



Green and Golden Bell Frog Monitoring, Arncliffe, Dec 2022 – Feb 2023

Prepared by AMBS Ecology & Heritage Pty Ltd
for Transport for NSW

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1 Introduction

1.1 Background

AMBS Ecology & Heritage Pty Ltd (AMBS) was commissioned by Transport for NSW to undertake monitoring of the Green and Golden Bell Frog (*Litoria aurea*) (GGBF) at Arncliffe. This quarterly report presents the results of monitoring and other GGBF management actions undertaken by AMBS for the three-month period of December 2022 to February 2023 inclusive.

1.2 Study Area

The Study Area includes the following locations (Figure 1.1):

- M8 Marsh Street habitat area (previously known as the “New M5 Marsh Street habitat area”) – an area set aside for the establishment of potential GGBF habitat, including three ponds and surrounding terrestrial habitat, located south of the M5 between Marsh Street and Eve Street;
- the “Creek” area – a drainage line near the M8 Marsh Street habitat area, which runs eastwards from a stormwater outlet below Marsh Street to the Eve Street Wetland Reserve;
- the RTA Ponds – two ponds constructed as replacement habitat for the GGBF when the M5 was built (late 1990’s to early 2000’s), by the then NSW Roads and Traffic Authority (RTA), located near the Marsh Street/M5 intersection and adjacent to the Kogarah Golf Course;
- the Enhancement Area – six small ponds located near a drainage line that runs along the southern boundary of the Kogarah Golf Course, east of the RTA ponds;
- Kogarah Golf Course – a golf course located between Marsh Street and the Cooks River, which contains a number of water features, including some ponds where GGBFs have been recorded;
- Riverine Park and surrounds – parts of the area between the M5 and the Spring Street canal, where GGBFs have been recorded or potentially suitable habitat occurs;
- Barton Park – parts of the area in the northern section of Barton Park;
- Underpass – a passageway below the M5 East, which contains a pedestrian/bicycle path and a fenced-off containment pond.

1.3 Scope and Methodology

Monitoring and management of the GGBF at Arncliffe included:

- tadpole surveys and water quality measurements in the M8 Marsh Street habitat area, RTA Ponds, Enhancement Area, Kogarah Golf Course, Riverine Park and surrounds and Barton Park;
- nocturnal frog surveys in the M8 Marsh Street habitat area, RTA Ponds, Enhancement Area, Kogarah Golf Course, Creek, Underpass, Riverine Park and surrounds and Barton Park;
- removal of Striped Marsh Frogs (*Limnodynastes peronii*) from the M8 Marsh Street habitat area (under Office of Environment and Heritage [OEH] Licence);
- release of captive-bred GGBF tadpoles into the M8 Marsh Street habitat area;
- regular checks and support feeding of tadpoles in the M8 Marsh Street habitat area;
- inspections of the M8 Marsh Street habitat area, RTA Ponds and Enhancement Area;
- vegetation management in the M8 Marsh Street habitat area (undertaken by Total Earth Care [TEC]).

Tadpole and water quality surveys were undertaken concurrently in all areas on 21 December 2022 (Dr Arthur White and Glenn Muir), 26 January 2023 (Dr Arthur White and Glenn Muir) and 3 March 2023 (Dr Arthur White and Glenn Muir). Survey techniques included dip net sweeps and watching for tadpole activity; identification and staging of any tadpoles captured; and use of a hand-held probe to take water quality measurements.

Nocturnal frog surveys were undertaken on:

- 1 December 2022 in the M8 Marsh Street habitat area by Lisa Albino, Carl Corden, Henry Cook and Glenn Muir;
- 25 January 2023 in the RTA Ponds, Enhancement Area, Kogarah Golf Course and Underpass by Henry Cook and Alana de Laive;
- 2 February 2023 in the M8 Marsh Street habitat area by Henry Cook, Santiago Cuartas-Villa, Yang Hu and Alana de Laive; and
- 10 February 2023 in the Riverine Park and surrounds and Barton Park by Yang Hu and Lisa Albino.

