Travers

bushfire & ecology

Expert report

Green and Golden Bell Frog

Macarthur Gardens North
Lot 1097 DP 1182558
Goldsmith Avenue,
Campbelltown

October 2017
(REF: A16113BSA2)

Expert Report
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Goldsmith Avenue, Campbelltown

OCTOBER 2017

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File:	A16113BSA2

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

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GGBF Expert Report

SECTION 1.0 – INTRODUCTION

Travers bushfire & ecology (TBE) has been engaged to prepare an expert report on the Green and Golden Bell Frog (GGBF) for a proposed residential subdivision as part of the Macarthur Gardens North precinct within Lot 1097 DP 118255 accessed off Goldsmith Avenue, Campbelltown. The entire area of this lot has been subject to previous flora and fauna survey effort by *TBE* in 2016 and is referred to as the 'study area'. This area is shown on Figure 1.

The Report has been prepared by Mr Corey Mead - Bachelor of Applied Science (1994) and has over 10 years' experience in fauna survey and habitat assessment for wildlife including but not limited to threatened frogs.

Portions of Lot 1097 have already been subject to approved previous and current works associated with the precinct development. The portions of the study area providing water retention for potential frog breeding opportunities will be subject to concentrated habitat assessment and survey and will be referred to as the 'subject site'. Some of the subject site are part of the recent earthworks.

1.1 Background

A flora and fauna assessment report was prepared for the proposal by *TBE* (2016). Survey for this report was undertaken during winter which is unsuitable for GGBF activity. Further survey, particularly for the GGBF was therefore recommended after rains within the calling period (September - January). Whilst not expected to occur, these further surveys were also based on nearby recordings at Blair Athol to the north-east in 2013.

1.2 Aims of the assessment

The aims of the expert report are to:

- Undertake a habitat assessment of independent potential breeding locations within the study area in accordance with habitat criteria outlined by Pyke & White (1996) and DEC (2005).
- Carry out a single night's target survey for GGBF in suitable breeding locations within the study area as well as a nearby reference site at Blair Athol.
- Prepare an expert report in accordance with the requirements of the *Biobanking Assessment Methodology* (2014) and with consideration to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Threatened Species Conservation Act 1995* (TSC Act).

1.3 Using expert reports instead of undertaking a survey

The following criteria is specified under Section 6.6.2 of the *Biobanking Assessment Methodology* (2014):

6.6.2.1 An expert report may be obtained instead of undertaking a threatened species survey at a development site or biobank site.

6.6.2.2 An expert report must only be prepared by a person who is accredited by the Chief Executive of OEH under section 142B(1)(b) of the TSC Act, or a person who, in the opinion of the Chief Executive of OEH possesses specialised knowledge based on training, study or experience to provide an expert opinion in relation to the biodiversity values to which an expert report relates.

6.6.2.3 The expert report must document the information that was considered, and/or rejected as unsuitable for consideration, to reach the determination made in the expert report.

6.6.2.4 An expert report can only be used instead of a survey for species to which species credits apply.

6.6.2.5 An expert report must set out whether: (a) for development sites – the species is unlikely to be present on the development site – in this case no further assessment of the species is required, or (b) for all development sites or biobank sites – the species is likely to be present on the site – in this case the expert report must provide an estimate of the number of individuals or area of habitat to be impacted by the development or the management actions (according to the unit of measurement identified for the species in the Threatened Species Profile Database).

6.6.2.6 The Chief Executive of OEH may decide not to accept an expert report instead of undertaking a threatened species survey at a development site or a biobank site, in which case a target species survey will be required for the species.

1.4 Development proposal and amendment

In the Masterplan for the Macarthur Regional Centre, Macarthur Gardens North consists of a constructed level residential subdivision development platform in the north and the realignment of Bow Bowing Creek south of this for flood mitigation. A conservation area is proposed between the realigned Bow Bowing Creek and the rail line which runs along the southern study area boundary. The existing Macarthur Gardens to the south of the rail line under the Masterplan has already been completed and the proposed development is therefore the next and final stage of the development.

The development application is to address the removal of existing vegetation and earthworks required to fill the development parcel and realign Bow Bowing Creek consistent with the findings of the flood report and the original development consent. The creek realignment is considered necessary due to the potential for flooding resulting from upstream works.

