I thank you for the opportunity to lodge a formal submission relating to the proposed Martins Creek Quarry Expansion Project.

- This project is classified as A State Significant Development (SSD) under the Environmental Planning and Assessment Act (1979) (Application Number SSD 6612).

- My comments directly relate to the document:-

BIODIVERSITY ASSESSMENT REPORT PREPARED FOR MARTINS CREEK QUARRY STATION STREET MARTINS CREEK prepared by Conacher Consulting Pty Ltd August 2016.

- This is a supplementary supporting document to the overall Environmental Impact Statement (EIS),prepared by Monteath and Powys Pty Ltd on behalf of Buttai GravelPty Ltd .This document is dated September 2016.

My comments directly relate to the data, methodology, results and recommendations contained with in this supporting document.

I believe there are inconsistencies and omissions in the methodology employed to confirm the presence or absence of two fauna species, currently classified as **Vulnerable** on the New South Wales Office of Environment and Heritage threatened species list.

These are :-

The Brush-tailed Phascogale *Phascogale tapoatafa*

The Eastern Pygmy-possum *Cercartetus nanus*

Impact *:-There must be no uncertainty around survey findings. Once the proposed 36.8 hectare site is cleared , habitat is lost permanently.*
The presence or absence of one or both of these Species will have a significant impact upon the cumulative Ecosystem Credits incurred for the proposed clearing of approximately 36.8ha of existing vegetation.

My concerns relate to four points pertaining to these species :-

1. The detection strategy
2. The survey time frames and season
3. The assumptions made as to the ranges for these species
4. The areas surveyed

This falls under the general overview,that whenever data is presented, one is entitled to ask :-
under what context was such data obtained ?

<u>Point 1 :The detection strategy.</u>
On pages 14 and 15 of the document, details of correspondence between :- the Office of Environment and Heritage,[OEH], and Conacher Consulting Pty Ltd, regarding detection methodology. are shown.
OEH recommended methodology being a combination of :-
Nest boxes [were used by Conacher Consulting].

Arboreal Elliott traps [were used by Conacher Consulting].
Hair sampling tubes [not used by Conacher Consulting].

Use of a third party expert report [not used or not listed by Conacher Consulting].

On page 15 Conacher Consulting states that baited, tree mounted A Type Elliot traps were used in surveys for the Eastern Pygmy Possum

No mention is made of the specific tree types selected.
Was there an alternative species preferred food source tree nearby ?
What was done to the traps between survey times ?

I cite the following published reference paper :-
A REVIEW OF ELLIOTT TRAPPING METHODS FOR SMALL MAMMALS IN AUSTRALIA
ELIZABETH M. TASKER AND CHRISTOPHER R. DICKMAN *Australian Mammalogy* **23**: 77-87.

"Much of the knowledge of small mammal ecology in Australia has come from Elliott trapping, however the results of these studies are influenced by the way in which trapping is carried out. We review some of the major factors affecting the results of Elliott trapping: trap spacing, local placement, presence of odours on the trap (from conspecifics, similar species, predators, and humans), and duration of trapping. Most factors clearly influence trapping results and should be routinely considered, and preferably controlled, in future studies which use Elliott traps."

[I can provide a full copy of this paper if required]

The paper states :-
"One obvious but important feature of the Elliott trap is that it can only capture an animal *if the animal itself decides to go in the trap*. Thus, it becomes particularly important in Elliott trapping to examine the factors that influence the likelihood of an animal entering a trap, and to maximise the chances of it doing so."

The following conclusions are drawn :-
It can be seen that various factors, some of which have generally been overlooked in Elliott trapping, may have a significant impact on the outcome. As Gurnell and Flowerdew (p.1, 1982) point out "Trapping small mammals is as much an art as a science." While we recognise that there is a trade-off between how much trapping can be done, and the time that is taken with each trap, many of the measures we suggest can be implemented without any significant increase in the time taken. Other measures, such as whether to replace traps between captures, may play such a crucial role in what is caught that they must be considered if a demographic study is planned, even if this means that more time must be taken.

