



Department of
Environment and Conservation

04/13175-02

Your ref:
Our ref: CPS 818/4
Enquiries:
Phone: L Rohl
Fax: 9219 8708
Email:

Neil McCarthy
Southern Gateway Alliance
PO Box 1281
INNALOO WA 6918

Dear Mr McCarthy

RE: CLEARING PERMIT OFFSET PROPOSAL PAGANONI ROAD (CPS 818/4)

Thank you for your offset proposal in regards to the proposed clearing at Paganoni Road. I understand that the clearing is to be undertaken in accordance with CPS 818/4 and that the offset proposal is to comply with Part V of the clearing permit.

I consider that the offset proposal as written on 12 March 2008 is acceptable and is therefore approved.

If you have any queries regarding this decision, please contact Liesl Rohl from the Department's Native Vegetation Conservation Branch on 9334 0333.

Yours sincerely

Keith Claymore
**AI ASSISTANT DIRECTOR
NATURE CONSERVATION DIVISION**

13 March 2008

Att: New Perth Bunbury Highway Project Paganoni Road Upgrade V3- Clearing Permit Offset Proposal

cc: Murray Limb, Environmental Manager, Main Roads WA, PO Box 6202, East Perth 6892.

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DIRECTOR GENERAL AND ENVIRONMENTAL SERVICES DIVISIONS: The Atrium, 168 St Georges Terrace, Perth, Western Australia 6000
Phone: (08) 6364 6500 Fax: (08) 6467 5513 TTY: 1880 555 630

PARKS AND CONSERVATION SERVICES DIVISIONS: Executive: Corner of Australia II Drive and Hackett Drive, Crawley, Western Australia 6009
Phone: (08) 9442 0300 Fax: (08) 9386 1578 Operations: 17 Dick Perry Avenue, Technology Park, Kensington, Western Australia 6151
Phone: (08) 9334 0333 Fax: (08) 9334 0498 TTY: 9334 0546

POSTAL ADDRESS FOR ALL DIVISIONS: Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
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New Perth Bunbury Highway Project

Paganoni Road Upgrade – Clearing Permit Offset Proposal

Section 1: Contact Details

Date: 10/03/08

Purpose permit holder contact person:

Name: Gerry Zoetelief, Project Development Manager, Main Roads Western Australia

Telephone: 9725 5640 or 0148928937

E-mail: gerry.zoetelief@mainroads.wa.gov.au

Environmental specialist contact Person

Name: Neil McCarthy, Environmental Manager, New Perth Bunbury Highway Project

Telephone: 0438532120

E-mail: nmccarthy@ghd.com.au

Environmental specialist qualifications

Bachelor of Science Murdoch University (1991)

16 years experience in the field of environmental impact assessment and environmental management. Experience gained with Main Roads WA and GHD Pty Ltd..

Section 2: Clearing Permit Information

Purpose permit Number: 818/4

Permit holder: Main Roads Western Australia

Purpose of permit: Clearing for project activities including widening of Paganoni Road (refer to Section 1(a) of CPS 818/4). Paganoni Road currently occurs

north of and adjacent to Lot 809 (Paganoni Reserve). The proposed works will upgrade the existing road to improve road safety to support increased traffic flows as a consequence of construction the New Perth Bunbury highway (NPBH).

Land on which clearing is to be done (including number of hectares):

- 1 Paganoni Road reserve (3.08ha) zoned Other Regional Road under the Metropolitan Region Scheme.
- 2 Lot 809 (0.34 ha) located to the south of the road reserve for re-instatement of DEC fire access track. Lot 809 is owned freehold by the Western Australian Planning Commission and zoned Parks and Recreation under the MRS.

Section 3: Assessment of application against Clearing Principles

Variation with Clearing Principles

The clearing is considered to be within an environmentally sensitive area in respect to it being adjacent to and within a Bush Forever site and in within the 50m buffer of a conservation category wetland (Paganoni Swamp).

DEC correspondence of January 29, 2008 raised the following issues in respect to the proposed clearing. SGA's response is included for reference below.

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

SGA believes that this proposal may be at variance with this principle, which deals with significant habitat for fauna. However, the impact on this habitat has been significantly reduced in size from the original proposal following extensive stakeholder consultation and redesign works. The original impact comprised a total of 7.1 hectares of clearing for roadworks and the reinstatement of a fire access track within Paganoni Reserve. In the final design, this has now been reduced to a total of 3.42 hectares, a reduction of 3.68 hectares. Plans showing the reduction in clearing achieved during this design refinement process are attached as Figure 3.

In addition, the clearing area is immediately adjacent to Lot 809 (Paganoni Reserve), which comprises 697 ha of suitable alternative habitat for fauna species. The total clearing area for the Paganoni Road works represents less than 0.5% of this habitat and as such, it is considered unlikely that this level of clearing will have any significant impact on indigenous fauna habitat.

The area around Paganoni Road is a known habitat for conservation significant cockatoo species. However, a targeted survey of mature trees to be cleared indicated that no active nesting trees for these species will be impacted by the proposed clearing. These surveys were conducted in January and February, 2008 by SGA and DEC personnel and included an assessment of potential nesting hollows by a cherry picker at each tree.

Edge effects on the reserve are an existing impact / potential impact on the reserve. Clearing for roadworks will not exacerbate the potential edge effect.

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

SGA believes that the clearing required to upgrade Paganoni Road may be at variance to this principle due to the proximity of Paganoni Swamp and Paganoni Reserve, and also the clearing of 0.34 hectares within Lot 809 (Paganoni Reserve) to reinstate the fire access track for DEC. In recognition of this, Main Roads will request an amendment to the MRS to re-zone 4ha of land currently zoned Primary Regional Road, that is surplus to Main Roads requirement for the New Perth Bunbury Highway, to Parks and Recreation, and the inclusion of this land into the adjacent Lot 809 (Paganoni Reserve) and Bush Forever Site 394

Following redesign of the works, the clearing impact on the Paganoni Swamp buffer has been minimised, with approximately 3m of vegetation being



cleared from the existing edge of disturbance to the new edge of clearing. The buffer to this Conservation Category Wetland has thus been reduced from approximately 41m to 38m. The majority of this clearing to the north of Paganoni Swamp consists of highly degraded vegetation associated with Stock Road.

In addition, road drainage has been designed to minimise impacts on the environment, including Paganoni Swamp, by steepening cut and fill batters to the minimum for road safety and by the use of kerbing in the vicinity of Paganoni Swamp to avoid the requirement for roadside drains.

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora.

SGA believes that this proposal is not at variance with this principle, given that a targeted flora survey has shown that clearing will not impact on conservation significant species.

Flora surveys conducted by ecologists from GHD in spring 2004 and spring 2007 did not locate any Declared Rare Flora, priority listed flora or Threatened Ecological Communities within the proposed clearing area for the road upgrade.

