Dolwendee Quarry Project

Supplementary Response to Submissions Report

Upper Hunter Holdings Pty Ltd

17 October 2016

Project No. 2013.006

KMH ENVIRONMENTAL

As part of the pitt&sherry *Group*

pitt&sherry

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1. Introduction

Upper Hunter Holdings Pty Ltd (UHH) is proposing to establish a sandstone and conglomerate quarry on the property "Dolwendee", near Denman in the NSW Hunter Valley (the "Project"). The Project site is located within the Muswellbrook Local Government Area (LGA) approximately 20 km southwest from Muswellbrook and 7 km northwest from Denman.

The Project involves the proposed construction and operation of a conventional sandstone / conglomerate quarry with an active extraction area (limited to approximately 10.5 hectares), raw material and product stockpiles, crushing and screening plant, and a small office, amenities and car parking space. An internal haul road approximately 2.5km long would connect with the Golden Highway near Dolwendee Homestead.

The Project meets the definition of State Significant Development (SSD) as it is an extractive industry that proposes extraction from a total resource exceeding 5 million tonnes. An Environmental Impact Statement (EIS) for the Project was prepared by KMH Environmental (KMH) and publically exhibited by the Department of Planning and Environment (DPE) between 11th December 2015 and the 1st February 2016.

2. EIS Submissions and Response

DPE received a total of 18 submissions to the EIS which were addressed in a Response to Submissions (RTS) Report prepared by KMH, on behalf of UHH, in July 2016. DPE sought review and feedback on the RTS Report by several government agencies. A number of additional submissions were subsequently made, some indicating that the RTS Report satisfactorily addressed their previous comments, and others requesting further information.

DPE subsequently requested further information from UHH, including a response to the additional submissions. Additional submissions were received from:

- NSW DPE;
- NSW Department of Primary Industries, Water (DPI);
- NSW Environment Protection Authority (EPA);
- Heritage Council of NSW;
- Muswellbrook Shire Council;
- NSW Office of Environment and Heritage (OEH);
- NSW Roads and Maritime Services (RMS).

The additional submissions and requests for clarification are addressed in this Supplementary Response to Submissions Report (Supplementary RTS Report)

Submission details and responses to submissions are provided in **Table 1** below.

Table 1 Additional Submissions Received and UHH Response

Item No.	Submission Received	UHH Response
NSW DPE		
1.	**Traffic Impact Assessment** Email from DPE to KMH, 4/8/2016: Further comment/justification is required to support the assertion that a single hour of traffic monitoring is sufficient to validate the conclusion that traffic levels have not changed since 2012 on the Golden Highway. Muswellbrook Shire Council has advised the Department that it does not consider this is sufficient to support this conclusion and has recommended one week monitoring at a minimum. The Department is presently awaiting on advice from the RMS as to whether they have traffic data for the Golden Highway, which either supports or contradicts your conclusion. In the event of the latter outcome, additional traffic survey and/or analysis may be required, unless otherwise justified. We are still considering Council's other comments relating to local road limits in the haul route and the request to seal the entire haul route. We do not require you to respond at this point in time. Email from DPE to KMH,12/8/2016: I have also attached RMS comments on the RTS and their subsequent advice regarding background traffic volumes on the Golden Highway. From our conversation yesterday, I note you had drafted a response, which I would suggest that you submit to us to be considered in our assessment. I have also sought further clarification from Council on some of its other comments relating to traffic and transport, which I will send through once received.	Refer to the submissions by Muswellbrook Council and RMS which are included below, along with UHH's response to the matters raised. These issues are addressed. No further assessment or information is required.

2.	**Aboriginal Cultural Heritage Assessment** Email from DPE to KMH 4/8/2016: OEH has indicated that they have concerns with respect to the ACHA. We have sought further clarification from OEH on these issues. We expect to receive this advice next Wednesday. We will then forward to you along with our recommendations for addressing these issues. We do not require you to respond at this point in time. Email from DPE to KMH 12/8/2016: OEH has raised two matters, including that the ACHA is inadequate and that a geomorphological survey must be undertaken. OEH has also provided us with some further detailed comments on what it considers to be the material issues in relation to these two matters (see attached email). In relation to OEH's comments, I think it would be useful if you considered the issues raised and identified those which you may not agree with. We can then arrange a meeting (including DPE, OEH and relevant consultants) to discuss those matters.	A response to the matters raised by OEH is provided below.
3.	**Rehabilitation** Email from DPE to KMH, 4/8/2016: We are not satisfied with the response in the RTS regarding our request for progressive rehabilitation and a rehabilitation plan for the following reasons: • The proposed method of progressive rehabilitation involves dust suppression and weed management measures. These are not accepted methods of progressive rehabilitation. We require drawings, which indicate the spatial extent and method by which the quarry will be progressively rehabilitated over its lifetime. The need to undertake progressive rehabilitation has been echoed by DPI – Agriculture in its submission.	Progressive rehabilitation and final landform are described in the EIS, including in particular at Section 6.19 and Appendix G (refer especially Figure 11) and further explained in the previous RTS Report. This submission has been discussed with DPE and it was agreed to resolve this by providing a drawing which consolidates the conceptual rehabilitation commitments (including haul road, processing, stockpile and office/amenity areas). A conceptual rehabilitation plan is provided in Appendix A to this Supplementary RTS. To reiterate the commitment made in the EIS and in the previous RTS Report

	• In addition, we require a conceptual plan of the final landform of the quarry and how it will be rehabilitated following closure. This is a standard requirement for many SSD quarries, which forms part of a development consent. We also consider this to be particularly necessary due to the use of the uncertain language used to describe the final landform as including a "closed void". We do not consider this provides the Department, stakeholders, or the community with a clear understanding of whether an acceptable landform would be left in the landscape after extraction is complete.	(KMH, July 2016) and clear up any uncertainty, we can confirm that the final landform includes a closed void with a gently sloping quarry floor and benched quarry faces. A closed void is a pit that is not free draining from a drainage perspective, ie it does not have an outlet for stormwater to drain away to the surrounding landscape. This is because the pit would be excavated to approximately 30 m below the surrounding ground level. The key objective of the progressive and final (closure) rehabilitation strategy would be to establish a stable landform that minimises risks to safety and the environment. The rehabilitation objectives and methods would be detailed in a Rehabilitation and Closure Strategy to be prepared at a later stage as the quarry is nearer to closure, approximately during stage 3 of development. The quarry floor and benches would be rehabilitated progressively by suitable means to suppress dust, minimise erosion and minimise potential for weed establishment. The methods employed would be dependent on various factors, not least of which will be the availability of overburden and topsoil for preparation of a suitable growth substrate for revegetation. Native vegetation would be employed where appropriate and subject to the success of planting trials. An access ramp would be maintained to the quarry floor. The proposed final quarry batter faces would remain at a slope of approximately 0.5 horizontal : 1 vertical. The height of these final faces would require review as the quarry develops, in conjunction with the Mines Safety Inspectorate. It is unlikely that the faces will have any vegetation on them as they will not be visible to neighbours, do not pose a significant erosion hazard and the roots of plants can over time destabilise the stratum and make the faces unsafe. Progressive rehabilitation of disturbed areas would be undertaken outside the active extraction area in locations that are disturbed temporarily during construction but not required for operations. This would include, for example, any temporary storage/laydown areas, large or steep road batters, earth bunds and drains conveying concentrated stormwater flows.

		As part of a closure plan, the processing and administration areas external to the quarry would be revegetation and returned to a stable condition upon the removal of all equipment and materials. Techniques for rehabilitation would typically include: • Ripping surfaces of the processing area and any disturbed lands to be rehabilitated to a depth of 250 mm to key in topsoil; • Spreading topsoil stripped from the site prior to the quarry operations to form a minimum 100mm deep layer; • Seeding with the preferred plant mix; • Watering, fertilising and maintaining vegetation as necessary to ensure successful establishment; and • Maintaining sediment and erosion controls until the site is stable. Clean water diversion drains would be maintained around the high side of the quarry to help maintain the stability of the faces and minimise water capture within the closed void. Safety bunds or fencing would be retained around the perimeter of the extraction area to protect the safety of the public, stock and native fauna. Once extraction and product haulage has ceased the haul road would be rehabilitated, potentially (should the landowner agree) leaving a single lane farm track for access. Rehabilitation of the haul road would include ripping the road surface, spreading topsoil and revegetating. Should it be considered necessary or beneficial to attainment of the rehabilitation objectives, the operators may seek to import clean fill material (ie VENM/ENM) to assist in rehabilitation. For example, to provide supplementary growth materials (topsoil and subsoil) for rehabilitation of the quarry floor if there is a shortage of materials available onsite.
4.	**Air quality monitoring** Email from DPE to KMH, 4/8/2016:	Comments in response to EPA's letter are provided below.

