



Annual Report Green and Golden Bell Frog Management Arncliffe May 2017-May 2018

This annual report has been prepared to meet the requirements of Ministers Condition of Approval B14(d) which requires annual reporting of monitoring results associated with the New M5 project's (the project) Green and Golden Bell Frog Plan of Management. The report has been prepared by the project's herpetologist and covers the reporting period May 2017 to May 2018 (the reporting period).

A number of activities have been carried out at Arncliffe on behalf of New M5 Construction Contractor, Sydney Motorway Corporation and Roads and Maritime in accordance with the Plan of Management for the Green and Golden Bell frogs (Ecological 2017). These activities detailed below have been carried out to:

1. To ensure that the frogs are not inadvertently injured or killed due to the construction activity in the Arncliffe area;
2. To try to protect the remaining Green and Golden Bell frog habitat areas on or near the Kogarah Golf Course;
3. To create and monitor new habitat areas that will assist with the survival of Green and Golden Bell frogs in the local area, and
4. To create and develop a new Frog Habitat Area at Eve Street Arncliffe.

1. Securing the Arncliffe Work Compound

The Arncliffe work compound was established in 2016 and the site has been surrounded by frog-exclusion fencing ever since. During the year, modifications were made to the fence (mainly at the request of the Kogarah Golf Club) and those changes were made

without compromising the integrity of the frog barrier around the site. To date, no frogs have been found inside the compound since the frog-exclusion fence was erected.

The fence on the southern side of the compound (Figure 1) was moved as changes were made to the out wall of the compound.



Figure 1: Relocated Fence on Southern side of compound

2. Enhancement Area

In early 2017, six small ponds (Figure 2) were established along the southern margin of the Kogarah Golf Course. This area (referred to as the Enhancement Area) is maintained as a temporary movement thoroughfare for frogs moving between the golf course and the RTA ponds. The ponds came into operation in May 2017 and the filling of five of the six ponds has been carried out using the irrigation system in place on the Kogarah Golf Course. Personnel from the golf course operate the water system after advice from the consulting herpetologist.

Pond 1, the only pond not connected to the golf course's irrigation system, is in a low-lying area that is naturally often water filled. This pond is filled from a water point on the southern side of the construction compound (on the advice of the consulting herpetologist).

The frog ponds are small and have emergent vegetation established in them (Figure 2). In addition, small rocks piles and plantings of tussocks grasses were also established around the ponds, and mowing "no-go" zones were established for the golf course's maintenance crews, and "out of bounds" areas established for the golfers.



Figure 2: Stepping Stone Pond on 4 May 2017

Frog and habitat monitoring of the enhancement area commenced in May 2017 and two nights survey were carried out there each month. Table 1 below summarises the frog monitoring details for the enhancement area.

Table 1: Monitoring Summary Enhancement Area

Survey Number	Date	Frogs Observed
1	24 May 2017	
2	28 May 2017	
3	31 July 2017	
4	17 August 2017	
5	30 August 2017	Striped Marsh Frog
6	4 September 2017	Striped Marsh Frog, Perons Tree Frog
7	28 September 2017	Striped Marsh Frog
8	20 October 2017	Striped Marsh Frog
9	29 October 2017	Striped Marsh Frog, Perons Tree Frog
10	7 November 2017	Striped Marsh Frog, Perons Tree Frog
11	25 November 2017	Striped Marsh Frog
12	6 December 2017	Striped Marsh Frog
13	11 December 2017	Striped Marsh Frog, Perons Tree Frog
14	12 January 2018	Striped Marsh Frog
15	22 January 2018	Striped Marsh Frog
16	17 February 2018	Striped Marsh Frog, Perons Tree Frog
17	20 February 2018	Striped Marsh Frog
18	21 March 2018	Striped Marsh Frog
19 ^A	23 March 2018	Striped Marsh Frog
20	2 April 2018	Striped Marsh Frog
21	26 April 2018	Striped Marsh Frog

Frog population monitoring extended into an additional search area in Barton Park (referred to as the extended search area) at the end of 2016. The Kogarah Golf Course and extended search areas are shown in Figures 3 and 4. Note, the new Marsh Street habitat area is shown below, however no frog monitoring was undertaken during the reporting area as the habitat area was under construction.