The NSW DPI Office of Water has approved the proposed creek realignment for Bow Bowing Creek, and outlined specific conditions of approval for the development. Being a 4th order watercourse, the vegetated riparian zone width requirements are 40 metres each side of the watercourse, and a total riparian corridor width of 80m + channel width, as per the guidelines for riparian corridors on waterfront land. A constructed drainage in 2015 that runs

below Goldsmith Avenue into Bow Bowing Creek and also providing habitat assessed for potential use by GGBF will be likely retained now as part of the continued works.

The proposed development layout is shown in Figure 1.

Figure 1 – Proposed Macarthur Gardens North subdivision development
(*Source: J. Wyndham Prince*)

1.5 Information collation, licenses and expertise

1.5.1 A data search

A search of the *Atlas of NSW Wildlife* (OEH 2017) was undertaken to identify GGBF records located within the nearby locality.

1.5.2 Desktop assessment

To determine the likely occurrence of GGBF a desktop assessments on Nearmap was undertaken to review the historical modifications to the study area potentially affecting GGBF habitat back to 2009. A similar review was undertaken for the nearby recording of GGBF at Blair Athol in 2013.

1.5.3 Licences

Individual staff members of *Travers bushfire & ecology* are licensed under Clause 20 of the *National Parks and Wildlife (Land Management) Regulation 1995* and Sections 120 & 131 of the *National Parks and Wildlife Act 1974* to conduct flora and fauna surveys within service and non-service areas. NPWS Scientific Licence Numbers: SL100848.

Travers bushfire & ecology staff are licensed under an Animal Research Authority issued by the Department of Agriculture. This authority allows *Travers bushfire & ecology* staff to conduct various fauna surveys of native and introduced fauna for the purposes of environmental consulting throughout New South Wales.

1.5.4 Staff

The site habitat assessment, target survey and expert report has been prepared by Corey Mead. A Curriculum Vitae relevant to Corey's work with GGBF is provided in Appendix 2.

SECTION 2.0 – SITE ASSESSMENT

A field visit to the study area incorporating a habitat assessment of potential breeding locations for their suitability of use as well as nocturnal target survey was undertaken on the 23rd October 2017.

2.1 Habitat assessment

Pyke & White (1996) found that, for a site to support a breeding population of GGBF, it should contain water bodies which are still, shallow, ephemeral, unpolluted, unshaded and free of *Gambusia* and other predatory fish. It should have a grassy area nearby and other nearby vegetation should be no higher than woodland. The substrate of the ponds should be sand or rock, aquatic plants should be present and there should be a range of possible diurnal shelter sites, including vegetation and rocks.

Breeding habitat value was assessed on a field proforma considering the detailed breeding habitat values outlined by *Pyke & White* (1996) as well as the Draft Recovery Plan for the Green and Golden Bell Frog (*DEC* 2005).

Within the study area three separate potential breeding locations were independently assessed. These included:

Site 1 – Constructed drainage from under Goldsmith Avenue and the university
Site 2 – A collective set of points along the main drainage channel of Bow Bowing Creek
Site 3 – A stormwater collection point at the end of the channel

These locations are shown on Figure 1. Appendix 1 provides the completed field proforma for each site. The proforma has been prepared so that the more ticks (✓) indicating suitable habitat features, the higher quality habitat for breeding.

Site 1 provides the most suitable and high quality breeding habitat potential. This is given the absence of Mosquitofish (*Gambusia holbrooki*) a known predator of GGBF eggs. Also other appropriate water-body characteristics including the apparent high water quality and as well as reedy vegetation within the water column. This habitat area however appears more limited on available surrounding shelter opportunities, particularly for over-wintering, dispersal and non-breeding periods. The immediately surrounding landscape with the exception to the south, is highly and recently disturbed by earthworks.

Sites 2 and 3 were both found to contain Mosquitofish. Site 2 along the main creek channel is generally unsuitable also due to the deep channel and shading as well as the regular flows and pooling to contain Mosquitofish during dry periods. This site, represented by collective locations, are all generally very weedy. As a result the main channel is not likely to support any breeding potential.

