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Wednesday 6<sup>th</sup> December 2023

Attention: Duncan McComb

Dear Duncan

**Re: Specialist Assessment of land owned by Besmaw Pty Ltd [251, 260R, 278 & 280-282 Captain Cook Drive] as well as land associated with required upgrade to infrastructure within sections of the road reserve frontage of Captain Cook Drive, Kurnell, NSW**

Thank you for engaging Australian Environmental Surveys – (AES, Ross Wellington) to undertake a supplementary ecological assessment for the Green and Golden Bell Frog (GGBF) and the potential habitat areas considered to possibly occur within the ‘subject land’ identified above.

After having had a lengthy involvement with conservation efforts for the GGBF across NSW and at Kurnell in particular, I appreciate the opportunity to provide conservation related input on this topic and in support of your proposal.

I have now reviewed the provided background information and other assessment reports, as well as the broader framework of the current proposal. I have also undertaken both a targeted GGBF survey and a species expert habitat appraisal for the GGBF across the subject land.

Furthermore, I have also undertaken a linear assessment along the road reserve and adjacent lands along Captain Cook Drive that might require upgrade or widening. Whilst I did not undertake targeted GGBF survey along the Captain Cook Road roadside habitat area I did inspect and evaluate any existing habitat values and sites that may provide opportunities for improving such values for the GGBF where they occurred.

In providing this letter report I have attempted to outline and address several matters relating to implications of the possible occurrence of Green and Golden Bell Frog within the subject land, nearby and at Kurnell more broadly.

These matters include the adequacy of the existing survey effort undertaken by others and whilst it may have been argued that these were considered adequate, I have now supplemented these with further targeted survey effort repeating some efforts at the same locations as well as surveying other areas and including areas of all the lots comprising the subject land. The results of the additional surveys I undertook were consistent with the results of previous efforts that found no evidence of the Green and Golden Bell Frog on the subject

land. Having undertaken this additional survey effort and an evaluation of habitat elements present I have concluded that the GGBF is unlikely to be currently present within the subject land as far as this can be categorically established. I have further appraised the areas that were considered to have specific GGBF habitat value on site and have also concluded that whilst they do have relevant habitat values for the species that they do not appear to be any longer occupied. Nevertheless, these specific habitat areas are proposed for exclusion or avoidance from impact within the current proposal and in fact are identified as being not only retained but enhanced and incorporated into the broader biodiversity habitat rehabilitation and re-establishment initiatives proposed. The current master plan for the site and its planned biodiversity conservation areas and other associated measures also provides a unique opportunity to implement aspects of the Kurnell Green and Golden Bell Frog Key Population conservation strategy.

The GGBF habitat evaluation along relevant areas of the Captain Cook Drive (CCD) road reserve revealed that whilst there are elements of the local landscape along it as well as adjacent that provide habitat values for GGBF, they are generally in poor condition and are heavily weed infested. Swale areas that occur parallel to CCD (east-west) for significant lengths of some sections of the roadway, do provide inherent corridor connectivity values for GGBF.

Similarly, culverts beneath CCD may also provide connectivity value north south, across the CCD connectivity 'barrier'. All these areas are constructed and/or heavily modified habitat elements at best and are herein considered merely potential habitat elements for the GGBF and therefore should not be considered or identified as actual habitat elements requiring offsetting in my expert opinion. Nevertheless, road upgrade works that may be an essential aspect of the current proposal do provide a suitable opportunity to rehabilitate those swale areas that have become choked with weed infestations. Essential culvert upgrades also provide an opportunity to enhance connectivity and for provision of microhabitat features that may enhance such utilisation by GGBF.

Whilst all or most of these matters most specifically relate to issues, that are development assessment related and part of the approval process, sight should not be lost of the underlying conservation outcome opportunities for GGBF at Kurnell. These issues are all discussed in further detail in **Attachment 1** and **Attachment 2** to this letter report. However, the recommendations from the two GGBF evaluation component Attachments for this proposal are reiterated here.

#### **Besmaw Lands Assessment Recommendations**

1. That the Green and Golden Bell Frog should be considered as having been adequately and compliantly surveyed for within the Besmaw Lands and in accordance with survey Guidelines/Protocols.
2. Targeted surveys for the Green and Golden Bell Frog have found no evidence of their presence on the subject land and it is thus considered highly likely to be currently absent from said land.
3. That Besmaw continue with its current strategy to incorporate GGBF habitat features within the master planning for the current proposal and its biodiversity reconstruction and enhancement initiative inclusions.
4. Besmaw should consider cooperating with other GGBF initiatives nearby and continue with its current approach to incorporate other Kurnell GGBF Key Population Plan initiatives in its future site considerations.