	I recall that you were concerned with air quality monitoring requirements proposed by the EPA. If you have any supplementary comments to make in relation to the EPA's attached advice, you may do so to us and we will consider in our assessment.	
NSW OEH		
5.	**<u>Aboriginal Cultural Heritage Assessment</u>** <u>OEH Letter to DPE 26/7/2016:</u> The July OEH letter first references comments made in their 1 February 2016 letter which outlined a response following review of the EIS. Key points made in this original submission are (paraphrased): • OEH acknowledges the ACHA includes a desktop review of regional geomorphology but not a geomorphological survey of the project area. A geomorphological survey could have refined predictions about archaeological potential. • OEH supports the development of an Aboriginal Cultural Heritage Management Plan. • OEH provides recommended conditions of approval for Aboriginal Cultural Heritage.	UHH drafted a preliminary response to the matters raised by OEH in regards to the Aboriginal Cultural Heritage Assessment (ACHA) (MCH, 2015). These matters raised by OEH in regards to the Aboriginal Cultural Heritage Assessment (ACHA) were discussed at a meeting attended by representatives of UHH, KMH, McCardle Cultural Heritage (MCH), OEH and DPE, in the Newcastle OEH offices on 7 September 2016. During the 7 September meeting, UHH pointed out an apparent inconsistency in OEH's response throughout the course of the assessment. The 1 February submission by OEH did not insist on a geomorphological survey being required, but only noted that it could have refined predictions about PAD. In fact, recommended conditions of approval were provided by OEH. If the OEH considered this element of the ACHA mandatory, then this was not reflected in its initial submission. The 26 July submission by OEH represents a significant change in OEH's position. Nevertheless, OEH has maintained its position that a geomorphological assessment is required as it is clearly identified in the SEARs for the EIS. DPE agreed within this position. To address the matter UHH subsequently engaged Pam Dean-Jones of Umwelt to conduct the geomorphological assessment.
6.	OEH states that the requirement for a geomorphological study was outlined in the SEARs, making the following points (paraphrased): • Geotechnical studies are different to geomorphological assessments • Geomorphological assessment must be undertaken in consultation with all of the local Aboriginal knowledge holders	<u>Geomorphological assessment</u> The geomorphological assessment was undertaken by Pam Dean-Jones and included a site inspection on 29 September 2016. In response to the previous

	• MCH ACHA report made little effort to establish the nature of registered interests across the Registered Aboriginal Parties, specifically which hold local Aboriginal knowledge, and did not differentiate local Aboriginal knowledge holders from parties that may have a historical connection to the land; and that in this regard the ACHA is inadequate.	concerns raised by Tocomwall, including as outlined in their 25 May 2015 and 2 February 2016 letters to DPE, about the uncertain site geomorphology and potential for intact archaeological deposits, Tocomwall was given the opportunity to attend this site inspection with Umwelt. The proponent also attended. It is noted that no other Registered Aboriginal Parties (RAPs) have raised any concerns about the ACHA and all other responses received thus far have been supportive of the methods and findings. A geomorphological assessment report was prepared by Umwelt and is included in Appendix B. The assessment concludes there is a very low potential for intact subsurface archaeological deposits to be present in the project area. This interpretation and conclusion was discussed with all participants in the field during the geomorphological survey and there was strong agreement that it is highly unlikely that Aboriginal cultural materials remain in any intact stratified soil context. There are no soil materials that would meet the criteria for Potential Archaeological Deposit. There is no requirement for further testing. This finding is consistent with the outcomes of the original archaeological site survey conducted by McCardle Cultural heritage and reported in the ACHA Report (MCH, 2015). <u>Consultation</u> MCH and UHH undertook consultation as per the relevant guidelines, i.e. the *Aboriginal cultural heritage consultation requirements for proponents* (DECCW, 2010; the "Consultation Guidelines"). The Guidelines are set out to ensure appropriate and adequate consultation when followed. The guidelines provide for the identification of knowledge holders, however, as OEH are well aware, all interested Aboriginal groups/individuals, regardless of holding knowledge or not, may register an interest. No archaeologist or proponent can, nor has the right, to identify and select who is a knowledge holder and who is not. This is a cultural decision that can only be determined by Aboriginal people. OEH are fully aware of this issue as they themselves are not able to assist in making such determinations.

		All Registered Aboriginal Parties (RAPs) were provided numerous opportunities to provide their knowledge, any connection to the project area, sites identified and the wider region. The MCH report provided very detailed information and all documentation regarding the consultation, including all responses from the RAPs, all opportunities and requests for knowledge, connections and significance. Every effort was made to establish the nature of the RAPs interests; however, MCH do not and cannot force people to contribute their knowledge, the nature of their interest or any information that they do not wish to. The consultation guidelines were followed and the legislative requirements have been met. It appears that the basis for this comment is the correspondence from Tocomwall. The proponent is unaware of any other criticism on this point from any other RAPs. Tocomwall had the opportunity of attending the arranged site visit and declined to attend – their choice. Tocomwall has had ample opportunity to provide any information which may be relevant to this site. All RAPs have been provided regular updates on the project. An update letter was sent to all RAPs in January 2016, then again in September 2016. These letters provided an update on the project's progress through the assessment process and requested that if any RAPs hold relevant cultural knowledge which they would like to share, that they do so by contacting the proponent's representatives. At the 7 September meeting with OEH, it was agreed by OEH that the consultation to date was appropriate. OEH did request that UHH send a final consultation letter to all RAPs requesting provision of any cultural knowledge and providing a closing date for this information. In response UHH sent another update to all RAPs on 12 September 2016. The letter requested provision of any previously undisclosed cultural knowledge related to the site of this project, by contacting Adam Bishop or Penny McCardle before 21 September 2016. No information has been forthcoming. Copies of correspondence letters are provided in Appendix C.

7.	OEH stated that the MCH assessment of low archaeological potential, including the claim that geomorphological investigation and subsurface investigation is not required, is fundamentally flawed based on: • Reliance on visual inspection only • Level of disturbance should be based on soil profile data • Assessment should clearly illustrate anthropogenic disturbance • Soil profile data could be generated through archaeological testing and supported by geomorphological investigations	A geomorphological assessment has now been undertaken as detailed above. The findings support the MCH assessment of low archaeological potential.
8.	Tocomwall requested access to existing geotechnical data. Lack of cooperation by the proponent to supply this data is a separate issue and not related to the above requirements.	The bore logs have been on public record since the EIS was publically exhibited during December 2015 and January 2016. The EIS (Appendix F) provides borehole data that confirms the site contains skeletal soils with shallow topsoils (commonly sandy gravels) overlying sandy gravel and gravelly sand subsoils formed on weathering conglomerate. The geomorphological assessment undertaken by Umwelt confirmed these findings.
9.	<u>Email from OEH to DPE, 10/8/16:</u> The main issue with the ACHA undertaken for this project is that the Applicant/MCH did not sufficiently evaluate the connection to Country of each Aboriginal party that registered an interest in this project. A determination of connection to Country will assist the Applicant to identify the **Aboriginal people who hold relevant cultural knowledge** in accordance with the requirements of DECCW 2010 *Aboriginal cultural heritage consultation requirements for proponents* (ACHCRs). Failure to undertake this integral step by treating all registered parties equally quite often leads to an inadequate assessment of cultural values and by extension, a misrepresentation (or absence) of an assessment of Aboriginal cultural significance.	MCH afforded every opportunity for the RAPs who registered, to submit if they held cultural knowledge relevant to determining the significance of Aboriginal objects(s) and/or place(s) in the area of the proposed project, to provide this information. The RAPs were involved throughout the entire project so that information about cultural significance may be provided to MCH to inform decisions regarding an application for an AHIP. MCH provided many opportunities for the RAPs to submit if they held cultural knowledge relevant to determining the significance of the identified Aboriginal objects within the project area, to participate in the decision making for the management of their cultural heritage by providing proponents information regarding cultural significance and inputting into management options. MCH was not provided with any specific cultural heritage information despite the