Site 3 is an end point to the channel at the head of a stormwater overflow. The physical characteristics and vegetation of this location appear to support good habitat however the deeper and more perennial stagnant nature of the water makes it susceptible to algae and other poor water quality flow on effects. No frogs were heard calling at this location during the survey, therefore this location is considered as poor quality habitat and unlikely breeding potential.

Given the results of the habitat assessment, a review of Site 1 was undertaken, refer to Section 2.4.

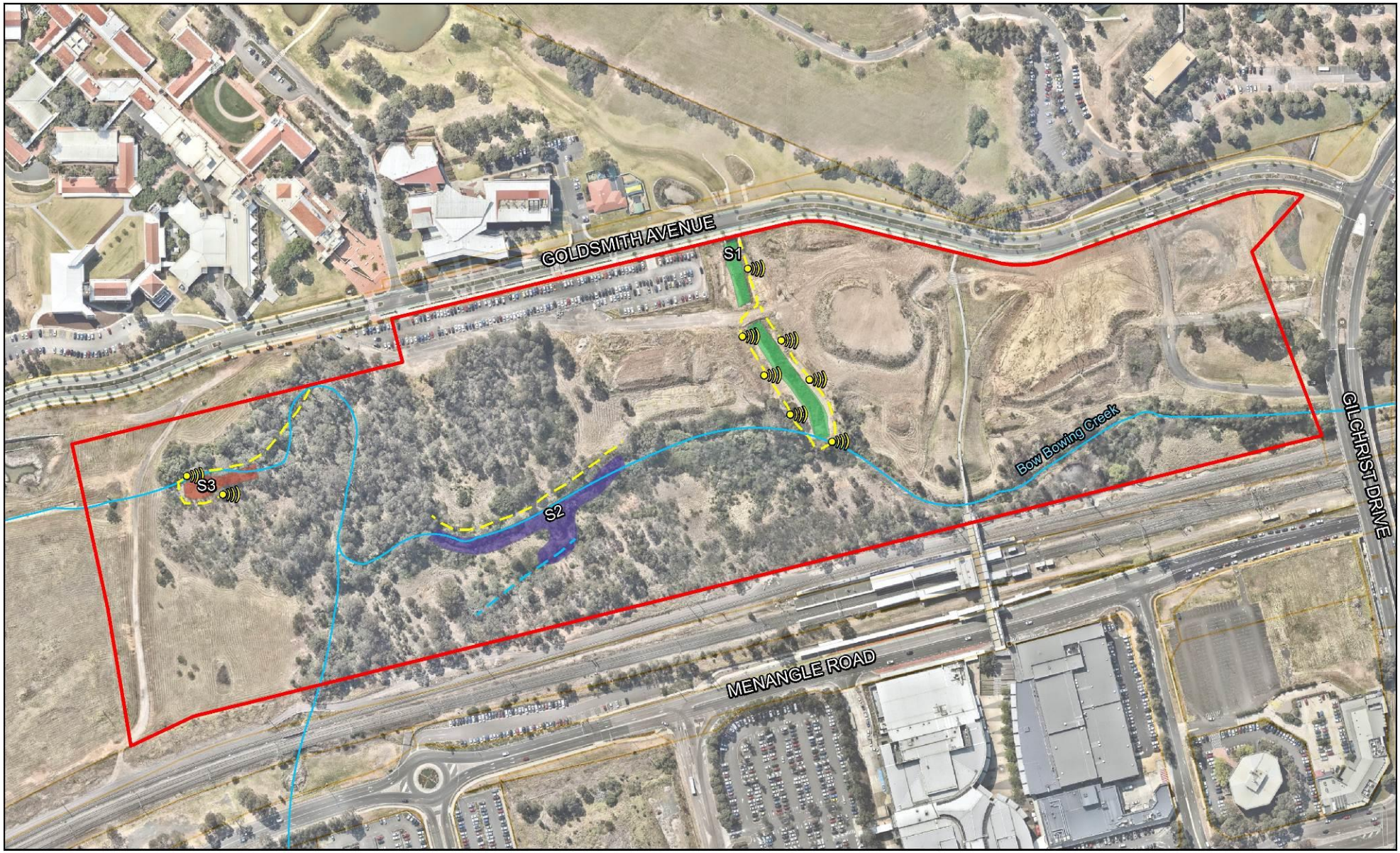

Figure 2 – Green and Golden Bell Frog habitat assessment and target survey locations

2.2 Target survey

Following the habitat assessment target survey was undertaken with a priority on Site 1 followed by the other two sites. The date selected for the site visit was following 16.8mm of rainfall in the three days prior (refer to Table 2).

