Supplementary Submission No 51a

INQUIRY INTO INTEGRITY OF THE NSW BIODIVERSITY OFFSETS SCHEME

Organisation: Better Planning Network Inc

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SUBMISSION TO THE LEGISLATIVE COUNCIL'S INQUIRY INTO THE INTEGRITY OF THE NSW BIODIVERSITY OFFSETS SCHEME ADDITIONAL TABLED DOCUMENT OCTOBER 2021

INTRODUCTION

Better Planning Network Inc (BPN) made a submission on the integrity of the NSW Biodiversity Offsets Scheme (BOS) Inquiry on 31 August 2021. This document is by way of additional information that is being been tabled for the Inquiry's hearing on 22 October 2021.

The BPN 31 August 2021 submission addressed the integrity of the BOS with regard to its application and impact at a Strategic scale, using the example of the Growth Centres' Biodiversity Offset Program, and at a Landscape scale using the example of the Cumberland Plain Conservation Plan.

This additional BPN document addresses the integrity of the BOS at a Development Application scale, using two recent examples in the northern suburbs of Sydney, 55 Coonara Ave, West Pennant Hills (Mirvac / former IBM site) and 36 David Rd, Castle Hill (Mary Mount Mercy Centre). There is no suggestion that any of the proponents, their consultants, or council officers have done anything unlawful or untoward. They are quite simply working within a system that we believe lacks integrity**. A concise list of BPN's Recommendations is included on pages 22 and 23 of this submission.**

MARY MOUNT MERCY CENTRE

- The subdivision proposal for this site is for 60 dwellings with the removal of Sydney Turpentine Ironbark Forest (STIF), a Threatened Ecological Community (TEC). STIF is also a Critically Endangered Ecological Community. Biodiversity Offset Credits are proposed for this development. A Biodiversity Development Assessment Report (BDAR) has been provided which includes the Biodiversity Credit Report (Variations) detailing the total Biodiversity Offset credits to be retired and the value of those offsets.

  Of the 3.1ha of STIF to be cleared on for this development, there are:
  - 2.4ha of STIF that the BDAR has assessed to be of low condition, and
  - 0.7ha of STIF that the BDAR has assessed to be of good condition

  The price of biodiversity offset credits under the market-based Biodiversity Offsets Scheme, varies according to the number of credits being traded. This creates an anomaly whereby in cases such as Sydney Turpentine-Ironbark Forest and Blue Gum High Forest (another TEC), because there are fewer good condition TECs traded than low condition TECs, the price per credit for clearing low condition STIF is higher per credit than for good condition STIF.

RECOMMENDATION: It should not be cheaper to clear good condition TECs than it is to clear low condition TECs.

This can be clearly seen in the BDAR tables below. The price per credit is as follows:

- 2.4ha (44 credits) of low condition STIF - $12,311.14 per credit
- 0.7ha (31 credits) of good condition STIF - $ 9,281.37 per credit

BAM Biodiversity Credit Report (Variations)

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1281-Sydney Turpentine - Ironbark forest	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	0.7	31	0	31.00
1281-Sydney Turpentine - Ironbark forest	Not a TEC	2.4	0	44	44.00

Biodiversity payment summary report

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

IBRA sub region	PCT common name	Threat status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Cumberland	1281 - Sydney Turpentine - Ironbark forest	Yes	Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion	18.83%	$302.25	1.7832	$9,281.37	31	$287,722.49
Cumberland	1281 - Sydney Turpentine - Ironbark forest	No	Northern Hinterland Wet Sclerophyll Forests >90%	20.69%	$394.94	1.6277	$ 12,311.14	44	$541,690.38

To explain in further detail, the BDAR has assessed that the low condition STIF is not a Threatened Ecological Community (TEC). The low condition STIF is therefore being assessed under the Biodiversity Offsets Scheme as a Threatened Species habitat only (BDAR excerpts below), for which there is a much higher level of trading of credits.

The 'low condition' PCT 1281 vegetation is not an EEC or CEEC but is associated with threatened species habitat and therefore requires an offset for impacts to this vegetation where the VI score is ≥17. The VI for the 'low

An offset is required for the impacts of proposals on the habitat of threatened species assessed for ecosystem credits and associated with a PCT in a vegetation zone with a vegetation integrity score of ≥17. These ecosystem

Because the BDAR does not consider the low condition STIF to be a TEC, for that reason the number of credits per hectare for the low condition STIF is much less than for the high condition STIF. To explain further, for clearing 2.4ha of low condition STIF there are 44 ecosystem credits, whereas for clearing 0.7ha of high condition STIF, there are 31 ecosystem credits.

However, in accordance with the *NSW Threatened Species Scientific Committee Final Determination*, the Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion is a Critically Endangered Ecological Community. **All occurrences, regardless of their condition, are covered by the Determination** (Final Determination excerpts below and in full Appendix D).

So while the *NSW Threatened Species Scientific Committee Final Determination* considers low condition STIF to be a Critically Endangered Ecological Community, the Biodiversity Offsets Scheme does not even consider it to be a Threatened Ecological Community for the purposes of ecosystem credits. This further skews the market-based system of the BOS with regard to the most endangered ecological communities.

NSW Threatened Species Scientific Committee

Proposed Publication date: 31/05/19

Notice of and reasons for Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list the Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion as a CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY in Part 1 of Schedule 2 of the Act and to remove the Sydney Turpentine-Ironbark Forest from Part 2 of Schedule 2 of the Act. Listing of ecological communities is provided for in Part 4 of the Act.

Part 2. Particular area occupied by the ecological community

2.1.1 The assemblage of species listed in Part 1.1 above which characterises the Sydney Turpentine-Ironbark Forest occurs within the Sydney Basin Bioregion. This Bioregion is defined by SEWPaC (2012) Interim Biogeographic Regionalisation for Australia, Version 7. Department of Sustainability, Environment, Water, Population and Communities. http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/maps.html

2.2 It is the intent of the NSW Threatened Species Scientific Committee that all occurrences of the ecological community (both recorded and as yet unrecorded, and independent of their condition) that occur within this bioregion be covered by this Determination.

RECOMMENDATION: The market based Biodiversity Offsets System of credits must be reformed to reflect the scarcity of the TECs, not the scarcity of credit trades.

RECOMMENDATION: The Biodiversity Offsets System of credits must align with the NSW Threatened Species Scientific Committee Final Determinations with regard to what constitutes an Endangered Ecological Community, instead of relying on a Vegetation Integrity (low or good quality) score.

- Powerful Owls (*Ninox strenua*) are recorded in the BDAR as being on the site. Powerful Owls are a native species 'apex predator'. These apex predators consume a possum per night thus keeping local populations of possums in check and balance. Without Powerful Owls, possum populations would become a significant issue for local households.

  As an apex species, the Powerful Owl in effect acts as an umbrella species for numerous other native fauna species, both threatened and otherwise. Protecting their habitat protects the habitat of all of these species which form the Threatened Ecological Community (TEC). On this site for instance, there is also habitat for the endangered Gang-Gang Cockatoo as well as the Southern Myotis, an endangered micro-bat. TECs are a whole ecological system of canopy trees, mid-storey vegetation, ground covers, plus the fauna - mammals, birds, invertebrates and insects - that are each integral to and support the ecosystem.

  Potential Powerful Owl nest trees (trees with hollows that have entrances over 20cm and >0.5m deep) are recorded on the site. The BDAR notes that large eucalypts (diameter 80-240cm) which are at least 150 years old are needed to form hollows of the size needed for Powerful Owls.

The BDAR notes that in 2014 the Sydney region had a population of only 120 Powerful Owls (BDAR excerpt below).

No	Assessment requirements	Impact Assessment
b)	*Estimate vehicle strike rates with supporting data or literature, where available*	Bain *et el* (2014) estimates that of a population of 120 Powerful Owls in the Sydney region there are nine fatal strikes per year. No information was found in relation to vehicle strikes to Gang-gang Cockatoos.

Of that 120 individuals, it was estimated by Bain et al that nine are killed each year by vehicle strikes alone. While mortalities also result from predation by cats and dogs (BDAR excerpt below), there is no record of the number killed by predation. In recent years there have also been a significant number of Powerful Owl mortalities from poisoning by second-generation rodent baits that are readily available over the counter.

It is therefore reasonable to expect that at least an additional 3 individuals are killed by predation and poisoning each year. ie **approximately 10% of the total population of 120 Powerful Owl individuals are killed every year**. Therefore a significant number of successful breeding events are needed every year to ensure the viability of the Powerful Owl apex predator within the Sydney region, particularly as not all of those 120 individuals are one of a breeding pair.

No	BAM Assessment Criteria	Noise, Light Spill and Dust	Weeds and Pathogens	Rubbish	Wood Collection	Predation by Cats and Dogs
3b	*Identify the native vegetation, threatened species, TECs and their habitats likely to be affected and the type of indirect impact that is likely to occur*	Impact to breeding habitat for Gang-gang Cockatoo and Powerful Owl which could result in reduced breeding success.	Impact to STIF CEEC which could reduce vegetation condition.	Impact to STIF CEEC which could reduce vegetation condition.	NA	Impact to breeding success of Gang-gang Cockatoo and Powerful Owl.

Yet within the last 12 months three sites within 7.5km of each other, which are <u>known</u> Powerful Owl breeding sites, have been approved or earmarked for extensive redevelopment. These are Mary Mount Mercy Centre, the Mirvac / former IBM site and the Hornsby Quarry.

- Mirvac/former IBM site had Powerful Owls recorded on the site by the Birdlife Australia Powerful Owl Project, up until mid 2021 (redevelopment approved);
- Hornsby Quarry had a breeding pair observed on the site by Powerful Owl Project citizen scientists up until the end of the first quarter of 2021 (redevelopment approved);
- Mary Mount had Powerful Owl photographed on the site in May 2021 (redevelopment earmarked).

The BDAR for Mary Mount states there will be impacts to the breeding habitat of the Powerful Owl. This includes removal of one of the nest trees. Both the Mirvac and the Quarry Powerful Owls breeding pairs failed to breed this year, even though their habitats are some of the best available. Both pairs apparently abandoned the sites due to disturbance around their habitat. In the case of the Quarry Owls, a helicopter delivering materials to the site hovered over their nest.

It should be noted that Powerful Owls have a high fidelity rate both to each other and to particular nest trees. However, more than one nest tree is used over successive years, depending on factors such as weather patterns and disturbance rates. Therefore the loss of even one nesting hollow can prevent a pair from breeding for several years, particularly because Powerful Owls are known not to use replacement nesting boxes (source: Powerful Owl Project).

Despite this need for a range of hollow trees, the Mary Mount development will remove a nest tree as well as foraging habitat, for a cost of just $12,700 (BDAR excerpt below). We are sure the Powerful Owl pair would value their hollows and their ability to raise a chick each year much higher than that, but that is the value the Biodiversity Offset Scheme trading puts on that loss.

NSW GOVERNMENT

Biodiversity payment summary report

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price
10549	***Myotis macropus*** (Southern Myotis)		$741.31	20.6900%	$80.00	10	$9,746.87
10562	***Ninox strenua*** (Powerful Owl)		$463.67	20.6900%	$80.00	20	$12,792.07
10975	***Callocephalon fimbriatum*** (Gang-gang Cockatoo)		$463.67	20.6900%	$80.00	59	$37,736.60

RECOMMENDATION: There must be a more robust assessment and avoidance of cumulative impacts on Threatened fauna Species such as the Powerful Owl, required by the BOS &BAM

RECOMMENDATION: The provision of nest boxes must not be used as a mitigating measure for the loss of trees with hollows of a size that can accommodate Powerful Owls. The removal of such trees must be avoided not mitigated, otherwise the Powerful Owls could become functionally extinct within the Sydney Basin. Loss of nest trees must factor much higher in BOS credits.

MIRVAC / FORMER IBM SITE

Mirvac obtained approval on 15 September 2021 to demolish the building campus on the former IBM site and clear 1.85ha of Blue Gum High Forest (BGHF). The failure of the Biodiversity Conservation Act and Biodiversity Offset Scheme to protect the 1.85ha of BGHF in the demolition area is significant

- Mirvac is required to retire just 57 ecosystem credits for clearing some of the rarest ecological community in the Sydney Basin (approved Conditions of Consent below). Even more disturbing is that because there is very little trading of Blue Gum High Forest ecosystem credits in the Sydney Basin Bioregion, it is understood that the credit price for BGHF is currently between approximately $6,000 and $7,000 per credit. Yet the PCT 1237 is a particular Plant Community Type found only in the Sydney Basin Bioregion.

Impacted plant community type	Number of ecosystem credits	Offset option	IBRA subregion	Plant community type(s) / species that can be used to offset the impacts from development
PCT 1237 Blue Gum High Forest in the Sydney Basin Bioregion	57	Like-for-like	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Wyong. or Any IBRA subregion that is within 100 km of the outer edge of the impacted site.	PCT 1237 (HBT – No)

- The then NSW Office of Environment and Heritage report *The Native Vegetation of the Sydney Metropolitan Area*, states that there are only 152 ha of PCT 1237, Blue Gum High Forest in the Sydney Basin Bioregion, left on private land (excerpt below). Another 135ha were recorded on Government land.

  In total, only 287ha of this Critically Endangered Ecological Community are to be found anywhere in the world.

  Yet the Biodiversity Conservation Act failed to prevent the clearing of 1.85ha of BGHF and instead permitted the decision-maker, a Local Planning Panel, to approve its felling and to allow Mirvac to pay an approximate measly $342,000 under the Biodiversity Offsets Scheme for the privilege of clearing this critically endangered ecological community.

