Hume Highway Duplication
Application for Modification of the Approval

Quarries Environmental Assessment

(Incorporating N1 Quarry, Kyeamba Borrow Pit and Aeroplane Hill Quarry)

Prepared for

Roads and Traffic Authority, NSW

Prepared by

Northern Hume Alliance

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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 to the north of Albury (the Hume Highway Duplication) and has entered into an alliance, the Northern Hume Alliance, comprising 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.

Department of Planning have issued approval for the following:

- Concept Approval – Sturt Highway to Mullengandra (06_0314)_
- Project Approval - Sturt Highway to Tarcutta (06_0245)
- Project Approval – Kyeamba Hill (06_0246)
- Project Approval – Little Billabong (06_0247)
- Project Approval – Yarra Yarra to Holbrook (06_0248)

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 the Minister's approval for the project (and/or concept plan) where the proposed alteration is considered to be inconsistent 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 Projects 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). This report relates to two of the Approved Projects:

- Sturt Highway to Tarcutta - between 37 kilometres and 42 kilometres south of Gundagai
- Kyeamba Hill - between 67 kilometres and 76 kilometres south of Gundagai

A site location plan is provided as **Figure 1**.

Description of the Modified Proposal

Since approval was granted, RTA design development has identified a number of benefits that can be achieved by modifying the Approved Project. The proposed modifications to operate two quarries and a borrow pit that were not considered as part of the Approved Project, and are therefore the subject of this environmental assessment. The proposal includes the commencement of one borrow pit and reactivation of two previously used quarries to provide general fill, drainage rock, dense grade base and rock rip rap for two sections of the Hume Highway Duplication.

Two of the Approved Projects to which this modification applies are Sturt Highway to Tarcutta (between 37 kilometres and 42 kilometres south of Gundagai, the N1 Section of the Approved Project)

and Kyeamba Hill (between 67 kilometres and 76 kilometres south of Gundagai, the N2 Section of the Approved Project). A site location plan is provided as **Figure 1**.

The N1 Quarry is located approximately 10 km up the Hume Highway towards Sydney (northbound) from the N1 Approved Project and is proposed to the be the primary source of fill material for this section. The quarry is located approximately 1km south, off the existing Highway, and was used in the previous Hume Highway upgrade approximately 15 years ago. The condition of the quarry is considered to be disturbed, and significant rehabilitation is proposed to remediate the area.

Operation of the N1 Quarry requires a modification to the Project Approval – Sturt Highway to Tarcutta (N1).

The Kyeamba Borrow Pit is located at the northern end of the N2 Section of the Hume Highway Duplication and the commencement of this site is proposed to supply general fill to the Highway Duplication in the vicinity of the pit. Rehabilitation over the long term of this site would ensure that the local biodiversity would not be impacted by the proposed borrow pit.

Aeroplane Hill Quarry is the final proposed excavation site, located south of the N2 Section of the Approved Project. This site would be required to supply general fill material and is largely disturbed due to excavation works for the previous Hume Highway upgrade. Significant rehabilitation is again proposed to suitably remediate the area.

Operation of the Kyeamba Borrow Pit and Aeroplane Hill Quarry requires a modification to the Project Approval – Kyeamba Hill (N2).

Assessment of Consistency with the Approved Project

The proposed quarry operations are not consistent with the Approved Projects, under Minister's Condition of Approval 1.1 (SHT 06_0245 and KH 06_0246). No quarry operations were included in the original Environmental Assessment (SKM, 2007) and the proposed quarrying sites are located outside the road corridor, therefore the modifications are not consistent with the Approved Project.

An assessment of the environmental impacts associated with the quarries and borrow pit modification are documented in **Section 4.0,** which concludes that there are modified yet not significant impacts to biodiversity, air quality, noise and vibration, traffic, and soil and water management which were not assessed under the Approved Project. Other key environmental issues are also considered and are addressed in **Section 4.3.**

Additional Statement of Commitments (SoC)

The proposed quarries modification would be undertaken in accordance with the Minister's Conditions of Approval for the Approved Project (including the Concept Approval 06_0314 and the Project Approval 06_0245 and 06_0246), 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 traffic, noise and vibration, and water management.

Conclusions

The NHA considers that the proposed quarry modifications to the Approved Project result in environmental impacts, while unlikely to be significant, 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 required under Section 75W of the EP&A Act.

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. Two of the Approved Projects to which this modification applies are Sturt Highway to Tarcutta (N1) and Kyeamba Hill (N2). 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 25 July 2007.

In December 2006, the RTA 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 Project Approval, the NHA (on behalf of the RTA) have refined the original concept design and identified a number of benefits that can be achieved by modifying the Approved Project. The proposed modifications, to operate two quarries and one borrow pit, were not part of the original environmental assessment and are therefore the subject of this assessment.

Planning and design development have identified a need to source a range of quarry materials for drainage, earthworks and pavement construction from outside the road corridor. External sources are required in particular for the northern two Projects known as (N1) Sturt Highway to Tarcutta and (N2) Kyeamba Hill.

Due to the distance and excessive costs of sourcing materials from existing commercial quarry operators, the NHA proposes to reactivate operations at N1 Quarry and Aeroplane Hill Quarry; sites originally established in the early 1990's to supply road construction material and general fill for previous upgrade works on the Hume Highway. The NHA also proposes to commence a borrow pit operation at the northern end of the N2 Section of the Hume Highway Duplication.

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 the Minister's approval for the project (and/or concept plan) where the proposed alteration is considered to be inconsistent with that approval.

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 quarry modifications;
- Assess the relative change in environmental impacts of the Hume Highway Duplication between Sturt Highway and Tarcutta and at Kyeamba Hill before and after putting in place the proposed quarry operations, 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.

2.0 DESCRIPTION OF THE APPROVED PROJECTS

Approved Project N1

Two new carriageways would be constructed between chainages 36700 and 37800. Work would mostly be on the western side of the existing highway before moving to the eastern side.

From chainages 37800 to near 40000, the existing highway carriageway would be retained as the northbound carriageway. A new southbound carriageway would be constructed to the east of the existing highway carriageway.

From near chainages 40000 to 40900, two new carriageways would be constructed. The work would move from the eastern side to the western side of the existing highway. The current two junctions with the Highway (Toonga Settlement Road and Lower Tarcutta Road) would be made into a cross intersection. The new intersection would include left and right turning bays.

From chainages 40900 to 41400, the existing highway carriageway would be retained as the southbound carriageway. A new northbound carriageway would be constructed to the west of the existing highway carriageway. The Approved Project Sturt Highway to Tarcutta would 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 community of Tarcutta.

The N1 Approved Project is currently the subject of another modification request due to alignment design developments.

Approved Project N2

The Approved N2 Project involves duplication of the existing Hume Highway between two previously duplicated sections, extending from approximately 67 to 76 kilometres south of Gundagai, a length of approximately nine kilometres.

A key feature of the Proposal is to relocate and realign the Tumbarumba Road intersection with the Hume Highway, between chainages 70000 and 73500, and separate the predominantly through-traffic along the two sections of Tumbarumba Road from the Highway to improve road safety.

In addition, private access points along the proposed duplication would be maintained or upgraded so that traffic, including the local school buses, can enter and leave the highway safely and more efficiently. With the exception of the section between chainages 70000 and 73500 and the minor curve realignment required between chainages 67000 and 68000, the highway duplication would be generally located within the existing road corridor.

The N2 Approved Project is currently the subject of another modification request due to alignment design developments.

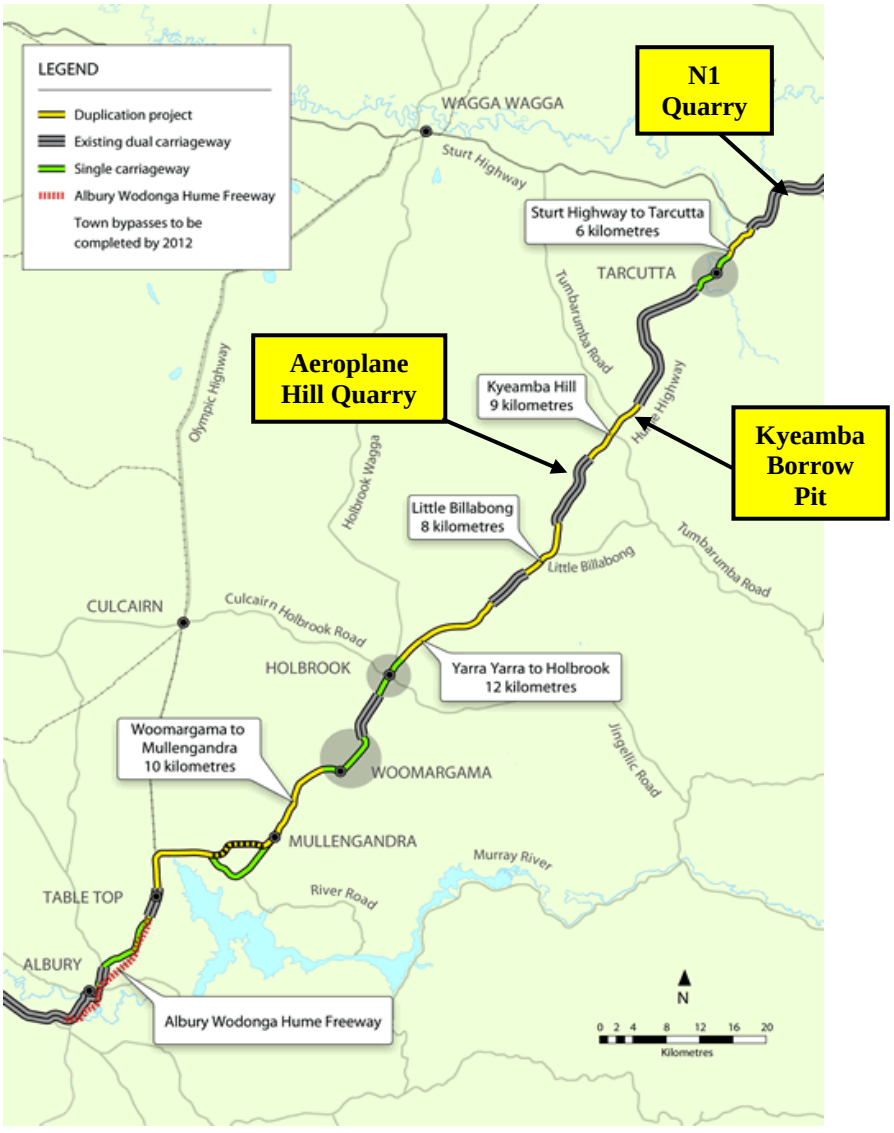
3.0 DESCRIPTION OF THE PROPOSED REVISIONS

3.1 Overview

The Approved Projects were developed by the RTA and resolved to a concept design level only. Whilst this stage of design development was appropriate for environmental assessment, detailed planning and further design development have identified a need to source a range of quarry materials for drainage, earthworks and pavement construction from outside the road corridor. External sources are required, in particular for the N1 and N2 sections of the Project.

Due to the distance and excessive costs of sourcing materials from existing commercial quarry operators, the NHA proposes to reactivate operations at N1 Quarry and Aeroplane Hill Quarry; both sites originally established in the early 1990's to supply concrete aggregate and general fill for previous upgrade works on the Hume Highway. The NHA also proposes to commence a borrow pit operation at the northern end of the N2 Section of Highway duplication known as Kyeamba Hill.

Figure 1 - Quarry locations (with respect to Approved Project)



3.2 Description of the Proposed Quarry and Borrow Pit Operations

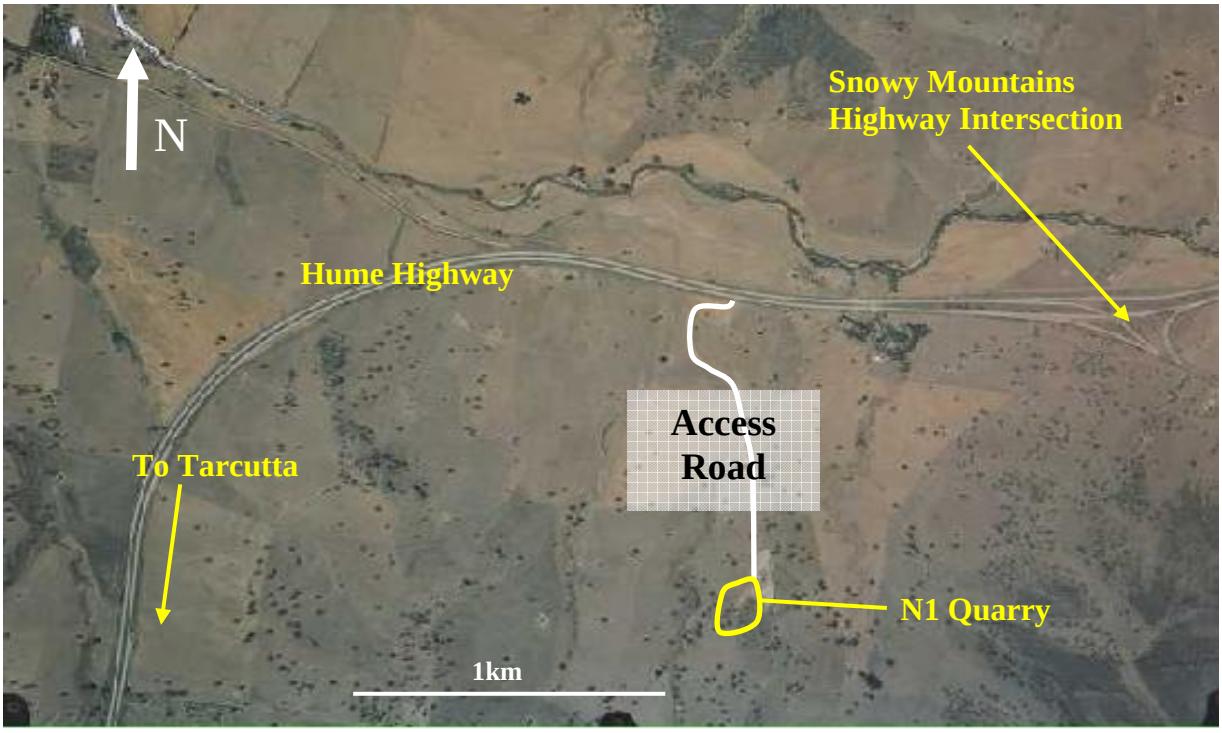
3.2.1 N1 Quarry

The N1 property entrance is located on the Hume Highway approximately 1km west of the Snowy Mountains Highway turnoff, and the actual quarry site is approximately 1km south of the Hume Highway (**Figure 2**). N1 Quarry is located within the Gundagai Shire Council area in Lot 95 DP 45513.

