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Department for Environment, Food and Rural Affairs and the Countryside Agency

Report of a research project on motor vehicles
on byways open to all traffic

January 2005



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Contents

1	Background to the research project	1
1.1	The brief	1
1.2	Programme	1
1.3	Objectives of the research	1
2	Methodology	2
2.1	Background	2
2.2	Study inception and data gathering strategy	6
2.3	Direct volumetric surveys of byway use	8
2.4	Surveys of byway characteristics, features and condition	12
2.5	Qualitative data on byway use	16
2.6	Sampling the population of byways open to all traffic	17
2.7	Analysis	24
2.8	Overall quantification	27
2.9	Limitations to the methodology	28
3	Historical and legal background to byways open to all traffic	29
3.1	Historical background	29
3.2	Legal issues relating to the use and maintenance of byways open to all traffic	32
3.3	Traffic regulation orders and maintenance	34
4	Stakeholder consultation	35
4.1	Background	35
4.2	Seminar	35
4.3	Recreational motor vehicle users	36
4.4	Recreational users not using motor vehicles	45
4.5	Organisations representing land management interests	45
4.6	Local highway authorities	45
4.7	Other interests	52
4.8	Responses to household questionnaire surveys	53
4.9	Key points emerging from the stakeholder consultation	60

5	Results of the site surveys	62
5.1	Introduction	62
5.2	Vehicle logger surveys	62
5.3	Results of the vehicle logger surveys at national level	64
5.4	Moving observer surveys	74
5.5	Results of the moving observer surveys at national level	74
5.6	Results of the vehicle logger surveys for individual byways	89
5.7	Data from other sources	99
6	Quantification of motor vehicle use on byways open to all traffic	101
6.1	Overview of quantification	101
6.2	Overall quantification at national level	101
6.3	The purposes for which byways are used at national level	104
7	Conclusions	112
7.1	Motor vehicle flows on byways open to all traffic	112
7.2	Key points emerging from the stakeholder consultation	113
7.3	The purposes for which motor vehicles use byways open to all traffic	114
7.4	Condition and availability of byways open to all traffic	116
7.5	Implications for the management of byways open to all traffic	119
Appendices		
1	Summary of literature review	121
2	Moving observer surveys – data fields	126
3	Questionnaire for householders in vicinity of byways open to all traffic	133
4	Byways open to all traffic – total length in kilometres by local authority	135
5	Comparison between 1997 and 2003 data and calculation of weights for each local authority group	138
6	Example of weighting of moving observer data	142
7	The seminar – attendees and summary of proceedings	143
8	A predictive framework for byway use	148

Background to the research project

1.1 The brief

The research was commissioned by the Department for Environment, Food and Rural Affairs (Defra) and the Countryside Agency to quantify the level of motor vehicle use on byways open to all traffic in England and to assess the implications of use for the network and its management. The scope of the work was confined to byways open to all traffic although unclassified county roads and roads used as public paths were to be included where they interact with byways open to all traffic. FaberMaunsell Ltd were contracted to undertake the research. This report represents their findings.

1.2 Programme

Field research started in February 2003 and ended in April 2004. Visual surveys of byways open to all traffic were carried out mainly in spring, summer and autumn 2003. Traffic counts were undertaken using vehicle loggers from March 2003 to March 2004.

1.3 Objectives of the research

The research strategy was designed to:

- establish in a structured way the characteristics of byways open to all traffic, based on a carefully designed representative sample;
- establish an average annual daily traffic figure, or range of annual daily traffic for byways open to all traffic for England as a whole;
- differentiate that traffic by characteristics of byways open to all traffic, by time of year, by type of vehicle and by type of user;
- develop a typical behaviour pattern by type of user;
- consider the variation in average annual daily traffic from one byway to another, evaluate the factors which underlie variations and develop a predictive framework that can be used in providing an estimate of use on any byway open to all traffic;
- in broad terms, establish any relationship between the use of byways open to all traffic and roads used as public paths and unclassified county roads; and
- assess the implications of use for the network of byways open to all traffic and its management.

While the research looked at previous studies of the use of byways open to all traffic, it was mainly concerned with collecting data over a set time period using carefully controlled surveying criteria.

Methodology

2.1 Background

2.1.1. Focus of the research

The main focus of the research was on quantification of the level of motor vehicle use on byways open to all traffic. Until now little data have been collected on motor vehicle use on byways open to all traffic and the limited quantified data that are available have not been collected on a national basis. Many of the stakeholders, including motor vehicle users, other rights of way users and local highway authorities, have knowledge on the use of motor vehicles on certain byways open to all traffic but it is not systematically quantified and is often related to the condition of the byways rather than on-site surveys relating to users. Much of it is judgemental and coloured by stakeholders' experiences of specific areas and their views of motor vehicle use. It does not constitute a body of knowledge which could be relied on in quantifying either the use of motor vehicles on public rights of way nationally or in understanding why there is more use on some byways open to all traffic than others.

2.1.2. Research method

The development of a methodology that would allow quantification of motor vehicle use posed a number of challenges. In particular:

- in comparison with the sealed highway network, byways open to all traffic carry low volumes of motor vehicle traffic intermittently. Some types of traffic, for example associated with agricultural harvests, are seasonal. Because of these factors it is difficult to carry out surveys cost-effectively;
- data are needed on the types of vehicles using byways open to all traffic as this influences wear and tear on the byway and, possibly, impacts on the environment and other users;
- data are needed on the purposes for which byways open to all traffic are being used as this may influence regulation of traffic;
- there is good reason to believe that recreational traffic on byways open to all traffic is influenced by particular features or characteristics of individual byways or the network of byways open to all traffic in a particular area;
- other traffic on byways open to all traffic, for example for land management or access to property, is influenced by land use and the presence of buildings in use, notably dwellings; and
- the distribution of byways open to all traffic across England is very uneven but they are present in a wide range of landscape and land use contexts.

As a result of these considerations, the researchers concluded that it was essential to attempt to collect data on:

- traffic flows over an extended period to include all seasons;
- information on the classification of vehicles within those flows;

- information on trip purpose; and
- information on the features and characteristics of byways open to all traffic.

The collection of data on byways open to all traffic requires from the outset knowledge of the network. The network is recorded on the definitive maps and statements of public rights of way compiled and maintained by county councils or unitary authorities. The original legislation on the recording of public rights of way, the National Parks and Access to the Countryside Act 1949, provided that footpaths, bridleways and 'roads used as public paths' should be recorded on definitive maps. Byways open to all traffic came into being through the Countryside Act 1968 which required every road used as a public path to be reclassified as a byway open to all traffic, or a bridleway or a footpath. More information about the legal recording of byways open to all traffic is given in Section 3. The definitive maps prepared by each surveying authority (county councils, unitary authorities and the London borough councils) provide a reliable source of information about the total recorded population of byways open to all traffic in the country.

A survey, undertaken on behalf of the Institute of Public Rights of Way Officers in 1997 (the 1997 survey), listed the length of byways open to all traffic and roads used as public paths by local authority. Definitive maps, and hence the network of byways open to all traffic, are subject to revision but, despite this, the 1997 survey provides an acceptable snapshot of the total population of byways open to all traffic in England. The 1997 survey has been relied on in developing the approach taken in this research and as the basis for the sampling framework.

Consideration was given to extending the scope of the research to cover roads used as public paths and unclassified county roads. However on neither of these classes of ways is there an unambiguous legal right of passage for mechanically propelled vehicles. Vehicular rights have to be proved in each case. In contrast byways open to all traffic are the only category of route on which there are public rights of passage for mechanically propelled vehicles and there is consistent information, in the form of the definitive maps, to enable identification of the total population for sampling purposes.

Existing data sources were reviewed to see if they could contribute to the quantification of use. Two significant sources were identified – for the Lake District (gathered by the National Park Authority) and the National Trails Office work on the Ridgeway. Both datasets were incomplete and, while they provide useful supporting evidence, do not have the national coverage that was required.

It was readily apparent that it would not be practicable to use a single method to collect all of the required data and that a combination of methods would be needed. In order to fully address the objectives of the research a three-pronged approach was identified. This comprised:

- volumetric traffic surveys to establish the flow of traffic by time of day, day of the week and season and by type of vehicle on a number of byways open to all traffic;
- moving observer surveys of the byway network to establish its features, characteristics and the context of the land through which byways open to all traffic pass in order to see whether there is a link between these and the level of traffic; and
- interviews with users of byways open to all traffic, either as individuals or through organisations, to establish how they use them.

Section 2

Volumetric traffic surveys require the use of automatic traffic counters. Figure 2.1 illustrates the Duddon Electronics vehicle logger for traffic counting on unsurfaced tracks and quiet lanes. The loggers are left in place for extended periods and subsequently downloaded using a laptop personal computer and a DEVLOP interface.

Figure 2.1a: Duddon Electronics vehicle logger at left connected to laptop personal computer at right using DEVLOP interface

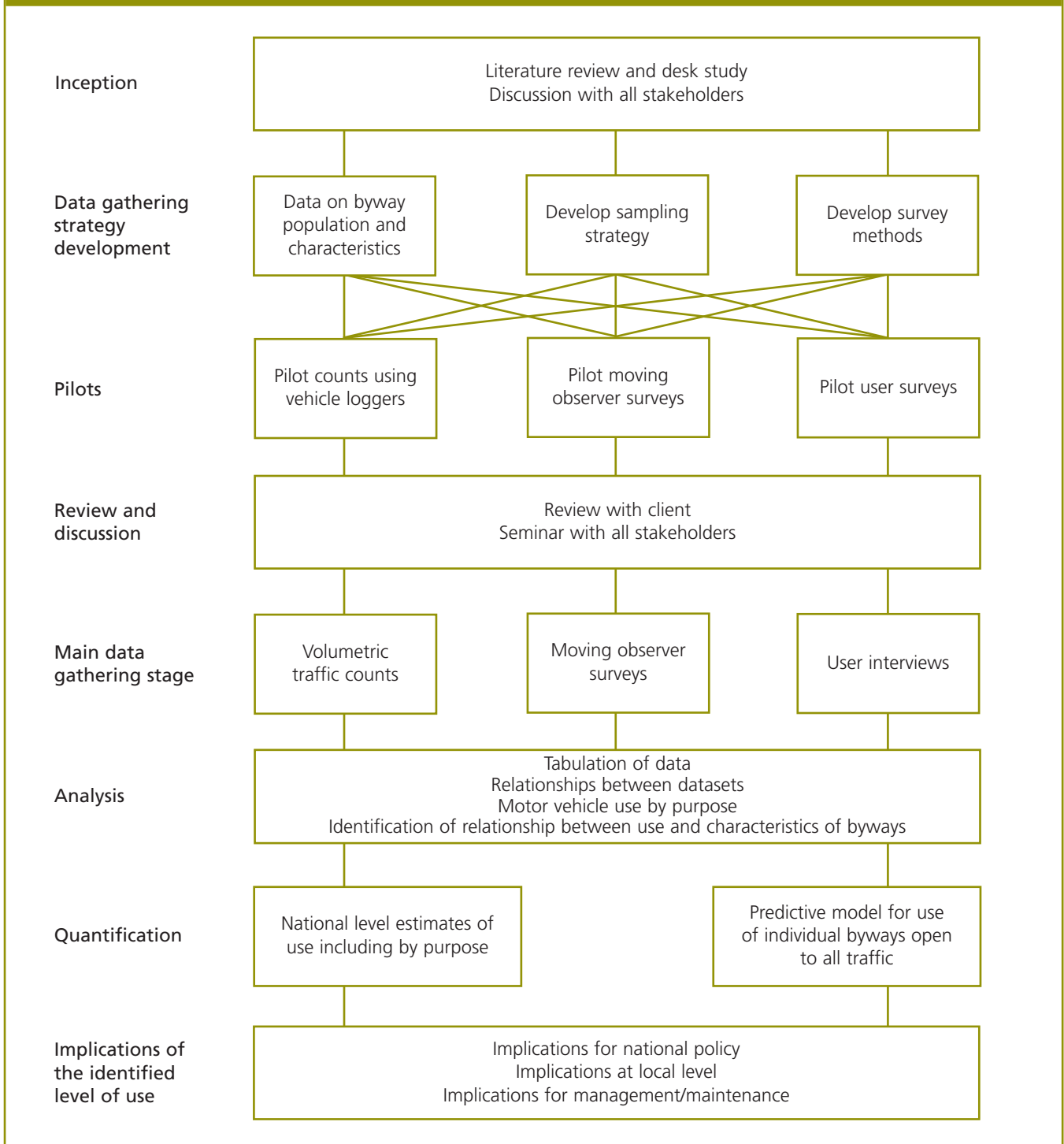


Figure 2.1b: Duddon Electronics vehicle logger installed but not covered with soil



The proposed methodology was presented to an invited audience of interested parties at a seminar on 1 May 2003, at Defra offices in Bristol. This is described further in Section 4.2. Following the seminar additional attributes were added to the moving observer surveys, for example the details of the enclosure present on each side of the byway were added and the need for qualitative research (and the method for doing this) was agreed. An outline of the approach used in the research is given in Figure 2.2.

Figure 2.2: Outline of overall approach



2.2 Study inception and data gathering strategy

2.2.1 Study inception

The study inception comprised a literature review and desk study, principally to ensure that all relevant available data were used in the project; and initial discussion with stakeholders. The outcome of the two exercises confirmed that there was no readily available material on which quantification could be reliably based and that the research needed to fill gaps in existing data.

2.2.2 Literature review and desk study

Overview

A literature search was undertaken at the start of the research project. It was not intended to identify all material on the impacts of motor vehicle use on byways open to all traffic. It was focused on any material that would shed light on:

- the quantification of motor vehicle traffic on byways open to all traffic;
- the nature and purpose of motor vehicle use of byways open to all traffic; and
- the characteristics of byways open to all traffic that might have an influence on motor vehicle use.

The research was done through a systematic search of the internet using Google, a targeted search of individuals and organisations known to have an interest in this field and a review of past work known to the researchers. A summary of the findings of the literature review and desk study is in Appendix 1.

Internet search

The internet search was intended to gain an insight into what data might be available that could be of value in quantifying the use of byways open to all traffic. A search string was entered and the first 50 responses reviewed. Any site of apparent interest was visited and some pages printed. Details of the search criteria and outline summary of findings are presented in Table 2.1.

Table 2.1: Summary of findings of internet search

Search string	Findings produced
"Byways open to all traffic"	Details of definitive map modification orders being progressed and policy statements by user groups.
"Public rights of way review"	Mixed results, including many from the USA; little of obvious value.
"Research into use of byways open to all traffic" and "Research into byways open to all traffic"	Details of websites of many active users of byways open to all traffic (both national and local groups); much of the research concerned evidence being sought to support claims for byway status.
"Levels of use of byways open to all traffic"	Mixed returns included minutes of numerous local authority committee meetings.

The results of the internet search were primarily of value in identifying hot spots, for example where the use of motor vehicles is on a scale that results in conflicts with other users or severe deterioration in the condition of byways open to all traffic and identifying the locations that recreational users of motor vehicles find attractive.

However little useful hard data were available to help in quantifying use of byways open to all traffic in England in a comprehensive and objective manner.

Interested organisations and individuals

Early contact was made with Tim Stevens of the Land Access and Recreation Association, Dave Robinson of the Lake District National Park Authority and Mike Furness of the National Trails Office. Following initial pilot studies more formal contact took place through the seminar held on 1 May 2003. At this interested organisations and individuals were asked to draw to attention any data they held or publications they thought might be helpful to the research. Copies of the publications that were mentioned were obtained.

Review of other known work

Under this heading previous work undertaken in the area was reviewed, notably Making the Best of Byways (DETR 1997) and the research that led to its publication.

2.2.3 Data gathering strategy

The data gathering strategy is core to the research. The data gathering strategy is summarised in Table 2.2.

Study requirement	Available approaches
Quantification of vehicle use – volume of use by vehicle type, including expansion to total length of byway open to all traffic in England	Existing data from literature review and desk study Direct traffic surveys by manual or automated methods
Characterisation of vehicle use - including trip purpose, frequency, trip length, use by the mobility impaired, attitudes/perceptions of problems and conflicts	Literature review and desk study Interviews with users
Characteristics of byways open to all traffic	Literature review and desk study Direct survey Desk study based on OS mapping, GIS or other data sources
Supplementary information, for example data on effects of use	Literature survey and desk study Interviews with special interest groups Direct survey

2.3 Direct volumetric surveys of byway use

2.3.1 Manual traffic surveys

The most effective traffic surveys are classified vehicle surveys carried out by direct observation by surveyors. They allow very accurate measurements of numbers of vehicles and vehicle types. However manual traffic surveys are very expensive especially when applied to routes carrying low volumes of traffic. The use of these surveys to count vehicle flows on byways open to all traffic within reasonable budget constraints would have limited the project to perhaps 40 survey days. This would have severely limited the number of byways open to all traffic that could have been surveyed and would not have given representative results.

However the moving observer surveys of the characteristics of byways open to all traffic incorporated a classified count of all traffic observed during the survey. The numbers of users/vehicles counted in total was small and the surveys were biased towards those byways open to all traffic where surveying took place more slowly because of conditions; and the times, generally weekdays during the day, when surveys took place.

The bias towards byways open to all traffic where surveying took place more slowly will only be a concern if the classification of traffic by vehicle type on these byways differs from the other byways surveyed. The researchers do not believe that there are any grounds for believing this. Despite the above biases, the results were considered to give a reasonably reliable indication of traffic during the week at a national level that can usefully be compared to the weekday counts recorded by the automated traffic surveys described below.

The vehicle numbers counted during the moving observer surveys were too small to permit reliable analysis at a byway or cluster level.

2.3.2 Automated traffic surveys

Both surveys using fixed video recording cameras triggered by magnetic induction loops and surveys by automatic traffic counters were considered.

The former posed practical problems because of the high costs of the equipment, and the difficulty of secure installation in a rural environment. Conventional automatic traffic counters are not well suited for use on unsealed carriageways as they rely on either pneumatic loops fixed to the surface of the road or magnetic loops buried in the road. On loose surfaced carriageways the former were not considered practicable while the latter would have required substantial works to install. It was decided that the specialist vehicle loggers made by Duddon Electronics, which were readily available at moderate cost and were relatively easy to install, offered a cost-effective solution. These devices can be buried on site adjoining a route and will operate unattended for long periods. They operate by recording acoustic and magnetic traces of any passing noise or metallic object. Figures 2.3a to 2.3d illustrate typical motor vehicle traces recorded by the vehicle loggers.

Figure 2.3a: Typical magnetic and acoustic trace for a car

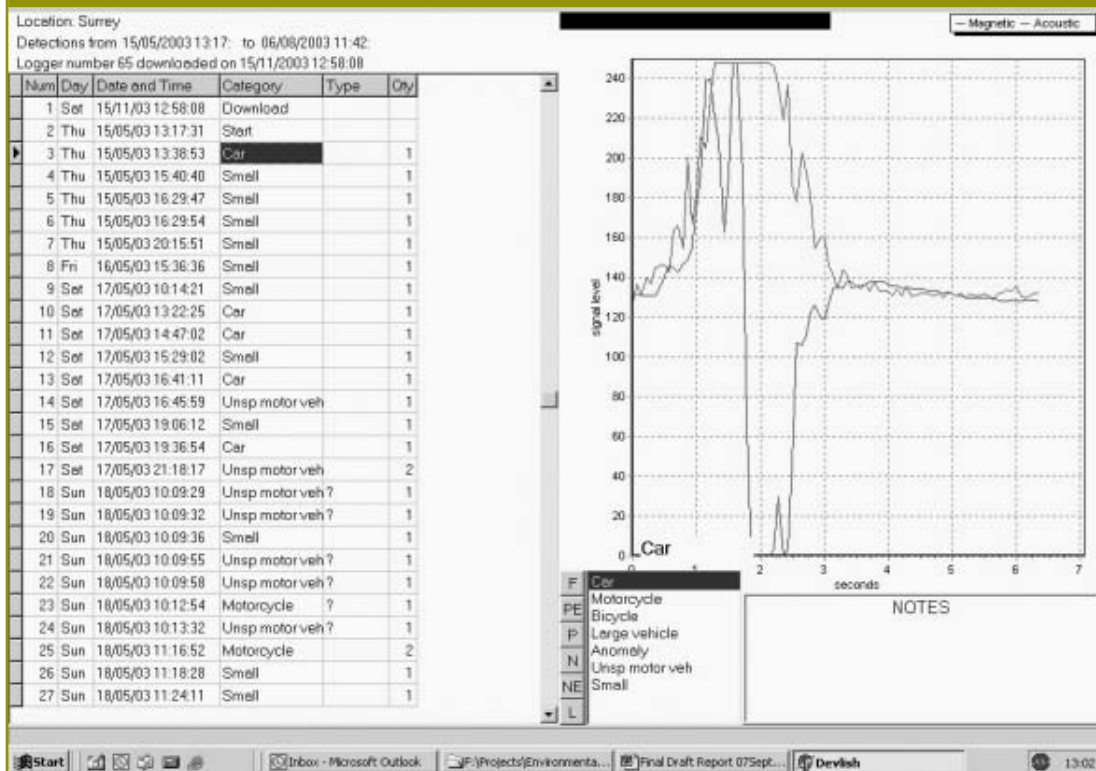
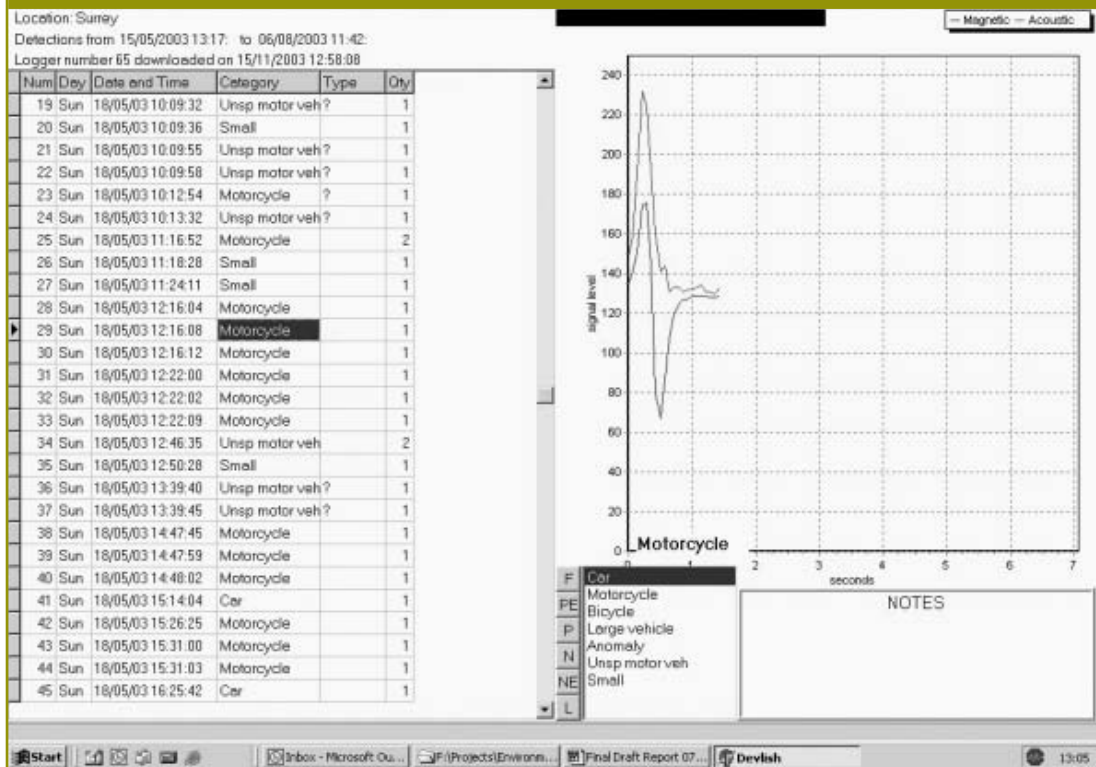


Figure 2.3b: Typical magnetic and acoustic trace for a motorcycle



Section 2

Figure 2.3c: Typical magnetic and acoustic trace for a large vehicle

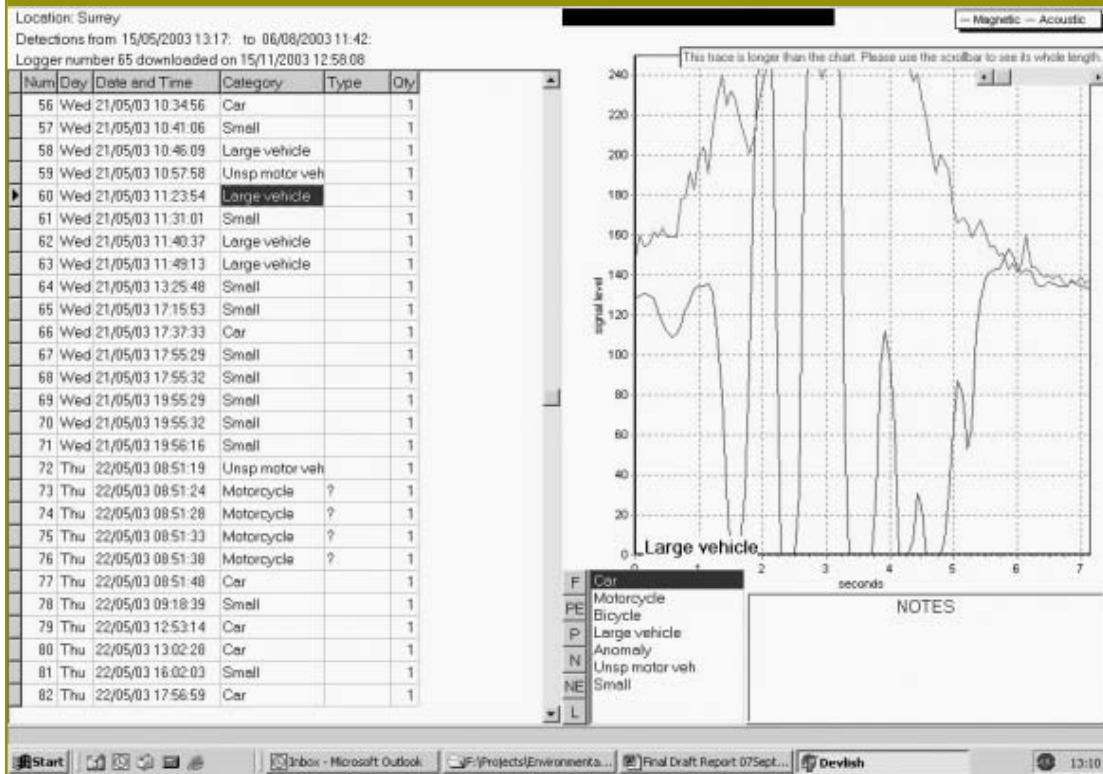
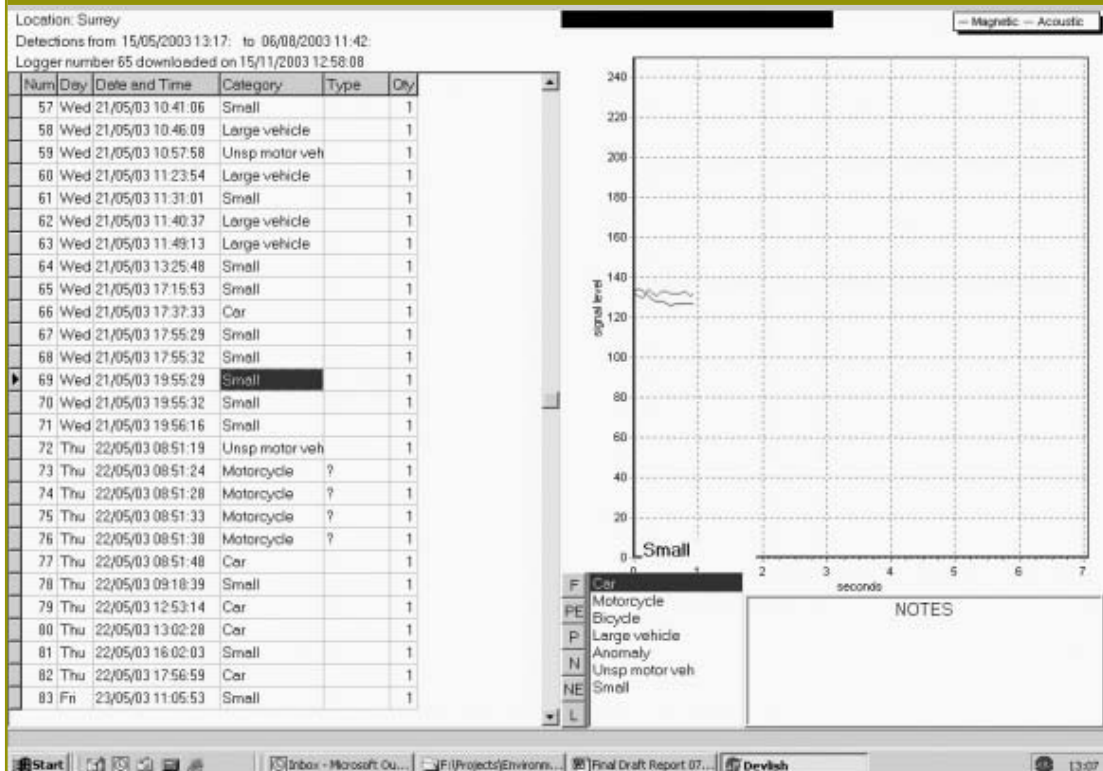


Figure 2.3d: Typical magnetic and acoustic signal for small classification



A pilot survey was carried out using two Duddon Electronics vehicle loggers. Although some problems were encountered in identifying individual vehicle types from some records, it was decided that these vehicle loggers were the best available means of undertaking volumetric counts on byways open to all traffic and thus meeting the brief.

Vehicle loggers record the acoustic and electro-magnetic traces of everything that passes within range. In combination these traces represent the signatures of the vehicle or other object passing. The optimal range for recording is two or three metres. The traces are recorded digitally along with the time and date of the event. For each event, a graph of the acoustic trace and the electro-magnetic trace is produced. Following downloading to a personal computer, examination of the record for an event is usually sufficient to allow a decision to be made as to whether a motor vehicle has passed. Bicycles, horses, pedestrians, electrical or mechanical equipment and wildlife, may all be recorded as an event and can be differentiated from motor vehicles with reasonable reliability. These other signatures can be a significant proportion of records. The occurrence of several records within a short period usually means that users of the way are moving in a group.

It is more difficult to differentiate the type of motor vehicle but in most cases it is possible to differentiate between motorcycles, cars (including 4x4 vehicles and light goods vehicles), and larger vehicles. Variations in the vehicle speed, the distance from the logger and two or more vehicles passing close together, can affect the signature. In some cases it is possible to be reasonably confident that a motor vehicle has passed but not to be sure about the type of motor vehicle. These are described as unspecified motor vehicles.

Judgement is involved in classifying some of the signatures but calibration exercises done on the Ridgeway suggest that these are not a significant proportion of the total. However, the loggers occasionally produce signatures that cannot be classified as motor vehicles. These are recorded as small, which may represent pedal cycles, and anomalies, which may include animals, for example a herd of cattle or horse. While this category may be indicative of non motor vehicle use, it is not a reliable indicator and has not been further analysed.

The vehicle loggers do not work properly in situations where:

- there is significant background noise;
- traffic on other routes can be counted by the loggers;
- there is an electro-magnetic field, for example caused by an overhead or underground power line, electric fence, electronic or electrical appliances or machinery close to the loggers;
- there is a metal object, for example a farm gate, near to the loggers; or
- the byway is wider than three metres and the distance at which motor vehicles pass, varies.

These locations were generally avoided when the loggers were installed. However in some cases there were problems, for example from a central heating fuel tank hidden by a hedge and by an electric fence installed after a logger had been positioned. As a result some data were lost.

2.3.3 Surveys using Duddon Electronics vehicle loggers

The number of vehicle loggers to be used and the number of locations to be surveyed was constrained by cost. Each vehicle logger costs £480 and, with a dispersed survey covering the whole of England, the cost of collecting data from the loggers was relatively high. Purchasing fewer loggers and rotating them around several locations was considered but this had the disadvantage of additional costs for relocation and would not have provided a long data run at each site. In view of this, it was decided that 20 vehicle loggers should be used to survey 20 sites on the network of byway open to all traffic and that each logger would remain in place for as long as possible. The data thus provided were considered to give sufficient coverage over time, geographically and of the different byway characteristics/contexts present nationally. The selection of the sites to be surveyed is discussed under sampling.

Surveying more sites for shorter periods was also considered. However this would have increased costs and would not have provided an extended run of data at each site. It was therefore discounted.

Each vehicle logger was installed as close as practicable to the sampled site. The exact site of each logger was selected for operational reasons (for example security of the equipment) and to maximise the value of the data (for example avoiding sites carrying a risk of double counting or where background noise might influence results). In one case the selected byway was impassable by motor vehicles because of vegetation including trees. As it was evident that no vehicle had used the route for many years a nil return was recorded and the logger was relocated to the nearest section of byway open to all traffic on which there was evidence of motor vehicle use. The resulting record was not included as part of the national sample but used as supporting evidence.

The vehicle loggers provided data on the flow of motor vehicles on byways open to all traffic. However, the loggers do not record any qualitative data other than the type of vehicle that has passed and the time and date of passage. Although some inferences can be drawn from this, for example, it may be reasonable to assume that four vehicles passing the logger in a single group on a Sunday afternoon in summer are recreational users, it was necessary to undertake further research of a qualitative nature.

2.4 Surveys of byway characteristics, features and condition

2.4.1 Establishing the characteristics, features and condition of byways open to all traffic

The following data requirements were identified:

- the types of vehicles using byways open to all traffic as this influences wear and tear on the route and, possibly, impacts on the environment and other users;
- the purposes for which byways open to all traffic are being used as this may influence regulation of traffic; and
- the particular features or characteristics of individual byways. There is good reason to believe that these, or the network in a particular area, influence traffic on all the byways open to all traffic in the area.

Two options were available to fulfil these requirements:

- direct survey of byways open to all traffic or of a sample of byways open to all traffic; and
- desk study based on Ordnance Survey mapping, geographical information systems, aerial photographs or other data sources.

Although desk study methods could be used to establish the general land use and landscape context through which byways open to all traffic passed it was not practicable to provide detailed information on the sample byways open to all traffic by this method. In contrast a linear survey along the byway could collect a wide range of data about what might either affect its use or be an indication of how it was being used, for example by identifying the wear and tear evident on the surface. While desk study can help to set the scene for byway open to all traffic use, it was considered insufficient by itself.

The direct, moving observer survey, method involves driving along the route collecting information.

2.4.2 Moving observer surveys

The objective of the moving observer surveys is to collect detailed information along each surveyed byway open to all traffic. The information includes:

- the physical characteristics of the byway – width, surface, presence of verges, gradient, drainage and the presence of hedges, fences, walls or other means of enclosure;
- the characteristics of the land on either side of the byway - land use, landscape character and habitat value;
- accesses, for example serving fields, dwellings, farm buildings or businesses;
- evidence of use by motor vehicles (tread marks or ruts), and by other users (footprints, cycle tracks and the hoof prints of horses); and
- a classified count of all traffic (motor vehicles, horse-drawn vehicles, pedal cyclists, equestrians and pedestrians) travelling in the opposite direction.

This can be used to build up a picture of possible use and its relationship to the byway's characteristics and features. Where quantitative traffic data are available from the vehicle loggers, this can be related to the characteristics and features of the byway concerned.

The survey technique used was to drive along the byway in a 4x4 vehicle stopping at 100 metre intervals to record information in a spreadsheet on a laptop computer and to take digital photographs. The intervals were located using a Global Positioning System (GPS) device which recorded the distance travelled. The GPS did not work effectively under trees and some locations were paced but this is not likely to have significantly affected the overall output. The technique was pilot tested and found to be effective. Figure 2.4 shows a sample of photographs taken on a byway using this method.

Section 2

Figure 2.4: Sample of photos from the moving observer record

Byway 9, Hampshire



Moving observer comment

Surface	Applied hardcore
Degree of rutting	Shallow
Evidence of motor vehicle use	Tractor and 4x4 tracks
Estimated level of motor vehicle use	Low
Additional comments	Enclosed by vegetation



Surface	Applied hardcore
Degree of rutting	Shallow
Evidence of motor vehicle use	Tractor and 4x4 tracks
Estimated level of motor vehicle use	Low
Additional comments	Two field access points



Surface	Applied hardcore
Degree of rutting	Shallow
Evidence of motor vehicle use	Tractor and 4x4 tracks
Estimated level of motor vehicle use	Moderate
Additional comments	Well used for access to main farm complex



Surface	Applied hardcore
Degree of rutting	Shallow
Evidence of motor vehicle use	Tractor and 4x4 tracks
Estimated level of motor vehicle use	Moderate
Additional comments	Mixed woodland adjacent to byway



Surface	Grass
Degree of rutting	Shallow
Evidence of motor vehicle use	Tractor and 4x4 tracks
Estimated level of motor vehicle use	Moderate
Additional comments	Two field access points

The moving observer surveys were undertaken between March and November 2003. Most of the surveying took place between 9.00am and 5.00pm between Monday and Friday in June, July and August. In respect of the information collected on observed traffic this will have biased the results. As more recreational use is likely to take place at the weekends, recreational users of all kinds are likely to be underrepresented while land management use will be over represented on the assumption that there is more land management activity on weekdays.

It was recognised that the conditions encountered might vary with time of year and weather conditions. However it was not practicable to confine surveying to a shorter period or to survey only under specified weather conditions. The weather conditions at the time of the survey and prior to the survey were recorded as an aid to analysis.

The output of the moving observer surveys provides:

- a still image record at 100 metre intervals along the length of the byway;
- a classified count of all traffic (motor vehicles, horse-drawn vehicles, pedal cyclists, equestrians and pedestrians) travelling in the opposite direction; and
- a spreadsheet with completed data fields containing information on the characteristics and features along the byway.

The moving observer survey records each contain 76 fields of data covering:

- location of the byway including grid reference of the start and finish point;
- width of each section;
- presence and nature of any obstructions;
- presence and nature of any traffic regulation orders;
- byway condition including rutting and presence of surface water;
- extent to which byways serve as the main access to dwellings;
- extent to which byways serve as the main access to farm buildings;
- extent to which byways provide access to farmland;
- extent to which byways provide access to other land and buildings;
- character of the byway including topography and land use;
- landscape and biodiversity interest of/adjoining byways;
- enclosure adjoining byways open to all traffic;
- presence and nature of any drainage;
- land use adjoining byways open to all traffic;
- junctions with other public rights of way;
- junctions with other routes;
- traffic observed during the survey;
- evidence for motor vehicle use;
- evidence for other, non motor vehicle, use;
- weather at time of survey and during previous week;
- comments where appropriate; and
- digital photographs of each byway section.

The criteria for completion of the data fields are in Appendix 2.

Some byways open to all traffic to be sampled were found to be impassable by the 4x4 motor vehicle used in the survey, a Land Rover Defender 90. Where this occurred, the route was surveyed on foot and the form of obstructions recorded.

The digital photographs provide a visual indication of the level of use although this needs to be considered in the light of ground conditions; for example soft ground conditions may result in heavy deterioration of the surface even when traffic is low.

2.5 Qualitative data on byway use

2.5.1 The need for qualitative data

The volumetric surveys provide data about traffic flows and about the type of vehicle. The moving observer surveys provide detailed information along each surveyed byway open to all traffic. While these surveys might be sufficient to establish the overall level of use and the byway characteristics that help to determine this, neither is sufficient to establish authoritatively who is using byways, and why they are using them. The aims of the qualitative component of the research were to establish, as far as possible:

- user characteristics including trip purpose, frequency and trip length;
- any special user characteristics such as mobility impairment;
- the behaviour patterns of users; and
- attitudes/perceptions of problems.

Some inferences can be drawn from the moving observer survey; for example, if tractor wheel marks were found along the route, and surrounding land was clearly in use for agriculture, it seems reasonable to infer that a byway is used for agricultural purposes.

2.5.2 Household surveys by questionnaire

It was felt that the occupiers of dwellings on or close to byways were in a good position to comment on the use of byways both by themselves and others. It was therefore decided to survey these households to provide qualitative data on byway use. Many of these households rely on byways open to all traffic to provide access to their dwellings and other property. All such households will use the byway to gain access to the wider road network, thus generating a base flow on the section of byway concerned. On farms, byways open to all traffic may be used to gain access to agricultural land.

Dwellings which appeared to depend on the byway for access or were in very close proximity to the byway were identified during the course of the moving observer surveys. The occupiers of these dwellings were either interviewed directly or a questionnaire was left at the property for later completion by the householder and return by Freepost envelope. A copy of the questionnaire is at Appendix 3. The questionnaire covered:

- Use of the byway by any member of the household;
- mode of travel used on the byway;

- frequency of use;
- use by others;
- condition of the byway;
- conflicts between users; and
- maintenance.

65 questionnaires were completed.

2.5.3 Surveys of stakeholders

This research was focused on five main groups:

- national organisations representing recreational users (people who drive motor vehicles as a recreational pursuit and other users, pedal cyclists, equestrians and walkers);
- land managers (who may include farmers, foresters, nature reserve managers and landowners);
- owners/occupiers of property adjoining byways;
- local groups representing people who drive motor vehicles as a recreational pursuit; and
- local authorities with rights of way responsibilities including authorities with delegated powers.

