ENEVAL81

User Manual

Environmental Evaluation Software

February 2008

mvaconsultancy

Document Control

Project Title:	ENEVAL81
MVA Project Number:	C3664900
Document Type:	User Manual
Directory & File Name:	D:\FORTRAN\ENEVAL\2007 - APR\Manual\ENEVAL81 User Manual_V1.Doc

Document Approval

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Distribution

Issue	Date	Distribution	Comments
1	26/2/08	Kevin Lumsden David Connolly	For Review

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1 Introduction

1.1 Background

1.1.1 ENEVAL is a FORTRAN (FTN95) program, which performs a range of environmental assessments for CUBE and SATURN highway assignment models. The program uses link speeds, junction delay times and flow data from an arbitrary number of model network files (input in either CUBE network format, or as text files) and junction files to perform a range of environmental evaluations.

1.1.2 Four distinct forms of environmental assessment can be performed, these are:

- regional vehicle exhaust emissions assessment (including new Carbon emissions methodology – May 2007);
- local roadside air quality assessment;
- traffic noise calculations; and
- fear and intimidation scores.

1.1.3 These calculations are based on the guidance and methodologies described in Design Manual for Roads and Bridges, Volume 11, Section 3, February 2003 (Reference [1]) and Air Quality Amendment No 2, March 2000 (Reference [2]), Calculation of Road Traffic Noise Section 1 and Procedural Charts – Charts 1-16 (Reference [3]) and work carried out by Crompton, 1981 (Reference [4])) respectively. These documents contain more detail and explanation of the relevant methodologies than is reproduced here.

1.1.4 ENEVAL80 was updated to include Carbon Emissions calculations, which were included in ENEVAL in May 2007. Section 1.6 describes the new methodology and its implementation. ENEVAL81 includes an additional estimation of Carbon Dioxide Equivalence, calculated by multiplying the predicted carbon emissions by 44/12.

1.1.5 There are a number of areas where the ENEVAL approach differs from the current approach recommended in DMRB (Feb 2003), or is a simplification of the full DMRB-recommended methodology, as follows:

- when calculating speeds for vehicle emissions, ENEVAL combines link-times and junction delays to calculate a single average speed for each modelled highway link (this does not occur in the calculation of Carbon emissions which keeps these times separate). The process makes no attempt to sub-divide input CUBE model links into shorter sections of 'homogeneous speed' (eg to separately identify sections of free-flow and queuing traffic on a given input link). In addition, it should also be noted that junction delays cannot be included if the input networks are not in CUBE format;
- ENEVAL cannot combine emissions from more than one link in the assessment of local air quality and is therefore unable to predict local air quality at junctions where a combination of more than one link contributes significantly to the concentrations of individual pollutants at particular receptor locations;
- ENEVAL cannot be used as a dispersion model for emissions; and

- ENEVAL does not take account of gradient, road surface, the effect of buildings, the presence of screening or the type of ground cover in the calculation of road traffic noise.

1.1.6 ENEVAL is designed as a tool for summarising the main environmental impacts of road traffic on a network-wide basis. The ENEVAL results for different schemes can be compared to highlight areas where the various environmental impacts of road traffic are significantly altered by particular schemes. ENEVAL is also useful for indicating the nature of change in the environmental effects over time, taking account of the changes in traffic levels and speeds in the associated forecast year model networks.

1.1.7 ENEVAL is not suitable for detailed air quality calculations at particular locations in accordance with the DMRB localised impact procedure, nor for absolute noise assessment. In such cases more-detailed assessment (eg following exactly the DMRB-based procedures) and detailed local data collection is required. ENEVAL should be used with care where comparisons are being made between schemes that affect speeds at junctions, as it may lead to misleading conclusions.

1.2 Emissions

1.2.1 Vehicle exhaust emissions calculations are disaggregated into five components:

- Carbon Monoxide (CO);
- Hydrocarbon pollutants (HC);
- Oxides of Nitrogen (NO_X);
- Particulate pollutants (PM_{10}); and
- *Carbon Dioxide (CO_2).*

1.2.2 Annual regional emissions calculations for CO, NO_X, HC, PM_{10} and CO_2 are based on the methodology for overall impact assessment as defined in Annex 2 Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1, February 2003 (Reference [1]).

1.2.3 In the latest version of the DMRB guidance (May 2007), the Carbon Dioxide emissions have been replaced by emissions of Carbon. The previous Carbon Dioxide calculations have been left in ENEVAL for the moment (for comparative purposes), but any use of this output should highlight that that is estimated using out-of-date methodology. Version 8.1 of ENEVAL also includes an estimate of 'Equivalent Carbon Dioxide', calculated as a simple scaling up of the estimated emissions of Carbon (x44/12).

1.2.4 Regional impacts are evaluated as total emissions for the whole study area but can also be disaggregated by link Jurisdiction Code. Within CUBE model networks, Jurisdiction Codes are user-defined values given to groups of links. This allows the user to evaluate emissions by specific areas of the highway network (for example by different local authority areas, for a user-defined study area etc). The Regional emission calculations are undertaken by dividing up user-defined input vehicle type on each link (these will be described in chapter 2) into 71 vehicle types. These are the vehicle types that are listed in Design Manual for Roads and Bridges, Volume 11, Section 3, February 2003 (Reference [1]) Annex 2, with the exception of Motorcycles.

1.2.5 ENEVAL can take in five different vehicle types, namely: Cars, LGV's, Lights, Heavies and Buses. The program then splits these between the 71 vehicle types using a set of year specific proportions, which the program reads in from a text file.

1.2.6 In Design Manual for Roads and Bridges, Volume 11, Section 3, February 2003 (Reference [1]) Annex 2, there are a set of coefficients for each of the 71 vehicle types (see Appendix E) for each of the five emission types. These are the coefficients for the Emission Rate formula. These are then combined to give totals for emission type over the entire network.

1.2.7 Anomalous total emission results can, however, be produced by the use of link-average speeds incorporating junction effects, in cases where total emissions from two schemes involving significant changes to junction flows are being compared. The DMRB approach, upon which ENEVAL is based, is not suitable in such cases, and the user should consider alternative assessment methods.

1.2.8 Any discrepancy between the DMRB and ENEVAL approaches which does occur is likely to cancel out when ENEVAL is used to compare schemes, either with each other or against a Do-Minimum, unless a particular scheme creates a significantly different effect on link and junction-approach speeds (eg junction improvement schemes). For schemes such as these, the differences between ENEVAL at DMRB should be borne in mind and more detailed emissions calculations carried out if necessary.

1.3 Air Quality

1.3.1 Local air quality assessments in ENEVAL are designed to predict roadside air quality. The relevant calculations are carried out on a link-by-link basis, with no attempt to combine the effects of more than one link at a given receptor. Local air quality assessments are carried out for the five following pollutant types:

- Carbon Monoxide (CO);
- Nitrogen Dioxide(NO_2);
- Benzene;
- 1,3-butadiene; and
- Particulate pollutants (PM_{10}).

1.3.2 The predicted levels of each of the pollutants (including appropriate background levels) are checked against user-defined maximum levels on each link. All links which fail one or more of these air quality standards are listed in the ENEVAL output. The air quality standards checked in ENEVAL are CO maximum annual running 8-hour mean, NO_2 annual mean, 99.8th percentile of hourly means and number of hours per year > 200 $\mu g/m^3$, Benzene running annual mean, 1-3, butadiene running annual mean and PM_{10} annual mean, 90th percentile of daily means and number of days per year > 50 $\mu g/m^3$.

1.3.3 The background values used in these calculations can be either the UK wide default values, as given in DMRB, or else local values for each link, obtained from maps.

1.3.4 The predicted levels of CO (maximum annual running 8-hour mean), NO_2 (annual mean), Benzene (running annual mean) and PM_{10} (annual mean) can be output in either comma-separated variable (CSV) or CUBE network format.

1.3.5 Due to a limit on the number of volume fields in a CUBE network, the predicted values for NO_2 99.8th percentile of hourly means and number of hours per year > 200 μg/m^3, 1-3, butadiene running annual mean and PM_{10} 90th percentile of daily means and number of days per year > 50 μg/m^3 cannot be exported in CUBE network format. They are however included in the CSV format output.

1.3.6 Emissions calculations require the user to provide an arbitrary number of CUBE network files together with corresponding annual flow factors which are used to combine the networks to give an annual flow for each link in the study area:

F_{ln} = flow on link l for each input network $n \in \{1...N\}$

$ANFAC_n$= annual flow factor for each input network $n \in \{1..N\}$

$$\text{Annual flow} = \sum_{n=1}^{N} [F_{ln} \times ANFAC_n]$$

1.3.7 If available, the user can also provide highway junction files for each corresponding input network. This will allow the average link speed to incorporate the queuing delay at modelled junctions. However, the option of using junction files is only available if the input networks are in CUBE format.

1.3.8 The DMRB suggests that links should be separated into sections of homogeneous flow and speed, and that junction approaches be treated as separate links with a lower average speed. This approach is necessary for localised impact assessments, in order to allow for the effect of slower speeds and stop/start driving at the junction, which produces higher roadside concentrations. However, the speed related emission factors in the DMRB are based upon the average speeds for drive cycles of several kilometres, which include some stop/start driving. On this basis, link average speeds that incorporate junction effects, as used within ENEVAL are considered more appropriate for calculations of total emissions from a link.

1.3.9 As noted in 1.1.4 above, ENEVAL is not suitable for calculation of local air quality at junctions, thus the use of link-average speeds incorporating junction effects is not a problem.

1.4 Traffic Noise

1.4.1 Traffic noise levels (L_{10}-18hr) are based on the methodology given in Calculation of Road Traffic Noise (1988), pages 40 and 41 (Reference [3]) which follows the basis of DMRB, Volume 11, Section 3, Part 7, May 1999 (Reference [1]).

1.4.2 Noise levels are calculated on a link-by-link basis for the whole study area. This value is the basic noise level for a road segment at a reference distance of 10 metres from the nearside carriageway edge with no correction for gradient, road surface, roadside development, the effect buildings, the presence of screening, the type of ground cover etc.

1.4.3 Any roads where the two carriageways are more than five metres apart, or where the heights between the outer edges of the two carriageways differs by more than one metre should in theory be modelled as separate 1-way links as the Calculation of Road Traffic Noise (Reference [3]) requires that the noise levels for each of the carriageways for these types of road should be treated separately.

1.4.4 Noise levels are based on average 18-hour (0600-2400) link flows and speeds so the user is required to supply 18-hour correction factors for each input network ($18FAC_n$). Flows and speeds for each link in the network are calculated in a similar fashion to annual flows as described in Section 1.1.6 above, except that the average speeds used during noise calculations are link running speeds only, ie exclusive of junction delays.

1.4.5 NB The definition of heavy vehicles used in the DMRB-defined method for the assessment of air quality (unladen weight exceeding 3500kg) is different from that assumed in the calculation of road traffic noise (unladen weight exceeding 1525kg). ENEVAL V7.9 uses a single estimation of 'heavy' vehicles on each link, calculated as an amalgamation of the link flows defined as 'heavy' by the user. If necessary (and the relevant data are available) separate runs of ENEVAL can be carried out using different input definitions of 'heavy' for the two forms of calculation. However, this level of precision is only likely to be needed if absolute noise and emissions/air quality are required, since any inaccuracies created are likely to cancel out when the results from ENEVAL are used to compare schemes with each other or with a Do Minimum scenario.

1.5 Fear and Intimidation

1.5.1 Fear and intimidation scores are the sum of three individual fear and intimidation scores based on the average 18-hour total two way flow, the total two way 18-hour HGV flow and the average link speed over 18-hours respectively. These scores are based on work carried out by Crompton (1981) (Reference [4]) which is summarised in Table 1.1.

Table 1.1 Fear and Intimidation Scores

Band	A	B	C	D
Average 2-Way 18-hour total flow (veh/hr)	1800+	1201-1800	601-1200	0-600
Flow Score	1	2	3	4
Total 2-Way 18-hour HGV Flow	3000+	2001-3000	1001-2000	0-1000
HGV Score	1	2	3	4
Average 18 hour speed (kph)	32+	24-32	16-24	0-16
Speed Score	1	2	3	4

1.5.2 The program allows all calculations to be based on up to MAXNVT input vehicle types, where MAXNVT is a program parameter (see Appendix A for current value), held in user specified volume fields of the input networks and junction files. The program's calculations are based on flow units of vehicles so PCU factors must be supplied for each input vehicle type of each input network. Furthermore, the program requires the user to input an equivalent ENEVAL vehicle types (1 = Cars, 2 = LGV, 3 = Light, 4 = Heavies and 5= Buses) for each input vehicle type.

1.5.3 Any run of ENEVAL can provide the user with up to four output files:

- Emissions summary table (overall totals plus a disaggregation by Jurisdiction Code);
- Comma-separated Variable (CSV) link based records;
- CUBE dumped network (link records) – NB this option is not available if the input networks are not in CUBE format; and
- DELTA output files, which disaggregate environmental measures by zone.

1.5.4 If a CUBE network is requested, then the user has the opportunity to specify which volume fields are to contain the output data.

1.5.5 In addition, if emissions levels are requested, the program allows any subset of the five emissions types to be stored in the output network.

1.5.6 If the user requests an emission summary table, ENEVAL allows any subset of Jurisdiction Codes to be omitted from the emissions calculations and subsequent output.

1.5.7 In CUBE networks, any links that are attached to a node number less than the number of zones is assumed to be a zone centroid connector. Zone centroid connectors are automatically excluded from ENEVAL calculations. The user can also specify a range of other link types that are to be screened out of the calculations and the resulting outputs.

1.6 Carbon Emissions

1.6.1 The updated functions (May 2007) are different to those included in the previous version of ENEVAL, and only calculate Carbon rather than the five types of emissions produced before (ie Carbon Monoxide, Hydrocarbons, Oxides of Nitrogen, Particulate Matter and Carbon Dioxide). In the new calculation, 'Carbon' relates to all the Carbon bound in the emitted pollutants (CO, C02, Hydrocarbons and PM10s).

1.6.2 To calculate the Carbon emitted per vehicle, the fuel consumption is, calculated using the cubic expression defined by WebTAG section 3.5.6 (February 2007). These are then multiplied by Carbon emission factors. This differs significantly from the function defined in DMRb Volume 11 (Environmental Assessment), Section 3 Part 1, February (2003).

1.6.3 As well as a new function for calculating the emissions, a number of other changes have been made to the methodology within ENEVAL. The main one is that in the new methodology link time and speed are considered separately from the time spent queuing at junctions.

1.6.4 Junction delays are characterised by stop/start driving conditions, which have a different emission rate from either free-running, or stationary 'idling' vehicles. Since using idling engine emissions rates would underestimate the emissions, we use an assumption that stop-start queuing has an average speed of 10kph (this is the lowest speed for which the new functions are valid). The junction delay emission rate is then given by the formula below, with the 10kph emission factor coming from formula (1). It is divided by 3600 to convert the speed in kilometres per second.

Junction Delay Emission Rate (g/s) = 10kph Emission Factor (g/veh/km) x 10 (kph) / 3600

1.6.5 The total junction emissions is then calculated by multiplying this by the total junction delay in seconds, which is calculated by adding the times of all relevant vehicles at the junction.

1.6.6 So, as to not double count emissions the length of the link used for the calculation of link based emissions must be reduced by the length of the queue at the junction. This is, calculated as follows:

Queue (km) = (Total Junction Time(s) x 10 (kph) / 3600)/ No. of Lanes

1.6.7 It is assumed for the purposes of ENEVAL that any queuing cars are spread evenly over all lanes on the road. The number of lanes is, calculated by taking the coded link capacity and dividing by the standard link capacity for that link type (a file with standard capacities is a new input).

1.6.8 In the case when the Queue is greater than the link length we assume the queuing occurs along the full length of the link and the length of the free-flowing section of the link is therefore assumed to be zero.

1.6.9 Finally, the link based emissions are calculated using the free-flowing link length (modelled link length minus queue), modelled speed and formulae (1) and (2).

1.6.10 This approach allows the user to completely separate link based and junction based emissions. In particular, it allows the user to combine emissions from all approach arms at a junction, rather than distributing these back along the approach links. This means that individual junctions can be compared for emission outputs between tests.

