

Project Appraisal Guidelines

Unit 5.6 Reporting

February 2011

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1 Introduction

Overview

- 1.1. This Unit of the Project Appraisal Guidelines provides guidance on the structure and content of the Traffic Modelling Plan (TMP) and Traffic Modelling Report (TMR).
- 1.2. The TMP is the first deliverable of the modelling exercises, and functions as a scoping document for the traffic modelling inputs – this can allow an understanding of the proposed methodologies before any significant data collection or modelling decisions take place.
- 1.3. The TMR is produced after the modelling work has been completed. The purpose of the TMR is to describe the work that has been undertaken and make the case for using the transport model as the basis for the appraisal of the scheme. It therefore needs to describe in some detail the way in which the model has been built and provide evidence that it is sufficiently capable of reflecting observed conditions. The TMR should also make clear the basis for any forecasts produced by the model and provide a clear view of the impact of the scheme that is being assessed.

2. Contents of the Traffic Modelling Plan

- 2.1. The TMP should set out in detail the proposed approach to the traffic modelling that is necessary to support the development of a scheme. The required content is as follows:
 - An introduction, which provides details on the background of the project and the key objectives to be met;
 - The Study Area, which clearly identifies the study boundary of the proposed model within which the scheme impacts will be assessed, and any basis for this Study Area;
 - Relevant Data Requirements, which reviews existing data that may be available (e.g. origin-destination surveys, mapping resources, and existing national, regional or local models), and sets out proposed additional data to be collected;
 - Modelling Methodology, which describes the type of model (static, assignment or variable demand model), the software to be used, the forecast years to be assessed and the complexity of the modelled network; and
 - Proposals for Traffic Forecasting, which will highlight any proposed allowable deviations from the basic guidance set out in *PAG Unit 5.3: Traffic Forecasting*.

3. Contents of the Traffic Modelling Report

- 3.1. The detailed requirements of the Traffic Modelling Report are specified in the TMR Checklist in Table 5.6.1, but the structure of the document should, as a minimum, cover the following elements:
 - Introduction;
 - Data Collection;

- Network Development;
 - Matrix Development;
 - Model Calibration & Validation; and
 - Traffic Forecasting.
- 3.2. It is likely that much of the information presented in the TMP will be incorporated into the TMR at the reporting stage of a project.

Introduction

- 3.3. A description of the scheme, its location, and the objectives that it is required to address. Any information on previous analysis relevant to the scheme should also be noted.

Data Collection

- 3.4. The data collection section should provide a summary of any transport data that has been collected in order to build the models. This will include project specific surveys (e.g. traffic counts), data collected from other sources (e.g. census data) as well as information obtained from other models (e.g. regional / national models or earlier versions of the scheme model). It should enable the reader to understand what data has been used in building the model and what the quality of that data is.

Network Development

- 3.5. This section should clearly describe the nature and extent of the model network and zoning system. The data used to develop the model cordon should also be described. Zone plans should be included as legible diagrams within the report.

Matrix Development

- 3.6. The Matrix Development section should summarise the process by which the relevant matrices were constructed using the available data. It should show how the various data sets have been used to construct the matrices, and any necessary processing of such data where necessary.

Model Calibration and Validation

- 3.7. The model build and validation section should describe how the model was built and provide evidence that it is capable of reflecting conditions as they are observed on the network. It will therefore contain comparisons of model output to a number of observed data sets such as link counts, turning counts and journey time surveys. The validation standards that are expected of models are set out in *PAG Unit 5.2: Construction of Transport Models*. Ultimately the report needs to demonstrate that the model is fit for purpose.
- 3.8. A good understanding of existing travel patterns through the study area should be presented by an analysis of the key desire lines from the model. This analysis of desire lines should be achieved through the definition of 'sectors' which represent

areas of the traffic model. The results should be presented in diagrammatic form using colour and bandwidth thickness to illustrate travel demand. An example is provided in Figure 5.6.1.

