

# Shorebird Monitoring: Lee Point, Darwin, Northern Territory (December 2024)

*Defence Housing Australia*



4 elements

*Shorebird Monitoring: Lee Point, Darwin, Australia (October 2024)*  
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4 Elements Consulting  
107 Scott Street  
Bungalow, QLD 4870

[www.4elementsconsulting.com.au](http://www.4elementsconsulting.com.au)

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## 1.0 Introduction

Defence Housing Australia (DHA) is proposing an urban development on the outskirts of Darwin that will establish a residential, community, and commercial precinct in the suburb of Nightcliff. During the environmental approvals process, the proposal was identified as having potential to impact Darwin's migratory shorebird population through increased beach traffic at key roosting and feeding areas on the city's northern beaches. To mitigate any potential impacts to these populations, the Northern Territory Environment Protection Agency (NT EPA) provided the following recommendation in its assessment report for this project:

*Recommendation 3*

*That approvals for the proposal should include a condition that requires DHA to develop and implement a monitoring program to quantify impacts from the Proposal on local shorebirds. The program is to be designed in consultation with Flora and Fauna Division, Department of Environment Natural Resources, and Wildlife and Heritage Division, Department of Tourism and Culture Parks, and implemented before commencement of construction activities. Results and annual updates from the program should be made publicly available on the internet (NT EPA 2018).*

The environmental impact statement (EIS) for this project included a detailed report by Dr Amanda Lilleyman (Charles Darwin University) outlining the potential impacts of increased anthropogenic disturbance on Darwin's migratory shorebirds. This monitoring program was adopted in a report published by EcoZ Pty Ltd (*Shorebird Monitoring Program: Lee Point Master-planned Urban Development*) in September 2022, which was updated in August 2023 (EcoZ 2023) with a few minor adjustments. This monitoring program was reviewed by Brydie Hill from the Flora and Fauna Division (Department of the Environment, Parks and Water Security) and Dean McAdam (Parks and Wildlife Division), with their assessment concluding that the proposed methodology is adequate for detecting project-related impacts to local shorebird populations. Finally, this monitoring program was adopted by Ecology and Heritage Partners (*Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory, 2023*) with a minor adjustment to the minimum tide height (from 6.5m to 6m).

Four Elements Consulting was commissioned by Defence Housing Australia to conduct the shorebird monitoring program in accordance with the *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory*, (Ecology and Heritage Partners 2023). Darwin's northern beaches provide habitat for up to 10,000 shorebirds comprising over 20 different species, with the majority breeding in the northern hemisphere in China, Russia and Alaska before migrating through eastern Asia to Australia and New Zealand each year. The birds begin arriving in Australia in August and stay through the austral summer before departing again in March/April. Thus, this December survey will form part of an ongoing monitoring program aiming to quantify richness and abundance of shorebirds that spend their austral summer on Darwin's northern beaches.

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## 2.0 Methodology

### 2.1 Study Area

The study included five survey locations on Darwin’s northern beaches – Lee Point (**Plate 1**), Sandy Creek (**Plate 2**), Nightcliff Rocks (**Plate 3**), Spot on Marine (**Plate 4**) and East Point (**Plate 5**). Lee Point and Sandy Creek, which are public beaches approximately 15km north of Darwin (**Figure 1**), provide important shorebird foraging and roosting habitat and may experience increased anthropogenic disturbance as a result of the proposal (i.e., impact sites). The remaining three sites (Nightcliff Rocks, Spot on Marine and East Point) are not expected to be impacted by the proposal but will act as controls whilst also providing a greater understanding of shorebird utilisation in the Darwin area. Nightcliff Rocks and East Point are headlands with exposed intertidal rock flats located approximately 8.5km and 6.5km north of Darwin respectively, while spot on Marine is an exposed mangrove mudflat approximately 6.5km north of Darwin.



**Plate 1 Lee Point**



**Plate 2 Sandy Creek**



**Plate 3 Nightcliff Rocks**



**Plate 4 Spot on Marine**



**Plate 5 East Point**





**Figure 1 Lee Point and Sandy Point Survey Locations**

## 2.2 Field Assessments

Shorebird surveys were undertaken from December 3<sup>rd</sup>-5<sup>th</sup> 2024 by two qualified Ecologists competent in shorebird identification and counting techniques. Monitoring was conducted in accordance with the methods outlined in *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory* (Ecology and Heritage Partners, 2023). Each of the five survey locations was surveyed once by one person for a two-hour period approximately one hour either side of the high tide (see **Table 1**). In accordance with the Shorebird Monitoring Program (Ecology and Heritage Partners, 2023), the high tides on these days exceeded 6m (see **Table 1**). Sandy Creek and Lee Point were surveyed simultaneously as shorebirds are known to move between these proximate roosts (i.e., shorebirds roosting at Lee Point one day may roost at Sandy Point the next day), thus ensuring an accurate count of birds utilising the area. Surveys were conducted at least 100m from roosts to ensure birds were not disturbed, with each surveyor equipped with binoculars (10 x 42) and a spotting scope (20-60 x magnification).

