

08 July 2015

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Dear Stuart

**Toondah Harbour and Weinam Creek Priority Development Area migratory shorebird survey results**

Biodiversity Assessment and Management Pty Ltd (BAAM) has prepared this technical memorandum for Palaris on behalf of Walker Corporation for the purpose of providing a summary of the results of three summer season and one winter migratory shorebird surveys of the Toondah Harbour and Weinam Creek Priority Development Areas undertaken between January and June 2015. These four surveys, together with an initial survey completed in November 2014, meet the Commonwealth migratory shorebird survey guidelines for a minimum of five surveys, four in summer and one in winter.

Kind regards



Dr Penn Lloyd  
Principal Ecologist

## TECHNICAL MEMORANDUM

### Toondah Harbour and Weinam Creek Priority Development Areas migratory shorebird survey results

#### 1. OBJECTIVES OF THE STUDY

The objectives of this study are to:

- plan and execute three summer wader surveys and one winter survey (including high tide and low tide) as per the survey requirements for migratory shorebirds in accordance with the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Draft Policy Statement 3.21: Significant Impact Guidelines for 36 Migratory Shorebird Species (Draft Migratory Shorebird Guidelines), for the Toondah Harbour and Weinam Creek Priority Development Areas (PDAs); and
- submit a technical memo describing the methods and summarising the results of the surveys; as the intent of this study is to acquire benchmark seasonal data on shorebird use of the area in line with State and Federal guidelines as input to future more detailed assessment as part of an EIS for the project, the technical memo does not provide interpretation of the results in a legislative context.

#### 2. APPROACH TO THE STUDY

The study approach combined a desktop review with field surveys of shorebirds utilising shoreline and intertidal habitats during each of the low tide and high tide phases of the tide cycle.

The desktop review combined an examination of aerial imagery for the area and a review of available information on shorebird use of the vicinity of the Toondah Harbour and Weinam Creek PDA areas, principally an earlier survey undertaken by BAAM October-November 2014 (BAAM 2014), to identify appropriate habitat areas to focus the field survey on.

The field surveys were undertaken by Dr Penn Lloyd (Principal Ecologist) between December 2014 and June 2015. The surveys for foraging shorebirds were conducted in accordance with the survey guidelines outlined in the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Policy Statement 3.21: Significant Impact Guidelines for 36 Migratory Shorebird Species* (DEWHA 2009). Specifically:

- The surveys for foraging shorebirds were conducted as close to the time of low tide as practicable and at a maximum of no more than two hours either side of low tide;
- The surveys for roosting shorebirds were conducted as close to the time of high tide as practicable and at a maximum of no more than two hours either side of high tide;
- The surveys were not undertaken during periods of high rainfall or strong winds, or when activities that cause disturbance to the birds were taking place;
- The surveys determined the total number of individuals of each species present, to enable assessment of site and habitat importance; and

- The surveys collected spatial data of the area used by shorebirds for roosting and feeding to facilitate mapping of roosting and foraging habitat.

During the low tide surveys, shorebirds feeding on intertidal mudflats were surveyed using a high-powered Swarovski spotting telescope mounted on a sturdy tripod. Habitat areas were surveyed from suitable vantage points that provided an unobstructed view of the entire area, without causing disturbance to the shorebirds. A known migratory shorebird roost site in an offshore area of mangroves located immediately east of Toondah Harbour (referred to as Cassim Island) was surveyed from a boat driven slowly around the perimeter of the mangroves. Birds roosting in the mangrove trees were counted using Leica 10x42 binoculars. A further known migratory shorebird roost site on a claypan adjoining Nandeebie Park, immediately to the south of the Toondah Harbour PDA, was surveyed using a spotting telescope and/or Leica 10x42 binoculars.

The survey determined the total number of individuals of each species present, and collected spatial data of the area used by shorebirds for roosting and feeding to facilitate mapping of roosting and foraging habitat. The total number of people, dogs and boats present on the on-land portions of the study area during each survey were also recorded as a measure of the potential level of disturbance to roosting and foraging shorebirds.

### 3. SURVEY RESULTS

Survey times in relation to tides and weather conditions during the surveys at each of the survey sites are summarised in **Appendix 1**.