	The aim is to facilitate positive Aboriginal cultural heritage outcomes by: • affording an opportunity for Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal objects(s) and/or place(s) in the area of the proposed project to be involved in consultation so that information about cultural significance can be provided to DECCW to inform decisions regarding applications for an AHIP • providing Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal objects (s) and/or place(s) in the area of the proposed project with the opportunity to participate in decision making regarding the management of their cultural heritage by providing proponents information regarding cultural significance and inputting into management options. The Applicant needs to determine which RAPs **hold cultural knowledge relevant to determining the significance of Aboriginal objects (s) and/or place(s) in the area of the proposed project.**	RAPs all being given ample opportunity to do so in accordance with the guidelines.
10.	The development of an Aboriginal cultural heritage assessment (ACHA) is fundamentally not an archaeological endeavour. The ACHA should detail the cultural significance of the area/objects that are proposed for impact and any archaeological assessment should always be attached to the main ACHA as an appendix. The OEH 2011 *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*:5 outlines the following: **Skills to investigate and assess Aboriginal cultural heritage** The investigation and assessment of Aboriginal cultural heritage should make use of all relevant disciplines. The assessment of cultural significance is more than a component of an archaeological assessment or investigation. It cannot be assumed that any one	The MCH ACHA report did detail the cultural significance of the objects identified and all RAPs were provided with a copy of the ACHAR report. An anthropological study is not necessary as the RAPs had an opportunity to identify whether they held knowledge and provided their cultural significance of the identified objects. But again, not all RAPs chose to provide such information.

	practitioner will have the full range of skills required to investigate and assess cultural significance and harm. During this task it may be necessary to engage additional practitioners with special expertise.	
11.	The Applicant will need to consider the results of the geomorphological investigations (as conducted by an appropriately qualified person) in relation to their assessment of Potential Archaeological Deposits (PAD) and amend their archaeological assessment accordingly. Should the geomorphological investigation suggest a likely occurrence of sediments/soil profiles that may support an assessment of PAD within the project area, then the Applicant will need to develop a sub-surface testing methodology in accordance with the procedures outlined in *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010). This methodology will need to be developed in consultation with the RAPs in accordance with the DECCW 2010 *Aboriginal cultural heritage consultation requirements for proponents* (ACHCRs).	A geomorphological assessment report was prepared by Umwelt and is included in Appendix B. The assessment concludes there is a very low potential for intact subsurface archaeological deposits to be present in the project area. This interpretation and conclusion was discussed with all participants in the field during the geomorphological survey and there was strong agreement that it is highly unlikely that Aboriginal cultural materials remain in any intact stratified soil context. There are no soil materials that would meet the criteria for Potential Archaeological Deposit. There is no requirement for further testing. This finding is consistent with the outcomes of the original archaeological site survey conducted by McCardle Cultural Heritage and reported in the ACHA Report (MCH, 2015). There is no need to amend or update the archaeological assessment or the ACHA Report. A new consultation process is not required as: • the consultation process was initiated for the entire investigation and assessment process; and • there has been a continuous consultation process with Aboriginal people from the investigation stage through to preparing the Aboriginal Cultural Heritage Assessment report and AHIP application.
12.	**<u>Threatened Biodiversity Assessment</u>** Summary of response (paraphrased) • OEH has reviewed the biodiversity assessment and proposed offset made during the transitional period of current NSW biodiversity policy for major projects • OEH accepts the offset package and recommended that the offset be secured by an appropriate mechanism • OEH also noted that claims of “low condition” to be supported by data OEH recommends that the proponent commence procedures to formally secure the biodiversity offset land sooner rather than later,	UHH notes OEH’s acceptance of the threatened biodiversity assessment and proposed offset. The comment regarding “low condition” vegetation is taken as advisory only. No further assessment is required. UHH is yet to decide on the preferred mechanism for securing the offset land. UHH requests maximum flexibility by DPE when drafting consent conditions, both in respect of the mechanism of securing the offset and the timeline for this to occur. We would prefer that any timing be linked to commencement of quarry operations, giving a suitable timeframe (eg 2 years) from commencement to

	as these options can take months to complete	secure the offset. It is noted that UHH intends securing the previously indicated land on Lot 1 as the offset.
NSW EPA		
13.	<u>EPA Letter to OEH, 15/7/2016</u> The EPA submission outlines a range of additional information that will need to be provided with the EPL application, including: • Details of the proposed onsite sewage management system • Best practice air quality assessment • Sediment basin design details	The requested information would be provided with a future EPL application.
14.	The EPA submission outlines a number of changes to the recommended conditions of approval.	UHH notes the changes in relation to water management with removal of conditions relating to water discharges. UHH reiterates its position and does not accept the proposed conditions in relation to weather and ambient particulate matter monitoring. In both cases this seems unreasonable given the small scale of the proposed quarry and relatively low risks associated with the proposal in relation to noise and air quality impacts. These impacts are expected to be minimal at this site. Offsite sensitive receivers are afforded substantial protection against noise and air quality impacts due to the shielding effect of topography, and the large buffer distances to the main operational area. UHH believes the imposition of "standard" monitoring requirements, which appears to be the EPA's justification for the currently drafted monitoring conditions, is unjust. In the same way that a risk based approach is favoured in environmental assessment, so should any monitoring programs be developed and applied in a manner that is consistent with the assessed level of risk. The requested weather station and PM_{10} monitoring network would require significant upfront capital and ongoing operational costs which are simply not justified by the level of risk. This might be acceptable if the receivers were close by, or if modelling indicated a real risk of impacts – but neither is the case in

		relation to this application. Further, such costs would place this operation at a significant commercial disadvantage with its competitors who do not undertake similar monitoring. UHH would seek to discuss these matters with the EPA and negotiate an appropriate monitoring regime that is commensurate with the scale of activity and potential risks. This would be done at the time of EPL application, post development consent. Our request though is that DPE avoid issuing prescriptive consent conditions in relation to air and weather monitoring. Further justification is below. UHH would accept a condition requiring preparation of an Operational Environmental Management Plan that includes development of an appropriate environmental monitoring program to assess the effectiveness of the environmental controls and ensure that offsite impacts are avoided as far as practicable. This would capture any agreed monitoring for the EPL. <u>Weather monitoring</u> The EPA's main justification for requiring a weather station appears to be for the purpose of gathering data on sigma theta, for noise monitoring purposes. UHH contends that this is not necessary in the context of this site, given the very low risks of noise impacts (as predicted by modelling), and in consideration of the proposed noise monitoring regime. The EPA's draft noise monitoring conditions for the EPL require quarterly noise monitoring for a year, and thereafter, if compliance with criteria is demonstrated (35 dB at nearest sensitive receiver), no further monitoring would be required. At each quarterly monitoring event noise is to be measured over three consecutive days, for a total of 1.5 hours. This regime is reasonable and acceptable to UHH. It is noted that the monitoring must be undertaken when noise enhancing meteorological conditions are not present (ie avoiding Stability Class F and G). Monitoring of sigma theta at a weather station is not required to achieve this. The proposed operations are daytime only. The noise enhancing meteorological conditions that are to be avoided occur typically at night and early morning. Sensible scheduling of the monitoring times, for example in the middle

		of the day, along with use of hand held anemometer to measure wind speeds at time of monitoring, would easily achieve compliance with the EPA monitoring conditions. There are Bureau of Meteorology weather stations within a short distance of the site that provide adequate data on rainfall, wind direction and other relevant information. There is not a need to continuously monitor wind speed/direction or rainfall at this site. <u>Requirement to monitor ambient particulate matter</u> The PM_{10} monitoring recommended by EPA would incur substantial costs and is not justified at this small quarry. This proposal is not a large coal mine, is not in an area with existing poor air quality, nor does it have sensitive receivers in close proximity. Air quality in the area is generally good. For example, the 2015 Mangoola AEMR reports that background dust levels are low, and approx. 1/3 of the EPA annual average PM10 criteria. The predicted emission levels and overall air quality risks are very low. By way of comparison and to provide context to the proposal, the proposed maximum annual production at the Dolwendee Quarry (250,000 T/yr upper limit) is insignificant by comparison with the 2014/15 annual production at Mt Arthur coal which was 280 million tonnes of overburden and coal. The quarry's proposed maximum annual production is equivalent to less than 8 hours of average activity at Mt Arthur in 2014/15. Air quality modelling undertaken for the EIS indicates a background annual average PM_{10} concentration of 15.4 $\mu g/m^3$ and an incremental annual average PM10 concentration of less than 1.2 $\mu g/m^3$ as a result of the proposal, which is very low and well within the EPA Criteria of 30 $\mu g/m^3$. In light of the above UHH does not accept that monitoring is necessary.