Survey initially included listening for calling males during the dusk period. Late in this period and following no calls by GGBF, call-playback techniques were deployed to attempt to evoke a call response. Call-playback involves broadcasting recorded GGBF calls through a 15 watt Toa 'Faunatech' megaphone for 2-minute periods with 2-minutes quiet listening for response. Call-playback was undertaken at various locations within the study area adjacent to potential breeding locations (see Figure 2). No GGBF calls were heard within the study area.

Spotlighting was undertaken along the edge of the water for frogs perched on vegetation or within the waters' surface and for tadpoles. Potential GGBF tadpoles that could not be readily identified in the field using Anstis (2007) are typically photographed over a scale and sent for identification to Dr Marion Anstis or Dr Arthur White. No GGBF frogs or tadpoles considered potentially GGBF were observed during the survey within the study area.

Immediately following surveys in the study area, a site visit to the nearby Blair Athol was undertaken as a reference site. This location approximately 1.5 km to the NNE of the study area contained a recorded GGBF from 2013. Listening, call-playback and spotlighting was also undertaken at the suitable breeding area referenced at the point indicated on *Bionet*. Listening around other nearby dams and soaks was also undertaken. As indicated on Table 1 the temperature was no more than 13°C at the time of this visit. Recorded calling at the reference site would more confidently rule out the study area for presence however no calls were recorded at the first reference site.

A second reference site was undertaken (90km distant from the subject site) at a reliable GGBF breeding site at North Avoca. The temperature at Avoca Lagoon was at 11°C. No frogs were heard calling or stimulated by call-playback at this time.

2.3 Field survey effort

Table 1 details the GGBF related survey effort undertaken, duration and weather conditions and Figure 1 shows survey locations within the study area.

Table 1 – Survey effort

Location	Date	Weather conditions	Time effort (24hr)
Study area	23/10/17	0/8 cloud, light - no wind, no rain, temp 17-15°C	1hr 15min 1930 - 2045
Ref site 1 – Blair Athol	23/10/17	0/8 cloud, no wind, no rain, temp 13°C	1hr 15min 2055 - 2145
Ref site 2 – North Avoca	24/10/17	0/8 cloud, no wind, no rain, temp 11°C	15min 0215 - 0230

The survey conditions, particularly following the preceding 2-3 days' rainfall, was considered suitable for the study area. Weather conditions and mainly temperature at the reference sites was far less suitable. Given the extended dry period prior to the rainfall, a second large rainfall event may prove more reliable for the species detection.

Table 2 shows the recorded weather and rainfall collected for Campbelltown from the Bureau of Meteorology. This table shows the high rainfall 2-3 days prior to the field visit. Prior to this rainfall the previous month experienced dry conditions. As noted by DEC (2005)

GGBF is most likely to be detected during and after heavy rainfall but this should not be taken to mean that the frogs definitely become active after a single rain event.

Table 2 – Weather conditions (source: BOM)

Date	Day	Temps		Rain	Max wind gust			9 am				3 pm				
		Min	Max		Dir	Spd	Time	Temp	RH	Dir	Spd	Temp	RH	Cld	Dir	Spd
		°C	°C	mm	km/h		local	°C	%	km/h		°C	%	8th	km/h	
19	Th	11.1	31.5	0	NE	26	14:07	19.6	68	N	11	30.8	24		NE	13
20	Fr	17.9	19.5	9.0	S	31	09:59	19.1	99	Calm		14.2	91		S	11
21	Sa	9.0	20.0	7.8	SSW	28	08:35	14.0	60	SSW	11	19.3	39		SSW	7
22	Su	10.5	23.0	0.2	NNW	24	12:57	16.1	66	NNW	7	16.1	80		SE	13
23	Mo	8.5	23.2	2.6	NE	28	15:47	15.2	73	SW	9	21.7	37		SSE	9

Amphibian survey was undertaken in accordance with the *Hygiene Protocol for the Control of Diseases in Frogs* (DECC 2008). Any frogs that are found are visually identified and examined, are handled with latex gloves and kept moist until release.