#### **Captain Cook Drive Assessment Recommendations**

1. Green and Golden Bell Frog habitat along Captain Cook Drive should be considered artificial heavily modified and generally unsuitable for occupation other than as a transient pathway at best.
2. It is not possible to generate any relevant or appropriate habitat polygons for GGBF along any sections of Captain Cook Drive inspected and it is not considered herein relevant to require offsets for GGBF as part of any development assessment process including BAM.
3. Conservation measures that could be applied to the assessment considerations for GGBF might more profitably consider provision of habitat enhancement and rehabilitation initiatives particularly along drainage swale areas and culverts in concert with bush regeneration weed management.

4. Any conservation measures for GGBF should consider the GGBF Best Practice Habitat Guidelines (DECC 2008) and be recognised as contributing to implementation of the Kurnell GGBF Key Population management Plan (DECC2007)

If you have any further questions about this subject matter, please do not hesitate to contact the writer Ross Wellington, Conservation Biologist, Accredited Biodiversity Expert for the GGBF, Senior Ecologist and Principal AES, who can be contacted on 0407 489 489 or at [rwrossco@gmail.com](mailto:rwrossco@gmail.com) .

Yours sincerely



**Ross Wellington**

AES - Australian Environmental Surveys  
Proprietor and Senior Ecologist  
Accredited Biodiversity Expert  
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## **Attachment 1: Detailed Comments – Description of the Planning Proposal on Besmaw Lands**

### **Background**

The subject land owned by Besmaw Pty Ltd is comprised of Lots 8//DP586986 (including a tiny inholding Lot 9 DP586986 260R), 2//DP1030269 (N) & 2//DP//559922 (S) and are mainly three large allotments located at 251, 278 & 280-282 Captain Cook Drive, essentially encompassing a coast to bayside expanse of land ca 210 ha in area that, south to north straddles the width of the Kurnell Peninsula.

The subject land has been variously developed previously or currently with Lot 2 north largely cleared, highly modified and currently operating as a horse riding, training, stables and agistment area, with a relatively small component of coastal wetland identified within the Coastal Management SEPP layer. Lot 8 is undeveloped historically and consists largely of a mobile sand dune and exotic vegetation with some remnant areas of ecological and cultural value which are proposed to be preserved and enhanced. Lot 9 is a small, cleared lot, internal to Lot 8, that was historically used by Air Services Australia as an aircraft navigation beacon. Lot 8 and 9 are Zoned E4 General Industrial under the standard instrument, whereas both Lot 2 north and Lot 2 south are zoned for a variety of uses via SEPP Precincts (Central River City) 2021 with Lot 2 South still approved as an operating sand quarry and land rehabilitation business.

The Planning Proposal aims to translate and amend current land use zones under the applicable controls to be consistent with the standard instrument local environmental plan zones and enable additional uses to accommodate a diverse range of land uses at 251, 260R, 278, and 280-282 Captain Cook Drive, Kurnell (the site). The Planning Proposal will establish a new mixed-use community encompassing residential, employment, tourism, education, cultural facilities, ecological regeneration zones and public open space areas.

The subject land provides by its location and extent, strategic connective values east-west and north-south across the Kurnell Peninsula. However, historical and ongoing development modifications within the subject land as well as across most of the peninsula generally, have significantly changed and degraded biodiversity values generally as well as specifically for GGBF. Nevertheless, fringing the subject land and adjacent are areas of high biodiversity value, with attributes including Towra Point Nature Reserve, Quibray Bay and designated RAMSAR wetlands of international importance.

The Green and Golden Bell Frog (*Litoria aurea*) has had previous consideration as a significant element of the biota at Kurnell forming a component of various assessments for developments and other activities across Kurnell where it was implicated. These considerations have been triggered by other nearby industrial sand extraction and landfill works (Breen Holdings & Rocla), wastewater treatment facility upgrades and sewage outfall pipelines (Sydney Water), desalination plant sites (Veolia), power line stanchion upgrades, maintenance, sub-station installations and sub-Botany Bay cable projects (Energy Australia), as well as residential, commercial, light industrial and recreational area more recently evaluated and approved.