Inspections of the M8 Marsh Street habitat area, RTA Ponds and the Enhancement Area were undertaken concurrently with the surveys.

GGBF tadpoles were transported from Symbio Wildlife Park on 22 December 2022 and 17 February 2023 and released into the ponds in the M8 Marsh Street habitat area or the RTA Ponds.

1.4 Other

Construction work on the upgrade of Barton Park continued throughout the survey period. These works are being undertaken by Bayside Council and are very close to the Landing Lights East pond. Access to the site has been fenced off since October 2022.



Figure 1.1: Study area.

2 Results

2.1 Water Quality Monitoring

Results of the water quality measurements in comparison with threshold values indicated by Mahony and Beranak are summarised in Table 2.1. Raw data are provided in Appendix 1. All water quality variables were within the overall GGBF survival thresholds described by Mahony and Beranak, in all ponds holding water, except for salinity in Pond 6 of the Enhancement Area (December 2022 survey), salinity in the Eastern Pond on Kogarah Golf Course (January 2023 survey), salinity in the Mangrove Pond on Kogarah Golf Course (all three survey periods), and dissolved oxygen in the Long Pond and Eastern Pond of Kogarah Golf Course (December 2022 survey). Turbidity was acceptable in all ponds.

Table 2.1: Summary of water quality results.

Location	Pond	Temperature			Salinity			Dissolved O2			pH			
		Dec 22	Jan 23	Feb 23	Dec 22	Jan 23	Feb 23	Dec 22	Jan 23	Feb 23	Dec 22	Jan 23	Feb 23	
M8 Marsh Street habitat area	A	Pass*	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass*	Pass*	Pass*	
	B	Pass*	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass*	Pass*	Pass*	
	C	Pass*	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	
RTA	Western	Pass*	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass*	
	Eastern	Pass*	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass*	Pass*	Pass*	
Enhancement Area	1	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
	2	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
	3	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
	4	Pass*	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass*	Pass*	Pass*
	5	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	6	Pass*	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass*	Pass	Pass	Pass*	Pass*
Kogarah Golf Course	Circular	Pass*	Pass	Pass	Pass*	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	
	Long	Pass*	Pass	Pass	Pass	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	
	Mangrove Pond	Pass	Pass	Pass	Fail	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Pass	
	Eastern Pond	Pass	Pass	Pass	Pass*	Fail	Pass	Fail	Pass	Pass	Pass	Pass	Pass	
	Skinny	-	-	-	-	-	-	-	-	-	-	-	-	-
	Northern	-	-	-	-	-	-	-	-	-	-	-	-	-
Riverine Park and surrounds and Barton Park	Eastern Channel	-	-	-	-	-	-	-	-	-	-	-	-	
	Southern Phragmites	Pass*	Pass	Dry	Pass	Pass	Dry	Pass	Pass	Dry	Pass	Pass	Dry	
	Bend Swamp	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
	Southern Jungle	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
	Landing Lights East	-	-	-	-	-	-	-	-	-	-	-	-	
	Landing Lights West	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
	Driving Range Wetland	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	

*Indicates outside higher survival threshold but within overall survival threshold as described in Mahony and Beranak.

2.2 Tadpole Releases

Approximately 1800 tadpoles were released into Ponds A, B and C of the M8 Marsh St Habitat Area and a further 1800 tadpoles into the Western RTA Pond (Table 2.2).