1.6.11 This approach takes in the same vehicle types as the previous emissions calculations. It then splits these between the vehicle types described in Appendix E.

1.6.12 Whilst no longer combining link and junction times, the model will still use average times if more than one network is input. To undertake true annualisation each time period network should be run through ENEVAL individually and the results annualised by the user.

1.6.13 Carbon Emissions are also converted to Carbon Dioxide equivalent values [CO_2(e)] to asses the Global Warming Potential (GWP), by multiplying the predicted amount of Carbon emitted by 44/12.

2 Running ENEVAL

2.1 Introduction

2.1.1 This chapter describes the control data file that is required by ENEVAL to specify input and output files, to set the necessary parameters and to select particular options.

2.1.2 The control data file consists of four components:

TITLE Record

&FILES Record(s)

&PARAM Record(s)

&OPTION Record(s)

2.1.3 A sample control data file is given in Appendix D.

2.2 Section 1 – TITLE Record

2.2.1 The first record of the control file specifies the ENEVAL run title. This is a string of text (up to 60 characters long), which will be used to title any output files.

2.3 Section 2 – &FILES Record(s)

2.3.1 The following section consists of several &FILES records. These specify the data files that are read in and the output files to which the results from ENEVAL are written.

2.3.2 The general form of an &FILE record is:

SELECTION = 'filename.ext',

where 'filename.ext' is the name of the file which is to be associated with the various input and output files described below.

2.3.3 A full list of input and output files can be seen in Table 2.1 below. Note that ICSV1, ICSV2, ICSV3, ICSV4 and ICSV5 are all new files associated with the new Carbon Calculation methodology.

Table 2.1 ENEVAL Input and Output Files

Selection	Description
OPRN	The name of the Print File that logs the progress of ENEVAL
IDAT1	A File containing all the annual and 18 hour network flow factors
IDAT2	A File specifying the link an jurisdiction codes to screen out (optional)
IDAT3	Emission Coefficient file
IDAT4	A File containing the distance correction factors
IDAT5	A File containing emission standards
IDAT6	A File containing Fear and Intimidation indices
IDAT7	A File containing details of the local pollutant background levels on a link by link basis
IDAT8	A File containing link to zone correspondence (for DELTA output only)
IDAT9	A File containing the test year fleet composition
INET1	The Name of the first input Network File (CUBE format)
ICMD1	The Name of the first input Network file (Text Format)
IJUNC1	The Name of the first input junction file (if junction delays are included)
INET2	The Name of the second input Network File (CUBE format) etc
ICMD2	The Name of the second input Network file (Text Format) etc
IJUNC2	The Name of the second input junction file (if junction delays are included) etc
ICSV1	Standard Link Capacities
ICSV2	Consumption Coefficients File for Carbon Calculations
ICSV3	Fuel Efficiency Improvements File
ICSV4	Carbon Emission Factors file
ICSV5	Fleet Projections for the new Carbon Calculations
ODAT1	A File which contains the output emission summary table (if requested)
ODAT2	The File that contains the output link based CSV report (if requested)
ODAT3	The Filename of the output CUBE network (if requested)
ODAT4	The Filename of the output DELTA file (if requested)

The &FILES section is finished by a record containing &END.

NB regarding the input networks, either, INET1, INET2 etc, or ICMD1, ICMD2 etc, can be used. It is not possible to mix the format of the input networks.

2.3.4 Selections OPRN, IDAT1 and IDAT9 or ICSV5 must be specified for any run of ENEVAL and IDAT1–7 should be specified as appropriate to the calculations requested. The structure of the input files is given in Chapter 3, and examples can be found in Appendix C.

2.3.5 The user must specify an INET record for each network that is to be considered, and an IJUNC record for each corresponding junction file if junction delays are to be included in the assessment (only for CUBE input networks). The maximum number of networks is defined by the ENEVAL parameter MAXNET, (see Appendix A for the current program value). If the networks are not in CUBE format the user must specify an ICMD for each input network.

2.3.6 If particular types of output are requested in the &OPTION section, but the appropriate ODATn selection is not provided, then an error will be reported in print, and the run of ENEVAL aborted.

2.4 Section 3 – &PARAM Record(s)

2.4.1 The &PARAM records specify the parameters for a run of ENEVAL. The general form of each record is:

SELECTION = value,

Where SELECTION is the parameter to be set, and value is an integer number for all selections except FACHR, which is a real number. Any parameter that is not set by the user will be given its default value. The default values for the various parameters are given in Appendix B. A full list of parameters is in Table 2.2 below.

Table 2.2 ENEVAL Parameters

Parameter	Description
YEARX	The modelled year
NNET	The Number of input networks
NVT	The Number of input vehicle types
DISTAB	The distance from centre of nearside links to receptors (meters)
DISTBA	The distance from centre of oncoming links to receptors (meters)
OUTVOL(n)	The volume fields that are used to store the required outputs (only if an output network is requested)
NVTOF(n)	The number of the volume fields in the input networks that contain the flows for vehicle type n, there must be one entry for each vehicle type NVT
VTEQUV(n)	The user must specify an ENEVAL equivalent for input vehicle type n where: 1 = Cars 2 = LGV 3 = Lights 4 = Heavies 5 = Buses
FACHR	The Factor for converting total annual flow to average flow per hour

The &PARAM section is finished by a record containing &END.

2.4.2 YEARX must be set to represent the modelled year in the input network and junction files.

2.4.3 If an output CUBE network is requested in the &OPTIONS section, then the results of the various requested calculations are stored in the volume fields of this network. Volume fields 6-20 are free to be used to record the result from ENEVAL calculations. Volume fields 1 to 5 contain the following information:

- Volume Field 1 - Flow (veh/hr);
- Volume Field 2 – Average Speed (kph);
- Volume Field 3 – Percentage HGV;
- Volume Field 4 – 18hr Flow (vehicles);
- Volume Field 5 – Carbon Emissions (kg) (If DOCARB=T); and
- Volume Field 6 – Carbon Dioxide Equivalent (kg) (If DOCARB=T).

2.4.4 The number of the volume field in which to store calculation is specified using the OUTVOL(n)=m record, where m is the volume field number and n is the calculation number. The calculated outputs are the speed, flow, emission statistics, local air quality statistics, noise and fear scores, depending upon which of these calculations have been requested.

2.4.5 If the factor to convert total annual flow to the average flow per hour, FACHR, is not specified, ENEVAL will use a default value of 8760 (the number of hours in a 365-day year). If the user provides a value other than 8760, ENEVAL will print a warning in the print-file highlighting the use of a non-default value of FACHR.

2.5 Section 4 – &OPTION Record(s)

2.5.1 The &OPTION section specifies the calculations that ENEVAL will perform and the outputs required.

These options take the form:

SELECTION = value

Where value is either T (for true) or F (for false) depending upon whether an option is to be selected. Any option that is not set by the user will be given its default value. The default values for the various options are given in Appendix B. The possible options are shown in Table 2.3 below.

Table 2.3 ENEVAL Options

Option	Description
EMISS	Calculate the emission statistics
LOCMIS	Calculate Local Air Quality Statistics
NOISE	Calculate Noise Statistics
FEAR	Calculate the Fear and Intimidation Statistics
TABS	Output and emissions summary table
CSVOUT	Output a link based CSV report
TRIPNT	Output a CUBE network
EPERKM	To Scale the network data to emissions per km
EMINKG	To output emissions in kg (rather than in Tonnes)
YESJNC	To incorporate junction delays into the calculations (if T junction files must be input)
JSCREN	Screen by Jurisdiction Code
LSCREN	Screen by Link Type
LINKBG	To use local pollutant background values for each link during air quality calculations
TXTNET	To indicate that input networks are in text format. In this case YESJNC and TRIPNT must be set to FALSE
DODELT	To produce output delta files
DELT12	To produce 12 Hour delta files (rather than 24 hour)
DOCRAB	Do new Carbon Calculations

The final record of the &OPTION section is an &END record.

2.5.2 Any inconsistent selections of options and files will be highlighted by an error message in the print file, and the run of ENEVAL will be aborted.

2.5.3 An example of this type of inconsistency would be to request the calculation of local air quality statistics, (LOCEMIS=T), while not associating IDAT5 to an appropriate emission standards file.

2.5.4 Any redundant specifications will either be ignored, or a warning will be given in the print file. ENEVAL will not be aborted.

3 Description and Format of Input Files

3.1 Introduction

3.1.1 This chapter describes the format of the various input files used by the program. The previous chapter described the conditions under which each of these files are opened and, to avoid duplication, this information is not repeated here, (it is generally obvious from the set of options chosen which input files will be opened).

3.1.2 In **all** cases, blank lines and comment lines (those with a '*' in column 1) are ignored.

3.2 Network Flow Factors File

3.2.1 This file contains the annual, 18-hour and PCU factors used to combine the flows in all input networks. A sample flow factors file is provided in Appendix C.

3.2.2 The first (non-blank/non-comment) line of this file confirms the number of input networks to be used in this run of the program. The second confirms the number of input vehicle types to be used. These values are checked against those specified in the control data file and help to ensure that the correct number of flow and PCU factors are provided in this input file. These values are read using the FORTRAN format (I6) ie one integer, right justified in columns 1-6.

3.2.3 The following group of records contains the PCU factors for each input vehicle type of each input network. These values are read in blocks of six, (1 to number of input vehicle types) for each input network, (1 to number of input networks). The order of the PCU factors should be consistent with the order of each of the corresponding input vehicle types that are specified in the NVTVOF records in the control data file. Values are read using the FORTRAN format (6X,6F6.1) ie columns 1-6 are ignored, followed by six real numbers with one decimal place each, right justified in columns 12-36. NB if no PCU adjustment factor is to be applied to an input vehicle type, then a value of 1.0 must be entered. The two remaining groups of records are read using the FORTRAN format (6X,F8.1) ie columns 1-6 are ignored, followed by one real number with one decimal place, right justified in column 14. These records contain the annual flow factors for each input network and the 18-hour flow factors for each input network respectively.

3.3 Screening Definitions File

3.3.1 This file contains the jurisdiction codes and link types to be omitted from any calculations and subsequent outputs. A sample screening definitions file is provided in Appendix C.

3.3.2 The content and format of this file is dependent on the user's specifications in the control data file. If both jurisdiction code and link type screening is required then the program will expect two sets of data, otherwise only one table is required. NB in cases where both types of screening are to be carried out, the jurisdiction code data must be supplied first. All records in this file are read using the FORTRAN format (I6).

3.3.3 Both of these tables of data follow the same input format; the number of records to be read (*n*), followed by the number of records (*1-n*) and an end of table identifier '9999'.

3.3.4 When reading jurisdiction code data all records must lie in the range, (0 to MAXJC), where MAXJC is a program parameter (see Appendix A for current value). Similarly when reading link type screening data all records must lie in the range, (0 to MAXLT), were MAXLT is a program parameter (see Appendix A).

3.4 Emissions Tables File

3.4.1 This file contains a table of coefficients for each of the emission types for use with the Emission Rate formula. It also contains four tables used to work out local emission rates, these are emission factors for Lights and Heavies and speed correction factors for Lights and Heavies.

3.4.2 An example of this can be seen in Appendix C.

3.4.3 This file is based on DMRB Volume 11, section 3, Annex 2 (February 2003) and it is strongly recommended that it is not changed by the user.

3.5 Distance Factors File

3.5.1 This file contains the correction factors for the distance from the centre of the road to the receptor. These are found in Table A1.4 of DMRB Volume 11, Section 3, for Carbon Dioxide and Hydrocarbons, and Table 4 of the DMRB Air Quality Amendment No 2, for NO_X and PM_{10}. The user is strongly recommended not to change any of this input data.

3.5.2 The table is read in as an unspecified number of records, without a '9999' record on the final line.

3.6 Standards Tables File

3.6.1 This file contains the local air quality standards, default background levels, the noise level standards, the table for converting NO_X concentrations to their equivalent NO_2 annual mean, 99.8th percentile of hourly means and number of hours per year > 200μg/m^3, and the table for converting annual mean PM_{10} concentrations to their equivalent 90th percentile of daily means and number of days per year > 50μg/m^3. The format and content of this file is based explicitly on DMRB Volume 11, Section 3, and Air Quality Amendment No 2. The user is strongly recommended not to change any of this input data.

3.6.2 The first record consists of the air quality standard levels for CO (maximum annual running 8-hour mean), Benzene (running annual mean), NO_2 (annual mean) and PM_{10} (annual mean) local air quality. Default values are based on Table A1.2 of DMRB, Volume 11, Section 3, for CO and Benzene, and Table 3 of DMRB Air Quality Amendment No 2, for NO_2 and PM_{10}. The second record contains three additional standards for 1,2-butadiene (running annual mean) and NO_2 (99.8th percentile of hourly means and number of hours per year > 200μg/m^3), with default values again derived from Table A1.2 of DMRB, Volume 11, Section 3 and Table 3 of DMRB Air Quality Amendment No 2. The third record contains an additional two standards for PM_{10} (90th percentile of daily means and number of daily means > 50 μg/m^3), with values being taken from Table 3 of DMRB Air Quality Amendment No 2.

3.6.3 The fourth record contains default background levels for CO, Benzene, NO_X and PM_{10}. Default values are based on the values in Table A1.1 of DMRB, Volume 11, Section 3, for CO and Benzene, and Table 2 of DMRB, Air Quality Amendment No 2, for NO_X and PM_{10}. However, ENEVAL users are recommended to use local non-default background values where possible.

3.6.4 The fifth record contains the standard for the noise level.

3.6.5 The next data is the NO_X to NO_2 statistics (annual mean, 99.8th percentile of hourly means and number of hours > 200 $\mu g/m^3$) conversion table, as given in Table 5 of DMRB, Air Quality Amendment No 2. This takes the same format as the tables in the emissions tables file; the first record contains the number of records that will make up the table, followed by these records, which relate the levels of NO_X to the various statistics. The final record is an end of table identifier '9999'.

3.6.6 The penultimate data in the standards table file is the PM_{10} annual mean to the 90th percentile of daily means and the number of daily means > 50 $\mu g/m^3$ conversion table, as given in Table 6 of DMRB Air Quality Amendment No 2. This again takes the same format as the tables in the emission tables file; the first line containing the numbers of records that make up the table, followed by these records and then the end of table identifier '9999'.

3.6.7 The final data in the standards table file is the emission reduction table, as given in Table A1.10 of DMRB, Volume 11, Section 3. The first record indicates the number of records that make up the table. This is then followed by the records, which take the form of year and corresponding reduction factor. These are followed by the end of table identifier '9999'. A sample standards table's file is given in Appendix C.

3.7 Fear Indices Tables File

3.7.1 This file contains the fear and intimidation scores tables, based on Crompton (1988) (Reference [4]). The three tables contained in this file hold fear scores for average two-way 18-hour flow (Veh), total 18-hour two-way HGV flow (Veh) and average 18-hour traffic speed (Kph) respectively. A sample fear indices tables file is given in Appendix C.

3.7.2 All tables of data follow the same format; the number of records to be read (*n*), followed by the number of records (*1-n*) and an end of table identifier '9999'.

3.7.3 The content of this file can be considered flexible and the program will tolerate user-supplied data representing local or site specific survey knowledge, providing the specified input format is observed.

3.7.4 All records in this file are read using a (2I6) FORTRAN format.

3.8 Local Background Values File

3.8.1 This file contains the local background values of CO, Benzene, NO_X and PM_{10} for each link included in the input network files.

3.8.2 Each record (one for each link) contains, in order, link number, a-node, b-node, CO background (ppm), Benzene background (ppm), NO_X background ($\mu g/m^3$) and PM_{10} background ($\mu g/m^3$). These are stored in the FORTRAN format 3(I8,1X), 4(f12.8,1X).

3.8.3 The first three terms of each record are included to allow error checking of the data. A sample local background values file is given in Appendix C.

3.9 DELTA zone file

3.9.1 This file contains a list of all links and the zone that contains the link. This is used in producing the optional DELTA output file. An example of this is given in Appendix C.

3.9.2 This is a comma-separated file containing Anode, Bnode and corresponding zone, for each link in the network. For two way links both directions must be included in the list.

