Government of Western Australia

mainroads WESTERN AUSTRALIA

Heavy Vehicle Operations

GUIDELINES FOR ASSESSING THE SUITABILITY OF ROUTES FOR RESTRICTED ACCESS VEHICLES

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1. INTRODUCTION

1.1 General

These guidelines have been prepared by Main Roads Western Australia to assist Local Government, Main Roads' staff and consultants in assessing the suitability of routes proposed for the operation of Restricted Access Vehicles (RAVs) on urban, rural and townsite roads.

The guidelines provide for the assessment of routes for three levels of RAV access. These levels are grouped to cover certain sizes of vehicles, as set out in Section Two of the Main Roads WA Restricted Access Vehicles Class 2 - 3 Period Permit Operating Conditions:

- RAVs Categories 2-4 (e.g. pocket road train, B-Double, and other RAVs with a maximum length of either 25.0 m or 27.5 m);
- RAVs Categories 5-8 (e.g. rigid truck plus two dog trailers, B-double towing dog, and other RAVs with a maximum length of 36.5 m); and
- RAVs Categories 9-10 (e.g. triple road train, B-double towing two dogs, and other RAVs with a maximum length of 53.5 m).

The guidelines are intended to assist assessors in ensuring that the major relevant factors have been considered in the route assessment process.

Where quantitative limits are recommended, they are intended as a guide only and are no substitute for common sense and judgement based on experience. In certain cases, routes which do not meet the requirements outlined in this document can be accepted as RAV routes by imposing additional conditions, such as speed restrictions, curfew etc.

Should an aspect of a route clearly fail to conform to these guidelines in a manner which cannot be suitably addressed, resulting in a compromise of road safety, the route should be considered unsuitable for RAV access.

The information used in preparation of this document has been obtained from various internal and external sources and incorporates the latest reference material available at this time.

Appendix A (page 22) is a glossary of the terms used throughout these guidelines.

1.2 Assessment Requirements

Route assessment should be undertaken by a person who has experience with the heavy transport industry and a substantial knowledge of the following:

- the principles of heavy vehicle operation, including vehicle configurations, maximum dimensions and axle load limits;
- limitations on the ability of heavy vehicles to accelerate, brake, ascend grades and negotiate corners;
- heavy transport issues, legal requirements and permit systems;

- road and traffic engineering; and
- road safety concepts and principles.

When considering a potential route, the assessor is advised to initially perform a desktop assessment using all available information. In some cases this initial assessment will identify particular physical constraints, such as bridge load limits and road width deficiencies, which may render the route unacceptable without the need for further assessment.

Heavy vehicle use of a route may have some negative effects in terms of the environment, community and traffic. Assessors can recommend variations to the initially proposed route to reduce such impacts.

Note:

Before using a RAV on any road, it is necessary to obtain the approval of Main Roads Western Australia. Before making a decision on an application for route access, Main Roads may deem it necessary to do any or all of the following:

- **perform a further assessment of the route;**
- **assess the stability of the vehicle and load;**
- **assess the suitability of the road pavement;**
- **assess the suitability of all bridges on the proposed route to accommodate the specific vehicle;**
- **specify conditions of access such as speed limits, hours of operation or accreditation requirements;**
- **obtain Local Government agreement for the proposed route (for all operators); and**
- **recommend a number of road improvements as conditions of approval.**

1.3 Further Assistance

Additional information and guidance is available from Main Roads Heavy Vehicle Operations Branch Policy and Access Planning Section on telephone (08) 9311 8450.

2.4 Townsite Road Widths

There are a number of width requirements to be considered for RAVs travelling in urban and townsite areas. As well as accommodating the additional swept width of RAVs, the width requirements for such activities as cycling and kerbside parking also need to be taken into account. The minimum road width requirements in townsite areas are listed in Appendix C (page 25).

Note: There is no 75 vehicles per day traffic volume upper limit as applies to narrower, very low volume rural roads.

