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DEVELOPMENT OF A CYCLING POLICY FOR YORK TECHNICAL REPORT

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DEVELOPMENT OF A CYCLING POLICY FOR YORK

C O N T E N T S

1. INTRODUCTION

In early 1983 York City Council and North Yorkshire County Council commissioned the Institute for Transport Studies to carry out a study of cycling in York. The terms of reference were to:

i) Include an origin and destination survey of current movements by trip purpose and an assessment of future demand, indicating the likely mode from which any transfer will occur;

ii) Identify problem areas following discussions with various cycling groups and a study of accident statistics;

iii) Take into consideration any previous decisions of the City Council for investigation;

iv) Assess the appropriateness of the recommended standards for cycle facilities to a compact urban area;

v) Propose various solutions to problems where appropriate, assess the effect on other road users, and formulate a basic cycling plan for York.

vi) Advise the Council on the most appropriate type and location of cycle parking facilities at places of attraction.

The Institute for Transport Studies at the University of Leeds was appointed to carry out the study, with Professor A.D. May as the Director of the Study and Mr. D.A. Waring as Research Engineer. Work commenced on this project in June 1983 and was completed in May 1984.

This report describes the technical conduct of the study. Section 2 describes the design of the surveys which were conducted, section 3 their conduct, and section 4 the results obtained. Section 5 outlines the ways in which the results were used in the formulation of proposals and provides references to the main sources of design literature. Appendices which are available separately from the Institute provide fuller details of the survey results.

The recommendations arising from the study are contained in a separate Summary Report, available from the Institute as Working Paper 175.

2. SURVEYS - DATA COLLECTION

2.1) INTRODUCTION

This chapter describes the surveys that have been carried out as part of the York Cycling Study. It explains why surveys were needed and the reasons why particular types of survey were undertaken. The designs of the individual surveys are described in detail and data relating to the design and execution of the surveys is presented.

2.1.1) The Need for Surveys.

At the beginning of the study all the available existing information on cycling in the city was assembled and reviewed. At the same time an appeal was made through Radio York and local newspapers for groups and organisations in the city to come forward with their views and ideas on cycling in York.

An Origin and Destination survey had been carried out in 1976 as part of the Greater York Transport Study. However the original data that had been collected for this survey had been destroyed and no detailed data on cycle flows and movements was available.

The interviews with interest groups and the response from the general public revealed differences of opinion regarding the problems that cyclists face and the locations of the problems that were said to exist. Furthermore it was considered important to discover whether cyclists in general shared the same views as the cycling interest groups. There appeared to be a lack of understanding of the relative priorities of cyclists, and of the trade-offs they were making between travel time, travel cost, and security. There seemed to be differing views on cycling and cycling problems between different groups of road users.

These considerations demonstrated the need for additional information and formed the basis for the survey design.

2.1.2) Types of survey undertaken

As part of this study the following surveys were carried out which involved the collection of new data by the study team.

1) Origin and Destination Survey
2) Rowntree/Mackintosh Cycling Survey &
   British Rail Engineering Ltd Cycling Survey
3) Cyclists' Opinion Survey
4) Cycle Parking Opinion Survey
5) Cycle Parking Volume Survey
6) Public Opinion Survey

2.1.3) Origin and Destination Survey (incorporating the Rowntree/Mackintosh and British Rail Engineering Cycling Surveys)

The terms of reference of the study required us to undertake an Origin and Destination survey. A small scale pilot survey was carried out during August 1983 to evaluate the data collection method to be employed. The main survey took place during September and October 1983. Roadside interviews of cyclists were

carried out between 2 p.m. and 7 p.m. at 44 sites. The police assisted at the busiest sites. An alternative questionnaire survey was also carried out at the Rowntree Mackintosh factory to ensure adequate coverage of this important generator of cycle trips (see section 2.1.4) During April 1984 supplementary surveys were carried out to improve the coverage of British Rail Engineering Limited, and to replace data that had been lost in transit.

In general, an excellent response from the cyclists was obtained and a total of about 7000 interviews were obtained.

2.1.4) Rowntree/Mackintosh and British Rail Engineering Limited Cycling Surveys.

These surveys were carried out as an integral part of the Origin and Destination Survey in order to ensure adequate coverage of these two important generators of cycle trips. The Rowntree/ Mackintosh Cycling Survey was carried between Thursday 13th October 1983 and Wednesday 19th October 1983. Questionnaires concerned with destination and routeing were left on bicycles parked within the factory perimeter. Some bicycles received Cyclists' Opinion Survey questionnaires instead. A total number of parked bicycles was also counted. The response rate for this survey was about 50%.

The British Rail Engineering Limited Survey was carried out on Monday 16th April 1984. The survey was similar to the Rowntree/ Mackintosh Cycling Survey and the questions were identical. The only difference was that no Cyclists' Opinion Survey questionnaires were distributed. The response rate for this survey was about 35%.

2.1.5) Cycle Parking Opinion Survey

This survey was carried out on Thursday 20th October 1983 and repeated on Saturday 22nd October 1983. On both days the survey was undertaken in the morning and repeated in the afternoon. It was carried out concurrently with the Cycle Parking Volume Survey. The area covered by this survey comprised the shopping and commercial centre of the city including the Rougier Street area and the railway station. Over 1000 questionnaires were placed on parked bicycles and the response rate was about 45%.

2.1.6) Cycle Parking Volume Survey

This survey was carried out concurrently with the Cycle Parking Opinion Survey and the survey area was identical (see section 2.1.5). The number of bicycles parked in every publicly accessible place in the survey area was counted and recorded.

2.1.7) Cyclists' Opinion Survey

This survey was carried out in conjunction with the Origin and Destination Survey. A random sample of the cyclists interviewed at the census points were given a questionnaire to take away with them and to complete at the end of their journey. Some of the questions were specifically related to the journey being made at the time they received the questionnaire. Other questions were of a more general nature.

Over 1,000 questionnaires were distributed and the response rate was about 60%.

2.1.8) Public Opinion Survey

This survey was a postal questionnaire survey. About 1,000 questionnaires were sent by post to a random sample of residents, aged 18 years or over, in the study area. The response rate for this survey was about 25%.

2.2) ORIGIN AND DESTINATION SURVEY

2.2.1) Purpose of survey

An Origin and Destination Survey was needed to provide the following information:

i) The origins and destinations of cycle trips
ii) The numbers of cycle trips being made
iii) The purpose of the cycle trips being made
iv) The routes that are heavily used by cyclists

2.2.2) Existing Origin and Destination Information

Information from the Greater York Travel Study reports indicated that the main generators of cycle trips were the City Centre, the University, the carriage works of British Rail Engineering Limited, and the confectionery factories of Rowntree/Mackintosh and Terry's.

2.2.3) Screenlines and Cordons.

The design of the survey incorporated a number of screenlines and cordons that divided the city into distinct areas which, as far as possible, isolated these major generators. Cordons were placed around the city centre following the line of the city walls, and around the University and Heslington village. Screenlines were drawn as follows:

i) River Ouse
ii) Track bed of Derwent Valley railway
iii) Selby - Scarborough railway line
iv) Clifton Bridge - Acomb - Knavesmire

Where possible these followed barriers to movement.

Because it was not possible to survey movements from the factories of Rowntree/Mackintosh and British Rail Engineering Limited using cordon crossing surveys, these sites were covered by alternative questionnaire surveys (see section 2.3). Census points were located at every crossing point of the cordons and screenlines likely to be used by cyclists. These points included locations where cycling or pushing a bicycle was either illegal or of doubtful legality. The locations of the cordons, screenlines and census points are shown on figures 2.1 and 2.2.

2.2.4) Interviews and associated cycle counts

At every census point interview and associated cycle count

data was collected on one day only from 2pm until 7pm. The time period was selected to cover roughly half a day's trips, on the assumption that those before 2pm were a mirror image of those after. This enabled data to be obtained for the whole of the evening peak period, and for a proportion of the off-peak period.

The total number of cyclists passing the census point was counted, with separate counts for each direction. Subsidiary totals were kept of numbers of cyclists for each 15 minute period.

Concurrently with the cycle counts, interviewers were questioning as many cyclists as possible about the journey they were making at that time. Cyclists were often observed to appear in bunches probably due to the effect of traffic signals previously encountered en route. With the manpower resources available it was not possible to interview every cyclist. The sampling procedure adopted was to interview the first cyclist that arrived after the cyclist previously interviewed had left. The proportion of cyclists interviewed at any census point was dependent upon

i) whether the census point was attended by the police
ii) the number of interviewers present
iii) the willingness of cyclists to stop
iv) the variation in flow of cyclists
v) the degree on bunching

The number of successful interviews depended upon the willingness of cyclists to answer the questions fully once they had stopped.

The interviewing took place for one direction of cycle flow only and this was usually the direction of maximum peak hour flow. The names and reference numbers of census points together with the dates on which interview and associated count data was collected is given in Table 2.1. The direction for which interview data was obtained is indicated by the arrows in figures 2.1 and 2.2. A copy of the interview form is to be found in Appendix 1.

2.2.5) Types of Census Point

At the 18 most heavily trafficked census points a policeman was present to stop a sample of cyclists, and to ensure the safety of the cyclist being interviewed and the rest of the traffic. At the remaining points where interview data was collected no police officer was present and the cyclists were encouraged to stop of their own free will to help the study. In general cyclists were willing to stop once the purpose of the survey was generally known through road warning signs, publicity, and past experience.

2.2.6) Information from the Interview

The object of the roadside interview was to obtain the minimum amount of information about the trip being made that was absolutely necessary. This was to ensure that the time taken per interview was as short as possible, that each cyclist interviewed was delayed as little possible, and that the maximum number of cyclists could be interviewed during the five hour survey period.

The following information was sought from cyclists:

i) The destination address
ii) The origin address
iii) The purpose of the journey classified as work/education or otherwise
iv) If the journey purpose was work/education whether an additional journey home was made at mid-day

The time of the interview was also recorded. The numbers of interviews obtained at each census point together with the associated cycle flows are given in Table 2.2

The main survey commenced on Monday 26th September 1983 and ended on Friday 28th October 1983. Data was collected on Monday to Friday throughout this five week period.

2.2.7) Expanding the sample to All-day flow

Although the five hour time period was considered to be representative of cycle trip making throughout the day it was necessary to have additional information to be able to convert this sample of trip making into an estimate of a full day's trips for an average day.

2.2.8) Variations in cycle flow during the survey period.

It was anticipated that the volume of cycle trips would vary with the day of the week, and with the week that the interviews and count took place. In order to compensate, if necessary, for these variations a series of counts lasting from 9am until 1pm and from 2pm until 6pm were carried out at the following five census points that were considered to be representative of all the other census points:

i) Lendal Bridge
ii) Tadcaster Road
iii) Crichton Avenue
iv) Fishergate Bar
v) Melrosegate

The time period was selected to cover the most important part of the day that could be covered by one person in an eight hour working day. These counts were extended in duration on Thursdays and lasted from 6am until 10pm in order to provide information on cycle flows to convert the five hour sample flow to a full 24 hour flow. It was assumed that the number of cyclists between 10pm and 6am was negligible.

The sites selected for these longer counts, together with the dates on which the counts took place are given in Table 2.3.

2.2.9) Seasonal variations in cycle flow

It was also considered that the extent of cycle trip making might vary with the time of year. In order to detect any such variation a count at the same five representative sites mentioned above was carried out once a month from September until April on the Thursday nearest to the 20th of the month. The counts took place at each site at the times stated below:

Lendal Bridge	9.ØØ - 1Ø.ØØ
Crichton Avenue	1Ø.3Ø - 11.3Ø
Tadcaster Road	12.ØØ - 13.ØØ
Fishergate Bar	14.3Ø - 15.3Ø
Melrosegate	16.ØØ - 18.ØØ

The overall time period (9am - 6pm) was the same for this survey as for the Monday to Friday counts. The breaks between one site and the next were to enable one enumerator to carry out the complete day's work allowing for travelling and meal breaks.

2.3) ROWNTREE/MACKINTOSH AND BRITISH RAIL ENGINEERING LIMITED SURVEYS.

2.3.1) Background

It had originally been hoped that the Origin and Destination Survey census points would give adequate coverage of British Rail Engineering Limited. From the outset the close proximity of the Rowntree/Mackintosh factory to the Crichton Avenue census point dictated that an alternative method would be needed to collect the trip information.

During the Origin and Destination Survey it became clear that there would be inadequate coverage of British Rail Engineering Limited and that an additional survey, similar to the one carried out at Rowntree/ Mackintosh, would be needed.

The main reason for the poor coverage was that when data was collected at the Holgate Road census point it was dark by the time cyclists were leaving the carriage works. In the interests of safety the police would not permit interviewing to take place during this crucial time period.

2.3.2) Type of survey

A self-completion questionnaire survey seemed the most appropriate means of obtaining the trip information that was required.

