



Hume Highway Duplication Application for Modification of the Approval

Sturt Highway to Tarcutta – Environmental Assessment

Prepared for: Roads and Traffic Authority, NSW

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Executive Summary

Background

The Roads and Traffic Authority of NSW (RTA) is duplicating five sections of the Hume Highway between its junction with the Sturt Highway and Albury (the Hume Highway Duplication) and has entered into an alliance, the Northern Hume Alliance (NHA), comprising the RTA, Leighton Contractors, Maunsell Australia, Coffey Engineering and SMEC, to design and deliver the Approved Project. The existing carriageway will be upgraded to a four lane dual carriageway. The Hume Highway is a route of strategic national significance serving intrastate and interstate users, and is the main road transport corridor linking Sydney and Melbourne. The limitations of the existing Highway in providing an efficient, integrated and safe transport link has led the Australian government to include the Hume Highway Duplication as part of the AusLink program.

The NSW Minister for Planning declared the Hume Highway Duplication, of which the proposed modifications are a part, to be a project to which Part 3A of the *Environment Planning and Assessment Act, 1979* (EP&A Act) applies by order published in the NSW Government Gazette (No 114) dated 4 September 2006. The Minister also declared the Hume Highway Duplication to be a critical infrastructure project under Section 75C of the EP&A Act by order published in the NSW Government Gazette (No 175) on 8 December 2006. The declaration of the Hume Highway Duplication as a critical infrastructure project reflects its importance to the State.

Section 75W of the EP&A Act regulates the modification of an approval for a project under Part 3A. It provides that the Proponent may request the Minister for Planning to modify a project approval where the Proponent intends to modify the project, so that it would not be consistent with that approval. This consistency review and environment assessment has been prepared as supporting documentation for that application.

The Approved Project

The primary objective of the Approved Project is to duplicate the existing single carriageway sections of the Highway between its intersection with the Sturt Highway and Mullengandra (excluding the single carriageway sections through Tarcutta, Holbrook and Woomargama). One of the sections which has been approved for duplication is from the Sturt Highway to Tarcutta, between 37 kilometres south of Gundagai to approximately 42 kilometres south of Gundagai (the Approved Project). A site location plan is provide as **Figure 1**. Since approval was granted, the Alliance has identified a number of benefits that can be achieved by modifying the Approved Project. The proposed modifications are the subject of this environment assessment.

The Modified Project

The proposed modifications would include the realignment of the duplication between chainages 38000 and 40400 as shown in **Figure 2**. The approved alignment between chainage 38100 and 40300 is generally located on the eastern side of the existing carriageway, however the proposed modification would change this to the other side of the carriageway. This would result in the entire Sturt Highway to Tarcutta Hume Highway duplication being located along the western side of the existing carriageway. Other changes resulting from this proposed modification to the alignment include:

- Realignment of Dellateroy Creek;
- Reduced construction program;
- Reduced interaction of construction vehicles with Hume Highway traffic; and
- Retention of the existing Hume Highway as the southbound carriageway subject to minor improvements to road surfacing, signage and protective fencing.

The proposed modifications provide for highly improved constructability with respect to:

- Traffic management;
- Construction timeframe; and
- Worker and public safety.

Other notable benefits include:

- Improved flooding immunity.

Assessment of Consistency with the Approved Project

The proposed modifications have been assessed for consistency with the Approved Project, and although the proposed modifications would not result in substantive change to the overall objectives and functions of Highway duplication, the modifications are not considered to be consistent with the Approved Project due to the associated environmental impacts from the modification. An assessment of the environmental impacts associated with the modification are documented in **Section 5.0**, which concludes that there are additional impacts to aquatic ecology and heritage items which were not assessed under the Approved Project. With additional mitigation measures and corresponding Statement of Commitments (as outlined in **Sections 5.0** and **7.0**), the impacts of the modification are expected to be minimal. While the proposed modifications to the Approved Project would not explicitly prohibit the Proponent from satisfying any Minister's Condition of Approval (MCoA) or RTA Statement of Commitments (SoC), the additional environmental impacts, namely on biodiversity and heritage would require an amendment to the MCoA and SoC.

Key issues associated with the Proposed Modifications

Key issues identified for their potential to have greater environmental impacts include:

- Biodiversity - due to the altered vegetation clearance requirements resulting in minor additional vegetation loss;
- Heritage (Indigenous and non-Indigenous) - due to the modified footprint of works, additional heritage items will be impacted; and
- Flooding and hydrology; and soils and water - due to the realignment works proposed for Dellateroy Creek.

Other environmental issues are also considered and addressed in **Section 5.3**.

Additional Statement of Commitments

The proposed modification would be undertaken in accordance with the MCoA for the Approved Project (including the Concept Approval 06_0314 and the Project Approval 06_0245) and the RTA Submissions Report and Revised SoC (RTA, 2007). However, as part of this assessment, additional SoC have been proposed to mitigate potential impacts upon aquatic ecology and riparian areas around Dellateroy Creek; and Aboriginal heritage site T-PAD-2.

Conclusions

The NHA has assessed the environmental impacts associated with the proposed modifications, in order to assess whether approval from the Minister for Planning is required under Section 75W of the EP&A Act to modify the Approved Project.

The NHA considers that the proposed modifications to the Approved Project are not consistent with the assessment of environmental impacts in the Environmental Assessment, and as such, seek approval from the Minister for Planning to modify the Approved Project as outlined in this report.

1.0 Introduction

1.1. Background

The Roads and Traffic Authority of NSW (RTA) is duplicating five sections of the Hume Highway between its junction with the Sturt Highway to the north of Albury (the Hume Highway Duplication). The existing two lane single carriageway will be upgraded to a four lane dual carriageway. One of the sections, which has been approved for duplication, is from the Sturt Highway to Tarcutta, between 37 kilometres south of Gundagai to approximately 42 kilometres south of Gundagai (the Approved Project). A site location plan is provided as **Figure 1**.

The Approved Project was the subject of an Environmental Assessment (EA) prepared in accordance with the process and requirements of Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act), which detailed the environmental issues associated with the Approved Project, including mitigation measures to address potential impacts. On 10 October 2006 the Director-General's requirements were issued in respect to the Approved Project pursuant to Section 75F of the EP&A Act. The Project was approved by the Minister for Planning on 20 July 2007.

In December 2006, the Alliance as Proponent for the Project, appointed the Northern Hume Alliance (NHA), a consortium comprising Leighton Contractors, Maunsell Australia, Coffey Engineering and SMEC to design and deliver the Approved Project. All members of the NHA have a demonstrated ability to deliver large scale infrastructure projects in line with stringent environmental requirements.

1.2. Purpose and Objectives of the Modification Report

Following approval of the Project, the NHA (on behalf of the RTA) have refined the original concept design and identified a number of benefits that could be achieved by modifying the Approved Project. The proposed modifications are the subject of this environment assessment.

The proposed modifications would include the realignment of the duplication between chainages 38000 and 40400. The approved alignment between chainage 38100 and 40300 is generally on the eastern side of the existing carriageway. The proposed modification would change this to the other side of the carriageway. This would result in the entire Sturt Highway to Tarcutta Hume Highway duplication being located along the western side of the existing carriageway. Other changes which would result from the proposed modification include:

- Realignment of Dellateroy Creek;
- Reduced construction program;
- Reduced interaction of construction vehicles with Hume Highway traffic; and
- Retention of the existing Hume Highway as the southbound carriageway subject to minor improvements to road surfacing, signage and protective fencing. In this regard the construction works, and therefore the associated environment and community impacts, would be reduced.

The proposed modification is shown in **Figure 3**.

The proposal was referred to the Australian Government Minister for the Environment and Water Resources (DEW), to determine if the Approved Project is a controlled action in view of the removal of a vegetation community listed under the *Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act).

Removal of EPBC protected *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grasslands* (Box - Gum Woodland) was deemed a controlled action undertaken in accordance with the EPBC Act, 1999, and an allowance for the removal of 30 hectares of EPBC protected vegetation was granted. Currently the total area of EPBC protected vegetation removal

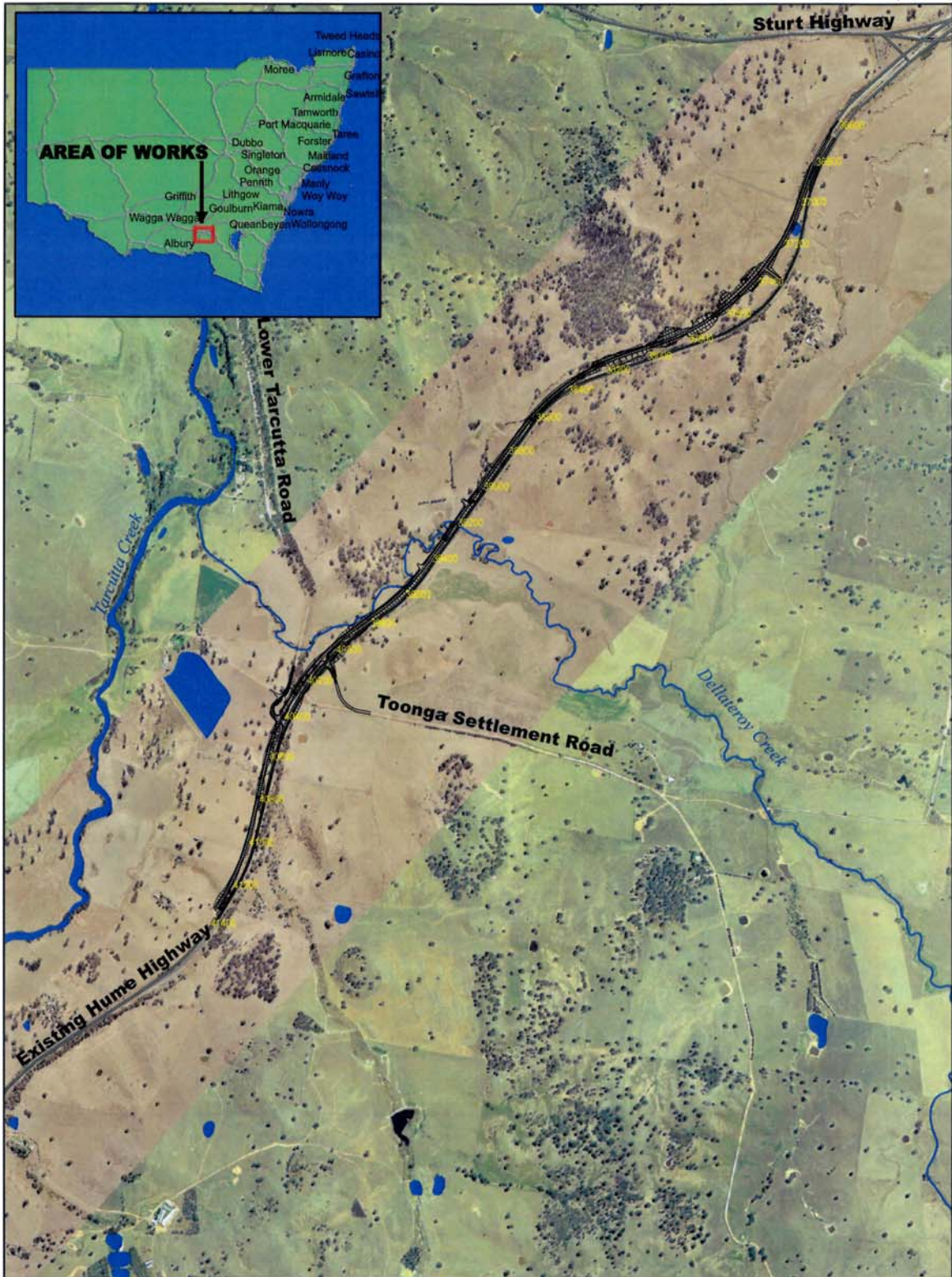
(across Sturt Highway to Tarcutta Project) is estimated to be 2 hectares and, as detailed in **Section 5.2**, the proposed modification will result in no change to this figure. In this regard, it is considered that no further approval is required from DEW as a result of the proposed modification.

Section 75W of the EP&A Act regulates the modification of an approval for a project under Part 3A. Section 75W(2) provides that the Proponent may request the Minister for Planning to modify a project approval where the Proponent intends to modify the project, such that it would not be consistent with that Approved Project.

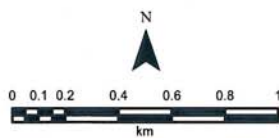
The request for the Minister for Planning's approval is to be lodged with the Director-General of the Department of Planning. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification. The objectives of this Environmental Assessment are to:

- Assess the environmental impacts of the proposed modifications;
- Assess the relative change in environmental impacts of the Hume Highway Duplication between Sturt Highway and Tarcutta before and after putting in place the proposed modifications, within the meaning of Section 75W(2) of the EP&A Act; and
- Comply with all statutory requirements.

The Minister may modify the approval (with or without conditions) or disapprove of the modification, in accordance with Section 75W(4) of the EP&A Act.



