated considering impacts on:

- Hydrologic, water quality and ground water.
- Ecological value, in particular on floodplain and mountain range.
- Threatened flora and fauna.

2.4.6 Aboriginal heritage

For the initial identification of options, areas with an increased probability of significance such as natural water bodies and undisturbed natural areas were highlighted and considered as potentially containing items of indigenous heritage. Subsequently shortlisted options were referenced to the Aboriginal Heritage Information Management System database to identify any records of known heritage sites.

2.4.7 Social and amenity

The issue of social and amenity constraints considered potential visual, noise, accessibility, economic and safety effects of various options on the community.

White Park adjacent to railway at the southern end of Scone was identified as a constraint. White Park caters for equestrian events, including the annual Scone and Upper Hunter Horse Festival. Options have been developed to minimise direct impact on the park.

Elizabeth Park, adjacent to the Kelly Street rail crossing, is a significant asset to Scone. The park is well established opposite the tourist information centre, railway station, and adjacent to the Scone commercial centre. The park services travellers on the NEH as a rest area providing toilet, picnic and playground facilities. The Mare and Foal statue in the park is a notable Scone icon.

Concerns with heavy vehicles and trains through town have been noted as a community concern, with the potential conflict of heavy vehicles in Kelly Street and high pedestrian movement rates. Concerns were raised regarding the inherent risks of rail level crossings with pedestrian and vehicle movements.

Options have been developed to minimise the potential social effects on Scone. The impacts to business and community services have been considered for each option identifying accessibility, isolation and relocation considered as potential impacts on business. Similarly, impacts to predominantly residential streets were also identified as a key issue during option development.

Options were developed and assessed on meeting the objective to provide continuous emergency and police service accessibility to all areas of Scone.

2.4.8 Traffic and transport

The constraints identified for traffic and transport operations considered the impact of proposed options on rail operations, existing road hierarchy, local network efficiency and pedestrian movement. Of particular concern is the need for continuous emergency and police service accessibility to all areas of Scone with the escalation of rail operations.

2.4.9 Engineering

The relative engineering complexity and/or risk of options was considered a constraint when developing and comparing similar options. Constructability and managing traffic during construction were key considerations in the development of options.

3 Rail operations

3.1 Rail operations

Scone is bisected by the MNR running north-south through town. Currently there are two rail level crossings in operation, one at Liverpool Street and the other at Kelly Street (NEH). The distance between the two crossings is approximately 600 m and, given that coal trains are up to 1.2 km long, there is potential for both level crossings to be closed simultaneously for a prolonged period by a standing train. Should an emergency response be required the alternative access from the emergency service base to the incident is via Aberdeen, adding at least 20 minutes to a trip.

The MNR through Scone services freight (predominantly coal trains) and passenger trains. In the vicinity of Scone station there is a passing loop with an asymmetric layout, which requires all passing trains to slow to negotiate the points and curved alignment.

ARTC have a project to alter the track arrangements at Scone station to upgrade the passing loop to provide an unrestricted run for through trains. This is required to increase the coal capacity of the line in the short term (indicatively by 2014). It is noted that construction of this project has been delayed pending the findings of this assessment given the proximity to the Kelly Street crossing. An extension to the existing passing loop to enable coal train usage is also restricted by the proximity to the Kelly Street level crossing.

In Figure 3.1 below it can be seen that coal train operations on the rail line through Scone is predicted to increase significantly over the next ten years. This will further exacerbate the cross town accessibility associated with the railway through Scone.