#### TOONDAH HARBOUR PDA

##### *High tide surveys*

Two high tide roost sites were utilised by migratory shorebirds, both situated outside of, but closely adjoining, the Toondah Harbour PDA (**Figure 3.1**). One site comprises an offshore patch of mangroves immediately east of the PDA and north of the harbour entrance channel (referred to as Cassim Island), and the other site comprises a claypan and associated low, sparse saltmarsh vegetation located next to Nandeebie Park, to the south of the PDA.

The high tide survey results of roosting migratory shorebirds are summarised in **Tables 3.1** and **3.2** for Cassim Island and the Nandeebie Claypan, respectively. Both of these roost sites are identified as important roosting habitat for migratory shorebirds based on the relatively large total numbers of migratory shorebirds utilising these roost sites. Up to 920 migratory shorebirds of four species known to roost in mangrove trees were recorded at Cassim Island. Up to 1,060 migratory shorebirds were recorded roosting at the Nandeebie claypan at high tide, but numbers were highly variable, with greater numbers tending to be recorded on spring high tides. Furthermore, migratory shorebirds were observed moving between the Nandeebie claypan and the nearby Oyster Point roost site depending on the tide height (moving from Nandeebie to Oyster Point as the tide receded) and extent of disturbance at Oyster Point. A relatively large number of Bar-tailed Godwits utilising the Nandeebie claypan roost were observed with engraved leg flags (see **Appendix 2** for combinations) that are used to monitor the movements of individually identifiable birds both within Moreton Bay and the East Australasian flyway more broadly.

**Table 3.1. Summary of migratory shorebirds roosting in the mangroves of Cassim Island during the initial survey period of November 2014 (BAAM 2014) and the four surveys (January to June 2015) of this study.**

Species	Common name	EPBC <sup>1</sup>	NCA <sup>2</sup>	6/11/2014	9/1/2015	16/2/2015	19/3/2015	18/6/2015
<i>Numenius phaeopus</i>	Whimbrel	M	S	184	270	160	140	0
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	S	215	600	570	460	0
<i>Arenaria interpres</i>	Ruddy Turnstone	M	S	10	20	50	26	0
<i>Xenus cinereus</i>	Terek Sandpiper	M	S	8	30	30	22	0
<b>Total</b>				<b>417</b>	<b>920</b>	<b>810</b>	<b>648</b>	<b>0</b>

<sup>1</sup> Status under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*: M = migratory.

<sup>2</sup> Status under the Queensland *Nature Conservation Act 1992*: S = special least concern (migratory).

**Table 3.2. Summary of migratory shorebirds roosting on the Nandeebie Claypan during the initial survey period of October-November 2014 (BAAM 2014) and the survey periods (December 2014 to June 2015) of this study.**

Species	Common name	EPBC <sup>1</sup>	NCA <sup>2</sup>	30/10/2014	31/10/2014	5/11/2014	6/11/2014	21/11/2014	25/11/2014	26/11/2014	27/11/2014	8/12/2014	9/12/2014	6/01/2015	8/01/2015	16/02/2015	3/03/2015	20/03/2015	18/06/2015
<i>Limosa limosa</i>	Bar-tailed Godwit	M	S				43								1026	730	841		
<i>Numenius phaeopus</i>	Whimbrel	M	S	5			1		103	2	23					124			
<i>Numenius madagascariensis</i>	Eastern Curlew	M,CE	NT	14	6		1	6	1	2	2	2	1	1	34	45	36		
<i>Calidris tenuirostris</i>	Great Knot	M	S													1	5		
<b>Total migratory shorebirds</b>				<b>19</b>	<b>6</b>	<b>0</b>	<b>2</b>	<b>49</b>	<b>1</b>	<b>105</b>	<b>4</b>	<b>25</b>	<b>1</b>	<b>1</b>	<b>1060</b>	<b>900</b>	<b>882</b>	<b>0</b>	<b>0</b>

<sup>1</sup> Status under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*: CE = critically endangered; M = migratory.

<sup>2</sup> Status under the Queensland *Nature Conservation Act 1992*: NT = near threatened; S = special least concern (migratory).