3.10 Fleet Composition File

3.10.1 This file contains the proportion of each of the 71 vehicle types ENEVAL considers within each of the five ENEVAL vehicle classes. It also contains Scale factors for each of the 71 vehicle types and each of the five emission types, these represent changes in fuel efficiency etc. There will be one of these files for each possible test year, as fleet proportions and technology will change over time.

3.10.2 An example fleet composition file can be found in Appendix C.

3.10.3 This file contains two tables; the first is the proportion of each of the 71 vehicle type, which constitutes each of the ENEVAL vehicle classes. The second table is the scale factors of which there is one for each vehicle type for each emission type. These tables are in FORTRAN free format.

3.10.4 These tables are based on 1999 NAEI Road Transport Emissions Inventory (Reference [5]) and it is strongly recommended that any user should keep the default values for a given year.

3.11 CUBE based network files

3.11.1 These can be input straight from assignment and require no further manipulation.

3.12 Text based Input Networks

3.12.1 If text based input networks are being used then each record must be stored in FORTRAN format 4I10, 4F10.3. The format should be as follows:

Anode, Bnode, Link Type, Jurisdiction Code, Link Length, Speed, Total Lights and Total Heavies.

3.13 New Carbon Calculations – Input Files

3.13.1 A further five input files must be read in to undertake the new Carbon emission calculations. These files will be expected if the DOCARB parameter is set to true. These are all in CSV format and are as follows:

- **ICSV1** – *Standard Capacities* - this file contains two columns; Link Type and Standard Capacity in PCU's/hr. If this file is excluded all links ending in model junctions will default to 2 lanes;
- **ICSV2** – *Consumption Coefficients* – this file will be fixed and contains the consumption coefficients from Table 1. It also contains the maximum and minimum speeds (in kph) for which the formula is valid;
- **ICSV3** – *Fuel Efficiency Improvements* – this contains eight columns, namely - Year, then one column for each of Petrol Car, Diesel Car, Petrol LGV, Diesel LGV, OGV1, OGV2 and PSV with fuel efficiency improvements as a percentage from 2002. This will normally be as in Table 2;
- **ICSV4** – *Carbon Emission Factors* – this file contains three columns - Year, Carbon Emission Factors for Petrol and Carbon Emission Factors. This will normally be as in Table 3; and
- **ICSV5** – *Fleet Projections* - this contains eight columns, namely; Year, Petrol car as a percentage of all cars, Diesel car as a percentage of all cars, Petrol LGV as a percentage of all LGVs, Diesel LGV as a percentage of all LGVs, OGV1 as a percentage of all OGVs, OGV2 as a percentage of all OGVs and LGVs as a percentage of all Lights (if the input network does not distinguish LGVs and cars).

All files end with a left justified '9999' to signify the end of the file.

4 Description and Format of Output Files

4.1 Introduction

4.1.1 This chapter describes the format and content of the various output files generated by the program. Chapter 2 described the conditions under which each of these output files are opened and, to avoid duplication, this information is not repeated here.

4.1.2 All output files generated by ENEVAL contain run specific data such as run-time, run-date and run-title.

4.2 Output Print File

4.2.1 This file is always produced. It contains three main types of information:

- user inputs from the control data file and the input files;
- confirmation of the successful completion of each stage of the program; and
- any warnings or error messages generated by the program.

4.2.2 It is recommended that this file should be checked for warning or error messages after each run of the program to ensure that the user's requests have been satisfactorily carried out. In addition, the user is advised to inspect the value of the RCODE variable at the end of each run. (See CUBE manuals for description of RCODE levels).

4.3 Output Emissions Summary

4.3.1 This file contains the annual emissions rates for all emissions types, calculated on a link-by-link basis, aggregated by model jurisdiction code. Total emissions, summed over all required jurisdiction codes, are provided for all pollutant types (CO, PM10, NOX, HC and CO_2) at the end of the file.

4.3.2 If the DOCARB flag is set to TRUE, then ENEVAL81 outputs two further columns containing Carbon emissions (in tonnes) and the Carbon Dioxide Equivalent [CO_2(e)].

4.3.3 This file also contains a listing of the user supplied jurisdiction codes (if any) to be screened out of all calculations.

4.3.4 The file is in standard ASCII format and unless EMINKG option as been selected the outputs will be in Tonnes.

4.4 Output CSV Link Based Report

4.4.1 This file is a comma-separated variable (CSV) format, suitable for importing into spreadsheet packages and databases.

4.4.2 The file contains link (Anode-Bnode) based records for each link in the input networks. Each record consists of the basic link data, (Anode, Bnode, jurisdiction code, link type, link length, flow and average speed), plus any output data (emissions, local air quality, noise and fear) values requested by the user.

4.4.3 If DOCARB is set to true, then Carbon emissions by vehicle type and split into those emitted at junctions and on links are also output. Queue Length, Link Time, Junction Time, Total Carbon Emissions and Carbon Dioxide Equivalents are also output.

4.4.4 This file also contains a listing of the user supplied link types (if any) to be screened out from all calculations and a key to the order of the link records.

4.4.5 When link types or jurisdiction code screening is in use, any link type specified in the screening definitions file will contain no output emissions or noise data in the corresponding output link records.

4.4.6 To avoid double counting, noise and fear values (which are calculated on a two-way flow basis) will only be output once for each Anode-Bnode pair, ie the corresponding Bnode-Anode record will hold no noise or fear outputs. Emissions are provided separately for each direction.

4.4.7 Due to the restricted number of volume fields that are available in a CUBE network file, ENEVAL cannot export the predicted values for NO_2 99.8^{th} percentile of hourly means and number of hours per year > 200 $\mu g/m^3$, 1-3,butadiene running annual mean, PM_{10} 90^{th} percentile of daily means and number of days per year > 50 $\mu g/m^3$ cannot be exported in CUBE network format. They are however included in the CSV output file.

4.5 Output CUBE Dumped Network

4.5.1 The format of this file replicates those produced by MVNET, MVGRAF etc when producing 'dumped' network link records. The MVNET manual should be referenced for a detailed description of link records stored in this manner.

4.5.2 Any output calculations (emissions, noise and fear) will be held in the volume fields specified by the user. In this file, the output emissions will be in either kg or tonnes, depending on the value of the EMINKG option in the control data file.

4.5.3 Some volume fields have fixed output in them, these are described in 2.4.3.

4.5.4 Noise and fear values will be output once for each Anode-Bnode pair.

4.5.5 This file can be 'rebuilt' via MVNET and used in MVGRAF to aid in graphical representation and reporting of ENEVAL results. Note that this file will contain some dummy network values ie link capacity, time and speed etc and is not intended to be used as a genuine (assignable) network.

4.6 Output DELTA file

4.6.1 The output from this file is a file, which gives different measures on a zonal basis. The format of this file is three columns. Firstly is the number of the measure, then the zone number and then the value of the measure.

4.6.2 The measures are as follows:

- 1. Vehicles per hour;
- 2. Vehicle Kilometres;
- 3. Average Speed (Kph);
- 4-8. Vehicle Emissions (kg) (If EMISS=T);
- 9. Vehicle Time (hr);
- 10. Free Flow Time (hr);
- 11. Link Based Carbon Emssions (If DOCARB=T);
- 12. Junction Based Carbon Emissions (If DOCARB=T);
- 13. Total Carbon Emssions (If DOCARB=T); and
- 14. Carbon Dioxide Equivalent (If DOCARB=T).

4.6.3 It should be noted that the measures are referred to by their number in the file and that the output values are totals for the entire zone.

References

1. Design Manual for Roads and Bridges, Volume 11 (Environmental Assessment), Section 3 Part 1, May (2007).

2. Calculation of Road Traffic Noise, Section 1 and Procedural Charts – Charts 1-16 (1988).

3. Fear Score Classification, Crompton (1981).

4. Projections from 1999 NAEI Road Transport Emissions Inventory – NETCEN.

5. WebTAG section 3.5.6 (2007).

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Appendix A – ENEVAL81 Parameters

ENEVAL81 Parameters

```
C=================================================================
C Global Common declarations used in ENEVAL81 CR 2005
C=================================================================
      PARAMETER (MAXNVT=71)
C the max number of input vehicle types
      PARAMETER (MAXNET=3)
C the max number of input network pairs
      PARAMETER (MAXBRK=55)
C the max number of table break points
      PARAMETER (MAXFER=3)
C the number of different fear categories
      PARAMETER (MXETYP=5)
C The emission number/types
      PARAMETER (ETCO=1)
      PARAMETER (ETNOX =3)
      PARAMETER (ETPM10=4)
      PARAMETER (ETHC=2)
      PARAMETER (ETCO2 =5)
C No of links, Jurisdiction codes and Link types
      PARAMETER (MAXLNK = 99999)
      PARAMETER (MAXCAP = 32)
C The maximum number of capacity indices
      PARAMETER (MAXJC = 32)
      PARAMETER (MAXLT = 99)
C emissions vehicle classifications
      PARAMETER (LIGHT = 72)
      PARAMETER (HEAVY = 73)
      PARAMETER (ALLVT = 3)
      PARAMETER (NEMVT = 2)
      PARAMETER (MAXOUT = 16)
C the maximum possible number of outputs
      PARAMETER (BNANOD = 2)
C Pointer to the ANODE number of nodes in BNOD array
      PARAMETER (BNNCL = 3)
C Pointer to the NCL VALUE in the BNOD array
      PARAMETER (BNBNO1 = 5)
C Pointer to the 1st BNODE number in the BNOD array
      PARAMETER (IHNNOD = 3)
C Pointer to the number of nodes in IHEAD record
      PARAMETER (IHMXLT = 4)
C Pointer to the maximum link type field in the IHEAD record
      PARAMETER (IHNVOL = 8)
C Pointer to the number of volume fields in IHEAD record
      PARAMETER (INVOL = 20)
C The number of volume fields
      PARAMETER (MAXNCL = 8)
C The maximum number of connected links
      PARAMETER (L1=3000)
C length of buffer bjunc
      PARAMETER (L2 = MAXNCL + 4 + (MAXNCL*6) + (MAXNCL*INVOL))
C length of buffer bnod
      PARAMETER (LENID=30)
C
C Base Year
      PARAMETER (BASEYR=2002)
C Maximum Year
      PARAMETER (MXYEAR=2031)
C The biggest volume field output (from MVGRAF manual)
      PARAMETER (MAXMVG = 2000000)
C Length of filename in two Byte words
      PARAMETER (FLEN = 128   )
```

```
C number of input files
      PARAMETER (NIFILE = 29)
C Factor for converting total annual to average flow/hr lower and upper limits
      PARAMETER (FACMIN = 1.0)
      PARAMETER (FACMAX = 9999.0)
C Distance from nearside link to receptors lower and upper limits
      PARAMETER (DABMIN = 0)
      PARAMETER (DABMAX = 999)
C Distance from on-coming link to receptors lower and upper limits
      INTEGER     DBAMIN, DBAMAX
      PARAMETER (DBAMIN = 0)
      PARAMETER (DBAMAX = 999)
C The maximum number of zones (used in DELTA report)
      PARAMETER (MAXNZ = 100)
C The number of DELTA measures
      PARAMETER (NDELTA = 14)
C The number of output DELTA measures
      PARAMETER (NDELTO = 14)
C Delta Measures
      PARAMETER (DMVEHS = 1)
      PARAMETER (DMKMS = 2)
      PARAMETER (DMSPD = 3)
      PARAMETER (DMCO = 4)
      PARAMETER (DMCO2 = 5)
      PARAMETER (DMHC = 6)
      PARAMETER (DMNOX = 7)
      PARAMETER (DMPM10 = 8)
C vehicle hours
      PARAMETER (DMHRS = 9)
C vehicle hours at free-flow speeds
      PARAMETER (DMFFHR = 10)
C Link Based Carbon Emissions
      PARAMETER (DMLCAR = 11)
C Junction Based Carbon Emissions
      PARAMETER (DMJCAR = 12)
C Total Carbon Emissions
      PARAMETER (DMTCAR = 13)
C CO2E emissions
      PARAMETER (DMC02E = 14)
C The maximum number of zones (for DELTA report)
      PARAMETER (MXZONE = 100)
C MINSPD used when calculating average zone speeds for links with zero speed
      PARAMETER (MINSPD = 1.0)
C DEFSPD used when calculating average zone speeds for zones with no traffic
      PARAMETER (DEFSPD = 30.0)
C End of Parameters for Calculation
C=================================================================
```

Appendix B – Default Values

Default Values for ENEVAL81

```
Default Values for ENEVAL81 – CR 2005
*
*     Model Year
      YEARX=2002,
*
*     Number of input networks
      NNET=3,
*
*     Number of input vehicle types
      NVT=2,
*
*     Distance from nearside link to receptors
      DISTAB=5,
*
*     Distance from on-coming link to receptors
      DISTBA=5,
*
*     input volume fields (0 if not required)
      OUTVOL(1 to MAXOUT)=0,
*
*     Volume field containing input vehicle types
      NVTVOF(1 to MAXNVT)=0,
*
*     Vehicle type ENEVAL equivalents
      VTEQUV(1 to MAXNVT)=0,
*
*     Factor for converting total annual to average flow/hr
      FACHR=8760.0,
*
*     Calculations required
      EMISS=T,
      LOCMIS=T,
      NOISE=T,
      FEAR=T,
*
*     Outputs required
      TABS=T,
      CSVOUT=T,
      TRIPNT=T,
*
*     Delta Files
      DODELT=F,
      DELT12=T,
*
*     Emissions units
      EPERKM=F,
      EMINKG=T,
*
*     Junction delays
      YESJNC=T,
*
*     Jurisdiction codes and link types
      JSCREN=F,
      LSCREN=T,
```

```
*
*     use local background values in air quality assessment
*     LINKBG=F,
*
*      Text Network
      TXTNET=F,
*
*      Do new Carbon Calculations
      DOCARB=T,
```

Appendix C – Sample Input Files

Sample Network Factors File

```
* ===========================================================
* ENEVAL Sample Network Flow Factors File  CR  2007
* -----------------------------------------------------------
*    Confirm the number of input Networks and Vehicle Types
*
     3  [NNET] the number of input networks
     5  [NVTS] the number of input vehicle types
* -----------------------------------------------------------
* Factors to convert the flows from each input network to
* Vehicles (PCU factor)
* -----------------------------------------------------------
*  FORMAT(6X,6*F6.1)
*
*  INET PCU1  PCU2  PCU3  PCU4  PCU5
     1  10.0  10.0  10.0  19.0  22.0
     2  10.0  10.0  10.0  19.0  22.0
     3  10.0  10.0  10.0  19.0  22.0
*
* -----------------------------------------------------------
* Factors to combine all input networks flows to annual flows (AAWDT)
* -----------------------------------------------------------
*  FORMAT(6X,F8.1)
*
*  INET  FACAN
     1   572.0
     2  4082.0
     3   675.0
*
* -----------------------------------------------------------
* Factors to combine all input network flows to 18 Hr flows
* -----------------------------------------------------------
*  FORMAT(6X,F8.1)
*
*   INET FAC18
     1     2.0
     2    11.4
     3     2.0
* -----------------------------------------------------------
```

Fear Indices File

```
* ===========================================================
* ENEVAL Fear Indices CR 2007
* -----------------------------------------------------------
* Fear1 indices relating to Ave 18 hr 2-way traffic flow
* -----------------------------------------------------------
     4 [FEAR1B] the number of fear1 break points
*
* FORMAT(2*I6)
*
     0     4
   601     3
  1201     2
  1800     1
  9999
* -----------------------------------------------------------
* Fear2 indices relating to 18 hr 2-way HEAVY traffic flow
* -----------------------------------------------------------
     4 [FEAR2] the number of fear2 break points
*
* FORMAT(2*I6)
*
     0     4
  1001     3
  2001     2
  3000     1
  9999
* -----------------------------------------------------------
* Fear3 indices relating to Ave 18 hr traffic speed
* -----------------------------------------------------------
     4 [FEAR3] the number of fear3 break points
*
* FORMAT(2*I6)
*
     0     4
    16     3
    24     2
    32     1
  9999
* -----------------------------------------------------------
```