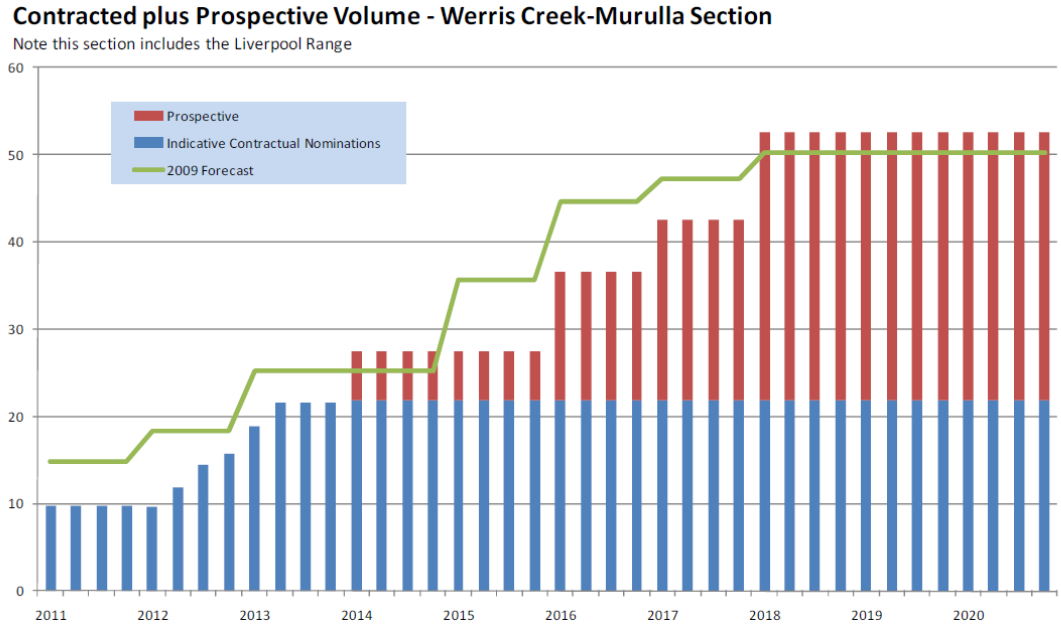

Figure 3.1 Predicted Coal Volumes through Scone 2011 – 2020 (source ARTC March 2011) Million Tonnes Per Annum (MTPA)

Associated with the increase in tonnage volume, train movements are predicted to increase from approximately 9,000 trains per annum up to 13,500 trains per annum by 2017 (Details provided by ARTC, 2012). There is also a degree of 'background' traffic on the rail lines including passenger trains, grain and cotton, and agricultural trains combined totalling approximately 7,000 trains per annum.

4 Options

4.1 Identification of options

The purpose of option identification is to determine a range of potential options which address the objectives of the project. A workshop with stakeholders was used to develop and refine options for the project.

For the initial workshop twenty options, incorporating a range of options from community and stakeholder consultations, were tabled and analysed with the best ten options selected for further development. A second workshop was subsequently held to review these ten options in more detail and shortlist the options for more detailed investigations including design and traffic modelling. The workshops used a MCDA approach and included stakeholders from RMS, UHSC, and ARTC. Details of the workshops are provided in Appendix E.

4.2 Long term and short term solutions

The Terms of Reference for the project includes considering short and long term solutions to the impact of rail operations on the NEH at Scone. ARTC have advised that they would not support an additional rail level crossing, therefore long term solutions all involve grade separation where road and rail are independent (eg road bridged over rail). The short term options primarily address the risk to the response capabilities of police and emergency service providers resulting from existing arrangements and the potential that both crossings are closed for an extended period of time. The intent of the short term solution is to improve emergency access in the short term and would be superseded when the long term solution is implemented. ARTC acknowledge the impact of existing arrangements and have indicated that they would support an additional crossing for emergency access only.

Following discussions, ARTC have identified and carried out initial investigations for a short term option. This option is the construction of a basic rail level crossing and approaches adjacent to the Scone Saleyards. The location is sufficiently north of the two existing rail crossings such that one crossing would be clear even for longer, standing coal trains. The emergency crossing would be closed to the general public and would only be used when the existing crossings are closed for prolonged periods. Further investigation and strategic designs of this short term option will be developed as part of the project.

4.3 Description of preliminary options

The initial options identified were high level alignments (or corridors) considering the transport hierarchy through Scone. The options addressed the objectives of the project, initially primarily by grade separating i.e. road over rail bridging the NEH and MNR through Scone to ensure continued east-west road connectivity in Scone. Options identified were not constrained to road infrastructure hence several rail infrastructure options were identified for consideration alongside the road options.

Options were initially identified and assessed at a series of workshops with stakeholders. Options were reviewed, modified and assessed against multiple criteria such as meeting project objectives, potential environmental impacts, and engineering risks. Better ranked options were developed and investigated in further detail for consideration at subsequent workshops.

4.3.1 Workshop 1

The first workshop was held on 28 September 2011 with participants from RMS, ARTC, UHSC and AECOM. The 20 options presented were high level strategic options, representing a potential alternative corridors for road and rail. The development of each corridor included suggestions from the community and stakeholders. Appendix B contains figures of the 20 options presented. Where possible the options were reviewed and amended during the workshop to better meet the objectives of the project or minimise the impact of the option.