Muswellbrook Council		
15.	<u>Letter from Council to DPE, 20/7/2016:</u> Council's letter to DPE summarised in Table form their previous areas of concern (the original EIS submissions), applicants response (as provided in the RTS Report) and Council's position including residual issues. Remaining issues where Council's position was unchanged following review of the RTS report, are (paraphrased): • Due to the design/capacity of the road, no product is to be transported on Reedy Creek Road	UHH reiterates its position from the RTS Report. Reedy Creek Road is unlikely to be a significant haulage route associated with the quarry and considers it unnecessary and unacceptable to impose a condition prohibiting such access. The proposed vehicle numbers associated with the quarry operation are very small in relation to traffic generated by the large coal mines locally. Reedy Creek Road is a public road. Potential customers/users of quarry product may exist along Reedy Creek Road. Such a condition would prohibit supply of quarry products to these customers and is not acceptable. Council's 12/8/2016 email to DPE confirms there is no load limit on Reedy Creek Rd
16.	• Due to the design/capacity of the road, product transported on Wybong Road should only be to sites only accessible from Wybong Road	UHH reiterates its position from the RTS Report. Wybong Road is unlikely to be a significant or preferred haulage route associated with the quarry. Wybong Road has been upgraded recently to accommodate mine traffic and would readily accommodate any quarry related traffic which would be small in number relative to mine traffic. It seems unnecessary to impose conditions relating to use of local roads which would only experience infrequent and low volumes of traffic generated by the quarry. The Golden Highway is expected to be the dominant roadway used for product transport from the quarry.
17.	• Proposed haul road should be sealed for the full distance	UHH reiterates its position from the RTS Report. This requirement is not acceptable. Council's 12/8/2016 email to DPE concedes this point and notes they are willing to accept sealing of a minimum 50m from the haul road.
18.	• Further information required about traffic on Golden Highway. Additional 1 hour traffic count considered inadequate. Recommended referral to RMS for verification of latest traffic counts	Data is available on the RMS website from a permanent traffic count station just to the north of Denman on the Golden Highway. This shows that traffic flows to north of Denman have remained virtually the same since 2008. The two way average daily traffic counts for a subset of recent years were: • 2533 (2008) • 2711 (2010) • 2674 (2012) • 2652 (2014) • 2646 (2016) No further traffic counts are necessary. RMS's email to DPE on 9/8/2016

		supports this position.
19.	• Require response from RMS on the future of Great Western Highway	
20.	<u>Email from Council to DPE, 12/8/2016:</u> Following on from our conversation this morning regarding Council's response on the RTS document, I wish to advise: 1. Council's Community Infrastructure Department (Engineers) have confirmed there is no load limit on Reedy Creek Road.	This supports UHH's position that a condition prohibiting use of reedy Creek Road by quarry vehicles is excessive and unnecessary.
21.	2. Enforcement with restricting vehicles using Reedy Creek Road would be carried out by Council's Rangers following on from complaints received and general observations.	UHH would prefer that any operational issues regarding traffic management be dealt with in appropriate management plans and through consultation with the community, should complaints be received.
22.	3. Sealing of the haul road – Council are willing to accept the sealing of a minimum of 50m of the haul road. Council would like to mention, there are concerns about vehicles tracking mud/material onto the Golden Highway. It is recommended that a condition be imposed regarding a cleaning schedule of the entrance and road way should material be tracked off site.	UHH accepts Council's position regarding sealing of a minimum of 50m of the haul road, from the entrance. UHH notes the concern over potential sediment tracking but cannot accept a condition imposing a cleaning schedule. This is entirely speculative and presupposes that sediment tracking will be a problem, which we do not accept will be the case. Suitable measures would be in place to minimise sediment tracking such as a rumble pad and the section of sealed internal haul road at the entrance would further assist in removing sediment from truck wheels. UHH would prepare an operational environmental management plan which would address, among other things, the prevention of sediment tracking.
23.	4. Traffic counts – Council notes your comments in relation to the confirmation from the RMS on the low increase of traffic on the Golden Highway. Council still has concerns the revised traffic assessment only collected data for a one hour period.	UHH considers this matter resolved. No further response required at this time.
24.	5. Section 94 – Council has both a Section 94 and Section 94A contributions plan. The land was subdivided in 2008 and therefore the Section 94 Contributions Plan applies. In this regard, Council generally requires $0.06c/tonne to be paid quarterly. If the applicant do not wish to pay Section 94 contributions, Council is open to entering into a VPA.	Section 94 contributions were paid to Council as a condition of consent for subdivision of the land, which was approved by Muswellbrook Council in 2008. UHH considers that development of the proposed quarry would impose minimal demand on Council resources for the provision or improvement of amenities and

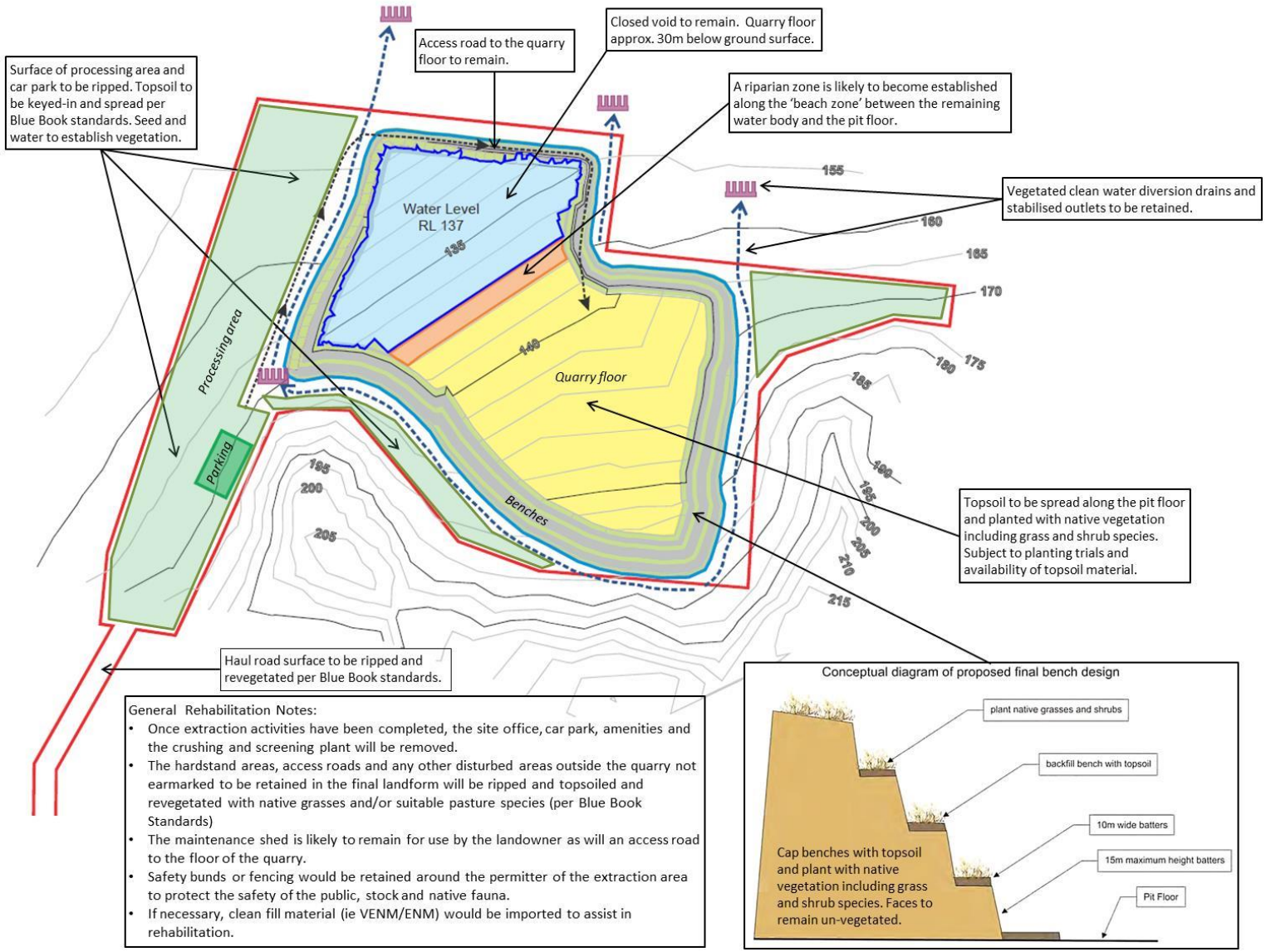
		services. With reference to the Muswellbrook Shire Council Section 94 Contributions Plan 2001, it is noted that extractive industry would typically be subject to contribution rates for Rural Roads Maintenance, calculated on a case by case basis in accordance with Appendix B of the Plan. However, the use of local roads for quarry operations and product haulage would be minimal as the development fronts the Golden Highway. The main access road would be the Golden Highway which is a State Road, the maintenance of which is not Council's responsibility.
Roads and Maritime Services		
25.	<u>Email from RMS to DPE, 1/8/2016:</u> Roads and Maritime have reviewed the Applicant's Response to Submissions (RTS) report dated 6 July 2016 for the Dolwendee Quarry Project. It is noted in the RTS they refer to constructing the intersection with the Golden Highway to a BAR/BAL. Roads and Maritime's response on the 20th January 2016 was for the intersection to be constructed as a BAR/AUL, this advice still remains and the applicant will require to construct the AUL component as part of their works. Also as referred to in the RTS, Roads and Maritime are in the process of upgrading the intersection of the Golden Highway / Rosemount Road. The applicant should continue to liaise with the Roads and Maritime's coordinator for this project to ensure a co-ordinated approach. Roads and Maritime have no further issues with the RTS.	Noted. UHH will address this matter as part of the detailed design and Works Authorisation Deed (WAD) process post development consent. UHH will liaise closely with RMS as part of detailed design to ensure a coordinated approach to the proposed upgrade of the Rosemount Road intersection.
26.	<u>Email from RMS to DPE, 9/8/2016:</u> Roads and Maritime do not have any recent traffic data at this location. There is a permanent count station (05.223) on the northern end of Denman as you leave town, reviewing the growth	Noted. This information supports UHH's position that no further traffic surveys are required.

