Highway Service Levels

by Vijay Ramdas, Craig Thomas (TRL limited)
Carole Lehman, Dan Young (Ipsos MORI)

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HIGHWAY SERVICE LEVELS

Version: 1

by Vijay Ramdas, Craig Thomas (TRL) and Carole Lehman, Dan Young (Ipsos MORI)

Prepared for: Project Record: CONTRACT PPRO 04/37/02
Highway Service Levels
Client: Local Transport and Funding Division
Department for Transport
(Edward Bunting)

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Executive summary

The Highway Service Levels project was set up by the Department for Transport to explore public opinions of paved surfaces on the Local Authority road network and to relate their requirements from the highway network to engineering standards currently used to manage the network. The overall aim was to start the process of getting the public mindset into the prioritisation process so that the services provided are better aligned to customer needs. The scope of the work was limited to getting an improved understanding, in qualitative terms, of the levels of service the public expected for the surface of carriageways, cycletracks and footways. User views and expectations of other aspects of the highway network (e.g. lighting, speed humps) were beyond the scope of this project.

Following an initial information review, public opinion has been explored in two stages. The first stage consisted of group discussions with a broadly representative cross-section of road users and face-to-face interviews with vulnerable users to examine the terms used by the public and to establish the factors that drive perceptions among different categories of users. These discussions essentially explored recalled attitudes (i.e. memories of completed journeys) and prompted attitudes (e.g. with defect photographs, video) to footway/carriageway condition. Twelve focus groups and nine interviews were carried out in three locations; Newcastle Upon Tyne, Northampton and Chichester.

The second stage consisted of accompanied journeys with individual users to identify the defects they actually noticed, their reactions to different levels of condition when they experienced them and their priorities for maintenance. A total of 66 journeys were carried out with pedestrians, cyclists, motorcyclists, motorists and Heavy Goods Vehicle (HGV) drivers. The pedestrian and cyclist journeys were carried out on an urban network of minor (C and U) roads in Northampton and the remainder of the journeys on a mainly rural network of middle to low hierarchy (B and C) roads in West Sussex.

This Report summarises the results of the study and is based on the views expressed by the users who participated in the discussions, interviews and accompanied journeys. Road surfaces are generally not in the consciousness of road users and they normally do not notice them, assuming them to be ‘fit for purpose’. For the study, therefore, participants were asked to focus on surface conditions and this sets the context for all justifications presented in the report. Overall the participants were knowledgeable, with strongly held views on the expectations of the road network. In general, the participants showed a wide scale of tolerance to different levels of condition and were, under some circumstances, tolerant of condition that is considered poor by engineering standards.

The main findings of the study are:

- There is growing recognition in the UK and other countries, of the need to improve our understanding of user requirements to deliver public services effectively and efficiently. Local Authorities carry out annual user satisfaction surveys to gather public opinion on issues related to the highways. However none of the surveys specifically aim to relate user needs and engineering standards.
- The type of road user is a key driver of perceptions of road surface condition. The elderly and disabled (whether pedestrians, private motorists or passengers) notice road surfaces more than any other group. Motorists notice surfaces less than all other groups.
- Public mindsets about road condition are influenced by a number of factors, including experiences of a wider road network beyond the immediate locality and non-condition related factors. In the study, participants’ initial responses based on recalled attitudes tended to be more negative than the views expressed after reflection/discussions. This has implications for the routine customer satisfaction surveys carried out by the Local Authorities as these surveys record only the initial responses and there is probably a need to examine the format and design of questionnaires for future surveys.
- The two main condition drivers that influenced user opinions and satisfaction were ‘safety’ and ‘ride comfort’. Users expected to use the highways without actually noticing the surface they were travelling on. In general, any condition aspect that caused them to react to the surface condition and took their attention away from driving was construed as unsafe and unacceptable.
The acceptability of a road or footway surface is more complex than whether a surface is in good or bad condition. All the participants accepted that not all surfaces can be perfect and ‘bad’ or ‘poor’ surfaces were not always unacceptable surfaces. They were willing to tolerate some level of deterioration and accept trade-offs (e.g. carriageways rather than footways, patches rather than new surfacing). The actual scales of tolerance, or when users believe a length of carriageway or footway needs to be maintained relates to more than just condition.

The quality of the maintenance and repair also impacts on acceptability. Repairs should provide a good surface for a long period (from 10 to 15 years), even if it means closing the road to carry out the repairs. However, closures should be properly communicated to road users. This may come in the form of signs both before and during maintenance, informing the users about issues related to what is being done, the reasons for the roadworks, the expected duration of the disruption and the availability of alternative routes.

Utility companies are commonly blamed for poor repairs. They are seen to use materials inferior to those already in place. As such, road users call for utilities to be held more accountable for the damage they cause and for procedures to ensure that reinstatements bring the surface back to its original condition.

The perceptions of pedestrians in this study broadly agreed with the views reported from earlier surveys. Trip hazard (trip >10mm) was the main aspect that concerned the participants. Elderly and disabled pedestrians were also concerned by the lack of kerbs and the use of tactile surfaces at crossings. The latter was thought to be particularly uncomfortable and affected the balance of less steady users. There was only limited alignment between the participants’ perceptions of maintenance needs and engineering assessment (based mainly on Coarse Visual Inspection (CVI) data) of the maintenance needs of the footways. The differences in measured and perceived data may be due to the subjective nature of visual surveys and the increased awareness of the participants to condition.

The cyclists were mainly concerned about step changes (step > 20mm) in their line of travel caused by potholes, sunken or raised ironworks, failed patches and debris on the carriageway. The available CVI data for the cycle route did not align with the unacceptable defects identified by the cyclists. More targeted surveys (e.g. focussed on the cycle paths) are needed to ensure that the requirements of this category of vulnerable road users are adequately addressed.

The types of defects identified by the motor vehicle users on the route of B and C class roads used for the accompanied journeys were:

- Motorcyclists – Lack of grip, uneven/bumpy surfaces, overbanding, tramlines and the location and condition of ironworks and potholes;
- Car drivers and passengers – Slippery surfaces, bumpiness and its effect on safety and ride comfort;
- HGV drivers – Lack of grip and edge deterioration; also, carriageway width and impact of the HGVs on carriageways and surfaces not designed to carry HGVs.

Participants’ perceptions of condition have been compared with the measured condition data represented by standard Surface Condition Assessment for the National NEtwork of Roads (SCANNER) parameters (except cracking) and 3 additional SCANNER parameters under development. ‘Bumpiness’ and sudden, unexpected ‘jolts’ were identified as the main issues by the drivers of motorised vehicles:

- In general, the lengths users believed had poor ride quality also had high values for 3m and 10m Longitudinal Profile Variance (LPV), i.e. user perceptions of poor ride quality aligns well with 3m and 10m LPV;
- The bump measure also aligns well with user perceptions and high LPV values;
- There was no significant rutting on the route and therefore it has not been possible to relate this parameter with user perceptions;
- Lack of grip is an issue of concern for all users and perceptions of poor grip are driven by factors such as visual appearance (e.g. shiny surface), type of treatment (e.g. ...
overbanding) and debris (e.g. mud). On the study route, the locations of some of the comments on poor grip aligned with lengths where the measured texture was poor. It is not expected that users will always be able to easily judge lessening of grip;

- The other parameters, transverse unevenness and Edge Deterioration Index, do not align with user perceptions and may be appropriate only as engineering parameters.

- The Road Condition Index (RCI) values calculated using SCANNER algorithms were also compared with the qualitative opinions of the users regarding the lengths in need of maintenance. While lengths categorised by users as poor all had high RCI values, the converse was not true. Users’ levels of acceptability of condition and the need for maintenance on longer lengths are related to more than just the condition. Condition that is deemed to be unacceptable in one location could be acceptable in another. For example, users expect and tolerate less smooth roads on speed restricted roads and urban environments.

- User hierarchy for roads and their expectations and requirements are influenced by their interpretation of where the road fits within that hierarchy. The users’ hierarchy appears to be different to the standard categorisation of roads on the network and is related to factors such as traffic flow, speed, carriageway width, road geometry and the environment. Current Best Value Performance Indicators (BVPI) and the RCI do not appear to reflect user thresholds for further investigation or maintenance. A way forward would be the development of user BVPI taking account of user categorisation of road classes and expectations.

- The methodology used in the study has been successful in providing a qualitative view of user expectations of carriageway and footway condition and how they relate to the engineering parameters currently in use. The study has been limited by the categories of road class considered in the study and the defects on those roads. Further investigation is required to determine quantitative estimates of user scales of tolerance and thresholds for maintenance.
1 Introduction

This Report has been prepared for the Local Transport Strategy and Funding Division, Department for Transport (DfT), and is the final output under Contract PPRO 04/37/02, Highway Service Levels. This work was undertaken by TRL Limited (TRL) with Ipsos-MORI (MORI), specialists in the application of techniques to determine public satisfaction levels.

The Prime Minister’s Public Service Reform programme has customer focus as a key principle, ensuring better, customer focussed public services by giving users a greater say in the design and delivery of services, and requiring managers to demonstrate that standards are set to deliver value for money and take account of customer needs and aspirations.

Road networks are provided for the benefit of its users and there have been significant changes in the context within which local highway authorities are charged with the maintenance of their highway assets. This is reinforced in the Code of Practice for Highway Maintenance, Well-maintained Highways, which includes as a key objective, “To encourage a focus on the needs of users and community and their active involvement in the development and review of policies, priorities and programmes”. This requires managers of local road networks to understand user expectations of the quality of service and their relative priorities for maintenance.

Standards for the construction and maintenance of the highway network have evolved over many years and are mainly based on engineering interpretation of performance, safety criteria and the costs of providing and maintaining specified levels of condition. Physical measurements of highway condition (e.g. from Surface Condition Assessment for the National NEtwork of Roads (SCANNER) surveys) are the drivers for setting targets (e.g. Best Value Performance Indicators) and making maintenance decisions. However, there are no procedures for feeding road users’ expectations of network condition into the process for setting Standards or making maintenance decisions.

This project was commissioned by the DfT to provide guidance to Local Authorities on the role of road user requirements and aspirations in maintaining and managing the surface condition of the paved surfaces (carriageways and footways) of the road network. User views and expectations of other aspects of the highway network (e.g. lighting, traffic congestion) were beyond the scope of this project. The overall objectives of the Highways Service Levels project were to:

- Get a better understanding of the factors that drive perceptions of road surface condition among different types of road users;
- Establish how these factors relate to the parameters used by Local Authorities to measure and report on network condition;
- Identify the scales of tolerance of users to surface condition and establish the link between thresholds for maintenance that are based on engineering knowledge and road user views.

The project has been divided into three Tasks:

- Task 1 – Information Review of current knowledge and available research on public expectations;
- Task 2 – Qualitative research based on group discussions and interviews to explore public perceptions of road surface condition, their expectations with regard to acceptable levels of condition and the language used to describe the surfaces;
- Task 3 – Accompanied journeys to further explore user reaction to surface condition as and when they are being experienced and relate their requirements to measured condition.
This report summarises the results of the study and is based on the views expressed by the users who took part in the discussions, interviews and accompanied journeys.

2 Information Review

The main objective of the review was to identify existing information on user expectations and experiences as well as their priorities in relation to their use of the road network. While the focus has been mainly on studies carried out within the UK, selected studies from other countries, particularly relevant to the current project have been included. The Review examined:

- Previous research carried out on user perception studies among members of the general public in the UK on aspects related to the condition and maintenance of road networks;
- Published information from other related studies identified using search engines from the TRL Library and Knowledge Base;
- Discussions with engineers from a number of Local Authorities to get a broad national perspective on the management of their road networks;
- Data from relevant earlier studies carried out by TRL and MORI examining the way the transport infrastructure and its provision are perceived by members of the public.

A considerable amount of research has been carried out into public perceptions and aspirations of the travelling public. In general the studies have been aimed at establishing overall perception and satisfaction with the service provided and not at the detailed level of condition of different aspects of condition.

2.1 Road user satisfaction surveys

Over the last few years there has been an increasing emphasis on the need to demonstrate that public organisations provide value for money by delivering services that meet customer needs and expectations. Local Authorities and the Highways Agency (HA) carry out regular social research/user satisfaction surveys and the observed trends of public satisfaction are seen as a measure of their performance. The Road Users’ Satisfaction Survey (RUSS) carried out by the HA is designed specifically to measure user awareness and satisfaction with various aspects related to the management of the Trunk Road network while the surveys carried out by the Local Authorities generally tend to cover the wider range of services performed by the councils, including the management of local roads and footways. For example, in 2003, Local Authorities all over England carried out a resident’s satisfaction survey to measure how satisfied people are with the services (e.g. transport, education, social services, cultural and recreational services etc) provided by their Councils.

Appendix J in the Code of Practice for Highway Maintenance Management (Roads Liaison Group, 2005) gives advice to Local Authorities on methods of customer consultation. All Local Authorities carry out user surveys, using the techniques mentioned, as part of the input required for the preparation of Transport Asset Management Plans. The range of topics and the depth of information covered by the surveys are different across the various authorities. In general however, they assess user satisfaction with the services provided through their records of faults reported by road users and claims for compensation. For this review, information on user satisfaction surveys has been obtained from research carried out by MORI, data obtained through the consultation meetings with Local Authority engineers and from a literature search.

2.1.1 Satisfaction with road maintenance – MORI research

MORI has surveyed attitudes towards road maintenance in Great Britain, through the County Surveyors’ Society (CSS), Commission for Integrated Transport (CfIT) survey, and local government residents and BVPI surveys.
MORI has been tracking public opinion on transport in Britain for the County Surveyors’ Society for over a decade and one of the key areas the survey looks at is public satisfaction with roads and road maintenance. Trends to date show that satisfaction with road maintenance, though improving, still falls well below that of satisfaction with the road network itself.

The surveys have normally been carried out as face-to-face interviews with a representative number of residents in their homes and form only a part of surveys that cover all the council services and aim to gauge how satisfied residents are with the council’s performance and their priorities with regard to council services. The surveys have shown the importance of road maintenance for residents who usually rate it within the top three of the services councils provide.

The general national pattern since 1991, when the survey was first conducted, has been that more people are dissatisfied than are satisfied with road maintenance. The lowest level of satisfaction with maintenance was recorded in 1991 (-26% net satisfied) but this had improved by 2000 (0% net satisfied), when the proportions of respondents stating they were satisfied or dissatisfied was the same. However, as Figure 1 shows satisfaction levels then decreased between 2001 and 2003. The scores have shown consistent improvement since 2003, and in 2005, for the first time, the net satisfied score was positive, (i.e. a higher proportion of respondents stated they were satisfied than dissatisfied). In 2006, satisfaction with the road network and road maintenance in particular has increased significantly over the previous year to 27% and 22% respectively. However, satisfaction with road maintenance still falls well below that of satisfaction with the road network itself.

![Satisfaction with roads - trends since 2000](image)

**Figure 1: Public satisfaction with roads**

Levels of satisfaction were found to be influenced by congestion, and those experiencing congestion within a 5 miles radius of where they lived expressed less satisfaction (50%) than those who did not experience congestion (66%). Among different types of road users, cyclists were a little more likely to be satisfied with the road system than motorists or motorcyclists. The 2006 survey found that smoothness of ride/walk is the most important criterion by which highway assets are judged by users.

Within this overall trend, there is a marked regional variation in satisfaction with road maintenance. As an example of regional detail, results for 2003 are shown in Table 1. Dissatisfaction is highest in the Eastern region in England and in Scotland (-32% and -31% net satisfied respectively). In comparison, London has the highest levels of satisfaction and the only positive net score (+30%).
Table 1: Satisfaction with road maintenance – regional variations

<table>
<thead>
<tr>
<th>Region</th>
<th>Satisfied (%)</th>
<th>Dissatisfied (%)</th>
<th>Net satisfied (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern</td>
<td>26</td>
<td>58</td>
<td>-32</td>
</tr>
<tr>
<td>Eastern Midlands</td>
<td>38</td>
<td>51</td>
<td>-13</td>
</tr>
<tr>
<td>London</td>
<td>56</td>
<td>26</td>
<td>+30</td>
</tr>
<tr>
<td>North East</td>
<td>28</td>
<td>53</td>
<td>-25</td>
</tr>
<tr>
<td>North West</td>
<td>37</td>
<td>51</td>
<td>-14</td>
</tr>
<tr>
<td>South East</td>
<td>34</td>
<td>54</td>
<td>-20</td>
</tr>
<tr>
<td>South West</td>
<td>32</td>
<td>54</td>
<td>-22</td>
</tr>
<tr>
<td>West Midlands</td>
<td>37</td>
<td>50</td>
<td>-13</td>
</tr>
<tr>
<td>Yorkshire &amp; Humberside</td>
<td>32</td>
<td>57</td>
<td>-25</td>
</tr>
<tr>
<td>Scotland</td>
<td>29</td>
<td>60</td>
<td>-31</td>
</tr>
<tr>
<td>Wales</td>
<td>39</td>
<td>48</td>
<td>-9</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>50</td>
<td>-14</td>
</tr>
</tbody>
</table>

Base: Adults aged 15+ (c. 2000 per year), 2003  
Source: MORI

Results from the MORI survey for CfIT in 2002 (CfIT, 2002), which measured satisfaction with road maintenance in England, are shown in Table 2. Here again, satisfaction is overall negative, with around a quarter of the general public satisfied with road maintenance and over half dissatisfied, giving a net satisfied score of -28% for England. At the regional level, satisfaction is highest in the East of England and lowest in the South West. Those in rural areas are also less satisfied than those in urban locations or London (which has a negative score in contrast to the CSS survey). In addition, those in the middle age groups are less satisfied than younger respondents and car users are more negative than non-car users.

Table 2: Satisfaction with road maintenance (England)

<table>
<thead>
<tr>
<th>Region/Environment/Age/User</th>
<th>Satisfied (%)</th>
<th>Dissatisfied (%)</th>
<th>Net satisfied (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West</td>
<td>22</td>
<td>69</td>
<td>-47</td>
</tr>
<tr>
<td>Midlands</td>
<td>27</td>
<td>58</td>
<td>-31</td>
</tr>
<tr>
<td>South East</td>
<td>25</td>
<td>54</td>
<td>-29</td>
</tr>
<tr>
<td>North</td>
<td>29</td>
<td>53</td>
<td>-24</td>
</tr>
<tr>
<td>East of England</td>
<td>32</td>
<td>49</td>
<td>-17</td>
</tr>
<tr>
<td>England (Total)</td>
<td>27</td>
<td>55</td>
<td>-28</td>
</tr>
<tr>
<td>Rural</td>
<td>24</td>
<td>63</td>
<td>-39</td>
</tr>
<tr>
<td>Urban</td>
<td>28</td>
<td>55</td>
<td>-27</td>
</tr>
<tr>
<td>London</td>
<td>27</td>
<td>50</td>
<td>-23</td>
</tr>
<tr>
<td>Age 16 – 34</td>
<td>32</td>
<td>49</td>
<td>-17</td>
</tr>
<tr>
<td>Age 35 -54</td>
<td>23</td>
<td>60</td>
<td>-37</td>
</tr>
<tr>
<td>Age 55 – 64</td>
<td>26</td>
<td>57</td>
<td>-31</td>
</tr>
<tr>
<td>Age 65+</td>
<td>29</td>
<td>54</td>
<td>-25</td>
</tr>
<tr>
<td>Car User</td>
<td>27</td>
<td>56</td>
<td>-29</td>
</tr>
<tr>
<td>Non car user</td>
<td>29</td>
<td>39</td>
<td>-10</td>
</tr>
</tbody>
</table>

Base: All respondents (1725), CfIT 2002  
Source: MORI
MORI also measured satisfaction with road maintenance at the County level and Table 3 shows the data for County Councils in the three years, 2001, 2002 and 2003. Again there is significant variation in the levels of satisfaction between the counties, with the net satisfaction scores ranging between +22% and -40%. Two counties, Leicestershire and Lancashire, have positive net balances and Kent has the lowest level of satisfaction.

Table 3: Satisfaction with road maintenance (Counties)

<table>
<thead>
<tr>
<th>Council</th>
<th>Year</th>
<th>Satisfied (%)</th>
<th>Dissatisfied (%)</th>
<th>Net Satisfied (%)</th>
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<td>43</td>
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</tr>
<tr>
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<td>2003</td>
<td>45</td>
<td>41</td>
<td>+5</td>
</tr>
<tr>
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<td>44</td>
<td>-4</td>
</tr>
<tr>
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<td>40</td>
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<td>-6</td>
</tr>
<tr>
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<td>2002</td>
<td>39</td>
<td>46</td>
<td>-7</td>
</tr>
<tr>
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<td>2003</td>
<td>34</td>
<td>46</td>
<td>-11</td>
</tr>
<tr>
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<td>-28</td>
</tr>
<tr>
<td>Northamptonshire</td>
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<td>-30</td>
</tr>
<tr>
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<td>61</td>
<td>-36</td>
</tr>
<tr>
<td>Kent</td>
<td>2001</td>
<td>23</td>
<td>53</td>
<td>-40</td>
</tr>
</tbody>
</table>

Base: MORI resident surveys

Examples of particular Local Authority surveys illustrating the types of information obtained are given in Appendix A.

2.1.2 Highways Agency user surveys

The HA has been carrying out yearly surveys of customer satisfaction, Road Users Satisfaction Survey (RUSS) since 1995 using focus groups and face-to-face interviews with people at their homes. The HA is planning to extend the survey to include telephone interviews in order to achieve larger sample sizes. In addition to the annual surveys the HA has also sponsored a number of research projects related road user perceptions. Brief descriptions of 3 HA projects are included in Appendix A.

2.1.2.1 Road user satisfaction surveys

The results of the survey are published on the HA website and the information is used as an indicator of the Agency’s Annual Performance. RUSS covers a number of aspects related to the trunk road network including user perception of safety, satisfaction with maintenance, attitudes to litter and debris on paved surfaces and noise levels. The survey measures general satisfaction with HA roads, but does not go into details of specific defects such as potholes, cracking, or patches.

The network is split into all purpose trunk roads and motorways and respondents are asked about their:

- Expectations – What quality of service they expected;
- Satisfaction – How well the Agency delivered that service in their most recent journey.

Motorists are almost unanimous in perceiving traffic congestion as the major problem. Overall, there is a higher level of satisfaction with trunk roads compared to local roads. Some of the key findings of the 2004 RUSS (Highways Agency, 2004) related to road surfaces were:

- Road surfaces were a particular safety concern for motorcyclists and nervous drivers;
• Ruts in the road surface and the transition between two different types of road surface made road users feel unstable, particularly motorcyclists;
• In wet weather, ruts were a concern for all road users as water collected in them and increased the amount of spray on the roads, reducing visibility;
• Road surfaces with loose stones were a serious concern for motorcyclists, making them feel particularly unsafe because they flew up and hit them as they drove over them;
• Road surfaces being free of litter and debris was very important to users;
• Quietness of the road surface is also important (but received a lower score on importance compared to the surface being free of litter and debris).

In addition to the general public, the HA also carry out a survey of business users called the Intensive Business Users Satisfaction Survey (IBUSS). The results from this indicate that intensive business users are more satisfied with the Agency's performance regarding the reduction of accidents than other road users. Both intensive business users and other road users felt that the Agency was performing better at reducing the number of accidents than it was at maintaining roads and providing and maintaining emergency phones.

2.2 Vulnerable users

Vulnerable users of the road network include pedestrians, cyclists and horse riders. In general safety is the main concern for this category of users and this is reflected in the results from the studies.

2.2.1 Footways

The Footways and Cycletrack Management Group (FCMG) (www.footways.org) is one of four technical groups reporting to the UK Roads Board. The Steering Group consists of representatives of local and regional government, DfT, Highways Agency and industry experts. The group is one of the key bodies driving research on footways and cycle tracks. Research sponsored by the group in the nineties included surveys of user perceptions of footway condition and an attempt to correlate this with measured condition data. There have been no recent updates of this work.

In 1989, a user survey (Leake, May, Pearson, 1991) was carried out at 14 footway sites in Sheffield. This identified the main aspects regarding footways that caused users concern to be:

• Undulations;
• Raised edges;
• Friction;
• Broken flags;
• Gaps between flags;
• Poor quality of repairs;

A follow up survey in Sheffield (Spong, Cooper, 1994) repeated this earlier survey and then compared the results against measured profile data. Large and small flag footways were examined. The order in which the questions were asked was reversed for 50% of the participants in order to eliminate bias. Main findings from the study about user views and expectations of footway condition were:

• Transverse variations are more important than longitudinal variations;
• Trips > 10mm are a good indicator of poor condition (compared to trips >5mm but <10mm);
• Best correlation between measured data and public perception occurred when unevenness was considered rather than just trips.
A third survey (Spong, 1998) was carried out at 12 sites in Reading and 12 sites in Leeds to expand on the earlier Sheffield footway surveys. Once again profile data and footway user ratings were compared and a key finding of the study was that users are particularly susceptible to unevenness in the transverse direction. The results were used to develop a model to predict user ratings based on the measured condition parameters and there was good correlation between the model and user views.

More recently, as part of the work sponsored by the FCMG, TRL has developed condition indicators to aid in the assessment of footways and cycle tracks. These are designed to include user perception aspects in addition to engineering defects. Over 60 footway defects were identified (Zohrabi, 2002) and divided into user-related surface defects and personal security, user satisfaction and comfort defects based on Safety, Accessibility, Comfort and Environment parameters. The condition indicators were combined to give an overall score for each of these categories. There are different thresholds for the different footway categories.

2.2.2 Pedestrian Environment Review System

The Pedestrian Environment Review System (PERS) is a software audit tool developed by TRL to assess footways, crossings and pedestrian areas from users’ points of view. It includes all aspects of a footway journey such as footway design, lighting, litter, street furniture, availability of seating etc. It also includes footway quality, which has a high weighting and footway maintenance which has a baseline weighting (weighting bands are critical, high and baseline).

The tool has been used to examine the walking environment of the street scene in a number of town centres through a systematic review including discussions with stakeholders to gain views and comments on the walking environment. Footway condition is one of many aspects discussed (e.g. are there any locations where the footway is uneven or does not drain?). The street audits have shown that the condition aspects that cause concern to users include:

- Uneven paving representing a trip hazard;
- Lack of dropped kerbs at crossings, causing difficulties particularly for the disabled user;
- Camber and narrowness of footways;
- Flooding.

2.2.3 Living Streets

Living Streets (formerly called the Pedestrian Association) is a charity organisation that promotes the development of streets to encourage walking. As part of its work to raise awareness of the walking environment, it performs footway audits and gathers the opinions of local residents and visitors for Local Authorities on sections of the footway network that are of particular concern (Living Streets, 2006). The audits cover a wide range of aspects associated with the street environment, such as footway width, surface condition, seating, street furniture, crossings, layout, fly-posting, cleanliness, i.e. the audits examine the whole street scene but do not go into any level of detail specifically on the surface condition of footways. Studies have been carried out in a number of locations, including South Bridge, Edinburgh and Clitheroe Town Centre, Lancashire and the methodology used by Living Streets included:

- Meetings with invited stakeholders and council officers to discuss the issues involved;
- Walking the section of street with local people in daylight and evening to gather their opinions;
- Presenting the preliminary conclusions of the audit to the public (e.g. by setting up a stall) and asking for their comments.

The conclusions of their audits were that in the users’ views, the surface condition characteristics that would encourage walking are:
• Uniform even walking surfaces;
• Access covers that are flush with the surface;
• Absence of litter, commercial waste and gum on footways;
• Better quality repair work;
• Absence of ponding;
• Improved crossings for wheelchair users.

2.2.4 Less-able highway users

The condition of footways can be a barrier to mobility for older and disabled pedestrians affecting their independence and social inclusion. In a recent survey of disabled people by the Disabled Persons Transport Advisory Committee (DPTAC) (DPTAC, 2002), transport was seen as the top problem (48%), before crime (22%), the environment (16%) and social services (16%). Disabled people are more likely to make use of public transport than able-bodied people. They use cars 47% less often than the general public as a whole and when they do use cars they are more likely to be passengers than drivers. Older people also often make more use of footways and tend to be more aware of the condition of the footway as they are more concerned about their safety and the possibility of falling.

