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MEMORANDUM

Attention:	Belinda Bastow	From:	Siobhan West
Company:	MBS Environmental	Date:	22/01/2010
Subject:	Accompaniment to the Conservation Significant Species Report to incorporate additional flora data.	Project:	Tropicana Joint Venture Tropicana Gold Project

Please advise if any part of this transmission failed or was misdirected

1. Background

The Tropicana Joint Venture (Tropicana JV) plans to develop the Tropicana Gold Project (TGP), an open pit gold mining operation located approximately 330 kilometres east-north-east of Kalgoorlie on the western edge of the Great Victoria Desert in Western Australia. The Tropicana JV is between AngloGold Ashanti Australia Limited (70% stakeholder and Manager) and Independence Group NL (30% stakeholder).

The TGP consists of three main components:

- Operational Area - This area contains the mine, processing plant, aerodrome, village and other associated infrastructure.
- Water Supply Area - Two basins have been investigated; the Minigwal Trough and Officer Basin.
- Infrastructure Corridors - Two options have been considered; The Tropicana-Transline Infrastructure Corridor (TTIC) is the preferred communications corridor and the Pinjin Infrastructure Corridor is the preferred corridor for the mine access road.

In preparation for the project's environmental impact assessment, Tropicana JV commissioned a series of baseline flora and fauna surveys to determine the environmental values of the proposed TGP footprint and the surrounding environment.

A document was prepared by MBS Environmental (September 2009) that reviewed and consolidated the results of specialist surveys of terrestrial flora, vegetation and vertebrate fauna of the TGP area with the aim to complete a consolidated impact assessment of conservation significant species and communities that might be adversely affected by the TGP.

Since the release of a Public Environmental Review (PER) document by Tropicana JV, additional survey work has been undertaken to further establish the distribution of conservation significant flora in the broader TGP area. This memorandum is an accompaniment to the original Conservation Significant Species Report (MBS Environmental 2009) and provides:

- Details of the additional survey work undertaken.
- Updated distribution records of conservation significant species in the TGP area.

- A recalculation of the percentages of conservation significant flora species potentially impacted by the TGP proposal.

2. Additional Conservation Significant Species Surveys and Methodology

2.1 Spring 2009 Flora Survey – Mattiske Consulting

Mattiske Consulting was commissioned to undertake additional spring survey work for the TGP. The flora survey took place over four days from 2 to 5 October 2009 and included the Pinjin Infrastructure Corridor and areas identified by Ecologia (2009) as potential Priority Ecological Communities (PEC) in the TTIC.

The objective of this flora survey was to collect and identify taxa, particularly annual species that had not previously been recorded within the proposed corridor, and identify other populations of conservation significant flora in areas located outside of those proposed for infrastructure development.

Flora and vegetation was described and sampled systematically at each survey site by a trained botanist in accordance with Level 2 survey requirements outlined in EPA Guidance Statement 51(2004).

2.2 Opportunistic Recordings - Tropicana JV

As part of ongoing exploration activities in the broader TGP area, pre-clearance environmental surveys have been undertaken periodically by an Environmental Officer of Tropicana JV. Opportunistic sightings of conservation significant flora were identified, a systematic count was undertaken, GPS locations recorded and records incorporated into the Tropicana JV database.

3. Results

The combined results of previous flora surveys (reported in the Conservation Significant Species Report (MBS Environmental 2009)), the 2009 spring flora survey and opportunistic recordings confirmed a total of 20 conservation significant flora species were present in the defined survey areas (as defined in MBS Environmental 2009) with 20 in the Operational Area, 11 in the Pinjin Survey Corridor, 10 in the Tropicana-Transline survey corridor and seven in the Borefield and Pipeline Survey Area.

Table 1 provides an updated list of all Declared Rare Flora (DRF) and Priority flora expected within and/ or recorded from the Operational Survey, Infrastructure Corridor Survey, Water Borefield and Pipeline Survey Areas as well as additional locations recorded outside defined survey areas (MBS Environmental 2009). Where possible it includes:

- A population and plant count estimate.
- Species' regional distribution in Nature Reserves and other known locations outside the proposed TGP area of impact.
- Records held by FloraBase (DEC 2008).