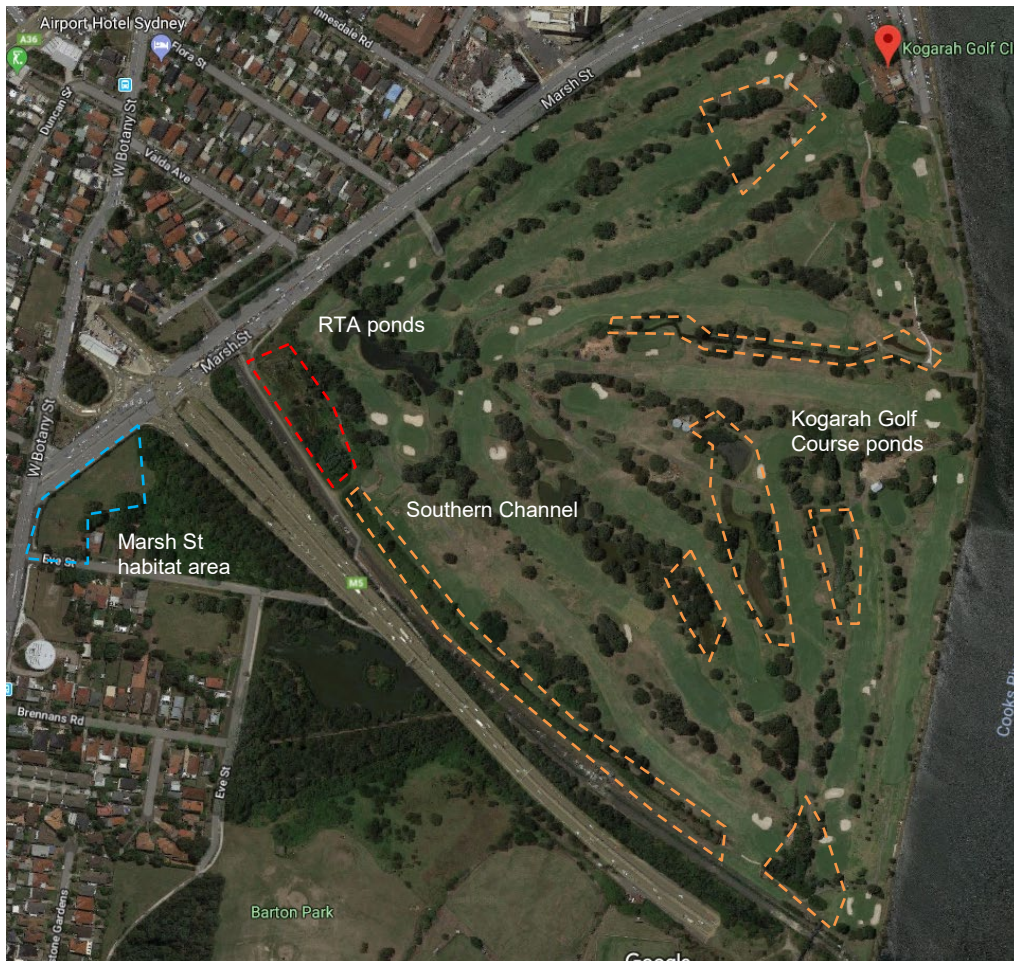


Figure 3: Frog monitoring locations at Kogarah Golf Course



Figure 4: Extended search area in Barton Park

Frog population and tadpole monitoring results for the RTA ponds, Kogarah Golf Course and extended search area are provided in Table 2.