Each option was assessed using MCDA based on seven broad criteria:

1. Meeting project objectives.
2. Social impact of the project.
3. Impact on safety, property access and road network.
4. Environmental impact of the project.
5. Engineering constraint on project – potential risks during construction.
6. Relative cost of option.
7. Value for money: potential community benefits relative to cost.

Each option was scored against the criteria based on a semi subjective 1-5 scale, 1 representing a negative effect for each major constraint and 5 representing a positive effect or few to no major constraints.

The evaluation process was based on the above criteria with each discussed as the workshop progressed and stakeholders made comment. Connectivity for emergency services was identified as one of the key items to be considered in the constraints evaluation, in line with the project objectives. Appendix E contains a copy of the Options and Feasibility Workshop report.

The corridors assessed at Workshop 1 were refined based on broad engineering constraints, standards and best practice in design. Given that the workshop was interactive and collaborative there was generally broad acceptance of the initial set of corridors. Options that were modified during the workshop are denoted by the 'A' options.

The workshop identified the following 10 options for further development:

1. Option 2.0A – NEH bypass to the west of town (bridge south of Scone).
2. Option 2.2 – Realign NEH to Aberdeen Street (bridge south of Scone).
3. Option 2.3 – Realign NEH to Guernsey Street (bridge south of Scone).
4. Option 2.6 – Realign NEH to Aberdeen Street (bridge at Kingdon Street).
5. Option 2.6A – Realign NEH to Guernsey Street (bridge at Kingdon Street).
6. Option 2.8 – Realign NEH to Main Street (bridge north of Kelly Street).
7. Option 2.10 – Realign NEH to Muffett Street (bridge north of Scone).
8. Option 3.0A – Road over rail bridge at the Kelly Street rail crossing.
9. Option 4.0 – Railway freight bypass to the west of Scone.
10. Option 4.0A – Rail realignment and new railway station to the west of Scone.

These options were amended and refined in preparation for Workshop 2.

4.4 Refinement of options

As part of the initial options identification, relevant surveys, studies, investigations, reports, plans and other information were reviewed to nominate options that addressed the impacts of rail operations on the NEH through Scone.

Prior to the second workshop, the 10 options were further developed and reassessed to refine and further quantify the constraints of each.

4.4.1 Workshop 2

Workshop 2 was held on 4 November 2011 and included participants from RMS, ARTC, UHSC, Transport for NSW (TfNSW), DoIT and AECOM. The 10 options selected from Workshop 1 were further refined and presented. Appendix C contains figures of the 10 options presented. These options were discussed and ranked as the workshop progressed and participants added value.

The workshop focused further on the objective of the project addressing:

- Improved emergency services access to all areas of town.
- Improved local traffic conditions.
- Improved NEH traffic conditions.
- Improved rail network conditions.
- Impact on local business in the short and long term.
- Compatibility with adjacent land use including visual amenity and noise impacts.

A detailed MCDA was developed to further refine the options assisted by constraints mapping. The constraints mapping included heritage areas, conservation areas, flood risk areas, council owned lands, cadastre, bush fire prone areas and records of significant sightings of flora and fauna.

The criteria that the options were scored against were:

- Existing land use and ownership.
- Social and amenity effects.
- Environmental effects.
- Traffic and transport effects.
- Engineering constraints.
- Relative cost.

The above criteria were weighted to acknowledge the relative importance of each criteria. Each criteria was broken down into a number of sub criteria issues, each of which had their own weighting. Every option was scored against the sub criteria issues based on a scale of 1 to 3 – 1 indicating an overall negative effect, 2 indicating no net effect and 3 an overall positive benefit.

4.4.2 Option routes

The alignments of options from Workshop 1 were refined based on broad engineering constraints, standards and best practice in design.

Private, commercial and industrial access was discussed during the workshop with all of the options, except the rail option. The potential impact of the options on the access was captured in the social and amenity criterion.

Adequate vertical sight distance to intersections was an item of note with the bridge options, in particular with Option 2.8.

The five options that were identified as a result of the MCDA were:

1. Option 2.0A – NEH bypass to the west of town (bridge south of Scone).
2. Option 2.8 – Realign NEH to Main Street (bridge north of Kelly Street).
3. Option 2.10 – Realign NEH to Muffett Street (bridge north of Scone).
4. Option 3.0A – Road over rail bridge at the Kelly Street rail crossing.
5. Option 4.0A – Rail realignment and new railway station to the west of Scone.