Contact with the first two groups was made through offices of their national representative organisations. (Although Forest Enterprise is a government agency it was included because of its interest in forestry.) Many of the organisations were also invited to the seminar held early in the study.

Contact with owners and occupiers of land adjacent to or crossed by byways open to all traffic was made through the household surveys. Local groups representing people who drive motor vehicles as a recreational pursuit, were identified through their respective national organisations and self completion questionnaires distributed to them. Selected local authorities were approached and asked to provide data about the sampled byways open to all traffic including anecdotal information based on observation by rights of way officers.

2.6 Sampling the population of byways open to all traffic

2.6.1 Establishing the sample population

Sampling cannot be properly undertaken without sufficient information about the population to be sampled. Table 2.3 indicates the distribution of byways across local authorities in England for all local authorities with more than 1% of the network. It is based on the 1997 survey undertaken by the Institute of Public Rights of Way Officers. The data from this survey for all local authorities are at Appendix 4. Some 93% of the network is within the 34 local authority areas in Table 2.3. Two counties, Wiltshire and Cambridgeshire, together account for some 27% by length of all byways open to all traffic.

Some national park authorities have delegated powers from the relevant surveying authorities to modify the definitive map. For example the Lake District National Park Authority has delegated rights of way powers from Cumbria County Council. In such cases the byways within the national park have not been included in the total for the surveying authority.

Section 2

Table 2.3: Byways open to all traffic – total length in kilometres by local authority for authorities with more than 1% of the network in England, 1997

Authority	Byways open to all traffic (km)	Cumulative total (km)	% of total	Cumulative %
Wiltshire County Council	629	629	17%	17%
Cambridgeshire County Council	401	1030	11%	27%
Oxfordshire County Council	287	1317	8%	35%
Hampshire County Council	226	1543	6%	40%
Essex County Council	194	1737	5%	46%
Cornwall County Council	178	1915	5%	50%
Suffolk County Council	166	2081	4%	55%
West Berkshire Council	154	2235	4%	59%
Hertfordshire County Council	137	2372	4%	62%
Surrey County Council	134	2506	4%	66%
Cumbria County Council	107	2613	3%	69%
Northamptonshire County Council	105	2718	3%	71%
Northumberland County Council	79	2797	2%	73%
Leicestershire County Council	74	2871	2%	75%
East Sussex County Council	55	2926	1%	77%
Devon County Council	50	2976	1%	78%
Staffordshire County Council	50	3026	1%	79%
Bedfordshire County Council	47	3073	1%	81%
Worcestershire County Council	47	3120	1%	82%
Isle of Wight Council	47	3167	1%	83%
Bath and North East Somerset Council	46	3213	1%	84%
Norfolk County Council	40	3253	1%	85%
North Yorkshire County Council	39	3292	1%	86%
Wokingham District Council	37	3329	1%	87%
Durham County Council	35	3364	1%	88%
Lancashire County Council	30	3394	1%	89%
Lake District National Park Authority	26	3420	1%	90%
Lincolnshire County Council	23	3443	1%	90%
Herefordshire Council	22	3465	1%	91%
Yorkshire Dales National Park Authority	21	3485	1%	91%
Dorset County Council	20	3505	1%	92%
Calderdale Metropolitan Borough Council	20	3525	1%	92%
Kirklees Metropolitan Council	19	3544	1%	93%
Sheffield City Council	19	3563	1%	93%

Source: Institute of Public Rights of Way Officers 1997

The distribution of byways open to all traffic throughout England is uneven. This may be attributed to:

- differences in the character of the areas covered by different authorities;
- wide variation in historical practice in the development of the rights of way network. Many roads with tarmac surfaces now in use by motor vehicles originated from the same historic roots as byways open to all traffic. It is to some extent an accident of history whether a road received a tarmac surface and came into regular use by road traffic, or was left unsealed and so became a byway open to all traffic;
- variations in the way that surveying authorities have pursued the reclassification of roads used as public paths (for example, some authorities have not begun the task of establishing what rights exist over their roads used as public paths while others have reclassified all of their roads used as public paths as either byways open to all traffic, bridleways or footpaths); and
- variations in the way that surveying authorities prepared their original definitive maps.

To identify the total population of byways open to all traffic in 2003, all local authorities were asked for details of byways open to all traffic recorded in their definitive maps and statements. While responses were awaited, the length of byway open to all traffic recorded for each local authority in the 1997 survey (Appendix 4) was assumed to be sufficiently accurate to draw up a sampling framework.

The responses from local authorities revealed very large variations in the form and content of definitive maps and statements. Most authorities could provide copies of the definitive statement which typically included the byway length, the parish and a reference number. This was sufficient information for sampling purposes but did not allow easy identification on the ground and did not provide a geographical reference against which survey data collected later in the study could be attached. 1:50,000 raster mapping provided by Defra was used as an aid to identifying byways open to all traffic on the ground.

2.6.2 Sampling methodology

The overall length of the byway open to all traffic network based on the information from the 1997 survey in Appendix 4 was assumed to be 3,812km. The following samples had to be drawn from this population in a statistically reliable way:

- 20 vehicle logger sites at discrete points on the byway network; and
- sufficient length of byway open to all traffic to produce acceptable results from the moving observer surveys.

In respect of the latter, a balance had to be drawn between size of sample and amount of survey detail. It was decided that a 10% sample survey of the byway network using the moving observer technique would provide reliable and widely accepted results at a national level, be sufficiently large to provide reliable results for a coarse classification of byway types, give a reliable indication of the differences in the level of use between regions and be manageable and affordable.

A 10% sample of the 1997 byway population would result in a total surveyed length of 381km of byway. With a sampling unit of 0.1km this would result in 3,810 separate records.

Section 2

If the 3,810 0.1km sections of byway open to all traffic had been drawn from the sample population at random, the resulting sample would in all probability have been highly dispersed geographically. This dispersed sample would have been expensive to survey. Apart from the difficulty of locating these sections accurately on the ground, driving to and along the network to access the sample sections would have been very time consuming and not productive. Furthermore it was essential that the byways on which the vehicle loggers were to be sited should be included in the moving observer surveys.

The best means of overcoming these difficulties was to cluster the sections of byway to be surveyed around the sites chosen for the vehicle loggers. If each cluster was composed of around 20km of byways open to all traffic, this would give a sample of 400km (around 10.5% of the 1997 population). In practice, the moving observer surveys covered 4,001 0.1km sections.

The sampling rules used to select vehicle logger sites and associated clusters were:

1. Local authorities were grouped and vehicle logger sites drawn from within each sampling group in accordance with the size of the group. Decisions on group size were based mainly around the need to achieve multiples of 5% of the 1997 byway network in England. Thus Cambridgeshire with 400km of byways open to all traffic represented 10.5% of the network which required the selection of two clusters. Wiltshire and the South West (excluding Cornwall) included 20.2% of byways. Four clusters were selected with 3 in Wiltshire to reflect the fact that is accounted for 17% of the network;
2. Within each group the vehicle logger sites were selected by choosing x random numbers between 1 and y where x is the number of logger sites required in the group and y is the number of 0.1km lengths of byway open to all traffic within the sampling group. Each logger site used is a discrete point on the 0.1km section of byway selected. Where the selected sample failed to meet sampling Rule 3 below, random numbers were reselected;
3. Vehicle logger sites were selected so that clusters did not overlap and logger sites were not within 10km of each other;
4. In general the 20-25km of byway closest to the vehicle logger site was identified as suitable for inclusion in the cluster to be surveyed by the moving observer technique. This included the whole of each byway on which the vehicle logger was located. Where a vehicle logger site was close to the boundary between local authorities the selected byways were not confined within the original local authority boundary;
5. Only whole byways open to all traffic were surveyed. If a shorter or longer length of byway was required to reach the required survey length, byways were selected accordingly;
6. The final decision on which byways open to all traffic were included in the cluster was made on-site based on the need to complete the survey of between 18 and 22km of byways open to all traffic within each cluster. In practice the decisions made by the surveyors in the field resulted in the moving observer surveys covering 4,001 0.1km sections of byway, an average of 200 sections or 20km per cluster.

The byways included in the moving observer surveys were generally those closest to the vehicle logger site. Where the byways were very dispersed, for example Suffolk and Norfolk, it was difficult to ensure that the byways were those closest to the logger site. In other places, for

example Cumbria, the surveyors found it more convenient to survey byways that were not always those closest to the logger site. The researchers believe that selection of byways that were not the closest to a logger site does not significantly bias the results of the surveys.

The groups into which local authorities were placed for the purposes of sampling and the sample taken from each group are set out in Table 2.4. Note that the references to South East England, North East England, etc., do not refer to the standard regions. Local authorities not listed were assumed to have no byways open to all traffic. Most of the sample is drawn from southern England where most byways open to all traffic are found. The sample selection was skewed in favour of Group 8 North East England. There is slight under-sampling of most of the groups in the south.

Table 2.4: Groups of local authorities used for sampling and sample size taken

Groups of local authorities	Length of byways (km)	% of all byways in England	Number of clusters
Oxfordshire and Northamptonshire	392	10.28%	2
Oxfordshire County Council	287	7.53%	
Northamptonshire County Council	105	2.75%	
Cornwall	178	4.67%	1
Cornwall County Council	178	4.67%	
Wiltshire and South West England except Cornwall	769	20.17%	4
Wiltshire County Council	629	16.50%	(at least 3)
Devon County Council	50	1.31%	
Bath and North East Somerset Council	46	1.21%	
Dorset County Council	20	0.52%	
Swindon Borough Council	10	0.26%	
Somerset County Council	6	0.16%	
Bournemouth Borough Council	3	0.08%	
Gloucestershire County Council	3	0.08%	
South Gloucestershire Council	2	0.05%	
Hampshire and South East England	648	17.00%	3
Hampshire County Council	226	5.93%	(at least 1)
Hertfordshire County Council	137	3.59%	
Surrey County Council	134	3.52%	
East Sussex County Council	55	1.44%	
Isle of Wight Council	47	1.23%	
West Sussex County Council	16	0.42%	
Royal Borough of Windsor and Maidenhead	8	0.21%	
Medway Towns Council	8	0.21%	
Buckinghamshire County Council	6	0.16%	
London Borough of Hillingdon	5	0.13%	
Brighton and Hove Council	3	0.08%	

Section 2

Groups of local authorities	Length of byways (km)	% of all byways in England	Number of clusters
London Borough of Richmond Upon Thames	2	0.06%	
Milton Keynes Council	1	0.03%	
West Berkshire/Wokingham/Bracknell Forest	194	5.09%	1
West Berkshire Council	154	4.04%	
Wokingham District Council	37	0.97%	
Bracknell Forest Borough Council	3	0.08%	
Cambridgeshire	401	10.52%	2
Cambridgeshire County Council	401	10.52%	
Central England	193	4.56%	1
Staffordshire County Council	50	1.31%	
Worcestershire County Council	47	1.23%	
Herefordshire Council	22	0.58%	
Shropshire County Council	18	0.47%	
Wirral Borough Council	17	0.45%	
Cheshire County Council	11	0.28%	
Tameside Metropolitan Borough Council	10	0.26%	
Telford and Wrekin Council	10	0.26%	
Sefton Metropolitan Borough Council	5	0.13%	
Stockport Metropolitan Borough Council	2	0.05%	
Warwickshire County Council	1	0.03%	
North East England	287	7.53%	2
Northumberland County Council	79	2.07%	
North Yorkshire County Council	39	1.02%	
Durham County Council	35	0.92%	
Yorkshire Dales National Park	21	0.54%	
Calderdale MBC	20	0.52%	
Kirklees MC	19	0.50%	
Sheffield City Council	19	0.50%	
North York Moors National Park	15	0.39%	
Redcar and Cleveland Borough Council	12	0.31%	
East Riding of Yorkshire Council	9	0.24%	
Hartlepool Borough Council	7	0.18%	
Doncaster Metropolitan Borough Council	5	0.12%	
Leeds City Council	4	0.11%	
Stockton Borough Council	3	0.08%	
City of Sunderland	1	0.03%	
North West England	180	4.72%	1
Cumbria County Council	107	2.79%	

Groups of local authorities	Length of byways (km)	% of all byways in England	Number of clusters
Lancashire County Council	30	0.79%	
Lake District National Park	26	0.68%	
Bury Metropolitan Borough Council	6	0.16%	
Oldham Metropolitan Borough Council	4	0.10%	
St Helens MBC	3	0.09%	
Knowsley Metropolitan Borough Council	3	0.08%	
Blackburn with Darwen Borough Council	1	0.03%	
Eastern England except Cambridgeshire	570	14.95%	3
Essex County Council	194	5.09%	(at least 1)
Southend on Sea Borough Council	3	0.08%	
Thurrock Council	1	0.03%	
Suffolk County Council	166	4.35%	
Peterborough City Council	5	0.13%	
Leicester City Council	5	0.13%	
Leicestershire County Council	74	1.94%	
Nottinghamshire County Council	3	0.08%	
Rutland County Council	6	0.16%	
Bedfordshire County Council	47	1.23%	
Norfolk County Council	40	1.05%	
Broads National Park	2	0.05%	
Lincolnshire County Council	23	0.60%	
North Lincolnshire Council	1	0.03%	
	3812	100%	20

The responses from local authorities revealed that the total length of byway open to all traffic in 2003 was 4,171km compared to the 3,812km in the 1997 survey. The main differences were:

- in Worcestershire the 1997 data indicated 47km and the 2003 data 3.4km of byways open to all traffic;
- in Oxfordshire the 1997 data indicated 287km and to the 2003 data 64.7km;
- in Northumberland the 1997 data indicated 79km and the 2003 data 127km; and
- in Kent the 1997 data indicated no byways and the 2003 data 280km.

Section 2

These differences may be the result of errors in the 1997 survey, local authority boundary changes between 1997 and 2003, reclassification of roads used as public paths to byways open to all traffic or successful claims for the recording of byways open to all traffic. The key effect of these differences is that some local authority areas were over sampled, while others were under sampled. The main sampling errors are that:

- Oxfordshire has been substantially over weighted and Kent has been substantially under weighted. There are sufficient similarities between Kent and Oxfordshire, both lowland agricultural counties in Southern England with downland, for the biases to correct each other. If Oxfordshire, Northamptonshire and Kent are grouped together the sample taken is close to the optimum;
- Hampshire and South East England have been slightly under weighted; and
- North East England has been over weighted.

Bias within the groups tends to cancel out. For example, Worcestershire, Herefordshire and Staffordshire have been over weighted while Shropshire has been under weighted. However, the effects of these errors are mitigated because 19.8kms of byways open to all traffic in Shropshire near the Herefordshire border were included in the moving observer surveys.

For the vehicle logger sites, a sample of 20 locations was taken from the network of 4,171kms. The results of these surveys have been used to provide estimates of the average daily traffic for all byways open to all traffic in England. All sample data are subject to error but the potential for error is reduced by the number of sites, the large number of survey days, the geographical spread of the logger sites and the reasonably close conformity between this geographical spread and the distribution of byways. The results may also be used in developing a predictive framework for traffic on byways. Use for this purpose is not affected by the bias in the sample as each result represents a value which may help to explain the variation in traffic from one byway to another.

For the moving observer surveys the sample represents some 10% of the byway network. This is a large sample relative to the total population and is regarded as very reliable.

The question of whether the data should be weighted to counteract any bias is considered further under analysis (see Section 2.7) but, in summary, this sample of byways open to all traffic is of sufficient size and appropriate distribution to be a representative cross-section of byways open to all traffic in England and thus a sound basis from which to draw conclusions on the use of motor vehicles on byways as a whole.

2.7 Analysis

2.7.1 Weighting the data

The data from the loggers are the more susceptible to bias than the data from the moving observer surveys. It was decided that the most appropriate means of removing this bias was to weight the logger data on the basis of the ratio between the actual length of byway open to all traffic in the group of local authorities in 2003 and the ideal length that would be covered by a sample of the size taken. The calculation of these weights is set out in detail Appendix 5 and summarised in Table 2.5 opposite.

Table 2.5: Summary of calculation of weights for groups of local authorities used for sampling

Groups of local authorities	Number of clusters	2003 length of length of byway (km)	% of sample sites taken	Ideal length of byway represented by this sample	Weight based on ratio of actual length and ideal length
Oxfordshire, Northamptonshire and Kent	2	458	10%	417	1.098058
Cornwall	1	203	5%	209	0.973388
Wiltshire and South West England except Cornwall	4	834	20%	834	0.999760
Hampshire and South East England	3	734	15%	626	1.173180
West Berkshire/ Wokingham/Bracknell Forest	1	205	5%	209	0.982978
Cambridgeshire	2	400	10%	417	0.959003
Central England	1	205	5%	209	0.982978
North East England	2	330	10%	417	0.791177
North West England	1	177	5%	209	0.848717
Eastern England except Cambridgeshire	3	625	15%	626	0.998961
Total	20	4,171	100%		

The logger data are reported on both a weighted and an unweighted basis.

The moving observer surveys data have not been weighted. The effect of weighting these data was investigated for a key variable, rutting, and the results are summarised in Appendix 6. The differences are minimal and the effort required to weight the data would have gained little. Furthermore the large size of the moving observer sample relative to the population sampled means that it is inherently very reliable.

2.7.2 Vehicle logger data

The following key variables were analysed from the data collected through the vehicle loggers:

- average daily traffic;
- seasonal variations in traffic;
- variations in traffic by day of the week; and
- composition of traffic by type of vehicle.

The moving observer surveys data for each vehicle logger site was reviewed to see to what extent the traffic recorded by the logger can be explained by the data collected during moving observer surveys, for example the presence or otherwise of dwellings dependent on the byways for access.

2.7.3 Moving observer surveys

The moving observer surveys produced 4,001 records each containing some 76 data fields. The potential for analysis is very extensive but has been focused on:

- comparing the classified vehicle count from the moving observer surveys and the overall vehicle type classification recorded by the vehicle loggers;
- the evidence for motor vehicle use of the surveyed byways open to all traffic and the extent to which this use can be classified by user;
- the extent to which byways open to all traffic serve as the main access to dwellings;
- the extent to which byways open to all traffic serve as the main access to farm buildings;
- the extent to which byways open to all traffic provide access to agricultural land;
- the extent to which byways open to all traffic provide access to other land and buildings;
- the proportion of the byway open to all traffic network that is obstructed;
- the proportion of the byway open to all traffic network on which there are traffic regulation orders and the nature of those orders;
- the relationship between rutting, surface water and drainage;
- the relationship between the evidence of use and any of the above; and
- the extent of enclosure of byways open to all traffic that may restrict the ability of motor vehicles to drive on adjoining land.

2.7.4 Cluster reports

The results from the vehicle logger sites and moving observer surveys were brought together at a cluster level and conclusions drawn for the cluster as a whole. These are reported in *Motor vehicles and rights of way – cluster reports*.

The *cluster reports* provide a detailed analysis of the motor vehicle use of each sample cluster. The survey data collected during this research project suggest that the level of motor vehicle use of byways is determined by the particular circumstances of individual byways including:

- the land and property through which they pass;
- their location relative to resident population and the extent of accessibility to and from that population; and
- their physical characteristics.

Each cluster report follows the same format. The report includes a description of the general context for the cluster, the results from the moving observer surveys of the byways in the cluster, the results from the logger sited on one of the byways in the cluster and a summary and conclusions for the cluster. The *cluster reports* focus on developing an understanding of how local circumstances lead to a particular level of traffic on a byway.

2.7.5 Household questionnaires

The responses from households were analysed at an aggregate level. In aggregate the responses were compared with the overall results from the vehicle logger sites and moving observer surveys.

2.7.6 Survey of stakeholders

Information provided by organisations representing motor vehicle users provided an insight into the perceived needs of recreational motor vehicle users, the role of byways in meeting these needs and their attitudes to such issues as maintenance and illegal use. The more detailed information, for example areas used and frequency of use, was compared to the evidence for use from the vehicle logger surveys and moving observer surveys.

Information provided by organisations representing other recreational users also provided an insight into their perceived needs, the role of byways in meeting these needs and their attitudes to such issues as maintenance and conflict. Those with an interest in land management provided a similar range of views from a different perspective.

2.8 Overall quantification

The vehicle logger data can be used to derive estimates of average daily flow for byways open to all traffic. Analysis can be extended to vehicle types and the time of use, weekday/weekend and month of the year.

The key step in analysing the data further is to link the quantitative data obtained from the vehicle logger sites and with the qualitative data from the moving observer surveys for the byways on which the loggers were located, and with broader qualitative data on the use of byways open to all traffic as related by stakeholders, householders, local motor vehicle user groups and national organisations. Such links include the connection between the use of byways for dwelling access and the number of dwellings on a byway, the relationship between farming practices and motor vehicle use for land management and whether recreational use takes place at particular times, for example the weekend.

Assumptions can be made on the basis of this that are reasonably robust. Using these the data can be grossed to the national level to produce estimates of the level of use by use type, for example land management, recreational and dwelling access. The data can be stratified to some extent on the basis of predominant land use areas (arable farming, mixed farming, livestock farming and forestry), each of which gives rise to particular characteristics of motor vehicle use.

Analysis has been undertaken at national level only. It was not considered appropriate to provide a regional level analysis as the uneven distribution of rights of way and the variation in the character of the countryside could make this misleading. The clustering of the sample sites within a region risks further bias in grossing up estimates at the regional level.

The quantification has been used to develop a predictive framework that can be used to indicate the likely level of use of a byway with a given set of characteristics.

2.9 Limitations to the methodology

The limitations of the methodology need to be taken into account when considering the results. The study looked only at motor vehicle use of byways open to all traffic. Legal use of routes away from the sealed road network by mechanically propelled vehicles includes use of roads used as public paths and unclassified county roads. By selecting only byways open to all traffic, the complete picture of use on unsealed roads has not been captured. Furthermore, data have not been recorded for a full 12 months at every site so there is a small risk that some seasonal use may have been underestimated.

The sample size is relatively small but two additional vehicle logger datasets were obtained for 12 sites on the Ridgeway and 15 sites in the Lake District. These datasets need to be used with caution since the loggers may not all be located on byways open to all traffic. No information is available as to the characteristics of the sites concerned, for example whether they serve dwellings. However the extent to which they broadly corroborate the results from these surveys is useful.

Historical and legal background to byways open to all traffic

3.1 Historical background

3.1.1 Origins

An understanding of the present status and management of byways open to all traffic requires an appreciation of their legal history, of how byways have come to be recorded and of the inter-relationship between byways open to all traffic and the road network.

Historically, the law recognised three types of highway:

“At common law highways are of three kinds according to the degree of restriction of the public rights of passage over them. A ‘cartway’ or ‘carriageway’ is a highway over which the public has a right of way (1) on foot, (2) riding on or accompanied by a beast of burden, or (3) with vehicles and cattle. A bridleway is a highway over which the rights of passage are cut down by the exclusion of the right of passage with vehicles and sometimes, although not invariably, the exclusion of the right of driftway, that is driving cattle, while a footpath is one over which there is a public right of passage on foot.”

Halsbury’s Laws of England Vol 21, para 8, London 1995

Byways can come to be recorded on the definitive map following re-classification of roads used as public paths; and as a result of an application for a definitive map modification order.

3.1.2 Re-classification

The National Parks and Access to the Countryside Act 1949 required that county councils should survey their areas and record all public footpaths and bridleways on definitive maps with any other relevant information about limitations and conditions recorded on accompanying definitive statements. Certain authorities (e.g. the then London County Council) and some areas (e.g. fully urbanised areas within a county) were not obliged to be covered by definitive maps and statements. Authorities were also required to review the maps and statements from time to time. The Wildlife and Countryside Act 1981 (section 58) had the effect of extending the coverage of the requirement to these areas that were formerly excluded.

The Act also introduced a new category of public right of way – the road used as a public path – which was to be recorded on definitive maps. The Act defined a road used as a public path as a highway other than a public path, used by the public mainly for the purposes for which footpaths and bridleways are so used. It did not require local authorities to decide whether vehicular rights existed over these ways. In 1949 (when there were far fewer cars and fewer metalled roads) the distinction between what might have been considered to be a road used as a public path and what might have been considered to be a carriageway, cartway, or road, was a fine one. In many areas it seems to have been determined by the presence or absence of formal surface metalling, or tarmac. This may have been because of the advice laid down in the

Section 3

memorandum *Surveys and Maps of Public Rights of Way* (Commons, Open Spaces and Footpaths Preservation Society, London 1950), which implied that unmetalled vehicular routes that were used as footpaths and bridleways were those that should be recorded as roads used as public paths. In practice, authorities used this category of way to record ways where they were uncertain about what rights existed.

The Countryside Act 1968 attempted to clarify matters by requiring surveying authorities to undertake a special review of roads used as public paths. The aim of the special review was for authorities to re-classify roads used as public paths as either byways open to all traffic, bridleways or footpaths. This is the first time that the term 'byway open to all traffic' is used in legislation, although it did not define this new category of public highway. Nevertheless, the Act required authorities to re-classify roads used as public paths. The tests to be applied when determining re-classification were:

- whether any vehicular right of way had been shown to exist;
- the way's suitability in terms of position, width, condition and state of repair, and nature of the soil; and
- whether extinguishments of any vehicular rights would cause undue hardship.

Because of the large numbers of ways to be re-classified and the difficulty of deciding into which category of way roads used as public paths should be re-classified, authorities did not apply these tests consistently, and some did not undertake the review at all. In addition, a legal challenge (Hood, 1975) arose over the ability to re-classify roads used as a public path as a footpath (it was found that the 1949 Act provided conclusive evidence of rights to ride a horse along any route shown as a road used as a public path, unless there was new evidence to the contrary). Because the confusion and difficulties could not be dealt with under existing procedures, it was decided to introduce further legislation.

The next attempt to improve the re-classification process was contained in the Wildlife and Countryside Act 1981. It required authorities, in effect, to make another attempt at re-classification but using different tests to determine the status of a road used as a public path. Firstly, it modified the tests so that only the existence or otherwise of rights could be used to determine how a road used as a public path should be re-classified. Secondly, it was made clear that if any vehicular rights were found to exist, the way should be classified as a byway open to all traffic. Further, if no vehicular rights were found to exist, the way was to be re-classified as a bridleway unless evidence showed that no bridleway rights exist, in which case it was to be shown as a footpath (this last point has been subject to further legal debate, but this is not relevant to byways). The 1981 Act also provides a legal definition of byway – *means a highway over which the public have a right of way for vehicular and all other kinds of traffic, but which is used by the public for the purpose for which footpaths and bridleways are used.*

Another legal point of relevance to the re-classification process is what becomes of any vehicular rights over a road used as a public path that is re-classified as a bridleway. The legal question is whether the process of re-classification has extinguished these rights. There are arguments supporting both views but the opportunity to test the law on this point (in Riley, 1989) was not taken and the matter remains undecided.

3.1.3 Application for definitive map modification orders

Byways can also be added to the definitive map through the making of a definitive map modification order by the surveying authority (usually the highway authority). Making an order does not change the status of a route; rather, it corrects an error in the definitive map and brings it into line with the legal position. So, a way may be recorded on the definitive map as a bridleway but if evidence can be adduced to show that the way carries vehicular rights, then the record is incorrect.

The process leading to the making of a definitive map modification order can be initiated either by the highway authority itself or following the submission of an application from someone else for an order to be made. Applications can only be made on the basis of suitable evidence. If the evidence is there that a right of way exists, then the definitive map must be modified to show this, whether or not the way physically exists and regardless of the impact upon the landowner or the environment through which the route passes.

The lodging of an application for a definitive map modification order sets in train a series of procedures that are laid out in statute. Failure to follow these procedures may invalidate the process. In outline, the process is that the authority must:

- consult every local authority or local council for the area;
- consider all the evidence available and its relevance;
- prepare the order in the form prescribed;
- give notice (in a prescribed form) of the proposed order;
- allow a period for representations and objections to be submitted; and
- make available details of what documents were taken into account when deciding to make the order to anyone who asks for and, if in the authority's possession, allow them to be inspected or copied.

If an order is unopposed, the authority can confirm the order. If objections are made and not withdrawn, the matter is referred to the Secretary of State who will normally appoint an inspector from the Planning Inspectorate to decide whether the order should be confirmed, not confirmed or confirmed with modifications. Representations and objections may be dealt with through a public inquiry, public hearing or exchange of written representations.

Because applications to modify the definitive map to record a byway are often contentious, such applications are often opposed and public inquiries held.

Where the order is confirmed (or confirmed with modifications), then the definitive map will be changed accordingly. The order (or modified order) may thus result in a byway being recorded where one was not previously recorded. As noted earlier, though, this is not creating a byway.

3.1.4 Other factors affecting the recording of byways

The legal definition of byways (given by the 1981 Act) has given rise to further challenges in the courts. In the case of *Nettlecombe* (1997) it was held that for a way to be recorded as a byway open to all traffic, there had to be some evidence of current usage; this is because the legal definition states that a byway is a way *which is used by the public...* (researcher's emphasis). In the *Nettlecombe* case, the way was completely overgrown and so not able to be used by the public. As a consequence, although it was acknowledged that vehicular rights existed, it was deemed that the way could not be recorded as a byway open to all traffic. This ruling has, in turn, been contradicted and supported by subsequent cases. The issue of whether a route has to be in use before it can be recorded as a byway was resolved in the Court of Appeal, which determined that current usage was not the guiding principle in re-classification.

Further challenges have emerged around the balance of use of a way: for the way to be a byway, it could be argued that the preponderance of user should be on foot or on horseback. If the dominant use is by motorised vehicle, then the way could become indistinguishable from ordinary roads. This issue appears to have been resolved in the case of *Masters* (1999), where it was determined that the fact that a way is not currently being used by walkers or horse riders does not preclude the way from being a byway.

3.2 Legal issues relating to the use and maintenance of byways open to all traffic

Maintenance of byways open to all traffic is an important consideration for all concerned. This section examines some of the legal issues relating to byway maintenance.

The Wildlife and Countryside Act 1981 provides that every road used as a public path re-classified as a byway open to all traffic under section 54 is maintainable at public expense. The Countryside Act 1968 provides the same maintenance responsibility for ways re-classified under the special review, but only as from the date of publication of the definitive map. If the review was abandoned (as may have been the case in some circumstances), it is possible that byways are not publicly maintainable.

Once a public highway becomes the maintenance responsibility of the highway authority, it ceases to be publicly repairable only if it is lawfully stopped up, or the site of the highway has been physically destroyed (by the action of the sea, or by a landslip) or if a court orders on the application of a highway authority that a publicly maintainable highway is to cease to be so maintained.

The matter is less clear-cut for any byway added to the definitive map other than by a re-classification order. In these cases the byway will be repairable at public expense only if it was a publicly repairable highway prior to the coming into operation of the Highways Act 1835. But, broadly speaking, the majority of byways open to all traffic are highways maintainable at public expense.

Historical and legal background to byways open to all traffic

The law does not necessarily require the highway authority to provide a metalled surface or a surface that is suitable for the passage of vehicles over a way shown on the definitive map as a byway. Similarly, the law does not set specific maintenance standards. Inconsistencies are possible between the standards of maintenance desired by different types of user. For example, vehicle drivers may prefer a type of surface that does not suit horses.

The highway authority's responsibility for maintenance of a byway only extends as far as the ordinary traffic of the neighbourhood. Section 59 of the Highways Act 1980 allows the highway authority to recover any extra expense of maintaining the highway which results from damage caused to a publicly repairable way by traffic that is extraordinary (e.g. of excessive weight or volume). It is unclear whether the term "extraordinary traffic" could be applied by the courts to byways open to all traffic where the use of, for example, four-wheel drive vehicles or tree-felling equipment has destroyed the surface of the route so as to make it impassable or unsafe for horse riders, cyclists and pedestrians. If a highway authority were to successfully argue that such use was extraordinary, then it may be absolved from its liability to make good the damage on what would otherwise be a publicly-maintainable byway.

This research has found some, generally short, segments of byway that were difficult to drive along, typically because of soft ground conditions, failure of drainage, rutting or over hanging vegetation. Some of these conditions (e.g. rutting) are likely to be caused by excessive use in inappropriate conditions or the failure of drainage. In other situations, difficulties arose through under-use (e.g. excessive vegetation growth). In some circumstances, highway authorities could be compelled to repair such sections (under section 56 of the Highways Act 1980). It is likely that even in instances where the vehicular use has been solely by those accessing property the liability to repair and maintain the byway will almost always lie with the highway authority and not with the owner of the subsoil, or adjoining landowners.

The only occasions where maintenance liability will lie with parties other than the highway authority are where:

- excessive damage has been caused by extraordinary traffic;
- a byway is not publicly maintainable; and
- the overhanging growth stems from highway boundary hedgerows that are not owned by the highway authority.

In some instances, where a byway has become so out of repair that it is impossible to pass over, the researchers have found evidence that some users are deviating from the byway onto adjoining land. The law recognises a right to deviate round obstructions (other than those of natural origin) on rights of way. This includes byways that are soft and/or muddy or otherwise in a poor state of repair. The researchers have also found instances of vehicles straying from byways open to all traffic into adjoining areas of land even where there is no obvious difficulty in remaining on the legal line. This is particularly prevalent where the byway is unenclosed. It is an offence under the Road Traffic Act 1988 to drive a mechanically propelled vehicle on land without lawful authority or excuse onto any land that does not form part of a road or is a footpath, bridleway or restricted byway. (However, it is not an offence under this section to drive on any land within 15 yards of a road for the purposes only of parking the vehicle on that land.)

3.3 Traffic regulation orders and maintenance

The Road Traffic Regulation Act 1984 authorises the making of traffic regulation orders for a wide variety of reasons. Traffic regulation orders may be permanent or temporary. They can be applied to all classes of way and all classes of user, but they cannot be used to prevent access to premises by pedestrians. Authorities are under a duty to use these powers where this is necessary to secure safe, convenient and proper use of the way. A traffic regulation order does not alter the status of the highway to which it is applied.

The imposition of a traffic regulation order on a publicly maintainable byway does not remove the duty to maintain. In practice, the reduction of certain types of traffic or of traffic at certain times of the year may have the effect of reducing the maintenance required.

Stakeholder consultation

4.1 Background

The results of this research are intended to inform policy-makers. To be of greatest value, the research needs to provide an accurate assessment of motor vehicular use of byways open to all traffic in both quantitative terms (on how many occasions byways are used) and qualitative terms (why they are used). The data gathered by the vehicle logger and moving observer surveys provide answers to the first question. However, the loggers cannot answer to the second question, although it may be possible to draw inferences. Consequently, the representatives of stakeholders were consulted, and some qualitative information was obtained direct from users through other elements of the research (see Section 2.5.2).

4.2 Seminar

The first step in this stakeholder consultation process was a seminar held at Bristol on 1 May 2003. The seminar had the objectives of giving stakeholders the opportunity to comment on the proposed approach and to contribute any views or information they had on patterns and levels or effects of byway usage. A list of attendees and notes of the discussion are in Appendix 7.

The key points emerging from the seminar with respect to stakeholder consultation are summarised in Table 4.1.

Table 4.1: Key points with respect to stakeholder consultation, from the seminar

Points raised	Comments
There is a limited amount of relevant survey data and reports available at either a local or national level. These may inform the study and provide contextual information; for example, 12 vehicle loggers are currently in use along the Ridgeway.	The researchers believe that they have identified the main areas, the Ridgeway and the Lake District, where additional surveys are taking place on a significant scale.
Parish and town councils were identified as being potentially useful contacts to provide information at a local level. If possible, they should be involved in the consultation process.	The researchers did not consider it practical to do this on a consistent basis within the resources available. (There are about 9000 parish and town councils in England.)
At some stage during the research key stakeholders should be told where the loggers are so that they can provide location specific information. However, the researchers would need to ensure that identifying the locations of the loggers did not introduce bias into the results.	The broad areas of interest have been identified to vehicle user groups.
Local management groups, where they existed, could inform the research.	The researchers identified a local management group in the Lake District. Others emerged from the consultation with local highway authorities.
A list of contacts and/or consultees that could assist in the consultation process could already be in available through local access forums.	The researchers did not consider it practical to do this on a consistent basis within the resources available. (There is roughly one local access forum for every highway authority, each with around 20 members)
The researchers should develop a consultation strategy in conjunction with Defra to best meet the requirements of the study.	The researchers have done so. The strategy focuses on national organisations, local vehicle user groups and householders in the immediate vicinity of byways open to all traffic.

Section 4

During the latter half of 2003, the researchers had discussions (either in person or by telephone) with key stakeholder groups, many of whom were present at the seminar. The results are presented below.

4.3 Recreational motor vehicle users

Questionnaires were sent out to national organisations representing recreational motor vehicle users. With the assistance of the national organisations a separate questionnaire was distributed to local groups of recreational motor vehicle users. The questionnaire sent to national organisations was more general while the questionnaire to local groups concentrated on the specific activities in which that group took part. Five national organisations and nineteen local groups responded.

4.3.1 National organisations representing recreational motor vehicle users

The researchers wrote to a wide range of national organisations with a possible interest in recreational motor vehicle use including all of the organisations that are members of the Land Access and Recreation Association. Responses were received from the following national organisations:

- Land Access and Recreation Association (LARA)
- All Wheel Drive Club (AWDC)
- Trail Riders Fellowship (TRF)
- Association of Classic Trials Clubs (ACTC)
- Association of Rover Clubs (ARC)
- Green Lane Association (GLASS)

The Land Access and Recreation Association is primarily an umbrella organisation with 11 full members and three associate members. It is not primarily a direct membership organisation although individuals and small clubs can become Individual members. The five other organisations that responded are all members of the Land Access and Recreation Association.

Both the Association of Classic Trials Clubs and the Association of Rover Clubs are associations of clubs and do not have individual members. The All Wheel Drive Club and the Trail Riders Fellowship are open only to individual membership, whilst the Green Lane Association includes both individual members and affiliated local clubs.

There are difficulties in estimating the number of byway users represented by national organisations. For example, the Civil Service Motoring Association (CSMA) with 350,000 members is a member of the Land Access and Recreation Association, but only a minority of its members is likely to have an interest in recreational use of byways open to all traffic. Some people belong to more than one organisation. Membership numbers range from 825 in the Green Lane Association to over 10,000 in the Association of Rover Clubs. In some organisations, members join a local club that is affiliated to the national representative body (e.g. the Trail Riders Fellowship); in other cases, the members join specialist sections of the national body (such

as the Range Rover Register within the Association of Rover Clubs). Again, this makes estimation of active byway users difficult. The researchers estimate that the number of members of the above organisations who have an interest in byways open to all traffic is in the range 10,000 to 15,000 based on the membership numbers set out in Table 4.2. However, this does not mean that they are all active recreational motor vehicular users of byways open to all traffic.

The responses from national organisations representing recreational motor vehicle users are summarised in Table 4.2. The responses emphasise the importance of byways to club members although this varies from organisation to organisation. Use of byways and similar routes provide the basis for many of the activities undertaken by members. The responses from the national organisations do not provide the basis for any quantitative analysis of the total volume of byway use in England, although overall membership numbers offer some indication of the numbers potentially engaged in the activity. This could be regarded as an upper limit, assuming all people engaged in motor vehicle recreational activity are members of one of these organisations or it might represent a lower limit assuming that there are many active motor vehicle users who do not choose to join an organisation.

Use of byways varied between organisations. Key points of the national organisation responses are:

- all organisations except for the Association of Classic Trials Clubs cited the use of byways for recreational use (often referred to as *green laning*) as being important to their members. Use by members for access to dwellings, travelling to work and for competitions was mentioned by some organisations;
- green laning is predominantly carried out at weekends. Competitions tend to be held a few times a year;
- the distance travelled to byways depends on time available to the user and the availability of a local network. If the whole weekend is available, groups travel quite long distances to reach an interesting, well-connected network. Competitions also attract recreational users from further afield than normal;
- byway condition plays an important part in recreational use, with a preference for naturally surfaced byways that are free from obstruction. Traditional routes with historic importance are important. Byways in a poor state of repair often attract irresponsible drivers looking for a challenge. This tends to result in further deterioration of the byway condition. For competitions, controlled use of byways results in controlled damage which can be remedied either by work before or after the event;
- maintenance is perceived as being primarily undertaken by volunteers, especially where a competition is held;
- the organisations believe that properly signposted byways open to all traffic will lead to more dispersed recreational use, spreading the impact on byways and decreasing maintenance needs;
- conflict between recreational motor vehicle users and the general public on byways is predominantly perceived rather than actual, in part because of ignorance of the law relating to byways open to all traffic; and
- there is a perception on the part of the national motor vehicle organisations that recreational motor vehicle users who are not members of clubs, particularly those who have no insurance and/or whose vehicles are not registered, had the most potential to experience or cause conflict.