	trend at this count station it appears that there has not been significant growth with approximately 1.5 % growth between 2012 and 2015. Please refer to Roads and Maritime's Traffic Volume Viewer http://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.html#/?z=6 Roads and Maritime's response in regards to the upgrade of the intersection at the site was based on the safety issue of trucks entering and exiting the site. Requesting an updated traffic survey would not change Roads and Maritime's response to this proposal.	
DPI Water		
27.	Letter from DPI to DPE, 21/7/2016: Comment has been sought from relevant divisions of DPI. Views were also sort from NSW Department of Industry, Lands that are now a division of the broader Department and no longer within NSW DPI. Any further referrals to DPI can be sent by email to landuse.enquiries@dpi.nsw.gov.au. The Department has reviewed the Response to Submissions and advises that the proponent should be aware that low flow conditions apply to water licences in the Wybong Creek Water Source and this may limit the ability to take water during dry times.	Noted. No further response required at this time
Heritage Council of NSW		
28.	Letter from Heritage Council to DPE, 20/7/2016: The historic heritage assessment included a review of historical sources for the site and a site visit. No evidence of historic structures were present on the site and the historical record indicated that the site was used for grazing as part of a large land	Noted. No further response required at this time. A condition requiring preparation of an Unaccepted Finds procedure is acceptable. It is anticipated that this procedure would be part of an Operational

	holding since historic occupation of the area. The report did not recommend any additional investigation of historical heritage values and concluded a stop work procedure would be an appropriate management strategy in the unlikely event historic heritage issues were identified during the proposed activity. The Heritage Division considers the report satisfactorily identifies the low likelihood of the project impacting items of historic heritage significance and that archaeological potential across the project area was nil. The Heritage Division recommends an appropriate condition of approval to address unexpected finds should include: a) A stop work procedure should be included in the project which should clarify in the event an unexpected find is identified, works must cease in that area. A suitably qualified and experienced heritage professional/archaeologist should assess the find and identify if it has significance (local or state). If the item has significance, how to manage this item within the development activity. The stop work procedure should be included in all site inductions involving excavation for the project with appropriate examples of what may be considered an unexpected find.	Environmental Management Plan.

Appendix A

Conceptual Rehabilitation Plan Drawing



General Rehabilitation Notes:

- Once extraction activities have been completed, the site office, car park, amenities and the crushing and screening plant will be removed.
- The hardstand areas, access roads and any other disturbed areas outside the quarry not earmarked to be retained in the final landform will be ripped and topsoiled and revegetated with native grasses and/or suitable pasture species (per Blue Book Standards)
- The maintenance shed is likely to remain for use by the landowner as will an access road to the floor of the quarry.
- Safety bunds or fencing would be retained around the permitter of the extraction area to protect the safety of the public, stock and native fauna.
- If necessary, clean fill material (ie VENM/ENM) would be imported to assist in rehabilitation.

Appendix B

Geomorphological Assessment

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Quality outcomes

Upper Hunter Holdings Pty Ltd

DOLWENDEE QUARRY

Geomorphology assessment in relation to archaeological potential

FINAL

October 2016

Upper Hunter Holdings Pty Ltd

DOLWENDEE QUARRY

Geomorphology assessment in relation to archaeological potential

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Upper Hunter Holdings Pty Ltd

Project Director:	Pam Dean-Jones
Project Manager:	Pam Dean-Jones
Report No.	3869/R01/V2
Date:	October 2016

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	**Date**	**Name**	**Date**
1	Pam Dean-Jones	30 September 2016	Pam Dean-Jones	7 October 2016

Table of Contents

Appendices

1.0 Introduction

This report presents the results of a geomorphic assessment of the proposed Dolwendee Quarry site, near Denman in the Upper Hunter Valley of NSW. The assessment was prepared on behalf of the proponent, Upper Hunter Holdings Pty Ltd (UHH). The quarry proposal includes a gravel extraction and processing area and a haul road which connects the extraction area to the Golden Highway.

1.1 Purpose and scope of the assessment

The purpose of the geomorphic assessment is to provide further information about the likelihood that any potential archaeological deposits (PAD) are present within the project area. A PAD is a geomorphic element with soils or sediments organised as intact and stratified subsurface deposits, which include or may include Aboriginal archaeological materials (objects).

The assessment is based on:

- a review of the assessments previously prepared for the environmental impact statement (EIS) for the project, including agriculture/land capability, geotechnical and Aboriginal archaeology
- consideration of the regional geomorphic context and soil landscape mapping, together with aerial photographs of the project area
- a field inspection including the extraction area and the haul road, including observations of soil profiles exposed in previously excavated geotechnical test pits, natural exposures of soils and sediments in eroded creek banks and of the condition of the ground surface across the project area
- discussion with the client, Office of Environment and Heritage (OEH) and Tocomwall, who are a Registered Aboriginal Party.

1.2 Background to the assessment

UHH submitted an EIS in support of a development application for a new gravel quarry in the Upper Hunter Valley in 2015. The EIS was prepared in response to Secretary's Requirements (SEARs) issued by the Department of Planning and Environment on 22 April 2015.

The SEARs require an assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, having regard to OEH's requirements.

Item 2 of the OEH Standard Requirements attached to the SEARs requires:

The EIS must include surveys by suitably qualified archaeological and geomorphological consultants, in consultation with all of the local Aboriginal knowledge holders.

An archaeological assessment of the project area was prepared by McCardle Cultural Heritage Pty Ltd (MCH) (May 2015) and submitted as part of the EIS for the project. The archaeological assessment noted that the project area has been extensively cleared in the past, and generally displays evidence of previous or current active sheet and rill erosion, as well as a deeply incised drainage line.