Options were identified were based on scoring well in the MCDA, as well as their rank relative to similar options. For example, Option 4.0 scored well, but was discounted as it scored lower than the similar Option 4.0A. This approach ensures that the options represent a range of potential solutions over a cross section of physiographic settings.

The five options that have been identified through the MCDA process provide the best option for potential benefits for, constructability constraints are minimised, impact on key areas such as the heritage properties, environmental effects and better emergency services access which is one of the key focus areas for this assessment.

4.5 Options for strategic design

The four options determined from the Workshop 2 are being further developed, including detailed strategic design, traffic modelling and cost estimating. Text below describes each option and their defining characteristics. Appendix D contains figures of the five options resulting from Workshop 2 MCDA process. It should be noted that through strategic design, these options will be further defined according to road standards, specific constraints and stakeholder preferences.

During the initial stages of the strategic design there were general design standards applied and the constraints discussed in the workshops were addressed at a more detailed level. A third workshop with RMS and UHSC was held to discuss the 20 per cent completion of the strategic design of road options, summarised below.

4.5.1 Option 2.0A NEH bypass to the west of town (bridge south of town)

Option 2.0A is considered to be an internal bypass of Scone centre, effectively removing through traffic from Kelly Street. To minimise the impact of this option, the alignment maximises use of land owned by council and land previously identified as road reserve. This option traverses the floodplain which will require engineering design consideration. To provide adequate flood immunity, the road would need to be constructed on an embankment through the floodplain. The bypass would have a speed limit higher than the current highway in town. However, the new route length would be longer than the current route negating some of the travel time savings for through traffic. Liverpool Street intersects the bypass which allows local traffic access to both sides of town.

It has been assumed that the road would provide a flood immunity of one per cent annual exceedance probability (AEP) that is there is a one per cent chance in any year of having a flood higher than the level of the road. This is the standard criteria used to provide an effectively “flood free” route. From preliminary information there appears to be a marginal cost benefit to reduce the flood immunity to a nominal five per cent AEP.

4.5.2 Option 2.8 Realign NEH to Main Street (bridge north of Kelly Street)

This option involves the realignment of NEH to Main Street, an alignment it followed once before. The NEH would bridge the railway at the proposed extension of Sherwood Street and Belmore Street. It is anticipated that the level crossing could remain for emergency access only.

There is the potential with this option that a commercial centre would transfer to Main Street. Main Street currently provides access for oversized vehicles using the NEH. The benefit of this option is the bridge would be located in a less sensitive urban area.

Further investigation of this option identified a number of concerns that had not been fully appreciated during the workshop. The Main Street road reserve width was found to be inadequate to cater for current design standards. This would impact on adjacent residences and businesses with regard to traffic movements and accessibility. A supermarket and loading dock is located along this alignment and the volume of movements in this area would cause disruption to the highway traffic flow should this option be further developed. A subsequent re-evaluation of this option against the workshop MCDA found that the option was not as competitive or desirable as the other shortlisted options and it was agreed to discount this option from further consideration.

4.5.3 Option 2.10 Realign NEH to Muffett Street (bridge north of town)

Option 2.10 is an option to construct a road over rail bridge in a location away from the built up environment. This allows for easier construction and less disturbance to neighbouring properties during construction. It is anticipated that the level crossing could remain for local access.

This option realigns the NEH along Muffett Street adjacent to the rail corridor. The highway would be bridged across the railway prior to the saleyards joining the existing highway to the north of Scone.

The location of the bridge outside the town centre would make it less intrusive and improve urban design. The consolidation of access points to the industrial area and the town requires further investigation, ensuring pedestrian access near Kelly Street is maintained. The existing level crossing would remain as a local road, maintaining access to the town. Ongoing accessibility of emergency and police services is provided for with the redesigned intersections and bridge.

4.5.4 Option 3.0A - Road over Rail Bridge at the Kelly Street rail crossing

Option 3.0A is a road bridge over the rail line in the proximity of the existing Kelly Street rail level crossing. The proposed structure is a four lane road bridge over the rail line and associated road approach works to maintain and provide local road connections. Access from Muffett Street to Susan Street could be provided with access to Belmore Street cut off with a cul-de-sac provided. This option maintains highway access through Scone. While the scale of this option is smaller than other short listed options, the constraints of the site have required a sub-option identification process to determine the road alignment and local access arrangements. Constraints at the site relate to the proximity to Elizabeth Park, neighbouring heritage properties, providing direct access to the Muffett Street industrial area, and maintaining appropriate access to local roads and adjacent properties. The project should be quicker to construct, however, given the smaller scale of the project.