Table 1: Tropicana Gold Project Conservation Significant Flora Species Recorded and Their Regional Context

Species	Populations Observed in Tropicana Gold Project Area (No. Plants Recorded)					Populations Recorded in Nature Reserves (Estimated No. of Plants)			FloraBase Records (DEC 2008)			Conservation Status		
	Operational Area	Pinjin *	TTIC *	Borefield & Pipeline**	Other***	Neale Junction	Plumridge Lake Nature Reserve	Queen Victoria Springs	No. Records	No. Plants	Description	WA	Federal	IUCN
Conospermum toddii	15 (1,329)	×	×	×	9 (226)	×	8 (41,346)	14 (>60,000)	29	>3000	Occasional to Abundant	DRF	EN	EN
Eucalyptus articulata	×	×	×	×	1	×	×	×	×	×		DRF	VU	VU
Thryptomene wittweri	×	×	×	×	×	×	×	×	×	×		DRF	-	-
Caesia rigidifolia	×	×	×	×	×	×	×	8 (>70,000)	×	×		P1	-	-
Baeckea sp. Sandstone	4 (90)	×	×	×	5 (5)	×	×	×	5	Unknown	Occasional to locally common	P1	-	-
Dampiera eriantha	23 (226)	×	×	×	13 (74)	×	×	×	5	~15		P1	-	-
Eremophila aureivisca	×	×	×	×	×	×	×	×	×	×		P1	-	-
Grevillea phillipsiana	×	×	×	×	6 (~1550)	×	×	×	×	×		P1		
Labichea deserticola	×	×	×	×	×	×	×	×	×	×		P1	-	-
Lechenaultia aphylla	×	×	×	×	×	×	×	×	1	Unknown	Common on roadside near Cue	P1	-	-
Minuria ?tridens	×	×	×	×	2 (~10)	×	×	×	×	×		P1	-	-
Micromyrtus helmsii	×	×	×	×	×	×	×	×	×	×		P1	-	-
Philotheca linearis	×	×	×	×	×	×	×	×	×	×		P1	-	-
Philotheca tubiflora	×	×	×	×	×	×	×	×	×	×		P1	-	-
Phyllanthus baeckeoides	×	×	×	×	×	×	×	×	×	×		P1	-	-
Verticordia mirabilis	×	×	×	×	×	×	×	×	×	×		P1	-	-
Baeckea sp. Great Victoria Desert	90 (3,567)	18 (238)	15 (190)	10 (811,545)	44 (>400,400)	×	8 (>10,000)	3 (>50,000)	7	>250	Occasional to common	P2	-	-
Calytrix warburtonensis	×	×	×	×	×	×	×	×	×	×		P2	-	-
Dicrastylis nicholasii	306 (15,065)	5 (58)	27 (681)	36 (8,775,527)	50 (>15,600)	×	17 (>250,000)	×	8	Unknown	Occasional to common	P2	-	-
Eremophila undulata	×	×	×	×	×	1	2 (159)	×	×	×		P2	-	-

