Technical Note

Pavements in Poor Condition

TN 109

Introduction

This Technical Note provides guidance on identifying pavements in "Poor Condition" in accordance with VicRoads *Managing Pavements in Poor Condition Policy*. It includes information on the factors that need to be assessed in determining if a pavement should be considered as being in 'Poor Condition'. These factors include the type and extent of pavement and surfacing distress.

A pavement in "Poor Condition" is a section of pavement that contains distress of significant severity that could adversely impact the safety of road users. Consideration needs to be given to what road users could reasonably expect in relation to the level of service provided by the road, given the road environment (e.g road alignment, speed limit, road cross-section, general pavement condition, adjacent land use) and road user types (e.g passenger vehicles, cyclists, motorcyclists, freight vehicles).

Road sections with good pavement condition that do not meet current standards for alignment and/or width are not considered to be pavements in "Poor Condition" as the alignment and lane widths are a permanent feature of the road.

Where a pavement has been assessed as being in "Poor Condition" but cannot be remediated immediately, the following mitigation measures may be applied:

- Road closure and diversion of traffic
- Speed reduction
- Warning signs e.g Slippery When Wet

Refer to VicRoads *"Managing Pavements in Poor Condition Policy" and "Guidelines for Signing Roads in Poor Condition"* for details.

Pavement Distress

Pavements can display many types of defects. Broad types of pavement distress are:

- Deformation e.g rutting, shoving, depressions
- Cracking e.g crocodile, transverse, longitudinal
- Surface texture e.g flushing, stripping
- Edge defects
- Potholes.

The attributes of these distress types which initiate intervention, are defined in VicRoads Standard Specification Section 750 *Routine Maintenance*. However, the required extent to which these defects occur for the site to be considered in "Poor Condition" requires judgment. Key issues to consider include whether the severity and extent of the defect(s):

- adversely impact on the level of service provided with respect to safety, and
- frequently recur before the next routine maintenance inspection.

Candidate Sites

Sites that are generally considered for assessment against the requirements VicRoads *Managing Pavements in Poor Condition Policy* are:

- proposed rehabilitation sites
- flushed surface sites.

These sites can be defined as high risk where there is significant concern regarding pavement condition posing a high road safety risk to road users (as defined in the VicRoads *Managing Pavements in Poor Condition Policy).*

Proposed rehabilitation sites and flushed surface sites may be assessed for priority treatment using VicRoads *Pavements in Poor Condition Checklist* (attached to this Technical Note).

Proposed Rehabilitation sites are generally visually identified as sites that have significant distress and most likely require a structural treatment.

Rehabilitation sites that are considered 'High Risk sites' due to the impact on safety for road users are therefore 'Pavements in Poor Condition'. These sites may have a higher priority for treatment than other rehabilitation sites that are being considered for rehabilitation for other reasons (e.g whole of life pavement cost).

Examples of defects that can lead to the need for permanent signage on road sections are as follows:

Potholes – a significant number within a short area. Refer Figures 1 and 2. These areas have a history of potholes occurring between the routine maintenance inspections.

Shape loss – a significant deformation within a short area. Shape loss such as rutting, shoving, and depressions can affect the ride quality and vehicle stability for road users. Shape loss is a greater concern in high speed environments (generally greater than 80 km/hr). Refer Figures 3 and 4. These areas have a history of continued shape loss especially after rain.

Examples of shape loss affecting safety may also include areas that road users are avoiding or slowing down through.

Failed pavement areas – significant/extensive failed pavement which affects the ride quality or vehicle stability, or results in pavement material becoming dislodged. Refer Figures 5 and 6.

Flushed sites are sites that provide low skid resistance. A flushed site can be assessed as a pavement in 'Poor Condition' as a result of the safety impact it may have on road users. Extended lengths (greater than 50 metres) of slick surfaces in both wheel paths may affect road user safety. Refer Figures 7 to 9 for examples. The assessment of sites where concern has been raised regarding the level of skid resistance should be assessed in accordance with Technical Note 110 (Measurement and Interpretation of Skid Resistance Using SCRIM)

Pavements Not in Poor Condition

Some pavement and surfacing defects are less likely to affect the safety of road users. These types of defects are generally considered for treatment as part of the routine maintenance program within a defined response time. Typical examples of these include:

- Potholes within the intervention levels of VicRoads Standard Specification Section 750 *Routine Maintenance*
- Wheel ruts or depressions within the levels of VicRoads Standard Specification Section 750 *Routine Maintenance*
- Minor stripping of aggregate from sprayed seals
- Cracking.