Table 2.2: Number and location of tadpole releases

Date	Site	Number
22 Dec 2022	M8 Marsh St Habitat Area Pond A	490
22 Dec 2022	M8 Marsh St Habitat Area Pond B	490
22 Dec 2022	M8 Marsh St Habitat Area Pond C	850
22 Dec 2022	RTA Pond West	1450
17 Feb 2023	RTA Pond West	400
Total		3680

2.3 Tadpole Monitoring

The results of the tadpole monitoring surveys are shown in Tables 2.3 - 2.5. Tadpoles of the GGBF were detected in Ponds A and B of the M8 Marsh Street habitat area after tadpole releases into those two ponds and also in the Western RTA Pond after the tadpole release there. Tadpoles of the Peron's Tree Frog (*Litoria peronii*) were recorded in all three ponds at the M8 Marsh Street habitat area and the Western RTA Pond. Tadpoles of the Striped Marsh Frog (*Limnodynastes peronii*) were recorded in Pond A at the M8 Marsh Street habitat area, the Eastern RTA Pond and Pond 4 of the Enhancement Area.

Table 2.3: Summary of tadpole net sweep results 21 December 2022.

Area	Pond	Tadpoles Present	Species	Number and Stage			
				A	B	C	D
M8 Marsh Street habitat area	A	Yes	<i>Litoria aurea</i>	-	8	-	-
			<i>Litoria peronii</i>	-	1	-	-
	B	Yes	<i>Litoria aurea</i>	-	-	4	2
RTA Ponds	C	Yes	<i>Litoria peronii</i>	-	1	-	-
	Western	Yes	<i>Litoria peronii</i>	-	2	-	-
Enhancement Area	Eastern	Yes	-	-	-	-	-
	1	Too dry	-	-	-	-	-
	2	Too dry	-	-	-	-	-
	3	Too dry	-	-	-	-	-
	4	Yes	<i>Limnodynastes peronii</i>	-	3	-	-
	5	Too dry	-	-	-	-	-
Kogarah Golf Course	6	No	-	-	-	-	-
	Circular	No	-	-	-	-	-
	Long	No	-	-	-	-	-
	Eastern	No	-	-	-	-	-
Riverine Park and surrounds and Barton Park	Mangrove	No	-	-	-	-	-
	Eastern Channel	N/s	-	-	-	-	-
	Southern Phragmites	No	-	-	-	-	-
	Bend Swamp	Too dry	-	-	-	-	-
	Southern Jungle	Too dry	-	-	-	-	-
	Landing Lights East	N/s	-	-	-	-	-
	Landing Lights West	Too dry	-	-	-	-	-
Driving Range Wetland	Too dry	-	-	-	-	-	

Table 2.4: Summary of tadpole net sweep results 26 January 2023.

Area	Pond	Tadpoles Present	Species	Number and Stage			
				A	B	C	D
M8 Marsh Street habitat area	A	Yes	<i>Litoria aurea</i>	-	-	1	-
			<i>Limnodynastes peronii</i>	-	2	-	-
	B	Yes	<i>Litoria peronii</i>	-	2	-	-
	C	No	-	-	-	-	
RTA Ponds	Western	Yes	<i>Litoria aurea</i>	-	-	-	1
	Eastern	Yes	<i>Limnodynastes peronii</i>	-	-	1	-
Enhancement Area	1	Too dry	-	-	-	-	-
	2	Too dry	-	-	-	-	-
	3	Too dry	-	-	-	-	-
	4	Yes	<i>Limnodynastes peronii</i>	-	13	1	-
	5	Too dry	-	-	-	-	-
	6	No	-	-	-	-	-
Kogarah Golf Course	Circular	No	-	-	-	-	-
	Long	No	-	-	-	-	-
	Eastern	No	-	-	-	-	-
	Mangrove	No	-	-	-	-	-
Riverine Park and surrounds and Barton Park	No.9 Pond	N/s	-	-	-	-	-
	Eastern Channel	N/s	-	-	-	-	-
	Southern Phragmites	No	-	-	-	-	-
	Bend Swamp	No	-	-	-	-	-
	Southern Jungle	Too dry	-	-	-	-	-
	Landing Lights East	N/s	-	-	-	-	-
	Landing Lights West	Too dry	-	-	-	-	-
Driving Range Wetland	Too dry	-	-	-	-	-	

Table 2.5: Summary of tadpole net sweep results 3 March 2023.