2.3.3) Sample size

As these surveys took place on private property negotiations were necessary before the surveys could be carried out. Therefore circumstances did not permit a pilot survey to be undertaken. However the pilot surveys for the Cyclists Opinion Survey and Cycle Parking Opinion Survey indicated that the likely reponse rate would be in the order of 25%. The managements estimated the number of cyclists at their respective factories and it was considered both practical and desirable to sample as many cyclists as possible. Therefore it was decided to aim for a 1ØØ% sample and distribute 1ØØØ questionnaires at Rowntree/ Mackintosh and 4ØØ questionnaires at British Rail Engineering Limited.

2.3.4) Questionnaire design

The questionnaire was originally intended solely for use at Rowntree/Mackintosh but, with very minor modifications, was also used at British Rail Engineering Limited. It was designed to be as short as possible, self-explanatory and easily understood. A copy

of both versions of the questionnaire are to be found in Appendix 1.

2.3.5) Questions asked in the survey

The cyclists were asked simply to give their destination, the route they took, and how many round trips to and from work they made each day.

2.3.6) Disribution of questionnaires

As the two surveys took place on private property it was necessary to seek the approval of the factories concerned before the surveys could take place. The study team wishes to record the willing co-operation shown by the management, unions and employees of Rowntree/Mackintosh and British Rail Engineering Limited in connection with these surveys.

Of the various methods of distributing the questionnaires the one most likely to achieve the highest response rate was considered to involve placing questionnaires on parked bicycles within the factory perimeter. Every cyclist would receive a questionnaire, and he would be able to read it, and learn about the purpose of the survey before starting his journey home. The pilot studies in the city centre demonstrated that the response rate would be acceptable and that there would be no litter problem. The main alternative method that was considered was to hand out questionnaires to cyclists on the move at the factory gates during their journey home. It was considered that a large number of people would be necessary to ensure that an adequate sample size could be achieved and it was considered doubtful that many cyclists would be interested in taking a questionnaire.

A total of 1000 questionnaires were distributed at Rowntree/ Mackintosh between Thursday 13th October 1983 and Wednesday 19th October 1983. As an alternative, some cyclists were given a Cyclists' Opinion Survey questionnaire in order that Rowntree/Mackintosh cyclists could be adequately represented in that survey also.

The British Rail Engineering Cycling Survey took place on Monday 16th April 1984 when 400 questionnaires were placed on parked bicycles. There were more bicycles than was anticipated and the resulting sample was about 80%. As this survey took place rather late in the study it was decided not to distribute any cyclist opinion questionnaires but to concentrate solely on obtaining the essential origin and destination information.

2.3.7) Returning the questionnaires

A number of different ways of returning the questionnaires were considered including the placing of collecting boxes prominently in the factories. However it was considered that,although this was an inexpensive method,it would have caused some inconvenience for the factories concerned and would have required some effort on the part of the respondents. It was decided that the best way of returning the questionnaires was by post which was the method used for all the other questionnaire surveys. It was made clear in the questionnaire that no postage would be needed to return the completed questionnaire as the accompanying envelope was marked "Freepost".

2.4) CYCLISTS' OPINION SURVEY

2.4.1) Purpose of survey

During August discussions on cycling issues had taken place with representatives of cyclists' organisations in the city. The purpose of the Cyclists' Opinion Survey was to obtain the views on cycling of a representative cross-section of the city's cyclists.

2.4.2) Type of Survey

It was considered that a relatively unbiased sample of the city's cyclists could be obtained from the cyclists who were stopped and questionned at the roadside census points. It would have been impractical to have questionned cyclists at length by the roadside and therefore a sample of interviewed cyclists were invited to take a questionnaire away with them to be completed at the end of their journey.

2.4.3) Pilot Survey

A small scale pilot survey was carried out during August primarily to test the questionnaire. Because the pilot Origin and Destination Survey had already taken place, and because this pilot survey was carried out simultaneously with the Cycle Parking questionnaire survey, the questionnaires were placed on bicycles parked in the city centre rather than distributed to passing cyclists at the roadside.

2.4.4) Sample size

The pilot survey suggested that the response rate would be of the order of 25%. In order to be able to subdivide the completed questionnaires into smaller groups for the purposes of analysis, it was considered that a total of about 250 fully completed questionnaires would be necessary. Therefore it was decided to distribute 1000 questionnaires for the main survey.

2.4.5) Questionnaire Design

The questionnaire contained two sections. The first section contained questions about the journey that was being made when the questionnaire was received. The other section was concerned with cycling issues in general. A copy of the questionnaire can be found in Appendix 1.

2.4.6) Questions about the journey being made.

i) Journey details

The origin and destination were recorded as a check on sampling bias and to identify the route taken.

Journey purpose and duration were used to help in assessing the trade-offs that are being made between journey time, journey distance, and safety.

The frequency of making the journey provides a check on the familiarity of the cyclist with the journey that he was making, and with the route being taken.

ii) Choice of mode

In order to examine the attractiveness, or otherwise, of cycling it is helpful to know why a bicycle was used for the journey rather than any other mode and what alternative means of transport would have been used if the journey had not been made by bicycle.

iii) Problems and problem locations.

The assumption was made, as a result of discussions with cycling groups, that cyclists do face problems on their journeys. Cyclists were prompted to list any locations where they felt unsafe. The most frequently mentioned locations could be identified and studied to see what improvements could be suggested. The origin and destination information is helpful if the location is a junction in determining the manoeuvre that has been made.

iv) The trade-off between time, distance and safety.

Cycle priority measures are often designed to increase cycle safety. However they sometimes increase travel time for cyclists. When considering the advisability of such measures it is necessary to have some indication of the willingness of cyclists to extend their journey time, or increase their journey distance in order to feel safer.

v) Directness of routeing

In many instances there are physical barriers to movement that make a journey less direct, or more circuitous, than it need be. The local knowledge of cyclists is useful in identifying any such barriers to movement.

vi) Cycle parking

Although it is easier to find a place to park a bicycle than it is a car, there are problems associated with cycle parking. Unless the cyclist takes strict precautions it is relatively easy for the bicycle to be stolen. It is even more difficult to protect bicycle fittings, and any belongings that may have been left on the bicycle. It was considered desirable to have some indication of how bicycles were parked, whether any problems were encountered when parking the bicycle, and the willingness to spend time, or money, in order to park securely.

2.4.7 Questions about cycling in general

i) Popularity of cycling in York

Cycling is very popular in York. An understanding of the reasons for this might enable the attractions of cycling to be borne in mind when proposals are being formulated. Similarly some knowledge of the things that people do not like about cycling would also be useful.

ii) Measures to help cyclists

Although it is the task of the study team to make proposals and recommendations on ways of helping cyclists, it is helpful to know what types of measure would be popular with cyclists and where they suggest these measures should be implemented.

iii) Cycling safety and the perception of safety.

In the section of the questionnaire dealing with the journey being made cyclists were asked to list any locations on their journey where they felt unsafe (section 2.4.6 (iii)). The general perception of safety was being related to specific problem sites.

Many cyclists injure themselves when riding their bicycles but because no motor vehicle is involved the accident is not reported to the police and is therefore not included in the accident statistics. To get some indication of the frequency of cyclist injuries they were asked whether they had had any recent injury accidents.

iv) Theft of bicycles, bicycle fittings and personal belongings.

In the section of the questionnaire dealing with the journey being made cyclists were asked how far they would be prepared to walk to park their bicycles securely. To get some idea of the severity of the problem of bicycle theft, and theft from bicycles, the cyclists were also asked whether they had been recent victims of this type of crime.

v) Highway Maintenance

Cycling interest groups both locally and nationally draw attention to the fact that because bicycles have poor suspension, the quality of the road surface used by cyclists needs to be good. Cyclists were asked whether they had had their bicycles damaged recently as a result of uneven road surfaces or potholes.

vi) Cycle training

For many years school children have received cycle training under the Cycling Proficiency Scheme. It was considered useful to know what proportion of cyclists had receive such training. The views of cyclists who had received cycle training could be compared with those who had not.

vii) Average weekly cycle mileage

In order to obtain an idea of the amount of cycling that takes place cyclists were asked to estimate their average weekly cycle mileage.

viii) Driving licence holding and car availablity.

Many cyclists may have the alternative of making journeys by private motor vehicle if circumstances permitted. Other cyclists do not have ready access to private motor transport. The views on cycling of these two groups may be different. Cyclists were asked to give details of their driving licence holding, and the number of cars and vans available for their household to use.

ix) Personal details

In order to be able to compare the views of different groups of the cycling population, cyclists were asked to give their sex, age group and age group, and their address or postcode.

2.4.8) Distribution of questionnaires

A total of approximately 1000 questionnaires was distributed to cyclists who were stopped and interviewed at the roadside as part of the Origin and Destination Survey. After the Origin and Destination Survey interview was completed a sample of cyclists were asked whether they would be prepared to take a questionnaire away with them, complete it at the end of their journey, and return it. It was made clear to the cyclist that no postage would be needed to return the completed questionnaire as the accompanying envelope was marked "Freepost". Very few cyclists refused to take a questionnaire especially when they learned of the chance of winning a 25 cash prize (see section 2.8).

Cyclists were chosen on the basis of stratified random sampling. The Origin and Destination Survey interviewers were given an equal number of Cyclists' Opinion Survey questionnaires to distribute. They were instructed to sample the population of cyclists principally on the basis of cycle flow, but they were asked to make sure that cyclists of both sexes and all age groups were included where appropriate.

The volume of cyclists passing each census point was not known when this survey was designed. Time did not permit these counts to be made before the survey was carried out. As an alternative an assessment was made of each census point and it was classified as indicated below. The number of questionnaires distributed at each census point depended on its flow classification and this is also indicated below.

Flow Classification of Census Points

Class	Number of Questionnaires Distributed
Heavy flow	36
Medium flow	18
Low flow	9
Very low flow	5

Each census point is listed in Table 2.4 giving its flow classification, the number of questionnaires actually distributed and the number returned.

2.5) CYCLE PARKING OPINION SURVEY

2.5.1) Purpose of survey

During August discussions on cycling issues had taken place with representatives of cyclists' organisations in the city. The purpose of the Cycle Parking Opinion Survey was to seek the views of cyclists who had parked their bicycles in the city centre where cycle parking was said to be a problem.

2.5.2) Type of survey

It was considered that the most appropriate survey method would be a self-completion questionnaire survey with the questionnaires placed on parked bicycles, in conjunction with a count of the numbers of bicycles parked (see section 2.6). In order to investigate variations in cycle parking problems by the day of the week, and by the time of day, the questionnaires were distributed on a Thursday and on a Saturday both in the morning and in the afternoon.

2.5.3) Definition of survey area

A visual study of cycle parking in York, together with the results of discussions with cycling groups indicated that cycle parking problems were limited to the city centre, the Rougier Street area, and the station. The area covered by the Cycle Parking Survey is indicated on figure 2.3.

2.5.4) Pilot Survey

A small scale pilot survey was carried out during August primarily to test the questionnaire, in conjunction with a pilot survey for the Cyclists' Opinion Survey. Questionnaires were placed on a random sample of bicycles parked within the defined survey area. Resources did not permit a pilot study for the beat survey.

2.5.5) Sample size

The pilot survey suggested that the response rate would be of the order of 25%. In order to be able to subdivide the completed questionnaires into smaller groups for the purposes of analysis, it was considered that a total of about 250 fully completed questionnaires would be necessary. Therefore it was decided to distribute 1000 questionnaires for the main survey.

2.5.6) Questionnaire Design

The questionnaire was designed to be self-expanatory and easily understood. A copy of the questionnaire can be found in Appendix 1.

2.5.7) Questions asked in the survey

i) Parking location

The first questions were concerned with the location of the parked bicycle. In conjunction with the Cycle Parking Volume Survey it was possible to relate problems in particular areas or streets to the number of bicycles parked there. Cyclists were also asked if there was anywhere else they would prefer to have parked.

ii) Time, duration and purpose of parking

In order to determine the demand for parking space cycists were asked to state the time they found the questionnaire, the

purpose of their visit and the length of time they had parked.

iii) Parking safety, security, and protection from the weather

From the discussions with cycling interest groups it became apparent that thefts of bicycles, their fittings and cyclists' belongings was a key issue. Cyclists were asked whether they had recently had their bicycle stolen or anything stolen from their bicycle. They were also asked how far they would be prepared to walk to find a safe and secure parking place. They were asked how far they would be prepared to walk to leave their bicycles protected from the weather. Finally cyclists were asked how far they would be prepared to walk, and how much they would be prepared to pay to use a cycle park with all of the attributes mentioned above.

iv) Types of bicycle support

There are a number of different ways in which a parked bicycle can be supported. Cyclists were asked which method they had used and which method they preferred.

v) Locations where Cycle parking is a problem.

