Dear Sir or Madam

2018/8277

MBARK FGC RETIREMENT PTY LTD/Residential Development/Block 1 Section 56, Red Hill; Block 2, Section 56 & Block 1, Section 55, Red Hill/Australian Capital Territory/Federal Golf Club Retirement Village Project, ACT

Thank you for this opportunity to comment on the above proposal. The proposed action will have a significant impact on critically endangered White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands endangered community. This is because:

- the proposed action will result in direct clearance of at least 0.89 ha of woodland and possibly as much as 2ha, which is a much larger area than presented in the referral. In addition it appears that not all the road works associated with the proposed action have been described or assessed in the referral documents and these works would add substantially to the area of impact;

- the proposed action will remove at least 2% of the total tree hollow resource within the Red Hill woodland remnant, and probably more than 5% of key red gum hollow bearing trees, which are important both for maintaining faunal populations within the woodland remnant and for providing important habitat to regionally rare species;

- the proposed action will remove or alienate a significant foraging and roosting area of importance to maintaining local Red Hill woodland fauna populations;

- in terms of size, plant diversity and habitat of rare and threatened species the woodland being impacted is one of the most significant patches left of its woodland type. The proposal reduces its integrity;

- the *Dinaella longifolia* mentioned in the referral has a high likelihood of actually being Matted Flax-lily (*Dianella amoena*), which is listed as nationally endangered. The golf club lease area may be one of the most important remaining habitats for this species;

- the referral only considers the current usage of the site by Superb Parrots and not the likely future scenario, resulting from climate change, where woodlands in the ACT become increasingly important breeding habitat of the species; and

- increased vehicle movements associated with construction activity, the movement of residents and the delivery of goods and services is likely to lead to increased road kill and disturbance of woodland fauna in one of the few core habitat areas of the remnant;

Background Information

Red Hill Regenerators
Red Hill Regenerators are a landcare/parkcare group of over 120 local residents who for more than thirty years have spent tens of thousands of hours restoring, promoting and protecting Red Hill's woodland and wildlife. At least on average every month, over the thirty years, group activities of 3 – 4 hours have been held, members also work individually at times that suit them, while around twice a year Red Hill Regenerators will facilitate landcare or guided walk activities of other community groups such as scouts, cubs, boys brigade, schools, and conservation and church groups.

Red Hill Regenerators has removed many hundreds of thousands of woody weeds and countless exotic grasses and herbs from the Red Hill woodland remnant, undertaken track rationalisation and erosion control, monitored rare and threatened plant and animal populations, assisted in the import of coarse woody debris and planted and then cared for thousands of endangered daisies and native trees and shrubs.

<u>Significance of the Red Hill Woodland Remnant</u>
Red Hill supports one of the largest remaining remnants of the endangered yellow box – Blakley's red gum grassy woodland in Australia. This woodland type once covered over 25,000 square kilometres, in a belt stretching from Melbourne to South Queensland. Over 90% of this vegetation belt is now cleared, leaving this woodland highly fragmented and generally existing as isolated patches smaller than 5ha in area (Gibbons and Boak 2000).

As noted in the EPBC Act listing advice, "In terms of size, connectivity, diversity and condition, the ACT remnants are exceptional, especially the presence of larger patches (over 100 ha) in good condition." Remnants greater than 200ha are extremely rare. There are only four remnants left in Australia of 1000ha or more and all are in the ACT (ACT Government 2004). There are no Yellow Box - Red Gum remnants greater than 100ha in Victoria or the Murray catchment of NSW (Davidson 2005), and there are no remnants of 200ha or greater in southern NSW (Rainer Rehwinkel former NSW NPWS threatened species officer pers comm 2010).

Red Hill supports a Yellow Box -Red Gum woodland of about 275ha. It is a vital component of the second largest Yellow Box -Red Gum woodland remnant in Australia that covers about 1,200ha from Red Hill to East O'Malley- Symonston-Mugga Lane and Callum Brae. Although Hindmarsh Drive is a barrier to some species, most woodland plant and animal species are able to disperse across this highway.

Because of its relatively large size and the good condition of the understorey, Red Hill supports one of the highest native plant diversities recorded in a Yellow-Box - Red Gum woodland remnant anywhere in Australia. 225 native woodland plant species have been recorded on Red Hill. The NSW National Parks and Wildlife Service has a database of plant species records from about 1000 grassy ecosystem (grassland + grassy woodland) sites across south-eastern NSW and the ACT. Fewer than 5% of these sites have a recorded plant

diversity of over 100 species. It is relevant that remnants of particularly high quality have been targeted in the surveys which populated the database.

Given the size and diversity of its endangered woodland, it is not surprising that Red Hill supports important populations of rare and threatened species. As detailed in Appendix 3, thirty rare or threatened plant, invertebrate, reptile and bird species have been recorded on Red Hill and it is a major habitat of many of these species. In addition, as detailed in Appendix 4, 102 regionally uncommon species have been recorded within the Red Hill woodland.

The Red Hill Remnant is nationally significant as one of the largest remaining patches of its community type remaining anywhere. As such it is import to the continued functioning and diversity of the endangered yellow box – Blakely's red gum woodland. Its significance is such that any further degradation should be avoided.

Area of endangered woodland to be impacted by the proposed action.