Area	Pond	Tadpoles Present	Species	Number and Stage			
				A	B	C	D
M8 Marsh Street habitat area	A	Yes	<i>Litoria peronii</i>	-	2	-	-
	B	No	-	-	-	-	-
	C	Yes	<i>Litoria peronii</i>	-	2	-	-
RTA Ponds	Western	Yes	<i>Litoria peronii</i>	-	2	-	-
	Eastern	Yes	<i>Limnodynastes peronii</i>	-	2	-	-
Enhancement Area	1	Too dry	-	-	-	-	-
	2	Too dry	-	-	-	-	-
	3	Too dry	-	-	-	-	-
	4	Yes	<i>Limnodynastes peronii</i>	-	1	4	-
	5	Too dry	-	-	-	-	-
	6	No	-	-	-	-	-
Kogarah Golf Course	Circular	No	-	-	-	-	-
	Long	No	-	-	-	-	-
	Eastern	No	-	-	-	-	-
	Mangrove	No	-	-	-	-	-
Riverine Park and surrounds and Barton Park	Eastern Channel	N/s	-	-	-	-	-
	Southern Phragmites	No	-	-	-	-	-
	Bend Swamp	No	-	-	-	-	-
	Southern Jungle	Too dry	-	-	-	-	-
	Landing Lights East	N/s	-	-	-	-	-
	Landing Lights West	Too dry	-	-	-	-	-
Driving Range Wetland	Too dry	-	-	-	-	-	

2.4 Nocturnal GGBF Monitoring in the M8 Marsh Street habitat area

A total of 20 GGBFs were encountered during timed spotlight searches in the M8 Marsh Street habitat area in December (six of which were captured, measured and released) and 93 GGBFs were encountered in February (55 of which were captured, measured and released) (Tables 2.6 - 2.7). Almost all of the GGBFs captured in the December survey were juvenile frogs, too small to be tagged, with the exception of one animal that was a recapture (Table 2.6). During the February survey about a third of the GGBFs captured were old enough to be tagged (Table 2.6).

Striped Marsh Frogs (*Limnodynastes peronii*) were recorded during both surveys and Peron's Tree Frogs (*Litoria peronii*) were recorded during the December survey (Table 2.7).

Table 2.6: GGBF captures, M8 Marsh Street habitat area

Date	Pond	Juvenile / Subadult	Recapture	Number microchipped	Total
1 Dec 2022	Pond A	4	0	0	4
	Pond B	2	0	0	2
	Pond C	0	1	0	1
	Swale	0	0	0	0
	Perimeter	0	0	0	0
Total		6	1	0	7
2 Feb 2023	Pond A	20	0	9	29
	Pond B	4	0	0	4
	Pond C	21	0	14	35
	Swale	0	0	0	0
	Perimeter	10	0	3	13
Total		55	0	26	81

Table 2.7: Frogs observed but not captured (all species), M8 Marsh Street Habitat Area

Date	Pond	<i>Litoria aurea</i>	<i>Limnodynastes peronii</i>	<i>Litoria peronii</i>
1 Dec 2022	Pond A	4	15	4
	Pond B	6	5	2
	Pond C	3	0	26
	Swale	0	0	0
	Perimeter	0	0	0
Total		13	20	32
2 Feb 2023	Pond A	9	7	0
	Pond B	12	10+	0
	Pond C	17	20	0
	Swale	0	0	0
	Perimeter	0	0	0
Total		38	37+	0

2.5 Nocturnal Frog Monitoring in the Wider Study Area

Results of the frog monitoring surveys in the wider study area are summarised in Table 2.8. Five GGBFs were detected by call-playback or spotlight outside of the M8 Marsh Street habitat area, including two in the RTA Ponds, one in Pond 5 of the Enhancement Area and two in the Circular Pond on Kogarah Golf Course. Of these, two GGBFs (both adult males) were captured, measured and released. One of these was a recapture, found in the Circular Pond of Kogarah Golf Course, which was first captured in April 2022 in the Long Pond and again in October 2022 in Pond 3 of the Enhancement Area.