Discussions with the cycling interest groups indicated that the only location where cycle parking was a problem was in the city centre. To check whether this really was the case cyclists where asked to state any other locations where they considered cycle parking to be a problem.

vi) Other cycle parking issues.

Cyclists were invited to list any other ways in which cycle parking could be made easier.

2.5.8) Distribution of questionnaires

A total of 1000 questionnaires were distributed by placing them at random on parked bicycles. To detect any differences in parking problems by the time of day, and by the day of the week the questionnaires were distributed on a Thursday and a Saturday,in the morning and again in the afternoon on both days. The Thursday chosen was 20th October 1983 and the Saturday was 22nd October 1983. Distribution in the morning started at 10.15 and in the afternoon at 2.15. A total of 250 questionnaires were distributed on each of the four occasions and took about one hour to complete. It was made clear in the questionnaire that no postage would be needed to return the completed questionnaire as the accompanying envelope was marked "Freepost".

2.6) CYCLE PARKING VOLUME SURVEY

2.6.1) Purpose of survey

The purpose of the Cycle Parking Volume Survey was to determine the number of bicycles parked in the city centre, and adjacent areas, and to detect any differences by time of day, and by the day of the week.

2.6.2) Type of survey

The most appropriate method of collecting parking volume data was considered to be a beat survey in which a pre-determined fixed route is followed and the number of bicycles parked in each street, or section of street is recorded. As bicycles do not have a registration number, or any other identifying marks it is not possible to record the duration of parking of any particular bicycle. Information on duration was obtain from the Cycle Parking Opinion Survey.

2.6.3) Definition of survey area

A visual study of cycle parking in York, together with the results of discussions with cycling groups indicated that cycle parking problems were limited to the city centre, the Rougier Street area, and the station. The area covered by the Cycle Parking Survey is indicated on figure 2.3.

2.6.4) Design of survey

Limitations on time and manpower did not permit a pilot survey to be undertaken. Using a large scale map it was found that the survey area could be divided into two beats such that every publicly accessible cycle parking place in each part could be visited on one occasion by a single observer within the space of approximately two hours. Therefore with two observers the whole survey area could be visited morning and afternoon. At the same time a third person was distributing the associated Cycle Parking Opinion Survey questionnaires.

2.7) PUBLIC OPINION SURVEY

2.7.1) Purpose of survey

The purpose of the Public Opinion Survey was to seek the views of a cross-section of the general public on matters related to cycling in York. Both cyclists and non-cyclists were asked to help the study with this survey.

2.7.2) Type of survey

Of the various ways of undertaking a public opinion survey it was considered that a home-based survey would be the most suitable because of the limited resources available to the study team. Although a personal introduction often results in a higher response rate the manpower was not available to do this and the questionnaires were distributed by post.

2.7.3) Pilot Survey

A small scale pilot survey was carried out during August primarily to test the questionnaire. Two areas of York were selected for the pilot survey, Tang Hall and Woodthorpe. Tang Hall is an estate of either prewar or immediately post-war council housing. Woodthorpe is an area of new private housing. For the

pilot survey only, the questionnaires were delivered by hand and the person answering the door, if an adult, was asked to complete and return the questionnaire at their leisure. Every sixth house was visited and if no reply was obtained, or the householder was not interested, then the adjacent house was selected as a replacement.

2.7.4) Sample size

The pilot survey suggested that the response rate would be of the order of 25%. In order to be able to subdivide the completed questionnaires into smaller groups for the purposes of analysis, it was considered that a total of about 250 fully completed questionnaires would be necessary. Therefore it was decided to distribute 1000 questionnaires for the main survey.

2.7.5) Questionnaire Design

The questionnaire was designed to be self-expanatory and easily understood. A copy of the questionnaire can be found in Appendix 1.

2.7.6) Questions asked in the survey

i) Popularity of cycling in York

Cycling is very popular in York. An understanding of the reasons for this might enable the attractions of cycling to be borne in mind when proposals are being formulated. Similarly some knowledge of the things that people do not like about cycling would also be useful.

ii) Cycling ability

In order to distinguish those who could cycle from the rest the respondents were asked to state whether they could rise a bicycle, if they could, whether they cycled regularly.

iii) Modal choice

If measures are taken to help cyclists it may well encourage people to start cycling regularly who currently use some other form of transport. Respondents were asked what sort of measures would persuade them to change to cycling and from which mode of transport they would change. A significant change from car driving to cycling may reduce traffic congestion in the peak hours. A similar change from bus to cycling may reduce the number of people using the buses. Respondents also asked which form of transport they used most frequently to get around York.

iv) Driving licence holding and car availablity.

Many people have the alternative of making journeys by private motor vehicle if circumstances permit. Other people do not have ready access to private motor transport. The views on cycling of these two groups may be different. Respondents were asked to give details of their driving licence holding, and the number of cars and vans available for their household to use.

v) Attitudes to cycling

People's attitudes to cycling may vary depending on which mode of transport they happen to be using at the time. Respondents were asked to give their attitudes to cycling and cyclists from the point of view of differnt types of road user.

vi) Measures to help cyclists

Although it is the task of the study team to make proposals and recommendations on ways of helping cyclists, it is helpful to know what sorts of measures would be popular and where these measures should be implemented. Respondents were asked to give their ideas on ways of helping cyclists.

vii) Evaluation of cycling schemes.

To help in formulating a method for evaluating cycling schemes, respondents were asked to identify those strengths and weaknesses of potential improvement measures which they considered particularly important.

viii) Number of cyclists per household

A persons attitude to cycling may depend not only on the person's own regular form of transport but also on that of other members of the the household. Respondents were asked to state how many members of the household cycled regularly.

ix) Personal details

In order to be able to compare the views of different groups of the population, respondents were asked to give their sex, age group and age group, and their address or postcode.

2.7.7) Sampling method

Ideally a random sample of all residents of the study area old enough to understand and complete the questionnaire would have been preferable. However time constraints made this approach impossible. York City Council had a computer program available that would select a random sample of ratepaying heads of households, including council tenants, for the York City Council area. The study are also includes parts of the surrounding Districts of Harrogate, Ryedale and Selby for which no equivalent program was available. It was decided to use this program for selecting the sample for the York City Council part of the study area. For the rest of the study area a random sample of electors was obtained from the electoral registers. The sample was stratified on the basis of the population of the respective areas. To overcome the problem of heads of household being selected for the York City area rather than individuals, the questionnaire was addressed to the head of the household with instructions for the questionnaire to be completed by one of the following, randomly predetermined, categories of resident of the household:

i) the oldest lady in the household
ii) the oldest gentleman in the household

iii) the youngest lady (18 or over) in the household
iv) the youngest gentleman (18 or over) in the household

If this was not possible the head of the household was invited to complete the questionnaire.

2.7.8) Distribution of questionnaires

A total of approximately 1000 questions was distributed by post. It was made clear in the questionnaire that no postage would be needed to return the completed questionnaire as the accompanying envelope was marked "Freepost".

2.8) PUBLICITY AND INCENTIVES

During the survey period every effort was made to publicise the surveys and encourage people to co-operate.

Posters were displayed at public buildings, the Rowntree/Mackintosh factory , and in libraries and cycle shops in the study area. Leaflets were available at libraries and cycle shops, and were handed out at census points.

As an incentive to complete and return questionnaires, every person so doing by the closing date had the chance of winning a cash prize of 25.The idea of having a prize was in itself of great publicity value.

2.9) OTHER SOURCES OF INFORMATION.

2.9.1) Accident data.

Details of all road accidents reported to the police in which a cyclist was injured were obtained from North Yorkshire County Council for the period 1980-1982. The location of each accident was plotted on a map of the study area was a different symbol to indicate slight, serious, and fatal injury accidents.

More information on accident locations can be found on a plan in Appendix 3.

2.9.2) Interest Groups

In response to the publicity in depth discussions took place with representatives of the following organisations:

i) Cyclists' Touring Club
ii) York Cycling Campaign
iii) Priory Street Pedallers
iv) Institute of Advanced Motorists.

The following groups and organisations have written giving their views on cycling:

i) Council for the Protection of Rural England
ii) Ramblers Association
iii) National Federation of Old Age Pension Associations
iv) Transport 2000
v) Motor Schools Association of Great Britain

2.9.3) Response from the general public.

Individual members of the public have written giving their views and suggestions. A total of 35 letters have been received.

YORK CYCLING STUDY

Table 2.1 *Origin and Destination Survey* - List of Census Points

Location	Code No	Date of Interviews	Date of Counts	Type (see note 1)
Acomb Road	16	Wed 12 Oct (2)	Wed 12 Oct (3)	Police
Blake Street		(4)	Thurs 29 Sept(5)	-
Bootham	20	Tues 18 Oct	Tues 18 Oct	Police
Bridge(Hospital)Lane	62	Thurs 6 Oct	Thurs 6 Oct	Voluntary
BR War Memorial	71	(6)	Mon 9 Apr	-
Clifton Bridge	11	Wed 28 Sept	Wed 28 Sept	Police
Crichton Avenue	21	Wed 19 Oct	Wed 19 Oct	Police
Duncombe Place	54	Thurs 29 Sept	Thurs 29 Sept	Voluntary
Field Lane	75	Thurs 27 Oct	Thurs 27 Oct	Voluntary
Fishergate Bar	67	Thurs 13 Oct	Thurs 13 Oct (7)	Voluntary
Foss Islands Road	68	Thurs 13 Oct	Thurs 13 Oct (8)	Voluntary
Hamilton Drive West	58	Wed 5 Oct (2)	Wed 5 Oct	Voluntary
Heslington Lane	73	Thurs 27 Oct	Thurs 27 Oct	Voluntary
High Petergate	61	Thurs 6 Oct	Thurs 6 Oct	Voluntary
Holgate Road	27	Wed 26 Oct (2)	Wed 26 Oct	Police
Leeman Road	28	Wed 26 Oct	Wed 26 Oct	Police
Lendal	55	Thurs 29 Sept	Thurs 29 Sept	Voluntary
Lendal Bridge	17	Mon 17 Oct	Mon 17 Oct	Police
Love Lane	59	-	Tues 27 Oct	-
Marygate Lane	63	Thurs 6 Oct	Thurs 6 Oct	Voluntary
Melrosegate	74	Thurs 27 Oct	Thurs 27 Oct	Voluntary
Metcalfe Lane	66	Tues 11 Oct	Tues 11 Oct	Voluntary
Micklegate Bar	19	Tues 18 Oct	Tues 18 Oct	Police
Monk Bar	14	Tues 4 Oct	Tues 4 Oct	Police
Navigation Road	69	Tues 13 Oct	Tues 13 Oct	Voluntary
North River Bank	80	Thurs 6 Oct	Thurs 6 Oct	Voluntary
Ouse Bridge	18	Mon 17 Oct	Mon 17 Oct	Police
Peasholme Green	13	Tues 4 Oct	Tues 4 Oct	Police
Piccadilly	65	Tues 11 Oct (9)	Tues 11 Oct (9)	Voluntary
Poppleton Road	15	Wed 12 Oct(2)(10)	Wed 12 Oct (10)	Police
Rougier Street	70	Thurs 20 Oct	Thurs 20 Oct	Voluntary
Saint George's Field	52a	(11)	Tues 27 Sept	-
Scarborough Rail Bdg	60	Thurs 6 Oct	Thurs 6 Oct	Voluntary
Skeldergate	53	Tues 27 Sept	Tues 27 Sept	Voluntary
Skeldergate Bridge	23	Mon 24 Oct	Mon 24 Oct	Police
South River Bank	56	Thurs 29 Sept	Thurs 29 Sept	Voluntary
Sowerby Road	57	Wed 5 Oct	Wed 5 Oct	Voluntary
Tadcaster Road	26	Tues 25 Oct	Tues 25 Oct	Police
Tang Hall Lane	22	Wed 19 Oct	Wed 19 Oct	Police
Terry Avenue	52	Tues 27 Sept	Tues 27 Sept	Voluntary
Toft Green	82	Tues 10 Apr	Tues 10 Apr	Voluntary
Tower Street	64	Tues 11 Oct (12)	Tues 11 Oct (12)	Voluntary
University Rd (Lower)	25	Tues 25 Oct	Tues 25 Oct	Police
Victoria Bar	51	Tues 27 Sept	Tues 27 Sept	Voluntary
Walmgate Bar	24	Mon 24 Oct	Mon 24 Oct	Police
Water End	12	Wed 28 Sept	Wed 28 Sept	Police
Wellington Row	72	Thurs 20 Oct	Thurs 20 Oct	Voluntary