The route should be further evaluated if the road width in townsite areas is less than the applicable width shown in Appendix C.

2.5 Provision for Overtaking

RAVs tend to operate at lower average speeds than light vehicles. If the road does not have sufficient overtaking opportunities, drivers of light vehicles may experience delays behind slower moving RAVs and in some cases may form "queues" of vehicles waiting to overtake. This may cause driver frustration and thereby increase the risk of drivers attempting to overtake when it is not safe. Therefore it is essential, from a road safety perspective, to have adequate overtaking opportunities on a RAV route.

It is recommended that AADT figures are used to assess overtaking opportunities, but the assessor should consider the impact of seasonal traffic during the assessment as the AADT could be less than seasonal peak traffic volume.

The volume of traffic and percentage of RAVs on the route affects the requirement for overtaking opportunities. To assess suitability of overtaking, an AADT derived using the Passenger Car Equivalence (PCE) factors (table 3) shall be used. PCE factors represent the equivalent number of light vehicles for a particular type of RAV or general access heavy vehicle. The use of PCE factors provides a derived AADT value that can then be used to better assess overtaking opportunities.

Table 3: Passenger Car Equivalence Factors for RAVs

Vehicle Types		PCE Factors on Flat Terrain	PCE Factors on Rolling Terrain
Austroads Class 2		1	1.3
Austroads Class 3 to 5		2	3.5
Austroads Class 6 to 9		2.5	5
Austroads Class 10	RAVs Categories 2-4	4	10
Austroads Class 11	RAVs Categories 5-8	4	10
Austroads Class 12	RAVs Categories 9-10	9	22

The suitability criteria for provision of overtaking opportunities are shown in Table 4 (on the following page). In all cases, the assessment of steep ascending grades in Section 2.6.1 (page 11) must be performed separately.

APPENDIX C – TOWNSITE ROAD MINIMUM WIDTHS

Feature	RAVs Categories 2-4		RAVs Categories 5-8		RAVs Categories 9-10	
	60 - 70 km/h	80-100 km/h	60 - 70 km/h	80-100 km/h	60 - 70 km/h	80-100 km/h
(Undivided carriageway – 2 Way) Width between sealed edge and road centre (m)						
basic	3.2	3.5	3.3	3.7	3.6	4.1
with marked separation line	3.5	3.8	3.6	4.0	3.9	4.4
with on-road cyclists	4.7	5.5	4.8	5.7	5.1	6.1
with regular parallel parking	5.7	NA	5.8	NA	6.1	NA
with regular angle (45°) parking	9.2	NA	9.3	NA	9.6	NA
(Divided carriageway – single lane) Width between sealed edge and edge of median or traffic island (m)						
basic	3.5	3.8	3.6	4.0	3.9	4.4
with on-road cyclists	5.0	5.8	5.1	6.0	5.4	6.4
with regular parallel parking	6.0	NA	6.1	NA	6.4	NA
with regular angle (45°) parking	9.5	NA	9.6	NA	9.9	NA
(Undivided carriageway – 2 lanes) Width between sealed edge and road centre (m)						
basic	6.6	7.0	6.7	7.1	7.0	7.5
with on-road cyclists	8.1	9.0	8.2	9.1	8.5	9.5
with regular parallel parking	9.1	NA	9.2	NA	9.5	NA
(Divided carriageway – 2 lanes) Width between sealed edge and edge of median or traffic island (m)						
basic	6.6	7.0	6.7	7.1	7.0	7.5
with on-road cyclists	8.1	9.0	8.2	9.1	8.5	9.5
with regular parallel parking	9.1	NA	9.2	NA	9.5	NA
(Multiple Lane Carriageways – 3 or more lanes) Width of additional through lane (m)						
basic	3.2	3.4	3.3	3.5	3.4	3.6

Stopping sight distances for RAVs are shown in Appendix D (page 26). Minimum visibility distances for light vehicles (cars) on the through road are shown in Table 9.