A further two separate nights of survey during similar appropriate weather conditions and ideally separated by 2-4 weeks would more conclusively rule out presence (DEC 2005). In the absence of this survey a detailed review of the suitable breeding habitat provided by Site 1 was undertaken.

2.4 Site review

A historical analysis of the study area by aerial photographs on *Nearmap* was undertaken to obtain further understanding of the previous potential for breeding. These are shown as Photos 1-8 on the following pages. This shows that the constructed drainage of Site 1 (considered as the potential GGBF breeding location within the study area) was only constructed between May and November 2015. Prior to this a drainage swale was present that received excess flows from the university lands to the north and directed this towards Bow Bowing Creek further east.

It is recognised that GGBF may recolonise suitable breeding habitat after heavy site disturbances. In this case frogs may later utilise the newly constructed breeding areas if provided before appropriate seasonal breeding conditions and dispersal. It is also noted that disturbances that are limited in size, temporary and limited to the degraded breeding areas during cooler months when frogs are over-wintering in adjacent shelter habitat, may also occur without significant impacts provided alternative habitat is created after disturbance.

The review of site aerials more confidently considers the site as unlikely to support GGBF breeding habitat given

1) due to works that completely removed the drainage swale and its vegetation in 2015 which also removed all nearby surrounding shelter, foraging and overwintering potential in the immediate surrounds, and
2) the vegetation within the previous drainage swale was completely managed in 2010 and 2011.

The following selected photographs show the recent history of Site 1; available aerials reviewed on *Nearmap* do not date prior to December 2009.

Photo 1 – Drainage swale with low vegetation (Dec 2009 on Nearmap)

Photo 2 – Drainage swale mostly managed (Mar 2010 on Nearmap)

Photo 3 – Drainage swale completely managed (Feb 2011 on Nearmap)

Photo 4 – Drainage swale partially managed (Aug 2012 on Nearmap)

Photo 5 – Temporary road construction (Jun 2014 on Nearmap)

Photo 6 – Channel construction (Nov 2015 on Nearmap)

Photo 7 – Regrowth
(Jun 2014 on Nearmap)

Photo 8 – Adjacent management
(Jun 2014 on Nearmap)

SECTION 3.0 – Conclusion & Recommendations

Travers bushfire & ecology (TBE) has been engaged to prepare an expert report on the Green and Golden Bell Frog for a proposed residential subdivision as part of the Macarthur Gardens North precinct within Lot 1097 DP 118255 accessed off Goldsmith Avenue, Campbelltown. The entire area of this lot has been subject to previous flora and fauna survey effort by *TBE* in 2016.

A habitat assessment within the study area has defined one drainage area (Site 1 on Figure 1) as having breeding potential by GGBF. Preliminary site surveys during this visit in appropriate conditions did not record the species present. Further survey may more effectively rule out presence/absence however this specialist report has alternatively concluded that important habitat for GGBF is unlikely to be present based on a review of recent site earthworks and local records.

The area identified as most suitable for breeding has been recently constructed in 2015. The drainage swale present prior to this may have also provided breeding opportunity however this was completely cleared of vegetation more than once dating back on aerial photographs reviewed to 2009.

If any other nearby potential breeding habitat combined with available adjacent shelter and foraging opportunity existed, then this may have given further potential for the species to recolonise the study area and subsequently prompt further need for survey. The nearby open water areas within the University of Western Sydney grounds however are deep, permanent with limited fringing vegetation for breeding opportunity.

The nearest GGBF records are approximately 1.5 km to the NNE at Blair Athol in 2013. These records are from recent years but are not located proximate to the study area to consider the study area as a satellite breeding opportunity.

Travers bushfire & ecology is satisfied with the limited surrounding habitat opportunities and distance to Blair Athol records to consider that both locations are unlikely utilised by a same population. This is particularly given the significant barrier provided by the busy Narrallan Road between these locations. There are otherwise no other records in the immediate area to suggest that the study area may be of importance to the species. The single site visit and survey provided further assurance to the overall conclusions of the site habitat assessment and review.