NOTES

1) "Police" census points had a policeman present to stop cyclists for interviewing. "Voluntary" census points had no police officer present and relied on the goodwill of cyclists.
2) Also contains data derived from the British Rail Engineering Limited questionnaire survey.
3) Supplementary peak hour count on Wed 19 Oct because of staff shortage on Wed 12 Oct
4) No interviews because the road is one-way in the interview direction and complementary to Lendal
5) One way count in conjunction with Lendal
6) Wide entrance at junction with a major gyratory system made interviewing impracticable
7) Supplementary count on Wed 11 Apr
8) Supplementary count on Tues 10 Apr
9) Supplementary interviews and count on Wed 11 Apr
10) Supplementary interviews and count on Mon 9 Apr
11) The anticipated low cycle flow did not justify separate manning of this census point. It was combined with Terry Avenue for counting purposes.
12) Supplementary interviews and count on Tues 10 Apr

YORK CYCLING STUDY

Table 2.2 Origin and Destination Survey - Numbers of Interviews and Counts at Census Points

Location	Code No.	No. of Ints.	No. of Cycles 2 - 7pm Ints. Directn.	Other Directn.	Total	All Day Estimated 2 Way Flow
Acomb Road	16	277(1)	499	145	644	1338
Blake Street(2)	90	-	118(3)	-	-	-
Bootham	20	419	807	411	1218	2680
Bridge(Hospital)Lane	62	56	57	26	83	259
BR War Memorial	71	-	161	75	236	-
Clifton Bridge	11	160	268	399	667	1386
Crichton Avenue	21	267	508	209	717	1577
Duncombe Place	54	125	313	235	548	1711
Field Lane	75	64	125	67	192	599
Fishergate Bar	67	99	276	106	382	1193
Foss Islands Road	68	67	277	153	430	946
Hamilton Drive West	58	161(1)	408	235	643	1336
Heslington Lane	73	71	95	75	170	531
High Petergate	61	39	42	231	273	852
Holgate Road	27	220(1)	648	782	1430	2972
Leeman Road	28	91	202	178	380	790
Lendal	55	133	605	28	633	2345
Lendal Bridge	17	398	638	519	1157	2782
Love Lane	59	-	3	7	8	-
Marygate Lane	63	56	64	26	90	281
Melrosegate	74	41	198	246	444	1386
Metcalfe Lane	66	14	39	61	100	220
Micklegate Bar	19	359	628	422	1050	2310
Monk Bar	14	406	726	384	1110	2443
Navigation Road	69	27	57	16	73	228
North River Bank	80	18	20	18	38	119
Ouse Bridge	18	502	875	868	1743	4192
Peasholme Green	13	267	824	213	1037	2155
Piccadilly	65	72	115	104	219	455
Poppleton Road	15	132(1)	281	164	445	1070
Rougier Street	70	86	175	172	347	1820
St George's Field	52a	-	5	-	-	-
Scarborough Rail Bdg	60	60	97	33	130	406
Skeldergate	53	111	143	28	171	376
Skeldergate Bridge	23	205	340	420	760	1827
South River Bank	56	60	110	256	366	1143
Sowerby Road	57	25	45	37	82	170
Tadcaster Road	26	338	510	217	727	1600
Tang Hall Lane	22	192	339	266	605	1257
Terry Avenue	52	80	228	107	335	737
Toft Green(4)	82	95	134	24	158	-
Tower Street	64	123	195	147	342	1067
University Rd(Lower)	25	338	412	187	605	1331
Victoria Bar	51	88	119	135	254	559
Walmgate Bar	24	362	614	270	884	2126
Water End	12	234	683	333	1016	2111
Wellington Row	72	172	235	65	300	937

NOTES

N.B.: "Ints."= INTERVIEWS ; "Directn."= DIRECTION ;

1) Contains interviews from the British Rail Engineering Limited survey
2) The cycle flow from this location will be combined with Lendal for the modelling stage of the analysis
3) This movement involves pushing a bicycle in a one way street against the main direction of flow.
4) The interviews from this Census Point will be combined with those from Micklegate Bar for the modelling stage of the analysis

Table 2.3 ORIGIN & DESTINATION SURVEY

CORRECTION FACTORS FOR CYCLE FLOWS
SCHEDULE OF CYCLE VOLUME COUNTS AT SELECTED SITES

LOCATION	DATE	DAY OF WEEK	WEEK OF SURVEY	PERIOD OF COUNT
Lendal Bridge	26 Sept	Mon	1	9.ØØ - 18.ØØ
	7 Oct	Fri	2	9.ØØ - 18.ØØ
	13 Oct	Thurs	3	6.ØØ - 22.ØØ
	19 Oct	Wed	4	9.ØØ - 18.ØØ
	25 Oct	Tues	5	9.ØØ - 18.ØØ
	12 Apr	Thurs	6	6.ØØ - 22.ØØ
Crichton Ave	27 Sept	Tues	1	9.ØØ - 18.ØØ
	3 Oct	Mon	2	9.ØØ - 18.ØØ
	14 Oct	Fri	3	9.ØØ - 18.ØØ
	2Ø Oct	Thurs	4	6.ØØ - 22.ØØ
	26 Oct	Wed	5	9.ØØ - 18.ØØ
Tadcaster Road	28 Sept	Wed	1	9.ØØ - 18.ØØ
	4 Oct	Tues	2	9.ØØ - 18.ØØ
	1Ø Oct	Mon	3	9.ØØ - 18.ØØ
	21 Oct	Fri	4	9.ØØ - 18.ØØ
	27 Oct	Thurs	5	6.ØØ - 22.ØØ
Fishergate Bar	29 Sept	Thurs	1	6.ØØ - 22.ØØ
	5 Oct	Wed	2	9.ØØ - 18.ØØ
	11 Oct	Tues	3	9.ØØ - 18.ØØ
	17 Oct	Mon	4	9.ØØ - 18.ØØ
	28 Oct	Fri	5	9.ØØ - 18.ØØ
Melrosegate	3Ø Sept	Fri	1	6.ØØ - 18.ØØ
	6 Oct	Thurs	2	6.ØØ - 18.ØØ
	12 Oct	Wed	3	9.ØØ - 18.ØØ
	18 Oct	Tues	4	9.ØØ - 18.ØØ
	24 Oct	Mon	5	9.ØØ - 18.ØØ

YORK CYCLING STUDY

Table 2.4 Cyclists' Opinion Survey - Response rate by point of distribution

Disribution Point	Code No	Number of questionnaires returned	distributed	Response Rate(%)
CLIFTON BRIDGE	11.	23	36	88
WATER END	12.	23	36	88
PEASHOLME GREEN	13.	25	36	69
MONK BAR	14.	26	36	72
POPPLETON ROAD	15.	19	36	53
ACOMB ROAD	16.	27	36	75
LENDAL BRIDGE	17.	25	36	69
OUSE BRIDGE	18.	23	36	88
MICKLEGATE BAR	19.	27	36	75
BOOTHAM	20.	22	36	61
CRICHTON AVE	21.	9	18	50
TANG HALL LANE	22.	15	36	42
SKELDERGATE BRIDGE	23.	23	36	88
WALMGATE BAR	24.	20	36	56
UNIVERSITY ROAD	25.	25	36	69
TADCASTER ROAD	26.	26	36	72
HOLGATE ROAD	27.	15	36	42
LEEMAN ROAD	28.	16	36	44
VICTORIA BAR	51.	10	18	56
TERRY AVENUE	52.	13	18	72
SKELDERGATE	53.	7	18	39
DUNCOMBE PLACE	54.	15	18	83
LENDAL	55.	14	18	78
SOUTH RIVER BANK	56.	4	10	40
SOWERBY ROAD	57.	13	18	72
HAMILTON DRIVE WEST	58.	10	18	56
SCARBOROUGH RLY BRG	60.	9	18	50
HIGH PETERGATE	61.	5	9	56
BRIDGE LANE	62.	2	9	22
MARYGATE LANE	63.	1	5	20
TOWER STREET	64.	10	18	56
PICCADILLY	65.	11	18	61
METCALFE LANE	66.	4	9	44
FISHERGATE BAR	67.	10	18	56
FOSS ISLANDS ROAD	68.	9	18	50
NAVIGATION ROAD	69.	4	9	44
ROUGIER STREET	70.	10	18	56
WELLINGTON ROW	72.	11	18	61
HESLINGTON LANE	73.	12	18	67
MELROSEGATE	74.	8	18	44
FIELD LANE	75.	3	9	33
ROWNTREE SURVEY	99.	19	36	53
TOTAL		603		

3. SURVEYS - DATA PREPARATION & ANALYSIS

3.1) INTRODUCTION

This chapter describes the methods of analysis used on the data collected in the surveys, and also the preparation of the data prior to analysis.

All the data collected needed to be converted into a purely numeric form before it could be analysed on the University of Leeds Amdahl computer.

3.2) ORIGIN & DESTINATION SURVEY

The design of the Origin and Destination Survey was described in Section 2.2. Over 7000 cyclists were interviewed at 43 sites.

In the design and analysis of this survey we were fortunate to have the valuable assistance of Mr F Ghahri Saremi of the Institute for Transport Studies.

3.2.1) Interview data preparation

Prior to coding, the city and its surroundings had been divided into zones. The size of each zone was approximately related to the number of cycles trips starting and ending in the zone. The zone boundaries for the Greater York area were similar to those used in the Greater York Transport Study. The cordons and screenlines are always found along zone boundaries so that every observed trip, other than a circular tour, finishes in a different zone from the one in which it started.Each zone was given a unique number and for every address there was a corresponding zone number depending on the zone in which the address was situated. The zones for the York City area are shown in fig 3.1 and for the surrounding districts in fig 3.2. A special code was used for very distant addresses.

The coding of the data involved giving a number code to the following information:

i) Identity of census point
ii) Day of week
iii) Week of survey
iv) Identity of person collecting data
v) Identity of person coding data
vi) Destination Address
vii) Origin Address
viii) Trip purpose
ix) For a work journey, whether or not an additional work trip was made at mid-day

Details of the number codes used can be found in the separate coding manual.

The coded information was first transferred from coding sheets to magnetic tape, and then into a computer file.

The zones were combined into larger zones for the modelling stages of the analysis, these are shown in figure 3.1.

3.2.2) Cycle count data preparation

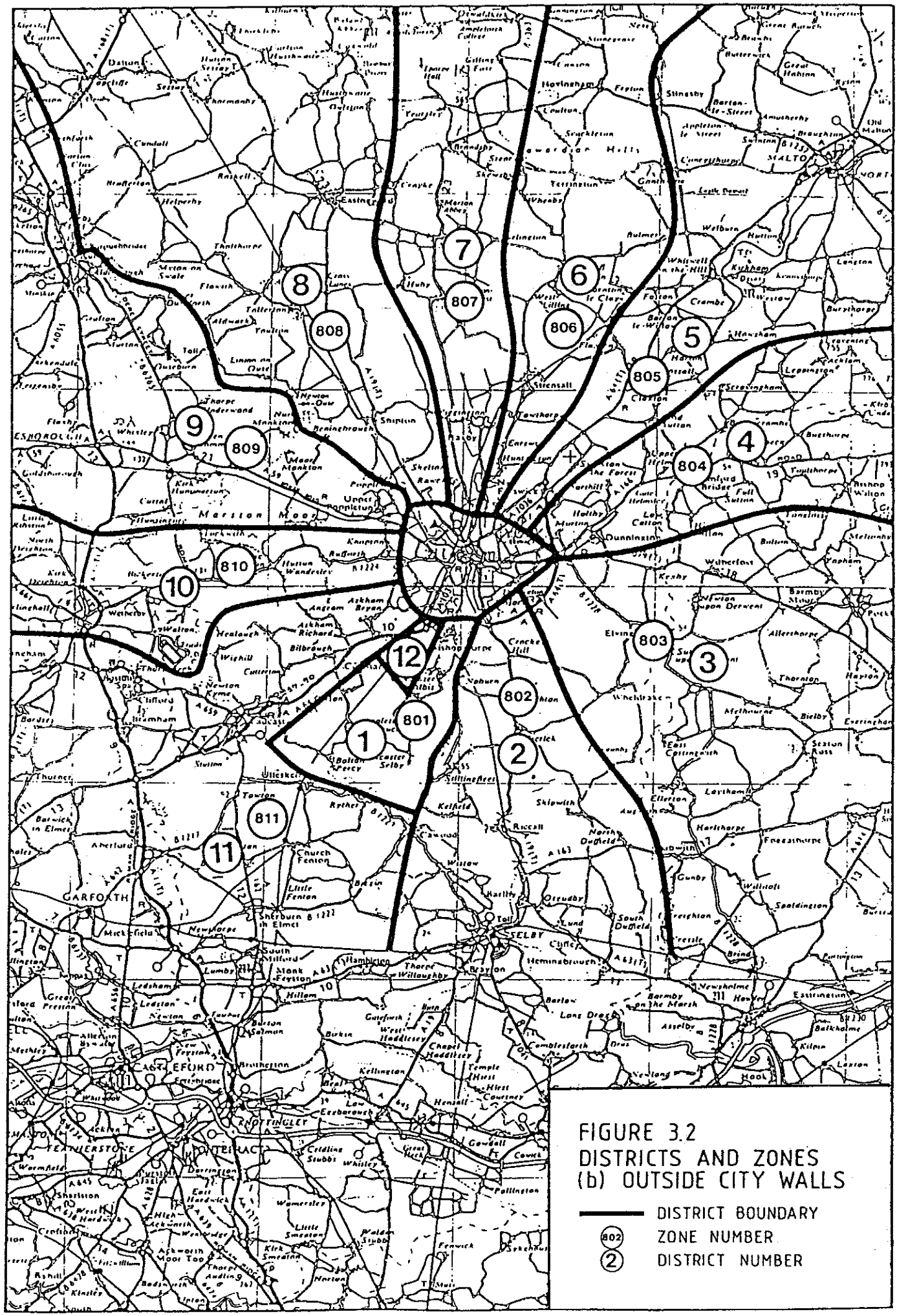


FIGURE 3.2
DISTRICTS AND ZONES
(b) OUTSIDE CITY WALLS
DISTRICT BOUNDARY
802 ZONE NUMBER
2 DISTRICT NUMBER

The cycle count data was transferred directly from the survey sheets to the computer after the total number of cycles for each 15min period had been calculated. Codes were given for the location of the count, the day of the week and the week of the survey. The codes were the same as those used for the interview data.