Table 19: Area of each native vegetation community in the Sydney metropolitan area, against each of the major land ownership categories

Map Unit Code	Map Unit Name	Area (Hectares) on Commonwealth Government Land (Per Cent of Extant Area)	Area (Hectares) on State Government Land (Per Cent of Extant Area)	Area (Hectares) on Local Government Land (Per Cent of Extant Area)	Area (Hectares) on Private Land (Per Cent of Extant Area)	Unknown Tenure (Per Cent of Extant Area)	Total Extant Area (Hectares)*
Rainforests							
S_RF01	Illawarra Escarpment Subtropical Rainforest	0 +0 (0%)	2.5 +0 (21%)	0 +0 (0%)	9.5 +0 (79%)	0 +0 (0%)	12.0 +0
S_RF02	Coastal Sandstone Gallery Rainforest	0 +0 (0%)	158 +0 (72%)	49.7 +0 (23%)	11.4 +0 (5%)	0.3 +0 (0%)	219 +0
S_RF03	Coastal Warm Temperate Rainforest	0 +0 (0%)	323 +0.1 (83%)	4.6 +0 (1%)	62.3 +3.2 (16%)	0 +0 (0%)	390 +3.3
S_RF05	Hinterland Dry Rainforest	0 +0 (0%)	0.4 +0.3 (100%)	0 +0 (0%)	0 +0 (0%)	0 +0 (0%)	0.4 +0.3
S_RF06	Coastal Dune Littoral Rainforest	0 +0 (0%)	19.1 +0.2 (81%)	1.3 +0 (6%)	3.1 +0 (13%)	0 +0 (0%)	23.5 +0.2
S_RF07	Coastal Escarpment Littoral Rainforest	0 +0 (0%)	34.2 +0 (53%)	18.6 +0 (29%)	11.3 +0 (18%)	0 +0 (0%)	64.1 +0
S_RF08	Coastal Headland Littoral Thicket	0 +0 (0%)	129 +0 (98%)	0.6 +0 (0%)	1.3 +0.3 (1%)	0 +0 (0%)	131 +0.3
Wet Sclerophyll Forests							
S_WSF01	Blue Gum High Forest	0 +0 (0%)	56.0 +8.6 (20%)	78.7 +27.6 (27%)	152 +245 (53%)	0 +0 (0%)	287 +281
S_WSF02	Coastal Enriched Sandstone Moist	1.5 +0 (0%)	468 +1.9 (45%)	321 +3.0 (31%)	243 +41.2 (23%)	3.2 +0 (0%)	1037 +46.1

The Native Vegetation of the Sydney Metropolitan Area 43

- To the best of our knowledge, no arrangements have been instigated by Mirvac under the Biodiversity Offsets Scheme, to retire the 57 ecosystem credits against a specific site. As the credits must be retired prior to any clearing of vegetation (approved Conditions of Consent below), it is assumed that Mirvac will simply pay the approx $342,000 to the Biodiversity Conservation Fund instead. Cash for clearing as it is often referred to. Neighbours were notified on 18 October 2021 that clearing would start mid November, so it appears Mirvac is paying BCF.

23. Biodiversity Offsetting Requirements

To offset the loss of biodiversity from the site from the development, the following ecosystem and species credits listed in the tables below must be retired prior to any clearing of vegetation.

The development must purchase and retire credits which may be satisfied by sourcing credits from the Biodiversity Credit market or payment to the Biodiversity Conservation Fund of an amount equivalent to the class and number of ecosystem credits, as calculated by the Biodiversity Offsets Payment Calculator (The amount payable to discharge an offset obligation will be determined at the time of payment).

The final value of the development was estimated by Mirvac, through the Urban Taskforce in a letter to Michael Gadiel of NSW Treasury on 31st March 2020, as being approximately $600M. The second tranche of the COVID Fast Track approvals estimated the construction costs to be $151M (both excerpts are below). The 'book value' of the site in 2019/2020 was approximately $70M. Add another $80M for 'incidentals', and the estimated profit for Mirvac from this development is at least a whopping $300M.

The $342,000 in Biodiversity Offset funds to clear fell the rare and critically endangered BGHF, is only about 1,000th of the profits that Mirvac will make from this development. No wonder Mirvac was agreeable to paying this relatively paltry amount, even though it submitted to the Local Planning Panel that it did not agree that it was obliged to pay for any Offset credits.

Urban Taskforce
AUSTRALIA

Mirvac | Project: Coonara Avenue, West Pennant Hills

Address: 55 Coonara Avenue, West Pennant Hills

Strategic Merit

- Growth corridor.
- Gateway approval.
- Council officer support.
- Diversity of Housing
- Within walking distance of Cherrybrook Metro station

Readiness

- Works on site could commence immediately following vacant possession in October 2020
- DA's could then be lodged with Hills Shire Council
- Rezoning plan required to be made by DPIE
- Demolition could commence towards the end of this year with new construction thereafter

Economic / Housing Value

Circa $600m of end value.
600 new homes and apartments over approximately 5 years of construction work

Planning Proposals

Project	LGA	Description	$$$	Jobs	Proponent
The Hills LEP 2019 - 55 Coonara Avenue, West Pennant Hills amendment to facilitate residential development	The Hills Shire	A proposal to rezone land currently zoned as Business to Residential and Environmental Conservation to allow up to 600 dwellings and dedication of part of the site for the Cumberland State Forest.	$151m	302	Mirvac

In contrast, the Sisters of Mercy who own the Mary Mount Mercy Centre will have to pay $828,000 for their 3.1ha clearing of the Sydney Turpentine-Ironbark Forest on their development site. As both BGHF and STIF are Critically Endangered Ecological Communities, proportionally and logically, **if the BOS had integrity**, one could reasonably expect Mirvac to pay 60% of the amount that the merciful Sisters are paying (1.85ha is 59.7% of 3.1ha). Mirvac would then pay $496,000. But no, big developer Mirvac only pays approximately $342,000.

Yet there is far less area of BGHF (approximately 287ha) than there is of STIF (approximately 1,200ha - *Australian Government Best Practice Guidelines for Sydney Turpentine-Ironbark Forest*).

RECOMMENDATION: Again, the market based Biodiversity Offsets System of credits must be reformed to reflect scarcity of the TECs, not the scarcity of credit trades.

Serious and irreversible impacts with regard to the example of the Mirvac / former IBM site:

- The Biodiversity Conservation Act Part 6 - Biodiversity Offsets Scheme, Division 1, Clause 6.5 deals with *"Serious and irreversible impacts on biodiversity values"* (BC Act excerpt below).

6.5 Serious and irreversible impacts on biodiversity values

(1) The determination of serious and irreversible impacts on biodiversity values for the purposes of the biodiversity offsets scheme is to be made in accordance with principles prescribed by the regulations.

(2) The Environment Agency Head may provide guidance on the determination of any such serious and irreversible impacts, and for that purpose may publish, from time to time, criteria to assist in the application of those principles and lists of potential serious and irreversible impacts.

The BC Regulation Section 6.7 deals with how serious and irreversible impacts (SAII) are to be determined (BC Regulation excerpt below).

6.7 Principles applicable to determination of "serious and irreversible impacts on biodiversity values" (section 6.5(1))

(1) This clause applies for the purposes of determining whether an impact on diversity values is a serious and irreversible impact for the purposes of the biodiversity offsets scheme.

(2) An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because—

(a) it will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline, or

(b) it will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size, or

(c) it is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution, or

(d) the impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

(3) For the purpose of this clause, a ***decline*** of a species or ecological community is a continuing or projected decline in—

(a) an index of abundance appropriate to the taxon, or

(b) the geographic distribution and habitat quality of the species or ecological community.

The Biodiversity Assessment Method (BAM) Section 9 of deals with *"Thresholds for assessing and offsetting the impacts of development"*. Section 9.1 deals with *"Assessment for serious and irreversible impacts on biodiversity values"*. Point 1 of Section 9.1 states *"The determination of a serious and irreversible impact on biodiversity values is to be made by the decision-maker in accordance with the principles set out in the BC* (Biodiversity Conservation) *Regulation"*.

9.1 Assessment for serious and irreversible impacts on biodiversity values

1. The determination of a serious and irreversible impact on biodiversity values is to be made by the decision-maker in accordance with the principles set out in the BC Regulation.
2. To assist the decision-maker, the document Guidance to assist a decision-maker to determine a serious and irreversible impact includes criteria that enable the application of the four principles set out in clause 6.7 of the BC Regulation to identify the species, populations and ecological communities that are likely to be at risk of SAIIs.
3. The assessor must identify every threatened entity at risk of an SAII that would be impacted by the proposal.

The Environment Agency Head referred to in the BC Act Clause 6.5(2) has published the *Guidance to assist a decision-maker to determine a serious and irreversible impact* which contains criteria to assist in the application of the four principles described in the BC Regulation Clause 6.7(2).

However, despite the BC Act, the BC Regulation and the Biodiversity Assessment Method stating that determination of a serious and irreversible impact is to be made in accordance with the four principles, and the BC Act stating that criteria to assist in the determination is provided in the Guidance, **ultimately it is left to the subjective opinion of the decision-maker as to whether there will be a serious and irreversible impact as a result of a development**.

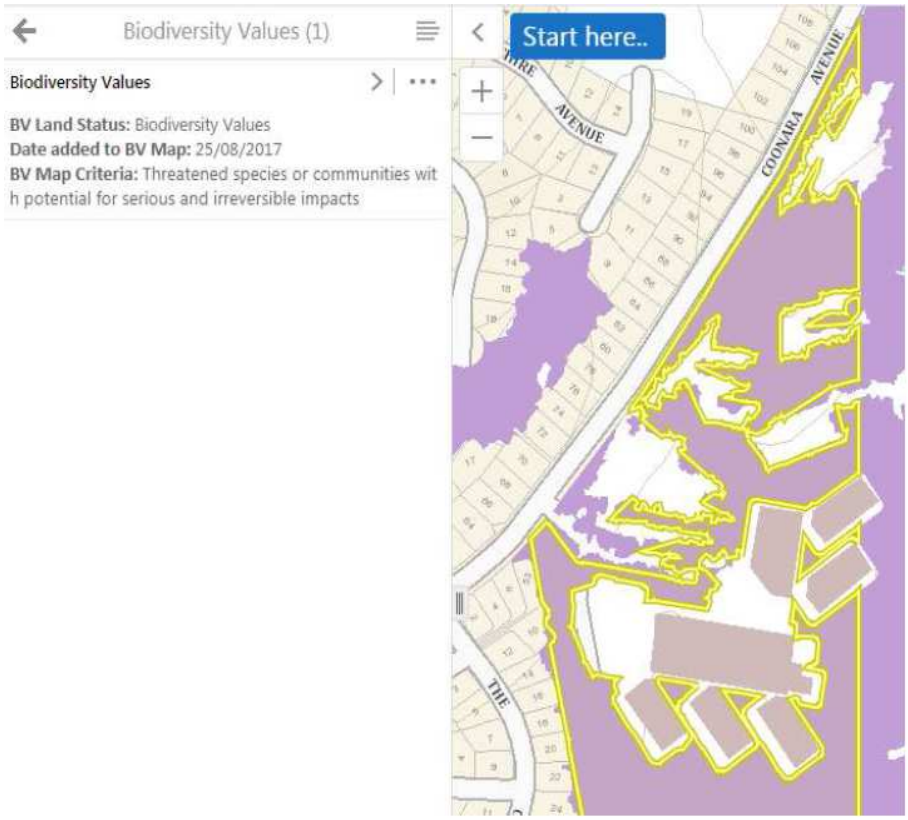
However, the SAII legislation is quite circular. While the BC Act and Regulation read as definitive - *"An impact is to be regarded as serious and irreversible if it is likely to contribute significant risk of a threatened species or ecological community becoming extinct because-"* (and then the BC Regulation quotes the four principles of SAII), the outcome is based on a subjective opinion.

How the subjective opinion of the decision-maker played a role in the Mirvac approval

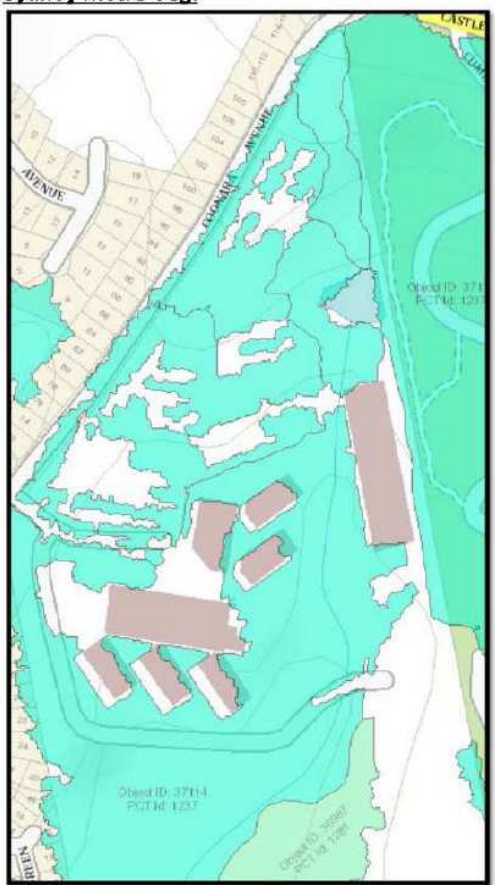
The information below is not necessarily in chronological order, but rather in a sequence that shows what occurred that 'informed' the decision-maker's decision.

1. Assessment of whether there is Blue Gum High Forest within a development site -

- Mirvac declined to acknowledge the presence of Blue Gum High Forest within the demolition footprint
- Mirvac's assessment of the 5.31ha of vegetation within the demolition footprint consisted of assessing just one BAM plot of 20m x 20m, almost hard up against one of the buildings
- The Biodiversity Assessment Method (BAM) requires a BAM plot survey to be undertaken for each vegetation type and condition. This was not done.
- Hills Shire Council (Council) requested as additional information that Mirvac undertake BAM plot surveys to stratify each of the various vegetation types and conditions. Mirvac declined to do so.
- Council itself undertook just one additional BAM plot survey. Council's report to the decision-maker (a Local Planning Panel) stated that it could only do one BAM plot survey because of COVID restrictions. Even though the work would have been in the open air and even though Council had nine months between the lodgement of the DA and its approval in which it could have conducted further on site BAM plot surveys. This was not done.
- Council report to the Local Planning Panel stated that based on the floristic composition of both the Council and the Mirvac BAM plots, there was BGHF within the demolition footprint.
- Council report to the Local Planning Panel stated that, using the precautionary principle based on the two BAM plots done for the 5.31ha of vegetation within the demolition footprint, together with the proximity of the BGHF surrounding the demolition footprint, Council concluded that there was 1.85ha of BGHF within the footprint.
- However, there was never any ground survey done by either Council or Mirvac of that 1.85ha of BGHF to determine its exact area and condition. COVID restrictions were no excuse for the Council not to have done this work that Mirvac declined to do.
- It should be noted that the *NSW Biodiversity Values Map* and the NSW Government Sydney Metropolitan Vegetation Map, both show Blue Gum High Forest (Plant Community Type PCT 1237) surrounding the buildings yet still within the demolition footprint (maps on following page).



Sydney Metro Veg:



RECOMMENDATION: Developers must not be allowed to refuse to provide the information requested by councils in accordance with the requirements of the Biodiversity Assessment Method. Where developers refuse to comply with council requests, then refusal of the application must be mandatory on the basis that insufficient information has been provided on which to make a decision.

