

Other cultural heritage impacts during construction or operation

Section 3.13 of *Proponents Guidelines for the Review of Environmental Factors* provides further guidance

	Applicable?	Likely impact (negligible/ maintenance, minor, major, contentious; or N/A)	Reasons (Describe the type, nature and extent of the impact, the nature of the receiving environment and any proposed safeguards which will limit the impact)
1. What is the impact on places, buildings, landscapes or moveable heritage items?	<input type="checkbox"/>	Unknown	The Plan of Management states that 39 sites of European significance have been identified in the Reserve. An Archaeologist must review the proposed activity.
2. Is any vegetation of cultural landscape value likely to be affected (e.g. gardens and settings, introduced exotic species, or evidence of broader remnant land uses)?	<input type="checkbox"/>	No.	No vegetation with cultural landscape value has been identified within the Reserve. Remnant vegetation is discussed elsewhere in this REF.

*If yes, all columns need to be completed. If no, write 'N/A' in the second and third columns

9. Threatened species assessment of significance (seven-part test)

9.1 Included Species

The species, populations and ecological communities, or their habitats that are likely to be affected by the proposed activity are:

Insectivorous Bats

- Large-eared Pied Bat *Chalinolobus dwyeri*
- Eastern Freetail-bat *Mormopterus norfolkensis*
- Eastern Bentwing-bat *Miniopterus schreibersii*
- Greater Broad-nosed Bat *Scoteanax rueppellii*

Forest Owls

- Powerful Owl *Ninox strenua*
- Barking Owl *Ninox connivens*
- Masked Owl *Tyto novaehollandiae*
- Sooty Owl *Tyto tenebricosa*

Broad-headed Snake *Hoplocephalus bungaroides*

Eastern Pygmy Possum *Cercartetus nanus*

Cockatoos

- Gang-gang Cockatoo *Callocephalon fimbriatum*
- Glossy Black-cockatoo *Calyptorhynchus lathami*

Grey-headed Flying-fox *Pteropus poliocephalus*

Koala *Phascolarctos cinereus*

Red-crowned Toadlet *Pseudophryne australis*

Nectar feeding birds

- Regent Honeyeater *Xanthomyza phrygia*
- Little Lorikeet *Glossopsitta pusilla*
- Swift Parrot *Lathamus discolor*

Southern Myotis *Myotis adversus*

Spotted-tailed Quoll *Dasyurus maculatus*

Square-tailed Kite *Lophoictinia isura*

Turquoise Parrot *Neophema pulchella*

Yellow-bellied Glider *Petaurus australis*

Dillwynia tenuifolia

Melaleuca deanei

Persoonia acerosa

Persoonia hirsuta

Pterostylis saxicola

Pultenaea villifera

Zieria involucrata

Shale/Sandstone Transition Forest

Sydney Turpentine Ironbark Forest

9.2 Excluded Species

No seven-part tests have been undertaken for the following species:

Giant Burrowing Frog

Cumberland Plain Land Snail

Freckled Duck

Giant Dragonfly

Green and Golden Bell Frog

The reasons for exclusion are:

The Giant Burrowing Frog prefers sandy edges to watercourses for burrowing. This habitat does not occur on the site.

The Cumberland Plain Land Snail is only present east of the Hawkesbury-Nepean River.

The Freckled Duck is a species that inhabits wetlands and other large areas of freshwater. This type of habitat does not exist on the site.

The Giant Dragonfly inhabits Blue Mountains Swamps. This type of habitat does not exist on the site.

Green and Golden Bell Frog requires areas of reasonably still open water, often with *Typha* sp. This type of habitat does not exist on site.

9.3 Seven-part Tests

9.3.1 Insectivorous bats

Large-eared Pied Bat *Chalinolobus dwyeri*

Eastern Freetail-bat *Mormopterus norfolkensis*

Eastern Bentwing-bat *Miniopterus schreibersii*

Greater Broad-nosed Bat *Scoteanax rueppellii*

Seven-part test for Insectivorous Bats

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. Potential roost sites (hollow-bearing trees) will not be affected by the proposed activity. An insignificant area of foraging habitat only will be modified by this development. The proposed activity is highly unlikely to have an adverse effect on any of these species such that a viable local population is likely to be placed at risk of extinction.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a group of threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a group of threatened species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a group of threatened species.

d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

No hollow-bearing trees will be removed. Foraging habitat (~1,700 m²) will be modified through the removal of the shrub and groundcover layer, this will likely slightly reduce the abundance of insects that the bats could prey upon. However 2,010 m² tracks or track edges will be rehabilitated, which will over time slightly overcompensate for the loss of foraging habitat. There will over time be a net gain in foraging habitat for these species.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, due to the mobility of this group of species.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Negligible. Modification of a small area of foraging habitat is unlikely to have any effect on these species at local or regional scales.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

Critical habitat for these species has not been declared.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

Recovery plans currently do not exist for these species. However, the modification of habitat for track construction is unlikely to be broadly consistent with any broad objectives of the priority actions for these four species. Rehabilitation of habitat is likely to be broadly consistent with the objectives of the priority actions for these four species.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to these species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Large-eared Pied Bat, Eastern Freetail-bat, Eastern Bentwing-bat or Greater Broad-nosed Bat. Therefore a Species Impact Statement is not recommended.