3.2.3) Rowntree/Mackintosh and British Rail Engineering Ltd data coding

The coding scheme used for the interview data was adapted for use with the Rowntree/Mackintosh and British Rail Engineering Ltd Cycling Surveys data. The data was transferred onto the computer such that it was in the same format as the roadside interview data.

3.2.4) Data validity checks

Before any computer analysis was undertaken, a series of validity checks were carried out on the data to identify any coding errors that may have been present.

3.2.5) Correction factors for day of week and week of survey

The data for the Origin and Destination Survey was collected on different days of the week, and different weeks of the year. To standardise the data a series of cycle counts were undertaken throughout the survey period (see Sections 2.28 and 2.29). From this data a number of correction factors were derived, by analysis of variance, for the day of the week, the week of the survey, and the month of the year. These factors are given in Table 3.1. Only the factors for the day of the week were statistically significantly different at the 5% level. For this reason, the data was only corrected for the day of the week and not for the week of the year.

3.2.6) Total number of trips from each census point

The objective of the Origin and Destination Survey was to produce a trip matrix for an average 24 hour working day. For each census point the total numbers of trips from every origin to every destination were required for a 24 hour day.

The raw interview data gave the necessary origin and destination information but only for the sample of cyclists actually interviewed and only for the five hour survey period. The raw cycle count data, from the count carried out concurrently with the interviews, gave the total number of cyclists passing the census point but only for the five hour census period.

It was assumed that the origins and destinations of the sample interviewed were an unbiased estimate of the total number of cyclists counted. Therefore the total number of cyclists counted were assigned origins and destinations in the same proportions as those of the sample interviewed.

As interview data was only collected for one direction of flow, it was assumed that the trip pattern in the reverse direction was a mirror image of the direction surveyed.

At the five census points where counts were carried out to correct for the time of day, day of the week, and week of the

survey (see Sections 2.28 and 2.29), the count was taken from 6am until 10pm on the Thursday of each week. The flow for the 16 hour survey period was expressed as a ratio of the flow between 2pm and 7pm to give a factor to convert the 5 hour census information to a 16 hour day. It was assumed that the cycle flow between 10pm and 6am was negligible and could be ignored so that the 16 hour flow could be regarded as an all-day, 24 hour flow.

Using the interview and count data the numbers of trips for each origin and destination pair for each census point were estimated as follows:

i) The numbers of cyclists observed in each direction for every 15 minute time period was combined to give a total two-way flow for the 5 hour survey period.

ii) This two-way flow was converted into a 16-hour flow by using a factor,obtained from the 16 hour counts, that expressed the 16 hour flow as a percentage of the 5 hour flow. The 16 hour flow was assumed to be an acceptable approximation of the 24 hour flow.

iii) The 24 hour flow was corrected for the day of the week using the appropriate factor for each census point.

iv) The interview data was divided into work and non-work trips.

ii) For the complete 5 hour survey period a factor was derived for the extra midday work trips as a proportion of the total work trips.

iv) It was assumed that during the 5 hour survey period all the work trips in the interview direction had been counted. The total number of work trips per 24 hour day was assumed to be twice the number in the survey direction plus the extra mid-day journeys. It was further assumed that the number of work trips was independent of the day of the week and no adjustments were made for this.

v) The number of work trips was subtracted from the all-day total for all trips to give the number non-work trips.

3.2.7) Combining the Rowntree/Mackintosh and British Rail Engineering Ltd data with the Origin and Destination Survey data.

The information from the Rowntree/Mackintosh and British Rail Engineering Ltd Cycling Surveys was converted into a format that was similar to,and compatible with,the data from the Origin and Destination Survey since all these surveys are complementary.

Origin and destination information for the total number of cyclists at Rowntree Mackintosh on an average day was derived from the results of the questionnaires as follows

i) An estimate of the total number of cyclists on an average day was obtained from the management.

ii) From the questionnaire results the proportion of cyclists making an additional journey home at mid-day was derived.

iii) This factor was used to obtain an estimate of the total number of cycle journeys by the

total number of cyclists.

iv) The total number of cycle trips for each destination was obtained by expanding the survey sample results to the total number of cycle trips made.

For British Rail Engineering Limited the questionnaire returns were added to those for the relevant census point using information on the route taken. These returns were then treated as in section 3.2.6.

From the questionnaire results "interview" records were derived that were similar to those derived from the Origin and Destination Survey. For the British Rail Engineering Ltd Survey these interview records were combined with those of the nearest appropriate census point to the factory for the journey being made.

For Rowntree Mackintosh an additional cordon was placed around the factory, and the factory itself was regarded as an additional census point and zone.

3.2.8) Obtaining the observed trip matrix

The terms of reference required the Origin and Destination survey to take into account different trip purposes. Separate matrices were produced for work trips, non-work trips, and for all trips combined. The observed trip matrix showed the number of trips from every origin zone to every destination zone for the average 24 hour working day based on the interview and count information that was collected.

In order to produce this matrix the following data files were produced:

i) Interview data file containing the following information for every interview obtained:
   a) Origin zone
   b) Destination Zone
   c) Identity of Census Point

ii) Count data file containing the all-day flow in the interview direction for every census point

iii) Files giving the number of cordons and screenlines crossed from every origin zone to every destination zone.

3.2.9) Obtaining the synthesised trip matrix

The design of the cordons and screenlines enabled 83% of all the origin to destination cells in the trip matrix to be observed. The missing cells were for origin and destination pairs that did not involve crossing a cordon or screenline.

In order to obtain values for the missing cells an estimation process using partial matrix methods was used. In addition to the information used to obtain the observed trip matrix the following data was also required:

a) A file containing the travel costs, in terms of distance

travelled, from every zone centroid to every other zone centroid including a cost estimate for within zone trips.

b) A file which indicates, for every zone pair, whether the trips were observed or whether they must be estimated.

Synthesised matrices were produced for work trips, for non-work trips, and for all trips combined. A gravity model technique was used which has been developed in the Institute for Transport Studies by F. Ghahri Saremi and further information can be obtained from the Institute.

3.3) Cyclists' Opinion Survey

The Cyclists' Opinion Survey data was coded in three stages. At each stage the coded data was transferred to a computer file.

Stage 1 consisted of coding the answers to questions where the answers were straightforward. They were the questions which required a tick in a box or a numerical answer.

Stage 2 involved the coding of answers to open ended questions where the answers had to be interpreted into key words prior to coding. A list of key words and corresponding codes was produced for descriptions of problems and remedies. A street directory gave a code for every location mentioned.

Stage 3 of the coding was a more detailed treatment of the question concerning locations where the cyclist felt unsafe to obtain, separately, information about junctions, and about particular stretches of road.

Details of all the codes used can be found in the Coding Manual.

Statistical analysis was carried out on the data using the SPSS package.

3.4) Public Opinion Survey

The Public Opinion Survey data was coded in two stages. At each stage the coded data was transferred to a computer file.

Stage 1 consisted of coding the answers to questions where the answers were straightforward. They were the questions which required a tick in a box or a numerical answer.

Stage 2 involved the coding of answers to open ended questions where the answers had to be interpreted into key words prior to coding. A list of key words and corresponding codes was produced for descriptions of problems and remedies. A street directory gave a code for every location mentioned.

Details of all the codes used can be found in the Coding Manual.

Statistical analysis was carried out on the data using the SPSS package.

3.5) Cycle Parking Opinion Survey

The Cycle Parking Opinion Survey data was coded in two stages. At each stage the coded data was transferred to a computer file.

Stage 1 consisted of coding the answers to questions where the answers were straightforward. They were the questions which required a tick in a box or a numerical answer.

Stage 2 involved the coding of answers to open ended questions where the answers had to be interpreted into key words prior to coding. A list of key words and corresponding codes was produced for descriptions of problems and remedies. A street directory gave a code for every location mentioned.

Details of all the codes used can be found in the Coding Manual.

Statistical analysis was carried out on the data using the SPSS package.

3.6) Cycle Parking Volume Survey

Each road covered by the Cycle Parking Volume survey was given a numerical code obtained from the street diretory. Each road code, together with the observed total number of parked bicycles was transferred to a computer file, together with codes for the time of day and the day of the week.

Details of the codes used can be found in the coding manual.

Statistical analysis was carried out on the data using the SPSS package.

Table 3.1 Correction factors for day or week and week of survey

Day of week	Correction factor*
Monday	1.00
Tuesday	0.92
Wednesday	0.87
Thursday	1.30
Friday	1.01

Week of survey		Correction factor*
W/b	25/9/83	0.93
	2/10/83	0.99
	9/10/83	1.14
	16/10/83	0.99
	23/10/83	1.08

* (Overall survey mean/Flow for day, week indicated).

4. SURVEY RESULTS

4.1) INTRODUCTION

This chapter describes the results of the surveys that have been carried out as part of the York Cycling Study.

4.2) ORIGIN AND DESTINATION SURVEY

Approximately 7000 interviews were obtained of which 80% were codable and used together with the Rowntree Mackintosh and British Rail Engineering Limited data in the modelling stage of the analysis. The estimated all-day two way cycle flows at census points is given in Table 2.2 and in the tabulations in Appendix 2. Separate analyses were carried out on work and non-work trips and tabulations can be found in Appendix 2. The results for the two purposes combined were also produced and tabulations for these are also to be found in Appendix 2.

The main cycle movements for both purposes combined have been plotted on desire line diagrams (see figures 4.1 and 4.2).

4.3) ROWNTREE MACKINTOSH CYCLING SURVEY

Approximately 1000 questionnaires were placed on bicycles parked in the factory cycle parks and 489 were returned giving a response rate of nearly 50%. The results of this survey have been incorporated in the Origin and Destination Survey. Further information can be found in the tabulations in Appendix 2.

4.4) BRITISH RAIL ENGINEERING LTD CYCLING SURVEY

Approximately 400 questionnaires were placed on bicycles parked in the factory cycle park and 136 of them were returned giving a response rate of about 30%. The results of this survey have been incorporated in the Origin and Destination Survey. Further information can be found in the tabulations in Appendix 2.

4.5) CYCLISTS' OPINION SURVEY

4.5.1) Characteristics of the Sample

Approximately 1000 questionnaires were distributed at the roadside census points and a total of 603 were returned giving a response rate of about 60%. A response was received from every census point at which the questionnaires were distributed and the response rate for each census point is given in Table 2.4. The sample has been broken down by the address of the respondent. The numbers of questionnaires returned by the Origin and Destination Survey zone code of the respondent is given in Table 4.1.

The sex and age structure of the sample is given in Table 4.2 and Table 4.3. Just over half the sample were male and about two thirds of the sample were between the ages of 18 and 44. About 13% of the sample were under 18 and represent the views of young people who were considered old enough to be able to complete the questionnaire.

About 45% of the respondents possessed a full motor car driving licence but nearly 40% possessed no driving licence at

all. Details of licence holding can be found in Table 4.4.

4.5.2) The attraction of cycling

Respondents were asked why, in general, they cycle; and why they used a bicycle for the journey they had just made. In general cyclists considered the use of a bicycle to be quicker, cheaper and more convenient than any alternative mode of transport. Details of their replies can be found in Table 4.5 and in the tabulations in Appendix 2.

4.5.3) Alternative modes available to cyclists.

Respondents were asked what alternative mode of transport they would have used for the journey they were making if they had not used a bicycle. Nearly everyone answered this question and about 45% would have walked, 30% would have used public transport, and about 20% would have travelled by car. More details of the answers to this question can be found in Table 4.6.

4.5.4) Car ownership

About 45% of cyclists belonged to non-car owning households. Further details of car ownership levels can be found in Table 4.7.