Submissions made to the exhibition of the EIS (e.g. Tocomwall, May 2015) have raised concerns about the level of detail provided about the geomorphic context of the project area, and in particular:

- the evidence provided about the condition of the ground surface
- the potential for soil stratigraphic contexts with potential for subsurface and/or in situ archaeological deposits to occur within the project area
- whether the active erosion and sediment movement on hillslopes and across footslopes and valley fill alluvium may have created circumstances of natural ground surface burial as well as stripping of topsoil and exposure of the B Horizon.

OEH also advised the proponent that the assessment of the geomorphic condition of the project area should be supported with further evidence.

Following further discussions between the proponent's representative, MCH, OEH and Registered Aboriginal Parties, Umwelt (Australia) Pty Limited (Umwelt) was commissioned by UHH to provide further geomorphic assessment of the project area. Pam Dean-Jones from Umwelt undertook the assessment. Pam is a qualified geomorphologist with experience in the assessment of the archaeological potential of soil and sediment deposits in the Hunter Valley.

2.0 Project site location and landscape context

As noted in MCA 2015, the project area is located in the Denman-Sandy Hollow area of the Upper Hunter Valley. The project area can be considered in two parts, which have different geomorphic contexts:

- the main extraction area, situated on an upper slope, below a conglomerate cliff
- the haul road route, which crosses a rocky saddle and then traverses across the mid and lower slopes, to cross a deeply incised drainage line and low gradient slopes to the south of the drainage line.

2.1 Regional context

The quarry site is mapped within the Sandy Hollow Soil Landscape (Soil Conservation Service of NSW, 1991). Solodic soil profiles occur on mid to upper slopes, down-slope of broken rock outcrop and boulder debris which may be sandstone or conglomerate. Rock outcrop and debris slopes within the Lees Pinch Soil Landscape are situated upslope of the proposed quarry site.

These gravelly solodic soils have particular characteristics which affect the post discard movement of any artefacts that may be present. These include:

- There is a strong texture contract between the A horizon ('topsoil') and the B horizon ('subsoil'), which affects the drainage of the surface materials and their susceptibility to sheet erosion. The poor drainage of the B horizon is highlighted by the presence of a bleached A2 unit at the base of the A horizon. Further, the insect bioturbation processes which are common in the A horizon, generally do not penetrate the B horizon, so gravel that is present in the profile tends to accumulate as a stone line at the base of the A2. This process is exacerbated by surface erosion, which exposes the gravel as a lag deposit on the clay B horizon. On hillslopes with limited soil permeability the gravel lag material can be readily redistributed downslope by moderate to heavy rainfall and associated runoff. Clear evidence of these processes can be observed on slopes where gravel, A horizon soil material and organic material raft up behind any obstacle (exposed tree roots, fallen branches, rock float) on the surface.

  If mobile sediment is subsequently deposited onto the eroded surface, the gravel lag is sealed in place. This process may have occurred several times at any location on the hillslope over a period of thousands of years. Gravel lag deposits at the base of the A horizon in solodic, texture contrast soil profiles are not an indication of in-situ materials.

- A horizon materials set hard when dry, but tend to be saline and light textured, with weak structure and fabric. They lose structure when disturbed.
- Soil profiles on the upper to mid slopes tend to be less than 100 cm in total depth (and commonly only 50cm), over weathering sandstone or conglomerate bedrock.
- Soil profile depth may increase downslope because of the long term accretion of colluvial materials. However, the impacts of clearing and grazing of these erodible soils means that severe sheet erosion may also have impacted on the low slope sites which receive high runoff. Clay B horizon materials may be exposed at the surface.
- Alluvial materials are present in minor drainage lines, as channel fill, floodplain or terrace. Few drainage lines retain the fully accreted 'chain of ponds' morphology observed in the early years of European settlement. There are multiple examples in this landscape of overfill of drainage lines (including infill of the natural pond sequence) by sediment eroded from adjacent hillslopes after

clearing. The channel fill and overbank deposits tend to be light textured and are highly erodible, leading to deeply incised channel forms, with active side cut and head cut erosion.

This erosion has two impacts on any Aboriginal occupation evidence that may be present. Sites may be eroded by channel widening. In addition, exposure of the erodible A2 horizon of terrace units may lead to rapid sheet erosion.

A haul road will be constructed to provide access to the quarry from the Golden Highway. The proposed route of the haul road crosses the Wollombi Soil Landscape as well as the Sandy Hollow Soil Landscape. The Wollombi Soil Landscape comprises valley flats which may be bedrock benches, terrace or floodplain alluvium.

The alluvial soils of the Wollombi Soil Landscape are also light textured (often single grain siliceous sands) and are highly erodible.

2.2 Existing site specific observations

Two other studies prepared for the EIS are also relevant to the geomorphic assessment. These are the Preliminary Agricultural Appraisal (Ross Watson Agriculture Pty Ltd 2014) and the Geotechnical Assessment (RCA 2015). Both of these assessments provide observations and comments about the soil character across the project area.

Ross Watson notes that the entire project area, including the quarry site and the haul road, is situated within Class 4 agricultural land. The report provides descriptions and images of shallow gravelly soils on the slopes of the quarry site. Solodic soil profiles with bleached A2 horizons exposed at the surface are also described from field observations.

The geotechnical assessment was designed primarily to test the quality of the gravel resource and geological factors affecting the extraction process. Groundwater quality was also investigated.

Total 'soil' depth (including weathering bedrock) is reported as 1.1 to 4.75 m. The material is described as:

0.2m to 0.4m – gravelly silty sand, with abundant small roots

0.6 m to 4.75m – silty, sandy gravel, with some clayey gravel lenses.

In addition RCA tested soil samples collected from the upper part of boreholes and test pits, using standard test suites for revegetation suitability and erosion and sediment control. All samples tested were from the upper 100 cm of the profiles. RCA report gravelly sand as the typical surface soil material within the quarry site. Laboratory tests confirm low fertility, low organic content and moderate to high erodibility, including batter hazards on exposed bench cut-sites.

These results are consistent with the observation reported by Watson about gravelly, solodic soils, and both sets of field data confirm the general constraints identified in the Soil Landscape mapping.

The existing documentation at regional and local scales suggests that on the quarry site, high erodibility and significant actual erosion affecting A horizon soil materials lead to a low likelihood that Aboriginal archaeological materials that may have been discarded would remain in-situ. Further field observations made for this assessment are reported in **Section 3.1**.

The existing documentation indicates some potential for Aboriginal occupation evidence to remain in situ, or to have been relocated in mobile colluvial material to the lower footslopes and valley fill alluvium. The extent of archaeological potential in this part of the landscape depends on the specific local valley fill

stratigraphy and erosion circumstances. Field observations in this assessment therefore focused on the geomorphology and condition of the valley flat areas and eroded drainage lines along the route of the haul road. Results are reported in **Section 3.2**.

3.0 Field observations

A site inspection was conducted on Thursday 29 September 2016. The inspection was made by Pam Dean-Jones (Umwelt), accompanied by the proponent and four representatives of Tocomwall Pty Limited, including Tocomwall's geomorphology advisor, Jakub Czastka.

3.1 Quarry site

Soil characteristics of the quarry site were determined from observations of three test pits, previously excavated by bulldozer for the purpose of resource evaluation.

Soil forming materials

The quarry site is situated on an active colluvial slope, downslope of conglomerate cliffs and boulder debris. Observation of the cliffed area (which is outside the extraction area) indicated:

- the entire outcrop is conglomerate with pebble and small cobbles
- the rock is well jointed, with joint controlled blocks
- there are some shallow overhangs (less than 1.5 m depth) formed in the conglomerate; none with any flat or gently sloping floor area were observed.
- the conglomerate, in the lower parts of the outcrop appears to be moderately strongly weathered. The material has the appearance of a case hardened outer shell, with more strongly weathered conglomerate within.
- block fall appears to occur intermittently, driven by differential weathering, undercutting and expansion of tree roots in joint planes

The colluvial slopes comprise accumulated gravelly loam and gravelly clay units (refer to **Appendix 1**, **Photos 1** and **2**).

Soil profiles

Two soil profile types were observed, both containing abundant gravel. The amount of profile differentiation varies with distance from the rock outcrop.

Profile 1 (refer to **Appendix 1, Photos 3, 4** and **5**)

A horizon (approximately 0-30 cm), gravelly grey brown sandy loam, no A2 unit is present. Sharp boundary.