In 2005 a Draft National Recovery Plan (RP) was prepared for the Green and Golden Bell Frog (GGBF). This document synthesised the then current state of understanding of the species. It further developed a comprehensive framework for the conservation of remaining 'important' GGBF populations across the species national distribution, and thus identified 'Key' populations for focused conservation efforts with specific recovery actions to be implemented at Key Population level. Consequently, Kurnell was identified as harbouring one of the then 43 recognised/known Key Populations and a RP action was the prioritised development of important population Management Plans. Kurnell was one of the first GGBF populations for which a Key Population Management Plan (KPMP) was formulated as a priority. The Kurnell GGBF KPMP was developed following a facilitated stakeholder workshop with all relevant landowner managers included in this process. This process gained insights about opportunities and risks, raised awareness of the species and was hoped to gain an improved conservation status outcome for GGBF at Kurnell. Besmaw were an active participant in that KPMP development process at that time.

Despite this level of interest and investment in the assessment of potential impacts on the GGBF across Kurnell in the years during and post the Recovery Plan's development the general perception has been that the GGBF has declined. This has likely been contributed to by the general failure in implementation of the Recovery Plan or its subsidiary KPMP developed for Kurnell resulting from moves away from a comprehensive approach to conservation generally in NSW.

It is against this backdrop that the current planning proposal is being developed. These Besmaw lands are located at a strategically important site and are proposed for rezoning with a wide array of development outcomes envisaged. These include substantial areas being set aside and allocated for rehabilitation and reconstruction of biodiversity enriched areas. This is therefore herein considered as providing a unique opportunity to secure significant GGBF conservation outcomes as an integral part of the overall proposal.

As a part of this proposals considerations and to facilitate the best outcome for GGBF the following issues and questions regarding GGBF have been attempted to be addressed.

- Are GGBF still present within the Besmaw owned lands at Kurnell?
- To what extent are habitat values still present on the Besmaw lands?
- Has adequate survey and assessment already been undertaken to support a solid/robust understanding of the answers to the above questions?
- What other factors are at play that might influence the current planning proposal?
- What conservation measures are or could be further incorporated into the existing broader biodiversity rehabilitation works already proposed at Besmaw?
- How do these broad biodiversity related conservation measures sit within the broader implementation of RP and KPMP frameworks for the conservation of GGBF at Kurnell given that they are the only efforts undertaken to develop or provide one for the species?
- Can Besmaw in the development of its masterplan for the site actually become the primary implementation agent for the GGBF KPMP and the species broader conservation outcomes at Kurnell?

## **Method**

An evaluation of prior survey efforts for the Green and Golden Bell Frog on-site and nearby/adjacent were sourced where possible and evaluated. A Bionet Atlas search was also undertaken for the species to update records of the GGBF already in the possession of the author from previous surveys and habitat evaluations for GGBF at Kurnell where he has been involved (South Cronulla STP and deep water outfall by Sydney Water, trans Botany Bay submarine power cable and facilities upgrade by Energy Australia, Power Stanchion upgrade and maintenance works by Energy Australia, Australand Residential Development at Green Hills, Rocla sand mining proposal, Sydney Desalination Plant, Calsill Dunes development proposal, Breen Holdings land developments, Green and Golden Bell Frog Recovery Plan development for DEC, Kurnell GGBF Key Population management Plan development, GGBF best practice habitat guide formulation.

Thus, during suitable and prevailing warm and humid weather conditions, and also following recent substantial rain events, AES (Ross Wellington) undertook targeted surveys and a habitat appraisal over 16 hours on 14 and 15 November 2023. This also included a visitation to two known GGBF reference sites, one at Green Hills and the other at Arncliffe, to evaluate comparative activity levels and hence contemporaneous detectability of GGBF. Ross Wellington was accompanied by Darren Floyd during the undertaking of all the on-site survey efforts. Further survey effort was also contemporaneously undertaken along the Captain Cook Drive interface areas to each of the lots as well as west and east of the subject land allotments.

The subject land was surveyed by day to visually identify areas of potential habitat and also the finer resolution of extent of habitat type categorisations perceived to be present. This was followed by nocturnal survey efforts.

Survey methodology included diurnal searches of areas across each of the Lots comprising the subject land to identify the extent of potential habitat components present across the overall site. It also included visual scanning of suitable vegetation in suitable locations for basking individuals. Water bodies were also scanned for the visual presence of tadpoles with the intent of dip-netting where necessary or relevant. Any ideal areas were thus identified for later nocturnal search effort.

Nocturnal surveys were undertaken using headlamp and torch light to search for active amphibians as well as an auditory evaluation of calling frogs. Call playback and call imitation renditions were also undertaken at several sites and included across all land parcels.

## **Results**

Survey results included the detection of a number of non-target reptile and amphibian species.