The survey found that disabled people were generally dissatisfied with the condition of road carriageways and footways:

• 65% were dissatisfied with footway maintenance, including 34% who were very dissatisfied;
• 58% were dissatisfied with road maintenance, including 27% who are very dissatisfied.

Visually impaired people were more likely to be dissatisfied with roads and footways than other disabled users and about half (48%) the disabled people said they would go out more if the conditions for walking were better.

In a study of older peoples’ transport needs by the Department of Environment, Transport and the Regions (DETR, 2001) poor footway maintenance was raised a number of times during focus groups. Users would like prompt repairs to footways and a central telephone number for reporting potential hazards such as broken slabs. The study, carried out in Camden (London), Waverley (Surrey) and Carmarthen (Wales) with people over 60 years old, consisted of six focus groups, face-to-face interviews, discussions with stakeholders and a literature review. Key priorities identified by the study were:

• Users would like prompt repairs to footways;
• Dropped kerbs at crossing points and for these to be properly maintained (particularly for wheelchair and pushchair users);
• Tactile paving at crossings for visually impaired users;
• Joints between flags/cobbles, as these cause problems for stick users;
• Slip resistance and drain covers can cause problems;
• A central telephone number for reporting potential hazards such as broken slabs.

2.2.5 Cyclists

Qualitative and quantitative studies into cycling in London by Transport for London (TfL) have shown that one of the key barriers preventing more people from cycling in London is people’s attitude to cycling itself. MORI (MORI, 2005c) has carried out a qualitative study to address these attitudinal barriers and establish an effective way of improving attitudes to cycling in London. Participants in
outer and inner London reflected a range of different ages, life stages, genders, ethnicities and socio-economic groups. Recruitment procedures for the surveys also ensured a mixture of those who use different modes of transport (bicycles, cars, motorcycles, bus, tube, train, walking) and those working in inner and outer London. Perhaps most importantly, attendees had a range of attitudes to cycling and broadly represented TfL’s segmentation of Londoners’ cycling behaviours and attitudes. The study explored participants views on barriers to cycling in London and some the barriers identified included perceived ‘danger’ (primarily from accidents, but also from assault for women), lack of facilities at work for those who might consider commuting to work on a bike, weather and availability of other modes of transport (e.g. cars in outer London and public transport in inner London). It is interesting to note that although other user satisfaction surveys have identified aspects of surface condition (e.g. unevenness, litter and debris) as a cause of concern to cyclists, in this study poor surface condition of the travel lanes was not identified as a barrier to cycling.

In Scotland the Scottish Executive set up a study to explore the attitudes of drivers and cyclists towards each other (Granville et al, 2001). The objective was to establish the problems and barriers to viewing others as equal road users. The study was specifically planned to exclude engineering or enforcement solutions to solving road conflicts. The study included a review and an extensive programme of exploratory qualitative research, group and in-depth interviews among different types of road user.

The studies were carried out in Edinburgh (because of its long standing cycle friendly policies with modifications already made to the network in the city) and Aberdeen (because of its non-central location and more recent moves to increase provision for cyclists). Specific sites which were perceived to have the potential for road user conflict (e.g. congested lengths in urban situations) and also those providing different road conditions in terms of the allocation of road space, were selected. Participants included all user types (e.g. cyclists, motorcyclists, and private car and commercial vehicle drivers) and were recruited on the basis of having used the chosen sites.

Key findings of the study:
- Cyclists perceived themselves as equal to other road users but this status is not offered to them by others (although motorcyclists are regarded as being on a par with other motorised vehicle drivers);
- The failure of a small number of cyclists to observe the basic rules of the road when cycling contributes to a poor perception about all cyclists by drivers. Cyclists have a fairly good perception of car drivers;
- Some conflict situations were created by the poor state of repair of the road, failure to understand the difference between mandatory and discretionary provision of cycle lanes and weather conditions.

2.2.6 Horse riders

Recent reports on consultations with horse riders and their representative Groups (e.g. British Horse Society, BHS) have been related to concerns about the growing use of thin surfacings (e.g. Stone Mastic Asphalt, SMA) on rural highways. The grip between the metal horse shoe and the surfacing is a key safety issue. The perceived slipperiness due to the negative texture of surfacings such as SMA resulted in the consultation exercises.

The BHS has reported on complaints received from riders of problems regarding roads surfaced with SMA and have a questionnaire on their website to gather information on incidents related to surface condition of carriageways. The CSS and BHS have jointly commissioned research into the interaction between horses’ feet and SMA surfacing and as part of this work a consultation exercise was carried out with questionnaires distributed to Highway authorities. The study has resulted in the publication
of a Guidance Note (CSS / British Horse Society, 2005) on surface treatments that take account of the safety concerns of horse riders due to slippery road surfaces.

2.3 Discussion meetings with Local Authorities

A number of Local Authorities conduct customer satisfaction surveys that include aspects related to local road networks. Information on issues related to the surface condition aspects of carriageways, footways and cycletracks was obtained through discussions meetings with Local Authority engineers. The discussions focused on surface condition aspects of carriageways, footways and cycletracks:

- Condition data, maintenance thresholds and engineering practices;
- Customer surveys and their role within maintenance management.

Three meetings were held in Durham (North), Matlock (Midlands) and Guildford (South) to ensure broad national coverage. The meetings were set up as group meetings with representatives from adjacent authorities and a list of the authorities who participated in the meetings is given in Table 4. The aim was to ensure that urban, rural and metropolitan authorities were all represented and each region would have a minimum of three authorities taking part in each meeting.

<table>
<thead>
<tr>
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<th>Local Authority</th>
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2.3.1 Condition of paved surfaces

The introduction of SCANNER surveys on the Local Authority road networks and defined survey requirements for the 2005/06 Best Value Performance Indicators (BVPI) have resulted in an improved level of consistency in the condition data available across all the Local Authorities. The target for the end of 2005/06 was to have SCANNER data for 100% of nearside lanes, in both directions for A-roads, 100% of B-roads in one direction and 10% of the nearside lane of C-roads in one direction. In summary the condition data available included:

- SCANNER data for A, B roads and 10% of C roads (one direction only)
- Visual survey data for unclassified roads
Deflectograph data
Skid resistance (e.g. SCRIM or Grip tester)
DVI data for footways

In general, data for cycle tracks is available only where these tracks are part of the carriageway and there is little or no data for independent cycle tracks as these are not covered by routine surveys.

Across all the authorities, service levels are set mainly using BVPI thresholds and condition indices from the surveys carried out (e.g. rutting, cracking, fretting, edge deterioration, fatting, chipping loss, skid resistance).

### 2.3.2 Customer surveys

Over the last few years all Local Authorities have been carrying out user satisfaction surveys in which each survey is essentially a general survey that covers all the services provided by the council. With regard to highways, the surveys canvass public opinions on issues such as:

- Highway maintenance issues that are of key concern to the public;
- Experiences and opinions of roadworks in the area;
- Overall satisfaction with the condition of highways.

The results from these surveys are used mainly as a measure of performance in delivering service to the public. It also helps the Council to identify the service areas that the public gives priority to. In general, highway maintenance is rated as one of the most important services provided by Local Authorities.

In recent years, some authorities have extended the surveys to address transportation issues specifically with the aim of using the information to support the development of asset management plans. The surveys cover issues such as:

- Satisfaction with the condition of roads, not just overall but by road class;
- Priority for different aspects of condition (e.g. visual, unevenness, white lines, verge condition etc)
- Examples of specific lengths in good / poor condition and the reasons.

For example, Newcastle City Council undertook an extensive survey to measure public opinion of the street environment (this included condition and maintenance of footways and carriageways) in October 2004 (Newcastle City Council, 2004). This concentrated not only on the public opinion of the general condition but asked specific questions about the types of problems encountered and preferences on treatments. The survey covered 13 areas (roads) in Newcastle and respondents were asked about satisfaction with the frequency and quality of footway and carriageway maintenance, the main problems (e.g. uneven slabs, broken slabs, insufficient dropped kerbs, patch and unmatched surface etc for footways; potholes, surface damage, sunken, raised or damaged manholes, blocked gullies causing flooding, patch and unmatched surfaces etc for road carriageways). In addition, respondents were shown photographs of footway surface types with explanations on performance and costs to get user views on preference for particular types of surfaces.

Cumbria County Council conducted a postal survey of members of Cumbria’s Citizens’ Panel using a questionnaire covering a range of topics including various aspects of roads and highway maintenance. Respondents were asked to rate a range of maintenance issues (e.g. keeping the road surface in good condition, keeping the surface of footways in good condition, road gritting and snow clearance etc) in terms of how important they felt they were, how satisfied they were with the current state, their opinion on how well roadworks were carried out and their satisfaction with the condition of the highways.

Key issues from the user surveys on customer views and requirements were:
In general, users are more concerned by the condition of footways than carriageways; this is also reflected in the complaints and claims made by the public;

The condition of roads where pedestrians cross should be to footway standards. Dropped kerbs for example, indicate a place where pedestrians are encouraged to cross and therefore the carriageway condition should reflect this;

Disabled and elderly users have very different requirements for levels of service; for example, electric wheelchairs are susceptible to different defects compared with other vehicles or pedestrians;

Insufficient grass cutting of verges is a top complaint in a number of counties;

Appearance of the road is important; for example extent of patching, failed repairs etc. West Sussex County Council incorporates “visibly good roads” in the maintenance plans and this has increased the level of public satisfaction with A roads, but the lower category of roads (e.g. U roads) that are “fixed and made good” have a lower public satisfaction level;

There are differences in the opinion between the public and engineers about surfaces; the public like quiet surfaces (e.g. thin surfacings) but these materials are not always popular with the engineers (e.g. perceived to be not durable and hence, not providing value for money); similarly, surface dressing is unpopular with the public but from a network management point of view, it is seen as a cost-effective and efficient maintenance option;

Mud, dirt and rubbish on the road and the number of repaired or unrepaired potholes are perceived as major problems;

Motorcyclists and cyclists are more concerned than motorists about unevenness;

Equestrians take particular interest in the pavement surface type;

The main carriageway problems identified in the user surveys were:

- Potholes;
- Ironwork;
- Piece meal patching or unmatched surfaces;
- Debris/mud on the surface;
- Flooding;
- Overhanging /overgrowth of vegetation;
- Surface dressing.

The main footway problems identified in the user surveys were:

- Uneven slabs;
- Potholes;
- Lack of dropped kerbs at crossings;
- Overgrown vegetation/tree roots;
- Flooding;
- Obstruction;
- Drain covers.
2.4 International studies

Brief descriptions of the international studies that were reviewed are given in this section and more detailed descriptions of the studies are included in Appendix A.

2.4.1 USA

The Departments of Transportation of Wisconsin, Iowa and Minnesota (2001) joint funded a five year study by Marquette University that examined users’ perceptions of road condition and compared this to measured carriageway condition thresholds. This study is interesting as it has similar aims to this Highway Service Levels project, i.e. relating user perception to measured data and interpreting user vocabulary. The study highlighted the disadvantages of relying on each participant’s memory of a completed journey.

The study showed that user satisfaction is multi-dimensional and does not depend only on physical indices. In general, the public’s the zone of tolerance was wide and they were satisfied with a wide range of conditions ranging from very poor to very good in engineering terms. Similarly there was a large variation in the condition which they felt should be improved, (e.g. they wanted better ride quality on more heavily trafficked roads rather than the same for all roads). Almost all the participants wanted longer lasting carriageways to be built even if they cost more.

2.4.2 Australia

Potter et al, (1992) examined the relationship between user perception of ride quality and the measure of roughness; the level of roughness considered to be acceptable by users and the extra distance a user would travel to avoid a road with a given poor level of roughness. The methodology used accompanied journeys over selected lengths of road with members of the public driving or being driven over a specified section of road around 500m long, whilst accompanied by a researcher. The study found large variations in rating between users but there was a reasonable (around 80%) correlation between average rating and measured roughness. Urban participants were more tolerant of rough roads in the urban area than in the rural areas, perhaps because of slower speeds or higher demands on their driving taking their attention away from ride quality, and participants tolerated rougher rides for short trips and at lower speeds.

2.4.3 New Zealand

The New Zealand Asset Management Steering Group has produced guidelines for agreeing service levels with customers (NAMS Group, 2002). The aim is to deliver local government infrastructure services effectively and efficiently and a manual was developed to help local government officials agree service levels with their stakeholders and customers.

The Guidelines are presented in two sections. The first provides general guidelines with detailed descriptions of the stages in developing the process of identifying customer views and needs and including them within the decision making process. The second section has examples and case studies specific to a range of asset/service groups including transportation and pedestrian facilities. The examples take the reader through the stages described earlier, with the descriptions focusing on the relevant asset.

McCormick, Bowler, Dunne, (2001) examined the level of satisfaction of lorry drivers with the New Zealand National State Highways as previous surveys had shown that commercial drivers were significantly less satisfied with highways that other users. This survey looked in more depth at the reasons for the lack of satisfaction and the priorities for improvements. Issues relating to condition included the speed, quality and priority of repairs. Slippery surface, lack of grip around corners and potholes were some of the key condition parameters of concern.
2.5 Rail

Customer satisfaction with rail travel is different to that of highways in that the condition of the rails is not something generally commented on by customers. Public priorities for improving rail travel are levels of fares, reliability/punctuality and overcrowding. Prevention of accidents while travelling is important but has a lower priority. DfT Transport Statistics (DfT, 2005), for example, reports rail customer satisfaction in terms of reliability, cleanliness, helpfulness of staff, information available, train service, safety and security.

Train companies monitor the number of complaints by passengers as an indicator of customer satisfaction. According to the Rail Passengers Council survey carried out in 2003 (RPC, 2003), 26% of people gave train punctuality as the aspect they were most dissatisfied with and 24% the cost of tickets. The public believed that the service will get worse, especially price. 70% of non-rail users perceive that Britain’s railways are performing at a poor standard, 46% believed that the service provided is fairly poor and a further 24% considered it to be very poor (RPC, 2003). The rail industry is perceived by the public as unreliable, inconsistent and uncertain (Faber Maunsell, 2004).

MORI carried out a face to face interview with rail customers for the Rail Passenger Council study into the State of the Railways in July 2005 (RPC, 2005). Commuters were found to be more dissatisfied than leisure users. As with the road network, there were regional variations with the North East the most favourable (51%) towards the rail service and Wales the least favourable (24%).

In a study for the Railways Safety and Standards Board (RSSB, 2005), by MORI, to canvass public attitudes to safety, it was found that preventing accidents was a concern only for a minority (19%) of people, although it was their priority when it came to investment. The authors proposed that this was because safety was always expected and so was revealed as a priority only when prompted. 22% of people thought that rail travel was very safe although the general public tended to overestimate the number of people killed in train accidents. 41% of the public believed that the most likely cause of a passenger fatality by rail is due to poor track maintenance. They have a strong belief that the necessary investment is not being made in the rail industry. Their priorities for investment are prevention of accidents, better punctuality, reliability and frequency of trains, reduction of overcrowding and extension of the rail network.

2.6 Summary

The growing emphasis, in the UK and other countries, on delivering public services efficiently (deliver value for money) and effectively (meet the needs of the community) is reflected in the efforts put into canvassing public views. There are a number of reports on surveys of user opinion on highway condition, both in the UK and abroad. In the UK, as part of the consultation on Local Transport Plans, all Local Authorities carry out surveys on public satisfaction with highways and their priorities for maintenance. In general the surveys cover only a limited range of activities and in most cases provide a measure of customer satisfaction from which trends over time are monitored. The levels of satisfaction show significant variations at the regional and county levels. In general, of the services provided by the Local Authorities, users appear to give high priority to road maintenance and would like more investment in this area.

In the last few years, some authorities have extended the questionnaires used to gather public opinion to include more detailed questions on aspects of condition that cause dissatisfaction. Some examples of condition that cause dissatisfaction are found to be potholes, piece meal patching, poor workmanship and flooding for road carriageways and unevenness, broken/cracked slabs and absence of dropped kerbs at crossings for footways.

Examining user perception is more common for footways than carriageways. Footways assessment normally includes the whole street scene rather than focusing just on surface condition. There are various tools, such as PERS that can be used to assess footways and condition is only one of the many aspects assessed. The public have also been included in audits carried out by the Living Streets organisation.
There is no reported literature on studies carried out to help link user perception and user language describing carriageway/footway surface condition with the engineering interpretation and engineering language used to manage the carriageway and footway networks. Studies have also shown the users recall of condition, (unless it is very bad or very good) tends to be poor. For example, the report on the survey in the USA found that when participants were asked to drive a section of road and comment on it at a later date, recall was poor. Using accompanied journeys to record participants views as they experience the journey can therefore be expected to improve on this method and there may be more correlation between user opinion and measured data. This also has the advantage that the analysis can be based on observed reactions to condition rather than stated opinion.
3 Qualitative research

The specific objectives of the qualitative research were to:

- Identify how road users perceive road surface condition and the language used to describe surfaces;
- Investigate how perceptions vary by location, type of road user, types of road, traffic flow;
- Explore the range of adequate and inadequate levels of road surface condition (i.e. what is the level of acceptability?);
- Assess users’ priorities for repairing different types of road surface conditions.

The qualitative research was based on a series of group discussions and depth interviews with different types of road user in three areas across England. The areas were identified through discussions with the Local Authorities to give broad national coverage (North, Midlands and South) overall and within each area, a network of carriageways and footways offering a range of surface conditions.

3.1 Methodology

The qualitative research to gain a better understanding of road users’ perceptions of the surface condition of carriageways and footways on the local road network was undertaken through Focus Group discussions and depth interviews. Following the discussion meetings with a total of 19 Local Authorities (described in Section 2.3), small road networks (up to 30 km) that offered a variety of road surface conditions upon which road users could comment were identified. From this, in consultation with the Project Steering Group and Local Authority engineers, three specific road networks in three areas (Newcastle, Northampton and Chichester) were selected for use in the study. The three areas selected comprised metropolitan, urban and rural road networks respectively. A map and description of each of the three areas and the selected roads are given in Appendix B.

In order to meet the project objectives, MORI and TRL designed a comprehensive research structure to encompass many different types of road user. Different methodologies were used to suit different audiences. Participants were recruited from the general public through interviews in and around the three research areas. Group discussions were used to research the views of primary road users (e.g. private motorists and cyclists). Smaller or hard-to-reach groups (e.g. the disabled or elderly) were interviewed on a one-to-one, face-to-face basis. These depth interviews enabled greater insight into the perceptions of these users. This research structure was designed to present a robust picture of road users’ perceptions.

Table 5 shows the details of the 12 group discussions and Table 6 the details of the nine in-depth interviews carried out in May 2006.
### Table 5: Focus Groups used in the qualitative research

<table>
<thead>
<tr>
<th></th>
<th>Road user</th>
<th>Location</th>
<th>Road usage</th>
<th>No. of attendees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Private motorists</td>
<td>Newcastle (Metropolitan)</td>
<td>Light</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Private motorists / LGV drivers</td>
<td>Northampton (Urban)</td>
<td>Medium/ heavy</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Private motorists / LGV drivers</td>
<td>Chichester (Rural)</td>
<td>Heavy</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Motorcyclists</td>
<td>Chichester (Rural)</td>
<td>Mixture</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Cyclists</td>
<td>Northampton (Urban)</td>
<td>Light/medium</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>HGV / PSV / company LGV drivers</td>
<td>Newcastle (Metropolitan)</td>
<td>Heavy</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>HGV / PSV drivers</td>
<td>Northampton (Urban)</td>
<td>Heavy</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>HGV drivers</td>
<td>Chichester (Rural)</td>
<td>Heavy</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Other road users (bus users, vehicle passengers, pedestrians, cyclists)</td>
<td>Newcastle (Metropolitan)</td>
<td>Mixture</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>Other road users (bus users, vehicle passengers, horse riders, pedestrians, cyclists)</td>
<td>Northampton (Urban)</td>
<td>Mixture</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Other road users (bus users, vehicle passengers, horse riders, pedestrians, cyclists)</td>
<td>Chichester (Rural)</td>
<td>Mixture</td>
<td>7</td>
</tr>
<tr>
<td>12</td>
<td>Other road users (vehicle passengers, pedestrians, cyclists, private motorists)</td>
<td>Northampton (Urban)</td>
<td>Mixture</td>
<td>10</td>
</tr>
</tbody>
</table>

*Group 12 was an additional session conducted to compensate for low attendance in Group 10.*

### Table 6: Depth interviews used in the qualitative research

<table>
<thead>
<tr>
<th></th>
<th>Road user</th>
<th>Location</th>
<th>Road usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motorcyclist</td>
<td>Northampton (Urban)</td>
<td>Mainly weekend motorcycling</td>
</tr>
<tr>
<td>2</td>
<td>Disabled private motorist (hearing impaired)</td>
<td>Newcastle (Metropolitan)</td>
<td>Any</td>
</tr>
<tr>
<td>3</td>
<td>Disabled private motorist (with wheeled device)</td>
<td>Chichester (Rural)</td>
<td>Any</td>
</tr>
<tr>
<td>4</td>
<td>Elderly private motorist</td>
<td>Northampton (Urban)</td>
<td>Any</td>
</tr>
<tr>
<td>5</td>
<td>Elderly private motorist</td>
<td>Newcastle (Metropolitan)</td>
<td>Any</td>
</tr>
<tr>
<td>6</td>
<td>Motorcyclist</td>
<td>Northampton (Urban)</td>
<td>Weekday travel</td>
</tr>
<tr>
<td>7</td>
<td>Mother with child pedestrian</td>
<td>Northampton (Urban)</td>
<td>Medium</td>
</tr>
<tr>
<td>8</td>
<td>Disabled pedestrian (visually and physically impaired)</td>
<td>Northampton (Urban)</td>
<td>Medium</td>
</tr>
<tr>
<td>9</td>
<td>Disabled pedestrian (with wheeled device)</td>
<td>Newcastle (Metropolitan)</td>
<td>Medium</td>
</tr>
</tbody>
</table>
3.2 Pre-tasking participants

Previous MORI / TRL research for the Highways Agency has shown that road surfaces are not top-of-mind for the majority of road users. As such, pre-task travel diaries were designed to start participants thinking about the subject by recording their general thoughts on the condition of the roads on the selected network of roads and footways. An example copy of a travel diary is given in Appendix C. All participants were provided with the diary at the time of recruitment and asked to keep a travel diary in the week leading up to the discussion meeting. Participants were asked to record up to 10 journeys on the selected roads in their locality and their perceptions of those journeys.

Nearly all participants completed at least one journey in their travel diaries. The majority went a lot further and entered details of all the journeys they took on the selected network of roads during the week leading up to the discussion meeting or depth interview.

3.3 Discussion topics

A Topic Guide to structure the discussions and maintain consistency between the different sessions was developed for both the group discussions and depth interviews. During the discussions, pictures of various carriageway and footway defects were used, as well as video clips of local roads in the area. The video clips were designed to enable the participants to recognise local landmarks and hence aid recall of aspects of condition, their reaction to the condition and also to encourage discussion of what they believed were good and poor surfaces. Copies of all the pictures and topic guides used in the discussions are given in Appendices D, E and F.

The key topics that were explored in the discussions were:

- General perceptions of and levels of satisfaction with the condition of carriageways and footway surfaces in the local areas;
- Recalled attitudes to surface condition (e.g. definitions of good and poor surfaces, levels of acceptability);
- Prompted attitudes to surface condition (e.g. using video clips and defect pictures);
- Ranking of the defects and priority for maintenance (e.g. order of importance, how urgently the defects should be repaired)*

* One aspect not addressed directly in the discussion was road and footway users’ willingness to pay for road repairs and the extent to which some repairs should be given more money than others. In consultation with the DfT, it was decided that introducing the idea of monetary value would in fact detract from the real goal of the research to ascertain people’s priorities. In conversations about money, road users might easily become distracted by the logistics of which road surfaces cost more than others or by any grievances with where their Road or Council Taxes are being spent. As such, it was decided to focus purely on users’ priorities for repair.

3.4 Interpretation of the qualitative data

This task in the project was purely qualitative research. Unlike quantitative surveys, qualitative research is not designed to provide statistically reliable data. It is illustrative rather than statistically reliable and therefore does not allow conclusions to be drawn about the extent to which something is happening or views are held. Qualitative research is intended to shed light on why people have particular views and how these views may relate to demographic characteristics and the experiences of the groups concerned. It is important to bear in mind that this Task was dealing with perceptions rather than facts, although to participants these perceptions are facts. Verbatim comments from the group discussions and depth interviews have been included within this report to indicate the views
expressed. These should not be interpreted as defining the views of the group as a whole but have been selected to provide an insight into a particular body of opinion.

3.5 General perceptions of pavement conditions

3.5.1 The research in context

Before exploring attitudes to road surfaces, it is first important to view the research in context. The surveys carried out over the last few years on public satisfaction with the services provided by Local Authorities have shown quite consistently that in general, the public gives high priority to road maintenance. However, it is also recognised that, on a day-to-day basis, road and footway surfaces were not normally noticed by road and footway users:

“You drive on them all the time and you just don’t notice”

Private motorist/passenger, Northampton

Roads are used as a means of getting somewhere – they are functional and assumed ‘fit for purpose’. The purpose of the journey is far more important than the quality of the road surface, and as such, users seldom notice road surface conditions or make route decisions on the basis of surface condition unless the condition is extremely poor.

During this research, a range of techniques were used to heighten awareness of road surfaces (i.e. Travel Diaries in the week leading up to discussions and focusing the conversation on surfaces during these discussions). This was necessary to elicit sufficient information from our participants for discussions to be insightful and meaningful. However, if any of the discussions are viewed in isolation, it may appear that road surfaces are in fact more important to road users than they are in reality. Two aspects of key concern to road users are congestion and traffic calming measures. These aspects of road travel were mentioned quite spontaneously by participants in all 3 areas.

“I've been in the area for about 10, 11 years now. Congestion has risen more than anything else. Just trying to get here tonight was an absolute nightmare.”

Private motorist, Northampton

Moderator: What makes a bad surface?
Participant: Speed bumps, or speed humps, of an irregular size. All along [the road], to calm the traffic, but some of them are mountains, and they really should be regulated in size.

Private motorist, Newcastle

Discussions with participants should also be viewed in the context of the weather conditions. During the research (May 2006), England experienced some very heavy rain following a long dry spell. This caused small-scale flooding of roads and footways. Surface water, flooding and drainage were probably mentioned more frequently throughout the discussions than would have been expected generally and particularly for this time of year.

All of these factors have been taken into account in the analysis and interpretation of all qualitative data (i.e. transcripts, notes and Travel Diaries). The following sections give an overview of the general attitudes to the road surfaces in each of the three survey areas.
3.5.2  
**Newcastle (Metropolitan)**

In the metropolitan area of Newcastle, initial responses were that for the roads in the study (Figure 2), road surface conditions were poor and unsatisfactory. However, on reflection, the roads were in fact seen as “fair” or “okay”.

![Figure 2: Newcastle study area](image)

The fact that initial responses were more negative than considered responses (in Newcastle at least) does have implications for the routine customer satisfaction surveys on road surfaces conducted by Highway authorities (the Highways Agency and Local Authorities) as these quantitative surveys record only the initial, and possibly, more negative response. This should be borne in mind in future surveys.

Overall, the main roads in Newcastle (i.e. A roads) were viewed as having smoother and better quality road surfaces than lower hierarchy routes. It is assumed that because these roads are used by greater volumes of traffic, they are more actively maintained. However, the participants believed that all road categories should be maintained to the same standard.

> “The main roads are alright, but when you get down they don’t seem to bother with the side roads.”

Pedestrian/ vehicle passenger, Newcastle

One particular location, Saint Mary’s Place was praised for its very good new surface. Those singled out as particular problem roads were Strawberry Place and Blackett Street for their “potholes” and Queen Victoria Road for its “gritty holes”.