RECOMMENDATION: Where a developer does not undertake sufficient BAM plot surveys within all vegetation types and conditions in accordance with the Biodiversity Assessment Method, the relevant council must undertake the work and do so in a comprehensive manner. Otherwise there is no assessment or record of what native vegetation is actually on a development site before it is cleared.

2. <u>Inconsistency with Biodiversity Assessment Method requirements regarding SAII</u> -

- The Biodiversity Assessment Method (BAM) Section 9.1.1 provides information regarding what information must be provided by the BAM assessor with regard to a potential Serious and Irreversible Impact on a Threatened Ecological Community (TEC) such as the BGHF (Section 9.1.1 excerpt provided as Appendix A of this submission).
- The information required by the BAM regarding each TEC includes but is not limited to:
  - Evidence of reduction in geographic distribution (Principle 1)
  - Extent of reduction in ecological function (Principle 2)
  - Evidence of restricted geographical distribution (Principle 3)
  - Estimation of the impact area as a percentage of current geographical extent
  - Direct and indirect impacts including fire management, hydrology, pollutants, increased competition, fragmentation, edge effects, pathogens
  - Estimation of the size of remaining areas of the TEC within 500m of the footprint

- Estimation of the maximum dispersal distance for native flora species of the TEC
- Relevant composition, structure and function condition scores for each vegetation zone.

o However, because Mirvac declined to acknowledge the presence of the BGHF within the demolition footprint, **NONE of the above information was provided for the decision-maker on which to make their decision**. Furthermore, Hills Shire Council did not provide any of this information to the decision-maker, the Hills Local Planning Panel, to assist the Panel to make its decision.

RECOMMENDATION: All relevant information required by the BAM must be provided to the decision-maker to enable them to make a properly informed decision, particularly on SAII.

3. Incorrect and/or misleading information provided to a decision-maker

o Council's report to the Hills Local Planning Panel on 15 September 2021 stated that:

Council's Senior Biodiversity Officer had *"concluded that the current development will not result in a Serious and Irreversible Impact on Blue Gum High Forest";* and that

Council's Senior Biodiversity Officer had *"determined that the current development will not result in a Serious and Irreversible Impact on Blue Gum High Forest"* (Appendix B of this submission).

The attribution of the above two statement to Council's Senior Biodiversity Officer we believe is incorrect and/or misleading. The spokesperson for the community advocacy group that has provided the information on the Mirvac / former IBM development for this submission, contacted the Senior Biodiversity Officer that assessed the Mirvac application. It can be seen from Appendix B of this submission that the wording of the Council Officer's report is in italics, whereas the attributed statement is not. The Officer was therefore asked by the community group spokesperson whether they had in fact made that statement. The Officer responded with words to the effect of, they did not and could not make that statement.

A BAM assessor is not permitted to make a determination or definitive statement as to whether a development WILL or WILL NOT have a serious and irreversible impact. It is the role of the decision-maker only to determine whether a development will or will not have a SAII, not that of the assessor.

Furthermore, Council's report to the Local Planning Panel stated an additional two times that Council staff had *"concluded that the current development will not result in a Serious and Irreversible Impact on Blue Gum High Forest".*

o In Council's verbal submission to the Local Planning Panel meeting, Council's Director of Planning said words to the effect of *"They* (Mirvac) *agree to the extent with our ecologists that the development will not result in serious and irreversible impacts"* (transcript from Panel hearing recording on Council website).

o In Mirvac's verbal submission to the Local Planning Panel meeting, the Mirvac Director of Residential Development said words to the effect of *"There is no serious and irreversible impact on Blue Gum High Forest"*.

o In Mirvac's verbal submission to the Local Planning Panel meeting, the Mirvac Ecologist said words to the effect of *"I also agree with Council's decision that it is not a serious and impact for either of those critically endangered communities* (BGHF or STIF) *on site".*

o At least seven times the Hills Local Planning Panel was told that the development will not result in a serious an irreversible impact, a statement that ought not to have been made by either Mirvac or Council both of whom acted as Biodiversity Assessment Method assessors on the DA

- The Hills Local Planning Panel had no Biodiversity Assessment Method assessors on the Panel. Panels rely on the reports provided by the councils' assessors as well as reports from applicants. In this case, the Panel specifically recorded in its decision that it had regard to *"the detailed advice provided by Council's Senior Biodiversity Officer"* (Council report excerpt below).

> Having regard to the relevant provisions of the Biodiversity Act,1979 and the detailed advice provided by Council's Senior Biodiversity Officer, the Panel is satisfied that the development the subject of the DA is unlikely to result in a serious and irreversible impact on the Blue Gum High Forest or on the Sydney Turpentine-Ironbark Forest.

  However, the Council report stated the Council Senior Biodiversity Officer's words incorrectly and/or misleadingly. Furthermore the information provided by the Officer did not include most of the information required by the BAM to be provided by the assessor to the decision-maker, to enable the decision-maker to make their decision.

- In short, at least 7 times the Panel was told there would NOT be an SAII, when that decision was the Panels alone to make, and the Panel was provided with insufficient information on which to base their decision in accordance with the Biodiversity Conservation Act and the Biodiversity Offset Scheme. It is perhaps telling that the Panel did not even get the name of the Act right in its decision (excerpt above).

- The wording of the Biodiversity Conservation Act, the Regulation and the Biodiversity Assessment Method for the Biodiversity Offset Scheme, appear to be sufficiently prescriptive to prevent serious and irreversible impacts. However, leaving the final decision to decision-makers who may or may not have the relevant expertise to make such a decision, and therefore may make their decision based on incomplete and/or misleading information provided by others, results in ever increasing losses to Threatened Ecological Communities, even losses to those that are Critically Endangered Ecological Communities.

- If clearing of 1.85ha of Blue Gum High Forest which according to the NSW Threatened Species Scientific Committee Final Determination states *"**is facing an extremely high risk of extinction** in NSW in the immediate future"*, is not a serious and irreversible impact, and when there are only 152ha left on private land and 287ha in total, then **no Threatened Ecological Communities are safe from extinction under the NSW Biodiversity Offsets Scheme**.

RECOMMENDATION: If a development gives rise to any of the four Principles of SAII or any of the criteria that apply to those Principles are met, then a development MUST be considered to have a serious and irreversible impact. It must not be a subjective decision by a decision-maker.

4. Thresholds for Serious and Irreversible Impacts on Threatened Ecological Communities

- No thresholds have been assigned to any threatened ecological communities. Instead, the assessment criteria align with the four Principles defined in the Biodiversity Conservation Regulation (DPIE website excerpts below).

> Impact thresholds for some entities at risk of a SAII are available in the Threatened Biodiversity Data Collection hosted by **BioNet**. For other entities, thresholds have not been developed. For example, thresholds have not been assigned to any threatened ecological communities. In the absence of thresholds, the consent authority can disregard references to considering thresholds in the guidance when making their determination.

For BAM 2020, the impact assessment criteria for entities at risk of serious and irreversible impacts now align with the Principles defined in the **Biodiversity Conservation Regulation 2017**. Assessors are required to address these criteria. This information will aid the decision-maker in forming an opinion on whether the impact will be serious and irreversible.

- On 14 June 2019, the then Office of Environment and Heritage (OEH) informed the Hills Shire Council with regard to the rezoning proposal for the site, that *"Development consent cannot be granted to proposals which impact on SAII entities"* (excerpts below).

The BGHF and STIF on site are listed as potential ecological communities that meet the principles and criteria for serious and irreversible impact (SAII) (see https://www.environment.nsw.gov.au/resources/bcact/guidance-decision-makers-determine-serious-irreversible-impact-170204.pdf). Development consent cannot be granted to proposals which impact on SAII entities.

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- That apparently is no longer the case. So even though Senior OEH Officers had been of the understanding that *"Development consent cannot be granted to proposals which impact on SAII entities",* and that all SAII entities would therefore be protected under the Biodiversity Conservation Act, **without thresholds, any SAII entity including Critically Endangered Ecological Communities, can be fair game for developers to clear fell**, as will now occur on the Mirvac / former IBM site.

  This is despite the fact that by definition Critically Endangered Ecological Communities (CEECs) are at an extremely high risk of extinction in the immediate future (NSW Threatened Species Scientific Committee Final Determination for BGHF excerpt below). **The Biodiversity Offset Scheme has and is failing miserably in its ability to protect CEECs. The integrity of the BOS is no longer in doubt, it is seriously compromised.**

13. Blue Gum High Forest in the Sydney Basin Bioregion is eligible to be listed as a critically endangered ecological community as, in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the immediate future, as determined in accordance with the following criteria as prescribed by the Threatened Species Conservation Regulation 2002:

- All occurrences of Sydney Turpentine-Ironbark are covered by the NSW Threatened Species Scientific Committee Final Determination for STIF, regardless of condition (excerpt below).

2.2 It is the intent of the NSW Threatened Species Scientific Committee that all occurrences of the ecological community (both recorded and as yet unrecorded, and independent of their condition) that occur within this bioregion be covered by this Determination.

Similarly, the NSW Threatened Species Scientific Committee Final Determination for BGHF states that *"Most stands of the community are in a state of regrowth after past clearing"* (excerpt below). Therefore the condition of any CEEC must NOT be used as a threshold.

4. Blue Gum High Forest is dominated by a tall canopy of eucalypts that may exceed 30 m in height. Its understorey is typically multi-layered with a midstorey of mesophyllous shrubs and small trees and a diverse ground layer of herbs, ferns and some grasses. Most stands of the community are in a state of regrowth after past clearing or logging activities, and consequently trees may be shorter, less dense or more dense than less disturbed stands. Blue Gum High Forest is dominated by either *Eucalyptus pilularis* (Blackbutt) or *E.*

- **Even when a Threatened Ecological Community is already in a state of severe decline, has a very small population size and has a very limited geographical distribution, as is the case with the Blue Gum High Forest, the Serious and Irreversible Impacts test fails to protect and preserve it and does not stop its rapid slide into extinction.**

RECOMMENDATION: The Biodiversity Conservation Act, Regulation and Offsets Scheme must protect and preserve the Threatened Ecological Communities, and particularly the Critically Endangered Ecological Communities, as originally intended. NO clearing of CEECs can be permitted.

RECOMMENDATION: As a last resort, if the Act, Regulation and Scheme cannot protect TECs, size thresholds may have to be assigned to each TEC because the current BOS is being used to permit clearance of virtually any size area of TEC.

RECOMMENDATION: Prohibition of developments in TECs and CEECs that are SAII entities, must apply to all developments, including State Significant Development and State Significant Infrastructure.

5. Using the lack of a BAM definition to decline acknowledgement of BGHF within demolition area

- The initial Mirvac Biodiversity Development Assessment Reports (BDARs) claimed that all the vegetation within the demolition footprint was planted. After historical IBM Landscape documents were published by Hills Shire Council, the subsequent BDARs (there were many versions) acknowledged that some of the vegetation was regrowth. Mirvac's focus then changed to whether regrowth BGHF could be considered as being "remnant" vegetation with regard to the Biodiversity Assessment Method (BAM).

  This was important argument because not only would it determine whether Mirvac could provide just a Streamlined BDAR instead of a full BDAR, the BDAR would not have to apply a full assessment of the direct and indirect impacts on the BGHF, nor would it have to consider how to avoid, minimise and mitigate the impacts. Mirvac said the regrowth BGHF did not constitute BGHF for the purposes of the BAM.

  Council disagreed and obtained information from the BAM Support Team to support its position. One of the main arguments used by Mirvac was that "regrowth" vegetation did not constitute "remnant" vegetation and that there was no definition of "remnant" vegetation in the BAM.

  The BAM Support Team acknowledged the oversight of the lack of a definition of "remnant" vegetation in the BAM and stated that would be considered for rectification in future versions. Council's position was that the legislation that preceded the Biodiversity Conservation Act, the Native Vegetation Act, did contain a clear definition of "remnant" vegetation that could be applied to this development application.

  In applying that definition (Native Vegetation Act excerpt below), the vegetation within the demolition footprint would be classified as "remnant", because the regrowth predates 1st January 1990. The Council's view was therefore that the vegetation was "remnant" and a full BDAR was required. As such, the impacts on the BGHF within the demolition footprint would have needed to be considered in that full BDAR. Mirvac refused to accept Council's view that the BGHF within the footprint was "remnant", and therefore refused to provide a full BDAR.

NATIVE VEGETATION ACT 2003 - SECT 9

Meanings of remnant native vegetation and regrowth

9 Meanings of remnant native vegetation and regrowth

(1) For the purposes of this Act,
"remnant native vegetation" means any native vegetation other than regrowth.

(2) For the purposes of this Act,
"regrowth" means any native vegetation that has regrown since the earlier of the following dates:

(a) 1 January 1983 in the case of land in the Western Division and 1 January 1990 in the case of other land,

RECOMMENDATION: The definition of "remnant" as contained in the *Native Vegetation Act 2003* must be included in the Biodiversity Assessment Method. The dates as specified in (2)(a) must be updated to reflect the same 20 and/or 13 year differential as in the NV Act.

RECOMMENDATION: A developer must be required to provide documentation requested by a council in relation to the requirements of the Biodiversity Assessment Method.

6. Mitigating measures that don't offset or compensate for clearing of native vegetation

- The *Biodiversity Conservation Act, Part 6 Biodiversity Offsets Scheme, Clause 6.4 Biodiversity Conservation Offsets under Scheme*, includes *"biodiversity conservation measures to offset or compensate for impacts on biodiversity values"* (excerpt below).

6.4 Biodiversity conservation offsets under scheme

(1) For the purposes of the biodiversity offsets scheme, the biodiversity conservation measures to offset or compensate for impacts on biodiversity values after any steps taken to avoid or minimise those impacts are as follows—

(a) the retirement of biodiversity credits,

(b) other actions that benefit the biodiversity values of the impacted land or other biodiversity values.

- The Hills Shire Council report to the Local Planning Panel for the demolition/clearing DA, provided a list of measures that supposedly mitigated the clearing of 1,253 trees, including the 1.85ha of Blue Gum High Forest, in accordance with the Biodiversity Assessment Method for the Biodiversity Offset Scheme (Council report excerpt below).