It is concluded that the study area is not of any likely importance to Green and Golden Bell Frog. Therefore no further assessment under BioBanking is required.

3.1 Mitigation Measures

The constructed drainage of Site 1 that runs below Goldsmith Avenue into Bow Bowing Creek and also providing most suitable breeding habitat for GGBF will be likely retained as part of the continued works. It is recommended that large rocks and sedges are placed along the adjacent banks of this drainage to provide shelter, over-wintering and foraging habitat for frogs.

It is recommended that site habitat searches for frogs (and other fauna, particularly Cumberland Plain Land Snail) is undertaken prior to any further habitat clearance works. This is to effectively recover and relocate any residing fauna into proposed conservation areas. Terrestrial habitat improvement by placement of logs and on-ground shelters should be provided within the conservation area to the south of Bow Bowing Creek as part of these

works. These searches and habitat enhancement measures are to be undertaken by an experience fauna ecologist.

In the event that Green and Golden Bell Frog is recorded present at this time, a work order is to be stopped immediately within suitable habitat and a management plan prepared to relocate the GGBF into temporary habitat and to recreate suitable habitat as part of the drainage design.

Bibliography

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Appendix 1

G&GBF Habitat assessment proforma

Green & Golden Bell Frog Field Habitat Assessment

23/10/17

Site: Macarthur Gardens

	HOUSE No./ Location / Area	BREEDING -Water-body Characteristics							SHELTER / FORAGING - close to water-body(s)					REFUGE
		Ephemeral and/or widely fluctuating waterbody present?	Still or slow flowing?	Shallow?	Un-polluted?	Sand or rock substrate?	Without heavy shade?	Free of Gambusia?	Grassy Areas?	Woodland or Lower with complex structure (preferred)	Clumps of aquatic Plants Present eg *Typha, Eleocharis, Juncus, Phragmites*	Terrestrial fringing or nearby tussock plants eg *Gahnia, Danthonia, Lomandra*	Other nearby shelters	Abundant shelter opportunities eg. rocks, logs, dense tussock forming veg, artificial refuse?
1	Drainage from Uni	✓	✓	✓	probable ? appears clear	clay ×	✓	✓	✓	✓	*Typha Phragmites* ✓	×	limited	limited ×
2	Creek section	× perennial	slow - medium ×	✓	? may have higher nutrients	×	scoured channel × shaded	×	✓	✓	sections of *Ty* & *Ph* ✓	× very weedy	limited	limited ×
3	End drain	× perenial	✓	✓	probable	×	✓	×	✓	✓	*Typha* ✓	× weedy	✓ rock piles otherwise limited	limited ×
	Ref 1	✓	✓	✓	?	×	✓	?	✓	✓	✓	✓	✓	½
	Ref 2	perennial	✓	✓	✓	✓	✓	? ✓	✓	✓	✓	✓	✓	✓

Source: - Habitat Requirements for the Green & Golden Bell Frog as determined by Pyke & White (1996); and
- Draft Recovery Plan for the Green and Golden Bell Frog (DEC 2005)

Summary of Results

HOUSE No. / Location / Area	Summary of Results (Breeding, over-wintering, diurnal roost close to breeding,
Drainage from Uni	good - very good habitat within basin. Limited sheltered habitat beyond this.
Creek section	Not likely breeding habitat - flowing after rain, shaded channel, gambesia/perennial, very weedy in and out of channel.
End drain	Unlikely potential breeding areas with basking opportunities, constructed rock piles but otherwise limited shelter. Gambusia present. No frogs calling.
Ref 1	Blair Athol
Ref 2	Nth Avoca

Appendix 2

Curriculum Vitae – Corey Mead

(Relevant to Green and Golden Bell Frog Survey and Assessment)

Corey Mead – Experience & Qualifications

(Relevant to Green & Golden Bell Frogs)

RELEVANT EDUCATION / QUALIFICATIONS / TRAINING

- Southern Cross University - Bachelor of Applied Science (1994)
- NPWS Scientific Licence: S10359.
- Licensed under an Animal Research Authority issued by the Department of Agriculture.
- Training on threatened NSW frog species, including Bell Frog species provided by Frank Lemckert (NSW Forestry)