**Table 1 Survey Periods, Tide Data and Weather Data**

| Date     | Site             | High Tide Height (m) | High Tide Time | Weather                                   | Temperature (°C) | Rainfall (mm) | Wind Speed (km/h)/ Direction | Survey Period |
|----------|------------------|----------------------|----------------|---|------------------|---------------|------------------------------|---------------|
| 03/12/24 | Lee Point        | 6.37                 | 06:30          | Scattered heavy showers and thunderstorms | 25               | 44            | 17 ESE                       | 06:00-08:00   |
| 03/12/24 | Sandy Creek      | 6.37                 | 06:30          | Scattered heavy showers and thunderstorms | 25               | 44            | 17 ESE                       | 06:00-08:00   |
| 04/12/24 | Nightcliff Rocks | 6.34                 | 07:02          | Scattered clouds with light showers       | 25               | 0.2           | 9 SSE                        | 06:00-08:00   |
| 05/12/24 | Spot on Marine   | 6.23                 | 07:38          | Mostly clear                              | 27               | 0             | 6 SSW                        | 06:45-08:45   |
| 05/12/24 | East Point       | 6.23                 | 07:38          | Mostly clear                              | 27               | 0             | 6 SSW                        | 06:45-08:45   |

All shorebirds and waterbirds seen during the survey period were identified, counted and recorded. The behaviour of all birds was recorded (i.e., roosting, foraging etc), as were any changes to the environment, disturbances, and potential disturbances. As per the Shorebird Monitoring Program (Ecology and Heritage Partners, 2023), disturbances were defined as proximate stimuli (e.g., humans, dogs, raptors etc.), and the response of shorebirds to each disturbance was recorded (i.e., flight, walk away, no response). Distant disturbances were categorised as potential disturbances, and although these do not elicit a response from shorebirds, they provide a measure of anthropogenic disturbance on the beach. The time and type of each disturbance and potential disturbance was also recorded.

### 3.0 Results

Seventeen species of migratory shorebird were observed during the survey period – red knot (*Calidris canutus*), great knot (*Calidris tenuirostris*), bar-tailed godwit (*Limosa lapponica*), whimbrel (*Numenius phaeopus*), far eastern curlew (*Numenius madagascariensis*), red-necked stint (*Calidris ruficollis*), common sandpiper (*Actitis hypoleucos*), sharp-tailed sandpiper (*Calidris acuminata*), terek sandpiper (*Xenus cinereus*), ruddy turnstone (*Arenaria interpres*), greater sand plover (*Charadrius leschenaultia*), siberian sand plover (*Charadrius mongolus*), pacific golden plover (*Pluvialis fulva*), black-bellied plover (*Pluvialis squatarola*), black-bellied plover (*Pluvialis squatarola*), common greenshank (*Tringa nebularia*) and grey-tailed tattler (*Tringa brevipes*). All observations made during the survey period are detailed below.

#### Lee Point

Lee Point was surveyed simultaneously with Sandy Creek on December 3<sup>rd</sup> 2024. Fourteen species of migratory shorebirds were recorded (**Table 2**), as well as seven species of non-migratory waterbirds. Due to constant rain throughout the survey period, no disturbances or potential disturbances were recorded.

**Table 2 Bird Observations at Lee Point**

| Time  | Species                | No. Individuals | Direction from Surveyor | Distance from Observer (m) | Height (m) | Behaviour |
|-------|------------------------|-----------------|-------------------------|----------------------------|------------|-----------|
| 06:00 | Bar-tailed godwit      | 12              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Greater crested tern   | 32              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Great knot             | 3600            | E                       | 100                        | 0          | Roosting  |
| 06:00 | Red knot               | 300             | E                       | 100                        | 0          | Roosting  |
| 06:00 | Silver gull            | 3               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Ruddy turnstone        | 16              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Terek sandpiper        | 12              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Sharp-tailed sandpiper | 23              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Whimbrel               | 10              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Far Eastern Curlew     | 30              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Greater sand plover    | 320             | E                       | 100                        | 0          | Roosting  |
| 06:00 | Siberian sand plover   | 32              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Red-capped plover      | 16              | E                       | 100                        | 0          | Foraging  |
| 06:00 | Common tern            | 22              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Little tern            | 43              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Whiskered tern         | 1               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Gull-billed tern       | 1               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Pacific golden plover  | 1               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Black-bellied plover   | 2               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Red-necked stint       | 120             | E                       | 100                        | 0          | Roosting  |
| 07:00 | Common sandpiper       | 3               | E                       | 100                        | 0          | Roosting  |