Mapping error

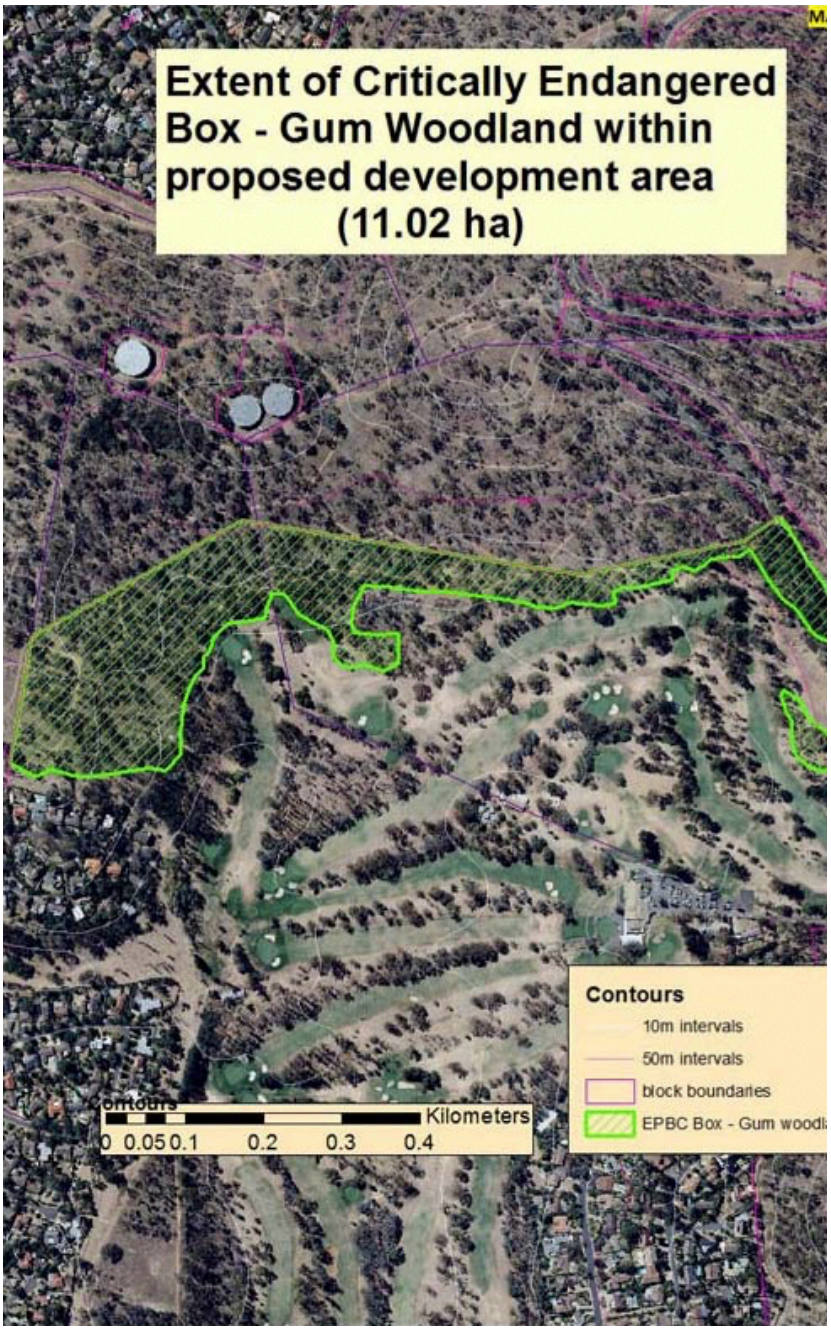
In 2011 the Red Hill Regenerators surveyed and mapped the extent of Box Gum woodland with in the vicinity of the old fairway, part of which is now proposed for a machinery shed and a practice fairway. This report is at http://www.redhillregenerators.org.au/wp-content/uploads/2014/08/fgc-conservation-values-report-oct2011-1.pdf

Red Hill Regenerators placed one 20m x 20m plot in the site that is now proposed as a machinery shed and another on the western or lower side of the then disused fairway – now proposed as a practice fairway. In addition a tape measure was run out for 50m at both locations and the presence of exotic or native perennial understorey species recorded every metre. Based on the predominance of native perennial species in the understorey and the occurrence of the requisite herb diversity, a further 0.52 hectares of endangered vegetation was mapped over the area of proposed development than has been mapped in the referral documents. (see map 1)

It appears that the ecological consultants for the proponents did not actually undertake any plot or transect measurements. Like the Red Hill Regenerators, the ecologist did find sufficient herb diversity within the maintenance shed and practice fairway to meet EPBC Act guidelines (see Appendix 3 of the consultants report). Presumably the EPBC Act endangered woodland mapping of the ecological consultant didn't reflect the mapping of the Red Hill Regenerators on the basis that they considered that less than 50% of the perennial understory was native. However this appears to be a judgement based on visual inspection only during the systematic meander across the proposed development areas. It is relevant that this inspection occurred when native perennial grass cover is most difficult to assess. This is because at the end of winter, kangaroo overgrazing has reduced the grass over most of the Red Hill remnant to only a few mm in height.

The perennial cover at the maintenance shed site was re-measured on 21 October 2018 by laying three 50m transects across it from north to south and recording the cover at every 1m mark. 68% of the perennial understorey is native and 32% is exotic (details at appendix 1). Similarly, a transect was laid across the land between the disused fairway and the course

From Red Hill Regenerators (2011)



and the perennial ground cover was found to be 85% native and 15 % exotic. In addition, 18 non grass species were observed in the understorey including five important species (details at Appendix 2). Thus the 2011 mapping of Red hill Regenerators is still accurate and the proposal is actually impacting at least 0.89ha of woodland, rather than the 0.32 stated.

Given that the ecological report mis-identified the vegetation between the disused fairway and the adjacent course and this area clearly met the EPBC Act criteria it is possible that there are some other patches of surviving woodland between fairways and that the amount of clearing proposed may actually be around 2ha.