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

SGA believe that these works are not at variance with this principle, as modifications to drainage have been made to minimise hydrological impacts by ensuring that there is no direct run-off from Paganoni Road into either Paganoni Swamp or a 50m buffer of the swamp.

As discussed under principle (h) above, the clearing impact to the north of Paganoni Swamp is minimal, with approximately 3m of vegetation being cleared from the existing edge of disturbance to the new edge of clearing. The buffer to this Conservation Category Wetland has thus been reduced from approximately 41m to 38m. The majority of the clearing required to the north of Paganoni Swamp consists of highly degraded vegetation associated with Stock Road.

In addition, DEC correspondence raises the issue of Paganoni Swamp and adjacent areas being registered on the Register of the National Estate (RNE), under the provisions of the Australian Heritage Council Act 2003. Places listed on the RNE may be afforded protection from an action under the Environmental Protection and Biodiversity Conservation Act (1999) only if the Commonwealth Government owns the place and / or the Commonwealth Government or one of its agencies take the action. No other statutory protection is currently afforded to places listed on the RNE. SGA has attempted through revision of the project design to minimise the impact of roadworks on this heritage asset. Much of the degradation associated with the intersection of Stock and Paganoni Roads in the Paganoni Swamp buffer area is the result of informal parking arrangements in this area. SGA, in consultation with DEC, have designed a small, formal parking area in a completely degraded area to ensure that this situation is controlled into the future.

Impact of clearing on the environment:

As noted above, the clearing proposed comprises 3.08 ha of the Paganoni Road reserve, and 0.34 ha of Bush Forever site 395 (Lot 809) for the re-instatement of the DEC existing fire access track. Site vegetation surveys described in the following section have shown that the site vegetation condition varies from Vegetation Condition Rating 3 to 5-6, essentially as a consequence of existing weeds at the site and previous disturbance by human activities.

Section 4: Developing the Offset Proposal

Describe the vegetation in the site to be cleared:

The vegetation to be impacted and its condition rating was mapped in spring 2007 and is detailed below. The vegetation mapping is shown on the attached Figure 2.

Major Vegetation System Associations within the Project Area (after Shepherd, 2005).

Vegetation Association	Description	Pre-European Extent (ha)	Current Extent (ha)	% Remaining
998	Medium woodland; tuart	51017.996	21178.011	41.5
1001	Medium vary sparse woodland; jarrah, with low woodland; banksia and Casuarina	57412.897	15241.705	26.5

A more accurate assessment of regional vegetation was undertaken by Heddle, *et al.* (1980). Vegetation complexes within the survey area are indicated in the table below.

Vegetation Complex Extent, Type and Status

Vegetation Complex	Description	Location	Pre-European Extent (ha)	Current Extent (ha) in System 6 area	% Remaining
Karrakatta Complex – Central and South	Predominantly open forest of <i>Eucalyptus gomphocephala</i> – <i>E. marginata</i> – <i>Corymbia calophylla</i> and woodland of <i>Eucalyptus marginata</i> – <i>Banksia</i> spp.	West end	49,912	14,729	29.5
Cottesloe Complex – Central and South	Mosaic of woodland of <i>E. gomphocephala</i> and open forest of <i>E. gomphocephala</i> – <i>E. marginata</i> – <i>C. calophylla</i> ; closed heath on the limestone outcrops.	West end	44 995	18 474	41.1
Yoongarillup Complex	Woodland to tall woodland of <i>Eucalyptus gomphocephala</i> with <i>Agonis flexuosa</i> in the second storey. Less consistently and open woodland of <i>E. gomphocephala</i> – <i>E. marginata</i> – <i>Corymbia calophylla</i> .	East	24,767	11,140	45.0

Commonly listed flora species observed in site surveys are listed in Attachment 1.

The vegetation within the site is summarised in the table below.

Description and Condition of Vegetation Within Survey Area

Vegetation Type	Description	Vegetation Condition Rating	Equivalent Vegetation Complex
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1	Cleared areas including: area of rehabilitation at the western end of the survey area vegetation dominated by weeds; and all roads and tracks	5-6	n/a
2	<i>Eucalyptus gomphocephala</i> , <i>Banksia attenuata</i> , <i>B. grandis</i> woodland	3	Karrakatta – Central and South
3	<i>Eucalyptus gomphocephala</i> , <i>Banksia littoralis</i> tall woodland	3-5	Karrakatta – Central and South
4	<i>E. marginata</i> , <i>B attenuata</i> , <i>B menziesii</i> , <i>B. illicifolia</i> , <i>Xylomelum occidentale</i> , <i>Allocasuarina fraseriana</i> low woodland with scattered <i>E. gomphocephala</i> towards west of eastern area	3-5	Yoongarillup

Describe the proposed offset site prior to revegetation (location, area, species composition) and why it is suitable to offset the vegetation that will be lost due to the above clearing:

As discussed under principle (h) above, the direct offset of providing an additional 4.0 ha of surplus NPBH road reserve zoned as Primary Regional Road for addition to Paganoni Reserve is proposed. The land proposed for addition to Paganoni Reserve has the following environmental attributes:

- ▶ Vegetation Condition Rating of 2 (excellent)
- ▶ Includes 2.35 ha of potential habitat for the DRF species *D. elastica*

SGA considers the proposed rezoning and re-vesting of the 4.0 ha of land zoned Primary Regional Road for inclusion into Paganoni reserve to be a suitable offset as it provides an overall environmental benefit in securing 4.0 ha of excellent vegetation (Condition Rating 2) to offset 3.42 of lesser quality vegetation (Condition Rating 3 to 5-6.).

Secondary offsets proposed include:

1. The fencing of the road reserve with fauna exclusion fence (based on DEC design) to minimise fauna roadkills on Paganoni Road, and exclude the movement of exotic animal species into the Paganoni Reserve. This fence will also restrict unauthorised public access by persons, horses, vehicle and motorcycles to Paganoni Reserve from Paganoni Road. Unauthorised access is currently a management issues for DEC. The fence will also be constructed with gates as per Dec requirement for fire management activities within Paganoni Reserve.
2. The proposed provision of informal parking facilities at Stock Road, as requested by DEC Regional Parks Unit, will provide a better managed parking facility than is currently available at Paganoni Reserve for organized and managed visitation.
3. Main Roads has made significant contribution to the knowledge base in regard to the *D. elastica* populations within Paganoni Reserve by extensive ground survey comprising some 70 man day targeted flora searches. These surveys have identified 88.2 ha



of previously unknown habitat suitable for *D. elastica* and an additional 2551 *D. elastica* plants.

Description of the process of achieving the offset and what you expect the offset will consist of when complete:

Main Roads will request an amendment to the MRS to re-zone 4.0ha of land currently zoned Primary Regional Road, that is surplus to Main Roads requirement for the New Perth Bunbury Highway, to Parks and Recreation, and the inclusion of this land into the adjacent Lot 809 (Paganoni Reserve) and Bush Forever site 394.

At completion the direct offset will provide an additional 4.0 ha of land into the Paganoni Reserve.