Distance Correction Factors File

```
* Emission concentrations produced by 1000 veh/hr at 100kph by distance
* Uses values from Table A1.4 of the DMRB (V11, Sec3) for CO, NMHC
* Uses values from Table 4 of March 2000 amendment for NOx, PM10
* FORMAT(I6,4(3X,F7.3))
* Distance  CO         HC     NOx      PM10
*   (m)     (ppm)     (ppb)   (ug/m3)    (ug/m3)
     5      0.254    41.400   106.600     3.080
    10      0.237    38.700    99.700     2.880
    15      0.215    35.100    90.500     2.620
    20      0.191    31.200    80.400     2.330
    25      0.168    27.400    70.500     2.040
    30      0.146    23.700    61.200     1.770
    35      0.126    20.500    52.800     1.530
    40      0.108    17.700    45.500     1.320
    45      0.094    15.300    39.300     1.140
    50      0.081    13.300    34.200     0.990
    55      0.071    11.700    30.000     0.870
    60      0.063    10.300    26.500     0.770
    65      0.056     9.100    23.500     0.680
    70      0.050     8.200    21.000     0.610
    75      0.045     7.300    18.900     0.550
    80      0.041     6.600    17.100     0.490
    85      0.037     6.000    15.500     0.450
    90      0.033     5.500    14.000     0.410
    95      0.030     5.000    12.800     0.370
   100      0.028     4.500    11.700     0.340
   105      0.025     4.100    10.600     0.310
   110      0.023     3.800     9.700     0.280
   115      0.021     3.400     8.900     0.260
   120      0.019     3.100     8.100     0.220
   125      0.018     2.900     7.400     0.210
   130      0.016     2.600     6.800     0.200
   135      0.015     2.400     6.200     0.180
   140      0.014     2.200     5.700     0.160
   145      0.012     2.000     5.200     0.150
   150      0.011     1.900     4.800     0.140
   155      0.010     1.700     4.400     0.130
   160      0.009     1.500     4.000     0.120
   165      0.009     1.400     3.600     0.110
   170      0.008     1.300     3.300     0.100
   175      0.007     1.200     3.100     0.090
   180      0.007     1.100     2.800     0.080
   185      0.006     1.000     2.600     0.070
   190      0.006     0.900     2.400     0.070
   195      0.005     0.800     2.200     0.060
   200      0.005     0.800     2.000     0.060
```

Standards File

```
* Conversion from calculated emission to corresponding standard
* First the three thresholds
* Free-format
*    CO       Benzene     NO2(ann.mean)PM10(ann.mean)
*    (mug/m3) (mug/m3)    (mug/m3)    (mug/m3)
      11.6     16.25        40.0        40.0
*
*  1,3-Butadiene  NO2-99.8th percentile NO2-Hrs>200mug/m3
*     (mug/m3)        (mug/m3)
       2.25             200.0                  18.0
* Added in standards for comparison for PM10
*   90th% day      No. days > 50 mug/m3
*    (mug/m3)
       50.0                35.0
*
* background levels
* Changed values for NOx and PM10 to those given in
*            Table 2 of the March 2000 amendment to the DMRB
* Free-format
*      CO     Benzene     NOx(98)     PM10
*    (ppm)    (ppb)      (mug/m3)   (mug/m3)
     0.200    0.350      38.000      20.000
*
* CSB 28/x/99 standard for noise levels (dB(A))
* Free-format
   99.00
* NOX <-> NO2 statistics table
  55 [NOXBRK] the number of NOX<->NO2 break points.
*
* ------------------------------------------------------
*  NOx      NO2     NO2 99.8%  HRS>200ug/m3
* (ug/m3) (ug/m3)   (ug/m3)
* ------------------------------------------------------
* FORMAT(I6,5(3X,F7.3))
*
*23456xxx1234567xxx1234567xxx1234567xxx1234567xxx1234567
    10     8.300    38.800     0.000
    20    12.400    58.600     0.000
    30    16.400    74.500     0.000
    40    20.200    88.400     0.000
    50    23.900   100.900     0.000
    60    27.600   112.500     0.000
    70    31.000   123.200     0.000
    80    34.400   133.400     0.000
    90    37.600   143.100     0.000
   100    40.700   152.300     0.000
   110    43.800   161.200     0.000
   120    46.700   169.700     0.000
   130    49.500   178.000     5.000
   140    52.100   186.000    10.000
   150    54.700   193.800    16.000
   160    57.200   201.400    21.000
   170    59.600   208.800    26.000
   180    61.900   216.000    31.000
   190    64.100   223.000    36.000
   200    66.200   229.900    42.000
   210    68.300   236.700    47.000
   220    70.200   243.300    52.000
   230    72.100   249.800    57.000
```

```
   240    73.900   256.200    62.000
   250    75.600   262.500    67.000
   260    77.200   268.700    73.000
   270    78.800   274.800    78.000
   280    80.300   280.800    83.000
   290    81.700   286.700    88.000
   300    83.100   292.500    93.000
   310    84.400   298.300    99.000
   320    85.700   304.000   104.000
   330    86.900   309.600   109.000
   340    88.100   315.100   114.000
   350    89.200   320.600   119.000
   360    90.200   326.000   125.000
   370    91.300   331.000   130.000
   380    92.200   336.600   135.000
   390    93.200   341.900   140.000
   400    94.100   347.000   145.000
   410    95.000   352.200   150.000
   420    95.800   357.200   156.000
   430    96.600   362.300   161.000
   440    97.400   367.300   166.000
   450    98.200   372.200   171.000
   460    99.000   377.100   176.000
   470    99.700   381.900   182.000
   480   100.400   386.700   187.000
   490   101.200   391.500   192.000
   500   101.900   396.200   197.000
   510   102.600   400.900   202.000
   520   103.300   405.600   208.000
   530   104.000   410.200   213.000
   540   104.700   414.800   218.000
   550   105.400   419.300   223.000
  9999

* PM10 conversions table
* Table 6 of the DMRB March 2000 amendment
* FORMAT(I6,5(3X,F7.3))
*
  46 [PM10BRK] the number of PM10 break points.
*
*-------------------------------------------------------
* PM10   90% days  days>50ug/m3
*(ug/m3)  (ug/m3)
*-------------------------------------------------------
*23456xxx1234567xxx1234567xxx1234567xxx1234567xxx1234567
     5     9.000     0.000
     6    10.700     0.000
     7    12.500     0.000
     8    14.300     0.000
     9    16.100     0.000
    10    17.900     0.000
    11    19.700     0.000
    12    21.500     0.000
    13    23.300     0.000
    14    25.100     0.000
    15    26.900     0.000
    16    28.600     0.000
    17    30.400     0.000
    18    32.200     0.000
    19    34.000     0.000
    20    35.800     1.000
```

```
    21    37.600     5.000
    22    39.400    10.000
    23    41.200    14.000
    24    43.000    18.000
    25    44.800    22.000
    26    46.500    27.000
    27    48.300    31.000
    28    50.100    35.000
    29    51.900    39.000
    30    53.700    44.000
    31    55.500    48.000
    32    57.300    52.000
    33    59.100    56.000
    34    60.900    61.000
    35    62.700    65.000
    36    64.400    69.000
    37    66.200    73.000
    38    68.000    78.000
    39    69.800    82.000
    40    71.600    86.000
    41    73.400    90.000
    42    75.200    95.000
    43    77.000    99.000
    44    78.800   103.000
    45    80.600   107.000
    46    82.300   112.000
    47    84.100   116.000
    48    85.900   120.000
    49    87.700   124.000
    50    89.500   129.000
  9999

* Emission reduction table.
*
  30 [REDBRK] the number of emission reduction break points.
* -------------------------------------------------
* Year      Redfct
* -------------------------------------------------
* FORMAT(I6,5(3X,F7.3))
*
*23456xxx1234567xxx1234567xxx1234567xxx1234567xxx1234567
  1996     1.000
  1997     0.930
  1998     0.860
  1999     0.780
  2000     0.700
  2001     0.620
  2002     0.560
  2003     0.500
  2004     0.450
  2005     0.410
  2006     0.380
  2007     0.340
  2008     0.320
  2009     0.300
  2010     0.280
  2011     0.260
  2012     0.250
  2013     0.240
  2014     0.230
  2015     0.230
```

2016	0.220
2017	0.220
2018	0.220
2019	0.230
2020	0.230
2021	0.240
2022	0.240
2023	0.250
2024	0.260
2025	0.270
9999	

Emission Coefficients File

```
* Emission Coefficients File - CR 2007
* Carbon Monoxide emission coeffiecients
*
* Veh          A           B            C    D          E  F         G       H      I       J      K       L       X   MIN
MAX
       1     13.6      -0.169            0        0          0 0 0.00000926     158      0       0      0       0  2.62
5  130
       2     9.53      -0.118            0        0          0 0  0.0000062     179      0       0      0       0  2.62
5  130
       3     9.71      -0.243       0.0018        0          0 0          0     244      0       0      0       0  2.62
5  130
       4     13.6      -0.169            0        0          0 0 0.00000926     158      0       0      0       0  1.87
5  130
       5     9.53      -0.118            0        0          0 0  0.0000062     179      0       0      0       0  1.87
5  130
       6     9.71      -0.243       0.0018        0          0 0          0     244      0       0      0       0  1.87
5  130
       7     13.6      -0.169            0        0          0 0 0.00000926     158      0       0      0       0  1.87
5  130
       8     9.53      -0.118            0        0          0 0  0.0000062     179      0       0      0       0  1.87
5  130
       9     9.71      -0.243       0.0018        0          0 0          0     244      0       0      0       0  1.87
5  130
      10     13.6      -0.169            0        0          0 0 0.00000926     158      0       0      0       0  1.55
5  130
      11     9.53      -0.118            0        0          0 0  0.0000062     179      0       0      0       0  1.55
5  130
      12     9.71      -0.243       0.0018        0          0 0          0     244      0       0      0       0  1.55
5  130
      13     13.6      -0.169            0        0          0 0 0.00000926     158      0       0      0       0  1.62
5  130
      14     9.53      -0.118            0        0          0 0  0.0000062     179      0       0      0       0  1.62
5  130
      15     9.71      -0.243       0.0018        0          0 0          0     244      0       0      0       0  1.62
5  130
      16     13.6      -0.169            0        0          0 0 0.00000926     158      0       0      0       0     1
5  130
      17     9.53      -0.118            0        0          0 0  0.0000062     179      0       0      0       0     1
5  130
      18     9.71      -0.243       0.0018        0          0 0          0     244      0       0      0       0     1
5  130
      19     4.23     -0.0867            0        0          0 0 0.00000801       0    360       0      0       0     1
5  130
      20    0.612           0            0        0          0 0 0.00000184       0    980   -2383      0       0     1
5  130
      21   0.0423           0     0.000145        0          0 0          0     112      0       0      0       0     1
5  130
      22    0.385     -0.0007            0        0          0 0          0    44.2      0       0      0       0     1
5  130
      23     0.51           0            0        0          0 0          0    8.01      0       0      0       0     1
5  130
      24   -0.241     0.00166            0        0          0 0          0    12.8      0       0      0       0     1
5  130
      25    0.385     -0.0007            0        0          0 0          0    44.2      0       0      0       0   0.9
5  130
      26     0.51           0            0        0          0 0          0    8.01      0       0      0       0   0.9
5  130
      27   -0.241     0.00166            0        0          0 0          0    12.8      0       0      0       0   0.9
5  130
      28    0.385     -0.0007            0        0          0 0          0    44.2      0       0      0       0   0.6
5  130
      29     0.51           0            0        0          0 0          0    8.01      0       0      0       0   0.6
5  130
      30   -0.241     0.00166            0        0          0 0          0    12.8      0       0      0       0   0.6
5  130
      31    0.478     -0.0068     0.000045        0          0 0          0    16.9      0       0      0       0     1
5  130
      32    0.599     -0.0056     0.000026        0          0 0          0      12      0       0      0       0     1
5  130
      33    0.499     -0.0098     0.000065        0          0 0          0       0    200    -777      0       0     1
5  130
      34   0.0373           0    -0.000034        0          0 0 0.000000316    8.82      0       0      0       0     1
5  130
      35    0.632     -0.0135     0.000075        0          0 0          0    2.38      0       0      0       0     1
5  130
      36    0.624     -0.0128    0.0000697        0          0 0          0   0.139      0       0      0       0     1
5  130
      37    0.632     -0.0135     0.000075        0          0 0          0    2.38      0       0      0       0   0.6
5  130
      38    0.624     -0.0128    0.0000697        0          0 0          0   0.139      0       0      0       0   0.6
5  130
      39    0.632     -0.0135     0.000075        0          0 0          0    2.38      0       0      0       0   0.6
5  130
      40    0.624     -0.0128    0.0000697        0          0 0          0   0.139      0       0      0       0   0.6
5  130
```

```
        41   20.52      -0.141    -0.005328       0          0 0   0.0000674   143.2  77.4       0     0       0     1
5  130
        42   20.52      -0.141    -0.005328       0          0 0   0.0000674   143.2  77.4       0     0       0     1
5  130
        43  -0.447           0            0       0          0 0 0.000000929     140     0       0     0       0     1
5  130
        44    0.51           0            0       0          0 0           0    8.01     0       0     0       0     1
5  130
        45    0.51           0            0       0          0 0           0    8.01     0       0     0       0   0.9
5  130
        46    0.51           0            0       0          0 0           0    8.01     0       0     0       0   0.6
5  130
        47   1.642     -0.0191     0.000005       0          0 0   0.0000012   4.312     0       0     0       0     1
5  130
        48   -1.49      0.0181            0       0          0 0           0    52.5  -140       0     0       0     1
5  130
        49   -1.49      0.0181            0       0          0 0           0    52.5  -140       0     0       0     1
5  130
        50   -1.49      0.0181            0       0          0 0           0    52.5  -140       0     0       0   0.6
5  130
        51   -1.49      0.0181            0       0          0 0           0    52.5  -140       0     0       0   0.6
5  100
        52    1.61           0            0       0          0 0           0    26.2   686   -2514     0       0   1.3
5  100
        53    0.93           0     0.000078       0          0 0           0    81.1     0    -161     0       0  1.31
5  100
        54    1.61           0            0       0          0 0           0    26.2   686   -2514     0       0     1
5  100
        55    0.93           0     0.000078       0          0 0           0    81.1     0    -161     0       0     1
5  100
        56    0.66           0    0.0000214       0          0 0           0    28.6   171    -671     0       0     1
5  100
        57    1.84           0      0.00006       0          0 0           0    80.2   479   -1882     0       0     1
5  100
        58    0.74           0            0       0          0 0           0      12   314   -1150     0       0     1
5  100
        59    1.98           0            0       0          0 0           0    32.2   844   -3092     0       0     1
5  100
        60    0.74           0            0       0          0 0           0      12   314   -1150     0       0   0.7
5  100
        61    1.98           0            0       0          0 0           0    32.2   844   -3092     0       0   0.7
5  100
        62    0.74           0            0       0          0 0           0      12   314   -1150     0       0  0.51
5  100
        63    1.98           0            0       0          0 0           0    32.2   844   -3092     0       0  0.51
5  100
        64    0.74           0            0       0          0 0           0      12   314   -1150     0       0  0.51
5  100
        65    1.98           0            0       0          0 0           0    32.2   844   -3092     0       0  0.51
5   60
        66    0.28           0            0       0          0 0  0.00000294     137     0       0     0       0  2.25
5   60
        67    0.28           0            0       0          0 0  0.00000294     137     0       0     0       0     1
5   60
        68   0.612           0      0.00002       0          0 0           0    26.7   160    -627     0       0     1
5   60
        69   0.691           0            0       0          0 0           0    11.2   294   -1079     0       0     1
5   60
        70   0.691           0            0       0          0 0           0    11.2   294   -1079     0       0   0.7
5   60
        71   0.691           0            0       0          0 0           0    11.2   294   -1079     0       0  0.51
5   60
9999
* Hydrocarbons emission coeffiecients
*
* Veh          A           B            C   D          E  F           G       H     I       J     K       L     X  MIN
MAX
         1    1.85     -0.0197            0       0          0 0  0.00000068    18.5     0       0     0       0  1.58
5  130
         2    2.13     -0.0317      0.00017       0          0 0           0    16.7     0       0     0       0  1.58
5  130
         3    1.22     -0.0108            0       0          0 0  0.00000034    25.8     0       0     0       0  1.58
5  130
         4    1.85     -0.0197            0       0          0 0  0.00000068    18.5     0       0     0       0  1.23
5  130
         5    2.13     -0.0317      0.00017       0          0 0           0    16.7     0       0     0       0  1.23
5  130
         6    1.22     -0.0108            0       0          0 0  0.00000034    25.8     0       0     0       0  1.23
5  130
         7    1.85     -0.0197            0       0          0 0  0.00000068    18.5     0       0     0       0  1.23
5  130
         8    2.13     -0.0317      0.00017       0          0 0           0    16.7     0       0     0       0  1.23
5  130
         9    1.22     -0.0108            0       0          0 0  0.00000034    25.8     0       0     0       0  1.23
5  130
        10    1.85     -0.0197            0       0          0 0  0.00000068    18.5     0       0     0       0  1.25
5  130
```

