Kleinfelder Australia Pty Ltd
95 Mitchell Road
CARDIFF NSW 2285
T| +61 2 4949 5200
www.kleinfelder.com.au
ABN: 23 146 082 500
NEWCASTLE OFFICE

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Attention: Kelsey Godwin-Smith
Delivered by email: kelsey@blp.com.au

Subject: **Warnervale Public School - Submissions from Central Coast Council (Council) and the Biodiversity Conservation Division (BCD)**

Kleinfelder was engaged by Billard Leece Partnership, on behalf of the NSW Department of Education, to undertake a Biodiversity Development Assessment Report (BDAR) within Lot 71 DP 7091 Warnervale Road, Warnervale, NSW. This BDAR was prepared to assess the impacts of the proposed New Primary School at Warnervale, and future expansion options. Following review of the BDAR by Central Coast Council (Council) and the Biodiversity Conservation Division (BCD) of the Department of Planning, Industry and Environment (DPIE), submission comments on the findings of the BDAR were provided. Additionally, Kleinfelder met with Council on 02/12/2019 to discuss the project.

The submission comments from Council and BCD have been considered and a response to each of these is provided in **Table 1**. The BDAR has also been updated and should be reviewed in conjunction with this document.

If you have any questions regarding Kleinfelder's response to the submission, please get in touch at your earliest convenience.

Yours sincerely,

Gilbert Whyte PhD, BSc (Hons)
Senior Ecologist

95 Mitchell Rd
Cardiff NSW 2285
gwhyte@kleinfelder.com
Mobile: 0456097605

Table 1: Submissions and response relating to biodiversity

Item	Submission	Comment	Response
1	Council	It is noted that the Biodiversity Development Assessment Report identifies the Squirrel Glider (*Petaurus norfolcensis*) as having a moderate likelihood of occurrence on the site. This should be correctly identified as a high likelihood of occurrence on the site and should be identified as a species reliably predicted to utilise the site. A single trapping period is not sufficient to confirm the absence of Squirrel Gliders. Given the known and well documented local population of Squirrel Gliders, including recent records from adjoining sites, the species should be assumed present on the site for the purpose of calculating species credits.	The Squirrel Glider was identified as having a 'moderate' likelihood of occurrence within the site based on an assessment of the habitat values present. This assessment; as presented within Appendix 3 of the BDAR, states that the midstorey layer within the site is sparse and that foraging resources such as flowering shrubs are limited in abundance. This was the main justification for determining a 'moderate' likelihood of occurrence within the site. However, in consideration of the number of recent Squirrel Glider records in the locality and the connectivity of forest vegetation within and adjacent to the site, the likelihood of occurrence assessment has been updated to 'high'. The habitat assessment presented in Section 4.1.1.2 of the BDAR has also been amended to reflect this determination. The survey effort undertaken to detect the Squirrel Glider within the site included an arboreal trapping program, which was undertaken for seven consecutive nights with 10 Elliot B traps placed in two transects (20 traps total). The minimum survey effort for the Squirrel Glider as per the *Wyong Shire Council Flora and Fauna Survey Guidelines Version 2.4 (2016)* recommends the use of Elliot B traps arranged in a trapping grid of 1 ha within each vegetation type using 10 Elliot B traps for 3 consecutive nights. The survey effort undertaken for the project therefore exceeds the minimum survey requirements as per this guideline. Additionally, the survey effort undertaken also complies with the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (DEC 2004)* The survey period coincided with the recommended survey timing stipulated within the NSW Biodiversity Data Collection. The BDAR demonstrates how the methods and approach of Section 6 of the BAM were followed to assess habitat suitability within the site for threatened species, including the Squirrel Glider. Review of the *Biodiversity Assessment Method – Operational Manual Stage 1 (OEH 2018)* indicates that target species should be assumed present when surveys are not undertaken in accordance with Section 6 of the BAM or when: • The target species is cryptic and therefore difficult to identify via survey; or • The optimal survey time for the species has been missed. Given that the arboreal trapping using Elliot Bs is generally considered to be a best practise method for detecting Squirrel Gliders and the surveys were undertaken during the appropriate survey period, the species has not been assumed to be present for the purpose of calculating species credits. The BAM and its associated manuals have been thoroughly reviewed and no support can be found to justify assuming presence for a threatened species based on the occurrence of historical records.
2	Council	The squirrel glider is listed as a vulnerable species under the Biodiversity Conservation Act 2016.	Review of the Biodiversity Offset Scheme Credit Supply Register on 12/12/2019 found that no species credits are available for the Squirrel Glider. Squirrel Glider Credits are available under the BioBanking