Further road works?

Section 1.4 of the ecological report states that "*the associated intersection upgrades are located to the immediate south of the junction of Gowrie Drive and Red Hill Drive, within Block 1, Section 55, Red Hill*", but then does not include these associated works within the assessment.

The cultural report states that "*An additional key benefit to the community will be the proposed upgrade and realignment of the current dangerous Gowrie Drive intersection, and the road between that intersection and the entrance to the site*" p44

It beggars belief that a dangerous intersection would be appropriate as the only entrance for an over 55's retirement village of up to 264 residents. Similarly, under EPBC Act referral guidelines a referral should include the totality of a project including associated road works. High quality endangered woodland exists at the intersection.

A further indication that the works described in the referral don't reflect what is actually planned, is the claim on page 46 of the cultural report that "*…one benefit to the increased population will be a direct expenditure injection into the Woden town centre which is an area that has been identified as needing significant support and uplift in patronage to support many commercial businesses…"* . This is nonsense as access to the proposed development is via Deakin and Forest and the Manuka, Kingston and Civic shopping centres are a closer travel time than Woden. The claim only makes sense if the access to Brereton Street is to be made open to public rather than just emergency traffic. This would require more extensive road works, within endangered woodland, and lead to a large increase in road kills and traffic related disturbance to wildlife due to the increase in rat running traffic between Woden and the inner South of Canberra.

The assessment of the referral needs to determine the truth of the claims made in the cultural report and ensure that the assessment of significance of impact is based on the totality of associated works.

It is also relevant that the proposed entrance road passes through an area of high fire danger. It is unclear whether increased fuel reduction and hence loss and degradation of EPBC Act woodland would be required either side of the road, if it was for residential, as opposed to the casual visitor use it is currently managed for.

In addition, it is proposed to bulldoze a 7.5m wide emergency access route through woodland in the Nature reserve, which is designated land. There appears not to have been detailed discussions with road authorities and emergency services authorities in the ACT

regarding the adequacy of the proposed upgrades to Gowrie Drive and the suitability of the proposed emergency access road. Certainly no approvals have been granted. It is possible that additional work will be required on roads, which would result in increased impact on the grassy woodland.

Deleted:

The remnant trees on the golf course are an integral part of the Red Hill Remnant

Early photography indicates that much of the upper slopes of Red Hill were cleared by 1920. For several decades up until the 1940s, wood collecting licences were issued over the northern and eastern sides of Red Hill to provide wood for all heating and cooking in builder's camps located in the now neighbouring suburbs of Deakin and Red Hill. Thus large hollow bearing trees are now fairly scarce and would not number more than 1000 across the whole remnant. The Red Hill Regenerators and others have placed over 100 nesting boxes on Red Hill. Boxes have been designed for a range of hollow nesting bird, bat and possum species. All boxes are quickly occupied by wildlife, which suggests that hollows are a limiting resource on Red Hill.

Much of the Red Hill remnant is on the relatively steep slopes of Red Hill itself. The large trees on these slopes are mainly all yellow box or apple box, which develop relatively few and relatively shallow hollows in comparison to those found in large Blakely's red gums. In the vicinity of Red Hill, large Blakely's red gum mainly grow on the deeper soils on the lower slopes. There would not be more than 400 such trees remaining. They are of particular importance to species requiring large (Galah, Sulphur Crested Cockatoo, Gang-gang, Kookaburra, Wood Duck, Boobook Owl and Brushtail Possum) and or deep (King Parrot, Superb Parrot) hollows. It is not surprising that the ecological consultant observed all these species within the proposed development area; it is key nesting habitat for these species within the wider Red Hill woodland remnant.

For several years, and including an intensive year-long Gang-gang community survey, Chris Davey and members of the Canberra Ornithologist Group have been observing and mapping the location of Gang-gang Cockatoos exhibiting breeding behaviour. Behaviour is ranked into five classes of increasing confidence that Gang-gangs actually successfully raised young at a location. The classes are

1= possible, one report only bird/s near hollow
2= one record birds seen entering hollow
3= more than one record of birds at or near hollow
4= very likely, seen on multiple occasions at or near and entering hollow on at least one occasion
5= confirmed, non-flying young seen at entrance

There are only two confirmed breeding locations in the whole of the ACT both on or bordering Red Hill Nature Reserve. Of the total 250 breeding observations from across the ACT, sixty-three (25%) are from the Hughes area of Red Hill, which contains forty-two of the seventy-five (56%) of those observations with a three or higher likelihood rating. Some of these sightings are on the golf club lease. Although Gangs-gangs haven't been recorded at multiple times in or near hollows within the proposed development area, the site has not been subject to comprehensive survey. It would appear that like many parrots Gang-gangs prefer to nest near each other and that the northern Red Hill remnant area (including the golf club area) is a key breeding habitat for this species, listed as threatened in NSW. The

development may impact on the breeding of this species either directly or through reducing the availability and hence increasing competition for hollows elsewhere on the Hill.

In addition to having more and better hollows, trees low in the landscape are in deeper and moister soils and are much more productive in terms of flower, pollen, nectar and leaf production than those trees found on the slopes. Thus they are a significant foraging resource for local butterfly, moth, beetle, wasp, fly and other winged invertebrates as well as nectivorous birds and bats. They also support relatively high densities of leaf eaters and hence are prime foraging for invertebrate, bird and mammal predators.

The hollow bearing and productive trees are also locally important roosting sites for microbats and birds. In winter of 2018, a survey conducted as part of a wider ACT roosting survey counted 600 little corellas and 400 sulphur crested cockatoos utilising trees on and surrounding the golf course, for night-time roosting.