The secondary offsets once implemented will assist DEC in providing improved management of the Paganoni Reserve.

Section 5: Verification that all Twelve Offset Principles have been Addressed

1. Direct offsets should directly counterbalance the loss of native vegetation.

The proposed inclusion of 4.0ha of excellent quality vegetation will more than counterbalance the loss of native vegetation cleared for the road upgrade.

2. Contributing offsets should complement and enhance the direct offset.

The contributing offsets complement the direct offset. Main Roads will fund the construction of fauna fencing on the southern road reserve. This will assist DEC to manage Paganoni Reserve in the long term by limiting uncontrolled access to the site by people, halting the movement of feral animals into the reserve and minimising the impact of fauna roadkills from increased traffic on Paganoni Road.

Similarly the construction of an informal parking bay as proposed at Stock Road and requested by DEC Regional Parks Unit will provide a safe off-road parking area and assist in managing site access.

The extensive *D. elastica* surveys conducted by Main Roads and SGA in the local area have significantly increased the knowledge base of this DRF species. In addition, although **not** to be considered part of this offset proposal Main Roads has agreed to fund a Threatened Species Research project through the Botanic Parks and Gardens Authority to the sum of in excess of \$400 000.

3. Offsets are implemented only once all avenues to avoid, minimise, rectify or reduce environmental impacts have been exhausted.

The clearing impact of the proposed works has been significantly reduced through revision of the project design. The initial clearing area for the Paganoni Road upgrade was estimated to be 5.6 hectares for earthworks, with an additional 1.5 hectares for a fire access track within Paganoni Reserve. Following refinement of the design prior to and post the stakeholder consultation process, the clearing areas have been reduced to 3.08 ha for earthworks and 0.34 hectares for the fire access track. In addition, of forty significant trees discussed during a stakeholder site visit as being at risk from clearing, twenty-six have been retained in the final design.

4. The environmental values, habitat, species ecological community, physical area, ecosystem, landscape and hydrology of the offset should be the same as, or better than, that of the area of native vegetation being offset.

The 3.42 ha to be cleared varies in condition from degraded / completely degraded to very good. The site surveys have shown that species of invasive weeds do occur within the proposed clearing area. The proposed revegetation of areas disturbed by roadworks will occur within the same landform as the clearing area utilising species that currently occur within the site.

5. A ratio greater than 1:1 should be applied to the size of the area of native vegetation that is offset to compensate for the risk the offset may fail.

The proposed offset of land to be re-vested into Paganoni Reserve is 17% greater than a 1:1 ratio, with 4.0 ha of excellent quality vegetation proposed against 3.42 ha of clearing.



6. Offsets must entail a robust consistent assessment process.

The impact assessment of the Paganoni Road upgrade and the Paganoni section of the NPBH was conducted by experienced professionals from SGA and GHD. The proposed offsets have been developed by Main Roads and SGA and relevant stakeholders. These organisations and the individuals involved are considered suitable professionals in their fields.

7. In determining an appropriate offset, consideration should be given to ecosystem function, rarity and type of ecological community, vegetation condition, habitat quality and area of native vegetation cleared.

The impact of the road upgrade will not impact on any Declared Rare Flora, priority flora or Threatened Ecological Communities. The vegetation associations to be impacted by the works are not considered to be regionally threatened and the clearing impact comprises less than 0.5% of Lot 809 (Paganoni Reserve).

The direct offset is considered to have better ecosystem function, has better condition vegetation and habitat quality, and is greater in area than the land to be cleared.

8. The offset should either result in no net loss of native vegetation, or lead to a net gain in native vegetation and improve the condition of the natural environment.

The proposed revegetation offset will result in a net gain of native vegetation of 0.58 hectares.

9. Offsets must satisfy statutory requirements.

The appropriate licenses are required for all seed suppliers to the NPBH project. No other legislative approval conditions are considered relevant to this project as it has been formally assessed by the EPA and determined not to require formal assessment.

Ongoing liaison with DEC Regional Parks Unit during the road upgrade will be conducted by site environmental personell.

10. Offsets must be clearly defined, documented and audited.

The proposed offsets are considered to be clearly defined and documented:

- ▶ The area of land shown at Figure 4 will be supported for rezoning and re-vesting into the adjacent Paganoni Reserve.
- ▶ Fauna fencing along the length of the roadworks on the southern side of Paganoni Road.
- ▶ *Parking bay construction as agreed with DEC – Regional Parks Unit.*
- ▶ *D. elastica* surveys have been completed and the results of these surveys provided to DEC Species and Communities Branch.

These offsets will be assessed and reported in line with Part VI of Main Roads Clearing Permit CPS 818/4.

11. Offsets must be long term (10-30 year) benefit.

The land proposed for re-vesting is identified as Primary Regional Road under the MRS. The rezoning to Parks and Recreation and handover to DEC will secure this vegetation in the long term.

The proposed fauna fencing and informal parking bay will be constructed by Main Roads and SGA. There longer term maintenance will be the responsibility of DEC as managers of Paganoni Reserve.

The *D elastica* surveys have been completed.

12. An environmental specialist must be involved in the design, assessment and monitoring of offsets.

Officers from the following organizations have been involved in the development of the assessment and offset package:

- ▶ Main Roads WA – offset package, monitoring of offset
- ▶ Southern Gateway Alliance – community consultation, landscaping and rehabilitation design and works, document preparation
- ▶ GHD – site flora surveys and vegetation assessment, and
- ▶ DEC – fauna fence design

Section 7: Commitments and Consultation

Monitoring Commitment:

The offset will be incorporated into the reporting requirements by Main Roads as detailed in Part VI of Clearing Permit CPS 818/4.

Management Commitment:

Agencies consulted and submissions received:

As per CPS 818/4 SGA has consulted with the following agencies regarding the Paganoni Road Upgrade:

- DEC Rockingham Regional Parks Unit
- DEC vegetation protection Branch
- City of Rockingham
- Commissioner for Soil and Land Conservation
- Department of Water
- Conservation Council of Western Australia, and
- Friends of Paganoni Swamp

Details of the responses of these stakeholders are included in the Paganoni Road Stakeholder Report previously issued to DEC. A copy is attached as an attachment for reference.