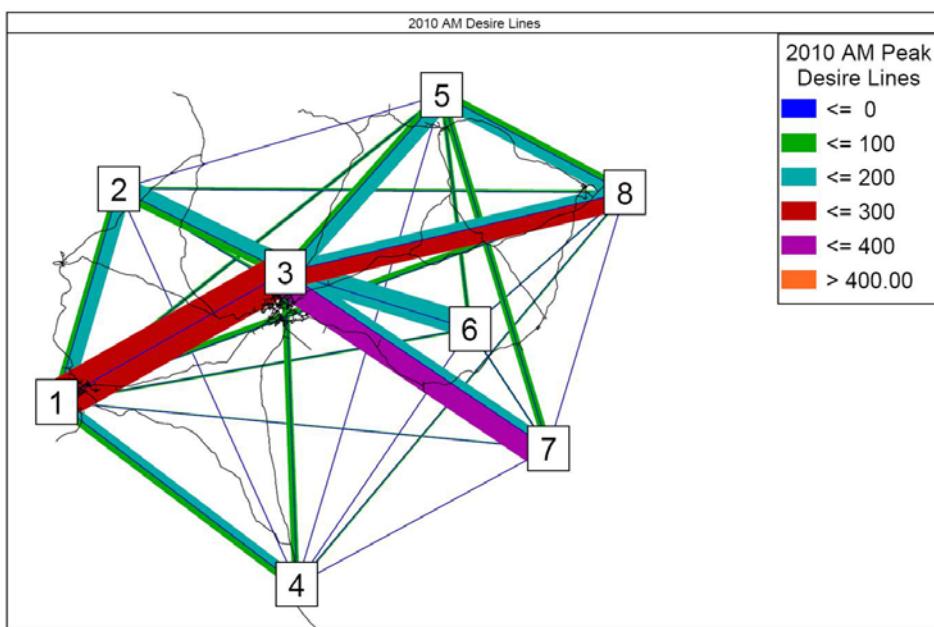


Figure 5.6.1: Sector Desire Lines Example

Traffic Forecasting

- 3.9. The purpose of the forecasting element of the report is to illustrate what the model predicts would happen if the scheme was built, and how this compares to what would happen if it was not. It should make clear the procedures which have been made as part of the forecasting process, and indicate the range of results which would occur if those assumptions were to change, as it is important that the forecasting work recognises the uncertainties associated with predictions about future events.

- 3.10. The report must contain an assessment of the impact of traffic forecasting on key demand indicators to verify that the outputs from the traffic forecasting process are sensible. A comparison of trip length distribution in the Base and future year models represents a check that the outputs from the traffic forecasting process are sensible. This comparison should be presented in a graphical format as illustrated in Figure 5.6.2.

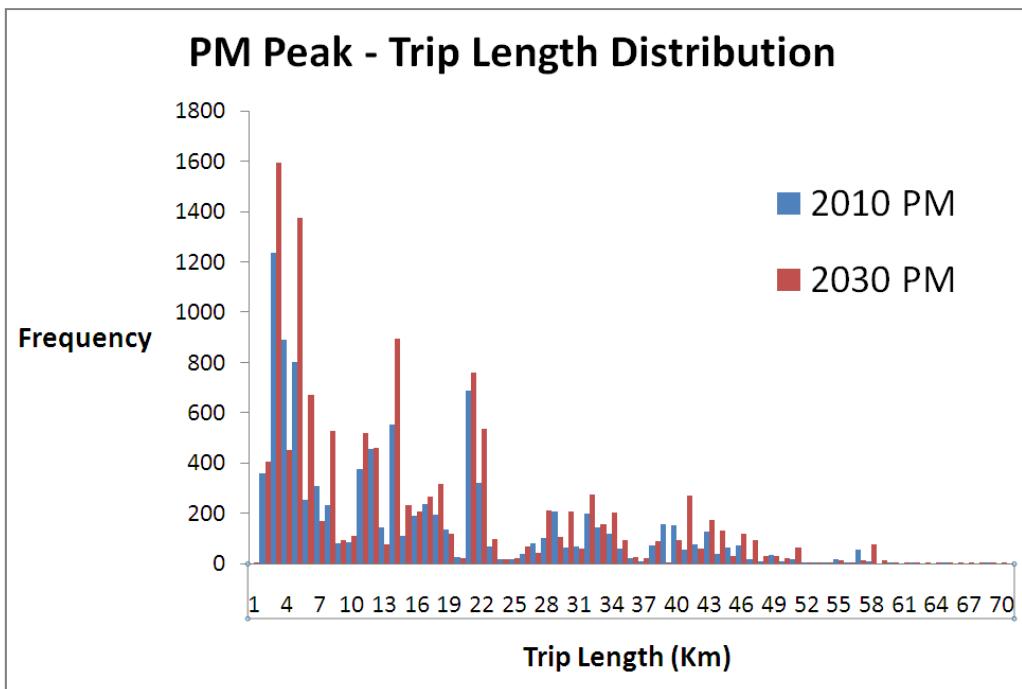


Figure 5.6.2: Sample Trip Length Distribution

- 3.11. An assessment of the Trip End Growth (TEG) between the Base and future year demand will determine if there are any significant changes in demand at zonal level compared to the overall growth between the two scenarios. In order to assess the true magnitude of Trip End Growth, the GEH statistic must be applied to the Base and future year trip ends in order to take account of not only the difference between the Base and future year demand, but also the magnitude of the difference. A GEH statistic exceeding 10 requires investigation. An example is illustrated in Figure 5.6.3.