3.5.3  
**Northampton (Urban)**

The part of Northampton used in the study (Figure 3) is an urban road network where surfaces were seen as both good and bad – often on the same stretch of road. The A508 (Marlborough Road) was frequently mentioned as an example of this (i.e. a mix of good/bad condition).
In contrast to Newcastle, Northampton’s busiest A roads were perceived to have the worst road surfaces. Each of the main A roads included in the study carries traffic to and from Northampton town centre. As such, the volume of traffic was assumed to have taken its toll on the surfaces and led to their deterioration.

Wellingborough Road and Holly Lodge Drive were singled out as being especially good surfaces. Wellingborough Road provides an excellent example of patching done to a high (i.e. even) standard. In contrast, Kettering Road is viewed as having “rutting, broken surfaces and potholes” along its route, getting progressively worse further south and closer to the town centre.

3.5.4 Chichester (Rural)

Overall, the rural roads considered in the Chichester area (Figure 4) were felt to be a mix of good and poor quality roads. Recent housing developments, for example in Selsey, were seen to have caused excessive use of roads not designed to take the considerable volumes of traffic. This is believed to be causing the roads to deteriorate at what is perceived to be a faster rate than was originally intended.

In addition, increased market gardening activity in the area necessitates HGVs travelling along narrow lanes to transport goods, also causing increased wear and tear on roads not designed to take that level of traffic loading. HGV, bus and coach drivers in particular find Chichester has more roundabouts than necessary. The roundabout surfaces are good quality “with circles” on them but there are so many it causes HGVs to stop and start too much, thus “churning up” the road surface.
Overall, selected roads are felt to be both good and bad

“Falling away”, “cracking up” & “chipping” all along B2141

Particularly “bad pothole”

Rutting and “rain laying”

Good but can be “rutted and corrugated”

Junction of A27 & A259 especially “bad” – blamed on HGVs

“Good surface BUT “red surface worn”

Figure 4: Chichester study area

“I think the major issues are the fact that we’ve got a massive population in Selsey that is coming into town every single day.”

Disabled private motorist, Chichester

A full glossary of all the specific roads mentioned and their conditions is given in the area information section of Appendix B.

3.6 Factors affecting perceptions of pavement conditions

3.6.1 Categorisation of road users

The discussions in the three selected areas showed an overall consistency among users in their general attitudes to road and footway surfaces. However, a number of other factors did affect their perceptions of road surfaces.

It is important to stress that people can be more than one type of road user and in these situations, their mindset plays a pivotal role. For example, when they are in a cyclist mindset, they speak like a cyclist and when they are in an HGV driver mindset, they speak like an HGV driver. People hold different views depending on their mindset at that time and their overall views are not just related to a particular mode.

Based on this study, by far the largest differentiating factor of perceptions is the type of road user. Different people use roads and footways in different ways, and, as such, their views differ considerably, but there is more similarity in views within each group of road user.

From this study, the following groups of road user have been ranked from those most affected by, and hence most aware of, surface condition (the elderly and/or disabled) to those least affected (private motorists):
The elderly and/or disabled

Cyclists

Motorcyclists

Pedestrians

Heavy Goods Vehicle (HGV), bus and coach drivers

Bus users

Horse riders

Private motorists.

Most affected

Least affected

NB. Note that this ranking is indicative only. It is based on qualitative research and so should not be treated as a strictly linear or nominal scale. However, it does show how some groups are more affected by road surfaces than others.

3.6.2 The elderly and/or disabled

Elderly and/or disabled road users (whether motorists, passengers or pedestrians) are most critical of surface conditions. Unlike many other groups, they are highly aware of surface problems. This is mainly because of fears for personal safety and discomfort. On footways, tripping or falling on raised or lowered paving slabs and potholes is a particular concern.

“It’s terrible and the pavements, they’re all cracked. I have to walk along looking at the floor to make sure I don’t fall over them”

Disabled pedestrian, visually impaired, Northampton

On the road, discomfort heightens awareness of surface conditions. Discomfort is caused by any unsMOOTH surface. Elderly and/or disabled motorists feeling discomfort see this as a very real safety concern. Indeed, their bodies are often less able to deal with even minor vibrations or jolts.

“I find even going over the smallest of bumps or the smallest of potholes, I feel it through my feet”

Disabled private motorist, wheeled device, Chichester

As a result of personal safety fears on footways and severe discomfort on the roads, poor surfaces are avoided wherever possible, and there is a greater tendency to take an alternative route. This can also be caused by obstructions in the footways (e.g. bus shelters with limited space on either side) or the absence of dropped kerbs. The diversion can be a different road altogether, even if it results in a longer journey, or a deviated path (e.g. from footway and into the road) on the same road.

“Quite often I have to get off the pavement and go on to the road because I can’t get up the pavement”

Disabled pedestrian, Newcastle
“I’ve had shooting pain... so that’s a bad road. Then I don’t go that way, just to avoid it”  

Disabled private motorist, Newcastle

In some cases, poor road surfaces can even force these types of road user to buy a new car.

“It took me six months to choose my new car, and I have tried almost every car on the market. It is smooth running. I don’t feel as many jolts”  

Elderly private motorist, Newcastle

3.6.3 Cyclists

Like the elderly and/or disabled, cyclists were particularly sensitive to uneven surfaces. They generally cycle on the left-hand side of the road and as such edge deterioration and raised ironworks are of particular concern. In the study area of rural Chichester, roads that have been resurfaced a number of times over the existing surface have “cliffs” at the edge that are perceived to be “dangerous”.

Cyclists’ perceptions of road surfaces were also coloured by their views on the condition of cycle lanes. Existing provisions in all three locations were seen as poor. Cycle lanes are often too narrow and covered in “debris”.

Poor surfaces at the edge of the road and in cycle lanes mean that cyclists can be forced to alter their route. For some, this may mean getting off their bicycle and walking. For others, this may involve swerving into other parts of the road to avoid defects such as “potholes” and “drain covers”.

“Where the road is in poor condition, I often get off and walk”  

Cyclist’s travel diary, Northampton

“You’re forced to suddenly swerve out by a foot to go round something... It’d only take someone to catch you round by your handlebars and you’re off”  

Cyclist, Northampton

Any deviation of the cyclists’ “line” is seen as very dangerous. Poor surfaces, especially at the edge of the road, may cause a sudden deviation that would then put the cyclist and other road users in danger.

3.6.4 Motorcyclists

Like cyclists, motorcyclists were also sensitive to uneven surfaces. Both groups being on only two wheels, and so less stable, undoubtedly felt even small defects more acutely. The worst defects were those that were not easily visible but with the potential to disturb their balance. For example, the thickly-laid paint used for road markings was seen as a potential hazard to motorcyclists:

“When they are wet, they are like glass”  

HGV driver & motorcyclist, Newcastle

One defect seen as particularly unsafe for motorcyclists is “rutting”. Motorcycles can get “stuck” in them and the rider can then be easily and suddenly thrown off. This obviously creates a serious safety concern.

“It only takes you just to move a little bit, and all of a sudden, wham. You’re out... ”  

Motorcyclist, Northampton
As such, “even” surfaces were seen as very important to motorcyclists. However, the grip of a road was also seen as equally important. Specific examples of grip issues were problems with resurfacing materials sticking to tyres and “lying water”.

Like cyclists, motorcyclists often swerve and alter their “line” to avoid noticeable defects. Occasionally, with ironworks in particular, there will be no clear line, free of defects, so a rider may be forced to ride over the uneven surface. Again, the concern is that avoiding the defect in fact impacts on other road users and places them and the motorcyclist in danger.

3.6.5 Pedestrians

The majority of pedestrians in the study were not sensitive to footway surface conditions. Only extreme conditions, such as a raised paving slab or kerb, and an incident relating to that condition, such as a trip or stumble, would cause the surface to be noticed. In general, pedestrians were unlikely to alter the journey route specifically to avoid footways with poor surfaces.

However, there are some groups of pedestrians who are affected by the condition of footway surfaces. Pedestrians who are pushing buggies or wheelchairs are much more aware of conditions. A wheel of a device may get stuck in cracks or may veer off when running over uneven surfaces.

One particular aspect that generated a lot of comment from both safety and comfort perspectives was the “bobbles” or “little bumps” in paving slabs, to identify crossings for the visually impaired.

“It sends [the wheels] crazy when you go over the bumps”

Pedestrian, Newcastle

It is accepted that these uneven surfaces are designed for the safety of the visually impaired. However, it does also seem a paradox that something meant to increase safety can in fact be seen as a risk by other groups of pedestrians as the “bumps” could cause them considerable discomfort and to stumble or lose their footing close to the road’s edge.

3.6.6 HGV, bus and coach drivers

HGV, bus and coach drivers’ views on road surface condition were generally positive, probably because they tend to use the main network more. However there were specific issues that they believed need to be addressed. Grip on a road surface was seen as very important by this group of users. These users require grip to control their heavy vehicles. Large areas of poor, bumpy surfaces were seen to cause problems for the drivers, the vehicles and the road surface.

“You are looking at loads shifting all the time and damaging goods. The truck is bouncing around and the weight of the truck is damaging the road underneath.”

HGV driver, Northampton

However, while they called for an even surface, many with newer vehicles also felt that the use of air suspensions mitigates the effects of uneven surfaces and they rarely noticed the “bumps” in the road. These users acknowledged that many local roads in the UK were not designed for the size and weight of the vehicles they now drive. The HGV, bus and coach drivers were very aware of the negative impact their large vehicles have on road surfaces.

“It’s terrible, there’s big dips in the road, there’s big puddles where the road’s subsided and things like that. That’s heavy goods drivers.”

HGV/PSV drivers, Newcastle
These users were aware that their vehicles cause many defects and also make many existing defects more severe. For example, when “Shell Grip” is used in places thought to be inappropriate (such as roundabouts) and HGVs “churn up” the road. HGV drivers aware of the impact they have on road condition, try to avoid even minor defects for fear of exacerbating any problems. For example, one HGV driver in Newcastle explained that he avoided small road defects so that they did not turn into bigger defects. In fact he suspected that other HGV drivers did the same because he had observed that over time rutting developed on either side of the original defect.

3.6.7 Bus users

Bus passengers had very different perceptions of road surfaces than bus drivers. They did not have a view on road surfaces per se, with any bumpiness in a ride usually attributed to poor driving. While the use of the Travel Diary may have caused these users to notice road surface conditions more, they were resigned to a rough ride and did not expect the ride quality to improve.

“You hurt your bum on the bus!”

Bus user, Newcastle

3.6.8 Horse riders

Horse riders were included in the research (attending two focus groups), however, they were also other types of road user and held more vehement views in those guises rather than as horse riders. From those that did express views about being a road user as a horse rider, it was clear that, like cyclists, horse riders’ perceptions of road surfaces were coloured by where they ride (i.e. on the edge of the road). Their main issues were “potholes” and “broken surfaces” or anything that a horse may get its foot stuck in or trip on. However, horse riders’ perceptions are also affected by their views as motorists when towing horse boxes. Horse boxes were perceived to feel potholes more than cars – possibly because these defects can scare the horse inside the box.

3.6.9 Private motorists

Private motorists form the largest population of road users. For this research, ‘private motorists’ encompass drivers and passengers, as well as those using Light Good Vehicles (LGVs). These users have been grouped because they share similar opinions on road surfaces. Private motorists are least affected by road surface condition. They are least affected because they are actually least aware of surfaces.

“I’ve been in the job about 25 years, I do exactly the same route every day five or six days a week, so really we don’t take much notice”

LGV driver, Newcastle

Only extreme conditions, (e.g. commonly coined “potholes”) that could damage the car, affect the steering or cause the driver to change speed, were seen as issues by these users. In general, private motorists tend to avoid defects less than other road user groups. Most modern cars are able to deal with slight or small defects. Furthermore, time is often a more important factor for these users so they did not want to take longer alternative routes. They use the road functionally – as a means of getting from A to B, with many routes familiar to them.
### 3.7 Other factors affecting perceptions

Beyond the type of road or footway usage, users identified two other main factors which were seen to impact on perceptions of surface conditions; volume of traffic and other previous experiences.

Volume of traffic works at two levels. It affects what is visible to the driver and also what a road defect feels like. This means that during both busy rush hours and during quieter times, some defects will appear more severe and some will appear less so. For example, during the rush hour slow traffic means a vehicle travels over a defect at a slower pace and so defects may appear less severe. However, traffic in front of a vehicle also obscures the drivers’ view of the road ahead. This means that the vehicle travels over a defect that may otherwise have been avoided (either consciously or unconsciously). As such, surface conditions may appear more severe.

The corollary is also true. During quieter times, clear roads mean defects can be seen and avoided. However, vehicles travelling faster may “hit” the defects harder and therefore experience a bigger impact. In this way, the volume of traffic can affect perceptions in a number of contrasting and seemingly conflicting ways.

A person’s experiences of other road surfaces also affect the perception of road conditions. Various examples of good road surfaces were cited (France, Perthshire and Milton Keynes among others). Likewise, various examples of bad surfaces were commonly cited (Leeds, North London and Devon among others). These experiences provide a contrast to the road surface currently being ‘experienced’. The difference makes the current defects much more noticeable – whether the surface is better or worse. The idea of ‘contrast’ is explored later in the report because it is integral to perceptions of surface conditions.

### 3.8 Good and bad pavement surface conditions

#### 3.8.1 What is a good road surface?

A general view from the discussions is that a good road or footway surface should not be noticed.

There are various elements that contribute to a good road surface in the eyes of road users:

- All types of road user agreed that a good road surface should be “smooth and even”;
- Among HGV, bus and coach drivers and motorcyclists, “grip” is of equal, if not greater importance. As one HGV driver in Newcastle put it, a road needs to be “a level playing field but not glass flat”;
- “Good clear road markings” are important;
- Ideally “new and black” (although this can sometimes signal smooth surfaces).

Pedestrians were less demanding of the footway surface condition. Their main requirement is for a surface is that it is “even” and “not bumpy”. Disabled pedestrians went a little further and also asked for “dropped kerbs” and less clutter on the “pavements” such as bins and bus stops.

#### 3.8.2 What is a bad road surface?

A bad road surface was most commonly described as the reverse of what makes a good road surface (i.e. it is not smooth and/or has no grip). Interestingly, poor road markings were not seen as part of a poor surface. This suggests that road markings are seen as secondary to smoothness and grip and only part of the ‘ideal’ surface rather than integral to making a surface better. Similarly, a noisy surface was also not spontaneously identified as a characteristic of a poor surface.

The main factors causing surfaces (both roads and footways) to be perceived as poor were ones that caused a sudden impact or forced diversion off course:
“Potholes” (the number one complaint among road and footway users);
- Poor quality “patching”;
- Raised or lowered ironwork or “drain covers” were especially an issue for those on two wheels (cyclists and motorcyclists) who have to adjust their “line” to avoid them;
- “Unevenness” at the edge of the road or in cycle lanes (an issue for cyclists as this also affects their “line”) or anything resulting in a “corrugated” surface (e.g. rumble strips);
- “Poor drainage” (however, this is probably more indicative of the time of year when the research was conducted, after a period of heavy rainfall in a usually dry month rather than an ever-present issue).

3.9 Acceptability of pavement conditions

What constitutes a good road surface and what constitutes a bad surface has been considered earlier in this report. However, acceptability is a very different argument. Indeed, something that is perceived as a bad road surface may in fact be acceptable.

As part of this research, all group discussion and depth interview participants were shown pictures of road and footway defects. Each defect was viewed and ranked in terms of their acceptability, (i.e. their priority for repair).

During the discussions three key issues that define acceptability emerged;
- Safety;
- Awareness;
- Realism.

However, safety and awareness were very much interwoven.

3.9.1 Safety

In each ranking exercise for all road user groups, safety ultimately defined acceptability. Before anything else, it was seen as most important that a surface is safe. As such, defects seen as the most unsafe were seen as less acceptable and those seen as having less impact on safety were seen as acceptable. This idea of safety transcended all the perceptions of acceptability. It can be concluded that when a surface is seen as unsafe it also becomes unacceptable.

Comfort also affects acceptability but comfort was seen as secondary to safety. Indeed, even in the case of comfort, acceptability was related back to safety. For example, a severe level of discomfort was seen as dangerous. Causing harm to the elderly and disabled, damage to a vehicle or causing vehicles to alter their course were all perceived as safety concerns.

3.9.2 Awareness

Roads and footways perform functions in people’s lives. They are a means of getting somewhere to do something else. When they are noticed, road surfaces are then involving themselves in people’s lives. As such, the ultimate aim of any road surface should be to go unnoticed.

In this study, what caused people to become aware of road surfaces were “sudden” movements (e.g. a swerve or jolt through the steering wheel). Sudden movements are noticed and so are viewed as unsafe, and therefore are unacceptable. For these reasons, users saw smaller, more severe defects as more important to repair (i.e. less acceptable) than larger, less severe defects.
3.9.3 Realism

All the different types of road users included in this study accepted that road surfaces cannot be perfect. Users were realistic about the levels of maintenance that can be achieved within the budgetary constraints of Local Authorities. They were realistic and knew that funds are limited, and that not every road can be repaired and maintained to a very high standard. As such, they were prepared to accept trade-offs. However, they do want value for money and this was not always felt to be achieved. Temporary fixing of potholes with a ‘bucket of tarmac’ was seen as a waste of time and shoddy work and therefore inefficient use of available funds.

Furthermore, HGV drivers were also realistic about the effects their vehicles have on road surfaces. These users realised they are largely to blame for road surface deterioration, but also criticise conditions (e.g. junction layouts) which can exacerbate the effects of their vehicles.

3.9.4 Which defects are less acceptable on roads?

Figure 5 shows an overall acceptability scale for the various road defects discussed. It should be noted that this scale is based on qualitative research and is indicative only. Each of the defects referred to below is referring directly to a picture shown during the research. All of the pictures used in the study are included in Appendices E and F.

User views of defect priorities for repair

Potholes stood out above all other defects as the most unacceptable of all conditions. Nearly all types of road users had this at the top of their scale. The only users not to place potholes at the top were one Focus Group of HGV, bus and coach drivers and two groups of motorists. However, even for these users, potholes still featured as very unacceptable.

Secondary to potholes were slippery surfaces and surface deterioration. These defects were seen as ‘noticeable’, ‘sudden’ and ‘unsafe’. Slippery surfaces featured particularly highly among cyclists and also pedestrians. Pedestrians saw both slippery roads and slippery footways as a danger to them (i.e. they may fall or a car may swerve on to the footway from a slippery road). Surface deterioration was seen as especially unacceptable among HGV drivers and private motorists.
Further down the list and therefore less unacceptable, poor road markings were seen as ‘slightly unacceptable’. Road markings were mentioned as an element of a good road surface but were less integral to a bad road surface. As such, they are a hygiene factor – something to be maintained but unlikely to make a road with more severe conditions, such as potholes and surface deterioration, acceptable.

In general, participants expressed a very negative view of “patches”. This was driven more by their perception that patches are carried out as short-term repairs, to a poor standard and this results in frequent re-repairs. Failed patches or patches resulting in discontinuity of the surface were not acceptable (i.e. “Poor patching” is seen as leading quickly to patch failing, which as Figure 5 shows was much less acceptable). However, patches were less of a concern and were more acceptable when carried out to a high standard.

3.9.5 Which defects are less acceptable on footways?

Figure 6 shows an overall acceptability scale for footway defects. As with road defects, it should be noted that this scale is based on qualitative research and is indicative only.

User views of defect priorities for repair

As with potholes for roads, trip hazards stand out above all other defects as least acceptable. Something that someone might trip over (e.g. failed patches, sunken slabs) was seen clearly as unacceptable and as such should be repaired before all other defects.

Kerb problems and subsidence are further down the scale because it was assumed that they are not always dangerous. For example, subsidence may produce fairly “even unevenness” (i.e. paving slabs may roll smoothly along the “pavement”). However, if either kerb problems or subsidence became potential trip hazards then they would also be occupying the top end of the scale.

As with roads, patches were again seen as acceptable, but only if the work had been done properly (i.e. with smooth transitions at the joints). This perhaps links back to the idea of realism. Both road and footway users accepted that repairing a whole road is an expensive task and were resigned to some degree of “patchwork” to keep roads and footways operational.
3.10 Other acceptability issues

In the eyes of the road users in this study, acceptability was not just confined to the condition defects themselves. The quality of repairs and the materials used were seen to play important roles in a surface condition’s level of acceptability.

3.10.1 Repairs

Overall, repairs to surfaces are only acceptable to road users if they are long-term. Road maintenance should be undertaken on a long-term basis rather than adopt a “quick fix” approach. Temporary repairs were seen as short-sighted and as causing more long-term problems than they solved.

“You’re patching it every six months. Now that causes people more inconvenience”

Private motorist, Northampton

The quality of many of the repairs on the road network, are seen as unacceptable. “Tarmac” may be “chucked” into potholes rather than the work being completed properly. If road closures (with the resulting disruption) were necessary to complete the repairs to good standards then this was seen as preferable to “poor patchwork” repairs. However, closures are acceptable only if repairs are done to a high standard and are long lasting. For most users, long lasting meant no further repairs for at least 10 to 15 years.

Road repairs and closures were also seen as being more acceptable if properly communicated. No knowledge of why a road or footway is closed was seen to lead to increased levels of frustration. As already described, road users are realistic and fully aware that roads sometimes need to be closed. However, it is also clear that the reason for closure (e.g. road safety or utility maintenance) should be explained.

Some road users suggested only conducting road and utility maintenance at night to minimise the disruption caused to traffic. The same principle is applied to night work on motorways.

“You see them on the motorway, they close the lane for a night and they do a mile stretch of a night and dig it up with the right surface in the night. So why can’t the Council do that? Why has it got to be closed for months and months and months?”

HGV driver, Newcastle

However, these arguments were soon conceded as it became apparent that night maintenance was impractical on many local roads. In any residential areas, the noise pollution would be too much of an inconvenience.

The majority of the road users agreed that roads should take priority over footways when it comes to repairs. Roads were viewed as more dangerous than footways and as such warrant repairs sooner. For example, an accident caused by a car meeting a road defect is likely to hurt more people than a single person tripping on a raised kerb stone. Perhaps surprisingly, this view was also shared among pedestrians.

“If [drivers] lost control of the car they’d do a lot more damage coming up on the pavement to a lot of people than we, one person, would do tripping up”

Pedestrian, Newcastle
3.10.2 Materials

The more frequent road users were very knowledgeable about the effects of different surfaces (e.g. “antiskid” on roundabouts and “shiny tarmac” becoming greasy with rainfall in the hot summer months).

Using this knowledge, the acceptability of a surface is influenced to some degree by the use of materials. Overall, there was a call for roads to be made of, and repaired with, good quality materials. It was assumed that such materials would be long-lasting, echoing the need for long-term repairs rather than quick fixes. This was also perceived as providing good value for money (the actual cost of the different materials and techniques were not considered in the discussion).

Road users also felt that roads should use the same materials along a stretch of road. One example of poor use of materials is the picture of a slippery surface shown in Figure 7.

![Figure 7: Example of poor use of repair materials](image)

The mixture of high friction surfacing, ‘Shell Grip’, alongside smooth bituminous material was in itself seen as a hazard. Many other examples arose of different combinations of surface being used and causing a safety concern as often there was deterioration of the surface where two different materials meet (i.e. at the join).

As such, the Focus Group participants agreed that patching was acceptable if it was carried out to provide seamless joins (e.g. as shown in Figure 8).

The use of different materials was mostly blamed on the utility companies. They were perceived to be doing “quick and dirty” jobs with the cheapest available materials.

“They hunged a lot of tarmac in this hole... They didn’t level it off, or anything”

Private motorist, Northampton

All different road and footway users in the study felt very strongly that utility companies should not be allowed to get away with poor quality repairs and should be forced to return the surface to its original condition. (There was a general presumption that the pavement condition was good before being dug up by the utility contractors).
On footways also, the use of different materials was a contentious issue. Paving slabs were seen as more aesthetically pleasing, especially in city centres or areas of historical interest such as Newcastle and Chichester. However, people also accepted that ‘black top’ bituminous surfaces are safer. Indeed, anyone with any transport difficulties such as the elderly or disabled or those with prams saw “tarmac” as far more acceptable than paving slabs.

“If we just have level tarmac on the pavements all around, it’s going to be a lot easier for disabled people in wheelchairs to come in on their own, as opposed to having to rely on someone to push them.”

Disabled private motorist/pedestrian, wheeled device, Chichester

“A lot of people moan about this tarmac stuff as pavements, but I think they’re better because they can’t crack or stick up or anything”

Disabled pedestrian, visually impaired, Northampton

3.11 Summary

The results of this study are based on qualitative research carried out with selected groups of users in three locations, Newcastle, Northampton and Chichester. Overall the participants were very knowledgeable with strongly held views on their expectations of the road network. While users consider the maintenance of the road network as a key part of the services provided by Local Authorities, the discussions also indicated that road surface condition specifically, is seldom in the consciousness of road users. The increased awareness of surface condition expressed at the discussions was partly the result of the early pre-tasking exercise which focused on surface condition.

The ultimate aim of road surfaces should be that they are not noticed. Road surfaces that are noticed raise safety fears. Anything that seems unsafe will be construed as unacceptable. Therefore, by association, road conditions that are not noticed are acceptable. The point at which a road surface becomes unacceptable is when something “sudden” causes it to be noticed.

While there was an overall consistency in the general expectations of users in the different areas where the research was carried out, different types of road users showed different levels of awareness when it comes to road surface condition. The pedestrians and private motorists in this study seldom
noticed surfaces and so had lower expectations for the roads than other users. In contrast, disabled and/or elderly people, cyclists and motorcyclists were sensitive to defects resulting in unevenness. For these users, all surfaces should be smooth and even but provide adequate grip.

Overall, all participants were realistic about the level of road maintenance possible within the budgetary constraints placed upon Local Authorities. However, they were unanimous in calling for a more long-term attitude to repairs. Even road closures were acceptable if it meant that surfaces would be repaired to a high standard, with good quality materials and would last for many years to come. Users were realistic about the levels of maintenance that could be achieved and accepted that some trade-offs may be needed (e.g. patches rather than a new surface for the whole length would be acceptable provided they were carried out to a high standard). In addition, acceptability can be improved if Local Authorities communicate the reasons for the repairs and/or closures. Signs before and during maintenance explaining why the repairs are needed (e.g. to ‘make roads safer’ by the Highway Authority or ‘mend a burst water main’ by the utility company) would be well received by road users and may reduce the levels of frustrations at delays or diversions.

Finally, the road users felt that utilities should take greater responsibility for the road surfaces they disturb. Utilities were blamed for many poor repairs, such as patching, when they dig up surfaces to access pipes and cabling. In the future, road users consulted in this study would like to see utilities re-instate roads and footways to their original standard – ‘they should leave the surface as they found it’. At the moment, users accepted that Local Authorities are unable to monitor all repairs made by utility companies.
4 Accompanied journeys

The Focus Group discussions identified the key factors that drove perceptions of the condition of paved surfaces among the user groups and their general expectations with regard to acceptable (and not-acceptable) levels of condition. There was an overall consistency in the general expectations of participants in the 3 locations where the research was carried out but different types of road user showed different levels of acceptability. Task 3 of this project investigated these views in greater detail by obtaining user views while accompanying them on journeys on two selected routes. The specific objectives of this Task were to:

- Identify how users perceive condition as and when they are being experienced;
- Investigate how users react to different levels of condition;
- Explore user requirements for pavement surface condition;
- Relate user requirements to measured condition.

4.1 Methodology

The accompanied journeys were designed to allow a researcher to accompany a number of users, one at a time, along a pre-determined route, and obtain a commentary recording their reactions to road characteristics along the route. The participants were given a description of what was required and the route to be followed prior to starting the journey. Voice and, where possible, video recordings of sufficient quality to identify the location and aspects of condition referred to by the user were made during the journey. The recorded commentaries provided the information to get an understanding of the terms used by users.

Accompanied journeys were carried out with 5 user groups, pedestrians, cyclists, motorcyclists, car drivers, car passengers and HGV drivers1.