Section 8 Supporting Documentation

Refer to the following documents attached:

- ▶ Paganoni Road Locality Plan
- ▶ Paganoni Rd Upgrade Vegetation Mapping
- ▶ Primary Regional Road for re-vesting into Paganoni Reserve
- ▶ Paganoni Road Vegetation Species List
- ▶ Paganoni Road Upgrade Revegetation and Landscape Plan
- ▶ Paganoni Road Stakeholder Report



Figure 1

Paganoni Road Locality Plan



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- Proposed NPBH Alignment - CHD - 20080204
- Cadastral - MFWA(Landgate) - 200711
- Metropolitan Region Scheme - DPI - 200712
 - Primary Regional Roads
 - Other Regional Roads
- Parks & Recreation
- Railways
- Rural
- Urban
- Urban Deferred

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SCALE



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LOCALITY MAP



PERTH - SOUTH METRO

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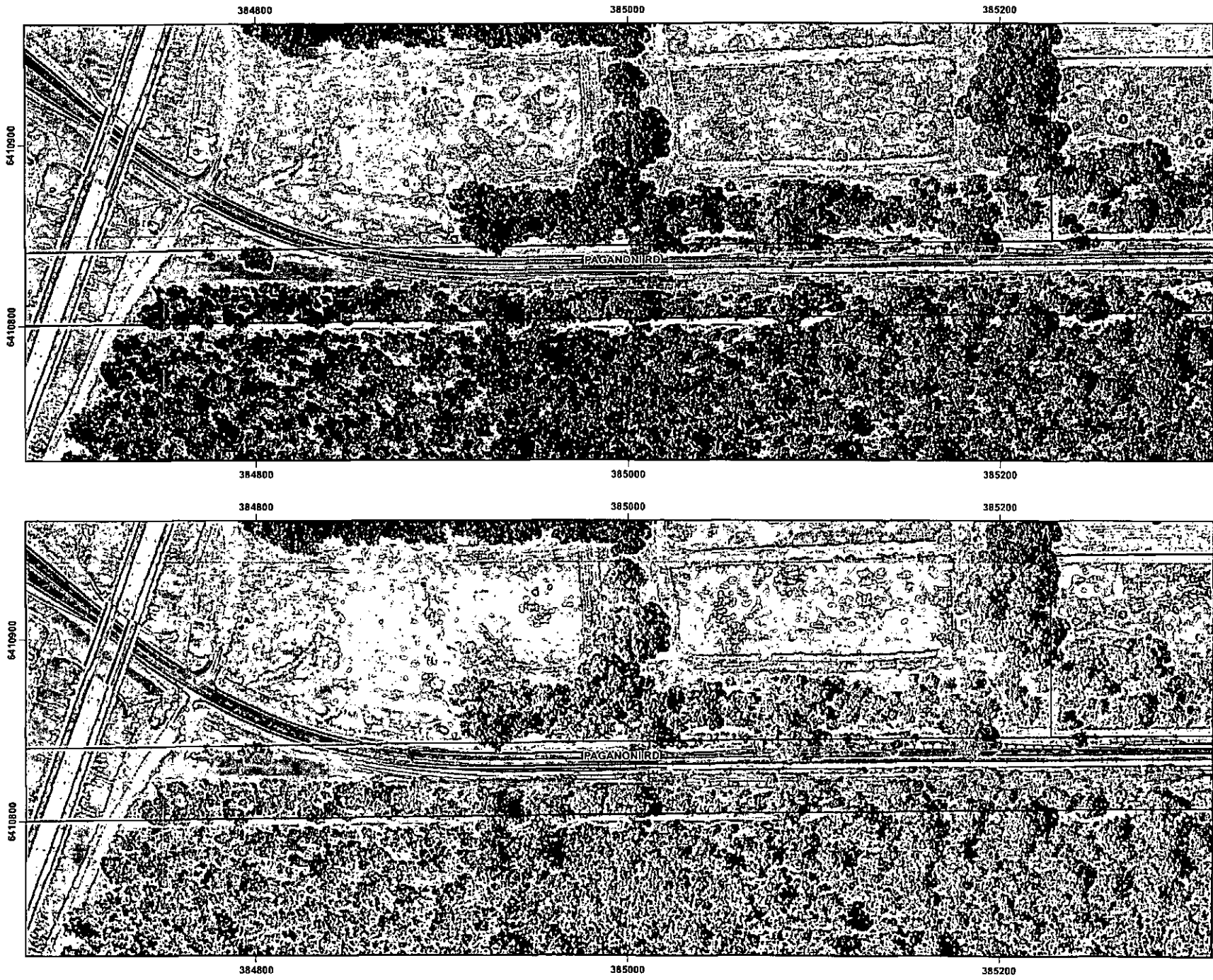
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NEW PERTH - BUNBURY HIGHWAY

Locality Plan
Paganoni Road



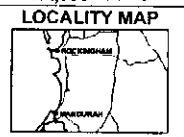
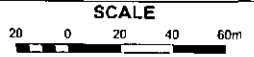


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- Proposed NPBH Alignment
- New Design - GHD - 20080204
 - Old Design - GHD - 20080123
- Cocastre - MIRWA - 200703
- New Design
 - Old Design
- Fire Track Clearing Requirements - GHD - 20080204
- New Design
 - Old Design

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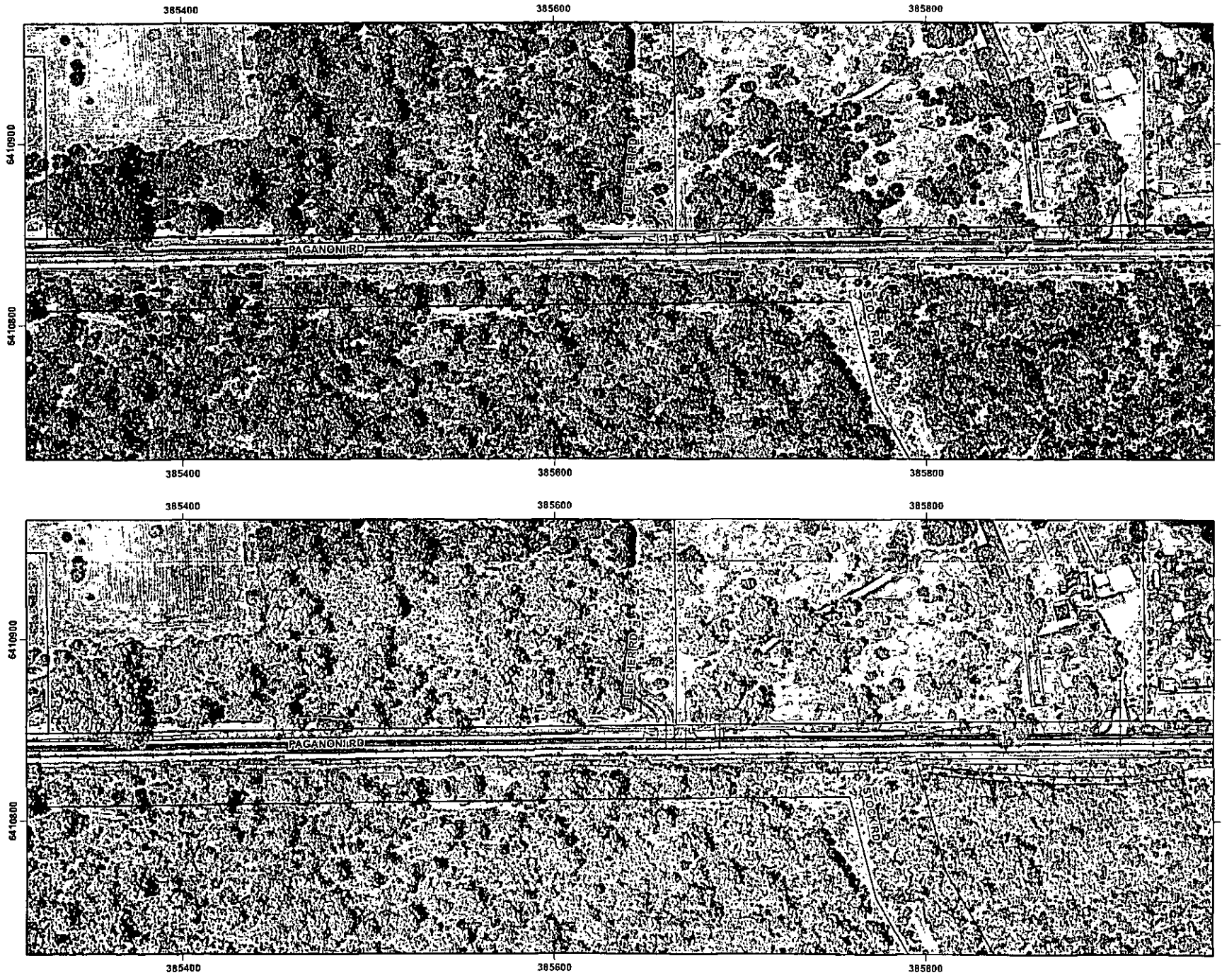
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NEW PERTH - BUNBURY HIGHWAY
PAGANONI ROAD