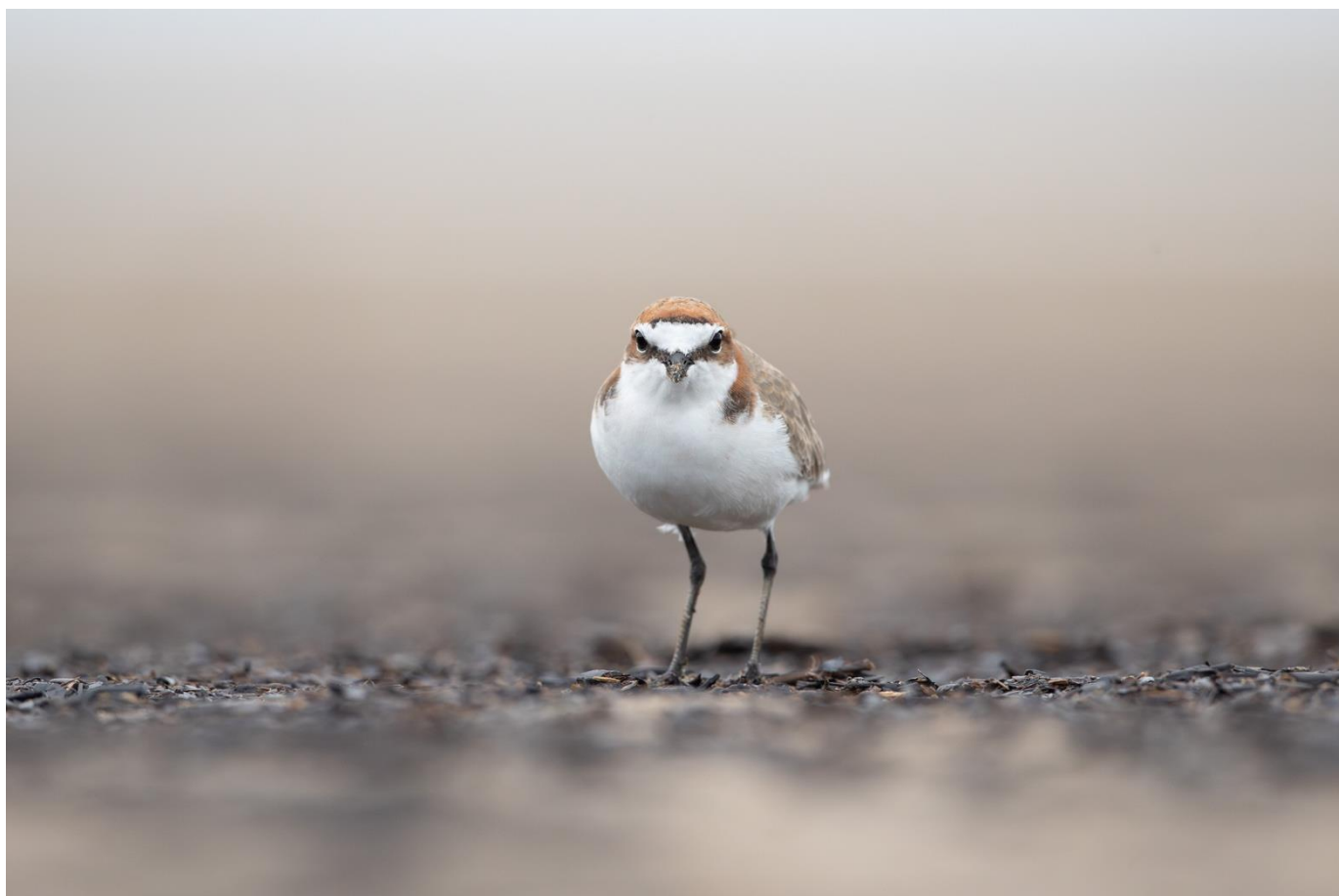
**Plate 6 Mixed Flock at Lee Point**

*Sandy Creek*

Sandy Creek was surveyed simultaneously with Lee Point on December 3<sup>rd</sup> 2024. One species of migratory shorebird and four species of non-migratory waterbirds were recorded during the survey period (**Table 3**). Due to constant rain throughout the survey period, no disturbances or potential disturbances were recorded.