11	2.13	-0.0317	0.00017	0	0	0	0	16.7	0	0	0	0	1.25	5	130
12	1.22	-0.0108	0	0	0	0	0.00000034	25.8	0	0	0	0	1.25	5	130
13	1.85	-0.0197	0	0	0	0	0.00000068	18.5	0	0	0	0	1.25	5	130
14	2.13	-0.0317	0.00017	0	0	0	0	16.7	0	0	0	0	1.25	5	130
15	1.22	-0.0108	0	0	0	0	0.00000034	25.8	0	0	0	0	1.25	5	130
16	1.85	-0.0197	0	0	0	0	0.00000068	18.5	0	0	0	0	1	5	130
17	2.13	-0.0317	0.00017	0	0	0	0	16.7	0	0	0	0	1	5	130
18	1.22	-0.0108	0	0	0	0	0.00000034	25.8	0	0	0	0	1	5	130
19	-0.52	0.00492	0	0	0	0	0	18.7	-92.3	186	0	0	1	5	130
20	0.14	-0.0054	0.000047	0	0	0	0	3.47	0	0	0	0	1	5	130
21	-0.0487	0.00076	0	0	0	0	0	7.16	0	-42	0	0	1	5	130
22	0.185	-0.0033	0.000019	0	0	0	0	0	0	0	0	0	1	5	130
23	0.0501	0	0	0	0	0	0	0	12.1	0	0	0	1	5	130
24	-0.0017	-0.00002	0	0	0	0	0	1.2	0	0	0	0	1	5	130
25	0.185	-0.0033	0.000019	0	0	0	0	0	0	0	0	0	0.7	5	130
26	0.0501	0	0	0	0	0	0	0	12.1	0	0	0	0.7	5	130
27	-0.0017	-0.00002	0	0	0	0	0	1.2	0	0	0	0	0.7	5	130
28	0.185	-0.0033	0.000019	0	0	0	0	0	0	0	0	0	0.53	5	130
29	0.0501	0	0	0	0	0	0	0	12.1	0	0	0	0.53	5	130
30	-0.0017	-0.00002	0	0	0	0	0	1.2	0	0	0	0	0.53	5	130
31	0.00641	0	0	0	0	0	0	6.23	-3.88	0	0	0	1	5	130
32	0.104	-0.0019	0.00001	0	0	0	0	4.12	-8.01	0	0	0	1	5	130
33	0.0157	0	0	0	0	0	0	2.64	0	0	0	0	1	5	130
34	0.139	-0.0023	0	0	0	0	0.00000011	0.663	0	0	0	0	1	5	130
35	0.0784	-0.0012	0	0	0	0	0.000000046	1.04	0	0	0	0	1	5	130
36	0.0473	-0.0003	0	0	0	0	0	2.06	0	0	0	0	1	5	130
37	0.0784	-0.0012	0	0	0	0	0.000000046	1.04	0	0	0	0	0.7	5	130
38	0.0473	-0.0003	0	0	0	0	0	2.06	0	0	0	0	0.7	5	130
39	0.0784	-0.0012	0	0	0	0	0.000000046	1.04	0	0	0	0	0.64	5	130
40	0.0473	-0.0003	0	0	0	0	0	2.06	0	0	0	0	0.64	5	130
41	2.624	-0.0477	0.00023	0	0	0	0.00000034	18.44	8.1	0	0	0	1	5	130
42	2.624	-0.0477	0.00023	0	0	0	0.00000034	18.44	8.1	0	0	0	1	5	130
43	0.0626	0	0	0	0	0	0	1.41	0	0	0	0	1	5	130
44	0.0501	0	0	0	0	0	0	0	12.1	0	0	0	1	5	130
45	0.0501	0	0	0	0	0	0	0	12.1	0	0	0	0.7	5	130
46	0.0501	0	0	0	0	0	0	0	12.1	0	0	0	0.53	5	130
47	0.602	-0.00878	0.000019	0	0	0	0.00000022	0.0678	11.44	-36.24	0	0	1	5	130
48	0.071	0	0	0	0	0	0	2.36	0	0	0	0	1	5	130
49	0.071	0	0	0	0	0	0	2.36	0	0	0	0	1	5	130
50	0.071	0	0	0	0	0	0	2.36	0	0	0	0	0.78	5	130
51	0.071	0	0	0	0	0	0	2.36	0	0	0	0	0.41	5	100
52	0.756	0	0.000027	0	0	0	0	33.3	381	-1416	0	0	2.01	5	100
53	0.259	0	0	0	0	0	-0.00000006	56.7	-9.01	0	0	0	2.52	5	100
54	0.756	0	0.000027	0	0	0	0	33.3	381	-1416	0	0	1	5	100

```
      55   0.259          0            0        0          0 0 -0.00000006    56.7  -9.01      0     0       0      1
5  100
      56   0.284    0.00001            0        0          0 0           0    12.5    143   -532     0       0      1
5  100
      57   0.736   0.000026            0        0          0 0           0    32.5    371  -1379     0       0      1
5  100
      58  0.0366      0.002            0        0          0 0           0    16.8      0   -118     0       0      1
5  100
      59  0.0984     0.0054            0        0          0 0           0    45.5      0   -320     0       0      1
5  100
      60  0.0366      0.002            0        0          0 0           0    16.8      0   -118     0       0    0.7
5  100
      61  0.0984     0.0054            0        0          0 0           0    45.5      0   -320     0       0    0.7
5  100
      62  0.0366      0.002            0        0          0 0           0    16.8      0   -118     0       0   0.49
5  100
      63  0.0984     0.0054            0        0          0 0           0    45.5      0   -320     0       0   0.49
5  100
      64  0.0366      0.002            0        0          0 0           0    16.8      0   -118     0       0   0.49
5  100
      65  0.0984     0.0054            0        0          0 0           0    45.5      0   -320     0       0   0.49
5   60
      66   0.448          0            0        0          0 0           0       0    430  -1093     0       0   4.13
5   60
      67   0.448          0            0        0          0 0           0       0    430  -1093     0       0      1
5   60
      68   0.267  0.0000096            0        0          0 0           0    11.8    135   -501     0       0      1
5   60
      69  0.0341    0.00187            0        0          0 0           0    15.8      0   -111     0       0      1
5   60
      70  0.0341    0.00187            0        0          0 0           0    15.8      0   -111     0       0    0.7
5   60
      71  0.0341    0.00187            0        0          0 0           0    15.8      0   -111     0       0   0.49
5   60
9999
* Total oxides of nitrogen emission coeffiecients
*
* Veh          A           B            C    D          E  F           G       H      I       J    K       L     X   MIN
MAX
       1   1.173     0.0225     -0.00014        0          0 0           0       0      0       0     0       0      1
5  130
       2    1.36     0.0217     -0.00004        0          0 0           0       0      0       0     0       0      1
5  130
       3     1.5       0.03       0.0001        0          0 0           0       0      0       0     0       0      1
5  130
       4   1.173     0.0225     -0.00014        0          0 0           0       0      0       0     0       0      1
5  130
       5    1.36     0.0217     -0.00004        0          0 0           0       0      0       0     0       0      1
5  130
       6     1.5       0.03       0.0001        0          0 0           0       0      0       0     0       0      1
5  130
       7   1.173     0.0225     -0.00014        0          0 0           0       0      0       0     0       0      1
5  130
       8    1.36     0.0217     -0.00004        0          0 0           0       0      0       0     0       0      1
5  130
       9     1.5       0.03       0.0001        0          0 0           0       0      0       0     0       0      1
5  130
      10   1.479    -0.0037      0.00018        0          0 0           0       0      0       0     0       0      1
5  130
      11   1.663    -0.0038       0.0002        0          0 0           0       0      0       0     0       0      1
5  130
      12    1.87    -0.0039      0.00022        0          0 0           0       0      0       0     0       0      1
5  130
      13   1.616    -0.0084      0.00025        0          0 0           0       0      0       0     0       0      1
5  130
      14       0          0            0        0          0 0           0       0      0       0  1.29  0.0099      1
5  130
      15   2.784    -0.0112     0.000294        0          0 0           0       0      0       0     0       0      1
5  130
      16    1.12      0.001     0.000145        0          0 0 -0.000000157      0      0       0     0       0      1
5  130
      17    1.35    0.00433     0.000137        0          0 0           0       0      0       0     0       0      1
5  130
      18    1.91          0     0.000089        0          0 0 0.000000595       0      0       0     0       0      1
5  130
      19   0.161          0            0        0          0 0 0.000000411    2.82      0       0     0       0      1
5  130
      20  -0.375      0.008            0        0          0 0           0    12.5  -51.5    81.1     0       0      1
5  130
      21   0.389          0    -0.000092        0          0 0  0.00000092       0      0      70     0       0      1
5  130
      22    0.25   -0.00283            0        0          0 0 0.000000172   0.182      0       0     0       0      1
5  130
      23   0.302          0            0        0          0 0 0.000000199       0      0       0     0       0      1
5  130
      24   0.265    -0.0028            0        0          0 0 0.000000353       0      0       0     0       0      1
5  130
```