4.1.1 Routes

The routes for the accompanied journeys were identified with the help of Local Authority engineers from the network of roads used in the group discussions in Task 2. The routes were planned such that the journeys, irrespective of the mode of travel, would not take more than 30 minutes and would have:

- Variable condition
- Measured condition data (e.g. SCANNER, DVI, CVI) that the Highway Authorities would use to plan maintenance
- No maintenance within the period of the study

The two routes chosen in Northampton for journeys with pedestrians and cyclists, highlighted in Figure 9, included a combination of C and U urban roads. The pedestrian route (about 1km) incorporated two surface types, bituminous and flagstones. The participants walked along the same side of the street for all of the journeys. The route for the cyclists was longer, about 2km and again all the journeys were carried out on the same side of the carriageway.

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1 HGV drivers were initially not included for this part of the study as it was recognised that it would be difficult to get participants. However, following their input in the group discussions, it was decided there was value in including HGV drivers, even if we had only a small number; two HGV drivers from the group discussions agreed to take part in the study.
A rural route in West Sussex was chosen for the journeys with car drivers, car passengers, motorcyclists and HGV drivers. The route highlighted in Figure 10, was about 14km long and included B and C class roads. All the journeys started and finished at the same points and followed the same direction of travel.
4.2 Participants
Details and descriptions of the accompanied journeys were provided to the participants at the group discussions and they were invited to volunteer for this phase of the study. While a large number of participants were selected the attendees of the group discussion, additional participants to make up the requirements for the study were recruited from outside the groups.

4.2.1 Demography
The age distribution of the participants is given in Figure 11. The ages ranged from 16-24 years to 60-64 years, with 46% female and 54% male participants. A majority of participants (80%) were in full or part-time employment and the remainder were students, unemployed or retired.

![Figure 11: Age distribution of participants](image)

The median values of the estimated distances travelled by the participants using the mode of transport their accompanied journey concerned, based on their estimations of the average weekly distance travelled, is given in Table 7.

<table>
<thead>
<tr>
<th>Weekly distance travelled</th>
<th>km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrians</td>
<td>20</td>
</tr>
<tr>
<td>Cyclists</td>
<td>32</td>
</tr>
<tr>
<td>Car drivers</td>
<td>370</td>
</tr>
<tr>
<td>Motorcyclists</td>
<td>557</td>
</tr>
<tr>
<td>HGV drivers</td>
<td>1820</td>
</tr>
</tbody>
</table>

The high median value for pedestrians was in part due to two participants who used footways extensively during work hours (police woman and police man) and two who used footways as part of a leisure activity (long distance running). Car passengers have been omitted from this table as most
participants tended to make journeys as “passengers” infrequently, i.e. not necessarily on a regular basis.

A total of 66 journeys, shown in Table 8, were carried out with 38 individual participants. Some participants took part in more than one role (e.g. pedestrians and cyclists, car drivers and car passengers, car passenger and motorcyclist)

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Planned</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrians (Bituminous surface)</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Pedestrians (Flagstones)</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Cyclists</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Car drivers</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Car passengers</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>HGV drivers</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Motorcyclists</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total journeys</strong></td>
<td>63</td>
<td>66</td>
</tr>
</tbody>
</table>

4.3 Format of the accompanied journeys

The accompanied journeys with pedestrians and cyclists took place between 11 July 2006 and 13 July 2006 in Northampton and between 29 August 2006 and 20 September 2006 in West Sussex.

Immediately before starting the journeys, the routes were visually surveyed by TRL staff and defects and possible points of interest were noted, and where possible and safe, photographs were taken of the noted defects.

The format of the accompanied journeys consisted of:

- Pre-journey briefing – The participants were given a brief description about the DfT’s objectives for the project, what was required from them and how the information they provided would be used. They were shown a map of the route and told that as they drove/walked along the route they should comment on any aspect of the carriageway or footway surface that was of interest to them, the reasons for this and then categorise the acceptability level of the noted condition within one of 4 categories shown in Table 9. The scope of the study was clearly explained, i.e. it related to the condition of the paved surface only and not other issues that may also be important to them such as traffic congestion, speed cameras, other drivers and speed humps.

- The journey – The journeys were all carried out individually with each participant. They were accompanied by a TRL researcher to encourage and record (in addition to electronic recording) comments on any aspect of the footway and carriageway surface that the participant ‘noticed’, their explanation of why they noticed it and their reaction to the noticed aspect in terms of the 4 point scale of tolerance as well as the language they used. In addition, they were also asked to rate their overall perception of longer lengths (made up by splitting the route at convenient break points).

- Post journey questionnaire - On completion of the journeys the participants completed a brief questionnaire. This was designed to gather demographic details about the participants and to present some of the key questions asked during the group discussions (e.g. rating of defects using defect photographs). Task 2 showed an overall consistency of opinion across the three study locations and the aim of this questionnaire was to assess if user opinions were different immediately after experiencing the condition of the carriageway / footway surfaces. The issues covered general opinions about carriageway/footway surfaces:

  - Overall satisfaction with carriageway/footway condition
Effect on travel behaviour
Opinions on roadworks
Ranking of defect types
Willingness to pay for improved road condition (asked last, to avoid long discussions on cost versus importance)

**Table 9: User scale of tolerance**

<table>
<thead>
<tr>
<th>Category</th>
<th>Tolerance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>Exceptional</td>
<td>Exceptional or above average. Would not expect the entire network to be of this standard.</td>
</tr>
<tr>
<td>Category 2</td>
<td>Average/Acceptable</td>
<td>Some minor or no deterioration. Does not require maintenance.</td>
</tr>
<tr>
<td>Category 3</td>
<td>Acceptable/Unacceptable</td>
<td>Condition requires maintenance, but is not urgent. Perhaps 6 to 12 months?</td>
</tr>
<tr>
<td>Category 4</td>
<td>Unacceptable</td>
<td>Should not have been allowed to deteriorate to this condition. Requires immediate repair.</td>
</tr>
</tbody>
</table>

### 4.3.1 Pedestrian journeys

Each participant was accompanied by a member of the TRL project team on the predetermined route which incorporated a mix of flagged as well as bituminous surfaced footways. The participants’ comments were recorded on prepared survey sheets (similar to a visual condition survey) and also on a Dictaphone so that they could be reviewed at a later date. The route was marked out in advance using a measuring wheel in 20m intervals so that the location of each defect mentioned could be marked down directly, (estimating any that fell between the 20m marks). The journeys took between 30 and 70 minutes depending upon the number of comments made.

### 4.3.2 Cycle journeys

There were no cycle paths on the route and the cyclists rode entirely on the main carriageway. As with the pedestrian route, a pre-survey of the cycle route was carried out before the journeys and each item that was likely to be noted was marked with a number and the location of each numbered item was recorded with a measuring wheel. The participating cyclists were each accompanied by a member of TRL staff on a second bicycle. For this journey, the participants cycled the route twice, once at normal cycling pace so that they experienced the surface defects as they would normally, and a second time stopping at any location where they wished to make a comment. All comments were recorded and defects were photographed. The journey took under 10 minutes at normal pace and between 20 and 40 minutes whilst stopping to make comments.

### 4.3.3 Motor vehicle journeys

The three vehicle categories included in the accompanied journeys task were motorcycles, cars and HGVs.

- **Motorcycle journeys**

  The motorcyclists used their own vehicle for the journeys. User comments and GPS positions were recorded with a Dictaphone and receiver located in a rucksack or top-box. TRL staff led in a car, to allow the participant to concentrate on the road surface and not navigation. The journeys took about 30 minutes each (except one, when due to congestion, the journey time nearly doubled).

- **Car and HGV journeys**

  The car and HGV drivers used their own vehicle accompanied by a TRL staff member and car passengers sat in the front passenger seat of a TRL vehicle driven by a TRL staff member. Sound and
GPS recording equipment were fitted to the vehicles being used to record user comments along with the location information. The journeys took about 30 minutes each.

### 4.4 Analysis - Pedestrians

#### 4.4.1 Comments – individual defects

Participants’ comments on and categorisation of the individual defects on the route, and their views on the overall acceptability / need for maintenance of longer lengths on the route have been analysed to identify the terms and language used to describe condition and to see how these views relate to the data used by the Local Authorities to plan maintenance.

Comments made by the participants as they walked along the route were recorded on the pre-prepared survey sheets. This included their descriptions of the defect, why it was a problem and their level of acceptability based on the scale of 1 to 4 in Table 9.

The comments from the participants were cross referenced against location and colour coded in relation to the levels of acceptability. In general, most users made comments at similar locations but the level of acceptability varied between users. For example, what was described as a totally unacceptable defect by some participants was seen as borderline or even acceptable by others. To interpret the large amount of data collected during the surveys, overall average figures for the user determined condition were produced for each chainage position, as a representation of the ‘balance’ of opinion for each point, not simply the worst or best comments. A sample of the data from the pedestrian journeys, showing individual levels of acceptability and the derived overall score, colour coded to represent the level of tolerance, is given in Table 10.

Almost all of the issues identified by the pedestrians inherently related to condition where they perceived an increased risk of trip, either for themselves or some one less able to cope with uneven surfaces (e.g. on a wheeled device). On the chosen route, the four types of defects that were mainly noticed and commented on by the participants were trips, subsidence, cracking and patches. However, only a proportion of the noted defects were considered to be unacceptable. The heights of the trips that were noticed were measured to give an approximate measure of the levels at which the participants started to notice / became critical of the trip hazards.

- **Trips** - Sudden changes in height (e.g. sunken or raised slabs) were noticed when they were >10mm with users becoming increasingly critical of trips heights >20 mm;
- **Subsidence** – Users appear to be more tolerant of the unevenness from subsidence where there is a gradual change in height, with users becoming critical when the subsidence is >30mm;
- **Cracking** – Areas of cracking were noted by the participants and generally were not of concern unless they were also a trip hazard (as described above);
- **Patches** – As with cracking, patches were also considered to be mainly a cosmetic issue. There was an acceptance that patches were probably the cost-effective solution in places and were generally acceptable if well executed. There was some level of dissatisfaction at the poor quality of utility reinstatements that resulted in failed patches creating trip hazards.
<table>
<thead>
<tr>
<th>Surface type</th>
<th>Road</th>
<th>Participants</th>
<th>Chainage</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Bituminous</td>
<td>Booth Lane South</td>
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<tr>
<td></td>
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<td>5</td>
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</table>
The participants in the accompanied journeys did not notice or comment on two of the issues highlighted in the group discussions; kerb defects and tactile surfacing. This may be because the journeys were made on one side of the street with no need to cross the road and there were no elderly or disabled participants.

4.4.2 **Overall opinions – longer lengths**

At the end of each road on the survey route, the participants were asked to rate the overall condition of the length they had just covered on the four point scale. The aim of this exercise was to explore how the combination of the number, type, extent and severity of defects influenced the participants’ perceptions of the overall condition of longer lengths of footways.

![Figure 12: Pedestrian route](image)

<table>
<thead>
<tr>
<th>Participant Location</th>
<th>A</th>
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<th>C</th>
<th>D</th>
<th>E</th>
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<th>Overall</th>
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<td>The Headlands</td>
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<td>Debdale Road</td>
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<td>Silverdale Road</td>
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<td>Bushland Road</td>
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<td>Ferndale Road</td>
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</table>

The six roads on the route are highlighted in Figure 12. It is clear that from Table 11, that some lengths had a greater level of acceptability than others. 2 of the 10 participants (labelled E and H) found the overall condition of all the footways acceptable but the other participants showed some dissatisfaction. All the participants were satisfied with the overall condition of the footways on 2 of
the 6 roads, Booth Lane South and Bushland Road but were less satisfied with the footways on the other roads. On Silverdale Road and Ferndale Road, the overall view was that more than just localised repair was needed. Footways in both these locations were slabs, and users perceived trip hazards due to a number of problems:

- Cracked and uneven slabs;
- Raised and sunken iron works;
- Tar strip alongside the slabs in very poor condition, with debris from the breaking surface transferring on to the slabs.

(The defects at the top end of The Headlands identified by the participants have been repaired since the accompanied journeys were carried out).

4.4.2.1 User language

Overall, pedestrians want a safe surface, and this is defined as a surface that is sufficiently flat so that there is little risk of anyone ‘falling over’. They are relatively pragmatic about ‘cosmetic issues’ and accept that some level of patching is inevitable.

- Acceptable condition
  - “No lumps, no bumps, no weeds showing through”
  - “Acceptable because no one is going to trip on them”
  - “Not very pretty, but flat enough; Acceptable”
  - “Adequate for what is required”
  - “Patches are alright, they are level, no one is going to trip on them”

- Unacceptable condition
  - “Anything sticking up that you are going to catch on”
  - “Laying water – could cause you to trip”
  - “Cable TV … not acceptable; its definitely a trip; quite dangerous if any one is infirm, pushing a buggy or not looking where they are going”
  - “Rocking slabs – you put your foot down and you don’t have level footing; sideways ones are more of a problem”

- Other comments
  - “What annoys me … re-repairs after 6 months”
  - “Do a job properly so it lasts longer”
  - “These are always a problem, paving stones or slabs”

Figure 13 and Figure 14 include photographs of particular defects considered acceptable and unacceptable respectively, by the participants.
4.4.3 Relating user requirements to engineering standards

Discussions were held with highway engineers at Northamptonshire County Council (NCC) about the procedures they use to identify and prioritise maintenance needs on the network and more specifically the data available for the study network. The aim was to see how this linked with the user comments on levels of acceptability and the need for maintenance.

NCC provided data from 3 main sources that essentially underpinned the management of the footways; DVI surveys, service inspection reports and customer complaints logged on the ‘Street Doctor’ system.

4.4.3.1 DVI survey data

The footway DVI surveys in Northamptonshire are performed on a 5 year rotation. DVI surveys of the footways chosen for the study had been carried out during August and September 2006. Best Value Performance Indicator BV187 which is designed to provide the percentage length of the footway network with a Footway Condition Index (FCI) greater than a defined threshold value indicates the need for investigation to determine whether maintenance is needed to preserve footway serviceability and to rank maintenance decisions. Footway lengths on the study network with FCI greater than or
equal to a threshold of 20 were provided by NCC. DVI data was incomplete and the FCI had not been calculated for all the footways on the study route.

4.4.3.2 Service inspection reports

Service inspection reports identify the areas on the footways where routine maintenance is required and record what action has been taken. Action generally takes the form of raising works order tickets and works are then carried out if budget is available, i.e. a raised works order ticket does not mean the works will definitely be carried out. The service inspections for the route used were carried out between March and July 2006 and did not identify any defects on the route requiring maintenance.

4.4.3.3 Customer complaints

NCC provided records of complaints from their ‘Street Doctor’ customer complaint system for the period October 2005 to October 2006. These reports give a brief description of the problem as described by the complainant, its location, the date on which the fault was reported and any action taken by the Council. Locations may be by house number, for example ‘The Headlands OS 272’ is outside house number 272 on The Headlands. These reports were compared with user comments to determine if the study participants were also picking out issues that had previously been reported by general members of the public. Table 12 summarises the data from Street Doctor and how this relates to the comments made by the study participants.

### Table 12: Customer complaints

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<tr>
<th>Street doctor complaint</th>
<th>User comments during accompanied journeys</th>
<th>Action taken</th>
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<tr>
<td>The Headlands; Loose and raised paving slabs.</td>
<td>23 trip hazard comments were made along</td>
<td>The slabs have been repaired by NCC (within 28 working days of receiving the</td>
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<td>Outside no. 272.</td>
<td>the length of The Headlands and one of the</td>
<td>complaint).</td>
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<td>comments related to the trip at this</td>
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<td>location.</td>
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<td>Ferndale Road; Between pavement and gutter a</td>
<td>Three participants felt that the defect</td>
<td>No action has been taken but the Council will monitor deterioration during</td>
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<td>section of tarmac that has cracked with loose</td>
<td>was generally unacceptable.</td>
<td>routine inspections.</td>
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<td>stones.</td>
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<td>Debdale Road; Very uneven paving. Caller</td>
<td>27 trip hazard comments were made along</td>
<td>No action has been taken but the Council will monitor deterioration during</td>
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<td>has tripped several times.</td>
<td>the length of Debdale Road.</td>
<td>routine inspections.</td>
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<tr>
<td>Booth Lane South; Damaged footpath.</td>
<td>7 trip hazards, 13 cracked areas and 7</td>
<td>No Action taken.</td>
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<td>Outside no. 131</td>
<td>poor patches were identified on Booth</td>
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<td>Lane but none were at an unacceptable</td>
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4.4.4 Measured and perceived condition

Figure 15 shows the locations where comments were made along the study route and defects perceived to be in categories 3 and 4 are shown by the amber and red dots. Plotted alongside (red lines) are the lengths with FCI > 20, the council’s threshold for considering maintenance. Lengths with no measured data are also shown. While the lengths where the FCI exceeds the threshold of 20 roughly aligns with the lengths users have also perceived to be in poor condition, there are a number of lengths highlighted by users that are not reflected in the FCI data. The length at the top right hand corner (marked No. 272) considered poor by the participants was maintained, following a complaint.
from a member of the general public, in the time between the accompanied journeys in July and the DVI surveys in August / September.

Figure 15: DVI data exceeding threshold and user opinions

Further analysis of the DVI data was carried out by NCC with two additional threshold levels, identified as ‘amber’ (FCI > 14 and < 20) and ‘green’ (FCI > 0 and < 14). The results are shown in Figure 16. The severity levels derived from measured data are still different from those perceived by the users but the analysis with additional thresholds for FCI provides an improved link between the condition ratings.

Overall, while user thresholds for trips on footways are broadly similar to current thresholds, there is only limited agreement between user requirements for footway surface condition as identified by the pedestrians in this study and the engineering and other data (e.g. DVI and the derived FCI which essentially form the basis of planned maintenance, service inspections for routine maintenance and Customer complaints driving reactive maintenance) used by NCC to plan footway maintenance. However this must be viewed within the context of the study, i.e. the participants were primed to note and comment on condition and that visual surveys have a level of subjectivity and hence may vary depending on who is carrying them out.
4.5 Analysis - Cyclists

There were no dedicated cycle lanes in the study route and the journeys were all carried out on the main carriageway.

4.5.1 Cyclist comments – individual defects

Detailed comments from cyclists on localised defects were obtained and categorised within the 4 levels of tolerance described in Table 9. Table 13 illustrates the levels of acceptability of the defects on the part of the carriageway used by the cyclists on the study route. As with pedestrians, levels of tolerance vary between the different participants and the overall score for the location is used as the representation of the overall view of all the participants.

On the chosen route three types of defect noted by the cyclists were mainly:

- Potholes;
- Sunken or raised ironworks;
- Patches and failed patches.

In addition to the surface defects, cyclists also expressed concern about debris on the carriageway, including loose stones from deteriorating surfaces or failed patches. As with the pedestrians, most of the issues that caused concern to cyclists related to condition that resulted in a step in the cycle path and hence presented a hazard. While patches and failed patches on the route were pointed out as defects, in general they were acceptable if the patches were level with the surrounding area.
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</table>

Table 13: Detailed cyclists comments against position

<table>
<thead>
<tr>
<th>Cyclists</th>
<th>Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booth Lane South</td>
<td>Overall</td>
</tr>
<tr>
<td>The Headlands</td>
<td>Overall</td>
</tr>
<tr>
<td>Birchfield Road East</td>
<td>Overall</td>
</tr>
<tr>
<td>Bushland Road</td>
<td>Overall</td>
</tr>
<tr>
<td>Ferndale Road</td>
<td>Overall</td>
</tr>
</tbody>
</table>
The cyclists were less tolerant where the repairs had begun to deteriorate creating a step change in the carriageway height or material was escaping on to the carriageway. Potholes, iron works and failed patches resulting in height changes of up to 20mm and within 20 cm of the kerb were in general tolerated. However, the position of the defect, distance from the kerb, width of the carriageway and the confidence level of the cyclists were also influencing factors, i.e. they were willing to tolerate defects that could be avoided without increasing risk to the cyclists.

4.5.2 Overall opinions – longer lengths

None of the cyclists felt that there were any long stretches on the route that required maintenance as a whole. At the time of the study none of the roads on the route were on NCC’s planned programme of works.

4.5.2.1 User language

- Acceptable condition
  
  "Not dangerous because you can avoid it, the road is wide enough"

- Unacceptable condition
  
  "Really bumpy, wants sorting out pretty quickly. If you are thrown by the dips, and a car is coming fast, it’s going to be on top of you"
  
  "Sunken drains... would not want to ride over those, you are forced to suddenly swerve out to go round it... dangerous to cyclists and others"
  
  "Breaking up, loose stones, completely uneven"

Figure 17 and Figure 18 show photographs of particular defects considered acceptable and unacceptable by the participants.

![Cyclist acceptable defects](image)
4.5.3 Relating user requirements to engineering standards

NCC provided data from 3 main sources that essentially underpinned the management of the carriageways; CVI surveys, service inspection reports and customer complaints logged on their “Street Doctor” system.

4.5.3.1 CVI data

NCC provided Condition Indices derived from CVI data from surveys carried out between May 2005 and October 2006. BVPI figures calculated from the CVI survey data, for the carriageway lengths used for the cycle surveys, are shown in Table 14. NCC use local BVPI figures to prioritise schemes. Roads with a local BVPI above 60% are considered for maintenance. To further differentiate between schemes the three Condition Indices (CI) representing Edge, Structural and Wearing Course defects are used. The CI data highlights only the lengths that have exceeded the engineering thresholds used to identify maintenance needs, and are shown in Figure 19 for the study route. The BVPI values are well below thresholds for all the roads and only a short length on the network has been highlighted by the CI defect indices. This implies the rest of the network is currently in good condition (as defined by the engineering thresholds). No other survey (e.g. SCANNER or DVI) had been carried out on network used for the cycle journeys.

Table 14: BVPI's for lengths used in cycle surveys

<table>
<thead>
<tr>
<th>Road</th>
<th>BVPI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booth Lane South</td>
<td>5.22</td>
</tr>
<tr>
<td>The Headlands</td>
<td>24.1</td>
</tr>
<tr>
<td>Birchfield Road East</td>
<td>0</td>
</tr>
<tr>
<td>Bushland Road</td>
<td>0</td>
</tr>
<tr>
<td>Ferndale Road</td>
<td>0</td>
</tr>
</tbody>
</table>
4.5.3.2 Safety/Service inspection reports

Safety inspections are intended to identify the areas that may create inconvenience or danger to the highway user and the service inspections identify the areas where routine maintenance is required to maintain the serviceability of the highway. For the class of roads used for this study NCC typically carries out combined safety and service inspections on a 6 monthly cycle. The inspection reports provided for the route used in the study were dated between March 2006 and July 2006.

The only report with defects identified on the cycle route was from the inspection carried out on 15 July 2006 (a few days after the accompanied journeys were carried out) and showed seven carriageway defects on one of the roads, The Headlands. Table 15 shows how these defects relate to user views.
Table 15: Safety / Service inspection defects and user views

<table>
<thead>
<tr>
<th>Location (o/s)</th>
<th>Defect</th>
<th>Action</th>
<th>User views</th>
</tr>
</thead>
<tbody>
<tr>
<td>136</td>
<td>Renew channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>142</td>
<td>Ultracrete patch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>148</td>
<td>Tarmac 2 slabs</td>
<td>Raised order</td>
<td></td>
</tr>
<tr>
<td>152</td>
<td>Ultracrete patch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>Relay channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>166</td>
<td>Tarmac slab</td>
<td></td>
<td></td>
</tr>
<tr>
<td>226</td>
<td>Patches</td>
<td>Raised order</td>
<td></td>
</tr>
</tbody>
</table>

The defects identified by the safety/service inspections broadly align with the views of the participants. However, there were also a number of other locations where the participants were concerned about the condition but these have not been identified during the inspections.

4.5.3.3 Customer complaints

The faults reported to NCC’s ‘Street Doctor’ customer complaint system for the period October 2005 to October 2006 showed 3 recorded complaints on the cycle route. The faults recorded in the Street Doctor’ system and user comments at those locations are given in Table 16.

Table 16: Customer complaints

<table>
<thead>
<tr>
<th>Street doctor complaint</th>
<th>Action taken by the Council</th>
<th>User views</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Headlands; Pothole by dropped kerb, outside House No. 94</td>
<td>Inspected; No further action recommended</td>
<td>No comments by users at this location</td>
</tr>
<tr>
<td>The Headlands; Pothole at Junction with Debdale road</td>
<td>Repaired within 24 hours of receiving the complaint (on 14 February 2006)</td>
<td>Comments about potholes and patches; Condition bordering on acceptable / unacceptable</td>
</tr>
<tr>
<td>Birchfield Road; Pothole on speed hump, surface is crumbling</td>
<td>Repaired within 24 hours of receiving complaint (on 13 June 2006)</td>
<td>No comments by users at this location</td>
</tr>
</tbody>
</table>

Figure 20: Reported pothole on The Headlands / Debdale Road junction
Although the reported pothole on The Headlands / Debdale Road junction was repaired before the journeys, there were still a number of potholes and poor patches in this location at the time of the journey as shown in Figure 20.

4.5.4 Measured and perceived condition

Figure 19 shows the locations where comments were made by the cyclists along the route. Plotted alongside are the Edge, Structural and Wearing Course defect lengths provided by NCC from the calculation of the condition index based on the thresholds currently used to make maintenance decisions. The carriageway length on the top right hand corner, (on The Headlands) with a dense population of defects noted by the cyclists corresponds with the lengths identified by the three Condition Indices. However, no defect lengths have been identified on the remainder of the network from the CVI data although there are a number of locations on the route where localised defects were perceived by the cyclists to have reached unacceptable levels. Overall there appears to be little alignment between the CVI data and cyclists’ requirements for carriageway condition.

In order to see whether the CVI data could be analysed in a way that provides better alignment with the user views, NCC carried out additional analysis of the CVI data to report on an Overall Condition Index (instead of choosing Structural, Edge and Wearing course) and sorted the results within 3 bands mirroring the 3 levels, green, amber and red, used to represent users’ scale of tolerance. The results are shown in Figure 21. This provides some improvement in the alignment although the new bands still do not identify all the areas that the cyclists identified as unacceptable.

CVI surveys cover the whole of the carriageway surface and the results of this study appear to indicate that the CVI surveys as carried out currently may miss some of the defects that are noted by cyclists. There may be a need for more targeted surveys (e.g. focused on the cycle paths or using cyclists) to ensure that the requirements of this category of vulnerable roads users is adequately addressed.
4.6 Analysis – Motorcyclists, motorists and HGV drivers

All the vehicles journeys (motorcycles, cars and HGV) followed the same route, about 14km of B and C roads, and a similar methodology was used to record the participants’ reactions to and opinions of the road surface condition. The vehicle journey route is highlighted in green in Figure 10.

4.6.1 User category

The group discussions and interviews showed the type of road user to be the largest differentiating factor affecting perceptions of road condition and of the three categories; motorcyclists appeared to be the most aware of surface condition, while motorists were the least aware. This was confirmed in the journeys where motorcyclists identified about twice as many defects as the car drivers and passengers on the same length of road, i.e. they showed a greater awareness/ability to register aspects of carriageway surface condition, including defects they expected to develop into a problem with time or under different conditions (e.g. wet weather). They also identified issues (e.g. overbanding) that were not as much of an issue for the motorists. It was clear that the motorcyclists took more notice of the condition of the carriageways over which they were driving. However, for the small sample size used in the study, the scale of tolerance to poor condition did not appear to be different between the users.
(With only 2 HGV drivers, it is not possible to make any comparison about the relative impacts of the carriageway condition on them).

Motorcyclists commented on aspects that would affect their safety, such as rutting, overbanding and debris on the carriageway. HGV drivers were particularly concerned about edge deterioration. Many of the roads in the study network were narrow and resulted in the wheels of the HGVs running on the edge of the carriageway making uneven surfaces at the edge more noticeable. HGV drivers were concerned about the wheels breaking through the surface, digging into the ground beneath and causing the vehicle to overturn. The sort of condition that caused concern to HGV drivers is shown in Figure 22. The HGV drivers also made the point that they were increasingly using roads that had not been designed to carry heavy vehicles and were conscious of the damage their vehicles were causing.