The quarry site is on the side of a hill and is not easily visible from the highway. The NHA has consulted with the property owner who has verbally accepted a proposed agreement for the NHA to develop the quarry and pay a royalty.

Initial investigations (refer to NHA Geotechnical Report, **Appendix A**) indicate that an estimated 100,000m^3 of material, necessary for works to be undertaken in the N1 section of the Hume Highway Duplication, can be sourced from this quarry site.

Figure 2 - N1 Quarry location (with respect to the Hume Highway)



An area of approximately 35,000m^2 has been identified as the possible quarrying site (3 football fields). It should be noted that not all of this area would be quarried, but a large area has been identified to allow flexibility in sourcing the best rock. An additional area of approximately 10,000m^2 would be required for stockpiling of the material.

The total quarry material required for N1 is approximately 100,000m^3 made up of the following materials and quantities:

- Drainage rock – a blasted and crushed rock material ranging in size from 25mm to 125mm – 19,000m^3;
- Select Material Zone – a blasted and crushed material ranging in size from 75mm to fines to be used for road pavements – 44,000m^3;
- DGB (Dense Graded Base) – a blasted, crushed and screened material less than 1mm to be used for road pavements – 15,000m^3;
- Rock Rip Rap- a blasted rock material ranging in size from 500mm to 125mm – 8,000m^3; and
- Other various crushed rock products - approximately 14,000m^3.

Topsoil would be stripped progressively as material is quarried. This topsoil would be placed in a bund around the quarry area until the quarrying operation is completed. At the completion of the quarrying operations, the topsoil would be respread over the disturbed area and grass seeded as per the request of the property owner. (Refer to **Section 4.2.9** for further quarry rehabilitation information)

During the quarrying operations, silt fences or earth bunds would be constructed uphill of the quarry to divert clean water around the site, and downhill of the quarry to intercept "dirty" water. Two existing dams would be used as secondary sedimentation ponds, and would be supplemented by additional primary sedimentation dams situated close to the quarry area (refer to **Section 4.2.5** for further soil and water management information).

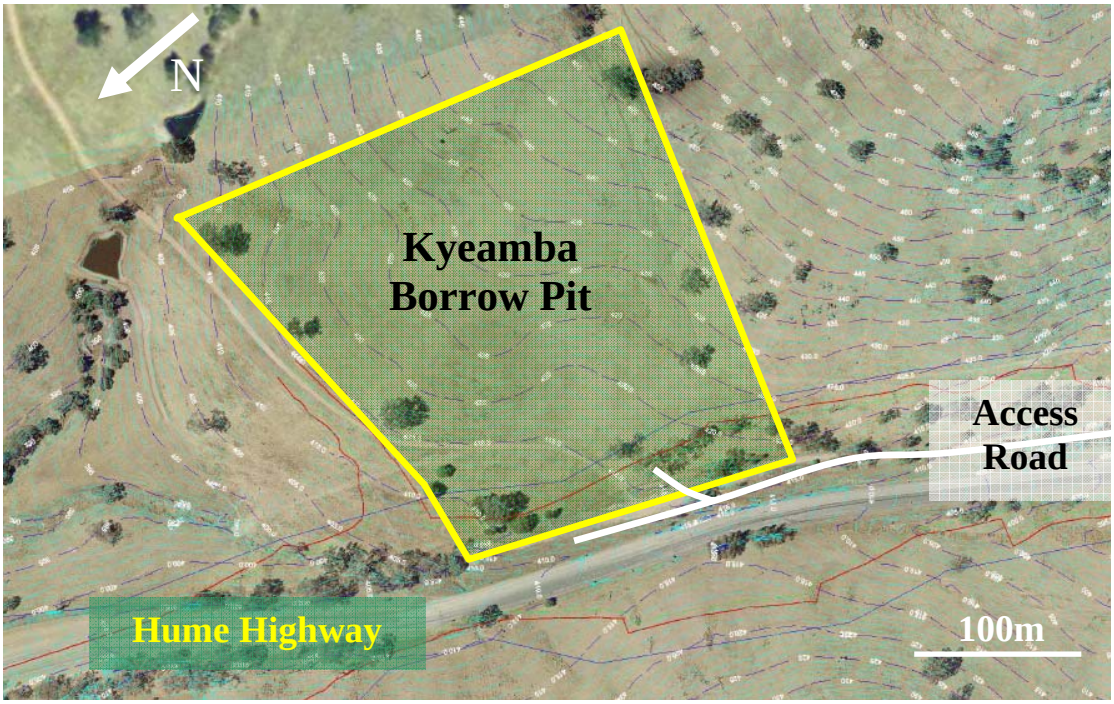
The site would be accessed from the Hume Highway by an existing property gate. The NHA would upgrade this entry and provide additional lengths of deceleration and acceleration lanes on the Hume Highway to cater for haulage trucks (refer to **Section 4.2.7** for further traffic management information).

3.2.2 Kyeamba Borrow Pit

Due to the distance and associated haulage and traffic considerations arising from sourcing materials from existing commercial quarry operators, it is proposed to develop a shallow borrow pit operation at Lot 31 DP 757237, to supply the N2 Project with general fill material. The Kyeamba Borrow Pit site entrance is located on the eastern side of the Hume Highway, adjacent to the N2 duplication works approximately 4km north of the Tumbarumba Road East and Hume Highway intersection at Kyeamba Hill.

The proposed Kyeamba Borrow Pit site is situated in the Wagga Wagga Local Government Area on the side of a gently sloping and sparsely vegetated hill that is visible from the existing Hume Highway. The proposed borrow pit operations would involve the stripping of topsoil and approximately 2 metres of suitable material over an area of 30,000m^2. This would produce approximately 60,000m^3 of general fill material for the northern end of the N2 section of the Hume Highway Duplication. The location and existing layout of the site are shown in **Figure 3**.

Figure 3 - Kyeamba Borrow Pit location (with respect to the Hume Highway)

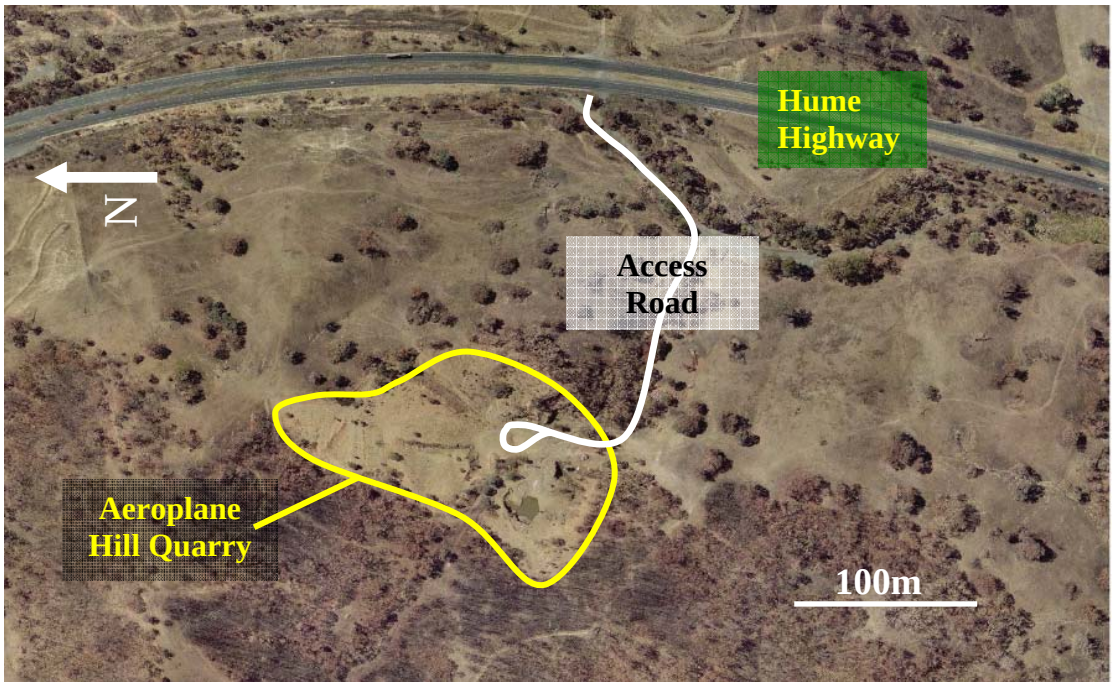


Aeroplane Hill Quarry

Due to the distance and associated haulage and traffic considerations arising from sourcing materials from existing commercial quarry operators, it is proposed to develop a previously used quarry at the Aeroplane Hill site. The site entrance is located south of the N2 section of the NHA Project, approximately 8km from the Tumbarumba road and Hume Highway Intersection at Kyeamba Hill. The quarry site is contained within a largely disturbed gully which is protected visually from the Highway by a partially vegetated embankment. While the owner of the property is the RTA, the property is currently under lease, the landowner has been notified and has agreed to the proposed quarry and rehabilitation operations.

The Aeroplane Hill Quarry property is situated in both the Wagga Wagga Local Government Area (LGA) and the neighbouring Greater Hume LGA. The location and existing layout of the Aeroplane Hill quarry is shown in **Figure 4**.

Figure 4 - Aeroplane Hill Quarry location (with respect to Hume Highway)



3.3 Need and Justification for the Proposed Modification

3.3.1 Overview

The Hume Highway is part of the interstate National Highway Route, which is an important interstate road corridor in Australia used to transport over 20 million tonnes of road freight each year. The Hume Highway is also a major link in the NSW regional roads network.

The road design for the N1 and N2 sections of the Approved Project have a shortage of approximately 100,000m^3 and 150,000m^3 respectively that cannot be economically sourced and transported to the Project from existing commercial operations. Without the proposed quarries and borrow pit, this material would need to be sourced from Wagga Wagga, Gundagai, Holbrook or Tumbarumba.

N1 and Aeroplane Hill Quarries are preferred over other potential sites as they have been operating quarries for the previous upgrade of the Hume Highway. The proposed quarry and borrow sites are located in close proximity to the Hume Highway Duplication works, have easy access to the Highway, existing access tracks and dams, and are considered a sufficient distance from sensitive receivers that the operations would have only minimal short-term impacts.

3.3.2 Justification

N1 Quarry

The reactivation of the N1 Quarry would significantly reduce haulage distances compared to sourcing the material from alternate locations. This in turn would reduce traffic impacts on the Hume Highway and local roads as well as minimising dust and air quality impacts (refer to **Section 4.2.6**). NHA operation of this quarry will also present the best value for money / economic option.

Operations at N1 Quarry would occur at the location of an existing and previously disturbed quarry site, leading to a minimal impact on local biodiversity. Noise and dust impacts are also expected to be minimal due to the distance of the quarry to sensitive receptors and its operation only in normal day time hours.

The proposed rehabilitation as described in **Section 4.2.9** also provides the opportunity to significantly improve the overall condition of the site. Reactivation of the N1 Quarry was therefore selected as the most cost effective, efficient and environmentally sustainable method of obtaining the fill material required for the N1 Approved Project.

Kyeamba Borrow Pit

The activation of the Kyeamba Borrow Pit would significantly reduce the haulage distances compared to sourcing the material from alternate locations. This in turn would reduce traffic impacts on the Hume Highway and local roads as well as minimising dust and air quality impacts at the alternate locations. NHA operation of this quarry will also present the best value for money / economic option.

The proposed rehabilitation as described in **Section 4.2.9** would also ensure that the biodiversity of the site is returned as close as possible to its current condition and ensure no future erosion or sediment control issues.

Commencement of borrow pit operations was therefore selected as an effective, efficient and environmentally sustainable method of obtaining the fill material required for the northern part of the N2 section of the Approved Project.

Aeroplane Hill Quarry

The reactivation of the Aeroplane Hill Quarry would significantly reduce the haulage distances compared to sourcing the material from alternate locations. This in turn would reduce traffic impacts on the Hume Highway and local roads as well as minimising dust and air quality impacts at the alternate locations. NHA operation of this quarry will also present the best value for money / economic option.

Operations at Aeroplane Hill would occur entirely within the boundary of an existing and disturbed quarry site, leading to a minimal impact on local biodiversity. Noise and dust impacts at sensitive receptors are also expected to be minimal due to the secluded location of the quarry and implementation of appropriate mitigation measures as described in **Section 4.2**.

The proposed rehabilitation as described in **Section 4.2.9** also provides the opportunity to significantly improve the overall condition of the site, in particular the current inadequate erosion and sediment control measures.

Reactivation of the Aeroplane Hill Quarry was selected as a cost effective, efficient and environmentally sustainable method of obtaining the fill material required for the N2 Approved Project.

4.0 ENVIRONMENTAL ASSESSMENT

4.1 Environmental Risk Assessment

At the Environmental Assessment phase, an environmental risk assessment was undertaken. The risk assessment identified the following to be key issues for the Hume Highway Duplication Project:

- Biodiversity
- Heritage (indigenous and non-indigenous)
- Flooding and hydrology
- Resource management
- Cumulative impacts

As the proposed quarries and borrow pit were not assessed as part of the EA, the NHA's assessment of the key issues relevant to the proposed quarry operations include biodiversity, noise and vibration, soil and water management, air quality management, traffic management and cumulative impacts. These issues were identified through an assessment of general quarry related environmental impacts, and through consultation with relevant regulatory agencies, for which outcomes are detailed in **Section 5.0**.

Section 4.2 details an assessment of the key environmental issues for the proposed operation of N1 Quarry, Kyeamba Borrow Pit and Aeroplane Hill Quarry.