Section 4

Table 4.2: Summary of views of national organisations representing recreational motor vehicle users

Subject	Land Access and Recreation Association	All Wheel Drive Club	Trail Riders Fellowship	Association of Classic Trails Clubs	Association of Rover Clubs	Green Lane Association
Membership	11 organisations who are full members and 3 organisations who are associate members	2,300 individuals	3,000 individuals who are also members of 43 local groups	25 clubs	29 local clubs, 7 UK marque clubs /registers, 26 overseas affiliates representing circa 10,000 members in total	825 individuals, clubs representing 3,000 plus
Role and importance of byways open to all traffic for members	Provide vital links in access to the countryside for vehicles.	"Vital." The only network available to motor vehicle users.	Foundation upon which organisation is based. TRF seek out potential byways open to all traffic. TRF record lost highways of England and Wales.	Crucial to sport to gain access to private land or competition sites.	Role in providing legal vehicular routes for recreation is essential.	Byways open to all traffic give a high degree of certainty of rights. Important for single vehicle users, those users who are inexperienced at map reading, family groups, people with disabilities.
Purposes for which use byways open to all traffic	Overwhelmingly for recreation and motor sport. Minority for business or access to property; however, this is not why they are members of LARA	Recreation; access to dwellings; access to land; travelling to work; infrequently for competitions.	Predominantly for recreation, also for travelling to work, access to property.	Competitions - about 25 events each year. Includes endure challenge – the climb steep muddy or rocky natural gradients.	Recreation.	Predominantly for recreation; less commonly for access to dwellings or travel to work. Also to preserve character of ancient highways. Access to countryside by people with disabilities.
Characteristics sought in byways open to all traffic	Unsurfaced routes, and routes which are different from ordinary roads.	Free from obstructions. Balance between natural and impassable. Non-contentious sharing with other users.	Good surface. Free from restricting vegetation and obstructions. Tradition, character, history.	Free from obstructions. Challenging natural gradient and surface.	Reasonable length and surface condition; interesting topography; free from obstructions	Landscape; change of scenery; free from obstructions; not damaged by light vehicle; accessible.
Pattern of members' use of byways open to all traffic	Varies, but predominantly at weekends.	Frequently at weekends. Members will travel long distances to access a high standard byway network	Twice a month. Some members ride a couple of times a week.	Competitions always held at weekends. Of the 350 byways open to all traffic used for competitions the vast majority are used only once a year.	Local byways, occasionally travel further afield. Recreational driving at weekends. Some night-time use, but discouraged.	Frequency and type of use varies. Used by different user groups for different purposes ranging from bird-watching to hot air balloon recovery. Weekend use predominant, rarely used after dark.

Table 4.2: Summary of views of national organisations representing recreational motor vehicle users

Subject	Land Access and Recreation Association	All Wheel Drive Club	Trail Riders Fellowship	Association of Classic Trails Clubs	Association of Rover Clubs	Green Lane Association
Areas of conflict	More perceived than real. Occasional conflict with local property owners. Signing would help reduce conflict.	Perceived. Used by anti-access campaigners to deny rights of others. No conflict between motor vehicle users.	Very little in practice. Exchange friendly greetings with vast majority of other users met on byways. No conflict between motor vehicle users.	All competitions run under Motor Sports Association regulations and require extensive local public relations. Therefore excellent rapport with local community.	Most is perceived. Some reported conflicts between vehicle users and non-vehicle users, but no details available.	Limited conflict with equestrians and large led groups of walkers. No conflict with overwhelming majority of users. Most users enjoy meeting other users. No conflict between motor vehicle users.
Condition	Overgrowth of vegetation and lack of drainage leads to a deterioration in byway condition.	No response	Varies enormously depending on use. Overgrown routes can be impassable. Lanes well used by horses can be impassable for all except 4x4s.	No view	Many byways open to all traffic are deteriorating because of absence of maintenance by highway authorities. Water run-off causes scouring difficult for all users. Many routes kept open by motor vehicles which limit vegetation growth.	Varies between counties. Vast majority are in good or underused condition, requiring no maintenance. Many are obstructed; use of others is impeded by small neglected sections.
Maintenance	Inadequate in most areas. Highway authorities do not maintain. Volunteers often turned down by highway authority for insurance reasons.	Maintenance is poor. Voluntary parties supplement highway authorities' work but are discouraged.	No response	Club members often undertake maintenance with permission of highway authority immediately before an event to prevent excessive damage to vehicles. Involves cutting back vegetation, repairing surface, removing litter, checking gates.	Undertake voluntary maintenance with consent of highway authorities. Some highway authorities do not welcome voluntary work.	Voluntary lane clearance with consent of highway authorities. Standard and level of maintenance varies. Inappropriate maintenance can destroy the character of byways more comprehensively than any recreational use.
Illegal use	Increasing problem, particularly on the urban fringe and around local authority housing estates. No alternative sites for recreational use.	No direct experience but AWDC Committee supports the prosecution of any user caught misusing any unsurfaced right of way.	Competition bikes used on byways open to all traffic in some areas, these may not always be taxed and insured.	No response	Occasional evidence of illegal vehicular use of byways open to all traffic, but no details provided.	Problem in certain areas; e.g. in moorland areas which are difficult to police, in urban areas with under age riding. Fly tipping is a problem. There are more illegal obstructions than there is illegal use.

Section 4

4.3.2 Local groups and clubs representing recreational motor vehicle users

Distribution and responses

The local vehicle user group questionnaires were distributed through the Trail Riders Fellowship, Association of Rover Clubs, Association of Classic Trials Clubs and All Wheel Drive Club. The response was mixed and there was some confusion between the questionnaire intended for national organisations and that for local groups. Consequently, the analysis of responses has been somewhat problematical. While all of the responses were useful, some provided more detail. In some cases it appears likely that the responses did not differentiate fully between use of byways open to all traffic and use of other unsurfaced routes, principally unclassified county roads and roads used as public paths.

Responses and membership numbers from the local groups and clubs are listed in Table 4.3. There was a strong response from local Trail Riders Fellowship groups indicating perhaps that Trail Riders Fellowship members have the strongest interest of any of the recreational motor vehicle organisations in byways open to all traffic. The North Berkshire Motorcycle Club requested a questionnaire from the research team direct. Their response has been included in the analysis.

Table 4.3: Responses from local groups and clubs representing recreational motor vehicle users

National organisation	Local group or club	County	No of members
Association of Rover Clubs	Breckland Land Rover Club	Norfolk	175
Auto Cycle Union	North Berkshire Motorcycle Club	Oxfordshire, Berkshire	153
Trail Riders Fellowship	Black Country Group	Staffordshire	Not given
Trail Riders Fellowship	Bristol Group	Bristol	40
Trail Riders Fellowship	Cornwall Group	Cornwall	80
Trail Riders Fellowship	Devon Group	Devon	106
Trail Riders Fellowship	Essex Group	Essex	70
Trail Riders Fellowship	Exmoor Group	Devon	32
Trail Riders Fellowship	Isle of Wight Group	Isle of Wight	15
Trail Riders Fellowship	Kent Group	Kent	57
Trail Riders Fellowship	Loddon Vale Group	Reading, Berkshire	65
Trail Riders Fellowship	Oxfordshire Group	Oxfordshire	75
Trail Riders Fellowship	Peak District Group	Staffordshire, Derbyshire	Not given
Trail Riders Fellowship	S. Northamptonshire	Bedfordshire, Northants, Leicestershire, Hertfordshire, Buckinghamshire, Cambridgeshire and Warwickshire	49
Trail Riders Fellowship	Somerset Group	Somerset	38
Trail Riders Fellowship	Southern Group	Hampshire	110
Trail Riders Fellowship	Surrey Group	Surrey	80
Trail Riders Fellowship	Sussex Group	Sussex	90
Trail Riders Fellowship	Wiltshire Group	Wiltshire	40
Trail Riders Fellowship	Worcester Group	Worcestershire	22
Total membership (where given)			1,297

Purpose of use

The main findings can be summarised as follows:

- all the clubs have members who use byways open to all traffic primarily for recreational use;
- 53% of clubs have members who use byways as a means to travel to work; and
- 47% of clubs have members who use byways to access dwellings.

Use of byways open to all traffic by local groups

Table 4.4 summarises the response to questions on the location, frequency and time of byway use. Analysis of the responses was difficult because of the varied responses given. This variation depended in large part on whether the response was given by the respondent as an individual (i.e. his or her own use) or on behalf of the group as a whole (i.e. reflecting use by club members) or the local group had been provided with the correct questionnaire by their national organisation.

Despite this the responses given are considered to be a reliable indication of use. In summary:

- all groups, except the Worcester Trail Riders Fellowship who provided no information, were active at least once a fortnight and 17 out of the 20 groups appear to be active weekly or more frequently;
- all of the 10 local groups that provided information on the approximate size of group indicated that they went out in groups. Where a size was given, six, seven or ten was quoted as the maximum group size. (Note that the Land Access and Recreation Association discourage people from going out in large groups and recommend a maximum group size of eight for motorcycles and four for four wheeled vehicles). Seven of these ten groups said that people also went out as individuals; and
- where information was provided on local use and use further afield (10 responses), local use was generally the more frequent. However Kent and Essex Trail Riders Fellowship groups indicated that they used resources further afield more often than local resources suggesting perhaps that there are few local byways available to them.

The suggestion was made that individuals who are retired make the highest use of byways.

Recreational activity was predominantly carried out at weekends and in daylight hours. Sundays were more popular than Saturdays. Some groups were active on summer evenings but, during the day on weekdays, group activity was low. Weekday daytime trips appeared to be more frequent among individuals who were retired or who were able to get out at these times for other reasons. Weekday daytime trips were often made to avoid other byway users.

Competitive use was infrequent with competitions occurring a few times a year across the country.

Section 4

Table 4.4: Motor vehicle use indicated by local user groups

Organisation	Local use (within 50 miles (80km))	Wider use (beyond 50 miles (80km))	Approximate size of groups
Black Country (Staffordshire) ¹	More than fortnightly	Once a fortnight	Groups of up to six riders
Breckland (Norfolk) ¹	More than weekly	Few times a year	Individuals or groups of up to six riders
Cornwall ¹	More than fortnightly	Once a month	Groups of up to six riders
Essex ¹	Once a month	Most weekends	Individuals or groups of up to six riders
Kent ¹	Few times a year	Most weekends	Groups only
Loddon Vale ¹	More than fortnightly	Few times a year	Individuals or groups of up to seven riders
North Berkshire ¹	More than fortnightly	Once a fortnight	Individuals and groups of up to 10 riders
Oxfordshire ¹	More than weekly	Few times a year	Individuals and groups of up to 10 riders
South Northamptonshire ¹	More than weekly	More than fortnightly	Individuals or groups of up to six riders
Southern Hampshire ¹	More than fortnightly	More than fortnightly	Individuals and groups of up to 10 riders
Wiltshire ¹	Weekly	Once a month	Groups of six riders
Bristol	Weekly	No indication of areas used other than 1-100 miles from home	Not given
Devon	Weekly	No indication of areas used outside Devon	Not given
Exmoor	Weekly	No indication given	Not given
Isle of Wight	Weekly	No indication of areas used on mainland other than up to 70 miles	Not given
Peak District	Weekly	No indication given	Not given
Somerset	Weekly	No indication given	Not given
Surrey	Weekly	No indication given	Not given
Sussex	Weekly	No indication given	Not given
Worcester	Not given	No indication given	Not given

¹: These organisations responded using 'local' questionnaires. The other organisations responded using 'national' questionnaires.

Distance travelled and use of byways by geographical area

The responses to the question about distance travelled to use byways varied widely. However it was clear that distance travelled was related to the byway network and its distribution in relation to where users live and the time that users have available to pursue the activity.

In general it appears that users regard a round day trip of 150 miles and a round weekend trip of 300 miles as acceptable, although they could travel twice these distances. Where byways are available locally, the round trip distance covered could be fewer than 50 miles.

It is evident that when a whole weekend is available, groups travel quite long distances to an interesting, well-connected network. The annual trip to attractive areas, for example Wales and North Yorkshire, is a recurring feature in all of the vehicle user groups' responses on activity outside their own area. Competitions attract recreational users from further afield.

14 responses provided information on the use of byways within their local area. All of these responses were from areas where there is a significant local network of byways and sometimes other unsealed routes. These included Kent, Hampshire, the Isle of Wight, Berkshire, Oxfordshire, Bedfordshire, Buckinghamshire, Northants, Leicestershire, Hertfordshire, Cambridgeshire, Wiltshire and Devon. It is, therefore, not surprising that local use was identified by all of these groups. It is possible that these active local groups are a consequence of the availability of a good local network.

Figure 4.1 summarises the areas visited by local groups that are outside their local area. This suggests that some areas are attractive to groups even where they have to travel up to 300 miles to reach them. (Two of these areas, the Isle of Man and Wales, are outside the study area.)

Key conclusions that can be drawn are:

- Yorkshire, Devon and Wiltshire (and Wales) all feature strongly as areas that are attractive to recreational motor users;
- some areas in Eastern England, notably Cambridgeshire and Essex, do not feature despite having very or fairly extensive byway networks; and
- most of the areas identified have at least some interesting areas, for example with hills or upland.

Figure 4.1: Areas visited by groups that are not local to the area

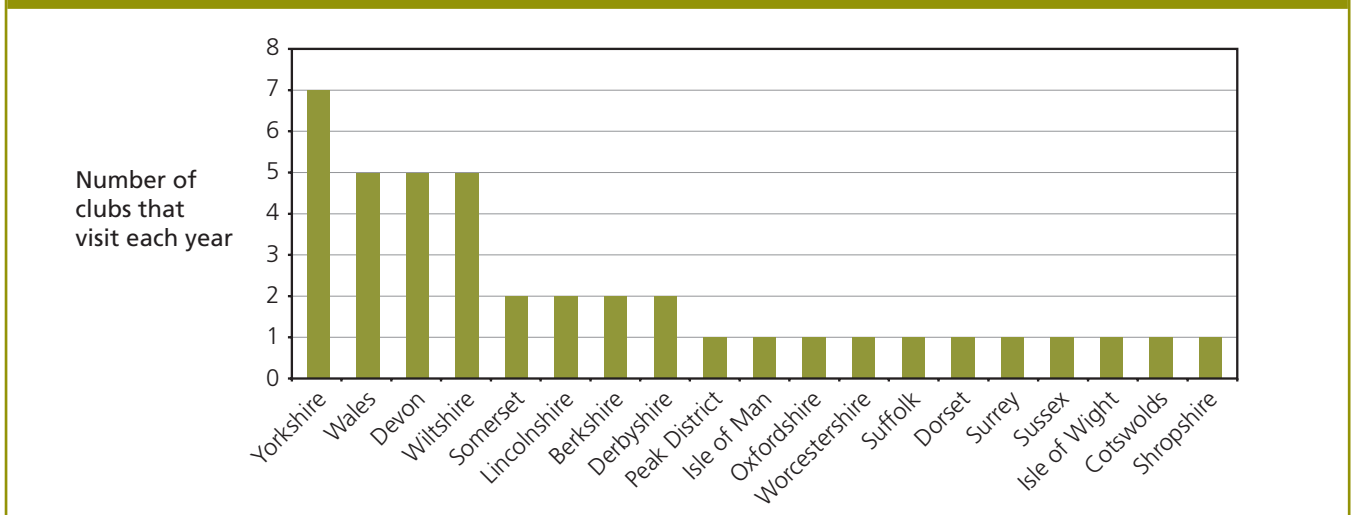


Table 4.5 summarises the number of visits to each area reported by respondents. On average each local group made 10 visits per year outside their local area. In England, Lincolnshire (21), Suffolk (20), Wiltshire (18), Berkshire (15), Yorkshire (12) and Oxfordshire (10) attracted the most visits. (Wales attracted the most visits at 34 although this is partly explained by the size of Wales relative to these English counties.) All of the visits to Lincolnshire, Berkshire, Oxfordshire and Suffolk were made by one or two clubs who visited frequently whereas Yorkshire (and Wales) attracted more clubs which each visited on fewer occasions. This suggests that some areas are able to attract use from a wide catchment but that this use is less frequent; other areas attract frequent use from local clubs.

Section 4

Table 4.5: Areas visited by groups located outside the area and number of visits per year

Area	Number of groups/clubs visiting	Number of visits	Average distance travelled per visit (miles)
Yorkshire	7	12	257
Wales	5	34	167
Wiltshire	5	18	126
Devon	5	9	118
Lincolnshire	2	21	63
Berkshire	2	15	53
Somerset	2	6	125
Derbyshire	2	4	50
Suffolk	1	20	50
Oxfordshire	1	10	60
Shropshire	1	8	30
Dorset	1	5	45
Surrey	1	5	45
Sussex	1	5	45
Isle of Wight	1	5	45
Cotswolds	1	5	60
Peak District	1	1	300
Worcestershire	1	1	75
Total	41	186	
Average	2	10	101

Two factors seem dominant in whether an area attracts motor vehicle use. They are the area's inherent attractiveness as a resource to recreational motor vehicle users and its proximity to user groups. The distance that groups are prepared to travel to an area is one indicator of the relative attractiveness of that area to them. Areas for which the distance travelled exceeds 100 miles, which might be regarded as the most attractive, include Peak District (300 miles), Yorkshire (257 miles), (Wales (167 miles),) Wiltshire (126 miles) and Devon (118 miles). Areas that are both attractive and close to many potential user groups, for example Oxfordshire and Berkshire, attract use.

Byway condition and maintenance

The responses by local groups on the condition of byways were evenly spread between 'poor condition', 'acceptable' and 'good condition':

- poor condition 28%
- acceptable 33%
- good condition 39%

It was not clear whether these responses were about byways in their local areas or byways further afield.

Six out of 20 responses indicated that local highway authorities undertook regular maintenance work. Several responses mentioned longstanding unresolved problems and the sporadic nature of

much maintenance. One response referred to excessive maintenance. Two local vehicle user groups regularly helped to maintain byways in conjunction with local authorities, often in the form of land clearance days. For motorcyclists the key concern was for a byway to be free from obstructions. Some local groups brought maintenance issues to the attention of the local highway authority.

Eight out of 20 responses said that the poor condition of byways was caused by excessive use of tractors and 4x4 vehicles rather than by organised groups of recreational vehicle users.

Conflict with other users

Local vehicle user groups regarded conflict as predominantly perceived rather than real, arising in part from poor signage and misunderstanding of vehicular rights. The responses underlined the desire to see byways properly signposted and accurately represented on Ordnance Survey maps.

4.4 Recreational users not using motor vehicles

The following organisations that represent the interests of potential users of byways who do not use motor vehicles were interviewed. They include equestrians – both on horseback and using horse drawn vehicles, pedal cyclists and pedestrians:

- Ramblers' Association (RA)
- British Horse Society (BHS)
- British Driving Society (BDS)
- Cyclists' Touring Club (CTC)

This does not purport to be a comprehensive list of organisations with an interest in this area. Off-road pedal cycling does not appear to have a strong national organisation although the British Cycling Federation's remit includes leisure cycling. A summary of the views expressed is given in Table 4.6.

4.5 Organisations representing land management interests

The National Farmers' Union and the Country Land and Business Association were also interviewed. Forest Enterprise (the leading national body involved with forest management and recreation) was interviewed by telephone. The views expressed are summarised in Table 4.7.

4.6 Local highway authorities

Rights of way officers at Wiltshire County Council and Nottinghamshire County Council were interviewed. The main purpose of the visits was to discuss the byways included in sample clusters and obtain information about their use, maintenance and problems related to use. This information was used to corroborate the inferences drawn from logger data and the moving observer surveys.

The relevant cluster datasets from the moving observer surveys were circulated to the local authorities responsible for rights of way in the areas concerned within the sample clusters and comments on the validity of the data invited. The only response received was from the Lake District National Park correcting errors in the data.

Section 4

Table 4.6: Summary of views of views - recreational users not using motor vehicles

Question	Ramblers' Association (RA)	British Horse Society (BHS)	British Driving Society (BDS)	Cyclists Touring Club (CTC)
Importance of byways open to all traffic for members	Byways open to all traffic are not significant in their own right – they are just another part of the network of public rights of way. Walkers would plan a route and use whatever rights of way are convenient, irrespective of their legal status.	The best riding routes are very important to horse riders, because they ride them time and time again. Byways open to all traffic are significant where they are part of one of these regularly used routes. But roads used as public paths and unclassified county roads are also important where these form part of regular routes. Although 17% of the public rights of way network is bridleway and 3% byways open to all traffic and roads used as public paths, the network available to equestrians is highly fragmented. Byways open to all traffic, roads used as public paths and unclassified county roads may be important in forming links.	Carriage drivers are limited to byways open to all traffic, roads used as public paths and unclassified county roads (as well as normal roads, although carriage drivers don't like trafficked roads because of speed, noise, etc.). Given the limited scope (i.e. about 3% of the network) byways open to all traffic are very important.	Byways open to all traffic are significant where they are common. But bridleways, roads used as public paths and unclassified county roads are also important where these form part of a regular cycling route. In essence, byways open to all traffic are important simply because they offer another form of route for cyclists. They will be another resource available to cyclists when planning a route.
Ideal route for user	Difficult to generalise – the joy of rights of way is their variety and ever-changing nature. A good surface is ideal, but 'good' does not mean metalled. Metalling destroys the character of the way from a walker's perspective. Overly manicured routes are undesirable, irrespective of whether they are byways open to all traffic or not. The ideal surface is not too muddy or boggy and is not blocked by excess vegetation. However, walkers are encouraged to recognise that variable conditions are an inherent feature of country walking.	To be horse-friendly, a route needs to be: <ul style="list-style-type: none"> • minimum 3m wide (1.5m per horse, so allowing two horses to pass); • no overhanging vegetation except above head height (for a mounted rider); • a surface that is not too rutted (it is difficult for horses to get their footing on rutted ground); • not excessively stony (less of a problem than ruts); • free of deep mud (pulling their legs out of deep mud can cause horses to strain muscles or lose shoes); • equipped with gates that allow passage of horses and preferably can be opened from on a horse • linked to other routes to allow the circuit to be completed. 	A good route for carriage driving is one with: <ul style="list-style-type: none"> • a good solid/even surface • a good length (most drivers look for a circuit of some 30km or so); • not too muddy (mud makes it hard work for horses); • not too stony (although off-road carriages are able to cope with quite rough ground) • width of at least 1.2m; • free of gates, although these are acceptable if they can be opened by an equestrian without dismounting. 	In terms of infrastructure, the ideal from a cyclist's perspective is: <ul style="list-style-type: none"> • signed from road (with right status shown); • waymarked as necessary along the way; • no excess vegetation; • good drainage (results in good, dry surface).

Table 4.6: Summary of views of views - recreational users not using motor vehicles

Question	Ramblers' Association (RA)	British Horse Society (BHS)	British Driving Society (BDS)	Cyclists Touring Club (CTC)
<p>Pattern of members' use of byways open to all traffic</p>	<p>Overall, use patterns will vary. Many walkers would go for half or a full day out. Lots of groups now operate mid-week (the young retired) although the tendency would still be for weekends to dominate; also would tend to be more activity in summer than winter (although groups do operate all year).</p>	<p>Key factors are:</p> <ul style="list-style-type: none"> only 10% of horse owners have their own transport, and so are limited to routes in close proximity to their horses' stables; rides need to start and finish in the same place; most riders look for a route that will take 1 to 2 hours to complete; horses need to be ridden very regularly (ideally once a day); most riders go out early (before work) or late (after work) during the week and will select times of day at weekend when routes are quiet. 	<p>Most carriage driving activity on byways open to all traffic is for recreational purposes. No information could be provided on patterns of use. Members include many with land owning/land management interests and may be out driving every day; others may be able to get out only at weekends.</p>	<p>Bearing in mind that the majority of cycle rides are by casual, recreational users, typical patterns are:</p> <ul style="list-style-type: none"> dominance of summer weekends (i.e. Easter through to end of Sept); off-road activity is not dependent on school holidays (off-riding not suitable for youngsters); use would typically occur between 10 am and 4 pm; a significant number of people use bikes to keep fit and may well go out in summer evenings cycling straight from home, so majority of such use would occur on urban fringe; a weekend trip may involve travel up to 100 miles each way for a decent ride (people might travel a long way to the Peak District to find some good cycling, but unlikely that many would travel the same distance to Wiltshire.
				<p>If cyclists knew that a byway is in bad condition (e.g. in winter), they would avoid using it (but this requires good local knowledge).</p>

Section 4

Table 4.6: Summary of views of views - recreational users not using motor vehicles

Question	Ramblers' Association (RA)	British Horse Society (BHS)	British Driving Society (BDS)	Cyclists Touring Club (CTC)
Areas of conflict	<p>RA policy is to lobby for a ban on vehicles using public rights of way. Their view is that vehicles have thousands of miles of road on which they are the dominant influence. Public rights of way are a way of escaping the ubiquitous influence of vehicles. Consequently, any vehicles encountered by a walker on a public right of way (whether legally driven or not) is likely to spoil the spiritual uplift they would otherwise enjoy.</p>	<p>Perception greater than reality in many cases but no hard research (most study of inter-user conflict excludes vehicles). Causes of conflict are:</p> <ul style="list-style-type: none"> ● noise; ● relative speeds; ● rider perception becomes self-fulfilling (rider thinks there's going to be conflict, tenses up, horse senses tension, gets nervous, is frightened by vehicle, then there is conflict); ● indirect conflict from the effect which motor vehicles have on surface (some surfaces better able to carry traffic than others). <p>Narrow routes can be a problem and raise the question of whether the horse or the vehicle backs up.</p>	<p>There is conflict with motorised users, mainly because of the damage they cause to the surface of the route. This is more a problem than noise (most horses pulling carriages get used to vehicles). Speed differential is a concern – motorbikes travel fast, carriages travel slowly. Having enough room for carriages and vehicles to pass can also be a problem.</p>	<p>Physical effect on surface:</p> <ul style="list-style-type: none"> ● casual cyclists may be deterred by poor surface conditions; ● horses are not a problem where drainage is good (but if drainage is bad and route is regularly used, routes can become uncyclable); ● damage caused by motorbikes is not commonly a problem, although where deep ruts are worn at each side by 4WDs, and a deep rut is worn in the middle by motorbikes, there is nowhere for the cyclist to go; ● may be unable to pedal in the ruts; ● there can be a major problem where there is commercial use (4WD safaris, pony trekking centres) (including difficulty for walkers as well as cyclists). <p>Conflicts arising from physical presence is not a common problem but the (few) situations where conflict can arise:</p> <ul style="list-style-type: none"> ● not being allowed to pass a group of walkers or horse riders (when approaching from behind); ● contact with motorcyclists tends to be short-lived – they soon pass; ● 4WDs tend to be driven slowly, so not really a source of conflict. More of a problem from a feeling of them intruding into somewhere they should not be. <p>Road cyclists typically avoid conflict by not going on public rights of way and form their views on the basis of press reports and other stories of conflicts</p>

Table 4.6: Summary of views of views - recreational users not using motor vehicles

Question	Ramblers' Association (RA)	British Horse Society (BHS)	British Driving Society (BDS)	Cyclists Touring Club (CTC)
Maintenance	<p>There is not enough money available to spend on byways open to all traffic, or on public rights of way generally. Although the situation has improved over the last 20 years or so, there is still a major shortfall. RA are concerned about the recording of vehicular rights over high moorland routes where ground conditions are very fragile. Impact of traffic could be disastrous both for other users and for environmental value (many such areas are SSSIs).</p>	<p>Key factors in maintenance are:</p> <ul style="list-style-type: none"> ● level and type of use of the byway; ● ease of access; ● local topography/physical features; ● drainage; ● original construction method and historic maintenance. <p>Because horse riders/owners are reliant on routes near their homes, they tend to have a stronger sense of ownership and responsibility for them.</p>	<p>No comment.</p>	<p>Key maintenance issues for cyclists are:</p> <ul style="list-style-type: none"> ● clearance of vegetation (because of sheer scale: huge lengths of public rights of way need to be cleared); ● drainage (although often just a few wet spots); ● waymarking. <p>Cutting of hawthorn and blackthorn hedges (byways open to all traffic are more likely to have hedges than other ways – and on both sides). The debris is usually left to fall onto the way. The thorns remain a threat to cyclists' tyres for 2 – 3 years. There are some technical solutions (deflector on the hedge trimmer, special tyres) but not commonly used (Note: the law requires debris to be cleared from country lanes, but not byways open to all traffic, but thorns not a problem on roads because they get dispersed by vehicles).</p>

Table 4.7: Summary of views of users of byways for land management

Subject	National Farmers Union	Country Land and Business Association	Forest Enterprise
Importance of byways open to all traffic	Byways open to all traffic are not significant in their own right – they are just one type of route that a farmer might use to get to his land. He may be aware of the route carrying vehicular rights, but not its exact status as a public right of way in relation to other routes. Farmers would use byways open to all traffic, roads used as public paths, unclassified county roads, public routes, farm tracks, routes with private rights, informal arrangements with other landowners.	Key concern for CLA members is access to their land. If they own the land and can access it directly off the road network, then byways open to all traffic are of no major significance to their land management activity. Where they rely on access across someone else's land, many landowners believe they enjoy private rights of passage but often this is not actually the case (and rights cannot be created through long usage). Therefore, they are dependent either on the way being a byway or no-one challenging their use of the way.	Byways open to all traffic are pretty insignificant to foresters. Most foresters would build their own forest tracks. In a very few cases, these tracks may be built over the top of byways open to all traffic but in the vast majority of cases, the forest tracks would be solely for forest use.
Ideal route for user	A route capable of carrying farm machinery.	No comments	A good, hard surface is essential for carrying heavy vehicles.
Pattern of use of byways open to all traffic	Pattern of use will vary significantly with type of land or property served.	General comment from feedback was that use was highly variable, depending on site-specific circumstances. For example, if the byway was also the farm drive, could expect usage of 20 times per day; if forestry land access, then may not get any landowner usage for months, even years, on end.	Harvesting – Only occurs every 45 years or so but results in very intensive vehicular activity, including operators' vehicles, forwarders, loaders, timber lorries (generates most of the traffic), delivery vehicles (fuel bowzers, spray deliveries etc). Thinning occurs more frequently than harvesting but is less intensive. Routine operations: deer management, pest control (e.g. rabbits), inspections, game keeping activities generate vehicle movements. Frequency will vary throughout the year – rabbit control may generate 2-3 movements per week at peak times, whereas others may only generate 2-3 per year. It is possible that byways open to all traffic would be used for these activities where they provide access to places not otherwise accessible via the forest tracks (e.g. areas outside the forests). Safety inspections concentrate on the more popular areas – whether byways open to all traffic or not.

Table 4.7: Summary of views of users of byways for land management

Subject	National Farmers Union	Country Land and Business Association	Forest Enterprise
Areas of conflict	<p>As a general comment, farmers are not keen on motorised vehicles coming on to their land because of:</p> <ul style="list-style-type: none"> ● security (theft and for other anti-social behaviour) ● inappropriate use causing damage to track (farmer may husband it, protect it and not use it in bad conditions, whereas recreational users may rip it up) ● noise/disturbance to livestock and game ● hare coursing – cannot stop people. 	<p>Byways are where the walking and driving worlds come together and so source of much conflict. As a general comment, landowners are not keen on motorised vehicles coming on to their land because of:</p> <ul style="list-style-type: none"> ● illegal activities that go on when people have access by motor vehicle (and landowner can't stop them, even at night). Main concerns are: fly-tipping (massive increase – tyres a big problem now); illegal camping; new age travellers; theft; ● heavy or inappropriate use (i.e. use in very wet conditions) causing damage to track; ● letting stock get out (gates left open). 	<p>Less of an issue for foresters than other land managers. Harvesting and public access are hard to mix because of health and safety concerns. Therefore, FE typically applies to close public rights of way during harvest. One of the conditions is to divert people along alternatives. This is usually easy for people on foot/horse/cycle but much more difficult for users of motor vehicles.</p>
Maintenance	<p>Farmers tend to be self-reliant, so if a route they use needs maintaining, they'll get on and maintain it. If the route is a byway, this may get them into trouble with the local highway authority. Three common reasons:</p> <ul style="list-style-type: none"> ● laying material on the surface which is OK in short term but fails in longer term; ● putting down something that is OK for them but not OK for other users (e.g. horses); ● putting down something that could be classed as a controlled waste (note that county councils and unitary authorities are both the highway and waste authority so they cannot leave controlled waste material in place if it has been laid on a byway). 	<p>Churning up of the surface by off-road recreational vehicles is a real problem. Maintenance is usually left to the landowner, and the landowner will maintain it to a level adequate for his needs – e.g. OK for a tractor. CLA members likely to see 4x4 and motorbikes as a major cause of surface damage – there are a lot of them now. Technology and access to it (i.e. affordability) has increased and led to exacerbation of problem.</p>	<p>FE's general outlook is that they would not maintain byways open to all traffic on their land (but would encourage local highway authority to do this) unless:</p> <ul style="list-style-type: none"> ● it was to their advantage for their routine operations ● it was part of a route which they were promoting for recreational use <p>If a byway was used for harvesting, FE or their contractors would take responsibility for repairing any damage done as a result.</p>

4.7 Other interests

Representatives of the following organisations were interviewed (by telephone):

- Association of National Park Authorities (ANPA)
- Byways and Bridleways Trust (BBT)
- CSS (formerly the County Surveyors' Society)
- Institute of Public Rights of Way Officers (IPROW)

Only a limited amount of data were obtained from these organisations, as their interests are not directly related to levels of use. The responses are summarised below.

4.7.1 Association of National Park Authorities

The importance of byways open to all traffic varies from park to park. In Dartmoor and Exmoor byways and their use are not seen as a problem. In other national parks, (Lake District, Yorkshire Dales and Peak District) use of byways (also of unclassified county roads and roads used as public paths) is a major concern, but even here, usage, and hence importance, varies significantly. In the Lake District, there are 15 byways but only five are heavily used. Byways cannot be seen in isolation from unclassified county roads, roads used as public paths and the wider road network.

National park authorities are generally responsible for maintenance of byways in their areas. However, the Association of National Park Authorities does not have a policy on how they should do so. The Lake District National Park Authority looks at each route on its merits and does what maintenance it deems necessary. There is a wide difference between maintenance of tarmac roads and of footpaths and bridleways. Much knowledge – skills, design standards, etc. – is available for design and maintenance of roads; similarly, there is much information on good practice concerning the design, repair and maintenance of footpaths. Byways fall in between and there is no good practice guidance to fill the gap.

4.7.2 Byways and Bridleways Trust

The Byways and Bridleways Trust is a registered charity with the following objective:

“to protect, preserve, maintain, secure, improve and develop public rights of way for the benefit of the public at large, so that conditions of life may be improved, in particular by taking steps to ensure high standards of surveying and recording on definitive maps and any other public records of public rights of way over byways open to all traffic, roads used as public paths, unmetalled carriageways, green lanes, drove roads, driftways and bridleways in England and Wales.”

The Trust considers that maintenance should be adequate and appropriate. The lack of functioning and suitable drainage is seen as a major issue. The problem is that drainage systems require regular low-level maintenance (such as that carried out by a 'lengthsmen') and local authorities no longer approach soft-surface maintenance in this way. Lack of maintenance results in disastrous failure of drainage causing expensive and difficult to repair damage.

There must be a level of use sufficient to keep the soft vegetation down and keep the track beaten; the lack of use during the closures in 2001 resulted in noticeable effect from non-use.

4.7.3 County Surveyors' Society

The CSS Northern Group have a business topic which focuses on the updating of the DETR guidance *Making the Best of Byways*. The group has recently contacted the authorities whose good practice was featured in the first edition to see if there has been any change in operation or policy. The Group are part way through their work on the topic which was halted by the outbreak of foot and mouth disease and has been delayed as a result.

4.7.4 Institute of Public Rights of Way Officers

The Institute of Public Rights of Way Officers does not have any specific policies or research documents relevant to the research.

4.7.5 Interests of people with disabilities

The May 2003 seminar was attended by a representative of the Disabled Ramblers' Association. The importance of the byway network for people with disabilities was emphasised by individuals with disabilities who either were members of other organisations or approached the researchers directly. The general thrust of these comments was that:

- some recreational motor vehicle use of byways is by people with disabilities who would otherwise not be able to access the countryside to the same extent. This is particularly important for people who become disabled and were previously able to walk, cycle or ride horses; and
- byways need to be in reasonably good condition for use by people with disabilities, particularly where motorised wheelchairs are used. Byways typically offer more scope for the use of motorised wheelchairs because they are wider than footpaths and bridleways.

4.8 Responses to household questionnaire surveys

4.8.1 The response to the surveys

In the course of carrying out the moving observer surveys the surveyors sought information on the use and maintenance of byways from the occupiers of dwellings served by or very close to the byways. The information sought related to the byways being surveyed, which were identified to respondents on Ordnance Survey maps.

In some cases information was sought by direct interview but in most cases a self-completion questionnaire was left at dwellings and returned by freepost envelope. The information was sought from occupants of dwellings where it appeared that the main means of access was via the byway and of dwellings in the immediate vicinity, opposite or on the corner of, the junction of a byway with a sealed highway.

No attempt was made to sample a set number of dwellings for each byway cluster. This would not have been practical as in some clusters there are few dwellings on or near byways while in others the number of such dwellings is high. The number of dwellings surveyed or to which questionnaires were distributed depended on the requirement to complete the moving observer surveys to programme. The best coverage was obtained where the surveyors were ahead of schedule and the number of dwellings within the above criteria was high.

Section 4

The responses to the questionnaire are set out in Table 4.8 by geographical area. 65 households from 17 local authority areas responded to the questionnaire. The largest number of responses came from Surrey (13), West Berkshire (9), Cornwall (8) and Hertfordshire (7), all in the southern half of England. The response from clusters was uneven; for example, only one response was received from Wiltshire where three of the byways clusters are located. In part this reflects that in the three Wiltshire byway clusters there are only six dwellings which rely on byway access.

The variation in responses between clusters may reflect:

- the number of dwellings on or near a byway;
- the level of concern that a household may have about the condition or use of a byway; and
- variations in the proportion of dwellings to which questionnaires were distributed, particularly where there are large numbers of dwellings served by byways, for example West Berkshire.

Table 4.8: Responses from households living on or near byways open to all traffic

<i>All responding households</i>				
Cluster	Number of dwellings along cluster byways	Number of responses	Responses as % of number of dwellings along cluster byways	Percentage of all responses
West Berkshire	72	9	13%	14%
Surrey	40	13	33%	20%
Hertfordshire	36	7	19%	11%
Cornwall	30	8	27%	12%
Sheffield and Huddersfield	27	1	4%	2%
Herefordshire and Shropshire	26	0	27%	0%
Bath and North East Somerset and West Wiltshire	19	3	16%	5%
Suffolk and Norfolk	18	4	22%	6%
Hampshire	15	4	27%	6%
Oxfordshire	14	2	14%	3%
Cambridgeshire (2)	13	4	31%	6%
Nottinghamshire and Leicestershire	12	5	16%	8%
Essex	9	1	11%	2%
Northumberland	8	2	25%	3%
Wiltshire (3)	6	1	17%	2%
Cumbria	4	0	0%	0%
Northamptonshire and Bedfordshire	1	1	100%	2%
Total	350	65	19%	100%

4.8.2 Use of byways by households

All of the responding households stated that one or more members of the household used the byway near to their property. Tables 4.9 and 4.10 set out:

- the frequency with which the byways are used for different purposes by household members; and
- the types of vehicles used on the byways for different purposes by household members.

Table 4.9: Frequency of use of byways open to all traffic by household members by purpose

<i>All responding households</i>								
Purpose	Frequency of use by at least one household member							
	Once or more than once per day		Fewer than once per day but once or more per week		Fewer than once per week but once or more per month		Fewer than once per month	
	No of households	%	No of households	%	No of households	%	No of households	%
Access to and from house and public roads	59	91%	3	5%	0	0%	0	0%
Access between farm, farm buildings and fields (i.e. to get around your farm)	19	29%	1	2%	0	0%	0	0%
Access to and from working farm and public roads	16	25%	0	0%	0	0%	2	3%
Other land management purposes (e.g. forestry)	3	5%	5	8%	0	0%	0	0%
Access between other business premises and public roads	8	12%	1	2%	0	0%	0	0%
Recreation	31	48%	9	14%	0	0%	0	0%
Other purpose	1	2%	3	5%	2	3%	1	2%
Households reporting use of a motor vehicle for any purpose	61	94%	3	5%	0	0%	1	2%

Members of households living in dwellings located on or very near a byway clearly make good use of the byway for a range of purposes:

- the most frequent use of the byway by households is for access between their dwelling and public roads, with 91% of households using the byway for this purpose once or more than once per day;
- 29% of households use the byway once or more than once per day to get around their farm;
- 25% of households use the byway once or more than once per day to get from a working farm to public roads;
- 12% of households use the byway once or more than once per day to get from other business premises to public roads; and
- 48% of households use the byway once or more than once per day for recreation.

Section 4

Table 4.10: Type of motor vehicle used by at least one household member when using byways open to all traffic by purpose

Purpose	All responding households							
	Type of vehicle							
	Tractor		4x4		Car		Motorcycle	
	No of households	%	No of households	%	No of households	%	No of households	%
Access to and from house and public roads	15	23%	21	32%	46	71%	9	14%
Access between farm, farm buildings and fields	15	23%	12	19%	9	14%	4	6%
Access to and from working farm and public roads	11	17%	8	12%	13	20%	2	3%
Other land management purposes (e.g. forestry)	3	5%	4	6%	1	2%	1	2%
Access between other business premises and public roads	5	8%	5	8%	8	12%	2	3%
Recreation	2	3%	8	12%	12	19%	8	12%
Other purpose	1	2%	0	0%	0	0%	0	0%
Households reporting use of a motor vehicle for any purpose	23	35%	22	34%	50	77%	9	14%

Members of households living in dwellings located on or very near byways use a range of motor vehicle types on the byway:

- the vehicle type most frequently used for *Access between dwellings and public roads* is the car with 71% of households using cars for this purpose. 4x4s are also frequently used and there is some use of motorcycles and, perhaps more surprisingly, tractors for this purpose;
- three of the purposes cited, *Access between farm, farm buildings and fields*, *Access to and from working farm and public roads* and *Other land management purposes* (e.g. forestry), are land management related. Taken together tractors, 4x4s and cars are all well used for these purposes. Motorcycles are used sometimes;
- the response to the recreation purpose suggests that there may be some confusion on the part of respondents between recreational use of the byway per se and trips to and from public roads that are for recreation elsewhere. This may explain the high incidence of car use identified. Relatively few households reported using byways for recreational purposes but the responses indicating 4x4 and motorcycle use may be interpreted that there is some motor vehicle use of byways as a recreational activity rather than simply for travel; and
- in addition to the vehicles in the table, the use of a quad bike was reported by one respondent (access to house and recreation), service vehicles by two respondents (access to house) and a horsebox by one respondent (access to house).