The issues that were more frequently identified by particular category of user were:

- Motorcyclists – Lack of grip, uneven/bumpy surfaces and the location and condition of manhole covers and potholes;
- Car drivers and passengers – Bumpiness and its effect on safety and ride comfort
- HGV drivers – lack of grip and edge deterioration; also, carriageway width and impact of the HGVs on carriageways and surfaces not designed to carry HGVs

### 4.6.2 Participant comments – individual defects

An important factor influencing the data collection during vehicle journeys was the speed of travel. The scope of the study was limited to the surface condition of the carriageways the participants were driving over. There was still a large number of issues for the participants to comment on, much of it occurring simultaneously and with limited time for the comments to be made. The TRL staff accompanying the participant directed and prompted the drivers to provide their comments at the appropriate times. However, often there was a delay between a defect being noticed and the comment being made and at times they missed making comments on some defects even if they had been noticed. This delay or the number of defects missed is difficult to quantify as there are many factors involved:

- Discussing an earlier defect or other related issues and missing a defect;
• Grouping a number of defects together rather than mentioning them separately;
• Concentrating on driving and either not noticing or unable to mention a defect;
• A new and higher priority defect overriding the original which would then not be mentioned;
• Noticing defects based on the appearance before it had actually been experienced;
• Reacting to a defect only after driving over it, either because the user had not originally noticed it or it was worse than they had originally thought.

There were other issues affecting the way user opinions were communicated. For example if a vehicle user said ‘I don’t like that pothole there, it should be repaired soon,’ this would take approximately three and a half seconds, which at 40mph would be 60 metres travelled. In the mean-time the user may have travelled over other defects either more or less important to him/her. Users sometimes referred to defects in general terms, ‘its bumpy all along this bit’ or in very specific terms, ‘that bump, there, is unacceptable’. The above factors have been taken into account in the analysis and interpretation of user requirements.

Commentaries recorded during the journeys were transcribed and together with the location data and taking account of the uncertainties in position as described above, defects were assigned to locations on the network. The number of participants commenting about a particular defect was assumed to reflect the impact of the defect and this was used with the rating of tolerance to derive the overall severity rating. Over the whole route there were 104 locations with defects falling into the red and amber categories. Most of the comments made by the participants covered 5 main types of defects:

• Potholes;
• Bumpiness/unevenness;
• Lack of grip, polished or slippery surfaces;
• Patches (good and bad);
• Manhole covers and ironworks.

There were a few references to cracking and edge deterioration over the entire route. Defects noted by users and categorised as red (unacceptable) or amber (acceptable/unacceptable) are shown in Figure 23.
4.6.3 Categorisation of lengths of carriageways

The route was divided into 9 lengths, as shown in Figure 24. These lengths were chosen as they were of broadly similar environment and were separated by easily identifiable features (e.g. roundabout). This also meant that participants could naturally and easily see the lengths as separate units. For example, Hunston Road between the A27 roundabout and the B2145 roundabout formed one length. (The lengths have been given convenient labels for reference in this report and do not necessarily represent the correct name for that road/length).

Maintenance schemes on roads generally cover reasonable lengths and can cause disruption and increased inconvenience to the road users. In asking for the participants’ views of the overall condition of a length of road, the aim was to discover whether they felt that the extent of defects on the length had reached a level that was less acceptable than the consequences of roadworks (e.g. additional disruption). The participants were asked to rate the condition of each of the 9 lengths into which the route had been divided on the four point scale (Table 9). Table 17 gives the overall ratings from all the participants for each of the 9 lengths.
Table 17: User categorisation of route lengths

<table>
<thead>
<tr>
<th>Road name</th>
<th>Scale of tolerance (see table 9)</th>
<th>Road type</th>
<th>User quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunston Road</td>
<td>2</td>
<td>Rural B road</td>
<td>“Old, but quite nice; basically the surface is good”</td>
</tr>
<tr>
<td>North Mundham</td>
<td>2</td>
<td>Urban B Road</td>
<td>“Bumpy, not a fantastic surface but at low speeds not of great significance”</td>
</tr>
<tr>
<td>Pagham Road</td>
<td>3</td>
<td>Rural B road</td>
<td>“Road extremely bumpy, unacceptable really, considering the amount of traffic”</td>
</tr>
<tr>
<td>Pagham Road 2</td>
<td>2</td>
<td>Rural B road</td>
<td>“Good condition, smooth with very few bumps”</td>
</tr>
<tr>
<td>Lower Bognor Road</td>
<td>2</td>
<td>Rural B road</td>
<td>“Few bumps and dips but because it is a back road you live with it”</td>
</tr>
<tr>
<td>Rose Green</td>
<td>4</td>
<td>Urban C road</td>
<td>“Very patchy, bumpy and uneven; needs the whole surface to be done”</td>
</tr>
<tr>
<td>Sefter Road</td>
<td>2</td>
<td>Urban/rural C road</td>
<td>“A little patchy but no big potholes or anything”</td>
</tr>
<tr>
<td>Sefter farm</td>
<td>2</td>
<td>Rural C road</td>
<td>“Road not perfect but OK, generally in pretty good condition”</td>
</tr>
<tr>
<td>Vinnetrow Road</td>
<td>1</td>
<td>Rural C road</td>
<td>“This section seems perfect; even if I go over a manhole cover there is very little movement”</td>
</tr>
</tbody>
</table>

There was some level of consistency in the type of defects that the participants were noticing but their reactions to the condition over longer lengths and their expressions of acceptable or not acceptable levels were not consistent on different parts of the study route. Bumpiness and uneven surfaces resulting in poor ride quality were seen as an issue to be highlighted but similar levels of bumpiness appeared to be acceptable in one location and not acceptable in another. It was clear from the responses obtained that user reactions to condition and their views of acceptable levels were influenced by several factors in addition to the actual condition itself. For example, 3 of the lengths, all B roads, North Mundham, Pagham Road and lower Bognor Road were seen as bumpy but with different levels of acceptability. The main differences between the sites were:

- North Mundham – 30 mile speed limit zone and low levels of traffic;
- Pagham Road – Higher traffic levels, more HGVs and a wide and open environment;
- Lower Bognor Road – Continuation of Pagham Road but narrower, lower traffic levels, more corners and lower average speed.
4.6.4 Measured and perceived data

4.6.4.1 Engineering data

Discussions were held with highway engineers at West Sussex County Council (WSCC) to explore their procedures to identify and prioritise maintenance needs on the network and more specifically the data available for the study network. The aim was to see how this linked with the user comments on levels of acceptability.

Data from a number of sources are used to identify carriageway maintenance needs and prioritise the potential schemes. For example, the data sources include:

- Condition surveys (each of the surveys cover only parts of the network);
  - Visual surveys (CVI and DVI)
  - SCANNER
  - Deflectograph
  - SCRIM
- Customer complaints;
- Ad Hoc inspections;
- Data logger inspections;
- Streetworks reports.

For the network used in this study, CVI data (collected in May/June 2006) and SCANNER data (collected in 2006 for the B roads only) were available.
Maintenance schemes are identified and prioritised by WSCC using a combination of factors (e.g. condition, political, safety, risk). Traditionally, condition data from network surveys has a bigger role in the identification of maintenance schemes on Principal roads whilst for the other road classes, schemes may be put forward by Local Area Superintendents based on local knowledge. On the study route only one length had been included in the maintenance programme for 2006/07, in North Mundham within a 30mph speed restricted zone, outside a school. The North Mundham scheme was due to:

- Poor structural condition;
  - Cracking
  - Chip Loss
  - Poor reinstatements
  - Potholes maintained in recent months
- Location and usage – route is used by school traffic, HGVs and buses.

Further discussions with WSCC confirmed that none of the other roads on the route was being considered for maintenance. As shown in Table 17, the length of road through North Mundham, selected for maintenance by WSCC, was categorised as acceptable by the participants. Conversely, the two lengths, Pagham Road and Rose Green, that were given a poor rating (scores of 3 and 4) by the participants were not in the maintenance programme and had not even been identified as potential future schemes.

In order to better understand what was causing the difference in interpretation, it was decided that it would be better to have a consistent set of data for the whole network rather than CVI data for some parts of the network and SCANNER data for other parts.

Local Authorities are moving towards carrying out SCANNER surveys for B and C class roads and it was decided to explore possible relationships between user perceptions and the SCANNER condition parameters. A data collection exercise was carried out by surveying the network with the Highways Agency Road Research Information System (HARRIS) machine. HARRIS is a research vehicle and a forerunner of the commercial SCANNER vehicles that routinely survey the local road network. The manner in which HARRIS operates enables raw data recorded to be processed into different formats, to enable detailed investigation of pavement condition. HARRIS operates at traffic speed (up to 80kph) and surveys can be carried out with live traffic and without lane closure.

The HARRIS survey was performed on 11 November 2006. There had been recent rain but the road surface was dry, as required for HARRIS surveys. Transverse profile measurements were taken at 100mm longitudinal intervals to a width of 3.150m, texture depth readings at 1mm intervals in both the nearside wheel path and centre of the carriageway, and a downward facing video of the lane to a width of 3.0m was recorded for the route.

HARRIS is not equipped with the same automatic cracking identification system as the commercial SCANNER vehicles. HARRIS therefore relies on manual analysis of video images of the roads surface to assess the quantity of cracking on that surface. This is a very time intensive analysis and as there were very few comments from participants about cracking, this parameter was not analysed.

The HARRIS data was analysed for all the other standard SCANNER parameters currently in use and three parameters currently under development. In addition, HARRIS software was used to determine the proportion of surface that is patched.

- Mean Rut (mm) – The rutting measurement in the right-hand wheelpath only. Left rut has been omitted because it has not been filtered to remove the effects of kerb stones etc.
• 3m LPV – 3m moving average Longitudinal Profile Variance. One of the current measures used by SCANNER to measure ride quality.

• 10m LPV – 10m moving average Longitudinal Profile Variance. One of the current measures used by SCANNER to measure ride quality.

• SMTD – Nearside wheelpath Sensor Measured Texture Depth.

• Bump measure – Analysis of profile data using the Central Difference Method; new parameter under development for including in SCANNER surveys in 2007/08).

• EDI – Edge Deterioration Index (new parameter)

• Transverse Profile Unevenness – new parameter under development for including in the SCANNER surveys in 2007/08.

• Proportion Patched – The proportion of the surface area that is patched (not a SCANNER parameter)

• Road Condition Index (RCI) - excluding cracking.

4.6.4.2 Condition parameters and user perceptions

Each of the Scanner parameters analysed has been compared with user comments broadly related to that parameter type (e.g. LPV and user comments about uneven or bumpy ride quality) to see which parameters relate to user perceptions. Condition thresholds used for the all the SCANNER parameters are from the SCANNER Specification 2006/7, Volume 5, Further Technical Guidance (Halcrow, 2006).

Wheel-track rutting

Figure 25 shows the right wheel-track rutting data for the entire route and the upper (red) and lower (amber) thresholds. Majority of the rutting measurements on the route are significantly below the lower threshold for rutting and this was also reflected in the very few references to rutting from the participants. The only two comments on rutting were:

“Slightly rutted by farm turn-off, but O K, grip levels are good”

“Quite a rut on the other side of the road”

However, rutting is perceived as a safety hazard, particularly by motorcyclists. For example, quotes from motorcyclists on the industrial road from the car park to the start of the journey route (i.e. outside the journey route)

“Going over ruts and bumps that disturb your driving are unacceptable”

“Grooves running 1 to 2 cm in depth; this will cause problems for the motorcyclist, carrying his machine the wrong way

“Groove that could grab the wheel of the bike and pull you into its direction; steering made more difficult; could destabilise the motorcyclist"
“Tram lines\(^2\) are a particular nuisance - the wheel can get caught in them and it takes you where you don’t want to go”

As the study route did not have any lengths with significant levels of rutting it has not been possible to explore users’ levels of tolerance for this condition.

\[\textbf{Figure 25: Mean Right Rut measure}\]

3m and 10m Longitudinal Profile Variance (LPV) and Bump measure

LPV is a measure of ride quality but it is limited to representing the undulations over longer lengths (i.e. 3m or 10m). As such it does not reflect all localised defects such as potholes that may impact on ride quality. Also, as the measurements are limited to the wheelpath, defects outside the wheelpath will not be picked up. The Bump measure from the analysis of the profile data using the Central Difference Method (CDM) has been developed to identify shorter wavelength defects that could impact on ride quality. The CDM produces bump measures from the raw longitudinal profile data to record the existence of a ‘bump’ within a 1m length. If the bump algorithm produces values that exceed pre-set thresholds, the 1m length is assigned a value of 1 (otherwise it is assigned 0).

SCANNER data is delivered in 10m sub-sections. Any 10m sub-section containing a 1m length with a value of 1, is assigned a bump value of 1 itself. Typically a 20mm step in the wheel path, that may be found at the edge of raised or sunken ironworks would trigger the thresholds to indicate a bump.

Figure 26 and Figure 27 show the 3m LPV and 10m LPV (of the nearside wheelpath) and the upper and lower thresholds appropriate to the particular road classes and environment. The positions where bumps were recorded from the bump measure are also presented in the figure (there is no severity level associated with the bump measure, just indicates the presence of a bump). It is important to note that the longitudinal profile parameters (3m LPV and 10m LPV) and the bump measure have been calculated from longitudinal profile data collected by a single laser in the nearside wheel path and therefore defects not in the path of the laser would not be picked up. In order to compare the measured data with user perceptions, the locations on the route where the participants’ comments related to poor

\(^2\) The user is referring to rutting as “tramlines”
ride quality (uneven/bumpy, potholes, patches and ironworks) and were scored at levels 3 or 4 (i.e. amber or red) are also included in the two figures.

The main points from the comparison of the engineering and user data are:

- The locations of the bumps align well with the positions that the participants considered to have poor ride quality. The only exception is the first bump (on Hunston Road). This was possibly missed by the participants as it was almost at the start of the route (about 140m from the start point). Additionally the bump measure has been triggered in locations with high 3m and 10m LPV.

- A large number of the locations with 3m and 10m LPV above the threshold and therefore contributing to the BVPI, have also generally been categorised by the participants as having poor ride quality. This is particularly the case for the 4 roads, North Mundham, Pagham Road, Rose Green and Sefter Road.

- There are some lengths, e.g. Pagham 2 and Sefter Farm, with locations that the participants have categorised as having poor ride quality but the 3m and 10m profiles are either below or only just above the lower threshold. This is to be expected because as described earlier, the LPV is based on measurements from the nearside wheel path only. Typical comments associated with the poor ride quality in Pagham 2 were:

  “Repair right in the wrong place. This is bad. Sort of thing that knocks you off”

  “Severe dip, unacceptable”

- However on Lower Bognor Road, although the LPV values are over the higher thresholds for about half the length, the participants did not consider the ride quality unacceptable. Their comments on the road showed that they registered the unevenness and bumpiness but the ride quality still fell within the levels they expected for their perceived standard for that road. For example, typical comments from participants on Lower Bognor Road:

  “There are a few bumps and dips but because it is a back road you live with it”

  “Country roads tend to be a bit more bumpy but you just tend to accept that”

  “Undulating surface is what you would expect from a country road”

  “Bit bumpy, but it is a country road”
Currently there is some discussion about reducing the LPV contribution to BVPI. The belief is that, on engineering grounds, the use of both 3m and 10m LPV within the basket of parameters used to calculate BVPI results in too high a weight being given to LPV compared to other parameters (e.g. rutting). However, it may be useful to examine whether the argument is still valid if user requirements are also taken into consideration. As shown above, overall, the three parameters representing ride quality, 3m LPV, 10m LPV and the bump measure, relate well with user requirements for ride quality.
The levels of acceptability or user thresholds, however, appear to be related to their views of the road and it may be useful to re-examine both the thresholds and the road classification.

**Sensor Measured Texture Depth (SMTD)**

Figure 28 shows the SMTD values for the route and the upper and lower thresholds. It is only in North Mundham that there is a long length of road with poor texture. Other than that, except for a few isolated locations, the texture on the route is within current engineering standards.

While the participants commented on polished or slippery looking surfaces, there were only a few locations where the participants perceived the level of “grip” to be unacceptable at the time of driving. (It was dry and sunny when the journeys were carried out). As seen in Figure 28, most of these comments are in North Mundham which has low measurements of texture depth. Low texture is not necessarily easily noticeable by road users. While, it is possible that some users may notice a lessening of grip where texture is low, it is also likely that low textures may result in a more positive perception of condition, e.g. due to lower noise. Comments by the participants did show clearly that good “grip” was important and poor grip was perceived as being unsafe. The poor grip may be due to the surface being polished or other reasons such as debris, poor repairs or overbanding.

- “Good road surface - slightly smoother but quieter and makes for a much more pleasant and smooth ride”
- “Urgent repair - surface grip is being lost and if you had to brake hard, that could have dangerous consequences”
- “Loss of grip, some sort of repairs that are OK in the dry but bad in the wet”
- “Overbanding on the corner is a great concern - it affects the vehicle you are travelling in. Lack of grip on the banding and the car may have a tendency to slide out towards the outside of the corner”
- “Mud on the road coming into the corner, needs to be cleared. It is very dangerous. Slippery when wet and you can’t really see the markings, demarcation lines are not visible”

![Figure 28: SMTD and user comments regarding polished surfaces](image-url)
**Proportion Patched**

At Rose Green, which got an unacceptable rating from the participants, there were a number of comments about poor utility reinstatements and patches in general. Therefore, although “proportion patched” is currently not used as a SCANNER parameter, HARRIS data was analysed to determine the proportions of patching from the measurements. A manual analysis of the images collected by HARRIS was undertaken to determine the quantity of patching.

Figure 29 is an image from HARRIS with the patched area marked using crosses, each cross representing a 200mm square area. Analysing the images manually is very time intensive and the analysis was therefore limited to images from 3 roads on the route, North Mundham, Pagham Road and Rose Green. The analysis provided the total proportion of patched area in each 10m length. The analysis algorithm does not distinguish between different types of patches, e.g. utility reinstatements or highway authority repair patches. As the results in Figure 30 show, Rose Green, where most of the comments about patches were made, has the highest proportion of patched surface (~3.4%). On the other 2 roads, the proportion of patched surface is much lower, about 1% on Pagham Road and just below 1% on North Mundham.
Transverse Unevenness

Transverse unevenness is also a new parameter that is currently being developed for inclusion as a SCANNER parameter in 2007/08. HARRIS data has been analysed and the results are shown in Figure 31. Thresholds have not yet been defined but based on the analysis of 60km of data from Hampshire, (Watson, Wright & McRobbie, 2006) the 90th percentile is about 0.06mm². From Figure 31, the only length with significant levels of transverse unevenness (i.e. >0.06 mm²) is Lower Bognor Road. There appears to be no alignment between transverse unevenness and user perceptions of poor ride quality indicating that the parameter may be appropriate only as an engineering parameter and not representative of user perceptions.
Figure 31: Transverse Profile Unevenness and user comments regarding uneven surfaces

Edge Deterioration Index

The Edge Deterioration Indicator (EDI) is also not currently in use as a SCANNER parameter but has been included here to see how the index relates to user comments on edge deterioration. EDI is calculated using 10m data from four parameters included in the SCANNER data:

- Edge Roughness;
- Transverse variance difference;
- Edge step 1;
- Edge step 2.

They are combined and weighted to produce the overall EDI which is then reported, averaged over 100m lengths. The thresholds used are still experimental and may change with experience.

Motorists and motorcyclists in this study made only limited comments about edge deterioration and overall there were only 5 locations where the edge deterioration was considered unacceptable, as shown in Figure 32. This is possibly because edge deterioration was usually not perceived to be a problem as the motorists and motorcyclists could drive to avoid it.

"Just breaking up on the nearside; it is isolated, so not really an issue"
Figure 32: Edge deterioration indicator and user edge comments

Road Condition Index (RCI)

BV244 (a), the Best Value Indicator for non-principal classified roads (such as those on the study route) provides the thresholds for each SCANNER parameter to allow categorisation of data into upper and lower bands. The categorised data is then used to calculate the SCANNER Road Condition Indicator (RCI) for each 10 m section. A subsequent set of thresholds allow the RCI for each 10m section to be categorised as “red”, “amber” or “green”. The proportion of “red” 10m sections is reported as the BVPI.

RCI values were calculated using the SCANNER algorithms, but excluding cracking and the overall RCI for the study network, using a red threshold of 100 is 12.4%. This value compares well with the overall RCI of 14% calculated by WSCC using their own data for the study route. The overall RCI also falls well within the range of values reported by McRobbie et al (2007) from the analysis of data from 16 Local Authorities which showed the proportion of RCI varying from about 1% to just under 30% and an average overall proportion of RCI red of 11.4%.

The qualitative opinions of the participants identifying lengths in poor condition and the RCI from the 10m lengths on the study network are presented together in Figure 33 to see how well they compare. The majority of the user comments, 72 out of a total of 104, align with RCI red, 25 comments align with RCI amber and only 7 comments align with RCI below the amber threshold. The 7 comments all concerned potholes or sunken ironworks which are the type of defect that may not be picked up by HARRIS (or SCANNER) surveys.
Further analysis was carried out by calculating the Overall RCI of the 9 lengths on the network and the results are shown in Figure 34. The distribution of individual parameters making up the RCI, the number of bumps (from the bump measure) and the proportion of area patched are given in Table 18. The results have been used to examine how the RCI and the participants’ views of the overall condition of each of the 9 lengths compare.
### Table 18: Measured data - condition of the network

<table>
<thead>
<tr>
<th></th>
<th>Hunston Rd</th>
<th>North Mundham</th>
<th>Pagham Rd</th>
<th>Pagham Rd 2</th>
<th>Lower Bogno Rd</th>
<th>Rose Green</th>
<th>Sefter Rd</th>
<th>Sefter Fm</th>
<th>Vinnetrow Rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of 10m lengths above the upper threshold for 10m RCI (%)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Mean Rut R (mm)</td>
<td>2.70</td>
<td>7.32</td>
<td>9.93</td>
<td>3.16</td>
<td>10.19</td>
<td>13.73</td>
<td>1.22</td>
<td>0.69</td>
<td>1.75</td>
</tr>
<tr>
<td>3m LPV (mm2)</td>
<td>1.80</td>
<td>11.38</td>
<td>9.93</td>
<td>1.05</td>
<td>16.20</td>
<td>17.65</td>
<td>7.32</td>
<td>0.69</td>
<td>2.92</td>
</tr>
<tr>
<td>10m LPV (mm2)</td>
<td>0.90</td>
<td>28.46</td>
<td>2.13</td>
<td>2.11</td>
<td>0.93</td>
<td>0.00</td>
<td>2.44</td>
<td>2.08</td>
<td>8.19</td>
</tr>
<tr>
<td>NS SMTD (mm)</td>
<td>0.90</td>
<td>19.51</td>
<td>27.66</td>
<td>3.16</td>
<td>21.30</td>
<td>21.57</td>
<td>7.32</td>
<td>0.69</td>
<td>1.17</td>
</tr>
<tr>
<td>Proportion of 10m lengths between the lower and upper thresholds for 10m RCI (%)</td>
<td>0.90</td>
<td>0.00</td>
<td>0.71</td>
<td>0.00</td>
<td>0.46</td>
<td>0.00</td>
<td>1.22</td>
<td>4.17</td>
<td>0.00</td>
</tr>
<tr>
<td>Mean Rut R (mm)</td>
<td>11.71</td>
<td>19.51</td>
<td>27.66</td>
<td>3.16</td>
<td>21.30</td>
<td>21.57</td>
<td>7.32</td>
<td>0.69</td>
<td>1.17</td>
</tr>
<tr>
<td>3m LPV (mm2)</td>
<td>18.92</td>
<td>29.27</td>
<td>24.11</td>
<td>8.42</td>
<td>33.33</td>
<td>17.65</td>
<td>28.05</td>
<td>4.17</td>
<td>4.09</td>
</tr>
<tr>
<td>10m LPV (mm2)</td>
<td>60.36</td>
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<td>48.23</td>
<td>2.11</td>
<td>14.35</td>
<td>61.76</td>
<td>39.02</td>
<td>75.69</td>
<td>41.52</td>
</tr>
<tr>
<td>NS SMTD (mm)</td>
<td>1.00</td>
<td>0.85</td>
<td>1.04</td>
<td>3.35</td>
<td>3.35</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Number of Bumps</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Proportion patched (%)</td>
<td>n/a</td>
<td>0.85</td>
<td>1.04</td>
<td>n/a</td>
<td>n/a</td>
<td>3.35</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

- **Hunston road – User Score Average/Acceptable; Overall RCI = 7.2%**

Hunston Road is a rural B road. The participants did not perceive any lengths to be in poor condition and this compares well, both with the values of the individual condition parameters and a low overall RCI.

"Good road surface, slightly smoother and makes for a much more pleasant, smoother ride"

"Average to good, it is smooth and does not drop at the edges"

"Normal for a road from this area. I am happy with its condition"

![Hunston Road](image)

- **North Mundham – User score Average/Acceptable Overall RCI = 22%**

North Mundham is an urban B road. There were localised defects (e.g. poor grip, edge deterioration, uneven and bumpy) that participants felt were individually unacceptable and this reflects the engineering data for this length (poor texture, high 3m and 10m LPV, and 2 bump measures that are about 500m apart) and high overall RCI of 22%. The data supports the Council’s maintenance decision. In spite of the defects on the road, the participants were tolerant of the overall condition of the length and did not feel it needed maintenance in the near future.

"A bit jolty, looks patchy, slightly broken up, but not bad"

"Not a fantastic surface, but at low speeds not of great significance"

![North Mundham](image)
This suggests that, within an urban environment and lower speeds, users expect and tolerate rougher roads.

- **Pagham Road** – User score Acceptable/Unacceptable, Overall RCI = 15.6%

Pagham Road is a rural B road. As with North Mundham there were localised defects that participants felt were individually unacceptable but in this case they were also less tolerant of the overall condition of this stretch of road. However, with regard to the engineering data, the 3m and 10m LPV are not very different to those on North Mundham but the texture is better giving a lower overall RCI. In effect there is an implication that the participants’ expectations of condition on this road are higher.

  “Road is extremely bumpy, unacceptable really, considering the amount of traffic”

  “Metal works, divots, potholes, definitely needs works done in less than 6 months”

A key difference between the two roads is that Pagham Road has been widened by haunching and has higher levels of traffic (including HGVs). The road is wider with a more open environment and after the first 100m, has national speed limits. High LPV is more uncomfortable at higher speeds and this probably explains the higher expectations.

- **Pagham Road 2** – User Score Average / Acceptable: Overall RCI = 4.2%

This is also a rural B road, a continuation of Pagham Road and there were only few comments from the participants. The five comments made all referred to an area of patching on the edge of the carriageway that had begun to fail in parts. On the whole they were satisfied with the condition and this relates well with the values of the engineering parameters and the overall RCI.

- **Lower Bognor Road** – User Score Average/Acceptable; Overall RCI 18.1%

Lower Bognor Road is also a rural B road and a continuation of Pagham Road 2. The RCI is higher than that for Pagham Road and the 3m and 10m LPV are also higher, although no bumps were registered. However the participants were again more tolerant of the overall condition on this length of road. Although it is the same road class as Pagham Road, the environment is different. It is narrower and with more corners, lower average speed and lower levels of traffic. Also it was evident that the road had been surface dressed and this gave it a more uniform appearance.

  “There are a few bumps and dips but because it is a back road you live with it”

  “The grip is fantastic, good camber. One of my favourite roads”

  “Acceptable because it is the type of road, lower traffic, and its location”

  “No surprise bumps or anything that creeps upon you”
This again supports the idea that there is a user hierarchy for roads and their expectations and requirements are influenced by their interpretation of where the road fits within that hierarchy. The users’ hierarchy appears to be different to the standard categorisation of roads on the network.

- **Rose Green, User Score Unacceptable; Overall RCI = 18.6%**

The urban road through Rose Green is a 30mph speed restricted zone with houses, shops and parked cars. The road also has many, very visible, utility reinstatements. The participants were most critical of the overall condition of this road and commented on severe bumps and unevenness, potholes and patches on the road. Analysis of visual images also confirmed that this length has the highest proportion of patched surface.