### **Low tide surveys**

The low tide survey results of foraging migratory shorebirds within and immediately adjoining (within 50m of the PDA boundary) the PDA are summarised in **Table 3.3**, with **Figure 3.1** showing the location of foraging habitat within the PDA.

**Table 3.3. Summary of migratory shorebirds foraging within and immediately adjoining the Toondah Harbour PDA area during the low tide surveys in October 2014 (BAAM 2014) and December 2014 to June 2015 (this study).**

Species	Common name	EPBC <sup>1</sup>	NCA <sup>2</sup>	31/10/2014	26/12/2014	9/01/2015	24/02/2015	19/03/2015	18/06/2015
<i>Limosa limosa</i>	Bar-tailed Godwit	M	S	32	33	27	9	30	
<i>Numenius phaeopus</i>	Whimbrel	M	S	6	15	19	12	16	
<i>Numenius madagascariensis</i>	Eastern Curlew	M,CE	NT	4	7	4	4	1	
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	S	88	60	41	55	91	
<i>Calidris tenuirostris</i>	Great Knot	M	S		1				
<i>Calidris ruficollis</i>	Red-necked Stint	M	S				1		
<i>Xenus cinereus</i>	Terek Sandpiper	M	S	7	42		26		
<b>Total migratory shorebirds</b>				<b>137</b>	<b>158</b>	<b>91</b>	<b>107</b>	<b>138</b>	<b>0</b>

<sup>1</sup> Status under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*: CE = critically endangered; M = migratory.

<sup>2</sup> Status under the Queensland *Nature Conservation Act 1992*: NT = near threatened; S = special least concern (migratory).

## WEINAM CREEK PDA

### High tide surveys

There are no known high tide roost sites used by migratory shorebirds within or immediately adjoining the Weinam Creek PDA. The rock seawalls bordering the passenger ferry terminal provide a potentially suitable roost site for several migratory shorebird species; however, because the seawalls are accessible to the public and located close to the busy ferry terminal, they are unlikely to be used by migratory shorebirds because of the likely high frequency of disturbance, and no migratory shorebirds were observed during the high tide surveys. Nonetheless small numbers of several resident shorebird species were recorded roosting on the northern seawall of the passenger ferry terminal during the high tide surveys.

### Low tide surveys

The low tide survey results of foraging migratory shorebirds within and immediately adjoining the Weinam Creek PDA are summarised in **Table 3.4**, with **Figure 3.2** showing the location of foraging habitat within the PDA. Intertidal foreshore areas within the Weinam Creek PDA are relatively narrow and consist largely of coral rubble and sand. The most suitable intertidal habitat area for migratory shorebirds, which includes areas of mudflat and seagrass, is located immediately north of the current vehicle ferry sea wall (**Figure 3.2**); up to 46 migratory shorebirds (mostly Grey-tailed Tattler) were recorded foraging in this area at low tide (**Table 3.4**). Intertidal feeding habitat within the PDA is of marginal value to migratory shorebirds due to the nature of the substrate and proximity to existing disturbance, and explains why only a single migratory shorebird was recorded within the PDA on a single low tide survey (**Table 3.4**). Similarly, only an occasional Whimbrel was found on the narrow intertidal fringe along the southern boundary of the PDA at low tide (**Table 3.4**). On each of two low-tide surveys, a Grey-tailed Tattler carrying dark blue over stained white leg flags on the left tarsus (engraved with the number 90) was observed on the mudflat to the north of vehicle ferry; this bird had been flagged at Torinoumi, Watari-cho, Miyagi-ken, Japan in May 2014.

**Table 3.4. Summary of migratory shorebirds foraging within or adjoining the Weinam Creek PDA area to the north and south during the low tide surveys in October-November 2014 (BAAM 2014) and January to June 2015 (this study).**