9.3.2 Large Forest Owls

Powerful Owl *Ninox strenua*

Barking Owl *Ninox connivens*

Masked Owl *Tyto novaehollandiae*

Sooty Owl *Tyto tenebricosa*

Seven-part test for Large Forest Owls

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. The proposed activity will modify a small amount of foraging habitat for these species. No hollow-bearing trees will be removed by the proposed activity. Additionally the proposed activity includes the rehabilitation of a greater area of vegetation than that proposed for removal. Thus it is highly unlikely that the proposed activity will have an adverse effect on the life cycle of the species such that a viable local population of any of these species will become extinct.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a group of threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a group of threatened species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a group of threatened species.

- d) **in relation to the habitat of a threatened species, population or ecological community:**

- (i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 1,700 m² of habitat used for foraging will be modified by the removal of the shrub and groundcover layer.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of other existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² of tracks or track edges will be rehabilitated. Overall, this will slightly improve the foraging habitat for these species on the site.

- (ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No, due to the mobility of these species.

- (iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Low. These species forage over wide areas and the area to be modified is insignificant relative to their home ranges. In addition, a greater area of potential foraging habitat will be rehabilitated by the proposed activity.

- e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for these species.

- f) **whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

A recovery plan exists for Large Forest Owls, which includes the Powerful Owl, Sooty Owl and the Masked Owl; and a draft Recovery Plan exists for the Barking Owl. The modification of habitat for track construction is not broadly consistent with any objectives of the recovery plans. Rehabilitation of habitat is likely to be broadly consistent with the objectives of the recovery plans.

- g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to these species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Powerful Owl, Barking Owl, Masked Owl or Sooty Owl. Therefore a Species Impact Statement is not recommended.

9.3.3 Broad-headed Snake *Hoplocephalus bungaroides*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. This species has not been recorded in Knapsack Reserve, however it may occur there. It prefers rocky outcrops during the cooler months and moves into adjoining woodland during the warmer months. During the warmer months it often roosts in tree hollows.

No trees are proposed for removal for the construction of the new tracks. No removal of sandstone is proposed. Only a small amount of foraging habitat will be modified.

The proposed activity is highly unlikely to have an adverse effect on the life cycle of this species so that a viable local population is placed at risk of extinction.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a threatened species.

c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

(i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

(ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a threatened species.

d) **in relation to the habitat of a threatened species, population or ecological community:**

(i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

No habitat in the form of large rocky outcrops will be removed or modified by the proposed activity.

Approximately 1,700 m² of habitat used for foraging during the warmer months will be modified.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of other existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² of tracks or track edges will be rehabilitated. Overall, this will slightly improve the foraging habitat for the species during the warmer months.

(ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. The building of tracks may slightly reduce connectivity however, the effect is considered insignificant for this species. Additionally the closure and rehabilitation of some tracks as well as the width reduction and rehabilitation of other tracks will increase connectivity on the site. This will overall slightly increase connectivity on the site.

(iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Low. It is not known if this species is present on the site. The area of habitat to be modified is small relative to the foraging range of this species. Additionally the area to be modified is made up of seven different sections so the impact area is not concentrated.

Additionally the proposed activity includes the closure and rehabilitation of existing tracks as well as reducing the width and rehabilitating the edges of other tracks. If the lost area of habitat is important then the gain of habitat will likely result in an overall net benefit for this species.

e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for this species.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan exists for this species. The modification of habitat for track construction is unlikely to be consistent with any objectives of the priority actions. Rehabilitation of habitat is likely to be broadly consistent with the objectives of the priority actions.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Broad-headed Snake. Therefore a Species Impact Statement is not recommended.

9.3.4 Eastern Pygmy Possum *Cercartetus nanus*

a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No. This species has been observed close to the area of proposed off road bicycle tracks. However, the area of vegetation to be removed/modified is small relative to the foraging area of this species. No hollow-bearing trees that may be used for roosting are proposed for removal.

This species forages over wide areas and the area of impact is small compared with that of a local viable population. It is highly unlikely that a viable population of the Eastern Pygmy Possum will be placed at risk of extinction by the proposed activity.

b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. This test is for a threatened species.

c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable. This test is for a threatened species.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a threatened species.

d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Approximately 1,700 m² of habitat possibly used for foraging will be removed.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this will slightly improve the foraging habitat for this species.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No. While there will be a small break created by the tracks this is insignificant due to the mobility of this species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Low. The habitat to be removed is small relative to the foraging range for this species.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared for this species.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan exists for this species. Seven priority actions exist for the Eastern Pygmy-possum. The proposed activity to construct tracks is not specifically inconsistent with the priority actions for either of these species. The modification of habitat for track construction is unlikely to be consistent with any broad objectives of the priority actions, while rehabilitation of habitat is likely to be broadly consistent with the objectives.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Eastern Pygmy-possum. Therefore a Species Impact Statement is not recommended.