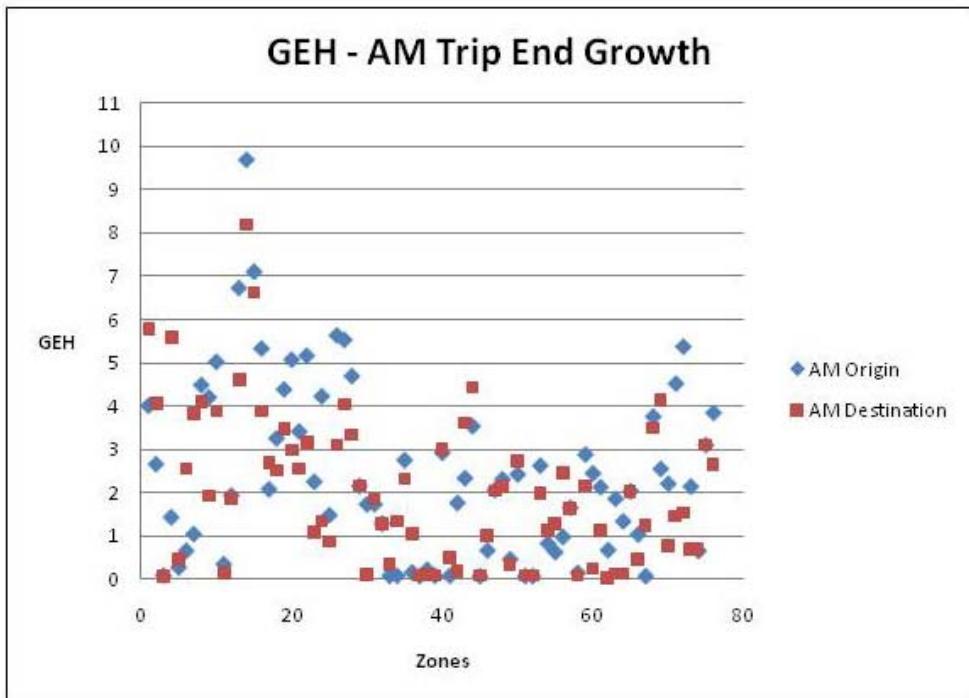


Figure 5.6.3: Trip End Growth Comparison Example

- 3.12. The same procedure for Trip End Growth must also be undertaken for zone to zone growth as illustrated in Figure 5.6.4. Again, a GEH statistic exceeding 10 should be investigated.