It is known and accepted that the areas within the development footprint have been subjected to previous disturbances due to the original IBM development which was located in an area that was previously cleared and used for agriculture. It is noted that the native vegetation present has conservation significance, however it has been determined and assessed the proposed vegetation removal is required to facilitate the demolition of the buildings and ultimately the future development on the site. This justification report has provided additional assessment and has demonstrated what would have been required by the applicant's consultant in accordance with Biodiversity Assessment Method. The applicant has expressed that the intent is to try and minimise the amount of tree removal required by the development but the assessment of impacts to trees have been calculated based on a worst case scenario.

I have also considered additional measures that will be undertaken as part of the overall development which will include open spaces, additional tree planting, vegetation management improvements works for areas of native vegetation to be retained and, increased protection for the intact remnant vegetation within the property being transferred/ dedicated to The Forestry Corporation of NSW.

These mitigating measures are all part of future DAs *"undertaken as part of the overall development"* that have not yet even been lodged with Council and therefore the extent of any future mitigation is unknown. Some of these mitigating measures in the excerpt above were used for the rezoning of the site and can be used repeatedly for subsequent DAs without the mitigating measures for each DA being actualised. These include:

- There will be open spaces. These spaces are not quantified or qualified in any way. This should not have been used as a mitigating measure as it is unknown what open space there will be in future DAs. Note: This has not been designated as a staged development.

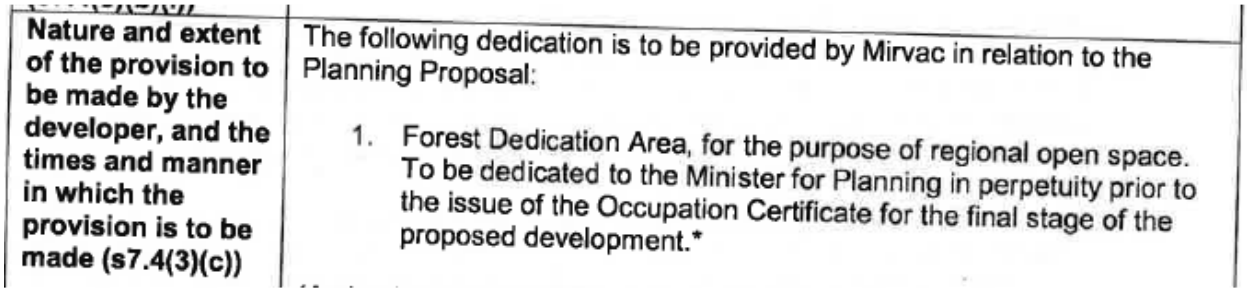
- Additional tree planting - only 60 trees will be planted for this DA to replace the 1,253 trees being removed, despite there being 1,000's of square metres of retained vegetated land needing revegetation. Considerably more replacement trees should have been conditioned for this DA consent.

- Vegetation management improvement works for areas of native vegetation to be retained. Again there are NO vegetation improvement works proposed for THIS DA, only vague promises to do works sometime in the future. It should be noted that IBM had engaged the National Trust's Bush Care Management Team to look after the site. After Mirvac obtained the site that engagement ceased. Many areas remnant native vegetation that were once of good quality have now been overrun by privet and lantana, as shown in the Arboricultural Impact Assessment and BDARs. Poor vegetation management practices should not be rewarded by using management improvements to mitigate the clearing of other areas.

- And the most lacklustre 'promise' of them all, dedication of some of the site to the Government, a 'promise' that has been made by Mirvac since as far back as March 2017 (first documentary excerpt below). This 'promise' was used in support of various rezoning proposals, including its Fast Track tranche approval. But even then, Mirvac said that the 'promise' should *"not be a prerequisite for the rezoning to be finalised".* It wasn't, it was rezoned without the dedication. Yet Mirvac still warned that *"progressing this agreement is dependent on the rezoning of the subject land"* (second documentary excerpt below).

- **Four and a half years later**, in the Council's report to the Local Planning Panel, this unrealised 'promise' is still being touted as a mitigating measure, this time for clearing 1,253 trees including 1.85ha of BGHF. That 'promise' is still no closer to being actualized, and only a *"non-binding in principle agreement"* has been reached (third documentary excerpt below)

  It is interesting to note that as far back as March 2017, Mirvac made clear what its strategy for the Forest Dedication Area was. Mirvac would retain the Area until *"the issue of the Occupation Certificate for the final stage of the proposed development"* (again, first documentary excerpt below). In other words, **this carrot of a Forest Dedication would be waved at all relevant consent authorities for the next five years, which is how long Mirvac estimates the build will take.** It can and is being repeatedly used as a mitigating measure for all subsequent DAs, without having to be actualized for any of them. **Ten years of Mirvac 'promises'.**



Nature and extent of the provision to be made by the developer, and the times and manner in which the provision is to be made (s7.4(3)(c))	The following dedication is to be provided by Mirvac in relation to the Planning Proposal: 1. Forest Dedication Area, for the purpose of regional open space. To be dedicated to the Minister for Planning in perpetuity prior to the issue of the Occupation Certificate for the final stage of the proposed development.*

Mirvac Response:
With regards the forested areas, we have previously submitted an offer to the Department of Planning in March 2018 (copy attached, though please note it is dated 2017 which was an error). Whilst no formal response was ever received, we were subsequently directed to Forestry NSW with whom we have reached a Heads of Agreement for the dedication of approximately 8.9ha of land, being the majority of the existing forest. Obviously, progressing this agreement is dependent on the rezoning of the subject land. We are more than happy to meet and discuss this offer with the Department, but suggest that resolving a VPA should not be a prerequisite for the rezoning to be finalised.

The dedication of the E2 land is a separate planning process which is currently being undertaken via a State Voluntary Planning Agreement with the proponent and DPIE/Forestry NSW. The last correspondence received from Mirvac was on 19 May 2021 where it was indicated that a *"non-binding in principle agreement was reached between Forestry Corporation and Mirvac last year"*. From this

- It is understood from information provided by Mirvac staff at a community meeting in mid 2021, that the Forestry Corporation of NSW will not accept the Dedication of the Forest Area until Mirvac has completed certain works, including vegetation management and infrastructure improvements, within the Forest Area to be dedicated. To the best of our knowledge none of these works have commenced, so Dedication cannot be in the near or imminent future.

- As an additional mitigating measure, the applicant (Mirvac) says it will try to minimise the amount of tree removal, yet all trees within the demolition footprint are approved for removal ie all trees included in this DA are to be removed.

RECOMMENDATION: Mitigation measures that are proposed for a rezoning or a development application under the Biodiversity Offset Scheme must be actualized for that rezoning or DA, not be allowed to be used for successive DAs without the measures ever being provided for the previous DAs or rezoning.

RECOMMENDATION: Mitigation measures must be quantified and qualified, not be couched in vague terms such as a development *"will include open spaces".*

RECOMMENDATION: The number of replacement trees provided to mitigate the impacts of a DA must be a reasonable percentage of the number of trees removed, not be totally inadequate as in this case where less than 5% of the number of trees being removed will be replaced.

RECOMMENDATION: Prior poor performance in native vegetation management must not be rewarding by accepting improved vegetation management as a mitigation measure.

RECOMMENDATION: Offset credits must not be reduced by taking into account mitigation measures that are not actualized, are undefined or inadequate, or rewards the developer for prior poor performance in native vegetation management.

7. Offset credits applied before measures taken to avoid impacts

- The Biodiversity Conservation Act, Part 6 Biodiversity Offsets Scheme, Clause 6.4 Biodiversity Conservation Offsets under Scheme, includes *"biodiversity conservation measures to offset or compensate for impacts on biodiversity values* ***after any steps taken to avoid or minimise those impacts****"* (excerpt below).

6.4 Biodiversity conservation offsets under scheme

(1) For the purposes of the biodiversity offsets scheme, the biodiversity conservation measures to offset or compensate for impacts on biodiversity values after any steps taken to avoid or minimise those impacts are as follows—

(a) the retirement of biodiversity credits,

(b) other actions that benefit the biodiversity values of the impacted land or other biodiversity values.

However, no steps were taken to avoid or minimise the impacts on the 1.85ha of Blue Gum High Forest within the demolition footprint **before** biodiversity credits were applied. Hills Shire Council skipped that important step in its assessment and recommended application of biodiversity credits to the Local Planning Panel for the demolition and vegetation clearance DA.

It cannot be argued that any steps were taken to avoid or minimise the impacts on the biodiversity values of the 1.85ha of Blue Gum High Forest within the demolition footprint at the rezoning stage. That is because Mirvac failed to provide at the rezoning stage, and DPIE and Hills Shire Council failed to request, any information regarding the native vegetation within the demolition footprint. The first time the community was made aware of the Blue Gum High Forest within the footprint was when the demolition and clearing DA was lodged in October 2020, four months after the DPIE rezoning approval in June 2020. The Arboricultural Impact Assessment and the BDAR for that DA showed the extent of the Blue Gum High Forest within the demolition footprint. It was then only in September 2021 that Hills Shire Council revealed the extent of the area of Blue Gum High Forest within the footprint.

Therefore NO steps were taken at all to avoid or minimise the impacts on the biodiversity values of the 1.85ha of Blue Gum High Forest within the demolition footprint.

RECOMMENDATION: Biodiversity credits or other actions that benefit the biodiversity values of impacted land must only be applied AFTER any steps are taken to avoid or minimise those impacts.

8. Use of irrelevant factors in the application of the Biodiversity Assessment Method

- As referenced earlier in this submission, the *Biodiversity Conservation Act, Part 6 Biodiversity Offsets Scheme, Clause 6.5 Serious and Irreversible Impacts on Biodiversity Values*, relates to determination of Serious and Irreversible Impacts.

The Hills Shire Council report to the Hills Local Planning Panel on 15 September 2021, regarding consideration of Serious and Irreversible Impacts, stated that *"it has been determined and assessed the proposed vegetation removal is required to facilitate the demolition of the buildings and ultimately the future development on the site"* (excerpt below). Neither the BC Act Part 6, nor the Biodiversity Assessment Method, includes future development or facilitation of demolition as factors to be considered for Serious and Irreversible Impacts.

These factors should not have been provided to the Hills Local Planning Panel as factors in their determination of a Serious and Irreversible Impact on the Blue Gum High Forest.

Council's Senior Biodiversity Officer has therefore provided their response and assessment regarding consideration of Serious and Irreversible Impacts:

It is known and accepted that the areas within the development footprint have been subjected to previous disturbances due to the original IBM development which was located in an area that was previously cleared and used for agriculture. It is noted that the native vegetation present has conservation significance, however it has been determined and assessed the proposed vegetation removal is required to facilitate the demolition of the buildings and ultimately the future development on the site. This justification report has provided additional assessment and has demonstrated what would have been required by the applicant's consultant in accordance with Biodiversity Assessment Method. The

RECOMMENDATION: Future development must not be considered as a factor in the Biodiversity Offset Scheme, particularly in regard to Serious and Irreversible Impacts.

9. Payment is likely be used in lieu of offset credits for the BGHF

- Mirvac has known since 2017 that it would be clearing native vegetation within the demolition footprint and since at least 2020 it has known the extent and type of that native vegetation. The Planning Panel quantified those credits in the Conditions of Consent for this DA (excerpt below). However it is our understanding that:
  - Mirvac has taken no steps towards initiating a Biodiversity Conservation Agreement that could be retired against the 3.03ha of Blue Gum High Forest on the Forest area of the site that is to be retained
  - If Mirvac did retire those credits on the Forest Dedication Area, it would be a meaningless retirement of the credits because that Area is theoretically going to be protected by being made part of Cumberland State Forest anyway. Credit retirement on that land would provide no additional protection of BGHF
  - It is unlikely that there is an area of BGHF of sufficient size available offsite to be able to purchase and retire the biodiversity credits for the 1.85ha of BGHF
  - Therefore the most likely outcome will be that Mirvac will simply pay approximately 1,000th of its estimated profits from this development into the Biodiversity Conservation Fund
  - The Biodiversity Conservation Fund will not be able to find anything but small fragmented patches of BGHF on which to discharge the offset credit
  - Meanwhile Mirvac will be able to commence clearing before any offsets are secured. Mirvac has advised that clearing commences mid-November 2021.

23. Biodiversity Offsetting Requirements

To offset the loss of biodiversity from the site from the development, the following ecosystem and species credits listed in the tables below must be retired prior to any clearing of vegetation.

The development must purchase and retire credits which may be satisfied by sourcing credits from the Biodiversity Credit market or payment to the Biodiversity Conservation Fund of an amount equivalent to the class and number of ecosystem credits, as calculated by the Biodiversity Offsets Payment Calculator (The amount payable to discharge an offset obligation will be determined at the time of payment).

RECOMMENDATION: Biodiversity Offsets must not be permitted for Critically Endangered Ecological Communities (CEECs) and payments to the Biodiversity Conservation Fund in lieu of offsets for all TECs must not be permitted.

RECOMMENDATION: Clearance of native vegetation must not occur until credits are retired.

10. <u>The overall failure of the BC Act and BOS to prevent the Local Planning Panel approval to clear 1.85ha of Blue Gum High Forest</u>

- The failure of the Biodiversity Conservation Act and Biodiversity Offset Scheme to protect the 1.85ha of Blue Gum High Forest within the demolition footprint is a significant example of the extent of the shortcomings in the Biodiversity Conservation Act and Regulation, the Biodiversity Offset Scheme and in the Biodiversity Assessment Method, which individually and collectively impacts upon the integrity of the Biodiversity Offset Scheme. The subjective decision of the Local Planning Panel was assessed based on:
  - Incorrect and/or misleading information provided by both Mirvac and Council
  - A lack of information regarding the extent and condition of the BGHF
  - Lack of information regarding how the Principles and Criteria for Serious and Irreversible Impacts applied to the demolition area
  - Being repeatedly advised that the development will not have a SAII, even though neither Mirvac nor Council should have provided that advice
  - A Streamlined BDAR that Council said was insufficient
  - Mitigating measures that didn't offset or compensate for clear felling the demolition area
  - Considering mitigating measures that were then not included in the consent conditions
  - Promise of Dedication of Forest Area that still has not eventuated after 4 years
  - No measures being taken to avoid impacts before applying offsets
  - Consideration of irrelevant factors including facilitating demolition and future development

  Despite all of the above shortcomings in the information provided to the Hills Local Planning Panel, the Panel was able to determine that the development would not have a Serious and Irreversible Impact on Blue Gum High Forest because the legislation provides that the decision-maker alone makes that decision on whether there will be an SAII, and therefore it could approve the development. Had the Panel decided that there would be an SAII on the Blue Gum High Forest, then it could not have approved the development application (DPIE excerpt below) to clear fell the site. **The footprint could have been made smaller instead.**

Effect of a serious and irreversible impact

The following table sets out the effect of a serious and irreversible impact for different types of development and activities (if they require assessment under the Biodiversity Offsets Scheme).