4.2 Assessment of Key Issues

4.2.1 Biodiversity

4.2.1.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

The landscape surrounding the proposal site is characterised by cleared agricultural land, with the quarry site containing isolated paddock trees and incised drainage lines several metres deep. Coarse grained granite is exposed as bedrock outcrop and tors in the surrounding area, primarily to the south of the proposal site (refer to **Appendix A).**

This quarry site is already considered highly disturbed as it was used to supply aggregate for sub-base concrete for the upgrading of the Hume Highway adjacent to the property approximately 15 years ago. Agricultural pursuits such as cropping and grazing are the primary activities undertaken within several kilometres of the quarry site.

A site inspection was undertaken on the 25th July 2007, by representatives of Eco Logical Australia, and the NHA (refer to **Appendix B**). The purpose of the inspection was to identify the vegetation communities and fauna habitat on the sites, and identify any ecological constraints through the use of the site as a quarry for the Hume Highway Duplication.

Only one threatened species, the Brown Treecreeper (*Climacteris picumnus*) was recorded during the survey. This species was heard calling from vegetation south of the proposal site.

Other threatened species potentially occurring on site include:

- Swift parrot (*Lathamus discolor*)
- Superb parrot (*Polytelis swainsonii*)
- Turquoise Parrot (*Neophema pulchella*)
- Diamond Firetail (*Stagonopleura guttata*)

Their occurrence on site is likely to be infrequent, if at all. Potential foraging habitat for these species exists on site, but similar resources in better condition are found elsewhere. It is unlikely that the site

contains critical resources for fauna known or likely to occur in the region. An assessment of significance was performed for the Brown Treecreeper which concluded that the reactivation of the N1 Quarry would not significantly impact on the habitat of this bird species (refer to **Appendix F**).

At ground level, outcropping granite boulders and a few loose surface rocks occurred, some of which appear consistent with the size and shape preferred by the threatened reptiles Pink Tailed Worm-Lizard (*Aprasia parapulchella)* and Striped Legless Lizard *(Delma impar)*. However, the density of rocks was well below that typically required by these species. It is estimated that less than one potential habitat rock was located per 500m^2 on the site and surrounds. Most of the rocks on site were massive and deeply imbedded into the earth.

No threatened or regionally significant flora species were observed on site, though the site is likely to have formerly comprised the Endangered Ecological Community (EEC) Box-Gum Woodland. Due to the degraded nature of the understorey, dominance of exotic ground cover species, and doubts that the community could regenerate naturally, the site was not considered to be Box-Gum Woodland as described in either the New South Wales (NSW) *Threatened Species Conservation Act, 1995* or the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*.

Mitigation Strategy (N1 Quarry)

Minimal impacts on flora and fauna are anticipated to result from the quarry operations, as the site has previously been cleared due to it historical use as a quarry.

The following mitigation measures would be implemented:

- Trees to be retained wherever possible. Site fencing to be used to protect trees from damage during operations. Site fencing to be erected prior to commencement of operations;
- Noxious weeds identified within the Proposal site would be destroyed and continuously suppressed as required under the *Noxious Weeds Act, 1993*;
- Any weeds that are physically removed would be bagged and disposed of at a licensed landfill facility as per the **Weed Management Sub Plan** (WMP, N829-EN-210E2 REV02);
- Existing access routes would be kept to a minimum width and any unnecessary clearing would be avoided; and
- Should any native fauna be identified during quarrying operations, all works in the vicinity of the fauna would cease, and the NHA Environment and Community Manager would be contacted prior to recommencement of works as per the **Construction Flora and Fauna Management Plan** (CFFMP, N829-EN-210 REV02).

4.2.1.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

The Kyeamba Borrow Pit is located in a grazed paddock on the eastern side of the current Hume Highway, on the side of a gently sloping and sparsely vegetated hill that is visible from the Highway. The site entrance is located adjacent to the N2 section of the NHA Project, approximately 4km north of the Tumbarumba Road East and Hume Highway intersection at Kyeamba Hill.

The proposed borrow pit operations would involve the stripping of topsoil and approximately 2 metres of suitable material over an area of 30,000m^2. This would produce approximately 60,000m^3 of general fill material for the N2 section of the Hume Highway Duplication.

A site inspection was undertaken on the 25th July 2007, by representatives of Eco Logical Australia, and NHA (refer to **Appendix B**). The purpose of the inspection was to identify the vegetation communities and fauna habitat on the sites, and identify any ecological constraints through use of the site as a quarry for the upgrade of the Hume Highway.

The ground cover predominantly consists of exotic annual species including Capeweed (*Erodium botrys*) and Patterson's Curse (*Romulea rosea*). The native grasses *Aristida* and *Bothriochloa* sp are

also located on site as well as a White Box and a Red Stringybark Tree, which are not proposed to be destroyed for the borrow pit operations.

Due to the presence of native grasses, the vegetation community is considered to be the EEC Box-Gum Woodland under the *Threatened Species Conservation Act*, *1995*. However, as the percentage of perennial ground cover is less than 50%, the site does not conform to the description of the EEC under the *Environment Protection and Biodiversity Act*, *1999*. Provided that sufficient measures are taken before and after borrow pit operations (as described in the Mitigation Strategy below), it is likely that the site would adequately regenerate itself.

An assessment of significance was performed for the Box-Gum Woodland which concluded that the operation of the Kyeamba Borrow Pit would not significantly impact on this community (refer to **Appendix F**).

No threatened flora or fauna were recorded during the Eco Logical site visit although both the Squirrel Glider and Diamond Firetail have been observed in the area previously. The access haul road passes through a known Squirrel Glider and Diamond Firetail habitat where dust and noise from quarry and haulage operations have the potential to affect the habitat of these species. Mitigation strategies described below would be implemented to ensure that potential habitats for the Squirrel Glider and Diamond Firetail remain unaffected.

Mitigation Strategy (Kyeamba Borrow Pit)

Although the site is classified as an EEC under the TSC Act, if the two trees were retained, the topsoil stockpiled for rehabilitation of the site, and suitable revegetation occurs, it is likely that the site could withstand the borrow pit operation and regenerate to its former self (Refer to **Section 4.2.9** for further rehabilitation information).

The following mitigation measures would be implemented:

- The two on site trees are to be retained. Site fencing is to be used to protect these trees and trees along the haul road from damage during operations. Site fencing to be erected prior to commencement of operations;
- Placement of available topsoil in on site perimeter bunds for use in rehabilitation works;
- Dust from the borrow pit and haulage road would be controlled through water truck operation using water from on site sediment dams. This would minimise impacts on any native fauna located nearby (Refer to **Section 4.2.6** for further air quality management measures);
- Noxious weeds identified within the Proposal site would be destroyed and continuously suppressed as required under the *Noxious Weeds Act, 1993*;
- Any weeds that are physically removed would be bagged and disposed of at a licensed landfill facility as per the WMP;
- Existing access routes would be kept to a minimum width and any unnecessary clearing would be avoided; and
- Should any native fauna be identified during quarrying operations, all works in the vicinity of the fauna would cease, and the Northern Hume Alliance Environment and Community Manager would be contacted prior to recommencement of works as per the CFFMP.

4.2.1.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

The landscape surrounding the Aeroplane Hill Quarry site is characterised by agricultural land to the north, east and south, and dense vegetation on moderately steep slopes to the west. This quarry site is already considered highly disturbed as it was used to supply aggregate for sub-base concrete for the upgrading of the Hume Highway adjacent to the property approximately 15 years ago, and more recently the quarry and surrounds appear to have been severely damaged by bushfires.

A site inspection was undertaken on 5 September, 2007 by representatives of SMEC and the NHA (refer to **Appendix D**). The purpose of the inspection was to identify the vegetation communities and fauna habitat on the sites, and identify any ecological constraints through the use of the site as a quarry for the Hume Highway Duplication.

Despite its poor condition, it is considered likely that the study area still provides some foraging habitat and dispersal habitat for a number of threatened fauna species that have previously been recorded in the locality. These include the Brown Treecreeper *(Climacteris picumnus victoriae),* Grey-crowned Babbler *(Pomatostomus temporalis)* Pink-tailed Worm Lizard *(Aprasia parapulchella),* Striped Legless Lizard *(Delma impar)* Squirrel Glider *(Petaurus norfolkensis)* and the Spotted-tailed Quoll *(Dasyurus maculatus maculatus).*

The assessment of significance (7-part test) found that the proposed works are unlikely to have a significant impact on these species and communities, provided the mitigation measures outlined in this report are implemented.

Given the disturbed nature of the proposed quarry site, the primary concern to the potential habitats of the above mentioned species was the access road from the Hume Highway. The proposed upgrade works to this road are considered minimal, with minor grading, gravel resheeting and the clearing of overhanging tree branches planned to make the road trafficable. These proposed minor works are considered by the NHA to have negligible impact on the biodiversity of the access road corridor.

Mitigation Strategy (Aeroplane Hill Quarry)

Minimal impacts on flora and fauna are anticipated to result from the quarry operations, as the site has previously been cleared due to it historical use as a quarry:

The following mitigation measures would be implemented:

- Only regrowth trees in the disturbed, previously quarried area, are to be removed;
- Dust from the quarry area and haulage road would be controlled through water truck operation using water from on site sediment dams. This would minimise impacts on any native fauna located nearby (Refer to **Section 4.2.6** for further air quality management measures);
- Noxious weeds identified within the Proposal site would be destroyed and continuously suppressed as required under the *Noxious Weeds Act, 1993*;
- Any weeds that are physically removed would be bagged and disposed of at a licensed landfill facility as per the WMP;
- Removal and disturbance of any existing fallen timber or rocks, throughout the study area, should be minimised or prevented. If these habitat features are to be removed, they should be placed in an appropriate site nearby.
- Fallen logs and branches provide valuable habitat for a range of ground-dwelling fauna. It is recommended that, in as far as practical, any lopped branches removed should stay on site to provide habitat. To achieve this, branches and logs could be sawn down to a manageable length and simply left *in situ.* Chipping and spreading chipped material is also an appropriate alternative, particularly as a weed suppressant on the access track.
- The ephemeral drainage line and surrounding vegetation will be protected by fencing or para-webbing prior to the commencement of works.
- Existing access routes would be kept to a minimum width and any unnecessary clearing would be avoided; and

- Should any native fauna be identified during quarrying operations, all works in the vicinity of the fauna would cease, and the Northern Hume Alliance Environment and Community Manager would be contacted prior to recommencement of works as per the CFFMP.

4.2.2 Indigenous Heritage

4.2.2.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

A search conducted on the Aboriginal Heritage Information Management System (AHIMS) database on 13 June 2007 found no records of Aboriginal Heritage within the study area (See **Appendix E** for further details).

In accordance with the management strategy outlined in the NHA Aboriginal Heritage Management Plan (AHMP), the Project's qualified archaeologist Kelleher Nightingale Consulting Pty Ltd (KNC) undertook a site inspection of the proposed quarry reactivation area in June 2007. No archaeological material or potential archaeological deposits were identified during this inspection (See **Appendix C** for further details). The management protocol (section 9.7c of the RTA Aboriginal Cultural Heritage Report) for unknown impacts outside the assessed corridor is to have the area assessed by the project archaeologist and should no impacts be identified, no further consultation is required.

The proposed reactivation of the N1 Quarry would therefore have no additional impacts on Indigenous Heritage compared to that of the Approved N1 Project.

Mitigation Strategy (N1 Quarry)

There are no known Indigenous Heritage sites or items in the N1 Quarry study area, therefore no further mitigation measures are proposed.

Should Indigenous Heritage items be uncovered during quarrying, all works in the vicinity of the find would cease and the RTA's Aboriginal Programs Adviser, and the NHA Environment and Community Manager notified, as detailed in the **Aboriginal Heritage Management Plan** (AHMP, N829-EN-202A REV02). Works would not re-commence until appropriate clearance has been received.

4.2.2.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

An AHIMS search was conducted on 21 June 2007 with three sites recorded near the proposal sites, including previously identified PAD's and artefact scatters. The closet of these sites is 1km to the north. This site would not be impacted by the proposed quarry operations (See **Appendix E** for further details).

In accordance with the management strategy outlined in the NHA Aboriginal Heritage Management Plan (AHMP), KNC undertook a site inspection of the site in July 2007. No archaeological material or potential archaeological deposits were identified during this inspection. KNC has also undertaken a review of the RTA Aboriginal Cultural Heritage Report (July 2007) for this area, and no cultural areas were identified. Please refer to **Appendix C**.

In response to additional cultural information on the proposed borrow pit, an on site meeting was held with the knowledge holders, RTA and NHA representatives. The proposal was discussed on site and the knowledge holders identified that the proposed borrow pit would have no impact on the cultural area.

The proposed commencement of operations at the Kyeamba Borrow Pit would therefore have no additional impact on Indigenous Heritage compared to that of the Approved N2 Project.

Mitigation Strategy (Kyeamba Borrow Pit)

There are no known Indigenous Heritage sites or items in the Kyeamba Borrow Pit study area, therefore no further mitigation measures are proposed.

Should Indigenous Heritage items be uncovered during the borrow, all works in the vicinity of the find would cease and the RTA's Aboriginal Programs Adviser, and the NHA Environment and Community Manager notified, as detailed in the AHMP. Works would not re-commence until appropriate clearance has been received.

4.2.2.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

A search conducted on the AHIMS database on found that one record of Aboriginal Heritage was located within 3km of the study area, K-PAD-9, as identified in the EA. The proposed quarry would have no impact on this item (See **Appendix E** for further details).

In accordance with the management strategy outlined in the NHA Aboriginal Heritage Management Plan (AHMP), KNC undertook a preliminary site inspection of the proposed quarry reactivation area in June 2007. No archaeological material or potential archaeological deposits were identified during this inspection. KNC has also undertaken a review of the RTA Aboriginal Cultural Heritage Report (July 2007) for this area, and no cultural areas were identified. Please refer to **Appendix C**. The management protocol (section 9.7c of the RTA Aboriginal Cultural Heritage Report) for unknown impacts outside the assessed corridor is to have the area assessed by the project archaeologist and should no impacts be identified, no further consultation is required.

The proposed reactivation of the Aeroplane Hill Quarry would therefore have no additional impacts on Indigenous Heritage compared to that of the Approved N2 Project.

Mitigation Strategy (Aeroplane Hill Quarry)

There are no known Indigenous Heritage sites or items in the Aeroplane Hill Quarry study area, therefore no further mitigation measures are proposed.