Herpetofauna species observed included:

Frogs – Dwarf Green Tree Frog *Litoria fallax*, Brown Tree Frog *Litoria peronii*, Brown Striped Marsh Frog *Limnodynastes peronii*, Spotted Marsh Frog *Limnodynastes tasmaniensis* and Common Toadlet *Crinia signifera*.

Reptiles – Delicate Litter Skink *Lampropholis delicata*, Water Skink *Eulamprus quoyii*, and Water Dragon *Intelligama lesueurii*.

No Green and Golden Bell Frogs were detected by any of the search methods that were applied. These methods included nocturnal call playback and call imitation rendition auditory survey, nocturnal spotlight/torch/headlamp surveys of any of the areas considered to have some potential habitat value. Diurnal searches of possible shelter habitat including the scanning of emergent sedges and other fringing vegetation where it existed around wetland and dam/pond areas. Scanning of other potential shelter/basking habitat by day to reveal any GGBF perched in advantageous positions.

Lot 2 south, being the active development site was observed as having virtually zero suitable habitat for the GGBF. Most of the site was observed and evaluated as being either an active dredge pond/lake or else otherwise predominantly covered in recently disturbed earth fill deposits that had been subjected to earth works by plant machinery or roads over which these machines drive. Surveys of the accessible parts of Lot 2 south that included margins of water bodies established to retain stormwater runoff revealed little if any suitable habitat for the species. Sites at which previous targeted surveys were undertaken by Cumberland Ecology were specifically revisited during the current targeted surveys and included the western margins of Lot 2 South with its closest proximity to the most recent GGBF records purportedly from the vicinity of Green Hills.

The Lot 8 component of the subject land now persists as a completed development site of the former sand extraction facility. The site is heavily weed infested with Bitou among other weed species and other vegetation cover including Coastal Wattle. The existing form of this site appears to be remnant fragments of former dunes post mining and some lower denuded swale areas. This component of the subject land currently provides little GGBF habitat value beyond shelter/refuge habitat although some low swales could provide suitable ephemeral water bodies following extreme/heavy rain events if GGBF were still present. A single dam/pond occurs in the east adjacent to the former access road to Boat Harbour and provides what could be considered a potential breeding site although it has little fringing vegetation or emergent macrophytes. This dam appears to be suffering the effect an excess of water bird roosting activity and consequent nutrient loads.

Lot 2 north was found to be mostly devoid of any GGBF habitat values other than within the area of wetland that adjoins other drainage swales fringed with planted Swamp Oak that border the equestrian business facilities. This business is understood to have operated on the site under lease for decades.

The wetland area itself was identified as having GGBF habitat values albeit it is isolated from other such areas by an open, closely cropped grassy area to the north and Captain Cook Drive to the south.

Map Figure 1 depicts those areas identified as having potential GGBF habitat values, the survey traverses undertaken in the most recent targeted survey and call playback locations where auditory surveys were undertaken.

## **Discussion**

The subject land does present some significant strategic value for the ongoing survival of Green and Golden Bell Frog at Kurnell. However, this strategic value appears to be mainly in the form of possible future opportunities presented as part of the planning proposal. Currently there is minimal actual habitat value persisting within the majority of the subject land. An area of wetland within a segment of Lot 2 North provides potential shelter, potential foraging and possibly also breeding habitat as well. This area of the subject land is to be excluded from any future proposed development impacts. Further, this area is also proposed to be enhanced and guided by the GGBF best practice habitat guide (DECC 2008) through provision of GGBF habitat features and proposed connectivity opportunities as a suite of conservation measures applied to this part of the site. Lot 2 South is currently an active industrial development site operating with approval. This precludes any current actions on-site for the benefit of GGBF and which (if present) are in any case currently actively discouraged away from the moving development impact zones. These works fronts include dredge, fill deposition, internal road use. Frogs either persisting or having been reintroduced are excluded from the subject land along its eastern boundary through the erection of a frog exclusion fence where it adjoins property including the Veolia operated Sydney Desalination Plant (SDP).

During the master planning phase of this proposal and as part of background investigation of the current known local situation of GGBF, it became apparent that Veolia/SDP were in the process of carrying out a reintroduction/translocation of GGBF. Enquiries made to Department of Planning and Environment (DPIE) as well as to Symbio revealed that it was a joint exercise by Veolia (the SDP operators) and Symbio (a private Zoo facility maintaining a GGBF breeding colony under licence, Arncliffe provenance). Froglets and tadpoles of Arncliffe provenance are understood to have already been released into the conservation area within the DSP site next door to the subject land.