Figure 1 - Sheet 1
Comparison of Clearing Impacts

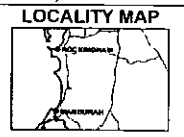
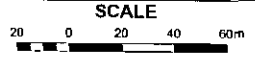


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- Proposed NPBH Alignment
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 - ▭ Cadastre - MRWA - 200703
- Fire Track Clearing Requirements - GHD - 20090204
- ▭ New Design
 - ▭ Old Design

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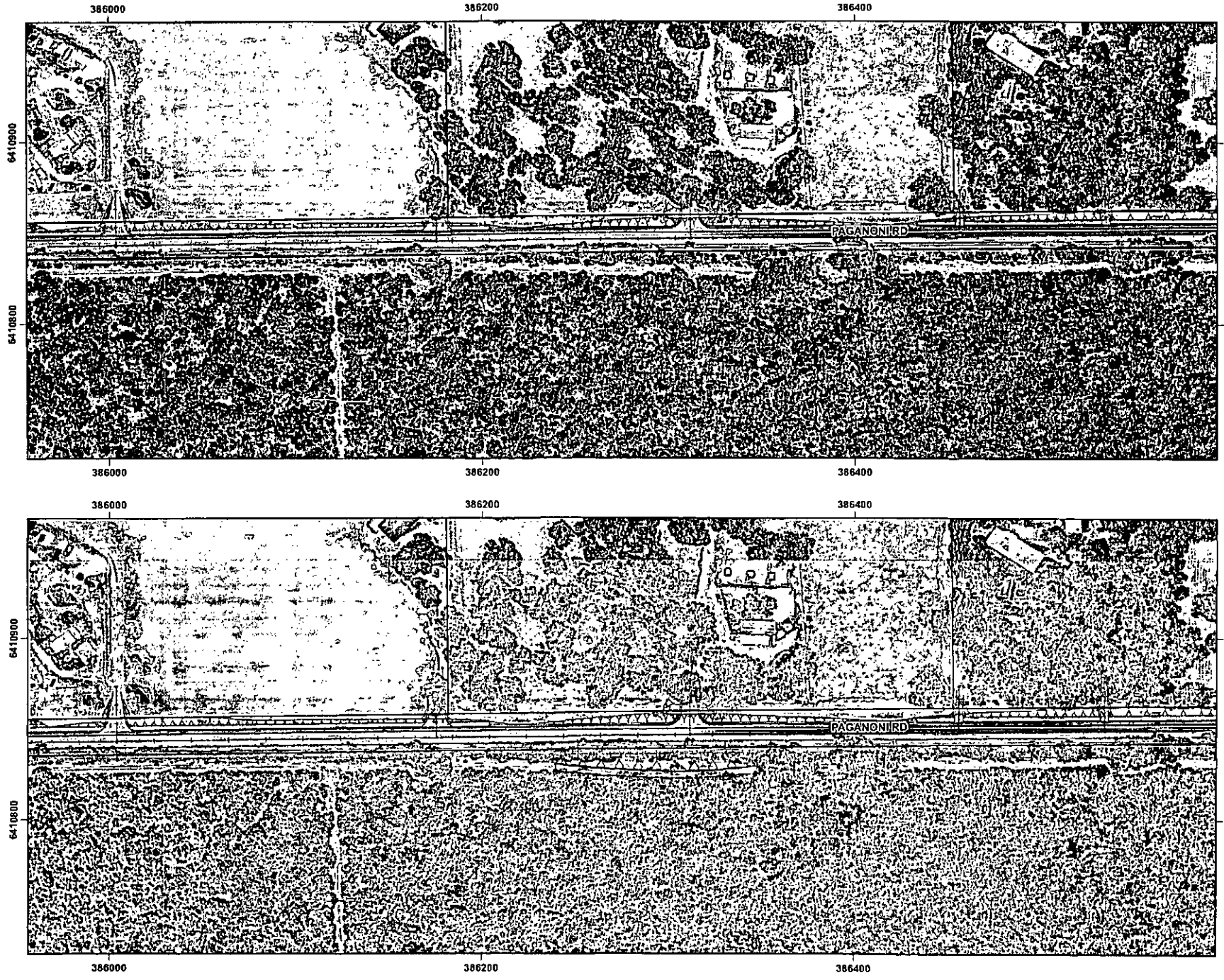
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NEW PERTH - SUNBURY HIGHWAY
PAGANONI ROAD

Figure 1 - Sheet 2
Comparison of Clearing Impacts

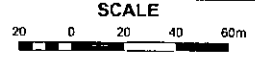


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- Proposed NPBH Alignment
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 - - - Old Design - GHD - 20080123
- Fire Track Clearing Requirements - GHD - 20080204
- New Design
 - Old Design

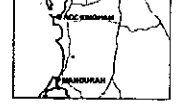
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LOCALITY MAP