Table 4.11 summarises use of non-motorised modes when using the byway for particular purposes.

Table 4.11: Non-motorised modes used by at least one household member when using byways open to all traffic by purpose

<i>All responding households</i>						
Purpose	Pedal cycle		Horse or horse drawn carriage		Walk	
	No of households	%	No of households	%	No of households	%
Access to and from house and public roads	25	39%	14	22%	42	65%
Access between farm, farm buildings and fields	4	6%	6	9%	16	25%
Access to and from working farm and public roads	4	6%	5	8%	9	14%
Other land management purposes (e.g. forestry)	0	0%	1	2%	4	6%
Access between other business premises and public roads	2	3%	1	2%	3	5%
Recreation	22	34%	14	22%	40	62%
Other purpose	0	0%	0	0%	2	3%
Households reporting use of mode for any purpose	28	43%	16	25%	49	75%

The use of byways by local householders does not necessarily involve the use of motor vehicles. While for most households, access to and from public roads is likely to be by motor vehicle much of the time, walking, cycling and horse riding are also important. Non motorised modes are less used for land management although walking remains significant with 25% of households reporting that at least one member got around the farm on foot. National research undertaken for the Countryside Agency (*Rights of Way Use and Demand Study, Entec 2001*) suggests that a high proportion of recreation trips on foot are likely to involve dog walking.

The following general conclusions can be drawn on the use of byways open to all traffic by householders living on or near them:

- the data do not tell how often a byway provides the most convenient connection between a dwelling, a working farm or other business premises and the public highway network but only reports how many households use byways for this purpose. However, where a byway provides the most convenient direct connection between a dwelling, a working farm or other business premises and the public highway network, it is likely to be used once or more than once daily by motor vehicles for dwelling access. The data provide support for this view;
- 25% of households reported using byways once or more than once per day to get around their farms. This suggests that byways sometimes provide a convenient means of getting around a working farm. While all modes are used for this purpose, tractors, 4x4s and walking were the modes mentioned most for this purpose; and
- there is some association between motor vehicle type used and trip purpose. In particular for access to and from house and public roads, cars were most frequently mentioned while tractors were most frequently mentioned for access between farm, farm buildings and fields.

Section 4

4.8.3 Information provided by responding households on use by others

43 (67%) of households reported that they were aware of use of byways close to their homes by others. Table 4.12 summarises the responses received.

Table 4.12: Byway use by others reported by households

<i>All responding households</i>									
	Mode								Total
	Tractor	4x4	Car	Motorcycle	Bicycle	Horse	Walker	Other ¹	
Number of households	11	24	7	26	21	34	32	5	43
Percentage	17%	37%	11%	40%	32%	52%	49%	8%	67%

¹ Includes quad bikes, goods vehicles and herded farm animals.

Uses of byways by others mentioned by householders included shooting parties, hare coursing and repairs to mobile phone masts. Use by non motor vehicle modes was reported more frequently than use by any of the motor vehicle modes. Amongst motor vehicles, motorcycles and 4x4s were mentioned much more frequently than tractors. Cars were the least reported of the specified modes.

4.8.4 Views of responding households on condition of byways

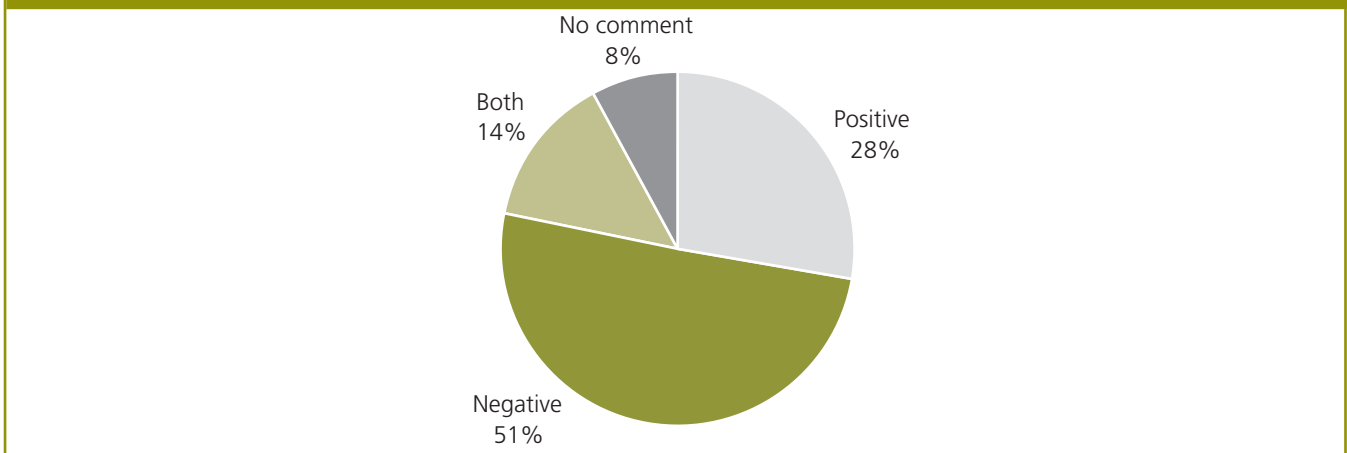
Households were asked for their views on the condition of the byways. Responses were subjective and varied considerably. There were both positive and negative views regarding the rutted and/or overgrown state of byways. For some rutted and overgrown byways were a blessing as they discouraged use by motor vehicles; for others the poor state of byways was an inconvenience. These qualitative views are set out in Table 4.13. Slightly over half of the responses commented negatively on the condition of the byway.

Table 4.13: Comments by households on byway condition

	Positive comments	Negative comments	Positive and negative comments	No comment
Number of households ¹	18	33	9	5
Percentage	28%	51%	14%	8%

¹ 60 households expressed positive comments, negative comments or both. Five (out of 65) households made no comment.

Figure 4.2: Comments by households on byway condition



Some households commented that ruts on the byway helped to reduce the speed of motor vehicles and were therefore a good thing. This was regarded as a positive response. Households also commented that improving the byway might encourage its use as a through road implying that poor byway conditions might be beneficial.

4.8.5 Views of responding households on user conflicts

29 (45%) of responding households considered that there were conflicts between users of the byways. The comments made by those households who considered that there was conflict were:

- the majority thought that there was conflict between motorcyclists, and walkers and horses. This was primarily attributed to the speed of motorcycles and the lack of respect on the part of motorcyclists for non-motorised users. This view was not universal; some respondents thought that motorcyclists slowed down and respected other users;
- weekend recreational activity was a source of conflict; there was specific mention of convoys of 4x4s or motorcycles driven at speed and that this caused conflict with walkers and horse riders;
- recreational motorists caused rutting and associated drainage problems;
- the higher the speed of vehicles the greater the rutting of byways;
- potholes and ruts helped to discourage motor vehicle traffic and thus reduce conflict; and
- larger vehicles, such as tractors, cause much of the rutting.

4.8.6 Involvement of respondents in maintenance of their local byway

32 (49%) of households carried out maintenance of some kind on their local byway. Regular maintenance included filling in potholes and trimming verges and hedges. Other maintenance included digging ditches and clearing drains to control surface water run-off. It is clear that property owners and occupiers are prepared to undertake maintenance where their use of the byway is essential.

4.8.7 Other views of households

Other views expressed by households were:

- the speed limit on byways should be set at 20mph for safety;
- the absence or lack of clarity of byway signs resulted in motor vehicle users intruding onto private property;
- traffic regulation orders should be shown on Ordnance Survey maps;
- without the passage of motor vehicles, byways become overgrown to the extent that they cannot be used by anyone;
- motor vehicle use of byways is a recreational activity enjoyed and valued by people with disabilities; and
- use of byways by motor vehicles purely for recreational purposes should be restricted to certain byways designated for this purpose, thus stopping recreational motor vehicle use along other byways open to all traffic.

4.9 Key points emerging from the stakeholder consultation

The stakeholder consultation had several distinct elements and is not readily summarised. The researchers have chosen to split the key points into a summary of the importance of byways open to all traffic for users groups and a list of concerns that users have:

Why are byways important to individual stakeholder groups?

Recreational motor vehicle users regard byways open to all traffic as a resource of vital importance to their activities. Without byways open to all traffic their activities would be severely constrained. For many **other recreational user groups**, byways open to all traffic offer further opportunities to exercise rights. Byways may provide essential links in the network.

Byways open to all traffic are an important resource for **people with disabilities**. For this group the ability to drive motor vehicles on byways open to all traffic and the availability of rights of way that are suited to use by motorised wheelchairs allows them greater access to the countryside.

Byways open to all traffic are of importance to **property owners and occupiers** but only where they have no other means of access or when byways are the most convenient way of getting around their property. In total **farmers and foresters** make little use of byways and, even where they use them, use will vary significantly with type of land or property served.

The **pattern and level of use of byways open to all traffic** varies considerably between user types. Occupiers of dwellings who rely on byways for dwelling access are likely to use them every day. At the other extreme forestry users may use byways very infrequently with long gaps between periods of use. At most this is likely to result in a few visits each year while at the other extreme several years may elapse between visits.

What are users' concerns?

Conflict between motor vehicles driven by farmers and other property owners and non-motorised users appears to be limited, whereas there appears to be a more general antipathy between recreational motor vehicle users and these groups.

There is general agreement that local highway authorities do not maintain byways open to all traffic adequately for lawful uses. Householders and farmers seem to maintain that part of the byway which provides access to their property to a standard appropriate for their needs.

A firm, dry and reasonably level surface, preferably not metalled, that is free from overhanging vegetation and in occasional use represents the optimum condition for a wide range of different byway users. Most users will be satisfied with a byway network in this condition although it will not fully satisfy 4x4 drivers and motorcyclists interested in experiencing difficult terrain or farmers or foresters who need to move heavy equipment or move crops with heavy goods vehicles.

Results of the site surveys

5.1 Introduction

This section summarises the results of the site surveys undertaken through vehicle loggers and by moving observer surveys. A detailed analysis of the survey data in each sample cluster is provided in the *cluster reports*. The analysis of the data for each cluster includes a review of the moving observer record for each vehicle logger to see how the level of traffic recorded by the logger might be explained. The results of the vehicle logger surveys for individual sites are summarised later in this section. This section also reports on data from other sources.

5.2 Vehicle logger surveys

The vehicle logger survey sites were selected at random. A Duddon Electronics vehicle logger was placed as close as practicable to the randomly selected survey point. Where possible the survey period was from mid March 2003 to mid March 2004. However most loggers were not installed until mid May 2003 and were removed by mid March. As a result the data between mid March and mid May are limited. Table 5.1 sets out the periods for which data were collected at each logger site.

Table 5.1: Periods covered by vehicle logger surveys

<i>All logger sites</i>			
Logger site	From	To	Number of days
Northamptonshire	24 April 2003	7 March 2004	319
Oxfordshire	16 May 2003 5 November 2003	1 November 2003 8 March 2004	295
Cornwall	1 March 2003 30 April 2003	20 April 2003 28 June 2003	80
Wiltshire (Aldbourne)	9 May 2003 7 July 2003	11 May 2003 15 March 2004	256
Wiltshire (Heytesbury)	9 May 2003 19 August 2003	9 August 2003 18 January 2004	246
Wiltshire (Winterbourne Bassett)	9 May 2003	15 March 2004	312
Bath and North East Somerset	16 May 2003	15 March 2004	305
Hertfordshire	15 May 2003	5 March 2004	296
Surrey	15 May 2003 15 November 2003	6 August 2003 9 March 2004	200
Hampshire	15 May 2003 2 November 2003	26 August 2003 7 March 2004	127
West Berkshire	15 May 2003 3 September 2004 17 September 2003 3 November 2003	12 August 2003 4 September 2004 1 November 2003 8 March 2004	265

Results of the site surveys

Logger site	From	To	Number of days
Cambridgeshire (Chatteris)	22 May 2003	10 March 2004	294
Cambridgeshire (Burwell)	22 May 2003	10 March 2004	294
Herefordshire	16 May 2003	8 March 2004	298
Northumberland	20 May 2003	29 March 2004	315
Sheffield	4 September 2004	9 March 2004	188
Cumbria	20 May 2003	29 March 2004	315
Essex	22 May 2003 26 November 2003	8 August 2003 10 March 2004	185
Suffolk ¹	–	–	(253)
Nottinghamshire	27 March 2003 19 May 2003 17 November 2003	24 April 2003 2 July 2003 9 March 2004	188
Total	5,031		

¹ The byway at the sample site for the Suffolk vehicle logger was completely obstructed on 22 May 2003 and 9 August 2003. It was assumed that there would be no motor vehicle traffic at this point throughout the survey period. The number of survey days for Suffolk in this table is imputed from the average number of survey days at each of the other sites.

In general the vehicle loggers were reliable but there was some loss of data as a result of:

- interference from other electrical installations – this affected the Nottinghamshire and Hampshire logger sites;
- malfunction of loggers – this affected the Aldbourne (Wiltshire), Cornwall, Nottinghamshire and Hampshire loggers;
- limits on the data capacity of loggers – capacity was reached on nine loggers where traffic levels were such that capacity was reached before they were downloaded. As a result data were not recorded for some periods by the Cornwall, Wiltshire (Aldbourn), Wiltshire (Heytesbury), Hertfordshire, Surrey, Hampshire, Essex, Suffolk (alternative) and Nottinghamshire loggers;
- difficulties with downloading data from loggers – this affected the Sheffield, Northamptonshire and Nottinghamshire data; and
- loss of vehicle logger – the Cornwall logger was removed from the byway by persons unknown at some time between November 2003 and March 2004.

The randomly selected site for the Suffolk logger was at a point on the byway that was impassable to motor vehicles because of vegetation overgrowth. It was assumed that no traffic would be recorded at this point and a nil value was used in the national dataset. The vehicle logger was relocated to an unobstructed part of the byway at its western end. The data collected have been used in gaining an understanding of traffic on byways generally and are reported in Section 5.3.5.

Interpolation to fill the gaps in the dataset to minimise any bias towards those logger sites where the data were more complete was considered but it was concluded that this would have made an insignificant difference to the overall results and would have placed undue weight on the sites for which data were incomplete; for example for Cornwall only 80 days of data were recorded from March to June 2003. Interpolation would have resulted in the average for this period being applied throughout the year thus tending to mask any seasonal fluctuations. It was considered

preferable to base the national conclusions on the data actually collected and to add the following cautions:

- the dataset is biased against the period mid March to mid May for which data are available only for Cornwall, Northamptonshire, Nottinghamshire and Suffolk and then only on a partial basis;
- the results are biased against the Cornwall vehicle logger location for the period for which no data were collected, i.e. July through to February;
- the results are biased slightly against the Surrey vehicle logger for the period for which no data were collected, i.e. August to mid November;
- the results are biased slightly against the Essex vehicle logger for the periods for which no data were collected, i.e. August to November; and
- the results are biased slightly against the Nottinghamshire vehicle logger for the periods for which no data were collected, i.e. early to mid May and July to mid November.

5.3 Results of the vehicle logger surveys at national level

5.3.1 Analysis

Two approaches to analysis at the national level are available: to aggregate all data and calculate averages from the aggregated records; and to calculate the average for each logger site and derive national averages as an average of these averages.

The former will bias the data geographically towards those logger sites for which there are more records and for which the survey period was longer. It could lead to misleading results and has not been used.

The latter weights each logger site data equally irrespective of the completeness of the data collected. Thus Cumbria with 315 survey days is given the same weight as Cornwall with 80 days. The number of survey days at all logger sites is sufficient to iron out any random fluctuations in traffic during the week or month. However where the number of survey days is small it will not fully reflect seasonal variations.

The logger data are reported on both a weighted and an unweighted basis. The weightings are designed to remove the bias inherent in the sampling method adopted. The weighting method is described in Section 2.7.

The procedure for downloading and analysing the data was as follows:

1. Download data from vehicle logger at vehicle survey point onto laptop computer using interface.
2. Transfer data from laptop computer to office server directory.
3. Complete record of download; check data for errors and omissions.
4. Classify all records in each set of incoming data by motor vehicle type and by other (small or anomaly) records.

5. Analyse by survey point to provide average daily traffic, traffic by day of the week, traffic by vehicle type, etc.
6. Calculate national averages both with and without weighting (see Section 2.7).
7. Adjust logger data to account for seasonal variations where incomplete data available.

5.3.2 Overall vehicle flow and vehicle flow by type

The vehicle loggers recorded 33,087 traces over a total of 5,031 survey days. Each trace was classified on the basis of the acoustic and magnetic pattern and recorded as a car, motorcycle, large vehicle, unspecified motor vehicle or other. This classification is not exact and the variation is such that it should not be relied on to produce a precise classification of vehicle type. However in broad terms it is a good indication of actual flows for each logger survey point.

The 'other' category comprises traces that were not motor vehicles. A total of 13,947 traces were categorised as *other*. These may be an indicator of non motorised use, for example by bicycles but further research would be required to establish this reliably. The *other* category provides no help in quantifying motor vehicle use and no further analysis of this category is provided in this report.

19,140 of the 33,087 traces (58%) were classified as motor vehicles. In looking at these data the following should be kept in mind:

- 4x4 vehicles not towing trailers, light goods vehicles under 3.5 tonnes gross vehicle weight (GVW) and tractors without attachments will have a trace which is the same as or similar to cars;
- tractors with farm implements or trailers attached, combine harvesters and other large farm machines, 4x4 vehicles towing trailers and goods vehicles exceeding 3.5 tonnes GVW will have a trace that is generally recognisable as a large vehicle;
- motorcycles generally have a distinctive trace although on a downhill gradient they could be freewheeled past a logger, making less noise. As a result some motorcycle records may have been placed in the unspecified motor vehicle class; and
- unspecified motor vehicles are those that do not produce a trace that can be readily classified. The reasons for this include vehicles that are travelling relatively fast or slow, vehicles without a substantial metallic content and vehicles that pass particularly quietly, for example because the ground is soft and the wheel to ground interaction produces no noise or because the gradient is downhill allowing vehicles to freewheel past.

Table 5.2a sets out an estimate of overall vehicle classification based on the average of the average daily flow at each logger site. The weighting makes a small difference to the figures.

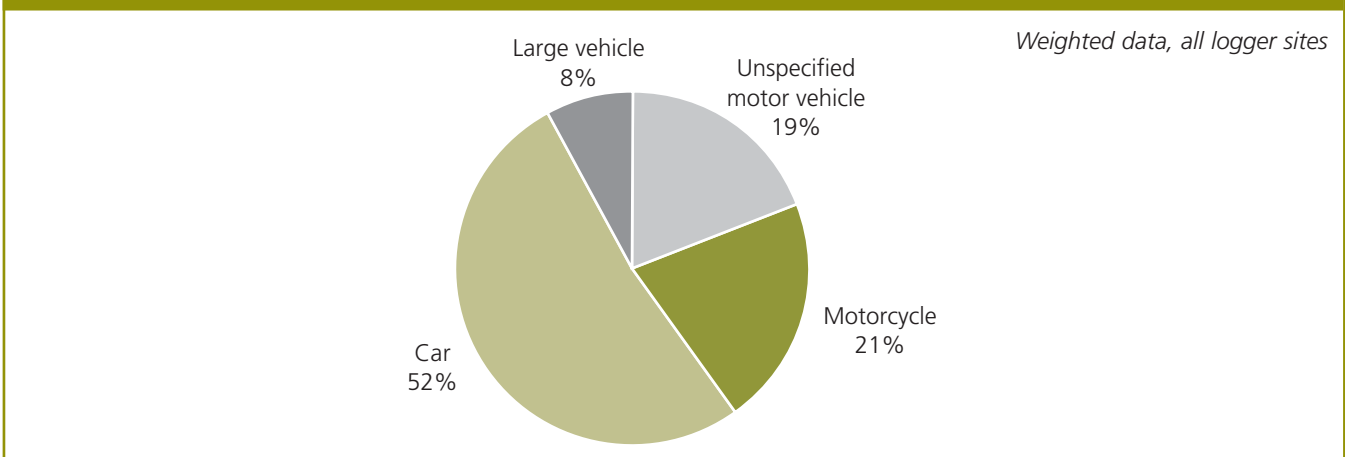
Section 5

Table 5.2a: Average daily vehicle flow by vehicle type – average of the average daily flow at each vehicle logger site

<i>Weighted and unweighted data, all logger sites</i>					
	Motorcycle	Car	Large vehicles	Unspecified motor vehicle	All motor vehicles
Unweighted average daily flow	0.8	2.1	0.3	0.8	4.0
% of total unweighted average daily flow	20%	52%	8%	20%	100%
Weighted average daily flow	0.9	2.2	0.3	0.8	4.2
% of total weighted average daily flow	21%	52%	8%	19%	100%

Figure 5.1 provides the weighted flow percentages as a pie diagram.

Figure 5.1: Average daily vehicle flow by vehicle type – average of the average daily flow at each vehicle logger site



The logger sites included one that was completely obstructed by vegetation (Suffolk), one that was obstructed by a locked gate (Bath and North East Somerset) and two on which traffic was restricted by a traffic regulation order for part or all of the survey period (Northamptonshire and Hertfordshire). (In general, traffic regulation orders did not appear to prevent use by the landowner or land occupier or by those occupying property fronting the byway.) Table 5.2b provides the same data as Table 5.2a but excludes these four sites. It reflects the traffic flow on byways on which traffic was not obstructed by vegetation, locked gates or other obstructions and not restricted by traffic regulation order.

Table 5.2b: Average daily vehicle flow by vehicle type - average of the average daily flow at each vehicle logger site excluding sites which were obstructed or which had traffic regulation orders

<i>Weighted and unweighted data, "unobstructed" logger sites</i>					
	Motorcycle	Car	Large vehicles	Unspecified vehicle	All motor vehicle
Unweighted average daily flow	1.0	2.5	0.4	0.9	4.8
% of total unweighted average daily flow	21%	53%	8%	19%	100%
Weighted average daily flow	1.1	2.6	0.4	0.9	5.0
% of total weighted average daily flow	21%	52%	8%	19%	100%

5.3.3 Vehicle flow by day of the week

Table 5.3 summarises average daily vehicle flow by day of the week, calculated as an average of the average daily flow at each vehicle logger site. The data are shown for all logger sites and excluding those obstructed by vegetation, locked gates or other obstructions or restricted by traffic regulation order.

The weighted data are illustrated in Figures 5.2a and 5.2b. Weekend days, in particular Sunday, have significantly higher flows. While there may be other explanations, recreational motor vehicle user groups have confirmed that their members are consistently more active on weekend days and particularly Sundays. The higher daily flow at weekends of 5.6 vehicles (weighted data) tends to support this. However the weighted weekday flow of 3.6 motor vehicles per day suggests that, if recreational activity is mainly at weekends, there is substantial non-recreational use at other times.

Table 5.3: Average motor vehicle flow by day of the week and weekend/weekday - average of the average daily flow at each vehicle logger site

<i>Weighted and unweighted data, all logger sites and "unobstructed" logger sites</i>				
Period	All logger sites		Excluding obstructed logger sites	
	Unweighted average daily flow of motor vehicles	Weighted average daily flow of motor vehicles	Unweighted average daily flow of motor vehicles	Weighted average daily flow of motor vehicles
Monday	3.5	3.6	4.2	4.3
Tuesday	3.4	3.5	4.2	4.3
Wednesday	3.7	3.7	4.4	4.5
Thursday	3.6	3.7	4.3	4.4
Friday	3.3	3.3	4.0	4.0
Weekday	3.5	3.6	4.2	4.3
Saturday	4.4	4.5	5.2	5.3
Sunday	6.4	6.7	7.5	7.9
Weekend	5.4	5.6	6.4	6.6
All days	4.0	4.2	4.8	5.0

Section 5

Figure 5.2a: Average daily motor vehicle flow by day of the week - average of the average daily flow at each vehicle logger site

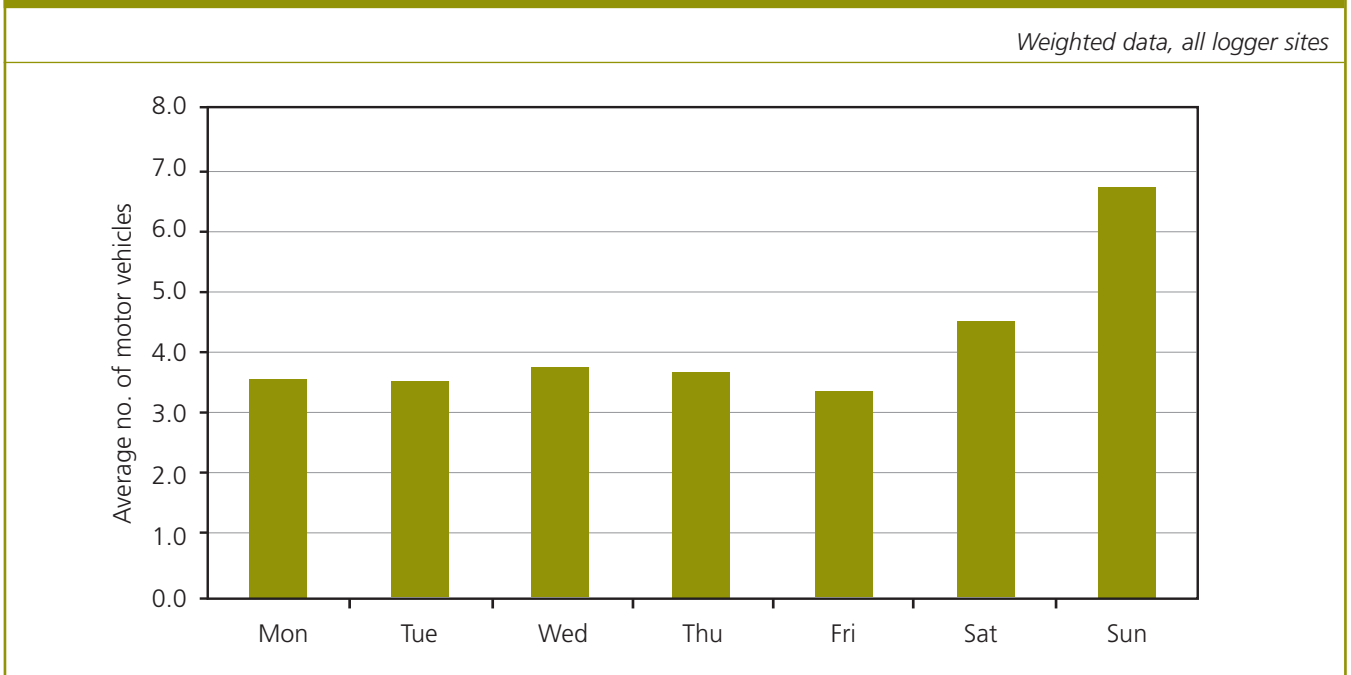


Figure 5.2b: Average daily motor vehicle flow by day of the week - average of the average daily flow at each vehicle logger site

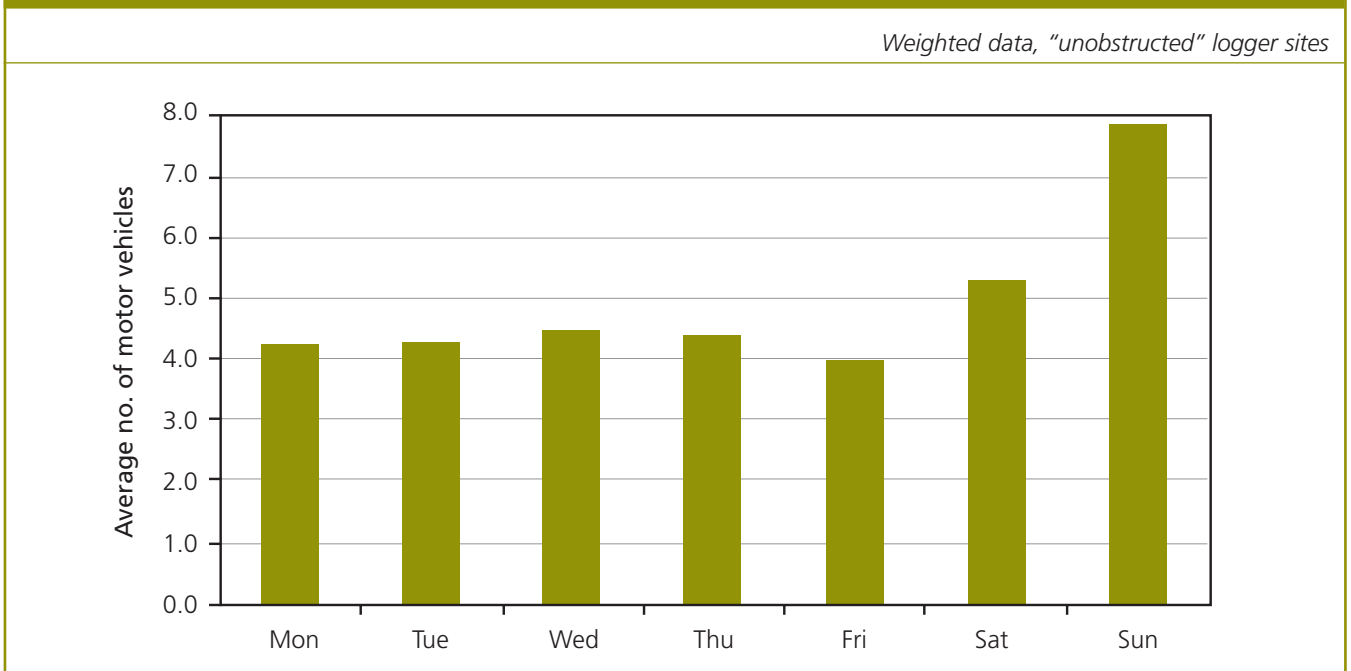


Table 5.4a and Table 5.4b compare weekday and weekend flow by motor vehicle type for all logger sites and for unobstructed logger sites. Motorcycle use is higher at weekends than on weekdays suggesting that this use may be recreational. For cars and other motor vehicles the difference is small and not regarded as significant. Large vehicle use is the same at weekends as on weekdays. Unspecified motor vehicle use is higher at weekends.

Results of the site surveys

Table 5.4a: Weekday and weekend flow by motor vehicle type - average of the average daily flow at each vehicle logger site

<i>Weighted and unweighted data, all logger sites</i>						
Motor vehicle type	Average daily flow – unweighted data			Average daily flow – weighted data		
	Weekday	Weekend	Full week	Weekday	Weekend	Full week
Motorcycle	0.4	1.9	0.8	0.4	2.1	0.9
Car	2.1	2.2	2.1	2.1	2.3	2.2
Large vehicle	0.3	0.3	0.3	0.3	0.3	0.3
Unspecified	0.7	1.0	0.8	0.7	1.0	0.8
Total motor vehicles	3.5	5.4	4.0	3.6	5.6	4.2

Table 5.4b: Weekday and weekend flow by motor vehicle type - average of the average daily flow at each vehicle logger site

<i>Weighted and unweighted data, "unobstructed" logger sites</i>						
Motor vehicle type	Average daily flow – unweighted data			Average daily flow – weighted data		
	Weekday	Weekend	Full week	Weekday	Weekend	Full week
Motorcycle	0.5	2.3	1.0	0.5	2.5	1.1
Car	2.5	2.6	2.5	2.6	2.7	2.6
Large vehicle	0.4	0.3	0.4	0.4	0.3	0.4
Unspecified motor vehicle	0.8	1.1	0.9	0.9	1.1	0.9
Total motor vehicles	4.2	6.4	4.8	4.3	6.6	5.0

Figure 5.3 compares the weighted motor vehicle weekday daily flow and weekend daily flow over a 24-hour period for all logger sites in aggregate. Flow across the week was weighted using the individual cluster weights. The vertical axis represents the weighted total flow of vehicles at all logger sites. Weekday flow and weekend flow follow the same general pattern rising flow between 07:00 – 11:00, peaking between 12:00 – 17:00, then fall between 18:00 – 22:00. Overall flow is higher at weekends than on weekdays and the weekend daytime flow begins earlier and continues later into the evening.

Section 5

Figure 5.3a: Weekday and weekend motor vehicle flows per hour over 24-hour period, average of all vehicle logger data

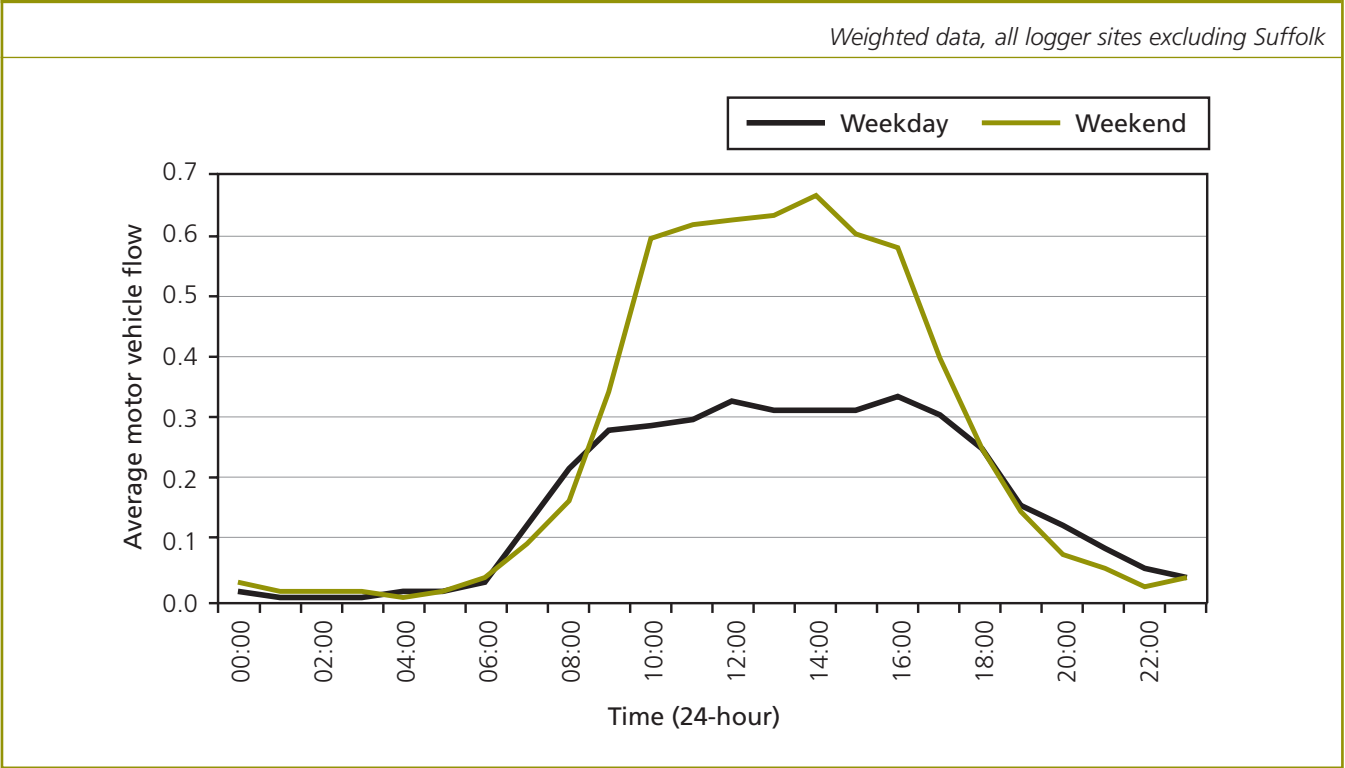
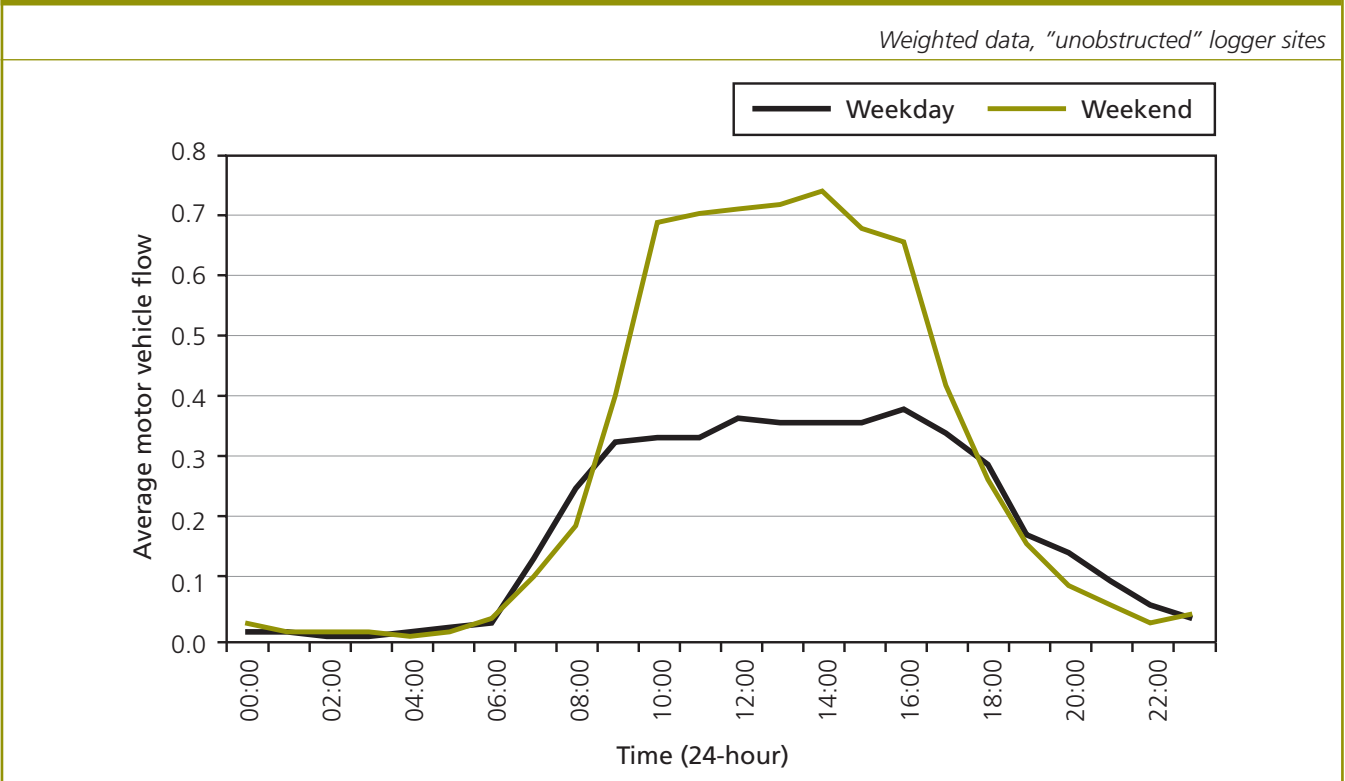


Figure 5.3b: Weekday and weekend motor vehicle flows per hour over 24-hour period, average of all vehicle logger data



5.3.4 Vehicle flow by month of the year

Table 5.5a and Table 5.5b set out the average of the average daily vehicle flow by month and quarter for all logger sites, and logger sites that were not obstructed to motor vehicle use. May, June, July and August all have significantly higher than average daily motor vehicle flows. February, November and December also have higher flows but less markedly. Possible explanations are higher recreational activity or higher agricultural activity associated with crop management and harvesting. The lack of data for April is likely to have biased the 2nd quarter average and the March, May and June figures suggest that the actual flows in April are likely to be higher. Figure 5.3a and Figure 5.3b illustrate the weighted monthly average daily flow. The peak occurs in August but it is not strongly pronounced and exceeds the annual daily flow by only 13%.

Table 5.5a: Daily motor vehicle flow by month and season – average of the average daily flow at each vehicle logger site

<i>Weighted and unweighted data, all logger sites</i>				
	Number of logger sites	Number of survey days	Average daily flow – unweighted data	Average daily flow – weighted data
January	19	574	4.1	4.2
February	18	519	3.9	4.1
March	18	219	2.9	3.0
Winter			3.6	3.8
April ¹	4	55	0.5	0.6
May	18	292	4.6	4.7
June	17	503	4.1	4.2
Spring			3.1	3.2
July	17	485	4.8	5.0
August	16	409	5.6	5.7
September	15	425	3.3	3.3
Summer			4.6	4.7
October	15	457	3.4	3.4
November	19	505	3.9	4.0
December	19	587	3.8	3.9
Autumn			3.7	3.8
Total		5031	4.0	4.2

¹ This figure should be treated with caution as it is derived from a small dataset.