4.5.5) Locations where cyclists felt unsafe.

Cyclists were asked to list any locations on the journey they had just made where they had felt unsafe. The locations at which at least 10 people felt unsafe are listed in Table 4.8. The complete list of locations mentioned is given in the tabulations in Appendix 2.

4.5.6) General cycling problems

Cyclists were invited to state anything they did not like about cycling in York and over 90% of the sample did so. The most important problems were motor vehicles, especially lorries, and traffic management. Further details can be found in Table 4.9 and in the tabulations in Appendix 2.

4.5.7) Directness of routeing

Cyclists were asked whether their journey was as direct as they would have liked and over 75% said that it was.

4.5.8) The trade-off between travel time and safety

Cyclists were asked, for the journey they had just made, how much longer they would have been prepared to spend on their journey to feel safe. Less than 5% stated that they would not be prepared to extend their journey time at all. Of those who would spend extra time over 85% would be prepared to increase their journey time by 20% or more, and 30% would be prepared to increase their journey time by 50% or more. More detailed information can be found in Table 4.10 and in the tabulations in Appendix 2.

4.5.9) Cycle parking Problems

Cyclists were asked if they had experienced any problems in parking their bicycles before of after the journey they had just made. About two thirds of cyclists answered the question and only about 10% had experienced any difficulty in parking.

4.5.10) Security of parked bicycles

Cyclists were asked how far they would have been prepared to walk to leave their bicycles in a secure parking place. About 80% of the sample answered this question and of these less than 5% would not have been prepared to walk at all. Nearly everyone was prepared to walk 1-5 minutes or more, but only about 5% were prepared to walk 10-15 minutes or more. Further details can be found in Table 4.11.

4.5.11) Cycling Safety

Cyclists were asked whether they had been injured recently while riding a bicycle. Over 95% of the sample answered this question and, of those, about 5% had been injured during the last year while over 10% said they had been injured 1-5 years ago.

4.5.12) Theft of bicycles, fittings, and personal belongings.

Nearly 10% of cyclists said they had had their bicycles stolen within the past year and about 15% said that this had happenened to them 1-5 years ago. Over 20% said they had had fittings or personal belongings stolen from their bicycles within the past year, and over 25% said that this had happened to them 1-5 years ago.

4.5.13) Damage to bicycles by poor road surfaces

Over 40% of cyclists said that their bicycles had been damaged by uneven road surfaces or potholes during the last year. The same number said that this had happened to them 1-5 years ago.

4.5.14) Average weekly cycle mileage

About 80% of the sample cycled 15 miles per week or more and about 40% cycled 30 miles per week or more. Further details on weekly mileage can be found in Table 4.12.

4.5.15) Formal cycle training

Nearly one third of the cyclists had attended a course of formal cycle training.

4.5.16) Measures to help cyclists.

Cyclists were asked to suggest measures that would help cyclists in York and nearly 95% did so. The most frequent suggestions were cycle lanes and cycle paths, less traffic in the city cantre, more education for all road users, and better road maintenance. Further details can be found in Table 4.13 and in the tabulations in Appendix 2.

4.6) PUBLIC OPINION SURVEY

4.6.1) Characteristics of the Sample

Approximately 1000 questionnaires were distributed by post to a sample of residents and a total of 260 were returned giving a response rate of about 26%. The numbers of questionnaires returned by the Origin and Destination Survey zone code of the respondent is given in Table 4.14.

The sex and age structure of the sample is given in Table 4.15 and Table 4.16. Just over half the sample were male and about half of the sample were between the ages of 18 and 44. Young people under 18 were not included in this survey.

About 60% of the respondents possessed a full motor car driving licence but about 30% possessed no driving licence at all. Details of licence holding can be found in Table 4.17.

About 60% of respondents belonged to car-owning households and about 15% came from multiple car-owning households. details of car ownership levels can be found in Table 4.18

Over 90% could ride a bicycle and over 40% said they cycled regularly. Over 40% of respondents came from households in which no-one cycled regularly and only 10% of respondents came from households with more than two regular cyclists.

About 40% said their most usual mode of transport was by car, about 15% said public transport and nearly 30% said bicycle. Further details can be found in Table 4.19.

4.6.2) The attraction of cycling

Respondents were asked why they thought that cycling was so popular in York. In general people considered the use of a bicycle to be quicker, cheaper and more convenient than any alternative mode of transport. Details of their replies can be found in Table 4.20 and in the tabulations in Appendix 2.

4.6.3) Encouraging more cycling

Respondents who could ride a bicycle but who did not cycle regularly were asked to chose up to three reasons,from a list, why they might start cycling regularly. The most popular answers selected were if bus fares became too expensive, if it became too difficult to park, or if they decided they needed more exercise. Further details can br found in Table 4.21.

4.6.4) Effects on other modes.

Respondents were asked what alternative mode of transport would loose their patronage if they started cycling regularly. Of those who answered this question about xx% would have walked, xx% would have used public transport, and about xx% would have travelled by car. More details of the answers to this question can be found in Table 4.22.

4.6.5) Cycling problems from the point of view of the cyclist.

Respondents who could ride a bicycle were invited to state any problems about cycling in York they felt existed from the point of view of a cyclists. Only 24% of respondents answered this question. The most important problems were motor vehicles, especially lorries, and traffic management. Further details can be

found in Table 4.9 and in the tabulations in Appendix 2.

4.6.6) Cycling problems from the point of view of the motorist

Respondents who frequently drove, or rode, a motor vehicle were invited to state any problems about cycling in York they felt existed from the point of view of the motorist. Virtually all regular car drivers answered this question. The most frequent problems were the need for more skilfull cycling, consideration for others on the part of all road users, and the dangers when large numbers of cyclists are in the vicinity of factory and school entrances. Further details can be found in Table 4.9 and in the tabulations in Appendix 2.

4.6.7) Cycling problems from the point of view of the pedestrian.

Respondents were invited to state any problems about cycling in York they felt existed from the point of view of the pedestrian. 62% of respondents answered this question and the most frequent problems were cycling in pedestrian areas, better facilities for cycle parking and the need for more consideration for each other on the part of pedestrians and cyclists. Further information can be found in Table 4.9 and in the tabulations in Appendix 2.

4.6.7) Measures to help cyclists.

Respondents were asked to suggest measures that would help cyclists in York. The most frequent suggestions were cycle lanes and cycle paths, and better cycle parking facilities. Further details can be found in Table 4.23 and in the tabulations in Appendix 2.

Respondents were then asked how often they would use a new bridge, for cyclists and pedestrians only, over the River Ouse near Rowntree Park if one were to be provided. The results are shown in Appendix 2 but a knowledge of the address of the respondent is needed before an interpretation of this results can be made and the demand for such a bridge to be determined. Lack of time has prevented us from carrying out this assessment.

4.7) CYCLE PARKING OPINION SURVEY

4.7.1) Response rate

Approximately 1000 questionnaires were placed on bicycles parked in the city centre and over 400 were returned giving a response rate of about 45%. Equal numbers of questionnaires were distributed on a Thursday and a Saturday both morning and afternoon. Only 221 questionnaires were coded.

4.7.2) Journey purpose

Respondents were asked to state the purpose of their journey. About two thirds of the journeys were shopping trips and about a quarter were work trips. Further information on journey purpose can be found in Table 4.24.

4.7.3) Parking type

Respondents were asked to state how they had parked their bicycles. About equal numbers had parked on the pavement,against a wall tree or fence, or in a bicycle park. Further information can be found in Table 4.25.

4.7.4) Protecting bicycles from the weather

Respondents were asked how far they would be prepared to walk to park their bicycles where they would be protected from the weather. Nearly 60% were prepared to walk for up to 5 minutes. A further 33% would have been prepared to walk from 5-10 minutes. Further details can be found in Table 4.26.

4.7.5) Theft of bicycles, fittings, and personal belongings.

About 7% of cyclists said they had had their bicycles stolen within the past year and about 9% said that this had happenened to them between 1-5 years ago. About 23% said they had had fittings or personal belongings stolen from their bicycles within the past year, and the same number said that this had happened to them between 1-5 years ago.

4.7.6) Safe and secure cycle parking

Respondents were asked how far they would be prepared to walk to park their bicycles in a safe and secure parking place. Although 35% said less than 5 minutes, over 50% would have been prepared to walk from 5-10 minutes. Further details can be found in Table 4.27.

4.7.7) Different types of cycle park

Many different types of cycle parking facilities are available and respondents were asked to state their preference. Over 40% prefered bars to which the frame could be chained and over 30% prefered bars to grip the front wheel. Further details can be found in Table 4.28.

4.7.8) Safe, secure parking protected from the weather

Respondents were then asked to imagine a cycle park under cover with an attendant to make sure bicycles were safe. They were asked to state how far they would be prepared to walk to use it and how much they would be prepared to pay to use it.

Nearly 50% of respondents would be prepared to walk between 5-10 minutes and another 34% would be prepared to walk for up to 5 minutes.

About 20% of respondents would never use it or only use it if it were free leaving about 80% who would be prepared to pay for this facility. The most popular charge, chosen by 40% of respondents,was a flat rate of 10 pence.

Further information can be found in Table 4.29 and Table 4.30.

4.7.9) Other areas of York where cycle parking is a problem

Respondents were asked to state the location of other places in York where cycle parking is a problem. Only the city centre area was mentioned.

4.7.10) Ways to make cycle parking easier

Respondents were asked to give their ideas on ways of making cycle parking easier. Cycle parkers wanted the existing facilities enlarged and more separate off street parking facilties provided. More details can be found in Table 4.31.

4.8) CYCLE PARKING VOLUME SURVEY

A count was made of the number of bicycles parked in the city centre on a Thursday and a Saturday both morning and afternoon. More bicycles were parked in the afternoon than in the morning and substantially more were parked on the Saturday than on the Thursday. The total number of parked bicycles on Thursday morning was 524 and in the afternoon the total was 580. On Saturday morning the total was 800 and in the afternoon the total was 909. A complete list of all cycle parking numbers in every street within the survey area can be found in the tabulations in Appendix 2.

Table 4.1 CYCLISTS' OPINION SURVEY: RESPONDENTS BY ORIGIN DISTRICT

DISTRICT	NUMBER	PERCENT
1	3	0.5
2	9	1.5
3	2	0.3
4	4	0.7
5	2	0.3
6	22	3.6
7	9	1.5
8	25	4.1
9	6	1.0
10	1	0.2
11	4	0.7
22	19	3.2
23	16	2.7
24	60	10.0
25	61	10.1
26	5	0.8
27	31	5.1
28	6	1.0
29	50	8.3
30	38	6.3
31	26	4.3
32	25	4.1
33	30	5.0
34	23	3.8
35	16.	2.7
36	41	6.8
59	23	3.8
999	46	7.5
TOTAL	603	100.0

TABLE 4.2

CYCLISTS' OPINION SURVEY

SEX OF RESPONDENT

CATEGORY LABEL	NUMBER ABSOLUTE FREQ.	PERCENT RELATIVE FREQ. (PCT)
MALE	336	55.7
FEMALE	263	43.6
NOT ASCERTAINED	4	0.7
TOTAL	603	100.0

TABLE 4.3.

