

LOT 15 BARFIELD ROAD, HAMMOND PARK

FLORA AND VEGETATION SURVEY

Prepared for: Richard Noble
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pgv ENVIRONMENTAL

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1. INTRODUCTION

1.1 Purpose

The owners of Lot 15 Barfield Road, Hammond Park (the site), Richard Noble, plan to develop the site for residential purposes in accordance with its zoning. The site is approximately 1.8ha in size and located in the City of Cockburn, approximately 24km south of the Perth CBD.

The site has previously been cleared and contained two houses, one of which is no longer occupied. Native vegetation has regenerated on the site in some areas. As a result, Richard Noble commissioned PGV Environmental to undertake a Level 2 spring flora and vegetation survey of the site.

1.2 Scope of Works

The Level 2 Spring Flora and Vegetation Survey was undertaken in accordance with Guidance Statement 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004) and included the following:

- Desktop search and review of DPaW's Declared Rare and Priority Flora database and Threatened Ecological Communities database;
- Examination of recent aerial photography and contour maps to provisionally identify vegetation types and condition;
- Field survey in spring using quadrats to record native and introduced species as well as a thorough site walkover of any areas of native vegetation;
- Recording of any significant plant species using a hand-held GPS;
- Description and mapping of vegetation types and vegetation condition; and
- Compilation of a flora list.

2. EXISTING ENVIRONMENT

2.1 Land Use

The site has previously been cleared as evidence by the 1974 aerial photograph (Landgate, 2014) (Plate 1). The site regenerated to some extent until houses were constructed firstly in the south-east corner in the early 1980s and then along Barfield Road in the 1990s. Only the house in the south-east corner is currently occupied.

Plate 1. 1974 Historic Aerial Photograph



2.2 Topography

The site slopes gently from a high of around 35m AHD in the south-east corner down to 28m AHD in the flatter north-west part (DAFWA, 2014).

2.3 Geology and Soils

The site is located on the Swan Coastal Plain on the Bassendean Dune System.

One soil unit is located on the site as follows (DAFWA, 2014):

- Bassendean B1 Phase (212Bs_B1) consisting of extremely low to very low relief dunes, undulating sandplain and discrete sand rises. Deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2m.

2.4 Hydrology

The Perth Groundwater Atlas indicates that groundwater under the site in May 2003 was around 21m AHD and flowing in a westerly direction. The historical maximum groundwater was around 23m AHD. The depth to the historic maximum watertable ranges from 5-12m under the site.

2.5 Wetlands

There are no wetlands located on the site as mapped in the *Geomorphic Wetlands of the Swan Coastal Plain* Database (Landgate, 2014). The site investigations for the flora and vegetation survey confirmed the absence of wetlands on the site.

3. FLORA AND VEGETATION

3.1 Methodology

A flora and vegetation survey of the site was conducted by Dr Paul van der Moezel on 26 September 2014. The survey included sampling from three non-permanent 10m x 10m quadrats as well as a thorough walk through the site. Site coverage was high due to the very small site, and high degree of disturbance enabling easy access on foot through the understorey.

3.2 Desktop Searches

A search of the Department of Parks and Wildlife's (DPaW's) Threatened Flora Database, the WA Herbarium database and the Declared Rare and Priority Flora Species List (Appendix 1) identified four Threatened (Declared Rare) plant species that have been recorded within 5km of the site (Appendix 1). A further 11 Priority listed species were also recorded.

Table 1: List of Flora Species Identified from Database Searches within 5km of the Site.

Species	Common Name	Status Under Wildlife Conservation Act 1950	Status Under EPBC Act 1999
<i>Caladenia huegelii</i>	Grand Spider Orchid	Threatened	Endangered
<i>Diuris micrantha</i>	Dwarf Bee-orchid	Threatened	Vulnerable
<i>Drakaea elastica</i>	Glossy-leaved Hammer Orchid	Threatened	Endangered
<i>Lepidosperma rostratum</i>	Beaked Lepidosperma	Threatened	Endangered
<i>Eremaea asterocarpa</i> subsp. <i>brachyclada</i>		Priority 1	
<i>Cyathochaeta teretifolia</i>		Priority 3	
<i>Eryngium pinnatifidum</i> subsp. <i>palustre</i>		Priority 3	
<i>Jacksonia gracillima</i>		Priority 3	
<i>Pimelea calcicola</i>		Priority 3	
<i>Stylidium paludicola</i>		Priority 3	
<i>Dodonaea hackettiana</i>	Hackett's Hopbush	Priority 4	
<i>Ornduffia submersa</i>		Priority 4	
<i>Thysanotus glaucus</i>		Priority 4	
<i>Tripterococcus paniculatus</i>		Priority 4	
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>		Priority 4	

The likelihood of each species occurring on the site is discussed in Table 2. One Threatened and four Priority species could potentially occur in the sandy soils on the site.