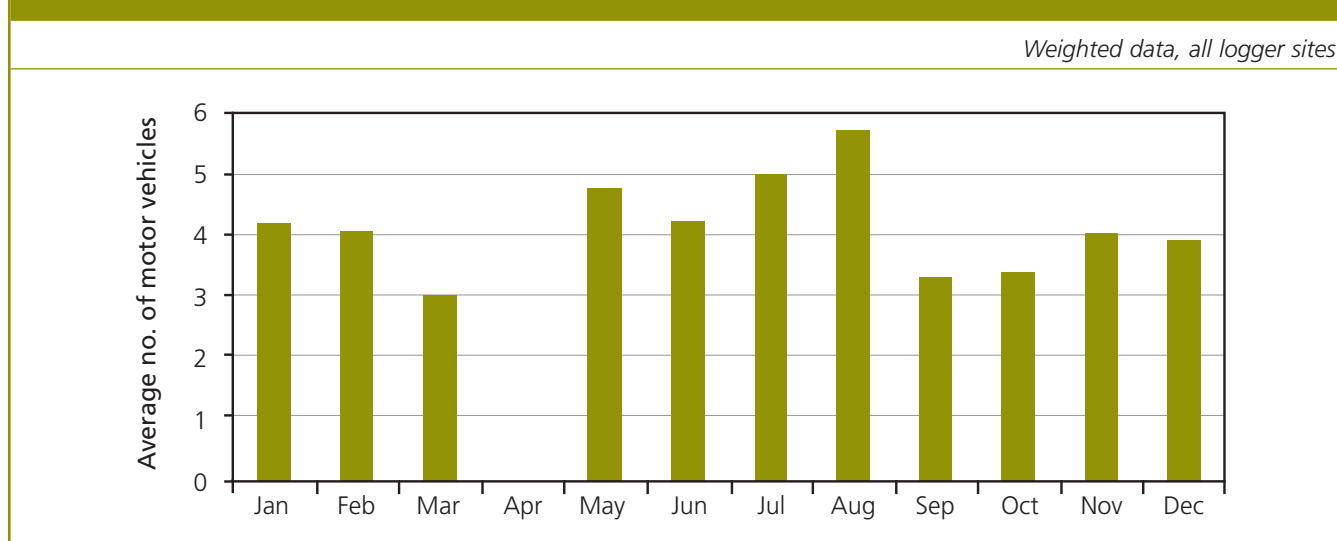
Section 5

Table 5.5b: Daily motor vehicle flow by month and season – average of the average daily flow at each vehicle logger site

<i>Weighted and unweighted data, "unobstructed" logger sites</i>				
	Number of logger sites	Number of survey days	Average daily flow – unweighted data	Average daily flow – weighted data
January	15	452	5.0	5.1
February	14	406	4.8	5.0
March	14	181	3.5	3.6
Winter			4.4	4.6
April ¹	2	45	0.5	0.5
May	14	213	5.8	5.9
June	13	388	5.1	5.3
Spring			3.8	3.9
July	13	368	5.9	6.2
August	12	296	7.0	7.1
September	11	313	4.1	4.1
Summer			5.7	5.8
October	11	341	4.2	4.2
November	15	390	4.9	4.9
December	15	465	4.6	4.7
Autumn			4.6	4.6
Total	15	3858	4.8	5.0

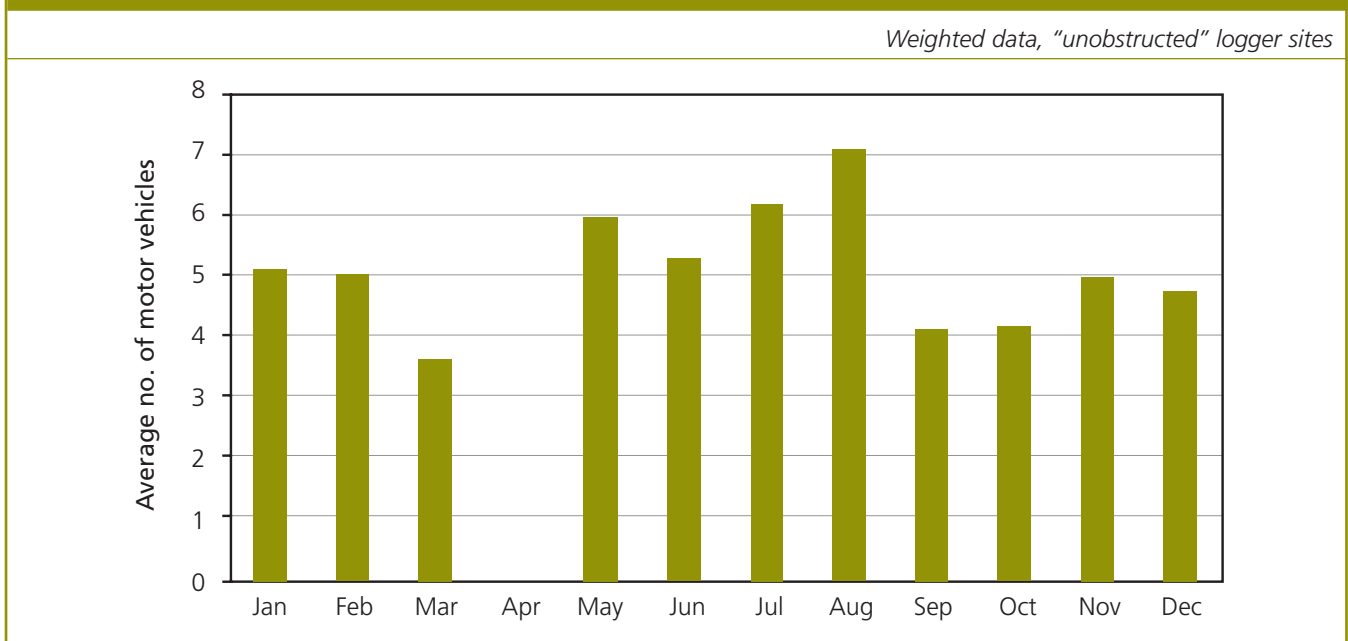
¹ This figure should be treated with caution as it is derived from a small dataset.

Figure 5.4a: Daily motor vehicle flow by month¹ – average of the average daily flow at each vehicle logger site



¹ April has been excluded as it derived from a small dataset.

Figure 5.4b: Daily motor vehicle flow by month¹ – average of the average daily flow at each vehicle logger site



¹ April has been excluded as it derived from a small dataset.

5.3.5 Use of the data from the alternative Suffolk vehicle logger site

As indicated in Section 5.2 the Suffolk vehicle logger would have been placed on a section of byway that was completely impassable to motor vehicles. It was assumed that the motor vehicle flow at this point was nil for the whole of the survey period. The vehicle logger therefore became available for use elsewhere. The site chosen was the nearest section of the same byway that was open to traffic. 207 days of data were recorded at this site, but have not been included in the estimates in this report.

This byway is obstructed to all traffic some 600 metres to the east of the logger site. It thus forms a cul-de-sac and in the surveyor's view is not likely to carry any recreational traffic. Aerial photographs indicate that the byway gives access to around 75ha of arable farmland extending to the north, and to a single dwelling that appears to be a farmhouse. The data and conclusions from this dataset are that:

- the average daily flow was 10.9 motor vehicles;
- 74% of vehicles were classed as cars, 19% as large vehicles and 2% as motorcycles;
- weekday flows for all types of vehicles were higher than weekend flows. The lowest daily flow was on Sunday, with flows on other days some 80 to 140% higher;
- higher than average monthly flows occurred from late summer to autumn possibly associated with harvesting and planting;
- the highest recorded daily motor vehicle flow, 46 motor vehicles, occurred on Wednesday 27 August 2003; and
- there was higher than average daily flow on weekdays than on weekends, possibly suggesting land management activity.

5.4 Moving observer surveys

The moving observer surveys covered 400.1km of byways from 20 clusters across England. One record was compiled for each 0.1km of byway surveyed to give a total of 4,001 records drawn from moving observer surveys of 273 individual byways open to all traffic.

Each moving observer survey record contains 76 fields of data covering:

- location of the byway including grid reference of the start and finish point;
- width of each section;
- presence and nature of any obstructions;
- presence and nature of any traffic regulation orders;
- byway condition including rutting and presence of surface water;
- extent to which byways serve as the main access to dwellings;
- extent to which byways serve as the main access to farm buildings;
- extent to which byways provide access to farmland;
- extent to which byways provide access to other land and buildings;
- character of the byway including topography and land use;
- landscape and biodiversity interest of/adjoining byways;
- enclosure adjoining byways open to all traffic;
- presence and nature of any drainage;
- land use adjoining byways open to all traffic;
- junctions with other public rights of way;
- junctions with other routes;
- traffic observed during the survey
- evidence for motor vehicle use;
- evidence for other, non motor vehicle, use;
- weather at time of survey and during previous week;
- comments where appropriate; and
- a digital photograph of the byway section.

Appendix 2 sets out the details of the data collected and, where subjective judgement was used, the criteria on which this was based.

5.5 Results of the moving observer surveys at national level

5.5.1 Background

The output of the moving observer surveys is a comprehensive dataset covering a sample of just under 10% of the 2003 estimate of the length of byways open to all traffic of 4,171km. The dataset includes photographs of each 0.1km section of byway surveyed which has the

disadvantage of increasing the computer file size. This makes manipulation somewhat cumbersome in the spreadsheet format adopted but allows for inconsistencies in the data to be checked by referring to the photographs.

The moving observer surveys data have not been weighted (see Section 2.7).

5.5.2 The physical infrastructure – geometry, surface treatment, drainage and enclosure of byways open to all traffic

The physical infrastructure of byways affects their ability to carry motor vehicle traffic and the recording of this information was an important part of the moving observer surveys. Tables 5.6a to 5.6d summarise the characteristics of the physical infrastructure of the byway sections in the sample.

Table 5.6a summarises the horizontal cross section of the byway. Carriageway width was defined as the part of the byway that was normally tracked by vehicles. (But it was not possible to do so where there was no evidence of vehicle tracks.) Verges were defined as any part of the byway that is not normally tracked by vehicles up to the adjoining enclosure, if any, but not including a ditch. Where there was no enclosure, the verge was defined as the adjoining land over which a vehicle might occasionally overhang or drive.

Most byways are narrow and motor vehicles, other than motorcycles, cannot pass without encroaching on the verge. Where byways are less than 3m and/or have overhanging vegetation, passage of large vehicles, for example combine harvesters, may not be possible. Encroachment outside the right of way is most likely where the width between enclosure is wide or no enclosure is present as on many byways across open moorland (see detailed comments in the cluster reports on Northumberland and Sheffield and Huddersfield).

Table 5.6a: Width of byways open to all traffic

<i>All moving observer surveys dataset</i>									
	Carriageway width			Width of verges ¹			Total width		
	Less than 3m	3-5m	Greater than 5m	Less than 1m	1-4m	Greater than 4m	Less than 4m	4-6m	Greater than 6m
Length of byway (km)	273.4	123.8	2.9	na	na	na	245.1	130.1	24.9
Length of byway frontage (km)	na	na	na	565.8	232.2	2.2	na	na	na
No of 0.1km byway sections	2,734	1,238	29	5,658	2,322	22	2451	1,301	249
% of records	68%	31%	1%	71%	29%	0%	61%	33%	6%

¹ The width of the verge on each side of the byway section was recorded separately.

This gave 8,002 records compared with 4,001 records for carriageway width.

Section 5

Table 5.6b summarises the surface character present on byways open to all traffic. Surface character is important because it affects the ability of the byway to carry traffic without deterioration. Where the surface of the byway was entirely of a particular surface type, for example tarmacadam or applied aggregate, characterisation was straightforward. There was greater difficulty where the surface was mixed, for example soil with some rock, or where the surface layer, generally grass, covered an underlying layer, for example hard core. The results should therefore be treated only as a broad indication of the surface character of byways.

On about one third of all byways work had been carried out to apply surface treatment ranging from complete surfacing with tarmacadam to filling potholes and ruts with hard core. In some cases it appeared that the local highway authority had undertaken surface treatment. However in most cases it is more likely to have been by property owners or occupiers who depend on the byway for access. This is confirmed by the 65 questionnaire responses received from households living near or on byways of whom 49% confirmed that they had undertaken maintenance works.

Almost half of all byways have natural surfaces whose bearing capacity appears weak. These surfaces are susceptible to the development of ruts and potholes. More robust natural surfaces were present on 19% of byway sections.

Table 5.6b: Surface character of byways open to all traffic

<i>All moving observer surveys dataset</i>					
	Surface with significant applied material present			Natural surface	
	Tarmacadam or concrete	Applied aggregate	Hard core	Robust (rock, chalk, sand and gravel)	Weak (grass, soil, peat)
No of 0.1km sections	276	743	334	764	1,884
Length of byway (km)	27.6	74.3	33.4	76.4	188.4
% of 0.1km sections	7%	19%	8%	19%	47%
% of 0.1km sections	34%			66%	

Table 5.6c summarises the presence of drainage on byways open to all traffic. Drainage is important because where surface water stands on the surface of a byway ruts or potholes may develop with the passage of traffic.

No drainage requires some explanation. Ultimately water from all byways drains somewhere. No drainage in this context of this report means no man-made drainage and no natural drainage in the form of adjoining watercourses or highly permeable soils. Because of the difficulty in making this judgement the results of this part of the analysis should be treated with some caution. The presence of man-made drainage was easier to identify.

Drainage was typically associated with drains serving adjoining arable land and was present on many byway sections in eastern England notably Cambridgeshire and Suffolk and Norfolk. On 70% of byways no drainage could be identified. In prolonged wet weather, surface water is likely to result in these byways becoming more difficult to negotiate in a vehicle.

Table 5.6c: Presence of drainage on byways open to all traffic

<i>All moving observer surveys dataset</i>			
	No drainage	Naturally good drainage	Man-made drainage
No of 0.1km sections	2,793	812	396
Length of byway (km)	279.3	81.2	39.6
% of 0.1km sections	70%	20%	10%

Table 5.6d summarises the presence of enclosure on byways open to all traffic. Enclosure is important because it may prevent vehicles encroaching on adjoining land to the detriment of land management, landscape or wildlife interests.

69% of byway frontages surveyed were enclosed. 31% were not enclosed, most often where the byway crossed open moorland, in arable areas where there was no need to contain livestock and where woodland adjoined the byway. The photographs in the moving observer records provide evidence of some motor vehicle encroachment onto adjoining land in all of these areas but in most cases traffic appears to remain on the byway even where there is no enclosure.

Table 5.6d: Enclosure¹ of byways open to all traffic

<i>All moving observer surveys dataset</i>				
	Hedgerow	Fence	Wall	No enclosure
No of 0.1km sections	3,894	1,517	579	2,807
Length of byway frontage (km)	389.4	151.7	57.9	280.7
% of records	45%	17%	7%	31%

¹ Enclosure on each side of the byway was recorded. Because more than one type of enclosure may be present on each side of a byway section, for example a hedgerow and a fence, there are 8,797 records.

5.5.3 Obstructions and traffic regulation orders identified in the surveys

Obstructions

Obstructions prevent the use of byways by motor vehicles and thus reduce motor vehicle traffic. Where motor vehicle passage was obstructed at any point on a byway, all of the survey sections on that byway were recorded as obstructed as the byway as a whole could not be used. Strictly this was not entirely true as the byway could be used on either side of the obstruction except where it was a cul-de-sac or the byway could be used where there was an unobstructed section between any two junctions with another highway, including a byway open to all traffic. However the view was taken that if a byway was obstructed at any point it could not properly be considered to be a fully functioning part of the network.

Section 5

The extent of obstruction found was:

- 17 byways with a total length of 35.6km were obstructed to the passage of all motor vehicles. This represents 9% by length of the byways surveyed;
- a further three byways with a total length of 6.1km were obstructed to the passage of all motor vehicles except motorcycles. This represents 2% by length of the byways surveyed; and
- combining these figures, 20 byways with a total length of 41.7km had some obstruction that prevented the passage of motor vehicles. This represents 10% by length of the byways surveyed.

Obstruction of byway sections resulted from the following types of obstruction:

- 72% by gates that were locked, broken, fixed or otherwise unusable by motor vehicle traffic;
- 8% by streams or ditches;
- 18% by bollards; and
- 2% by vegetation including fallen trees.

90% of obstruction to byway sections was the result of human action while the remaining 10% was the result of natural causes.

Traffic regulation orders

Traffic regulation orders may restrict or prohibit the use of byways by motor vehicle traffic. They may therefore have a strong bearing on the level of traffic. During the moving observers survey all traffic regulation order signs were recorded. Note however that this will not have covered any traffic regulation orders that were in place but not signed. Table 5.7 summarises the traffic regulation orders found on the byways open to all traffic surveyed. The following definitions have been used:

- permanent traffic regulation orders are those that prohibit the passage of any class of traffic at all times;
- seasonal traffic regulation orders are those that prohibit the passage of any class of traffic for part of the year, for example the winter months; and
- temporary traffic regulation orders are those that prohibit the passage of any class of traffic for a temporary period for any reason, for example disrepair.

Traffic regulation orders do not normally prevent access to premises served by the byway although they may restrict it to certain periods of the day.

8% of the surveyed byways had traffic regulation orders. The effect of traffic regulation orders is discussed further in those cluster reports where the vehicle logger sites were on byways subject to traffic regulation orders (Northamptonshire and Hertfordshire).

Table 5.7: Traffic regulation orders on byways open to all traffic

<i>All moving observer surveys dataset</i>				
	Permanent traffic regulation orders	Seasonal traffic regulation orders	Temporary traffic regulation orders	All traffic regulation orders
Number of byways	7	4	5	16
Length of byway (km)	14.1	12.0	6.4	32.5
% of byway by length	4%	3%	2%	8%

Five of the seven byways subject to permanent traffic regulation orders were in Hertfordshire and two in Suffolk and Norfolk. 12km of byways subject to permanent traffic regulation orders had evidence of light motor vehicle use and 2km had no evidence of motor vehicle use.

One byway in Nottinghamshire was subject to a seasonal traffic regulation order for 6 months a year during autumn and winter. The motor vehicle use of this byway was assessed as moderate when it was surveyed in summer. Three byways in Bedfordshire were subject to seasonal traffic regulation orders, all of which had been extended indefinitely because of bad weather. Motor vehicle use on these byways was assessed as generally light to moderate but sections of one byway were assessed as heavily used by motor vehicles.

6.4km (2%) of byways were subject to temporary traffic regulation orders. Two byways in the Suffolk and Norfolk cluster had a temporary traffic regulation order of less than one month. These were to allow a bridge to be repaired and an oil spill to be cleared up. Three byways in Northamptonshire were subject to temporary traffic regulation orders of up to 6 months because of deterioration in surface conditions.

Where traffic regulation orders were present the byways were often obstructed by bollards or locked gates.

Where use of a byway subject to a traffic regulation order continues this may be unauthorised use or lawful use by people, generally landowners or occupiers, to access land or property.

The combined effects of obstructions and traffic regulation orders

21.5km of byway was both obstructed and subject to traffic regulation orders. In total 52.6km of byway was obstructed and/or subject to a traffic regulation order. On the basis of the sample, this means that 13% of the network of byways open to all traffic is not freely available as public rights of way because of obstruction and / or traffic regulation order.

5.5.4 Property access from byways open to all traffic

General

Traffic is generated on byways where they are relied on to provide access to property. Access may be simply to provide for travel to or from a dwelling, for land management purpose, farming, forestry or nature conservation, or for access to other premises. The importance of access to dwellings and for land management purpose was apparent from the researchers' past experience and the moving observer surveys included identification of dwelling and land management accesses.

Section 5

Motor vehicle access to dwellings

The moving observer surveys identified all dwellings which relied on byways for access by motor vehicle. Dwellings were divided into farm dwellings and other dwellings. The number of dwellings served by each byway is detailed in the *cluster reports*. In total 351 dwellings, including farm dwellings, were served by the 400.1km of byways surveyed.

Table 5.8 summarises the extent to which byways in the sample were used for access to dwellings, including farm dwellings. The figures should not be relied on as evidence that the whole of the byways concerned are used for dwelling access because access to dwellings generally requires the use of only part of a byway, usually the part that provides the most convenient access to the nearest road. For example Byway 1 in Cornwall has a length of 1.2km and serves several dwellings from its western end. Only the 0.4km between the road at the western end of the byway and the last dwelling is likely to be used for dwelling access by motor vehicle on a regular basis but the whole byway has been included in Table 5.8. 45% of byways serve dwellings and so would be expected to be subject to the typical traffic flow generated by dwellings.

Table 5.8: Dwellings served by byways open to all traffic

<i>All moving observer surveys dataset</i>					
	No of dwellings served				Total
	0	1 or 2	3 to 9	10 or more	
Number of byways	151	80	38	4	273
% of byways	55%	29%	14%	2%	100%

Motor vehicle access for land management

There was good reason for believing that byways open to all traffic were used to some extent by motor vehicles in connection with land management. Support for this view was available both from field visits prior to the formal surveys and from the publication *Making the Best of Byways* (DETR, 1997) which reported that many highway authorities were aware of the use of byways open to all traffic and other unsurfaced routes to carry motor vehicle traffic associated with land management. Access points were identified as a useful indicator of the potential for such traffic. The following access points likely to be used for land management were recorded in the moving observer surveys:

- field accesses;
- woodland accesses;
- farm accesses to one or more buildings including a dwelling; and
- farm accesses to one or more buildings not including a dwelling.

Table 5.9a indicates the overall presence of access points for land management purposes on the surveyed byways. In overall terms the number and frequency of land management access points, primarily related to farming, is significant.

Table 5.9a: Land management access points served by byways open to all traffic by type of access

<i>All moving observer surveys dataset</i>				
	Type of access			
	Field access	Woodland access	Farm access to one or more buildings including a dwelling	Farm access to one or more buildings not including a dwelling
Number of access points	1,422	72	64	101
Frequency per km	3.6	0.2	0.2	0.3

The number of land management access points was calculated for each byway. The number of land management access points on the surveyed byways ranged from 0 to 36. Table 5.9b gives the proportion of byways by number of land management access points. The key conclusion is that 90% of byways in the sample are used to provide access for land management purposes. This may be an underestimate because access points are not required where a byway is not enclosed.

Table 5.9b: Land management access points per byway

<i>All moving observer surveys dataset</i>					
	Number of land management access points per byway				
	0	1-9	10-19	20-29	30 or more
% of byways	10%	56%	23%	9%	3%

5.5.5 Land use

Table 5.10 shows adjoining land use. Agricultural land (arable, improved and unimproved pasture land) accounted for 78% of land adjacent to the surveyed byways with arable land predominant. Woodland (deciduous, coniferous and mixed) accounted for 11% of land adjacent to the surveyed byways. Residential property accounted for 3%. Land use was recorded on both frontages to each byway section resulting in 8002 records. The results reflect the fact that byways open to all traffic are mainly in lowland England where arable land predominates.

Section 5

Table 5.10: Land use on either side of byways open to all traffic

<i>All moving observer surveys dataset</i>		
Land use	No of 0.1km sections	Percentage
Arable	4,262	54%
Improved pastoral	1,108	14%
Unimproved pastoral	884	11%
Deciduous wood	602	8%
Heath or moor	325	4%
Residential	220	3%
Scrub	179	2%
Mixed wood	153	2%
Other	131	2%
Coniferous wood	126	2%
Industrial	9	0%
Marsh	3	0%
Business	1	0%
Total	8002	100%

5.5.6 Landscape quality and biodiversity interest

Landscape quality and biodiversity interest were assessed using the criteria set out Appendix 2. Table 5.11 summarises the results. Note that an area with high interest for landscape may be of less interest for biodiversity or vice versa. However it is unlikely that an area will have high biodiversity interest without at least some landscape interest or that an area with high landscape interest will not have at least some biodiversity interest.

Most of the byway sections surveyed were assessed as of limited or moderate interest in terms of landscape quality or biodiversity interest. 10% of the byway sections surveyed were assessed as of high interest for landscape quality while 7% of sections were of high interest for biodiversity. In terms of recreational use, areas of high interest may attract people from further afield. Areas with less interest are more likely to attract only people living in the locality.

Table 5.11: Landscape quality and biodiversity interest

<i>All moving observer surveys dataset</i>				
	Landscape quality		Biodiversity interest	
	No of 0.1km sections	Percentage	No of 0.1km sections	Percentage
No significant interest	217	5%	196	5%
Limited interest	1977	49%	1632	41%
Moderate interest	1410	35%	1887	47%
High interest	397	10%	286	7%
Total	4001	100%	4001	100%

5.5.7 Condition of the byway network

Table 5.12a summarises the condition of the byways open to all traffic surveyed. Most of the byways surveyed were in good condition with no rutting and no surface water present. However the surveys were undertaken in summer. During the winter conditions are likely to deteriorate on those byways with weaker surfaces.

Table 5.12a: Condition of byways open to all traffic

<i>All moving observer surveys dataset</i>							
Rutting		Surface water		Drainage		Gradient	
Category	% of 0.1km sections	Category	% of 0.1km sections	Category	% of 0.1km sections	Category	% of 0.1km sections
No rutting	63%	No surface water	72%	No drainage	70%	Flat	77%
Shallow rutting	25%	Mud	19%	Naturally well drained	20%	Gentle gradient	19%
Deep rutting	12%	Puddles of standing water	8%	Man-made drainage	10%	Steep gradient	5%
		Flooded	1%				

Table 5.12b tabulates the presence of drainage against the rutting identified. It appears that the incidence of deep rutting is slightly higher where man-made or good natural drainage is present. However it is likely that man-made drains are more likely to be present where land is naturally poorly drained whereas man made drains are less likely to be present on well drained soils, for example sandy gravels and chalk.

Section 5

Table 5.12b: Coincidence of presence of drainage and rutting by 0.1km sections

<i>All moving observer surveys dataset</i>							
Rutting	Drainage						Total
	None	%	Man-made	%	Natural	%	
None	1747	70	532	21	222	9	2501
Shallow	719	71	191	19	101	10	1011
Deep	326	67	90	18	73	15	489
Total	2792	70	813	20	396	10	4001

The consistent recording of the presence of drainage was difficult because weather conditions varied during the surveys and because identifying drains on the ground was sometimes difficult. Furthermore, factors other than drainage, including gradient, the bearing capacity of the ground and axle loadings, that can contribute to rutting. From known engineering principles and experience rutting is most likely to be associated with:

- poor drainage whether man-made or natural;
- soft ground, particularly over impermeable soils, for example clay;
- byways that are overgrown preventing sun and air from drying out the surface of the byway;
- byways on gradients that in wet weather act as channels for surface water with resulting scouring;
- high traffic flows, particularly where associated with insufficient maintenance;
- high axle loadings from heavy vehicles; and
- higher speeds and rapid acceleration of vehicles.

5.5.8 Connections to other routes from byways open to all traffic

Connections between byways provide an indication of the extent to which they form a network available for motor vehicle users. There is rarely, even at a local level, a good network composed entirely of byways. For motor vehicle users other routes, including roads used as public paths, unclassified county roads and country lanes may together provide a local network which may attract recreational users. This is discussed further in the *cluster reports*.

Table 5.13a summarises the presence of junctions between byways open to all traffic and other rights of way including byways open to all traffic. On average a junction with another right of way occurs every 0.4km.

Table 5.13b summarises the presence of junctions between each byway open to all traffic in the sample and other byways open to all traffic (this includes other byways in the sample). With few exceptions byways are poorly connected with byways. On average, a junction with another byway occurs every 1.3km.

Table 5.13a: Junctions between byways open to all traffic and all rights of way

<i>All moving observer surveys dataset</i>					
	Number of junctions with other rights of way (including byways open to all traffic)				Total
	0-1	2-5	6-10	11 or more	
No of byways	66	168	31	8	273
% of byways	24%	61%	11%	3%	100%

Table 5.13b: Junctions between byways open to all traffic and other byways

<i>All moving observer surveys dataset</i>						
	Number of junctions with other byways open to all traffic					Total
	0	1	2	3	4 or more	
No of byways	123	55	61	17	17	273
% of byways	45%	20%	22%	6%	6%	100%

The area in the vicinity of each of the clusters was reviewed for evidence of roads used as public paths or unclassified county roads that could, with byways open to all traffic have provided a more extensive network of unsealed routes for motor vehicle users. Roads used as public paths are shown on 1:50,000 Ordnance Survey Landranger maps. No similar source allowed identification of unclassified county roads although some other routes with public access are shown on the Landranger maps. No detail is available as to whether these other routes carry motor vehicle rights. No roads used as public paths were identified in close proximity to the byways open to all traffic in the clusters. This may be because surveying authorities have worked to reclassify all of the roads used as public paths in an area before moving on to the next area. In Cornwall, Wiltshire (Winterbourne Bassett), Hertfordshire, Hampshire, West Berkshire, Cambridgeshire (Burwell), Cumbria, Suffolk and Norfolk and Nottinghamshire and Leicestershire other routes with public access were identified that, if they carry higher rights for motor vehicles, would form a useful part of the network. In some cases these other routes provide important connections that allow a byway open to all traffic to be used as a through route.

5.5.9 Evidence for and assessment of use of byways open to all traffic

The surface of each 0.1km section of byway surveyed was inspected for evidence of use by vehicles and other users. This relied on a quick and subjective judgement by the surveyor. There is some bias in this part of the surveys in that:

- hard surfaces do not readily show evidence of users while soft bare earth easily shows the imprint of a tyre, hoof print or footprint;
- heavy vehicles, for example tractors, provide a bigger imprint than lighter vehicles, for example motorcycles and pedal cycles, and tend to obliterate evidence of other use; and
- horses' hoof prints tend to be deeper and more distinctive than human footprints because of the relatively heavy weight of these animals.

Section 5

Table 5.14 shows the surface evidence of use by category of user on the sampled byways open to all traffic.

Table 5.14: Surface evidence of use on byways open to all traffic ¹				
<i>All moving observer surveys dataset</i>				
Motor vehicle tracks				
	Tractor	4x4	Car	Motorcycle
No of 0.1km sections	2,936	315	562	1,124
% of 0.1km sections	73%	8%	14%	28%
Tracks left by other, non motor vehicle, users				
	Horse hoof prints	Pedal cycle tracks	Pedestrians	
No of 0.1km sections	1,915	545	1,108	
% of 0.1km sections	48%	14%	28%	

¹ Each 0.1km section may have evidence of more than one type of use.

Thus there was clear evidence of the use of most of the surveyed byways by tractors. Almost half of the byway sections showed evidence of equestrian use.

The survey team also assessed the degree of motor vehicle and other, non-motorised, use on each byway section. Table 5.15 summarises the results.

Table 5.15: Assessment of evidence of use on byways open to all traffic				
<i>All moving observer surveys dataset</i>				
Motor vehicle use				
	None	Light	Moderate	Heavy
No of 0.1km sections	177	1498	2064	262
% of 0.1km sections	4%	37%	52%	7%
Non-motorised users (pedestrians, equestrians and pedal cyclists)				
	None	Light	Moderate	Heavy
No of 0.1km sections	1307	1893	507	9
% of 0.1km sections	33%	47%	13%	0%

From the moving observer survey, 89% of the sampled byway sections were assessed as subject to light and moderate use by motor vehicles. 7% were assessed as being heavily used by motor vehicles. 13% of byway sections were assessed as being subject to moderate use by non-motorised users (pedestrians, equestrians and pedal cyclists). Nine 0.1km byway sections were assessed as subject to heavy use by non-motorised users.

5.5.10 Traffic observed during the moving observer surveys

All traffic moving in the opposing direction was recorded during the moving observer surveys. These data help to establish the make up of traffic on the byways open to all traffic that were surveyed. However, it is likely to be biased towards weekday use during the day in summer as most of the surveying took place between 9.00am and 5.00pm between Monday and Friday in June, July and August. As more recreational use is likely to take place at the weekends, recreational users of all kinds are likely to be under-represented.

During the moving observer surveys 146 vehicles were recorded travelling in the opposite direction on the 400.1km of byway surveyed. This equates to an average of 0.4 vehicles per kilometre surveyed and 7.3 vehicles per byway. Given that the surveys typically covered 2km of byway per hour this equates to some 200 hours of on route surveying.

Table 5.16 sets out the numbers and proportions of motor vehicle traffic and non-motorised users observed. In summary:

- pedestrians, with or without dogs, were the vast majority of non motorised users;
- more than twice as many cyclists were observed than equestrians;
- no carriage drivers were observed;
- non-motorised users exceeded motor vehicle users by 205 to 146;
- agricultural and goods vehicles comprised 36% of observed motor vehicle traffic. While use of these vehicles may occasionally be recreational, it is much more likely to be associated with land management or business purposes;
- 4x4 estate car type vehicles comprised 34% of observed motor vehicle traffic. 4x4 vehicles may be associated with land management, recreation or access to dwellings;
- cars comprised 26% of observed motor vehicle traffic. Car traffic is most likely to be associated with recreation or access to dwellings; and
- at 5%, the proportion of motorcycles observed was low. However, if recreational motorcycling is concentrated at the weekend, as suggested by user groups, this is not unexpected.

Section 5

Table 5.16: Traffic observed during the moving observer surveys

<i>All moving observer surveys dataset</i>										
Non motorised users										
	Pedestrian	Pedestrian with dog(s)	Cyclist	Equestrian	Horse and carriage	Total				
No of observations	108	60	26	11	0	205				
Percentage	53%	29%	13%	5%	0%	100%				
Motor vehicles										
	Tractor	Tractor with trailer	Other agricultural vehicle	4x4 estate car	4x4 light goods vehicle	Motor-cycle	Car	Light goods vehicle (<3.5t)	Goods vehicle (>3.5t)	Total
No of observations	21	5	2	49	7	7	38	9	8	146
Percentage	14%	3%	1%	34%	4%	5%	26%	6%	5%	100%

Weekday vehicle data from the vehicle logger surveys and from the moving observer surveys are compared in Table 5.17. Unspecified motor vehicles have been excluded from these vehicle logger data as they cannot be reliably assigned to any motor vehicle type.

Table 5.17: Comparison of motor vehicle types on weekdays; vehicle logger surveys and moving observer surveys

<i>All logger sites, all moving observer surveys dataset</i>			
Vehicle logger surveys using weekday weighted data ¹		Moving observer surveys	
Motor vehicle type	% of vehicles recorded	Motor vehicle type	% of vehicles observed
Motorcycle	14%	Motorcycle	5%
Car	75%	Car type vehicle ²	71%
Large vehicle	11%	Large vehicle ³	25%
Total	100%	Total	100%

¹ Excludes unspecified motor vehicles.

² Car type vehicles include 4x4 estate cars, 4x4 light goods vehicles, cars and goods vehicles under 3.5t GVW.

³ Large vehicles include tractors, tractors with trailers, other agricultural vehicle and goods vehicle exceeding 3.5t GVW.

The above comparison suggests that the vehicle logger surveys may have overestimated the number of motorcycles and under estimated the number of large vehicles.

5.6 Results of the vehicle logger surveys for individual byways

5.6.1 Summary data for vehicle logger surveys

Table 5.18a summarises key features of the byways open to all traffic on which the vehicle loggers were located together with summary traffic flow data. Table 5.18b compares the average daily flow of motor vehicles with the highest daily motor vehicle flow recorded. The objective of the tables is to help identify any relationships between the traffic flows and byway features. Where dwellings were served by the byway a judgement was made as to the proportion of traffic to and from those dwellings which would pass the logger site. This traffic includes both residents and others, such as delivery and service vehicles (which include post vans which generally visit dwellings several times a week).

Section 5

Table 5.18a: Key features and traffic flow data from vehicle logger sites

Logger site	Summary of byway condition	All logger sites, plus Suffolk alternative													
		Number of dwellings including farm dwellings	Farm access points (excludes access to farm dwellings)	Junctions with other byways	Landscape quality	Habitat interest	Average daily weekday flow	Average daily weekend flow	Average daily flow	Motorcycle	Car	Large vehicles	Unspecified vehicles	Assessed level of use from moving observer survey	% of vehicles accessing dwellings likely to pass the logger
Northamptonshire	Good with limited rutting. Not suited for use by low clearance or two wheel drive vehicles. Subject to temporary traffic regulation order and obstructed by locked gate	0	3	1	0	2	0.5	2.4	1.0	27%	43%	1%	30%	1	None
Oxfordshire	Good with no rutting. Open to all motor vehicle types	1	15	2	2	2	7.8	8.8	8.1	10%	76%	5%	9%	2	33%
Cornwall	Good but rough surface with no rutting. Open to all motor vehicle types with care	5	0	2	1	2	1.0	1.3	1.1	24%	71%	5%	0%	2	1%
Wiltshire (Aldbourne)	Fair with both shallow and deep sections of rutting. Not suited for use by low clearance or two wheel drive road vehicles	0	19	16	1	1	6.7	11.1	8.0	12%	1%	1%	86%	2	None
Wiltshire (Heytesbury)	Variable from very good to very poor with sections of shallow and deep rutting. The section on which the logger is located is open to all motor vehicle types	0	18	3	3	1	14.8	15.1	14.9	8%	79%	10%	4%	2	None
Wiltshire (Winterbourne Bassett)	Good with no rutting. Open to all motor vehicle types	0	18	0	3	1	3.8	8.4	5.1	27%	54%	0%	19%	1	None

Results of the site surveys

Bath and North East Somerset	Poor with significant deep rutting. Obstructed by locked gate	0	4	0	1	2	1.4	2.7	1.8	13%	27%	17%	43%	2	None
Hertfordshire	Good with no rutting. Not suited for use by low clearance or two wheel drive road vehicles. Subject to traffic regulation order and obstructed by locked gate	4	12	0	1	2	0.7	1.1	0.8	22%	59%	10%	9%	1	None
Surrey	Good-fair with sections of deep and shallow rutting. Not suited for use by low clearance or two wheel drive road vehicles	3	7	0	2	2	7.9	21.7	11.9	43%	29%	5%	24%	2	33%
Hampshire	Good but rough surface with no rutting. Not suited for use by low clearance or two wheel drive road vehicles	6	9	0	2	2	0.5	6.3	2.2	71%	22%	1%	5%	2	None
West Berkshire	Fair with rough surface and numerous puddles in wet weather. Not suited for use by low clearance or two wheel drive road vehicles	0	4	3	2	3	1.9	2.6	2.1	25%	42%	23%	11%	1	None
Cambridgeshire (Chatteris)	Poor with overgrowth of vegetation and sections with shallow rutting. Not suited for use by low clearance or two wheel drive road vehicles	3	0	0	1	1	0.1	0.3	0.1	24%	24%	16%	37%	1	None
Cambridgeshire (Burwell)	Fair with sections of deep rutting. Not suited for use by low clearance or two wheel drive road vehicles	0	0	0	1	1	0.7	0.5	0.71.0	6%	37%	3%	55%	1	None

Section 5

Herefordshire	Fair with shallow or deep rutting throughout. Not suited for use by low clearance or two wheel drive road vehicles	0	4	0	2	2	0.4	0.9	0.6	36%	35%	12%	17%	2	None
Northumberland	Variable from good to fair with sections of shallow and deep rutting. Not suited for use by low clearance or two wheel drive road vehicles	3	11	0	2	2	0.0	0.7	0.2	48%	39%	9%	4%	2	None
Sheffield	Fair with rough surface but no rutting. Not suited for use by low clearance or two wheel drive road vehicles	0	9	0	1	1	1.2	2.1	1.5	4%	76%	17%	4%	2	None
Cumbria	Fair with but rough surface and long sections with deep rutting. Not suited for use by low clearance or two wheel drive road vehicles	0	7	0	2	2	1.8	6.7	3.2	51%	27%	15%	7%	2	None
Essex	Good with no rutting. Open to all motor vehicle types	3	36	0	1	2	12.1	9.8	11.4	10%	69%	17%	4%	2	25%
Suffolk	Northern section completely obstructed and overgrown.	1	7	0	1	1	0.0	0.0	0.0	0%	0%	0%	0%	1	None
Suffolk (alternative site)	Good-fair with shallow rutting. Open to all motor vehicle types with care	1	7	0	1	1	12.0	8.1	10.9	2%	74%	19%	5%	1	100%
Nottinghamshire	Good-fair with shallow rutting. Open to all motor vehicle types with care	2	7	0	1	1	6.4	5.3	6.1	15%	66%	4%	16%	3	10%

Table 5.18b: Average daily flow and highest daily flow at each logger site

<i>Unweighted data, all logger sites except Suffolk, plus Suffolk alternative</i>					
Logger site	Average daily flow	Highest daily flow	Day of highest daily flow	Ratio of highest daily flow to average daily flow	% of days with no traffic
Northamptonshire	1.0	14	Sunday	14	63%
Oxfordshire	8.1	23	Sunday	3	1%
Cornwall	1.1	7	Sunday	6	32%
Wiltshire (Aldbourne)	8.0	93	Saturday	12	3%
Wiltshire (Heytesbury)	14.9	62	Wednesday	4	0%
Wiltshire (Winterbourne Bassett)	5.1	30	Sunday	6	17%
Bath and North East Somerset	1.8	51	Saturday	28	61%
Hertfordshire	0.8	18	Sunday	23	68%
Surrey	11.9	101	Sunday	8	8%
Hampshire	2.2	21	Sunday	10	54%
West Berkshire	2.1	28	Monday	13	41%
Cambridgeshire (Chatteris)	0.1	4	Sunday	40	92%
Cambridgeshire (Burwell)	0.7	10	Wednesday	14	75%
Herefordshire	0.6	11	Sunday	18	78%
Northumberland	0.2	15	Saturday	75	91%
Sheffield	1.5	10	Friday ¹	7	52%
Cumbria	3.2	36	Sunday	11	32%
Essex	11.4	48	Thursday	4	3%
Suffolk (alternative site)	10.9	46	Wednesday	4	1%
Nottinghamshire	6.1	25	Thursday	4	18%
Average	4.6			15	40%

¹ This Friday was a Bank holiday.

From Table 5.18b, 14 of the highest daily flows occurred at weekends or on bank holidays. If the general assumption that weekend flows are more likely to be recreational is correct, this suggests that high flows are more likely to be driven by recreational use. Other conclusions about the fluctuations in traffic at logger sites can be drawn from Table 5.18b:

- at some logger sites traffic was present nearly every day while at others traffic was very infrequent. On average the logger sites had no traffic on 40% of days;
- the highest daily flow varied from three times the average daily flow to 75 times the average daily flow and averaged 15 times the average daily flow. The ratio of highest daily flow to average daily flow tended to be lower where average daily flows were higher.