These revelations followed an earlier series of pre-planning consultations with DPIE and Sutherland Shire Council about the sites future land use zone configuration and during which the GGBF was also discussed, with matters raised including the adequacy or otherwise of GGBF survey efforts undertaken to date. Matters arising from this include the GGBF reintroduction licensing decision and incongruous advice provided by DPIE with respect to GGBF being possibly present on Besmaw Land but with Besmaw considering that the survey effort, undertaken by Cumberland Ecology on their behalf, was adequate to meet survey requirements.

This is especially relevant given that Veolia has now reintroduced/translocated GGBF to the SDP conservation area. The threatened species translocation was approved by DPIE apparently premised on the belief that GGBF is extinct at Kurnell. This belief was apparently based on third party survey effort and advice that GGBF could not be found on the SDP site, or elsewhere nearby, just prior to the approval for GGBF reintroduction/translocation. No consultation or notification pitot to Besmaw an immediate neighbour was carried out. Besmaw's firsthand knowledge of the GGBF translocation release was via several local news/media items.

Besmaw has since responded to this knowledge by erecting, at considerable cost, a frog exclusion fence along its eastern boundary to prevent straying or migrating GGBF released on the SDP from entering an active industrial operational area that might result in inadvertent mortality.

Notwithstanding all of the above, Besmaw has commissioned this GGBF survey and habitat assessment to provide yet further GGBF survey effort and undertake an expert GGBF habitat reappraisal at the same time.

Based on this study by Ross Wellington (AES) and taking into consideration all of the matters outlined herein, it is considered unlikely that GGBF are still persist on the subject land. Were GGBF to be detected subsequently it would be likely very difficult, if not impossible, to distinguish GGBF individuals as being of either original/remnant Kurnell provenance or captive bred releases of Arncliffe provenance.

It is herein considered that an adequate survey effort has now been undertaken when this effort includes both the earlier Cumberland Ecology survey as well as the most recent supplementary survey efforts by AES. The vast majority of the site is an active industrial operation with existing development approval. The other smaller allotment components of the proposal have also now been surveyed and evaluated with a null result for any GGBF specimens and the areas with what might be regarded as the best potential habitat values, being thoroughly examined and in any case also planned for exclusion from the master plan impact areas of the proposal.

Besmaw has developed, with the assistance of Urbis, Cumberland Ecology, EcoPlanning and now with further inputs by AES, a master plan and planning proposal with significant areas proposed as conservation lands. These areas are planned to have relevant and appropriate biodiversity values re-established, rehabilitated or enhanced to create and maintain connectivity values through and across the subject land.

As part of this biodiversity re-establishment vision for the proposal there are currently also GGBF conservation measures being planned for incorporation into the broader ecological rehabilitation works identified to be undertaken. These measures are to be framed by the National Recovery Plan for the GGBF (DEC 2005) as well as by its subsidiary Kurnell GGBF Key Population Management Plan (DECC 2007) and, gaining specific microhabitat feature guidance from the GGBF Best Practice Guide (DECC 2008). These documents outline what is still the only comprehensive conservation strategy for the GGBF. It is therefore here considered that Besmaw in the development of its masterplan for the site is actually likely to become the primary implementation agent for the Kurnell GGBF KPMP and the species overall conservation outcome at Kurnell, if approved?

## **Conclusion**

That the Green and Golden Bell Frog is likely absent from the Besmaw property notwithstanding the sites, strategic location and the substantial conservation opportunities for GGBF that are to be provided by the current proposal.

What could be considered as areas having potential habitat value are already excluded from the proposal impact zone as part of the planning for it. These site components include the wetland area within Lot 2 North and pond/dam area located along the former access roadway to Boat Harbour within Lot 8. Both are proposed to be retained and incorporated within the biodiversity conservation/rehabilitation areas of the site with further habitat enhancement measures to be undertaken.

Other areas of the subject land are herein considered unremarkable and with generalised habitat values for connectivity, foraging and/or shelter habitat that are easily created/maintained, and or supplemented and enhanced.

Survey efforts undertaken by Cumberland Ecology during 2018 further supplemented by those undertaken by AES 2023 coupled with a species expert habitat evaluation should be considered an



adequate assessment of the subject land particularly given that the most significant area of the site is an active industrial sand mining operation operating with approval.

If approved the Besmaw proposal is likely to provide the best possible opportunity for salvaging what is or should be considered a precarious conservation situation for the GGBF at Kurnell. It provides a belated opportunity to implement components of the Kurnell KPMP and, perhaps with some coordination/collaboration, interlink with and bolster other initiatives (SDP/Veolia Symbio) to provide more secure connected and viable habitat for the GGBF at Kurnell, east to west in particular.