AGE OF RESPONDENTS

	NUMBER	PERCENT
UNDER 18	81	13.4
18 - 44	401	66.5
45 - 64	110	18.2
65+	10	1.7
NOT ASCERTAINED	1	0.2
TOTAL	603	100.0

TABLE 4.4

TYPE OF DRIVING LICENCE HELD BY RESPONDENT

	NUMBER	PERCENT
FULL CAR	281	46.6
FULL MCS	14	2.3
PROVISIONAL	69	11.4
NO LICENCE	230	38.1
NOT ASCERTAINED	9	1.5
TOTAL	603	100.0

TABLE 4.5

REASONS FOR CYCLING (NUMBER OF PEOPLE STATING THE REASON)

	REASONS FOR CYCLING IN GENERAL		REASONS FOR CYCLING ON THE PARTICULAR JOURNEY	
	NUMBER	PERCENT	NUMBER	PERCENT
CHEAPER	291	20.0	246	23.9
CHEAPER THAN CAR	9	0.6	2	0.2
CHEAPER THAN BUS	47	3.2	23	2.2
QUICKER	278	19.1	301	29.3
QUICKER THAN CAR	25	1.7	5	0.5
QUICKER THAN BUS	21	1.4	14	1.4
DIRECT ROUTE	13	0.9	8	0.8
NO OTHER TRANSPORT	58	4.0	50	4.9
NEED EXERCISE	49	3.4	19	1.8
HEALTHY, KEEP FIT	147	10.1	58	5.6
CONVENIENT	265	18.2	202	19.6
MORE CONVENIENT THAN CAR	20	1.4	7	0.7
MORE CONVENIENT THAN BUS	54	3.7	24	2.3
CAR PARKING PROBLEMS	41	2.8	12	1.2
ENJOYMENT	89	6.1	41	4.0
RELIABILITY	20	1.4	13	1.3
INDEPENDENCE	12	0.8	3	0.3
NO DRINK AND DRIVE	3	0.2	-	-
PLEASURE	13	0.9	-	-
NO OTHER TRANSPORT	2	0.1	-	-
TOTAL REASONS STATED	1,457	100.0	1,028	100.0

TABLE 4.6

CYCLISTS' OPINION SURVEY:
ALTERNATIVE MODE IF CYCLE NOT AVAILABLE

	NUMBER	PERCENT
CAR	112	18.6
PUBLIC TRANSPORT	195	32.3
WALK	262	43.4
TAXI	3	0.5
MCS OR MOPED	14	2.3
NOT ASCERTAINED	17	2.8
TOTAL	603	100.0

TABLE 4.7

CYCLISTS OPINION SURVEY:
NUMBER OF CARS AND VANS IN RESPONDENT's HOUSEHOLD

	NUMBER	PERCENT
NONE	274	45.4
ONE	258	42.8
TWO	55	9.1
THREE	7	1.2
FOUR OR MORE	3	0.6
NOT ASCERTAINED	6	1.0
TOTAL	603	100.0

Table 4.8 Cyclists' Opinion Survey: Sites cyclists felt were unsafe

(a)

Junction Name	Junction Code	No. of mentions
Blossom Street/Micklegate Nunnery Lane	67050	37
Fawcett St./Fishergate Paragon St. Gyratory	46730	34
Bootham/Gillygate	61230	30
Layerthorpe Bridge	64020	21
Boroughbridge Rd./Poppleton Road/Water End	69620	16
Station Road/Rougier St. Gyratory	61720	16
Clifton Green/Water End Shipton Road	78130	15
Walmgate/Hull Road/ Ring Road	62590	15
Monkgate Roundabout	63390	14
Museum St. /St. Leonard's Duncombe Place	62630	13
Coppergate/Parliament St./ Piccadilly	70100	11
Albemarle Rd./Dalton Terrace /Mount	55130	10

(b) Roads

Road Name	Road Code	No. of mentions
Lendal Bridge	1732	30
Blossom Street	1092	26
Holgate Road	1563	20
Tower Street	2195	17
Water End	2231	15
Bootham	1096	14
Goodramgate	1459	13
Tadcaster Road	2165	13
Gillygate	1445	11
Skeldergate Br.	2160	10

Note: Junctions and Roads with less than ten mentions not listed.

Table 4.9 Main problems for, and of, cyclists in York

Problem	Identified by Cyclists	Identified by the public as		
		Cyclists	Motorists	Pedestrians
Lorries	22%	19%	-	-
Other Vehicles	26%	34%	-	-
Pedestrians	9%	3%	-	-
Narrow Roads	7%	8%	-	-
Traffic management	21%	21%	-	-
Road surface	10%	7%	-	-
Cyclists' skill and consideration	-	-	44%	23%
Factory, school exits	-	-	26%	-
Cycling in pedestrian areas	-	-	-	33%
Better cycle parking	-	-	-	30%
Other problems	5%	8%	30%	14%

Note: Percentages indicate the proportion of mentions this problem received in relation to the total number of comments made.

Table 4.10 Extra minutes respondents would travel to feel safer

	NUMBER	PERCENT.	CUMULATIVE PERCENT.
NIL	16	2.7	2.7
NOT ASCERTAINED	149	24.7	27.4
1 - 5 MINS.	248	41.1	68.5
5 - 10 MINS.	125	20.7	89.2
10 - 15 MINS.	35	5.8	95.0
15 - 20 MINS.	9	1.5	96.5
20 - 25 MINS.	2	0.3	96.8
25 - 30 MINS.	13	2.2	99.0
30 - 40 MINS.	2	0.3	99.3
50 - 60 MINS.	3	0.5	99.8
OVER 60 MINS.	1	0.2	100.0
TOTAL	603	100.0	

Table 4.11 Cyclists' Opinion Survey: Extra Minutes Respondents Would Walk to a Secure Parking Place

	NUMBER	PERCENT.	CUMULATIVE PERCENT.
NIL	12	2.0	2.0
NOT ASCERTAINED	121	20.1	22.1
1 - 5 MINS.	345	57.2	79.3
5 - 10 MINS.	96	15.9	95.2
10 - 15 MINS.	19	3.2	98.3
15 - 20 MINS.	6	1.0	99.3
25 - 30 MINS.	2	0.3	99.7
50 - 60 MINS.	2	0.3	100.0
TOTAL	603	100.0	

Table 4.12 Cyclists' Opinion Survey: Number of Miles Cycled per Week

	NUMBER	PERCENT.
0 - 5 MILES	9	1.5
5 - 10 MILES	46	7.6
10 - 15 MILES	56	9.3
15 - 20 MILES	91	15.1
20 - 30 MILES	149	24.7
30 - 40 MILES	97	16.1
40 - 50 MILES	69	11.4
50 - 75 MILES	40	6.6
75 -100 MILES	18	3.0
100 -200 MILES	19	3.2
200 +	3	0.5
NOT ASCERTAINED	6	1.0
TOTAL	603	100.0

TABLE 4.13

CYCLISTS' OPINION SURVEY:
NUMBERS MENTIONING EACH SOLUTION TO PROBLEMS

	NUMBER	PERCENT
Cycle Paths	76	8.9
Cycle Tracks	31	3.6
Cycle Lanes	207	24.2
Contra Flow Lanes	92	10.8
Educ Cyclist	11	1.3
Educ Motorist	41	4.8
Less 1 Way Strs	35	4.1
Wider Roads	20	2.3
Direct Routes	18	2.1
Mend Potholes	5	0.6
Bike Traf Lights	30	3.5
Quiet Routes	32	3.7
Cycle Lanes	31	3.6
No Peds	7	0.8
Less Lorries	30	3.5
Better Surfaces	47	5.5
Traffic Free City Centre	68	8.0
Educ Peds	48	5.6
Pelicans	2	0.2
Better Signs	16	1.9
More Police	1	0.1
Comp Bike Test	1	0.1
Bike Route Map	6	0.7
TOTAL	855	100.0

TABLE 4.14

PUBLIC OPINION SURVEY:
RESPONDENTS BY DISTRICT OF ORIGIN

DISTRICT		NUMBER	PERCENT.
1		1	0.4
3		1	0.4
5		1	0.4
6		20	7.7
7		1	0.4
8		12	4.6
11		5	1.9
22		2	0.8
23		1	0.4
24		23	8.8
25		17	6.5
26		3	1.2
27		8	3.1
28		1	0.4
29		27	10.4
30		12	4.6
31		17	6.5
32		5	1.9
33		8	3.1
34		8	3.1
35		1	0.4
36		14	5.4
59		3	1.2
Uncodeable or no address	999	69	26.5
	TOTAL	260	100.0

TABLE 4.15

PUBLIC OPINION SURVEY: SEX OF RESPONDENT

	NUMBER	PERCENT
MALE	126	48.5
FEMALE	117	45.0
BLANK	17	6.5
TOTAL	260	100.0

TABLE 4.16

PUBLIC OPINION SURVEY:
AGE OF RESPONDENTS

	NUMBER	PERCENT
18 - 44	124	47.7
45 - 64	68	26.2
65+	56	21.5
BLANK	12	4.6
TOTAL	260	100.0

TABLE 4.17

PUBLIC OPINION SURVEY:
DRIVING LICENCE AVAILABILITY

CATEGORY LABEL	NUMBER	PERCENT
CAR	155	59.6
MOTOR-CYCLE	6	2.3
PROVISIONAL	11	4.2
NO LICENCE	80	30.8
BLANK	8	3.1
TOTAL	260	100.0

TABLE 4.18

PUBLIC OPINION SURVEY:
NUMBER OF CARS AND VANS IN HOUSEHOLD

	NUMBER	PERCENT
NO CAR	78	30
ONE CAR	133	51.2
TWO CARS	31	11.9
THREE CARS	6	2.3
FOUR CARS	3	1.2
UNSPECIFIED	9	3.5
TOTAL	260	100.0

TABLE 4.19

PUBLIC OPINION SURVEY:
MOST FREQUENTLY USED MODE

	NUMBER	PERCENT
CAR DRIVER	87	33.5
CAR PASS	19	7.3
MC OR MOPED	14	5.4
PUBLIC TRANSPORT	37	14.2
BICYCLE	75	28.8
FOOT	7	2.7
VARIES	11	4.2
BLANK	10	3.8
TOTAL	260	100.0

TABLE 4.20

PUBLIC OPINION SURVEY:
REASONS SUGGESTED FOR PEOPLE CYCLING IN YORK

	NUMBER OF REASONS	PERCENT
CHEAPER	64	15.2
CHEAPER THAN CAR	7	1.7
CHEAPER THAN BUS	41	9.7
QUICKER	52	12.3
QUICKER THAN CAR	8	1.9
QUICKER THAN BUS	3	0.7
NO OTHER TRANSPORT	1	0.2
NEED EXERCISE	7	1.7
HEALTHY KEEP FIT	7	1.7
CONVENIENT	113	26.8
MORE CONVENIENT THAN CAR	10	2.4
MORE CONVENIENT THAN BUS	27	6.4
CAR PARK PROBLEMS	41	9.7
ENJOYMENT	2	0.5
RELIABLE	5	1.2
INDEPENDENCE	3	0.7
PLEASURE	2	0.5
CUSTOM TRADITION	9	2.1
OTHER	16	3.7
UNCODED	4	0.9
TOTAL	422	100.0

TABLE 4.21

FACTORS WHICH WOULD PERSUADE
THE RESPONDENT TO START CYCLING AGAIN

REASON	NUMBER OF MENTIONS	% OF TOTAL MENTIONS
Motoring cost too high	45	14.2
Too difficult to park	58	18.4
Need the exercise	60	19.0
Bus Service too poor	42	13.3
Bus Fares too high	63	20.0
Better facilities for cyclists	25	7.9
Something else	23	7.2
Total	316	100.0

TABLE 4.22

PUBLIC OPINION SURVEY:
MODE WHICH WOULD BE ABANDONED IN FAVOUR OF CYCLING

	NUMBER	PERCENT
BUS	26	10.0
CAR	49	18.8
MCS	4	1.5
FOOT	18	6.9
NEW JOURNEYS	3	1.2
TOO MANY	16	6.2
BLANK	36	13.8
NOT APPLIC.	108	41.5
	260	100.0

TABLE 4.23

PUBLIC OPINION SURVEY:
MEASURES SUGGESTED WHICH WOULD HELP CYCLISTS

	NUMBER OF MENTIONS	PERCENT
CYCLE PATHS	13	3.6
CYCLE TRACKS	17	4.7
CYCLE LANES	58	16.2
CONTRA-FLOW LANES	9	2.5
EDUC CYCLISTS	9	2.5
EDUC MOTORISTS	11	3.1
LESS ONE WAY STRS	6	1.7
WIDER ROADS	5	1.4
MORE DIRECT ROUTES	6	1.7
TRAFF SIGS FOR BIKES	4	1.1
MEND POTHOLES	5	1.4
QUIET ROUTE	6	1.7
CYCLE ONLY LANES	10	2.8
LESS LORRIES	13	3.6
BETTER SURFACES	8	2.2
TRAFF FREE CITY CENT	12	3.4
BETTER BIKE PARKS	71	19.8
BETTER SIGNS	4	1.1
BIKE TEST	9	2.5
FINISH OUTER RING ROAD	5	1.4
LIGHTS ON BIKES	5	1.4
S-N ROUTE THRU CITY	2	0.6
REFLECTIVE WEAR	3	0.8
BETTER BELLS	2	0.6
LESS TRFF IN CITY CENT.	9	2.5
LESS STRT PARKING	2	0.6
OTHER/UNCODED	54	15.1
TOTAL MENTIONS	358	100.0

TABLE 4.24

CYCLE PARKING SURVEY:
JOURNEY PURPOSE

	NUMBER	PERCENT
WORK	58	26.2
SHOPPING	147	66.5
EDUCATION	3	1.4
SOC REC	5	2.3
PERSONAL BUS	3	1.4
NOT ASCERTAINED	5	2.3
TOTAL	221	100.0

TABLE 4.25

CYCLE PARKING SURVEY: PARKING LOCATION

	NUMBER	PERCENT
KERB	5	2.3
PAVEMENT	65	29.4
BIKE PARKING STAND	68	30.8
IN BUILDING	1	0.5
WALL/TREE/FENCE	63	28.5
CAR PARK	1	0.5
ALLEYWAY, ARCADE	2	0.9
NOT ASCERTAINED	16	7.2
TOTAL	221	100.0

