

TABLE 3: SUMMARY OF RELEVANT IMPACTS AND MITIGATION MEASURES IDENTIFIED BY OTHER SPECIALIST STUDIES

Column 1 reflects : summarised specialist report impacts and mitigation measures (workshopped on 12 June 2002) relevant to visual assessment.

Column 2 reflects: associated visual issues; and

Columns 4 to 18 reflect: relevance to other specialists i.e. expressing common ground of issue with other specialists (**soc**=social; **arc**=archeology; **wet**= wetlands / aquatic systems; **bot**= botany; **a&r**= amphibians and reptiles / herpetology; **avi**= avifauna; **grw**= ground water; **noi**=noise; **eng**= engineering; **plan**= planning; and **mam**= mammals)

ITEM	FINDINGS OF SPECIALIST STUDIES	VISUAL STUDY RELATED ISSUES	SOC	ARC	WET	BOT	A&R	AVI	GRW	NOI	ENG	PLAN	MAM	
1	SOCIAL													
	Impacts													
	• Increased crime and safety concerns – sector 1	Visual impact of security boundary walls, lighting and minimal landscaping (shrubs / dense vegetation pose / perceived as security problem) etc.;	*			*	*			*	*			
	• Increased overhead road crossings (structures) positive impact on safety - sector 1	Visual impact of elevated structures;	*							*	*			
	• Altered rural lifestyle / detract from sense of place – sector 3- section 8	Sense of place crucial to visual scenery and area image therefore need to retain, enhance, minimise impact on cultural landscape (refer archaeological mitigation);	*	*										
	Mitigation Measures													
• Separation of communities from amenities – construction of pedestrian bridges / walks – sector 1	Visual impact of elevated structures;	*									*			
• Safe crossing of roads – construction of pedestrian bridges / walks – sectors 1/ 2/ 5	Visual impact of elevated structures;	*									*			
• Proper lighting, emergency telephones and automatic billing at tollgates – sectors 1/ 2/ 5	Visual impact of light pollution / intrusion and clutter of elements, e.g. emergency telephones etc. (correlate with national regulations for these items) – specification and placement needs to be informed by Guidelines;	*									*			
2	ARCHAEOLOGY													
	Impacts													
	• Proposed Philippi link, may impact on some old farm homesteads – sector 5- section 10	Part of cultural landscape, Jonathan Kaplan to identify significant homesteads which will form scenic feature;		*										
	• Farm shed app. 250km south of De Bron Road, alongside Kuils River – sector 3- section 6	Part of cultural landscape / scenic feature?		*										
	• Eight farm homesteads occur between Wellington Road and N7 considered historically significant, however it is envisaged that none of these farmsteads will be directly impacted by the proposal. Large Bluegum trees partially or completely surround each of the farmsteads, tghus minimising the visual impact even further. Large overhead powerlines currently criss cross the homesteads, already contributing to a negative visual impact on the historical landscape and 'sense of place' - sector 3- section 7	Part of cultural landscape, locate and correlate with those identified – Jonathan Kaplan to advise;	*	*								*		
	• Proposed route between N7 and Otto du Plessis Drive is heavily infested with alien vegetation resulting in low archeological visibility sector 3- section 8	Alien eradication and rehabilitation programme to retain visual absorption capacity provided by alien vegetation (especially in road reserve landscaping);		*	*	*	*	*			*	*	*	*
	• East-west arterial runs parallel to site of Battle of Blouberg - sector 3- section 8	Buffer south of Battle of Blouberg site forms southern boundary of core Blaauwberg Conservation Area - correlate with other specialist recommendations as to buffer width;		*	*	*				*	*	*	*	
	Mitigation Measures													
• Heritage review and historic landscape analysis of the Farms: Phisantekraal, Vrymansfontein, Welgelug, Kuiperskraal, Welvergenoege and Olifantskop, required – sector 3- section 7	Inform cultural landscape / visual scenery / scenic feature location – potential scenic route attributes;	*	*									*		
• Between Vissershok interchange and Bloubergsvlei Farm - search for archeological remains once route cleared of alien vegetation – sector 3- section 8	Replanting to reinstate visual absorption afforded by alien vegetation – (part of rehabilitation programme and landscaping guidelines);		*	*	*	*	*			*	*	*	*	
• Leave buffer of at least 200m south of Bloubergsvlei Farm – sector 3- section 8	Correlate with other specialist buffer width recommendations – botanist, visual, aquatic, groundwater, noise etc.;		*	*	*				*	*	*	*		
• Leveling of dunes may expose buried archeological sites – sector 3- section 8	Rehabilitate dunes to emulate natural dune system;		*		*									