25	0.25	-0.00283	0	0	0	0	0.000000172	0.182	0	0	0	0	0.6
5	130												
26	0.302	0	0	0	0	0	0.000000199	0	0	0	0	0	0.6
5	130												
27	0.265	-0.0028	0	0	0	0	0.000000353	0	0	0	0	0	0.6
5	130												
28	0.25	-0.00283	0	0	0	0	0.000000172	0.182	0	0	0	0	0.32
5	130												
29	0.302	0	0	0	0	0	0.000000199	0	0	0	0	0	0.32
5	130												
30	0.265	-0.0028	0	0	0	0	0.000000353	0	0	0	0	0	0.32
5	130												
31	0.88	-0.0115	0.000086	0	0	0	0	1.67	0	0	0	0	1
5	130												
32	0.638	0	0	0	0	0	0.000000204	6.02	-10.6	0	0	0	1
5	130												
33	0.514	0	-0.000064	0	0	0	0.000000707	0	119	-408	0	0	1
5	130												
34	-0.378	0	0	0	0	0	0.000000498	47	-327	790	0	0	1
5	130												
35	0.844	-0.00884	0	0	0	0	0.000000708	0	0	0	0	0	1
5	130												
36	0.358	0	0	0	0	0	0.000000251	11.5	0	0	0	0	1
5	130												
37	0.844	-0.00884	0	0	0	0	0.000000708	0	0	0	0	0	1
5	130												
38	0.358	0	0	0	0	0	0.000000251	11.5	0	0	0	0	1
5	130												
39	0.844	-0.00884	0	0	0	0	0.000000708	0	0	0	0	0	0.5
5	130												
40	0.358	0	0	0	0	0	0.000000251	11.5	0	0	0	0	0.5
5	130												
41	1.596	-0.00672	0.000124	0	0	0	0	0	0	0	0	0	1
5	130												
42	1.596	-0.00672	0.000124	0	0	0	0	0	0	0	0	0	1
5	130												
43	0.414	0	-0.000054	0	0	0	0.000000577	0	0	0	0	0	1
5	130												
44	0.302	0	0	0	0	0	0.000000199	0	0	0	0	0	1
5	130												
45	0.302	0	0	0	0	0	0.000000199	0	0	0	0	0	0.6
5	130												
46	0.302	0	0	0	0	0	0.000000199	0	0	0	0	0	0.33
5	130												
47	0.9552	0	-0.0000316	0	0	0	0.000000624	15.692	0	-27.52	0	0	1
5	130												
48	1.31	0	-0.00025	0	0	0	0.00000232	0	0	0	0	0	1
5	130												
49	1.31	0	-0.00025	0	0	0	0.00000232	0	0	0	0	0	0.95
5	130												
50	1.31	0	-0.00025	0	0	0	0.00000232	0	0	0	0	0	0.71
5	130												
51	1.31	0	-0.00025	0	0	0	0.00000232	0	0	0	0	0	0.37
5	100												
52	13.5	0	0	0	0	0	0	0	0	0	0	0	1
5	100												
53	20.7	0	0	0	0	0	0	0	0	0	0	0	1
5	100												
54	4.34	-0.0464	0	0	0	0	0.00000564	133	-107	0	0	0	1
5	100												
55	6.86	0	0	0	0	0	0	441	-1118	639	0	0	1
5	100												
56	4.4	0	0	0	0	0	0.00000187	126	0	-805	0	0	1
5	100												
57	11.7	0	0	0	0	0	0.00000499	334	0	-2141	0	0	1
5	100												
58	4.66	-0.0303	0.000356	0	0	0	0	106	-178	0	0	0	1
5	100												
59	10	-0.0651	0.000764	0	0	0	0	227	-381	0	0	0	1
5	100												
60	4.66	-0.0303	0.000356	0	0	0	0	106	-178	0	0	0	0.69
5	100												
61	10	-0.0651	0.000764	0	0	0	0	227	-381	0	0	0	0.69
5	100												
62	4.66	-0.0303	0.000356	0	0	0	0	106	-178	0	0	0	0.49
5	100												
63	10	-0.0651	0.000764	0	0	0	0	227	-381	0	0	0	0.49
5	100												
64	4.66	-0.0303	0.000356	0	0	0	0	106	-178	0	0	0	0.28
5	100												
65	10	-0.0651	0.000764	0	0	0	0	227	-381	0	0	0	0.28
5	60												
66	0	0	0	23.9196	-0.128837	0	0	0	0	0	0	0	1
5	60												
67	17.1	-0.323	0.00221	0	0	0	0	0	277	0	0	0	1
5	60												
68	3.96	0	0	0	0	0	0.00000169	113	0	-725	0	0	1
5	60												

```
      69     4.46     -0.0291     0.000341        0          0 0           0      101   -170       0      0       0      1
5   60
      70     4.46     -0.0291     0.000341        0          0 0           0      101   -170       0      0       0   0.69
5   60
      71     4.46     -0.0291     0.000341        0          0 0           0      101   -170       0      0       0   0.49
5   60
9999
* Particulate Matter emission coeffiecients
*
* Veh          A            B             C    D          E  F           G        H      I       J      K       L       X   MIN
MAX
       1   0.0324     -0.0004            0        0          0 0     2.21E-08    0.377     0       0      0       0      1
5  130
       2   0.0227    -0.00028            0        0          0 0     1.48E-08    0.427     0       0      0       0      1
5  130
       3   0.0232    -0.00058   0.00000429       0          0 0            0    0.582     0       0      0       0      1
5  130
       4   0.0324     -0.0004            0        0          0 0     2.21E-08    0.377     0       0      0       0      1
5  130
       5   0.0227    -0.00028            0        0          0 0     1.48E-08    0.427     0       0      0       0      1
5  130
       6   0.0232    -0.00058   0.00000429       0          0 0            0    0.582     0       0      0       0      1
5  130
       7   0.0324     -0.0004            0        0          0 0     2.21E-08    0.377     0       0      0       0      1
5  130
       8   0.0227    -0.00028            0        0          0 0     1.48E-08    0.427     0       0      0       0      1
5  130
       9   0.0232    -0.00058   0.00000429       0          0 0            0    0.582     0       0      0       0      1
5  130
      10   0.0324     -0.0004            0        0          0 0     2.21E-08    0.377     0       0      0       0      1
5  130
      11   0.0227    -0.00028            0        0          0 0     1.48E-08    0.427     0       0      0       0      1
5  130
      12   0.0232    -0.00058   0.00000429       0          0 0            0    0.582     0       0      0       0      1
5  130
      13   0.0324     -0.0004            0        0          0 0     2.21E-08    0.377     0       0      0       0      1
5  130
      14   0.0227    -0.00028            0        0          0 0     1.48E-08    0.427     0       0      0       0      1
5  130
      15   0.0232    -0.00058   0.00000429       0          0 0            0    0.582     0       0      0       0      1
5  130
      16   0.0324     -0.0004            0        0          0 0     2.21E-08    0.377     0       0      0       0      1
5  130
      17   0.0227    -0.00028            0        0          0 0     1.48E-08    0.427     0       0      0       0      1
5  130
      18   0.0232    -0.00058   0.00000429       0          0 0            0    0.582     0       0      0       0      1
5  130
      19 0.00244           0 -0.000000853        0          0 0     8.72E-09 0.00795     0       0      0       0      1
5  130
      20 0.00307           0            0        0          0 0     8.35E-09        0      0       0      0       0      1
5  130
      21 0.00672           0 -0.00000154        0          0 0     1.52E-08        0      0       0      0       0      1
5  130
      22 0.00356    -0.00013  0.00000138       0          0 0            0        0      0       0      0       0      1
5  130
      23   0.0024   -0.000046            0        0          0 0     5.59E-09        0      0       0      0       0      1
5  130
      24   0.0024           0 -0.00000164        0          0 0     1.73E-08        0      0       0      0       0      1
5  130
      25 0.00356    -0.00013  0.00000138       0          0 0            0        0      0       0      0       0      1
5  130
      26   0.0024   -0.000046            0        0          0 0     5.59E-09        0      0       0      0       0      1
5  130
      27   0.0024           0 -0.00000164        0          0 0     1.73E-08        0      0       0      0       0      1
5  130
      28 0.00356    -0.00013  0.00000138       0          0 0            0        0      0       0      0       0      1
5  130
      29   0.0024   -0.000046            0        0          0 0     5.59E-09        0      0       0      0       0      1
5  130
      30   0.0024           0 -0.00000164        0          0 0     1.73E-08        0      0       0      0       0      1
5  130
      31    0.131           0    -0.000014        0          0 0 0.000000154     2.16      0       0      0       0      1
5  130
      32    0.282    -0.00399     0.000026        0          0 0     2.53E-08     1.32      0       0      0       0      1
5  130
      33    0.189    -0.00176            0        0          0 0     8.93E-08    -3.84   60.4    -191      0       0      1
5  130
      34   0.0857   -0.000901            0        0          0 0     7.56E-08     1.02      0    -4.5      0       0      1
5  130
      35   0.0722           0    -0.000018        0          0 0 0.000000151        0      0       0      0       0      1
5  130
      36    0.113           0   -0.0000224        0          0 0    0.0000002        0      0    30.4      0       0      1
5  130
      37   0.0722           0    -0.000018        0          0 0 0.000000151        0      0       0      0       0    0.7
5  130
      38    0.113           0   -0.0000224        0          0 0    0.0000002        0      0    30.4      0       0    0.7
5  130
```

```
       39  0.0722          0   -0.000018       0          0 0 0.000000151        0      0       0     0       0  0.35
5  130
       40   0.113          0  -0.0000224       0          0 0   0.0000002        0      0    30.4     0       0  0.35
5  130
       41 0.03472          0  -0.0000146       0          0 0 0.000000156 0.39335      0       0     0       0     1
5  130
       42 0.03472          0  -0.0000146       0          0 0 0.000000156 0.39335      0       0     0       0     1
5  130
       43 0.00307          0           0       0          0 0    8.35E-09        0      0       0     0       0     1
5  130
       44  0.0024  -0.000046           0       0          0 0    5.59E-09        0      0       0     0       0     1
5  130
       45  0.0024  -0.000046           0       0          0 0    5.59E-09        0      0       0     0       0     1
5  130
       46  0.0024  -0.000046           0       0          0 0    5.59E-09        0      0       0     0       0     1
5  130
       47   0.553  -0.006604     0.00002       0          0 0 0.000000254  -0.526 13.36       0     0       0     1
5  130
       48   0.127          0   -0.000038       0          0 0 0.000000415        0      0       0     0       0     1
5  130
       49   0.127          0   -0.000038       0          0 0 0.000000415        0      0       0     0       0     1
5  130
       50   0.127          0   -0.000038       0          0 0 0.000000415        0      0       0     0       0   0.8
5  130
       51   0.127          0   -0.000038       0          0 0 0.000000415        0      0       0     0       0  0.49
5  100
       52   0.174          0           0       0          0 0   0.0000001     14.4      0       0     0       0  2.09
5  100
       53   0.283          0           0       0          0 0           0     20.9  -12.8       0     0       0  1.14
5  100
       54   0.174          0           0       0          0 0   0.0000001     14.4      0       0     0       0     1
5  100
       55   0.283          0           0       0          0 0           0     20.9  -12.8       0     0       0     1
5  100
       56  0.0896          0           0       0          0 0    5.16E-08     7.43      0       0     0       0     1
5  100
       57   0.236          0           0       0          0 0 0.000000136     19.5      0       0     0       0     1
5  100
       58   0.111   -0.00145   0.0000126       0          0 0           0     4.05   -6.7       0     0       0     1
5  100
       59   0.288   -0.00379    0.000033       0          0 0           0     10.6  -17.5       0     0       0     1
5  100
       60   0.111   -0.00145   0.0000126       0          0 0           0     4.05   -6.7       0     0       0  0.72
5  100
       61   0.288   -0.00379    0.000033       0          0 0           0     10.6  -17.5       0     0       0  0.72
5  100
       62   0.111   -0.00145   0.0000126       0          0 0           0     4.05   -6.7       0     0       0  0.15
5  100
       63   0.288   -0.00379    0.000033       0          0 0           0     10.6  -17.5       0     0       0  0.15
5  100
       64   0.111   -0.00145   0.0000126       0          0 0           0     4.05   -6.7       0     0       0  0.15
5  100
       65   0.288   -0.00379    0.000033       0          0 0           0     10.6  -17.5       0     0       0  0.15
5   60
       66   0.128          0           0       0          0 0           0     14.4      0       0     0       0  2.31
5   60
       67   0.128          0           0       0          0 0           0     14.4      0       0     0       0     1
5   60
       68  0.0843          0           0       0          0 0    4.85E-08     6.98      0       0     0       0     1
5   60
       69   0.104   -0.00137    0.000012       0          0 0           0     3.81   -6.3       0     0       0     1
5   60
       70   0.104   -0.00137    0.000012       0          0 0           0     3.81   -6.3       0     0       0  0.72
5   60
       71   0.104   -0.00137    0.000012       0          0 0           0     3.81   -6.3       0     0       0  0.15
5   60
9999
* Carbon Dioxide emission coeffiecients
*
* Veh          A          B           C   D          E  F          G       H      I       J     K       L      X  MIN
MAX
        1   68.19     -0.751       0.005       0          0 0   0.0000053       98   6282  -19055     0       0 3.957
5  130
        2    53.7     -0.572       0.004       0          0 0   0.0000031      901      0       0     0       0 3.899
5  130
        3   75.46     -1.059       0.008       0          0 0  0.00000035     1215      0       0     0       0 3.971
5  130
        4   68.19     -0.751       0.005       0          0 0  0.00000534       98   6282  -19055     0       0 3.495
5  130
        5    53.7     -0.572       0.004       0          0 0  0.00000312      901      0       0     0       0 3.416
5  130
        6   75.46     -1.059       0.008       0          0 0 0.000000346     1215      0       0     0       0 3.138
5  130
        7   68.19     -0.751       0.005       0          0 0  0.00000534       98   6282  -19055     0       0 3.495
5  130
        8    53.7     -0.572       0.004       0          0 0  0.00000312      901      0       0     0       0 3.416
5  130
```

9	75.46	-1.059	0.008	0	0	0	0.000000346	1215	0	0	0	0	3.138	5	130
10	68.19	-0.751	0.005	0	0	0	0.00000534	98	6282	-19055	0	0	3.254	5	130
11	53.7	-0.572	0.004	0	0	0	0.00000312	901	0	0	0	0	3.166	5	130
12	75.46	-1.059	0.008	0	0	0	0.000000346	1215	0	0	0	0	3.278	5	130
13	68.19	-0.751	0.005	0	0	0	0.00000534	98	6282	-19055	0	0	3.254	5	130
14	53.7	-0.572	0.004	0	0	0	0.00000312	901	0	0	0	0	3.166	5	130
15	75.46	-1.059	0.008	0	0	0	0.000000346	1215	0	0	0	0	3.278	5	130
16	68.19	-0.751	0.005	0	0	0	0.00000534	98	6282	-19055	0	0	2.933	5	130
17	53.7	-0.572	0.004	0	0	0	0.00000312	901	0	0	0	0	2.933	5	130
18	75.46	-1.059	0.008	0	0	0	0.000000346	1215	0	0	0	0	2.933	5	130
19	54.4	-0.544	0.004	0	0	0	0.00000401	400	87	7005	0	0	2.933	5	130
20	34.81	-0.005	0	0	0	0	0.000013	979	490	-1191	0	0	2.933	5	130
21	38.47	0.001	0	0	0	0	0.0000134	1468	0	-42	0	0	2.933	5	130
22	29.33	-0.004	0	0	0	0	0.0000138	542	0	0	0	0	2.933	5	130
23	36.25	0	0	0	0	0	0.0000132	655	12.2	0	0	0	2.933	5	130
24	80.36	-1.049	0.008	0	0	0	2.02E-08	612	0	0	0	0	2.933	5	130
25	29.33	-0.004	0	0	0	0	0.0000138	542	0	0	0	0	2.918	5	130
26	36.25	0	0	0	0	0	0.0000132	655	12.2	0	0	0	2.918	5	130
27	80.36	-1.049	0.008	0	0	0	2.02E-08	612	0	0	0	0	2.918	5	130
28	29.33	-0.004	0	0	0	0	0.0000138	542	0	0	0	0	2.563	5	130
29	36.25	0	0	0	0	0	0.0000132	655	12.2	0	0	0	2.563	5	130
30	80.36	-1.049	0.008	0	0	0	2.02E-08	612	0	0	0	0	2.563	5	130
31	76.43	-1.063	0.00704	0	0	0	0.00000018	253	-3.92	0	0	0	2.933	5	130
32	86.94	-0.836	0.0000534	0	0	0	0.0000446	273	-8.1	0	0	0	2.933	5	130
33	60.93	-0.386	0.0000325	0	0	0	0.0000268	-1.81	5688	-19570	0	0	2.933	5	130
34	43.84	-0.00342	-0.00877	0	0	0	0.0000945	962	0	-9421	0	0	2.933	5	130
35	43.74	-0.246	0.0000165	0	0	0	0.0000273	428	0	0	0	0	2.933	5	130
36	48.53	-0.0067	-0.00572	0	0	0	0.0000591	612	0	35	0	0	2.933	5	130
37	43.74	-0.246	0.0000165	0	0	0	0.0000273	428	0	0	0	0	2.918	5	130
38	48.53	-0.0067	-0.00572	0	0	0	0.0000591	612	0	35	0	0	2.918	5	130
39	43.74	-0.246	0.0000165	0	0	0	0.0000273	428	0	0	0	0	2.563	5	130
40	48.53	-0.0067	-0.00572	0	0	0	0.0000591	612	0	35	0	0	2.563	5	130
41	90.8	-0.879	-0.00244	0	0	0	0.0000887	229.1	2404	0	0	0	2.933	5	130
42	90.8	-0.879	-0.00244	0	0	0	0.0000887	229.1	2404	0	0	0	2.933	5	130
43	103.5	-0.773	0	0	0	0	0.0000555	71.4	4632	0	0	0	2.933	5	130
44	99	-0.736	0	0	0	0	0.0000524	4	4422	0	0	0	2.933	5	130
45	99	-0.736	0	0	0	0	0.0000524	4	4422	0	0	0	2.918	5	130
46	99	-0.736	0	0	0	0	0.0000524	4	4422	0	0	0	2.563	5	130
47	81.22	-0.4766	0.0000448	0	0	0	0.0000587	483	-1264	2215	0	0	2.933	5	130
48	79.96	0.009	-0.016	0	0	0	0.000161	535	-70	0	0	0	2.933	5	130
49	77.43	0.009	-0.0155	0	0	0	0.000156	519	-70	0	0	0	2.933	5	130
50	77.43	0.009	-0.0155	0	0	0	0.000156	519	-70	0	0	0	2.842	5	130
51	77.43	0.009	-0.0155	0	0	0	0.000156	519	-70	0	0	0	2.754	5	100
52	128	0	-0.0223	0	0	0	0.00031	2884	1220	-4511	0	0	2.933	5	100

```
      53      648       -7.16   0.0000511        0          0 0     0.000474      225 12147    -105     0         0 2.933
5  100
      54      127           0     -0.0224        0          0 0      0.00031     2828   728   -2688     0         0 2.933
5  100
      55      647       -7.16    0.000039        0          0 0     0.000474      122 12163   -80.5     0         0 2.933
5  100
      56      150  0.0000103   0.0000107        0          0 0    0.0000656     2104 19467 -90259     0         0 2.933
5  100
      57      395  0.0000263     0.00003        0          0 0     0.000172     5533 51194 -237418    0         0 1.907
5  100
      58      210   0.000331     -0.0164        0          0 0     0.000184     27.7 30591 -117427    0         0 2.933
5  100
      59      491    0.00104     -0.0381        0          0 0     0.000429     74.4 71340 -274171    0         0 2.288
5  100
      60      210   0.000331     -0.0164        0          0 0     0.000184     27.7 30591 -117427    0         0 2.933
5  100
      61      491    0.00104     -0.0381        0          0 0     0.000429     74.4 71340 -274171    0         0 2.288
5  100
      62      210   0.000331     -0.0164        0          0 0     0.000184     27.7 30591 -117427    0         0 2.933
5  100
      63      491    0.00104     -0.0381        0          0 0     0.000429     74.4 71340 -274171    0         0 2.288
5  100
      64      210   0.000331     -0.0164        0          0 0     0.000184     27.7 30591 -117427    0         0 2.933
5  100
      65      491    0.00104     -0.0381        0          0 0     0.000429     74.4 71340 -274171    0         0 2.288
5   60
      66     26.8          0           0        0          0 0     0.000169     6516 -9753   -4560     0         0 2.933
5   60
      67       25          0           0        0          0 0     0.000167     6408 -11113 -1105     0         0 2.933
5   60
      68    141.3 0.00000968     0.00001        0          0 0    0.0000615     1977 18283 -84801     0         0 2.933
5   60
      69    200.3   0.000293     -0.0156        0          0 0     0.000175       26 29113 -111672    0         0 2.933
5   60
      70    200.3   0.000293     -0.0156        0          0 0     0.000175       26 29113 -111672    0         0 2.933
5   60
      71    200.3   0.000293     -0.0156        0          0 0     0.000175       26 29113 -111672    0         0 2.933
5   60
9999
* ==================================================
*
* ==================================================
* Table 4 - Emission rates for average LIGHT vehicle
* reletive to a 1990 petrol engined car
* --------------------------------------------------
* Year      CO         HC    NOX       PM10      CO2
* --------------------------------------------------
* FORMAT(I6,5(3X,F7.3))
*
  2002     0.530     0.420     0.440     0.510     0.980
  2003     0.460     0.340     0.370     0.450     0.980
  2004     0.410     0.280     0.310     0.390     0.970
  2005     0.370     0.230     0.260     0.350     0.970
  2006     0.320     0.190     0.220     0.310     0.960
  2007     0.290     0.160     0.190     0.270     0.950
  2008     0.260     0.140     0.170     0.250     0.940
  2009     0.240     0.130     0.150     0.230     0.930
  2010     0.220     0.120     0.140     0.210     0.930
  2011     0.210     0.120     0.140     0.200     0.920
  2012     0.200     0.110     0.130     0.190     0.920
  2013     0.190     0.110     0.130     0.180     0.910
  2014     0.180     0.110     0.120     0.170     0.910
  2015     0.170     0.110     0.120     0.170     0.900
  2016     0.170     0.100     0.120     0.170     0.900
  2017     0.160     0.100     0.120     0.170     0.900
  2018     0.160     0.100     0.110     0.160     0.900
  2019     0.150     0.100     0.110     0.160     0.900
  2020     0.150     0.100     0.110     0.160     0.900
  2021     0.150     0.100     0.110     0.160     0.900
  2022     0.150     0.100     0.110     0.160     0.900
  2023     0.150     0.100     0.110     0.160     0.900
  2024     0.150     0.100     0.110     0.160     0.900
  2025     0.150     0.100     0.110     0.160     0.900
```

```
9999
* ==================================================
*
* ==================================================
* Table 5 - Emisson rates for average HEAVY vehicle
* reletive to a 1990 petrol engined car
* --------------------------------------------------
* Year      CO         HC    NOX       PM10       CO2
* --------------------------------------------------
* FORMAT(I6,5(3X,F.3)
*
  2002     0.290     1.360     5.920     5.000     4.730
  2003     0.270     1.210     5.500     4.310     4.720
  2004     0.260     1.070     5.150     3.760     4.710
  2005     0.250     0.960     4.860     3.340     4.710
  2006     0.240     0.860     4.490     2.980     4.690
  2007     0.230     0.770     4.160     2.670     4.680
  2008     0.220     0.700     3.850     2.400     4.680
  2009     0.210     0.640     3.620     2.190     4.670
  2010     0.200     0.590     3.410     2.030     4.670
  2011     0.200     0.560     3.260     1.910     4.670
  2012     0.190     0.540     3.140     1.820     4.670
  2013     0.190     0.520     3.040     1.750     4.670
  2014     0.190     0.510     2.970     1.700     4.680
  2015     0.180     0.500     2.930     1.670     4.690
  2016     0.180     0.500     2.900     1.640     4.700
  2017     0.180     0.490     2.880     1.620     4.710
  2018     0.180     0.490     2.870     1.600     4.720
  2019     0.180     0.490     2.860     1.590     4.720
  2020     0.180     0.490     2.860     1.580     4.730
  2021     0.180     0.490     2.860     1.580     4.740
  2022     0.180     0.490     2.860     1.580     4.750
  2023     0.180     0.490     2.870     1.570     4.760
  2024     0.180     0.490     2.870     1.570     4.770
  2025     0.180     0.490     2.880     1.570     4.780
9999
* Table 3 LIGHT  - Correction factors for average traffic
* travelling at speeds other than 100km/h
* -------------------------------------------------------
* Speed     CO         HC     NOX       PM10       CO2
* -------------------------------------------------------
* FORMAT(I6,5(3X,F7.3))
*
*23456xxx1234567xxx1234567xxx1234567xxx1234567xxx1234567
     5     4.420     7.750     0.700     1.670     2.860
    10     2.660     4.810     0.640     1.270     1.990
    15     2.060     3.650     0.610     1.170     1.640
    20     1.700     3.030     0.600     1.120     1.440
    25     1.450     2.620     0.600     1.080     1.300
    30     1.240     2.310     0.600     1.050     1.190
    35     1.080     2.070     0.600     1.020     1.110
    40     0.940     1.860     0.610     1.000     1.040
    45     0.830     1.690     0.620     0.980     0.980
    50     0.750     1.540     0.630     0.970     0.940
    55     0.680     1.420     0.650     0.960     0.910
    60     0.630     1.310     0.670     0.950     0.880
    65     0.610     1.210     0.700     0.940     0.870
    70     0.600     1.140     0.730     0.940     0.860
    75     0.620     1.070     0.760     0.940     0.870
    80     0.650     1.030     0.800     0.940     0.880
    85     0.710     1.000     0.840     0.950     0.890
```

```
    90     0.780     0.980     0.890     0.960     0.920
    95     0.880     0.980     0.940     0.980     0.960
   100     1.000     1.000     1.000     1.000     1.000
   105     1.140     1.030     1.060     1.030     1.050
   110     1.300     1.080     1.130     1.060     1.110
   115     1.490     1.150     1.210     1.090     1.180
   120     1.690     1.240     1.290     1.130     1.260
   125     1.920     1.340     1.380     1.180     1.350
   130     2.180     1.470     1.480     1.230     1.440
9999
* ==================================================
* Table 3 HEAVY - Correction factors for average traffic
* travelling at speeds other than 100km/h
* --------------------------------------------------
* Speed     CO        HC    NOX       PM10       CO2
* --------------------------------------------------
* FORMAT(I6,5(3X,F7.3))
*
     5     6.640     0.410     4.390    18.070     2.820
    10     3.780     5.570     2.950     4.360     1.750
    15     2.570     3.660     2.280     3.080     1.400
    20     1.990     2.750     1.890     2.440     1.220
    25     1.660     2.240     1.640     2.050     1.100
    30     1.450     1.920     1.460     1.790     1.000
    35     1.300     1.700     1.320     1.610     0.930
    40     1.200     1.540     1.220     1.470     0.870
    45     1.130     1.420     1.130     1.360     0.820
    50     1.070     1.330     1.070     1.280     0.780
    55     1.030     1.260     1.010     1.220     0.750
    60     1.000     1.200     0.970     1.160     0.730
    65     0.980     1.150     0.950     1.120     0.720
    70     0.970     1.120     0.930     1.080     0.720
    75     0.960     1.090     0.920     1.060     0.730
    80     0.960     1.060     0.920     1.040     0.760
    85     0.960     1.040     0.920     1.020     0.800
    90     0.970     1.020     0.940     1.010     0.850
    95     0.980     1.010     0.970     1.000     0.920
   100     1.000     1.000     1.000     1.000     1.000
9999
```