9.3.5 Cockatoos

Glossy Black-cockatoo *Calyptorhynchus lathami*

Gang-gang Cockatoo *Callocephalon fimbriatum*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. While both these species have been observed in Knapsack Reserve the area of habitat to be removed is small relative to the habitat used by these species for foraging. No trees or stags are proposed for removal so no nesting hollows will be removed for the proposed activity.

Both of these species forage over wide areas and the area of impact is small compared with that of a local viable population. It is highly unlikely that a viable population of either species will be placed at risk of extinction by the proposed activity.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for two threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for two threatened species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for two threatened species.

- d) **in relation to the habitat of a threatened species, population or ecological community:**

- (i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 1,700 m² of habitat possibly used for foraging will be removed/modified.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this will slightly improve the foraging habitat for these species.

- (ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there will be a small break created by the tracks this is insignificant due to the mobility of these species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

- (iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Low. The habitat to be removed is small relative to the foraging range of these species.

- e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for either of these species.

- f) **whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

No recovery plan exists for these species. Ten priority actions exist for the Glossy Black-cockatoo and eleven for the Gang-gang Cockatoo. The proposed activity to construct tracks is not specifically inconsistent with the priority actions for either of these species. However, the modification of habitat for track construction is unlikely to be consistent with the objectives of the priority actions, while rehabilitation of habitat is consistent with the objective "Encourage the restoration of foraging habitat that has been cleared or degraded by previous impacts" for the Glossy Black-cockatoo.

- g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to these species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on either the Glossy Black-cockatoo or the Gang-gang Cockatoo. Therefore a Species Impact Statement is not recommended.

9.3.6 Grey-headed Flying-fox *Pteropus poliocephalus*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. This species ranges over wide areas and the removal of vegetation for the construction of tracks is highly unlikely to have an adverse effect on its life cycle such that a viable population will be placed at risk of extinction.

The proposed activity also includes rehabilitation of existing areas, which will eventually provide additional foraging habitat for this species.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a threatened species.

d) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Approximately 1,700 m² of habitat possibly used for foraging will be removed/modified.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this will slightly improve the foraging habitat for this species.

- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No. While there will be a small break created by the tracks this is insignificant due to the mobility of this species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Low. The habitat to be removed is small relative to the foraging range for this species.

- e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared for this species.

- f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan exists for this species, although thirty-one priority actions have been identified. None of the priority actions is directly relevant to the clearing of vegetation to construct the tracks. However, the removal/modification of habitat for track construction is unlikely to be consistent with any broad objectives of the priority actions, while rehabilitation of habitat is possibly consistent with the objective "Increase the extent and viability of foraging habitat for Grey-headed Flying-foxes that is productive during winter and spring (generally times of food shortage), including habitat restoration/rehabilitation works".

- g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Grey-headed Flying-fox. Therefore a Species Impact Statement is not recommended.

9.3.7 Koala *Phascolarctos cinereus*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. This species appears to have been observed in Knapsack Reserve according to the NSW Wildlife Atlas. The proposed activity does not include the removal of any trees so it is highly unlikely to have an adverse effect on the life cycle of the species such that a viable local population is likely to be placed at risk of extinction.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a threatened species.

- d) **in relation to the habitat of a threatened species, population or ecological community:**

- (i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 1,700 m² of vegetation will be removed. However, no trees will be removed by the proposed activity so no foraging habitat will be removed.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this may slightly improve the area of foraging habitat for this species on the site.

- (ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there will be a small break created by the tracks this is insignificant due to the mobility of this species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

- (iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Negligible. No foraging habitat for this species will be removed by the proposed activity. The areas to be rehabilitated may increase the foraging habitat for this species on the site over time.

- e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for either of these species.

- f) **whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

A recovery plan exists for the Koala. The construction of tracks is unlikely to be consistent with general aims of the recovery plan. The rehabilitation of habitat is consistent with Objective two of the recovery plan, "Rehabilitate and restore koala habitat and populations", however, the increase in foraging trees over the long term is likely to be insignificant for any viable population.

- g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the koala in the locality. Therefore a Species Impact Statement is not recommended.

9.3.8 Red-crowned Toadlet *Pseudophryne australis*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. The NSW Wildlife Atlas shows a record of Red-crowned Toadlet on the site in 1999. This REF has assumed they are still present on the site. Existing bike trails cross watercourses at various locations on the site. Thus there is currently the possibility that some Red-crowned Toadlet habitat is adversely affected. The proposed activity requires that all watercourse crossings will be upgraded to consist of a hardened sandstone block base or a bridge. This is a requirement of Blue Mountains City Council. An ecologist will inspect the locations of the watercourse crossings and also assess the watercourse crossing construction and will provide advice on the most appropriate method to minimise impact on any Red-crowned Toadlets that may occur. This will improve the current situation for any Red-crowned Toadlets that may be near existing crossings.

