7. DATA PREPARATION

7.1 Part 7 Chapter 2 of this Manual describes the structure of COBA data and Part 7 Chapter 4 the preparation of data for COBA in terms of descriptions of the various lines or records that must be collected into a file for input. COBA itself takes this data in the strict format described. There are several methods the user can adopt to prepare the COBA input data file. Whichever method is used the user is advised to manuscript his data onto the coding sheets. Copies of all of these are to be found in Part 7 Chapter 6 of this Manual; the user can photocopy these as needed. The layout of data has been designed, with the KEY (header) lines, to make the file readable to the user. The methods suggested to prepare the input data file are:

i) the experienced COBA user may prefer to edit an existing COBA input file;

ii) enter data into a file in the strict format defined on the sheets. The file containing a list of data KEY headers (Cl1HDR.DAT) can be used to assist the user (by copying and pasting the lines into a data file);

iii) use CSCREEN to edit an existing COBA input file or to create a new file in COBA data format on screen. Some data checking is undertaken as the file is created (see paragraph 7.5);

7.2 The data file produced by all of these methods should, when completed, be copied into the COBA directory for use.

Data Editing

7.3 Most users of COBA will find that a first run through COBA with a given set of data will give a printout with errors or warnings due to faulty or incomplete data. Or, the output may suggest ways of preparing data for the scheme being assessed that better represent the features of the scheme or additional data might be needed to improve the definition of the scheme. This gives a requirement to edit the data file.

7.4 In order to edit files the user can use any simple text editor. The file should be plain ASCII; that is it should contain no special characters, and each line should terminate with a CR (carriage return). All characters in the file must be upper case (capitals). The Notepad program included with Windows is a suitable text editor, as is the EDIT program in DOS. If the user wishes to use a more sophisticated word processor they should ensure that the file is saved as a "Plain text" or "Text only" file.

CSCREEN Data Preparation and Editing Program

7.5 The CSCREEN program can be used as a pre-processor to create COBA formatted data files and carry out some data checking. It accepts an existing data file or data input from the keyboard. In either case the data is presented on screen in COBA format and can be edited. CSCREEN carries out data range checks and some logic checks but the more comprehensive consistency checks can only be carried out by COBA. To run CSCREEN, type **CSCR11**. The program will then prompt for data file names. A help facility describes how to move about the data file and how to edit the data. For further information on running CSCREEN see the **README.TXT** file on the release disk. Note that currently the CSCREEN program doesn't work with Windows 7 or above. On the other hand, there are other ways of creating / editing COBA input files because these are text files which may be edited by any text editor.

8. OBTAINING AND USING COBA

Versions of COBA

8.1 COBA will run on any PC operating Windows XP or later version. The graphical user interface for COBA runs in Windows and the main analysis program runs in DOS mode. COBA will handle a maximum network size of 10,000 links and 6,000 nodes; the user cannot alter the maximum number of links and nodes. Due to storage requirements the total number of junctions that can be coded for delay calculations will generally be less than the number of network nodes; see paragraph 4.9. Special program versions may be supplied to meet specific user requirements of problem size.

Obtaining a Copy of the COBA Program

8.2 Copies of the COBA program can be obtained by contacting Mott MacDonald at the address shown below.
An electronic version of the user manual in pdf format can be downloaded from the website at:

http://www.tamesoftware.co.uk/

Installing COBA

8.3 COBA should be installed onto the target PC by running INSTALL_COBA2021_V11R23.EXE. You will be prompted for a directory into which the required files will be copied.

After the installation process is complete, the following files will have been copied onto your PC:

C11HDR.TXT	Set of COBA KEY headers
C11WAR.DAT	COBA test data, input
C11WAR.PRN	COBA test data, output
COBA11.ERR	COBA error/warning file
COBA11.EXE	COBA executable
COBA2017GUI.EXE	COBA Graphical User Interface executable
CSCR11.EXE	COBA data preparation program
DOS4GW.EXE	WATCOM program for COBA
GENERICMENU.DLL	DLL for COBA Graphical User Interface
PRNDOT.EXE	Legacy program to print to generic dot matrix printer
PRNLAS.EXE	Legacy program to print to generic laser printer
README.TXT	Latest release notes
UNINSTALL_COBA2017_V11R19.EXE	COBA uninstaller

8.4 Please refer to the README.TXT file (included in the COBA installation directory) for any additional information relating to the particular release of the software.

8.5 COBA and its associated programs are run from the installed desktop shortcut. There are various files which are used by COBA during execution, and these are assumed by COBA to be present in the same directory. The default input and output files are available in the COBA installation directory. It is advised that data files and their output are stored in directories other than the COBA installation directory.