- Modified Alignment
- Roads
- Waterways



STURT HIGHWAY TO TARCUTTA
- MODIFICATION REPORT

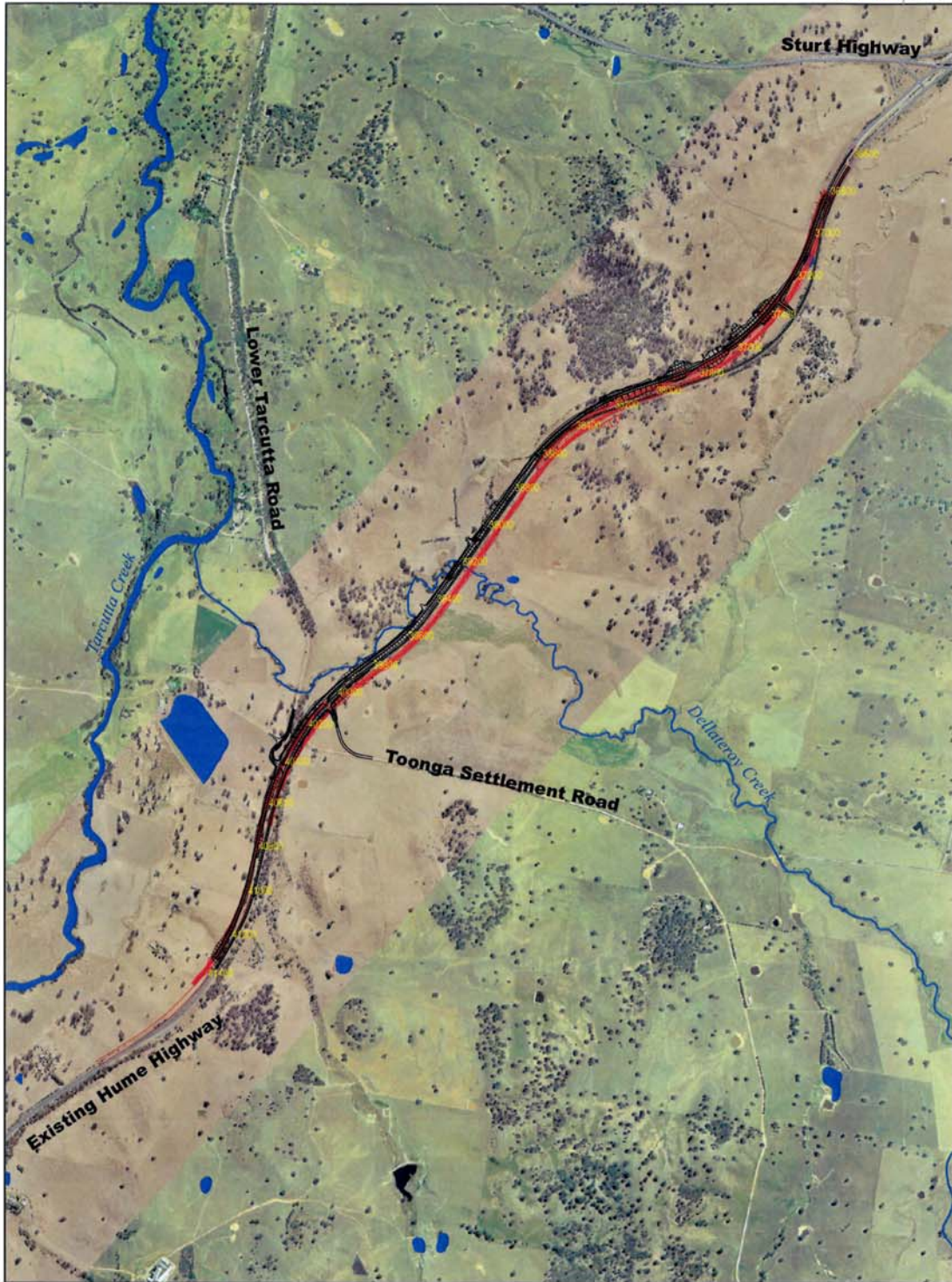
FIGURE 1: SITE LOCATION

Source: MapData 2006, RTA 2007

2.0 Description of the Approved Project

The Approved Project is shown in plan in **Figure 2**, and contains the following main design features:

- Two new carriageways will be constructed between chainages 36700 and 37800. Work will mostly be on the western side of the existing Highway before moving to the eastern side.
- From 37800 to near 40000 the existing Highway carriageway will be retained as the northbound carriageway. A new southbound carriageway will be constructed to the east of the existing Highway carriageway.
- From near 40000 to 40900 two new carriageways will be constructed. The work will move from the eastern side to the western side of the existing Highway.
- From 40900 to 41400 the existing Highway carriageway will be retained as the southbound carriageway. A new northbound carriageway will be constructed to the west of the existing Highway carriageway. The Approved Project will end at around chainage 41400. A connection would be provided at this location, and the Highway would continue to operate as a single carriageway passing through the village of Tarcutta.



- Modified Alignment
- Approved Alignment
- Roads
- Waterways



STURT HIGHWAY TO TARCUTTA
- MODIFICATION REPORT

**FIGURE 2: LAYOUT OF THE MODIFIED
AND APPROVED ALIGNMENT**

Source: MapData 2006, RTA 2007

3.0 Description of the Proposed Revisions

3.1 Overview

The Approved Project was developed by the RTA and resolved to a concept design level only. Whilst this stage of design development was appropriate for environmental assessment, the detailed design process has identified several areas where modification would improve the efficiency of project delivery with regard to worker and public safety, accessibility and construction program.

The approved alignment between chainage 38100 and 40300 is generally on the eastern side of the existing Hume Highway carriageway. The proposed modification will result in the alignment being located along the western side of the existing Hume Highway carriageway for the entire Sturt Highway to Tarcutta Hume Highway duplication. The proposed modifications to the approved alignment are shown overlain on the Approved Project in **Figure 2**, and are discussed in the following sections.

3.2 Road Alignment Modifications

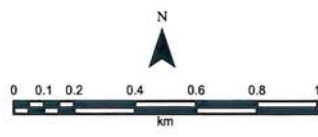
The modified road alignment would consist of the following:

- The new carriageway between chainages 36700 and 40900 would be wholly on the western side of the existing Highway.
- Between chainage 36700 and 38100 the current proposed Project would be consistent with the Approved Project.
- The new carriageway between chainage 38100 and 40300 would be relocated to the western side of the existing Hume Highway.
- Between chainage 40500 and 41400 the current proposed project would be consistent with the Approved Project.

The proposed modifications would result in the existing Hume Highway being converted to the final southbound carriageway. This would be subject to minor improvements to road surfacing, signage and protective fencing to make it suitable for a single direction carriageway at the current speed limit. Ultimately, more significant works would be required to upgrade this carriageway to achieve the desired design speed performance, as considered within the Approved Project. However, these enhancement works would be postponed to allow the allocation of resources to other priority duplication and bypass upgrades along the Hume Highway.



- Modified Alignment
- Roads
- Waterways
- █ Existing Vegetation



STURT HIGHWAY TO TARCUTTA
- MODIFICATION REPORT

FIGURE 3: MODIFIED ALIGNMENT

Source: MapData 2006, RTA 2007

3.3 Dellateroy Creek Alignment Modifications

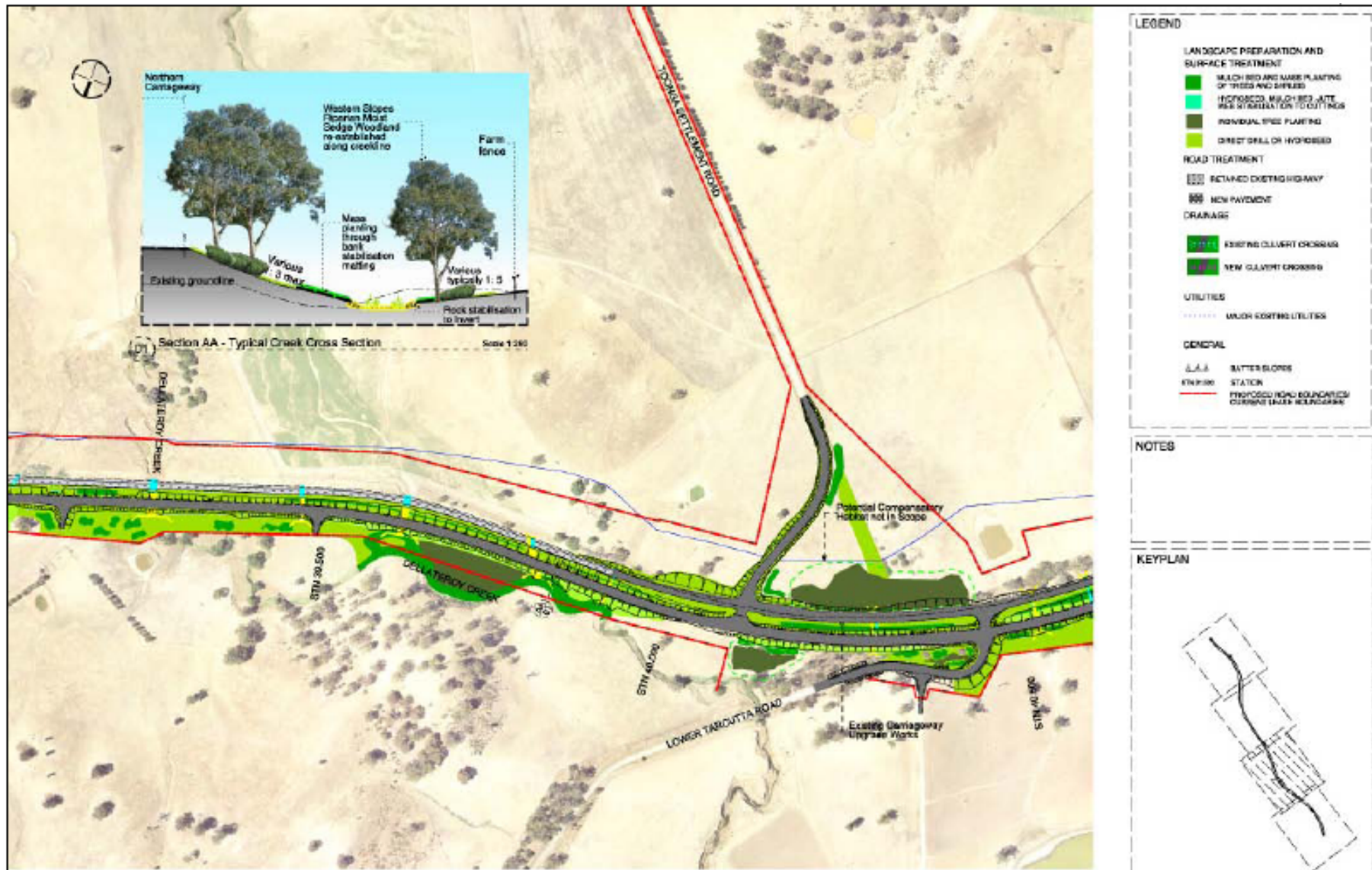
Within the extent of the proposed modifications, there is a one kilometre section of works where Dellateroy Creek runs adjacent to the existing Hume Highway on the western side. The Approved Project locates the new carriageway on the eastern side in this section to avoid encroachment into the creek and avoid flood impacts. However, further detailed design investigations have demonstrated that construction of the new carriageway on the western side of the existing Hume Highway, between Dellateroy Creek and the Hume Highway, would result in improvements to the flooding regime, in particular a reduction in the up stream inundation area. Due to the limited space available between Dellateroy Creek and the existing carriageway, the bends of three meanders in the Dellateroy Creek system would need to be cut off. To offset the impact of these changes and to maintain creek line stability, some realignment and armouring of the creek line has been proposed.

The creek is in a generally degraded state, a product of higher storm flow rates and the presence of stock within the creek environs damaging creek edges. The result is a highly incised channel some 3.0m deep in places. Channel walls are often steep with slopes of 1:1 or greater. As a result, there is high potential for ongoing erosion. Therefore, the section of realigned creek would require scour protection treatment to reduce the erosion potential to protect the waterway and the new carriageway infrastructure.

The Project offers the potential to rehabilitate the creek line and re-establish the natural systems by improving connectivity with other native vegetation. The design intent is to revegetate the creek and its margins using vegetation of the Western Slopes Riparian Moist Sedge Woodland. This is a vegetation community dominated by *Eucalyptus camaldulensis* (River Red Gum) with a diverse ground cover layer. The proposal includes a wetland area that would further enhance ecological links within the area. Beyond the creek line, on higher ground, planting in line with any existing Box-Gum vegetation community would be undertaken.

In terms of profile, the intent is to achieve creek banks with slopes of between 1:3 and 1:5 to improve the long-term stability of the creek line. Flatter slopes would be reinforced using coir matting or similar to bind the profile as the landscape establishes. Steeper slopes would use rock armouring with planting of the void spaces between rocks undertaken. A preliminary alignment and cross section has been provided as **Figure 4**.

Figure 4: Proposed Modifications to the Dellateroy Creek realignment



3.4 Need and Justification for the Proposed Modification

3.4.1 Overview

The Approved Project as described in **Section 2** was developed by the RTA, and resolved to a concept design level only. The detailed design process has since identified several areas where modification would improve the efficiency of project delivery with regard to worker and road user safety, accessibility and construction program, specifically the area of works between chainage 38100 and 40300.

The construction of the Project within a major Highway corridor necessitates significant staging of traffic throughout the duration of the Project, in order to minimise disruption to traffic. As a result of this traffic staging, there would also be some resulting reduction in the efficiency with which materials and plant / equipment can be transported along the Project corridor throughout the works.

Whilst the proposed modification does not result in a change to the overall construction methodology, the modification would provide for improved constructability with respect to traffic management, construction timeframe and worker and road user safety as outlined below. In addition it is expected that that flooding impacts (such as affects to the existing flow regime) associated with the modified alignment would be less in comparison to the original eastern alignment. This is further discussed in **Section 5.2.5**.

Traffic Management

To construct either the Approved Project or modified proposal, the works areas to the south require fill sourced from the northern cut between chainage 37100 - 37700 (approx). The Approved Project, with the Hume Highway crossings, requires the transportation of fill along the Project predominantly by road, using truck and trailer equipment. The proposed modification would reduce traffic impacts on the Hume Highway, as the work for the modification would be carried out on the western side of the existing Highway as opposed to a large section of the Approved Project being constructed predominantly to the east. This would reduce traffic impacts by eliminating the main point of construction material transfer across the Highway, and reducing the impact of traffic introduction at Project completion. The work area breakdown and road crossings for the Approved Project and modified project are shown in **Figures 5** and **6** respectively.

Construction Timeframe

The Highway crossings (traffic switches) are major impediments to efficient transport of material along the Project. Removal of the crossings allows the main work area required to construct the new carriageway to be largely isolated from the existing Hume Highway traffic. By isolating the works areas from the Hume Highway traffic, larger off road equipment such as scrapers and off road trucks would improve the efficient transfer of material into areas of fill. This would lead to a shorter overall construction timeframe, and hence a reduction in community impacts coupled with earlier Project completion and operation dates.

Worker and Road User Safety

The use of the Hume Highway by construction traffic results in an ongoing interaction with 'live' traffic. Subsequently, a risk to road users and the construction team during the course of delivery would be inevitable. By providing a work site that is isolated from the existing Hume Highway traffic, most works could be undertaken without interaction with live traffic. The proposed modification would reduce the extent of work under live traffic and provide a safer environment for workers and road users.