Should Indigenous Heritage items be uncovered during quarrying works, all works in the vicinity of the find would cease and the RTA's Aboriginal Programs Adviser, and the NHA Environment and Community Manager notified as detailed in the AHMP. Works would not re-commence until appropriate clearance has been received.

4.2.3 Non-Indigenous Heritage

4.2.3.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

A desktop search was undertaken of the NSW State Heritage Register. Three items of State Significance are registered for the Gundagai Local Government Area (LGA), none of which are located near the proposed quarry reactivation site. As this site is heavily disturbed, no further field assessment was carried out.

Therefore the proposed reactivation of the N1 Quarry should have no additional impacts to non-Indigenous Heritage compared to that of the Approved N1 Project.

Mitigation Strategy (N1 Quarry)

There are no known non-Indigenous Heritage sites or items in the N1 Quarry study area, therefore no further mitigation measures are proposed.

Should any non-Indigenous Heritage items be uncovered during investigations, all works in the vicinity of the find would cease and the Senior Environmental Officer South West Region, NHA Environment and Community Manager and the Heritage Office would be contacted as detailed in the **Non-Aboriginal Heritage Management Plan** (NAHMP, N829-EN-202B REV02). Works would not re-commence until appropriate clearance has been received.

4.2.3.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

A desktop search was undertaken of the NSW State Heritage Register. Four items of State Significance are registered for the Wagga Wagga LGA, none of which are located near the proposed borrow pit site. The area of the proposed borrow pit is adjacent to the area assessed as part of the EA. No items of non-Indigenous heritage were identified at this site.

Therefore the proposed commencement of operations at the Kyeamba Borrow Pit should have no additional impacts to non-Indigenous Heritage compared to that of the Approved N2 Project.

Mitigation Strategy (Kyeamba Borrow Pit)

There are no known non-Indigenous Heritage sites or items in the Kyeamba Borrow Pit study area, therefore no further mitigation measures are proposed.

Should any non-Indigenous Heritage items be uncovered during investigations, all works in the vicinity of the find would cease and the Senior Environmental Officer South West Region, NHA Environment and Community Manager and the Heritage Office would be contacted as detailed in the NAHMP. Works would not re-commence until appropriate clearance has been received.

4.2.3.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

A desktop search was undertaken of the NSW State Heritage Register. Seven items of State Significance are registered for the Wagga Wagga and Greater Hume LGA, none of which are located near the proposed quarry reactivation site. As this site is heavily disturbed, no further field assessment was carried out.

Therefore the proposed reactivation of the Aeroplane Hill Quarry should have no additional impacts to non-Indigenous Heritage compared to that of the Approved N2 Project.

Mitigation Strategy (Aeroplane Hill Quarry)

There are no known non-Indigenous Heritage sites or items in the Aeroplane Hill Quarry study area, therefore no further mitigation measures are proposed.

Should any non-Indigenous Heritage items be uncovered during investigations, all works in the vicinity of the find would cease and the Senior Environmental Officer South West Region, NHA Environment

and Community Manager and the Heritage Office would be contacted as detailed in the NAHMP. Works would not re-commence until appropriate clearance has been received.

4.2.4 Noise and Vibration

4.2.4.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

The study area is located in a rural environment that has a low ambient noise level. The dominant source of noise within or adjacent to the study area is currently limited to the vehicles using the existing highway.

The proposed operations are remote and well removed from sensitive receptors. The nearest homestead is located 1km to the NW of the excavation site and 600m from the nearest point on the quarry access road.

Potential noise and vibration impacts are likely to result from quarry operations, including blasting, drilling, crushing and loading of materials into trucks for transportation. As detailed further in **Section 4.2.7,** the number of truck movements from the N1 Quarry during intense campaigns is expected to be 150 per day for the 16 months of quarry operation. This equates to approximately 13 truck movements per hour during peak periods, which would have minimal additional impact on existing Hume Highway noise.

Given the N1 Quarry's relatively close proximity to the Approved Project, the noise impacts on Highway traffic would actually be minimised compared to sourcing the required fill material from existing commercial operations located in Wagga Wagga, Gundagai, Holbrook or Tumbarumba.

Due to the distance of the quarry to sensitive receptors, and provided operations are undertaken in accordance with the mitigation measures below and the **Construction Noise and Vibration Management Plan** (CNVMP, N829-EN-206 REV02), there are no additional noise and vibration impacts expected at sensitive receptors.

Mitigation Strategy (N1 Quarry)

The following mitigation measures would be adopted:

- Noisy activities such as drilling, crushing and loading of materials would be carried out during normal day time operating hours;
- Blasting is to be conducted between 9am and 5pm to avoid potential temperature inversions, and as such will occur only during Approved working hours as per Minister's Conditions of Approval regarding *Construction and Blasting Requirements*;
- Use of dampened tips on rock breakers;
- Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment; and
- Selection of plant and equipment based on noise emission levels.

4.2.4.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

The study area is located in a rural environment that has a medium ambient noise level. The dominant source of noise within or adjacent to the study area is currently limited to the vehicles using the existing highway, located within 100m of the proposed borrow pit.

The proposed operations are well removed from sensitive receptors, with the nearest homestead located 1km to the south east of the proposed borrow pit site.

Potential noise and vibration impacts are likely to result from quarry operations, including winning and loading of material into trucks for transportation. The winning of material would primarily be done using a bulldozer with a front end loader loading haulage trucks.

As detailed further in **Section 4.2.7,** the number of truck movements from the proposed Kyeamba Borrow Pit during intense campaigns is expected to be 60 per day for the 16 months of quarry operation. This equates to approximately 5-10 truck movements per hour during peak periods.

Given the borrow pit's close proximity to the Approved Project, traffic movements are expected to be along the haulage roads so that interaction with Highway traffic is minimised. The noise and safety impacts on Highway traffic would therefore be minimised compared to sourcing the required fill material from existing commercial operations located in Wagga Wagga, Gundagai, Holbrook or Tumbarumba.

Due to the distance of the quarry to sensitive receptors, and provided operations are undertaken in accordance with the mitigation measures below and the CNVMP, there are no additional noise and vibration impacts expected at sensitive receptors.

Mitigation Strategy (Kyeamba Borrow Pit)

The following mitigation measures would be adopted:

- Noisy activities such as winning and loading of materials would be carried out during normal day time operating hours;
- Use of dampened tips on rock breakers;
- Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment; and
- Selection of plant and equipment based on noise emission levels.

4.2.4.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

The study area is located in a rural environment that has a low ambient noise level. The dominant source of noise within or adjacent to the study area is currently limited to the vehicles using the existing highway.

The proposed operations are remote and well removed from sensitive receptors. The nearest homestead is located 2kms to the south of the proposed excavation site. The quarry site is owned by the RTA and is currently leased. The lessee has been notified, and agrees to the proposed reactivation of the Aeroplane Hill Quarry.

Potential noise and vibration impacts are likely to result from quarry operations, including winning and loading of materials into trucks for transportation. As detailed further in **Section 4.2.7,** the number of truck movements from the Aeroplane Hill Quarry during intense campaigns is expected to be 200 per day for the 16 months of quarry operation. This equates to approximately 16 truck movements per hour during peak periods, which would have minimal additional impact on existing Highway noise.

Given the Aeroplane Hill Quarry's close proximity to the Approved Project, the noise impacts on Highway traffic would actually be minimised compared to sourcing the required fill material from existing commercial operations located in Wagga Wagga, Gundagai, Holbrook or Tumbarumba.

Due to the distance of the quarry to sensitive receptors, and provided operations are undertaken in accordance with the mitigation measures below and the CNVMP, there are no additional noise and vibration impacts expected at sensitive receptors.

Mitigation Strategy (Aeroplane Hill Quarry)

The following mitigation measures would be adopted:

- Noisy activities such as drilling, crushing and loading of materials would be carried out during normal day time operating hours;
- Use of dampened tips on rock breakers;

- If required, blasting is to be conducted between 9am and 5pm to avoid potential temperature inversions, and will occur only during Approved working hours as per Minister's Conditions of Approval regarding *Construction and Blasting Requirements*;
- Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment; and
- Selection of plant and equipment based on noise emission levels.

4.2.5 Soil and Water Management

4.2.5.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

The study area is generally characterised by rolling to moderately steep hills with shallow valleys. The operations are situated on the top of a northerly trending ridgeline at an elevation of about 320m Australian Height Datum (AHD). Side slopes are consistent around the hill at 25 to 30% and the ridge crest 10%. Minor erosional drainage lines flank the eastern and western sides of the ridge. The drainage water courses form an integrated unidirectional tributary network of stream channels that ultimately flow into Hillas Creek about 2 kilometres to the north. Drainage height is about 40 metres, with evidence of rapid runoff and partly stabilised minor sheet and rill erosion around the site.

The proposed quarry would alter the shape of the ridge and has the potential to generate sediment during the operation. There is the potential for rain events during the operations to mobilise any loose soils within the disturbed area, in turn transporting sediments to surrounding areas. Erosion and sedimentation control measures are to be implemented and maintained around the site. Given the limited scale of proposed works and the history of the site, any impacts are likely to be minor and short-term in nature.

Topsoil would be stripped progressively as material is quarried. This topsoil would be placed in a bund around the quarry area until the quarrying operation is completed. The topsoil bund would be vegetated as soon as practicable after placement, to ensure the risk of erosion is minimised. At the completion of the quarrying operations the topsoil would be respread over the disturbed area and grass seeded. A rehabilitation plan would be developed, in consultation with the property owner, to address revegetation of the site (Refer to **Section 4.2.9** for further information).

During the quarrying operations, silt fences or earth bunds would be constructed uphill of the quarry to divert clean water around the site, and downhill of the quarry to intercept “dirty” water. Existing dams would be used as secondary sedimentation ponds, and would be supplemented by additional primary sediment dams, situated inside the quarry area, in order to reduce the “footprint” of the quarry activities (**Figure 5**). Wherever possible, treated water would then be reused for dust suppression on site. All sedimentation dams would be designed or upgraded, if necessary, to be in accordance with the guidelines set out in Managing Urban Stormwater: Soils and Construction (Landcom, 2004).

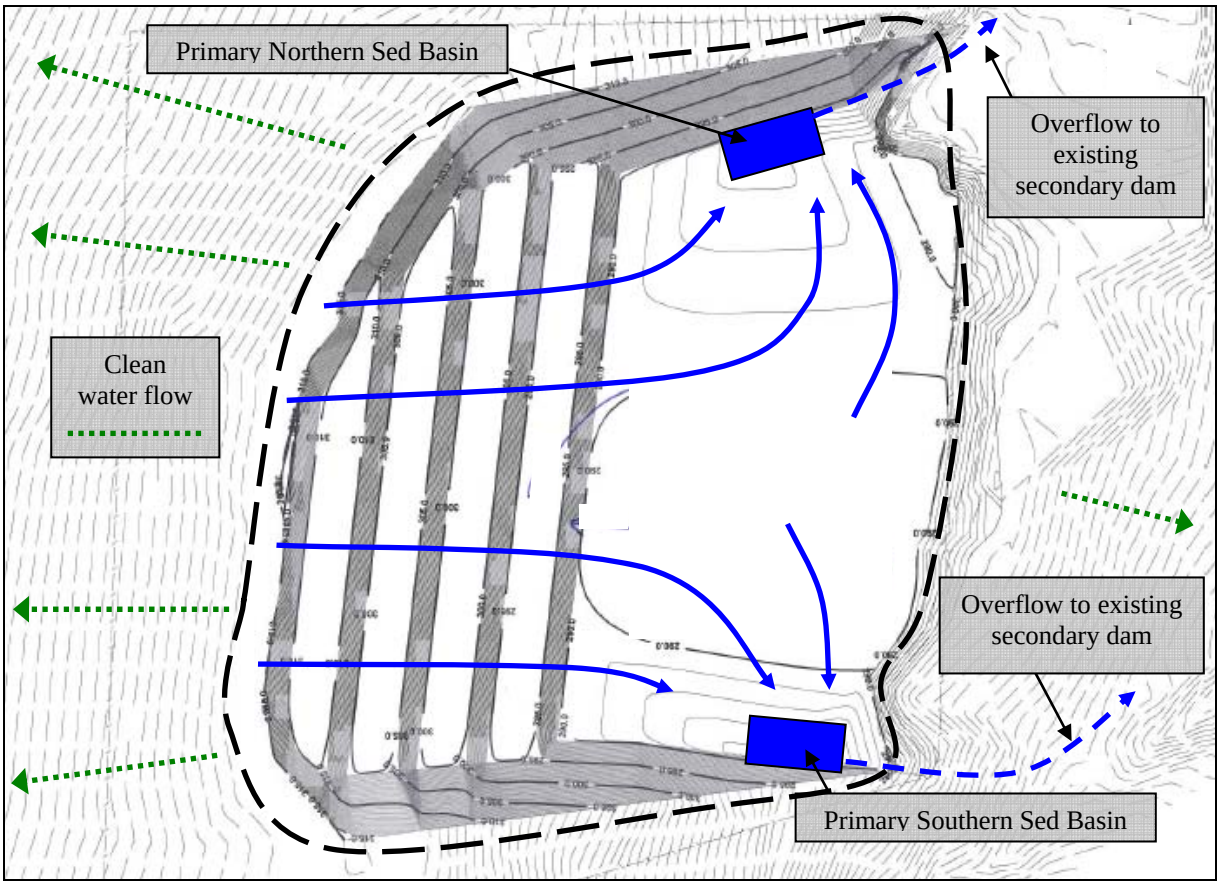
Water required for operational use would be extracted from two existing dams located on the property. The estimated volume of water required for operational purposes would be 12ML to 14ML (total), or 25kL/day. If required, bore water (from the N1 bore water allocation – licence number 40BL 191555 which has an allocation of 250ML/year) would be delivered by truck to the site. Water use would be minimised where possible in accordance with the Construction Water Management Strategy (CWMS).

A search on the NSW Government website, www.waterinfo.nsw.gov.au, showed the closest known groundwater bore is located 2km north east of the N1 Quarry and is used for domestic stock purposes. The bore is located at 230m AHD and the lowest point of the N1 Quarry is proposed to be 290m AHD.