Any sandstone rock used for the creation of the crossings will not be sourced from areas that may be used by Red-crowned Toadlets for basking.

The proposed activity is thus highly unlikely to have an adverse effect on a viable local population of the Red-crowned Toadlet such that it will be placed at risk of extinction.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a threatened species.

c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

(i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

(ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a threatened species.

d) **in relation to the habitat of a threatened species, population or ecological community:**

(i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

The proposed cross-country primary trail either crosses a drainage line or is very close to the headwaters of a drainage line at eight locations. These locations are all existing tracks or crossings. There are two new drainage line crossings resulting from the new alignments of the proposed cross-country primary trail, in addition to the eight locations mentioned above. The proposed cross-country secondary trail crosses or is very close to a drainage line at four locations. Proposed downhill track option A travels very close to a watercourse for approximately 80 m and crosses the watercourse three times over the 80 m section. The alignment proposed downhill track option B is identical to that of option A at the beginning of this section where it crosses the drainage line. Thus it also crosses the watercourse three times over an 80 m section. The total area of modification by watercourse crossings or those near the headwaters of a watercourse crossing is approximately 1,300 m².

Red-crowned Toadlets are known to roam, however it is thought that they do not generally disperse widely. Approximately 1,700 m² of vegetation will be removed. It is unlikely that Red-crowned Toadlets on the site use all of this area.

Offsets consisting of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks, are included in the proposed activity. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this may slightly improve the area of foraging habitat for this species on the site.

(ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there may be a small break created by the watercourse crossings this is insignificant due to the mobility of this species. Additionally, the current watercourse crossings will be improved slightly, which will improve connectivity for this species.

(iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Low-medium. It is unclear whether Red-crowned Toadlets are present near existing watercourse crossings. However, as a precautionary approach it is considered that habitat is present. Modifications to watercourse crossings are likely to improve habitat on the site for this species. Prior to the placement of watercourse crossings an ecologist will select the most appropriate location for the crossing so that any impact on the Red-crowned Toadlet is minimised.

- e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for either of these species.

- f) **whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

No recovery plan exists for the Red-crowned Toadlet, however fourteen priority actions have been identified. Many of the priority actions are concerned with providing information so that people can follow the guidelines to reduce impacts on Red-crowned Toadlets. While activities such as track construction are mentioned in the priority actions they refer to the need for the creation of information rather than providing information.

- g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Red-crowned Toadlet in the locality. Therefore a Species Impact Statement is not recommended.

9.3.9 Nectar Feeding Birds

Regent Honeyeater *Xanthomyza phrygia*

Little Lorikeet *Glossopsitta pusilla*

Swift Parrot *Lathamus discolor*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. All these species forage over wide areas and no trees are proposed for removal. The removal of shrubs may cause the loss of some foraging habitat, however the impact is minor. Additionally rehabilitation of vegetation on the site will, overall in the long term, improve habitat for these species.

The proposed tracks are highly unlikely to have adverse effect such that a local viable population of any of these species is placed at risk of extinction.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a group of threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a group of threatened species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a group of threatened species.

d) in relation to the habitat of a threatened species, population or ecological community:

- (i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 1,700 m² of vegetation will be removed. However, no trees will be removed by the proposed activity, which is probably the preferred foraging habitat for these species.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this may slightly improve the area of foraging habitat for these species on the site.

- (ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there will be a small break created by the tracks this is insignificant due to the mobility of these species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

- (iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Negligible-low. The areas to be rehabilitated may, over time, increase the foraging habitat for these species on the site.

- e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for these species.

- f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

A recovery plan for the Regent Honeyeater has been written by the Department of Natural Resources and Environment, Victoria. The NSW DECCW lists 36 priority actions for this species. None is directly relevant to the proposed activity.

No recovery plan or priority actions exist for the Little Lorikeet.

No recovery plan exists for the Swift Parrot, however thirteen priority actions have been identified. None are directly relevant to the proposed activity.

However, the removal/modification of habitat for track construction is unlikely to be consistent with any objectives of recovery plans or priority actions for these species. Rehabilitation of habitat is broadly consistent with the overall objectives of recovery plans and priority actions

- g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to these species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the three species of nectar feeding birds observed in the locality. Therefore a Species Impact Statement is not recommended.

9.3.10 Southern Myotis *Myotis adversus*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. This species requires open bodies of water or streams with open water for foraging. No habitat of this type will be significantly affected to such an extent that a local viable population of the species is likely to be placed at risk of extinction. The Southern Myotis is also known to roost in tree hollows and caves. No hollow-bearing trees will be removed by the proposed activity, nor will any caves be significantly affected by the proposed activity.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a threatened species.

- d) **in relation to the habitat of a threatened species, population or ecological community:**

- (i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

No habitat suitable for this species will be removed. While the tracks cross various drainage lines within Knapsack Reserve, they are generally in areas where there is little or no open water. Thus the track crossings are not located on foraging habitat for this species.