Table 9 Minimum visibility distances for light vehicles on the through road

Speed limit on the through road	Minimum stopping sight distance for light vehicles on the through road
80 km/h	105 m
110 km/h	190 m

2.8 Turning at Intersections

It is essential that intersections can be safely negotiated, with minimal or no interference to other traffic.

2.8.1 Vehicle Speed While Negotiating the Turn

The vehicle turning radius is directly related to the maximum turning speed of the vehicle as shown in the table at Appendix E (page 27).

- For intersections where the vehicle must always stop before turning (e.g.: at a Stop sign), a turning speed of 15 km/h or less is generally sufficient.
- For intersections where the vehicle rarely or never needs to stop before turning, a speed of 20 km/h or 30 km/h could be assumed.
- Where following traffic is likely to be slowed as a result of the RAV turning off a high traffic road, a high turning speed (30 km/h or greater) is desirable, to minimise disturbance to traffic.

2.8.2 Turning Clearances

Appendix E (page 27) shows the approximate envelope of the turning vehicle and can be used as a quick check to determine whether the cornering radii are adequate. Where there is any possibility that the RAV may have insufficient clearance from kerbs or other nearby objects, standard turning templates shall be used to accurately check the swept path of the RAV. The appropriate turning template shall be superimposed over a suitably scaled drawing of the intersection and any clearance problems shall be noted on the assessment form. As a rule:

- The wheel paths of the rear trailer of the RAV must not come any closer than 200 mm from the face of any kerb;
- No part of the vehicle shall overhang a kerb;
- If there is no kerb (such as a gravel road), the edge of the road formation can be taken as the kerb;
- The overhang path must not come any closer than 200 mm to a nearby object;
- For a left turn, the wheel paths must not cross into the path of oncoming traffic. An exception is for a left turn into a road with single broken central line marking or no central line marking, where encroachment over the centreline may be acceptable where traffic volumes are low (e.g. AADT / vpd less than 250) and the sight distances to all directions of the intersection are adequate according to Appendix D (page 26).

