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PREPARED FOR: EspinCapital

September 2023



Proposed Advertising Signs 139 Badgerup Road, Wanneroo Road Safety Assessment

Document history and status

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1 Introduction

This Road Safety Assessment has been undertaken by Transcore on behalf of EspinCapital with regard to the proposed advertising signs to be installed at 139 Badgerup Road, Wanneroo in the City of Wanneroo.

The proposed sign will be installed on the southeast corner of the subject site as shown in **Figure 1**. The sign is proposed to be double-sided and will be visible to both the eastbound and westbound traffic on Ocean Reef Road (also referred to by the Main Roads Route Name of Ocean Reef Upper Swan Highway). As the sign is visible from Ocean Reef Upper Swan Highway, which is a State Road under care and control of Main Roads WA, Transcore has undertaken with reference to Main Roads WA *"Policy and Application Guidelines for Advertising Signs Within and Beyond State Road Reserves"*.



Figure 1: Location of Proposed Sign

2 Sign Description

As detailed in **Figure 2** and **Appendix A**, the proposed sign will be double-sided to be installed in the southeast corner of the subject site. The eastbound-facing panel of the sign is proposed to be static, and the westbound-facing panel of the sign is proposed to be digital. Both panels will be 4m high and 12m in width. The proposed sign will be approximately 11m above ground level.



Figure 2: Sign structure

The digital sign panel feature the following specifications:

- The westbound-facing panel is an electronic variable message LED sign which will display static advertising/community information only;
- The eastbound-facing panel is a static sign;
- The digital panel will not be illuminated externally, and the static panel will only be illuminated during hours of darkness;
- The digital panel will cycle through a series of static advertisements/community information. The device can be programmed with a specific display time/dwell time for each advertisement/community information; and;
- Advertisement/information and other device programming for the digital panel can be undertaken online and therefore physical access to the sign will not be required to change advertisements/information.

The sign layout plans and dimensions are included in Appendix A of this report.

3 Western Australian Planning Commission Development Control Policy 5.4

In the Main Roads WA Policy and Application Guidelines for Advertising Signs Within and Beyond State Road Reserves, Section 2.4.2.3 (Western Australian Planning Commission Development Control Policy 5.4) states,

"The policy applies to advertising on land reserved under a region scheme such as the Metropolitan Region Scheme and sets out the objectives and considerations taken into account by the Western Australian Planning Commission in determining applications for the display of advertisements on reserved land. The erection, alteration and extension of any advertisement on land reserved by a region scheme such as the MRS requires the approval of the WAPC."

Ocean Reef Upper Swan Highway is classified as an Other Regional Road (ORR) or *Blue Road* in the MRS. As shown in **Figure 3**, the proposed advertising sign is within the ORR road reserve, and as such, the advertising sign will require the approval of the WAPC.



Figure 3: Metropolitan Region Scheme Map (Source: PlanWA)

4 Main Roads WA Roadside Advertising Guidelines

Revision 8 of the Main Roads WA 'Policy and Application Guidelines for Advertising Signs Within and Beyond State Road Reserves' (the Guidelines), amended October 2020, provides guidance on the assessment of roadside advertising signs located within State Road reserves, or visible from State Road reserves.

Section 2.3 of the Guidelines states that "These guidelines apply to all gazetted highways and main roads ("State roads") controlled by Main Roads Western Australia....."

The proposed sign is to be installed on the southeast corner of the subject site. The proposed sign is located on the north side of Ocean Reef Upper Swan Highway (State Route 84) in the City of Wanneroo. The proposed sign will be visible in both directions of traffic on Ocean Reef Upper Swan Highway.

As detailed in **Figure 4**, Ocean Reef Upper Swan Highway forms part of the State Road network under care and control of Main Roads WA and therefore, road safety assessment for the proposed advertising sign is undertaken for both directions of traffic on Ocean Reef Upper Swan Highway in accordance with Main Roads WA roadside advertising guidelines. The speed limit on Ocean Reef Upper Swan Highway in the vicinity of the subject site is 80km/h.

The relevant requirements of the Guidelines are summarised in this section of the report. The road safety assessment undertaken through the application of the Guidelines is presented in Section 5.