Table 5.19 summarises the data from each vehicle logger site, informed by the experience of the project team and the findings of the stakeholder consultation, of how the variations in flow at the logger sites are explained by the features of these byways open to all traffic. In the commentary the following broad assumptions have been made:

Section 5

- the presence of farmland, forestry, woodland and land designated for nature conservation accessed by the byway on which the logger was sited will generate traffic in connection with the management of that land;
- the presence of dwellings accessed by the byway on which the logger was sited will generate regular traffic in connection with access to those dwellings. This traffic will be spread throughout the week although the pattern may change between weekdays and the weekend;
- land management traffic is more likely on weekdays than at weekends although the demands of land management, for example harvest, means that this is not always the case;
- recreational traffic is more likely at weekend than on weekdays although some users, notably the retired, may be active during the week;
- isolated peaks in flow are more likely to be explained by recreational use particularly where they occur at weekends; and
- sustained peaks over several days are more likely to be associated with land management particularly where they occur during the week.

Table 5.19: Relationship between traffic flows and byway characteristics

<i>All logger sites, plus Suffolk alternative</i>		
Logger site	Average daily number of motor vehicles	Commentary
Wiltshire (Heytesbury)	14.9	This site was on a byway which connected a large farm building complex to the nearest road and provided access to 18 farmland areas. The site recorded traffic on all survey days. The regular use suggested land management use as the byway serves no dwellings. However weekend use and motorcycle use suggest there was an element of motor vehicle use for recreation. Peaks could be explained by recreational flows. The route appeared attractive for recreation.
Surrey	11.9	The consistently higher level of motor vehicle use on Sundays, combined with the prevalence of motorcycles on that day, suggests that this byway carried recreational traffic. The route appeared attractive for recreation. The byway appeared to be used to access some farmland and an old quarry but this was not likely to generate high flows. The logger site was sited sufficiently close to the junction with a farm dwelling access to pick up some dwelling access traffic (assumed to be 50% of dwelling access traffic). Use of the byway to access shooting rights was observed on one day. Very high peak flow suggests recreational use but only 8% of days had no traffic suggesting some regular use that was more likely to be for land management or dwelling access.
Essex	11.4	The byway provided access to an extensive area of arable farmland (36 farm access points) and to three dwellings. However the logger site was only likely to be passed by traffic to one of these dwellings. Traffic was present on all but 3% of survey days suggesting that motor vehicle use of the byway was related to land management and dwelling access. While most use is not recreational there is good evidence of higher motorcycle use at weekends. Peaks could be explained by the demands of arable cultivation.
Suffolk (alternative site)	10.9	The byway provided access to a dwelling and an area of arable farmland suggesting that some motor vehicle use of the byway was related to dwelling access and land management. Traffic is very regular with flows on all but 1% of survey days. The byway was obstructed to all motor vehicles some 500 metres east of the logger site and was not likely to attract recreational users. Peaks could be explained by the demands of arable cultivation.

Results of the site surveys

Oxfordshire	8.1	The byway provided access to farmland, a dwelling, a reservoir and a telecommunications mast. These can be expected to generate a sustained and relatively high level of motor vehicle traffic for land management and access to property (both residential and business) purposes. Traffic was present on all but 1% of survey days. There was some evidence for higher weekend motorcycle use which is supported by identification of motorcycle tracks. The route appeared attractive for recreation.
Wiltshire (Aldbourn)	8.0	The Aldbourn byway connected to four byways and one highway and provides access to 19 farmland areas. Traffic was present on all but 3% of survey days. The byway appeared to be used mainly for land management purposes in an area with large, predominately arable, farm units. There are some peak flows of motor vehicle traffic which may be associated with country sports. There is higher weekend motorcycle use which was supported by identification of motorcycle tracks.
Nottinghamshire	6.1	The byway provided access to two dwellings and farmland, suggesting that motor vehicle observations along the byway will in part be for these purposes. No traffic was present on 18% of survey days, a higher proportion of days with no traffic than would be expected if the site were used for dwelling access. Weekend use was lower than weekday use suggesting that weekend recreational use was limited. It appears likely that traffic at the logger site was predominantly for land management.
Wiltshire (Winterbourne Bassett)	5.1	The byway connects to another byway and highway, and provides access to 18 farmland areas. No traffic was present on 17% of survey days. Recreational use is suggested by the higher motor vehicle flows at weekends. The route appeared attractive for recreation. No dwellings were served which suggests that all motor vehicle traffic is related to land management, primarily agriculture, or recreation.
Cumbria	3.2	The byway provided access to farmland and moorland suggesting that some of the traffic recorded was for land management. Motor vehicle use at weekends was higher than on weekdays, suggesting recreational activity at these times. There were higher motorcycle flows at weekends. There was a higher level of use between June to September which may reflect higher recreational use during the summer.
Hampshire	2.2	6 dwellings were situated along the byway. However the logger was not on the most convenient route from these to the closest road. Motor vehicle use at weekends was significantly greater than on weekdays. Evidence of high motorcycle use at weekends is consistent with the motorcycle tracks identified and suggests recreational use. The route appeared attractive for recreation. There was limited evidence for land management use with no traffic present on 54% of survey days.
West Berkshire	2.1	The identification of tractor tracks indicated that this byway was used for land management purposes to some extent. However the woodland through which this byway passes was not likely to generate substantial land management traffic although its status as a nature reserve may generate some traffic. There is some evidence of increased motor vehicle use at weekends, particularly on Sundays.
Bath and North East Somerset	1.8	The byway provides access to farmland and was restricted by a locked gate controlled by the farmer. Any recreational motor vehicle use, other than by motorcycles, was likely to be at the farmer's discretion. Most use is likely to be for land management but the occasional peak flows may be explained by use in connection with country sports. There was some evidence of higher weekend motorcycle use which is supported by identification of motorcycle tracks. The logger data suggests possible increased use of the byway for livestock feeding in winter. Higher recorded use in August may be explained by harvesting.
Cornwall	1.1	The byway serves five dwellings but the logger was not placed on the most convenient route to a sealed road from these properties. The relatively low level of traffic recorded confirms that this is the case. There is some evidence of higher weekend motorcycle use which is supported by identification of motorcycle tracks during the moving observer survey. There was limited evidence for land management use with no traffic present on 32% of survey days.

Section 5

Northamptonshire	1.0	The traffic regulation order on this byway appeared to result in a reduced flow of traffic. However there was some traffic. Motor vehicle use along the byway was likely to be associated with access for land management or with recreation. When the traffic regulation order was in force, and locked gates prevented use by the public, all traffic was likely to have been for land management unless motorcyclists managed to avoid the locked gate. There was some evidence for higher weekend motorcycle use, supported by identification of motorcycle tracks.
Hertfordshire	0.8	The low average daily flow reflected the permanent traffic regulation order which prohibited motor vehicle traffic on this byway. The byway provided access to four dwellings and extensive areas of arable farmland. However most traffic to and from most of these was not likely to use the section on which the logger was located. Higher motorcycle flows at weekends may be a pointer to some, unauthorised, recreational use but this appeared small, amounting to one motorcycle per weekend. Higher than average flows were recorded during July and October and could be related to harvest and planting of the arable land in the area.
Cambridgeshire (Burwell)	0.7	No dwellings were served and there were no farmland access points. The only apparent use of this byway is to access the River Cam for fishing. There is some evidence that motor vehicle flow occurs more frequently during weekdays than on weekends. July, September, October and November all had higher than average values. This may be related to the open season for fishing.
Herefordshire	0.6	The byway provided access to some farmland but did not access any dwellings. Motor vehicle flows recorded on the byway are likely to be for land management or recreation. The absence of identified tractor tracks during the moving observer survey, the narrowness of the byway and higher weekend motor vehicle flows than on weekdays suggests that recreational use predominated. The route appeared attractive for recreation but is relatively remote from major population centres.
Northumberland	0.2	The byway provided access to three dwellings which would normally be expected to generate a sustained and relatively high level of use. However traffic to and from dwellings on the byway did not need to pass the logger in order to access the closest road. Tractor tracks confirm that this byway was used for land management but low flows on weekdays suggest that this use was infrequent. There was some evidence of motorcycle use at weekends. The route appeared attractive for recreation but is relatively remote from major population centres.
Cambridgeshire (Chatteris)	0.1	Although motor vehicle use was low, weekend use was higher than weekday use, suggesting that the limited motor vehicle use may be recreational. 24% of the recorded flow was motorcycles, again suggesting recreational use. The highest recorded motor vehicle flow passing the logger was 4 motor vehicles, which occurred on a Sunday. The most likely explanation of such weekend use is recreational.
Suffolk	0	No use as section completely obstructed and overgrown. See alternative Suffolk logger site.

5.6.2 Motor vehicles and other traffic observed during the moving observer surveys, by cluster

During the moving observer surveys, vehicles and other traffic travelling along each byway in the opposite direction to the surveyors were recorded. The number of vehicles passed by type in each cluster is summarised in Table 5.20. In most cases the numbers are too small to allow meaningful analysis by vehicle types at cluster level. There is wide variation between the clusters which may in part be explained by the timing of the surveys. For example where a survey on a byway serving dwellings coincided with the school run additional traffic would be expected. One byway was surveyed while harvesting was in progress on the adjoining field.

The number of vehicles passed exceeded 20 in the Surrey and Wiltshire (Winterbourne Bassett) clusters. The following conclusions can be drawn:

- in the Surrey cluster ten of the vehicles passed were cars and nine were 4x4s from total of 23 vehicles. This is consistent with the large number of dwellings (40) served by byways in the cluster which are likely to generate car and 4x4 trips by residents; and
- the byways in the Wiltshire (Winterbourne Bassett) cluster were well used for land management with 12 agricultural vehicles counted in a total of 21 vehicles.

Table 5.20: Motor vehicles observed along byways open to all traffic by cluster

Cluster	All moving observer surveys datasets											Total
	Tractor	Tractor with trailer	Other agricultural vehicle	4x4 estate car	4x4 light goods vehicle	Motorcycle	Car	Light goods vehicle (<3.5t)	Goods vehicle (>3.5t)			
Northamptonshire and Bedfordshire	0	0	0	0	0	0	0	0	0	0	0	0
Oxfordshire	0	0	0	0	4	0	1	3	4	0	0	12
Cornwall	0	0	0	0	0	0	1	0	0	0	0	1
Wiltshire (Aldbourne)	2	1	0	2	0	0	2	1	0	0	0	8
Wiltshire (Heytesbury)	2	0	0	6	0	0	4	1	0	0	0	13
Wiltshire (Winterbourne Bassett)	8	3	1	8	1	0	0	0	0	0	0	21
Bath and North East Somerset and West Wiltshire	0	0	0	0	0	0	1	0	0	0	0	1
Hertfordshire	0	0	0	2	0	0	2	0	0	0	0	4
Surrey	1	0	0	9	0	3	10	0	0	0	0	23
Hampshire	0	0	0	2	0	0	1	0	0	0	0	3
West Berkshire	0	0	0	1	0	0	1	1	0	0	0	3
Cambridgeshire (Chatteris)	1	0	0	0	0	0	0	0	1	0	0	2
Cambridgeshire (Burwell)	0	0	0	4	1	0	2	0	2	0	0	9
Herefordshire and Shropshire	0	0	0	4	0	4	2	0	0	0	0	10
Northumberland	0	0	0	10	0	0	2	1	0	0	0	13
Sheffield	3	0	0	0	0	0	5	0	1	0	0	9
Cumbria	0	0	1	0	0	0	0	0	0	0	0	1
Essex	0	0	0	0	0	0	0	0	0	0	0	0
Suffolk and Norfolk	1	1	0	0	1	0	2	1	0	0	0	6
Nottinghamshire and Leicestershire	3	0	0	1	0	0	2	1	0	0	0	7
Total	21	5	2	49	7	7	38	9	8	9	8	146
Percentage of total	14%	3%	1%	34%	5%	5%	26%	6%	6%	6%	6%	100%

5.7 Data from other sources

5.7.1 Trip Information Computer System

The research has explored what dwelling access is likely to mean in terms of generating trips on byways open to all traffic. Only those sections of a byway which represent the shortest and most direct route to the nearest metalled road are likely to be used regularly for dwelling access. (A trip is a movement either to the dwelling or from the dwelling. Thus a postman delivering mail will make two trips. The total number of trips generated is the daily trip generation.)

The Trip Information Computer System database (TRICS) is a comprehensive source of data on trip generation. The TRICS data for 3 years up to April 2004 give an average motor vehicle trip rate of 7.6 trips per day for private houses. Assuming that residents of dwellings that rely on byways for access generate the same number of trips per day as residents of private houses in the TRICS database the flow of dwelling access trips on those sections of byway used for dwelling access can be estimated.

5.7.2 Lake District National Park Authority surveys

Data are available from 13 vehicle logger sites in the Lake District National Park maintained by the National Park Authority. The data are of limited value as they include unsurfaced routes that are not byways. The data suggest that the average daily flow on all the routes surveyed is 3.4 vehicles, comprising 0.8 4x4 vehicles and 2.6 motorcycles. The surveys were undertaken over an extended period of at least a year. No indication was provided of the level of other vehicular traffic or of the status of the routes concerned, for example whether they were byways open to all traffic, roads used as public paths or unclassified county roads.

5.7.3 National Trails Office - the Ridgeway surveys

Table 5.21 summarises data from logger sites maintained by the National Trails Office on the Ridgeway. The data are over varying periods of not less than 12 months. The Ridgeway is regarded as a honey pot for off-road recreational users. Key features of the data are:

- motorcycles comprise more than one third of the overall flow;
- the flows on Saturdays and Sundays are much higher than the flows on weekdays;
- the average daily flow of 14.9 motor vehicles for the Ridgeway sites is more than three times higher than the average of the average daily flow of 4.2 based on weighted data from all 20 logger sites; and
- the average daily flow of 14.9 motor vehicles for the Ridgeway sites is of the same order as the busiest sites in the logger surveys that the researchers have undertaken, i.e. those at Wiltshire (Heytesbury) (14.9 vehicles), Surrey (11.9 vehicles) and Essex (11.4 vehicles).

Section 5

Table 5.21: Daily average motor vehicle flows on the Ridgeway

Site	Daily average motor vehicle flow	Comments
Overton Hill, Wilts	9.5	higher averages from May to August high motor vehicle use on weekends (especially by motorcycles on Sundays)
Hackpen Hill, Wilts	14.7	higher averages from July to October high motorcycles and cars use on weekends and on Wednesdays
Ogbourne St. George (west), Wilts	8.6	higher averages from June to August high motorcycles use on weekends and on Wednesdays
Round Hill Downs, Ogbourne St. George, Wilts	8.1	higher averages from May to August high motor vehicle use on weekends
Bishopstone, Wilts	22.5	higher averages from July to October high tractor use on Tuesdays and Sundays
Knighton Barn, nr. Waylands Smithy, Oxon	13.5	higher averages from May to October high motor vehicle use on weekends
Blowingstone Hill, Oxon	11.1	higher averages from August to November high motor vehicle use on weekends
Scutchamers Knob, East Hendred, Oxon	12.9	higher averages from August to December high motor vehicle use on weekends
Gore Hill, West Berks	11.4	higher averages from July to December high motor vehicle use on Tuesdays high pedal cycle use on Mondays and Sundays
Blewbury Hill, Oxon	22.8	higher averages from June to August high motor vehicle use on Tuesdays high motorcycle use on Sundays high tractor use on Wednesdays and Sundays
Shirburn Hill, Oxon	16.1	higher averages from June to September high motor vehicle use on weekends
Kingston Blount, Oxon	14.6	higher averages from July to September high motorcycle use on Fridays
Average	13.8	

Quantification of motor vehicle use on byways open to all traffic

6.1 Overview of quantification

The objective of the research is to quantify the level of motor vehicle use on byways open to all traffic in England and to assess the implications of use for the network and its management. Quantification of use at a national level is necessary to gain an appreciation of the scale of the issues surrounding the use of byways open to all traffic but such quantification may not be helpful in providing responses to those issues at a local level.

The key step in analysing the data to provide quantification is to link the quantitative data obtained from both the vehicle logger surveys and moving observer surveys with the qualitative data about each byway obtained from the moving observer surveys qualified by the responses as reported by those living on or near each byway and on byways open to all traffic in general as reported by representatives of national organisations.

At a national level, the data are capable of producing reasonable estimates of overall use. They are also capable of producing estimates of type and levels of use by different sorts of use (for example land management, recreational use, dwelling access) and of stratifying this on the basis of, for example upland/lowland areas, predominant land use areas (arable farming, mixed farming, livestock farming and forestry).

At a local level the factors that generate traffic flow on byways vary greatly from one byway to another and from one section of a byway to the next. A different approach is needed to estimate traffic flow at a local level. A predictive framework has been developed which uses known information about a byway section, for example the number of dwellings that rely on it for access, the way land is managed and the attraction that the section of byway has for recreational users to gain an understanding of the likely level of motor vehicle use. The predictive framework for byway use is described in Appendix 8.

6.2 Overall quantification at national level

6.2.1 Assumptions

The following assumptions have been made:

- the sample of 20 vehicle logger survey points is sufficiently large to represent byway use in England as a whole; and
- the absence of a full year's data and the extent of seasonal variations are not sufficient to invalidate conclusions at an aggregate level.

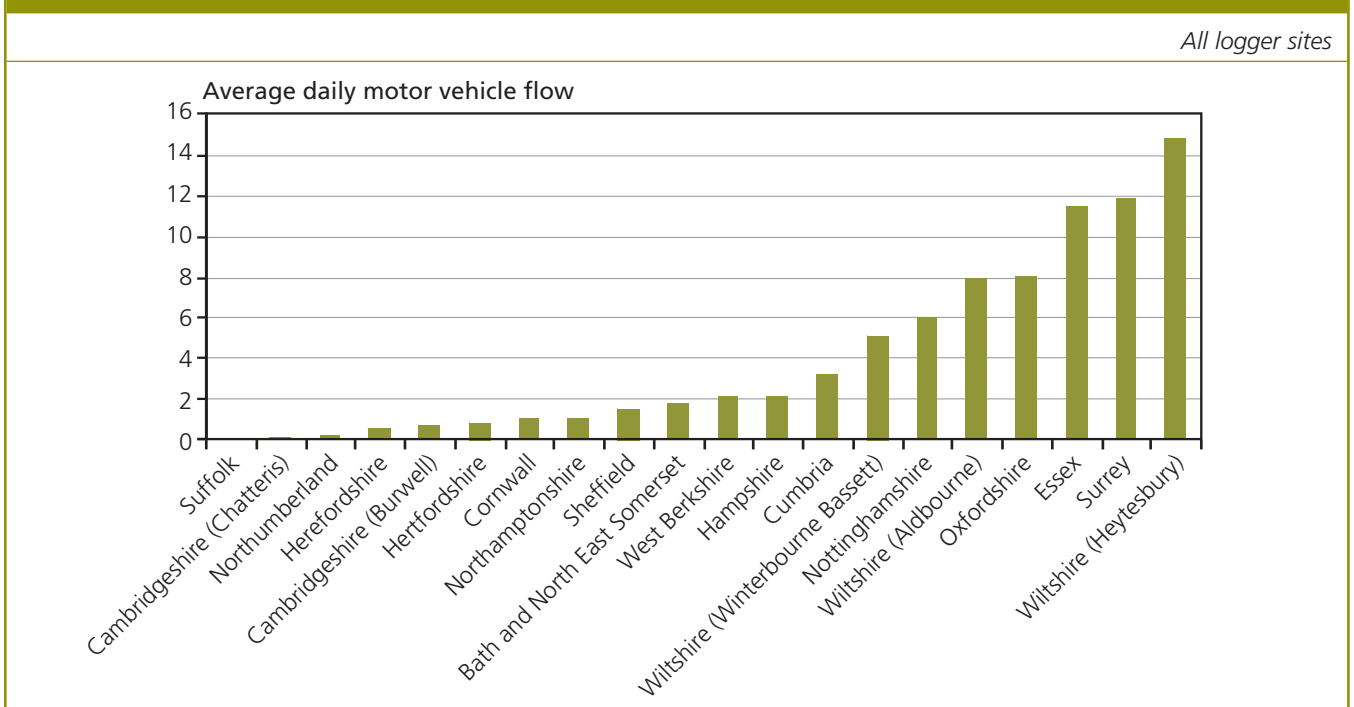
6.2.2 Flows of traffic on byways open to all traffic

The weighted data from the 20 logger sites give an average daily flow of 4.2 motor vehicles for all byways open to all traffic in England. Excluding data for those logger sites where the public was unable to exercise the right to pass and repass in a motor vehicle because the byways were obstructed by vegetation, locked gates or other means and/or where they were subject to traffic regulation orders that prohibit or restrict use, gives an average daily flow of 5.0 motor vehicles.

The average daily flow of 4.2 motor vehicles masks considerable variations from one byway to another. The average daily flow recorded at each logger site varied from 0.1 motor vehicles to 14.9 motor vehicles. Information for the Ridgeway suggests that some sections of byways open to all traffic have higher average daily flows than this but the Ridgeway is a recognised honey pot. The information gathered during the moving observer surveys confirms that the situation on the Ridgeway is not typical of the byways open to all traffic in England.

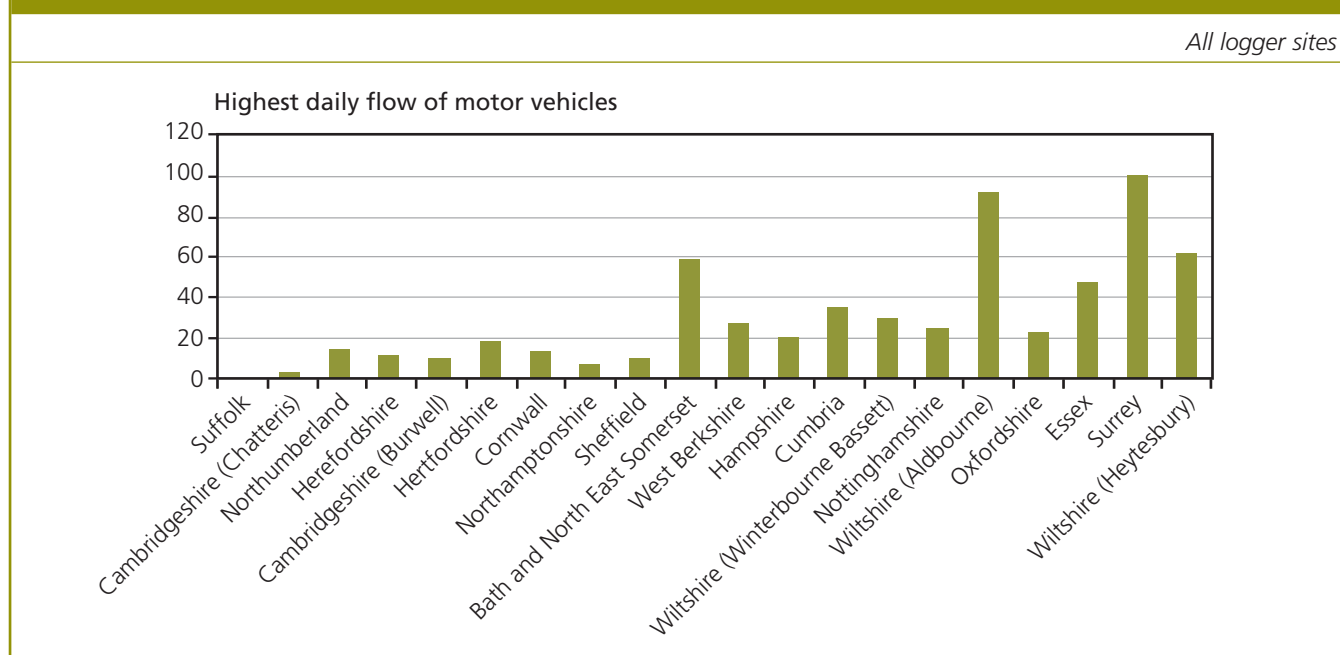
The average daily flow of motor vehicles conceals the variation in traffic on byways open to all traffic from one day to another. Figures 6.1 and 6.2 illustrate this. This variation is further reported in the cluster reports and can be illustrated by the results from the Wiltshire (Aldbourne) logger site. The average daily flow at the Aldbourne site was 8.0 motor vehicle but the highest recorded flow was 93 motor vehicles on Saturday 18 October 2003 and three times the daily flow was exceeded on nine of the 256 survey days. At other sites traffic flows showed less variation, for example the Oxfordshire logger recorded an average daily flow of 8.1 motor vehicles. The highest recorded flow was 23 motor vehicles on Sunday 28 September 2003, fewer than three times the daily flow. On average at all sites the peak flow was 15 times the average daily flow. For all sites aggregated there was no traffic on 40% of days. Where use for dwelling access and, to a lesser extent, land management predominate, traffic is more regular. The greatest fluctuations appear to be associated with recreation.

Figure 6.1: Average daily flow of motor vehicles at each logger site



Quantification of motor vehicle use on byways open to all traffic

Figure 6.2: Highest daily flow of motor vehicles recorded at each logger site



A further analysis of the logger site data is in Table 6.1. In summary:

- 5% of byways carried no motor vehicle traffic;
- 35% of byways carried light traffic, and had an average daily flow of 0.6 motor vehicles which varied from 0.1 to 1.1 motor vehicles. The highest recorded daily flows averaged 11 motor vehicles;
- 50% of byways carried moderate traffic, and had an average daily flow of 5.0 motor vehicles which varied from 1.5 to 11.4 motor vehicles. The highest recorded daily flows averaged 37 motor vehicles; and
- 10% of byways carried heavy traffic, and had an average daily flow of 13.4 motor vehicles which varied from 11.9 to 14.9 motor vehicles. The highest recorded daily flows averaged 82 motor vehicles.

Table 6.1 also compares the proportions of the byway sections assessed as having no use, light use, moderate use and heavy use from the moving observer surveys with the distribution of average daily flows from the logger sites. Thus 37% of the byway sections in the moving observer surveys and 35% (7) of logger sites were assessed as subject to light use.

Section 6

Table 6.1: Motor vehicle use - logger surveys and moving observer surveys

Unweighted data, all logger sites; all moving observer surveys dataset							
Level of motor vehicle use	% of 0.1km sections in moving observer surveys	Logger sites					
		No	%	Average daily motor vehicle flow	Range of average daily motor vehicle flow	Average highest motor vehicle flow	Range of average highest motor vehicle flow
None	4%	1	5%	0	0	0	0
Light	37%	7	35%	0.6	0.1 - 1.1	11	4 – 18
Moderate	52%	10	50%	5.0	1.5 - 11.4	37	10 – 93
Heavy	7%	2	10%	13.4	11.9 - 14.9	82	62 – 101
Total	100%	20	100%	4.0			

6.3 The purposes for which byways are used at national level

6.3.1 Deriving estimates of motor vehicle use by user type

An understanding of the purposes for which byways are being used is essential to policy development. The research has produced estimates of the purposes for which byways are used at a national level. These are based on estimates for each logger site using all of the information available for that site. The estimates of use by user type for each logger site are aggregated to produce national estimates of the proportion of use that can be attributed to each user type.

6.3.2 User type

The challenge is to make reliable estimates based on datasets that do not include direct surveys of users and their characteristics. The decision was made to confine the motor vehicle user types to the following:

- *Access to dwellings* which includes all traffic to and from a dwelling – trips by residents, trips by visitors, deliveries (including postal deliveries by van) and service traffic (for example meter readers and plumbers);
- *Land management* which includes traffic for farm, forestry and nature conservation management; and
- *Recreation* which includes traffic using byways in motor vehicles as a recreation in itself and those engaging in other recreations, for example shooting, hunt following and fishing.

The above represents the main users of motor vehicles on byways open to all traffic. Other motor vehicle users which do not fall within the above categories are:

- *Access to other property* which comprises access to business premises or facilities which are not connected to land management. During the moving observer surveys a few other properties which relied on byways open to all traffic for access were noted including telecommunications masts, a vehicle dismantler and businesses located in redundant farm

buildings. These are included in the land management use (but reported separately for the household surveys); and

- *Unauthorised use* which includes use by travellers for parking caravans and use for fly tipping. These uses represent a small proportion of overall use. No byways with evidence of use by travellers were identified during the moving observer surveys. Fly tipping was observed on some byways particularly close to towns. No attempt has been made to estimate the level of use for this purpose but it is believed to be low.

6.3.3 Assumptions made in deriving estimates of motor vehicle use by user type

The following assumptions have been made:

- dwellings which rely on byways for access generate 7.6 motor vehicle trips per day (based on the TRICS data);
- where there is only one route from a dwelling, or group of dwellings, to the nearest road all dwelling traffic will use that route. Where dwelling access traffic has two alternative routes – a short route on a good standard byway direct to a road and a much longer route over a rough byway it is assumed that all traffic uses the direct route. This applies to the Hertfordshire, Hampshire, Cambridgeshire (Chatteris), Northumberland and Suffolk alternative logger sites;
- where there is more than one byway route that could reasonably be used to access a dwelling from the nearest road and it is likely that traffic will use either route, dwelling access trips have been assigned in proportion to the convenience (as assessed by the surveyors) of each route. The proportions of dwelling access traffic assumed to pass the logger site are set out in Table 5.18. The basis is further explained in Table 6.2 below;
- if no dwellings are served by the byway, there is no dwelling access traffic;
- all motorcycle use is recreational. Motorcycles may be used for land management and for dwelling access but this is likely to be a small proportion of those types of traffic;
- all large vehicles are used for land management. Large vehicles may occasionally be used for deliveries to dwellings, but this is likely to be a small proportion of dwelling access traffic;
- the balance of weekend trips not allocated to dwelling access or land management or recreation under the above assumptions are recreational; and
- the balance of weekday trips not allocated to dwelling access, land management or recreation under the above assumptions are for land management.

Section 6

Table 6.2: Allocation of dwelling access traffic to routes past logger sites

Logger site	Number of dwellings	Estimated % of vehicles accessing dwellings likely to pass the logger	Commentary
Oxfordshire	1	33%	Although the route that does not pass the logger is much shorter, this byway is of very good standard and poses no difficulties for two wheel drive vehicles. The route past the logger is likely to be used for traffic going to the west, for example to Harwell. Delivery vehicles may find it convenient to use one route when going to the dwelling and the other to leave the dwelling.
Cornwall	5	1%	The route past the logger is generally much longer and of moderate standard. However it could be used occasionally for visiting neighbouring farms.
Surrey	3	17%	Traffic to and from two of the dwellings would not pass the logger site. The logger site was sufficiently close to the junction between the access to the third dwelling to pick up half of vehicles going to or from it.
Essex	3	33%	The byway provided access to three dwellings but the logger site was likely to have been passed by traffic to only one of these.
Nottinghamshire	2	10%	The route that does not pass the logger was much shorter, but the logger site byway was of reasonable standard. The route past the logger was likely to be used for traffic going to the village of Sibthorpe. Delivery vehicles may find it convenient to use one route when going to the dwelling and the other to leave the dwelling.

The assumptions are considered to be robust enough to produce the right order of magnitude for the different use types. However they have the following shortcomings:

- weekday recreational use may be under estimated because of the assumption that there is no weekday recreational use except by motorcycles;
- weekend recreational use may be over estimated because of the assumption that all residual weekend use is recreational;
- land management use at weekends may be under estimated because of the assumption that there is no weekend land management use except by large vehicles; and
- weekday land management use may be over estimated because of the assumption that all residual weekday use is for land management.

Quantification of motor vehicle use on byways open to all traffic

Table 6.3 sets out a worked example of the calculations which have been used to derive Table 6.4.

Table 6.3: Calculation of vehicle flow by use type – Wiltshire (Heytesbury)									
Recorded flows									
	Weekday			Weekend			Total		
	Count	Day	Average	Count	Day	Average	Count	Day	Average
Motorcycle	93	175	0.5	202	71	2.8	295	246	1.2
Car	2104	175	12	781	71	11	2885	246	11.7
Large vehicle	290	175	1.7	58	71	0.8	348	246	1.4
Unspecified motor vehicle	99	175	0.6	29	71	0.4	128	246	0.5
Total	2586	175	14.8	1070	71	15.1	3656	246	14.9
Assigned flows by use type									
Dwelling access									
Dwelling access									None
Recreation									
Motorcycle	93	175	0.5	202	71	2.8	295	246	1.2
Residual weekend use				810	71	11.4			3.3
Total									4.5
Land management									
Large vehicle	290	175	1.7	58	71	0.8	348	246	1.4
Residual weekday use	2203	175	12.6						9.0
Total									10.4
Total									14.9

Section 6

6.3.4 Estimates of motor vehicle use by user type

Table 6.4: Estimated average daily motor vehicle flow by purpose

<i>Unweighted data, all logger sites</i>								
Logger site	Access to dwellings		Land management		Recreation		Total	
	Average daily flow	% of total	Average daily flow	% of total	Average daily flow	% of total	Average daily flow	%
Northamptonshire	0.0	0%	0.3	31%	0.7	69%	1.0	100%
Oxfordshire	2.5	31%	3.7	45%	1.9	23%	8.1	100%
Cornwall	0.4	35%	0.3	32%	0.4	33%	1.1	100%
Wiltshire (Aldbourne)	0.0	0%	4.4	56%	3.5	44%	8.0	100%
Wiltshire (Heytesbury)	0.0	0%	10.4	70%	4.5	30%	14.9	100%
Wiltshire (Winterbourne Bassett)	0.0	0%	2.2	42%	3.0	58%	5.1	100%
Bath and North East Somerset	0.0	0%	1.1	60%	0.7	40%	1.8	100%
Hertfordshire	0.0	0%	0.6	79%	0.2	21%	0.8	100%
Surrey	3.9	33%	1.8	15%	6.2	52%	11.9	100%
Hampshire	0.0	0%	0.2	8%	2.0	92%	2.2	100%
West Berkshire	0.0	0%	1.1	54%	1.0	46%	2.1	100%
Cambridgeshire (Chatteris)	0.0	0%	0.1	57%	0.1	43%	0.1	100%
Cambridgeshire (Burwell)	0.0	0%	0.5	74%	0.2	26%	0.7	100%
Herefordshire	0.0	0%	0.3	45%	0.3	55%	0.6	100%
Northumberland	0.0	0%	0.1	30%	0.2	70%	0.2	100%
Sheffield	0.0	0%	1.0	67%	0.5	33%	1.5	100%
Cumbria	0.0	0%	0.9	29%	2.3	71%	3.2	100%
Essex	7.5	66%	2.5	22%	1.4	12%	11.4	100%
Suffolk	0	0%	0	0%	0	0%	0.0	0%
Nottinghamshire	1.5	25%	2.9	47%	1.7	28%	6.1	100%
Total	0.8	20%	1.7	42%	1.5	38%	4.0	100%

Support for the assumption that land management traffic is mainly on weekdays comes from the alternative Suffolk logger data. (See Table 6.5.) After deducting the average daily number of trips associated with residential use (using the dwelling trip generation of 7.6 vehicles per day from the TRICS database), the residual average daily flow is 4.4 motor vehicles on weekdays and 0.5 motor vehicles at weekends. As this byway is a cul-de-sac, it is assumed that there is no recreational traffic. The byway provides access for about 75 hectares of land under arable cultivation. Weekend working may be the exception rather than the rule except at certain times of the year such as harvest. (Note that the alternative Suffolk logger data provide no help in clarifying land management use in areas where farming is predominately livestock rearing.)

Quantification of motor vehicle use on byways open to all traffic

Table 6.5: Alternative Suffolk logger data: calculation of land management flow

	Weekday	Weekend	All days
Average daily flow – all motor vehicles	12.0	8.1	10.9
Less average daily flow attributable to residential use (TRICS data)	7.6	7.6	7.6
Balance attributable to land management	4.4	0.5	3.3

The estimates in Table 6.4 can be refined in the light of the knowledge about each cluster collected during the moving observer surveys. For example:

- there is good reason for believing that the byway on which the Cambridgeshire (Burwell) logger was sited, serves no significant land management function because it does not give access to any land;
- the byway on which the Northamptonshire logger was sited was subject to a traffic regulation order and obstructed by locked gates. Except for motorcycles that can avoid the obstruction, no recreational use is likely; and
- the byway on which the West Berkshire logger was sited does not give access to agricultural land. It passes through woodland designated for nature conservation. Land management flows have been reduced to reflect the likely lower level of land management traffic associated with woodland.

These refinements are shown in Table 6.6 and explained in the comment column. Further assumptions are:

- where a byway clearly serves no land management or dwelling access purpose all use is recreational; and
- where a byway serves no recreational purpose, all use is land management or property access.

Section 6

Table 6.6: Adjusted estimated average daily motor vehicle flow by purpose

Logger site	Unweighted data, all logger sites									
	Access to dwellings		Land management		Recreation		Total		Comment	
	Average daily flow	%	Average daily flow	%	Average daily flow	%	Average daily flow	%		
Northamptonshire	0.0	0%	0.7	69%	0.3	31%	1.0	100%	This byway was subject to a traffic regulation order and a locked gate prevented recreational use except by motorcycles. Weekend use apart from motorcycles has been transferred from recreation to land management.	
Oxfordshire	2.5	31%	3.7	45%	1.9	23%	8.1	100%	No adjustments made	
Cornwall	0.4	35%	0.3	32%	0.4	33%	1.1	100%	No adjustments made	
Wiltshire (Aldbourne)	0.0	0%	4.4	56%	3.5	44%	8.0	100%	No adjustments made	
Wiltshire (Heytesbury)	0.0	0%	10.4	70%	4.5	30%	14.9	100%	No adjustments made	
Wiltshire (Winterbourne Bassett)	0.0	0%	2.2	42%	3.0	58%	5.1	100%	No adjustments made	
Bath and North East Somerset	0.0	0%	1.6	87%	0.2	13%	1.8	100%	At the time of the moving observer survey and on subsequent visits recreational use was prevented by a locked gate. Weekend use apart from motorcycles transferred from recreation to land management.	
Hertfordshire	0.0	0%	0.6	79%	0.2	21%	0.8	100%	This byway was subject to a permanent traffic regulation order prohibiting motor vehicle use and at the time of the moving observer survey and on subsequent visits recreational use was prevented by a locked gate. Weekend use apart from motorcycles transferred from recreation to land management.	
Surrey	3.9	0%	1.8	33%	6.2	67%	11.9	100%	No adjustments made	
Hampshire	0.0	0%	0.2	8%	2.0	92%	2.2	100%	No adjustments made	
West Berkshire	0.0	0%	0.6	27%	1.5	73%	2.1	100%	Land use is woodland which generates little regular land management traffic. Land management daily average flow reduced by 50%.	
Cambridgeshire (Chatteris)	0.0	0%	0.1	57%	0.1	43%	0.1	100%	No adjustments made	

Quantification of motor vehicle use on byways open to all traffic

Logger site	Access to dwellings		Land management		Recreation		Total		Comment
	Average daily flow	%	Average daily flow	%	Average daily flow	%	Average daily flow	%	
Cambridgeshire (Burwell)	0.0	0%	0.0	0%	0.7	100%	0.7	100%	Residual weekday flow transferred from land management to recreational because no regular land management use is likely. The byway does not provide any access to land other than the bank of the River Cam. The River is used for fishing.
Herefordshire	0.0	0%	0.3	45%	0.3	55%	0.6	100%	No adjustments made
Northumber-land	0.0	0%	0.1	30%	0.2	70%	0.2	100%	No adjustments made
Sheffield	0.0	0%	1.0	67%	0.5	33%	1.5	100%	No adjustments made
Cumbria	0.0	0%	0.9	29%	2.3	71%	3.2	100%	No adjustments made
Essex	7.5	66%	2.5	22%	1.4	12%	11.4	100%	No adjustments made
Suffolk	0	0%	0	0%	0	0%	0.0	0%	No adjustments made
Total	0.8	20%	1.7	42%	1.5	38%	4.0	100%	

The broad conclusions on motor vehicle use by purpose that can be drawn from these estimates are that:

- use for dwelling access comprises about 20% of all motor vehicular traffic on byways. However this traffic is concentrated on the small proportion of the byway network that provides the most convenient route from the nearest road to dwellings; and
- land management and recreation traffic predominate on byways open to all traffic as a whole and account for similar proportions at 42% and 38% respectively.

Conclusions

7.1 Motor vehicle flows on byways open to all traffic

Average daily motor vehicle flows

Based on the weighted average of the data for 20 logger sites, there is an estimated average daily flow of 4.2 motor vehicles throughout the year across all byways open to all traffic in England. This implies that, in total, motor vehicles travel in the order of 17,500kms each day on the 4,171km of byways open to all traffic in England. This equates to 6.4 million motor vehicle kilometres per year.

When the four byways which were obstructed and/or subject to traffic regulation orders were taken out of the calculation, the average daily flow was 5 motor vehicles for England.

Types of vehicles using byways open to all traffic, and weekday/weekend flows

52% of vehicles using the surveyed byways open to all traffic were motor cars and 8% were large vehicles. For both these types of vehicle, there was little difference between weekday and weekend flows. 21% of vehicles were motorcycles. Motorcycle use was predominantly at weekends. 19% of motor vehicles recorded by the vehicle loggers could not be identified by type, with little difference between weekday and weekend flows. Overall, the weekday average daily flow was 3.6 vehicles and the weekend average was 5.6 vehicles. Both weekday and weekend use occurred mainly between 10 am and 6 pm.