The RCI and the 3m and 10 m LPV are high compared to the other roads on the study route. The length also registered 3 bumps over a length of approximately 500m. (The first bump on Sefter Road which is the next road is within a very short distance of the last bump on Rose Green and may have added to the perception of a very bumpy road).

"Very patchy, bumpy and uneven. Needs the whole surface to be done"

"Potholes caused altering of position"

"Sunken road repairs, extremely uncomfortable"

"Whole surface should be done - drive over it frequently and it has so many bumps and patches it is very uncomfortable to drive along"

Given the limited amount of data available, it is difficult to draw conclusions on whether there were any particular aspects of the road that influenced their perceptions. While it is an urban speed restricted road, it also has the worst condition in terms of the engineering data. WSCC were provided with the HARRIS data for Rose Green and their standard analysis identified treatments for about 60% of the length. However, identification and prioritisation of schemes takes account of more than just the condition, and so this does not necessarily mean that with SCANNER data Rose Green would have been identified for maintenance.

- **Sefter Road User Score – Average/Acceptable; RCI = 6.1%**

Sefter Road is a C road, with an urban environment and 30 mile speed restrictions in the first part and a rural environment with national speed restrictions in the second part. Overall there were only limited comments on this road.

The second part of the road had a rough and uneven surface but this again was tolerated as it was only a short distance between the beginning of the national speed limit and the end of the road.

"Its only a short stretch, so bearable, but if it was a longer stretch it would be annoying"

"A bit patchy but no big potholes or anything"
• **Sefter Farm – User score Average/Acceptable; RCI = 8.3%**

Sefter Farm is a rural C road with national speed limits. There were comments from the participants at a few locations about poor ride quality but they were satisfied with the overall condition of the road. The 3m and 10m LPV are mainly within the threshold bands, no bumps were registered in the bump measure and the texture is also good. On this road user perceptions and engineering data are well aligned.

**Sefter Farm**

• **Vinnetrow Road – User score Exceptional; RCI = 4.7%**

A rural C road, this was the last road on the study route and had been resurfaced in June 2006, approximately 2 months before the journeys were carried out. The material used is listed by the Local Authority as being ‘14mm DBM 65PSV’. Although the road has a new surface there were comments about bumpiness at isolated locations. One motorcyclist commented about the lack of grip:

“very smooth lack of grip, terrible"

As no other participants commented about lack of grip on this road, it is not possible to say whether the comment was due to the motorcyclist actually feeling a loss of grip or whether the perception was because the road is ‘new, smooth and black’.

Overall, however, the participants thought that the road was “excellent”. Engineering data also shows the road to be in good condition, although there are some lengths where, in spite of being a new surface, the SMTD is below the lower threshold.

“Great road surface, exceptional standard"

“Really good road, no bumps”

“Good surface, fairly even, nice piece of road to travel on”

**Vinnetrow Road**

4.6.4.3 **Other issues**

There are several factors influencing user satisfaction and their expectations with regard to condition. Users are realistic and accept the need for trade-offs. As the comments made by the participants show, they do not expect defect free roads and will tolerate some level of deterioration. Expectations can be managed if users know what the constraints are. For all categories of users, safety is the main concern but ride comfort is also important. Noise levels (as a vehicle driver/passenger) and the appearance of the road appear to be less important.

“Physical repairs are more important for safety than the need to worry about cosmetic repairs. Would be nice to have both, but safety is vital”

“Main concern – definitely safety. But bumpiness can be very unpleasant”
“My car is older and susceptible to noisy tarmac but it is not a problem. Anyway most modern cars are cushioned and insulated against noise - so don’t think tax money should be spent to improve noisy surfaces”

User requirements for actual levels of service, however, cover a wide range of condition and users tolerate different levels of condition under different circumstances. The intuitive response, based on recalled experience of roads, to the question of whether standards should vary for different road classes is that all roads should be maintained to the same standard.

“All roads should be of a good standard. I see no reason why B roads should be less important and allowed to deteriorate”

The main roads are alright, but when you get down they don’t seem to bother with the side roads”

However, as described in earlier sections, comments while on the road itself showed that user expectations and levels of acceptability were different for different road classes.

“Odd defects on minor roads are OK. Standards can be different on different roads”

“Below average road, but as a 30 mile speed limit, it is not a problem”

“Faster roads should have priority as far as repairs and safety are concerned”

“Because its bendy, you don’t expect it to be perfectly smooth as a straight piece of road, e.g. motorway. If you hit a pothole on a faster road it will cause more discomfort than a smaller road”.

“Needs attention - the fact that it is a commuter route, needs to be in a better condition, for people’s cars and safety”

“Road could do with a resurfacing - it is a category 4 only because it is a major road and heavily congested twice a day”

There is an implication from the responses of this group of participants that users’ own interpretation of road hierarchy is an important factor in driving their expectations. Factors influencing user view of road hierarchy include:

- Speed limit;
- Traffic flow;
- Traffic speed;
- Geometry of the road (e.g. straight, bendy with number of corners);
- Width of the carriageway;
- Road environment (e.g. rural, urban, open or closed in).

The large number of comments on the quality (or perceived quality) of maintenance works shows that this has a big influence on user satisfaction. Participants showed a level of dissatisfaction with the quality of road repairs, in particular with regard to the works carried out by utilities. The overall opinion is that users will tolerate the disruption from roadworks if it improves the condition of the road. They also want maintenance to be carried out to a minimum standard of quality so that it lasts a reasonable period of time, even if this costs more.

“Constant re-repairs; it is very annoying”

“Pothole repair not level, not much better than the pothole”

“Utilities should take more time and care in the repair itself and do the job properly”

“Lots of repair works that don’t appear to have been particularly well done or made good; very bumpy to ride over; repairs should be done properly then they will last longer.”
- they should not do a quick job because it is cheaper; it makes a great deal of difference to ride quality and comfort"

“A nother shoddy repair – a sudden jolt to the car, it is very unpleasant”

“Utility repairs – checking system should be in place; it is unfair for the tax payer to fork out more money for resurfacing and general maintenance, then the utilities come along dig the road up and leave a bad repair”

“Very large area of what looks like ‘dumped tarmac’. Potential danger - it should be scraped off and provide a proper surface”

“Utilities should be more accountable for the quality of repairs. Completely destroys the smoothness of the surface and stays bumpy and uneven”

“Drain cover right in the line of travel, very uncomfortable going over it; drains and manhole covers should be more flush with the surface of the road so making for more ride comfort; actually not good having metal work in the line of travel; should be redirected out of the vehicle lane, extra cost is money well spent”

“They have not joined up the two layers of tarmac and it is going to cause instability for all two wheeled road users”

4.7 Post journey questionnaire

The post journey questionnaire was designed to assess if user opinions were different immediately after experiencing the condition of the carriageway/footway surfaces compared to the opinions expressed at the group discussions which were essentially based on memory of completed journeys. The issues covered general opinions about carriageway/footway surfaces:

- Ranking of defect types – The main difference was the ranking of unevenness which had been ranked low in the group discussions but following the journeys users ranked it next to potholes and the defects they perceived to be related to safety, slippery surfaces, surface deterioration and ironworks. Safety and ride comfort are the main user requirements.

- Impact of condition – The results were the same with cyclists and motorcyclists being most aware and motorists least aware of surface condition of carriageways.

- Opinions on roadworks – There was overall agreement that roadworks would be acceptable if they were carried out well, improved condition and lasted long.

- Willingness to pay for improved road condition – Two thirds of the participants said they would be willing to pay extra to improve the condition of carriageways and footways.

4.8 Summary

The accompanied journeys were carried out with pedestrians and cyclists on an urban network of C and U class roads in Northampton and with motorists (drivers and passengers), motorcyclists and HGV drivers (small sample) on a mainly rural network of B and C roads in West Sussex. There were no Principal roads on the study network.

Participants, in particular vulnerable users, pedestrians, cyclists and motorcyclists, identified safety as a prime requirement. However in terms of reacting to condition at the time of experience, ‘ride comfort’ also appeared to be an important driver of user satisfaction. This was also reflected in the ranking of defects after the journey, where the users ranked unevenness higher than they did during the group discussions. Any condition that resulted in a sudden change in height (leading to an increased risk of falling over, losing balance or experiencing an unpleasant ‘jolt’) was construed as unacceptable. In general, users are more tolerant of a gradually undulating surface.
Pedestrians tended to notice trips when the height of the step was more than 10mm and became increasingly critical of trips heights of 20mm. There is an overall preference for black top compared to slabs as the latter are seen as causing more trip hazards. The data from DVI surveys, Safety and Service inspections and customer complaints used by Northamptonshire County Council to manage the footways appears to have some alignment with user perceptions of localised unacceptable defects. There were defects that the participants had picked up that were not identified in the Council’s data sets. However within the context of the study, the participants were probably noticing defects that they may not notice under normal circumstances.

Defects resulting in ‘steps’ of about 20mm (e.g. potholes, ironworks, failed patches and debris) in the line of travel were considered unacceptable by the cyclists. Cyclists tended to ignore defects if the location was such that they could avoid it without additional risk. The safety/service inspections did identify some of the defects identified by the cyclists but there is little alignment between user perceptions and the CVI data. Condition surveys specifically targeted to address the needs of cyclists may be more appropriate.

The accompanied journeys with motorcyclists, motorists (drivers and passengers) and HGV drivers confirmed the finding of the qualitative research, that motorcyclists show greater awareness of surface condition. This was shown by the significantly greater number of comments from them. Motorcyclists noticed defects that could potentially develop into a problem.

The main cause of user perception of unacceptable condition on the study route was ‘bumpiness’, particularly where this resulted in sudden, sharp ‘jolts’. Comparison of user perceptions and engineering data showed that the parameters related to ride quality, 3m LPV, 10m LPV and the bump measure aligned well with user perceptions of poor ride quality. The other condition aspect that affected ride quality was poor or failed patches. On this route the RCI for the 9 lengths into which the route was divided also broadly reflected user perceptions. In general, the RCI was high on all the lengths users perceived to be in poor or unacceptable condition. However, there were lengths with high RCI values that users found acceptable.

In addition to actual condition, there are other factors that influence user expectations on a particular stretch of road. Expectations and acceptability of condition appear to be related to factors such as traffic speed, traffic flow, width, geometry and environment, e.g. participants were more tolerant of poor ride quality on lower speed roads. The users’ scale of tolerance for 3m and 10m LPV was different on different parts of the network. A consequence of this is that user thresholds for these parameters do not necessarily align with thresholds currently used to determine BVPI and RCI. This is the reason why some lengths with high RCI were perceived to be in acceptable condition.

Road users do not expect defect free roads and will tolerate some level of deterioration. They do want value for money and this is related to the quality of repairs and wanting the Local Authorities to take a long-term view when planning maintenance. 'Quick fixes' are perceived to be inefficient as users expect that to result in the need to repair again at frequent intervals. Users would be willing to tolerate the disruption from roadworks if they see improved condition and long lasting treatments. There is a strong mindset that the utility companies deliver poor quality repairs, are responsible for poor planning, resulting in frequent repairs, and are responsible for some of the deterioration on the network. Users would like procedures in place to force utility companies to deliver better standards of maintenance.
5 Conclusions and implications

This study has shown that user requirements and levels of acceptability of the surface condition of paved surfaces are influenced by more than just the condition of the surface. In general, the participants had a wide scale of tolerance and were, under some circumstances, tolerant of condition that is considered poor by engineering standards. Overall the participants were very knowledgeable, with strongly held views on their expectations of the road network. The key conclusions, based on the views of the participants, are:

(i) There is growing recognition in the UK and other countries, of the need to improve understanding of user requirements to deliver public services effectively and efficiently. In the UK, the Highways Agency and Local Authorities carry out annual surveys of public satisfaction with the road network and road maintenance. The Local Authority surveys have shown that levels of satisfaction have been improving each year since touching a low point in 2003. In general, these surveys cover a range of issues although, more recently, some Authorities have carried out extensive surveys to gather public opinion on specific issues related to problems on the highways. However none of the surveys specifically aim to relate user needs and engineering standards.

(ii) There was overall consistency in the general expectations of users in the three areas where the research was carried out. However, user responses based on recalled attitudes were different to more considered views. The initial response at the start of the discussions tended to be more negative than the views expressed later on in the discussions. For example, with regard to levels of satisfaction, initial response of ‘poor’ and ‘unsatisfactory’ changed to ‘fair’ and ‘okay’; the acceptability of patches, changed from ‘not acceptable’ and ‘never last’ to ‘acceptable if carried out well’. Public mindsets about road condition are influenced by a number of factors, including media reports, experience in other parts of the country or other countries and non-condition related factors (e.g. congestion, speed humps). The fact that initial responses tend to be more negative obviously has implications for the routine customer satisfaction surveys carried out by Local Authorities (and the Highways Agency) as these surveys record only the initial responses. This suggests that there is a need to re-examine the design of the questionnaire for future surveys.

(iii) Different users showed different levels of awareness of the condition of paved surfaces. Vulnerable users - elderly, disabled, cyclists, motorcyclists and pedestrians were most aware and also most affected by surface condition and motorists were the least aware and also least affected. Elderly and disabled users are particularly sensitive to condition and identified two specific issues of concern with regard to footways (e.g. lack of dropped kerbs in appropriate locations and the use of tactile surfacings). The latter was thought to be particularly uncomfortable and affected the balance of less steady users. Although motorists form the largest group of road users, there is an implied need to ensure that service levels are set to meet the needs of the vulnerable users (e.g. the selection of representative samples for user surveys).

(iv) The two main condition factors that influenced user opinions and satisfaction were ‘safety’ and ‘ride comfort’. Trip hazards, slippery surfaces and sudden unexpected bumps were all classed as unacceptable. Users expected to use the highways without actually noticing the surface they were travelling on. In general, any condition aspect that caused them to react to the surface condition and took their attention away from driving was construed as unsafe and unacceptable.

(v) Participants showed a good level of understanding of various issues related to highway management including the types of defects commonly encountered, treatments used and also the budgetary constraints under which Local Authorities operate. They were realistic and pragmatic about the extent of maintenance possible and did not expect defect free roads. They were willing to tolerate some level of deterioration and accept trade-offs, (e.g. carriageway rather than footways, patches rather than new surfacing). User requirements were mainly
centred on the need for safe surfaces (i.e. level with good grip) with no unexpected or sudden bumps and their expectations can be managed if they understand what the constraints are.

(vi) The participants felt very strongly that the Local Authorities needed to take a long term attitude to repairs rather than what they saw as ‘quick fixes’ that resulted in the repairs lasting only a short time and leading to frequent interventions. This was not seen as an efficient use of tax payers’ money. Road closures were acceptable if it meant surfaces would be repaired to a high standard with good quality materials and would last for many years. In effect, users want pro-active management of the network and this would have budget implications for Local Authorities.

(vii) Acceptability of roadworks can be improved if Local Authorities communicate the reasons for the repairs and/or closures. Signs before and during maintenance explaining why the repairs are needed (e.g. ‘to restore surface grip to make the road safer’ or ‘to provide a new more even surface’), how long the roadworks were expected to last, the availability of alternative routes at appropriate locations, and what the Local Authority is doing to minimise disruption (e.g. timing of the works – day / night, time of year) would be well received by road users and may reduce the levels of frustration at delays or diversions.

(viii) Road users felt that utilities should take greater responsibility for the road surfaces they disturb. Utilities were blamed for poor planning with many instances of digging up a recently resurfaced road, poor repairs with inferior materials and workmanship. Local Authorities were blamed for ‘letting the utilities get away with it’. For the future, the road users in this study wanted to see procedures in place to enforce minimum standards for reinstating roads and footways to their original standard. This could be through a checking system for monitoring the works or charging the utilities.

(ix) The perceptions of pedestrians in this study broadly agreed with the views reported from earlier surveys. Trip hazard was the main aspect that concerned the participants, e.g. raised or sunken edges with trips >10mm.

(x) Cyclists were mainly concerned about step changes in their line of travel (steps > 20mm) caused by potholes, sunken or raised ironworks, failed patches and debris on the carriageway. However the location and the environment were also important (e.g. if the carriageway was wide enough to allow the cyclist to avoid the defect without getting into the path of other faster vehicles on the road, then they tended to ignore the defect).

(xi) Compared to motorists and HGV drivers, motorcyclists showed a greater degree of awareness about the condition of the travelling surfaces. Within the small sample size used in the study it was not possible to differentiate the scales of tolerance to different defects between the 3 user categories. The types of defects identified by them were similar with some additional issues for each of the categories.

- Motorcyclists – Lack of grip, uneven/bumpy surfaces, overbanding, tramlines and the location and condition of ironworks and potholes;
- Car drivers and passengers – Slippery surfaces, bumpiness and its effect on safety and ride comfort
- HGV drivers – lack of grip and edge deterioration; also, carriageway width and impact of the HGVs on carriageways and surfaces not designed to carry HGVs.

(xii) There was only limited alignment between the perceptions of the pedestrians and the assessment of the maintenance needs of the footways on the study route. Lengths with a Footway Condition Index over the defined investigatory threshold values (red category) matched up with some of the lengths identified by the users. A few of the other localised defects identified by the users were also picked up in the customer complaints system. Additional analysis of the DVI data with amber and green thresholds showed some improvement in the alignment of lengths in poor condition although the severity levels were still different. The differences in measured and perceived data may be due to the subjective nature of visual surveys and increased awareness of the participants to condition. Further
investigation is needed to improve the link between user perceptions and the engineering data used for the management of footways.

(xiii) The only condition data for the carriageways used by the cyclists was from CVI. On the study route the cyclists identified several localised unacceptable defects and most of these are not picked up in a CVI or the safety/service inspections. Initial test analysis of the CVI data with red, amber and green thresholds for the overall Condition Index provides limited improvement in the alignment but still did not identify all the areas highlighted by the cyclists as unacceptable. More targeted surveys (e.g. focused on the cycle paths) are needed to ensure that the requirements of this category of vulnerable road users are adequately addressed.

(xiv) Local Authorities are moving towards SCANNER surveys for all B and C class roads and user perceptions have been compared to all the standard SCANNER parameters (except cracking) and 4 additional parameters currently under development. On the rural route in West Sussex the main issue for the users was ‘bumpiness’ including sudden, unexpected ‘jolts’. These locations aligned well with high values for 3m and 10m LPV and the bump measure. There was no significant rutting on the route and therefore it has not been possible to relate this parameter to user perceptions. Lack of grip is an issue of concern for all users but only a few locations with ‘poor grip’ were identified on the study route. For users, lack of grip could result from slippery surfaces, some types of treatments (e.g. overbanding) or debris (e.g. mud). On the study route, the locations of some of the comments on poor grip did align with lengths where the measured texture was low. The other parameters, transverse unevenness and Edge Deterioration Index do not align with user perceptions and may be appropriate only as engineering parameters.

(xv) The levels of acceptability of condition and the need for maintenance on longer lengths are related to more than just the condition. Users’ expectations of condition and their scale of tolerance are influenced by a number of factors such as traffic flow, speed, carriageway width, road geometry and the environment. This is not reflected in the same way in the engineering thresholds and a consequence of this is that user thresholds do not necessarily align with all the thresholds currently used to determine BVPI and RCI. Lengths categorised as poor by the users all have high RCI but the converse is not true. For example, users expect and tolerate, less smooth roads on speed restricted roads and urban environments. A better understanding of road users’ hierarchy for roads is required to improve the alignment between user and engineering thresholds. The development of a user BVPI and related thresholds for user RCI is one way to take this process forward and ensure that user requirements are integral to the management of the carriageway and footway networks.
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Appendix A: User Satisfaction Surveys

Local Authority surveys (UK)

St Albans

Results from the user survey in St Albans (MORI, 2005a), showed road maintenance as the most important service that the council provides, rated before refuse collection and recycling facilities. Road and footway maintenance were also the top two services which residents wished to see investment in. Only 26% of the residents surveyed said road condition was not a problem and 23% said they were dissatisfied with road maintenance. This survey asked those dissatisfied to provide more detail on the reason they were dissatisfied and this identified the presence and poor repairs of potholes as the main dissatisfier. 79% of respondents said that potholes were not repaired and 49% said that pothole repairs were of poor quality. Other aspects identified by the respondents were poor maintenance of footways (17%) and gullies and drainage at the side of the road (16%).

A total of 70% of residents said they would like more investment into road maintenance, more than would like investment in other transport aspects such as cheaper and more public transport (32%) and surprisingly reducing congestion (31%). This illustrates both the importance placed on road maintenance by the public and the perception that further investment is required than is currently provided.

Hertsmere

In Herstsmere (MORI, 2005b), road maintenance was rated the third most important service (after refuse collection and crime reducing initiatives). Residents were less satisfied with road maintenance and sweeping (5% each) than refuse collection (25%). These were also the top two services listed as poor; 30% and 20% respectively. Road maintenance was the service the respondents listed as most in need of improving, although crime rate was considered more important. Only 39% of residents were satisfied with road maintenance in their area. This survey did not investigate the reasons for the dissatisfaction with road maintenance, but again confirms the importance of road maintenance to users and the perceived need for further investment.

Durham

Durham County Council has conducted a Citizens Panel Highways Survey annually since 2002 in order to provide data for Local Best Value Performance Indicator (LBVPV1) SE4 ‘User Satisfaction’, as detailed in Appendix F of the Code of Practice for Maintenance Management ‘Delivering Best Value in Highway Maintenance’ (2001). The purpose of indicator SE4 is to determine the overall level of user satisfaction in respect of the highway maintenance service and the survey includes a comprehensive range of questions covering highway maintenance functions, with sixteen aspects of the service coming under review and with feedback data requested on satisfaction levels relating to thirty-four specific functions.

The questionnaire (Durham County Council, 2004) used in the survey, aimed essentially at assessing levels of satisfaction with different aspects of highways works, included questions on awareness of highway issues, such as the responsibility of utility companies for roadworks and frequency of use of roads, footways and cycle tracks. It covered satisfaction with various aspects of road maintenance including patching on carriageways, footways and cycle tracks, resurfacing, maintenance of road verges, litter, maintenance of traffic calming measures, maintenance of signs, road markings and road studs, street lighting and winter maintenance. The aspects people were most dissatisfied with were repairs by the utilities and patching of small areas on both roads and footways. Patching of large areas was considered better on roads, but still unsatisfactory on footways. Litter collection and winter
maintenance were also deemed not satisfactory. Resurfacing work and maintenance of traffic calming measures and signs were rated significantly better. For all these aspects, the satisfaction ratings have shown gradual but continuous improvement in the 3 years of survey.

The latest survey (2004/05) has been extended to obtain user priorities for spending the Highway maintenance service budget. Road repairs, public transport and co-ordinating roadworks were the priority choices.

**York**

In October 1999, the City of York Council (York City Council, 2001) carried out customer research of both a qualitative and quantitative nature using Focus Groups and a Panel to assess residents' opinions and attitudes towards road and footway maintenance in York. They found residents’ satisfaction with road (51%) and footway (48%) maintenance was strongly influenced by levels of congestion and travel delays. This is often found to be the case with general satisfaction surveys.

York CC also found opinions varied between the elderly people outside of town who were very dissatisfied and the young people living in the town who were the most satisfied. The survey found that the aspects people were most dissatisfied with were “piecemeal patching”, delay in carrying out repairs, poor standard of workmanship and lack of preventive maintenance.

The majority of people (54%) thought footways should take priority over roads (31%). Some people felt rural areas were neglected. Residents thought safety should be a priority and this was a function of the smoothness of the road or footway surface. Trips and gaps were felt to be most important aspects to consider when maintaining footways, but they were not prepared to pay more to have trips lower than 20mm (the current policy) repaired.

As a result of the survey, the council increased its inspection rates to be seen as more proactive and monitored its balance between footway and road spending. This survey does not mention potholes, but illustrates how lots of small patches although structurally sound gives the public the perception that the road is in poor condition. The timing of repairs is also important, there is a feeling that repairs take too long to be undertaken, are of poor quality and are undertaken in small sections whereas the whole area should be repaired.

**Newcastle Upon Tyne**

Newcastle City Council undertook an extensive survey to measure public opinion on the condition of the streets, roads and footways in 13 areas in the city (Newcastle City Council, 2004). This concentrated not only on public opinion of the general condition but asked specific questions about the types of problems encountered and preferences on maintenance treatments. The study was carried out through face to face interviews in each of the 13 areas.

There was a higher level of satisfaction with road carriageways compared to footways. Key results from the study were:

- Frequency, quality of maintenance and overall satisfaction with road carriageways received net positive satisfaction scores in all 13 areas. However, in both aspects, the scores spanned a wide range and the highest and lowest scores were obtained for the same areas;
- The priority problems with road carriageways were identified to be:
  - Road potholes;
  - Surface damage;
  - Patchy and mismatching surfaces; and
  - Blocked gullies causing flooding.
Frequency and quality of maintenance with footways received net positive satisfaction scores in only 2 of the 13 areas; Overall satisfaction scored higher but still well below road carriageways, with only 8 of the 13 areas giving net positive scores;

A majority of respondents showed a preference for tarmac surfacing for footways compared to flagstones;

The priority problems with footways were identified to be:

- Uneven footways
- Broken/cracked footways

**Aberdeenshire**

The residents’ survey of 2002 by Aberdeenshire Council found that 54% of the public were dissatisfied with road maintenance. It was the most common area identified as in need of more investment. Residents were able to identify where improvements had been made. As a result of this high level of dissatisfaction, in 2003 Aberdeenshire Council carried out a more detailed study of road maintenance (Aberdeenshire Council, 2003). This included a series of resident focus groups and three informal scrutiny and audit committee meetings which heard evidence from internal and external technical experts. The results of the focus groups indicated that the Residents’ Survey results in 2000 and 2002 reflected the feelings of the respondents relating to their whole experience of using the road and therefore were not a robust indicator of roads maintenance performance. It was also found that the public appeared to have misconceptions about the Council’s responsibilities for roads maintenance, for example when work is performed by the Councils and when by utilities. The maintenance problems identified by the public in the focus groups were:

- Potholes
- Short-term, reactive policies leading to false economy
- Efficiency of operations, for example maintenance being carried out at the wrong time of year
- Flooding in the same areas each year with nothing being done about it

Other issues raised were:

- Legibility and visibility of signage
- Sight lines at junctions
- Better lighting and road marking
- Congestion especially in the town centre and around schools
- Winter maintenance
- Footway maintenance
- Mechanism for the public to report faults

The surveys highlighted the issues difficulty users have in separating other aspects of highways from surface condition. The factors influencing public perception of the roads are complex and influenced by more than just the condition of road carriageways and footways.
Other UK studies

Effectiveness of slippery road warning signs

This study was commissioned by the Highways Agency as a part of the overall review of the policy for managing the skid resistance of the Trunk Road network. The objective was to determine the effectiveness, or lack of it, of the slippery road warning sign in modifying driver behaviour and the results were used to support proposed changes in the use of slippery road warning signs in connection with skid resistance policy. The main part of the study comprised a road trial including driver surveys. For the road trial, vehicle speed and headway (separation from the vehicle in front) were measured before and after the installation of two slippery road warning signs, and drivers were interviewed a mile downstream of the site. The survey confirmed that drivers do understand the meaning of slippery road signs and knew the appropriate action to take on seeing them. However, only a low proportion of drivers recalled having passed the signs. In the road trial it was observed that drivers do not, in practice, react to the presence of a sign by changing their speed or following distance.

User perception of condition

One of the earliest reported studies relating user perception and carriageway condition, Cooper and Young (1978), aimed to relate user perceptions of ride quality and the longitudinal profile variance. The study compared the accelerations experienced within a vehicle and the ride quality as perceived by occupants of the vehicle and found that specific levels of acceleration could be associated with levels of ride quality reported as being poor. The levels of acceleration which defined acceptable ride quality were therefore determined. Further work established a link between these acceleration levels, and the longitudinal profile variance of the carriageway at three wavelengths – 3m, 10m, and 30m. That is, the magnitude of features in the road surface which exist at these wavelengths was seen to have a strong link to the perceived ride quality. Measurement of the three condition parameters is part of the current TRACS routine surveys of the Trunk Road network.