Species	Populations Observed in Tropicana Gold Project Area (No. Plants Recorded)					Populations Recorded in Nature Reserves (Estimated No. of Plants)			FloraBase Records (DEC 2008)			Conservation Status		
	Operational Area	Pinjin *	TTIC *	Borefield & Pipeline**	Other***	Neale Junction	Plumridge Lake Nature Reserve	Queen Victoria Springs	No. Records	No. Plants	Description	WA	Federal	IUCN
Grevillea secunda	1 (5)	9 (100)	9 (30)	×	83 (>15,000)	×	2 (159)	10 (>5,000)	16	>90	Occasional to frequent	P2	-	-
Haegiela tatei	×	×	×	×	2 (unknown)	×	×	×	×	×		P2		
Isotropis canescens	×	×	1 (1)	×	×	×	×	×	4	Unknown	Occasional to abundant	P2	-	-
Malleostemon sp. Officer Basin	18 (465)	×	×	×	9 (72)	×	×	×	4	Unknown	Occasional to frequent	P2	-	-
Olearia arida	61 (1,224)	4 (9)	8 (114)	55 (545,771)	37 (2,497)	1 (9)	1 (1)	1 (1)	7	Unknown	Frequent	P2	-	-
Phlegmatospermum eremaeum	×	×	×	×	2 (unknown)	×	×	×	×	×		P2		
Physopsis chrysotricha	×	×	2 (~12)	×	3 (36)	×	×	×	3	Unknown	Very rare	P2	-	-
Thryptomene eremaea	×	×	×	×	1 (80)	×	×	×	8	Unknown	Occasional to frequent to common	P2	-	-
Trachymene pyrophila	×	×	×	×	×	×	×	×	×	×		P2	-	-
Acacia eremophila numerous nerved variant	21 (731)	×	×	×	25 (605)	1 (2,000)	11 (366)	×	7	Unknown	Frequent to patchy	P3	-	-
Acacia eremophila var. *variabilis*	3 (45)	×	×	×	7 (143)	×	×	×	16	Unknown	Few plants to variable	P3	-	-
Calandrinia porifera	×	×	×	×	×	×	×	×	×	×		P3	-	-
Calotis latiscula	×	×	×	×	×	×	×	×	×	×		P3	-	-
Calytrix praecipua	×	×	×	×	×	×	×	×	×	×		P3	-	-
Diocirea actutifolia	×	×	×	×	12 (unknown)	×	×	×	×	×		P3	-	-
Dicrastylis cundeeleensis	54 (6,078)	18 (1,668)	6 (73)	6 (2075)	63 (8,042)	1 (1)	6 (435)		11	Unknown	Uncommon to very common	P3	-	-
Diocirea ternata	×	×	×	×	40 (>2,000)	×	×	×	×	×			-	-

Species	Populations Observed in Tropicana Gold Project Area (No. Plants Recorded)					Populations Recorded in Nature Reserves (Estimated No. of Plants)			FloraBase Records (DEC 2008)			Conservation Status		
	Operational Area	Pinjin *	TTIC *	Borefield & Pipeline**	Other***	Neale Junction	Plumridge Lake Nature Reserve	Queen Victoria Springs	No. Records	No. Plants	Description	WA	Federal	IUCN
Eucalyptus pimpiniana	×	11 (554)	×	×	8 (195)	×	×	×	11	>600	Limited distribution to locally frequent	P3	-	-
Eucalyptus sparsa	×	×	×	×	×	×	×	×	×	×		P3	-	-
Frankenia georgei	×	×	×	×	×	×	×	×	×	×		P3	-	-
Melaleuca apostiba	×	×	×	×	×	×	×	×	×	×		P3	-	-
Melaleuca coccinea	×	×	×	×	2 (2)	×	×	×	×	×		P3	-	-
Menkea draboides	×	×	×	×	2 (unknown)	×	×	×	×	×		P3	-	-
Melaleuca nanophylla	×	×	×	×	×	×	×	×	×	×		P3	-	-
Microcorys macredieana	42 (1,213)	8 (122)	11 (266)	16 (44,145)	71(>30,000)	12 (12)	3 (>5,000)	7 (>30,000)	24	Unknown	Common, abundant, frequent	P3	-	-
Micromyrtus serrulata	×	×	×	×	7 (350)	×	×	×	14	Unknown	Rare, frequent, locally dominant	P3	-	-
Micromyrtus stenocalyx	94 (2017)	11 (147)	×	×	17 (>100,160)		2 (>50,000)	3 (>10,000)	17	>70	Occasional	P3	-	-
Sauropus ramosissimus	×	×	×	×	×	×	×	×	×	×		P3	-	-
Thryptomene nealensis	×	×	×	×	2 (unknown)	×	×	×	×	×		P3	-	-
Comesperma viscidulum	×	8 (25)	2 (9)	×	24 (>20,000)	×	×	×	9	>30	Mostly common	P4	-	-
Daviesia purpurascens	7 (520)	21 (97)	×	13 (22,789)	47 (334)	×	×	×	51	>300	Scattered to frequent to common	P4	-	-
Eucalyptus nigrifunda	×	×	×	×	×	×	×	×	×	×		P4	-	-
Lepidobolus deserti	78 (4,541)	19 (1291)	5 (177)	2 (7)	107 (>100,820)		×	11 (>800,000)	19	>100	Scattered to frequent	P4	-	-
Caesia talinyka ms	61 (668)	×	×	×	7 (87)	×	5 (6,251)	×	×	×		SOI	-	-

* Includes all species found within 200 metres of the central alignment of the proposed road (i.e. ~ 100 metres either side of the central alignment).