The ARTC policy is that all new road-over-rail bridges should have a clearance over the rail for double stacked freight containers, or should be designed to allow the bridge to be lifted in the future. For this assessment all road-over-rail bridge options have been designed to provide clearance for single stack freight containers with provision for lifting the structure. This is primarily based on the cost saving and unlikelihood of double

stacking on this line (for example the prohibitive cost to upgrade the rail tunnels through Liverpool Range). For this option providing clearance for double stacked containers would, apart from the visual impact, have a significant impact on the extent of works and feasibility.

The initial design for this option was based on the design tabled by UHSC at the August 2011 community meeting. Further development of this option, however, highlighted issues in achieving appropriate sight distance for the new intersections which in turn extended the limit of works and increased the difficulties to construct this alignment under traffic. By moving the bridge further to the north, whilst impacting more adjacent properties, the project has less impact on Elizabeth Park and local road connections can be better accommodated. Also, by moving the bridge to the north, more can be built offline, expediting construction and with less disruption.

4.5.5 Option 4.0A Rail realignment and new railway station to the west of town

The option to remove the rail operations to the floodplain west of town means that the safety and access for Scone are resolved with both level crossings removed and rail operations relocated outside of town. Passenger services would operate from a new station near Liverpool Street on the edge of town. There would be a grade separation (bridging) of the road and rail at Liverpool Street and at the NEH to the north of Scone.

There will be new noise receivers with this option and effects from and on the floodplain will need to be considered in detail for the design of such a rail alignment. However, the noise and dust levels in Scone from traffic would be reduced. With the removal of the passenger terminal from the centre of town, opens opportunities for the remnant corridor.

4.6 Strategic design schedule

The strategic designs are being developed for the three road options and one rail option. The options are:

1. Option 2.0A – NEH bypass to the west of town (bridge south of town).
2. Option 2.10 – Realign NEH to Muffett Street (bridge north of town).
3. Option 3.0A –Road over rail bridge at the Kelly Street rail crossing.
4. Option 4.0A – Rail realignment and new railway station to the west of town.

5 Conclusion

5.1 Decision making process

The development and refinement of options for the Scone Kelly Street level rail crossing have been developed as a result of a workshop process that involved participation from stakeholders. The workshops used a decision making process that ranked each option against weighted criteria. The four options for strategic design development were selected based on the MCDA of the following criteria:

- Existing land use and ownership.
- Social and amenity effects.
- Environmental effects.
- Traffic and transport effects.
- Engineering constraints.
- Relative cost.

The options MCDA approach ensures that shortlisted options, which meet a range of competing factors, have been selected for further consideration and best meet the objectives of the assessment.

5.2 Shortlisted options

There have been three road and one rail option identified for further assessment work.

1. Option 2.0A – NEH bypass to the west of town (bridge south of town).
2. Option 2.10 – Realign NEH to Muffett Street (bridge north of town).
3. Option 3.0A – Road over rail bridge at the Kelly Street rail crossing.
4. Option 4.0A – Rail realignment and new railway station to the west of town.

The identification of the above options through the workshops has been documented in the option identification workshop report, attached in Appendix E.

5.3 Next steps

Four options will be developed through an assessment (strategic design) phase. The strategic design will provide details around the requirements of options for geometric design, bridges and retaining structures, earthworks, utilities, property acquisition, drainage, pavement, construction staging and noise amenity controls.

Using the strategic design for each of the options, specific evaluation will be carried out for:

- Traffic modelling.
- Strategic cost estimate.
- Economic analysis.

A Value Management Study (VMS) will be held with stakeholders and community members to identify and consider the project development and assess the options against the project values. Following this, options will be displayed for public comment. At that stage, information will be used in establishing a preferred option and a preliminary environmental investigation and road safety analysis of the option will be carried out.

6 References

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Appendix A

Key constraints

Key constraints

Appendix B

Workshop 1 options

Workshop 1 options

Appendix C

Workshop 2 options

Workshop 2 options

Appendix D

Options for strategic design

Options for strategic design

Appendix E

Option and feasibility workshop report

Option and feasibility workshop report