The proposed action will remove and alienate (for many species) a significant component of the large tree resource within the Red Hill woodland, which is likely to result in a significant impact on the fauna of a woodland remnant that is of national significance.

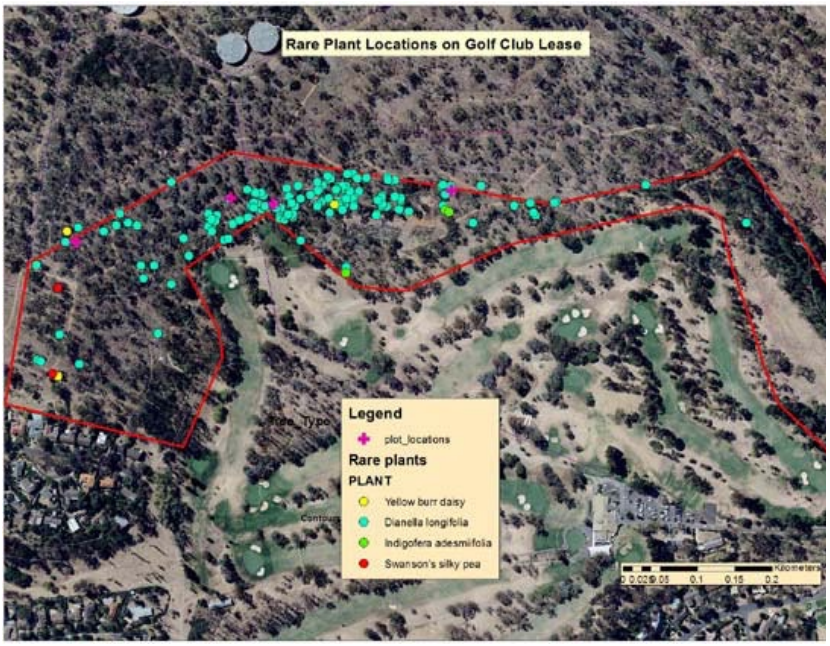
Probable presence of nationally endangered Matted Flax-lily (*Dianella amoena*)

Three Victorian based ecologists Adam Muyt (now an environmental officer at Hobart City Council), Geoff Carr (associated with the Victorian herbarium) and Steve Sinclair (Victorian Department of Environment, Land, Water and Planning) have visited Red Hill and are all of the opinion that at least some of the plants that the ACT Government currently identifies as *Dianella longifolia* (pale flax lily) are in fact *Dianella amoena* (matted flax-lily). Geoff Carr is the botanist that initially described Matted Flax-lily and is a taxonomic expert on the genus so his opinion has much weight.

David Albrecht of the CSIRO herbarium is currently undertaking an investigation as to the extent of *Dianella amoena* in the ACT and how it can be identified from D. sp. aff. longifolia (Benambra), which appears to be the other species that occurs here. Unfortunately, David Albrecht's study requires the collection of flowering specimens and this year has been so dry that there appears to be very little flowering occurring. In fact most plants have yet to produce leaves and seem to be existing as dormant bulbs/corms. One of the key distinguishing features is that the anthers on *Dianella amoena* have deep orange appendages while those on *Dianella sp. aff. longifolia* (Benambra) are yellow. Orange containing flowers do occur across Red Hill, including within the golf course lease. In 2011 the Red hill Regenerators mapped the distribution of what was then considered to be *Dianella longifolia* across the golf course lease. 409 plants were found at 151 locations including along the fire trail – which is to be upgraded as part of the proposal and on the site of the proposed maintenance facility (see map below). This is a major proportion of the plants within the Red Hill remnant and for the ACT as a whole, as it is usually found in a few scattered locations with less than 15 individual plants at each location. The National Recovery Plan for *Dianella amoena* notes that its relationship with *Dianella sp. aff. Longifolia* needs to be determined and that like the ACT's population of *Dianella sp. aff. Longifolia, Dianella amoena* exists in small numbers as fragmented locations. It is estimated that there are only 1400 plants of *Dianella amoena* remaining at 120 locations (not including any plants in the ACT) (Carter 2010).

Thus the golf course lease including the proposed development area could contain a nationally important population of the nationally endangered matted flax lily. This matter needs to be fully investigated in the context of any decision making under the EPBC Act.

From Red Hill Regenerators 2011



Possible future use of the site by breeding Superb Parrots

Before 2005 the superb parrot was regarded as a rare visitor in the ACT. In the summer of 2005–2006 an unprecedented number of superb parrots, including many dependent young, were recorded in north Belconnen (Lashko, 2006). Since then, increasing numbers have been reported from the northern suburbs of Canberra and the Goorooyarroo and Mulligan's Flat nature reserves. In the ACT the Superb Parrot has distinctive and separate breeding and foraging areas. Foraging largely occurs within suburban Belconnen and the Gungahlin suburb of Harrison. Birds are largely feeding on the seeds or flowers of planted trees and shrubs such as elms Ulmus sp, Red Ironbark *Eucalyptus sideroxylon*, or wattles Acacia sp. or on grass seeds on suburban sports grounds (ACT Government 2015).