References

VicRoads *Managing Pavements in Poor Condition Policy*, 2015, www.vicroads.vic.gov.au

VicRoads Standard Specification Section 750 *Routine Maintenance,* www.vicroads.vic.gov.au

VicRoads *Guideline for Signing Roads in Poor Condition*

VicRoads *Technical Note 110 - Measurement and Interpretation of Skid Resistance Using SCRIM*

Figure 1. Significant number of potholes.

Figure 2. Significant number of potholes.

Figure 3. Significant shape loss.

Figure 4. Significant failed patches with shape loss.

Figure 7. Significant flushed wheelpaths in a 100kph zone.

Figure 5. Significant failed areas with shape loss and loose pieces of pavement.

Figure 8. Significant flushed wheel paths in a 100kph zone.

Figure 6. Significant failed area with loose pieces of pavement.

Figure 9. Close-up of flushed surface.

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Technical Note - Revision Summary

TN 109 Pavements in Poor Condition

Date	Clause Number	Description of Revision	Authorised by
June 2018	Introduction	Addition of mitigation measures	Principal Advisor – Pavements, Geotech & Materials
November 2015	All	New document	Principal Advisor – Pavements, Geotech & Materials

Pavements in Poor Condition Checklist

1. Site Location Description

Road No.		Road Name	
Start Chainage		Road Section From	
End Chainage		Road Section To	
Melways/ VCD		LGA	

2. Field Investigation Details

Inspection Date		Day/ night
Road Surface	Wet/ dry	Clean/ dirty or dusty
Inspected by		

3. Site Conditions

Pavement Risk Factors

Component	Condition	Circle your selection	Comments/observations
Does the area display significant potholes?	No	0	
	Yes	3	
Pavement shape that could affect the stability of a vehicle?	Flat, smooth	0	
	Uneven & bumpy, rough ride	3	
Surface includes flushed/slippery areas >50m length	No	0	
	Yes	3	

Triggers for a Driver's Sudden Reaction

Component	Condition	Circle your selection	Comments/observations
Is pavement free of areas where ponding or sheet flow of water could contribute to safety problems (e.g. rutting)?	Yes	0	
	No	2	
Stopping sight distance is (Refer Austroads Guide to Road Design Part 3, Table 5.4 – Stopping sight distances for cars on sealed roads	Adequate	0	
	Inadequate	5	

Consequence of Losing Control

Component	Condition	Circle your selection	Comments/observations
Is lane width appropriate? (Refer VicRoads supplement to Austroads Guide to Road Design – Part 3, Table V4.1 and V4.2)	Yes	0	
	No	1	
Rural: Is shoulder width appropriate? (Refer VicRoads supplement to Austroads Guide to Road Design – Part 3, Table V4.1 and V4.2)	Yes	0	
	No	1	
Rural: Are shoulders sealed to minimum width? (Refer VicRoads Supplement to Austroads Guide to Road Design – Part 3, Table V4.1 and V4.2)	Yes	0	
	No	2	
Rural: If the shoulders are not sealed to minimum width, then is the transition from pavement to shoulder free of hazardous edge drop-offs?	Yes	0	
	No	1	
Sign and lighting supports, power poles etc. (Refer VicRoads Supplement to Austroads Guide to Road Design – Part 6, Figure V4.1)	Out of clear zone	0	
	In clear zone but frangible or shielded	1	
	In clear zone but rigid or un-protected	2	
Clear zone width clear of trees, rocks, etc. – and unsafe batters (cut or fill), etc. (Refer VicRoads Supplement to Austroads Guide to Road Design – Part 6, Figure V4.1)	Yes	0	
	No – but barriers in place	1	
	No – and no barriers in place either	2	