B horizon, observed to a depth of approximately 2 m. Coarse gravel colluvium, with sandy clay matrix. The upper 350 cm of this material includes gravel lenses overlain by thin discontinuous units of gravelly loam.

Drainage at depth is slow to moderate.

Profile 2 (refer to **Appendix 1, Photos 6** and **7**)

A1 horizon (approximately 20 cm, but variable), gravelly grey brown sandy loam, irregular lower boundary.

A2 horizon (approximately 20 cm, but variable), moderately bleached light grey brown sandy clay loam. Lower A2 is dominated by gravel. Sharp, irregular boundary.

B1 horizon (observed to a depth of 60 cm, but partly masked by water standing in the pit), poorly drained gravelly sandy clay; dull grey brown and orange brown mottles.

Hill slope processes

Ground cover across the quarry site is currently good; this tends to encourage accretion of any soil forming materials, rather than scouring of the surface.

The presence of gravel lenses (lag deposits) at the A/B horizon interface suggests ongoing active sheet wash is the dominant process on the upper slope, supported by bioturbation and rainsplash processes. The rate of sediment transport across the slope varies over time (e.g. seasonally and with drought cycles).

Both the accumulation of standing water in the pits and the presence of mottling in the B horizon of Profile 2 suggest poor drainage of subsoil materials, constrained by rock and by the texture of the clay B horizon.

3.2 Haul road

The haul road crosses a saddle where conglomerate slabs outcrop at the surface (refer to **Appendix 1, Photo 8**). Only skeletal, light textured and gravelly soil materials are present on the saddle.

The mid slope to lower slope area displays reddish brown light textured (sandy loam) gravelly A horizon soil materials, with some areas of active sheet erosion. There are discontinuous areas of A horizon accumulation, over shallow bedrock. The proponent reported that the soil materials set very hard when dry and turn to a slurry when wet. This dispersible behaviour is typical of highly erodible soils in the Sandy Hollow Soil Landscape.

Soil conservation works have been constructed at some time in the past to control overland flow and sediment entrainment. Contour banks are located on the lower slope on both sides of the drainage line (refer to **Appendix 1, Photos 9, 10, 11, 12, 13** and **14**). Both the severe sheet erosion and the construction of the contour banks have disturbed the soil materials.

The drainage line is affected by severe gully and creek bank erosion, associated with both high run-on (now controlled in part by the contour banks) and high, peaky discharges from the surrounding moderately steep country. The condition of the drainage line at the proposed crossing point and just up and down stream is shown in **Appendix 1, Photos 15, 16, 17, 18, 19** and **20**.

At the proposed crossing point, the ground has been heavily disturbed by previous vehicle traffic, including bull dozers. The ground surface is also strongly affected by sheet wash and active rilling processes.

The surface away from the creek bank is hummocky, with disturbance associated with various impacts including vehicle traffic (bogged vehicles), tree throw, channel change and excavation.

Observations of the creek bank stratigraphy include:

- The upper materials are sandy loam to fine sandy loam, including discontinuous patches of remnants of former bleached A2 horizon material.
- The A horizon soil remnants display surface 'porridgy' texture, typical of highly dispersible soils.
- There is evidence of active burrowing/tunnelling.
- There is evidence in the bank sediments of previous cut and fill episodes from when the drainage line had a shallower form.
- The sediments at depth in the creek bank include mottled sandy clay and gravel lenses.
- No evidence of buried soil units (former stable ground surfaces) was observed.

During the site inspection, occasional flaked stone artefacts were observed on the ground surface and within subsurface gravel lenses (gravel lags). In each case, the context of the archaeological evidence suggests that the cultural material is unlikely to be in its original discard position. The cultural materials have behaved in the same way as the abundant natural gravel on the slopes and in the remnants of the valley fill.

4.0 Assessment

4.1 Ground surface disturbance and condition

Although ground cover was generally good at the time of the site inspection, it was clear that ground cover can be highly variable. In dry conditions, there would be large areas of poor ground cover across the mid to lower slopes.

The surface soil materials are everywhere gravelly, including discontinuous gravel lag deposits. Gravel is set in a mix of patches of dispersible sandy loam matrix (as A horizon) or sandy clay matrix (as B horizon).

Both the ground surface condition and the character of the soil forming materials indicate active reworking of soil exposed at the surface. The patterns and rates of ongoing reworking of the soil materials and any cultural inclusions vary with local patterns of ground cover, tree throw and fire, as well as with disturbance associated with historical and current land use (clearing, stocking rates, excavation/construction of contour banks and dams, vehicle tracks, etc.).

4.2 Potential for intact, stratified subsurface materials

There is a very low potential for intact subsurface archaeological deposits to be present in the project area.

Whilst there is evidence across the project area that Aboriginal people have used the local resources and discarded flaked stone objects, there is a very low likelihood that these cultural materials remain in their discard positions.

On the upper slopes, the cultural materials appear to be associated with gravel lags and reworked topsoil, affected by multiple sheet erosion events.

On mid to lower slopes, the high run-on rate and dispersible soils have resulted in severe sheet erosion and redistribution of topsoil and any inclusions.

Whilst it is likely that at the time of European settlement, Aboriginal cultural materials were present in stratified sediments associated with the valley fill and overbank deposits of the drainage line, these deposits are now heavily disturbed. The relevant soil materials have been stripped, eroded, excavated and redistributed. At the proposed creek crossing for the haul road, the creek bank materials have been entirely removed by machinery and scouring.

This interpretation and conclusion was discussed with all participants in the field survey and there was strong agreement that it is highly unlikely that Aboriginal cultural materials remain in any intact stratified soil context. There are no soil materials that would meet the criteria for Potential Archaeological Deposit.

APPENDIX 1

Photo compendium

Appendix 1 – Photo compendium

This appendix provides photographs that illustrate the geomorphic context and condition of the Project Area

Plate 1 Conglomerate outcrop and boulder float, upslope of the proposed extraction area

Plate 2 Quarry area. The photo shows the proximity of the excavated pit to the conglomerate outcrop and the disturbance of the slope

Plate 3 and Plate 4 A horizon soil material in the quarry area. These photos show the light textured gravelly A horizon and limited profile development

Plate 5 Colluvial gravel, B and C horizon material in the quarry area. The photo shows accumulated gravel in a sandy clay matrix, and two lag deposits

Plate 6 and Plate 7 Profile developed on upper slope bench in the proposed quarry area. Conglomerate cliffs are located upslope, approximately 150m away. These photos show a partially stripped A1 horizon, a strong concentration of gravel in the lower A 2 horizon, bleaching in the A2 horizon, mottling in the upper B horizon (sandy clay) and poor drainage

Plate 8 Conglomerate outcrop at the saddle, adjacent to proposed haul road route, with skeletal soil

Plate 9 Track across mid slope, on alignment of the proposed haul road

Photos 10, 11, 12, 13 and 14 below: Soil materials on the mid to lower slope, disturbance of the lower slope by contour bank construction. These photos show gravely, crusted and dispersible soil materials. Contour banks have been constructed on both sides of the local drainage line. The contour banks are approximately 1.5m high and are made from local soil material scraped up by heavy earth working machinery.

Plate 10


Plate 11 and Plate 12

© Umwelt, 2016

Plate 13

© Umwelt, 2016

Plate 14

Photos 15, 16, 17, 18, 19 and 20 below: Ground surface condition and drainage line incision at and adjacent to the proposed creek crossing for the haul road. The photos highlight the extreme level of disturbance that has affected the drainage line, from both erosion and machinery impacts.