Figure 5 Approved Project - Work area breakdown and traffic crossings during construction

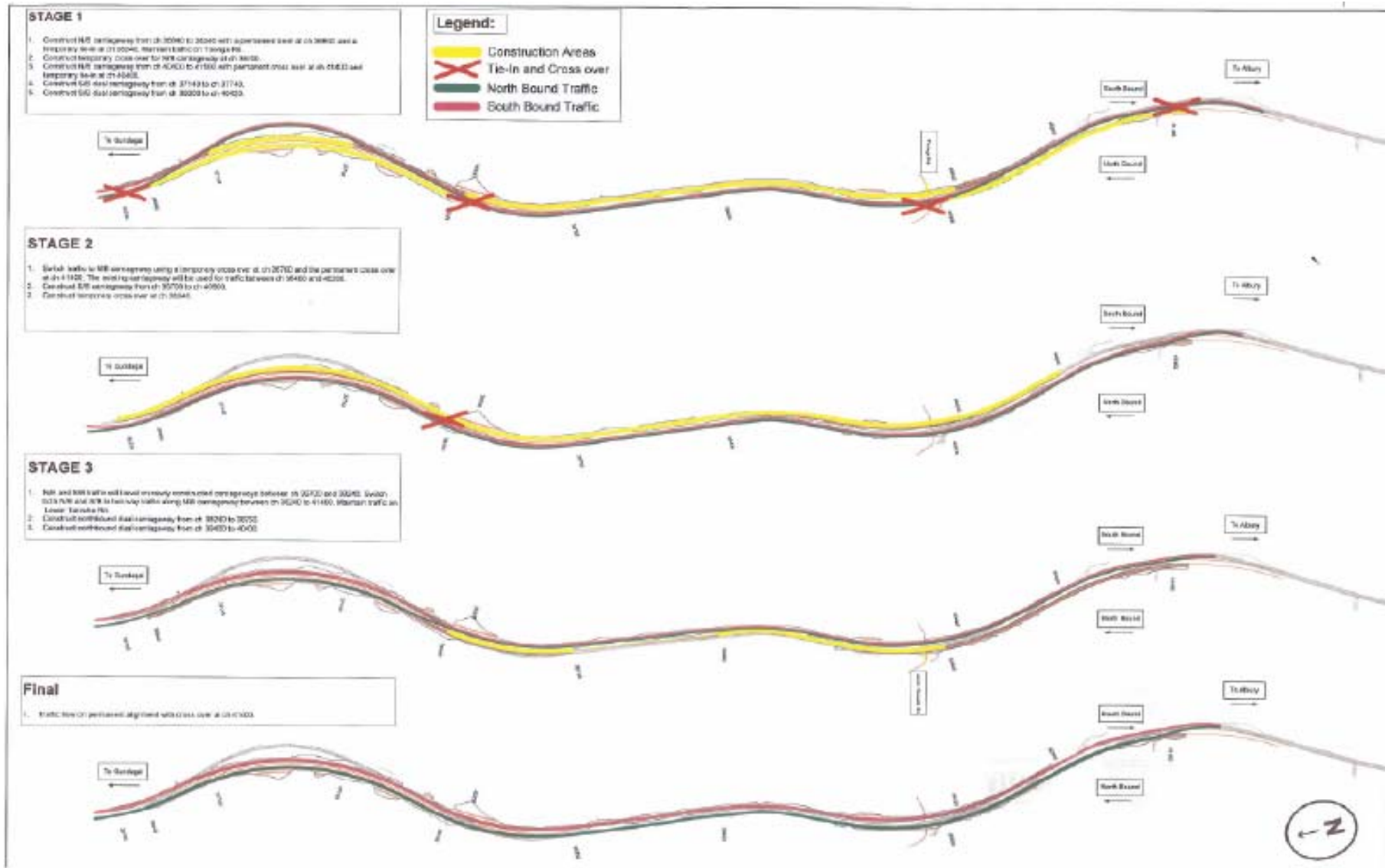
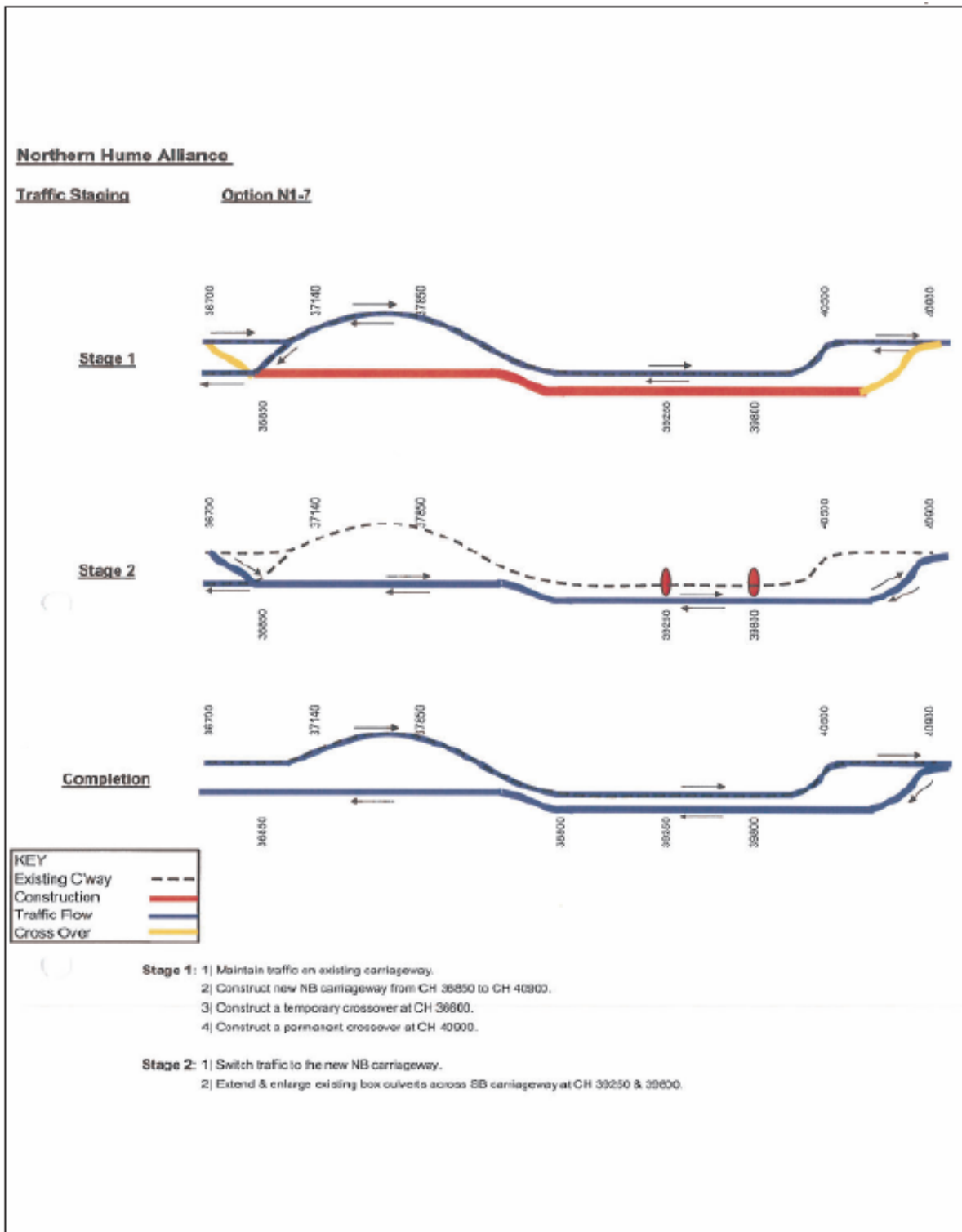


Figure 6: Modified Project – Work area breakdown and traffic crossings during construction



4.0 Assessment of Consistency with the Approved Project

4.1 Review of the Conditions of Approval

A review of the MCoA and Revised SoC for the Approved Project was undertaken. The following table lists those Conditions of Approval that are considered potentially relevant to the refined activity, and provides comments with respect to the consistency of the refined activity to those Conditions of Approval.

Table 1: Review of Conditions of Approval consistency with the Proposed Modification

Condition of Approval	Comment
<p>Terms of Approval (Project Approval - Sturt Highway to Tarcutta 06_0245)</p> <p>1.1 The Proponent shall carry out the project generally in accordance with the:</p> <ul style="list-style-type: none"> a) Major Projects Application 06_245; b) Sturt Highway to Tarcutta – Hume Highway Duplication – Environmental Assessment (four volumes), prepared by Sinclair Knight Merz Pty Ltd and Manidis Roberts Pty Ltd and dated March 2007; c) Hume Highway Duplication Concept Plan, Sturt Highway to Tarcutta, Kyeamba Hill and Little Billabong Environmental Assessments – Submissions Report and Revised Statement of Commitments, dated 26 April 2007, and prepared by NSW Roads and Traffic Authority and as supplemented by correspondence from the NSW Roads and Traffic Authority dated 16 May 2007; d) The conditions of approval granted by the Minister for Planning for the Hume Highway Duplication Concept Plan (Application Number 06_0314); and the conditions of this approval. 	<p>The proposed modification represents an alteration to the road alignment detailed in the major Projects Application 06_0245 and the Environmental Assessment (SKM 2007). These changes are discussed in Section 3.0 of this report, and do not impact on the overall objective of duplicating the Hume Highway.</p> <p>The proposed modification represents potential alterations to various environmental impacts detailed in the Environmental Assessment (SKM 2007). The impacts of these potential impacts are discussed in Section 5.0.</p> <p>The proposed modification represents an alteration to various conditions of approval granted by the Minister for Planning for the Hume Highway Duplication Concept Plan (Application Number 06_0314). Impacts of variations to the MCoA are detailed in Section 5.0.</p> <p>The proposed modification represents an alteration to various conditions of approval granted by the Minister for Planning for the Hume Highway Duplication Sturt Highway to Tarcutta (Major Projects Application Number 06_0245). Variations to the MCoA are detailed in Table 1 of this report.</p>

Condition of Approval	Comment
<p>Aboriginal Heritage</p> <p>2.6 Prior to the commencement of construction activities, the Proponent shall undertake subsurface testing for site T-PAD-1 and shall investigate the options to design and construct the project as to avoid or minimise the extent of disturbance to this site in consultation with the DECC.</p> <p>Where these sites cannot be avoided, the Proponent shall implement the mitigation and management measures detailed within the Construction Heritage Management Plan required under this approval.</p> <p>Any salvage (by either surface collection or archaeological excavation) of artefacts detected at these sites shall be conducted in consultation with the DECC and the relevant Aboriginal stakeholders prior to the commencement of construction works that may impact on this site.</p>	<p>Subsurface testing for T-PAD-1 has been completed. This site will not be impacted by the proposed modification. The proposed design does present a new impact on Aboriginal heritage, at T-PAD-2, which was not identified in the MCoA.</p> <p>The proposed mitigation measure for T-PAD-2 - salvage excavation - has been developed in consultation with DECC and Aboriginal stakeholders in accordance with the MCoA.</p>
<p>Non-Aboriginal Heritage</p> <p>2.10 Prior to the commencement of construction work in proximity to the following items, the Proponent shall complete all excavations and/or archival recordings, including photographic records, for T001, T008, T204, T205 and T206. This shall be undertaken and completed in accordance with the guidelines issued by the Heritage Council of NSW. The areas containing these items shall be clearly identified and fenced until the completion of the archaeological excavations and/or archival recordings.</p>	<p>The modified proposal results in additional impacts on one item, T003, a farm dam, not previously identified in the MCoA as impacted. The proposed mitigation for this item is archival recording, developed in consultation with the Project archaeologist, and is commensurate with mitigation proposed for similar item T001. Archival recording will be undertaken and completed in accordance with the guidelines issued by the Heritage Council of NSW.</p>

Table 2: Review of Statement of Commitments consistency with the Proposed Modification

Statement of Commitments	Comment
SoC B1 - The limits of clearing and other native vegetation disturbance will be clearly marked on relevant work plans and on site with temporary fencing installed prior to clearing.	The proposed modification would result in variations to the areas of native vegetation disturbance. This will be reflected and clearly marked on relevant work plans, and temporary fencing will be installed prior to clearing. Section 5.2 details changes in vegetation disturbance.
SoC B11 - Drainage culverts will be designed to facilitate movement of fauna species where feasible.	The proposed modification would result in variations to the size and location of drainage culverts in the Sturt Highway to Tarcutta section of the Hume Highway Duplication. The design of all drainage culverts will remain consistent with the commitment of facilitating movement of fauna species where feasible. The fauna provisions are yet to be finalised, however culverts 1.8m deep or larger are being considered for the provision of fauna friendly furniture, in consultation with DPI and DECC where relevant.
SoC B16 - Culverts will be designed to facilitate fish passage where appropriate.	The proposed modification would result in variations to the size and location of drainage culverts in the Sturt Highway to Tarcutta section of the Hume Highway Duplication. The design of all drainage culverts will remain consistent with the commitment of facilitating fish passage where appropriate.
SoC B17 - Fish passage will be maintained during construction.	The proposed modification would result in variations to the impact on Tarcutta and Dellateroy Creeks compared to the Approved Project, however fish passage will continue to be maintained during construction.
SoC AH2 - Test excavation will be undertaken for the following Aboriginal heritage items: T-PAD-I, K3, K10, K-PAD-6, K-PAD-8, K-PAD-9, LB3, LB4, LB-PAD-3, YY7, YY14, YY17, M-PAD-I, M-PAD-3 and LB-PAD-1 and LB-3 (if impacted) and any additional management and mitigation measures will be developed in consultation with Aboriginal stakeholders and DECC.	The proposed modification would result in variations to the impacts on one Aboriginal sites and Potential Archaeological Deposits (PADs) compared to the Approved Project. As discussed in Section 5.2.2 , T6 (formerly T-PAD-1) will not be impacted by the proposed realignment and T-PAD-2 will now be impacted. Salvage excavation will be required for T-PAD-2, and this mitigation is included in the proposed additional Statement of Commitments in Section 7.0 .
SoC H1 - Where the Proposal will directly impact heritage items of state and local significance, detailed heritage investigations and/or research will be performed prior to construction. Information collected will be documented in appropriate archival records.	The proposed modification would result in variations to the impacts on heritage items compared to the Approved Project. As detailed in Section 5.2.3 , two sites of local significance will now not be impacted by the modification and one additional site of local significance (T003 - dam) will now be impacted. As with the Approved Project, all necessary information will be documented in appropriate archive records as detailed in Section 5.0 .

