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16 September 2008

Buildev Properties Pty Ltd
PO Box 826
NEWCASTLE NSW 2300

Attention: Mark Daniels

Dear Mark

Re: Targeted Diuris Surveys at Fullerton Cove Sand Extraction Site

Introduction

Orogen Pty Ltd was commissioned by Buildev to conduct targeted surveys for two Threatened orchids, *Diuris praecox* and *Diuris arenaria* on a site described as George Street, Fullerton Cove, NSW. Orogen (2007) had recommended that the targeted surveys be undertaken in an attempt to confirm or discount the presence of these taxa on the site. The survey results would assist the NSW Department of Planning in its consideration of a Part 3A proposal for a sand extraction project on the site. *Diuris praecox* and *Diuris arenaria* are listed as Vulnerable and Endangered, respectively, under schedules to the NSW *Threatened Species Conservation Act 1995* (TSC Act).

Harden (1993) gives the following taxonomic description for *Diuris praecox*:

Leaves 2 or 3, linear, 15–35 cm long, 3–5 mm wide, conduplicate. Raceme 20–40 cm high, 6–10-flowered. Flowers nodding, yellow with a few dark brown markings at the base of the dorsal sepal and labellum, c. 2.5 c. across. Dorsal sepal narrow-ovate, 9–11 mm long, 4.5–6 mm wide, obliquely erect. Lateral sepals linear to lanceolate, 12–15 mm long, 1.5–2 mm wide, deflexed, parallel. Petals obliquely erect, widely divergent, recurved; lamina narrow-elliptic to ovate, 8–12 mm long, 5–6 mm wide; claw 4–6 mm long, blackish. Labellum 9–12 mm long; lateral lobes linear to ± obovate, 3–4 mm long, 0.8–1.4 mm wide, apex irregular; midlobe ovate when flattened, 5–7 mm.

Distinguishing characteristics of the species include divergent petals as well as toothed lateral lobes of the labellum (author's pers. obs.; Bishop 2000).

Bishop (2000) gives the following taxonomic description for *Diuris arenaria*

Leaves 2 linear, to 35 cm long. Flowering stem to 45 cm, with up to 6 flowers. Flower 15 mm across, light mauve with darker labellum; area between callus ridges rich ochre yellow and purple. Dorsal sepal ovate, 16 mm by 10 mm, bent weakly upwards, with recurved margins. Lateral sepals about 35 mm long, pointing forwards and downwards. Petals with short claw 6 mm long and elliptic

lamina 15 mm by 8 mm, lamina often reflexed and often curving downwards. Labellum 12 mm long; lateral lobes not spreading, oblong, 2 mm wide; midlobe broadly heart shaped with broad claw like base, 11 mm long by 8.5 mm wide when flattened; callus of 2 divergent ridges 5 mm long.

Distinguishing characteristics of the species include a deep yellow colouring between the callus ridges and a dark labellum midlobe relative to the rest of the flower (author's pers. obs., Bishop 2000).

Methodology

Immediately prior to the targeted survey for the two Threatened orchids, a site reconnaissance was undertaken by Orogen ecologists at the known populations of these taxa (eg. Anna Bay, Salt Ash) to verify the 2008 flowering periods. The site reconnaissance confirmed that the existing populations of *Diuris praecox* and *Diuris arenaria* were flowering at the time of the targeted survey. The Anna Bay population of *Diuris praecox* occurs within a slashed Energy Australia transmission line easement fringed by Coastal Dune Forest (Espallargos 2005; author's pers. obs.). Discussions with Port Stephens Council's Bushland Officer, Anthony Marchment, confirmed the Fern Bay population of *Diuris praecox* was also flowering at the time of the survey. The *Diuris arenaria* population occurs within a slashed Energy Australia transmission line easement fringed by Coastal Dune Forest at Salt Ash and Nelson Bay (ibid).

Individuals of *Diuris arenaria* and *D. praecox* observed at the known populations (at Salt Ash, Nelson Bay) were categorised into five groups, these being seedlings, flowering plants, budding plants and seeding plants. Flowering plants were identified as individuals with at least one open flower present on the flowering stem. Budding plants were identified as individuals that had produced buds at the time of the survey but had no open flowers. Seedlings were defined as individuals with only vegetative growth (ie. linear leaves). Seeding plants were defined as those with one or more swelled ovaries.

A total of six (6) Random Meander transects were undertaken in Coastal Dune Forest/Shrubland habitats across the Fullerton Cove site by Orogen ecologists on 28 August and 11 September 2008 to confirm or discount the presence of *D. praecox* and *Diuris arenaria*, respectively. Random Meander sampling was biased towards previously slashed forested tracks and woodland edges where breaks in the canopy were evident.

Table 1 shown below, lists the 6 transects, transect terminal grid references and associated vegetation types.

Table 1 - Fullerton Cove Transects

Transect No.	Grid Reference (Ausgeodetic 84)	Vegetation Type
1	S32 50.505 E151 50.091	Blackbutt – Angophora Dune Forest
	S32 50.603 E151 50.072	

Table 1 - Fullerton Cove Transects

Transect No.	Grid Reference (Ausgeodetic 84)	Vegetation Type
2	S32 50.603 E151 50.072	Blackbutt – Angophora Dune Forest
	S32 50.507 E151 50.173	
3	S32 50.507 E151 50.173	Blackbutt – Angophora Dune Forest
	S32 50.495 E151 50.097	
4	S32 50.477 E151 50.133	<i>Banksia aemula</i> Tall Open Shrubland
	S32 50.436 E151 50.189	
5	S32 50.424 E151 50.239	Angophora Dune Forest
	S32 50.473 E151 50.191	
6	S32 50.325 E151 50.329	Coastal tea-tree Open Shrubland
	S32 50.424 E151 50.239	

Note: Pasture Grassland was not surveyed as this habitat type has been subject to earthworks since the conduct of the baseline surveys in 2007 and is presently considered as unsuitable habitat for the 2 target orchids.

Transect locations are shown as **Figure 1**.

Results

No *Diuris praecox* or *Diuris arenaria* individuals were recorded during the targeted survey on the site. A total of two native orchids were recorded during the survey, these being *Caladenia carnea* and *Caladenia catenata*. The two *Caladenia* orchids were found predominantly in the Dune Forest habitat. Both *Caladenia* orchids recorded are considered to be common and widespread on the coastal plain in NSW (Bishop 2000; author's pers. obs.).

Yours faithfully
Orogen Pty Ltd



ISAAC MAMOT
Senior Botanist

Figure 1 – Transect locations



LEGEND

- Site Boundary
- Transect Lines

NOTES:

1. Map indicative only

0 50 150 250 500



Figure 1 - Transect Locations