We conclude with a suggestion that in general researchers should report more explicitly how their trapping was carried out. We hope that this in turn may stimulate experimental studies on the far reaching consequences of choice of trapping technique. The influence of trap placement, trap spacing, and the presence of odours of conspecifics and competing species on trapping studies in Australia, have been neglected in the past, and would be particularly productive areas for future research.

My point is, while Elliot trapping is an accepted technique for use in Fauna surveys, it must be carried out diligently or introduced errors will distort any results.

Also, I cannot find any reference as to what species were actually caught in the tree mounted Elliot traps and the frequency of capture.
There is a generic statement only in TABLE 4.2 :FAUNA OBSERVED WITHIN THE SUBJECT

SITE,[Pages 40 to 44].for small mammals, the Brown Antechinus *Antechinus stuartii ,* Bush Rat *Rattus fuscipies as "Trapped"*

Point 2 :The survey time frames and season.

On pages 14 and 15 of the document, there appears to be a major discrepancy between the recommendations of the OEH and the actual survey times undertaken by Conacher Consulting Pty Ltd.

For the Eastern Pygmy Possum :

OEH states : *"I have no obvious reason why the survey time matrix does not list any suitable months for completing surveys for the Eastern Pygmy Possum, apart from the fact there might be a glitch in the credit tool. I will discuss with John Briggs to see if there is a data gap or an error occurring."*

Was this anomaly resolved prior to the actual survey period ?

On page 15, OEH recommended survey times :- Mid Spring to Mid Autumn, [October to April]
Conacher Consulting stated actual survey times :- "completed during spring in September 2015"
Falling outside the recommended period

Specific dates stated by Conacher Consulting.:-
Table 3.4 On page 22 lists :- "Arboreal Mammal Elliot Trapping" was undertaken over the 15th Sept. -17th Sept. 15
The minimum night time temperature ranges for this period are recorded as 9.1^{O} C to 12.2^{O} C [page 4 Appendix 1].
Also, the minimum temperature range for the week prior to the survey period, was 7.1^{O} C to 9.2^{O} C.

- **I believe there is a strong possibility that this species could be in torpor at these temperatures**
- **If this is correct, then Elliot trapping would not have detected this species, even if it were present in the area.**

I cite the following published reference paper :-

Hibernation in the Eastern Pygmy Possum, Cercartetus-Nanus (Marsupialia, Burramyidae) Article in Australian Journal of Zoology · January 1993
Author Fritz Geiser Department of Zoology, University of New England, Armidale, N.S.W.

Results *Cercartetus nanus entered torpor regularly in the laboratory and the occurrence of torpor was more frequent at low T,. Torpor occurred in 61% (of 59 total observations) at T, = 18°C,* ***89% (of 124 total observations) at T, = 12"C, 95% (of 236 total observations) at T, = 8"C***

[I can provide a full copy of this paper if required]

For the Brush-tailed Phascogale

On page 15 OEH states : "it is preferable that targeted surveys are undertaken between February and June when population numbers are higher and/or animals are moving more widely (i.e. more active). **Winter to early Summer is not considered a preferable time** due to lower numbers / smaller populations and/or animals are not dispersing."
Conacher Consulting stated actual survey times :- *"The surveys undertaken by Conacher Consulting included a four week survey period between **11*** June and 9 July during the breeding season"

Again, Falling outside the recommended period and a direct contradiction of the OEH statement, highlighted above.

On page 15, following on from the documented survey times, Conacher Consulting also states *"when male home ranges are likely to have been largest,with the highest probability of intersecting the site."*

The words *"likely"* and *"highest probability"*introduces a level of contention about any resulting survey data.

Point 3 :The assumptions made as to the ranges for these species

On pages 14 and 15

For the Eastern Pygmy Possum :

No comments are offered either by the OEH or Conacher Consulting as to the range of this species.

For the Brush-tailed Phascogale

For the range of this species :- Conacher Consulting comments are a direct word for word lift from the OEH website, [sub page for Threatened Species]

Conacher Consulting also cite range Studies in Victoria by Soderquist (1995).