Table 2: Likelihood of Identified Significant Flora Species occurring on the Site

Scientific Name	Preferred Habitat	Likelihood of Presence on site
<i>Caladenia huegelii</i>	Sand or clay loam. Does not survive in disturbed areas.	Possible
<i>Diuris micrantha</i>	Brown loamy clay. Winter-wet swamps, in shallow water	No
<i>Drakaea elastica</i>	Low-lying situations adjoining winter-wet swamps. Does not survive in disturbed areas	No
<i>Lepidosperma rostratum</i>	Peaty and clay soils	No
<i>Eremaea asterocarpa</i> subsp. <i>brachyclada</i>	Deep grey sand	Possible
<i>Cyathochaeta teretifolia</i>	Grey sand, sandy clay. Swamps, creek edges	No
<i>Eryngium pinnatifidum</i> subsp. <i>palustre</i>	Winter-wet areas	No
<i>Jacksonia gracillima</i>	Grey and brown well-drained sand	Possible
<i>Pimelea calcicola</i>	Sand. Coastal limestone ridges	Unlikely
<i>Stylidium paludicola</i>	Swampy areas	No
<i>Dodonaea hackettiana</i>	Sand. Outcropping limestone	Possible
<i>Ornduffia submersa</i>	Wetland areas	No
<i>Thysanotus glaucus</i>	White, grey or yellow sand, sandy gravel	Possible
<i>Tripterococcus paniculatus</i>	Grey, black or peaty sand. Winter-wet flats	No
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	Grey, black or peaty sand. Winter-wet depressions	No

*sourced from Florabase (DPaW, 2014b)

A search of the DPaW Threatened and Priority Ecological Community database identified one Threatened and three Priority Ecological Communities have been recorded within 5km of the site as follows:

- SCP 26a - *Melaleuca huegelii* - *Melaleuca acerosa* (currently *M. systema*) shrublands on limestone ridges (Threatened – Endangered)
- SCP 24 - Northern Spearwood shrublands and woodlands (Priority 3)
- SCP 21c - Low lying *Banksia attenuata* woodlands or shrublands (Priority 3)
- SCP 22 – *Banksia ilicifolia* woodlands (Priority 3)

3.3 Survey Conditions

The conditions that the survey was undertaken in are presented in Table 4 in order to assess the adequacy of the survey. In summary, there were no constraints to the survey.

Table 4: Statement of Botanical Survey Conditions

ISSUE	CONSTRAINTS (YES/NO); SIGNIFICANT, MODERATE OR NEGLIGIBLE	COMMENT
Competency/experience of the consultant conducting the survey	No constraints	Dr Paul van der Moezel has extensive survey experience on the Swan Coastal Plain.
Proportion of the flora identified	No constraints	The timing of the survey in early October should have identified most of the native species on the site.
Sources of information (historic/recent or new data)	No constraints	The flora of the Swan Coastal Plain is relatively well documented.
Proportion of the task achieved and further work that may need to be undertaken	No constraints	No follow-up survey required.
Timing/weather/season/cycle	No constraints	Generally slightly below average rainfall in winter 2014. Late September survey ideal for identifying rare orchids and maximising flowering of most species.
Intensity of survey (e.g. In retrospect was the intensity adequate)	No constraints	The open understorey made access and coverage easy.
Completeness (e.g. was relevant area fully surveyed)	No constraints	Approximately 4 hours spent on site.
Resources (e.g. degree of expertise available for plant identification)	No constraints	Experienced botanist undertook plant identifications on site.
Remoteness and/or access problems	No constraints	Easily accessible sites traversed entirely on foot.
Availability of contextual (e.g. bioregional) information for the study area.	No constraints	Hedde <i>et al.</i> (1980), Government of Western Australia (2000), Gibson <i>et al.</i> (1994).