**Table 3 Bird Observations at Sandy Creek**

| Time  | Species              | No. Individuals | Direction from Surveyor | Distance from Observer (m) | Height (m) | Behaviour |
|-------|----------------------|-----------------|-------------------------|----------------------------|------------|-----------|
| 06:00 | Greater crested tern | 3               | SW                      | 100                        | 0          | Roosting  |
| 06:00 | Lesser crested tern  | 1               | SW                      | 100                        | 0          | Foraging  |
| 06:00 | Common sandpiper     | 3               | SW                      | 100                        | 0          | Foraging  |
| 06:00 | Australian pelican   | 1               | SW                      | 100                        | 0          | Foraging  |
| 06:00 | Silver gull          | 18              | SW                      | 100                        | 0          | Foraging  |



**Plate 7 Red-capped plover at Sandy Creek**

*Nightcliff Rocks*

Thirteen species of migratory shorebirds and six species of non-migratory waterbirds were observed at Nightcliff Rocks during the survey period (**Table 4**). Two disturbances and no potential disturbances (**Table 5**) were recorded during the survey period.

**Table 4 Bird Observations at Nightcliff Rocks**

| <b>Time</b> | <b>Species</b>      | <b>No. Individuals</b> | <b>Direction from Surveyor</b> | <b>Distance from Observer (m)</b> | <b>Height (m)</b> | <b>Behaviour</b> |
|-------------|---------------------|------------------------|--------------------------------|-----------------------------------|-------------------|------------------|
| 06:00       | Common sandpiper    | 2                      | W                              | 100                               | 0                 | Foraging         |
| 06:00       | Whimbrel            | 1                      | W                              | 100                               | 0                 | Foraging         |
| 06:00       | Pied oystercatcher  | 3                      | W                              | 100                               | 0                 | Roosting         |
| 06:00       | Grey-tailed tattler | 2                      | W                              | 100                               | 0                 | Foraging         |
| 06:00       | Ruddy turnstone     | 3                      | W                              | 100                               | 0                 | Foraging         |
| 06:00       | Masked lapwing      | 2                      | W                              | 100                               | 0                 | Roosting         |
| 06:00       | Silver gull         | 18                     | W                              | 100                               | 0                 | Roosting         |

|       |                       |     |   |     |   |          |
|-------|-----------------------|-----|---|-----|---|----------|
| 06:00 | Pacific golden plover | 2   | W | 100 | 0 | Roosting |
| 06:00 | Greater sand plover   | 100 | W | 100 | 0 | Roosting |
| 06:00 | Siberian sand plover  | 20  | W | 100 | 0 | Roosting |
| 06:00 | Whimbrel              | 4   | W | 100 | 0 | Roosting |
| 06:00 | Greater crested tern  | 12  | W | 100 | 0 | Roosting |
| 06:00 | Roseate tern          | 1   | W | 100 | 0 | Roosting |
| 06:00 | Red-necked stint      | 2   | W | 100 | 0 | Foraging |
| 06:00 | Terek sandpiper       | 7   | W | 100 | 0 | Roosting |
| 06:00 | Great knot            | 65  | W | 100 | 0 | Roosting |
| 06:00 | Red knot              | 10  | W | 100 | 0 | Roosting |
| 06:00 | Common greenshank     | 1   | W | 100 | 0 | Roosting |
| 06:30 | Striated heron        | 1   | W | 60  | 0 | Foraging |

**Table 5 Disturbance Observations at Nightcliff Rocks**

| Time  | Type  | Duration (min) | Shorebird Response | Species | Number Affected | Did the Affected Birds Leave the Site? | Entry and Exit Points of Disturbance   | Notes   |
|-------|-------|----------------|--------------------|---------|-----------------|--|--|---|
| 07:06 | Human | 5              | None               | -       | -               | -                                      | Entered via staircase leading to the rocks and walked along shore towards the harbour. | Person walked their dog approx. 60m from roosting birds, eliciting no response. |
| 07:55 | Human | 5              | None               | -       | -               | -                                      | Entered via staircase leading to the rocks and walked along shore towards the harbour. | Person walked their dog approx. 80m from roosting birds, eliciting no response. |



**Plate 8 Striated Heron at Nightcliff Rocks**

*Spot on Marine*

Five migratory shorebirds were recorded at Spot on Marine during the survey period (**Table 6**). No disturbances or potential disturbances were recorded during the survey period.