4.2 Consistency Assessment

Table 3: Consistency Assessment of the Modified Proposal compared to the Approved Project

FACTOR	YES	NO
4.2.1 Fundamental consistency with Approved Project		
<p>Will all proposed modifications, considered together, result in a radical change to the activity as approved? (Note – this question is aimed at the fundamental concept of the project, its location and standard.)</p> <p>The proposed modifications would not result in a radical change to the activity as approved. The activity of Highway duplication in the N1 section of the Approved Project will not change significantly due to the proposed realignment between chainages 38000 and 40400.</p>		√
4.2.2 Consistency with objectives and functions of Approved Project as a whole		
<p>Will all proposed modifications, considered together, result in any substantive change to the objectives and functions of the approved project as a whole?</p> <p>The proposed modifications would not result in any substantive change to the objectives and functions of the Approved Project as a whole. The primary objective of the Approved Project remains to duplicate the existing single carriageway sections of the Hume Highway between its intersection with the Sturt Highway and Tarcutta. Even with the proposed modifications this objective is still achieved.</p>		√
4.2.3 Consistency with objectives and functions of elements of Approved Project		
<p>Will each separate proposed modification result in any substantive change to the objectives and functions of that element of the Approved Project which it modifies AND do so without better satisfying any other Conditions of Approval such that a net improvement in the environment results?</p> <p>As detailed above, the functions and objectives of duplicating the existing single carriageway sections of the Hume Highway will not be affected by the proposed modifications.</p>		√
4.2.4 Consistency with environmental impact		
<p>Are there any new environmental impacts or changes to environmental impact associated with the proposed modification that are not covered by safeguards or mitigation measures identified in the EA or associated documents; or any Condition of Approval; or which would make safeguards, mitigation measures or Conditions of Approval ineffective?</p> <p>An assessment of the environmental impacts as a result of the proposed modifications is provided in Section 5.0 of this report. Whilst there is an improved environmental outcome in relation to flooding, construction timeframe and traffic management, there is a modified impact to both biodiversity and heritage as outlined in Section 5.0. Additional mitigation measures and Statement of Commitments have been included to minimise these environmental impacts.</p>	√	

4.2.5 Consistency with particular Conditions of Approval	
<p>Will any proposed modification, either by itself or in association with any other proposed modifications, result in the inability to satisfy any Condition of Approval?</p> <p>The proposed modifications would not result in the inability to satisfy any Conditions of Approval. However, as detailed in Section 4.1, the proposed modification results in impacts on heritage items that have not been detailed in the MCoA. These new impacts suggest that the proposed modification is inconsistent with the Conditions of Approval.</p>	√

4.3 Conclusion

The proposed modifications to the alignment are generally considered to be consistent with the objectives and function of the Hume Highway Duplication Project, as approved by the Minister for Planning. However, the associated environmental impacts of the proposed modifications are not consistent with those identified in the Environmental Assessment (SKM 2007) and the MCoA. As such, a request to modify the Approved Project should be sought from the Minister of Planning in accordance with Section 75W of the EP&A Act.

4.4 Certification

This consistency report provides a true and fair review of the proposed changes to the N1 Section of the Hume Highway Duplication, in relation to its consistency with the Minister for Planning's approval. It addresses to the fullest extent possible, all matters likely to be relevant to the determination of consistency.

5.0 Environmental Assessment

5.1 Environmental Risk Assessment

Within the environmental assessment prepared for the Approved Project, an environmental risk assessment was undertaken. The risk assessment performed by Sinclair Knight Mertz identified the following to be key issues for the Approved Project:

- Biodiversity;
- Heritage (Aboriginal and non-Aboriginal);
- Flooding and hydrology;
- Resource management;
- Cumulative impacts.

A subsequent review was undertaken by the NHA environment team to determine the key issues relevant to the proposed modification. The issues identified as potential key issues for assessment in **Section 5.2** include biodiversity, heritage, hydrology, and soil and water quality. Resource management and cumulative impacts of the proposed modification are however, consistent with the Approved Project, and have been considered along with other issues in **Section 5.3**.

5.2 Assessment of Key Issues

5.2.1 Biodiversity Impacts

5.2.1.1 The effect of the Approved Project

Detailed assessment of the approved impact on the ecology of the study area can be found in the Environmental Assessment, Sturt Highway to Tarcutta Hume Highway Duplication (March 2007) for the Approved Project.

In particular, removal of Box-Gum Woodland which is an Endangered Ecological Community (EEC) listed under the EPBC Act and TSC Act will be required for the Approved Project. The extent of removal expected is shown in **Table 4**, below. The EPBC Act listed community forms a subset of the TSC Act community. Assessments of significance conducted under both EPA Act and EPBC Act criteria concluded that the Approved Project will be unlikely to have a significant impact on listed Box-Gum Woodland.

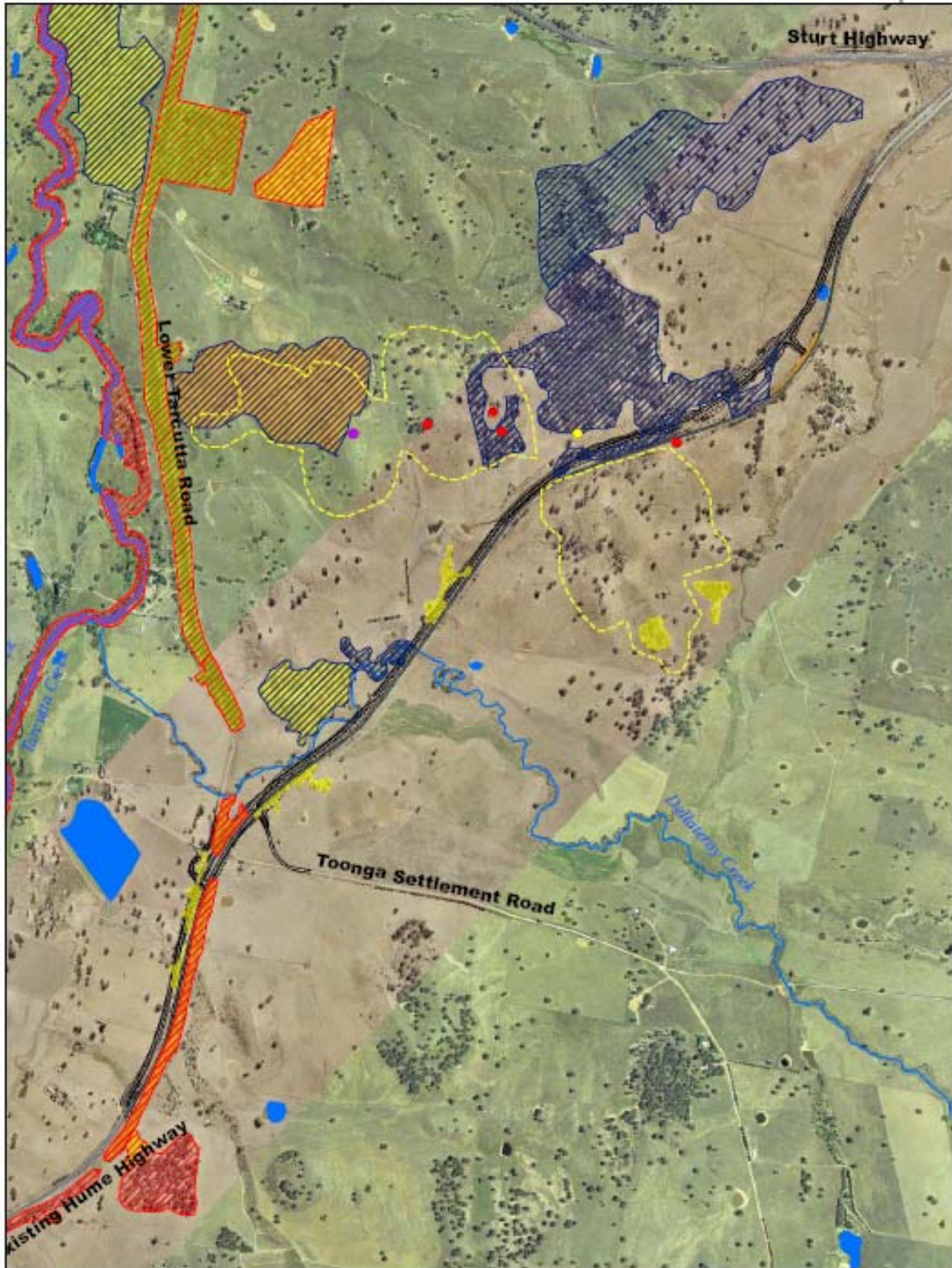
Table 4: Approved Project removal of Box-Gum Woodland threatened ecological communities

Vegetation Community	Potential impact / habitat removal (ha)
White Box - Yellow Box - Blakely's Red Gum Woodland (EEC-TSC Act)	2.27
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CEEC - EPBC Act)	0.33
Total	2.60

No other threatened terrestrial ecological communities occur within the study area. However, the aquatic ecological community in the natural drainage system of the lower Murray River catchment is listed as an EEC under the *Fisheries Management Act, 1994* (FM Act). This community occurs in the study area within Dellateroy Creek.

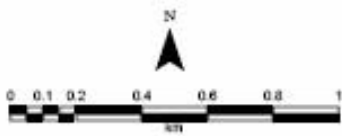
5.2.1.2 The effect of the Modified Project

Detailed assessment of the modified impact on the ecology of the study area can be found in the Biodiversity Assessment for the modified proposal in **Appendix A**. A combined ecological constraints map (**Figure 7**) and summary of impacts is provided below.



- Vegetation Condition**
- High
 - Moderate
 - Low
 - Reptile Habitat
 - High Quality Squirrel Glider & Bird Habitat
 - Moderate Quality Squirrel Glider & Bird Habitat

- Threatened Fauna Survey**
- Brown Treecreeper
 - Diamond Firetail
 - Striped Legless Lizard
 - Modified Alignment
 - Roads
 - Waterways



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FIGURE 7: ECOLOGICAL CONSTRAINTS

Source: MapData 2006, RTA 2007, SKM 2007

5.2.1.2.1 Threatened terrestrial ecological communities

Removal of Box-Gum Woodland which corresponds to the EECs listed under the EPBC Act and TSC Act would be required for the proposed modification. The extent of removal expected is shown in **Table 5** below. The EPBC Act listed community forms a subset of the TSC Act community.

The modified proposal would result in the removal of an additional 0.86 ha of TSC Act listed Box-Gum Woodland. Of the additional woodland requiring clearing, only 0.30 ha is of moderate condition with the remaining 0.56 ha being of low condition.

The modified Proposal will require the removal of less EPBC Act listed Box-Gum Woodland than the Approved Project. The Approved Project required the removal of 0.33 ha of EPBC Act Box-Gum Woodland, whereas the modified proposal would require the removal of 0.30 ha.

The remnant of Box-Gum Woodland with the greatest conservation value within the study area, due to its greater size and better condition, occurs at the southern end of the proposal on the eastern side of the existing Hume Highway. Less clearing of this patch would be required for modified proposal.

Table 5: Modified Project removal of Box-Gum Woodland endangered ecological communities

Vegetation Community	Potential impact / habitat removal (ha)
White Box - Yellow Box - Blakely's Red Gum Woodland (EEC-TSC Act)	3.13
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CEEC - EPBC Act)	0.30
Total	3.13

Assessments of significance conducted under both EPA Act and EPBC Act criteria concluded that the approved proposal would have a lower impact on listed Box-Gum Woodland.

5.2.1.2.2 Threatened plant species

A number of threatened plant species have some potential to occur in areas affected by the modified proposal. No threatened plant species were recorded in the study area, though some of the species listed in **Table 6** below have some potential to occur.

Habitat for five of the threatened plant species considered below consists of Ironbark Woodland. The modified proposal would require a similar amount of habitat to be removed for these species as required for the Approved Project.

Greater habitat removal would be required for species which inhabit Box-Gum Woodland. The modified proposal would result in the removal of an additional 0.86 ha of Box-Gum Woodland. Of the additional woodland requiring clearing, only 0.30 ha is of moderate condition, with the remaining 0.56 ha being of low condition. This low condition woodland is likely to be of only marginal value as habitat to threatened species due to the impacts of cattle grazing and weed invasion.

The highest quality threatened flora habitat occurs at the southern end of the proposal on the eastern side of the existing Hume Highway. This area has greater native species diversity, more complex vegetation structure and less weed cover. The patch also has received less grazing pressure and has a lower edge to area ratio. These factors give this patch greater long-term viability as flora habitat than smaller, more disturbed patches. Less clearing of this patch would be required for the modified proposal.

Table 6: Expected removal of possible habitat for threatened plant species

Species	TSC Act Status	EPBC Act Status	Habitat	Potential impact / habitat removal (ha)
<i>Ammobium craspedioides</i>	V	V	Box-Gum Woodland	3.13
<i>Amphibromus fluitans</i>	V	V	Riparian / Wetland Habitats	0.02
<i>Brachycome papillosa</i>	V	V	Ironbark Woodland	2.61
<i>Caladenia arenaria</i>	E	-	Ironbark Woodland	2.61
<i>Caladenia concolor</i>	E	E	Box-Gum and Ironbark Woodland	5.74
<i>Caladenia rosella</i>	PE	V	Ironbark Woodland	2.61
<i>Diuris tricolor</i>	V	V	Ironbark Woodland	2.61
<i>Goodenia macabarronii</i>	V	V	Ironbark Woodland	2.61
<i>Pilularia novae-hollandiae</i>	E	-	Riparian / Wetland Habitats	0.02
<i>Rutidosia leptorrhynchoides</i>	E	E	Box-Gum Woodland	3.13
<i>Swainsona murrayana</i>	V	V	Box-Gum Woodland	3.13
<i>Swainsona recta</i>	E	V	Box-Gum Woodland	3.13
<i>Senecio garlandii</i>	V	V	Box-Gum Woodland	3.13

Assessments of significance conducted under both the EPA Act and EPBC Act criteria, concluded that the proposed modification would be unlikely to have a significant impact on any threatened plant species.