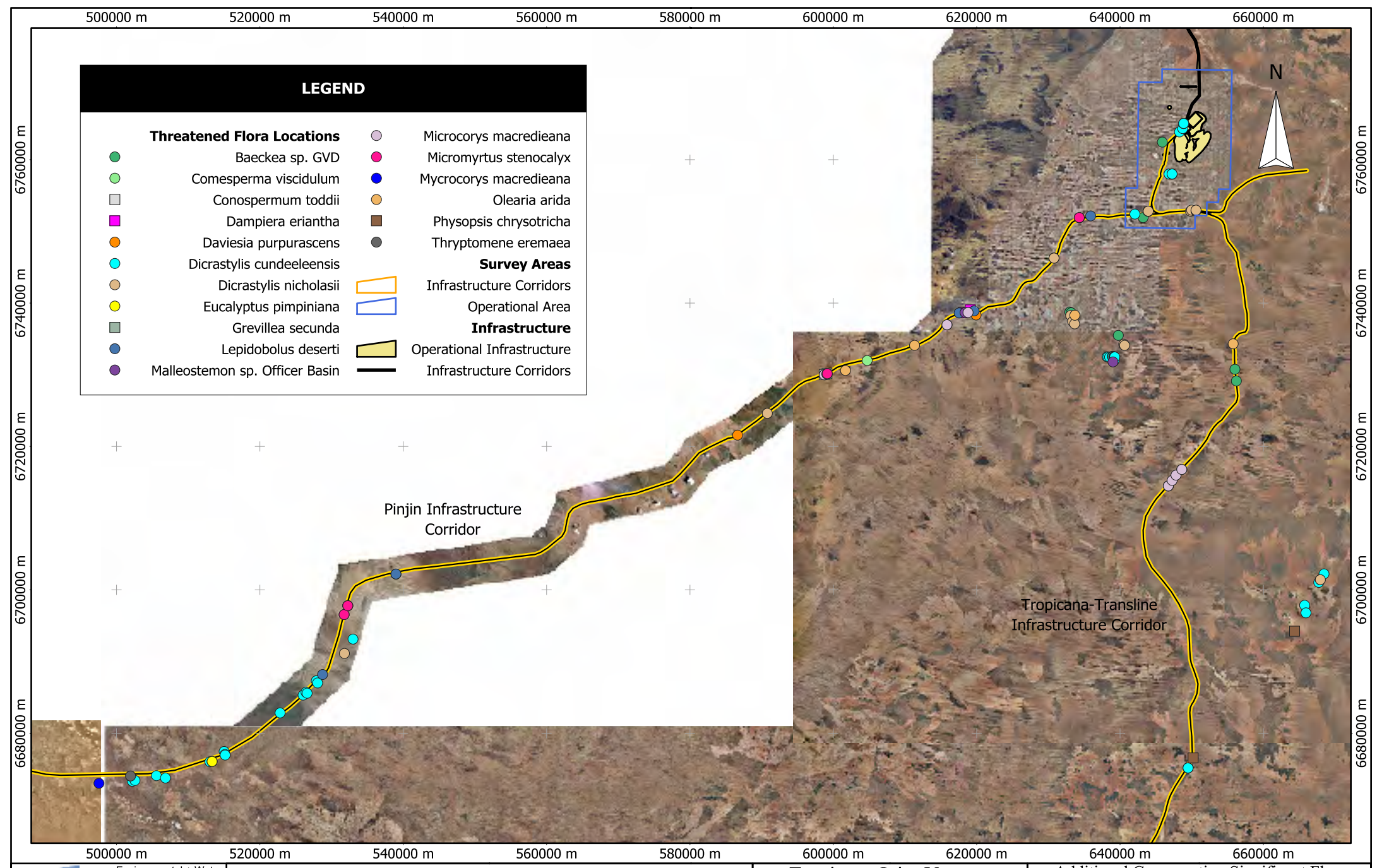
** Includes extrapolated data for the entire borefield survey area.