No hollow-bearing trees are proposed for removal.

- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No. This species is highly mobile and track crossings are insignificant for this species.

- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Negligible. It is highly unlikely that the *Myotis* uses any of the areas near the drainage line crossings.

- e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared for this species.

- f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plans exist for this species, however fifteen priority actions have been identified. The retention of hollow-bearing trees, which is part of this proposed activity, is generally consistent with the priority actions.

- g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Southern *Myotis*. Therefore a Species Impact Statement is not recommended.

9.3.11 Spotted-tailed Quoll *Dasyurus maculatus*

- a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No. While this species has been observed on site the area of impact is small compared with the home range of this species. Additionally the proposed activity includes the rehabilitation of some areas on the site, which will, overall over the medium term, likely increase the habitat for prey for the Spotted-tailed Quoll, indirectly improving site quality for this species. Thus the proposed activity is highly unlikely to have an adverse effect such that a local viable population of the Spotted-tailed Quoll is at an increased risk of extinction.

- b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. This test is for a threatened species.

c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

(i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

(ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a threatened species.

d) **in relation to the habitat of a threatened species, population or ecological community:**

(i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 1,700 m² of vegetation will be removed for the construction of new tracks.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this may slightly improve the area of foraging habitat for this species on the site.

(ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there will be a small break created by the tracks this is insignificant due to the mobility of this species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

(iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Negligible-low. The areas to be rehabilitated may over time increase the foraging habitat for this species on the site. Moreover, this species forages over wide areas.

e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for these species.

f) **whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

No recovery plan exists for this species, however 35 priority actions have been identified. None are directly relevant to the proposed activity. The removal of vegetation is unlikely to be consistent with the general objectives of the priority actions. However, rehabilitation of old tracks and reducing the width of tracks is likely to be broadly consistent with the general objectives of the priority actions.

g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Spotted-tailed Quoll. Therefore a Species Impact Statement is not recommended.

9.3.12 Square-tailed Kite *Lophoictinia isura*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. This species forages over a wide area and the area of impact is small compared to the foraging range of this species. The removal of shrubs may remove some foraging habitat, however the impact is minor. Additionally rehabilitation of vegetation on the site will overall in the long-term improve habitat for this species.

The proposed tracks are highly unlikely to have an adverse effect such that a local viable population of the Square-tailed Kite is placed at risk of extinction.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a threatened species.

- d) **in relation to the habitat of a threatened species, population or ecological community:**

- (i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 1,700 m² of vegetation will be removed.

Offsets are included in the proposal, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this may slightly improve the area of foraging habitat for this species on the site.

- (ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there will be a small break created by the tracks this is insignificant due to the mobility of this species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

- (iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Negligible-low. The areas to be rehabilitated may over time increase the foraging habitat for this species on the site.

- e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for this species.

- f) **whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

No recovery plan exists for this species, however three priority actions have been identified. The priority action "Ensure implementation of management strategies that reduce disturbance of riparian areas" is relevant to the proposed activity. Track construction will be supervised by staff of the Blue Mountains City Council, who will be responsible for ensuring that any impacts in riparian zones are minimised.

Removal/Modification of habitat for track construction is unlikely to be consistent with the objectives of the priority actions for this species, however rehabilitation of habitat is broadly consistent with the overall objectives of the priority actions.

- g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Square-tailed Kite. Therefore a Species Impact Statement is not recommended.

9.3.13 Turquoise Parrot *Neophema pulchella*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. This species forage over wide. The removal of shrubs and groundcovers may remove some foraging habitat, however the impact is minor. Additionally rehabilitation of vegetation on the site will, overall in the long term, improve habitat for this species.

The proposed tracks are highly unlikely to have adverse effect so that a local viable population of Turquoise Parrot becomes extinct.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a threatened species.

c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

(i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

(ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a threatened species.

d) **in relation to the habitat of a threatened species, population or ecological community:**

(i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 1,700 m² of vegetation will be removed.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. This may, overall, slightly improve the area of foraging habitat for this species on the site.

(ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there will be a small break created by the tracks this is insignificant due to the mobility of this species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

(iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Low. The areas to be rehabilitated may, over time, increase the foraging habitat for this species on the site.

e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for these species.

f) **whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

No recovery plan exists for the Turquoise Parrot, however ten priority actions have been identified, of which none is directly relevant.

However, the removal/modification of habitat for track construction is unlikely to be consistent with the objectives of the priority actions, while rehabilitation of habitat is broadly consistent with the overall objectives of the priority actions for this species.

- g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Turquoise Parrot. Therefore a Species Impact Statement is not recommended.

9.3.14 Yellow-bellied Glider *Petaurus australis*

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. This species has not been observed on the site, but is known in the area. However, the area of impact is small compared with the home range of this species. Additionally the proposed activity includes the rehabilitation of some areas on the site which will, overall over the medium term, likely increase the habitat for the Yellow-bellied Glider.