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		It is noted that there are currently no available species credits for the Squirrel Glider.	Assessment Methodology 2014 (BBAM) system. However, availability of credits is not applicable as the species has not been assumed present.
3	Council	There are some other species which also stand out as not having been adequately surveyed and presence should be assumed and species credits retired including (but possibly not limited to): • Large Forest Owls Breeding - based on hollow size present on site and lack of targeted owl survey in accordance with Threatened Biodiversity Database requirements. • Glossy Black Cockatoo Breeding - the Threatened Biodiversity Database considers breeding habitat to be "Living or dead trees with hollows greater than 15 cm diameter and greater than 5 m above the ground" and that foraging habitat constitutes "the presence of *Allocasuarina* and *Casuarina* species". Both are present on site and there has been a very recent record of immature Glossy Black Cockatoo with a group on the adjoining site.	**Large Forest Owls** In accordance with the BAM, species credits for Large Forest Owl species are required for impacts to 'breeding habitat' rather than 'foraging habitat'. It is acknowledged that Call Playback methods were not undertaken for Large Forest Owl species during the survey; however, other best practise methods were used to detect these species and assess the presence of breeding habitat. These methods include the following: • A survey of trees within the development area was undertaken to locate hollow-bearing trees, dead standing stags and trees containing nests on 18/09/18. The location of hollow-bearing trees and the number and size of the associated hollows was recorded. Hollow size was classified as either small (< 8 cm diameter), medium (8 – 20 cm diameter) or large (> 20 cm diameter) based on the size of the hollow entrance. A total of 29 hollow-bearing trees and dead stags were identified within the site, of which 18 occur within the development footprint. • The suitability of hollows within the development footprint for nesting Large Forest Owls were assessed according to the hollow characteristics preferred by each species in the Central Coast and Hunter Regions (DEC, 2006; Forest Fauna Surveys, 1999; Kavanagh, 2003; LMCC, 2014). For the Powerful Owl (*Ninox strenua*), preferred hollows are approximately 15–20 m high in trees, of approx. 30–50 cm internal diameter and approx. 1–5 m deep. Nest trees are usually within 100 m of creeklines. For the Masked Owl (*Tyto novaehollandiae*), preferred hollows are approx. 12–20 m high in trees, of approx. 35–50 cm internal diameter and approx. 1–5 m deep. Nest trees also tend to be within 100 metres of creeklines, although on occasion have been identified higher in the catchment at great distances from the creekline. For the Barking Owl (*Ninox connivens*), nesting and roosting trees tend to occur near watercourses or wetlands in dense foliage. The nest site is a large open hollow, often vertical or sloping, in the trunk or sometimes a spout of a eucalypt or Melaleuca, usually a live tree though occasionally a dead tree. Nest-hollow entrances are 2-35 m above the ground with a diameter of 20-46 cm and depth of 20-300 cm. • Four trees were identified as containing large hollows (>20 cm), however trees were assessed as being of low suitability due to the height and size of the hollows; and the proximity to watercourses. To further confirm the presence or recent utilisation of hollows by large forest owls, the contents of large hollows were visually inspected by ecologists and qualified arborists on 16/01/19 2019. Photos were taken within each hollow by the arborists and these were then reviewed by the ecologist to determine fauna species that may be utilising the hollow.