8.6 COBA is a batch program; that is, data is prepared, then submitted. There is no interaction between the user and the program while it is running. Output from COBA is to a file which can be sent to a printer after the COBA run has finished. Any text editor can be used to create data files, and to view and print output files. COBA defaults to using NOTEPAD.EXE installed in the Windows System32 subdirectory.

Program Execution

8.7 To run COBA:

In COBA's graphical user interface select the **'2: COBA Run'** button. Click on the **'Select'** button to browse to the desired input file. Click on the **'Change'** button to browse to the desired output folder. Modify the name of the output file in the **'Enter name of output file:'** textbox as required. Click on the **'Run'** button to run COBA.

COBA automatically appends **.PRN** to the output file name. If the output file already exists, COBA will overwrite it.

8.8 If the input file is not specified or does not exist, COBA will issue an "The input file does not exist" error message.

Example: run COBA using the supplied sample input file C11WAR.DAT; this will generate an output file C11WAR.PRN.

Data Errors and System Errors

8.9 There are a number of error and warning messages built into COBA. These are mainly concerned with incompatibility of data and are generally discovered by the user after a run has been attempted but the program has stopped after the data input and verification stage. In any case the data in error will be indicated and the user should consult the manual for the correction(s) necessary.

8.10 These error and warning messages are maintained on a file [COBA11.ERR] associated with COBA; COBA requires this file to be in the directory from which it is being run.

8.11 Run time errors can occur when running COBA or its associated programs. These errors are usually caused by data errors or file system errors. The more common errors are listed below. Nearly all errors reported in the past have been from this group.

Run time errors in the COBA program

ERR IO - 07 Bad character in input field
- meaning an error in data file, for example a non-numeric character in number field of data or data line incomplete.

ERR IO - 10 Format specification does not match data type
- meaning error in data file, for example, non-numeric character in number field of data or data file incomplete.

Stub Exec Failed, DOS4GW, No such file or directory
- meaning DOS4GW.EXE file not present (needs to be located with COBA program).

DOS4GW Fatal Error, loader failed, LINEXE_LOADER
- meaning insufficient memory (RAM, extended memory) to run program

COBA Output

8.12 Output from COBA is in the form of a text file, with page breaks, with a row width of up to 120 characters. You can use any text editor or word processor to examine and print the output, however COBA will default to using NOTEPAD.EXE.

8.13 Part 7 Chapter 5 of this Manual describes some features of the COBA printed output; in particular, it describes the scope of the `print phases' that the user obtains by default or requests on Key 002 records.

9. EXAMPLES OF INPUT DATA

9.1 Included here are two data files which it is hoped will assist the user, especially those preparing input for the first time, by providing examples of data file formats. It is not possible to give examples of "best practise" as this will depend on the individual scheme being appraised. The examples should be viewed in conjunction with Chapter 2 which describes the structure of COBA data and Chapter 4 which instructs on the details of the data on each record.

9.2 The first example is of a very simple COBA input file required to examine the widening of a five kilometre length of single carriageway to dual carriageway. This data file has very little local data and the appraisal relies on default data, no cost data has been input. It is the type of run that could be undertaken at the early stages of scheme development in order to get an idea of whether a scheme is likely to prove economic.

```
GENERAL TITLE             DUALLING OF THE A999 FROM A TO B  (L/G)

YEARS FOR THIS SCHEME -  FIRST      LAST  PRES-VAL   CURRENT        JOURNEY TIME
                         2010                          2013

NTWRK CLASSIFICATION TF-PERIOD   TF-YEAR  TF-MONTH ACCIDENTS  TIDALITY
                 TNB      12HR      2009        05       SEP

OPTIONS      TRAFFIC  ECONOMIC  FUELCOST
                DEFL      DEFL      DEFL

TRAFFIC PROPNS  YEAR PER CAT-1     CAT-2     CAT-3     CAT-4     CAT-5     CAT-6
                2010  12  .767      .092      .072      .059       .01

END OF BASIC DATA  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

SCHEME  TITLE                               DO MINIMUM

NODE-LINK DATA      NODE LINK LINK LINK LINK LINK LINK
                       1    1
                       2    1
9999

END OF NODE-LINK DATA ++++++++++++++++++++++++++++++++++++++++++++++++++++++++

FLOW ON        LINK   VMG1   VMG2   VMG3 INTO NODE
                  1  16400
9999

RURAL ROAD LINK  C AT DES LENGTH  CWID  HILLS DOWN BEND SWID VWID JUNC VISI MAXS
              1  1  4   0    5.0   7.0     20    0   90         2  0.8  350   97
9999

END OF SCHEME DATA ============================================================

SCHEME  TITLE                IMPROVED TO DUAL 2 LANE

NO NODE-LINK DATA CHANGES ++++++++++++++++++++++++++++++++++++++++++++++++++++

RURAL ROAD LINK  C AT DES LENGTH  CWID  HILLS DOWN BEND SWID VWID JUNC VISI MAXS
              1  2 11        5.0  14.6     15    0   30                       113
9999

END OF SCHEME DATA
FINISH
```