Type of development or activity	Effect of serious and irreversible impacts
▪ Clearing proposals ▪ Part 4 development (that is not State Significant Development or State Significant Infrastructure)	The approval authority must **not** grant approval if they determine the proposal is likely to have a serious and irreversible impact on biodiversity values.
▪ State Significant Development ▪ State Significant Infrastructure ▪ Part 5 activities (where a proponent chooses to opt in to the Biodiversity Offsets Scheme) ▪ Biodiversity Certification	The approval authority can approve a proposal which is likely to have serious and irreversible impacts. The approval authority must take those impacts into consideration and determine whether there are any additional and appropriate measures that will minimise those impacts if approval is to be granted.

RECOMMENDATION: The decision on whether a development will have a Serious and Irreversible Impact on biodiversity values must not be a subjective decision made by decision-makers who may or may not have the expertise to understand its complexities, or the resources available and willing to argue its position in the Land and Environment Court.

INHERENT PROBLEMS WITH DEVELOPER-ENGAGED CONSULTANTS

Better Planning Network has consistently over the years and in many forums, raised the issue of consultants that are engaged by developers being an inherent conflict of interest. Given the flexible and often subjective nature of the Biodiversity Offsets Scheme, there are inherent problems where consultants need to provide Biodiversity Assessments that produce a development outcome which benefits the developer.

As illustrated by the examples of the Mary Mount and Mirvac developments above, there are so many loopholes big enough to drive a fleet of bulldozers through within the Biodiversity Offset Scheme, that its integrity is seriously compromised. There doesn't have to be so-called 'cowboys' within the industry to create poor biodiversity outcomes, the BOS is quite capable of doing that itself. For instance, if a developer refuses to provide a report, there is nothing in the BOS that compels them to do so. Likewise if the information in reports is incorrect or incomplete, there are no avenues for appeal on that basis.

Both the Biodiversity Offsets Scheme and the Biodiversity Assessment Method, which is supposed to regulate the provision of BDARs, need to be overhauled so that the Biodiversity Conservation Act conserves biodiversity not developers.

While many consultants have a code of ethics, if they don't provide BDARs that are beneficial to the developer, they won't get the work and another consultant will simply be engaged to provide another report. Obviously there's no database of previous unfavourable BDARs so the developer can just obtain other reports. The majority of developers' work is therefore likely to be given to those consultants that produce reports that are beneficial to developers.

This monumental problem, which infects all aspects of planning, from rezoning to DA determinations through to construction and certification, could be solved really simply by having a roster system of consultants that are provided to the developers. Yet the NSW State Government and DPIE appear to be ideologically opposed to this concept.

Better Planning Network recently made this recommendation of a roster system yet again with regard to the introduction of Registered Environmental Assessment Practitioners (REAPs) under the Rapid Assessment Framework. BPN recommended that the REAPs, who will all be registered and all have the necessary expertise, should go onto a list whereby the next available consultant would be assigned to the next developer that needed a REAP.

DPIE's ludicrous response was that a roster system would be too difficult to organise. With all due respect, decades ago even the then RTA was able to organise a roster system for the next available officer. If DPIE's IT division cannot organise something as simple as a roster, then they could employ a monkey to tick off a paper list. Even a koala could probably be trained to do something that simple.

While developers continue to be permitted to cherry pick those consultants that will provide them with favourable BDARs, then the outcomes for biodiversity will continue to be anything but favourable. If there was one single thing that this Inquiry was able to change that would make a huge difference, it would be prohibiting developer-engaged consultants and establishing a roster system for all reports regarding biodiversity.

RECOMMENDATION: A roster system of consultants must be established to prevent developers from selecting consultants that provide reports on biodiversity that are favourable to the developer but have avoidable detrimental outcomes on biodiversity.

CONCLUSION

The following recommendations are made to the Legislative Council's Inquiry into the integrity of the NSW Biodiversity Offsets Scheme:

RECOMMENDATION: It should not be cheaper to clear good condition TECs than it is to clear low condition TECs.

RECOMMENDATION: The market based Biodiversity Offsets System of credits must be reformed to reflect the scarcity of TECs, not the scarcity of credit trades.

RECOMMENDATION: The Biodiversity Offsets System of credits must align with the NSW Threatened Species Scientific Committee Final Determinations with regard to what constitutes an Endangered Ecological Community, instead of relying on a Vegetation Integrity (low or good quality) score.

RECOMMENDATION: There must be a more robust assessment and avoidance of cumulative impacts on Threatened Species of fauna, required by the Biodiversity Offsets Scheme and BAM.

RECOMMENDATION: The provision of nest boxes must not be used as a mitigating measure for the loss of trees with hollows of a size that can accommodate Powerful Owls. The removal of such trees must be avoided not mitigated, otherwise the Powerful Owls could become functionally extinct within the Sydney Basin. Loss of nest trees must factor much higher in BOS credits.

RECOMMENDATION: Developers must not be allowed to refuse to provide the information requested by councils in accordance with the requirements of the Biodiversity Assessment Method. Where developers refuse to comply with council requests, then refusal of the application must be mandatory on the basis that insufficient information has been provided on which to make a decision.

RECOMMENDATION: Where a developer does not undertake sufficient BAM plots within all vegetation types and conditions, in accordance with the Biodiversity Assessment Method, the relevant council must undertake the work and do so in a comprehensive manner. Otherwise there is no assessment or record of what native vegetation is actually on a development site before it is cleared.

RECOMMENDATION: All relevant information required by the BAM must be provided to the decision-maker to enable them to make a properly informed decision, particularly with regard to SAII.

RECOMMENDATION: If a development gives rise to any of the four Principles of SAII or any of the criteria that apply to those Principles are met, then a development MUST be considered to have a serious and irreversible impact. It must not be a subjective decision by a decision-maker.

RECOMMENDATION: The Biodiversity Conservation Act, Regulation and Offsets Scheme must protect and preserve the Threatened Ecological Communities, and particularly the Critically Endangered Ecological Communities, as originally intended. NO clearing of CEECs can be permitted.

RECOMMENDATION: As a last resort, if the Act, Regulation and Scheme cannot protect TECs, size thresholds may have to be assigned to each TEC because the current BOS is being used to permit clearance of virtually any size area of TEC.

RECOMMENDATION: Prohibition of developments in TECs and CEECs that are SAII entities, must apply to all developments, including State Significant Development and State Significant Infrastructure.

RECOMMENDATION: The definition of "remnant" as contained in the *Native Vegetation Act 2003* must be included in the Biodiversity Assessment Method. The dates as specified in (2)(a) must be updated to reflect the same 20 and/or 13 year differential as in the NV Act.

RECOMMENDATION: Mitigation measures that are proposed for a rezoning or a development application under the Biodiversity Offset Scheme must be actualized for that rezoning or DA, not be allowed to be used for successive DAs without the measures ever being provided for the previous DAs or rezoning.

RECOMMENDATION: Mitigation measures must be quantified and qualified, not be couched in vague terms such as a development *"will include open spaces".*

RECOMMENDATION: The number of replacement trees provided to mitigate the impacts of a DA must be a reasonable percentage of the number of trees removed, not be totally inadequate such as less than 5% of the number of trees being removed being replaced.

RECOMMENDATION: Prior poor performance in native vegetation management must not be rewarding by accepting improved vegetation management as a mitigation measure.

RECOMMENDATION: Offset credits must not be reduced by taking into account mitigation measures that are not actualized, are undefined or inadequate, or rewards the developer for prior poor performance in native vegetation management.

RECOMMENDATION: Biodiversity credits or other actions that benefit the biodiversity values of impacted land must only be applied AFTER any steps are taken to avoid or minimise those impacts.

RECOMMENDATION: Future development must not be considered as a factor in the Biodiversity Offset Scheme, particularly in regard to Serious and Irreversible Impacts.

RECOMMENDATION: Biodiversity Offsets must not be permitted for Critically Endangered Ecological Communities (CEECs) and payments to the Biodiversity Conservation Fund in lieu of offsets for all TECs must not be permitted.

RECOMMENDATION: Clearance of native vegetation must not occur until all credits are retired.

RECOMMENDATION: The decision on whether a development will have a Serious and Irreversible Impact on biodiversity values must not be a subjective decision made by decision-makers who may or may not have the expertise to understand its complexities, or the resources available and willing to argue its position in the Land and Environment Court.

RECOMMENDATION: Both the Biodiversity Offsets Scheme and the Biodiversity Assessment Method, which is supposed to regulate the provision of BDARs, need to be overhauled so that the Biodiversity Conservation Act conserves biodiversity.

RECOMMENDATION: A roster system of consultants must be established to prevent developers from selecting consultants that provide reports on biodiversity that are favourable to the developer but have avoidable detrimental outcomes on biodiversity.

No Threatened Ecological Communities are safe from extinction under the current NSW Biodiversity Offsets Scheme. The Biodiversity Offset Scheme has and is failing miserably in its ability to protect Critically Endangered Ecological Communities. The integrity of the BOS is no longer in doubt, it is seriously compromised.

APPENDIX A

BAM requirements for assessment of serious and irreversible impacts on biodiversity values

9 Thresholds for assessing and offsetting the impacts of development

1. In Stage 1, the site context, native vegetation, TECs and habitat suitability for threatened species were assessed. In Chapter 7 (Stage 2), avoidance and minimisation were demonstrated. These assessments inform the final footprint for the proposal.
2. This section sets out the impact thresholds the assessor must apply, including:
   a. impacts on biodiversity values at risk of a serious and irreversible impact
   b. impacts for which the assessor is required to determine an offset requirement
   c. impacts for which the assessor is not required to determine an offset requirement
   d. impacts that do not require further assessment by the assessor.

9.1 Assessment for serious and irreversible impacts on biodiversity values

1. The determination of a serious and irreversible impact on biodiversity values is to be made by the decision-maker in accordance with the principles set out in the BC Regulation.
2. To assist the decision-maker, the document Guidance to assist a decision-maker to determine a serious and irreversible impact includes criteria that enable the application of the four principles set out in clause 6.7 of the BC Regulation to identify the species, populations and ecological communities that are likely to be at risk of SAIIs.
3. The assessor must identify every threatened entity at risk of an SAII that would be impacted by the proposal.
4. The assessor may identify any other threatened entity impacted by the proposal that is likely to be at risk of an SAII, in accordance with the four principles in the BC Regulation.
5. A decision-maker may require an assessor to include an assessment of additional threatened entities that are at risk of an SAII other than those identified in the BAM-C as part of a proposal.
6. To assist the decision-maker to evaluate the extent and severity of the impact on an entity at risk of an SAII, the BDAR or BCAR must contain details of the assessment of SAIIs, in accordance with the criteria set out in Subsection 9.1.1 for impacts on each TEC and in Subsection 9.1.2 for each threatened species. All criteria must be addressed for each TEC or threatened species at risk of an SAII and likely to be impacted by the proposal.

9.1.1 Additional impact assessment provisions for threatened ecological communities at risk of an SAII

1. The assessor is required to provide further information in the BDAR or BCAR regarding the impacts on each TEC at risk of an SAII. This must include the action and measures taken to avoid the direct and indirect impact on the TEC at risk of an SAII. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR and BCAR.
2. The assessor must consult the TBDC and/or other sources to report on the current status of the TEC including:
   a. evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)

b. extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by:
   i. change in community structure
   ii. change in species composition
   iii. disruption of ecological processes
   iv. invasion and establishment of exotic species
   v. degradation of habitat, and
   vi. fragmentation of habitat
c. evidence of restricted geographic distribution (Principle 3, clause 6.7(2)(c) BC Regulation), based on the TEC's geographic range in NSW according to the:
   i. extent of occurrence
   ii. area of occupancy, and
   iii. number of threat-defined locations
d. evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation).

3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a TEC for a criterion listed in Subsection 9.1.1(2.), the assessor must record this in the BDAR or BCAR.
4. In relation to the impacts from the proposal on the TEC at risk of an SAII, the assessor must include data and information on:
   a. the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal:
      i. in hectares, and
      ii. as a percentage of the current geographic extent of the TEC in NSW.

      Data and information should include direct impacts (i.e. from clearing) and indirect impacts where partial loss of the TEC is likely as a result of the proposal. The assessor should consider for example, changes to fire regime (frequency, severity), hydrology, pollutants, species interactions (increased competition, changes to pollinators or dispersal), fragmentation, increased edge effects and disease, pathogens and parasites, which are likely to contribute to the loss of flora and/or fauna species characteristic of the TEC
   b. the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by:
      i. estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals
      ii. describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:
         - distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and
         - estimated maximum dispersal distance for native flora species characteristic of the TEC, and
         - other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development
      iii. describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.
5. The assessor may also provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAII is not accurate.

APPENDIX B

Hills Shire Council report to the Local Planning Panel regarding SAII

LOCAL PLANNING PANEL MEETING 15 SEPTEMBER, 2021 **THE HILLS SHIRE**

Matter of Serious and Irreversible Impacts

Two vegetation communities that have been recorded within and adjacent to the development footprint, Blue Gum High Forest and Sydney Turpentine-Ironbark Forest are both identified as entities at risk of Serious and Irreversible Impacts.

As the applicant's consultant has not assessed the vegetation appropriately no additional information set out in Section 9.1 as per the Biodiversity Assessment Method 2020 was provided in the BDAR.

Council's Senior Biodiversity Officer has therefore provided their response and assessment regarding consideration of Serious and Irreversible Impacts:

It is known and accepted that the areas within the development footprint have been subjected to previous disturbances due to the original IBM development which was located in an area that was previously cleared and used for agriculture. It is noted that the native vegetation present has conservation significance, however it has been determined and assessed the proposed vegetation removal is required to facilitate the demolition of the buildings and ultimately the future development on the site. This justification report has provided additional assessment and has demonstrated what would have been required by the applicant's consultant in accordance with Biodiversity Assessment Method. The applicant has expressed that the intent is to try and minimise the amount of tree removal required by the development but the assessment of impacts to trees have been calculated based on a worst case scenario.

I have also considered additional measures that will be undertaken as part of the overall development which will include open spaces, additional tree planting, vegetation management improvements works for areas of native vegetation to be retained and, increased protection for the intact remnant vegetation within the property being transferred/ dedicated to The Forestry Corporation of NSW.