*** Includes species records from other nearby areas outside the defined survey areas (described above). **Excludes** Queen Victoria Springs Nature Reserve, Plumridge Nature Reserve, Neale Junction Reserve.

The main changes to conservation significant flora species for consideration include additional populations of:

- *Conospermum toddii* (One population located northwest of the Pinjin Infrastructure Corridor).
- *Dampiera eriantha* (Two populations located northwest of the Pinjin Infrastructure Corridor).
- *Baeckea sp.* Great Victoria Desert (16 populations located both within and in the north of the Operational Area, adjacent to the Pinjin Infrastructure Corridor, within the TTIC and midway between both infrastructure corridors).
- *Dicrastylis nicholasii* (14 populations located within the Operational Area, within and adjacent to the Pinjin Infrastructure Corridor and between both infrastructure corridors).
- *Grevillea secunda* (Two populations located in the Pinjin Infrastructure Corridor).
- *Malleostemon sp*. Officer Basin (One population located between the two infrastructure corridors).
- *Olearia arida* (Four populations located within the TTIC, within and adjacent to the Pinjin Infrastructure Corridor and between both corridors.
- *Physopsis chrysotricha* (One population located adjacent to the Pinjin Infrastructure Corridor).
- *Dicrastylis cundeeleensis* (47 populations located within and adjacent to both infrastructure corridor survey areas, within the operational survey area, east of the TTIC and between the infrastructure corridors).
- *Eucalyptus pimpiniana* (One population located adjacent to the Pinjin Infrastructure Corridor).
- *Microcorys macredieana* (11 populations located within and adjacent to the Pinjin Infrastructure Corridor and within the TTIC).
- *Micromyrtus stenocalyx* (Four populations located in the Pinjin Infrastructure Corridor survey area).
- *Comesperma viscidulum* (One population located in the Pinjin Infrastructure Corridor survey area).
- *Daviesia purpurascens* (Three populations located in the Pinjin Infrastructure Corridor).
- *Lepidobolus deserti* (Nine populations located within and adjacent to the Pinjin Infrastructure Corridor survey area and within the TTIC).
- *Thryptomene eremaea* (One population adjacent to the Pinjin Infrastructure Corridor).

The locations of all newly identified populations of conservation significant flora are presented in Figure 1.



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Grid: Australia MGA94 (51)

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Tropicana Joint Venture

Tropicana Gold Project

Additional Conservation Significant Flora Data Surveyed in Spring 2009

Figure 1

W:\Tropicana\Drawings\Flora Maps 2009 07 09.map 22/01/2010 Memorandum Attachment 1

4. Supplementary Residual Impact Assessment

Of the 54 threatened flora species that have the potential to occur in the greater TGP region (MBS Environmental 2009), 14 (thirteen priority species and one species of interest) will be directly impacted by clearing for infrastructure development. No conservation significant flora species additional to those already assessed by MBS Environmental (2009) will be impacted by the project. Table 2 provides a summary of percentage impacts to flora species due to direct clearing of individuals or populations. This incorporates new data from the October 2009 spring survey (Mattiske 2009) and opportunistic recordings, along with survey data presented in the original Conservation Significant Species Report (MBS Environmental 2009).

Due to the large amounts of flora and vegetation data gathered for the TGP proposal, the following process was undertaken to consolidate all this data for the project (MBS Environmental 2009):

- All duplicates were removed.
- GPS points (representing a population) within 100 metres of each other were merged and defined as one population and the sum of plant counts was taken for each point to provide the most accurate measure of plant numbers (all reference to populations are based on merged data).
- The percentage of each species expected to be impacted by the proposed TGP development was derived from dividing the total number of plants identified within the proposed area of disturbance by the sum of all plants recorded in the greater region, including records from:
  - Site specific surveys.
  - FloraBase.
  - Surveys undertaken by Tropicana JV at Neale Junction, Queen Victoria Springs Nature Reserve and Plumridge Lakes Nature Reserve.
  - Surveys undertaken as part of exploration activities and opportunistic sightings.