Species	Common name	EPBC <sup>1</sup>	NCA <sup>2</sup>	31/10/2014	6/11/2014	9/01/2015	25/02/2015	19/03/2015	18/06/2015
<b>Within PDA</b>									
<i>Numenius phaeopus</i>	Whimbrel	M	S	1					
<b>Total migratory shorebirds</b>				<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Northern boundary of PDA</b>									
<i>Limosa limosa</i>	Bar-tailed Godwit	M	S	1			1		
<i>Numenius phaeopus</i>	Whimbrel	M	S	1	1	1	2	2	
<i>Numenius madagascariensis</i>	Eastern Curlew	M,CE	NT	1	1				
<i>Tringa brevipes</i>	Grey-tailed Tattler	M	S	33	1	45	18	2	1
<b>Total migratory shorebirds</b>				<b>36</b>	<b>3</b>	<b>46</b>	<b>21</b>	<b>4</b>	<b>1</b>
<b>Southern boundary of PDA</b>									
<i>Numenius phaeopus</i>	Whimbrel	M	S			1	1		
<b>Total migratory shorebirds</b>				<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>

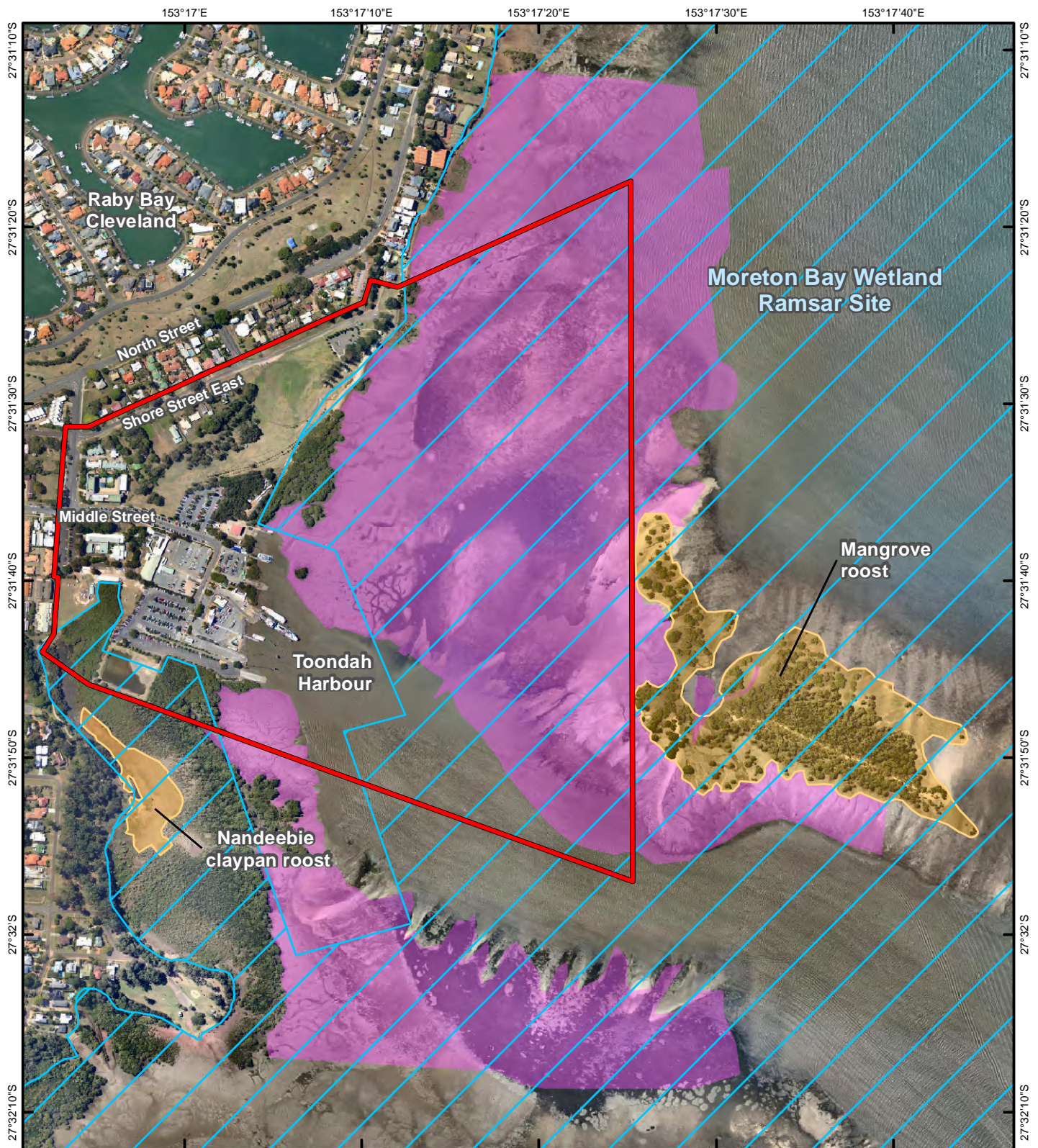
<sup>1</sup> Status under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*: CE = critically endangered; M = migratory.