Breeding in the ACT is confined to two areas, the Central Molonglo Valley and the Throsby Ridge area in Gunghalin. It is thought that 10 -20 pairs of Superb Parrots breed at each of the locations. Breeding only occurs within scribbly gum (*Eucalyptus rossii)* or more usually Blakely's red gum (*Eucalyptus blakleyi).*

As noted in the Commonwealth conservation advice for the species, bioclimatic modelling has shown that the superb parrot is highly sensitive to climate change. Modelling suggests that its bioclimatic range will decline by around 47% by 2050 and by 75% by 2070. The

future bioclimatic core range of the superb parrot will likely focus around the ACT and an area to the immediate north. This is concerning as the advice points out that nest trees in this area have already been highly cleared and under a business as usual scenario are likely to decline a further 38% from current levels by 2050.

Perhaps already reflecting climate change, the Superb Parrot is increasingly being reported in south Canberra. As evident within the sightings on Canberra Nature Map (https://canberra.naturemapr.org/Community/Map?Species=15095) and ebird, the golf course lease is one of the few areas in south Canberra with suitable breeding trees where he superb parrot has been observed every year since 2014. Increased presence of the bird over a number of years was a precursor to actual breeding at the Throsby and Molonglo Valley sites. It is considered likely that Superb Parrots will begin breeding in south Canberra in the near future (Chris Davey pers. Comm.) Red Hill golf course is a possible future breeding location, though the development would considerably reduce this likelihood. The superb parrot is known to breed on the Young golf course. It is relevant that the two ACT breeding locations are both several hundred metres away from residential development.

The precautionary approach is to consider the proposed development area as future breeding habitat of the nationally vulnerable species.

Increased Road kill within an area of core habitat

Stagoll (2011) and Iken et al (2014) studied changes in bird composition along transects placed from urban areas deep into neighbouring reserves in the Canberra area. They found that guilds and species composition displayed a gradient response to urban edge, with some species only occurring in core woodland areas well away from the urban edge. The Red Hill remnant is largely surrounded by houses, with very little of the remnant less that 200m from the urban edge.

The proposed entrance road and maintenance shed are in or pass through a large proportion of the core habitat remaining on Red Hill. This is the main location of several bird species found on Red Hill including the speckled warbler, brown goshawk, striated thornbill and yellow thornbill.

It is likely that the activity around the maintenance shed and increased traffic associated with the residents in the facility would have a negative impact on the sensitive species found within the core habitat areas. A speckled warbler, black blind snake and swamp wallaby are all recent road kills from the current usage. Increased traffic and potentially increased speed as a result of re-alignment or other road works is likely to increase road kill within the core habitat area

ACT Government Action

It needs to be taken into account that there have been seven previous attempts by the Federal Golf Club and associated developers to undertake residential and other commercial development on the golf course. All attempts have failed, with no development proposal gaining approval from the ACT Government.

In relation to this proposed action, MBark in June 2018 applied to the ACT Conservator for an Environmental Significance Opinion to state that the proposed action is unlikely to cause significant environmental harm and as such does not require an EIS under the ACT Planning and Development Act. The Conservator has put the application on hold until the outcomes of the process to develop an Integrated Plan for Red Hill are known. The outcomes of the Integrated Plan will have major implications for the likely impacts of the MBark proposed action on matters protected by the EPBC Act.

References

listing advice for White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands - 2006, Department of the Environment, Water, Heritage and the Arts p5 +9

ACT Government (2004*) Woodlands for Wildlif*e: ACT Lowland Woodland Conservation Strategy. Action Plan No. 27. (Environment ACT, Canberra), Chapter 5.

ACT Government (2015) *Superb Parrot Habitat Improvement Plan*. Plan prepared as part of the Gungahlin Strategic Assessment.

Carter, O. (2010). National Recovery Plan for the Matted Flax-lily *Dianella amoena*. Department of Sustainability and Environment, Victoria

Commonwealth Government (2016) *Polytelis swainsonii (*superb parrot) Conservation Advice.

Davidon I. (2005) Woodland Management Notes for the Murray Catchment. NSW Department of Environment and Conservation.

Gibbons P. and Boak M. (2000) The Importance of Paddock Trees for Conservation in Agricultural Landscapes. A discussion paper for consideration by the Riverina Highlands Regional Vegetation Committee. NSW National Parks and Wildlife Service.)

Karen Ikin · Philip S. Barton · Emma Knight · David B. Lindenmayer · Joern Fischer · Adrian D. Manning (2014) Bird community responses to the edge between suburbs and reserves Oecologia (2014) 174:545–557

Lashko, S. (2006). A Superb Summer: An influx of Superb Parrots into Belconnen in 2005-06. Canberra Bird Notes 31: 142-146

Rainer Rehwinkel, NSW Department of Environment and Conservation, Grassy Ecosystems Research Officer, Personal Communication

Red Hill Regenerators (2011) *Conservation values of the proposed development area within Federal Golf Course Lease*. Submission to the National Capital Authority

Karen STAGOLL, Adrian D. MANNING, Emma KNIGHT, Joern FISCHER and David B. LINDENMAYER (2011) Suburban edges: do bird responses reflect patch-matrix or 3 gradient concepts? *Biological Conservation*

Appendix 1 – Vegetation cover

Proposed Machinery Shed Area

Cover	**Percentage**
Litter	35
Austrostipa sp.	16
Bare ground	15
Blackberry	11
Poa sieberiana	11
Austrodanthonia sp.	5
Microlaena stipoides	5
Cooch (considers as exotic)	**3**
Cleavers (exotic annual)	3
Wood (logs)	2
Chilean Needle Grass	1
Carex inversa	1
Plantago lanceolata	1
Geranium solanderi	1
Elymus scaber	1

Land between disused fairway and course

Cover	**Percentage**
Litter	44
Austrodanthonia sp.	26
Bare ground	12
Poa sieberiana	8
Plantago lanceolata	6
Microlaena stipoides	6
Austrostipa sp.	2
Bothriochloa macra	2
Eucalyptus melliodora (seedling)	2
Phalaris	2