This species is known to roost in hollows and the proposed activity will not remove any hollow-bearing trees or stags.

Thus the proposed activity is highly unlikely to have an adverse effect such that a local viable population is at an increased risk of extinction.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

Not applicable. This test is for a threatened species.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a threatened species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a threatened species.

d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Approximately 1,700 m² of vegetation will be removed for the construction of new tracks.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. This may, overall, slightly improve the area of foraging habitat for these species on the site.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No. While there will be a small break created by the tracks this is insignificant due to the mobility of these species. Additionally, a larger area of vegetation will be rehabilitated by the proposed activity.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Negligible-low. The areas to be rehabilitated may over time slightly increase the foraging habitat for this species on the site. Moreover, this species forages over wide areas.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared for these species.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan exists for this species, but 14 priority actions have been identified. None are directly relevant to the proposed activity. The removal of vegetation is unlikely to be consistent with the general objectives of the priority actions, however, rehabilitation of old tracks and reducing the width of tracks is likely to be broadly consistent with the general objectives of the priority actions.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on the Yellow-bellied Glider. Therefore a Species Impact Statement is not recommended.

9.3.15 Threatened Plants

Dillwynia tenuifolia

Hibbertia puberula

Melaleuca deanei

Persoonia hirsuta

Pterostylis saxicola

Pultenaea villifera (endangered population)

Syzygium paniculatum (this species is not indigenous to the local area)

- a) **in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No. No TSC listed threatened plants have been observed in the reserve, as described in the Plan of Management for the Reserve. However, the NSW wildlife atlas records the threatened *Dillwynia tenuifolia* as occurring on the site. It was not observed during the site visit. No populations of this species occurring on the site are likely to be adversely affected by the proposed bike track works.

- b) **in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

The threatened population of *Pultenaea villifera* has not been recorded within the reserve.

- c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

- (i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

Not applicable. This test is for a group of threatened plant species.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

Not applicable. This test is for a group of threatened plant species.

- d) **in relation to the habitat of a threatened species, population or ecological community:**

- (i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 1,700 m² of vegetation will be removed for the construction of new tracks. Not all of this area of habitat will be suitable for each of the threatened plant species included in this seven-part test.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 2,010 m² tracks or track edges will be rehabilitated. Overall, this may slightly improve the area of habitat for some of these species on the site.

- (ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. The proposed tracks are approximately one metre wide. Seed dispersal and pollen dispersal for all of these species will vary but some seed/pollen will disperse further than this distance for all of these species.

- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Negligible-Low. While it is possible that the habitat is generally suitable for some of these plant species, none were observed on the site. Over the long term (decades to hundreds of years) there is the potential that one/some of these species may disperse to the site and then establish.

- e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat has been declared for any of these species.

- f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

The only species in the above list that has a recovery plan is *Melaleuca deanei* with eight priority actions. The other species all have priority actions. The number of priority actions follow in brackets after each species in the following list: *Dillwynia tenuifolia* (5), *Hibbertia puberula* (6), *Persoonia hirsuta* (14), *Pterostylis saxicola* (13), *Pultenaea villifera* threatened population (6) and *Syzygium paniculatum* (1). None of the priority actions from any of the above species is directly relevant to the proposed activity.

- g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to these species. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on threatened plant species. Therefore a Species Impact Statement is not recommended.

9.3.16 Sydney Turpentine Ironbark Forest

- a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. This test is for a Critically Endangered Ecological Community.

- b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. This test is for a Critically Endangered Ecological Community.

c) **in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;**

(i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

No. The proposed activity will reduce the extent of this ecological community by approximately 663 m² on the site through clearing for track construction. This amount is the difference between the area of this community to be cleared (approximately 825 m²) and the area of this community to be rehabilitated (approximately 162 m²).

Weed control via a vegetation management plan will be included as part of the proposal. This will reduce existing threats and reduce the likelihood of new weed threats becoming a significant problem.

The loss of an area of approximately 663 m² of this Ecological Community is highly unlikely to increase the risk of extinction for this community on the site. The loss is not large and it is highly likely that the majority, possibly all of the species found within this community will not have reduced population viability on the site resulting from the proposed activity.

(ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

No. Individuals of many shrub and groundcover species will be removed for the proposed activity. While the population sizes of some species may be changed by the proposed tracks, it is highly unlikely that the composition of the ecological community will be significantly adversely modified such that its local occurrence will be placed at risk of extinction.

d) **in relation to the habitat of a threatened species, population or ecological community:**

(i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 663 m² of this ecological community will be lost for the proposed activity. The loss through clearing will be approximately 825 m². However the proposed activity includes the rehabilitation of approximately 162 m², partially offsetting this loss.

(ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there will be a small break of approximately one metre wide, it is highly likely that this will not present a significant barrier to the dispersal of any seed or pollen or other organisms within the community.

(iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Low-Medium. The extent of the loss is not considered significant for the survival of this ecological community in the locality. However, the reduction in area of any Critically Endangered Ecological Community must be considered carefully.

e) **whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for these species.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan exists for Sydney Turpentine Ironbark Forest. However, there are ten priority strategies and also Best Practice Guidelines for this ecological community. None of the priority actions are directly relevant to the proposed activity. Some aspects of the Best Practice Guidelines discuss bush regeneration which is relevant to the rehabilitation works on the site.

However, the removal/modification of habitat for track construction is unlikely to be broadly consistent with the objectives of the priority actions for this ecological community. Rehabilitation of habitat is broadly consistent with the overall objectives of the priority actions and Best Practice Guidelines.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this ecological community. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on Sydney Turpentine Ironbark Forest. Therefore a Species Impact Statement is not recommended.

9.3.17 Shale/Sandstone Transition Forest

a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. This test is for an Endangered Ecological Community.

b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. This test is for an Endangered Ecological Community.

c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

No. An area of approximately 558 m² of this ecological community will be removed for the proposed activity, and approximately 1,143 m² of this ecological community will be rehabilitated as part of the proposed activity.

Weed control via a vegetation management plan will be included as part of the proposal. This will reduce existing threats and reduce the likelihood of new weed threats becoming a significant problem.

- (ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction**

No. Individuals of many shrub and groundcover species will be removed for the proposed activity. While the population sizes of some species may be changed by the proposed tracks, it is highly unlikely that the composition of the ecological community will be significantly adversely modified such that its local occurrence will be placed at risk of extinction.

d) in relation to the habitat of a threatened species, population or ecological community:

- (i) **the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

Approximately 558 m² of this ecological community will be removed for the proposed activity.

Offsets are included in the proposed activity, which consists of the closure and rehabilitation of existing tracks as well as reducing the width of existing tracks by rehabilitation of the edges of wide tracks. Approximately 1,143 m² of this ecological community will be rehabilitated, which represents a gain of approximately 558 m² for this community on the site.

- (ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No. While there will be a small break of approximately one metre wide, it is highly likely that this will not present a significant barrier to the dispersal of any seed or pollen or other organisms within the community.

- (iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Low-Medium. The extent of the loss is not considered significant for the survival of this ecological community in the locality.

- e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No critical habitat has been declared for this species.

- f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

A recovery plan exists for Shale/Sandstone Transition Forest. It is included in the Cumberland Plain Recovery Plan (January 2011 DECCW).

The removal/modification of habitat for track construction is unlikely to be consistent with the objectives of the recovery plan for this ecological community, however rehabilitation of habitat is broadly consistent with the overall objectives of the recovery plan.

- g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Yes. Although track construction is not listed as a key threatening process, the proposed development will require the "Clearing of native vegetation" which is a key threatening process relevant to this community. It is listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.

Conclusion

The proposed activity is unlikely to have a significant effect on Shale/Sandstone Transition Forest. Therefore a Species Impact Statement is not recommended.

Note this conclusion is based upon the threat of *Phytophthora cinnamomi* being adequately addressed. See the paragraph discussing *Phytophthora cinnamomi* within the Biological Impacts within "Section 9 Conclusions" for further details.

10. Summary of Impacts

Summarise the level impact as negligible, low, medium or high negative, positive or N/A from the above description of the impacts of the activity.

Category of Impact	Significance of impacts		
	Extent	Nature	Environmental sensitive features
Physical and Chemical	Variable. Low negative-to medium positive (depending upon the nature of the impact). Primarily along newly constructed tracks but also along existing tracks.	Soil erosion, dust and rocks, synthetic rubber from bicycle tyres	Soil stability, drainage lines and air quality.
Biological	Variable, medium negative to medium positive	Loss of some areas of Sydney Turpentine Ironbark Forest that is not completely offset. Loss of Shale/Sandstone Transition Forest that is positively off set.	Sydney Turpentine Ironbark Forest, Shale/Sandstone Transition Forest, Red-crowned Toadlets, indigenous vegetation.
Community	Variable: Low negative to medium positive.	Temporary localised generation of noise and dust during track construction. Increase in local business activities. Potential accidents, or bushfire resulting from off road cyclists.	Indigenous vegetation, People's safety.
Natural Resources	Variable, low negative to low positive.	Erosion may be increased through increase of off road cyclist usage. Weeds may spread faster along tracks.	
Cultural Heritage	Unknown	Both Aboriginal and European heritage items have been recorded in Knapsack Reserve.	Aboriginal and European Heritage items.

11. Conclusions

This REF has relied primarily on details provided by staff of the Blue Mountains City Council and information in the Knapsack Plan of Management. A brief on-site visit was undertaken with a staff member of Blue Mountains City Council followed by one full day of field work. The REF has relied upon field surveys described in the Plan of Management and records provided in the NSW wildlife Atlas as well as information and documents provided by Blue Mountains City Council. Neither a detailed flora survey nor a detailed fauna survey was undertaken for this assessment. Ideally, the proposed activity would also state how the potential for illegitimate additional track construction would be managed. This can perhaps be addressed by input from the Blue Mountains Off Road Cyclists. The erected signs will assist in reducing the likelihood of illegitimate track construction.