Striped Marsh Frogs were abundant in the Riverine Park and Barton Park areas and were also recorded from Ponds 3 and 4 of the Enhancement Area and the Circular Pond on the Kogarah Golf Course. Peron's Tree Frogs were recorded in the Western RTA Pond and Bend Swamp in the Riverine Park area. Eastern Dwarf Tree Frogs (*Litoria fallax*) were recorded from the Western RTA Pond.

Table 2.8: Summary of frog survey results outside of the M8 Marsh Street Habitat Area

Area	Pond	<i>Litoria aurea</i>	<i>Limnodynastes peronii</i>	<i>Litoria peronii</i>	<i>Litoria fallax</i>
Eastern Frog Corridor and Creek area	Creek (west)	-	-	-	-
	Creek (east)	-	-	-	-
	Underpass	-	-	-	-
RTA Ponds	Western	1	-	2	5
	Eastern	1	-	-	-
Enhancement Area	1	-	-	-	-
	2	-	-	-	-
	3	-	2	-	-
	4	-	3	-	-
	5	1	-	-	-
	6	-	-	-	-
Kogarah Golf Course	Circular	2	1	-	-
	Long	-	-	-	-
	Eastern	-	-	-	-
	Skinny	-	-	-	-
	Northern	-	-	-	-
	Mangrove	-	-	-	-
Riverine Park and surrounds and Barton Park	Eastern Channel	-	3	-	-
	Southern Phragmites	-	21+	-	-
	Bend Swamp	-	5	1	-
	Southern Jungle	-	20+	-	-
	Driving Range Wetland	-	17	-	-
	Landing Lights West	-	3	-	-



Figure 2.1: Locations where GGBFs were observed, December 2022 to February 2023.

2.6 Maintenance Observations

All ponds within the M8 Marsh Street habitat area were holding water and no Plague Minnow (*Gambusia holbrooki*) were observed. Terrestrial vegetation management was undertaken by Total Earth Care.

Both RTA Ponds were holding water for the duration of the quarter and no Plague Minnow were observed.

All ponds within the Enhancement Area are overgrown with weeds and grasses. Several ponds were dry throughout the survey period. Duckweed was present in Pond 4.

3 Discussion

The number of juvenile frogs in the M8 Marsh Street habitat area indicate the continued success of the captive breeding program, with the number of GGBFs encountered on the site increasing over the season and with a number of animals large enough to tag by the time of the February survey. However, few adult animals from previous seasons have been observed and few animals have been observed at the RTA Ponds (although the tadpole releases at the RTA Ponds occurred later in the season).

4 Conclusion

The objectives of the monitoring program are stated in the Plan of Management (ELA 2018) as “to assess the ongoing survival of the Arncliffe population at the Kogarah Golf Course and within the RTA ponds” and in the HCCBP as “to provide information for adaptive management on the effectiveness of the habitat created as part of the project” (i.e., the M8 Marsh Street habitat area).

The M8 Marsh Street habitat continues to provide habitat for GGBFs, although most of the GGBFs observed were the result of the captive-bred tadpole releases from this season. Few GGBFs have been observed in the RTA ponds so far this season.

5 References

ELA (2018). *Green and Golden Bell Frog Plan of Management - Arncliffe*. Prepared by Eco Logical Australia for NSW Roads and Maritime Services.

Mahony, M. and Beranak C. (undated). *Water Quality parameters measured to assess suitability for Green and Golden Bell Frog occupancy*. Unpublished report provided to NSW Roads and Maritime Services.