Council's Senior Biodiversity Officer has determined that the development will not result in a Serious and Irreversible Impact on Blue Gum High Forest or Sydney Turpentine-Ironbark Forest.

APPENDICES C AND D

Appendices C and D are attached as separate documents to this submission.

Blue Gum High Forest in the Sydney Basin Bioregion - Determination to make a minor amendment to Part 2 of Schedule 1A of the Threatened Species Conservation Act

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Determination to make a minor amendment to Part 2 of Schedule 1A (Critically endangered ecological communities) of the Act by inserting the Blue Gum High Forest in the Sydney Basin Bioregion (as described in the determination of the Scientific Committee under Division 5 Part 2) and as a consequence to omit reference to the Blue Gum High Forest in the Sydney Basin Bioregion (as described in the final determination to list the ecological community) which was published on pages 2357 to 2363 in the NSW Government Gazette No. 54 dated 20 April 2007. Minor amendments to the Schedules are provided for by Division 5 of Part 2 of the Act.

The Scientific Committee is of the opinion that the amendment is necessary or desirable to correct minor errors or omissions in the Determination in relation to the Thackway and Cresswell (1995) reference.

NSW Scientific Committee - final determination

The Scientific Committee has found that:

1. Blue Gum High Forest in the Sydney Basin Bioregion is the name given to the ecological community characterised by the species assemblage listed in paragraph 2. All sites are within the Sydney Basin Bioregion. Bioregions are defined in Thackway and Cresswell (1995).

2. Blue Gum High Forest in the Sydney Basin Bioregion is characterised by the following assemblage of species:

Acmena smithii	*Adiantum aethiopicum*
Allocasuarina torulosa	*Alphitonia excelsa*
Angophora costata	*Angophora floribunda*
Asplenium flabellifolium	*Backhousia myrtifolia*
Blechnum cartilagineum	*Breynia oblongifolia*

Calochlaena dubia	*Carex maculata*
Cissus hypoglauca	*Clematis aristata*
Clerodendrum tomentosum	*Dianella caerulea*
Doodia aspera	*Elaeocarpus reticulatus*
Entolasia marginata	*Entolasia stricta*
Eucalyptus globoidea	*Eucalyptus paniculata*
Eucalyptus pilularis	*Eucalyptus saligna*
Eustrephus latifolius	*Ficus coronata*
Glochidion ferdinandi var. *ferdinandi*	*Glycine clandestina*
Hydrocotyle laxiflora	*Leucopogon juniperinus*
Lomandra longifolia	*Marsdenia rostrata*
Maytenus silvestris	*Morinda jasminoides*
Notelaea longifolia forma *longifolia*	*Oplismenus aemulus*
Oplismenus imbecillis	*Oxalis perennans*

Pandorea pandorana	*Persoonia linearis*
Pittosporum revolutum	*Pittosporum undulatum*
Platylobium formosum	*Poa affinis*
Polyscias sambucifolia subsp. A	*Pratia purpurascens*
Pseuderanthemum variabile	*Pteridium esculentum*
Rapanea variabilis	*Smilax australis*
Smilax glyciphylla	*Tylophora barbata*
Viola hederacea	

3. The total species list of the community is considerably larger than that given above, with many species present in only one or two sites or in low abundance. The species composition of a site will be influenced by the size of the site, recent rainfall or drought condition and by its disturbance (including fire) history. The number of species, and the above ground relative abundance of species will change with time since fire, and may also change in response to changes in fire regime (including changes in fire frequency). At any one time, above ground individuals of some species may be absent, but the species may be represented below ground in the soil seed banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers. The list of species given above is of vascular plant species; the community also includes micro-organisms, fungi, cryptogamic plants and a diverse fauna, both vertebrate and invertebrate. These components of the community are poorly documented.

4. Blue Gum High Forest is dominated by a tall canopy of eucalypts that may exceed 30 m in height. Its understorey is typically multi-layered with a midstorey of mesophyllous shrubs and small trees and a diverse ground layer of herbs, ferns and some grasses. Most stands of the community are in a state of regrowth after past clearing or logging activities, and consequently trees may be shorter, less dense or more dense than less disturbed stands. Blue Gum High Forest is dominated by either *Eucalyptus pilularis* (Blackbutt) or *E. saligna* (Sydney Blue Gum). *Angophora costata* (Smooth-barked Apple) is frequently observed in remnants close to the shale/sandstone boundary, but also occurs infrequently on deep shale soils, as does *A.floribunda* (Rough-barked Apple). *Eucalyptus paniculata* (Grey Ironbark) is typically found on upper slopes. A relatively diverse stratum of small trees is usually present, and includes *Pittosporum undulatum* (Sweet Pittosporum), *Elaeocarpus reticulatus* (Blueberry Ash) and *Allocasuarina torulosa* (Forest Oak). Shrub species are typically mesophyllous, such as *Breynia oblongifolia* (Coffee Bush), *Pittosporum revolutum,* (Yellow Pittosporum), *Clerodendrum tomentosum, Notelaea longifolia* forma *longifolia* (Large Mock-olive), *Maytenus sylvestris* (Narrow-leaved Orange Bark), *Polyscias sambucifolia* subsp. A (Elderberry

Panax) and *Rapanea variabilis* (Muttonwood). Mesophyllous species are generally more common in gullies associated with both shale and volcanic soils than slopes and ridgetops. Sclerophyllous species such as *Persoonia linearis* (Narrow-leaved Geebung) and *Leucopogon juniperinum* (Prickly Bearded-heath) occur more frequently closer to the shale/sandstone boundary. The ground stratum is often dense and contains a mixture of herb, grass and fern species including *Adiantum aethiopicum, Entolasia marginata* (Bordered Panic), *Lomandra longifolia* (Spiny-headed Matrush), *Calochlaena dubia* (Common Groundfern), *Dianella caerulea* (Blue Flax Lily), *Pseuderanthemum variabile* (Pastel Flower) and *Oplismenus imbecillis*. Vine species are also frequently present, in particular *Tylophora barbata* (Bearded Tylophora), *Eustrephus latifolia,* (Wombat Berry), *Clematis aristata* (Old Man's Beard) and *Pandorea pandorana* (Wonga Wonga Vine).

5. While no systematic fauna surveys have been carried out across the range of Blue Gum High Forest a number of mammal and bird species listed as threatened in NSW have been recorded as resident or transient in the community. These include the Grey-headed Flying Fox (*Pteropus poliocephalus*), Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventri*s), Glossy Black cockatoo (*Calyptorhynchus lathami*) and the Powerful Owl (*Ninox strenua*).

6. Blue Gum High Forest is typically associated with soils derived from Wianamatta Shale (Tozer 2003), though may occur in adjacent areas underlain by Hawkesbury Sandstone . The community also occurs on soils associated with localised volcanic intrusions, 'diatremes' (Benson and Howell 1994). Typically, Blue Gum High Forest occurs more than 100m above sea level, where rainfall exceeds 1050 mm per annum, although it may be present in sheltered locations with lower rainfall (Tozer 2003). In drier areas and approaching the shale/sandstone boundary, it intergrades with Sydney Turpentine Ironbark Forest, which is currently listed as an Endangered Ecological Community under the TSC Act. Stands that exhibit intermediate characteristics are collectively covered by the Determinations of these communities and may be diagnosed by detailed consideration of the assemblage of species present at the site.

7. Vegetation surveys carried out across the range of Blue Gum High Forest include those of Benson and Howell (1990, 1994) and Tozer (2003). All of these studies describe and map this community as 'Blue Gum High Forest', including map unit 6b 'Tall open-forest: *Eucalyptus pilularis – Eucalyptus saligna*' of Benson and Howell (1994) and map unit 153 of Tozer (2003). In addition, Benson and Howell (1994) map separately that part of this community which occurs on soils associated with diatremes as 'Glen Forest, map unit 6c, i. Tall open-forest: *Eucalyptus saligna*', noting that this vegetation was 'very similar to the Blue Gum High Forest of the north shore [i. e. map unit 6b]'. Blue Gum High Forest belongs to the North Coast Wet Sclerophyll Forests vegetation class of Keith (2004).

8. Blue Gum High Forest is found on the north shore and northern suburbs of Sydney and has been recorded from the local government areas of Lane Cove, Willoughby, Ku-ring-gai, Hornsby, Baulkham Hills, Ryde and Parramatta within the Sydney Basin Bioregion and may occur elsewhere in the Bioregion. Bioregions are defined in Thackway and Cresswell (1995).

9. Blue Gum High Forest has a very highly restricted geographic distribution, and is currently estimated to cover an extant area of less than 200 ha (Tozer 2003). The distribution comprises a series of small remnant patches, the largest of which is less than 20ha. Highly modified relics of the community also persist as small clumps of trees without a native understorey. All remnants of the community are now surrounded by urban development. Consequently, the distribution of Blue Gum High Forest is severely fragmented. Fragmentation of habitat contributes to a very large reduction in the ecological function of the community.

10. Prior to European settlement, about 200 years ago, Blue Gum High Forest is estimated to have covered an area of approximately 3700 ha (Tozer 2003). Its current extent amounts to less than 5% of this original distribution. The dominant eucalypts of the community live for several hundred years. Blue Gum High Forest has therefore undergone a very large reduction in its geographic distribution within a time span appropriate to the life cycle and habitat characteristics of its component species. Small-scale clearing associated with residential subdivision, road upgrading, extension and maintenance of service easements, etc. pose a threat of ongoing decline in the extent of the community. Clearing of native vegetation is listed as a Key Threatening Process under the Threatened Species Conservation Act 1995.

11. Changes in structure of Blue Gum High Forest have occurred as a consequence of the extensive removal of large old trees. A number of stands of Blue Gum Forests have highly modified understories, in which the native woody component has been largely replaced by woody exotic species or by increased abundance of native and exotic grasses. Continued underscrubbing, frequent burning and mowing may maintain the understorey in an artificially open state and prevent recruitment of species with the community. The loss of large trees removes essential habitat for a range of tree-dependent fauna (Gibbons and Lindenmeyer 1996). The reduction of understorey complexity, through the reduction of native shrub cover, degrades habitat for a range of bird and mammal species (Catling 1991). These processes contribute to a very large reduction in the ecological function of the community.

12. The influx of stormwater, which brings excessive moisture, pollutants and nutrients to the remnant forests from surrounding urban areas, is a significant ongoing threat to the ecological integrity of Blue Gum High Forest. This, together with the legacy of past disturbances and the abundance and dispersal of weed propagules from nearby urban areas, results in the invasion, establishment and spread of weeds (Thomson and Leishman 2005). Problematic weed species in Blue Gum High Forest include the following:

Asparagus asparagoides	Bridal Creeper
Cinnamomum camphora	Camphor laurel
Lantana camara	Lantana
Ligustrum lucidum	Large-leaved Privet
Ligustrum sinense	Small-leaved Privet
Ochna serrulata	
Passiflora edulis	Passionfruit
Passiflora subpeltata	Passionfruit
Pennisetum clandestunum	Kikuyu
Rubus ulmifolius	Blackberry

Senna colutioides

Tradescantia fluminensis

'Invasion and establishment of exotic vines and scramblers, 'Invasion of native plant communities by exotic perennial grasses' and 'Invasion, establishment and spread of Lantana (*Lantana camara* L. *sens. lat*)' are listed as Key Threatening Processes under the Threatened Species Conservation Act. The influx of stormwater, pollutants and nutrients, and the invasion of weeds contribute to a very large reduction in the ecological function of the community.

13. Blue Gum High Forest in the Sydney Basin Bioregion is eligible to be listed as a critically endangered ecological community as, in the opinion of the Scientific Committee, **it is facing an extremely high risk of extinction in New South Wales in the immediate future**, as determined in accordance with the following criteria as prescribed by the Threatened Species Conservation Regulation 2002:

Clause 25

The ecological community has undergone, is observed, estimated, inferred or reasonably suspected to have undergone, or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:

(a) a very large reduction in geographic distribution.

Clause 26

The ecological community's geographic distribution is estimated or inferred to be:

(b) very highly restricted,

and the nature of its distribution makes it likely that the action of a threatening process could cause it to decline or degrade in extent or ecological function over a time span appropriate to the life cycle and habitat characteristics of the ecological community's component species.

Clause 27

The ecological community has undergone, is observed, estimated, inferred or reasonably suspected to have undergone, or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:

(a) a very large reduction in ecological function,

as indicated by any of the following:

(b) change in community structure

(c) change in species composition

(f) disruption of ecological processes

(g) invasion and establishment of exotic species

(h) degradation of habitat

(i) fragmentation of habitat

Dr Richard Major
Chairperson
Scientific Committee

Proposed Gazettal date: 14/10/11
Exhibition period: 14/10/11 - 9/12/11

Note this ecological community was originally listed as an endangered ecological community in 1997

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Thomson VP, Leishman MR (2005) Post-fire vegetation dynamics in nutrient-enriched and non-enriched sclerophyll woodland. *Austral Ecology* 30, 250-260

Tozer MG (2003) The native vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities. *Cunninghamia* 8, 1-75.

Proposed Publication date: 31/05/19

Notice of and reasons for Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list the Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion as a CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY in Part 1 of Schedule 2 of the Act and to remove the Sydney Turpentine-Ironbark Forest from Part 2 of Schedule 2 of the Act. Listing of ecological communities is provided for in Part 4 of the Act.

Summary of Conservation Assessment

Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion is eligible for listing as Critically endangered, as the highest threat category met by the community across all categories, under Clauses 4.9 (a), 4.11 (a) and 4.12 (a) because the community has: i) undergone a very large reduction in geographic distribution; ii) experienced a very large degree of environmental degradation; and iii) experienced a very large disruption of biotic processes and interactions.

This determination contains the following information:

Parts 1 & 2: Section 1.6 of the Act defines an ecological community as "an assemblage of species occupying a particular area". These features of Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion are described in Parts 1 and 2 of this Determination, respectively.

Part 3: Part 3 of this Determination describes the eligibility for listing of this ecological community in Part 1 of Schedule 2 of the Act according to criteria prescribed by the *Biodiversity Conservation Regulation 2017*.

Part 4: Part 4 of this Determination provides additional information intended to aid recognition of this community in the field.

Part 1. Assemblage of species

1.1 Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion (hereafter referred to as Sydney Turpentine-Ironbark Forest) is characterised by the assemblage of species listed below.

