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MEMORANDUM

Date	22 April 2020	**Title**	Desktop Vegetation Mapping for the proposed Seawater Pipe Route
Ref.	MBS20002_MEM02_Rev0	**Distribution**	[redacted] MBS Environmental
Author	[redacted] Scientist/Botanist	**Review/ Authorisation**	[redacted] Principal Ecologist

Background

Focused Vision Consulting Pty Ltd (FVC) was commissioned by MBS Environmental to prepare desktop mapping of vegetation associations and vegetation condition for a proposed seawater pipeline route associated with the Ningaloo Marine Research Facility within the Exmouth townsite (**Figure 1**). The aim of the assessment was to determine through desktop analysis, the broad vegetation associations and vegetation condition along the pipeline route, incorporating an approximate 50 m buffer.

This correspondence presents the mapping as able to be prepared at a desktop level, based on available information.

Methodology

The vegetation mapping was prepared based on a combination of interrogated site photos, aerial imagery and Beard *et al.* (2013) regional vegetation mapping for the area. The characterisation of the vegetation was desktop based and no ground truthing or qualitative data was recorded in order to define each vegetation unit.

Photos taken from nine sites (**Figure 2**) along the pipeline corridor were provided to FVC. The site photos were examined to determine the dominant flora as accurately as possible (mostly to genus level) and the vegetation structure (e.g. woodland, shrubland or grassland) at each location.

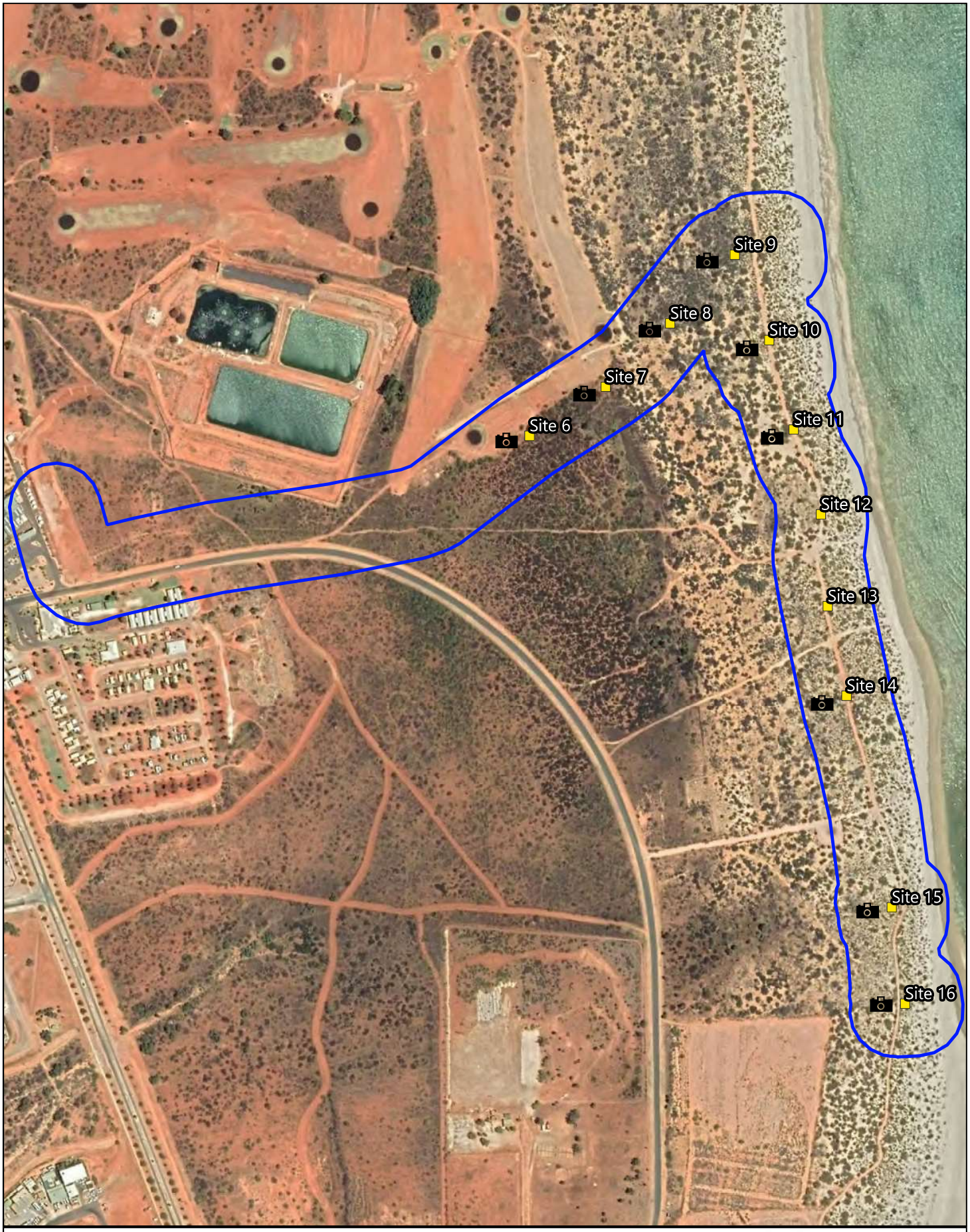
Beard *et al.* (2013) regional vegetation mapping of the area was also examined. Vegetation within the pipeline corridor has been broadly characterised by Beard *et al.* (2013) as Hummock grasslands, shrub steppe; waterwood over soft spinifex. This information was used as the basis for the composition and structure of the vegetation within the study area, verified with photographs.