5.2.1.2.3 Threatened terrestrial fauna

Four species of threatened fauna, the Brown Treecreeper, Diamond Firetail, Striped Legless Lizard and Speckled Warbler, were recorded during investigation for the Approved Project. This investigation also included the surveying of areas required for the modified proposal. A number of other threatened terrestrial fauna species were considered to have habitat in the study area. These species and the potential habitat removal required are shown in **Table 7**.

An additional 0.85 ha of mammal and bird habitat would require removal for the modified proposal, though some of this additional habitat is of relatively low condition.

The impact on areas identified in the Environmental Assessment as high quality habitat for threatened reptiles would be reduced under the modified proposal. The loss of habitat would be reduced from 0.5 ha to 0 ha.

The patch of fauna habitat with the greatest conservation value within the study area, due to its larger size, greater structural complexity and abundance of tree hollows, occurs at the southern end of the proposal on the eastern side of the existing Hume Highway. The modified proposal would result in less of this area being cleared for the Highway Duplication.

Table 7: Expected removal of known and potential habitat for threatened terrestrial fauna

Species	TSC Act Status	EPBC Act Status	Habitat	Potential impact / habitat removal (ha)
Barking Owl (<i>Ninox connivens</i>)	V	-	Woodland habitat	5.74
Black-chinned Honeyeater (eastern subsp) (<i>Melithreptus gularis gularis</i>)	V	-	Woodland habitat	5.74
Brown Treecreeper (<i>Climacteris picumnus</i>)	V	-	Woodland habitat	5.74
Bush Stone Curlew (<i>Burhinus grallarius</i>)	V	-	Woodland habitat	5.74
Diamond Firetail (<i>Stagonopleurata guttata</i>)	V	-	Woodland habitat	5.74
Grey-crowned Babbler (eastern subsp) (<i>Pomatostomus temporalis temporalis</i>)	V	-	Woodland habitat	5.74
Hooded Robin (<i>Melanodryas cucullata</i>)	V	-	Woodland habitat	5.74
Painted Honeyeater (<i>Grantiella picta</i>)	V	-	Woodland habitat	5.74
Pink-tailed Worm-lizard (<i>Aprasia parapulchella</i>)	V	V	Rocky hill-slope areas	0
Regent Honeyeater (<i>Xanthomyza phrygia</i>)	E	E, M	Woodland habitat	5.74
Speckled Warbler (<i>Pyrrholaemus sagittatus</i>)	V	-	Woodland habitat	5.74
Squirrel Glider (<i>Petaurus norfolcensis</i>)	V	-	Woodland habitat	5.74
Striped Legless-Lizard (<i>Delma impar</i>)	V	V	Rocky hill-slope areas	0
Superb Parrot (<i>Polytelis swainsonii</i>)	V	V	Woodland habitat	5.74
Swift Parrot (<i>Lathamus discolor</i>)	E	E, M	Woodland habitat	5.74
Turquoise Parrot (<i>Neophema pulchella</i>)	V	-	Woodland habitat	5.74
Yellow-bellied Sheath-tail Bat (<i>Saccolaimus flaviventris</i>)	V	-	Woodland habitat	5.74

Assessments of significance conducted under both the TSC Act and EPBC Act criteria, concluded that the Approved Project will be unlikely to have a significant impact on any threatened terrestrial fauna species or population.

5.2.1.2.4 Threatened aquatic ecological communities

The aquatic ecological community in the natural drainage system of the lower Murray River catchment is listed as an EEC under the FM Act. This community occurs in the study area within Dellateroy Creek.

Limited aquatic fauna survey in the form of dip-netting and careful turning of loose rocks was conducted during investigation for the modification report. This revealed the presence of two fish species, the introduced Plague Minnow *Gambusia holbrooki*, and the native Mountain Galaxias *Galaxias olidus*. Aquatic invertebrates including yabbies *Cherax destructor*, freshwater shrimp *Paratya australiensis*, aquatic snails, dragonfly larvae, damselfly larvae and mayfly larvae were also found. Personnel from the DPI have also recorded the presence of River Blackfish *Gadopsis marmoratus* in Dellateroy Creek.

The modified proposal would have a direct impact on this community associated with the realignment of several small bends of the creek, and extension of culverts where the creek passes underneath the Hume Highway. Indirect effects would also result from altered hydrology and earthworks.

The re-alignment would involve a small reduction in the length of the watercourse, and hence a loss of habitat. Realignment works would also involve revegetation of the affected areas of creek bank with native plant species from Western Slopes Riparian Moist Edge Woodland. The proposal also includes a wetland that would further enhance the ecological links within this area. These works have the potential to lead to a long-term improvement to the ecological community in the locality.

An assessment of significance conducted under the EP&A Act (Section 5A) criteria, concluded that the proposed modification would be unlikely to have a significant impact on the ecological community.

5.2.1.2.5 Threatened fish

There is some limited potential for the threatened Purple Spotted Gudgeon and threatened Southern Pygmy Perch to occur within Dellateroy Creek, however no other threatened fish species are considered likely to occur. Nevertheless, a number of threatened fish species (refer to **Table 8**) were considered in the assessment of significance on the basis that they may occur within Tarcutta Creek, and hence be indirectly affected by the proposed modifications.

Limited aquatic fauna survey in the form of dip-netting and careful turning of loose rocks was conducted during investigation for the modification report. No threatened fish species or populations were detected.

The modified proposal would have a direct impact on possible habitat for the Purple Spotted Gudgeon and Southern Pygmy Perch associated with the realignment of several small bends of the creek, and extension of culverts where the creek passes underneath the Hume Highway. Indirect effects would also result from altered hydrology and earthworks.

Indirect impacts on fish species, such as sedimentation, have greater potential to occur as a result of the modified proposal due to the increase in earthworks required. The re-alignment would involve a small reduction in the length of the watercourse, and hence a loss of habitat.

Realignment works would also involve revegetation of the affected areas of creek bank with native plant species indigenous to the vegetation community that would originally have existed in the vicinity of the creek. These works have the potential to lead to a long-term improvement to threatened fish habitat in the locality.

Table 8: Expected removal of potential habitat for threatened fish species

Species	FM Act Status	EPBC Act Status	Habitat	Potential impact / habitat removal (ha) - approximate
Macquarie Perch (<i>Macquaria australasica</i>)	V	V	Tarcutta Creek	0
Murray Cod (<i>Maccullochella peelii peelii</i>)	-	V	Tarcutta Creek	0
Purple Spotted Gudgeon (western population) (<i>Mogurnda adspersa</i>)	E	-	Dellateroy Creek	0.03
Silver Perch (<i>Bidyanus bidyanus</i>)	V	-	Tarcutta Creek	0
Southern Pygmy Perch (<i>Nannoperca australis</i>)	V	-	Dellateroy Creek	0.03
Trout Cod (<i>Maccullochella macquariensis</i>)	E	E	Tarcutta Creek	0

Assessments of significance conducted under the FM Act and EPBC Act criteria, concluded that the proposed modification would be unlikely to have a significant impact on any threatened fish species or populations.

5.2.1.2.6 Migratory Species

Five species listed as migratory under the EPBC Act were considered likely to occur in the study area:

- Rainbow Bee Eater (*Merops ornatus*);
- Regent Honeyeater (*Xanthomyza phrygia*);
- Satin Flycatcher (*Myiagra cyanoleuca*);
- Swift Parrot (*Lathamus discolor*); and
- White-throated Needletail (*Hirundapus caudacutus*).

These species are likely to utilise woodland habitats throughout the study area on a seasonal basis or as occasional visitors. The increased woodland habitat clearance as a result of the modification (0.85 ha) is unlikely to significantly alter the impact on these species.

Impacts on the Regent Honeyeater and Swift Parrot were assessed under EPBC Act threatened species assessment criteria. The remaining species were assessed under EPBC Act migratory species impact criteria.

5.2.1.2.7 Summary

These assessments concluded that significant impact on these species is unlikely to occur as a result of the proposed modification.

Impacts on terrestrial ecology are unlikely to be significantly altered as a result of modification to the alignment. Although a larger amount of Box-Gum Woodland, and hence fauna habitat, would require removal, less removal of the highest quality patch with the greatest long-term viability and conservation value would be required.

Impact on threatened reptile habitat is likely to be reduced under the modified proposal.

There is a greater likelihood that detrimental impacts on threatened fish and the aquatic ecological community in the natural drainage system of the lower Murray River catchment would occur, as a result of the proposed modification. Despite this increase in potential for impact, it is still considered unlikely that the modified proposal would have a significant impact on these species or the aquatic community.

The overall effect of the modified proposal on the ecological values of the study area is likely to be similar to that of the Approved Project.

5.2.1.3 Mitigation strategy

The following mitigation measures, additional to those contained in the EA and SoC, would be implemented in order to minimise the impact of the proposed modification on terrestrial and aquatic ecology.

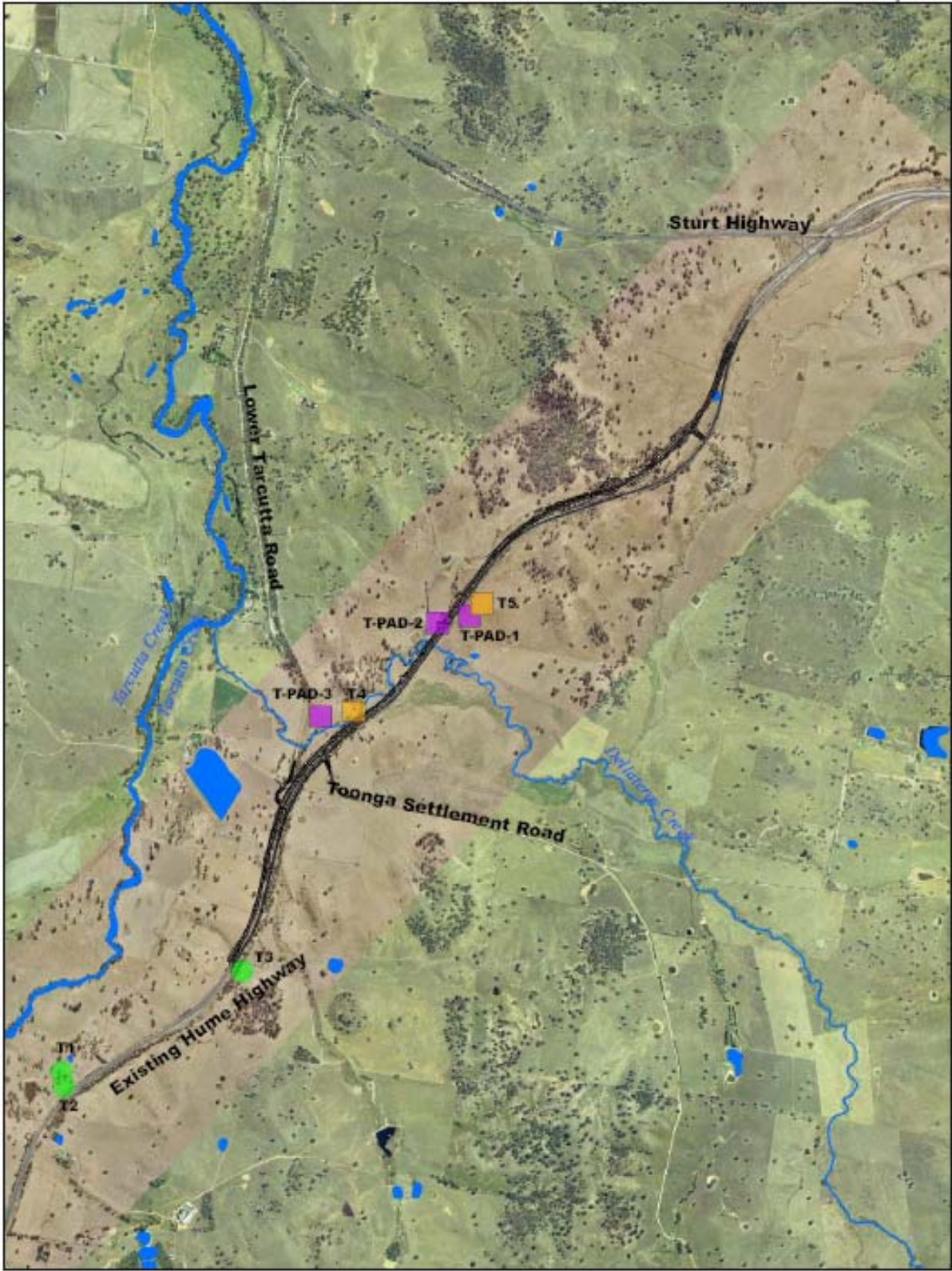
Realignment of the affected bends of Dellateroy Creek would involve a variety of mitigation measures designed to improve the condition of the waterway and associated riparian vegetation. These measures would result in improvement to the condition of the area in the long-term. Excavation of the creek diversions and revegetation of the sites would be conducted prior to filling in the current natural creek sections. This would ensure that fully-functional habitat is available for aquatic fauna prior to the diversion of the creek. Relocation of aquatic fauna would be conducted under the direction of the DPI representatives. Further protective measures, such as the exclusion of stock from rehabilitated areas, would be implemented to allow the area to stabilise and the vegetation to establish. The protective measures would be developed in consultation with the DPI and DWE, and detailed within the **Construction Riparian Management Plan (N829-EN-210F)** as required by the MCoA.

5.2.2 Aboriginal Heritage

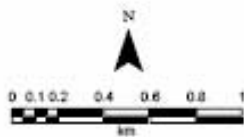
5.2.2.1 The effect of the Approved Project

Five Aboriginal archaeological sites, comprising three scarred trees and two isolated finds, and three Potential Archaeological Deposits (PADs) were recorded in the Sturt Highway to Tarcutta section during the Environmental Assessment. An impact assessment was conducted by Kelleher Nightingale Consulting (KNC), who identified impacts on one PAD (T-PAD-1). This PAD was test excavated in early 2007, and was identified as an archaeological site (T6).