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3	WETLANDS / AQUATIC SYSTEMS												
	Impacts												
	• Reduced buffer width between wetland and residential area (between Zandvlei system and urban area)– <i>sector 1- section 1</i>	Need to improve buffer quality due to reduction in quantity – road reserve landscaping with indigenous vegetation and appropriate screening plants / trees;			*	*	*	*		*	*	*	*
	• Increased light, movement and noise disturbance to wetland– <i>sector 1- section 1</i>	Prevent light pollution, provide screening of movement and noise attenuation through construction of landscaped berms (where possible);				*	*	*		*			
	• Loss of rare and endangered botanical habitat – <i>sector 5- section 10</i>	See botanical assessment – reinstate in road reserve landscaping;			*	*	*	*		*	*	*	*
• Unclear as to how sensitive the perching of this spring is – <i>sector 3- section 8</i>	Buffer width, south of Bloubergsvlei - correlate with other specialist recommendations;		*	*	*			*	*	*	*		
	Mitigation Measures												
	• Not available												
4	BOTANICAL												
	Impacts												
	• Disturbance to adjacent vegetation during and after construction – <i>sector 1- section 1</i>	Road reserve landscaping to include rehabilitation programme;			*	*	*	*		*	*	*	*
	• Destruction of veldtype – <i>3 sector - section 6</i>	Reinstate within road reserve landscaping / rehabilitation			*	*	*	*		*	*	*	*
	• Destruction of rare habitat – <i>3 sector – section 6</i>	Reinstate within road reserve landscaping / rehabilitation			*	*	*	*		*	*	*	*
	• Destruction of renosterveld – <i>sector 3- section 7</i>	Reinstate within road reserve landscaping / rehabilitation			*	*	*	*		*	*	*	*
	• Destruction of sandplain fynbos / renosterveld ecotone – <i>sector 3- section 7</i>	Reinstate within road reserve landscaping / rehabilitation			*	*	*	*		*	*	*	*
	• Destruction of sandplain fynbos – <i>sector 3- section 8</i>	Reinstate within road reserve landscaping / rehabilitation			*	*	*	*		*	*	*	*
	• Destruction dune thicket / fynbos mosaic – <i>sector 3- section 8;</i>	Reinstate within road reserve landscaping / rehabilitation			*	*	*	*		*	*	*	*
	• Destruction of dense dune thicket on limestone – <i>sector 3- section 8.</i>	Reinstate within road reserve landscaping / rehabilitation			*	*	*	*		*	*	*	*
		Mitigation Measures											
	• Stay as far north as possible to avoid wetlands and rare plant habitats in Westlake Nature Reserve, needs to be a fenced off 'no go' area – <i>sector 1;</i>	Consider visual impact of boundary treatment – fencing, etc. (retain visual penetration);	*		*	*	*				*	*	
	• Stay as far north as possible to avoid natural vegetation in Zandvlei Nature Reserve, needs to be a fenced off 'no go' area – <i>sector 1</i>	Consider visual impact of boundary treatment – fencing, etc. (retain visual penetration), scenic route opportunity;	*		*	*	*				*	*	*
	• East of sewage works and west of Strandfontein Road key vegetation area, alignment needs to be as far north as possible, road should curve north-west immediately after crossing Strandfontein Road (as viewed from east) – <i>sector 2</i>	Consider visual impact of road through unbuilt landscape as opposed to keeping to the edge of the urban area;	*			*					*	*	*
	• East of Strandfontein sensitive wetlands to be avoided – keep as far north as possible;	Consider visual impact of road through unbuilt landscape as opposed to keeping to the edge of the urban area;			*	*	*				*	*	
	• Vanguard Road / Wespoort Road intersection, natural vegetation triangle in this area – <i>sector 2;</i>	Scenic feature? Include in related open space / reserve landscaping;				*						*	
	• Hindle Road Interchange – conserve natural vegetation in interchange area – <i>sector 2- section 4</i>	Scenic feature? Include in related open space / reserve landscaping;				*						*	
• Conserve roadside patches of natural vegetation – <i>sector 2- section 5</i>	Scenic feature? Include in related open space / reserve landscaping;				*						*		
• Wellington Interchange – irreplaceable in terms of CAPE - no development in portions – <i>sector 3- section 6</i>	Scenic feature – liaise with botanist and engineer regarding introduction of appropriate trees to increase visual absorption capacity, include in related open space landscaping;				*						*		
• Groot Phesantekraal farm: avoid patch of natural Renosterveld at northeast corner of dam – <i>sector 3- section 7</i>	Locate farm, scenic feature?				*						*		
• Avoid Bloubergsvlei – <i>sector 3- section 8;</i>	Correlate with other specialist buffer width recommendations – botanist, visual, aquatic, groundwater, noise, etc.;		*	*	*			*	*	*	*		