Appendix 2 – Indigenous species observed in understorey on land between disused fairway and course

Acacia implexa (seedling)
Acaena ovina
Asperula conferta (important species)
Bulbine bulbosa (important species)
Calotis lappulacea (important species)
Carex invisa
Einadia nutans
Erodium crinitum
Eucalyptus melliodora (seedling)
Geranium solanderi
Goodenia pinnatifida (important species)
Hydrocotyle laxiflora
Oxalis perennans
Senecio quadridentalis
Solenogyne dominii (important species)
Vittadinia cuneata
Vittadinia muelleri
Wahlenbergia stricta

Appendix 3: Rare and Threatened Species Occurring on Red Hill *

Species	Common Name	Status
Rutidosis leptorhynchoides	Button Wrinklewort	5th largest population of this nationally endangered daisy
Dianella amoena	Matted Flax Lily	Present - but full extent on Red Hill yet to be determined of this nationally endangered species
Dianella aff. Longifolia (Benambra)	Pale Flax Lily	Rare species in the ACT – Red Hill has largest ACT population
Swainsona sericea	Silky Swainson-pea	Many hundreds of plants of this pea on the Hill It is listed as vulnerable in NSW.
Swainsonia behriana	Behr;s Swanson-pea	Rare in the ACT. Rare on Red Hill
Swainsona monticola	Notched Swainson-pea	Rare in the ACT. Rare on Red Hill.
Aristida behriana	Bunch Grass	One of four known populations in the ACT occurs on Red Hill
Perunga ochracea	Perunga Grasshopper	Listed as vulnerable in the ACT. Observed at three separate locations on the Hill, which is one of only about 30 known locations of this species
Hypochrysops delicia	Moonlight Jewel Butterfly	Rare in the ACT– Red Hill is a hill-topping breeding site for species.
Agrilus hypoleucus	Hypoleucus jewel beetle	One of two recorded locations in the ACT
Tropis paradoxa	A longihorn beetle	One of two recorded locations in the ACT
Polytelis swainsonii	Superb Parrot	Nationally vulnerable – occasional forager on Red Hill – Red hill provides suitable breeding habitat for this species
Callocephalon fimbriatum	Gang Gang Cockatoo	Listed as vulnerable in NSW. Red Hill is the only confirmed breeding location of this bird in the ACT.
Daphoenositta chrysoptera	Varied Sitella	Listed as vulnerable in the ACT and in NSW. Occasionally, nests on Red Hill with 2009 breeding record on edge of Golf Club (but not site of development)
Stagonopleura guttata	Diamond Firetail	Listed as vulnerable in the ACT and NSW. Constant breeder on Red Hill during 1990s, but is now a rare sighting.
Lalage sueurii	White-winged Triller	Listed as vulnerable in the ACT. Occasional breeder and relatively frequent sighting on Red Hill, until last 5 years. It is now a rare sighting.
Hieraaetus morphnoides	Little Eagle	Listed as vulnerable in the ACT and

		NSW. Pair breeding on Black Mountain regularly hunt on hill for rabbits and birds
Pyrrholaemus saggitatus	Speckled Warbler	Listed as vulnerable in NSW. 12-13 breeding pairs/groups occur on Red Hill
Calyptorhynchus lathami	Glossy Black Cockatoo	Listed as Vulnerable in NSW and the ACT. A rare nomadic visitor on Red Hill that forages on Drooping She-oak cones
Petroica multicolor	Scarlet Robin	Listed as Vulnerable in NSW and ACT. An altitudinal migrant that is regularly observed on Red Hill between March and June.
Petroica phoenicea	Flame Robin	Listed as Vulnerable in NSW. An altitudinal migrant that is occasionally observed on Red Hill between March and June.
Gerygone mouki	Brown Gerygone	Rare winter visitor to ACT region. Occasional visitor to Red Hill.
Turnix varia	Painted Button Quail	Rare breeding resident in the ACT region. Breeds on Red Hill but in low numbers.
Turnix velox	Little Button Quail	Rare non-breeding visitor to the ACT region– occasional visitor to Red Hill
Taeniopygia bichenovii	Double-barred Finch	Listed as vulnerable in NSW. Occasionally breeds on Red Hill.
Glossopsitta concinna	Musk Lorikeet	Rare non-breeding visitor to the ACT region– occasional visitor to Red Hill
Coracina papuensis	White-bellied Cuckoo Shrike	Rare non-breeding visitor to the ACT region– occasional visitor to Red Hill
Lichenostomus melanops	Yellow-tufted Honeyeater	Rare breeding resident of the ACT region. Resident on Red Hill
Aprasia parapulchella	Pink-tailed Worm Lizard	Listed as vulnerable nationally. Twice been recorded on Red Hill under dacite rocks. Metamorphic rocks have provided suitable habitat elsewhere and the lizard may be more widespread. Probably only a small population exists on Red Hill
Pteropus poliocephalus	Grey-headed Flying Fox	Listed as nationally endangered. Like most of inner Canberra, Red Hill is a foraging site for some of the about 1,500 flying foxes that camp at Commonwealth Park about 1.5km to the north.