Based on the combination of Beard *et al.* (2013) regional vegetation mapping and the appearance of vegetation in photographs, vegetation associations were described.

Vegetation condition was broadly determined by examining site photos and aerial imagery, and was based primarily on the visible ratio of introduced (weed) species to native species, the level of disturbance and the intactness of the vegetation structure, compared to pre-European descriptions of Beard *et. al* (2013).

The categories used to determine vegetation condition as outlined in Technical Guidance – Flora and Vegetation Surveys for Environmental Impact (EPA 2016) consisted of a combination of methods developed by Keighery (1994) and Trudgen (1991), as summarised in **Table 1**.

Figure 1 - Study Area



0 25 50 75 100 m

GDA 94 / MGA Zone 50

Figure 2 - Locations of Sites with Photographs

Legend

- Study Area
- Site with Photographs
- Site Location

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Table 1 - Bushland Condition Ratings for Eremaean Botanical Province (EPA 2016) (Adapted from Keighery 1994 and Trudgen 1991)

Description	Explanation
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs

Aerial imagery was also used to delineate the extent and boundaries of each of the mapped vegetation associations and varying vegetation condition classifications, within the pipeline corridor.

Results

Vegetation Associations

Four vegetation associations were mapped within the pipeline corridor (**Figure 3**), which are described in **Table 2**.

Table 2 – Vegetation Association Descriptions

Unit Code	Broad Vegetation Description
AES	*Acacia* spp., *Exocarpos* sp. and *Scaevola* spp. Open Shrubland over *Enchylaena* sp. and *Rhagodia* sp. Low Sparse Chenopod Shrubland
ARG	*Acacia* spp. and *Rhagodia* spp. Open Shrubland over Tussock Grassland
ATG	*Acacia* spp. Open Shrubland over Tussock Grassland
CTG	Occasional *Acacia* spp. over Closed Tussock Grassland

Vegetation Condition

The vegetation condition of the study area is considered to range from 'Completely Degraded' (CD) in localised areas, to 'Good' (G) (**Figure 4**). Overall, the average condition of the vegetation within the corridor is considered to be 'Good', which is defined as having more obvious signs of damage caused by human activity, some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.