4. Additional Risk Factors

Component	Condition	Circle your selection	Comments/observations
Number of recorded crashes on site in last 5 years	≤ 3	0	
	≥ 3	5	
Community concern	Not raised by the community	0	
	Raised by community (1 – 2 times)	3	
	Frequently raised by community (3 or more times)	5	
Speed Zone	≤ 80kph	3	
	100kph	10	
Traffic score. The AADT shall be used as follows: • For undivided two–way roads, use the total AADT (both directions of travel) • For divided carriageways, use the AADT for the carriageway that contains the Pavement in Poor Condition (AADT = Annual Average Daily Traffic)	Light	0	0 < AADT <500
	Medium	5	501 < AADT < 1,500
	Heavy	7	1,501 < AADT < 7,000
	Urban	10	7,001 < AADT
Heavy Vehicles in %	Low	0	HV <5%
	Medium	5	5% < HV <10%
	High	7	10% < HV
Have signs been installed due to the condition of the pavement?	Warning signs	5	
	Speed Advisory signs	7	
	Regulatory signs	10	
Site Ranking Score = (Total of Sections 3 and 4)			

Concluding summary of comments & observations:

Table V4.1: Urban Freeway Widths

Element	Lane/Shoulder Width (m)	Comments
Traffic lane ([1])	3.5	General traffic lane width
Lane width on interchange ramps	3.5 – 4.5	Range of lane widths on interchange ramps (refer VicRoads Supplement to AGRD Part 4C for freeway ramp widths)
Left Shoulder ([2]) (sealed for the full width)	3.0 ([3])	Minimum shoulder width adjacent to a safety barrier Minimum shoulder widths on freeways of 3 or more lanes
Median Shoulder ([2]) (sealed for the full width)	3.0 ([3])	Minimum shoulder width adjacent to a safety barrier Minimum shoulder widths on freeways of 3 or more lanes

Notes:

1. Traffic lane widths include lane lines but are exclusive of edge lines.
2. Shoulder widths may be locally narrowed where there are overpass bridge piers or similar large constraint. Designers should maintain at least minimum clearances/offsets from traffic lanes to barriers where locally narrowing shoulders.
3. A 3.0m wide shoulder enables a truck to stop clear of the traffic lane.

Table V4.2: Widths of Rural Carriageway Elements (from RDG Table 3.6.3)

Classification [(5)] and (AADT)	Lane Widths (m)	Shoulder Widths (m)	Sealed Shoulder (m)	Total Seal (m)	Carriageway (m)
M	Duplicated Carriageway 2 x 3.5 each	LHS 3.0 RHS 1.0	LHS 3.0 RHS 1.0	11.0 each	11.0 [(2)] each
A (AADT<1500) (AADT>1500)	 2 x 3.3 2 x 3.5	 2.0 2.5	 1.5 1.5	 9.6 10.0 [(3)]	 10.6 12.0 [(2)]
B (AADT<1500) (AADT>1500)	 2 x 3.3 2 x 3.5 [(1)]	 2.0 2.0	 0 [(4)] 1	 6.6 9.0 [(3)]	 10.6 [(2)] 11.0
C [(6)] (AADT<1500) (AADT>1500)	 2 x 3.1 2 x 3.5 [(1)]	 2.0 2.0	 0 [(4)] 0 [(4)]	 6.2 7.0 [(3)]	 10.2 11.0
Local access (51 – 150)	1 x 4.0	1.5	NA	4.0	7.0
Private access (1 – 50)	1 x 3.0	2.0	NA	Unsealed	7.0

Notes

1. Where there are more than 500 trucks ADT two way on roads with unsealed shoulders
   a. Traffic lanes may be widened to 3.7 m, and
   b. Total seal on curves may be widened to provide tracking widths in Table V7.3.
2. Minimum standard prescribed in Victoria's Rural Arterial Road Network Strategy - Draft (VicRoads, 2010).
3. Where road radius is less than 200 m, sealed width should be increased to provide tracking width in Table V7.3.
4. 1.0m sealed shoulder on designated tourist routes, designated tourist cyclists routes, Principal Freight Network and where warranted by accident record.
5. For definitions of M, A, B, C Roads, see Section 2.2 of the Supplement.
6. On routes less than 200 v.p.d, generally maintain existing pavement and widths on 'C' roads unless upgrading is warranted by exceptional traffic volumes or by crash records. New works in excess of 100m length will be constructed to the specified standards.

Tables V4.1 and V4.2 are taken from the *VicRoads Supplement to Austroads Guide to Road Design – Part 3.*