Appendix 4: Uncommon Species Occurring on Red Hill

Trapezites luteus	Yellow Ochre Butterfly	Resident on Red Hill, Uncommon resident with very localised distribution across the ACT.
Paralucia pyrodiscus	Fiery Copper Butterfly	Resident on Red Hill, Uncommon resident with very localised distribution across the ACT.
Ogyris abrota	Dark Purple Azure Butterfly	Resident on Red Hill, Uncommon resident with very localised distribution across the ACT
Theclinesthes miskini	Wattle Blue Butterfly	Resident on Red Hill, Uncommon resident with very localised distribution across the ACT
Artamus personatus	White-browed Woodswallow	Uncommon breeding migrant in the ACT region. Bird courting display observed in birds on Red Hill in 2009.
Aphelocephala lucopsis	Southern Whiteface	Uncommon breeding resident in the ACT region. Occasionally breeds on Red Hill, including on Golf Club lease
Cacomantis variolosus	Brush Cuckoo	Uncommon migrant in the ACT region. Occasionally breeds on Red Hill.
Eurystomus orientalis	Dollar Bird	Uncommon breeding migrant in the ACT region. Breeds annually on Red Hill.
Ptilotula fusca	Fuscous Honeyeater	Uncommon breeding resident/autumn migrant. Occasional breeding record on Red Hill
Microeca fascinans	Jacky Winter	Uncommon breeding resident in ACT region. Breeding resident on Red Hill.
Corvus mellori	Little Raven	Uncommon breeding resident/winter migrant. Occasional visitor to Red Hill.
Falco cenchroides	Nankeen Kestrel	Uncommon breeding resident in ACT region. Breeding resident on Red Hill.
Falco peregrinus	Peregrine Falcoln	Uncommon breeding resident in ACT region. Breeds on cliffs in adjacent Mugga Mugga reserve and hunts over Red Hill
Petroica rosea	Rose Robin	Uncommon breeding migrant in ACT region. Bred on Red Hill in 2015.
Myiagra cyanoleuca	Satin Flycatcher	Uncommon breeding summer

		migrant in the ACT. Occasionally breeds on Red Hill
Acanthiza nana	Yellow Thornbill	Uncommon breeding resident in the ACT region. Resident on Red Hill
Adiantum aethiopicum	Maidenhair Fern	Uncommon in region. Common on Red hill
Arthopodium milleflorum	Vanilla Lily	Uncommon in region. Rare on Red Hill
Arthropodium minus	Small Vanilla Lily	Uncommon in region. Rare on Red Hill
Asplenium flabellifolium	Necklace Fern	Uncommon in region. Common on Red Hill
Astroloma humifusum	Cranberry Heath	Uncommon in region. Common on Red Hill
Bossiaea buxifolia	Bush-pea	Uncommon in region. Common on Red Hill
Brachyloma daphnoides	Daphne Heath	Uncommon in region. Rare on Red Hill
Brachyscome dentata	Lobe-seed Daisy	Uncommon in region. Uncommon on Red Hill
Bulbine Bulbosa	Bulbine Lily	Uncommon in region. Abundant on Red Hill
Burchardia umbellata	Milkmaids	Uncommon in region. Rare on Red Hill
Calotis lappulacea	Yellow Burr Daisy	Uncommon in region. Abundant on Red Hill
Cheilanthes austrotenuifolia	Rock Fern	Uncommon in region. Uncommon on Red Hill
Cheilanthes austrotenuifolia	Rock Fern	Uncommon in region. Uncommon on Red Hill
Cheilanthes distans	Bristly Rock Fern	Uncommon in region. Common on Red Hill.
Cheilanthes sieberi	Rock Fern	Uncommon in region. Common on Red Hill
Chrysocephalum apiculatum	Button Everlasting	Uncommon in region. Abundant on Red Hill
Chrysocephalum semipapposum	Clustered Everlasting	Uncommon in region. Abundant on Red Hill
Clematis microphylla	Cut-leaved Clematis	Uncommon in region. Uncommon on Red Hill
Craspedia variabilis	Billy Buttons	Uncommon in region. Uncommon on Red Hill
Cryptandra amara	Bitter Cryptandra	Uncommon in region. Common on Red Hill
Cymbopogon refractus	Barbed-Wire Grass	Uncommon in region. Common on Red Hill
Daviesia mimosoides	Bitter Pea	Uncommon in region. Uncommon on Red Hill
Desmodium brachypodum	Large Tick-trefoil	Uncommon in region. Uncommon on Red Hill

Desmodium varians	Slender Tick-trefoil	Uncommon in region. Common on Red Hill
Dianella revoluta	Black-anther Flax Lily	Uncommon in region. Abundant on Red Hill
Dichopogon fimbriatus	Chocolate Lily	Uncommon in region. Uncommon on Red Hill
Dillwynia sericea	Egg and Bacon Pea	Uncommon in region. Uncommon on Red Hill
Dipodium punctatum	Blotched Hyacinth Orchid	Uncommon in region. Rare on Red Hill
Diuris chryseopsis	Golden Moth Orchid	Uncommon in region. Rare on Red Hill
Diuris sulphurea	Tiger Orchid	Uncommon in region. Rare on Red Hill
Dodonaea viscosa	Hop Bush	Uncommon in region. Common on Red Hill
Drosera auriculata	Sundew	Uncommon in region. Uncommon on Red Hill
Drosera peltata	Pale Sundew	Uncommon in region. Common on Red Hill
Eryngium ovinum	Blue Devil	Uncommon in region. Common on Red Hill
Fimbristylis dichotoma	A sedge	Uncommon in region. Uncommon on Red Hill
Galium gaudichaudii	Rough Bedstraw	Uncommon in region. Common on Red Hill
Glycine clandestina	Twining Glycine	Uncommon in region. Common on Red Hill
Glycine tabacina	Variable Glycine	Uncommon in region. Common on Red Hill
Gonocarpus tetragynus	Common Raspwort	Uncommon in region. Abundant on Red Hill
Goodenia hederacea	Ivy Goodenia	Uncommon in region. Common on Red Hill
Goodenia pinnatifida	Scrambled Eggs	Uncommon in region. Common on Red Hill
Grevillea juniperina	A grevillea	Uncommon in region. Uncommon on Red Hill
Haloragis heterophylla	Varied Raspwort	Uncommon in region. Common on Red Hill
Hardenbergia violacea	Native Sassparella	Uncommon in region. Common on Red Hill
Hemarthria uncinata	Matgrass	Uncommon in region. Uncommon on Red Hill
Hovea heterophylla	Common Hovea	Uncommon in region. Common on Red Hill
Hypericum gramineun	Small St Johns Wort	Uncommon in region. Common on Red Hill
Indigofera adesmiifolia	Tick Indigo	Uncommon in region. Common on Red Hill