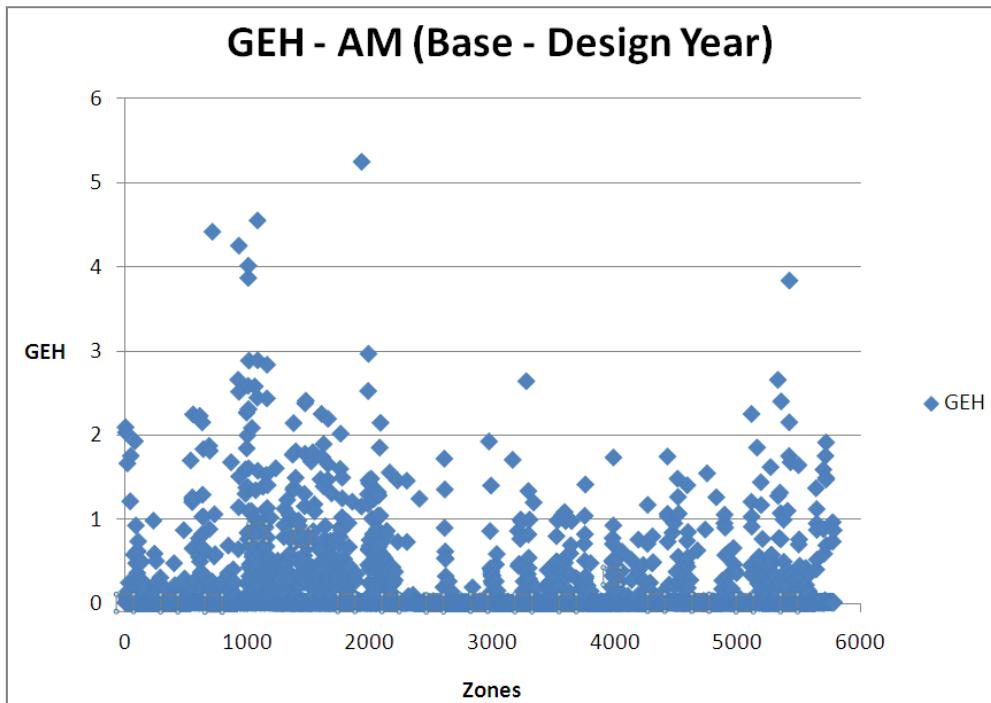


Figure 5.6.4: Zone to Zone Growth Comparison Example

- 3.13. A detailed schedule of the required content of the TMR is outlined below in Table 5.6.1. All raw data used in the development of the models, as well as the models themselves, should be delivered to the NRA SPU along with the draft Traffic Modelling Report for review.
- 3.14. A sample Traffic Modelling Report is provided in *PAG Unit 20.3: Sample Traffic Modelling Report*.

Table 5.6.1: Traffic Modelling Report Checklist

Chapter	Details
Introduction / Context	<ul style="list-style-type: none"> • Description of the purpose of the forecasting process and the scheme(s) being assessed. • References to all other relevant reports.
Matrix Development	<ul style="list-style-type: none"> • Background / justification for choice of forecast year(s). • Tabulation of growth rates used & confirmation of their agreement with NRA national values. • Description of how official national growth rates are used. • Explanation of how highway growth rates relate to other components of the model system. • Description of how specific developments are reflected. • Explanation of how the various sources of growth are reconciled. • Derivation of 12 hour or AADT flows e.g. 12 Hour = (2 * AM Peak) + (8 * Inter Peak) + (2 * PM Peak). • Specification of any demand constraint mechanism employed. • Results obtained from any demand constraint mechanism including quantification of numbers of suppressed / induced trips. • Comparison of final / output growth rate with that from national forecasts. • Consideration of all the above for "high" and "low" growth scenarios.
Network Development	<ul style="list-style-type: none"> • Description and supporting diagrams of Do-Minimum and Do-Something schemes. • Justification for inclusion of all the above schemes (including references to official documents and key correspondence). • Description of changes made to the forecast model networks to represent these schemes. • Assessment of the effect on base year model validation of any forecast network changes which are not part of the scheme itself but which have been introduced to ensure meaningful modelling of the scheme (e.g. addition of minor side roads in the forecast year to model the impact of junction improvements). • Explanation of any sensitivity tests to investigate the impact of uncertain schemes.
Forecast Assignments	<ul style="list-style-type: none"> • Assignment approach used (fixed demand / variable demand). • Confirmation that assignment approach used is compatible with base year. • List of deviations from any default parameters used in the assignment software. • Justification of deviations from any default parameters used in the assignment software. • Comprehensive list of assignments undertaken. • Statement of convergence stability (usually P>90% for 4 iterations) - N.B. May need to be higher for

	<p>variable demand assessments.</p> <ul style="list-style-type: none">• Statement of convergence proximity (usually $\delta < 1\%$).• Comparison of convergence with base year equivalent model.
Presentation of Traffic Forecast	<ul style="list-style-type: none">• Diagrammatic presentation of forecast flows on key links feeding the economics.• If not using COBA, presentation of link times and junction delays.• Presentation of any alternative forecasts (e.g. feeding operational / environmental assessments).• Derivation of any factors used (e.g. to generate AADT or 18hr forecasts from hourly models).• Diagrammatic presentation of key forecast flow differences arising from the scheme.• If not using COBA, presentation of changes in link times and junction delays throughout.• Consideration of select link analyses on the key scheme link(s).• Discussion of scheme impacts in terms of key link flows and changes in key journey times.• Comparing Do-Minimum conditions with forecast growth, against base year conditions.• Comparing Do-Something conditions against Do-Minimum conditions.
Miscellaneous Issues	<ul style="list-style-type: none">• Check maps and plans are legible and colour figures are reproduced accordingly.• Check that all outputs have been presented for each time period, forecast year, growth scenario and (if relevant) vehicle type.