Groundwater is not expected to be intercepted at the N1 Quarry based on the proposed final landform reaching final base depths that are higher than surrounding depressions and water bodies. In the unlikely case that groundwater is intercepted, it is expected to be localised and a closed system, that would not be intercepting regional groundwater networks. All water would be contained on site and the DWE contacted to seek their advice on the management of this water, particularly in regards to licencing. As such there would be no significant impact on surrounding groundwater uses or ecology.

Given the limited timeframe of the proposed works and the current inadequate erosion and sediment controls on site, the soil and water impacts from quarry reactivation are likely to be minor and short-term in nature, with proposed rehabilitation designed to improve and stabilise the site. This rehabilitation (shown in **Figures 8, 9** and **10** and described in **Section 4.2.9**) would return the site to an area suitable for activities consistent with neighbouring agricultural pursuits.

Figure 5 – Locations of N1 Quarry Sediment Dams and Water Flows



Mitigation Strategy (N1 Quarry)

The following mitigation measures would be implemented:

- In areas in which erosion is likely to occur as a result of slope instability, relevant erosion control measures would be installed;
- Erosion and sedimentation control measures would not be removed until disturbed areas have been stabilised;
- Topsoil is to be stockpiled in perimeter bunds for redistribution across the site at completion of the Project;
- Topsoil bunds to be revegetated as soon as practicable after placement to minimise the risk of erosion;
- No stockpiling to occur within 40 metres of a marked watercourse;
- Prior to the commencement of works, access routes and turning points would be defined. All plant and vehicle access would be restricted to the specified access routes and would not utilise any surrounding or adjacent surface areas. All staff would be advised of the access route requirements;
- Silt fences and earth bunds would be constructed at the perimeter of the quarry to control erosion and divert clean water around the site; and
- Existing dams would be utilised as sedimentation ponds and treated water reused for dust suppression on site.

4.2.5.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

The proposed borrow pit would slightly alter the shape of the gently sloping incline by extracting the top 2-3 metres of material; an activity that has the potential to generate sediment. There is the potential for rain events during the operations to mobilise any loose soils within the disturbed area, in turn transporting sediments to surrounding areas. Erosion and sedimentation control measures are to be implemented and maintained around the site.

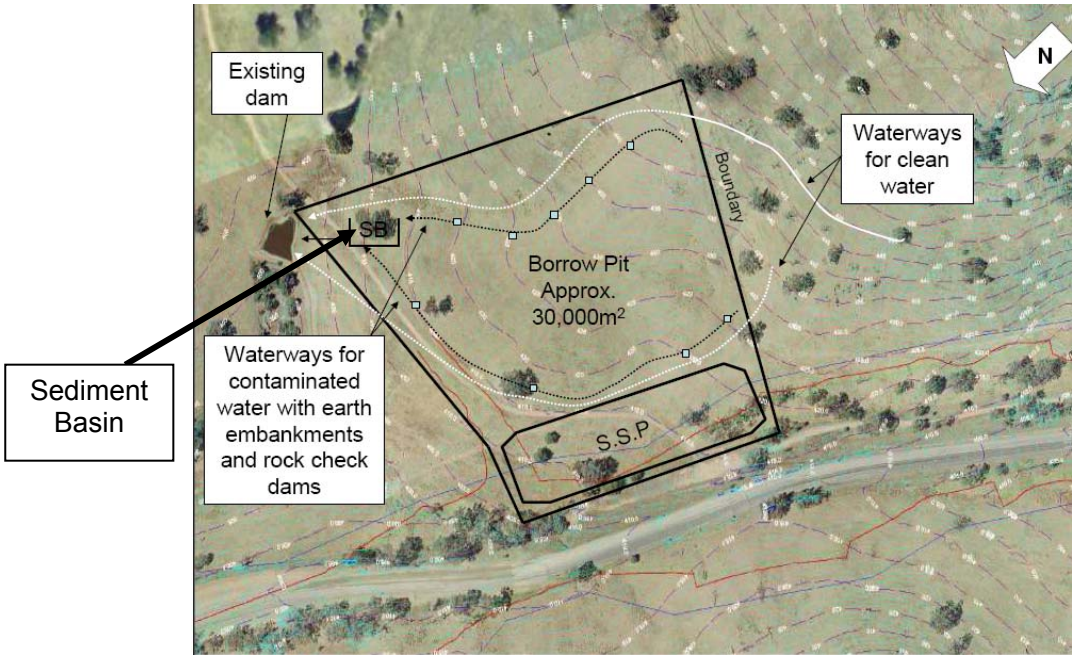
Topsoil would be stripped progressively as material is quarried and would be placed in a bund around the borrow area until the operations are complete. The topsoil bund would be vegetated as soon as practicable after placement, to ensure the risk of erosion is minimised. At the completion of the quarrying operations, the topsoil would be respread over the disturbed area and grass seeded. A rehabilitation plan would be developed in consultation with the property owner, to address revegetation of the site.

During the quarrying operations, silt fences or earth bunds would be constructed uphill of the quarry to divert clean water around the site, and downhill of the quarry to intercept “dirty” water. The existing dams would be used as sedimentation pond for the water flowing around the disturbed borrow pit site, and would be supplemented by an additional dam situated at the north eastern corner of the pit. Wherever possible, treated water would then be reused for dust suppression on site. All sedimentation dams would be designed to be in accordance with the guidelines set out in Managing Urban Stormwater: Soils and Construction (Landcom, 2004).

Water required for operational use would be extracted from existing and proposed dams located on the property (refer to **Figure 6**). The estimated volume of water required for operational purposes would be 5ML to 8ML (total), or 12kL/day. If required, bore water (from the N2 bore water allocation – licence numbers 40BL 191556, 191574, 191575 and 191576 which have a combined allocation of 150ML/year) would be delivered by truck to the site. Water use would be minimised where possible in accordance with the Construction Water Management Strategy (CWMS).

A search on the NSW Government website, www.waterinfo.nsw.gov.au, showed the closest known groundwater bore is located 3km to the west of the borrow pit site and is used for domestic stock purposes. The bore is located at 300m AHD and the lowest point of the Kyeamba Borrow Pit is proposed to be 410m AHD.

Figure 6 – Locations of Kyeamba Borrow Pit Sediment Dams and Water Flows



Groundwater is not expected to be intercepted at the borrow pit based on the proposed final landform reaching final base depths that are generally higher than surrounding depressions and water bodies. In the unlikely case that groundwater is intercepted, it is expected to be localised and a closed system, that would not be intercepting regional groundwater networks. All water would be contained on site and the DWE contacted to seek their advice on the management of this water, particularly in regards to licencing. As such there would be no significant impact on surrounding groundwater uses or ecology.

Given the limited scale of the proposed works and the planned erosion and sediment controls, the soil and water impacts from the borrow pit operations are likely to be minor and short-term in nature, with proposed rehabilitation designed to return the site as close as possible to original condition. This rehabilitation (shown in **Figure 11** and described in **Section 4.2.9**) would return the site to an area suitable for activities consistent with neighbouring agricultural pursuits. **Figure 6** shows the proposed water flows and sediment dam to be located on site.

Mitigation Strategy (Kyeamba Borrow Pit)

The following mitigation measures would be implemented:

- In areas in which erosion is likely to occur as a result of slope instability, relevant erosion control measures would be installed;
- Erosion and sedimentation control measures would not be removed until disturbed areas have been stabilised;
- Topsoil is to be stockpiled in perimeter bunds for redistribution across the site at completion of the Project;
- Topsoil bunds to be revegetated as soon as practicable after placement to minimise the risk of erosion;
- No stockpiling to occur within 40 metres of a marked watercourse;
- Prior to the commencement of works, access routes and turning points would be defined. All plant and vehicle access would be restricted to the specified access routes and would not utilise any surrounding or adjacent surface areas. All staff would be advised of the access route requirements;
- Silt fences and earth bunds would be constructed at the perimeter of the pit to control erosion and divert clean water around the site; and
- Existing dam would be utilised as sedimentation ponds and treated water reused for dust suppression on site.

4.2.5.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

The proposed quarry would alter the shape of the currently disturbed gully and has the potential to generate sediment during the operation. There is the potential for rain events during the operations to mobilise any loose soils within the disturbed area, in turn transporting sediments to surrounding areas. Erosion and sedimentation control measures are to be implemented and maintained around the site during the operation of the Aeroplane Hill Quarry.

Limited topsoil would be stripped progressively as material is quarried. Any topsoil would be placed in a stockpile until the quarrying operation is completed and would be vegetated as soon as practicable after placement, to ensure the risk of erosion is minimised. At the completion of the quarrying operations any topsoil would be respread over the disturbed area and grass seeded. A rehabilitation plan would be developed in consultation with the RTA, to address revegetation of the site.

During the quarrying operations, silt fences would be constructed uphill of the quarry to divert clean water around the site, and downhill of the quarry to intercept “dirty” water. The two existing dams would be used as sedimentation ponds and, where possible, treated water would be reused for dust

suppression on site. All sedimentation dams would be upgraded, if necessary, to be in accordance with the guidelines set out in Managing Urban Stormwater: Soils and Construction (Landcom, 2004).

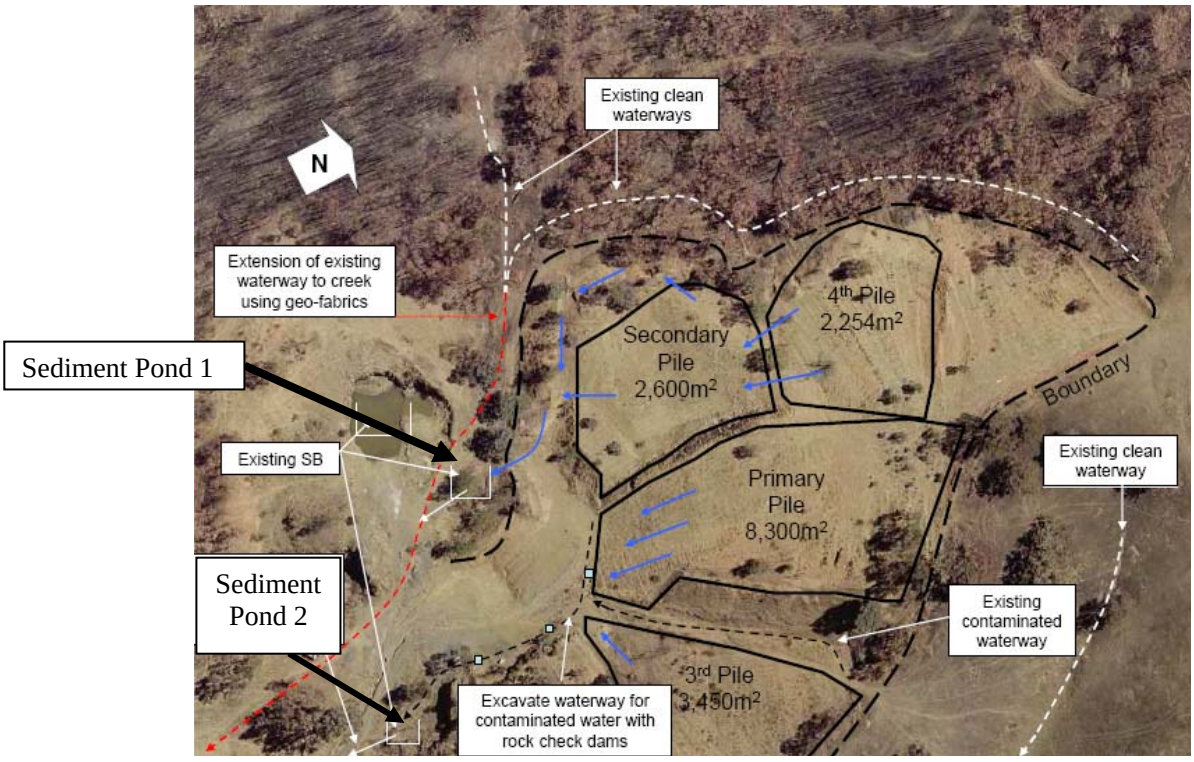
Water required for operational use would be extracted from existing dams located on the property (refer to **Figure 7** for location). The estimated volume of water required for operational purposes would be 10ML to 12ML (total), or 20kL/day. If required, bore water (from the N2 bore water allocation – licence numbers 40BL 191556, 191574, 191575 and 191576, which have a combined allocation of 150ML/year) would be delivered by truck to the site. Water use would be minimised where possible in accordance with the Construction Water Management Strategy (CWMS).

A search on the NSW Government website, www.waterinfo.nsw.gov.au, showed the closest known groundwater bore is located 1.5km east of the Aeroplane Hill Quarry and is used for domestic stock purposes. The bore is located at 425m AHD and the lowest point of the Aeroplane Hill Quarry is proposed to be 480m AHD.

Groundwater is not expected to be intercepted at the Aeroplane Hill Quarry based on the proposed final landform reaching final base depths that are higher than surrounding depressions and water bodies. In the unlikely case that groundwater is intercepted, it is expected to be localised and a closed system, that would not be intercepting regional groundwater networks. All water would be contained on site and the DWE contacted to seek their advice on the management of this water, particularly in regards to licencing. As such there would be no significant impact on surrounding groundwater uses or ecology.

Given the limited scale of the proposed works and the current disturbed nature of the site, the soil and water impacts from quarry reactivation are likely to be minor and short-term in nature with proposed rehabilitation designed to substantially improve the site condition. This rehabilitation (shown in **Figures 12** and **13** and described in **Section 4.2.9**) would return the site to an area suitable for activities consistent with neighbouring agricultural pursuits.

Figure 7 – Locations of Aeroplane Hill Quarry Sediment Dams and Water Flows



Mitigation Strategy (Aeroplane Hill Quarry)

The following mitigation measures would be implemented:

- In areas in which erosion is likely to occur as a result of slope instability, relevant erosion control measures would be installed;
- Erosion and sedimentation control measures would not be removed until disturbed areas have been stabilised;
- No stockpiling to occur within 40 metres of a watercourse;
- Prior to the commencement of works, access routes and turning points would be defined. All plant and vehicle access would be restricted to the specified access routes and would not utilise any surrounding or adjacent surface areas. All staff would be advised of the access route requirements;
- Silt fences would be constructed at the perimeter of the quarry to control erosion and divert clean water around the site; and
- Existing dams would be utilised as sedimentation ponds and treated water reused for dust suppression on site.