Acacia falcata
Acacia floribunda
Acacia implexa
Acacia longifolia
Acacia parramattensis
Adiantum aethiopicum
Allocasuarina torulosa
Angophora costata
Anisopogon avenaceus
Aristida vagans
Arthropodium milleflorum
Austrostipa pubescens
Austrostipa rudis
Billardiera scandens
Breynia oblongifolia
Brunoniella australis
Brunoniella pumilio
Bursaria spinosa
Cayratia clematidea
Centella asiatica
Cheilanthes sieberi
Clematis aristata

Clematis glycinoides var*. glycinoides*
Commelina cyanea
Denhamia silvestris
Desmodium varians
Dianella longifolia
Dichelachne rara
Digitaria parviflora
Doodia aspera
Echinopogon ovatus
Elaeocarpus reticulatus
Entolasia stricta
Eucalyptus fibrosa
Eucalyptus notabilis
Eucalyptus pilularis
Eucalyptus resinifera subsp*. resinifera*
Eustrephus latifolius
Gahnia aspera
Glochidion ferdinandi var*. ferdinandi*
Glycine microphylla
Gonocarpus tetragynus
Goodenia heterophylla
Hibbertia diffusa
Imperata cylindrica
Kennedia rubicunda
Lepidosperma laterale
Lindsaea microphylla
Lomandra longifolia
Myrsine variabilis
Opercularia hispida
Oplismenus aemulus
Oxalis exilis
Pandorea pandorana
Paspalidium distans
Persoonia linearis
Pittosporum undulatum
Poa sieberiana var*. sieberiana*
Pomaderris intermedia
Pratia purpurascens
Pultenaea villosa
Rumex brownii
Sigesbeckia orientalis subsp*. orientalis*
Smilax glyciphylla
Syncarpia glomulifera subsp*. glomulifera*
Trema tomentosa var*. viridis*
Veronica plebeia
Clerodendrum tomentosum
Daviesia ulicifolia
Desmodium rhytidophyllum
Dianella caerulea
Dichelachne inaequiglumis
Dichondra spp*.*
Dodonaea triquetra
Echinopogon caespitosus var*. caespitosus*
Einadia hastata
Entolasia marginata
Eucalyptus acmenoides
Eucalyptus globoidea
Eucalyptus paniculata subsp*. paniculata*
Eucalyptus punctata
Eucalyptus saligna X *E. botryoides*
Exocarpos cupressiformis
Geranium solanderi var*. solanderi*
Glycine clandestina
Glycine tabacina
Goodenia hederacea subsp*. hederacea*
Hibbertia aspera subsp*. aspera*
Hydrocotyle sibthorpioides
Indigofera australis
Kunzea ambigua
Leucopogon juniperinus
Lomandra filiformis subsp*. filiformis*
Microlaena stipoides
Notelaea longifolia forma *longifolia*
Opercularia varia
Oplismenus imbecillis
Ozothamnus diosmifolius
Panicum simile
Passiflora herbertiana subsp*. herbertiana*
Pittosporum revolutum
Poa affinis
Polyscias sambucifolia
Poranthera microphylla
Pseuderanthemum variabile
Rubus parvifolius
Sarcopetalum harveyanum
Smilax australis
Solanum prinophyllum
Themeda triandra
Tylophora barbata
Zieria smithii

1.2 The total species list of the community across all occurrences is likely to be considerably larger than that given above. Due to variation across the range of the community, not all of the above species are present at every site and many sites may also contain species not listed above. Annual species and geophytes may not be detectable at certain times of the year such as the cooler months.

Characteristic species may be abundant or rare and comprise only a subset of the complete list of species recorded in known examples of the community. Some characteristic species show a high fidelity (are relatively restricted) to the community, but may also occur in other communities, while others are more typically found in a range of communities.

The number and identity of species recorded at a site is a function of sampling scale and effort. In general, the number of species recorded is likely to increase with the size of the site and there is a greater possibility of recording species that are rare in the landscape.

Species presence and relative abundance (dominance) will vary from site to site as a function of environmental factors such as soil properties (chemical composition, texture, depth, drainage), topography, climate and through time as a function of disturbance (*e.g.* fire, logging, grazing) and weather (*e.g.* flooding, drought, extreme heat or cold).

At any one time, above ground individuals of some species may be absent but the species may be represented below ground in the soil seed bank or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers.

The species listed above are vascular plants, however the community also includes micro-organisms, fungi and cryptogamic plants as well as vertebrate and invertebrate fauna. These components of the community are less well documented.

Part 2. Particular area occupied by the ecological community

2.1.1 The assemblage of species listed in Part 1.1 above which characterises the Sydney Turpentine-Ironbark Forest occurs within the Sydney Basin Bioregion. This Bioregion is defined by SEWPaC (2012) Interim Biogeographic Regionalisation for Australia, Version 7. Department of Sustainability, Environment, Water, Population and Communities. http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/maps.html

2.2 It is the intent of the NSW Threatened Species Scientific Committee that all occurrences of the ecological community (both recorded and as yet unrecorded, and independent of their condition) that occur within this bioregion be covered by this Determination.

Part 3. Eligibility for listing

3.1 Reasons for determining eligibility for listing

3.1.1 Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion (STIF) is listed as an Endangered Ecological Community under the *Biodiversity Conservation Act 2016*. Since the original listing new data have become available and the NSW Threatened Species Scientific Committee has undertaken a review of the conservation status of the ecological community to inform the current listing status under the Act.

3.1.2 Sydney Turpentine-Ironbark Forest corresponds to the community referred to by this name in Benson and Howell (1990) and includes vegetation occurring on the Hornsby Plateau, the eastern Cumberland Lowlands and the northern Woronora Plateau physiographic regions (*sensu* Chapman and Murphy 1989). This vegetation was described as map unit 9o by Benson (1992) and Benson and Howell (1994). More recent field surveys have shown that the community also occurs near the south eastern margin of the Cumberland Plain as described by NSW OEH (2013ab) (map unit S_WSF09), and to the south west and north west of the Cumberland Plain as described by Tozer *et al*. (2010) (map unit WSF p87). Sydney Turpentine-Ironbark Forest includes map units 15 and 43 of Tozer (2003). Sydney Turpentine-Ironbark Forest falls within the Northern Hinterland Wet Sclerophyll Forests Class of Keith's (2004) Wet Sclerophyll Forest Formation (OEH 2013b).

3.1.3 Sydney Turpentine-Ironbark Forest has undergone a very large reduction in distribution. Clearing of STIF for agricultural development commenced in the inner west of Sydney soon after European settlement and accelerated following the expansion of Sydney's suburbs in the nineteenth and early twentieth centuries (Benson and Howell 1994). Although the pre-European extent of STIF is uncertain, there is general agreement among sources that the reduction in extent exceeds 90%. Tozer (2003) estimated that 30,339 ha of STIF existed prior to European colonisation and approximately 1,183 ha (± 227 ha) remained in 1997 (3.9 ±0.7%), although this estimate was based only on the distribution of STIF on the Cumberland Lowlands and the Hornsby and Woronora Plateaux. Tozer *et al*. (2010) estimated some 2,300 ha of STIF remains, comprising <10% of its original distribution and including STIF occurring to the south west and north west of the Cumberland Plain in the lower Blue Mountains. NSW OEH (2013b) found that the original distribution of STIF was probably higher than 23,000 ha but concurred that less than 10% remains. Additional remnants of STIF have been mapped by BMCC (2003) (a total of 190 ha) and Smith and Smith (2008) (148 ha). Combining these maps with the maps of Tozer et al. (2010) and NSW OEH (2013ab) gives an estimated 2,940 ha of STIF remaining, or less than 10% of Tozer's (2003) estimated original distribution.

3.1.4 The distribution of Sydney Turpentine-Ironbark Forest is highly restricted. The extent of occurrence (EOO) of STIF is 4,479 km^2 based on a minimum convex polygon enclosing known occurrences of the community as interpreted in Sections 4.2 – 4.10 and using the method of assessment recommended by IUCN (Bland *et al.* 2017). The estimated area of occupancy (AOO) is 12 10 km x 10 km grid cells, the scale recommended for assessing AOO by IUCN and applying a minimum occupancy threshold of 1% (Bland *et al.* 2017).

3.1.5 Remnants of Sydney Turpentine-Ironbark Forest are poorly represented in the formal reserve network, and unreserved areas are subject to the threat of vegetation clearing. An estimated 280 ha of STIF (less than 1% of the pre-European extent) is distributed among 15 reserves (with a minimum area of 0.5 ha) under the management of the NSW National Parks and Wildlife Service (Tozer *et al.* 2010; BMCC 2003; Smith and Smith 2008; NSW OEH 2013a). This includes 112 ha in Bargo SCA, 49 ha in Blue Mountains NP, 25 ha in Lane Cove NP and 22 ha in Newington NR. A further 254 ha occurs in Crown Reserves and 36 ha is preserved in perpetuity under Biobanking or Conservation Agreements. The total area under reservation is estimated to be 570 ha, equivalent to less than 2% of the estimated pre-1750 distribution or 20% of the remaining extent.

3.1.6 Remnants of Sydney Turpentine-Ironbark Forest have historically been subjected to a range of anthropogenic disturbances including logging, grazing by domesticated livestock and burning at varying intensities (Benson and Howell 1994). These disturbances have affected the structure and potentially the composition of remnants. For example, the density and average basal diameter of trees in remnants sampled by Benson and Howell (1994) suggested that the removal of large older trees has led to higher densities of smaller trees such that remnants typically have the structure of regrowth forest. Increased fire frequencies associated with hazard reduction burning have led to declines in populations of slow-maturing, fire sensitive species and effected a structural simplification in some remnants of STIF. Conversely, remnants with a long-term history of fire-exclusion, particularly when coupled with increases in nutrient and moisture availability, are characterised by higher densities and cover of mesic species (such as *Pittosporum undulatum*, *Glochidion ferdinandi* and *Homalanthus populifolius*), larger and more diverse populations of exotic species and lower diversity of understorey species (Rose and Fairweather 1997, McDonald *et al*. 2002, Howell 2003). 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' and 'Loss of hollow-bearing trees' are listed as a Key Threatening Processes under the Act.

3.1.7 Remnants of Sydney Turpentine-Ironbark Forest are typically small and fragmented and are susceptible to continuing attrition through clearing for routine land management practices due to the majority of remnants being located in close proximity to rural land or urban interfaces (Benson and Howell 1994; Tozer 2003). Applications to the NSW Land and Environment Court demonstrate that there is ongoing pressure to clear STIF in the course of developing private properties or for the establishment of Asset Protection Zones (https://www.caselaw.nsw.gov.au accessed 19/11/2018). 'Clearing of native vegetation' is listed as a Key Threatening Process under the Act.

3.1.8 Remnants of Sydney Turpentine-Ironbark Forest are subject to ongoing invasion by an extensive range of naturalised plant species. Weed invasion is exacerbated by the proximity of remnants to areas of rural and urban development and the associated influx of both weed propagules from gardens and nutrients contained in stormwater runoff, dumped garden refuse and animal droppings (Leishman 1990, Benson and Howell 1994, Leishman *et al.* 2004, Smith and Smith 2010). Species such as *Ligustrum lucidum* (Large-leafed Privet) and *Ligustrum sinense* (Small-leafed Privet) are highly invasive under conditions of enhanced soil nutrients and have been recorded in at least half of all plots sampling STIF by Tozer (2003). Other frequently recorded species include the shrubs *Ochna serrulata* (Mickey Mouse Plant), *Phytolacca octandra* (Inkweed), *Sida rhombifolia* (Paddy's Lucerne) and *Chrysanthemoides monilifera* (Bitou Bush/Boneseed), the scandent shrubs *Lantana camara* (Lantana) and *Asparagus aethiopicus* (Asparagus Fern), the climbers *Araujia sericifera* (Moth Vine), *Asparagus asparagoides* (Bridal Creeper) and *Hedera helix* (English Ivy) and the grasses *Paspalum dilatatum* (Paspalum), *Ehrhata erecta* (Panic Veldtgrass) and *Setaria parviflora* (Tozer 2003). 'Invasion and establishment of exotic vines and scramblers', 'Invasion, establishment and spread of *Lantana* (*Lantana camara* L. *sens. lat.*)', 'Invasion of native plant communities by *Chrysanthemoides monilifera*', 'Invasion of native plant communities by exotic perennial grasses' and 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants'are listed as Key Threatening Processes under the Act.

3.1.9 The threats to Sydney Turpentine-Ironbark Forest listed above are ongoing and likely to cause continuing declines in geographic distribution and disruption of biotic processes and interactions.

3.2 Criteria for listing

Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion is eligible to be listed as a Critically Endangered Ecological Community in accordance with Part 4 of the Act as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing an extremely high risk of extinction in Australia in the immediate future, as determined in accordance with the following criteria as prescribed by the *Biodiversity Conservation Regulation 2017*:

Clause 4.9 – Reduction in geographic distribution of ecological community
(Equivalent to IUCN criterion A)
Assessment Outcome: Critically endangered under Clause 4.9 (a)

The ecological community has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of its component species:			
	(a)	for critically endangered ecological communities	a very large reduction in geographic distribution
	~~(b)~~	~~for endangered ecological communities~~	~~a large reduction in geographic distribution~~
	~~(c)~~	~~for vulnerable ecological communities~~	~~a moderate reduction in geographic distribution~~

Clause 4.10 - Restricted geographic distribution of ecological community
(Equivalent to IUCN criterion B)
Assessment Outcome: Endangered under Clause 4.10 (b), (d) (i, ii, iii), e

The ecological community's geographic distribution is:				
	~~(a)~~	~~for critically endangered ecological communities~~		~~very highly restricted.~~
	(b)	for endangered ecological communities		highly restricted.
	~~(c)~~	~~for vulnerable ecological communities~~		~~moderately restricted.~~
and at least 1 of the following conditions apply:				
	(d)	there is a projected or continuing decline in any of the following:		
		(i)	a measure of spatial extent appropriate to the ecological community,	
		(ii)	a measure of environmental quality appropriate to characteristic biota of the ecological community,	
		(iii)	a measure of disruption to biotic interactions appropriate to characteristic biota of the ecological community,	
	(e)	There are threatening processes that are likely to cause continuing decline in either geographic distribution, environmental quality or biotic interactions within the near future,		
	~~(f)~~	~~The ecological community exists at:~~		
		~~(i)~~	~~for critically endangered ecological communities~~	~~an extremely low number of locations.~~

		~~(ii)~~	~~for endangered ecological communities~~	~~a very low number of locations.~~
		~~(iii)~~	~~for vulnerable ecological communities~~	~~a low number of locations.~~

Clause 4.11 – Environmental degradation of ecological community
(Equivalent to IUCN criterion Clause C)
Assessment Outcome: Critically endangered under Clause 4.11 (a)

The ecological community has undergone or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:			
	(a)	for critically endangered ecological communities	a very large degree of environmental degradation.
	~~(b)~~	~~for endangered ecological communities~~	~~a large disruption of biotic processes or interactions.~~
	~~(c)~~	~~for vulnerable ecological communities~~	~~a moderate degree of environmental degradation.~~

Clause 4.12 – Disruption of biotic processes or interactions in ecological community
(Equivalent to IUCN criterion D)
Assessment Outcome: Critically endangered under Clause 4.12 (a)

The ecological community has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of its component species:			
	(a)	for critically endangered ecological communities	a very large disruption of biotic processes or interactions
	~~(b)~~	~~for endangered ecological communities~~	~~a large disruption of biotic processes or interactions~~
	~~(c)~~	~~for vulnerable ecological communities~~	~~a moderately large disruption of biotic processes or interactions~~

Clause 4.13 – Quantitative analysis of probability of collapse of ecological community
(Equivalent to IUCN criterion E)
Assessment Outcome: Data deficient

The probability of collapse of the ecological community is estimated to be:			
	~~(a)~~	~~for critically endangered species~~	~~extremely high~~
	~~(b)~~	~~for endangered ecological communities~~	~~a large disruption of biotic processes or interactions~~
	~~(c)~~	~~for vulnerable species~~	~~high~~

Dr Marco Duretto
Chairperson
NSW Threatened Species Scientific Committee

Part 4. Additional information about the ecological community

The following information is additional to that required to meet the definition of an ecological community under the Act but is provided to assist in the recognition of the Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion (hereafter referred to as the Sydney Turpentine-Ironbark or STIF) in the field. Given natural variability, along with disturbance history, Sydney Turpentine-Ironbark may sometimes occur outside the typical range of variation in the features described below.