Figure 4: City of Wanneroo LPS No. 2

4.1 MRWA Guidelines – Section 3 General Safety and Efficiency Considerations

Section 3 of the Guidelines provides general conditions relating to safety, traffic efficiency, site selection and physical characteristics of advertising devices. Some items of note being relevant to the sign include:

4.1.1 General Safety and Efficiency Criteria

An advertising device may be considered a traffic hazard if it interferes with road safety or traffic efficiency; or if it:

- Interferes with the effectiveness of traffic control devices (e.g., traffic signals, stop or give way signs), or
- Distracts a driver at a critical time (high demand, decision making areas), or
- Obscures a driver's view of a road hazard (e.g., curves, traffic Stopping Sight Distance), or
- Gives instructions to traffic to "stop", "halt" or other (give way, merge, turn), or
- Imitates a traffic control device, or is a dangerous obstruction to road or other infrastructure, traffic, pedestrians, cyclists or other road users, or
- Is in an area where there are several devices and the cumulative effect of those devices may be potentially hazardous, distracting or demanding.

The application of these criteria is discussed in **Section 5** of this report.

4.1.2 Site Selection Criteria

Lateral Placement

Advertising signs should be located outside road clear zones to minimise the risk of collision of an errant vehicle with an advertising device. Consideration of lateral placement normally applies only to advertising devices that are within the boundaries of state-controlled roads.

The application of this criteria is discussed in **Section 5** of this report.

Longitudinal Placement

The application of the longitudinal placement controls is intended to:

- Minimise the level of driver distraction in areas where greater concentration is required;
- Preserve sight distance; and,
- Retain a high level of traffic efficiency.

Longitudinal placement controls for Advertising Devices within and/or visible from statecontrolled roads shall be in the form of device restriction distances to be designated traffic situations and official traffic signs. The application of this criteria is discussed in **Section 5** of this report.

4.1.3 *Physical Characteristics*

Control of the physical characteristics of Advertising Devices shall relate to the:

- Size and shape;
- Colour;
- Illumination and luminance;
- Movement and rotation;
- Advertising Device content; and,
- Supporting structure.

The application of these criteria is discussed in **Section 5.2** of this report.

4.1.4 Crash History

Crash Rate Criteria

A billboard sign is not permitted where sections of the road on a carriageway have a crash rate higher than the critical crash rate.

Crash rate calculations were undertaken by Transcore as outlined in Appendix C of the Main Roads WA guidelines. The results of the calculations are presented in Section 5.4.

4.1.5 Intersection Restriction Distance

The device restriction distances are detailed in **Table 1**, with respect to Device Restriction Area drawings for advertising devices visible from a state-controlled road other than a Freeway or Freeway standard road in Appendix A of Main Roads WA guidelines are shown in **Figure 5**.

Speed Limit (km/h)	Distance 'd' (m)	0.6V (m)
50 or less	45	30
60	65	36
70	85	42
80	110	48
90	140	54
100	170	60
110	210	66

Table 1: Distance 'd' and '0.6v' for use with Device Restriction Area drawings



Figure 5: Restriction areas for advertising devices visible from a state-controlled road <u>other</u> than a Freeway or Freeway standard road

4.2 Main Roads WA Guidelines – Section 4.1 Safety Considerations

Section 4.1 of the Guidelines provides specific conditions relating to road user safety for advertising devices classified as 'billboard signs' located within State Road reserves. Conditions relating to display, location, content, and movement and rotation are detailed in Section 4.1 of the Guidelines and are summarised as follows:

4.2.1 Display

- Billboard signs shall be restricted to static displays that are externally illuminated during hours of darkness or, alternatively, are displayed electronically.
- When displayed electronically, only single, 'self-contained' messages shall be displayed, which shall have a 'dwell' duration of not less than those shown in Table 2, where, under congested conditions, the speed environment is operating below normal free flowing conditions, the dwell time shall be adjusted accordingly.
- Billboard signs shall not display advertising in a format normally used for traffic control, or warning, incident or traffic management, or road safety or driver information messages,
- Billboard signs shall not be displayed in projected image format.
- The letter size and legibility of text should generally conform to the guidelines set out in Austroads' Guide to Traffic Management Part 10: Traffic Control and Communication Devices.
- The maximum letter size of additional legend that is not intended to be readable by drivers shall be equal to or less than one-third of the legible letter height.
- The illumination of any reflective sign materials should generally conform to the guidelines set out in Austroads' Guide to Traffic Management part 10: Traffic Control and Communication Devices.
- When attached to overhead infrastructure, signs shall be directed only at motorists passing under the infrastructure.