The location of indigenous heritage sites is shown in **Figure 8**.



- | | |
|---------------------------|----------------------|
| Aboriginal Heritage Items | — Modified Alignment |
| ■ Isolated Fine | — Roads |
| ■ PAD | — Waterways |
| ● Scarred Tree | |



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FIGURE 8: INDIGENOUS HERITAGE SITES
(indicative only)

Source: MapData 2006, RTA 2007

5.2.2.2 The effect of the Modified Project

The modified alignment would change the potential impacts on items of indigenous heritage significance as follows:

- Additional impacts upon one PAD (T-PAD-2); and
- Reduction in impacts on one site (T6 (T-PAD-1)).

Table 9 outlines the status of each of the identified items, and assesses the consistency of impacts between the approved and modified alignment.

Table 9: Indigenous Heritage Sites - N1 - Consistency with Approved Project

Site	Impact	Consistent with Approved Project	Further investigative works required
T1 – Scarred Tree	No Impact	Yes	None
T2 – Scarred Tree	No Impact	Yes	None
T3 – Scarred Tree	No Impact	Yes	None
T4 – Isolated Find	No Impact	Yes	None
T5 – Isolated Find	No Impact	Yes	None
T6 (T-PAD-1)	No Impact	No (impact removed)	None
T-PAD-2	Impact	No (additional impact)	Salvage excavation
T-PAD-3	No Impact	Yes	None. The Project archaeologists (Kelleher Nightingale Consultants) determined that although the new alignment runs close to the PAD, it would not impact this potential deposit. No investigation is required.
Place 1 – Tarcutta Women’s Area	No Impact	Yes	None
Tarcutta Women’s Teaching Area	No Impact	Yes	None
Place 3 – Ancestral Spirit with totems	No Impact	Yes	None

5.2.2.3 Mitigation strategy

Prior to construction commencing in proximity to T-PAD-2, a salvage excavation is required. Works are to be undertaken in accordance with the **Aboriginal Heritage Management Plan (N829-EN-202A)** as required by the MCoA. It is anticipated that this salvage investigation would require 1-3 weeks to complete, and would be undertaken in accordance with the methodology described in Appendix C of the Hume Highway Upgrade Duplication Project; Aboriginal Cultural Heritage Report - Test Excavations Results, Assessment and Management Measures (RTA July 2007). This methodology has been developed in consultation with the DECC and Aboriginal stakeholders. No

further archaeological work is recommended for any other archaeological sites or features within the N1 section.

5.2.3 Non-Aboriginal Heritage

5.2.3.1 The effect of the Approved Project

Survey of non-Aboriginal heritage for the Environmental Assessment identified a number of heritage items in the study area. The study found nineteen non-Aboriginal heritage items within 100 metres of the existing Highway. These include:

- Archaeological heritage - 8 sites of archaeological heritage;
- Built heritage - 6 sites of built heritage; and
- Landscape heritage - 5 sites of landscape heritage.

5.2.3.2 The effect of the Modified Project

Table 10 provides a summary of the items, their heritage significance and a comparison of the potential for impact between the original and modified alignment. The impact criteria for the heritage items are as follows:

High impact denotes that the development would physically affect the item or some of its important elements. The building would be demolished or landscape features, garden setting or the visual connections between related buildings would be physically affected.

Moderate impact means that there would be a small reduction in the current physical extent of the item, or a minor impact on the setting or visual curtilage of items of heritage significance.

Minimal impact indicates that the existing built structures represent low heritage significance, or the development would have no adverse impact on a significant component.

Direct impact denotes that the archaeological item would be in the direct route of the development resulting in full or partial destruction of the item.

Nil Impact denotes that the archaeological item would be outside of the footprint of the development.

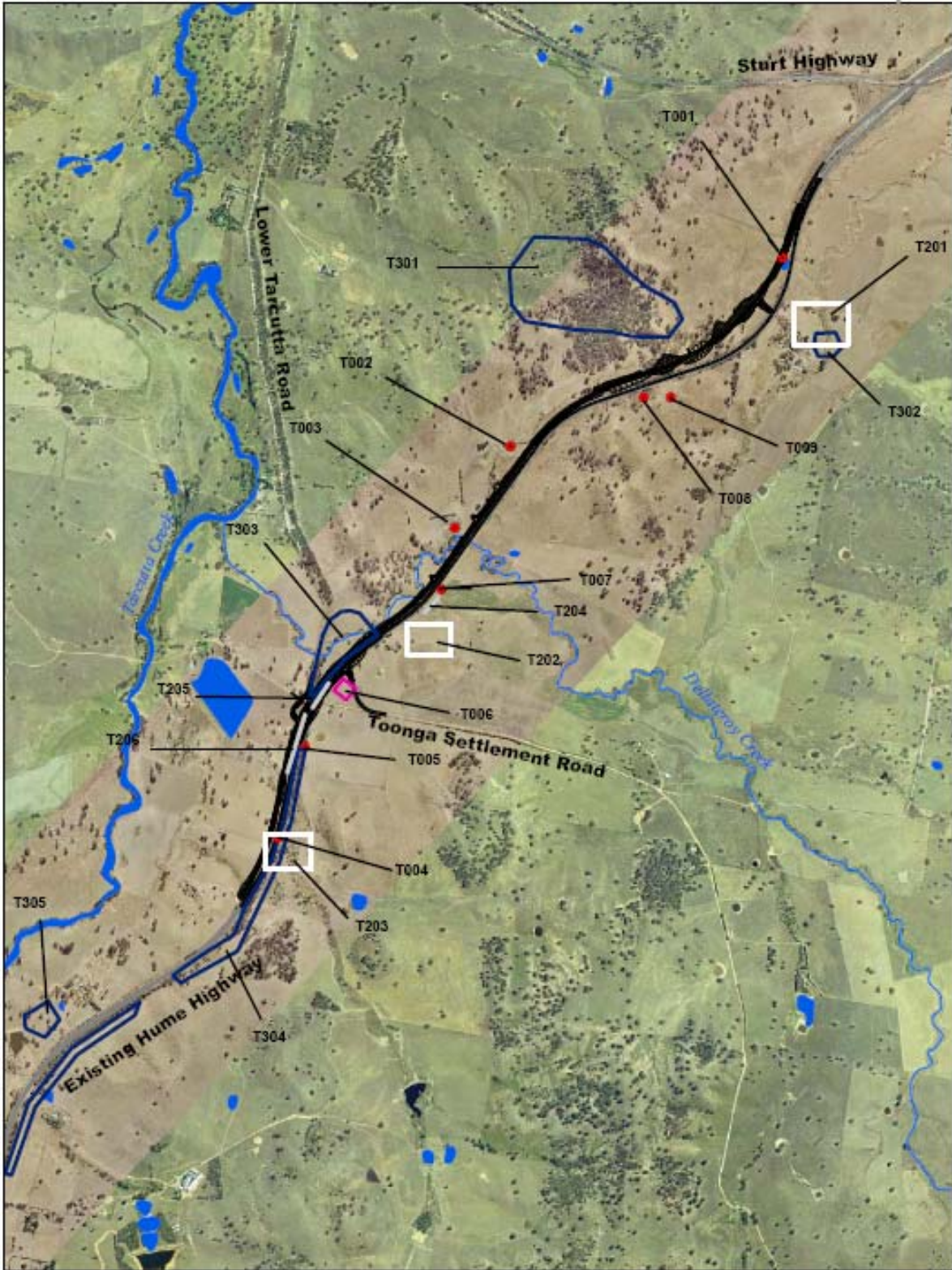
Table 10: Comparison of non-Aboriginal heritage impacts associated with the modified alignment.

Ref	Description	Significance	Approved Project Impact	Modified Project Impact
Archaeology				
T001	Dam	Local	Direct	Direct
T002	Dam	Local	Nil	Nil
T003	Dam	Local	Nil	Direct
T004	Stockyard	Local	Nil	Nil
T005	Dam	Local	Nil	Nil
T006	Dairy complex	Local	Direct	Nil
T007	Concrete well	Local	Nil	Nil
T008	Gravel road	Local	Direct	Nil
T009	Schist quarry	Local	Nil	Nil
Built heritage				
T201	Sheds	Local	Minimal	Minimal
T202	Timber stockyard	Local	High	Nil
T203	Timber stockyard	Local	Minimal	Minimal
T204	Road alignment	Local	High	High

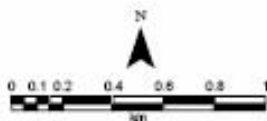
T205	Road alignment	Local	High	None*
T206	Road alignment	Local	High	None*
Landscape heritage				
T301	Dead Mans Hill	Local	Minimal	Minimal
T302	Plantings	Local	Minimal	Minimal
T303	Vegetation	Local	Moderate	Moderate
T304	Vegetation	Local	Moderate	Moderate
T305	Plantings	Local	Minimal	Minimal

* During field work undertaken for the archival recording of locally significant non-Aboriginal heritage items, sites T205 and T206 could not be located in the field. These sites, initially identified in the Environmental Assessment from analysis of historic aerial photographs, were not ground-truthed and have been mis-plotted. As a result, these sites could not be located during the archival recording field work, and thus could not be recorded.

The above non-Aboriginal heritage sites are shown in **Figure 9**.



- Modified Alignment
- Hume Highway
- Non-Aboriginal Archaeological Items
- Historic Archaeological Items
- Built Heritage Items
- Historic Landscape Items



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**FIGURE 9: NON INDIGENOUS
HERITAGE SITES**

Source: MapData 2006, RTA 2007, SKM 2006

Archaeological heritage

The alignment change would result in an additional impact on one item identified as of local significance (T003 - dam). Impacts on one site, T001 - dam will remain, and there will be reduced impacts on items T006 - dairy and T008 - road remnant.

Built heritage

The Environmental Assessment identified impacts on four of the six built heritage items. The modified proposal will reduce impacts on one site T202, and two sites (T205 and T206) have been identified as erroneous recordings during the Environmental Assessment.

Landscape heritage

It is anticipated that impacts for heritage items in relation to the modified alignment would be at similar scale as prescribed in the Environmental Assessment. It is expected that the modified proposal would diminish peripheral views of Dead Mans Hill (T301) north of the township of Tarcutta; and to the sheds (T302) to the east of the Highway in this location. In addition, the modified proposal would result in some loss or marginalisation of vegetation associated with the homestead planting (T305).

The impacts will not be changed, and will remain as moderate impacts associated with the extent of vegetation removal proposed around the intersection of the Hume Highway and Old Tarcutta Road (T303), together with roadside vegetation to the south of this intersection (T304). To the north of the intersection the modified proposal would be located close to the existing road alignment, and due to the relative absence of substantial roadside planting, no significant impacts on heritage landscape values have been identified.

5.2.3.3 Mitigation Strategy

Mitigation measures for additional impacts on T003 have been developed in consultation with the Project Non-Aboriginal Archaeologist. Recommendation is for archival recording of this site.

Despite a reduction in impacts on T006 and T008, site specific history for T006 has been complete in accordance with MCoA 2.9, and archival recording has been complete for items T006 and T008 in accordance with MCoA 2.10.

As outlined above, due to mis-plotting of items T205 and T206, archival recording (as required by MCoA 2.10) has not been completed for these items.

5.2.4 Soils and Water Management

The Highway corridor traverses low hills, valleys and alluvial plains typical of the western slopes of the Great Dividing Range. The existing Highway has been generally located on lower footslopes, however in places crosses short sections of the floodplain.

The predominant bedrock unit within the study area is composed of metamorphic and metasedimentary rocks such as slate, phyllite, metasandstone and metasilstone. The rocks are of late Ordovician age, however they have since been extensively deformed, regionally metamorphosed and intruded by granite rocks.

Three soil types are evident throughout the area:

- Colluvial soils of the lower gradient foot slopes; these soils are stony clays and due to their topographic situation have a tendency to become waterlogged and salinised in places;
- Residual soils on the upper slopes, hill crests and saddles; these are similar to the colluvial soils and tend to act as intake areas for shallow groundwater, which may cause waterlogging further downslope; and
- Alluvial soils of the main floodplains; these are surface soils composed predominantly of silts and clays, with some sand, and are prone to flooding, waterlogging and shrink-swell behaviour.

Tarcutta Creek is the largest tributary of the Murrumbidgee River between Gundagai and Wagga Wagga, and flows in a northerly direction adjacent to the site (approximately 5000m to the west) to the junction of the Murrumbidgee River, approximately 25km east of Wagga Wagga (Nancarrow *et al* 2001).

Incised channels, eroding banks, declining water quality, degraded riparian zones and changing hydrology are common characteristics of streams within the Tarcutta catchment (Landcare Australia, 2006). The creeks in the study area have undergone hydrological stress due to recent drought conditions, and extraction for the purposes of stock watering, domestic uses and irrigation.

Dellateroy Creek is the only named watercourse crossing the proposal with its origins about 8.5 kilometres east of the Highway. Flowing in an east-west direction, Dellateroy Creek passes beneath the Highway midway along the proposal, continues flowing in a southerly direction immediately adjacent to the Highway for approximately 1 kilometre, diverts west and confluences with Tarcutta Creek approximately 1.3 kilometres east of the proposal.

5.2.4.1 The effect of the Approved Project

The assessment conducted on the Approved Project in March 2007 made an assessment in reference to potential impacts that are likely to transpire with construction and operation of the approved alignment. The assessment considered the following key areas:

- Erosion and sediment controls;
- Soil erosion potential; and
- Operational impacts due to spills.

With the exception of the increased impact upon Dellateroy Creek due to the realignment, the potential impacts of the proposed modifications are consistent with those considered in the Approved Project. Detailed assessment is provided within the original environmental assessment document, and an assessment of the impacts due to the realignment of Dellateroy Creek is provided in the following section.

5.2.4.2 The effect of the Modified Project

The modification would result in substantial alteration of the impact on soils and water; due to the realignment of several bends of Dellateroy Creek (**Figure 10**). Realignment would result in impacts on stream morphology, and would affect the area subject to inundation during flood events.