Efforts have since been made to address user related issues; for example, some years ago, the effects of current road standards on the ride quality for road users, in terms of increased fuel consumption and noise experienced by the users and local residents, were investigated. Also, the views of users and local residents are taken into account for geometric standards for road alignment, e.g. through consideration of visual impact and intrusion. However, parameters that are used to define carriageway condition (e.g. rutting, cracking), establish procedures for the measurement of condition, set treatment thresholds, select maintenance treatments and provide reports on road performance, are defined essentially by the physical characteristics of the carriageway and engineering requirements. Network maintenance management procedures take into account road users’ needs mainly in terms of minimising disruption and delays at maintenance works.

As part of research aimed at developing a methodology to include user perception in the maintenance management process of the Trunk Road network, the HA has a current project that aims to enhance the understanding of customer perceptions with the Trunk Road network and evaluate methodologies to integrate these factors within the overall carriageway network management process. The study has used:

- Focus Groups with participants representing different groups of road users in selected locations, using topic Guide and stimuli such as maps, videos and photographs of carriageway condition materials to channel the discussion and willingness to pay exercises to obtain appropriate information;
- Accompanied journeys with motorists and motorcyclists to further explore the relationship between the actual carriageway condition and the driver’s perception of its condition;
• Questionnaire surveys of a representative quota sample of adult (aged 17+) car drivers with quotas set on gender, age and work status and the data weighted to the national profile of private motorists;
• Machine surveys to record the surface condition to provide information on actual condition.

Evaluating problems, priorities and solutions for road travel

Rees Jeffreys Fund commissioned ITS and TRL (Bonsall et al, 2003) to study the extent to which existing transport policies and investments reflect the aspirations of road users. The study gathered evidence, through a questionnaire survey of about 3000 members of the public, employees of government organisations responsible for transport, and drivers and operators in the freight and bus industries, on people’s experiences and expectations of their travel by road as drivers, passengers, pedestrians and cyclists.

The study showed that the perceptions of problems varied significantly as a function of gender, age, car access, degree status and residence location. The findings also suggested discrepancies between what the public considered to be the problem for “users’ of Britain’s roads” and “for themselves personally from own experience”. “Poorly maintained road surfaces” was identified as one of the problems perceived to be serious by “users from their own experience”.

The study also compared the issues identified by the public with those identified by service providers. This showed discrepancies between the perceptions of problems, and ranking of their priorities, between service providers and end users. Analysis of the results suggested that service providers’ views of users’ perception were influenced by factors such as the media profile of issues.

International studies

USA

The Department of Transport of Wisconsin, Iowa and Minnesota joint funded a five year study on the public’s perception of the Midwest carriageways. The aim was to obtain user contributions for their highway improvement policies for carriageways. It examined users’ perceptions of road condition and compared this to measured carriageway condition thresholds. It also examined user priorities for road funding. The methodology used included focus groups, random telephone surveys and questionnaires completed after requesting drivers to travel along a specified section of road.

• Focus groups were held at different locations to discover public perceptions of condition and priorities for maintenance. Some participants were requested to drive a specified section of road before the meeting, but this was not believed to have helped recall conditions. There was general discussion of features, and then participants were asked to prioritise improvements and rank factors to be considered when prioritising road maintenance. Explanation of carriageway terms was given at the beginning of the discussion.
• Telephone surveys were used to discover levels of satisfaction and if there were any differences between regions, road classes and types of surface. There were also questions on how capable the public believed the highway authorities were at maintaining the roads and the degree of trust they had in them. Roughness tolerance thresholds were investigated and compared to the measured International Roughness Index (IRI) and engineering opinions giving a Pavement Distress Index (PDI). This was performed by asking participants to rate a section of road they often travel along as satisfactory, better than most or needs improvement and comparing the average result with the IRI and PDI.
Further surveys were performed to create the data for a model of user satisfaction. The model aimed to predict user satisfaction from the measured data. Participants were asked to drive on a section of road of varying condition and comment were obtained through a phone survey within a week of the journey. A plot of public perception against IRI and PDI showed that 70% of the public were satisfied with an IRI of 1.69 (for flexible pavements) and a PDI of 20 and 70% thought the carriageway should be improved with an IRI above 2.64 (for flexible pavements) and above 59. Psychological questions in the survey were used in the analysis and this improved the variance between public perception and measured values.

Key conclusion related to user perceptions of surface condition were:

- User satisfaction is multidimensional and does not depend only on physical indices. Perception and psychology have a part to play, for example how much the users trust the highway authority in carrying out required maintenance.
- The results from the telephone interviews showed very low correlation between public perception of roughness thresholds and the measured IRI and PDI. The authors thought this may be because the road was described from memory.
- The public were satisfied with a wide range of conditions ranging from an IRI of 3.3 which is very poor to 0.7 which is very good. Similarly there was a large variation in the condition which they felt should be improved, i.e. the zone of tolerance was wide.
- 54% of the public favoured better ride quality on more heavily trafficked roads rather than the same for all roads (44%).
- Participants had good understanding of carriageway defects, but used a large variety of verbal and non-verbal means of describing them. They understood the terms patching, resurfacing and reconstruction.
- Noise and appearance were minor concerns.
- Participants had difficulty in describing how bad defects had to be before maintenance was required. Descriptions included “a road needs repair, when you are on a first name basis with your garage mechanic replacing shock absorbers, or when the radio station changes when you hit a bump” One criteria was when “you had to pay attention to road condition rather than other aspects of driving”
- 95% said longer lasting carriageways should be built even if they cost more. Priorities were to build longer lasting carriageways, fix bumpy sections, resurface patched carriageways, reduce construction delay and lastly correct noisy carriageways.
- Drivers are more tolerant of rougher rides on rigid carriageways than flexible.

This study is interesting as it has similar aims to the Highway Service Levels project, i.e. relating user perception to measured data and interpreting user vocabulary. The study highlighted the disadvantages of relying on participant’s memory of a completed journey.

**Australia**

A pilot study by the Australian Roads Board (Potter et al, 1992) examined:

- The relationship between user perception of ride quality and the measure of roughness;
- Level of roughness considered to be acceptable by users;
- The extra distance a user would travel to avoid a road with a given roughness.

The aims of the study were to compare the results with a study performed 18 years earlier, compare results between States and assess how user perceptions change with the regions population density.
The methodology used for the study consisted essentially of accompanied journeys over selected lengths of road. Members of the public were asked to drive or be driven over a specified section of road around 500m long, of uniform roughness whilst accompanied by a researcher. Each participant travelled over around 20 sections of road and answered a questionnaire after driving each section. The same car was used for all the tests and participants were familiar with the road sections. The test were carried out at five different locations using panels of 15 participants. Both urban and rural roads were included in the survey. The perceptions of the panels from capital cities were compared to the perceptions of the panels from rural areas. Three medium density rural areas and one isolated area were chosen. The Melbourne urban panel rated urban and rural roads as there were concerns over the impact of congestion out-weighing the influence of ride quality. For each section the user was asked to rate ride comfort on a scale of 1 to 10, the acceptability of this level if they were to perform a journey of specified durations at a specified speed (yes/no/undecided) and the willingness to travel further on a smoother road to reach the same destination. The questionnaire also asked, sex, age, years of driving experience (for drivers), frequency and extent of travel. The weather conditions were also recorded. One section was repeated to check for user consistency throughout the test. The drift was calculated by plotting rating against test sequence and the mid-sequence rating used. Noise levels in the car were also recorded. The ratings were plotted against measured roughness.

The study findings included:

- A large variation in rating between users.
- Ratings tended to increase as the test proceeded, especially for rougher sections.
- A reasonable (around 80%) correlation between average rating and measured roughness.
- Areas with smoother roads have residents with higher expectations.
- Rural area participants were more tolerant of rough roads than the isolated area participants.
- The urban participants’ ratings of rural roads were in-between the rural and isolated area participant’s ratings.
- Urban participants were more tolerant of rough roads in the urban area than in the rural, perhaps because of slower speeds or higher demands on their driving taking their attention away from ride quality.
- Participants tolerated rougher rides for short trips and at lower speeds.

New Zealand

Creating customer value from community assets

The New Zealand Asset Management Steering Group has produced guidelines for agreeing service levels with customers. The aim is to deliver local government infrastructure services effectively and efficiently and this manual was developed to help local government officials agree service levels with their stakeholders and customers.

The Guidelines is presented in two sections. The first provides general guidelines with detailed descriptions of the stages in developing the process of identifying customer views and needs and including them within the decision making process. One part of the process is ‘communicating with customers’ and descriptions of the different methods and the techniques that can be used to encourage participation from a wide range of people and obtain the necessary input are included. The methods described include the use of community forums and public meetings, postal or published polls and questionnaires, survey research and focus groups. Other new approaches for consulting with customers are also briefly described. An important objective of this process is to familiarise the customer with the issues involved.
The second section has examples and case studies specific to a range of asset/service groups including transportation and pedestrian facilities. The examples take the reader through the stages described earlier, with the descriptions focusing on the relevant asset. For example, an example of the materials that can be used in focus group discussions to explore customer issues with regard to establishing service quality levels, what is acceptable and what is not acceptable. The discussion is designed to take the participants in a systematic manner through the issues. For example, for transportation and pedestrian facilities the description includes:

- **Range of customer groups and their needs**
  - e.g. the community, road users, road occupiers, internal customers, key stakeholder groups
- **Grouping customer needs into overall customer values**
  - e.g. Core value of “quality”, summarised in customer terms as smooth comfortable ride on sealed roads, comfortable ride on unsealed roads, free of corrugation and loose gravel etc
- **Imposing obligatory minimum levels of service**
  - e.g. by legislation, standards, technical constraints etc
- **Developing customer levels of service based on customer perceptions of value and technical levels of service for internal management**
  - Core value of quality
    - Customer service level – annual survey shows x% of road users (drivers, pedestrians, joggers etc) are satisfied with the smoothness and comfort of their rode
    - Technical service level – Carriageway smoothing to achieve smooth travel exposure index of (y) by 200(n).
- **Identifying cost drivers and assessment of costs of service level options**
  - e.g. cost driver for “quality”, cost of smoothing, rehabilitating or reconstructing road carriageways
  - Cost of range of option such as minimum/steady state/ improve
- **Consulting and informing customers**
  - e.g. focus groups, workshops, surveys
  - types of questions that may be asked in focus groups, surveys etc
  - Willingness to pay
  - need to educate participants in the consulting process
- **Ongoing monitoring and measurement of service levels**

**Survey of lorry drivers**

A survey (McCormick, Bowler, Dunne, 2001) performed in 1999 examined the level of satisfaction of lorry drivers with the New Zealand National State Highways. The reason for the study was that previous surveys of all road user types had shown that commercial drivers were significantly less satisfied than other users with the Highways. This survey looked in more depth at the reasons for the lack of satisfaction and the priorities for improvements. The project was in two stages. The first stage examined in–depth the specific concerns of lorry drivers, using focus groups of four drivers at different locations, including both owner drivers and company drivers. The issues appeared to be the same for all locations. Issues relating to condition included:

- Speed of repairs too slow
- Repairs not done properly (have to be redone often)
- Individual problems fixed not the whole picture
- Repairs done in low priority areas (i.e. with little traffic)
- Slippery surface (bitumen comes through surface making road slippery)
- Lack of grip around corners
- Potholes
- Dips in road caused by subsidence in wet/clay areas
- Lips on resealed sections which make truck difficult to control
- Undulations (small rises/falls 6cm to 50cm every 2m to 20m over a stretch of 600m to 2kms)
- Dips and rises which block visibility

The second stage quantified the qualitative results from stage one by conducting face-to-face interviews with a representative sample of drivers across the country. The questionnaire asked the participants:

- To prioritise the problems identified in stage 1;
- To re-prioritise after being given the cost of the solution and a fixed budget; and finally
- Whether they were willing to pay extra tax or re-allocate funding from other areas to fund the improvements.

The top three priorities were: not enough passing lanes, undulations and narrow bridges. However when cost was added, the priorities changed to not enough passing lanes, undulations and too sharp corners. 72% of drivers said they would re-allocate money for the improvements, mostly from new road construction. Only 12% of owner drivers said they would be willing to pay more tax.

The main surface issues raised were undulations and dips and rises which block visibility. Currently maintenance is focused on short wave distortions and long wave tend to be overlooked. Lorries with longer wheelbases than cars tend to be more affected by these.

*Other comments*

- Lorry drivers tend to describe discrete problems with the Highways as opposed to car drivers who describe problem areas.
- Priorities of company drivers and owner drivers were similar.
- 92% would like Transit employees to travel with them to experience the problems first hand.
Appendix B: Case study information

Newcastle (Metropolitan)
The roads included in Newcastle are marked on the map below:

Throughout the report, only the most relevant roads have been discussed. However, several other roads were mentioned throughout the course of our discussions. These roads are:

- **St Mary's Place**: It's just smoother
- **Claremont Road**: I get on it and it just bumps, it's horrible
- **John Dobson Street**: The slabs are wobbly, sometimes it dips
- **Strawberry Place**: It's like driving on a pebbly beach to me, a few little holes in it, there are quite a few bumps in it - I try not to use it
- **Queen Victoria Road**: I found the pavements are not up to much, Well that had little gritty holes in, I actually tripped, but I don't know what I tripped on, it could have just been loose stones, it could have been a little hole, it could have been anything
- **St Thomas St**: The surface seemed a lot better than the roads round about, to me, driving
- **Jesmond Rd**: The drains at the side of the road - the road seemed to crumble away from there.
- **New Scotswood Road**: That is quite a nice surface - it was just so smooth
and I felt comfortable. It was wet and I had to stop but I didn't slide or anything

Sandiford Road
There are patches and it's bumpy

St Mary's Place
There was one bit of patching on the road which made the road bumpy

John Dobson Street
Paving stones - they were very flat

Back lanes in Jesmond
They are abysmal, they're just potholes, all potholes.

On the bottom of Fenton Road
Outside somebody's house there is obviously it's been a drain and there's no cover on it and that is scary.

John Dobson Street
There are some points where there is no pavement

St Mary's Place
On that bend there was the patching; it was bumpy and uneven

Samford Road
You've got a pothole there, and you've got to go over to the next lane, actually, to miss it

High Street
Look at the bottom end of it, it's just the patches on top of patches.

St Mary's Place
That isn't bad for going along, that's quite smooth

Coast road
That's quite loud, it's quite a loud surface

Claremont Road.
It was bumpy in places, all the way down into the town. Bits of potholes, and bits of chip in it and that. Lots of chipping

St James Street
For some reason there's potholes, that it's tarmac on top of tarmac, it's patches on top of patches at the bottom end

Eastlands
Has had a new surface put on it, you don't have the potholes anymore

Newton Road
The surface has been broken (dug up) and now its terrible

Jesmond Street
Is dreadful (the pavement) - you could trip over

Claremont Road
It's chipping - all the way down,

Queen Victoria Road
That's where the surface is coming away - there

Salford Road
It drops down there - right into the grass verge

Berwick Road and New Bridge Street
They have been resurfaced but they're starting to deteriorate straightaway

Blackett Street
I think it needs a lot of repair - it is absolutely atrocious.

167, the New Bridge roundabout
One pothole's been there for two years fills up with water and floods and I always seem to hit it

New Bridge Street
It's all potholes, you go over by the bridge and then you know when you go over by the bridge by the second traffic lights you've got a problem there's
Strawberry Place
potholes all over the place.

Gallowgate
The road surface has just gone. The road surface has all lifted.

Blackett Street
That gets flooded every time it rains

Blackett Street
It’s subsiding, there’s a lot of potholes, they just come and mend, put some stuff on, tarmac, and two or three days it’s gone again.

Blackett Street
The pavements - there all cracked

Jesmond Road
That’s a good road surface - its lovely and smooth

Napier Street
Its really, really in need of repair - it’s just like potholes

Up Sandiford and I turn left down Godfleet Road
That road is rubbish, patched up all over - and the pavements

New Bridge Street
You bump a bit - its bumpy

Blackett Street, where all the buses stop outside Elgin Square.
Lots of cracks in the pavement

Northumberland Street
Tarmac, that’s better because it’s just nice and flat

Strawberry Place
All the pavement and the roads are like really bad round there

Elgin Square they’ve put like a new road through next to the monument
There’s like massive, bumpy bits that’s in the road

Blackwell Street
It’s all the little cobble, the little, they’re little squares - It slows you down. It shakes you up and all don’t it

Just opposite Newcastle Stadium
The whole time that building was being built which it took them like a year to build the whole road was just an absolute mess, like proper mess for buses to get past it and stuff like that. ...

New Bridge Street
Resurfaced a lot of that now, it’s a lot smoother, but there’s still a part of it that they haven’t resurfaced which is bumpy

Blackwell Street
Bumpy as hell, it’s got the pebble stones on it.

John Dobson Street and Ridley Place
Bad pavements and bad roads - the pavements. They’re all humps and bumps like
Northampton (Urban)

The roads included in Northampton are highlighted below:

Roads mentioned by participants not included in the report are:

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just after Mansfield Hospital</td>
<td>Is subsidence a problem? Well I think it's a bit of bad road making because it's only patches of, they've got 65 metres just after Mansfield Hospital, 70 metres before Mansfield Hospital, it's in patches.</td>
</tr>
<tr>
<td>Lumbertubs roundabout from Moulton Village</td>
<td>Made it all nice, have spent some time resurfacing it and doing all that sort of thing and literally one month later, come along and dig it all up to put a pipe in.</td>
</tr>
<tr>
<td>Near the Mansfield Hospital</td>
<td>There's a pothole, been there for months - yesterday it had filled in for the first time, it's been really bad, a very, very bad one and full up with water.</td>
</tr>
<tr>
<td>Henry Street</td>
<td>York stone which are very uneven.</td>
</tr>
<tr>
<td>White Elephants</td>
<td>Just going into Northampton there's about 50 yards before the traffic lights there is that rutting and it is quite nasty. You have to make sure you're, if you're not in the right position you will actually get thrown about all over the place, it's very nasty that particular one is.</td>
</tr>
<tr>
<td>Holly Lodge junction</td>
<td>That was poor. The surfaces were poor, the broken.</td>
</tr>
<tr>
<td>Kingswell junction</td>
<td>About a week ago I would have said that was really bad because it was very raised but they've actually</td>
</tr>
</tbody>
</table>

[Map of Northampton (Urban)]
patched that, they've just patched it.
That was good - it was a smoother ride

Surface that I thought that needed repairing - well the ironwork was sunk and the surface was broken

A though patched it was done well
That was poor

Very poor, uneven

A void the sunken iron-work there

Poor reinstatements - well patches that there's been a hole or a square patch or a rectangular patch where somebody's dug a hole and there's a, like a patchwork quilt or trenches.

This bit ... where the junction was patched moderately. Yes turn right into Ladys Lane and The Mounts, very poor, uneven so that's The Mounts yes I put very poor, uneven towards The Mounts, I said The Mounts round the junction was good but the access to it was very poor. A cross to the Mounts junction plenty of patches but moderately good. Turned left into Kettering Road and avoided the sunken ironwork there yeah. Turned right into Abington Avenue, poor reinstatements round Park Avenue.

It's really nasty - its in need of repair

Used to be bad, but tarmac-ed it or asphalted it, it's a good road now, the whole road was uneven and there was potholes

There are bits that stick out - slabs sticking out (or pavement)

It's terrible and the pavements, they're all cracked. I have to walk along looking at the floor to make sure I don't fall over them.

Well, there was a paving slab, I think, up in the drapery and, of course, I just tripped over it

It's quite bumpy in places - bumpy and potholey

It has its own website with people complaining about how bad the road surface is.

A 43 has just been completely resurfaced from town to the A 14 bit.

There's a lot of standing water as you walk down and it's on the pavements as well.
Main road up into Riverside Wharf

Is strewn with potholes everywhere because there's so much construction going on. You come to the end of the road by the Ruby chinese and there's a pothole about that big and about that big as you pull up to the lights, so you have to get near to the path so you end up sitting like this at the lights, but there's two of them, one there and one about a yard behind it. Turn into my street, there's two big manholes that are literally I'd say that big, two inches deep and I have to near enough stop to get over them, one wheel on one, one wheel on the other side, because I can't brake as I go around the corner because when I dip down there it makes my brakes make a horrible noise.

Wellingborough Road - Between the first set of traffic lights where Abington Park starts and the next set as you're going round onto the roundabout

I've noticed that you've got quite a bit of the surface missing in places; it's pitted quite, in a few areas

Turner Street

There was no road surface, near enough all the way up the street. Where people are parking there is no road surface, it's just gravel and like the tarmac looks like it's just been pulled up.

Harborough Road (A508)

Lumpy bumpy, up and down and you feel like you're on a kids' rollercoaster sometimes because some of the manholes have sunk

A508 once you've left town

They do and within two weeks you've got two streaks where the gravel and the tar has completely gone because the road tyres just take it off because they say only do 20 mile an hour and unless you get a police car on there nobody does 20 mile an hour.

Barratt Road / A508

As you pull out of our driveway just before a crossing there is a sunken manhole that is quite, I mean they've actually marked it so they're obviously going to do something with it, with blue paint, but I should think it's sunk by about that much.

George's Avenue

It's an awful stretch of road, One bit of road that you go across you've still got original cobbles there. It's just so uneven. They're cracked, they're broken, they're uneven and it's quite easy to trip up and fall over, very easy.

Victoria Promenade

The drain there doesn't work - so there's a big puddle

A508 Cock Hotel junction

It's two lanes but it's not marked as two lanes and it's not officially wide enough for two lanes
Roundabout where the Romany pub is
A508
A51
Tanner Street
A508
A508
Wellingborough Road from Abington up to Weston Favell
Kingsthorpe Road
Spencer Bridge Road
Billing Road
Rushmere Road
Kingsthorpe
Kingsthorpe Forum
Spencer estate

But the angle, the depth, the change in the gradient is just and I managed to come off my bike.
It quite bad for having tracks in the road - where your tyres are in a kind of track.
It can also be quite bad for this (tyre tracks)
Edge deterioration - where it comes to near enough halfway across the lane.
The most things that cause unevenness and cause all these sort of problems are the repairs that go on on the road all the time. Contractors come in, dig up the road, repair whatever’s got to be done, and they lay the road surface down as a last event, but it’s never even, it’s never a proper patch to the road.
A 508, which is the one I use most, there are areas in that that are in bad need of, you can tell the road is wearing and it is worn out and it needs repairing, especially through the busy areas by the Cock Hotel and down towards Kingsthorpe Hollow.
I noticed that the main bit of the roads are tarmac and then it’s just like obviously the surface before they tarmaced it is left like that. There, on the right, between the pavement and the main bit of the road and then you’ve got potholes. It’s really bumpy and when it’s been raining you’re riding through a river
The shopping centre and as you’re coming from the shopping centre all the way back into town. That’s where the 6” deep hole is.
It’s awful - its all cracked, cracked pavements as well
A section of it is, well it’s two lanes along most of its length and they’re quite narrow and because you’re getting the sunk en metalworks and splurges of tarmac you’re forced out on what is already a narrow section.
That was resurfaced a couple of years ago and generally it’s a hell of a lot better than it was but it’s already starting to break up along the edge
Road surface was uneven- its quite juddery
Is a key area - because there were lots of potholes there on the video.
There’s a massive pothole in the road.
The roads are quite bumpy and potholes and everything down there
Downgate Road down by Bedford Mansions

Obelisk Drive

Wellingborough Road, at the bottom of the Kettering Road there's like a sort of mini roundabout there

Kettering Road

Harborough Road towards Brampton Crossing

London Road

The Kettering Road as you come off at Abington Avenue

Kettering Road

Wellingborough Road

A5

Birch Farm Lane

A43, A34, down to the M27

Kettering Road

Wellingborough Road

Kingsley Road the roundabout

405 Allington Park

A residential just off the Wellingborough Road

Kettering Road, down near Derby Road just by

There was quite a few dips in the road.

There are a lot of holes in the road.

There's potholes, temporary road surface, and very uneven at that particular part. The potholes are terrible.

Different road surfaces N changes in a mile and a half.

Very rutted by HGV's.

Footpaths actually run out. They just end. And then you're forced onto a main road. And then the road's full of potholes and drains.

There was a patch that was sort of potholes and they did actually fill them in. But again, they filled it in, but it's all bumpy.

All the drains have sunk.

A lot of trench work being done, you notice it, you can see it, but you don't feel it.

The material that it's made of, it's so noisy.

In ten months it was dug up six times.

It's wonderful, it's a beautiful drive.

It's knackered. I have never ever known Kettering Road to be resurfaced. And that's 60 years.

It's patched up.

They're papering over the cracks.

That's the surface is quite bad and uneven. It's old.

It's breaking up. It's sort of like bricks round the outside, and then it's concrete bit in the middle. There's great lumps out of it.

It's completely broken up. They're always digging them up so that's obviously disturbing them and they're not getting a chance to settle.

The gully it's broken away so you come off your drive and you're banging down into the, and then you're into the old, it will be the cobbles almost, so where you've got like a wearing course that's broken away.

They actually came along and repaired it but it said obviously three metres and they've done three metres.
the auto place so either side of it is still wrecked but the three metres they've been paid to do they've done, which is not too bad but it's not even a very good job but then either side of it it's still rubbish, crappy road, isn't it

Moulton Park This road here has just been re-laid, that's excellent
A43 It's smooth, there's no problems with it at all. It starts off roughly and goes smooth. It's a lovely road to drive on

Wellingborough Road The road has crumbled away for about a metre in, you then get the potholes
A508 You're hitting every pothole The rough, the kerb edging

A4500 That's ... terrible actually It's a bad surface It's been dug up that many times

Kingsthorpe Road It goes down into a dip but then rolls away on its own and breaks up

Kingsthorpe Road That's just redone, I've actually found one good road
Chichester (Rural)

The roads included in the Chichester area are marked on the map below:

- Hunston Road: Poor markings
- Donnington road: Even worse than the Hunston for marking and for general disrepair
- Hunston Road: Pavement is right level for wheelchair accessible bus on one side and not other
- Cromwell Roundabout or Chichester roundabout: You'll notice all the cracks and all it is all the asphalt’s being pulled apart by us going round with 44 tonne cos the actual surface won’t allow your tyres to move
- Chilrow Road: Lots of standing water on surface - not flowing away
- Road onto the Ogilvy Roundabout: The approach is very soft
- A27: That road is a disaster
- The Langness Road - junction with the Royal: Lots of mud stuck on the road so the surface is slippery
- Broad Road, Hambrook, which runs up to Common Road: It's heavily rutted, it's a corrugated road surface and when it rains its awash
The red tarmac stretch - I noticed that was particularly bad, - it's cracking up, deteriorating, there almost no drainage up there and there was loads of standing water

The level of traffic means the road is actually disappearing down into the ditch. Lots of water as well

If you go on it now - it's slippery

The red tarmac area - there are large areas of that that are broken and missing and you're looking at something like a two inch drop from where it was to where it is now

There is a point where all the drains have sunk

Pavement is cracked with uneven paving slabs

Path is very narrow, it's very rough and it's on a slope so you can hardly walk along it
Appendix C: Example travel diary

This Appendix contains an example of the Travel Diary (from Newcastle) completed by all participants for the week leading up to the depth interviews or group discussions. Participants were asked to complete up to 10 journeys from that week and comment on the road surfaces of the highways identified in the maps. For conciseness only the pages for one journey (marked 1) are included here, the pages for journeys 2 to 10 being identical. Participants were also given the opportunity to air any other views on roads and road surfaces at the end of the diary.
BACKGROUND TO THE RESEARCH

Thank you very much for agreeing to take part in this important piece of research for the Department for Transport (DfT), the organisation responsible for the road network in England. This study will be looking at the road surface condition of local roads - those surfaces used by vehicles, cycles, pedestrians and other users of the road. This includes roads and pedestrian footways.

You have agreed to attend a Focus Group meeting for this study. The Focus Group will be an informal discussion among a group of local people, looking at issues associated with the surface condition of pavements and footways and their maintenance. The discussion will last for around one and a half hours, but will not be ‘hard work’ and there are no right or wrong answers. Refreshments will be provided free of charge. During the discussion we will be asking you to watch a short video so, if appropriate, please don't forget to bring your glasses!