Actual plant numbers recorded for species of conservation significance in representative quadrats in the Borefield and Pipeline Corridor survey areas were extrapolated to provide a relative estimate of species numbers over the entire Borefield and Pipeline survey area. These extrapolated numbers have been used in Table 2 to estimate impacts to Priority species based on vegetation associations of these species. This method of impact assessment was not applied to other surveyed areas.

Plant counts for Queen Victoria Springs and Plumridge Lake Nature Reserves are also extrapolated based on a surveyed density (plants per square metre) that was applied to the actual estimated area of the population.

It is worth noting that these numbers may over-represent the proportion of plants within the impact area relative to the area outside the impact footprint in some instances, as a more intense survey effort has been directed at these areas than more remote portions of the same survey area. It is likely if the areas surrounding these more remote records were also intensively searched, additional numbers of plants outside the impact footprint would be identified.

Table 2: Summary of Threatened Flora Species Disturbance

Species	TGP Survey Data		Regional Data		Proposed Impact Area Data		% Impact*
	No. of Populations	No. of Plants	No. of Populations/ Records	No. of Plants	No. of Populations/ Records	No. of Plants	
Baeckea sp. Great Victoria Desert	133	815,540	62	460,650	17	5,995	0.47
Dicrastylis nicholasii	374	8,791,331	75	265,608	56	63,221	0.70
Grevillea secunda	19	135	111	20,249	5	27	0.13
Olearia arida	128	547,118	46	2,515	39	3,706	0.67
Acacia eremophila numerous nerved variant	21	731	44	2,978	12	372	10.03
Acacia eremophila var. *variabilis*	3	45	23	159	1	10	4.90
Dicrastylis cundeeleensis	84	9,894	81	8,489	33	4,925	26.79
Eucalyptus pimpiniana	11	554	19	795	2	125	9.27
Microcorys macredieana	74	45,682	117	65,012	7	427	0.39
Micromyrtus stenocalyx	105	2,164	39	160,230	5	29	0.02
Comesperma viscidulum	10	34	33	20,030	12	10	0.05
Daviesia purpurascens	41	23,406	98	634	2	569	2.37
Lepidobolus deserti	104	6,016	137	900,920	3	10	0.001
Caesia talinyka ms	61	668	12	6338	2	31	0.44

*No. Plants in Impact Area / Estimated Regional Count (No. Plants in TGP + No. Plants Regional Data)

The majority of additional conservation significant flora populations identified in the 2009 spring survey and other opportunistic sightings occur outside the areas of proposed infrastructure development (impact area). This has resulted in a reduction in the percentage impact to *Dicrastylis cundeeleensis*. The reduction in percentage impact to *Dicrastylis cundeeleensis* from 46.52 percent (originally predicted in the Conservation Significant Species Report (MBS Environmental 2009)) to the new calculated impact of 26.79 percent, has occurred due to the subsequent identification of an additional 7,900 plants in an area that will not be impacted by the proposed operations.

The 2009 spring survey and other opportunistic recordings have also established additional populations of other conservation significant flora species (as described in Section 3). While this has increased the known number of plants that will not be disturbed by the proposed development, it is not substantial enough to appreciably decrease percentage impact further. All other conservation significant species impacts are below 10.05 percent, with the majority being below one percent.

Conclusions made in the original Conservation Significant Report (MBS Environmental 2009) remain unchanged. It is considered unlikely that the proposed TGP will have a significantly negative impact on the status of any Priority flora species recorded during these additional surveys for the following reasons:

- The majority of Priority flora populations identified are located outside the proposed areas of disturbance.
- Many Priority flora species located in the TGP area are well represented in local Nature Reserves.
- No identified flora species are anticipated to change conservation status to a higher category in the near future.
- It is possible that some species identified in these surveys may be delisted due to improved knowledge gained through the TGP surveys, the high number of specimens identified and the subsequent increases to their known distributions.

If you have any queries relating to the information contained in this memorandum please do not hesitate to contact me on (08) 9226 3166.

Yours sincerely
MBS Environmental

Siobhan West
Environmental Scientist

5. References

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