Appendix 1: Water Quality Results

Table A1-1: Water Quality Results for December 2022

Location	Date	Pond	General Condition	mVpH	pH	ORP [mV]	% Sat (DO%)	Diss. O2 [mg/l]	Conduct [uS/cm]	TDS ppm	Salinity (PSU)	Turbidity [FNU]	Temp [C°]	Gambusia
Eve Street	21/12/2022	A	Full	30.2	6.5	21.4	1.6	0.15	232	116	0.11	133	19	no
	21/12/2022	B	Full	21.3	6.7	180.6	2.5	0.22	3739	1871	1.98	1.7	19.3	no
	21/12/2022	C	Full	-5.1	7.1	185.5	3.7	0.33	299	149	0.14	2.2	19.7	no
RTA	21/12/2022	Western	50% full	27.6	7.2	17.7	3.6	0.34	330	166	0.16	10.3	19.1	no
	21/12/2022	Eastern	50% full	32.9	6.6	-3.1	1.7	0.15	174	87	0.08	16.6	19.4	no
Enhancement Area	21/12/2022	1	Dry											
	21/12/2022	2	Dry											
	21/12/2022	3	Dry											
	21/12/2022	4	Full	32.8	6.5	39.4	1.5	0.14	162	76	0.07	26.6	17.7	no
	21/12/2022	5	Dry											
	21/12/2022	6	Almost empty	-13.2	7.3	-178.1	2.5	0.21	20620	10320	12.43	86.3	17.5	no
Kogarah Golf Course	21/12/2022	Circular	Very muddy	-38.2	7.7	98.1	1.9	0.16	9721	4867	5.51	114.9	18.8	yes
	21/12/2022	Long	Low, muddy	-83.6	8.1	-184.3	1.4	0.12	4021	2009	2.14	147	19.7	yes
	21/12/2022	Mangrove Pond	Full	-34.9	7.7	-35	3.8	0.28	45160	22660	29.64	24.2	21.5	yes
	21/12/2022	Eastern	Low	-67.7	8.1	-113.6	1.5	0.12	13220	6619	7.64	17.2	20.1	yes
	21/12/2022	Skinny	Not sampled											
	21/12/2022	Northern	Not sampled											
Barton Park	21/12/2022	No.9 Pond	Not sampled											
	21/12/2022	Eastern Channel	Dry											
	21/12/2022	Southern Phragmites	Very low	-12.2	7.3	-78.9	2.6	2.4	2025	864	1.95	11.8	15.5	no
	21/12/2022	Northern Phragmites	Not sampled											

	21/12/2022	Bend Swamp	Dry											
	21/12/2022	Southern Jungle	Dry											
	21/12/2022	Landing Lights East	Not sampled											
	21/12/2022	Landing Lights West	Dry											
	21/12/2022	Driving Range Wetland	Dry											

Table A1-2: Water Quality Results for January 2023

Location	Date	Pond	General Condition	mVpH	pH	ORP [mV]	% Sat (DO%)	Diss. O2 [mg/l]	Conduct [uS/cm]	TDS ppm	Salinity (PSU)	Turbidity [FNU]	Temp [C°]	Gambusia
Eve Street	26/01/2023	A	Full	14.8	6.8	86.5	3.5	0.31	234	117	0.11	4.3	23.9	
	26/01/2023	B	Full	16.3	6.8	101.1	4.4	0.35	2653	1326	1.37	1.7	24.3	
	26/01/2023	C	Full	-11.9	7.3	77.8	5.2	0.48	334	167	0.16	2.2	24.6	
RTA	26/01/2023	Western	75% full	-18.8	7.3	-28	3.9	0.32	148	73	0.07	138	22.7	
	26/01/2023	Eastern	75% full	26.9	6.6	54.4	4.3	0.34	105	53	0.05	40.3	21.8	
Enhancement Area	26/01/2023	1	Dry											
	26/01/2023	2	Dry											
	26/01/2023	3	Dry											
	26/01/2023	4		57.7	6.1	24.1	1.8	0.15	94	21	0.02	21.3	22.9	
	26/01/2023	5	Dry											
	26/01/2023	6		32.2	6.49	-36.1	1.6	0.13	2741	1302	1.45	45	22.7	
Kogarah Golf Course	26/01/2023	Circular	75% full	-24.9	7.5	-88.3	2.2	0.18	4546	2270	2.42	11.2	24.4	
	26/01/2023	Long	75% full	-75.2	8.3	-40.5	2.3	0.18	4239	2121	2.25	65.8	25.1	
	26/01/2023	Mangrove Pond	Full	-11.2	7.3	-172.9	4.4	0.34	42950	21460	27.6	49	23.8	
	26/01/2023	Eastern	75% full	-81.1	8.4	-71.9	3.4	0.26	14130	7072	8.19	57.8	24.9	
	26/01/2023	Skinny	Not sampled											
	26/01/2023	Northern	Not sampled											