Screening File

```
* ============================================================
* ENEVAL Screening Definitions file CR 2007
* ------------------------------------------------------------
* Jurisdiction Code Screening Definitions
* ------------------------------------------------------------
*
* FORMAT(I6)
*23456
     0
    32
  9999
*
* ------------------------------------------------------------
* Link Type Screening Definitions
* ------------------------------------------------------------
*
* FORMAT(I6)
*
     0
    32
  9999
*
* ------------------------------------------------------------
```

Background Emission Levels

```
* LOCAL BACKGROUND POLLUTANT CONCENTRATIONS
* Contains data on a node by node basis for input to ENEVAL
* Data written in the format (3(I8,1X),4(f12.8,1X))
*7654321x87654321x87654321x***.87654321x***.87654321x***.87654321x***.87654321
*------------------------------------------------------------------------------
*LINK NO    ANODE    BNODE           CO      BENZENE          NOX         PM10
*                                 (ppm)        (ppm)      (ug/m3)      (ug/m3)
*------------------------------------------------------------------------------
       1     1065     1275   0.15980390   0.13731401   9.67305756  16.32895088
       2     1065     1278   0.16598970   0.17660481  11.50431919  16.38604927
       3     1163     1250   0.15000071   0.05697561   4.18631744  15.26482010
       4     1163     1265   0.15000071   0.05697561   4.18631744  15.26482010
       5     1246     1795   0.29214540   0.53533602  43.24272919  17.51194954
       6     1247     1248   0.27952611   0.51213121  38.82045746  17.36182976
       7     1247     1909   0.26009011   0.43880239  34.93748474  17.23502922
       8     1247     2354   0.26009011   0.43880239  34.93748474  17.23502922
       9     1248     1247   0.27952611   0.51213121  38.82045746  17.36182976
      10     1248     1249   0.30466571   0.59940469  43.41391754  17.46499062
      11     1248     1425   0.27952611   0.51213121  38.82045746  17.36182976
      12     1248     1795   0.29214540   0.53533602  43.24272919  17.51194954
      13     1249     1248   0.30466571   0.59940469  43.41391754  17.46499062
      14     1249     1250   0.30466571   0.59940469  43.41391754  17.46499062
      15     1250     1163   0.15000071   0.05697561   4.18631744  15.26482010
      16     1250     1249   0.30466571   0.59940469  43.41391754  17.46499062
      17     1264     1265   0.31445199   0.65567279  43.38467407  17.51016998
      18     1264     1557   0.31445199   0.65567279  43.38467407  17.51016998
      19     1265     1163   0.15000071   0.05697561   4.18631744  15.26482010
      20     1265     1264   0.31445199   0.65567279  43.38467407  17.51016998
      21     1265     1266   0.31445199   0.65567279  43.38467407  17.51016998
      22     1266     1265   0.31445199   0.65567279  43.38467407  17.51016998
      23     1266     1267   0.26026100   0.45193750  32.67337036  17.12484932
      24     1266     1276   0.26026100   0.45193750  32.67337036  17.12484932
      25     1267     1266   0.26026100   0.45193750  32.67337036  17.12484932
      26     1267     1274   0.26599070   0.48691201  32.44285965  17.12463951
      27     1268     1272   0.26245770   0.46965680  32.06939697  17.12338066
      28     1268     1273   0.26599070   0.48691201  32.44285965  17.12463951
      29     1268     1557   0.31445199   0.65567279  43.38467407  17.51016998
      30     1270     1271   0.26245770   0.46965680  32.06939697  17.12338066
      31     1270     1292   0.22733480   0.36281839  23.31427193  16.82403946
      32     1271     1270   0.26245770   0.46965680  32.06939697  17.12338066
      33     1271     1272   0.26245770   0.46965680  32.06939697  17.12338066
      34     1271     1394   0.26245770   0.46965680  32.06939697  17.12338066
      35     1272     1268   0.26245770   0.46965680  32.06939697  17.12338066
      36     1272     1271   0.26245770   0.46965680  32.06939697  17.12338066
      37     1272     1561   0.26245770   0.46965680  32.06939697  17.12338066
      38     1273     1268   0.26599070   0.48691201  32.44285965  17.12463951
      39     1273     1274   0.26599070   0.48691201  32.44285965  17.12463951
      40     1273     1396   0.26599070   0.48691201  32.44285965  17.12463951
      41     1274     1267   0.26599070   0.48691201  32.44285965  17.12463951
      42     1274     1273   0.26599070   0.48691201  32.44285965  17.12463951
      43     1274     1275   0.26599070   0.48691201  32.44285965  17.12463951
```

Zones File for Delta

```
*  ANODE BNODE ZONE
    1065,  1275, 1
    1065,  1278, 2
    1163,  1250, 3
    1163,  1265, 4
    1246,  1795, 5
    1247,  1248, 6
    1247,  1909, 7
    1247,  2354, 8
    1248,  1247, 9
    1248,  1249, 10
    1248,  1425, 1
    1248,  1795, 1
    1249,  1248, 1
    1249,  1250, 1
    1250,  1163, 1
    1250,  1249, 1
    1264,  1265, 1
    1264,  1557, 1
    1265,  1163, 1
    1265,  1264, 1
    1265,  1266, 1
    1266,  1265, 1
    1266,  1267, 1
etc
```

Fleet Composition File

```
* FLEET PROPRTIONS 2002 – CR 2007
*
*     VEH          CAR          LGV          LIGHT        HGV          BUS
        1   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
        2   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
        3   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
        4   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
        5   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
        6   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
        7   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
        8   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
        9   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
       10   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
       11   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
       12   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
       13   0.00029073   0.00000000   0.00025636   0.00000000   0.00000000
       14   0.00028285   0.00000000   0.00024941   0.00000000   0.00000000
       15   0.00004095   0.00000000   0.00003611   0.00000000   0.00000000
       16   0.07810531   0.00000000   0.06887217   0.00000000   0.00000000
       17   0.07598867   0.00000000   0.06700575   0.00000000   0.00000000
       18   0.01100064   0.00000000   0.00970021   0.00000000   0.00000000
       19   0.08645270   0.00000000   0.07623278   0.00000000   0.00000000
       20   0.08410984   0.00000000   0.07416688   0.00000000   0.00000000
       21   0.01217631   0.00000000   0.01073690   0.00000000   0.00000000
       22   0.13879969   0.00000000   0.12239162   0.00000000   0.00000000
       23   0.13503824   0.00000000   0.11907483   0.00000000   0.00000000
       24   0.01954906   0.00000000   0.01723809   0.00000000   0.00000000
       25   0.07370134   0.00000000   0.06498881   0.00000000   0.00000000
       26   0.07170405   0.00000000   0.06322763   0.00000000   0.00000000
       27   0.01038037   0.00000000   0.00915326   0.00000000   0.00000000
       28   0.02894355   0.00000000   0.02552202   0.00000000   0.00000000
       29   0.02815919   0.00000000   0.02483038   0.00000000   0.00000000
       30   0.00407652   0.00000000   0.00359461   0.00000000   0.00000000
       31   0.00787422   0.00000000   0.00694338   0.00000000   0.00000000
       32   0.00146262   0.00000000   0.00128972   0.00000000   0.00000000
       33   0.03379894   0.00000000   0.02980344   0.00000000   0.00000000
       34   0.00627807   0.00000000   0.00553592   0.00000000   0.00000000
       35   0.04321665   0.00000000   0.03810783   0.00000000   0.00000000
       36   0.00802739   0.00000000   0.00707844   0.00000000   0.00000000
       37   0.03419118   0.00000000   0.03014930   0.00000000   0.00000000
       38   0.00635093   0.00000000   0.00560016   0.00000000   0.00000000
       39   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
       40   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
       41   0.00000000   0.06081703   0.00718942   0.00000000   0.00000000
       42   0.00000000   0.02260450   0.00267217   0.00000000   0.00000000
       43   0.00000000   0.04380732   0.00517864   0.00000000   0.00000000
       44   0.00000000   0.03277115   0.00387401   0.00000000   0.00000000
       45   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
       46   0.00000000   0.10434613   0.01233517   0.00000000   0.00000000
       47   0.00000000   0.16766069   0.01981984   0.00000000   0.00000000
       48   0.00000000   0.44184264   0.05223198   0.00000000   0.00000000
       49   0.00000000   0.12615054   0.01491276   0.00000000   0.00000000
       50   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
       51   0.00000000   0.00000000   0.00000000   0.01212594   0.00000000
       52   0.00000000   0.00000000   0.00000000   0.00361395   0.00000000
       53   0.00000000   0.00000000   0.00000000   0.05314062   0.00000000
       54   0.00000000   0.00000000   0.00000000   0.01446075   0.00000000
       55   0.00000000   0.00000000   0.00000000   0.11166987   0.00000000
       56   0.00000000   0.00000000   0.00000000   0.06629667   0.00000000
```

```
      57   0.00000000   0.00000000   0.00000000   0.30512502   0.00000000
      58   0.00000000   0.00000000   0.00000000   0.26443714   0.00000000
      59   0.00000000   0.00000000   0.00000000   0.08522458   0.00000000
      60   0.00000000   0.00000000   0.00000000   0.08390545   0.00000000
      61   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      62   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      63   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      64   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      65   0.00000000   0.00000000   0.00000000   0.00000000   0.10414359
      66   0.00000000   0.00000000   0.00000000   0.00000000   0.08825741
      67   0.00000000   0.00000000   0.00000000   0.00000000   0.16471628
      68   0.00000000   0.00000000   0.00000000   0.00000000   0.50412611
      69   0.00000000   0.00000000   0.00000000   0.00000000   0.13875661
      70   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
      71   0.00000000   0.00000000   0.00000000   0.00000000   0.00000000
9999
* SCALE FACTORS FOR DIFFERENT VEHICLE TYPES - 2002
*
*    VEH       C0       HC  NOX     PM10      C02
       1        1        1        1        1        1
       2        1        1        1        1        1
       3        1        1        1        1        1
       4        1        1        1        1        1
       5        1        1        1        1        1
       6        1        1        1        1        1
       7        1        1        1        1        1
       8        1        1        1        1        1
       9        1        1        1        1        1
      10        1        1        1        1        1
      11        1        1        1        1        1
      12        1        1        1        1        1
      13        1        1        1        1        1
      14        1        1        1        1        1
      15        1        1        1        1        1
      16        1        1        1        1        1
      17        1        1        1        1        1
      18        1        1        1        1        1
      19    0.676    0.595    0.854        1        1
      20    0.676    0.595    0.854        1        1
      21    0.676    0.595    0.854        1        1
      22    0.676    0.595    0.854        1        1
      23    0.676    0.595    0.854        1        1
      24    0.676    0.595    0.854        1        1
      25    0.839    0.786    0.747        1        1
      26    0.839    0.786    0.747        1        1
      27    0.839    0.786    0.747        1        1
      28        1        1        1        1        1
      29        1        1        1        1        1
      30        1        1        1        1        1
      31    0.943    0.955        1  0.88328        1
      32    0.943    0.955        1  0.88328        1
      33    0.943    0.955        1  0.88328        1
      34    0.943    0.955        1  0.88328        1
      35    0.943    0.955        1    0.905        1
      36    0.943    0.955        1    0.905        1
      37        1        1        1  0.95163        1
      38        1        1        1  0.95163        1
      39        1        1        1        1        1
      40        1        1        1        1        1
      41        1        1        1        1        1
      42    0.676    0.595    0.854        1        1
```