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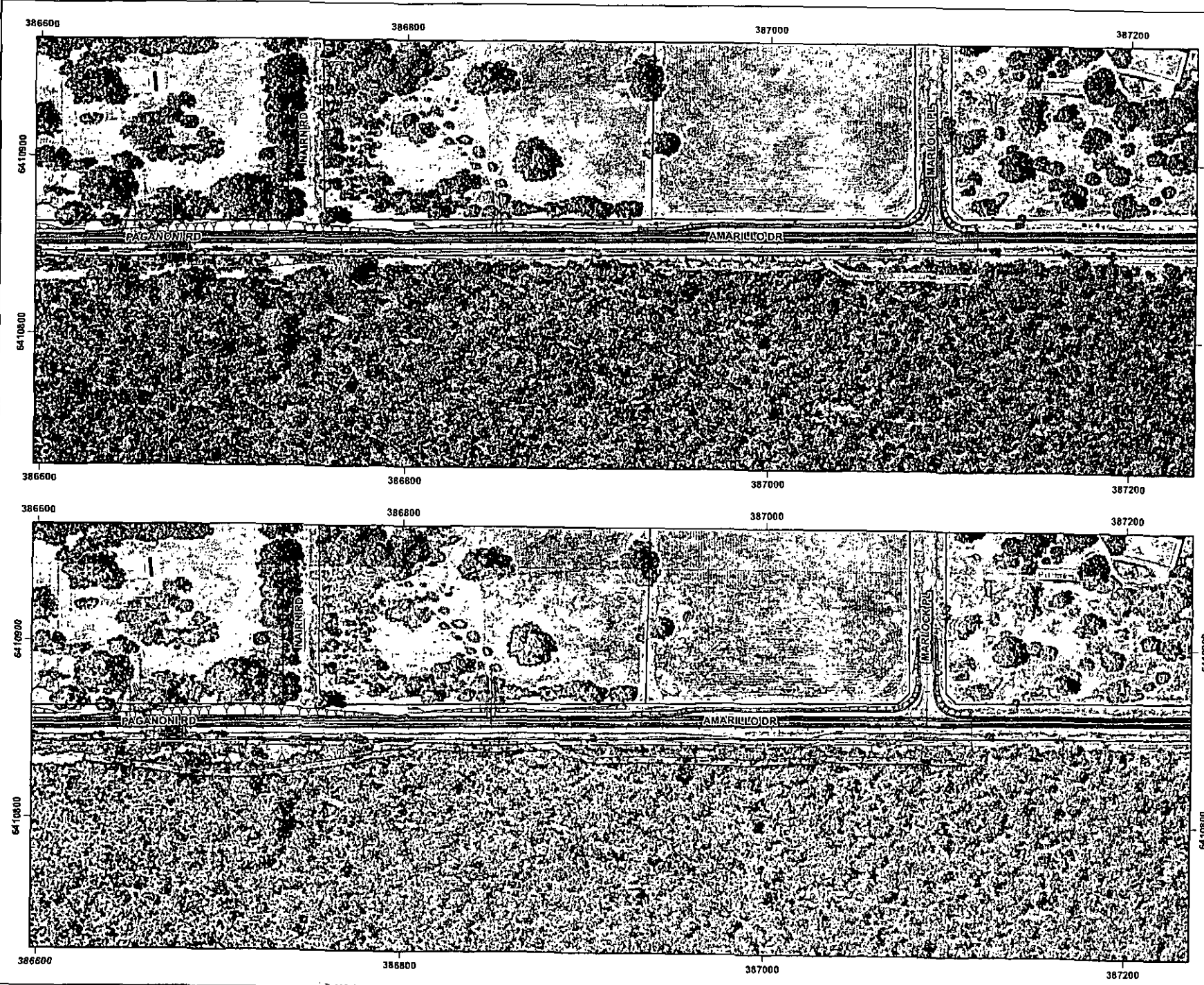
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**NEW PERTH - SUNBURY HIGHWAY
PAGANDJI ROAD**

Figure 1 - Sheet 3
Comparison of Clearing Impacts

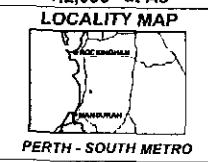
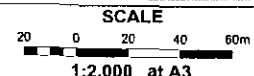


LEGEND

- Proposed MPBH Alignment
- New Design - GHID - 20080204
 - - - Old Design - GHID - 20080123
 - Cadastre - MRWA - 200703
- Fire Track Clearing Requirements - GHID - 20080204
- New Design
 - Old Design

COPY

NOTE THAT POSITIONAL ERRORS CAN BE ± 3M IN SOME AREAS
AERIAL PHOTOGRAPHY DATED DEC 2008 SOURCED FROM MRWA MAY 2007



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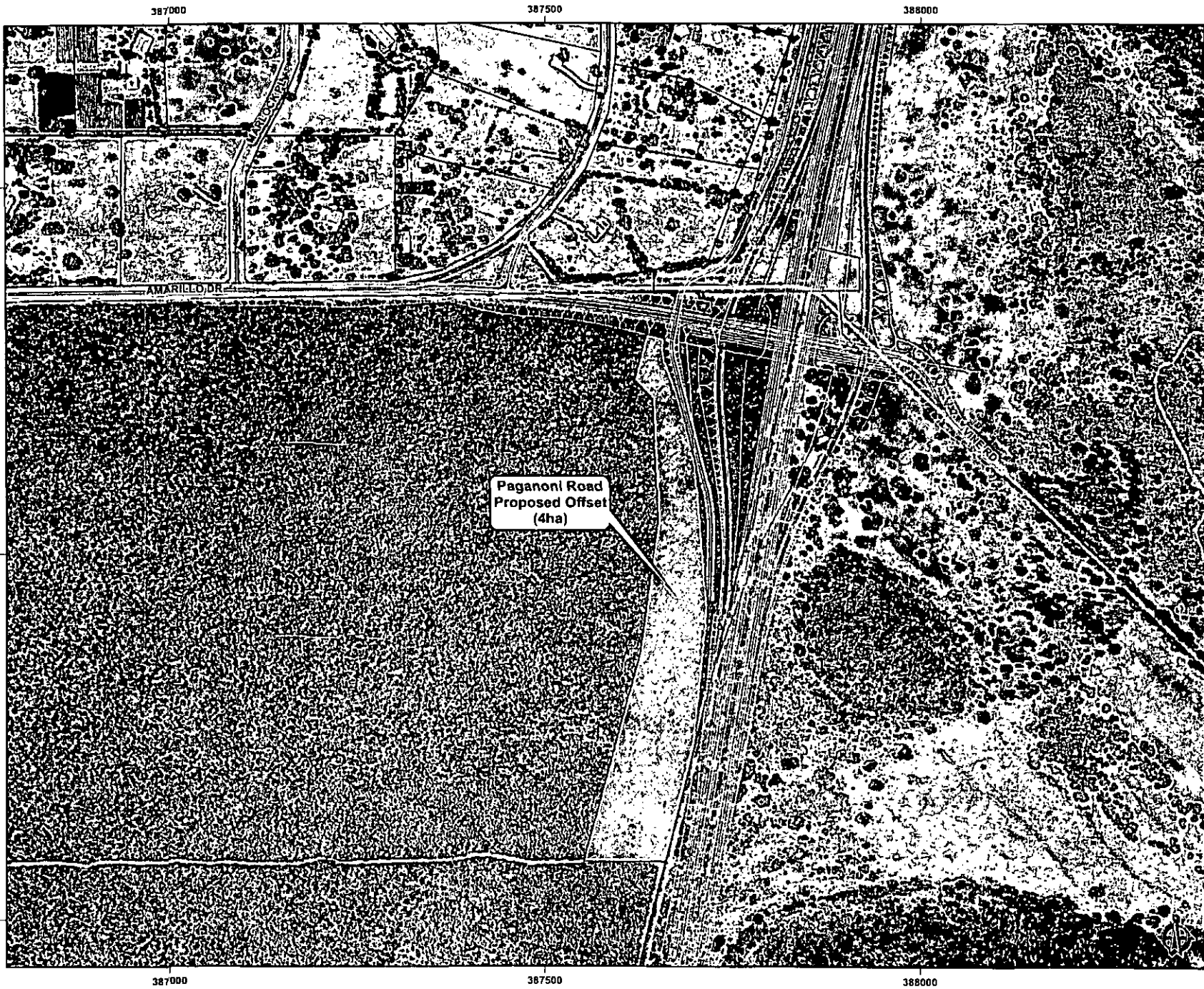
NEW PERTH - BUNBURY HIGHWAY
PAGANONI ROAD