- **Can this data, with its differing climate, fauna and importantly flora profiles be directly transferred to the Martins Creek survey site?**

- **I contend reliance on these two data sources alone introduces uncertainty as to the accuracy of any collected data.**

Point 4 : The areas surveyed

In table 3.4 on page 22 under methodology for Arboreal Mammal Elliot Trapping, survey undertaken states :- "6 traps per transect ." giving a total 54 traps [6 traps X 9 transects].
Figure 3.2 on page 25 shows the location of the transects.
A breakdown shows :-

4 transects in Dry Sclerophyl Forest.	[32.59 ha of this habitat type shown on page 14]
3 transects in Dry Rainforest	[8.44 ha of this habitat type shown on page 14]
2 transects in Wet Sclerophyl Forest.	[16.05 ha of this habitat type shown on page 14]

All transects are shown as straight lines

Four of the transects are shown as immediately adjacent to the existing quarry workings [one transect is shown as intersecting the quarry workings]

A portion of 3 transects are 20 to 30 metres from the existing active quarry periphery [estimated from the scale bar on the the bottom of the image]. Approximately 80 metres of another transect is shown as being within the existing quarry workings.

Based upon the scale bar on the bottom of the image, eight of the transects are 200 metres long and one is 100 metres long.

For the 200 metre transects, this means one Elliot trap every 33 metes
For the 100 metres transect, this means one Elliot trap every 16.5 metes
This assumes a suitable flora site is available to set up traps with even spacing.

If the transect locations are accurate, [and they should be], showing a linear survey only:-

- For a 32.59 ha of Dry Sclerophyl Forest habitat, 800 linear metres were surveyed.

- For an 8.44 ha of Dry Rainforest habitat, 600 linear metres were surveyed.
- For a 16.05 ha of Wet Sclerophyl Forest habitat, 300 linear metres were surveyed.

A crude analogy would be, surveying along the fence line for a rural property and interpreting any findings as typical of those contained within the fence boundaries.

- **I contend only a very small portion of each flora community was actually examined, biased to linear strips within each community.**
- **This over 3 nights only.**
- **I concede supplementary spotlighting was done,but, I am of the opinion that any data regarding species habitation is not a definitive representation of the actual situation.**

Summary

- **I believe the survey methods used for these two species, lacks sufficient scientific rigour to generate sound, unambiguous data for their ranges and frequency.**

- **Both these species are currently classified as Vulnerable on the New South Wales Office of Environment and Heritage threatened species list. There must be no uncertainty around survey findings. Once the proposed 36.8 hectare site is cleared , habitat is lost permanently.**

- **The presence or absence of these species will have a significant impact upon the threatened species off set credits requirements. The higher the cumulative total, [currently stated as 17,404 in table 5.3 page 50], the greater will be the impact upon the business case for the project.**

Recommendations

- Recommence a targeted survey for these vulnerable species , extending over a longer time frame, being from early December 2016 through to late March 2017

- Use nest boxes, infra red cameras and pre mixed attractant, spaced in a formal square or rectangular grid pattern.

- Do not use Elliot trapping

- Where Occupational Health and Safety regulations allow, encourage local community involvement in monitoring these detection sites

- Approach Daracon for funding towards purchase of the hardware infrastructure, [remote infra red cameras and nest boxes]. Nest boxes could be made locally.

- There are several community groups state wide who are actively involved in the above mentioned surveys and methods. I cite the following example :-

  Distribution of Eastern Pygmy Possums (*Cercartetus nanus*) in the Ku-ring-gai LGA
  Ku-ring-gai Council, WildThings and WildThings NSW.

  [I can provide a full copy of this paper if required]

This is an excellent example of local community input and ownership, outlining clear methodology and formal plans for the future.

Using nest boxes and remote cameras they have several documented sightings of the Eastern Pygmy Possum.

- Make contact with this group to see if their techniques are directly transferable to the Martins Creek site.

- There are techniques where remote cameras, when triggered, relay the photos they take back to a central base station which then transmits them back to a computer. This means the cameras can be monitored on a daily basis without the need to visit the actual site. The University of Newcastle may be able to give some expertise on this technique.

These are entirely my own opinions and conclusions, formed from a review of the Biodiversity report and the cited publications in this submission.

It is not an outright condemnation of the report, much good work and time has gone into its outcomes, but a suggestion for further investigation,directly involving the local community and a possible act of good will by Daracon.

Thank you