4.1 Sydney Turpentine-Ironbark Forest typically has the structural form of Open Forest (*sensu* Specht 1970) with a tree canopy ranging in height from the mid to upper range for this form (10-30 m) and with projected foliage cover at the mid to lower end of the range (30-50%) (Tozer *et al*. 2010). Remnants with a history of logging or other anthropogenic disturbance may resemble woodland or open woodland, with a sparser tree cover associated with lower tree densities and/or the selective removal of larger trees. Examples of STIF undergoing regrowth following tree removal may have higher densities of younger trees, and projected foliage cover at the high end of, or exceeding, the range given above. The dominant tree species include *Syncarpia glomulifera* and *Eucalyptus paniculata*. These species may have been characteristic of the community prior to European settlement but a range of other tree species may co-occur or even dominate STIF as a result of past disturbance or reflecting natural variation in the landscape (Benson and Howell 1994). These include *Eucalyptus globoidea*, *E. punctata*, *E. resinifera*, *E. pilularis* and *Angophora floribunda* (Benson and Howell 1994) and *E. acmenoides* (Tozer 2003). *Eucalyptus saligna* may have occurred locally in gullies or depressions (Benson and Howell 1994) or may be dominant at the upper end of the rainfall range over which STIF occurs (Tozer 2003). STIF is frequently characterised by a stratum of smaller trees which, in addition to saplings of the species listed above, is dominated by species such as *Pittosporum undulatum*, *Acacia parramattensis, Allocasuarina torulosa* and *Elaeocarpus reticulatus* (Tozer *et al*. 2010). The understorey may be either shrubby or grassy (Benson and Howell 1994). Frequently recorded shrub species include *Breynia oblongifolia*, *Bursaria spinosa*, *Denhamia silvestris, Hibbertia aspera* subsp. *aspera*, *Leucopogon juniperinus, Notelaea longifolia* forma *longifolia*, *Ozothamnus diosmifolius*, *Persoonia linearis*, *Pittosporum revolutum*, *Polyscias sambucifolia* (Tozer *et al.* 2010), *Dodonaea triquetra* and *Acacia falcata* (Benson and Howell 1994). Common herbaceous species include *Themeda triandra, Echinopogon caespitosus, Pseuderanthemum variable*, *Pratia purpurascens* (Benson and Howell 1994), *Lomandra longifolia*, *Dianella caerulea*, *Adiantum aethiopicum*, *Billardiera scandens*, *Dichondra* sp., *Echinopogon ovatus*, *Entolasia marginata*, *E. stricta*, *Imperata cylindrica*, *Microlaena stipoides* and *Oplismenus* spp. Climbers such as *Eustrephus latifolius, Glycine clandestina, Kennedia rubicunda, Pandorea pandorana* and *Tylophora barbata* are frequently present (Tozer *et al.* 2010).

4.2 Sydney Turpentine-Ironbark Forest has been reported as occurring in areas receiving moderate rainfall (900-1100 mm) on soils derived either from Wianamatta Shale or from Wianamatta Shale interbedded with Hawkesbury Sandstone (Benson and Howell 1994, Tozer 2003). In most of these locations STIF occurs up to approximately 100 m above sea level although it is found as high as 200 m above sea level on the western edge of the Hornsby Plateau where average annual rainfall falls below 1050 mm (Tozer 2003). Tozer *et al.* (2010) reported a broader range in elevation (up to 500 m a.s.l.) and rainfall (850–1250 mm) for the community in order to accommodate marginal examples at the upper (Heathcote) and lower (Thirlmere, Oakdale, east of Kurrajong) levels of the rainfall range.

Benson and Howell (1994) stated that STIF was the characteristic vegetation of inner western Sydney and was widespread between St Peters and Peakhurst and found as far west as Lansdowne. Sydney Turpentine-Ironbark Forest is also found on the Hornsby Plateau at locations between Ryde – Arcadia – Castle Hill (Benson and Howell 1994), on the Woronora Plateau at Menai and in the Lower Blue Mountains (Tozer *et al.* 2010).

4.3 Sydney Turpentine-Ironbark Forest occurs on low rolling hills characteristic of the Cumberland Lowlands and the broad, shale-capped ridges of the surrounding plateaux. These ridges often transition relatively abruptly to valleys incised into the underlying Hawkesbury Sandstone and in such situations STIF is replaced by Sandstone Ridgetop Woodland or Sandstone Gully Forest (Benson and Howell 1994, Tozer *et al.* 2010). As the depth of the shale cap decreases towards the ridge margin, an increasing component of the STIF flora is shared with adjoining sandstone vegetation communities. These areas correspond to the Turpentine-Ironbark Margin Forest (map unit 43) as described by Tozer (2003).

4.4 In the eastern parts of its range, Sydney Turpentine-Ironbark Forest has been described as a community intermediate between Cumberland Plain Woodland and Blue Gum High Forest along a gradient of increasing rainfall (Benson and Howell 1994). Moisture available for plant growth is determined by a range of factors including the timing and magnitude of rainfall events, soil depth and texture and topographic factors which influence rates of evapotranspiration. Collectively, these factors determine the points of transition between the three communities such that examples of STIF may occur outside the thresholds of annual rainfall described in Section 4.2. In areas where shale shallowly overlies sandstone, or where shale lenses are interbedded with sandstone, STIF intergrades with Shale Sandstone Transition Forest as described by Tozer (2003) and Tozer *et al*. (2010). In the western parts of its range STIF intergrades with Blue Mountains Shale Cap Forest with increasing elevation and rainfall (Benson 1992). The transition is characterised by the addition of *Eucalyptus deanei* and *E. cypellocarpa* as dominant species in association with *Syncarpia glomulifera, E. notabilis, E. globoidea* and *E. paniculata* Benson (1992).

4.5 The transition from Sydney Turpentine-Ironbark Forest to Blue Gum High Forest is associated with an increase in the height and projected foliage cover of the tree canopy and the replacement of *Syncarpia glomulifera* and *Eucalyptus paniculata* with *E. pilularis* and *E. saligna* as the dominant species. Based on plot samples analysed by Tozer *et al*. (2010), species which have been recorded more frequently in Blue Gum High Forest (WSFp153) compared with STIF (WSFp87) include, in decreasing order of diagnostic power*, *Platylobium formosum, Calochlaena dubia, Alphitonia excelsa, Smilax glyciphylla, Morinda jasminoides*, *Blechnum cartilagineum* and *Marsdenia rostrata.* Species which have been recorded more frequently in STIF include, in decreasing order of diagnostic power*, *Clematis glycinoides* var. *glycinoides, Solanum prinophyllum, Glycine microphylla, Bursaria spinosa, Echinopogon caespitosus* var. *caespitosus, Eucalyptus punctata, Acacia parramattensis, Panicum simile, Centella asiatica, Acacia floribunda, Hydrocotyle sibthorpioides, Veronica plebeia, Aristida vagans, Lomandra filiformis* subsp*. filiformis* and *Billardiera scandens*.

[*species listed in sections 4.5 – 4.8 generally occur in more than one of the related communities. Diagnostic power is a measure of the extent to which the records of a species are concentrated in the target community]

4.6 The transition from Sydney Turpentine-Ironbark Forest into Shale Sandstone Transition Forest is associated with a decrease in the height and cover of the tree canopy and the replacement of *Syncarpia glomulifera* and *Eucalyptus paniculata* with *E. crebra*, *E. fibrosa* and, to a lesser extent, *E. eugenioides* and *E. punctata*. Based on plot samples analysed by Tozer *et al*. (2010), species which have been recorded more frequently in Shale Sandstone Transition Forest (GWp2) compared with STIF (WSFp87) include, in decreasing order of diagnostic power*, *Goodenia hederacea* subsp. *hederacea, Allocasuarina littoralis, Lissanthe strigosa, Opercularia diphylla, Austrostipa pubescens, Vernonia cinerea* var. *cinerea, Lomandra filiformis* subsp. *coriacea, Stypandra glauca, Cymbopogon refractus, Laxmannia gracilis, Acacia decurrens, Lagenifera gracilis, Eragrostis brownii, Bossiaea prostrata, Calotis dentex, Jacksonia scoparia, Digitaria ramularis, Dichelachne micrantha, Dianella revoluta* var. *revoluta and Pimelea linifolia* subsp. *linifolia*. Species which have been recorded more frequently in STIF include, in decreasing order of diagnostic power*, *Eustrephus latifolius, Oplismenus imbecillis, Pandorea pandorana, Pittosporum undulatum, Imperata cylindrica, Clematis glycinoides* var. *glycinoides, Pseuderanthemum variabile, Adiantum aethiopicum, Pittosporum revolutum, Angophora costata, Polyscias sambucifolia, Oplismenus aemulus, Centella asiatica, Poa affinis, Denhamia silvestris, Clerodendrum tomentosum, Tylophora barbata, Kennedia rubicunda* and *Hydrocotyle sibthorpioides*.

4.7 Sydney Turpentine-Ironbark Forest is characterised by a number of frequently recorded species which are highly diagnostic of STIF but are much less frequently recorded in samples of the adjacent Sandstone Ridgetop Woodland and Sandstone Gully Forest (map units DSFp131 and DSFp142 of Tozer *et al.* (2010). These include, in decreasing order of diagnostic power*, *Pratia purpurascens, Dichondra* spp., *Eustrephus latifolius, Oplismenus imbecillis, Entolasia marginata, Breynia oblongifolia, Pittosporum undulatum, Bursaria spinosa, Hibbertia aspera* subsp. *aspera, Imperata cylindrica, Clematis glycinoides* var. *glycinoides, Pseuderanthemum variabile, Ozothamnus diosmifolius, Adiantum aethiopicum, Notelaea longifolia* forma *longifolia, Pittosporum revolutum, Solanum prinophyllum, Echinopogon caespitosus* var. *caespitosus, Leucopogon juniperinus, Glycine microphylla, Acacia parramattensis, Oplismenus aemulus, Panicum simile, Myrsine variabilis, Acacia floribunda, Echinopogon ovatus, Themeda triandra, Clerodendrum tomentosum, Tylophora barbata, Veronica plebeia* and *Aristida vagans* (Tozer *et al*. 2010).

4.8 Sydney Turpentine-Ironbark Forest may contain the following threatened animal and plant species listed under the BC Act or Commonwealth EPBC Act:

Plant Species	**Common Name**	**BC Act^**	**EPBC Act+**
Acacia pubescens	Downy Wattle	Vulnerable	Vulnerable
Acacia terminalis subsp. *terminalis*	Sunshine Wattle	Endangered	Endangered
Epacris purpurascens var. *purpurascens*		Vulnerable	
Eucalyptus benthamii	Camden White Gum	Vulnerable	Vulnerable
Grammitis stenophylla	Narrow-leaf Finger Fern	Endangered	
Persoonia mollis subsp. *maxima*		Endangered	Endangered
Pimelea curviflora var. *curviflora*		Vulnerable	Vulnerable
Zieria involucrata		Endangered	Vulnerable

Animal Species			
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	
Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	
Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	
Daphoenositta chrysoptera	Varied Sittella	Vulnerable	
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Endangered
Epthianura albifrons	White-fronted Chat	Vulnerable	
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	
Glossopsitta pusilla	Little Lorikeet	Vulnerable	
Hieraaetus morphnoides	Little Eagle	Vulnerable	
Lathamus discolor	Swift Parrot	Endangered	Critically Endangered
Litoria aurea	Green and Golden Bell Frog	Endangered	Vulnerable
Lophoictinia isura	Square-tailed Kite	Vulnerable	
Miniopterus australis	Little Bentwing-bat	Vulnerable	
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Vulnerable	
Mormopterus norfolkensis	Eastern Freetail-bat	Vulnerable	
Myotis macropus	Southern Myotis	Vulnerable	
Ninox connivens	Barking Owl	Vulnerable	
Ninox strenua	Powerful Owl	Vulnerable	
Pachycephala olivacea	Olive Whistler	Vulnerable	
Petaurus australis	Yellow-bellied Glider	Vulnerable	
Petaurus norfolcensis	Squirrel Glider	Vulnerable	
Petroica phoenicea	Flame Robin	Vulnerable	
Phascolarctos cinereus	KoalaKoala	Vulnerable	Vulnerable
Pommerhelix duralensis	Dural Land Snail	Endangered	Endangered
Pseudophryne australis	Red-crowned Toadlet	Vulnerable	
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	
Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	
Tyto novaehollandiae	Masked Owl	Vulnerable	
Tyto tenebricosa	Sooty Owl	Vulnerable	

^ *Biodiversity Conservation Act* 2016
\+ *Environment Protection and Biodiversity Conservation Act 1999*

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