Variations in average daily motor vehicle flows

The average daily flow of 4.2 motor vehicles masks considerable variations:

- the average daily flow was nil on a byway obstructed by overgrown vegetation (Suffolk) and 0.1 motor vehicles on a byway with no land management or dwelling access function and no attraction for recreational users (Cambridgeshire (Chatteris));
- the average daily flow was 14.9 motor vehicles on a byway that was metalled and used as the main access to an agricultural building complex and an extensive area of agricultural land under arable cultivation (Wiltshire (Heytesbury)); and
- six logger sites recorded traffic every day - Surrey (11.9 motor vehicles), Essex (11.4 motor vehicles), Oxfordshire (8.1 motor vehicles), Wiltshire (Aldbourne) (8.0 motor vehicles), Nottinghamshire (6.1 motor vehicles) and Wiltshire (Winterbourne Bassett) (5.1 motor vehicles).

The ratio between the highest recorded motor vehicle flow in a day and the average daily flow for each logger site varied. The logger sites where the ratio was higher tended to be those byways where there was recreational use. Sites with comparatively low average daily flows could sometimes be subject to much higher flows, for example the Bath and North East Somerset logger site recorded an average daily flow of 1.8 motor vehicles and a highest daily flow of 51 motor vehicles.

Data for the Ridgeway suggest that none of the logger sites that were sampled in this survey carries as high a flow of traffic as the busier sites on the Ridgeway for which average daily flows

of 23 motor vehicles have been recorded. Byways are particularly likely to carry higher traffic flows where they:

- serve as the access to dwellings;
- serve a key land management role, for example a link between a major farm building complex and land; and/or
- are particularly attractive for recreational use, for example a long route following a ridge.

Variation in flows from day to day

Traffic on byways fluctuates considerably from day to day. For example:

- the highest daily flow recorded by the loggers was 101 motor vehicles at the Surrey logger site. The average daily flow at that site was 11.9 motor vehicles;
- a much smaller difference was recorded at the Oxfordshire logger site with a peak of 23 motor vehicles and an average daily flow of 8.1 motor vehicles; and
- at some sites with low average daily flows the peaks were more pronounced, for example the Cumbria logger site had an average daily flow of 3.2 motor vehicles and a peak flow of 36 motor vehicles.

The ratio of the average highest flow to the average daily flow was 15. On average no traffic was recorded on 40% of survey days. Peak flows are most likely to be associated with recreational use although there are also peak flows associated with land management, notably harvesting. 12 of the highest flows occurred on Saturdays or Sundays. Peak flows that are much higher than average daily flows are not likely to be associated with dwelling access.

7.2 Key points emerging from the stakeholder consultation

Recreational motor vehicle users regard byways open to all traffic as a resource of vital importance to their activities. Without byways open to all traffic they consider that their activities would be severely constrained. For many other recreational user groups, byways offer further opportunities to exercise other rights. They can provide essential links between different parts of the network.

Byways open to all traffic are an important resource for people with disabilities. For this group the ability to drive motor vehicles on byways open to all traffic and the availability of rights of way that are suited to use by motorised wheelchairs allows them greater access to the countryside. Byways open to all traffic are also important for property owners and occupiers when they have no other means of access or when byways are the most convenient way of getting around their property. On the whole, farmers and foresters make little use of byways. Where they do use them, use will vary significantly with type of land or property served.

The pattern and level of use of byways open to all traffic varies considerably between user types. Occupiers of dwellings who rely on byways for dwelling access are likely to use them every day. At the other extreme forestry users may use byways very infrequently with long gaps between periods of use. At most this is likely to result in a few visits each year; years may elapse between visits.

The key concerns of users are:

- conflict between motor vehicles driven by farmers and other property owners and non-motorised users appears to be limited, whereas there appears to be a more general antipathy towards recreational motor vehicle users from others;
- there is widespread agreement that local highway authorities do not maintain byways open to all traffic adequately for lawful uses. Householders and farmers seem to maintain those parts of byways which provide access to their property to a standard appropriate for their needs; and
- a firm, dry and reasonably level surface, preferably not metalled, that is free from overhanging vegetation and in occasional use represents the optimum condition for a wide range of byway users. Most users will be satisfied with a byway network in this condition although it will not fully satisfy those 4x4 owners interested in experiencing difficult terrain or farmers or foresters who need to move heavy equipment or crops.

7.3 The purposes for which motor vehicles use byways open to all traffic

Motor vehicle use of byways open to all traffic is predominantly for land management, recreation and dwelling access. Overall, just over 40% of motor vehicles on byways were estimated to be associated with land management, just under 40% were recreational and 20% were associated with access to dwellings. These figures mask considerable differences. On some byways, a higher proportion of traffic is associated with land management, on others with access to dwellings or with recreation. The research identified occasional use for access to businesses that are not engaged in land management and as routes for through traffic but these were not identified as significant for England as a whole.

Land management use

The overall proportion of motor vehicular traffic flow on byways attributable to land management was estimated to be 42%. Given the predominance of farmland fronting byways, this is likely to be predominantly for agriculture although there are also flows associated with woodland management, sporting rights and nature conservation.

90% of byways surveyed provided access to farmland by way of identifiable accesses, for example field gates. Byways may well provide access to other land where the byway is not enclosed and so there are no identifiable access points.

The estimated average daily flow on byways attributable to land management is 1.7 motor vehicles. However the land management flows vary considerably both geographically and temporally. In particular:

- farms use only those sections of byway that are useful to them. In the extreme this may result in one section of a byway carrying heavy traffic while the remainder carries none;
- some byways are used to access farm buildings daily;
- the volume, type and pattern of traffic is a function of the area served, the type of farming practised and the intensity of farming;

- arable cultivation typically results in surges of use associated with ploughing, planting and harvesting. At other times traffic depends on the requirements of particular crops, for example vegetable crops may need more regular attention than cereals. Hay and silage cropping traffic is likely to follow the same pattern as arable cultivation in summer but not in winter. Peaks in traffic flows are associated with harvesting, when the crop is taken off the land. Overall flows are very difficult to estimate. However peak flows of 50 vehicles per day per 100ha may occur with some crops, for example wheat or barley. Some of these peak flows will occur in mid to late summer when the byways are best able to cope with the additional traffic because the surface has dried out. However where cropping continues well into the autumn, as for some root crops, deterioration of the surface can result;
- livestock rearing generates lower volumes but more regular traffic. There may be occasional peaks associated, for example, with lambing in spring and feeding livestock at pasture in winter. Where unsurfaced byways are used for winter feeding severe deterioration of the surface can result;
- traffic on mixed farms exhibit both of the above patterns and levels of flow;
- woodland and forestry management flows are very infrequent with planting, management and cropping often many years apart. Peak flows are high and may extend over several months where a block of woodland is felled. At other times there is little or no traffic; and
- the volume of traffic flow associated with land management for sporting rights or nature conservation depends on the intensity of management and is low. It cannot readily be estimated.

The vehicles used for land management are tractors, trailers, agricultural implements and specialised agricultural machines, for example combine harvesters. Almost all other types of vehicle can be used on occasion for land management but the most common is likely to be some form of 4x4 vehicle, either an estate car or light goods vehicle variant.

Recreational use

The overall proportion of motor vehicular traffic flow on byways that is attributable to recreation is estimated at 38%. The estimated average daily flow attributable to recreational use is 1.5 motor vehicles. The research found that motorcycle use, which is probably mainly recreational, represents 21% of motor vehicle use on byways and is mainly at weekends.

The research identified three types of recreational use of byways open to all traffic:

- recreational use of the byway in which the experience of travelling along the byway is the recreation. Best summed up as 'rambling in a motor vehicle' and generally undertaken on unsurfaced routes on motorcycles or 4x4 vehicles. This is likely to be the predominant recreational motor vehicle use of byways and is likely to take place at all times but particularly at weekends;
- use of byways to access country sports notably hunt following, shooting and fishing. These users are most likely to use 4x4 vehicles. It was evident from the research that this was significant but for hunting and shooting was limited to those days when there is a hunt or shoot. These tend to be on a few days in each year within a particular area; and
- use of byways to access other land for activities including climbing, canoeing, cycling, wildlife watching and walking. This is likely to be insignificant in total but particular byways may attract recreational users because of a local resource, for example a climbing crag or site of interest for nature conservation.

The first group of recreational users is typically attracted by:

- longer routes or the availability of a network of routes within a confined geographical area that enable a reasonably long excursion with a maximum of off-road content;
- routes that are readily accessible either by being local to place of residence or within range of a day or weekend trip; and
- routes which are interesting either for landscape (or visual) and possibly biodiversity interest or which are challenging to ride, for example because of gradient or rough conditions.

This type of user may travel alone or in a group. Where a size was given by local motor vehicle user groups, six, seven or ten were quoted as maximum group sizes. The Land Access and Recreation Association discourage people from going out in large groups and recommend a maximum group size of eight for motorcycles and four for four wheeled vehicles.

There is evidence that those who engage in recreational use of byways include people with mobility problems for whom walking, cycling and horse riding is not possible. The research was not able to estimate the numbers involved.

Dwelling access

The research estimated that 20% of motor vehicular traffic flow on byways open to all traffic is attributable to dwelling access. 45% of byways provide access to one or more dwellings. 351 dwellings in total relied on access from the 400km of byway open to all traffic surveyed. These properties are likely to generate in the order of 7.6 motor vehicle trips per day. (This will include visitors, delivery traffic and service traffic.)

For those sections of byways that carry dwelling access traffic, this will usually be the predominant purpose for which they are used. While the flows generated on byway sections which provide dwelling access may be high, they rarely affect more than the section of the byway to its junction with the nearest metalled road.

The vehicles used for dwelling access will typically be cars (including 4x4s) and motorcycles. They will include goods vehicles owned or used by residents and goods vehicles making deliveries. Goods vehicles will predominately be light goods vehicles of less than 7.5 tonnes gross vehicle weight but may sometimes be heavy goods vehicles exceeding that weight.

7.4 Condition and availability of byways open to all traffic

The key features that are likely to prevent the use of a byway are traffic regulation orders that prohibit motor vehicles, obstructions, overgrowth with vegetation or fallen trees and deep rutting. Deep rutting may not prevent all use but makes use more difficult. For some users deep rutting is an attractive feature. High numbers of motor vehicles may cause problems particularly where they coincide with periods when the byway surface is at its most vulnerable, for example after wet weather.

Obstructions and traffic regulation orders

10% by length of byways had an obstruction that prevented the passage of all or some motor vehicles. The obstructions included overgrowth of vegetation, streams, locked gates, bollards and concrete blocks.

8% by length of byways were not available for passage by the public because of traffic regulation orders. Seven of these traffic regulation orders were permanent covering 4% by length. The remainder were seasonal or temporary.

13% of the network was obstructed and/or subject to a traffic regulation order. This represents the proportion of the network of byways open to all traffic on which the public are not able to exercise a right of passage by motor vehicle.

Physical characteristics

Width, surface character and drainage are the main determinants of byway condition which affect users. Most byways are single lane. 68% by length of those surveyed were less than 3 metres wide. 71% of verges were less than 1 metre in width and 61% of byways had a total overall width of less than 4 metres. The narrowness of many byways was insufficient for the passage of large agricultural machinery.

34% by length of the byways surveyed had significant applied surface material and some 7% were surfaced with tarmacadam or concrete. This may be an indicator of the proportion of the byway network that is well used for dwelling access and land management purposes.

19% by length of the byways surveyed had relatively robust natural surfaces while 47% had weak natural surfaces, for example grass, soil or peat. This is a good indicator of the proportion of the network that is vulnerable to damage by motor vehicles.

Drainage is important because standing water can result in the development of ruts or potholes. Good natural drainage was present on 20% by length of the byways surveyed. Man-made drainage was present on 10%.

Rutting affects use of byways. 12% by length of the byways surveyed were deeply rutted; and 25% by length had shallow ruts. Deep rutting was often associated with poor or no drainage or soft ground.

At the time of the moving observer surveys, mainly spring and summer 2003, 78% of byways by length was free from obstruction, traffic regulation order and deep rutting and thus available to all motor vehicle users.

Effects of use

The condition of byways reflects in part the effects that different users have on them, but the condition is also affected by the level of maintenance. There was no evidence of widespread damage to the byway network from motor vehicles, whether they were recreational vehicles or using byways for land management or access to dwellings. However there were sections of byways that had been damaged by vehicles, usually where there was poor or no drainage or soft

ground. There was some evidence of the beneficial effect of motor vehicles on some byways where use could prevent ways from becoming overgrown and thus impassable by motor vehicle and other users.

Impacts of the passage of motor vehicles on the surface of the route

The impacts of the passage of motor vehicles on the surface of the route are largely determined by the bearing capacity of the surface and the axle loading of the vehicle. The bearing capacity is in turn determined by the inherent strength of the surface material which can be weakened by the presence of water. There are particular problems where the surface material is soft ground including clay, topsoil or peat; water does not drain readily from the surface of the byway; and the byway is enclosed in an envelope of vegetation or is in a shaded sunken lane. These prevent air and sun from drying the byway surface.

All of the above were evident on the surveyed byways. Where there is no applied surface material, or manmade or natural drainage, the surface could deteriorate even where traffic flows were low. This is illustrated by the Wiltshire (Heytesbury) logger site. The byway at this point is hard surfaced with concrete and despite the high average daily flow of 14.9 motor vehicles, many of them heavy agricultural tractors, there was virtually no deterioration in surface condition.

Damage to byway surfaces in general increases exponentially with the increase in axle loading. Motorcycles are likely to have the lowest axle loading of any vehicle but their ability to accelerate quickly can produce rutting on soft surfaces. However, the main concern is with vehicles with heavier gross vehicle weights. The effects of land management vehicles, which are generally heavy, are likely to be much greater than dwelling access and recreational traffic although their impact may be mitigated by the low speeds at which such vehicles operate.

Deterioration in surface condition is most likely where ground conditions are weak (47% by length of the byways surveyed were classed as weak); drainage is poor (70% by length of byways were without either natural or man-made drainage); traffic flows are high; and axle loadings are high.

Motor vehicles can have a beneficial effect. They prevent byways becoming overgrown. The Cambridgeshire (Chatteris) logger site with an average daily flow of 0.1 motor vehicles was close to becoming overgrown. Part of the Suffolk byway was completely overgrown.

Impacts of the passage of motor vehicles on adjoining areas and vegetation

The impact of the passage of motor vehicles on adjoining areas was noted during the research particularly where byways are not enclosed and where verges are wide. In some cases motor vehicles travel on adjoining areas because the byway is badly rutted. This was particularly evident on open upland moors and in poorly drained woodland. However not all such incursions are involuntary and there was evidence, notably in the Surrey cluster, of motorcyclists using adjoining woodland even though the byways were passable, presumably to provide a more interesting ride. This has implications for biodiversity, the landscape and land management.

Impacts of the passage of motor vehicles on others

On most byways traffic is very light and the chances of two motor vehicles meeting while travelling are low. Other users are likely to meet motor vehicles only rarely although they are more likely to do so on peak days on popular byways. The impact of motor vehicle use will in general be increased by higher speeds and by higher noise levels.

Noise from motorcycles causes most concern and, during surveying in Cornwall, a group of motorcyclists operating over a network of byways within a confined geographical area resulted in perceptible noise for much of the day. Two walkers in West Berkshire made a similar comment about use of the byways around Bucklebury Common by motorcyclists on a Sunday in late winter.

For others the principal group affected by motor vehicle use on byways open to all traffic is the residents of dwellings adjoining byways. Their major concerns are motorcyclists, the speed of vehicles, lack of respect for other users and both larger vehicles and recreational vehicles causing rutting.

7.5 Implications for the management of byways open to all traffic

Management measures fall into two categories: restraint and regulation of motor vehicle traffic to minimise conflicts with its physical and environmental capacity and with its use by others; and maintenance to ensure that byways remain available for all users or for particular classes of users. A combination of both measures may achieve the best results.

Voluntary restraint has been used in the Lake District National Park and on the Ridgeway. In general it has been directed towards recreational users rather than land management users. Where problems on byways are the result of land management use, successful voluntary restraint will need to have the support of land management interests.

Traffic regulation orders have greatest impact on recreational users of byways. Traffic regulation orders generally do not prevent access by landowners, land occupiers and by the owners of property fronting the byway. This means that some use of byways will continue even where traffic regulation orders are in place. From the proportions attributable to different purposes (land management 42%, recreation 38% and dwelling access 20%), traffic regulation orders may not be effective against more than 60% of motor vehicle use of byways, and some of this residual use is likely to be by heavier vehicles. However in some cases traffic regulation may be effective. For example, the Northamptonshire and Hertfordshire logger sites, that were on byways subject to traffic regulation orders, had relatively low average daily flows of 1.0 motor vehicles and 0.8 motor vehicles respectively and the byways were in reasonably good condition.

The major conclusion from the variation in traffic flow between sites is that measures to control or restrict traffic on byways open to all traffic would best be applied on a case by case basis.

Section 7

Local authorities have a duty to ensure that byways are maintained and free from obstruction. Some authorities carry out active management of byways while others tend to respond to demands. From the moving observer surveys, it was apparent that, where people relied on a byway for access, they maintained the byway to a sufficient standard to meet their needs. A significant proportion of byways are very well maintained, apparently by landowners and land occupiers. The research encountered some evidence of landowner and occupier resistance to the use of byways across their land which may in part result from the effort they put into maintenance.

Volunteers can also play a part in maintenance. They are generally drawn from recreational motor vehicle user groups. To undertake maintenance they must have the agreement of either the landowner or land occupier or of the local highway authority. From the research, it appears that permission is not readily forthcoming either because of concerns about liability, and hence insurance cover, or because improvement may attract additional recreational use.

Summary of literature review

Background

This summary is not intended to provide a comprehensive description of all material relevant to motor vehicles and rights of way but simply to summarise the material identified by the researchers. The nature of the summary is such that there will be omissions but the summary covers the material sufficiently for the purposes of the subsequent research.

The summary focuses on material that:

- provides some insight into the level of motor vehicular traffic on byways open to all traffic or the purposes for which people use motor vehicles on byways;
- provides information on the behaviour or needs of both motor vehicle users of byways or of non-motorised users; and
- assists in understanding the management and maintenance of byways whether in the interests of users or of any environmental resources.

Quantification of use

There was very little evidence of systematic survey to establish the level or characteristics of motor vehicle use on byways open to all traffic. The Lake District National Park Authority and the National Trails Office (in respect of the Ridgeway) were the only authorities or bodies identified as undertaking volumetric counts of the use of byways open to all traffic or of other unsurfaced routes on a large scale. Some of the Lake District data were reported in *The Lake District Hierarchy of Trails Routes Experiment* in July 2001. Data from the Lake District and the Ridgeway made available to the research are reported in Section 5.

Counts and surveys may have been undertaken elsewhere.

Organisations representing users of byways

Material from user organisations is important in that organisations reflect the views and needs of their members. In general the information available from user organisations focuses on:

- maintaining and developing the byway network in a state which allows the use and enjoyment of the network by members for the purposes for which the organisation exists;
- discouraging use of byways by users who are perceived to disturb or otherwise reduce the enjoyment that members gain from using byways; and
- encouraging responsible behaviour by members to minimise conflicts with others and with the environment.

Organisations representing recreational motor vehicle

LARA (Motoring Organisations' Land Access and Recreation Association) are very active in representing the users of unsurfaced routes and have published extensively. Documents identified include:

- *Lake District Hierarchy of Routes First Report 1997* catalogues the first three years of a pioneering project, the hierarchy of trail routes initiative, in the Lake District National Park;
- *Planning for motor sport and recreation in an increasingly sensitive environment* summarises a symposium held in Warwickshire on 21st April 1993 covering a wide range of subjects including illegal use of vehicles and maintenance;
- *The LARA System of Voluntary Restraint and Codes of Conduct* (LARA website) sets out how voluntary restraint may be applied and codes of conduct for motorised users. The latter include the LARA Code of Conduct and those prepared by the Trail Riders Fellowship (*Code of Conduct*) and for the Lake District National Park (*Lake District Green Road Code for Vehicle Users*) and The Ridgeway (*Code of Respect*);
- *LARA advice notes* on RUPPS and restricted byways, local countryside access forums and land access and motor sport.

The broad focus of these documents is on:

- extending the network available to members by new additions to the byway network;
- a recognition that the behaviour of motor vehicle users should be subject to a code of conduct that minimises impacts on others and on the environment;
- an acceptance that voluntary restraint has a part to play and a preference for this over traffic regulation; and
- a desire to see better maintenance of byways whether by highway authorities or through voluntary means.

The Auto Cycle Union (ACU) have published *British Motorcycle Sport and Leisure Environment Policy* essentially a guide for motorcyclists in avoiding conflicts with other people and the environment. The publication is of limited interest in respect of the use of byways by motor vehicles.

The Trail Riders Fellowship (TRF) *Handbook*, published annually, includes information about byway usage by members and guidance on conduct and maintenance. Clearly identifies TRF members as users of byways open to all traffic and encourages appropriate behaviour by trail riders. Identifies how members may involve themselves with maintenance of byways.

The Trail Riders Fellowship *Code of Conduct* covers conduct of motorised users on unsurfaced ways.

Caring for green lanes (Trail Riders Fellowship 1994) covers maintenance issues.

The Association of Rover Clubs (ARC) *Handbook*, published annually, contains information relating to rights of way usage and the driver's code of conduct.

The *Off-Road Riders Guide* is a promotional pamphlet outlining the various types of off-road motorcycling by the Motor Cycle Industry Association. It emphasises the importance of safety. The publication is of limited interest in respect of the use of byways by motor vehicles.

Organisations representing non-motorised users

The most relevant British Driving Society material is the Response to the DETR consultation paper on improving rights of way, dated 15th October 1999, which discusses the reclassification of RUPPS and interaction between the driving horse and motorised vehicle. Three British Driving Society advisory statements are also relevant:

- Number 2 Obstruction of rights of way;
- Number 21 Use of byways / unsurfaced highways;
- Number 22 Additional information in claiming a right of way.

Ramblers' Association documents of relevance include:

- *Rights of Way and Countryside Advice Notes 1: Roads used as Public Paths and Byways Open to all Traffic* provides more on this area of interest;
- *Byways: A Policy Statement* is available from the Ramblers' Association website and summarises the Ramblers' Association's policy towards the use of motor vehicles on byways;
- *Green Lanes Campaign* is available from the Ramblers' Association website and summarises the Ramblers' Association's active campaign in relation to the use of motor vehicles on byways. A more detailed .pdf document available from this site sets out Ramblers' Association policy on recreational vehicles and rights of way in more detail.

Management of motor vehicle use on byways

Management of motor vehicle use on byways open to all traffic rests with highway authorities, mainly county councils, although national park authorities have also become involved. National park authorities often have delegated powers from highway authorities in respect of public rights of way.

Pro-active management by local authorities and others

The following authorities or agencies were identified as having particular approaches to the management of motor vehicles on unsurfaced routes:

- Lake District National Park;
- Yorkshire Dales National Park;
- National Trails Office (the Ridgeway);
- Derbyshire County Council; and
- Northamptonshire County Council.

The Lake District National Park Authority published *The Lake District Hierarchy of Trails Routes Experiment* in July 2001. The experiment was formally established in April 1999 and tested the hypothesis that voluntary restraint can be as effective as statutory control. The evidence gathered during the experiment suggests that voluntary restraint can work although not in every

circumstance. The experiment also concluded that without proper funding and a sustained maintenance regime, routes will continue to deteriorate, no matter how much control is applied to vehicular use. The Lake District National Park have prepared the *Lake District Green Road Code for Vehicle Users*.

The *Yorkshire Dales National Park Authority* has an increasing number of complaints from park users about recreational off road users. The Authority has embarked on an experiment, the Yorkshire Dales Local Action Plan, to determine whether traffic regulation orders can be effective in controlling vehicular traffic.

Discussion with Mike Furness, the National Trails Officer, and information from the *National Trails Office* indicates clear concern about the Ridgeway. The major initiative is a comprehensive survey of usage which is currently underway. Surface improvement proposals include:

- segregation of users;
- alternative agricultural access options;
- a decision making protocol to guide the specification of future repairs;
- regular survey of surface condition and annual surface audit;
- work to secure finance for repair of sub-standard sections;
- rigorous on-going maintenance programme;
- review of code of respect;
- a programme to use voluntary help from motoring groups;
- investigation of licensing for vehicle groups;
- investigate potential weight restrictions; and
- selective traffic regulation orders on vulnerable sections.

The Ridgeway Code of Respect has been prepared and covers all users.

Derbyshire County Council have published *Policy for the Management of Motorised Vehicle use in the Countryside* which sets out issues and policy but gives no real indication of the scale of the problem.

Northamptonshire County Council have prepared a comprehensive survey of the byways in their area which includes their condition and strategic importance for different classes of users but does not quantify traffic.

Making the Best of Byways was published by the former DETR in 1997 and focuses on best practice in the management of unsurfaced routes. It provided no hard data on the level or purpose for which these routes are used. However it surveyed local authorities for their views on the purpose of use but the responses to this were subjective.

Material from other organisations and agencies

The Countryside Agency

The following documents of relevance have been identified:

- *Planning for a national countryside access database* (The Countryside Agency website) summarises the idea of an information gateway to the countryside for the public;
- *Rights of way condition survey 2000* sets out data on the condition of all public rights of way but little that is specific to byways open to all traffic. For motorists it identifies that 75% of gates are 'satisfactory' or 'usable but needing attention' and 69% of bridges are 'satisfactory' or 'usable but needing attention'. A possible conclusion is that the remainder are not usable. The requirements of different types of path user is also explored with cameo portraits of the typical requirements of each of the five types of rights of way user provided by the Ramblers' Association, the British Horse Society, the Cyclists Touring Club (OffRoad), the British Driving Society and Motoring Organisations' Land Access and Recreation Association; and
- publications about improving the rights of way network and access generally.

The National Trust

The National Trust has produced several important documents:

- *Access and Recreation on National Trust Land* (National Trust website) summarises the situation with regard to access and recreation on National Trust land;
- The National Trust's response to the DETR consultation *Improving Rights of Way in England and Wales* October 1999 is available from the National Trust website. It makes some reference to problems of conflict between vehicle users and pedestrians on rights of way near their busier properties and to the use of traffic regulation orders;
- The National Trust website includes a page *recreational activities at national trust properties guiding principles and good practice* which includes a section on motor vehicles. It refers to guidance from other sources notably LARA and the Trail Riders Fellowship.

The Planning Inspectorate

Two relevant publications have been produced:

- *Advice Note 1* Discusses definitive map modification and reclassification orders; and
- *Advice Note 8* discusses the definition of byway open to all traffic and the effect of *Masters v Secretary of State for the Environment, Transport and the Regions*

Appendix 2

Appendix 2: Moving observer surveys – data fields to be completed by surveyors

<i>Cluster no</i>		
<i>Local highway authority</i>		
<i>Survey date</i>		
<i>Survey time</i>		
<i>Parish</i>		
<i>Byway no</i>		
<i>Grid reference</i>	GPS start	
	GPS end	
<i>Length</i>	Kilometres	
<i>Width</i>	Track width	
	Verge width	Right Left
	Total width	
<i>Obstruction</i>	Obstruction to all motor vehicles	
	Obstruction to all motor vehicles except motorcycles	
	Form of obstruction	
	TRO - permanent	
	TRO - seasonal (months in year)	
	TRO - temporary (total duration in months)	
<i>Byway condition</i>	Surface	
	Rutting	
	Surface water	
	Drainage	
	Gradient	
<i>Vehicle access points</i>	Dwelling (except farm dwelling)	
	Field access	
	Woodland access	
	Farm access (farm including dwelling)	
	Farm access (outbuilding)	
	No of dwellings served (including farm dwellings)	
	Dwellings along individual byways	
	Farm management access	
<i>Surroundings</i>	Underlying ground conditions	
	Topography	
	Height	
	Land use	Right Left
	Landscape quality	
	Biodiversity interest	

Moving observer surveys

<i>Enclosure</i>	Hedgerow	Right
		Left
	Fence	Right
		Left
Wall	Right	
	Left	
<i>Junctions with other rights of way</i>	Footpath	
	Bridleway	
	Road used as public path	
	Byway open to all traffic	
	Other highway	
	Total	
<i>Traffic</i>	Pedestrian	
	Pedestrian with dog(s)	
	Cyclist	
	Equestrian	
	Horse and carriage	
	Tractor	
	Tractor with trailer	
	Other agricultural vehicle	
	4x4 Car	
	4x4 Light goods vehicle	
	Motorcycle	
	Car	
	Light goods vehicle (<3.5t)	
	Goods vehicle (>3.5t)	
<i>Evidence of Motor Vehicle Use</i>	Tracks	Tractor
		4x4
		Car
	Motorcycle	
Assessment of motor vehicle use		
<i>Evidence of Other Use</i>	Tracks	Horse
		Cycle
		Pedestrian
	Horse and carriage	
Assessment of other use		
<i>Weather</i>	Previous week	
	Conditions at time of survey	
<i>Commentary</i>		

Appendix 2

Codes and Criteria for Moving Observer Surveys		
DATA FIELD	CODE	NOTES
WIDTH		
track width		Insert width of track in metres to nearest 0.5m
verge width		Insert width in metres to nearest 0.5m
OBSTRUCTION		Answer the question - Can motor vehicles pass along the length of the byway? Ignore the fact that motor vehicles used by the public could use a route across private land to gain access to the byway.
no obstruction present	0	
obstruction present at one point	1	
obstruction present at two points	2	
FORM OF OBSTRUCTION		
locked gate	LG	
unusable broken or fixed gate	BG	
bollards or other physical man-made construction	B	
vegetation including fallen trees	V	
stream or ditch	S	
TRAFFIC REGULATION ORDER		
TRO permanent		
present	1	
not present	0	
TRO seasonal		0
present	n	n = duration in months per year
not present	0	
TRO temporary		0
present	n	n = duration in months
not present	0	
SURFACE OF BOAT		Subjective judgement based on predominant surface over the 0.1km section
chalk/flint	CH	
clay	CL	
peat	P	
soil	S	
hard rock	HR	
sand/gravel	SG	
grass	G	
applied aggregate	AA	
applied hard core	AH	

Moving observer surveys

applied tarmac or concrete	AT	
TYPE OF RUTTING		Judgement based on deepest rutting over the 0.1km section
no rutting	0	
shallow rutting (5-15cm)	1	
deep rutting (15cm+)	2	
SURFACE WATER		Judgement based on maximum surface water presence over the 0.1km section
none	0	
mud	1	
puddles on surface of track	2	
flooded across width of track	3	
DRAINAGE		Judgement based on predominant drainage regime over the 0.1km section
no apparent drainage	0	0
naturally well drained	N	N
man-made drainage present, e.g. ditches	M	M
APPROXIMATE GRADIENT		Judgement based on average gradient over the 0.1km section
steep gradient (>10%)	2	2
slight to moderate gradient (<10%)	1	1
level	0	0
SIDE ACCESS TYPE	Present	Actual number of accesses over the 0.1km section
dwelling access (excludes farm dwellings)	number	
field access	number	
woodland access	number	
farm access (main farm including dwelling)	number	
farm access (outbuilding)	number	
GENERAL TOPOGRAPHY		Judgement based on topography over the 0.1km section
flat	F	
undulating	U	
hilly	H	
mountainous	M	
Height in metres		
ADJACENT LAND USE/ CHARACTER		Judgement based on predominant land use over the 0.1km section
arable	A	
improved pasture	IP	
unimproved pasture	UP	

Appendix 2

heath or moor	HM	
scrub	S	
deciduous wood	DW	
coniferous wood	CW	
mixed wood	MW	
marsh	M	
Residential	R	
Industrial	IP	
Business	B	
other (define in comments)	O	
LANDSCAPE QUALITY		
little or no interest	0	
some features of interest (e.g. limited views, trees, hedgerows)	1	
interesting - some attractive features (e.g. good long views, historic features, attractive hedgerows and woodland)	2	
very interesting - many attractive features (e.g. good long views, historic features, attractive hedgerows and woodland)	3	
WILDLIFE INTEREST		
no interest	0	No identifiable interest
limited interest	1	Some habitats of limited interest (e.g. ditches, trees, hedgerows)
interesting -	2	Some good quality habitats of interest (e.g. ancient hedgerows, deciduous woodland, streams)
very interesting -	3	Continuous good quality habitats of interest (e.g. ancient hedgerows, deciduous woodland, streams)
HEDGEROWS		
present	1	
not present	0	
TYPE OF HEDGEROW		
ancient hedgerow	AH	Number of tree species > 5
other hedgerow	OH	Single species or no of species < 5
bank with ancient hedgerow	ABH	
bank with other hedgerow	OBH	
HEDGEROW TREES		
present	1	
not present	0	
FENCE		
present	1	
not present	0	

Moving observer surveys

TYPE OF FENCE		
stock proof wire fence	SWF	
post and rail wooden fence	PRF	
other fence	OF	
WALL PRESENT		
present	1	
not present	0	
TYPE OF WALL		
drystone	DW	
mortared stone	MSW	
brick or block	BW	
EVIDENCE OF MOTOR VEHICLE USE	Present	
tractor tracks	1	
4x4 tracks	1	
car tracks	1	
motorcycle tracks	1	
agricultural trailer use (mark in middle of track)	1	
motor vehicle not identifiable	1	
ASSESSMENT OF MOTOR VEHICLE USE		
no evidence of significant motor vehicle use	0	
evidence of light motor vehicle use	1	
evidence of moderate motor vehicle use	2	
evidence of heavy motor vehicle use	3	
EVIDENCE OF OTHER USE	Present	
horse tracks	1	Visible hoof prints
cycle tracks	1	Visible cycle tyre tracks
footprints	1	Visible footprints
PASSING TRAFFIC ON THE BYWAY	Present	
pedestrian	number	
pedestrian with dog(s)	number	
cyclist	number	
equestrian	number	
tractor	number	
tractor with trailer	number	
other agricultural machine, e.g. combine harvester	number	
4 x 4 car	number	
4 x 4 light goods vehicle	number	
motorcycle	number	

Appendix 2

car	number	
light goods vehicle (<3.5 tonnes)	number	
goods vehicle (>3.5 tonnes)	number	
WEATHER CONDITIONS ON THE DAY OF SURVEY		
sunny	S	
cloudy	C	
sunny periods	SC	
heavy rain	HR	
light rain	LR	
snow/sleet/hail	SN	
foggy	F	
WEATHER PREVIOUS WEEK		
dry less than 10mm of rain	D	Based on subjective judgement
wet (between 10 and 50mm rain)	W	Based on subjective judgement
very wet (more than 50mm of rain)	VW	Based on subjective judgement

Questionnaire used for surveys of householders in vicinity of byways open to all traffic

BOAT Reference:		County:			Unique ref number:			
<p>These questions are about the byway open to all traffic marked on the attached Ordnance Survey extract. We have tried to make the questionnaire as straightforward as possible and to allow plenty of space for responses. Where alternatives are given, please tick or circle as indicated. Thank you for your assistance.</p>								
<p>Q1. Do you or any member of your family use the byway? <i>Please circle one</i></p> <p style="text-align: right;">Yes (Go to Q2) No (Go to Q4)</p>								
<p>Q2. Please indicate which mode(s) of transport you use on the byway for each of the following purposes (Please tick all that apply):</p>								
Purpose for which the byway is used	Tractor and other farm machinery	4x4	Car	Motor-cycle	Pedal-cycle	Horse or horse drawn vehicle	Walk	Other vehicle (please state in box)
1. Access to and from your house and public roads								
2. Access between your farm, farm buildings and fields (i.e. to get around your farm)								
3. Access to and from your working farm and public roads								
4. Access for other land management purposes (e.g. forestry)								
5. Access between other business premises and public roads								
6. Recreation								
7. Other purpose								
<p>Where 'Other purpose' has been recorded please state the purpose:</p>								
<p>Q3. Please indicate the frequency at which you use the byway for each of the following uses (Please tick only one frequency box per purpose):</p>								
Purpose for which byway is used	Once or more per day	At least once per week	At least once per month	Less than once per month	Do not use the byway			
1. Access to and from your house and public roads								
2. Access between your farm, farm buildings and fields (i.e. to get around your farm)								

Appendix 3

3. Access to and from your working farm and public roads					
4. Access for other land management purposes (e.g. forestry)					
5. Access between other business premises and public roads					
6. Recreation					
7. Other purpose					
Where 'Other purpose' has been recorded, please state the purpose:					
Q4. Are you aware of any other use made of this byway by the public? <i>Please circle one</i> Yes (Go to Q5) No (Go to Q6)					
Q5. Please provide any information that you know about the use of the byway by the public in the space provided below:					
Q6. What are your views on the condition of the byway? This might include views on drainage, surface conditions such as rutting, and obstruction by vegetation. Please set out your views in the space provided below:					
Q7. Do you think there are any conflicts between different users of the byway? <i>Please circle one</i> Yes (Go to Q8) No (Go to Q9)					
Q8. Please provide details of the conflicts that you perceive to exist between different users of the byway:					
Q9. Do you undertake maintenance on this byway? <i>Please circle one</i> Yes (Go to Q10) No (Go to Q11)					
Q10. Please provide details of the maintenance you undertake on this byway: On a regular basis, for example annually. As required, for example one-off work?					
Q11. If you have any other views on the use of byways in general by motor vehicles, please provide them in the space below:					

Please complete the following personal details:

Name:..... Date:.....

Address:

Thank you for taking the time to complete this questionnaire. We would be grateful if you could return it to us using the FREEPOST envelope provided.