Speed Limit (km/h)	Dwell Time (sec)
110	20
100	25
90	25
80	30
70	35
60	40
<50	45

Table 2: Electronic Advertising Dwell Times

4.2.2 Size and Shape

- The dimensions of Advertising Devices shall generally conform to the industry standard values depicted in Table 3
- The maximum available area of any face of Advertising Device is 85m²

Description	Dimensions (m)	Area (m ²)
Small Portraits	3 x 4.5	13.5
Posters	6 x 3	18
Super 8's	8.22 x 2.66	18.6
Portraits	4 x 6	24
Supersites	12.66 x 3.35	42.4
Spectaculars	18.99 x 4.45	84.5

Table 3: Typical advertising device dimensions

4.2.3 Location

Billboard signs shall be located at sites approved by Main Roads. The site identification process shall ensure signs are <u>excluded</u> from the following locations:

- Within clear zones of verges and median strips unless the vertical clearance beneath the sign is not less than 5.4 metres above the verge/median ground level.
- Within driver sightline areas
- Within 500m following a fixed Variable Message Sign (VMS) that is visible to drivers approaching the site of the proposed billboard sign.
- On overhead infrastructure where guide signs have been, or are planned to be, installed.
- Where spacing between electronic billboard signs do not meet those in Table 4.3 of the Guidelines
- Within a longitudinal distance of 2.5V (metres), of any traffic sign or directional sign on a freeway standard road (V=speed limit in km/h), or a distance 'd' as set out in Table 1 of any major intersection, pedestrian crossing, school zone, railway crossing, traffic sign or directional sign for other Main Roads controlled roads.
- Where required, provision shall be made for safe access to the location of the sign for maintenance purposes

Further, advertising devices should not be located in Device Restriction Areas. The relevant reference diagram from Appendix A: Figure 1 of the Guidelines, is shown in **Figure 5**.

The application of the Device Restriction Area criteria is discussed separately in **Section 5.3**.



4.2.4 Content

The content of signs shall exclude the following:

- Colours and shapes arranged that may be mistaken for a traffic signals, traffic signs, or instruction signs.
- Symbols, graphics or text, which entices drivers to immediately turn or change lanes, or which could be mistaken for an instruction to drivers.
- Complicated/long website, social media or email addresses, and text messaging instructions.

4.2.5 Sign Movement and Rotation

Moving or rotating billboard sign components shall not be permitted.

The application of the above criteria is discussed in **Section 5.2** of this report.

5.1 Document References and Guidelines

Transcore has undertaken a Road Safety Assessment of the proposed advertising sign with reference to the following documents:

 Main Roads WA 'Policy and Application Guidelines for Advertising Signs Within and Beyond State Road Reserves' – October 2020.

5.2 Road Safety Assessment General Findings

The findings of the Road Safety Assessment confirm that the advertising sign satisfies the general, physical characteristics, and display safety conditions set out in the Main Roads WA Guidelines.

The proposed advertising sign's panels are of acceptable shape and dimensions, they entail no mechanical movement and rotation and will display advertising messages. No flashing, coloured, or pulsating lights will be installed on the signs. This complies with Main Roads WA guidelines.

The display area for each panel (digital and static) of the proposed advertising sign is 48m² which is compliant with the policy. Please refer to **Figure 2** and **Appendix A** for more details.

The static panel will be restricted to being externally illuminated during hours of darkness, with luminance to adhere to the maximum and minimum luminance levels in accordance with Main Roads WA guidelines.

The proposed transition time for the digital panel is instantaneous, and no message sequencing will be permitted for the digital panel, in accordance with Main Roads WA guidelines.