43	0.676	0.595	0.854	1	1
44	0.839	0.786	0.747	1	1
45	1	1	1	1	1
46	0.943	0.955	1	0.88328	1
47	0.943	0.955	1	0.88328	1
48	0.943	0.955	1	0.905	1
49	1	1	1	0.95163	1
50	1	1	1	1	1
51	0.956	0.97	0.941	0.79692	1
52	0.956	0.97	0.941	0.79692	1
53	0.956	0.97	0.941	0.79692	1
54	0.956	0.97	0.941	0.79692	1
55	0.956	0.97	0.941	0.79692	1
56	0.956	0.97	0.941	0.79692	1
57	0.946237	0.960299	0.939484	0.907245	1
58	0.938757	0.952866	0.938323	0.900537	1
59	0.935546	0.935615	0.94567	0.911564	1
60	0.928818	0.929042	0.944563	0.905419	1
61	1	1	1	1	1
62	1	1	1	1	1
63	1	1	1	1	1
64	1	1	1	1	1
65	0.907	0.723	1.014	0.58899	1
66	0.907	0.723	1.014	0.58899	1
67	0.907	0.723	1.014	0.58899	1
68	0.583216	0.555316	0.989793	0.511226	1
69	0.824392	0.652582	1.009652	0.625255	1
70	1	1	1	1	1
71	1	1	1	1	1

9999

Files for Carbon Calculations

ICSV1 - Standard Capacities

```
* Link Type,Capacity per lane
1,2400
2,1800
3,1800
4,1800
5,1600
6,1600
7,1000
8,800
9,1000
10,1000
9999
```

ICSV2 - Consumption Coefficients

```
*,Petrol car,Diesel car,Petrol LGV,Diesel LGV,OGV1,OGV2,PSV
a,0.18804764,0.14086613,0.25246149,0.18637593,0.76833752,1.02443156,0.63466867
b,-0.00437947,-0.00285222,-0.00486999,-0.00268049,-0.02257303,-0.03021812,-
0.0189897
c,0.00005068,0.00002867,0.00004424,0.00001172,0.00031766,0.00044285,0.00027431
d,-1.691E-07,-6.93E-08,-7.53E-08,8.23E-08,-1.3544E-06,-2.0059E-06,-1.2161E-06
min,10,10,10,10,10,10,10
max,130,130,130,130,100,100,100
9999
```

ICSV3 - Fuel Efficiency Improvements

```
* Year,Petrol car,Diesel car,Petrol LGV,Diesel LGV,OGV1,OGV2,PSV
2002,1,1,1,1,1,1,1
2003,0.9926,0.9882,0.9878,1.0097,1.0046,0.9983,1
2004,0.9851555,0.97644042,0.97239032,0.9955642,1.0046,0.9983,1
2005,0.977668318,0.964625491,0.955081772,0.977843157,1.0046,0.9983,1
2006,0.969358137,0.95285706,0.940851054,0.963273294,0.99224342,0.98602091,1
2007,0.961118593,0.941232204,0.926832373,0.948920522,0.980038826,0.973892853,1
2008,0.952949085,0.929749171,0.913022571,0.934781606,0.967984348,0.961913971,1
2009,0.944849018,0.918406231,0.899418535,0.92085336,0.956078141,0.950082429,1
2010,0.936817801,0.907201675,0.886017198,0.907132645,0.94431838,0.938396415,1
2011,0.925388624,0.896315255,0.886017198,0.907132645,0.94431838,0.938396415,1
2012,0.914098883,0.885559472,0.886017198,0.907132645,0.94431838,0.938396415,1
2013,0.902946877,0.874932758,0.886017198,0.907132645,0.94431838,0.938396415,1
2014,0.891930925,0.864433565,0.886017198,0.907132645,0.94431838,0.938396415,1
2015,0.881049367,0.854060362,0.886017198,0.907132645,0.94431838,0.938396415,1
2016,0.868009837,0.843470014,0.886017198,0.907132645,0.94431838,0.938396415,1
2017,0.855163291,0.833010986,0.886017198,0.907132645,0.94431838,0.938396415,1
2018,0.842506875,0.822681649,0.886017198,0.907132645,0.94431838,0.938396415,1
2019,0.830037773,0.812480397,0.886017198,0.907132645,0.94431838,0.938396415,1
2020,0.817753214,0.80240564,0.886017198,0.907132645,0.94431838,0.938396415,1
2021,0.817753214,0.80240564,0.886017198,0.907132645,0.94431838,0.938396415,1
2022,0.817753214,0.80240564,0.886017198,0.907132645,0.94431838,0.938396415,1
2023,0.817753214,0.80240564,0.886017198,0.907132645,0.94431838,0.938396415,1
2024,0.817753214,0.80240564,0.886017198,0.907132645,0.94431838,0.938396415,1
2025,0.817753214,0.80240564,0.886017198,0.907132645,0.94431838,0.938396415,1
9999
```

ICSV4 - Carbon emissions factors

```
* Year,Petrol,Diesel
2002,627.57,717.15
2003,627.57,717.15
2004,627.57,717.15
2005,627.57,717.15
2006,627.57,717.15
2007,627.57,717.15
2008,618.94,707.29
2009,614.23,701.91
2010,609.27,696.23
2011,608.74,695.64
2012,608.22,695.04
2013,607.7,694.44
2014,607.17,693.84
2015,606.65,693.25
2016,606.13,692.65
2017,605.61,692.05
2018,605.08,691.45
2019,604.56,690.85
2020,604.04,690.26
2021,604.04,690.26
2022,604.04,690.26
2023,604.04,690.26
2024,604.04,690.26
2025,604.04,690.26
9999
```

ICSV5 - Fleet Split

```
*Year,Petrolcar,Dieselcar,PetrolLGV,DieselLGV,OGV1,OGV2,light,"OGV1,2andPSV100
%Diesel"
2002,0.79,0.21,0.15,0.85,0.474576271,0.525423729,0.12,
2003,0.78,0.22,0.15,0.85,0.474576271,0.525423729,0.12,
2004,0.77,0.23,0.15,0.85,0.474576271,0.525423729,0.12,
2005,0.76,0.24,0.15,0.85,0.474576271,0.525423729,0.12,
2006,0.75,0.25,0.15,0.85,0.474576271,0.525423729,0.12,
2007,0.74,0.26,0.15,0.85,0.474576271,0.525423729,0.12,
2008,0.72,0.28,0.15,0.85,0.474576271,0.525423729,0.12,
2009,0.71,0.29,0.15,0.85,0.474576271,0.525423729,0.12,
2010,0.69,0.31,0.15,0.85,0.474576271,0.525423729,0.12,
2011,0.682,0.318,0.15,0.85,0.474576271,0.525423729,0.12,
2012,0.674,0.326,0.15,0.85,0.474576271,0.525423729,0.12,
2013,0.666,0.334,0.15,0.85,0.474576271,0.525423729,0.12,
2014,0.658,0.342,0.15,0.85,0.474576271,0.525423729,0.12,
2015,0.65,0.35,0.15,0.85,0.474576271,0.525423729,0.12,
2016,0.642,0.358,0.15,0.85,0.474576271,0.525423729,0.12,
2017,0.634,0.366,0.15,0.85,0.474576271,0.525423729,0.12,
2018,0.626,0.374,0.15,0.85,0.474576271,0.525423729,0.12,
2019,0.618,0.382,0.15,0.85,0.474576271,0.525423729,0.12,
2020,0.61,0.39,0.15,0.85,0.474576271,0.525423729,0.12,
2021,0.602,0.398,0.15,0.85,0.474576271,0.525423729,0.12,
2022,0.594,0.406,0.15,0.85,0.474576271,0.525423729,0.12,
2023,0.586,0.414,0.15,0.85,0.474576271,0.525423729,0.12,
2024,0.578,0.422,0.15,0.85,0.474576271,0.525423729,0.12,
2025,0.57,0.43,0.15,0.85,0.474576271,0.525423729,0.12,
9999
```

Appendix D – Example Control File

Example Control File

```
ENEVAL V8.0, Sample Control File
   &FILES
     OPRN ='final_.PRN',
     IDAT1='netfact3.dat',
     IDAT2='scrndef.dat',
     IDAT3='emiss.dat',
     IDAT4='distance.dat',
     IDAT5='standard.dat',
     IDAT6='feartab.dat',
     IDAT7='linkbg.dat',
     IDAT8='zones.dat',
     IDAT9='prop2005.dat',
     ICSV1='icsv1.csv',
     ICSV2='icsv2.csv',
     ICSV3='icsv3.csv',
     ICSV4='icsv4.csv',
     ICSV5='icsv5.csv',
     INET1='final_AM.net',
     IJUNC1='final_AM.jnc',
     INET2='final_OP.net',
     IJUNC2='final_OP.jnc',
     INET3='final_PM.net',
     IJUNC3='final_PM.jnc',
     ODAT1='final_.EM',
     ODAT2='final_.CSV',
     ODAT3='final_.trp',
     ODAT4='final_.del',
   &END
   &PARAM
*
*    Model year
     YEARX=2005,
*
*    Number of input networks
     NNET=3,
*
*    Number of input vehicle types
     NVT=5,
*
*    Distance from nearside link to receptors
     DISTAB=5,
*
*    Distance from on-coming link to receptors
     DISTBA=10,
*
*    Output volume fields (0 if not required)
*    CO
     OUTVOL(3)=10,
*
*    Hydro carbons
     OUTVOL(4)=11,
*
*    Oxides of nitrogen
     OUTVOL(5)=12,
*
*    Particulates PM10
     OUTVOL(6)=13,
*
*    Carbon dioxide
     OUTVOL(7)=14,
```

```
*
*     Carbon monoxide
      OUTVOL(8)=15,
*
*     Nitrogen dioxide
      OUTVOL(9)=16,
*
*     Benzene
      OUTVOL(10)=17,
*
*     Particulates PM10
      OUTVOL(11)=18,
*
*     Noise levels
      OUTVOL(12)=19,
*
*     Fear indices
      OUTVOL(13)=20,
*
*     Volume field containing input vehicle types
      NVTVOF(1)=5,
      NVTVOF(2)=4,
      NVTVOF(3)=3,
      NVTVOF(4)=2,
      NVTVOF(5)=10,
*
*     Vehicle type ENEVAL equivalents
      VTEQUV(1)=1,
      VTEQUV(2)=1,
      VTEQUV(1)=2,
      VTEQUV(2)=4,
      VTEQUV(2)=5,
*
*     Factor for converting total annual to average flow/hr
      FACHR=4931,
    &END
    &OPTION
*     Calculations required
      EMISS=T,
      LOCMIS=T,
      NOISE=T,
      FEAR=T,
*
*     Outputs required
      TABS=T,
      CSVOUT=T,
      TRIPNT=T,
*
*     Delta Files
      DODELT=T,
      DELT12=T,
*
*     Emissions units
      EPERKM=F,
      EMINKG=F,
*
*     Junction delays
      YESJNC=T,
*
*     Jurisdiction codes and link types
      JSCREN=T,
      LSCREN=T,
*
*     use local background values for each link
      LINKBG=T,
*
*     Text Network
      TXTNET=F,
```

```
*
*     Do New Carbon Calculations
      DOCARB=T,
  &END
```

Appendix E – ENEVAL Vehicle Types

ENEVAL Vehicle Types for Normal Emissions Calculations

The following is a list of the 71 vehicle types taken into consideration by ENEVAL

No	Type	Legislation Class	Engine Size
1	Petrol Car	Pre-ECE	<1.4 L
2	Petrol Car	Pre-ECE	1.4 - 2.0 L
3	Petrol Car	Pre-ECE	>2.0 L
4	Petrol Car	ECE 15.00	<1.4 L
5	Petrol Car	ECE 15.00	1.4 - 2.0 L
6	Petrol Car	ECE 15.00	>2.0 L
7	Petrol Car	ECE 15.01	<1.4 L
8	Petrol Car	ECE 15.01	1.4 - 2.0 L
9	Petrol Car	ECE 15.01	>2.0 L
10	Petrol Car	ECE 15.02	<1.4 L
11	Petrol Car	ECE 15.02	1.4 - 2.0 L
12	Petrol Car	ECE 15.02	>2.0 L
13	Petrol Car	ECE 15.03	<1.4 L
14	Petrol Car	ECE 15.03	1.4 - 2.0 L
15	Petrol Car	ECE 15.03	>2.0 L
16	Petrol Car	ECE 15.04	<1.4 L
17	Petrol Car	ECE 15.04	1.4 - 2.0 L
18	Petrol Car	ECE 15.04	>2.0 L
19	Petrol Car	Euro I	<1.4 L
20	Petrol Car	Euro I	1.4 - 2.0 L
21	Petrol Car	Euro I	>2.0 L
22	Petrol Car	Euro II	<1.4 L
23	Petrol Car	Euro II	1.4 - 2.0 L
24	Petrol Car	Euro II	>2.0 L

25	Petrol Car	Euro III	<1.4 L
26	Petrol Car	Euro III	1.4 - 2.0 L
27	Petrol Car	Euro III	>2.0 L
28	Petrol Car	Euro IV	<1.4 L
29	Petrol Car	Euro IV	1.4 - 2.0 L
30	Petrol Car	Euro IV	>2.0 L
31	Diesel Car	Pre-Euro I	<1.4 L
32	Diesel Car	Pre-Euro I	1.4 - 2.0 L
33	Diesel Car	Euro I	>2.0 L
34	Diesel Car	Euro I	<1.4 L
35	Diesel Car	Euro II	1.4 - 2.0 L
36	Diesel Car	Euro II	>2.0 L
37	Diesel Car	Euro III	<1.4 L
38	Diesel Car	Euro III	1.4 - 2.0 L
39	Diesel Car	Euro IV	>2.0 L
40	Diesel Car	Euro IV	<1.4 L
41	Petrol LGV	Pre-Euro I	1.4 - 2.0 L
42	Petrol LGV	Euro I	>2.0 L
43	Petrol LGV	Euro II	
44	Petrol LGV	Euro III	
45	Petrol LGV	Euro IV	
46	Diesel LGV	Pre-Euro I	
47	Diesel LGV	Euro I	
48	Diesel LGV	Euro II	
49	Diesel LGV	Euro III	
50	Diesel LGV	Euro IV	
51	HGV	Pre -1988 Models	Rigid
52	HGV	Pre -1988 Models	Articulated
53	HGV	1988-1993 Model	Rigid

54	HGV	1988-1993 Model	Articulated
55	HGV	Euro I	Rigid
56	HGV	Euro I	Articulated
57	HGV	Euro II	Rigid
58	HGV	Euro II	Articulated
59	HGV	Euro III	Rigid
60	HGV	Euro III	Articulated
61	HGV	Euro IV	Rigid
62	HGV	Euro IV	Articulated
63	HGV	Euro IV+ (2008)	Rigid
64	HGV	Euro IV+ (2008)	Articulated
65	Bus	Pre -1988 Models	
66	Bus	1988-1993 Model	
67	Bus	Euro I	
68	Bus	Euro II	
69	Bus	Euro III	
70	Bus	Euro IV	
71	Bus	Euro IV+ (2008)	

ENEVAL Vehicle Types for Carbon Emissions Calculations

For the updated Carbon Emissions (May 2007) the following vehicle types are used in the calculations:

- Petrol Car;
- Diesel Car;
- Petrol LGV;
- Diesel LGV;
- OGV1;
- OGV2; and
- PSV.