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			• No evidence of breeding, or occupation, by any Large Forest Owl species was found during the survey In consideration of the survey effort undertaken and the lack of evidence to suggest that these are breeding within the site, no Large Forest Owls have been assumed to be present for the purpose of calculating species credits. **Glossy Black Cockatoo** In accordance with the BAM, species credits for the Glossy Black Cockatoo are required for impacts to 'breeding habitat' rather than 'foraging habitat'. The assessment of habitat suitability for threatened species in Section 4.1.1.2 of the BDAR, states that Glossy Black Cockatoo may utilise habitats within the site for foraging habitat. This assessment was determined based on the presence of suitable feed tree species such as *Allocasuarina littoralis* (Black Sheoak), which occurred in the south-east portion of the site. Vegetation Zones 2 and 5 were not assessed as representing potential foraging habitat for the species due to the lack of feed trees (these zones are degraded due to historical vegetation clearing (Section 4.1.2). According the Saving our Species Factsheet for the Glossy Black Cockatoo (OEH 2018), the preferred breeding habitat for the species consists of large hollows in dead and living eucalypt trees. A typical nest hollow has an entrance diameter of at least 15 cm and is around one metre deep. The surveys for the Glossy Black Cockatoo coincided with the optimum period of detectability for the species as per the requirements of the BAM. In consideration of the survey effort undertaken to inspect large hollows within the development footprint and the lack of evidence to suggest that the Glossy Black Cockatoo is breeding within the site, the species is not assumed to be present for the purpose of calculating species credits. As stated previously for the Squirrel Glider, the BAM and its associated manuals have been thoroughly reviewed and no support can be found to justify assuming presence of a threatened species based on the occurrence of historical records.
4	Council	A north-south tree canopy corridor (preferably eastern side) is to be provided through the site to link with the vegetation and oval on the northern side of Warnervale Road. The corridor is to include native trees whose canopy provides a linkage for fauna through the site to Warnervale Road and should	A strategy for the site design has been developed to improve connectivity based on the retention of trees and the installation of glider poles. This has been provided to ensure that canopy linkages are maintained within the site to allow movement and dispersal of Squirrel Gliders from north to south. A figure showing the preliminary design of this strategy is presented in **Appendix A.** The *Lake Macquarie Squirrel Glider Management Guidelines (2015)* state that Squirrel Gliders can glide for approximately 1.8 times the launch height (less 2 m, assuming landing 2 m off the ground). Further investigations will be required to effectively position glider poles within the site; however, for the purposes of preparing a preliminary design, the average tree height within the site is estimated to be approximately 12 m. The locations of Glider poles have therefore been selected to ensure that the

Item	Submission	Comment	Response
		include replacement street tree planting with a large canopy to allow for a squirrel glider link between the tree canopies and vegetation located on either side of Warnervale Road. This corridor currently exists on site and needs to be retained to minimise potential for the existing squirrel glider population to be adversely impacted by the proposal.	resultant gaps are no greater than 18 m. Taller trees, or installation of a minimum 14 m pole along the road frontage will allow for appropriate glide distance across Warnervale Road. Additional considerations may be required for the connectivity strategy such as ensuring that Gliders do not glide through areas where injury may occur, such as in areas containing powerlines, roads or other infrastructure.
5	Council	The subject site provides the best location for provision of this corridor in comparison to adjoining lots. Council is currently developing a Squirrel Glider monitoring program that will include survey of that vegetation surrounding Warnervale Oval.	This comment has been addressed previously for *Item 4* which discussed the strategy to improve habitat connectivity for the Squirrel Glider.
6	Council	Replacement planting and bush regeneration within the 'biodiversity valued land to be retained' located at the rear of the site in order to revegetate the (existing unauthorised) cleared area would need to be carried out. This area is Squirrel Glider habitat and part of an important conservation corridor for this species. For more information regarding the species refer to Council's Squirrel Glider Conservation Management Plan: Wyong Shire which is available on Council's website.	A Vegetation Management Plan (VMP) has been prepared for the site (**Appendix B**). This VMP includes recommendations for planting and bush regeneration. Measures to improve habitat values for the Squirrel Glider are also included in the VMP.

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7		In relation to the BDAR for the proposal the following comments are made: • Hollow replacement has not been addressed as a mitigation measure in the BDAR. • The BDAR includes very little detail about the future/long term management of the "avoid" lands. Council would want these to be retained and managed as a corridor in perpetuity. Recommended conditions have been included prior to commencement of work to address these matters.	**Hollow Replacement** Implementation of a nest-box program was agreed upon as a suitable hollow replacement strategy during a meeting with Council that was held on 02/12/2019. During this meeting it was agreed that hollows to be removed will be supplemented by the installation in retained habitat at a 1:1 ratio. **Long-term Monitoring of Retained Lands** The VMP includes recommendations for a monitoring program over a 5 years period to assess the success of implementation of relevant management measures to improve biodiversity values within the site.
8		Concern is raised regarding the extent of tree removal associated with the proposal. Replacement native tree planting to compensate for the loss of trees along the street front, within the street setback and areas adjacent to the side boundary (within proximity and view of the street) should be investigated and carried out.	The VMP includes recommendations for a revegetation program to compensate for street front, within the street setback and areas adjacent to the site boundary
9		The street trees also provide for a linking corridor of vegetation across Warnervale Road which is being impacted under the proposal. The squirrel glider glides between trees and the species is sensitive to habitat fragmentation when tree gaps exceed its gliding ability.	This comment has been addressed previously for *Item 4* which discussed the strategy to improve habitat connectivity for the Squirrel Glider.