In order to gain as much knowledge as possible about what different people think about the surface condition on local roads, we would like you to complete a small task in advance of the discussion, which involves filling in this diary for up to a week before the event.

You have agreed to attend the Focus Group as a particular type of road user (i.e. driver/passenger, cyclist, horse rider, pedestrian), so please only complete the diary as this type of road user.

We would like to know how you feel about the conditions of the surface of the roads. Is it good or poor? Why? Are some parts of the road better than others? Do you take road surface condition into account when choosing the route for your journey?
The diary covers a maximum of 10 journeys you have made on certain roads within your local area during the 7 days before the Focus Group meeting. Please complete the questions on each page about your journeys, including where you travelled and what was your opinion of the roads you used. For each day, there is a map of the area showing the roads the Group will be talking about. Please use this to show the roads you travelled on for the journey you have described. Travel in different directions on the same road is treated as different journeys. Please note, for the purposes of this diary we are only interested in the roads highlighted on the map inside the diary.

Also please be honest - this is not a test - we are simply interested in different people's opinions of road surface condition. Please complete the diary before the discussion and bring it along on the day.

All information you provide is completely confidential. We will take elements of your diaries and use them in our analysis and report for this project but nothing will be directly attributed to you personally.

If you have any questions while filling in your diary, please feel free to contact either the Focus Group recruiter you originally met or one of the coordinators:

Dan Young
Ipsos MORI
0207 347 3186
or 0207 347 3000

Vijay Ramdas
TRL
01344 770461
or 01344 773131

PLEASE FILL IN:

First name: _______________________

Location of Focus Group: _______________________

Date of Group meeting: _______________________

Time: _______________________

Type of Road User: _______________________

Which of the roads opposite did you travel on for this journey?

Which of the roads do you wish to tell us about?

Road: ____________________________

Direction: _________________________

If using footways, which side of the road? _________________________

What time of day did you start your journey? _________________________

What were the weather and light like?

What was the purpose of your journey? PLEASE TICK ONE BOX

- Travelling to/from work
- Travelling to/from place of education
- Shopping
- Personal business (e.g. doctor, dentist, bank)
- Part of your work
- Visiting friends/family
- Social outing

How did you travel?

Car ☐ Van ☐ HGV ☐ Coach/Bus ☐

Cycle ☐ Horse ☐ Walking ☐

(If car/van/motorcycle): Vehicle /Make /Model: _________________________

Vehicle approx age (or year of registration): _________________________

Were you the driver or passenger? _________________________

(If cycle): what type of cycle (e.g. racing/mountain/2 or 3 wheel)? _________________________

(If pedestrian): Were you on your own? _________________________

If accompanied, who with (e.g. child/elderly person)? _________________________

Were you walking with a pram/pushchair/shopping trolley? _________________________

How often do you do this journey? _________________________

What was your overall opinion of the surface on which you travelled?

Good ☐ Average ☐ Poor ☐

Why? _________________________
Were there any particularly bad lengths? Where? Why?

Were there any particularly good lengths? Where? Why?

Were there any lengths on your journey that you feel need repairs?

How did the condition of the surface affect your driving/cycling/walking/riding?

Did the condition on this or other roads affect your choice to use this road? If so, how?

Please mark the route of your journey on the map above.
YOUR THOUGHTS ON ROAD CONDITION

We would also like to know how you feel about the condition of the road. Are they good or poor? Why? Are some parts of the network better than others? Do you take road condition into account when choosing your route?

Do you feel road/footway/cycle track surfaces are better or worse in your area than in other parts of the country? Why do you feel this?

Do you ever avoid certain roads/footways/cycle tracks because of their surface condition? If yes, what caused you to make that choice?
Overall, how good or poor is the surface condition of the roads shown on the map?

Is there a difference between the different types of roads shown on the map?
Thank you very much for completing your travel diary for this important project.

As we said at the beginning of the booklet, the findings of this research will be used to inform future decisions on measuring and maintaining road condition.

Please don’t forget to bring your diary along to the Focus Group. We look forward to meeting you then. If you have any questions before then please call us.

Dan Young
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0207 347 3186
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Vijay Ramdas
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or 01344 773131
Appendix D: Group discussion topic guide

Below is the topic guide used in all group discussions.

Road Surface Condition of Local Roads

GROUP GUIDE FINAL 25/05/06

OBJECTIVES

- Explore public opinions and expectations of road surface conditions in their area and what is driving these attitudes
- Identify the language used by the public when describing road surfaces
- Assess how attitudes differ by different types of road user, whether it’s a carriage way or a footway or different types of road (e.g. A road versus estate cul-de-sac)

MODERATOR NOTES

- Throughout discussions, please note and mirror the language used by participants
- **Probe on attitudes fully** – i.e. people may dislike certain aspects of the local roads but how do they impact on the journey / on the purpose of the journey i.e. getting somewhere to do something else?
- We are only interested in the **carriageways and footways of local roads and NOT in motorways**
- This study in primarily concerned with road surface condition and excludes aspects such as traffic calming measures, congestion etc.
- For groups 9, 10, 11 (mixture of user types) we need to make sure the views of the different groups are obtained (e.g. horse riders are included only in Group 11)

<table>
<thead>
<tr>
<th>Key Questions</th>
<th>Notes</th>
<th>Approx timing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Introduction</strong></td>
<td></td>
<td>10 mins</td>
</tr>
<tr>
<td><strong>1.1 Scene-setting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Thank participants for attending</td>
<td>Welcome: orientates participants, gets them prepared to take part in the discussion</td>
<td></td>
</tr>
<tr>
<td>- Explain purpose of research – to talk about local roads (both the carriageways and the footways/pavements) and not motorways. Certain things we need to focus on so I may keep you on track throughout discussions</td>
<td>Outlines the ‘rules’ of the interview (including those we are required to tell them about under MRS and Data Protection Act guidelines)</td>
<td></td>
</tr>
<tr>
<td>- Housekeeping: toilets, fire exits etc</td>
<td>No detail about specifics at this stage. This ensures that spontaneity is retained for initial discussions</td>
<td></td>
</tr>
<tr>
<td>- Introduce self, Ipsos MORI, TRL &amp; any other attendees – role as independent research organisation, gather all opinions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Explain the rules of the discussion – all opinions valid, disagreements OK, no right or wrong answers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Confidentiality: reassure all responses anonymous and that information about</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
individuals will not be passed on to anyone.

- Get permission to digitally record – transcribe for quotes and an accurate record, no detailed attribution.

### 1.2 Introductions

- Give first name, where live, how long lived in area and what is their **main mode of transport** (for work/leisure).
- What **other modes of transport** used? PROBE for car, van, HGV, coach, motorbike, bicycle, walking, bus, horse?
- Ever a **passenger** for any of these modes of transport?
- **How often** to do they use each of these modes of transport?

### 2. Intro to road surfaces & exploring travel diaries

- If you had to describe the condition of the road surfaces in this area to a friend who lived some distance away, what would you say?
- How satisfied are you with local road surfaces overall? What about foot pavements?
- LOOK FOR LANGUAGE USED TO DESCRIBE DIFFERENT CONDITIONS
- **Is this different in other areas / parts of the country?**

Talk through diaries. Show map of specific roads. Look for spontaneous mentions of road surfaces.

**ASK TWO/THREE PEOPLE TO TALK THROUGH THEIR DIARIES.** PROBE ON CONTEXT OF JOURNEYS E.G. MODES OF TRANSPORT, JOURNEY PURPOSE, TIME OF DAY, PASSENGERS, WHETHER FAMILIAR OR UNFAMILIAR ROUTE?

- What do you like about the roads near you? What else?
- What do you dislike about the roads near you? What else?
- Were these regular journeys or were some that you do occasionally or for first time?
- Did you notice anything new about the condition of the roads and footpath/pavements from filling in the diaries? What else?
- Did anything about the roads impact on the
purpose of your journey? Why?
- Are there any problems/issues exclusive to these roads? What are these?
- How do you feel when travelling by car, bus etc (different modes)? Or whether you were a passenger or not?
- What about cyclists? What part of the road are they using?
- What about when you are walking?
- Anything else interesting you noticed that you haven’t included in the diaries? Anything about other roads in your area?

<table>
<thead>
<tr>
<th>3. Attitudes to road surface conditions</th>
<th>PROBE FOR REASONS THROUGHOUT THIS SECTION &amp; EXTENT TO WHICH SURFACES IMPACTED ON JOURNEY. SHOW MAP.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPONTANEOUS SECTION</td>
<td>A section to assess whether people would like to see improved surfaces and in what way</td>
</tr>
</tbody>
</table>

WRITE ON FLIP CHART.

- What makes a good road surface?
- What makes a bad road surface?
- ALTERNATE: At what point does a good surface become unacceptable? OR At what point does a bad surface become acceptable?

USE PICTURES IF GROUP IS STRUGGLING WITH CONCEPT.

THROUGHOUT LOOK FOR MENTIONS OF:

- Rutting / Cracking / Fretting / Potholes / Slipperiness / Roughness / Uneveness (bumpy) / Patches / Ponding / Noise / Appearance / Litter / Debris / Rumble strips or friction surfaces approaching junctions or roundabouts
- What other things affect road condition?
  PROBE ON weather / time of day / roadworks / road markings / type of vehicle using etc.
- What are the effects to you of bad road conditions? Why is that?
- Does this vary depending on the type of road – residential, town centre, rural, main road (A, B roads)?
- Does it vary depending on the vehicle you are using / speed / time of day / weather?
- What is more important – the area (size) of the defect or the severity or both? Does it matter if it is over a long stretch of road or do...
Do any of these things affect how you use a road or pavement? **PROBE** do you avoid parts of the road by swerving or do you avoid certain roads altogether?

### 4. Prompted attitudes to road surface conditions (TRL local video / pictures)

4a. **SHOW TRL VIDEO OF ROADS ON MAPS TO TRIGGER VIEWS. STICK TO ATTITUDES TO SURFACE CONDITIONS ONLY**

- Do you recognise these roads? Do you use them often? How are you using them? Mode of transport?
- **What do you think about the conditions of surfaces of the roads in video?**
- Which bits are good surfaces? Why?
- Which bits are bad surfaces? Why?
- Anything you particularly noticed about road conditions in the video?
- Are they similar to any other areas?

**PROMPTED SECTION**

**PROBE** further on road conditions with video – enabling participants to see roads and what it is like to travel on them

Some video clips may be from outside the area

Looking for own language used to describe conditions

4b. **ROAD DEFECT RANKING EXERCISE**: SHOW PICTURES OF ROAD CONDITIONS. DIVIDE PARTICIPANTS INTO TWO GROUPS.

- Can you rank these in order of importance to you? By importance, I mean how urgently they need repairing.
- **Why have you ranked them in this way?**
- **How would you describe each of these conditions?**
- Which of these conditions occur on the roads we have been discussing around here?

4c. **FOOTWAY DEFECT RANKING EXERCISE**: SHOW PICTURES OF FOOTWAY CONDITIONS. DIVIDE PARTICIPANTS INTO TWO GROUPS.

- Can you rank these in order of importance to you? By importance, I mean how urgently they need repairing.
- **Why have you ranked them in this way?**
- **How would you describe each of these conditions?**
- Which of these conditions occur on the roads we have been discussing?

4d. **SECTION SUMMARY**

- Is there anything from the video or pictures that
we haven’t mentioned so far that you feel is important?
  ▪ Where would these defects fit into the overall priorities we have discussed?

<table>
<thead>
<tr>
<th>5. Maintenance priorities</th>
<th>15 minutes</th>
</tr>
</thead>
</table>

Roadworks are done to maintain the overall condition of the road surface and also to service utilities such as gas pipes.

5a. MAPPING TASK (SHOW MAP)

Imagine you were in charge of repairing the roads on this map. Can you place stickers on the parts of the road that you would repair or improve. If areas in need of repair are not on this map, please write the area(s) on a separate sheet and place your stickers on this.

**PUT STICKERS ON AREAS MOST IN NEED OF REPAIR & ANY OTHER SHEETS**

(IF NO TIME JUST ASK PEOPLE TO SHOUT ROADS OUT & MARK ON MAP)

**PROBE CHOICES FULLY:**

  ▪ Why has a certain area got many stickers?
  ▪ Why has another area got few / no stickers?
  ▪ What particularly about the areas means they require special attention?
  ▪ Do some roads require more attention than others? Why is that?
  ▪ Should some local roads be kept in a better condition than others? Why?
  ▪ Are these priorities specific just to the roads we are looking at or to other roads in the area? Why is that?
  ▪ What about roads in other parts of the UK? How is that? Where is that?

Now thinking about the realities of maintenance.

**Which would you prefer – frequent maintenance to provide immaculate roads but causing more disruptions and delays OR less maintenance and lesser quality roads for part of the time? PROBE FULLY** Why is that? At what point is there an ideal level of maintenance and road quality?

**NB: LAST QUESTION MAY BE TOO MUCH FOR PARTICIPANTS BUT WE CAN TRY**

<table>
<thead>
<tr>
<th>6. Footways / pavements</th>
<th>5 mins</th>
</tr>
</thead>
</table>
**IF NOT COVERED IN DISCUSSIONS SO FAR:**

- How often do you walk along these roads? **SHOW MAP**
- How important the surface conditions of footpath compared to roads? Why is that?
- Are some conditions more or less acceptable on a footway than a road? Why is that?
- What about in different situations (mother with pram, disabled person, group of people talking, carrying large amount of shopping)

| Makes sure footways are covered if not examined yet |

**7. Conclusions**

- What would you tell those in charge of maintaining the roads, are the main priorities to repair over others? This assumes that it’s not an ideal world and not all can be repaired at once.

| Provides opportunity to make any final thoughts not given so far |

- TRL TO DESCRIBE ACCOMPANIED JOURNEYS. Any interest in follow-on accompanied journeys?

**THANK PARTICIPANTS**
Appendix E: Depth interview topic guide

Below is the topic guide used in all depth interviews.

Road Surface Condition of Local Roads

DEPTH GUIDE FINAL - 25/05/06

OBJECTIVES

- Explore public opinions and expectations of road surface conditions in their area and what is driving these attitudes
- Identify the language used by the public when describing road surfaces
- Assess how attitudes differ by different types of road user, whether it's a carriage way or a footway or different types of road (e.g. A road versus estate cul-de-sac)

MODERATOR NOTES

- Throughout discussions, please note and mirror the language used by participants
- **Probe on attitudes fully** – i.e. people may dislike certain aspects of the local roads but how do they impact on the journey / on the purpose of the journey i.e. getting somewhere to do something else?
- We are only interested in the **carriageways and footways of local roads and NOT in motorways**
- This study in primarily concerned with road surface condition and excludes aspects such as traffic calming measures, congestion etc.

<table>
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<tr>
<th>Key Questions</th>
<th>Notes</th>
<th>Approx timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>Welcome: orientates participants, gets them prepared to take part in the discussion</td>
<td>5 mins</td>
</tr>
<tr>
<td>1.1 Scene-setting</td>
<td>Outlines the 'rules' of the interview (including those we are required to tell them about under MRS and Data Protection Act guidelines)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No detail about specifics at this stage. This ensures that spontaneity is retained for initial discussions</td>
<td></td>
</tr>
</tbody>
</table>
## 1.2 Introductions

- Give first name, where live, how long lived in area and what is their **main mode of transport** (for work/leisure)
- What other **modes of transport** used? **PROBE** for car, van, HGV, coach, motorbike, bicycle, walking, bus, horse?
- Ever a **passenger** for any of these modes of transport?
- **How often** to do they use each of these modes of transport?

## 2. Intro to road surfaces & exploring travel diaries

- **If you had to describe the condition of the road surfaces in this area to a friend who lived some distance away, what would you say?**
- How satisfied are you with local road surfaces overall? What about foot pavements?
- **LOOK FOR LANGUAGE USED TO DESCRIBE DIFFERENT CONDITIONS**
- **Is this different in other areas / parts of the country?**

*Talk through diary. Show map of specific roads. Look for spontaneous mentions of road surfaces.*

**PROBE ON CONTEXT OF JOURNEYS E.G. MODES OF TRANSPORT, JOURNEY PURPOSE, TIME OF DAY, PASSENGERS, WHETHER FAMILIAR OR UNFAMILIAR ROUTE?**

- What do you like about the roads near you? What else?
- **What do you dislike about the roads near you? What else?**
- Were these regular journeys or were some that you do occasionally or for first time?
- **Did you notice anything new about the condition of the roads and footpath/pavements from filling in the diaries? What else?**
- **Did anything about the roads impact on the purpose of your journey? Why?**
- Are there any problems/issues exclusive to these roads? What are these?
- **How do you feel when travelling by car, bus...**
etc (different modes)? Or whether you were a passenger or not?

- What about cyclists? What part of the road are they using?
- What about when you are walking?
- Anything else interesting you noticed that you haven’t included in the diaries? Anything about other roads in your area?

### 3. Attitudes to road surface conditions

**PROBE FOR REASONS THROUGHOUT THIS SECTION & EXTENT TO WHICH SURFACES IMPACTED ON JOURNEY. SHOW MAP.**

- What makes a good road surface?
- What makes a bad road surface?
- ALTERNATE: At what point does a good surface become unacceptable? OR At what point does a bad surface become acceptable?

**USE PICTURES IF PARTICIPANT STRUGGLING WITH CONCEPT.**

**THROUGHOUT LOOK FOR MENTIONS OF:**

- Rutting / Cracking / Fretting / Potholes / Sliperiness / Roughness / Unevenness (bumpy) / Patches / Ponding / Noise / Appearance / Litter / Debris / Rumble strips or friction surfaces approaching junctions or roundabouts
- What other things affect road condition? PROBE ON weather / time of day / roadworks / road markings / type of vehicle using etc.
- What are the effects to you of bad road conditions? Why is that?
- Does this vary depending on the type of road – residential, town centre, rural, main road (A, B roads)?
- Does it vary depending on the vehicle you are using / speed / time of day / weather?
- What is more important – the area (size) of the defect or the severity or both? Does it matter if it is over a long stretch of road or do you get used to it?
- Do any of these things affect how you use a road or pavement? PROBE do you avoid parts of the road by swerving or do you...
<table>
<thead>
<tr>
<th>avoid certain roads altogether?</th>
<th>15 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4. Prompted attitudes to road surface conditions (TRL local video / pictures)</strong></td>
<td>PROMPTED SECTION</td>
</tr>
<tr>
<td>▪ Do you recognise these roads? Do you use them often? How are you using them? Mode of transport?</td>
<td>PROBE further on road conditions with video – enabling participants to see roads and what it is like to travel on them</td>
</tr>
<tr>
<td>▪ What do you think about the conditions of surfaces of the roads in video?</td>
<td>Some video clips may be from outside the area</td>
</tr>
<tr>
<td>▪ Which bits are good surfaces? Why?</td>
<td>Looking for own language used to describe conditions</td>
</tr>
<tr>
<td>▪ Which bits are bad surfaces? Why?</td>
<td></td>
</tr>
<tr>
<td>▪ Anything you particularly noticed about road conditions in the video?</td>
<td></td>
</tr>
<tr>
<td>▪ Are they similar to any other areas?</td>
<td></td>
</tr>
<tr>
<td><strong>4a. SHOW TRL VIDEO OF ROADS ON MAPS TO TRIGGER VIEWS. STICK TO ATTITUDES TO SURFACE CONDITIONS ONLY</strong></td>
<td></td>
</tr>
<tr>
<td><strong>4b. ROAD DEFECT RANKING EXERCISE:</strong> SHOW PICTURES OF ROAD CONDITIONS.</td>
<td></td>
</tr>
<tr>
<td>▪ Can you rank these in order of importance to you? By importance, I mean how urgently they need repairing.</td>
<td></td>
</tr>
<tr>
<td>▪ Why have you ranked them in this way?</td>
<td></td>
</tr>
<tr>
<td>▪ How would you describe each of these conditions?</td>
<td></td>
</tr>
<tr>
<td>▪ Which of these conditions occur on the roads we have been discussing around here?</td>
<td></td>
</tr>
<tr>
<td><strong>4c. FOOTWAY DEFECT RANKING EXERCISE:</strong> SHOW PICTURES OF FOOTWAY CONDITIONS.</td>
<td></td>
</tr>
<tr>
<td>▪ Can you rank these in order of importance to you? By importance, I mean how urgently they need repairing.</td>
<td></td>
</tr>
<tr>
<td>▪ Why have you ranked them in this way?</td>
<td></td>
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<tr>
<td>▪ How would you describe each of these conditions?</td>
<td></td>
</tr>
<tr>
<td>▪ Which of these conditions occur on the roads we have been discussing?</td>
<td></td>
</tr>
<tr>
<td><strong>4d. SECTION SUMMARY</strong></td>
<td></td>
</tr>
<tr>
<td>▪ Is there anything from the video or pictures that we haven’t mentioned so far that you feel is important?</td>
<td></td>
</tr>
</tbody>
</table>
Where would these defects fit into the overall priorities we have discussed?

5. Maintenance priorities

Roadworks are done to maintain the overall condition of the road surface and also to service utilities such as gas pipes.

5a. MAPPING TASK (SHOW MAP)

Imagine you were in charge of repairing the roads on this map. Can you place stickers on the parts of the road that you would repair or improve. If areas in need of repair are not on this map, please write the area(s) on a separate sheet and place your stickers on this.

PUT STICKERS ON AREAS MOST IN NEED OF REPAIR & ANY OTHER SHEETS. NOTE REASONS ON MAP

PROBE CHOICES FULLY:

- Why has a certain area got many stickers?
- Why has another area got few / no stickers?
- What particularly about the areas means they require special attention?
- Do some roads require more attention than others? Why is that?
- Should some local roads be kept in a better condition than others? Why?
- Are these priorities specific just to the roads we are looking at or to other roads in the area? Why is that?
- What about roads in other parts of the UK? How is that? Where is that?

Now thinking about the realities of maintenance.

Which would you prefer – frequent maintenance to provide immaculate roads but causing more disruptions and delays OR less maintenance and lesser quality roads for part of the time? PROBE FULLY Why is that? At what point is there an ideal level of maintenance and road quality?

NB: LAST QUESTION MAY BE TOO MUCH FOR PARTICIPANTS BUT WE CAN TRY

6. Footways / pavements

IF NOT COVERED IN DISCUSSIONS SO FAR:

- How often do you walk along these roads? SHOW MAP

- How important the surface conditions of

Makes sure footways are covered if not examined yet
footpath compared to roads? Why is that?

- Are some conditions more or less acceptable on a footway than a road? Why is that?
- What about in different situations (mother with pram, disabled person, group of people talking, carrying large amount of shopping)

7. Conclusions

- What would you tell those in charge of maintaining the roads, are the main priorities to repair over others? This assumes that it’s not an ideal world and not all can be repaired at once.

- DESCRIBE ACCOMPANIED JOURNEYS. Any interest in follow-on accompanied journeys?

THANK PARTICIPANTS

Provides opportunity to make any final thoughts not given so far.
Appendix F: Showcards used for road surface defects

Below are the slides used during interviews and group discussions to explain defects and to rank them in terms of the priority with which they should be repaired.
Appendix G: Showcards used for footway surface defects

Below are the slides used during interviews and group discussions to explain defects and to rank them in terms of the priority with which they should be repaired.
### Appendix H: Glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHS</td>
<td>British Horse Society</td>
</tr>
<tr>
<td>BVPI</td>
<td>Best Value Performance Indicators</td>
</tr>
<tr>
<td>CDM</td>
<td>Central Difference Method</td>
</tr>
<tr>
<td>CITT</td>
<td>Commission for Integrated Transport</td>
</tr>
<tr>
<td>CI</td>
<td>Condition Index</td>
</tr>
<tr>
<td>CSS</td>
<td>County Surveyors Society</td>
</tr>
<tr>
<td>CVI</td>
<td>Course Visual Inspection</td>
</tr>
<tr>
<td>DBM</td>
<td>Dense Bituminous Macadam</td>
</tr>
<tr>
<td>DETR</td>
<td>Department of Environment, Transport and the Regions</td>
</tr>
<tr>
<td>DiT</td>
<td>Department for Transport</td>
</tr>
<tr>
<td>DPTAC</td>
<td>Disabled Persons Transport Advisory Committee</td>
</tr>
<tr>
<td>DVI</td>
<td>Detailed Visual Inspection</td>
</tr>
<tr>
<td>EDI</td>
<td>Edge Deterioration index</td>
</tr>
<tr>
<td>FCI</td>
<td>Footway Condition Index</td>
</tr>
<tr>
<td>FCMG</td>
<td>Footways and Cycletrack Management Group</td>
</tr>
<tr>
<td>HA</td>
<td>Highways Agency</td>
</tr>
<tr>
<td>HARRIS</td>
<td>Highways Agency Road Research Information System</td>
</tr>
<tr>
<td>HGV</td>
<td>Heavy Goods Vehicle</td>
</tr>
<tr>
<td>IBUSS</td>
<td>Intensive Business Users Satisfaction Survey</td>
</tr>
<tr>
<td>IRI</td>
<td>International Roughness Index</td>
</tr>
<tr>
<td>LA</td>
<td>Local Authorities</td>
</tr>
<tr>
<td>LBVPI</td>
<td>Local Best Value Performance Indicator</td>
</tr>
<tr>
<td>LGV</td>
<td>Light Goods Vehicles</td>
</tr>
<tr>
<td>LPV</td>
<td>Longitudinal Profile Variance</td>
</tr>
<tr>
<td>NCC</td>
<td>Northamptonshire County Council</td>
</tr>
<tr>
<td>PDI</td>
<td>Pavement Distress Index</td>
</tr>
<tr>
<td>PERS</td>
<td>Pedestrian Environment Review System</td>
</tr>
<tr>
<td>PSV</td>
<td>Public Service Vehicle</td>
</tr>
<tr>
<td>PSV</td>
<td>Polished Stone Value</td>
</tr>
<tr>
<td>RCI</td>
<td>Road Condition Index</td>
</tr>
<tr>
<td>RPC</td>
<td>Rail Passengers Council</td>
</tr>
<tr>
<td>RSSB</td>
<td>Railways Safety and Standards Board</td>
</tr>
<tr>
<td>RUSS</td>
<td>Road Users' Satisfaction Survey</td>
</tr>
<tr>
<td>SCANNER</td>
<td>Surface Condition Assessment for the National Network of Roads</td>
</tr>
<tr>
<td>SCRIM</td>
<td>Sideway-force Coefficient Routine Investigation Machine</td>
</tr>
<tr>
<td>SMA</td>
<td>Stone Mastic Asphalt</td>
</tr>
<tr>
<td>SMTD</td>
<td>Sensor Measured Texture Depth</td>
</tr>
<tr>
<td>TfL</td>
<td>Transport for London</td>
</tr>
<tr>
<td>WSCC</td>
<td>West Sussex County Council</td>
</tr>
</tbody>
</table>
Abstract

The Highway Service Levels project was set up to explore public opinions of paved surfaces on the Local Authority road network and to relate their requirements from the highway network to engineering standards currently used to manage the network. The overall aim was to start the process of getting the public mindset into the prioritisation process so that the services provided are better aligned to customer needs. The scope of the work was focused on getting an improved understanding, in qualitative terms, of the levels of service the public expected for the surface of carriageways, cycle tracks and footways.

Following an initial information review, public opinion has been explored in two stages. The first stage consisted of group discussions with a broadly representative cross-section of road users and face-to-face interviews with vulnerable users to examine the terms used by the public and to establish the factors that drive perceptions among different categories of users. These discussions essentially explored recalled and prompted attitudes to footway/carriageway condition.

The second stage consisted of accompanied journeys with individual users to identify the defects they actually noticed, their reactions to different levels of condition when they experienced them and their priorities for maintenance. Journeys were carried out with pedestrians, cyclists, motorcyclists, motorists and Heavy Goods Vehicle (HGV) drivers.

This Report summarises the results of the study and is based on the views expressed by the users who participated in the discussions, interviews and accompanied journeys. Road surfaces are generally not in the consciousness of road users and they normally do not notice them, assuming them to be ‘fit for purpose’. For the study, therefore, participants were asked to focus on surface conditions and this sets the context for all justifications presented in the report.