<sup>2</sup> Status under the Queensland *Nature Conservation Act 1992*: NT = near threatened; S = special least concern (migratory).

#### 4. REFERENCES

**BAAM (2014).** Migratory Shorebird Assessment, Toondah Harbour and Weinam Creek Priority Development Areas. Report prepared by Biodiversity Assessment and Management Pty Ltd for frc environmental on behalf of Walker Corporation.





Notes: Image sourced from Nearmaps (c) 2014

Coordinate System: GCS GDA 1994  
Datum: GDA 1994  
Units: Degree



1:9,500 at A4  
0 25 50 100 150 200 250 300 350 400 450 500  
Meters

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## LEGEND

- Migratory shorebird foraging habitat
- Shorebird roost sites
- Ramsar Wetland area
- Priority Development Area boundary

Figure: **3-1**

Title: Migratory shorebird habitats within and adjoining the Toondah Harbour PDA

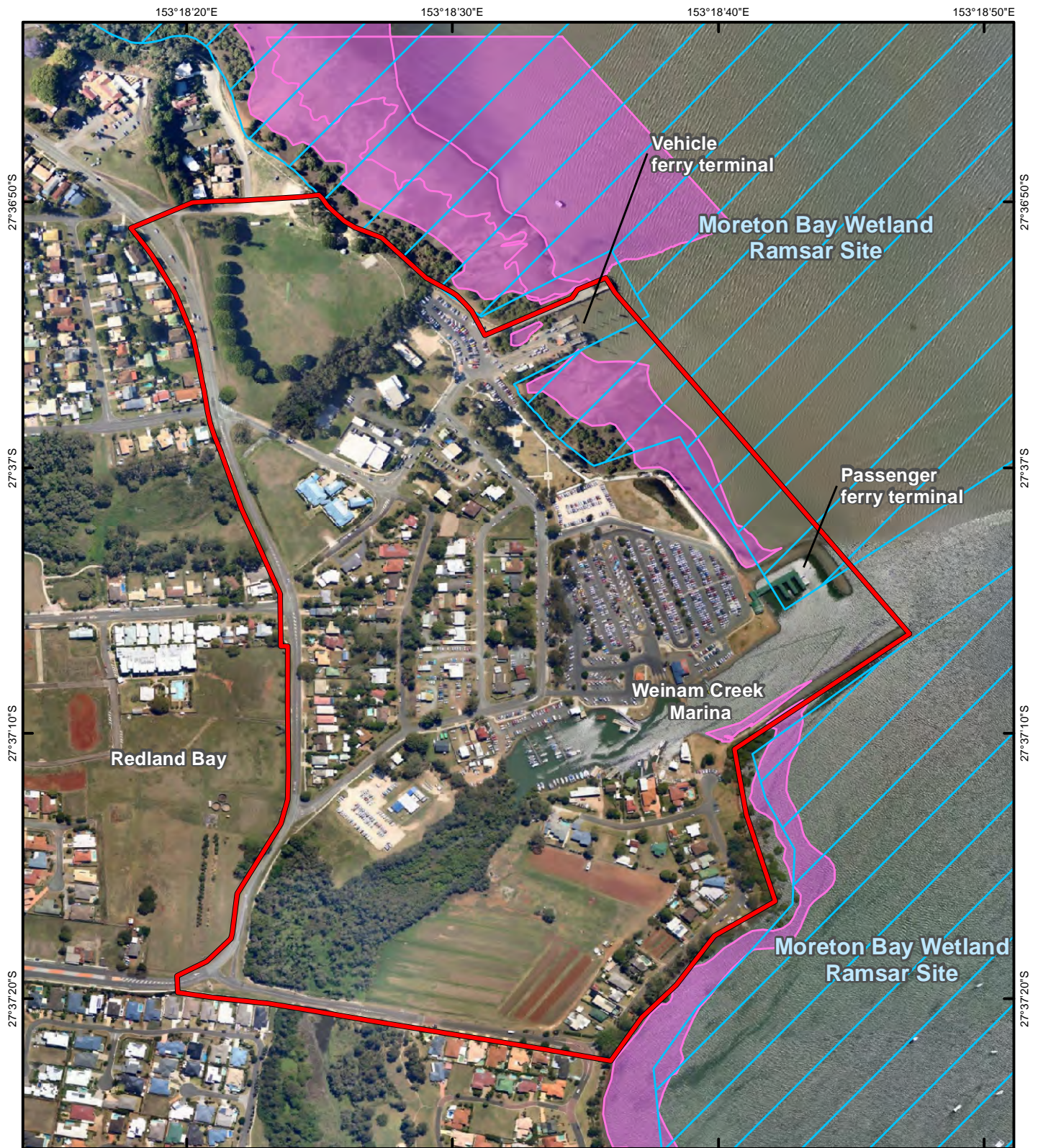
Project: **Migratory Shorebird Assessment, Toondah Harbour and Weinam Creek Priority Development Areas.**