The digital panel of the proposed advertising sign will have the ability to display advertising content at variable luminance levels. The luminance of the display will be programmed to operate at different levels required for different times of the day and night. The luminance level for the advertising sign is in accordance with the specified levels from the pre-lodgement meeting with Main Roads WA.

Additionally, both panels of the proposed sign will not obstruct or interfere with any traffic control signs or devices, or with the driver's view of hazards as it is proposed to be installed 11m above ground level. The sign will not obstruct access to road or other infrastructure, traffic, pedestrian, cyclist or other road user movements.

Other conditions relating to advertising content will be met on a continuous basis through the ongoing adoption of appropriate advertising content. These include:



- Advertising content should not imitate a traffic control device, or display a message which may be interpreted as a traffic related instruction;
- No more than 7 words (readable by drivers) should be displayed at any time per sign;
- Advertising devices should not contain extreme emotional material; and
- No complicated email, social messaging or text messaging instructions should be displayed on the sign.

5.3 Site Location Assessment

The location of the sign satisfies the Lateral and Longitudinal placement of the guidelines as it is located within a private property.

The crash records of the unsignalised T-intersection of Ocean Reef Upper Swan Highway and Badgerup Road have been reviewed for Killed and Serious Injury Criteria (KSI) for the last 5-year period ending December 2022. There were no recorded 'fatal'/'hospital' crashes at this intersection during the last 5 years. As per the Main Roads WA guidelines, if KSI is 3 or more, the specified DRA distances need to be doubled. Accordingly, as the KSI figure is zero, the DRA distances would not need to be doubled for this assessment.

Based on the assessment undertaken by Transcore, it is acknowledged that the proposed advertising sign is located within the Device Restriction Area (DRA) for the "T-intersection" (Ocean Reef Upper Swan Highway/Badgerup Road) and "Existing Traffic Sign".

The impacted DRAs for eastbound and westbound traffic on Ocean Reef Upper Swan Highway are illustrated in **Figure 6.**

In Transcore's opinion, the traffic sign has the potential to be relocated, such that its DRA will no longer impact the proposed advertising sign. This can be further discussed with Main Roads WA.

Accordingly, the location of the proposed advertising sign was assessed in consideration of observations of the road environment near the proposed sign.





5.3.1 Advertising Sign Location Assessment Based on Road Environment Observations

Transcore reviewed the image of the view of a vehicle travelling in the westbound direction towards the proposed sign on Ocean Reef Upper Swan Highway.

As detailed in **Figure 7**, the sign is mounted high up on a pylon on the southeast corner of the subject site and clear of existing traffic. The sign will not obstruct any traffic control devices or traffic signs. As evident, the proposed sign has no impact on the existing traffic on Ocean Reef Upper Swan Highway within the identified DRA.

Although the same image for the eastbound direction of travel has not been provided to Transcore, the same conclusions as per the westbound direction of travel apply.

Therefore, the impact of the advertising sign on driver awareness would be minimal.



Figure 7: View of westbound traffic direction Ocean Reef Upper Swan Highway

5.4 Crash History Calculations

The following outlines the crash rate calculations in accordance with Main Roads WA policy.

<u>Step 1</u>

Detailed crash history data was extracted from the Main Roads WA Crash Map to undertake crash rate calculations in accordance with Appendix C of the Main Roads WA advertising signs guidelines.

In accordance with the guidelines, the crash data was reviewed for the 1.5km road section of Ocean Reef Upper Swan Highway (1km before the proposed sign and

500m after the proposed sign in both directions). The crash data was sourced for the 5-year period ending December 2022. The crash analysis was undertaken for six 1.0km rolling sections, for both eastbound and westbound directions of traffic flow on Ocean Reef Upper Swan Highway.

<u>Step 2</u>

The casualty crash rate (R), expressed as 10^4 ERU (Equivalent Risk Unit) per 10^8 VKT (vehicle kilometres travelled), was calculated as per **Equation 1** adopted from the Main Roads WA guidelines.