## **Recommendations**

1. That the Green and Golden Bell Frog should be considered as having been adequately and compliantly surveyed for within the Besmaw Lands and in accordance with survey Guidelines/Protocols.
2. Targeted surveys for the Green and Golden Bell Frog have found no evidence of their presence on the subject land and it is thus considered highly likely to be currently absent from said land.
3. That Besmaw continue with its current strategy to incorporate GGBF habitat features within the master planning for the current proposal and its biodiversity reconstruction and enhancement initiative inclusions.
4. Besmaw should consider cooperating with other GGBF initiatives nearby and continue with its current approach to incorporate other Kurnell GGBF Key Population Plan initiatives in its future site considerations.

## **References**

Department of Environment and Climate Change (NSW) 2007, Management Plan for the Green and Golden Bell Frog Key Population at Kurnell. Department of Environment and Climate Change (NSW), Sydney, DECC 2007/139 July 2007

Department of Environment and Climate Change (2008) Best Practice Guidelines Green and Golden Bell Frog Habitat DECC 2008/510 November 2008

Department of Environment and Conservation NSW (2005) Draft Recovery Plan for the Green and Golden Bell Frog (*Litoria aurea*). DEC NSW, Hurstville, NSW.

NSW National Parks and Wildlife Service (2003) Environmental Impact Assessment Guidelines Green and Golden Bell Frog *Litoria aurea* (Lesson, 1829) July 2003 <https://www.environment.nsw.gov.au/resources/nature/gandgbellfrogeia0703.pdf>

Department of the Environment Water Heritage and the Arts (2010) Survey guidelines for Australia's threatened frogs Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999.

Department of the Environment Water Heritage and the Arts (2009a) Significant impact guidelines for the vulnerable green and golden bell frog (*Litoria aurea*) Nationally threatened species and ecological communities EPBC Act policy statement 3.19.

Department of the Environment Water Heritage and the Arts (2009b) Significant impact guidelines for the vulnerable green and golden bell frog (*Litoria aurea*) Nationally threatened species and ecological communities Background paper to the EPBC Act policy statement 3.19

Department of Planning Industry and Environment (2020) NSW Survey Guide for Threatened Frogs A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method



<p><b>Legend</b></p>	<p><b>Holt-Besmaw Lands</b></p>	<p>0 162.5 325 650</p>
<p> Subject Land</p>	<p>251, 260R, 278 &amp; 280-282</p>	<p>Metres</p>
<p> Lots</p>	<p>Captain Cook Drive Kurnell NSW</p>	<p></p>
<p> Call Playback Locations</p>	<p>Green and Golden</p>	<p></p>
<p> Targeted Survey Traverses</p>	<p>Bell Frog Survey</p>	<p></p>
<p> Potential GGBF Habitat Area</p>	<p><small>This map is not guaranteed to be free from error or omission. Therefore Australian Environmental Surveys (AES) its employees &amp; associates disclaim liability for any act done or omission made on the basis of information provided within the map and any consequences of such acts and omissions.</small></p>	<p></p>

Figure 1 – Survey Locations

## **Attachment 2: Detailed Comments – Description of the Captain Cook Drive Upgrade**

### **Background**

Captain Cook Drive has been identified as requiring upgrades and widening to accommodate an increased traffic flow anticipated as being a resultant outcome of the future proposals on the Besmaw Lands. An evaluation of the Captain Cook Road Reserve was consequently identified as requiring an ecological assessment for the resultant/likely biodiversity value impacts of these anticipated works. An expert evaluation of the GGBF habitat elements along CCD was thus commissioned.

Urbis therefore provided to AES a plan and digital spatial data for the new road alignment design in its existing corridor/road reserve.

### **Method**

Using ARC Map GIS software Captain Cook Road Reserve segments were generated into georeferenced PDFs for use within the Avenza Map spatial referencing tool App used within a handheld mobile/tablet device.

Consequently, Captain Cook Drive was thus traversed on either side to evaluate a 10-20m band of generally vegetated areas bordering the existing Captain Cook Drive roadway.

Spatial traverse data was captured for the areas evaluated and waypoints to demarcate various features along the length of roadway evaluated.

### **Results**

Both sides of Captain Cook Drive were thus evaluated, photographed and mapped to reveal/depict areas of landscape, geomorphological form and the prevailing vegetation in its various type and condition (See Map Figure 2). Road culverts traversing CCD were position captured to indicate points where habitat enhancement measures could be undertaken. The extent of occurrence of apparent roadside swales parallel to CCD and providing inherent connectivity habitat value was also captured.