Fungi and nonvascular flora (e.g. algae, mosses and liverworts) were not specifically surveyed for during the survey.

3.4 Results

3.4.1 Flora

A combined total of 62 species were recorded from the site (Appendix 2). The total included 43 native and 19 (31%) introduced species. The low number of native species, even for a small 1.8ha site, and the high percentage of introduced species reflects the high degree of disturbance to the native vegetation on the site.

The highest number of species recorded in the three quadrats was 26 in the Banksia woodland in Good condition in the north-east corner (Appendix 3). The other two quadrats recorded contained

vegetation in Degraded to Completely Degraded condition and had species richness numbers of 8 and 16 with a high proportion of introduced species.

None of the species recorded is a Threatened (Declared Rare) or Priority listed species. The survey was undertaken at a time when the Threatened orchid species *Caladenia huegelii* would have been flowering.

3.4.2 Vegetation

Vegetation Complexes

The vegetation belongs to the Bassendean – Central and South vegetation complex as mapped by Heddle *et al.* (1980).

Vegetation Types

Three vegetation types were mapped (Figure 3) and described for the site based on the structure and composition of the dominant layers.

BmBa *Banksia attenuata*/B. *menziesii* Low Open Woodland over *Xanthorrhoea preissii* Open Shrubland

This vegetation type occurred in the north-east corner of the site. The *Banksia* trees were up to 4m high and in low densities. *Xanthorrhoea preissii* was the most dominant native understorey species at around 1m high and 10% cover. All other native species had very low coverage. *Gladiolus caryophyllaceus*, *Ursinia anthemoides* and Flat Weed (*Hypochaeris glabra*) were the most prevalent weed species. The soil was grey-brown sand. Quadrat B1 is representative of this vegetation type.

Xp *Xanthorrhoea preissii* Open Shrubland

A small section of *Xanthorrhoea preissii* shrubland occurred in the north central part of the site. The *Xanthorrhoea* shrubs were up to 1.2m high and 20% density. Very few native species were recorded in this vegetation type and no trees except several WA Christmas Trees (*Nuytsia floribunda*). Presumably the *Banksia* and possibly Jarrah trees that occurred previously in this area did not regenerate after clearing in the early 1970s. Introduced species were common, particularly *Ursinia anthemoides*, Veldtgrass (*Ehrharta longiflora*) and Flat Weed. The soil was grey sand. Quadrat B2 is representative of this vegetation type.

Em *Eucalyptus marginata*/ *Banksia attenuata*/B. *menziesii* Low Woodland over weeds

Two stands of this vegetation type occurred, one in the north-west corner and the other in the south-west corner. Jarrah (*Eucalyptus marginata*) was the most common tree species up to 6m high and varying in density while *Banksia attenuata* and *B. menziesii* also occurred but in very low numbers. Few native understorey species were present while introduced species such as Veldtgrass and *Ursinia* were common. The soil was light grey sand. Quadrat B3 is representative of this vegetation type.

Floristic Community Types

Floristic Community Types (FCT) are based on the whole floristic composition of the vegetation rather than being determined by soil type and geomorphology (Vegetation Complex) or the nature of the dominant species (Vegetation Types). The FCT level of vegetation is required to identify whether any of the vegetation on the site is a Threatened or Priority Ecological Community.

Most of the vegetation on the site is too degraded to assign a FCT.

Analysis of the FCT for the Banksia woodland quadrat B1 was undertaken by comparing the species in each quadrat to the species-Community type table 12 in Gibson *et al.* (1994). The analysis produced a strong correlation for the Banksia woodland vegetation with FCT 28 'Spearwood *Banksia attenuata* woodlands or *Banksia attenuata* – *Eucalyptus* woodland' with high similarities to FCT 21a 'Central *Banksia attenuata* – *Eucalyptus marginata* woodlands' and 23a 'Central *Banksia attenuata* – *B. menziesii* woodlands'. FCT 28, however, occurs on Spearwood sands on Cottesloe and Karrakatta soil types and was not recorded by Gibson *et al.* (1994) on Bassendean Sands. The vegetation is therefore most likely to be FCT21a which occurs on Bassendean soil types. While FCT23a also occurs on Bassendean Soils this FCT rarely contain Jarrah (*Eucalyptus marginata*) which is common on the site.