4.2.6 Air Quality (Dust) Management

4.2.6.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

It is anticipated that dust generated by the proposed N1 Quarry operations would be minimal. Dust generation from quarry sites can be due to a number of factors including winning material, traffic movements, open exposed areas and material processing and handling. The operation of the N1 Quarry would include all the factors described above as well as blasting, and would be undertaken strictly in accordance with the NHA **Dust Management Plan** (DMP, N829-EN-204 REV02).

As described in **Section 4.2.9**, progressive rehabilitation would ensure that all exposed areas are reduced as much as practicable. This would help to reduce dust emissions in periods of non quarry operation such as early mornings, evenings and Sundays.

The nearest receptor to the quarry is the homestead located approximately 1km NE of the proposed quarry reactivation site. Adhering to the requirements of the DMP and implementing the mitigation measures described below would ensure that dust impacts at nearby receivers are adequately minimised.

Mitigation Strategy (N1 Quarry)

The following mitigation measures would be implemented to reduce the impacts of dust on nearby receptors:

- Water taken from nearby and on site dams to be used for dust suppression along access roads;
- Water also to be used for dust suppression during quarry operations; and
- Dust generating activities not to be undertaken during windy conditions where excessive dust lift-off is observed.

4.2.6.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

It is anticipated that dust generated by the proposed Kyeamba Borrow Pit operation would be minimal. Dust generation from quarry sites can be due to a number of factors including winning material, traffic movements, open exposed areas and material processing and handling. The operation of the Kyeamba Borrow Pit would include all the factors described above and would be undertaken strictly in accordance with the DMP.

As described in **Section 4.2.9**, progressive rehabilitation would ensure that all exposed areas are reduced as much as practicable. This would help to reduce dust emissions in periods of non quarry operation such as early mornings, evenings and Sundays.

Given the close proximity and visual accessibility from the Highway, excavation works would be undertaken strictly in accordance with the DMP and the mitigation measures described below to ensure that dust impacts at the Highway and at nearby receivers are adequately minimised. The NHA do not consider it likely that dust from the proposed borrow pit would significantly impact nearby receptors.

Mitigation Strategy (Kyeamba Borrow Pit)

The following mitigation measures would be implemented to reduce the impacts of dust on nearby receptors:

- Water taken from nearby and on site dams to be used for dust suppression along access road;
- Water also to be used for dust suppression during quarry operations;
- Dust generating activities not to be undertaken during windy conditions where excessive dust lift-off is observed; and

- The stockpile located near to the Highway would be revegetated using the temporary revegetation mixture if required to be in place for greater than 3 weeks. Regular watering would also be carried out to minimise dust emissions.

4.2.6.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

It is anticipated that dust generated by the proposed Aeroplane Hill Quarry operations would be minimal. Dust generation from quarry sites can be due to a number of factors including winning material, traffic movements, open exposed areas, and material processing and handling. The operation of the Aeroplane Hill Quarry would include all the factors described above, as well as the possibility of blasting if sufficiently hard material is encountered during excavation. All activities would be undertaken strictly in accordance with the DMP.

As described in **Section 4.2.9**, progressive rehabilitation would ensure that all exposed areas are reduced as much as practicable. This would help to reduce dust emissions in periods of non quarry operation such as early mornings, evenings and Sundays.

The nearest receptor is located approximately 2km south of the proposed quarry reactivation site therefore adhering to the requirements of the DMP and implementing the mitigation measures described below would ensure that dust impacts at nearby receivers are adequately minimised.

Mitigation Strategy (Aeroplane Hill Quarry)

The following mitigation measures would be implemented to reduce the impacts of dust on nearby receptors:

- Water taken from nearby and on site dams to be used for dust suppression along access road;
- Water also to be used for dust suppression during quarry operations; and
- Dust generating activities not to be undertaken during windy conditions where excessive dust lift-off is observed.

4.2.7 Traffic Management

4.2.7.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

It is anticipated that the haulage of material from the N1 Quarry would be undertaken on a campaign basis due to the nature of blasting and road construction. Depending on the schedule of road construction, blasting is anticipated to occur approximately every 7 days during peak periods. This would influence the haulage of material, with the expected maximum number of truck movements required to service the predicted maximum output / demand to average around 800 per week.

This equates to approximately 150 truck movements per day or 13 per hour, however it should be noted that these periods of intense activity would be followed by periods of little or no activity, as material is either being won from the quarry or as the schedule of road construction places reduced demand on fill material.

Utilising material from commercial quarries, located further from the Project site is considered to have an additional impact on local traffic, therefore the reactivation of the N1 Quarry would minimise the distance over which local and highway traffic interacts with haulage vehicles. As such, sourcing material from the N1 Quarry for use in the N1 Section of the Hume Highway Duplication would reduce traffic impacts and air quality issues, and improve road safety compared to sourcing material from commercial operations located further from site.

Current access to the site is by way of an existing access road located approximately 500m west of the Snowy Mountains road interchange and this road was used during the previous upgrade of the Hume Highway. As part of the mitigation measures proposed for the reactivation of the quarry, acceleration and deceleration lanes would be provided to facilitate safe access and egress from the site.

All operations associated with the winning and transport of material from the N1 Quarry would be conducted in accordance with the **Construction Traffic Management Plan** (CTMP, N829-TM-201 REV02). In addition, all drivers transporting material from the quarry to road construction sites will operate under the NHA Safe Driving Policy and Transport Code of Conduct.

Mitigation Strategy (N1 Quarry)

In addition to the mitigation measures set out in the CTMP the following measures would be implemented to directly reduce traffic impacts from the N1 Quarry:

- Provision of acceleration and deceleration lanes on Hume Highway;
- A Safe Driving Policy, project instructions and Safe Work Method Statements (SWMS) would be prepared and educated to drivers through toolbox meetings;
- All heavy vehicles would be fitted with yellow flashing lights and two-way radios;
- All heavy vehicles would be fitted with approved load covers;
- Shaker grate would be implemented at exit gates to prevent debris from being tracked onto the Hume Highway (would also act as a cattle grid);
- Temporary vehicle storage areas would be identified on site to prevent congestion at access points, or if an unplanned incident has occurred on the Hume Highway; and

4.2.7.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

It is anticipated that an additional 330 truck movements per week (165 each way) would be required to service the predicted maximum output / demand from the Kyeamba Borrow Pit operations. These movements would be spread across the 12 hour operating period from 7am to 7pm, and equate to about 60 trucks per day. As with the N1 Quarry, the material is expected to be extracted on a campaign basis depending on the schedule of road construction in the Approved N2 Section.

Current access to the site is by way of an existing access road located approximately 4km north of the Tumbarumba Road East and Hume Highway intersection at Kyeamba Hill. It is planned to utilise the approximately 60,000m^3 of general fill material largely in the immediate vicinity of the proposed borrow pit.

Utilising material from commercial quarries, located further from the Project site, is considered to have an additional impact on local traffic therefore the commencement of the Kyeamba Borrow Pit would minimise the distance over which local and highway traffic interacts with haulage vehicles. It is proposed that the material from the borrow pit would be trafficked along the construction haul roads directly from site, therefore minimising the interaction of haulage trucks and Highway traffic.

As such, sourcing material from the Kyeamba Borrow Pit for use in the N2 Section of the Hume Highway Duplication would reduce traffic impacts and air quality issues and improve road safety, compared to sourcing material from commercial operations located further from site.

Existing access routes would be upgraded and utilised during the borrow pit operation however during the later stages of road construction a new property entrance would be installed to replace the existing entrance.

All operations associated with the winning and transport of material from the Kyeamba Borrow Pit would be conducted in accordance with the CTMP. In addition, all drivers transporting material from the borrow pit to road construction sites will operate under the NHA Safe Driving Policy and Transport Code of Conduct.

Mitigation Strategy (Kyeamba Borrow Pit)

In addition to the mitigation measures set out in the CTMP the following measures would be implemented to directly reduce traffic impacts from the Kyeamba Borrow Pit:

- A Safe Driving Policy, project instructions and SWMS would be prepared and educated to drivers through toolbox meetings;
- All heavy vehicles would be fitted with yellow flashing lights and two-way radios;
- All heavy vehicles would be fitted with approved load covers;
- Shaker grate would be implemented at the exit gate to prevent debris from being tracked onto Hume Highway (if traffic is to enter onto the Hume Highway); and
- Temporary vehicle storage areas would be identified on site to prevent congestion at access points, or if an unplanned incident has occurred on Hume Highway.

4.2.7.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

It is anticipated that the haulage of material from the Aeroplane Hill Quarry would be undertaken on a campaign basis due to the nature of blasting and road construction. Depending on the schedule of quarrying and road construction, blasting could occur up to once per week during peak periods. This would influence the haulage of material, with the expected maximum number of truck movements required to service the predicted maximum output / demand to average around 1000 per week.

This equates to approximately 200 truck movements per day or 16 per hour, however it should be noted that these periods of intense activity would be followed by periods of little or no activity, as material is either being won from the quarry or as the schedule of road construction places reduced demand on fill material. The existing quarry access road, which was used during the previous Hume Highway upgrade, would again be utilised to provide access from the quarry to the Highway (see **Figure 4**)

Utilising material from current commercial quarries, located further from the Project site, is considered to have an additional impact on local traffic therefore the reactivation of the Aeroplane Hill Quarry would minimise the distance over which local and highway traffic interacts with haulage vehicles. As such, sourcing material from the Aeroplane Hill Quarry for use in the N2 Project would reduce traffic impacts and air quality issues and improve road safety compared to sourcing material from commercial operations located further from site.

At Aeroplane Hill there is an existing crossover intersection to provide for access to the site for southbound traffic from the N2 road section. A site specific Traffic Control Plan (TCP) will be developed and will likely require temporary lane closures to provide acceleration and deceleration lanes.

All operations associated with the winning and transport of material from the Aeroplane Hill Quarry would be conducted in accordance with the CTMP. In addition, all drivers transporting material from the quarry to road construction sites will operate under the NHA Safe Driving Policy and Transport Code of Conduct.

Mitigation Strategy (Aeroplane Hill Quarry)

In addition to the mitigation measures set out in the CTMP the following measures would be implemented to directly reduce traffic impacts from the Aeroplane Hill Quarry:

- A Safe Driving Policy, project instructions and SWMS would be prepared and educated to drivers through toolbox meetings;
- All heavy vehicles would be fitted with yellow flashing lights and two-way radios;
- All heavy vehicles would be fitted with approved load covers;
- Shaker grate would be implemented at the exit gate to prevent debris from being tracked onto Hume Highway (would also act as a cattle grid); and
- Temporary vehicle storage areas would be identified on site to prevent congestion at access points, or if an unplanned incident has occurred on Hume Highway.

4.2.8 Visual Amenity

4.2.8.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

The N1 Quarry is located approximately 1km to the south of the Hume Highway and the nearest residence as shown in **Figure 2**. The site is on the side of a hill and is not easily visible from the Highway. Considering the current disturbed nature of the quarry from previous operations and the minimal visibility from the Highway and nearest receptor, it is submitted that the proposed reactivation of the N1 Quarry would have negligible impact on local visual amenity.

Mitigation Strategy (N1 Quarry)

As there would be negligible impact from the quarry on the local visual amenity, no specific mitigation measures are proposed to minimise visual impacts. However as described in **Section 4.2.9**, the proposed rehabilitation of the site during and following quarry operations would significantly improve the currently disturbed appearance of the site.

4.2.8.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

The Kyeamba Borrow Pit is located on the side of a cleared, moderately sloping hill that is partially visible from the Hume Highway, which is located approximately 100m to the west of the proposed borrow pit **(Figure 3**). The nearest residence is located approximately 1km to the south east, at the property "Ballandry", which is not visible from the proposed borrow pit.

Although the site would be partially visible to passing motorists, the NHA propose that the visual impact due to the Kyeamba Borrow Pit would be negligible compared to the adjacent Highway Duplication construction. Progressive rehabilitation would ensure that only necessary areas are disturbed to minimise dust emissions, reduce erosion and minimise visual impacts from the Highway.

Mitigation Strategy (Kyeamba Borrow Pit)

As there would be a minimal impact from the quarry on the local visual amenity, the proposed mitigation measures relate to ensuring that progressive rehabilitation is undertaken in accordance with **Section 4.2.9**.

4.2.8.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

The Aeroplane Hill Quarry is located approximately 300m to the west of the Hume Highway (as shown in **Figure 4**) and 2km to the north of the nearest residence. The site is contained within a largely disturbed gully which is protected visually from the Hume Highway by a vegetated embankment. Considering the current disturbed nature of the quarry from previous operations and the lack of visibility from the Highway and nearest receptor, it is submitted that the proposed reactivation of the Aeroplane Hill Quarry would have negligible impact on local visual amenity.

Mitigation Strategy (Aeroplane Hill Quarry)

As there would be negligible impact from the quarry on the local visual amenity, no specific mitigation measures are proposed to minimise visual impacts. However as described in **Section 4.2.9**, the proposed rehabilitation of the site during and following quarry operations would significantly improve the currently disturbed appearance of the site.

4.2.9 Rehabilitation

4.2.9.1 N1 Quarry

The effect of the Modified Project (N1 Quarry)

The N1 Quarry site is currently considered to be disturbed due to previous quarrying operations for the Hume Highway upgrade approximately 15 years ago. The NHA submit that the quarrying operations and subsequent rehabilitation would provide the opportunity to improve various aspects of the site, in particular the erosion and sediment control measures and the visual amenity.

Quarrying would be undertaken primarily through blasting to win the majority of material and bulldozer to push up the fill for loading into haulage trucks by a front end loader. Prior to blasting, topsoil, to a depth of approximately 0.5m, would be stripped off using a bulldozer, and used as a temporary safety bund wall at the top of the blast / work face to prevent access to the quarry edge. This topsoil bund wall would be grassed immediately to reduce erosion and would ultimately be respread over the final batters to promote long term revegetation following quarry completion.

As can be seen from **Figures 8, 9** and **10**, the batters would be benched and left in a 'rough' condition to reduce water velocity on the slopes and enhance the revegetation works on the final landform. To ensure long term site stability, finalised areas would be progressively revegetated with topsoil and the seasonal temporary revegetation mix proposed for use in erosion control work along parts of the Approved Project.