### **Discussion**

The entire length of Captain Cook Drive traversed revealed an area that has almost entirely modified habitat values with much of the vegetation having been planted or rehabilitated following road works originally or subsequently undertaken in association with later developments.

Almost all of the vegetation is heavily weed infested with little of it providing any habitat values for GGBF.

What could only be considered artificial constructed and now heavily modified habitat values for GGBF occur generally in sections along Captain Cook Drive. These areas of vegetation associated with swale culverts that have been constructed along and parallel to CCD when last constructed/upgraded may provide opportunistic occasional movement pathways for GGBF where/if they occur. Other habitat relevant elements occurring are the beneath road culverts traversing CCD and provide a north south connectivity opportunity for GGBF.

### **Conclusion**

No natural GGBF habitat was identified along Captain Cook Drive in the relevant sections investigated (see Map Figure 2 a-c).

It is considered unlikely that GGBF would be found occupying the relevant sections of CCD inspected given current prevailing conditions.

No areas of the relevant section of CCD inspected should be considered GGBF habitat for the purposes of developing or determining habitat polygons under the BAM as all such areas are derived or constructed elements considered unlikely occupied other than transiently if at all. Most areas are in very poor condition and with heavy weed infestation.

### **Recommendations**

1. Green and Golden Bell Frog habitat along Captain Cook Drive should be considered artificial, heavily modified and generally unsuitable habitat for occupation other than as a transient pathway at best.
2. It is not possible to generate any relevant or appropriate habitat polygons for GGBF along any sections of Captain Cook Drive inspected and it is not considered herein relevant to require offsets for GGBF as part of any development assessment process including applying BAM to road widening activities.
3. Conservation measures that could be applied to any assessment considerations for GGBF might more profitably consider for conservation purposes the provision of habitat enhancement and rehabilitation initiatives/measures, particularly along drainage swale areas where they occur and at beneath road culverts, in concert with bush regeneration weed management activities generally.
4. Any conservation measures for GGBF should consider the GGBF Best Practice Habitat Guidelines (DECC 2008) and be recognised as contributing to the implementation of the Kurnell GGBF Key Population Management Plan (DECC 2007).



<p><b>Legend</b></p> <ul style="list-style-type: none"> <li><span style="border: 1px solid purple; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Subject Land</li> <li><span style="border: 1px solid yellow; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Lots</li> <li><span style="border-bottom: 1px solid yellow; width: 15px; display: inline-block; margin-right: 5px;"></span> No Significant GGBF Habitat</li> <li><span style="border-bottom: 1px solid orange; width: 15px; display: inline-block; margin-right: 5px;"></span> Potential Movement Habitat Swales</li> <li><span style="border: 1px solid green; border-radius: 50%; width: 10px; height: 10px; display: inline-block; margin-right: 5px;"></span> Beneath Road Drain</li> </ul> <p>Map A</p>	<p><b>Holt-Besmau Lands</b></p> <p>251, 260R, 278 &amp; 280-282          Captain Cook Drive Kurnell NSW          Green and Golden          Bell Frog Survey</p> <p><small>This map is not guaranteed to be free from error or omission. Therefore Australian Environmental Surveys - AES, its employees &amp; associates disclaim liability for any act done or omission made on the basis of information provided within the map and any consequences of such acts and omissions.</small></p>	<p>0 100 200 400          Metres</p> <p>N          W E          S</p> <p>AES</p>
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Figure 2a – Road Reserve Assessment Area