Equation 1: Casualty Crash Rate

$$R = \frac{\sum_{t=1}^{20} C_t \times A_t \times 10^4}{n \times L \times V \times 365}$$

Where,

R = Casualty Crash Rate (expressed in terms of 10^4 ERU per 10^8 VKT)

t = RUM Group (1 - 20)

Ct = Crash Risk Score for a crash in RUM Group "t"

At = Number of crashes in RUM Group "t"

n = Number of years of crash data (usually 5)

L = Length (km) of road section (usually 1km)

V = Annual Average Daily Traffic (AADT) for the section

365 = Number of days in one year

<u>Step 3</u>

The Critical Crash Rate for a highway in a metropolitan environment with an 80km/h speed limit is 150.4 as shown in Table 4.

Table 4: Critical Crash Rate Thresholds (Main Roads WA)

Bood Turne (v)			Spe	ed Zone	(km/h)		
Road Type (x)	<=50	60	70	80	90	100	110
Freeways	•	-	300.8	390.4	-	410.5	145.3
Highways	•	265.7	212.7	150.4	520.8	425.5	1,079.8
	_						4 400 4
Main Roads	-	-		-	-	-	1,438.4
Table 4. Rural Cri	- tical Cra	- sh Rate		Ids ed Zone	- (km/h)		1,438.4
	- tical Cra <=50	- sh Rate 60			- (km/h) 90	- 100	
Table 4. Rural Cri			Spe	ed Zone		- 100) 110
Table 4. Rural Cri Road Type (x)			Spe	ed Zone		- 100	110 228.5

There are no recorded crashes along the relevant segments of the left carriageway of Ocean Reef Upper Swan Highway travelling eastbound.

As evident from the crash calculations along the relevant segments of the right carriageway of Ocean Reef Upper Swan Highway travelling westbound, it is confirmed that the crash rate calculation for all the relevant segments of the westbound direction of Ocean Reef Upper Swan Highway is below the critical crash threshold. Refer to Table 5 for more details.

Therefore, the proposed advertising sign is acceptable in both the eastbound and westbound direction of travel for Ocean Reef Upper Swan Highway with respect to the crash calculation requirements of Main Roads WA policy and guidelines.

Table 5: Casualty Crash Rate (R) – Ocean Reef Upper Swan Hwy Westbound

						-											
ı	Time Period = ength of Road Segment = Traffic Volume =		years km AADT						Length of	road segment (km) Sign SLK			START	10.26	FINISH	8.76	
	Speed Environment =		km/h	(High Speed)						Segment	1	2	3	4	5	6	
	Metro / Rural =									Start		10.16	10.06		-	-	
	Road Type =									Finish	9.26	9.16	9.06				
		• •				CASUALTY CR	RASH RATE (R)							•	•	•	
RUM		Crash Risk Score (x 10^4 Risk	Crash Risk Score (x 10^4 Risk														
Group	RUM Codes	Unit)	Unit)	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6								
noup		Low Speed	High Speed														
		(< 80km/h)	(>= 80km/h)														
1	10, 11, 12, 13, 14, 15, 16, 17, 18, 19	21	96	0.00	0.00	0.00	0.00	0.00	0.00	Segment	Start SLK	End SLK	AADT	Casualty Crashes	Crash Rate	Critical Crash Rate	Satisfactory/ Satisfactor
2	21, 51	98	319	0.00	0.00	0.00	0.00	0.00	0.00	1	10.26	9.26		1	88.9	150.4	
3	22, 23, 24, 25, 26	19	64	0.00	0.00	0.00	0.00	0.00	0.00	2	10.16	9.16		1	88.9	150.4	
4	31, 32, 33	8	21	0.00	0.00	0.00	0.00	60.25	60.25	3	10.06	9.06	19,099	1	88.9	150.4	SATISFACTO
5	35, 36, 37, 54	13	31	88.94	88.94	88.94	88.94	88.94	88.94	4	9.96	8.96		1	88.9	150.4	
6	38, 39	11	67	0.00	0.00	0.00	0.00	0.00	0.00	5	9.86	8.86		2	149.2	150.4	
7	27, 34	12	183	0.00	0.00	0.00	0.00	0.00	0.00	6	9.76	8.76		2	149.2	150.4	
8	42, 46, 47, 48	23	23	0.00	0.00	0.00	0.00	0.00	0.00								
9 10	53, 55, 56 43, 44, 61, 62, 63, 64	12	101	0.00	0.00	0.00	0.00	0.00	0.00								
10	43, 44, 61, 62, 63, 64	669	73	0.00	0.00	0.00	0.00	0.00	0.00								149.2
12	1, 2, 3, 4, 5, 6, 7, 8, 9, 98	60	235	0.00	0.00	0.00	0.00	0.00	0.00		1	60.0	_			149.2	149.2
13	65	0	0	0.00	0.00	0.00	0.00	0.00	0.00		1	40.0					
14	69.95	23	33	0.00	0.00	0.00	0.00	0.00	0.00	e	1	20.0					
15	52, 71, 73, 76, 77	20	79	0.00	0.00	0.00	0.00	0.00	0.00	Rate	1	00.0 88.	9 88.9	88.9	88.9		
16	72, 74, 94	37	95	0.00	0.00	0.00	0.00	0.00	0.00	Crash							
17	75	27	70	0.00	0.00	0.00	0.00	0.00	0.00	5		80.0					
18	81, 83	17	101	0.00	0.00	0.00	0.00	0.00	0.00	Critical		60.0					
19	82, 84	72	107	0.00	0.00	0.00	0.00	0.00	0.00	5		40.0 -					
20	85	23	62	0.00	0.00	0.00	0.00	0.00	0.00			20.0					
	20, 30, 40, 45, 49, 50, 60, 66,																
21	67, 70, 80, 90, 91, 92, 94, 96, 97	0	0	0	0	0	0	0	0		Crash Rate	0.0			4 88.9	5 149.2	6 149.2
			Total Crashes	1	1	1	1	2	2		 Critical Cras 				150.4	150.4	150.4
		Casual	ty Crash Rate (R)	88.9	88.9	88.9	88.9	149.2	149.2		- critical cras	TRate 150	.4 150.			150.4	130.4
			Threshold			15	0.4							ROBO	Segments		
			Crash Category	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory								

Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Crash SLK	RUM	RUM GROUP
0	0	0	0	1	1	8.90	31	4
1	1	1	1	1	1	9.53	35	5
0	0	0	0	0	0			
0	0	0	0	0	0			
0	0	0	0	0	0			
0	0	0	0	0	0			
0	0	0	0	0	0			
0	0	0	0	0	0			
0	0	0	0	0	0			
0	0	0	0	0	0			
0	0	0	0	0	0			

6 Conclusions

This Road Safety Assessment has been undertaken by Transcore on behalf of EspinCapital regarding the proposed advertising sign to be installed at 139 Badgerup Road, Wanneroo in the City of Wanneroo.

The proposed advertising sign is double-sided with one digital panel and one static panel. It is proposed to be installed at the southeast corner of the subject site and will be visible in both directions of traffic flow on Ocean Reef Upper Swan Highway, a State Road under care and control of Main Roads WA. Accordingly, this road safety assessment report is prepared for the advertising sign in reference to the Main Roads WA "Policy and Application Guidelines for Advertising Signs" as appropriate.

The Road Safety Assessment has established that the advertising sign satisfies the general, physical characteristics, display, luminance, and dwell time safety conditions set out in the Main Roads WA guidelines.

It is acknowledged that the proposed advertising sign is located within the 'Device Restriction Area' as it relates to the "Existing Traffic Sign" and "T-intersection". However, in Transcore's opinion, the existing traffic sign (a speed limit sign) can potentially be relocated, such that its DRA will no longer impact the proposed advertising sign. This can be further discussed with Main Roads WA.

The crash history calculation has also shown that the advertising sign satisfies the critical rate thresholds for both directions of travel in accordance with Main Roads WA policy.

In conclusion, it is considered that the findings of the Road Safety Assessment are supportive of the proposed advertising sign.



Appendix A

PROPOSED ADVERTISING SIGN PLAN



Engineering a better future for over 20 years!













Project STRUCTURE LED PANEL 12m x 4m STATIC PANEL 12m x 4m	Spyglass Modia 10, 104 POT 11, Octomer, 80, 078 POT 101, Octomer, 80, 078				
Looder: 138 BADGERUP RD	Revision: 9	BHEET SADE AT			
WANNEROO WA 6065	Date: 0709(2925	53 of 3			