Indigofera australia	Australian Indigo	Uncommon in region. Rare on Red Hill
Lepidospema laterale	Variable Sword Sedge	Uncommon in region. Common on Red Hill
Leptorhynchus squamatus	Scaly Buttons	Uncommon in region. Common on Red Hill
Linum marginale	Native Flax	Uncommon in region. Uncommon on Red Hill
Lomandra bracteata	Small Matrush	Uncommon in region. Common on Red Hill
Lomandra filiformis	Watlle Matrush	Uncommon in region. Abundant on Red Hill
Lomandra longifolia	Spiny-headed Matrush	Uncommon in region. Common on Red Hill
Lomandra mulktiflora	Many-flowered Matrush	Uncommon in region. Common on Red Hill
Lotus australis	Austral trefoil	Uncommon in region. Uncommon on Red Hill
Melichrus urceolatus	Urn Heath	Uncommon in region. Common on Red Hill
Mentha diemenica	Wild Mint	Uncommon in region. Rare on Red Hill
Microtis parviflora	Onion Orchid	Uncommon in region. Rare on Red Hill
Microtis unifolia	Onion Orchid	Uncommon in region. Common on Red Hill
Opercularia hispida	Hairy Stinkweed	Uncommon in region. Uncommon on Red Hill
Pelargonium australe	Native Stork's Bill	Uncommon in region. Rare on Red Hill
Pellea falcata	Sickle Fern	Uncommon in region. Rare on Red Hill
Pimelea curviflora	Curved Rice-flower	Uncommon in region. Common on Red Hill
Pimelea glauca	Smooth Rice-flower	Uncommon in region. Common on Red Hill
Plantago gaudichaudii	Narrow Plantain	Uncommon in region. Uncommon on Red Hill
Plantago varia	Native Plantain	Uncommon in region. Common on Red Hill
Pleurosorus rutifolius	Blanket Fern	Uncommon in region. Uncommon on Red Hill
Poa sieberiana	Native Poa	Uncommon in region. Abundant on Red Hill
Pultenaea procumbens	Bush Pea	Uncommon in region. Common on Red Hill
Rubus parviflora	Native Raspberry	Uncommon in region. Common on Red Hill
Scleranthus diander	Many-flowered knawel	Uncommon in region. Uncommon on Red Hill

Solanum cinereum	Narrawarra Burr	Uncommon in region. Common on Red Hill
Solanum linearifolium	Kangaroo Apple	Uncommon in region. Uncommon on Red Hill
Sorghum leiocladum	Native Sorghum	Uncommon in region. Uncommon on Red Hill
Stackhousia monogyna	Creamy Candles	Uncommon in region. Common on Red Hill
Stellaria pungens	Prickly Starwort	Uncommon in region. Uncommon on Red Hill
Styphelia triflora	Five cCrners	Uncommon in region. Rare on Red Hill
Themeda australis	Kangaroo Grass	Uncommon in region. Abundant on Red Hill
Thysanotus tuberosus	Common Fringe-lily	Uncommon in region. Rare on Red Hill
Tricoryne elatior	Yellow Rush Lily	Uncommon in region. Common on Red Hill
Veronica calycina	Hairy Speedwell	Uncommon in region. Common on Red Hill
Wurmbea dioica	Early Nancy	Uncommon in region. Common on Red Hill
Xerochrysum viscosum	Sticky Everlasting	Uncommon in region. Common on Red Hill
Zornia dyctiocarpa	Zornia	Uncommon in region. Rare on Red Hill

* Threatened species as per
Commonwealth EPBC Act
http://www.environment.gov.au/epbc/about/epbc-act-lists#species

the NSW Biodiversity Conservation Act
https://www.environment.nsw.gov.au/threatenedSpeciesApp/

and the ACT Nature Conservation Act
https://www.environment.act.gov.au/cpr/conservation_and_ecological_communities/threatenedspecieslist

Rare and regionally uncommon butterfly species as per Bond S. (2016) *Field Guide to the Butterflies of the Australian Capital Territory*

Other rare invertebrates re Canberra Nature Map and Atlas of living Australia

Rare and regionally uncommon bird species as per the classification of the Canberra Ornithologist Group
http://canberrabirds.org.au/birds/

Rare plants of the ACT as per a draft list of rare plants of the ACT held by the ACT Government

Regionally uncommon plants as per level A species of Rehwinkle R. (2016) the Floristic Value Score for grassy ecosystems, produced for EPBC listings. Level A species are defined by Rehwinkle as uncommon in the region, and where they occur, generally indicate grassland sites of high to very high value; such species occur very rarely or in very low numbers in grasslands that have been subject to intense, frequent, long-term or sometimes even one-off disturbances, such as, ploughing, heavy stock grazing pressures or application of fertilisers; some of these species are also inherently rare;