9.3 The second example is a hypothetical bypass scheme developed to give examples of all link and junction classifications.

```
GENERAL TITLE             SMALL TOWN BYPASS (EXAMPLE) HIGH GROWTH

YEARS FOR THIS SCHEME -  FIRST      LAST  PRES-VAL   CURRENT       JOURNEY TIME
                         2008                        2014               2010

NTWRK CLASSIFICATION TF-PERIOD   TF-YEAR  TF-MONTH ACCIDENTS  TIDALITY
                 TNB      12HR      2010        05       SEP

OPTIONS      TRAFFIC  ECONOMIC  FUELCOST
                DEFH      DEFH      DEFH

TRAFFIC PROPNS  YEAR PER CAT-1     CAT-2     CAT-3     CAT-4     CAT-5     CAT-6
                2010  12  .767      .092      .072      .059       .01

END OF BASIC DATA  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

SCHEME  TITLE                              DO MINIMUM

NODE-LINK DATA      NODE  LINK LINK LINK LINK LINK LINK
                       1     1    2
                       2     2    3   10
                       3     3    4
                       4     4    5
                       5     5    6
                       6     6   18    7   17
                       7     7    8
                       8     8    9
                       9    10   11
                      10    12   13
                      11    13   11   14
                      12    14   15
                      13    15   16
                      14    16   17
                      15    18   19
                      16    19   20
                      17    20   21
                      18    22    1
9999

END OF NODE-LINK DATA ++++++++++++++++++++++++++++++++++++++++++++++++++++++++

COSTS  YEAR       CAPITAL-COST   CONSTR-DELAY   MAINT-CAPITL    MAINT-DELAY
       2013                 50                          350            250
       2023                                              35             30
       2033                                              35             30
9999

FLOW ON        LINK   VMG1   VMG2   VMG3 INTO NODE
                  1  16400
                  2  16400
                  3  15400
                  4  15400
                  5  18000
                  6  18000
                  7  15800
                  8  13000
                  9  13000
                 10   3000
                 11   4600
                 12   5200
                 13   5200
                 14   4600
                 15   3000
                 16   3000
                 17   4000
                 18  10200
                 19   7700
                 20   7700
                 21   7700
                 22  16400
```

```
9999
```

```
RURAL ROAD LINK   C AT DES LENGTH  CWID  HILLS DOWN BEND SWID VWID JUNC VISI MAXS
              1   2 10        1.0  14.6     28          0                    113
              2   1  4        0.6   6.8     28         60          1          97
              3   1  6        0.5  10.0     28         60          1          97
              4   1  4        1.0   6.8     28         60          1          97
              9   1  4        1.0   7.3     15         40          1          97
             10   1  9        3.3   6.0     15        150          1          97
             12   1  9        1.0   7.0     15         30          1          97
             15   1  9        0.4   7.0     15         30          1          97
             20   1  9        0.3   7.0     15         30          1          97
             21   1  9        1.0   7.0     15         30          1          97

9999

SUBURBAN   LINK    AT S/D LENGTH WIDTH  HILLS        MAX-S         INT AXS

              5     6  1    0.55   6.5     28           64         0.8  28
              8     4  1    0.85   7.3     28           64         0.8  28
             16     9  1     0.9   7.3     15           64         0.8  28
9999

URBAN ROAD LINK   C AT S/D LENGTH WIDTH  HILLS         VOBS  DEVEL  INT      QOBS
              6   7  4  1     0.4     7     15                   50
              7   7  4  1    0.55     7     15                   50
             17   7  9  1     0.3   6.5     15                   50
             18   7  9  1    0.55   6.0     15                   50
             19   7  9  1    0.25   6.5     15                   50
9999

SMALL TOWN LINK   R AT S/D LENGTH WIDTH  HILLS        MAX-S     LD
             11     9  1     0.4   6.0     15           48   0.24
             13     9  1     0.5   6.8     15           48   0.24
             14     9  1     0.6   7.0     15           64    0.4
9999

MAJORMINOR RST JT  LINK L-WID R-WID L-VIS R-VIS C-WID T-WID          S V      MXD
         2 110  1                                                   0 1      300
                    3     0     0     0     0     0  8.50
                   10   3.0   2.5   250   140     0     0
                    2     0   2.5     0   160     0  8.50
9999

ACDY  ONLY JUNCT LNK1  DEL LNK2  DEL LNK3  DEL LNK4  DEL LNK5  DEL LNK6  DEL
         3          4    5    3    5
9999

SIGNALS    RST  LNK1 GR LNK2 GR LNK3 GR LNK4 GR LNK5 GR LNK6 GR    M M1  LTM MXD
         6 210     6  0   18  0    7  0   17  0                   0 99   10 300
      LINK INDEX LN  1L  R  GD 2L  R  GD 3L  R  GD WIDTH   1S2 STO OP  MVTS  XGR
              1  1   2     0  3     0  0     0  3.50   1 0   0  0     0
              1  2   4     0  0     0  0     0  3.50   1 0   0  0     0
              2  1   3     0  4     0  1     0  3.25   2 0   0  0     0
              3  1   4     0  1     0  0     0  3.50   1 0   0  0     0
              3  2   2     0  0     0  0     0  3.50   1 0   0  0     0
              4  1   1     0  2     0  3     0  3.25   2 0   0  0     0
9999
TURNF NODE F/P   FROM    TO 1   TO 2   TO 3   TO 4   TO 5   TO 6  INFL AMPI PMPI
         2  P              3     10      2
                    3      0     65    935
                   10    330      0    670
                    2    878    122      0
9999

TURNF NODE F/P   FROM    TO 1   TO 2   TO 3   TO 4   TO 5   TO 6  INFL AMPI PMPI
         6  P              6     18      7     17
                    6      0    288    684     28
                   18    510      0    245    245
                    7    778    158      0     64
                   17    125    625    250      0
9999