As a comparison, Bayley Environmental Services (2011) considered the regrowth Banksia woodland on Lots 42-44 Frankland Avenue, Hammond Park was either FCT 21a or 23a. Coffey Environments (2008) considered that the Banksia woodland on Lot 46 Frankland Avenue, Hammond Park was likely to be FCT 23a. PGV Environmental (2011) considered the Banksia woodland on Lot 3 Norkett Road, Mandogalup was most likely to be FCT21a. All three sites are within 2km of Lot 15.

3.4.3 Vegetation Condition

The vegetation condition over the site was assessed using the condition scale adopted in Bush Forever (Table 6). The native vegetation on most of the site is either Completely Degraded or Degraded with remnant trees or shrubs in a weed dominated understorey. The Banksia woodland vegetation in the north-east corner was considered to be in Good condition as the understorey contained a reasonable number of native plant species and life forms (shrubs, herbs, orchids, sedges) but was partially cleared and contained an abundance of aggressive weeds.

No presence of dieback was noted.

Table 6. Vegetation Condition Rating Scale.

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

Condition	Description
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Source: Government of Western Australia, 2000.

3.4.4 Conservation Significance of Flora and Vegetation

Flora

None of the species recorded is a Threatened (Declared Rare) or Priority listed species or is listed in Bush Forever as a significant species.

Vegetation

The vegetation on most of the site is considered too degraded to have values for protection of vegetation.

The small area of Good condition Banksia woodland in the north-east corner of the site is considered to be representative of the Bassendean - Central and South Vegetation Complex as well as Floristic Community Type 21a.

The current extent of the Bassendean - Central and South Vegetation Complex remaining in the Swan Coastal Plain portion of the Perth Metropolitan Region is 10,919ha (24% of the original extent) of which 5,883ha or 13% has some existing or proposed protection. These percentages are above the Bush Forever targets of protecting at least 400ha or 10% of each vegetation complex in the Perth Metropolitan Region.

FCT21a occurs in the central part of the Swan Coastal Plain from Perth to Capel and is considered well reserved and a low conservation risk (Gibson *et al.* 1994). Accordingly FCT21a is not a Threatened or Priority Ecological Community.

Vegetation from the Bassendean-Central and South Vegetation Complex and FCT21a is protected in the nearby Bush Forever site 392 'Harry Waring Marsupial Reserve' (271.6ha including open water) located 1km west of Lot 15.

The vegetation on the site does not form any part of a local or regional linkage and has very limited values for fauna.