Byways open to all traffic – total length in kilometres by local authority

<i>Local authority</i>	<i>Byways open to all traffic (km)</i>	<i>Cumulative total of byways open to all traffic</i>	<i>% of all byways open to all traffic in England</i>	<i>Cumulative % of byways open to all traffic</i>
Wiltshire County Council	629	629	17%	17%
Cambridgeshire County Council	401	1030	11%	27%
Oxfordshire County Council	287	1317	8%	35%
Hampshire County Council	226	1543	6%	40%
Essex County Council	194	1737	5%	46%
Cornwall County Council	178	1915	5%	50%
Suffolk County Council	166	2081	4%	55%
West Berkshire Council	154	2235	4.0	59%
Hertfordshire County Council	137	2372	4%	62%
Surrey County Council	134	2506	4%	66%
Cumbria County Council	107	2613	3%	69%
Northamptonshire County Council	105	2718	3%	71%
Northumberland County Council	79	2797	2%	73%
Leicestershire County Council	74	2871	2%	75%
East Sussex County Council	55	2926	1%	77%
Devon County Council	50	2976	1%	78%
Staffordshire County Council	50	3026	1%	79%
Bedfordshire County Council	47	3073	1%	81%
Worcestershire County Council	47	3120	1%	82%
Isle of Wight Council	47	3167	1%	83%
Bath and North East Somerset Council	46	3213	1%	84%
Norfolk County Council	40	3253	1%	85%
North Yorkshire County Council	39	3292	1%	86%
Wokingham District Council	37	3329	1%	87%
Durham County Council	35	3364	1%	88%
Lancashire County Council	30	3394	1%	89%
Lake District National Park Authority	26	3420	1%	90%
Lincolnshire County Council	23	3443	1%	90%
Herefordshire Council	22	3465	1%	91%
Yorkshire Dales National Park Authority	21	3485	1%	91%
Dorset County Council	20	3505	1%	92%
Calderdale Metropolitan Borough Council	20	3525	1%	92%
Kirklees Metropolitan Council	19	3544	1%	93%
Sheffield City Council	19	3563	1%	93%

Appendix 4

Shropshire County Council	18	3581	<1%	94%
Wirral Borough Council	17	3598	<1%	94%
West Sussex County Council	16	3614	<1%	95%
North York Moors National Park Authority	15	3629	<1%	95%
Redcar and Cleveland Borough Council	12	3641	<1%	96%
Cheshire County Council	11	3652	<1%	96%
Tameside Metropolitan Borough Council	10	3662	<1%	96%
Swindon Borough Council	10	3672	<1%	96%
Telford and Wrekin Council	10	3682	<1%	97%
East Riding of Yorkshire Council	9	3691	<1%	97%
Royal Borough of Windsor and Maidenhead Council	8	3699	<1%	97%
The Medway Towns Council	8	3707	<1%	97%
Hartlepool Borough Council	7	3714	<1%	97%
Buckinghamshire County Council	6	3720	<1%	98%
Somerset County Council	6	3726	<1%	98%
Bury Metropolitan Borough Council	6	3732	<1%	98%
Rutland County Council	6	3738	<1%	98%
London Borough of Hillingdon	5	3743	<1%	98%
Sefton Metropolitan Borough Council	5	3748	<1%	98%
Leicester City Council	5	3753	<1%	98%
Peterborough City Council	5	3758	<1%	99%
Doncaster Metropolitan Borough Council	5	3762	<1%	99%
Leeds City Council	4	3766	<1%	99%
Oldham Metropolitan Borough Council	4	3770	<1%	99%
St Helens Metropolitan Borough Council	3	3774	<1%	99%
Gloucestershire County Council	3	3777	<1%	99%
Nottinghamshire County Council	3	3780	<1%	99%
Knowsley Metropolitan Borough Council	3	3783	<1%	99%
Bournemouth Borough Council	3	3786	<1%	99%
Bracknell Forest Borough Council	3	3789	<1%	99%
Brighton and Hove Council	3	3792	<1%	99%
Southend on Sea Borough Council	3	3795	<1%	100%
Stockton Borough Council	3	3798	<1%	100%
London Borough of Richmond Upon Thames	2	3800	<1%	100%
Stockport Metropolitan Borough Council	2	3802	<1%	100%
Broads Authority	2	3804	<1%	100%
South Gloucestershire Council	2	3806	<1%	100%
Warwickshire County Council	1	3807	<1%	100%
City of Sunderland	1	3808	<1%	100%

Byways open to all traffic

Blackburn with Darwen Borough Council	1	3809	<1%	100%
Milton Keynes Council	1	3810	<1%	100%
North Lincolnshire Council	1	3811	<1%	100%
Thurrock Council	1	3812	<1%	100%
Kent County Council	0	3812	Nil	100%
Exmoor National Park Authority	0	3812	Nil	100%
Rochdale Metropolitan Borough Council	0	3812	Nil	100%
Bolton Metropolitan Borough Council	0	3812	Nil	100%
North Somerset Council	0	3812	Nil	100%
Dartmoor National Park Authority	0	3812	Nil	100%
Peak District National Park Authority	0	3812	Nil	100%
Gateshead Metropolitan Borough Council	0	3812	Nil	100%
Derbyshire County Council	0	3812	Nil	100%
Newcastle City Council	0	3812	Nil	100%
Trafford Metropolitan Borough Council	0	3812	Nil	100%
London Borough of Barnet	0	3812	Nil	100%
Barnsley Metropolitan Borough Council	0	3812	Nil	100%
Dudley Metropolitan Borough Council	0	3812	Nil	100%
Borough of Poole	0	3812	Nil	100%
Wakefield Metropolitan District Council	0	3812	Nil	100%
South Tyneside Metropolitan Borough Council	0	3812	Nil	100%
London Borough of Croydon	0	3812	Nil	100%
London Borough of Havering	0	3812	Nil	100%
Rotherham Metropolitan Borough Council	0	3812	Nil	100%
Walsall Metropolitan Borough Council	0	3812	Nil	100%
London Borough of Harrow	0	3812	Nil	100%
Bexley Council	0	3812	Nil	100%
London Borough of Newham	0	3812	Nil	100%
Total	3812			
<i>of which:</i>				
County councils	3216			
Metropolitan borough councils (these are unitary authorities)	118			
London boroughs	7			
Other unitary authorities	407			
National park authorities	64			

Source: Institute of Public Rights of Way Officers

Comparison between 1997 data used for sampling framework and 2003 data and calculation of weights to be applied to each group of local authorities

Summary by groups of local authorities

Code no	Groups of local authorities	Number of samples taken	2003 length of byway (km)	% of sample sites taken	Ideal length of byway represented by this sample	Weight based on ratio of actual length and ideal length	Weight x sample
1	Oxfordshire, Northamptonshire and Kent	2	458	10%	417	1.098058	2.196116
2	Cornwall	1	203	5%	209	0.973388	0.973388
3	Wiltshire and South West England except Cornwall	4	834	20%	834	0.999760	3.999041
4	Hampshire and South East England	3	734	15%	626	1.173180	3.51954
5	West Berkshire/Wokingham/Bracknell Forest	1	205	5%	209	0.982978	0.982978
6	Cambridgeshire	2	400	10%	417	0.959003	1.918005
7	Central England	1	205	5%	209	0.982978	0.982978
8	North East England	2	330	10%	417	0.791177	1.582354
9	North West England	1	177	5%	209	0.848717	0.848717
10	Eastern England except Cambridgeshire	3	625	15%	626	0.998961	2.996883
	TOTAL		4171	100%			20.00

Full detailed data

Code no	Groups of local authorities	Length of byways (km)	% of all byways in England	Number of clusters taken	Length of byway (km)	% of 2003 population	% of sample sites taken	Ideal length of byway represented by this sample	Weight based on ratio of actual length and ideal length	Weight x sample
1	Oxfordshire, Northamptonshire and Kent	392	10.28%	2	458	10.98%	10%	417	1.098058	2.196116
	Oxfordshire County Council	287	7.53%		65					
	Northamptonshire County Council	105	2.75%		106					
	Kent County Council	0	0.00%		287					
2	Cornwall	178	4.67%	1	203	4.87%	5%	209	0.973388	0.973388
	Cornwall County Council	178	4.70%		203					

Comparison between 1997 data used for sampling framework and 2003 data and calculation of weights to be applied to each group of local authorities

3	Wiltshire and South West England except Cornwall	769	20.17%	4 of which 3 in Wiltshire	834	20.00%	20%	834	0.999760	3.999041
	Wiltshire County Council	629	16.50%		668					
	Devon County Council	50	1.31%		3					
	Bath and North East Somerset Council	46	1.21%		50					
	Dorset County Council	20	0.52%		67					
	Swindon Borough Council	10	0.26%		10					
	Somerset County Council	6	0.16%		5					
	Bournemouth Borough Council	3	0.08%		19					
	Gloucestershire County Council	3	0.08%		10					
	South Gloucestershire Council	2	0.05%		2					
4	Hampshire and South East England	648	17.00%	3	734	17.60%	15%	626	1.17318	3.51954
	Hampshire County Council	226	5.93%		275					
	Hertfordshire County Council	137	3.59%		149					
	Surrey County Council	134	3.52%		123					
	East Sussex County Council	55	1.44%		55					
	Isle of Wight Council	47	1.23%		51					
	West Sussex County Council	16	0.42%		10					
	Royal Borough of Windsor and Maidenhead	8	0.21%		7					
	The Medway Towns Council	8	0.21%		11					
	Buckinghamshire County Council	6	0.16%		11					
	London Borough of Hillingdon	5	0.13%		27					
	Brighton and Hove Council	3	0.08%		11					
	London Borough of Richmond Upon Thames	2	0.06%		2					
	Milton Keynes Council	1	0.03%		2					
5	West Berkshire/Wokingham/Bracknell Forest	194	5.09%	1	205	4.91%	5%	209	0.982978	0.982978
	West Berkshire Council	154	4.04%		162					
	Wokingham District Council	37	0.97%		40					
	Bracknell Forest Borough Council	3	0.08%		3					
6	Cambridgeshire	401	10.52%	2	400	9.59%	10	417	0.959003	1.918005
	Cambridgeshire County Council	401	10.52%		400					
7	Central England	193	4.56%	1	205	4.91%	5%	209	0.982978	0.982978
	Staffordshire County Council	50	1.31%		33					
	Worcestershire County Council	47	1.23%		22					
	Herefordshire Council	22	0.58%		5					
	Shropshire County Council	18	0.47%		82					

Appendix 5

	Wirral Borough Council	17	0.45%		24					
	Cheshire County Council	11	0.28%		19					
	Tameside Metropolitan Borough Council	10	0.26%		0					
	Telford and Wrekin Council	10	0.26%		10					
	Sefton Metropolitan Borough Council	5	0.13%		4					
	Stockport Metropolitan Borough Council	2	0.05%		2					
	Warwickshire County Council	1	0.03%		2					
	Derbyshire County Council	0	0.03%		2					
8	North East England	287	7.53%	2	330	7.91%	10%	417	0.791177	1.582354
	Northumberland County Council	79	2.07%		127					
	North Yorkshire County Council	39	1.02%		52					
	Durham County Council	35	0.92%		5					
	Yorkshire Dales National Park	21	0.54%		21					
	Calderdale MBC	20	0.52%		18					
	Kirklees MC	19	0.50%		39					
	Sheffield City Council	19	0.50%		8					
	North York Moors National Park	15	0.39%		16					
	Redcar and Cleveland Borough Council	12	0.31%		12					
	East Riding of Yorkshire Council	9	0.24%		11					
	Hartlepool Borough Council	7	0.18%		6					
	Doncaster Metropolitan Borough Council	5	0.12%		9					
	Leeds City Council	4	0.11%		4					
	Stockton Borough Council	3	0.08%		2					
	City of Sunderland	1	0.03%		0					
9	North West England	180	4.72%	1	177	4.24%	5%	209	0.848717	0.848717
	Cumbria County	107	2.79%		112					
	Lancashire County Council	30	0.79%		28					
	Lake District National Park	26	0.68%		23					
	Bury Metropolitan Borough Council	6	0.16%		6					
	Oldham Metropolitan Borough Council	4	0.10%		4					
	St Helens MBC	3	0.09%		3					
	Knowsley Metropolitan Borough Council	3	0.08%		1					
	Blackburn with Darwen Borough Council	1	0.03%		0					

Comparison between 1997 data used for sampling framework and 2003 data and calculation of weights to be applied to each group of local authorities

10	Eastern England except Cambridgeshire	570	14.95%	3	625	14.98%	15%	626	0.998961	2.996883
	Essex County Council	194	5.09%		194					
	Suffolk County Council	166	4.35%		167					
	Leicestershire County Council	74	1.94%		74					
	Bedfordshire County Council	47	1.23%		52					
	Norfolk County Council	40	1.05%		40					
	Lincolnshire County Council	23	0.60%		26					
	Rutland County Council	6	0.16%		5					
	Peterborough City Council	5	0.13%		5					
	Leicester City Council	5	0.13%		0					
	Southend on Sea Borough Council	3	0.08%		1					
	Nottinghamshire County Council	3	0.08%		57					
	Broads National Park	2	0.05%		2					
	Thurrock Council	1	0.03%		1					
	North Lincolnshire Council	1	0.03%		1					
	TOTAL	3812			4171	100%	100%			20.00

Example of weighting of moving observer data

Weighting the moving observer surveys involves weighting the data in each cluster in two ways:

1. A weight that corrects for the bias present in the original sampling method. This weight is the same as that for the vehicle logger analysis.
2. A weight to take into account of the variation in length for each cluster between 17.9km and 23.8km.

The second weighting factor is calculated from dividing the ideal length of byway (20km) by the actual recorded length of byway within each cluster.

Cluster	Unweighted data				Cluster	Weighted data			
	Rutting					Rutting			
	none	shallow (5-15cm)	deep (15cm+)	Total		none	shallow (5-15cm)	deep (15cm+)	Total
01_01	57	77	52	186	01_01	67	91	61	220
01_02	163	41	0	204	01_02	175	44	0	220
02_01	182	14	0	196	02_01	181	14	0	195
03_01	124	74	13	211	03_01	118	70	12	200
03_02	164	60	11	235	03_02	140	51	9	200
03_03	132	29	30	191	03_03	138	30	31	200
03_04	154	7	18	179	03_04	172	8	20	200
04_01	187	7	4	198	04_01	222	8	5	235
04_02	72	87	45	204	04_02	83	100	52	235
04_03	164	54	10	228	04_03	169	56	10	235
05_01	145	33	28	206	05_01	138	31	27	197
06_01	191	24	0	215	06_01	170	21	0	192
06_02	132	51	11	194	06_02	131	50	11	192
07_01	46	91	101	238	07_01	38	75	83	197
08_01	84	92	9	185	08_01	72	79	8	158
08_02	118	57	12	187	08_02	100	48	10	158
09_01	82	52	59	193	09_01	72	46	52	170
10_01	125	25	29	179	10_01	140	28	32	200
10_02	104	56	23	183	10_02	114	61	25	200
10_03	75	80	34	189	10_03	79	85	36	200
Total	2501	1011	489	4001	Total	2517	997	486	4000
	63%	25%	12%			63%	25%	12%	

Weighting the dataset made no difference at the national level to the percentages of each class of rutting observed. It was therefore concluded that weighting the moving observer dataset would make no difference at the national level for other variables. Thus the moving observer surveys data are presented without weighting.

The motor vehicles and rights of way seminar, Friday 1 May 2003

Attendees

<i>Name</i>	<i>Organisation</i>
Mike Dyer	All Wheel Drive Club
Andrew Brown	Association of Classic Trials Clubs
Hannah Cohen	British Horse Society
Charlotte Edward	Central Council of Physical Recreation
Jane Krause (see below)	Cheshire County Council
Richard Walton	Cornwall County Council
Hazel Fleming	The Countryside Agency
Dr Lynn Crowe	Countryside Recreation Network
George Keeping	CSS Defra
Dr Robin Helby	Disabled Ramblers' Association
Mr J Grant	Department for Transport
Eddie Clunan	Duddon Electronics
Jo Ramsey	English Nature
Ian Ritchie	Friends of the Ridgeway
Chris Marsden	Green Lane Association
David Gardiner	Green Lanes Environmental Action Movement
Richard Jackson	Hampshire County Council
Eoin Bell	Hertfordshire County Council
Jane Krause	Institute of Public Rights of Way Officers
Tim Stevens	Land Access and Recreation Association (LARA)
H Brown	Long-Distance Walkers Association
Michael Green	National Association of Local Councils
Hugo Blomfield	The National Trust
Paul Burgess	Nidderdale AONB
Janet Davis	Ramblers Association
Mike Furness	Ridgeway Management Group (National Trails Office)
Mary George	Suffolk County Council
Steve Mitchell	Surrey County Council
Derek Edington	Swindon Borough Council
Dave Tilbury	Trail Riders Fellowship
Elaine Cox	West Berkshire Council
Paul Gerrard	Wiltshire County Council
Michael Bartholomew	Yorkshire Dales Green Alliance
Rev Peter Bailey	Long-Distance Walkers Association

Appendix 7

Research Steering Group	
Sue Toland	Defra
Jonathan Tweney	Defra
Dave Robinson	Lake District National Park Authority
Wendy Thompson	Countryside Agency
Other Defra	
Susan Carter	Defra
FaberMaunsell	
Nick King	Project Manager
Ken Taylor	Countryside Management Advisor
Sarah Hammond	Researcher
Tom Hamilton-James	Project advisor
Sue Rurfitt	Rights of way advisor
Apologies	
Dr Karen Jones	Country Land and Business Association (CLA)
Geoff Hughes	Sport England
Jont Bulbeck	Countryside Council for Wales
Non attendee	
Peter Lainson	RADAR

Summary of proceedings

Introduction

Susan Carter (Defra) was delayed and in her absence Sue Toland opened the proceedings by welcoming those attending, introducing the consultants – FaberMaunsell – and summarising the purpose of the research which is:

"To quantify the level of motor vehicle use on byways open to all traffic in England and to assess the implications of use for the network and its management."

The attendance at the seminar was intended to represent a wide range of stakeholder interests in the subject including users, landowners and occupiers, environmental interests, regulators and highway authorities.

Project objectives and proposed methodology – Presentation by Nick King, Project Manager from FaberMaunsell and Ken Taylor (Asken Ltd), Countryside Management Advisor from the FaberMaunsell Team undertaking the research

The presentation set out:

- the requirement for, and background to, the research,
- the study team from FaberMaunsell,
- the approach and methodology used, and
- information on the Duddon Electronics vehicle logger.

Discussion on proposed method

The presentation was followed by a discussion of the remit for the study and the methodology to be used:

Sue Rumfitt queried rights of landowners and occupiers to use a byway open to all traffic over land that was owned or occupied by them even if it was subject to a traffic regulation order. Agreed that FaberMaunsell needed to consider this.

The coverage of the sample was queried. It appeared to be biased towards the south but FaberMaunsell commented that the byways open to all traffic were predominantly in the south and the research was focused on byways open to all traffic. FaberMaunsell emphasised the importance of a sample that was as free of bias as possible and of a reliable population from which to sample.

Mike Furness commented that data could be made available from the vehicle loggers on the Ridgeway. Nick King added that the study needs to tap into any other data that have been collected, for example in the Lake District National Park.

Tim Stevens identified the need to record damage by different users.

The scope for obtaining information from local highway authorities, for example on the network, maintenance and use was emphasised by several of the local authority representatives present. FaberMaunsell commented that some authorities, for example Northamptonshire County Council, had already provided useful information as they are in the pilot areas. Cheshire County Council provided some additional information at the seminar. The idea that FaberMaunsell should make a point of approaching local highway authorities was emphasised. Noted that the approach specifically includes discussions with local authorities.

There was a question as to whether the survey work could be extended to roads used as public paths if there were funds remaining. Both Defra/The Countryside Agency and the consultants commented that this was not possible as the legal rights of motor vehicles to use roads used as public paths was uncertain and the length of roads used as public paths was such that large resources would be needed.

David Gardiner questioned whether we would be better focusing on problem areas. The response from both Defra/Countryside Agency and the consultants was that this was a national research study that was trying to provide objective data on the scale and nature of use of byways open to all traffic in England as a whole. Focus on problem areas would tend to exaggerate the scale of any problem. However the size and spread of the sample means that some of the areas sampled would be likely to exhibit problems.

There was widespread agreement by all that illegal use of byways open to all traffic, notably by unregistered vehicles and by unqualified drivers, was a concern.

Illegal blockage of byways open to all traffic was a concern; an example was given where extension of gardens had obstructed a byway.

Break-out sessions

Two break out sessions were run.

Characteristics affecting levels of use and data sources

Some local highway authorities hold more detailed data for all byways open to all traffic in their area, for example the width of the right of way. This would be useful in cross checking the results we obtain from the moving observer surveys.

Suggestions were made that FaberMaunsell should look into the illegal use and obstruction of byways open to all traffic; for example a farmer may have placed a concrete block to obstruct the byway. This would be an illegal obstruction by the farmer. Where a 4x4 driver can avoid an obstruction, for example by going up the side of the bank and around the obstruction, this needs to be noted. The illegal use of byways open to all traffic by unregistered vehicles needs consideration

Where local highway authorities hold maintenance records for the sampled byways open to all traffic, these should be obtained.

A point was made that FaberMaunsell should consider looking at the gradient of the surrounding land, as this will affect drainage of byways open to all traffic. Note: this is included in the survey (flat, undulating, hilly and mountainous land).

Use of byways open to all traffic by hunt followers (note: and presumably anti-hunt protesters) was a concern. Information on whether the hunt meets in the area of any of the sample byways open to all traffic would be useful.

The recreational interest of a byway will be an important consideration; for example, does the byway lead to or from an area of interest, does it pass through an area of high landscape or nature conservation quality that is attractive for recreation? This could be picked up from OS mapping, on the moving observer surveys and by talking to local people.

English Nature and the National Trust suggested that they could look over the survey findings in each of the areas and compare it to any data for the area that they hold.

Suggestion that the local highway authorities may be able to assist in reviewing the data from the moving observer surveys.

An additional column is to be added to the spreadsheet for horse drawn carriages and heavy goods vehicles (those over 7.5 tonnes gross vehicle weight).

A suggestion was made about linking tractor marks with any field entrances along the byway; this could be considered when we analyse the data.

An additional column should be added in relation to signage; possibly separate these out into mandatory (for example traffic regulation order signs), cautionary and way marking.

Comments were made about the initial approach to the local highway authorities when requesting information. It has been suggested that communications between FaberMaunsell and local government could be facilitated by the County Surveyors' Society.

Suggestion that FaberMaunsell should take into account the historical aspect of sampled byways open to all traffic; this could potentially make a difference to issues related to any damage that could be caused. 'The Story of the King's Highway' by Sidney and Beatrice Webb was mentioned as useful background.

Stakeholder consultation

It was identified that there is only a limited amount of relevant survey data and reports available at either a local or national level. This may inform the study and help provide good contextual information; for example, 12 vehicle loggers are currently in use in the Ridgeway.

Parish and town councils were identified as being potentially useful contacts at a local level to provide information. It was considered important that they should be involved in the consultation process in some way.

It was identified that at some stage during the research, it would be important to inform the key stakeholders as to the locations being surveyed in order that they can then provide any location specific information to inform the survey. However, FaberMaunsell would need to be aware of informing stakeholders prior to the surveys in case this introduced bias into the resultant surveys.

Reference was made to the existence of some local management groups that could inform the study. However, these were considered to be limited in number.

It was outlined that as part of the setting up of Local Access Forums, a list of contacts and/or consultees could already be in existence and therefore assist in the consultation process.

In conclusion, FaberMaunsell would develop a consultation strategy in conjunction with Defra to best meet the requirements of the study.

Report back session and summary

In general it was accepted that the methodology for the study was sound with the use of the vehicle loggers providing good traffic count data on byways open to all traffic at a national level for the first time. The key point coming out of the seminar was the need to make best use of the knowledge of stakeholders, notably local highway authorities. There remained some concerns about limiting the coverage to byways open to all traffic rather than including roads used as public paths and unsealed highways but there is no easy way of extending this without compromising the results for byways open to all traffic.

Thanks and close

Susan Carter (Defra) thanked all for attending.

FaberMaunsell
20 June 2003

A predictive framework for byway use

The purpose of this Appendix is to provide a method for predicting the likely flow and make up of traffic at a point on a byway with a particular set of features. The framework assumes that traffic flow at that point is a function of:

1. the extent to which traffic at that point is prevented or discouraged by natural or man-made obstacles;
2. the extent to which traffic at that point is prevented or discouraged by traffic regulation orders;
3. the reliance on that part of the byway as a means of access to dwellings;
4. the reliance on that part of the byway as a means of access to business premises;
5. the reliance on that part of the byway as a means of access to land or buildings in connection with the management of land for agriculture, forestry, nature conservation or other purposes;
6. the attractiveness on that part of the byway to recreational users including its location relative to where those users are drawn from; and
7. the attractiveness of on that part of the byway as a through route for general traffic.

The framework is not a tool for predicting traffic on a byway as a whole. The moving observer surveys demonstrate that variation in the use made of a byway along its length is the norm rather than the exception. While recreational trips may typically be along the full length of a byway, traffic associated with access to dwellings or property or for land management is more likely to use only part of a byway.

The predictive framework is based on establishing the level of traffic for a particular purpose on the basis of a consistent set of criteria through establishing:

- whether traffic is obstructed or constrained by physical obstructions whether natural or man-made (see Table A);
- whether traffic is restricted by a traffic regulation order (Table B);
- the level of traffic from access to dwellings including farm dwellings (Table C);
- the level of traffic from access for land management purposes, i.e. for farming, forestry or nature conservation (Table D);
- the level of traffic from access to businesses that do not involve the management of land for farming, forestry or nature conservation (Table E). This will rarely be applicable and is included only for completeness;
- the level of traffic for recreational purposes (Table F); and
- the use of the byway by through traffic for any other purpose (Table G). This will rarely be applicable and is included only for completeness.

The sequence in each table needs to be completed in full and the resulting totals added to give the prediction of average annual daily motor vehicle traffic. Tables A and B are about factors that restrict or prevent traffic. Tables C to G are about predicting traffic associated with particular uses.

Obstructions

Typical obstructions encountered during the moving observer surveys that would prevent or restrict use included concrete bollards, locked gates, overgrowth of vegetation and streams. Some judgement is required as to whether these obstruct a byway to all motor vehicle traffic. For example:

- vegetation might obstruct a 4x4 motor vehicle but not a motorcycle;
- a bollard might obstruct a 4x4 motor vehicle but not a motorcycle; and
- a locked gate would obstruct a member of the public but not a land owner, occupier or other person with access to the key.

An obstruction may occur a single point, for example a locked gate, or may extend over a section of a byway, for example a section may be overgrown with dense vegetation. Where it occurs at a single point use of the remainder of the byway may be technically possible but absence of a through route may affect its value, particularly for recreation.

Table A : Predictive framework - Obstructions

No	Question	Response	Assessment of likely level of traffic
1a	Is the whole of the byway obstructed to the passage of all motor vehicles by overgrowth of vegetation, landslip, watercourse or other natural feature?	Yes	No motor vehicle traffic, and possibly no traffic of any kind, on the section affected unless the obstruction results in the creation of two cul-de-sacs which are unobstructed
		No	There may be motor vehicle traffic
1b	Is the whole of the byway obstructed to the passage of motor vehicles except motorcycles by overgrowth of vegetation, landslip, watercourse or other natural feature?	Yes	There may be some recreational or through motorcycle traffic. The assumption is made that all motorcycle traffic on a partly obstructed byway will be recreational or through traffic
		No	Traffic on the byway is not obstructed by natural feature
2a	Is the whole of the byway obstructed to the passage of all vehicles by a permanent man-made feature?	Yes	No motor vehicle traffic, and possibly no traffic of any kind, on the section affected unless the obstruction results in the creation of two cul-de-sacs. The byway may be obstructed without legal authority but the obstruction clearly constrains the traffic that would otherwise pass
		No	Traffic on the byway is not completely obstructed by man-made feature
2b	Is the whole of the byway obstructed to the passage of motor vehicles except motorcycles by a man-made feature?	Yes	Motorcycle traffic is possible
		No	Traffic on the byway is not obstructed by man made feature
2c	Is the man-made feature in the form of a locked gate or other removable feature under the control of the landowner, occupier or other party?	Yes	There may be traffic at the discretion of the landowner, occupier or other party
		No	No motor vehicle traffic, and possibly no traffic of any kind, on the section affected
3	Does the natural or man-made obstruction result in the creation of two cul-de-sac byways?	Yes	There may still be some traffic for dwelling access, recreation or land management
		No	The obstruction prevents all traffic whether legally or otherwise

Traffic regulation

Byways open to all traffic may be subject to traffic regulation orders that prohibit or restrict motor vehicles. These will not usually apply to traffic for land management purposes including access to property. Traffic regulation orders may be supported by obstructions, for example locked gates and bollards. Even where traffic regulation orders are in place there may be unauthorised traffic where the byway is attractive to motor vehicle users and the traffic regulation order is hard to enforce, for example there are no other byway users or local residents to report unauthorised use.

Table B : Predictive framework – Traffic regulation

No	Question	Response	Assessment of likely level of traffic
1	Is the byway subject to a traffic regulation order restricting its use by motor vehicles?	Yes	There may be exceptions to the traffic regulation order
		No	Traffic on the byway is not restricted by traffic regulation
2	Does the traffic regulation order except certain classes of traffic?	Yes	There will be some excepted traffic, for example for access
		No	Private rights of passage may still be exercisable on the byway even where it is subject to a traffic regulation order
3	Does the traffic regulation order restrict traffic at certain times or for a period of the year	Yes	There may be traffic outside these times
		No	Traffic is restricted at all times apart from excepted traffic or private rights
4	Is any person the owner or occupier of the land; or the owner or occupier of other land in the area; or a person who has the permission of the owner or occupier of the land able to exercise a right of passage	Yes	Despite the traffic regulation order some motor vehicle traffic may take place
		No	No motor vehicle traffic unless excepted
5	Is the traffic regulation order effective in restricting use by motor vehicles?	Yes	No motor vehicle traffic
		No	There may be some unauthorised motor vehicle traffic

Dwelling access traffic

An estimated 20% of traffic on byways open to all traffic is dwelling access traffic. Byways that do not serve as the means of motor vehicular access to dwellings will not carry dwelling access traffic. The moving observer surveys identified 351 dwellings that were accessed from the 400km of byway open to all traffic surveyed. This represented an average of one dwelling every 1.1km which might suggest that most byways carry dwelling access traffic. However the moving observer surveys found that many of these dwellings were in groups and that traffic to dwellings often affected only a short length of byway leading to the nearest road.

Where a byway open to all traffic connects one or more dwellings to the nearest road, it is likely to be subject to regular dwelling access traffic. While some daily service trips, notably postal delivery, may be common to a number of dwellings. However most trips, for example travel to

work, school and shopping and visitor trips, will be related to individual dwellings. The volume of traffic will generally increase in proportion to the number of dwellings. The assumption is made that trip generation to and from dwellings served by byways open to all traffic is similar to the average trip generation for all dwellings in England. In Section 5.7 a trip generation rate of 7.6 trips per day per dwelling was calculated based on the Trip Information Computer System (TRICS) database. This figure has been used as the basis for calculating motor vehicle trips for dwelling access purposes.

Table C : Predictive framework – Dwelling access traffic

No	Question	Response	Assessment of likely level of traffic	Level of traffic	Next step
Q1	Are there any dwellings that depend on the section of byway for access?	Yes			Go to Q2
		No	There will be no dwelling access traffic	None	
Q2	How many dwellings does the section of byway serve?		Daily traffic will be 7.6 times no of dwellings	7.6 times no of dwellings	Go to Q3
Q3	Is there a choice of routes to and from the dwelling(s)	Yes	Apportion the traffic between the routes on the basis of judgement about the likely routes used by residents and other traffic	As assigned	Go to Table D
		No	Assign all traffic to the available route	As assigned	Go to Table D

Land management traffic

An estimated 42% of traffic on byways open to all traffic is associated with land management. This is primarily for agriculture but may also include forestry and woodland management and nature conservation. Byways that do not serve land under agriculture, forestry, woodland or nature conservation may still carry traffic for land management purposes. However the moving observer surveys (see Table 5.10) identified that 78% of land fronting byways was under agriculture and 11% was woodland (including forestry). The remaining categories not covered elsewhere are heath or moor, scrub and marsh. While these will generate some land management traffic it is not likely to be significant although if the land is grazed or managed for sporting rights there will be some traffic.

Regular traffic associated with woodland management will be low. Forest Enterprise has indicated that byways open to all traffic are insignificant to foresters and that most foresters would build their own forest tracks. However much of the woodland identified in the moving observer surveys was in small blocks which are less likely to be actively managed for forestry. The best estimate of the regular traffic that such small woodland blocks is likely to generate is that it is fewer than 10 trips per year.

For all woodland and forestry activity will be greater during harvesting, thinning, coppicing and to a lesser extent planting. This will generally be over a short period of three months or less.

Appendix 8

During such periods traffic could be significant but will depend on the role of the byway, for example is it used to allow heavy goods vehicles to approach the woodland for loading, and the work pattern adopted, for example harvested logs may be stockpiled for a period before dispatch.

The predominant land use adjoining byways is agricultural and farm traffic will be significant. The level of farm traffic depends on whether the farm is arable, mixed or livestock and on the size of unit. This research has not allowed a precise method to be adopted for estimating the level of farm traffic but the following guidelines are suggested:

- For arable land with farm units exceeding 100ha where the byway is the main means of access flows will typically be around 4 motor vehicles per day per 100ha. This is based on the data from the alternative Suffolk logger site described in Section 5.3.5. The average daily flow of traffic from this site is 10.9 motor vehicles. The byway serves one dwelling and about 75ha of arable land. Because it is obstructed beyond this dwelling and farmland, recreational traffic is unlikely. On the assumption that the dwelling generates 7.6 trips per day the residual traffic generated by the arable land is 3.3 trips from 75ha of arable land. This figure should be treated with caution as the level of traffic associated with arable land may vary depending on a number of factors, for example the crops grown and the intensity of cultivation. However in round figures the researchers believe that a trip generation rate of 4 motor vehicles per 100ha is a useful indicator. Peak flows may be much higher than the above rate. For example the alternative Suffolk logger site generated a peak flow of 46 motor vehicles on a Wednesday in late August which the researchers believe is likely to be harvest related.
- For livestock the assumption is made that these will require daily attention. The best data for estimating this is the Bath and North East Somerset logger site. The byway concerned serves agricultural land in mixed use (60% pastoral and 30% arable). The byway serves no dwellings and a locked gate prevented recreational traffic except by motorcycles. The area of farmland served appears to be circa 75ha. Excluding motorcycles the average daily flow is 1.6 motor vehicles. Discussion with the farmer while downloading the logger suggested that he made one round trip a day to the land (equals two one way trips). In round figures a trip generation rate of 2 motor vehicles per 100ha is a useful indicator.
- For mixed arable and livestock units, the average of the above gives a trip generation rate of 3 motor vehicles per 100ha as an indicator.

Table D : Predictive framework – Land management traffic

No	Question	Response	Assessment of likely level of traffic	Level of traffic	Next step
Q1	Are there any farms, woodlands or other lands that rely on the section of byway for access?	Yes			
		No	There will be no land management traffic	None	Go to Table E
Q2a	Is the section of byway a main access route between a farm and its land?	Yes	Farm traffic will be significant and depend on whether the farm is arable, mixed or livestock and on the size of unit		Go to Q3
		No			

A predictive framework for byway use

Q2b	Is the section of byway a main access route to forestry or woodlands?	Yes	Woodland management traffic will be significant and depend on how actively the woodland is managed. Traffic will depend on whether the byway is a main access or only used intermittently at intervals of several years and on the area of land concerned	Estimate based on management regime.	
		No			
Q2c	Is the section of byway a main access route to other lands, notably those used for sporting purposes or nature conservation?	Yes	Other land management traffic will be significant and depend on how actively the land is managed	Estimate based on management regime	
		No			
Q3	Is the farming operation predominantly arable, livestock or mixed?	Arable	Traffic will be characterised by periods of low flows interspersed with higher flows over short periods to meet the needs of ploughing, planting, crop maintenance and harvest	Indicative flow of 4 motor vehicles per day per 100ha. Adjust to take account of known information about byway	
		Livestock	In winter there may be regular daily use in connection with livestock feeding. During periods of more intense activity, for example lambing, regular daily use. In summer there will be intermittent flows	Indicative flow of 2 motor vehicles per day per 100ha of improved pasture. Adjust to take account of known information about byway	
		Mixed	Base on a mix of the above	Indicative flow of 2 motor vehicles per day per 100ha. Adjust to take account of known information about byway	
Q4	Is the section of byway an access route between the farm and any part of its land but not a main access routes?	Yes	There will be some farm use that will depend on the use of the land and its area	Estimate using the flows in Q3 as a guide	
		No	There will be minimal land management traffic from farm access traffic		Go to Table E

Business access traffic not connected with land management

The moving observer surveys identified only 0.25% of byway frontage in the sample as being mainly in industrial or business use. Very few businesses, other than those involving land management, are likely to rely on byways open to all traffic for access. They are not likely to be significant but where they are present there is no alternative to individual survey of the businesses concerned to establish trip generation. In such cases traffic is likely to affect only the length of byway leading to the nearest road.

Appendix 8

Table E : Predictive framework - Business access traffic

No	Question	Response	Assessment of likely level of traffic	Level of traffic	Next step
Q1	Are there any businesses, excluding any form of land management, that depend on the section of byway for access?	Yes	Can be predicted only on the basis of the businesses concerned		Go to Q2
		No	There will be no business access traffic	None	
Q2	How many daily trips do businesses served by this section of byway generate?		Estimate trip numbers	Insert estimate	
Q3	Is there a choice of routes to and from the business(es)	Yes	Apportion the traffic between the routes on the basis of judgement about the likely routes used by traffic	As assigned	
		No	Assign all traffic to the available routes	As assigned	Go to Table F

Recreational traffic

An estimated 38% of traffic on byways open to all traffic is for recreation. The consultation with stakeholders suggests, not surprisingly, that recreational use is more likely to take place at the weekends. The recreational uses identified are:

- recreational use of the byway in which the experience of travelling along the byway is the recreation. Best summed up as ‘rambling in a motor vehicle’;
- use of byways to access country sports notably hunt following, shooting and fishing; and
- use of byways to access other land for a range of activities including climbing, canoeing, cycling wildlife watching and walking.

Table A8.1 lists the recreational flows estimated for the 20 logger sites and sets out the factors present that may have influenced those flows.

Table A8.1: Estimated average daily recreational flows at each logger site with summary of context

Logger site	Average daily flow for recreation	% of all motor vehicle use	Comment
Northamptonshire	0.3	31%	Lowland
			Subject to traffic regulation order and obstructed by locked gate Modest local network available Moderate interest Accessible
Oxfordshire	1.9	23%	Down Modest local network available Moderate interest Accessible

A predictive framework for byway use

Cornwall	0.4	33%	Lowland Good local network available High interest Less accessible
Wiltshire (Aldbourne)	3.5	44%	Down Good local network available Moderate interest Accessible
Wiltshire (Heytesbury)	4.5	30%	Down Good local network available Moderate interest Accessible
Wiltshire (Winterbourne Bassett)	3.0	58%	Lowland Good local network available Moderate interest Accessible
Bath and North East Somerset	0.2	13%	Down No local network available Not a through route Low interest Accessible
Hertfordshire	0.2	21%	Lowland Subject to traffic regulation order and obstructed by locked gate Modest local network available Moderate interest Accessible
Surrey	6.2	67%	Down Good local network available High interest Very accessible
Hampshire	2.0	92%	Lowland undulating Subject to traffic regulation order and obstructed by locked gate Modest local network available Moderate interest Accessible
West Berkshire	1.5	73%	Lowland woodland Good local network available High interest Accessible
Cambridgeshire (Chatteris)	0.1	43%	Lowland flat Modest local network available Low interest Accessible
Cambridgeshire (Burwell)	0.7	100%	Lowland flat Modest local network available Not a through route Low interest Accessible
Herefordshire	0.3	55%	Upland Poor local network available High interest Less accessible

Appendix 8

Northumberland	0.2	70%	Upland Poor local network available High interest Less accessible
Sheffield	0.5	33%	Upland Poor local network available High interest Accessible
Cumbria and Lake District	2.3	71%	Upland Poor local network available High interest Less accessible
Essex	1.4	12%	Lowland flat Modest local network available Low interest Accessible
Suffolk	0	0%	Lowland flat Obstructed by vegetation Poor local network available Not a through route Low interest Less accessible
Nottinghamshire	1.7	28%	Lowland flat Obstructed by vegetation Poor local network available Not a through route Low interest Accessible

The average daily flows for recreational use vary between nil for an obstructed byway (Suffolk) to 6.2 motor vehicles for a byway (Surrey) with high interest, a good local network of routes and accessibility to a large population. In the above table byways have been classed as less accessible where they are remote from the larger areas of urban population.

In considering the availability of a local network the presence of roads used as public paths with motor vehicle rights and unclassified county road needs to be included in the evaluation. Where it appears that a byway is a honey pot site higher flows than those listed may be appropriate (refer to the Ridgeway data in Table 5.21). Table 5.21 indicate an average daily flow for all traffic on the Ridgeway of 13.8 motor vehicles and an average daily flow at the busiest site of 22.8 motor vehicles. On the assumption that two thirds of this traffic is for recreation and the remainder for other purposes, principally land management, a upper average daily flow for recreational use on honey pot byways of 15 motor vehicles is a reasonable indicator.

A predictive framework for byway use

Table F : Predictive framework – Recreational traffic

No	Question	Response	Assessment of likely level of traffic	Level of traffic	Next step
Q1	Is the byway isolated from other byways and from significant population within 5km?	Yes	The byway is not likely to attract significant recreational use unless it serves a particular local function, for example to provide access to fishing	No significant use likely	
		No			Go to Q2
Q2	Is the byway isolated from other byways but close to significant population within 5km?	Yes	The byway may attract some local motor vehicle use which will depend on the size and socio-economic characteristics of the local population	Estimate use using recreational flows in Table A8.1	
		No			Go to Q3
Q3	Is the byway part of a significant network within a confined geographical area and is it attractive to motor vehicle users by reason of interest (landscape, visual, biodiversity or challenging conditions)?	Yes	The byway may attract both local motor vehicle use and that from further afield. The level of use will depend on a wide range of variables including the size and socio-economic characteristics of the local population, accessibility from other urban areas and attractiveness relative to other resources available	Estimate use based on comparison with recreational flows in Table A8.1	

Through traffic

Through traffic is likely only where the byway is in excellent condition and provides a useful short cut for road traffic. During the moving observer surveys no byways were identified that could be used in this way and the table is only included for completeness.

Table G : Predictive framework – Through traffic

No	Question	Response	Assessment of likely level of traffic	Level of traffic	Next step
Q1	Is the byway such that it could be in attractive to motor vehicle users as a short cut?	Yes	This will apply only where a byway is in excellent condition	Estimate based on knowledge of traffic on other local roads	
		No		No through traffic likely	

Use of the predictive framework

As presented here, the output of the predictive framework is an average daily flow for the section of byway concerned. The analysis could usefully be extended to predict peaks in flows for particular use types, weekly variations in flow and seasonal variations in flow but the data collected does not readily allow this. Furthermore much of the variation can be explained on the basis on the basis of generally known activity patterns. The following comments can be made about the main purposes for which motor vehicles are used on byways open to all traffic:

- dwelling access flows will be regular throughout the year with some reduction in holiday periods, because people are away. Weekend flows will be similar to weekday flows but the timing of trips at the weekend will differ, often trips in the morning will be later than during the week;
- land management flows associated with forestry and woodland will be irregular with rare sustained peaks many years apart associated with planting, thinning, coppicing or harvesting;
- land management flows associated with arable cultivation will follow an annual pattern. This will be irregular with short peaks a few weeks apart associated with ploughing, planting, crop maintenance and harvesting. Land management flows will be higher on weekdays than at the weekend although the demands of arable cultivation will lead to traffic on weekends to meet crop needs;
- land management flows associated with livestock rearing will in part follow an annual pattern, for example associated with taking hay from pastureland, and in part derived by the demands from livestock at different times of the year. There will be some regular traffic, for example associated with checking stock and milking, and additional irregular use with peaks associated with, for example haymaking, silage making lambing and calving. Land management flows will be higher on weekdays than at the weekend although the demands of livestock husbandry will lead to traffic on weekends to meet the needs of animals;
- recreational traffic in the form of travel on byways for its own sake will take place when participants have free time. Much of this will be at the weekend although consultation with motor vehicle user groups confirms that people, for example the retired, are active at other times. There is no clear seasonal peak with participants active throughout the year and some participants have suggested that they time their use to reduce conflict with other users;
- recreational traffic associated with country sports will follow an annual pattern associated with the sports in question. Fox hunting takes place from Autumn through to Spring. Fishing and shooting have close seasons. Country sports activity tends to take place throughout the week although people may have more free time to participate at the weekends; and
- recreational traffic associated with other activities may sometimes follow an annual pattern, for example canoeing on rivers is less restricted during the close seasons for fishing. Again people may have more free time to participate at the weekends.

The predictive framework is intended for application to specific byway sections. The moving observer surveys confirmed that there can be great variation between byways within a local area and even along a single byway. Application on an area basis or to a byway with changing characteristics will require separate analysis for each section with common features.

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