

GUIDE FOR PAVEMENT INVESTIGATIONS

INTRODUCTION

Appropriate pavement investigation is necessary to ensure the adequacy and cost efficiencies of the pavement design or treatment, and to avoid costly construction problems due to unforeseen variations in pavement/subgrade composition and strength.

The purpose of this document is to provide road asset managers and practitioners with a simple and practical guide for the planning of pavement investigations. The guide does not cover all situations and sound judgement and specialist advice is required for successful solutions.

The types of investigations differ between proposed pavements on 'greenfield' sites and proposals for rehabilitation. The emphasis on 'greenfield' sites is on ground conditions and subgrade support whilst for rehabilitation it is on assessing past pavement performance and predicting future treatment life. Some projects may require investigations for both 'greenfield' and existing pavement sites (i.e widening and duplication or widening with rehabilitation).

PAVEMENT REHABILITATION

The objective of pavement investigations for rehabilitation projects is to obtain information regarding pavement performance to date and to identify treatment options and their predicted lives. The most cost effective treatment can then be determined.

Desktop Investigations

Prior to any field investigation a desktop study should be conducted to determine what information is available on existing ground conditions. This study should identify any available information about previous investigations, discussions and possible constraints which may impact on the works.

Visual Inspections

A visual inspection should be undertaken to:

- Determine the condition of the existing pavement such as surfacing type and condition, deformation, cracking, edge defects and shoulders, patches and potholes
- General site conditions such as topography,

geology, drainage, site constraints, services, road geometry and land use.

- Record the type, severity and extent of pavement distress.
- Identify any constraints on the type and extent of possible treatments.

Subgrade Investigations

The support provided by the subgrade is one of the most important factors in determining pavement design thickness, composition and performance. This subgrade support is dependent on soil type, material density and moisture content during construction and inservice.

Pavement Materials Investigation

To identify the causes of pavement distress and provide information for construction, the existing pavement composition needs to be determined. Generally pavement materials types and thicknesses are determined through excavation of a small area of pavement. Insitu strength testing of the subgrade may also be undertaken. Sometimes this can be achieved by coring of the asphalt.

Pavement Surface Investigation

Wherever possible, forms of non-destructive testing should be used to assess the condition of an existing pavement and to assist in locating sites for pavement material investigations. A number of techniques have been developed to provide information on pavement deterioration which include pavement deflection testing, skid resistance testing, ground penetrating radar, surface condition testing (ie ride quality or roughness, surface texture, rutting, etc.) and surface condition rating.

Pavement Strength Investigations

To more accurately predict the life of potential rehabilitation treatments, deflection testing of the existing pavement is required to assess pavement strength. Deflection test results can be used to predict the likelihood of pavement rutting and cracking and identify causes of pavement distress. This enables appropriate pavement treatments to be selected and assessed for cost effectiveness. Deflection testing is routinely undertaken in Victoria using the PaSE deflectograph.

NEW PAVEMENTS

The objective of investigations for ‘greenfield’ sites is to:

- Estimate a value of subgrade support for use in design Identify potential uses of site materials, and
- Identify any constructability issues and the presence of groundwater.

Desktop Investigations - As for pavement rehabilitation.

Visual Inspections

A visual inspection should be undertaken to obtain an understanding of the characteristics of the site such as terrain, geology, hydrology, soil drainage, etc., and to ensure that any subsequent testing is properly targeted.

Subgrade Investigations

A site investigation should be carried out along the alignment of the proposed new road to identify the extent and condition of the various soils likely to be encountered. The investigation can involve either insitu testing or excavation of a series of test holes from which soil samples are obtained for further assessment in the laboratory. The frequency of test holes will vary according to the length and importance of road, variability of site and risks associated with both design and construction.

BASIS OF INVESTIGATIONS

The minimum requirements for pavement investigations shall be as shown in the Table 1 below.

For works greater than or equal to \$150K, designs should be prepared by prequalified consultants at RM3 for pavement rehabilitation works and ND3 for new pavement construction.

A desktop investigation and site inspection should be undertaken on all projects during the development stage and prior to the project bid being submitted. The more detailed investigations (eg. subgrade, pavement materials, surface and strength) should be undertaken during the development stage for those projects that are high priority or where the project cost is likely to be significantly influenced by the investigation.

REFERENCES:

- Technical Bulletin 33: Pavement Strength Evaluation and Rehabilitation.
- Technical Bulletin 40: Pavement Investigation - Guide to Field Inspection and Testing

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Table 1.

Type of Investigation	Pavement Rehabilitation Project Cost		New Pavement ^{1,2}
	Less than \$150K	\$150K or greater ¹	
Desktop	Yes	Yes	Yes
Visual Inspection ³	Yes	Yes	Yes
Subgrade		Yes	Yes
Pavement Materials		Yes	
Pavement Surface		Yes	
Pavement Strength		Yes	

Notes:

1. Number of test sites may be increased for major works.
2. For minor works, detailed on site investigations may not be required.
3. Visual assessment to be undertaken by qualified personnel.

GeoPave believes this publication to be correct at the time of printing and does not accept responsibility for any consequences arising from the use of the information herein. Readers should rely on individual judgement and skill to apply information to particular issues.

GUIDE TO PAVEMENT / SUBGRADE INVESTIGATIONS