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4	BOTANICAL (continued) • Refer Barry Low's report – sector 5- section 10;	Discuss with botanist whether any relevant scenic features / visual aspects mentioned in Low's report, e.g. Varkensvlei Forest Reserve;				*						*	
5	AMPHIBIANS AND REPTILES Impacts • quality of road reserve habitat after road construction – sectors 1 / 3 / 4;	Road reserve landscaping to establish suitable habitat;			*	*	*	*		*	*	*	*
	Mitigation Measures <u>Design:</u> • alignment between Main Road and Prince George Drive – as far north as possible to minimise impact on Lakeside wetlands and adjoining habitats – sector 1 • Between sewage ponds and Strandfontein Road – as far north as possible to minimise impact on natural habitats south towards Pelikan Park – sector 1 • Installation of culverts under the road (especially in vicinity of wetlands and natural habitats – more than 500mm Ø and as many as possible), elevated road portions and flyovers facilitate movement– sector 1 • No solid wall type barrier to be constructed alongside the road which will restrict movement - entire route • Road reserves in an urban environment provide important sanctuary areas as well as serve as corridors for the movement of terrestrial life linking important conservation areas – entire route	Lakeside wetlands - Westlake Nature Reserve Wetlands, scenic feature; Correlate with aquatic specialist and botanist; Visual consideration of design and treatment of culvert ends on roadside and other elevated structures – spatial continuity; Visual, noise and herpetology considerations of barrier design; Visual opportunity; appropriate road reserve landscaping;			*	*	*						
	<u>Operation:</u> • Road reserve must be suitably landscaped and rehabilitated (with indigenous vegetation), wetland areas should be retained and not filled or drained – will help encourage recolonisation by reptiles or amphibians – entire route	Visual opportunity, correlate with other specialist requirements in terms of road reserve landscaping;			*	*	*	*		*	*	*	
6	AVIFAUNA Impacts • None												
	Mitigation Measures • Design of bridge lights to minimise bird collisions – entire route • Habitat improvement (e.g. bird and bat nest boxes) on road structures – entire route • Selection of rehabilitation vegetation for maximum bird attraction – entire route • Provision of underpass access to birds where wetlands are traversed or where continuous patches of natural vegetation are bisected – entire route	Consider and prevent light pollution / intrusion; Visual and environmental education opportunity; Reserve landscaping correlate with visual, botany, herpetology, aquatic, etc.; Visual consideration in design of underpass termination points along road;	*					*			*		
					*	*	*	*		*	*	*	*

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7	<p>GROUNDWATER</p> <p>Impacts Five potential risk sources were identified for construction and operation including: blasting; groundwater abstraction during construction, modification of flow (both recharge and subsurface flow), accidental spills and sewage and waste from the toll plazas. Modification or restriction of flow is seen as the only impact to have a direct visual impact.</p>	Road construction could impact on surface and subsurface flow, which in turn could impact drainage and flow to wetlands.		*	*	*	*	*	*		*		*
	<p>Though impacts usually remain localised and can readily be mitigated against, three special cases were identified along the proposed route:</p> <ul style="list-style-type: none"> Strandfontein Waste Water Treatment Works; Flooding due to increased runoff; Bloubergsvlei. 	Most direct visual impact in case of Bloubergsvlei which forms part of cultural historic landscape.		*	*	*	*	*	*		*		*
	<p>Mitigation Measures</p> <ul style="list-style-type: none"> Identification of boreholes likely to be impacted by blasting; Control blasting to limit impacts; Enforce acceptable groundwater abstraction rates (if used); Ensure adequate movement of surface and subsurface flow through the use of culverts at appropriate places; Have emergency response plans in place in the event of accidental chemical spills. 							*		*			
8	<p>MAMMALS</p> <p>Impacts</p> <ul style="list-style-type: none"> No impact of any significance is foreseen in this stage of the development as none of the 56 mammal species expected to occur are rare or endangered or even scarce and are well adapted to urbanisation; The most important impact of the proposed road would be the isolation of mammal populations, which already exist, in sub-optimal populations effecting the genetic viability of such populations. 	The visual impact of underpasses etc. as well as, where appropriate openings in walls / noise barriers for mammals to pass through					*			*	*		*
	<p>Mitigation Measures</p> <ul style="list-style-type: none"> In general providing access underneath the road where wetlands are traversed or continuous natural vegetation patches bisected; 				*	*	*			*	*		*
	<ul style="list-style-type: none"> Design of road shoulder to dispose of road runoff and accidental spills at predetermined less sensitive points – sectors 1, 3 and 4; 	Design road shoulder to consider visual impact thereof;									*		*
	<ul style="list-style-type: none"> Bridging rather than filling at critical sites – sector 1; 	Elevated structures increase visual impact;								*	*		*
	<ul style="list-style-type: none"> Design of underpasses to accommodate free movement of large mammals such as hippopotamus – sector 1, accommodate maximum width of underpasses allowable within engineering constraints – sector 3; 	Locate areas where underpasses require and consider visual impact of design along road edge;									*		*
	<ul style="list-style-type: none"> Rehabilitation of road verges with suitable indigenous species – sector 1, management of road reserves to act as permanent corridors connecting remnant patches of natural vegetation – sector 3; 	Road reserve landscaping to act as visual and functional corridors connecting patches of remnant natural vegetation;			*	*	*	*		*	*	*	*
	<ul style="list-style-type: none"> Road verge management – burning rather than use of pesticides and herbicides – sector 1; 	Temporary seasonal visual impact of burning – acceptable;				*	*				*		*