Client: **Palaris on behalf of Walker Corporation**



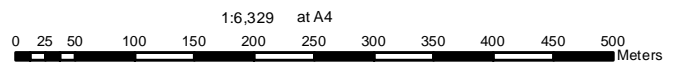
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## LEGEND

- Migratory shorebird foraging habitat
- Ramsar Wetland area
- Priority Development Area boundary

Figure: **3-2**

Title: Migratory shorebird habitats within and adjoining the Weinam Creek PDA

Project: **Migratory Shorebird Assessment, Toondah Harbour and Weinam Creek Priority Development Areas.**

Client: **Palaris on behalf of Walker Corporation**



Drawn By: MG Reviewed by: AC Date: 8/07/2015



**Appendix 1.** Survey times in relation to the tides and weather conditions during the surveys at each of the survey sites.

Site	Date	Tide ht (m)	Tide time	Start time	End time	Cloud	Rain	Wind strength <sup>1</sup>
<b>High tide</b>								
Nandeebie	30/10/2014	2.2	14:20	15:00	15:10	0	0	2
Nandeebie	31/10/2014	2.2	15:27	15:25	15:35	1	0	3
Nandeebie	5/11/2014	2.3	8:49	8:20	8:30	1	0	1
Nandeebie	6/11/2014	2.4	9:05	9:30	9:45	0	0	1
Nandeebie	21/11/2014	2.3	8:49	8:10	8:20	4	0	2
Nandeebie	25/11/2014	2.5	11:35	11:35	11:45	0	0	3
Nandeebie	26/11/2014	2.4	12:20	12:45	13:10	0	0	3
Nandeebie	27/11/2014	2.3	13:10	13:10	13:25	0	0	3
Nandeebie	8/12/2014	2.5	10:50	11:00	11:15	0	0	3
Nandeebie	9/12/2014	2.4	11:26	11:45	11:55	0	0	2
Nandeebie	6/01/2015	2.5	10:30	10:35	10:45	2	0	5
Nandeebie	8/01/2015	2.4	11:36	11:10	11:30	3	0	2
Nandeebie	16/02/2015	2.4	7:37	8:30	9:00	1	0	2
Nandeebie	3/03/2015	2.3	8:29	9:00	9:25	1	0	3
Nandeebie	20/03/2015	1.6	9:40	9:30	9:40	4	0	1
Nandeebie	18/06/2015	1.9	10:48	11:10	11:15	0	0	1
Cassim Isl	6/11/2014	2.4	9:05	8:20	9:05	0	0	1
Cassim Isl	9/01/2015	2.3	12:08	11:15	11:45	4	1	3
Cassim Isl	16/02/2015	2.4	7:37	7:55	8:20	1	0	2
Cassim Isl	19/03/2015	2.6	8:53	10:10	10:45	0	0	3
Cassim Isl	18/06/2015	1.9	10:48	11:30	12:10	0	0	1
Weinam Ck	31/10/2014	2.2	15:27	16:15	16:30	1	0	4
Weinam Ck	9/01/2015	2.3	12:08	12:35	12:55	3	0	3
Weinam Ck	18/02/2015	2.6	9:18	9:38	10:00	2	0	6
Weinam Ck	19/03/2015	2.6	8:53	9:35	9:50	0	0	3
Weinam Ck	19/06/2015	1.8	11:28	11:55	12:15	0	0	2
<b>Low tide</b>								
Toondah	31/10/2014	0.6	8:51	9:00	9:40	0	0	3
Toondah	26/12/2014	0.4	6:30	6:10	7:00	4	0	2
Toondah	9/01/2015	0.5	5:46	5:10	5:40	1	0	1
Toondah	24/02/2015	0.6	7:53	8:40	9:00	2	0	4
Toondah	19/03/2015	0.3	15:33	16:00	16:30	0	0	3
Toondah	18/06/2015	0.4	16:48	16:20	16:35	1	0	1
Weinam Ck	31/10/2014	0.6	8:51	10:00	10:15	0	0	3
Weinam Ck	6/11/2014	0.4	15:34	14:30	14:50	3	0	4
Weinam Ck	9/01/2015	0.5	5:46	6:00	6:45	1	0	1
Weinam Ck	25/02/2015	0.8	8:55	8:30	9:05	2	0	4
Weinam Ck	19/03/2015	0.3	15:30	15:10	15:40	0	0	3
Weinam Ck	18/06/2015	0.5	17:24	16:52	17:15	0	0	2