4. CONCLUSIONS AND SUMMARY

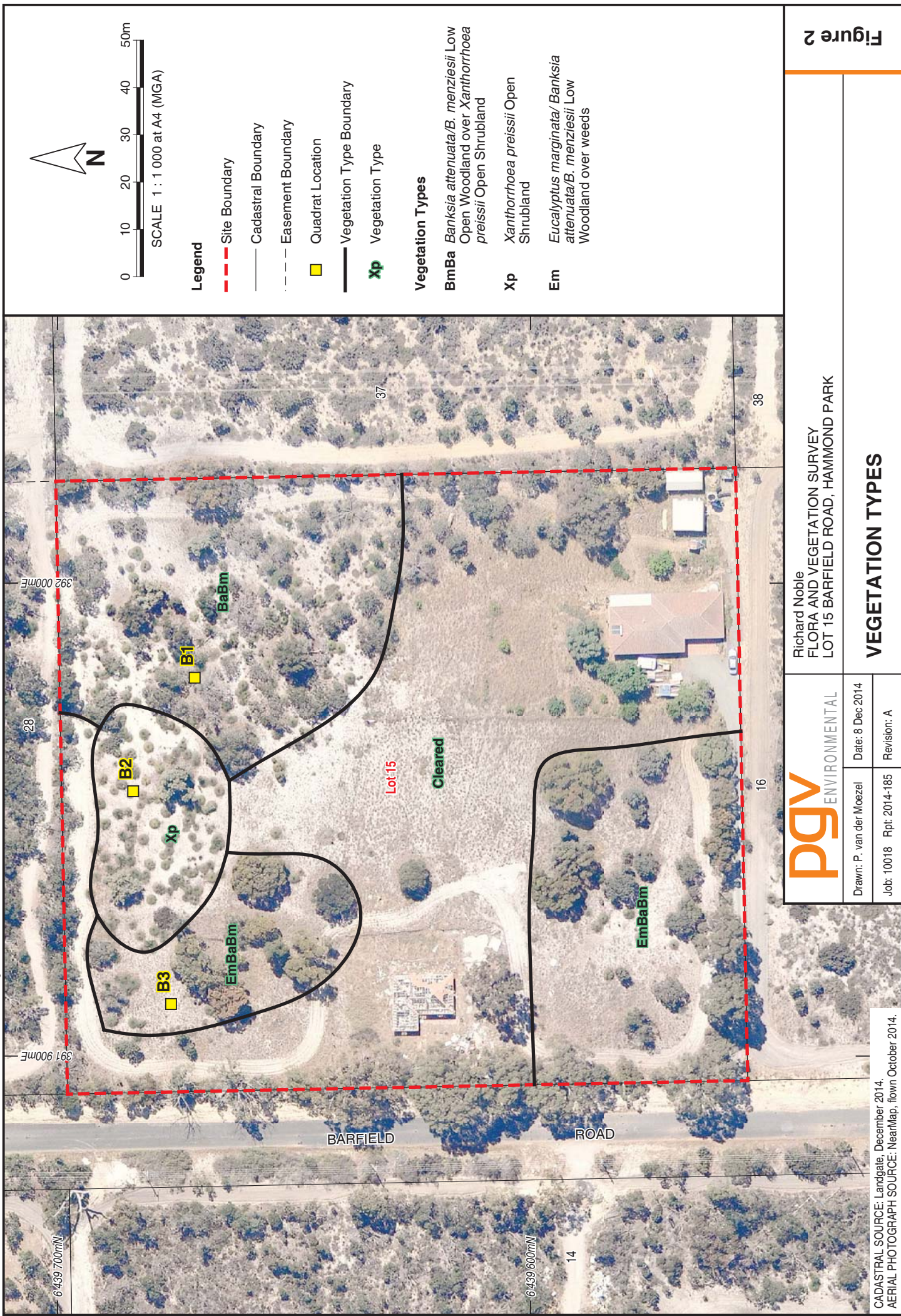
The Level 2 Flora and Vegetation Survey of Lot 15 Barfield Rod, Hammond resulted in the following findings:

- A total of 62 plant species including 43 native and 19 introduced species was recorded from the site. The low total of native species and high percentage of introduced species (31%) is indicative of not only small size of the site but the high degree of disturbance;
- No Threatened (Declared Rare) flora were recorded from either lot;
- Three vegetation types were recorded on the sandy soil types on the site, a *Banksia* woodland, a Jarrah/*Banksia* woodland and a *Xanthorrhoea preissii* Shrubland;
- The condition of the vegetation was mostly rated as Completely Degraded due to the past clearing on the site, low number of understorey species and prevalence of weeds. The *Banksia* woodland in the north-east corner of the site was rated as Good due to the higher number of native species in the understorey;
- The vegetation belongs to the Bassendean – Central and South vegetation complex which is well reserved on the southern Swan Coastal Plain;
- Most of the vegetation on the site was too degraded to assign a Floristic Community Type. The *Banksia* woodland vegetation type was considered to be representative of FCT 21a ‘Central *Banksia attenuata* – *Eucalyptus marginata* woodlands’ which is not a Threatened or Priority Ecological Community; and
- The vegetation on the site does not form part of any regional or local ecological linkage and has very limited values for fauna.

5. REFERENCES

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FIGURES





6 439 700mN

6 439 600mN

14

BARFIELD

ROAD

Lot 15

D

CD

G

37

38

392 000mE

391 900mE

28

16



0 10 20 30 40 50m
SCALE 1 : 1 000 at A4 (MSA)

Legend

--- Site Boundary

--- Cadastral Boundary

--- Easement Boundary

--- Vegetation Condition Boundary

G Vegetation Condition

Vegetation Condition
(SOURCE: Bush Forever, Govt. of W.A., 2000)

P - Pristine
Pristine or nearly so, no obvious signs of disturbance.

Ex - Excellent
Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive species.

VG - Very Good
Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

G - Good
Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

D - Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

CD - Completely Degraded
The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

CI - Cleared
No native vegetation remaining.



Richard Noble
FLORA AND VEGETATION SURVEY
LOT 15 BARFIELD ROAD, HAMMOND PARK

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VEGETATION CONDITION

Figure 3