The seasonal temporary revegetation mix proposed for use includes Annual cover for short term treatment (Japanese Millet, Rye Corn and Annual Sorghum) and Perennial cover for longer term treatments (Canary Grass and Buffel Grass). All cover crops would be applied at a rate of 20kg/ha. Final revegetation mixes will be determined in consultation with landowners.

The progressive rehabilitation and final landform of the proposed N1 Quarry would ensure that there is minimal damage to undisturbed land, and that excavation works provide the opportunity to improve the environmental and visual condition of the current site. The final intended landuse at the N1 Quarry site is agricultural and although suitable rehabilitation will occur to mitigate water management, visual amenity and safety issues, the site will be left so that further quarrying operations will not be precluded.

Figure 8: N1 Quarry – Profile of Current and Final Benched Landform

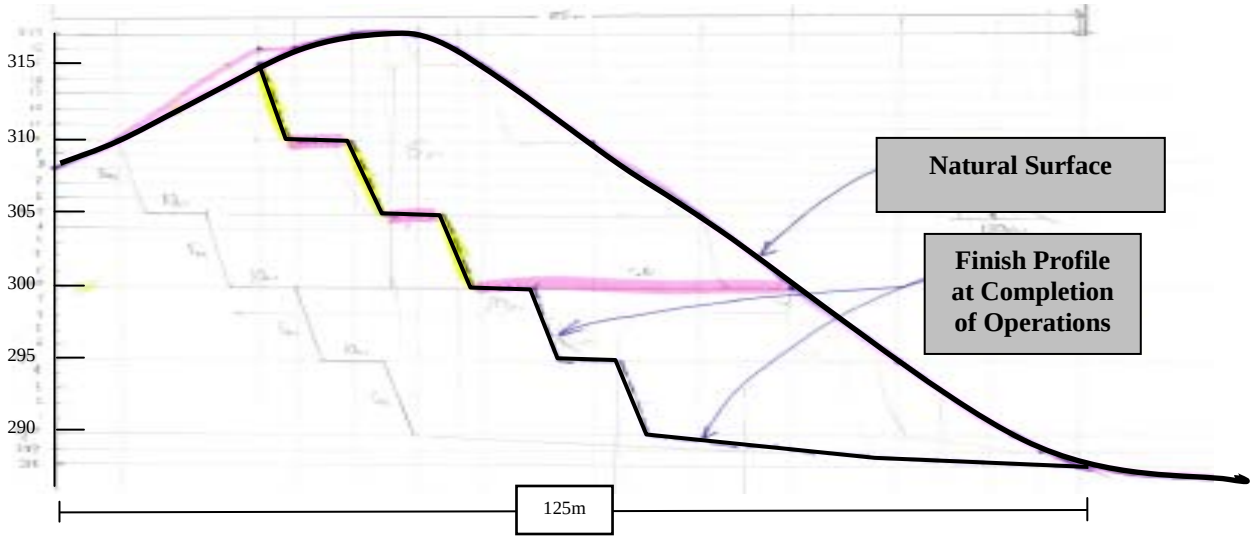


Figure 9: N1 Quarry – Plan View of Current Landform

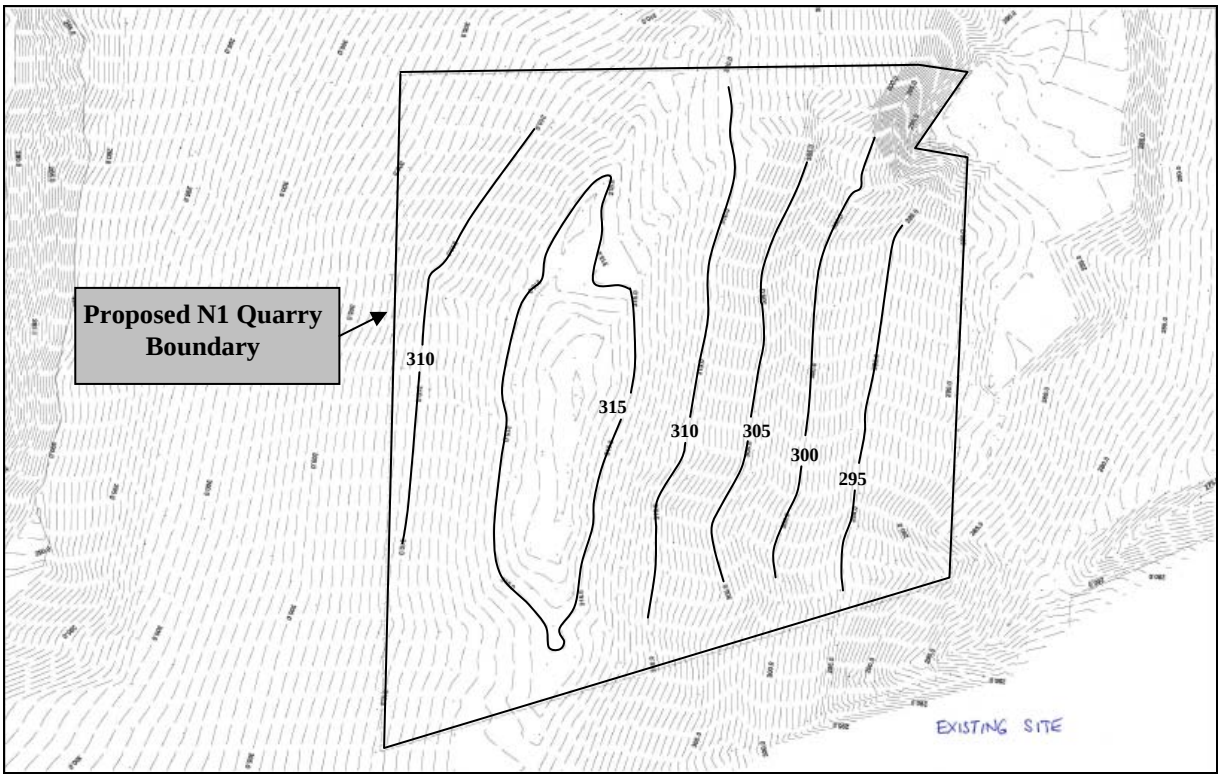
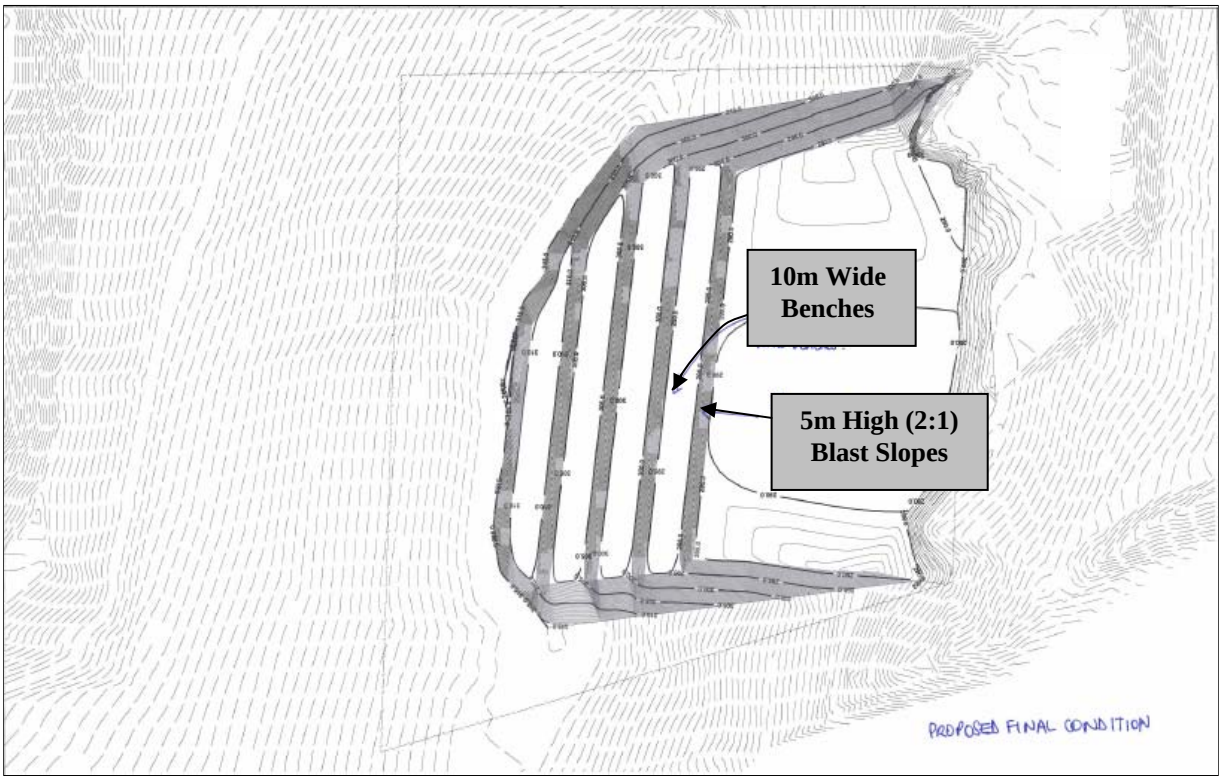


Figure 10: N1 Quarry – Plan View of Proposed Landform



4.2.9.2 Kyeamba Borrow Pit

The effect of the Modified Project (Kyeamba Borrow Pit)

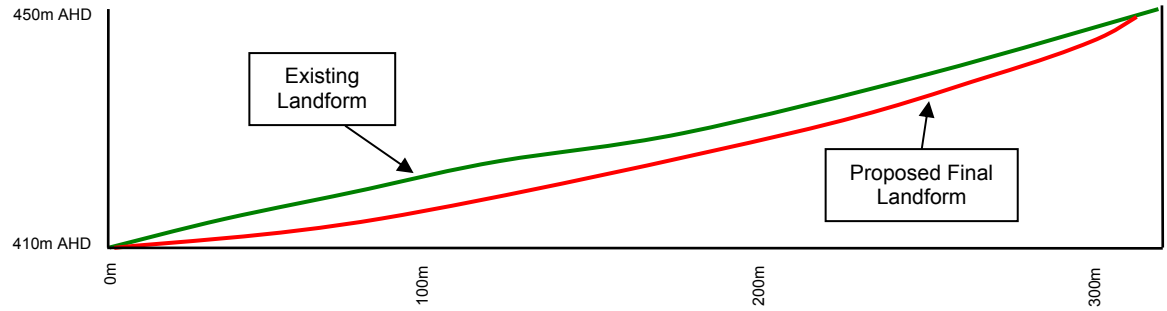
At the commencement of the proposed borrow pit operation, topsoil, to a depth of approximately 0.4m, would be stripped off using a bulldozer, and used as a temporary safety bund wall around parts of the borrow pit boundary. This topsoil bund wall would be grassed immediately to reduce erosion and would ultimately be respread over the final batters to promote long term revegetation following borrow pit completion. The bunds, and some existing natural landforms, would also assist to direct clean water away from disturbed areas and to existing sedimentation dams.

Operations would be undertaken primarily with a bulldozer (likely a D10) via a staged campaign, with works to commence on the north eastern corner of the site with progression towards the south west. Material would be stockpiled with a scraper, if space restrictions allow, and loaded from the floor of the pit.

To ensure long term site stability for the proposed final agricultural land use, disturbed areas of the Kyeamba Borrow Pit would be progressively revegetated with the revegetation mix proposed for use in erosion control work along relevant sections of the Approved Project. The revegetation mix proposed for use includes grass species Austrodanthonia fulva, Microlaena stipoides, Themeda australis, included in the Box Gum Woodland community. Final revegetation mixes and periods of stock exclusion to allow for vegetation establishment will be determined as part of the Landscape and Rehabilitation Plan, developed in consultation with relevant landowners.

The borrow pit site was chosen due its proximity to the N2 road duplication section, therefore future quarrying operations are unlikely. The borrow pit would also not constitute a safety hazard as there will not be excessively steep batters in the final proposed landform.

Figure 11: Kyeamba Borrow Pit – Profile of Current and Final Landform.



4.2.9.3 Aeroplane Hill Quarry

The effect of the Modified Project (Aeroplane Hill Quarry)

The Aeroplane Hill Quarry site is currently considered to be highly disturbed due to previous quarrying operations and recent bushfires. There is about 3.6Ha of existing disturbed land, with excavation activities proposed to be confined to the central 2Ha portion of the quarry.

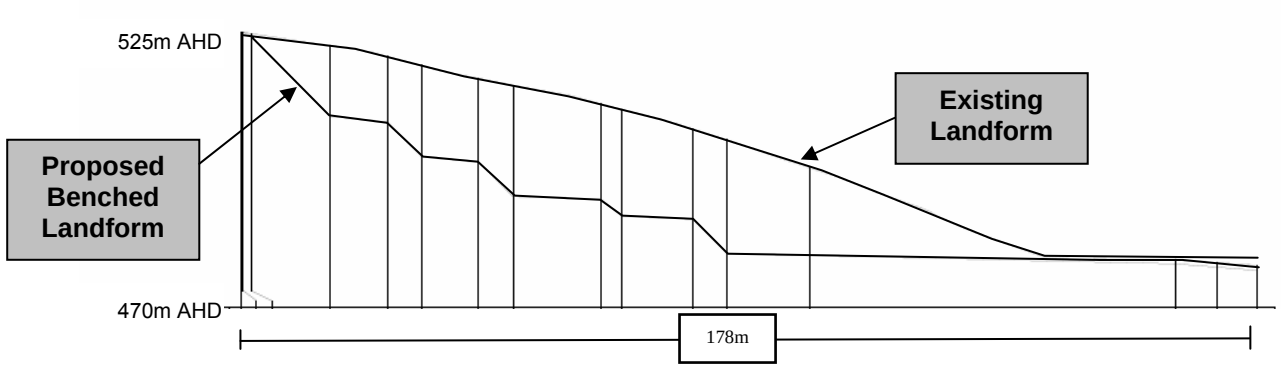
The NHA submit that the quarrying operations and subsequent rehabilitation would significantly improve the overall condition of the site, in particular the current inadequate erosion and sediment control measures.