**Appendix 2.** Engraved leg flag combinations observed on Bar-tailed Godwits utilising the Nandeebie claypan roost site.

Flagged leg	Flag colour	Flag combination	Flagged leg	Flag colour	Flag combination
Left tibia	Yellow (pale)	N3	Right tibia	Green	BNZ
Left tibia	Yellow (pale)	R8	Right tibia	Green	BPU
Right tibia	Green	AAA	Right tibia	Green	BRN
Right tibia	Green	ABC	Right tibia	Green	BRP
Right tibia	Green	ADV	Right tibia	Green	BRS
Right tibia	Green	ADW	Right tibia	Green	BRT
Right tibia	Green	ADY	Right tibia	Green	BRU
Right tibia	Green	AKV	Right tibia	Green	BRV
Right tibia	Green	AKW	Right tibia	Green	BRX
Right tibia	Green	ALL	Right tibia	Green	BRY
Right tibia	Green	AND	Right tibia	Green	CHH
Right tibia	Green	ANJ	Right tibia	Green	DZ
Right tibia	Green	ANP	Right tibia	Green	EH
Right tibia	Green	ANU	Right tibia	Green	EN
Right tibia	Green	ANW	Right tibia	Green	ET
Right tibia	Green	ANX	Right tibia	Green	FA
Right tibia	Green	APB	Right tibia	Green	FJ
Right tibia	Green	APJ	Right tibia	Green	FK
Right tibia	Green	APK	Right tibia	Green	FL
Right tibia	Green	APU	Right tibia	Green	FM
Right tibia	Green	AXU	Right tibia	Green	FZ
Right tibia	Green	BAA	Right tibia	Green	HA
Right tibia	Green	BAE	Right tibia	Green	JE
Right tibia	Green	BAK	Right tibia	Green	JR
Right tibia	Green	BAN	Right tibia	Green	KN
Right tibia	Green	BAP	Right tibia	Green	NC
Right tibia	Green	BAV	Right tibia	Green	NK
Right tibia	Green	BAW	Right tibia	Green	NU
Right tibia	Green	BAX	Right tibia	Green	NV
Right tibia	Green	BBA	Right tibia	Green	NZ
Right tibia	Green	BBD	Right tibia	Green	PM
Right tibia	Green	BC	Right tibia	Green	PV
Right tibia	Green	BCB	Right tibia	Green	PX
Right tibia	Green	BJN	Right tibia	Green	PY
Right tibia	Green	BJP	Right tibia	Green	RM
Right tibia	Green	BKH	Right tibia	Green	RP
Right tibia	Green	BKM	Right tibia	Green	RR
Right tibia	Green	BM	Right tibia	Green	RY