APPENDIX E – VEHICLE PATH TURNING RADII

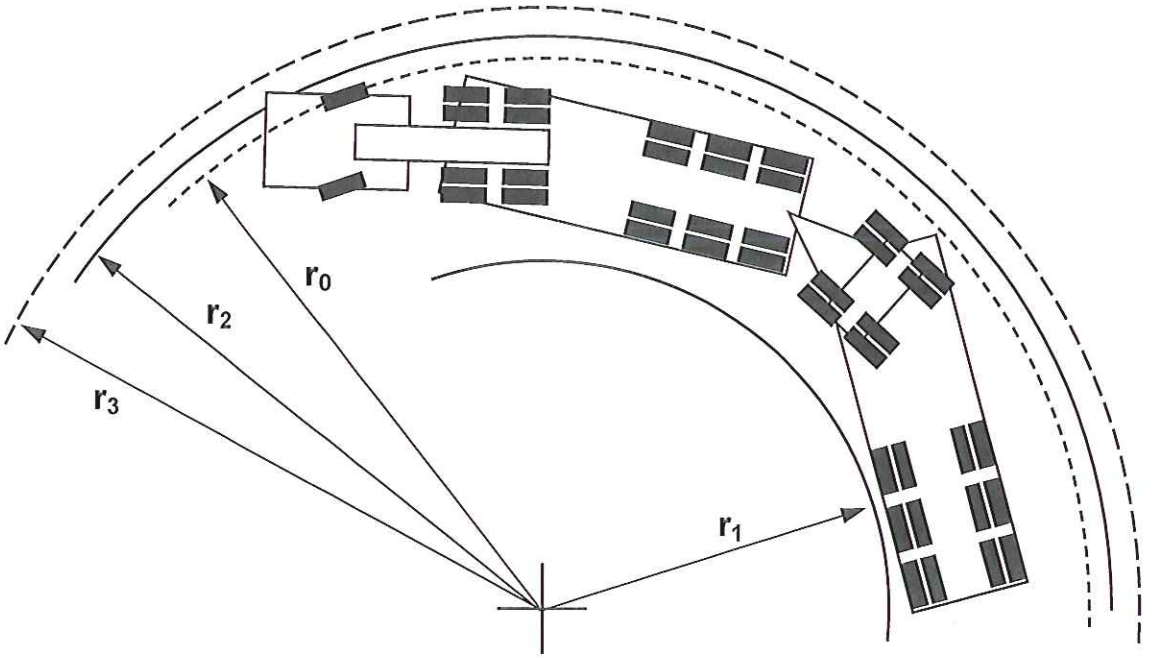
Vehicle Type	Maximum Speed km/h	r_0	Minimum r_2	Minimum r_3	Maximum r_1 (m) for angle of turn					
		m	m	m	30° turn	60° turn	90° turn	120° turn	150° turn	180° turn
RAVs Categories 2-4	0-5	15	15.6	16.5	9.8	9	7	6.1	5.5	5
	5-15	20	20.6	21.5	14.9	13.7	12.9	12.5	12.2	12.1
	20-30	30	30.6	31.5	25.3	24.4	24.3	24.1	24	24
RAVs Categories 5-8	0-5	15	15.6	16.5	9.3	7.2	5.5	4	Not suitable for on-road situation	
	5-15	20	20.6	21.5	14.4	12.6	11.6	10.8	10.2	9.9
	20-30	30	30.6	31.5	24.8	23.7	23.1	23	22.9	22.9
RAVs Categories 9-10	0-5	15	15.6	16.5	8.5	5.8	3.4	1	Not suitable for on-road situation	
	5-15	20	20.6	21.5	13.8	11.4	9.5	8.1	7	6.1
	20-30	30	30.6	31.5	24.2	22.4	21.4	21	20.8	20.7

r_0 = Radius of outside front wheel path

r_1 = Maximum radius of inner kerb = Radius of inside rear wheel path - 0.2 m

r_2 = Minimum radius of outer kerb = r_0 + 0.2 m

r_3 = Minimum clearance radius for front overhang = Path of front overhang + 0.2 m



3.2 Vibration

Where the RAV route passes close to abutting development there may be adverse impacts upon people and property due to vibration.

The assessor shall consider whether the introduction of the RAVs onto the route has potential to cause significant vibration impact by considering:

- distance to buildings and their use and condition;
- road roughness; and
- uneven drainage gullies and manhole covers.

Where vibration impacts are expected to be significant the assessor shall consider mitigative options such as road surface improvements and alternative routes.

3.3 Smell

Some types of RAV, such as stock trucks, produce undesirable odours. The effect is greatest when these vehicles remain in communities whilst on route, such as when held up in traffic and at intersections. Assessors shall consider this aspect and make recommendations to reduce such problems, such as modifications to the proposed route.

3.4 Dust

Where the RAV route passes close to abutting development there may be adverse impacts upon people and property due to dust, especially where a route is unsealed.

The assessor shall consider whether the introduction of the RAVs onto the route has potential to cause significant dust impact by considering:

- distance to buildings and their use;
- likely numbers of RAVs using the route; and
- likelihood of significant amounts of dust being produced by RAVs.

Where dust impacts are expected to be significant the assessor shall consider mitigative options such as alternative routes, possibility of sealing road sections and speed restrictions.

3.5 Community Consultation

In line with Government policy, Main Roads may require a route that has been given a favourable assessment using these guidelines to undergo a community consultation phase. Main Roads, with input from the relevant Local Government, will determine the need for community consultation on a case-by-case basis.

In such cases the requirements of Main Roads Document, *Community Involvement Long Vehicle and Road Train Routes* will apply (Main Roads website: www.mainroads.wa.gov.au under *Heavy Vehicles* > *Policy/planning* > *Policy Documents*).