Item	Submission	Comment	Response
10		BCD recommends that justification is provided demonstrating why PCT 1590 does not form part of the LHSGIB TEC.	The vegetation assessment determined that the Spotted Gum – Ironbark forest community within the site is commensurate with PCT 1590 (Spotted Gum – Broad-leaved Mahogany – Red Ironbark shrubby open forest). This determination was based on data floristic data that was collected via BAM plot transects. A floristic description of PCT 1590 is as follows: • The canopy of this vegetation is dominated by *Corymbia maculata, Eucalyptus eugenioides* and *Eucalyptus fibrosa,* with *Eucalyptus umbra and Angophora costata* also occurring. • The midstorey is dominated by a dense layer of *Melaleuca nodosa* with scattered *Allocasuarina littoralis* occurring. There is a sparse shrub layer *of Pimelea linifolia, Phyllanthus hirtellus, Acacia longifolia subsp. longifolia* and *Podolobium scandens*. • The ground layer is dominated by *Ptilothrix deusta, Entolasia stricta, Xanthorrhoea latifolia, Gahnia melanocarpa, Themeda triandra, Microlaena stipoides var. stipoides, Lobelia purpurascens* and *Cassytha pubescens*, This vegetation lacked many of the diagnostic features of the Lower Hunter Spotted Gum Ironbark Forest TEC (LHSGIB) as listed by the NSW Scientific Determination. Justification are listed below: • The vegetation is located outside the core distribution of LHSGIB, which mainly occurs to the north in the Cessnock - Beresfield area. The most southern limit of is described distribution (Northern Border of the Watagans National Park) occurs approximately 30 km to the north/north-west of the Study Area. • Although *C. maculata* and *E. fibrosa* are typically dominant in LHSGIB, the site contains an abundance of other canopy species such as *E. eugenioides, E. umbra and A. costata,* which are not diagnostic of LHSGIB. Sub-dominant canopy species which typically occur in LHSGIB such as *E. punctata and E. crebra* were not recorded. • LHSGIB generally contains a prominent shrub layer dominated by *Acacia parvipinnula*, however, this species does not occur within the site. • LHSGIB is strongly associated with yellow podsolic and solodic soils of the Lower Hunter soil landscapes of Aberdare, Branxton and Neath. Soils consistent with these characteristics were not recorded within the site. The BDAR has been updated to include these justifications.
11		BCD recommends that the proponent provides further information on the occurrence of squirrel glider on site.	This comment has been addressed previously for *Item 1* which discussed the habitat assessment and surveys conducted for the Squirrel Glider within the site. Additionally, further information regarding the identification of Sugar Gliders has been provided for in the BDAR (Section 4.2.3.2). It is outlined in this section that Sugar Gliders within the Study Area were identified through trapping on multiple nights. As such, ruling out potential for misidentification with the closely related, and threatened Squirrel Glider.

REFERENCES

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NSW Office of Environment and Heritage (2017). *Biodiversity Assessment Method*. NSW Office of Environment and Heritage Retrieved from https://www.environment.nsw.gov.au/biodiversity/assessmentmethod.htm.

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Forest Fauna Surveys (1999) *Distribution of Large Forest Owls in the City of Lake Macquarie*. Report to Lake Macquarie City Council by Forest Fauna Surveys Pty Ltd

Kavanagh, R. (2003). *Status and conservation of owls and arboreal mammals on the Central Coast of NSW, and field techniques for surveys*. Workshop for Landcare groups and planners from Lake Macquarie, Wyong and Gosford Local Government Areas.