END OF SCHEME DATA ==========================================================
```

```
SCHEME  TITLE                NORTHERN BYPASS (D2/WS2 OPTION)

DELETE THE FOLLOWING LINKS AND/OR NODES
                         1
9999

LINKS TO BE ADDED            LINK JOINS NODE TO NODE
                               30         18      31
                               31         31       1
                               32          1      32
                               33         32      35
                               34         35      33
                               35         33       1
                               36          1      34
                               37         34      18
                               38         31      32
                               39         33      34
                               40         17       8
                               41         17      35
9999

END OF NODE-LINK DATA  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

CONSTRUCTN COST  ESYR Q   RPI  RPF  NEXT  OPEN CON ST PR SU YR1 YR2 YR3 YR4 YR5
          13000  2001 1 171.8 1.01  2002  2008   2  3  6  5  47  50   3
      LAND COST  ESYR Q   RPI    YR PRO YR PRO YR PRO YR PRO YR PRO  YEAR PBRPI
           1300  2000 2 170.6    07 100
9999

COSTS  YEAR       CAPITAL-COST   CONSTR-DELAY   MAINT-CAPITL    MAINT-DELAY
       2006                            100
       2007                             60
       2018                                             50              5
       2023                                             50              5
       2028                                            400             20
       2033                                             50              5
9999

FLOW ON        LINK   VMG1   VMG2   VMG3 INTO NODE
                  2   8000
                  3   5000
                  4   5000
                  5   7600
                  6   7600
                  7   7600
                  8   4800
                 10   5000
                 11   5600
                 13   5200
                 14   2600
                 15   1000
                 16   1000
                 17   2000
                 18   4000
                 19   4500
                 20   4500
                 30   8200                        31
                 31   3000                         1
                 32   1000                        32
                 33   6200                        35
                 34   6200                        33
                 35   1000                         1
                 36   3000                        34
                 37   8200                        18
                 38   5200                        32
                 39   5200                        34
                 40   8200
                 41  12400
9999

RURAL ROAD LINK  C AT DES LENGTH  CWID  HILLS DOWN BEND SWID VWID JUNC VISI MAXS
             30  2 11        1.0   7.3          12   20                      113
             31  2 11        0.5   6.0          15   15                      113
             32  2 11        0.5   6.0     15         15                      113
             33  2 11        3.0   7.3     12         15                      113
             34  2 11        3.0   7.3          12   20                      113
             35  2 11        0.5   6.0          15   20                      113
```

```
             36  2 11        0.5   6.0     15        15                      113
             37  2 11        1.0   7.3     12        20                      113
             38  2 11        1.0   7.3      5        10                      113
             39  2 11        1.0   7.3           5   10                      113
             40  1  7   1    2.0  10.0     12        20  1.0  2.0             97
             41  2 11        0.1  14.6     15        20                      113
9999

MERGE NODE   T  LNK1 LNK2 LNK3    N  CAP AMPI PMPI  PARA PARB PARC PARD PARE MXD
       32       33   38   32    2                      227
       34       37   39   36    2                      227
9999

ROUNDABOUT RST RT  LINK  A-WID E-WID E-RAD F-LEN DIAM FI GSI  DCPK DCOPK GD  MXD
         8 120  2                                              0     0  0  300
             0        9   3.65   8.0    20    20   40 30
             0        8   3.65   8.0    20    20   40 30
             0       40   5.00   9.5    30    30   40 30
9999

SIGROUND   RST               DIAM                                        GD  MXD
        17 120  1              80                                          300
      LINK E EWID  ESAT F FWID  FSAT FLEN FLAR C CWID  CSAT JTIM JDIST  GRAD MIN
        41 3 3.65       1 3.65         20      3 3.00               60
        21 2 4.00       2 3.65         20      3 3.00               60
        40 3 3.20       2 3.65         30      3 3.00               60
        20 3 3.33       2 3.65         30      3 3.00               60
9999

TURNF NODE F/P   FROM    TO 1   TO 2   TO 3   TO 4   TO 5   TO 6  INFL AMPI PMPI
         2  P              3     10      2
                    3      0    200    800
                   10    200      0    800
                    2    500    500      0
9999
TURNF NODE F/P   FROM    TO 1   TO 2   TO 3   TO 4   TO 5   TO 6  INFL AMPI PMPI
         6  P              6     18      7     17
                    6      0    132    803     65
                   18    250      0    125    625
                    7    803     66      0    131
                   17    125    625    250      0
9999

TURNF NODE F/P   FROM    TO 1   TO 2   TO 3   TO 4   TO 5   TO 6  INFL AMPI PMPI
         8  P              9      8     40
                    9      0    364    636
                    8   1000      0      0
                   40   1000      0      0
9999

TURNF NODE F/P   FROM    TO 1   TO 2   TO 3   TO 4   TO 5   TO 6  INFL AMPI PMPI
        17  P             41     21     40     20
                   41      0    307    597     96
                   21    416      0    195    389
                   40    756    183      0     61
                   20    222    667    111      0
9999

DETAILED JUNCTION DELAYS  NODE     1STYEAR     2NDYEAR     3RDYEAR
                           17        2008
9999

END OF SCHEME DATA

FINISH
```