Plate 15 and Plate 16

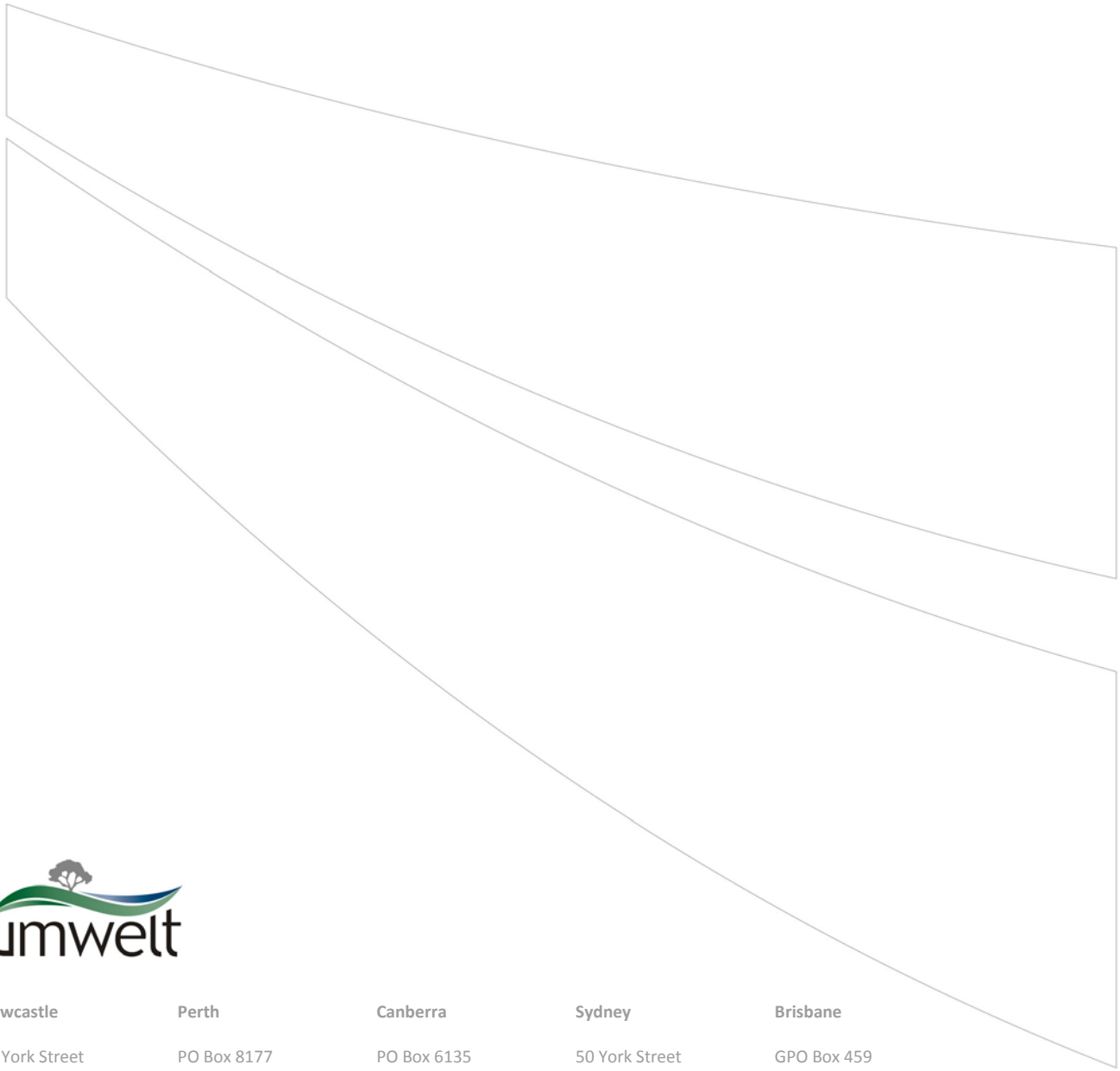
Plate 17

© Umwelt, 2016

Plate 18

© Umwelt, 2016

Plate 19



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Appendix C

Aboriginal consultation letters

27 January 2016

«AddressBlock»

«GreetingLine»

RE: Proposed Dolwendee Quarry, Project Update

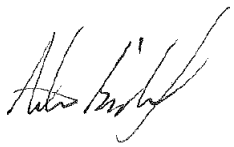
KMH Environmental (KMH), on behalf of the proponent Upper Hunter Holdings P/L (UHH), takes this opportunity to again thank you for registering your interest and for your participation so far in the proposed Dolwendee Quarry Project at Hollydeen, NSW. The Project is being assessed as a State Significant Development (Project number 6519). This letter is to provide you a brief update on the project status.

In May 2015 McCardle Cultural Heritage sought your review and input to the Aboriginal Heritage Impact Assessment (AHIA), which has now been finalised and included in the EIS. A copy of the Final AHIA was provided to you at the end of May, 2015.

Late in 2015 KMH completed preparation of the Environmental Impact Statement (EIS) for the Project and following a process of adequacy review by the NSW Department of Planning and Environment, the EIS was formally placed on exhibition. The project exhibition period was advertised in the Hunter Valley News on 9 December 2015 and the Muswellbrook Chronicle on 11 December 2015. Formal exhibition commenced on Friday 11 December 2015 and is planned to conclude on Monday 1 February 2016. Should you wish to review the project EIS in further detail, it can be viewed on the Department of Planning's Major Projects website at http://majorprojects.planning.nsw.gov.au/ by searching for "Dolwendee".

Should the project be approved it is anticipated that an Aboriginal Cultural Heritage Management Plan (ACHMP) will be prepared. You will be consulted in due course for review and feedback on the ACHMP. Once the ACHMP is approved a small number of artefacts may be salvaged that were identified during the previous site survey. Again, you would be consulted as to the methodology of any proposed salvage and to determine an appropriate "keeping place" for the artefacts.

Yours sincerely



Adam Bishop
Snr Environmental Consultant
KMH Environmental

5 September 2016

«AddressBlock»

«GreetingLine»

RE: Proposed Dolwendee Quarry, Project Update

KMH Environmental (KMH), on behalf of the proponent Upper Hunter Holdings P/L (UHH), takes this opportunity to write to you to provide an update on proposed Dolwendee Quarry Project at Hollydeen, NSW and thank you for your participation thus far. The Project is being assessed as a State Significant Development (Project number 6519).

The EIS for the Project was publically exhibited by the Department of Planning and Environment (DPE) between 11th December 2015 and the 1st February 2016. During this period, submissions were invited from anyone with an interest in the Project including members of the community, Government agencies and other stakeholders. DPE received a total of 18 submissions including some relating to the Aboriginal Cultural Heritage Assessment prepared by McCardle Cultural Heritage (MCH, 2015).

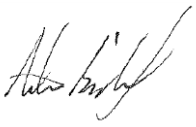
In July 2016 a Response to Submissions (RTS) Report was submitted by the applicant to DPE addressing the submissions received. A copy of the submissions along with the RTS Report can be viewed on the DPE's Major Projects website at http://majorprojects.planning.nsw.gov.au/ by searching for "Dolwendee".

The RTS Report has now been reviewed by the DPE and other Government agencies, resulting in some matters being raised which the Applicant will consider and address. One comment relates to the consultation process. Should you have any local knowledge which you haven't disclosed to us previously relevant to the site of this project then please forward such information to us asap by contacting Adam Bishop or Penny McCardle. In relation to the issue of a Geomorphological assessment for the site, based on the results of field inspections, the topography of the site and underlying geology, the proponent's experts advise that the site comprises low risk landscapes with low archaeological potential and as such further geomorphological assessment is not required.

Should the project be approved an Aboriginal Cultural Heritage Management Plan (ACHMP) will be prepared. You will be consulted in due course for review and feedback on the ACHMP. Once the ACHMP is approved a small number of artefacts that were identified during the previous site survey may need to be salvaged. Again, you would be consulted as to the methodology of any proposed salvage and to determine an appropriate "keeping place" for the artefacts.

Feel free to contact me if you have any questions or matters you wish to discuss in relation to the project and the Aboriginal Cultural Heritage Assessment.

Yours sincerely



Adam Bishop
Snr Environmental Consultant
KMH Environmental

12 September 2016

«AddressBlock»

«GreetingLine»

RE: Proposed Dolwendee Quarry, Final request for information

Recently KMH Environmental (KMH) wrote to you on behalf of the proponent Upper Hunter Holdings P/L (UHH) to provide an update on proposed Dolwendee Quarry Project at Hollydeen, NSW.

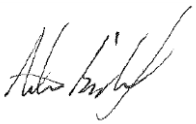
Should you have any relevant cultural knowledge related to the site of this project which you haven't disclosed to us previously, and wish to do so, please could you do this by contacting Adam Bishop or Penny McCardle before 21 September 2016.

Contact phone numbers are:

Penny McCardle (McCardle Cultural Heritage) – 0412 702 396

Adam Bishop (KMH Environmental) – (02) 4910 3600

Yours sincerely



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LGF, Ethos House, 28-36 Ainslie Place, Canberra City ACT 2601

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KMH ENVIRONMENTAL

As part of the pitt&sherry *Group*

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