Figure 1 - Sheet 4
Comparison of Clearing Impacts



Figure 3

Paganoni Road Design Sowing Reduction in Clearing Area.

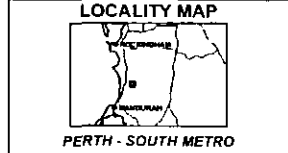
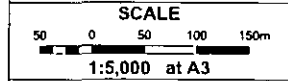


LEGEND

- Proposed NPBH Alignment - GHD - 20080204
- Cadastre - MRWA(Landgate) - 200711
- Proposed Offset - GHD - 20080310



Note: This document refers to a 1:5,000 scale drawing.
 Details within include all relevant data where available.
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NEW PERTH - BUNBURY HIGHWAY
 Figure 4
 Paganoni Road Proposed Offset

Full list of flora species observed during the 2007 survey

Family	Genus	Species	Common Name	Status	2007 – west end	2007 – east end
Aizoaceae	Carpobrotus	edulis	Pigface	*	x	x
Amaranthaceae	Ptilotus	drummondii	Narrowleaf Mulla-mulla			x
Anthericaceae	Caesia	micrantha	Pale Grass-Lily		x	x
Anthericaceae	Chamaescilla	corymbosa	Blue Squill			x
Anthericaceae	Sowerbaea	laxiflora	Purple Tassels		x	x
Anthericaceae	Thysanotus	arenarius				x
Anthericaceae	Thysanotus	manglesianus	Fringed Lily			
Anthericaceae	Thysanotus	occidentalis				
Anthericaceae	Tricoryne	elator	Yellow Autumn Lily		x	
Apiaceae	Eryngium	pinnatifidum	Blue Devils		x	x
Apiaceae	Foeniculum	vulgare	Fennel	*	x	
Apiaceae	Trachymene	pillosa	Native Parsnip			x
Asphodelaceae	Asphodelus	fistulosus	Dune Onion Weed	*	x	
Asphodelaceae	Trachyandra	divaricata	Onionweed	*	x	x
Asteraceae	Arctotheca	calendula	Capeweed	*	x	x
Asteraceae	Carduus	pycnocephalus	Slender Thistle	*		x
Asteraceae	Dimorphotheca	ecklonis	Veldt Daisy	*	x	
Asteraceae	Hyalosperma	cotula				



Asteraceae	Hypochaeris	spp.		*	x	x
Asteraceae	Hypochaeris	glabra	Flatweed	*		
Asteraceae	Lagenophora	huegelii				x
Asteraceae	Leucophyta	brownii		+	x	
Asteraceae	Olearia	axillaris	Coastal Daisy Bush		x	x
Asteraceae	Podolepis	gracilis	Slender Podolepis		x	x
Asteraceae	Senecio	pinnatifolius	Groundsel		x	
Asteraceae	Sonchus	oleraceus	Common Sowthistle	*	x	x
Asteraceae	Urospermum	picroides	False Hawkbit	*	x	x
Asteraceae	Ursinia	anthemoides	Ursinia	*	x	x
Brassicaceae	Brassica	tournefortii		*		x
Brassicaceae	Heliophila	pusilla		*	x	x
Brassicaceae	Raphanus	raphanistrum	Wild Radish	*	x	x
Brassicaceae	Sisymbrium	irio	London Rocket	*	x	x
Campanulaceae	Wahlenbergia	capensis	Cape Bluebell	*		x
Caryophyllaceae	Cerastium	glomeratum	Mouse Ear Chickweed	*		x
Caryophyllaceae	Polycarpon	tetraphyllum	Fourleaf Allseed	*	x	
Caryophyllaceae	Petrorhagia	dubia		*	x	
Caryophyllaceae	Silene	gallica	French Cattle	*	x	
Casuarinaceae	Allocasuarina	fraseriana	Sheoak		x	x
Chenopodiaceae	Chenopodium	album	Fat hen	*	x	

Chenopodiaceae	Rhagodia	baccata	Berry Saltbush		x	x
Colchicaceae	Burchardia	congesta	Milkmaids		x	x
Crassulaceae	Crassula	alata		*	x	x
Crassulaceae	Crassula	glomerata		*	x	
Cucurbitaceae	Cucumis	myriocarpus	Prickly Paddy melon	*	x	
Cyperaceae	Cyperus	tenellus	Tiny Flat Sedge	*	x	
Cyperaceae	Ficinia	nodosa	Knotted Club Rush		x	
Cyperaceae	Lepidosperma	squamatum			x	x
Cyperaceae	Lepidosperma	scabrum			x	
Cyperaceae	Mesomelaena	pseudostygia	Semaphore Sedge		x	x
Cyperaceae	Schoenus	grandiflorus	Bog Rush		x	
Dasypogonaceae	Acanthocarpus	preissii				x
Dasypogonaceae	Dasypogon	bromeliifolius	Pineapple Bush			x
Dasypogonaceae	Lomandra	nigricans				x
Dasypogonaceae	Lomandra	preissii	Preiss' Matt Rush		x	
Davilliaceae	Nephrolepis	cordifolia	Fishbone Fern	*	x	
Dilleniaceae	Hibbertia	hypericoides	Guinea Flower		x	x
Dilleniaceae	Hibbertia	subvaginata				x
Droseraceae	Drosera	?erythrorhiza				x
Droseraceae	Drosera	pallida				x
Droseraceae	Drosera	porrecta	Leafy Sundew		x	x