Physical and Chemical Impacts

It is noted that the tracks will be designed and constructed according to IMBA standards. Ideally a letter from an engineer stating that track design and construction will eliminate/minimise the likelihood of erosion on sandy soils such as that found at Knapsack Reserve and that the erosion will not be significant, would provide support for the proposed activity. The IMBA may also be able to provide details regarding other sites with similar soils where track construction has worked successfully. It is recommended that a letter from an engineer or the IMBA be attached to this REF.

Track construction methods must address areas of erosion on slopes ideally eliminating/minimising erosion at these locations. Crossings at drainage lines must also be constructed to eliminate/minimise erosion. Blue Mountains Council have stated that all watercourse crossings will be constructed with either a bridge or a sandstone rock crossing.

Biological Impacts

The proposed activity includes track construction within a mapped area of the Critically Endangered Ecological Community, Sydney Turpentine Ironbark Forest. Approximately 825 m² of new track are proposed within this ecological community, however track closures within this vegetation community only amount to approximately 162 m². This is a deficit and does not meet the general principles of the "Biodiversity Offsetting Guidelines: NPWS Current Practice".

Some of the new tracks are also proposed within the Endangered Ecological Community Shale/Sandstone Transition Forest. Ideally it would be preferable that no tracks be constructed in either this ecological community or the mapped Sydney Turpentine Ironbark Forest.

The increase in area of threatened ecological communities is a positive benefit of the proposed activity.

It appears that there are adequate financial and labour resources available to undertake weed control within the park and Blue Mountains Council have stated that a Vegetation Management Plan (VMP) for the track works will be written. Existing weed "hot-spots" have not been identified along existing tracks. A VMP must address all of these issues to demonstrate that weed control will be adequate. This REF has been written with the assumption that weed control will be adequate.

The soil borne plant pathogen *Phytophthora cinnamomi* has been recorded at the Reserve. "Infection of native plants by *Phytophthora cinnamomi*" is recognised as a Key Threatening Process by the NSW Scientific Committee. The current map displaying the locations of occurrence indicates that it is not widespread in Knapsack Reserve. An increase in off road

cycling may spread it further in the Reserve, however it is unclear whether this represents a significantly greater threat than the current activity levels of off-road riding and bushwalking in the Reserve.

One plant of the ROTAP species *Lissanthe sapida* is on the proposed Downhill trail Option A. Possible options include:

- i) Accepting the loss of the single plant with no offset.
- ii) Move the track to avoid this plant.
- iii) Conduct a survey near this plant to determine if a reasonably large (viable) population of this species exists so it can be concluded that the loss of a single plant is not significant.

Community

Ideally the proposed activity must be developed in detail so that a walkover with all interested parties could be conducted showing clearly the location of all tracks, all track closures and width reductions and locations where mitigation was applied (for example a bridge over a watercourse to avoid an impact on Red-crowned Toadlet breeding habitat).

It is recommended that signs be erected at the site showing both the overall track layout and directions within the site showing the location of the various tracks.

Natural Resource Impacts

The potential for erosion has been discussed above under the heading “Physical and Chemical Impacts”.

Aboriginal and Other Cultural Heritage Impacts

The potential impacts on Aboriginal or European cultural heritage items were not adequately addressed in this REF. Both Aboriginal and European archaeological heritage items have been reported in the Reserve. It is recommended that an Archaeologist provide feedback possibly locating any items that must be avoided as part of track design and construction.

In conclusion indicate if:

- there is likely to be a significant effect on the environment and an environmental impact statement is required

Reason(s):	No. It is recommended that a letter from the IMBA or an engineer, providing details about the proposed methods of track design and construction to ensure they are adequate to eliminate/minimise erosion in sandstone derived soils, either on the slopes or at drainage line crossings, be attached to this REF.
------------	--

- there is likely to be a significant effect on threatened species, populations, ecological communities or their habitats and a species impact statement is required


Reason(s):	No. A VMP will be included as part of this activity. The activity will result in a net loss of the mapped Critically Endangered Ecological Community Sydney Turpentine Ironbark Forest. This will not result in a significant effect for this community. The activity will have a positive benefit through the increase in the area of threatened ecological communities on the site through track closure and rehabilitation.
------------	---

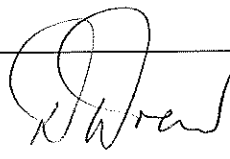
the activity is in respect of land that is, or is part of, critical habitat and a species impact statement is required.

Reason(s):	N/A
------------	-----

12. Signature of proponent

The REF must be certified by the proponent – not the consultant(s) where consultant(s) are used.

Signature	
Name (printed)	Dr Daniel McDonald
Position	Senior Botanist
Date	11 July 2011

Signature	
Name (printed)	DAMIEN DREW
Position	DIRECTOR, CITY SERVICES
Date	11/7/11

Seal (if signing under seal):