Barton Park	26/01/2023	No.9 Pond	Not sampled										
	26/01/2023	Eastern Channel	Not sampled										
	26/01/2023	Southern Phragmites	Very low	-11.1	7.2	-10.6	3.1	0.27	824	411	0.4	18.1	21
	26/01/2023	Northern Phragmites	Not sampled										
	26/01/2023	Bend Swamp	Almost dry										
	26/01/2023	Southern Jungle	Dry										
	26/01/2023	Landing Lights East	Not sampled										
	26/01/2023	Landing Lights West	Dry										
	26/01/2023	Driving Range Wetland	Dry										

Table A1-3: Water Quality Results for February 2023

Location	Date	Pond	General Condition	mVpH	pH	ORP [mV]	% Sat (DO%)	Diss. O2 [mg/l]	Conduct [uS/cm]	TDS ppm	Salinity (PSU)	Turbidity [FNU]	Temp [C°]	Gambusia
Eve Street	3/03/2023	A		21.6	6.8	117.7	9.3	0.77	204	99	0.1	10.4	22.1	
	3/03/2023	B		23.8	6.8	125.1	9.1	0.78	1951	978	0.99	1.2	22.7	
	3/03/2023	C		-6.6	7.2	111.6	9.1	0.77	348	174	0.17	1.5	23.3	
RTA	3/03/2023	Western		31.9	6.5	215.8	4.4	0.4	720	347	0.33	17.5	21.9	
	3/03/2023	Eastern		39.1	6.3	139.5	4.7	0.41	147	74	0.07	43	20.5	
Enhancement Area	3/03/2023	1	Dry											
	3/03/2023	2	Dry											
	3/03/2023	3	Dry											
	3/03/2023	4		46.8	6.3	25.5	3.2	0.28	119	49	0.05	37.7	21.2	
	3/03/2023	5	Dry											
	3/03/2023	6		8.9	6.9	-143.5	3.8	0.32	3546	1788	1.89	59.8	21.1	
Kogarah Golf Course	3/03/2023	Circular		-40.8	7.8	-0.4	5.8	0.48	3614	1818	1.91	32.2	23.2	
	3/03/2023	Long		-79.3	8.4	33.1	5.6	0.44	1735	879	0.94	42.1	24.2	

	3/03/2023	Mangrove Pond		-41.7	7.8	-184.7	5	0.41	23880	11970	14.57	27.1	21.2	
	3/03/2023	Eastern		-71.4	8.3	59.4	4.8	0.39	5537	2790	3.02	34.3	24.4	
	3/03/2023	Skinny	Not sampled											
	3/03/2023	Northern	Not sampled											
Barton Park	3/03/2023	No.9 Pond	Not sampled											
	3/03/2023	Eastern Channel	Dry											
	3/03/2023	Southern Phragmites	Dry											
	3/03/2023	Northern Phragmites	Not sampled											
	3/03/2023	Bend Swamp	Dry											
	3/03/2023	Southern Jungle	Dry											
	3/03/2023	Landing Lights East	Not sampled											
	3/03/2023	Landing Lights West	Dry											
	3/03/2023	Driving Range Wetland	Dry											