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9	NOISE												
	Impacts <i>Noise impact on affected areas, due to existing and proposed road development, determined in terms of difference between existing measured or typical noise levels and predicted levels for future scenarios (2005; 2015 and 2025).</i>												
	Impacts during Construction (from on-site equipment and site activities) • Without mitigation measures – receptors within 200m zone around construction site would experience noise levels higher than the permissible limit.	Visual impact of noise mitigation barrier								*	*	*	
	Impacts during Operation • Number of residences found to be within estimated controlled zones of operational year 2005; • Even greater number of residences affected by noise levels around road as controlled zones widen in 2015 and 2025; • Without mitigation measures road will have localised but significant negative effect on noise levels of affected areas;									*	*	*	
	Mitigation Measures <i>Number of mitigation measures can be applied to maintain noise levels below legislated limit and minimise anticipated reaction of communities such as:</i>												
	Primarily:- • Noise barriers: – heights varying between 1.8m and 2.8m depending on road section / situation; – design and construction to be executed properly so as to offer desired noise reduction; – for better efficiency, noise barriers should be placed as close as possible to the noise source.	Visual impact of noise mitigation barrier, impact increasing as height of barrier increases.								*	*	*	
	Additional measures include:- • Use of porous road surface (porous asphalt versus conventional bituminous surfacing); • Reduction of speed limit along specific sections; • Noise insulation of new buildings;									*	*	*	
	General Notes: • Different sections of proposed upgrading of R300 cross or are in close proximity to a number of sensitive noise receptors e.g. educational buildings, hospitals and churches;	Require special noise mitigation measures, e.g. sensitive receptor identification and boundary treatment – correlate with visual:								*	*	*	
	• Adjacent residential areas and communities will be given special consideration in terms of establishing the existing noise levels, as well as possible future noise increase – generally expected that within 20-40m of road, community response = no observed reaction / sporadic complaints;	Adjacent residential areas also highly sensitive from a visual impact point of view, identify and recommend mitigation , e.g. boundary treatment (berms where possible, etc.) correlate with noise attenuation capacity and road reserve landscaping;	*		*	*	*	*		*	*	*	*
	• Usage of porous asphalt could result in noise attenuation between 1dBA and 4Dba – compares to 1.5m high barrier;	Barrier height considerations;								*	*		
	• Noise barriers can be formed from earth mounds / berms (natural and more attractive appearance) along the road or high, vertical walls (staggering?);	Establish optimum road reserve width to accommodate berms and consider in road reserve landscaping where possible;			*	*	*	*		*	*	*	*
	• For noise barrier to be effective, it must be both high and long enough to block the view of the road. A noise barrier can achieve a 5 dB noise level reduction when it is tall enough to break the line-of-sight (with a maximum theoretical reduction of 20Dba);	Visual implications of . screening / boundary treatment, etc. in terms of height, setback, etc.								*	*		
	• Noise barriers do very little for homes on a hillside overlooking a road (e.g. Stellenberg Interchange to De Bron Road) or for buildings which rise above the barrier (double storey duplexes e.g. Dumonte);	Identify applicable areas and consider mitigation;								*	*		
	• Noise barriers can be effective in reducing noise for receptors within approximately 61m of a highway.	Impact on boundary treatment;										*	