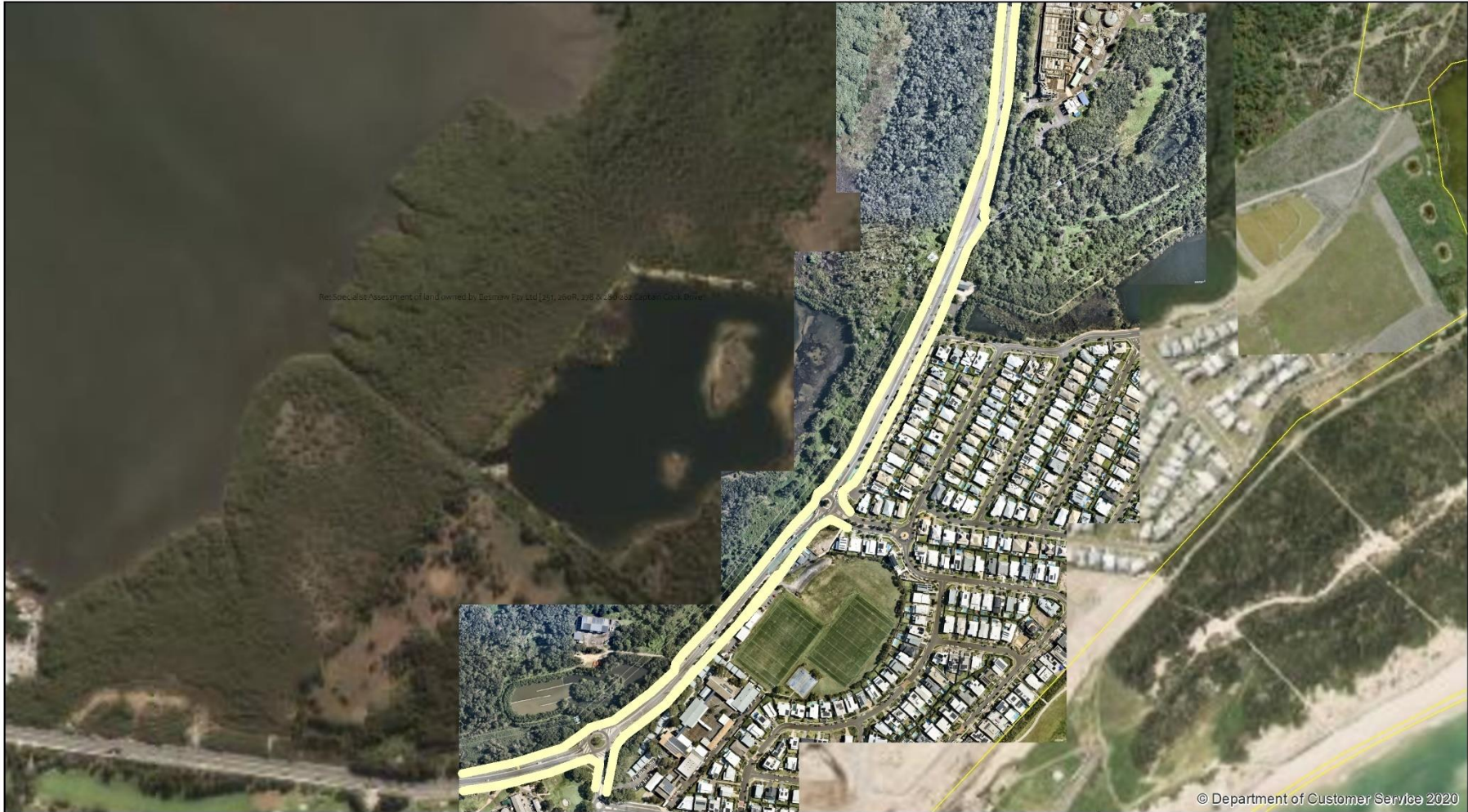
<p><b>Legend</b></p> <ul style="list-style-type: none"> <li> Subject Land</li> <li> Lots</li> <li> No Significant GGBF Habitat</li> <li> Potential Movement Habitat Swales</li> <li> Beneath Road Drain</li> </ul>	<p>Map B</p>	<p><b>Holt-Besmau Lands</b>          251, 260R, 278 &amp; 280-282          Captain Cook Drive Kurnell NSW          Green and Golden          Bell Frog Survey</p> <p><small>This map is not guaranteed to be free from error or omission. Therefore Australian Environmental Surveys - AES, its employees &amp; associates disclaim liability for any act done or omission made on the basis of information provided within the map and any consequences of such acts and omissions.</small></p>	<p>0 100 200 400          Metres</p> <p>N          W E          S</p> <p></p>
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Figure 2b – Road Reserve Assessment Area








<p><b>Legend</b></p> <ul style="list-style-type: none"> <li> Subject Land</li> <li> Lots</li> <li> No Significant GGBF Habitat Potential Movement Habitat Swales</li> <li> Beneath Road Drain</li> </ul>	<p style="text-align: center;"><b>Map C</b></p> <p style="text-align: center;"><b>Holt-Besmau Lands</b> 251, 260R, 278 &amp; 280-282 Captain Cook Drive Kurnell NSW Green and Golden Bell Frog Survey</p> <p style="text-align: center; font-size: small;">This map is not guaranteed to be free from error or omission. Therefore Australian Environmental Surveys - AES, its employees &amp; associates disclaim liability for any act done or omission made on the basis of information provided within the map and any consequences of such acts and omissions.</p>	<p style="text-align: center;">0    100    200    400 Metres</p> <p style="text-align: center;">N W    E S</p> <p style="text-align: center;"></p>
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Figure 2b – Road Reserve Assessment Area