**Table 6 Bird Observations at Spot on Marine**

| Time  | Species               | No. Individuals | Direction from Surveyor | Distance from Observer (m) | Height (m) | Behaviour |
|-------|-----------------------|-----------------|-------------------------|----------------------------|------------|-----------|
| 06:45 | Whimbrel              | 112             | SE                      | 100                        | 0          | Roosting  |
| 06:45 | Far eastern curlew    | 27              | SE                      | 100                        | 0          | Roosting  |
| 06:45 | Bar-tailed godwit     | 12              | SE                      | 100                        | 0          | Roosting  |
| 06:45 | Pacific golden plover | 16              | SE                      | 100                        | 0          | Roosting  |
| 06:45 | Black-bellied plover  | 12              | SE                      | 100                        | 0          | Roosting  |

*East Point*

Fourteen species of migratory shorebirds and eight species of non-migratory waterbirds were recorded at East Point during the survey period (**Table 7**). Two disturbances and no potential disturbances were recorded during the survey period (**Table 8**).

**Table 7 Bird Observations at East Point**

| Time  | Species               | No. Individuals | Direction from Surveyor | Distance from Observer (m) | Height (m) | Behaviour |
|-------|-----------------------|-----------------|-------------------------|----------------------------|------------|-----------|
| 06:45 | Common sandpiper      | 3               | W                       | 100                        | 0          | Foraging  |
| 06:45 | Whimbrel              | 1               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Common tern           | 2               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Greater crested tern  | 9               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Gull-billed tern      | 3               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Ruddy turnstone       | 3               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Terek sandpiper       | 8               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Grey-tailed tattler   | 11              | W                       | 100                        | 0          | Roosting  |
| 06:45 | Greater sand plover   | 70              | W                       | 100                        | 0          | Roosting  |
| 06:45 | Siberian sand plover  | 10              | W                       | 100                        | 0          | Roosting  |
| 06:45 | Masked lapwing        | 2               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Little tern           | 2               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Great knot            | 2               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Silver gull           | 6               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Pacific golden plover | 3               | W                       | 100                        | 0          | Roosting  |
| 06:45 | Red-necked stint      | 1               | W                       | 100                        | 0          | Roosting  |
| 07:00 | Striated heron        | 1               | W                       | 60                         | 0          | Foraging  |
| 07:30 | Pacific reef heron    | 1               | W                       | 80                         | 0          | Foraging  |

**Table 8 Disturbance Observations at East Point**

| Time  | Type  | Duration (min) | Shorebird Response | Species                               | Number Affected | Did the Affected Birds Leave the Site? | Entry and Exit Points of Disturbance  | Notes   |
|-------|-------|----------------|--------------------|---------------------------------------|-----------------|--|---|---|
| 06:45 | Human | 30             | None               | All of the above                      | -               | -                                      | Person present at the beginning of the survey, exited by walking north along the beach. | Person fishing on rocks 50-100m away from birds. No response elicited.                              |
| 07:35 | Kayak | 5              | Flushed            | Mixed flock of terns and silver gulls | 15              | Yes                                    | Person kayaking from open ocean towards the shore, exiting on the beach.                | Kayaker passed within 10m of roosting shorebirds, flushing a mixed flock of terns and silver gulls. |





**Plate 9 Pacific Reef Heron at East Point**

## 4.0 Conclusion

The aim of this survey was to quantify richness and abundance of migratory shorebirds on Darwin's northern beaches during the month of December, as well as gather data on anthropogenic disturbance at five key feeding and roosting locations. Monitoring was conducted in accordance with the *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory*, (Ecology and Heritage Partners 2023).

Seventeen species of migratory shorebird were recorded across the five survey sites, with the highest diversity and abundance recorded at Lee Point. Relatively few disturbances and potential disturbances were recorded at any of the sites, which is likely due to the high rainfall experienced during the survey period.

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## 5.0 References

Ecology & Heritage Partners (2023). *Shorebird Monitoring: Lee Point, Darwin, Northern Territory (Winter 2023)*. Report prepared for Defence Housing Australia, Darwin, Northern Territory.

EcOz Environmental Consulting (2022). *Shorebird Monitoring Program Lee Point Master-planned Urban Development*. Defence Housing Australia, Darwin, Northern Territory.

Lilleyman, A. (2017). *Report on Potential Impacts from Disturbance to Migratory Shorebirds in Darwin: Defence Housing Australia – Lee Point Master-planned Urban Development*. Defence Housing Australia, Darwin, Northern Territory.

Northern Territory Environmental Protection Authority (2018). *Assessment report 88 – Lee Point master-planned urban development*. Defence Housing Australia, Darwin, Northern Territory.