Accident Only Analysis

9.4 COBA can be used to provide an Accident Only Analysis. This provides only accident numbers and accident costs with all other outputs (for example, construction costs, link transit and junction delay costs etc.) being suppressed or blanked out. An Accident Only COBA is run as follows:

(i) If users have already coded the roads network using COBA (that is, a full set of link and junction data with flows and geometric data etc), an Accident Only Analysis can be selected on KEY004 (using ACS or ACC) depending on whether the original data set was coded as SEPARATE or COMBINED

(ii) If the roads network has not already been coded in COBA, then an Accident Only Analysis can be carried out by providing a much reduced amount of link, node and scheme data. Data for the following KEYs is needed:-

Although COBA can be used to assess the accident impacts of a scheme, it is expected by Overseeing Organisations that the DfT's COBALT software [DfT, 2013] would normally be used, though both programs should provide the same or very similar results.

Basic Data

001	General Title
003	Years for this Scheme
004	Network Classification/Flow Period/Year/Month/ Accidents/Tidality (this Key **must** contain ACS or ACC)
005	Options for Traffic/Economics/Fuel Cost Growth
008 (optional)	Seasonality Index/E-Factor/M-Factor
009 (optional)	Growth of Traffic
040	End of Basic Data

Scheme Data

041	Scheme Title
042	Node-Link Data
043 (as required)	Delete the Following Links/Nodes
044 (as required)	Links to be Added
045 (as required)	Nodes to be Added
050 or 051	End of Node Link Data or No Node Link Data Changes
056	Flow on Link

Link descriptions

060 (as required)	Rural Road Link	}	Link number, Road Class, Length and Accident Type only needed. (The default speed limit for this Road Class will be used by COBA
061 (as required)	Suburban Link	}	
062 (as required)	Urban Road Link	}	

063 (as required)	Small Town Link }	unless specified otherwise).
085 (optional)	Local Accident Data for Links	

Node descriptions

087 (optional)	Local Accident Data for Nodes
088 (optional)	Accident Only Node. If ACS is specified on 004 then junction accident type must be entered here.

Final Control Records

089 (optional)	Next Year for Scheme Data Changes
090	End of Scheme Data
998	Finish.