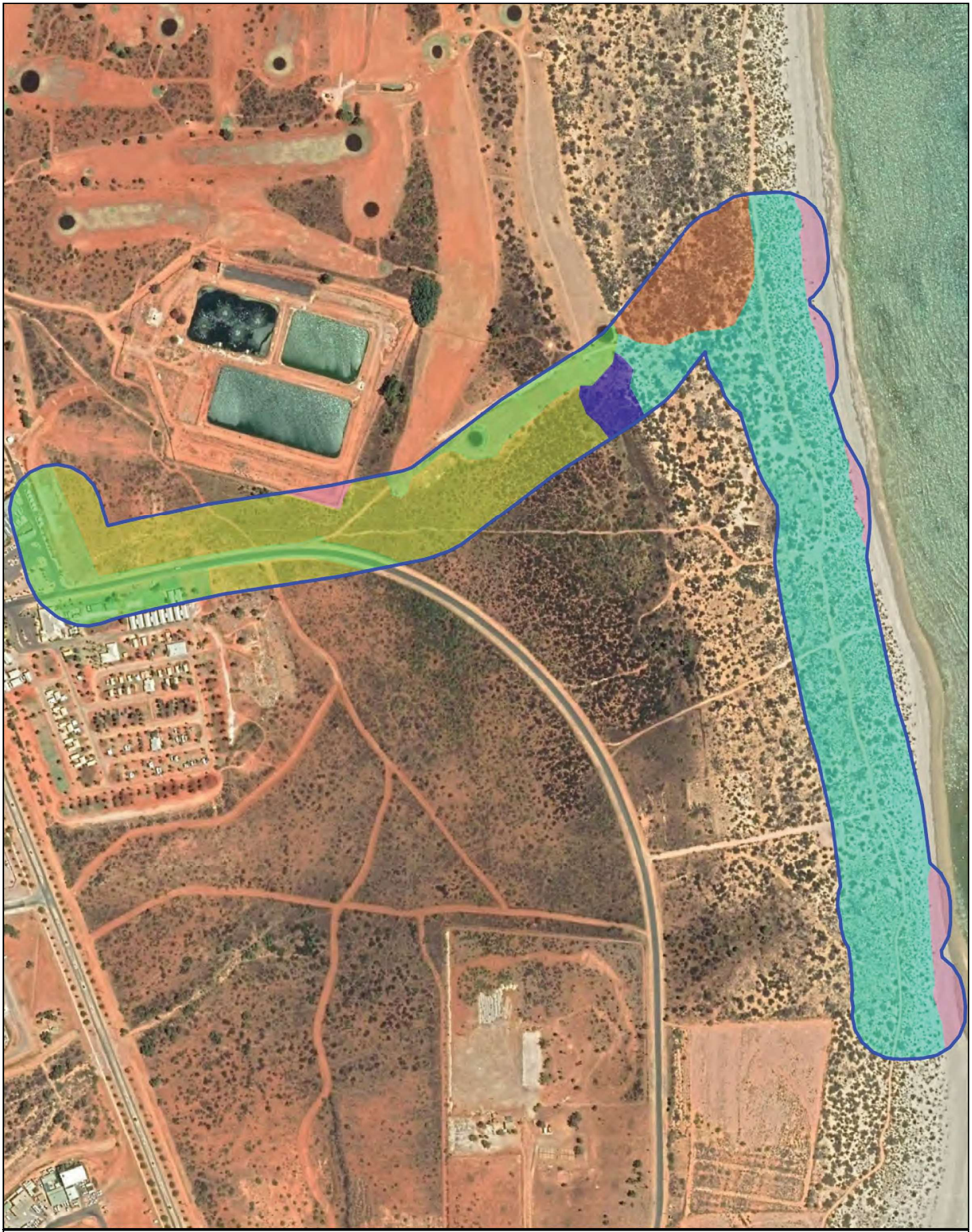

Figure 3 - Vegetation Associations

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Figure 4 - Vegetation Condition

Vegetation Representation

The regional vegetation supported by the study area, as per Beard *et al.* (2013) is; Hummock grasslands, shrub steppe; waterwood over soft spinifex. The proportionate representation of this regional vegetation in the Carnarvon Bioregion, Cape Range Sub-Region and the Shire of Exmouth, as well as its pre-European and current remaining extents in each context are summarised in **Table 3.**

The regional vegetation association (663) supported by the study area constitutes only a small proportion (less than 5%) of the IBRA Region, IBRA Sub-Region and the Shire of Exmouth. This vegetation association is limited to the Cape Range IBRA Sub-Region and the Shire of Exmouth (**Table 1**) and is largely restricted to the coastal fringes along the cape. In conclusion, this vegetation association and the vegetation on the study area is considered to be regionally significant, due to being regionally limited in its extent.

EPA Position Statement No. 2 (EPA 2000) identifies a series of constraints in relation to biodiversity. One of which is to protect at least 30% of the original extent of vegetation complexes in unconstrained areas and 10% in constrained areas such as urban zones in accordance with the principles of Bush Forever (Government of Western Australia 2000). The study area is considered to be an unconstrained area and as such the minimum retention target of 30% applies. Within the Carnarvon IBRA Region, Cape Range Sub-Region and Shire of Exmouth, vegetation association 663 is represented by greater than 30% of the pre-European extent (**Table 1**) and therefore, the remaining extents meet the EPA objective for retention for the purpose of biodiversity conservation.

Table 3 – Summary of Regional Vegetation (DBCA 2019)

Extent Context	Total Context Area (ha)	Pre–European Extent (ha)	% of the Context Area	Current Extent (ha)	% Remaining
Carnarvon IBRA Region	8,430,170.47	29,068.26	0.35	25,866.32	88.98
Cape Range IBRA Sub-Region	2,380,497.87	29,068.26	1.22	25,866.32	88.98
Shire of Exmouth	649,310.92	30,474.41	4.69	25,976.66	85.24

Closing

Should you require further information or clarification regarding the information provided in this report, please do not hesitate to contact the undersigned.

Best regards,

[redacted]

Focused Vision Consulting Pty Ltd