Epacridaceae	Leucopogon	propinquus			x	
Euphorbiaceae	Adriana	quadripartita	Bitterbush		x	
Euphorbiaceae	Euphorbia	peplus	Petty Spurge			x
Euphorbiaceae	Euphorbia	terraccina	Geraldton Carnation Weed	DP	x	x
Euphorbiaceae	Ricinus	communis	Castor Oil Pant	*	x	
Fumariaceae	Fumaria	capreolata	Whiteflower Fumaria	*	x	
Fumariaceae	Fumaria	muralis	Wall Fumitory	*	x	x
Geraniaceae	Erodium	botrys	Long Storksbill	*	x	x
Geraniaceae	Erodium	cicutarium	Storksbills	*	x	x
Geraniaceae	Erodium	moschatum	Nusky Storksbill	*	x	
Geraniaceae	Pelargonium	capitatum	Rose Pelargonium	*	x	x
Goodeniaceae	Scaevola	canescens	Grey Scaevola			x
Haemodoraceae	Conostylis	aculeata				x
Haemodoraceae	Conostylis	? Canescens			x	
Iridaceae	Gladiolus	caryophyllaceus	Wild Gladiolus	*		x
Iridaceae	Moraea	flaccida	One-leafed Cape Tulip	*DP	x	
Iridaceae	Romulea	rosea var australis	Guildford grass	*	x	x
Iridaceae	Romulea	rosea var communis		*		x
Malvaceae	Malva	parviflora	Marshmallow	*	x	
Mimosaceae	Acacia	cyclops	Coastal Wattle		x	x
Mimosaceae	Acacia	iteaphylla	Flinders Ranges Wattle	*	x	x



Mimosaceae	Acacia	pulchella var. glaberrima	Prickly Moses		x	x
Mimosaceae	Acacia	saligna	Coojong		x	x
Myrtaceae	Agonis	flexuosa	Peppermint		x	
Myrtaceae	Eucalyptus	gomphocephala	Tuart		x	x
Myrtaceae	Kunzea	glabrescens	Spearwood			x
Myrtaceae	Kunzea	recurva				x
Myrtaceae	Leptospermum	laevigatum	Victorian Tea-tree	*	x	
Myrtaceae	Melaleuca	huegelii	Chenille Honeymyrtle	+	x	
Myrtaceae	Melaleuca	systema			x	
Oleaceae	Olea	europea		*	x	x
Onagraceae	Oenothera	stricta	Evening Primrose	*	x	
Orchidaceae	Caladenia	spp.				x
Orchidaceae	Diuris	corymbosa	Common Donkey Orchid			x
Orchidaceae	Microtis	media	Mignonette orchid		x	x
Orchidaceae	Pterostylis	aff. nana	Snail Orchid			x
Orchidaceae	Pterostylis	spp.				x
Orobanchaceae	Orobanche	minor	Lesser Broomrape	*		x
Oxalidaceae	Oxalis	pes-caprae	Oxalis	*	x	x
Papilionaceae	Daviesia	divaricata	Marno		x	
Papilionaceae	Gompholobium	tomentosum	Hairy Yellow Pea		x	
Papilionaceae	Hardenbergia	comptoniana	Native Wisteria		x	x



Papilionaceae	Jacksonia	furcellata	Grey Stinkwood		x	x
Papilionaceae	Lupinus	angustifolium	Narrowleaf Lupin	*	x	
Papilionaceae	Lupinus	cosentinii	WA blue lupin	*	x	x
Papilionaceae	Medicago	?minor	Medic	*	x	
Papilionaceae	Medicago	polymorpha	Burr Medic	*		x
Papilionaceae	Melilotis	indica	Sweet Melliot	*	x	
Papilionaceae	Trifolium	campestre		*	x	x
Papilionaceae	Trifolium	dubium	Suckling Clover	*	x	
Papilionaceae	Trifolium	? Hirsutum		*		x
Phormiaceae	Dianella	revoluta	Blueberry Lily		x	x
Plantaginaceae	Plantago	lanceolata	Ribwort Plantain	*	x	
Poaceae	Austrostipa	mollis				x
Poaceae	Avena	barbata	Bearded Oat	*	x	x
Poaceae	Briza	maxima	Blowfly Grass	*	x	x
Poaceae	Briza	minor	Shivery Grass	*	x	x
Poaceae	Bromus	diandrus	Great Brome	*	x	x
Poaceae	Catapodium	rigidum	Rigid Fescue	*	x	
Poaceae	Cynodon	dactylon	Couch	*	x	
Poaceae	Ehrharta	calycina	Veldt Grass	*	x	x
Poaceae	Ehrharta	longiflora	Annual Veldt Grass	*	x	x
Poaceae	Eragrostis	curvula	Lovegrass	*	x	

Poaceae	Hyparrhenia	hirta	Tambookie grass	*	x	
Poaceae	Lagurus	ovatus	Hare's Tail Grass	*	x	x
Poaceae	Lolium	rigidum	Lolium	*	x	
Poaceae	Pennisetum	clandestinum	Kikuyu grass	*	x	
Poaceae	Phalaris	minor	Lesser Canary Grass	*	x	
Polygonaceae	Emex	australis	Doublegee	DP	x	
Polygonaceae	Muehlenbeckia	adpressa	Climbing Lignum		x	x
Polygonaceae	Polygonum	aviculare	Wireweed	*	x	
Primulaceae	Anagallis	arvensis var arvensis	Scarlet Pimpernel	*	x	
Primulaceae	Anagallis	arvensis var caerulea	Blus Pimpernel	*	x	x
Proteaceae	Banksia	attenuata	Slender Banksia		x	x
Proteaceae	Banksia	grandis	Bull Banksia		x	x
Proteaceae	Banksia	menziesii	Firewood Banksia		x	x
Proteaceae	Banksia	littoralis	Swamp Banksia		x	
Proteaceae	Banksia	ilicifolia	Holly-leaved Banksia			x
Proteaceae	Grevillea	crithmifolia			x	
Proteaceae	Grevillea	vestita			x	
Proteaceae	Hakea	prostrata			x	
Proteaceae	Hakea	lissocarpha	Honey Bush		x	
Proteaceae	Persoonia	saccata	Snottygobble			x
Proteaceae	Petrophile	linearis				x

Proteaceae	Stirlingia	latifolia				x
Proteaceae	Xylomelum	angustifolium	Woody Pear			x
Restionaceae	Desmocladius	flexuosus				x
Restionaceae	Lyginia	imberbis				x
Rhamnaceae	Spyridium	globulosum	Basket Bush		x	x
Rubiaceae	Galium	murale	Small Goosegrass	*	x	
Scrophulariaceae	Dischisma	arenarium		*	x	x
Solanaceae	Solanum	nigrum	Black Berry Nightshade	*		x
Stylidaceae	Stylidium	schoenoides	Cow Kicks			x
Thymeliaceae	Pimelea	rosea	Banjine		x	x
Valerianaceae	Centranthus	macrosiphon	Pretty Betsy	*		x
Violaceae	Hybanthus	calycinus	Wild Violet		x	x
Xanthorrhoeaceae	Xanthorrhoea	preissei	Balga		x	x
Zamiaceae	Macrozamia	riedlei	Macrozamia		x	x