Table 2: RTA pond, Kogarah Golf Course and extended search area monitoring results

Survey Month	Date	Monitoring results
May 2017	6 May, 20 May, 24 May, 28 May	No GGBF observed
June 2017		No GGBF observed
July 2017	30 & 31 July	No GGBF observed
August 2017	11 August, 29 August	No GGBF observed
September 2017	9 September, 18 September	No GGBF observed
October 2017	9 October, 22 October	No GGBF observed
November 2017	12 November, 19 November	No GGBF observed
December 2017	4 December, 17 December	No GGBF observed
January 2018	9 – 11 January, 22 January	1 GGBF observed in Barton Park on 9 January but not captured.
February 2018	3 February, 19 February, 25 February	No GGBF observed
March 2018	14 March, 22 March, 23 March	1 GGBF observed on 23 March in southern drain near the mangrove area in the south-eastern corner of KGC.
April 2018	9 April, 22 April	No GGBF observed
May 2018	13 May, 16 May	No GGBF observed

As detailed in Table 2, GGBF were only observed on two occasions during the reporting period in geographically separate locations. The sightings in January and March 2018 are the first sightings of GGBF in the Kogarah Golf Course and Barton Park since 18 December 2016 when two GGBF were observed in the eastern channel in Barton Park.

3. Marsh Street Frog Habitat Area

Earth works commenced at this site in October 2017. Progress was halted on several occasions due to the finding of contaminated soils. The soils had to be isolated and removed from the site. By early 2018 the three ponds were excavated and the water storage tank was installed. Subsequent to this the plumbing was fitted and the gabion and bank support work was done around the ponds (Figure 3). Construction of the new habitat area was completed on 27 April 2018. The site was inspected by both the nominated project and Roads and Maritime herpetologists prior to the completion of construction.

The emergent and fringing vegetation is still small and it will take a few months for the vegetation cover to become established.



Figure 3: Gabion ring wall around Pond 3, 20 April 2018.



Figure 4: Pond 1 prior to refilling, 26 April 2018



Figure 5: Pond 2 with planted vegetation prior to refilling, 26 April 2018

Until the management of the area can be handed over to Roads and Maritime, the Contractor is responsible for the maintenance of the Marsh Street habitat area. It is anticipated that the first captive-bred tadpoles will be translocated to this site at the end of 2018 once landscaping has established.

4. Fox Control

Contracted fox shooters were employed by Bayside Council to remove foxes from the Enhancement Area and nearby areas on the Kogarah Golf Course. In December 2017 and January 2018, the shooters killed five foxes. Several other foxes were seen but these were outside of the designated target areas.

Foxes are still seen regularly on the golf course and still hunt in the Enhancement Area. Bayside Council is responsible for organising and implementing a fox cull program at Kogarah Golf Course.

5. Captive Breeding Program at Symbio

Implementation of the captive breeding program continued during the reporting period at Symbio Wildlife Park. Zookeepers at Symbio continued to monitor the health of the 18 GGBF that form the captive breeding program. The sex of all GGBF was confirmed during the reporting period once all frogs matured.

Symbio provided an update for the GGBF in February 2018 following a request from the Department of Planning and Environment. Table 3 provides details of the GGBF as of 12 February 2018.

Table 3: GGBF captive bred details as of 12 February 2018

Frog	Sex	SVL mm	Weight g	Approx. Age	Infection Status (<i>x3 Negative Chytrid Results</i>)
T001	F	66.38	36.25	2	Clear
T002	F	68.78	38.30	2	Clear
T003	F	61.29	32.14	2	Clear
T004	F	67.70	37.00	2	Clear
T005	M	59.13	16.82	2	Clear
T006	F	69.62	35.21	2	Clear
T007	F	69.51	33.75	2	Clear
T008	F	66.22	34.00	2	Clear
T009	F	82.74	65.03	3+	Clear
T010	M	62.88	23.77	2+	Clear
T011	M	60.60	18.81	2	Clear
T012	M	57.71	16.40	2	Clear
T013	F	67.62	40.91	3	Clear
T014	M	63.48	21.17	2	Clear
T015	F	71.93	39.35	3	Clear
T016	F	65.45	31.00	2	Clear
T017	F	65.68	29.94	2	Clear
T018	F	60.94	31.91	2	Clear

6. Filling Point for RTA Ponds

During the reporting period a new water connection was provided from the Arncliffe construction compound to assist in filling the RTA ponds. The ponds were filled twice in 2018 using this system.