Quarrying would be undertaken primarily with a bulldozer (likely a D10) via a staged campaign, with works to commence on the southern end of the site to expand the existing turning and loading area to the north before establishing the batters. Batter work would then progress from the western side in an easterly direction, breaking up the current long exposed slope to produce a final benched landform.

As can be seen from **Figures 12** and **13**, the batters would be ripped on the contour and left in a 'rough' condition to reduce water velocity on the slopes and enhance the revegetation works on the final benched landform. To ensure long term site stability, finalised areas would be progressively

revegetated with the seasonal temporary revegetation mix proposed for use in erosion control work along parts of the Approved Project.

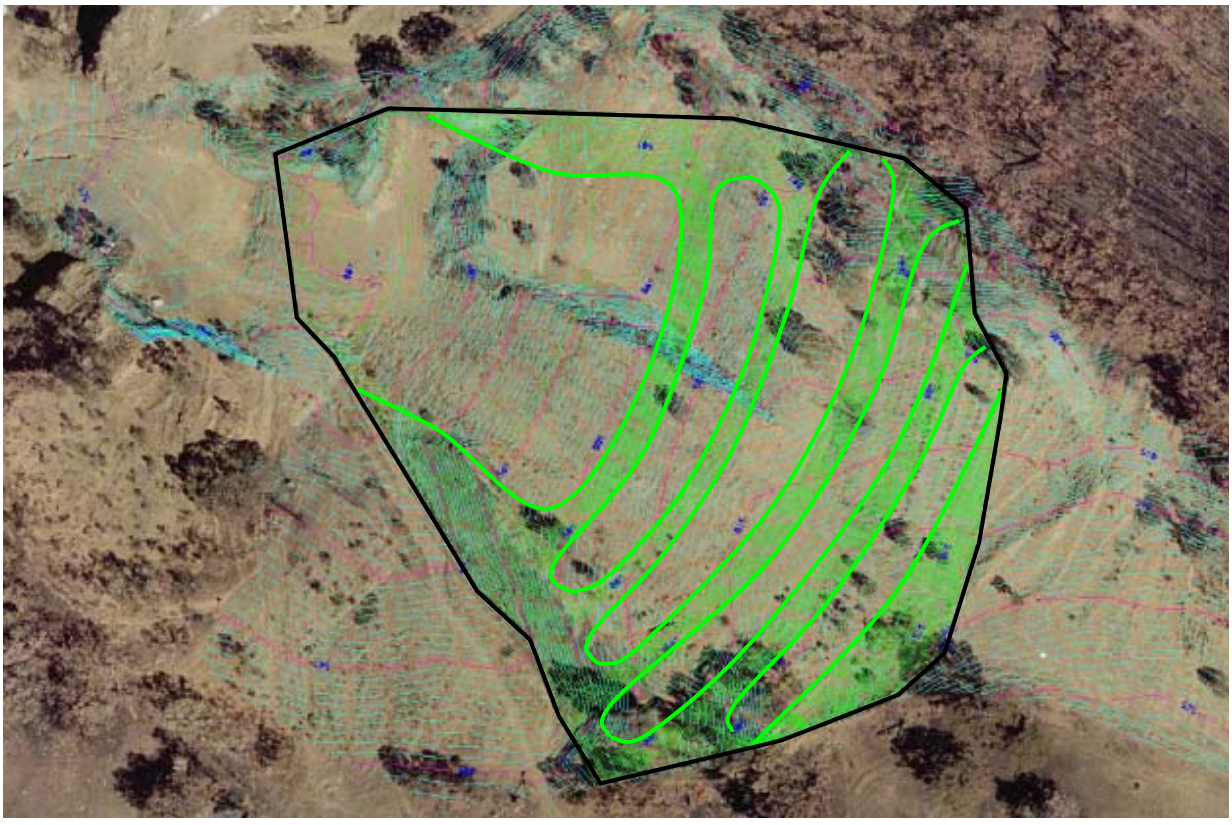
Figure 12: Aeroplane Hill Quarry – Profile of Current and Final Benched Landform



The seasonal temporary revegetation mix proposed for use includes Annual cover for short term treatment (Japanese Millet, Rye Corn and Annual Sorghum) and Perennial cover for longer term treatments (Canary Grass and Buffel Grass). All cover crops would be applied at a rate of 20kg/ha.

The progressive rehabilitation and final landform of the proposed Aeroplane Hill Quarry would ensure that there is minimal damage to undisturbed land, and that excavation works provide the opportunity to significantly improve the environmental and visual condition of the current site. The final intended landuse at the Aeroplane Hill Quarry site is dependent on the tenure of the land. As a result, the area will be suitably rehabilitated to mitigate water management, visual amenity and safety issues. However, due the unknown nature of future land use, the site will be left to ensure that further quarrying operations will not be precluded.

Figure 13: Aeroplane Hill Quarry – Plan View of Proposed Final Benched Landform



4.3 Other Issues

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

- Waste
- Contaminated land
- Social impacts

During operation of the proposed quarries and borrow pit, some benefit would be realised in the areas of:

- Resource management;
- Greenhouse gases – due to reduced fuel usage compared to sourcing fill from existing commercial quarries; and
- Road Safety – due to reduced material transport on regional roads compared to sourcing fill from existing commercial quarries.

4.4 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 proposed use of the N1 and Aeroplane Hill quarries and the Kyeamba borrow pit minimise the regional environmental impacts. The reactivation of existing quarries minimises the area of disturbed land. The close proximity of the quarrying operations to the Projects also reduces impacts from long haulage distances and associated traffic impacts.

The proposed 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 long term benefits 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.

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

5.0 CONSULTATION AND NOTIFICATIONS

5.1 Agency Consultation

The NHA (on behalf of the RTA) has consulted with relevant regulatory agencies prior to completing this document in order to identify any specific issues they may have with the proposed quarries modification. A summary of the consultation undertaken as part of this report preparation is provided in **Table 5** below.

Table 5: Summary of Agency Consultation

Summary of Issues	Report Reference
Gundagai Shire Council	
A letter was sent from the NHA to Gundagai Shire Council in October 2007. No response has been received.	
Wagga Wagga City Council	
A letter was sent from the NHA to Wagga Wagga Shire Council in October 2007. No response has been received.	
Greater Hume Shire Council	
A letter was sent from the NHA to Greater Hume Shire Council in October 2007. No response has been received.	
Department of Water and Energy (NSW)	
The DWE have requested the following information be addressed in the Environmental Assessment: ▪ Surface and Groundwater Management Issues ▪ Water Supply Issues ▪ Rehabilitation Plan ▪ Erosion and Sedimentation Controls	**Sections 4.2.5 and 4.2.9**
Department of Environment and Climate Change (DECC)	
The DECC have requested that the following information be addressed in the Environmental Assessment and other related documentation for the proposed quarries. ▪ Noise and Vibration Information ▪ Dust Mitigation Measures ▪ Protection of Threatened Species ▪ EPL requirements ▪ Rehabilitation Information ▪ Landholder Consultation ▪ Identification of trees to be retained and removed	**Section 4.2.4** **Section 4.2.6** **Section 4.2.1** **Section 6.1** **Section 4.2.9** **Section 5.2** **Section 4.2.1**

Department of Primary Industries (DPI)	
DPI requires the following under the *Mines Inspection Act, 1901*: ▪ Nomination of statutory positions for activities that occur on mine sites ▪ Preparation of a Mine Safety Management Plan for quarrying operations	**Section 6.1**
Department of Planning (DoP)	
DoP requires the following information in order to assess the modification request:	
▪ Detailed description of the quarry proposal, including ancillary infrastructure	**Section 3.0**
▪ The requirements of the Minister's Concept Plan Approval and Project Approvals for the Hume Highway Duplication	**Section 3.0**
▪ The scope and intent of the environmental assessment	**Section 1.2**
▪ Proposal-specific statement of commitments, clearly identifying how the new or amended commitments fit within the environmental management framework established by the Concept Plan Approval (including the Biodiversity Offset Strategy, Construction Water Management Strategy and Construction Environmental Management Plan [CEMP]) and project specific Conditions of Approval	**Section 6.0**
▪ An assessment of key issues including noise, vibration and blasting (including traffic noise), haulage traffic, air quality, water resources (surface and groundwater), flora and fauna, Aboriginal and European Heritage, visual amenity and rehabilitation.	**Section 4.2.1 – 4.2.7**
▪ The "matters for consideration" specified in Part 3 of SEPP 200 (including resource management and recovery, transport and rehabilitation)	**Section 4.2**
▪ Appropriate and justified level of consultation with local, State and Commonwealth public authorities and service providers, special interest groups such as local Aboriginal Councils and the public, including affected landholders	**Section 5.2**

5.2 Community Consultation

Discussions have been held regarding the proposed modification with all directly affected landholders. No concerns have been raised by the landholders who have indicated that they fully support the quarry (re)activation proposal.

Table 6: Summary of Affected Landholder Consultation

Summary of Issues	Report Reference
Affected Landholder Consultation	
• Rehabilitation of the should enable land to be used for current agricultural practices • The RTA has indicated approval for the use of the Aeroplane Hill Quarry provided a suitable rehabilitation plan is implemented.	**Section 4.2.9**

5.3 Further Consultation

Where required by the DoP, further consultation would be undertaken by the NHA.

6.0 ENVIRONMENTAL SAFEGUARDS

The NHA propose that the MCoA that apply to the Approved Projects would also apply to the proposed quarry operations. It is submitted that the MCoA are for the most part comprehensive and would be adequate to manage the change of potential adverse environmental impacts that could be caused by the proposed quarries modification to the Approved Project.

The proposed modifications would be undertaken in accordance with the MCoA granted for the Concept Approval (06_0314); Project Approval Sturt Highway to Tarcutta (06_0245) and Kyeamba Hill (06_0246); and the *Hume Highway Duplication Concept Plan, Sturt Highway to Tarcutta, Kyeamba Hill, Little Billabong, and Yarra Yarra to Holbrook Environmental Assessments - Submissions Report and Revised Statement of Commitments*. The proposed additional environmental safeguards, specific to the proposed quarry modifications, are shown in **Table 7**.

Table 7: Proposed Additional Statement of Commitments

Objective	Commitment	Timing	Document to be Updated to Reflect SoC
Minimise construction traffic impact on Hume Highway	Acceleration and deceleration lanes to be provided on Hume Highway for N1 Quarry entry	Operation of quarry	Traffic Management Plan
Minimise noise and vibration impacts due to quarry operation	Blast Management Plans to be prepared to Australian Standards for any blasting taking place	Operation of quarry	Noise and Vibration Management Plan
Contain and treat all water from disturbed quarry land	All water containing sediment from disturbed land will be captured and treated on site and, where possible, reused for dust suppression.	Operation of quarry	Construction Soil and Water Management Sub Plan
Ensure suitable rehabilitation of quarry areas	Rehabilitation plans will be prepared in consultation with landowners	Operation of quarry	Landscape and Rehabilitation Management Plan

6.1 Legislative Requirements

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. Further consultation would be undertaken with DWE, DPI and DECC prior to works commencing quarry operations to ensure that details on the nature and impact of the works are provided.

For certain quarrying activities, licences and approvals are required by both the DPI and DECC prior to commencement of operations. An application for Environment Protection Licences would be lodged with the DECC, following approval of this document by the DoP. All necessary Mine Safety Management Plans, certificates and nominations of statutory positions would be obtained from, or submitted to, the DPI prior the commencement of each quarry.

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.

7.0 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

7.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (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 8 shows the seven matters of national environmental significance and the likely impact from the proposed changes.

Table 8: 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 form a Ramsar wetlands and are located within the same catchment as all of the proposed quarries/ borrow pits, although at a distance in excess of 100km.	None expected
4) Any environmental impact on Commonwealth listed threatened species or ecological communities?	There are 12 threatened species in the vicinity of the N1 Quarry study area. There is one critically endangered ecological community in the vicinity of the study area.	None expected
	There are 12 threatened species in the vicinity of the Kyeamba Borrow Pit and Aeroplane Hill study area. There is one critically endangered ecological community in the vicinity of the study area.	
5) Any environmental impact on Commonwealth listed migratory species or migratory species listed under international agreements?	There are 12 migratory species that occur or have potential habitat in the vicinity of the N1 Quarry study area.	None expected
	There are 12 migratory species that occur or have potential habitat in the vicinity of the Kyeamba Borrow Pit and Aeroplane Hill study area.	
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 is also offered protection under the EPBC Act. As the Proposal is not located within or adjacent to Commonwealth land, it is not anticipated there would be any direct or indirect impacts upon Commonwealth land.

8.0 CONCLUSIONS

Following the review of the detailed design for the N1 and N2 Works, NHA propose to commence operations at one borrow pit and reactivate two previously used quarries to provide fill material for the Approved Projects. These operations have the potential to increase impacts on biodiversity, air quality, soil and water, noise and vibration, and traffic management. While these are unlikely to be significant impacts, **Section 4.0** details the measures proposed to effectively manage these potential impacts.

As a result of the proposed quarry operations, significant advantages would be achieved relating to the rehabilitation of disused mining operations and reduced traffic impacts compared to sourcing the necessary fill material from Wagga Wagga, Gundagai, Holbrook or Tumbarumba.

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 Minister's Conditions of Approval 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 as such, seek approval from the Minister for Planning for the proposed modification as outlined in this report.

9.0 REFERENCES

Hume Highway Duplication – Concept Plan, Environmental Assessment, January 2007 (prepared by Connell Wagner and Parsons Brinckerhoff)

Sturt Highway to Tarcutta, Hume Highway Duplication – Environmental Assessment, March 2007 (prepared by Sinclair Knight Merz and Manidis Roberts)

Kyeamba Hill, Hume Highway Duplication – Environmental Assessment, March 2007 (prepared by Sinclair Knight Merz and Manidis Roberts)

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

APPENDIX A – QUARRY RESOURCES INVESTIGATION REPORT (EXTRACTS)

APPENDIX B – ECO LOGICAL BIODIVERSITY REPORT

APPENDIX C – KNC PRE WORK HERITAGE CHECKLISTS

APPENDIX D – AEROPLANE HILL BIODIVERSITY REPORT

APPENDIX E – AHIMS REPORTS

APPENDIX F – ASSESSMENTS OF SIGNIFICANCE