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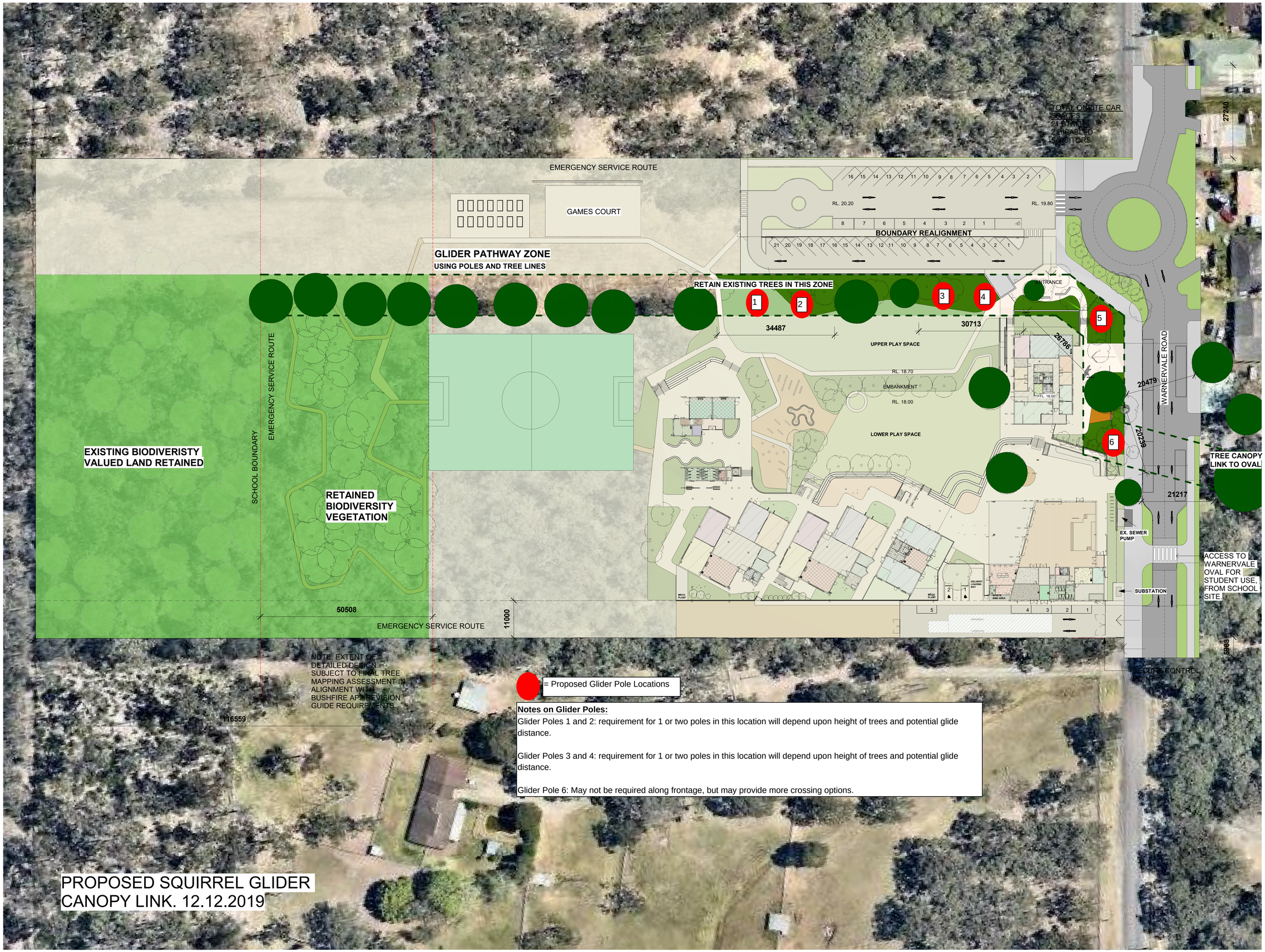
ATTACHMENT A: SQUIRREL GLIDER MOVEMENT STRATEGY


EMERGENCY SERVICE ROUTE
GAMES COURT
GLIDER PATHWAY ZONE
USING POLES AND TREE LINES
RETAIN EXISTING TREES IN THIS ZONE
TOTAL ONSITE CAR SPACES
21 STAFF
2 DISABLED
5 VISITORS
RL. 20.20
RL. 19.80
BOUNDARY REALIGNMENT
ENTRANCE
34487
30713
UPPER PLAY SPACE
RL. 18.70
EMBANKMENT
RL. 18.00
LOWER PLAY SPACE
26798
20479
20239
21217
27240
WARNERVALE ROAD
TREE CANOPY LINK TO OVAL
EXISTING BIODIVERISTY VALUED LAND RETAINED
SCHOOL BOUNDARY
EMERGENCY SERVICE ROUTE
RETAINED BIODIVERSITY VEGETATION
50508
EMERGENCY SERVICE ROUTE
11000
116559
EX. SEWER PUMP
SUBSTATION
ACCESS TO WARNERVALE OVAL FOR STUDENT USE, FROM SCHOOL SITE.
SECURE CONTROL JOINT
NOTE: EXTENT OF DETAILED DESIGN SUBJECT TO FINAL TREE MAPPING ASSESSMENT IN ALIGNMENT WITH BUSHFIRE APZ REVISION GUIDE REQUIREMENTS
= Proposed Glider Pole Locations
Notes on Glider Poles:
Glider Poles 1 and 2: requirement for 1 or two poles in this location will depend upon height of trees and potential glide distance.
Glider Poles 3 and 4: requirement for 1 or two poles in this location will depend upon height of trees and potential glide distance.
Glider Pole 6: May not be required along frontage, but may provide more crossing options.
PROPOSED SQUIRREL GLIDER CANOPY LINK. 12.12.2019

ATTACHMENT B: VEGETATION MANAGEMENT PLAN