The section of Dellateroy creek affected by the proposal is between chainage 38300 to 40300. This is a permanent water course with a spring source just north of the works. The present condition of the creek in this section is degraded, a product of higher storm flow rates and the presence of stock within the creek environs damaging creek edges. The result of this is a highly incised channel some 3.0m deep in places.

The realignment works would result in the loss of the current flow line features, and have potential for erosion and sedimentation during construction works, particularly any works within the flow line. However, these impacts can be mitigated through construction staging, and rehabilitation of vegetation for bank stability. Also the reinstatement of snags and other habitat features would minimise any long-term effects on biodiversity within the creek. Mitigation measures are discussed in greater detail in the following section.

For greater detail on the effects of the modification on hydraulics and flooding see **Section 5.2.5** as well as the *Hydrology and Hydraulics Study* in **Appendix C**.

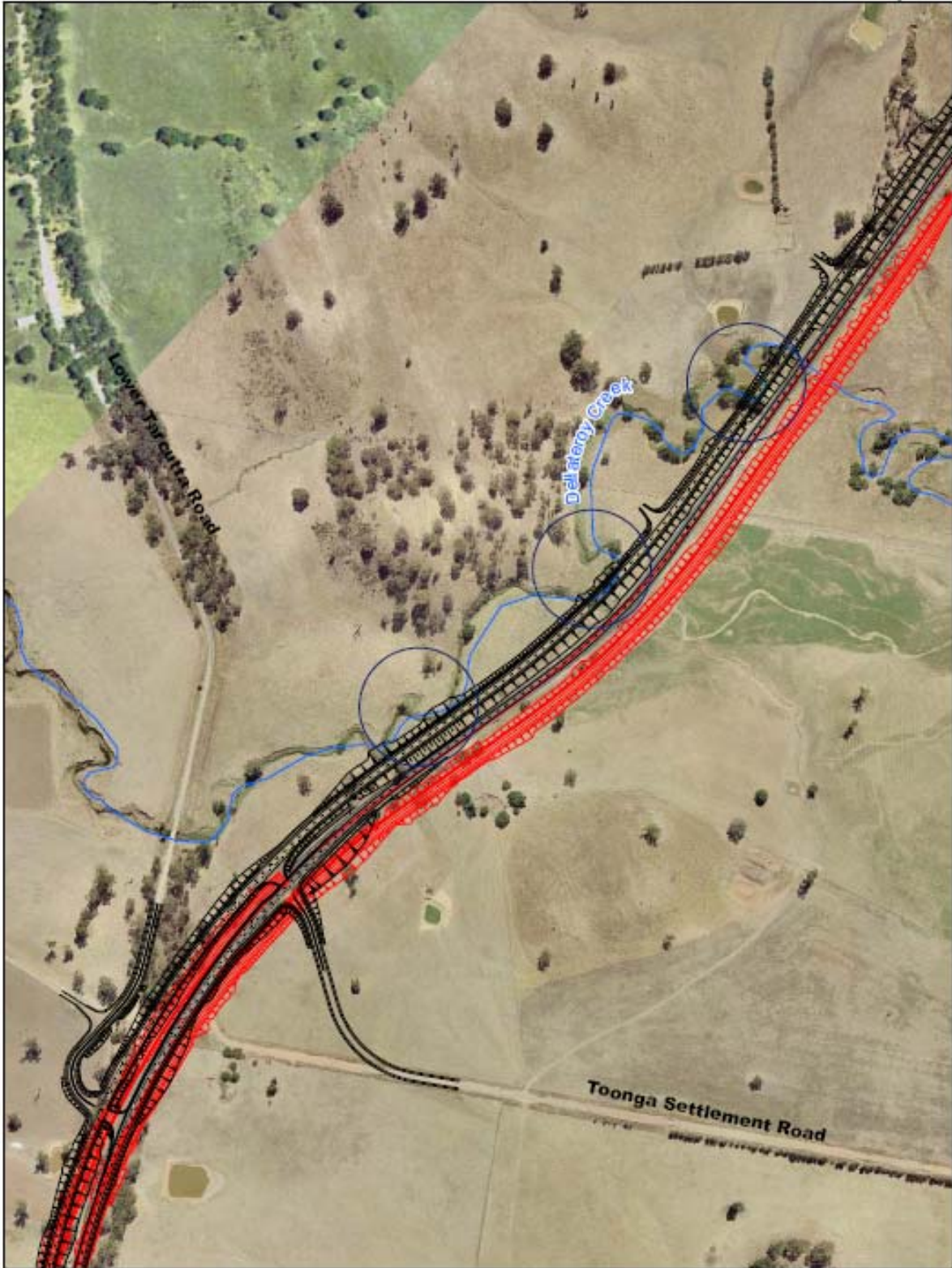
5.2.4.3 Mitigation Strategy

Mitigation measures would include those specified within Section 6.6 of the Sturt Highway to Tarcutta Environmental Assessment (March 2007) and the Final SoC for the Approved Project. Additional mitigation measures have also been developed for the increased impact to Dellateroy Creek. The modification would require rehabilitation of the realigned sections of the creek line, and re-establishment of the natural systems including a wetland area to further enhance ecological links within the area. The design intent is to re-establish the creek and its margins using vegetation of the Western Slopes Riparian Moist Sedge Woodland dominated by *Eucalyptus camaldulensis* (River Red Gum).

Where practicable, works would be staged to construct the flow line prior to connecting with the existing creek line. This would allow for installation of rehabilitation and stabilisation materials 'offline', to prevent the reconstructed channel from eroding during construction and causing subsequent water pollution.

In terms of the ongoing life of the creek beyond construction, the banks profile would be designed between 1:3 and 1:5 to improve the long-term stability. Flatter slopes would be reinforced using coir matting or similar, to bind the profile as the landscape establishes. Steeper slopes would use rock armoring with planting of the void spaces between rocks undertaken.

As part of the long term environmental strategy, dedicated spill control is proposed in the vicinity of Chainage 39800, which shall incorporate water quality treatment for interception of pavement drainage. In addition, three dedicated spill containment basins are currently under development. These basins will form part of the integration of the creek realignment works, and will protect this environmentally sensitive area from potential spills along the new carriageway. In addition, the existing stock crossing is to be extended and upgraded to include grasscrete (or equal), in order to provide transition from the monolithic culvert structure to the established grassed areas, thus minimising the opportunity for erosion or scour to occur at the culvert.



- Modified Alignment
- Approved Alignment
- Waterways
- Area of direct impact from the modified alignment



STURT HIGHWAY TO TARCUTTA
- MODIFICATION REPORT

**FIGURE 10: EXTENT OF ENCROACHMENT
ON DELLATEROY CREEK AS A RESULT
OF THE MODIFIED ALIGNMENT**

Source: MapData 2005, RTA 2007

5.2.5 Flooding and Hydraulics

5.2.5.1 The effect of the Approved Project

The assessment conducted on the Approved Project in March 2007 made an assessment in reference to potential impacts that are likely to transpire with construction of the approved alignment. The assessment considered the following key areas:

- Flooding behaviour;
- Water resource;
- Water resource licensing;
- Ground water contamination;
- Salinity and water logging; and
- Hazards to infrastructure.

Detailed assessment is provided within the original environmental assessment.

5.2.5.2 The effect of the Modified Project

The following impacts associated with the new alignment are primarily designated to the one kilometre section of road (specifically between chainages 39330 and 40000) where Dellateroy Creek runs adjacent to the existing Highway on the western side.

The design is expected to encroach into the creek, and is expected have minor influence on existing flooding processes. As such, the western alignment designs propose that sections of the existing channel on the western side of the Highway would be filled and re-aligned. Details of the proposed creek rehabilitation / re-alignment works are preliminary at this stage, and subject to further consultation with the relevant stakeholder authorities. Details of the flood design mitigation measures form part of a separate **Flooding and Drainage Management Sub Plan (N829-EN-207E)**.

An assessment of waterway options was conducted as part of the detailed design development in May 2007 (refer Hydrology and Hydraulics Study No.NHA-DR-50500403-CD-01 - **Appendix C**). This assessment modelled various scenarios relating to the future hydrological conditions based on the modified alignment option (i.e. alignment on the eastern side of the carriageway) in comparison to the approved alignment (i.e. alignment on the western side the carriageway). Modelling was carried out using HEC-RAS 1-D and TUFLOW 2-D, and modelled features such as extent of inundation and channel flow distribution, flood level and velocity during a 1 in 100yr ARI. In summary, the study concluded that the impacts associated with the approved alignment as compared to impacts for the modified alignment would be much greater, and generally not acceptable under the design criteria nominated for the Project.

Table 11: Assessment of flooding and hydraulic issues associated with the modified alignment

Aspect	Change to impacts / processes?	Discussion
Flooding behaviour - impervious surfaces	No	It is expected that impacts related to the increase of impervious material as a result of the duplication would still be negligible, considering that the increase in impervious area would not change greatly with the modified alignment.

Aspect	Change to impacts / processes?	Discussion
Flooding behaviour - afflux	Yes	According to the Hydrology and Hydraulics Study (Dated May 2007) it is expected that impacts (such as affects to the existing flow regime) associated with the modified alignment would be less in comparison to the original eastern alignment. As such, the flow regime of the waterways is expected to be relatively unaffected and afflux would be within the design criteria (0.25m) at the Project boundary.
Flooding behaviour - impact on waterways	Yes	The construction of the modified alignment to the west of the existing road would encroach onto the creek as pictured in Figure 4 . According to preliminary results documented in the Hydrology and Hydraulics Study, it is anticipated that no significant adverse impacts in relation to flood inundation would be encountered as a result of the alignment shift to the west.
Surface water resources	No	It is envisaged that the proposal would still require similar amounts of water during construction, and would be sourced from local groundwater stores or purchased from Riverina Water County Council.
Groundwater resources	No	Potential impacts of using groundwater within the catchment would be consistent with construction of the modified alignment.
Water resource licensing	No	It is expected that relevant licensing requirements under the <i>Water Act, 1912</i> would still apply to the proposed modification.
Ground water contamination	No	The potential for pollution of ground water during construction of the modified alignment is consistent with the Approved Project
Salinity and waterlogging	No	It is still expected that salinity and waterlogging issues would not change significantly since the modified alignment has not changed greatly from the approved alignment.
Hazard to infrastructure	No	It is recommended that the implementation of lateral drainage structures such as blind ditches (parallel to the modified alignment) should still be implemented to prevent Highway seepage and keep sub-grade pavement dry, as explained previously for the approved alignment.

5.2.5.3 Mitigation strategy

Mitigation measures as outlined in the previous Environmental Assessment (Dated, March 2007) should be adopted for the modified alignment proposal.

In addition, the measures required for Dellateroy Creek bank stabilisation on the realigned sections (as discussed in **Section 5.2.4.3**) would be relevant to maintaining the necessary flow area, and mitigating flooding impacts during high flows.

5.3 Other Issues

The proposed modifications would result in impacts that are consistent with the Approved Project in the following areas:

- Dust and air quality;
- Resource management;
- Air quality and greenhouse gases;

- Construction noise and vibration;
- Visual - There is not expected to be a larger visual impact as a result of the proposed modification;
- Waste;
- Contaminated land;
- Social impacts;
- Operational traffic and noise; and
- Hazard and risks (operational).

During construction of the proposed modification, some benefit would be realised in the areas of:

- Land acquisition;
- Construction traffic management; and
- Hazards and risks.

These benefits have been discussed in detail within **Section 2.4**.

5.4 Cumulative effects

The cumulative environmental effects of a proposal are those impacts which are likely to combine with each other, or with the impacts of other activities, to produce a beneficial or adverse effect. Many small activities and their environmental impacts, when combined, have at least as great an effect on the environment as single major activities or events.

The upgrade of the Hume Highway is part of an overall strategy to improve the national transport link, and is also a vital link to the residential, commercial and recreational areas in the South - Western Region of NSW. The Project would provide significant cumulative benefits long-term of regional accessibility. It would be expected that flow-on benefits in terms of the regional economy would result through reduced transportation cost and facilitation of development.

Consideration was given to the cumulative impacts on the aquatic ecological community in the natural drainage system of the lower Murray River catchment EEC. Extremely low levels of cumulative impacts are expected to occur, as the proposed modification is only re-aligning Dellateroy Creek in three sections. These three sections will be re-aligned in a way that does not significantly impact the volume and velocity of flow. Extensive revegetation will be used to reduce erosion and sedimentation down stream, and improve on the current degraded condition of the creek.

The potential cumulative impacts of the proposed modifications with other surrounding projects would be consistent with those considered as part of the Approved Project.

6.0 Consultation

6.1 Consultation with Government Agencies

6.1.1 Consultation undertaken prior to submission of this Report

The NHA (on behalf of the RTA) has consulted the relevant regulatory agencies prior to completing this document, in order to identify any specific issues they may have with the proposed modifications. A summary of the consultation undertaken as part of this report preparation is provided in **Table 12**.

Table 12: Summary of Agency consultation previously undertaken

Summary of Issues	Report Reference
<i>NSW Department of Environment and Climate Change</i>	
<ul style="list-style-type: none"> At Deadmans Hill (Chainage No. 37600 - 38300) a DECC representative raised concerns about the potential for loss of critical habitat for species such as the Striped Legless Lizard and Woodland bird species. Upon ground inspection of T-PAD-2 (Chainage No. 38900 - 39250) a DECC representative discovered a number of Quartz fragments and believes it requires further investigation, and that the Terms of Significance should be referenced. DECC recommendation is for a salvage excavation at this site. Correspondence was received from the DECC regarding the updated status of two PADs. Confirmation was made that T6 would no longer be impacted, and T-PAD-2 would now require salvage excavation to be undertaken in accordance with appropriate documents 	<p>Refer to Section 5.2.1.2</p> <p>Refer to Section 5.2.2.2</p> <p>Refer to Section 5.2.2</p>
<i>Department of Water and Energy</i>	
<ul style="list-style-type: none"> With regard to the channel works (creek realignment / Chainage No.39540 - 39640) the possibility was raised of needing to stabilise the creek bend to reduce the risk of erosion, or address the issue via altering the redirection, to increase the radius of the bend to help maintain bank stability. 	Refer to Section 5.2.4.2 & Section 7
<i>Department of Primary Industries – Fisheries</i>	
<p>No major issues with the preliminary details proposed for channel re-alignment works associated with western option.</p> <p>Specific Comments:</p> <ul style="list-style-type: none"> Channel should be similar to existing low flow in size and slope, and revegetated with Phragmites type reeds in invert. Creation of pool areas is allowable and may be beneficial. Allow re-snagging of channels where already present or appropriate (minimise scour potential). Livestock access should be limited during vegetation establishment periods. The crossing at CH 40850 (Ref N1-210) does not require fish friendly treatment due to limited sustainable flow or potential habitat on dead end stream. 	Refer to Section 5.2.4.2 & Section 7
<i>Wagga Wagga City Council</i>	
<ul style="list-style-type: none"> Council have indicated that they have no concerns regarding the proposed modifications. 	