GREEN & GOLDEN BELL FROG TARGET SURVEY & ASSESSMENT

- Botany – Bridge construction
- Avoca & Davistown Populations - Field research with Newcastle university
- Greenacre – Residential development adjacent to old brickpit breeding site
- Sewer pipeline – North Avoca population survey and habitat restoration management for Gosford City Council
- Sydney Olympic Park – Target survey & assessment on the SOPA population for a single lot development
- Horsley Park – Target survey & EPBC referral for a brickpit expansion

PREVIOUS GREEN & GOLDEN BELL FROG HABITAT ASSESSMENT SITES

- Prepared GGBF profile for Gosford City Council
- Road Widening proposal - Berkeley Vale
- Residential Subdivision – Baulkham Hills
- Residential Subdivision – Lawson
- Rural Residential Subdivision – Sutton
- Residential Subdivision – Wallarah
- Rural Residential Development – Matcham
- Road Widening – Berkeley Vale
- Residential Development – Baulkham Hills
- Residential Development – Lisarow
- Residential Development – Wisemans Ferry
- Road Widening – Jilliby
- Residential Development – Hamlyn Terrace
- Residential Subdivision – Ramsgate
- Industrial Subdivision – Riverstone
- Tourism Park – Hallidays Point
- Aquatic Complex Extension – Annangrove
- Residential Development – Kellyville
- Residential Development – Palm Beach
- Residential Subdivision – North Morriset
- Residential Subdivision – Prestons
- Residential Subdivision – Red Head
- Residential Subdivision – Forster
- Residential Subdivision – Claremont Meadows
- Residential Development – Fountaindale
- Residential Development – Cumbalum
- Effluent Dispersal Upgrade – Tahmoor
- Residential Development – Glenwood
- School Development – Pretty Beach
- Residential Development – Allambie Heights
- Bridge Development – Botany
- Residential Developments – Wilton
- Residential Rezoning & Development – Wyee
- Seniors Living Development – Umina
- Road Works – Ourimbah
- Residential Development – Prestons
- Estate Development – Forster
- Industrial Rezoning – Rouse Hill
- Pre-school Development – Wyee
- Rezoning & Development – Wyee
- Industrial Development – Erskine Park
- Tourist Park Development – Lake Conjola
- Recreation Centre Development – Milson Island
- Village Development – Summer Hill
- Residential Rezoning & Development – Five Dock
- Rezoning & Development – Iluka
- Subdivision & Development – Dural
- Buddhist Temple Development – Peats Ridge
- Residential Redevelopment – Dural

- Subdivision & Development – Dural
- Subdivision & Development – Springfield
- Bridge Replacement – Wyong Creek
- Road Upgrade Works – Ourimbah
- Sector Development – Diamond Beach
- Subdivision & Development – Beacon Hill
- Precinct Development – Oran Park
- Nursery – Glenning Valley
- Road Upgrade – The Ridgeway
- Timber Mill – Coutts Crossing
- Australian Rail-track Maintenance – North-eastern Railway Corridor
- Sector Development – Warriewood

RELEVANT EMPLOYMENT HISTORY

Date: Oct 2007 – Present (Full-time)
Company: Travers Bushfire & ecology
Title: **Senior Fauna Ecologist**
Duties: Fauna surveys, threatened fauna target surveys & assessment, threatened fauna habitat assessments.

Date: Mar 2006 – Oct 2007 (Full-time)
Company: Conacher Travers
Title: **Field Technician / Fauna Ecologist**
Duties: Fauna surveys, frog and reptile ecology, threatened fauna target surveys & assessment.

Date: Feb 2003 – Jan 2006 (Full-time)
Company: Australian Reptile Park
Title: **Head Keeper**
Duties: - The captive management of all native and exotic frogs (including Bell Frogs) within the collection.
- Supervising the ARP breeding program for the two local populations of Green & Golden Bell Frogs.
- The Reptile Park worked collaboratively with Dr Michael Mahony, Dr Aurthur White, Taronga Zoo and the NPWS on GGBF captive population management.
- Overseeing chytrid fungus hygiene protocols for captive frog species including Green & Golden Bell Frogs.

Phone referee:

- Mr Al Mucci, General Manager - Dreamworld Wildlife Section. Ph: 0407 437595 General Manager at the Australian Reptile Park from 2000 - 2006.