6.2 Community Consultation

Discussions have been held regarding the proposed modification with all directly affected landholders. No concerns have been raised by the landholders, and one landholder expressed a preference for the modified alignment due to the reduced impact upon their higher quality farmland.

7.0 Environmental Safeguards

The NHA propose that the Conditions of Approval that apply to the Approved Project will also apply to the proposed modification. It is submitted that the Conditions of Approval are for the most part comprehensive, and would be adequate to manage the change of location, magnitude and extent of potential adverse environmental impacts that could be caused by the proposed modification to the Approved Project. Minor amendments to the Conditions of Approval should be considered in relation to new impacts on Aboriginal and non-Aboriginal heritage caused by the proposed modification, as outlined in **Table 13** below.

Table 13: Proposed Amendment to Minister's Conditions of Approval (MCoA)

MCoA – Approved Project	Proposed modification amendment to MCoA
<p>Aboriginal Heritage</p> <p>2.6 Prior to the commencement of construction activities, the Proponent shall undertake subsurface testing for site T-PAD-1 and shall investigate the options to design and construct the project as to avoid or minimise the extent of disturbance to this site in consultation with the DECC.</p> <p>Where these sites cannot be avoided, the Proponent shall implement the mitigation and management measures detailed within the Construction Heritage Management Plan required under this approval.</p> <p>Any salvage (by either surface collection or archaeological excavation) of artefacts detected at these sites shall be conducted in consultation with the DECC and the relevant Aboriginal stakeholders prior to the commencement of construction works that may impact on this site.</p>	<p>T-PAD-2 should be included as an impacted PAD. Salvage to be included as proposed mitigation.</p>
<p>Non-Aboriginal Heritage</p> <p>2.10 Prior to the commencement of construction work in proximity to the following items, the Proponent shall complete all excavations and/or archival recordings, including photographic records, for T001, T008, T204, T205 and T206. This shall be undertaken and completed in accordance with the guidelines issued by the Heritage Council of NSW. The areas containing these items shall be clearly identified and fenced until the completion of the archaeological excavations and/or archival recordings.</p>	<p>T003 should be included as a site for archival recording.</p> <p>T205 and T206 should be removed as sites that require archival recording, as these sites cannot be located on the ground (see Section 5.2.3.2).</p>

The proposed modifications would be undertaken in accordance with the Conditions of Approval granted for the Concept Approval (06_0314); the *Hume Highway Duplication Concept Plan, Sturt Highway to Tarcutta, Kyeamba Hill and little Billabong Environmental Assessments - Submissions Report and Revised Statement of Commitments* and the *Sturt Highway to Tarcutta – Hume Highway Duplication - Environmental Assessment* (SKM and MR, March 2007) The proposed additional environmental safeguards specific to the proposed modifications are shown in **Table 14**.

Table 14: Proposed Additional Statement of Commitments

Objective	Commitment	Timing
Biodiversity		
Minimise impacts on aquatic ecology	Excavation of the creek diversions and revegetation / rehabilitation of the sites would be conducted prior to filling in the current natural creek sections of Dellateroy Creek. DPI would be given sufficient prior notice to undertake inspection of the constructed creek diversions once completed to advise on their suitability.	Construction
Minimise impacts on aquatic ecology	An appropriately qualified person would investigate whether any fish species are occupying the sections of Dellateroy Creek prior to in-filling. Based on the investigation and in consultation with DPI, fish species found occupying the sections would be relocated into suitable sections of the creek diversion.	Construction
Minimise impacts on aquatic habitat	The revegetation and rehabilitation activities and mitigation measures required for the constructed creek diversions of Dellateroy Creek would be included within the Construction Riparian Management Plan for the Approved Project	Construction and Operation
Aboriginal Heritage		
Minimise impact on Aboriginal Pre-Construction heritage items	Prior to construction commencing in proximity to the PAD, completion of a salvage excavation of T-PAD-2 would be required. Works are to be undertaken in accordance with the approved Construction Heritage Management Plan.	Pre-construction

7.1 Additional Licences, Permits and Approvals

Section 75U of the EP&A Act lists certain approvals which are not required for a project assessed and approved under Part 3A of the EP&A Act. As such, a permit under Part 3A of the *Rivers and Foreshores Improvement Act, 1948* or *Fisheries Management Act, 1994* associated with works in Dellateroy Creek is not required. Part 3A projects are also exempt from section 87 and section 90 permits, issued under the *National Parks and Wildlife Act, 1974*. Notwithstanding this, consultation will be undertaken with the DWE, DPI and DECC prior to works commencing, to ensure that details on the nature and impact of the works are provided.

Section 75U does not provide a provision for the exemption of a licence under Part 2 of the *Water Act, 1912*. This licence will be obtained for activities relating to realignment of Dellateroy Creek.

In addition, following receipt of approval of the proposed modifications provided herein, relevant Environmental Management Plans would be updated to reflect the additional measures outlined in this report.

7.2 Matters of National Environmental Significance

Under the EPBC Act, a proponent requires the approval of the Minister for the Environment to undertake an action that could have a significant impact on matters of national environmental significance (NES). There are seven matters that must be considered under this Act.

Table 15 shows the seven matters of national environmental significance and the likely impact from the proposed changes.

Table 15: Matters of National Environmental Significance

Factor	Summary of findings	Impact
1) Any environmental impact on World Heritage Properties as identified under Section 3A of the World Heritage Properties Conservation Act 1983?	There are no world heritage places within the vicinity of the proposal.	None expected
2) Any environmental impact on national heritage places?	There are no national heritage places within the vicinity of the proposal.	None expected
3) Any environmental impact on Ramsar wetlands of international importance?	Fivebough and Tuckerbil swamps are both Ramsar wetlands and located within the same catchment as the proposal, though at a distance in excess of 100km.	None expected
4) Any environmental impact on Commonwealth listed threatened species or ecological communities?	There are 19 threatened species that occur or have potential habitat in the vicinity of the study area.	No greater impact compared to Approved Project
5) Any environmental impact on Commonwealth listed migratory species or migratory species listed under international agreements?	There are 5 migratory species that occur or have potential habitat in the vicinity of the study area.	No greater impact compared to Approved Project
6) Does any part of the proposal involve a nuclear action?	The proposal does not involve a nuclear action.	None expected
7) Any environmental impact on a Commonwealth marine area?	The proposal is not located within, or adjacent to, a Commonwealth Marine Area.	None expected

Although not a matter of NES, it is important to consider the impact on Commonwealth land, as it also offered protection under the EPBC Act. As the proposal is not located within or adjacent to Commonwealth land, it is not anticipated that there would be any direct or indirect impacts upon Commonwealth land.

8.0 Conclusions

Following the review of the detailed design for the N1 Works, NHA proposed to modify the alignment of the duplication between chainages 38000 and 40400, resulting in the entire Sturt Highway to Tarcutta Hume Highway duplication being located along the western side of the existing carriageway. Other changes resulting from the proposed modification would include:

- Realignment of Dellateroy Creek;
- Reduced construction program;
- Reduced interaction of construction vehicles with Hume Highway traffic; and
- Retention of the existing Hume Highway as the southbound carriageway subject to minor improvements to road surfacing, signage and protective fencing.

Section 75W(2) of the EP&A Act provides that the Minister for Planning's approval for the modification is required if the Project as modified would not be consistent with the existing approval.

The NHA has assessed the environmental impacts associated with the proposed changes, in order to assess whether approval from the Minister for Planning is required to modify the MCoA for the Hume High Upgrade Project under Section 75W of the EP&A Act.

The NHA considers that the proposed changes to the Project are not consistent with the description and assessment of the Project in the Environmental Assessment, and result in some inconsistency in the MCoA. As such, the NHA seek approval from the Minister for Planning for the proposed modification as outlined in this report.

9.0 References

Archaeological and Heritage Management Solutions & Cultural Heritage Connections (2006). *Hume Highway Duplication – Northern Package. Historical Archaeological Impact Assessment*.

Australia and New Zealand and Environment Conservation Council (ANZECC) (1990) *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration*.

Australia and New Zealand and Environment Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000). *Australian and New Zealand Guidelines for Freshwater and Marine Water Quality*. Vol.1.

Australian Bureau of Statistics (2001) *Census of Population and Housing*.

Bureau of Meteorology. (2006). *Rainfall deficiencies: 36 Months, 1 October 2003 to 30 September 2006*, Canberra.

Commonwealth Department of Transport and Regional Services (2004). Auslink White Paper: Building our National Transport Future', Commonwealth Department of Transport and Regional Services, Canberra

Connell Wagner (2004). *Hume Highway Strategic Planning Study*. Prepared for the NSW Roads and Traffic Authority.

Coram JE, Dyson PR & Evans WR. 2001. *An Evaluation Framework for Dryland Salinity*. Bureau of Rural Sciences, Canberra.

Cresswell, R. G., Dawes, R.W., Summerell, G.K. and Walker, G.R. (2003). *Assessment of Salinity Management Options for Kyeamba Creek, New South Wales: Data Analysis and Groundwater Modelling*. Murray-Darling Basin Commission, Canberra, ACT.

Department of Environment and Conservation (2005). *Draft Guidelines for Threatened Species Assessment*.

Department of Environment and Heritage (2006). *EPBC Act Policy Statement 1.1. Significant Impact Guidelines - Matters of National Environmental Significance*.

Department of Land and Water Conservation (1999). *Murrumbidgee Catchment Groundwater Vulnerability Map – Explanatory Notes*.

Department of Land and Water Conservation (1999). *Murrumbidgee Catchment Groundwater Vulnerability Mapping*.

Department of Land and Water Conservation (2001). *Salinity Mapping for the Murrumbidgee Catchment*.

Department of Natural Resources (2004). *Guide to the Water Sharing Plan for the Tarcutta Creek Water Source*. NSW Department of Natural Resources.

Department of Natural Resources (2006). *Borehole Locations Database*.

Fairfull, S. and Witheridge, G. (2003). *Why do Fish Cross the Road? Fish Passage Requirements for Waterway Crossing*. NSW Fisheries, Cronulla.

Flood, J. 1980. *The Moth Hunters*. Australian Institute of Aboriginal Studies, Canberra.

Graham Brooks and Associates (2006) *Hume Highway Duplication Northern Section – Built Heritage Impact Assessment*.

Habitat Planning (2005). *Greater Hume Shire Scoping Study New Local Area Plan.*

Hardy, V. 2006. *Proposed Hume Highway Duplication: Preliminary Aboriginal Archaeology Assessment.* Report prepared for the NSW Roads and Traffic Authority. Cultural Heritage Connections Pty Ltd.

Landcare Australia (2006). *Project Case Study - Tarcutta Creek Rivercare Plan.* Online: http://www.landcareonline.com/case_study.asp?clD=25

Landcom (2004) *Managing Urban Stormwater: Soils and Construction.*

Nancarrow, J., Cawley, R. and Smith, T. (2001). *The Ecological Health of Tarcutta Creek – A study of the physical and biological integrity of Tarcutta Creek: Murrumbidgee River Basin, NSW.* NSW Department of Land and Water Conservation.

National Parks and Wildlife Service (2002). *Identification Guidelines for Endangered Ecological Communities – White Box Yellow Box Blakely's Red Gum Woodland (Box-Gum Woodland).*

NPWS. 1997. *Aboriginal Cultural Heritage Standards & Guidelines Kit.* Working draft, prepared by the Cultural Heritage Services Division of the NSW National Parks and Wildlife Service.

NSW Fisheries (2002b) *Aquatic ecological community in the natural drainage system of the lower Murray River catchment – Fishnote.* Online: www.fisheries.nsw.gov.au.

NSW Treasury (2006). *The State Infrastructure Strategy - New South Wales 2006-07 to 2015- 16.*

Pearson, M. and Sullivan, S. 1995. *Looking After Heritage Places: The Basics of Heritage Planning for Managers, Landowners and Administrators,* Melbourne University Press.

Priday, S. and Mulvaney, M. (2005). *The Native Vegetation and Threatened Species of the City of Wagga Wagga.* Department of Environment and Conservation, Queanbeyan, NSW.

RTA (2006). *Hume Highway Duplication, Sturt Highway to Tarcutta. Background Paper for Options Assessment Workshop. September 2006.* Roads and Traffic Authority of NSW.

RTA (no date). *Hume Highway Duplication Program. Sturt Highway to Table Top. Urban and Landscape Design.* Roads and Traffic Authority of NSW.

Spies, B and Woodgate, P. (2005). *Salinity Mapping Methods in the Australian Context.* Department of the Environment and Heritage; and Agriculture, Fisheries and Forestry, Canberra.

Sullivan, S. and Bowdler, S. 1984. *Site Survey and Significance Assessment in Australian Archaeology.* Canberra: RSPacS, Australian National University.

Taylor Brammer Landscape Architects Pty Ltd (2006). *Hume Highway Duplication Northern Package – Landscape Heritage Assessment.*

Tindale, N. B. 1974. *Aboriginal Tribes of Australia. Their Terrain, Environmental Controls, Distribution, Limits and Proper Names.* 2 Volumes. Australian National University Press, Canberra.

Wagga Wagga City Council (2004). *Wagga Wagga City Council Social Plan.*

Young, M. (ed). 2000. *The Aboriginal People of Monaro: A documentary history.* NSW National Parks and Wildlife Service, Sydney.

Appendix A – Biodiversity Assessment

Appendix B – Aboriginal Heritage Assessment

Appendix C – Hydrology and Flooding Assessment

Appendix D – Results from Regulatory Agency Consultation