TABLE 4.26

CYCLE PARKING STUDY:
ACCEPTABLE TIME TO WALK FROM A COVERED PARKING SPACE WHEN RAINING

	NUMBER	PERCENT	CUMULATIVE PERCENT
LESS THAN FIVE MINUTES	123	55.7	55.7
5 - 10 MINS.	75	33.9	89.6
10 - 15 MINS.	8	3.6	93.2
MORE THAN 15 MINUTES	2	0.9	94.1
NO ANSWER	13	5.9	100.0
TOTAL	221	100.0	

TABLE 4.27

CYCLE PARKING STUDY: ACCEPTABLE TIME
TO WALK FROM A SAFE AND SECURE PARKING SPACE

	NUMBER	PERCENT	CUMULATIVE PERCENT
LESS THAN FIVE MINUTES	79	35.7	35.7
5 - 10 MINS	114	51.6	87.3
10 - 15 MINS	16	7.2	94.6
MORE THAN 15 MINS	7	3.2	97.7
NO ANSWER	5	2.3	100.0
TOTAL	221	100.0	

TABLE 4.28

CYCLE PARKING STUDY:
PREFERRED TYPES OF CYCLE PARKING FACILITY

	NUMBER	PERCENT
CATEGORY LABEL	4	1.8
SLOTS IN PAVEMENT	7	3.2
BARS GRIP FRONT WHEEL	71	32.1
BARS CHAIN FRAME TO	92	41.6
METAL GROOVE RACKS	23	10.4
SOMETHING TO CHAIN IT TO	7	3.2
NOT ASCERTAINED	17	7.7
TOTAL	221	100.0

TABLE 4.29

CYCLE PARKING SURVEY:
ACCEPTABLE TIME TO WALK FROM A SAFE, SECURE AND COVERED PARKING SPACE

	CODE	NUMBER	PERCENT	CUMULATIVE PERCENT
LESS THAN 5 MINS.	1	75	33.9	33.9
5 - 10 MINS.	2	106	48.0	81.9
10 - 15 MINS.	3	18	8.1	90.0
MORE THAN 15 MINS.	4	3	1.4	91.4
NO ANSWER	5	19	8.6	100.0
TOTAL		221	100.0	

Table 4.30 Cycle Parking Study: Acceptable charge for a safe, secure and covered parking space

	NUMBER	PERCENT	CUMULATIVE PERCENT
WOULD NOT USE IT	14	6.3	6.3
ONLY IF FREE	32	14.5	20.8
5P FLAT RATE	31	14.0	34.8
10P FLAT RATE	90	40.7	75.6
5P PER HOUR	32	14.5	90.0
10P PER HOUR	17	7.7	97.7
NOT ASCERTAINED	5	2.3	100.0
TOTAL	221	100.0	

Table 4.31 Cycle Parking Survey: Suggested ways of making cycle parking easier

	NUMBER OF MENTIONS	PERCENT OF MENTIONS
OFF STREET CYCLE PARKS	16	13.1
MAKE IT SAFER	3	2.5
RAILINGS OUTSIDE SHOPS	8	6.6
BAR TYPE WHEEL SUPPORT RACKS	4	3.3
RACK GIVING EASY ACCESSIBILITY	7	5.7
SUBWAY TYPE BIKE PARKS	3	2.5
ATTENDANT BIKE PARKS	9	7.4
BIKE STAND INSIDE SHOPS	5	4.1
BIKE PARKS CENTRAL IN ROAD	9	7.4
CYCLE ONLY PARKS	13	10.7
RINGS IN WALL FOR BIKES	3	2.5
COVERED CENTRAL BIKE PARK	12	9.8
ENLARGE EXISTING BIKE PARKS	23	18.9
REARRANGE EXISTING PED. STREETS	7	5.7
TOTAL	122	100.0

5. THE BASIS FOR DESIGN

5.1 Solutions to problem locations.

5.1.1 Table 4.9 lists those problem locations identifed by 10 or more respondents to the cyclist opinion survey. It was decided to concentrate on these sites, even though the number identifying them was small, since the origin-destination data (figures 4.1 and 4.2) confirmed that they were all heavily used, and the accident data (appendix 3) indicated that they were generally locations with a significant accident record. The accident data also highlighted one other junction: Cemetery Rd./Kent St. (which was only mentioned by one respondent) and one road: Fulford Rd. (which was mentioned by three) as being worthy of study because of the high numbers of accidents there. It was not possible to consider all these 24 locations in equal detail; however the information provided will enable officers to study the remaining sites, and others, as required. The remainder of this section describes the approach adopted.

5.1.2 With each individual site, the starting point where possible was cyclists' statements of the nature of the problem. Unfortunately in many cases these were not specified. As an alternative, site visits were made to observe at first hand the problems experienced. Use was also made of cyclists' comments on general problems (table 4.9).
The main problems were seen as:

narrow roads and bridges,
lane changing between junctions,
left turning traffic conflicting with straight ahead cyclists,
right turns, and occasionally straight ahead movements, from lanes away from the kerb,
gradients, potholes and crosswinds.

The order of priority of these problems inevitably varied from site to site.

5.1.3 Some of these problems can be solved by conventional traffic management and highway maintenance techniques. These are not discussed further here, but it is worth noting that the needs of cyclists may justify a greater investment in certain measures, or a change in emphasis in budget allocations.

5.1.4 The second type of approach provides protection for the cyclist while still enabling him to use his existing route. A range of cycle priority measures is available. Some of these have been used in this country while others have been developed elsewhere, but not yet accepted for use by the UK Department of Transport. Two useful sources of details of these measures are the IHT guidelines for cycling (1), and 'Bicycle Planning' (2). In York the choice betwen such measures is limited by the narrowness of many of the streets used by cyclists; indeed it is often the narrowness which causes the complaints. As a result, the solutions have concentrated on:

narrow kerbside lanes which provide the cyclist with some protection from other vehicles,

stopline modifications which allow the kerbside cyclist to avoid the turning vehicle,

stopline modifications which give priority to cyclists turning right.

In one or two locations where space permits lanes away from the kerb have also been considered. These techniques are now discussed in turn.

5.1.5 Most streets are too narrow to permit the provision of full width (1.5 m) cycle lanes, and the needs of frontage access rule out the use of lanes which prohibit use by other vehicles. The only obvious solution appears to be advisory with flow cycle lanes which can be as little as 0.7m wide (1). There has been relatively little experience with the use of these, but it appears that they are effective in encouraging drivers to leave more space at the kerb. This in turn raises the question of the effect on opposing streams of traffic and on friction between adjacent lanes which will as a result be narrower. If the lanes are effective they will encourage cyclists to overtake queues of traffic on the inside. This is a manoeuvre which is frowned upon, but which is so commonplace that it is probably better for it to be provided for in a safer manner. However, it will be essential to avoid situations in which frontage access traffic turns across the path of unsuspecting cyclists. The final design consideration is that of parking. The occasional parked vehicle need not unduly disrupt the cycle lane; cyclists can simply wheel their machines past or divert into the main traffic stream. The presence of the cycle lane may itself discourage parking. However, it will be important to avoid kerbs which are heavily parked. All of these design considerations need to be borne in mind in implementing advisory lanes. They point to the need for carefully monitored experiments to ensure that the design develops in the light of experience. It would be unfortunate if the potential disadvantages of such measures were used as an excuse for not conducting such experiments.

5.1.6 Once the cyclist reaches the stopline he is vulnerable to left turning traffic. One DTp experiment has tested a signal scheme to separate through cyclists from left turning vehicles (3) and a similar scheme is proposed for the Boroughbridge Rd./ Carr Lane junction in York. However, such schemes are relatively expensive, and require additional space which is at a premium in York. A much simpler arrangement is to extend the kerbside lane to a stopline which is 2 or 3 metres in advance of the stopline for other vehicles (Figure 5.1). This can be achieved either by advancing the cyclist stopline or, more probably, by setting back that for other vehicles. The arrangement gives the cyclist a head start which should enable him to impose priority over left turning vehicles, and certainly will make him more visible. Again there is little experience with such measures and careful experiment will be required to ensure that the setback is sufficient to have the desired effect.

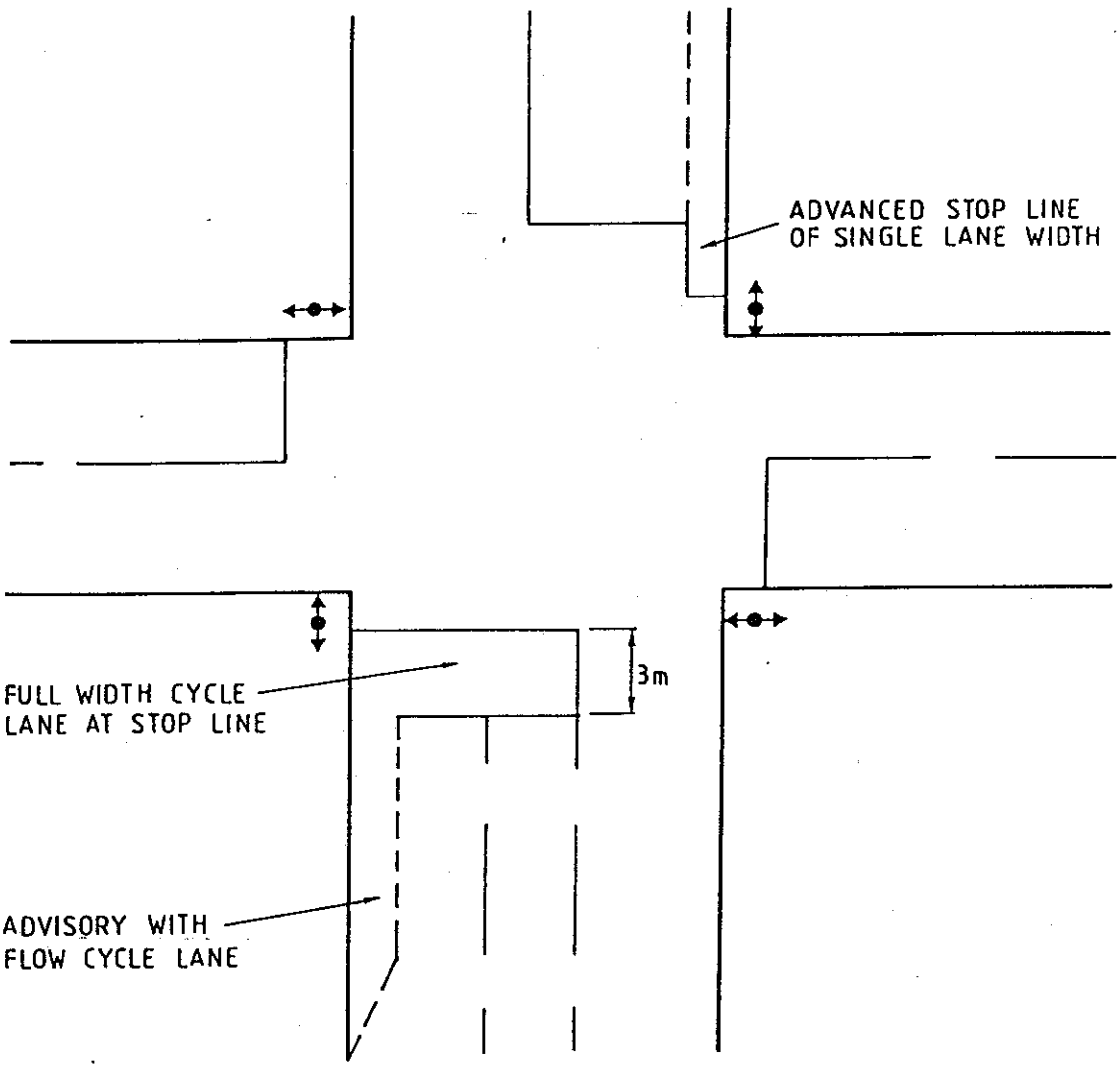


FIGURE 5.1
ADVISORY WITH FLOW CYCLE LANE AND ALTERNATIVE STOP LINE ARRANGEMENTS

5.1.7 Kerbside advisory lanes and advanced stoplines cater only for the left turning and possibly for the straight ahead cyclist. They do nothing to ease the problems of the right turning cyclist, and may make conditions worse by encouraging him to move across from a kerbside lane close to the junction. Where space permits, an extra lane can be provided between the traffic lanes (see para 5.1.8) but this is rarely feasible in York. An alternative proposed is to extend the advanced stopline for the full width (Figure 5.1) thus enabling right turning cyclists to use the kerbside lane and move across to the right in front of other traffic. This type of installation is not yet approved by the DTp but has been tried successfully in the Netherlands(4). Any scheme for York would require special approval, and would need to be carefully tested. In particular the effects on capacity, the behaviour of cyclists reaching the junction when the signal was green, and the space necessary to permit safe movement across the approach width would need to be carefully assessed.

5.1.8 Where space permits, it may be possible to provide for major cycle movements by designated lanes between the other vehicle lanes. Two such proposals are made for right turning traffic from Water End into Boroughbridge Rd. and for straight ahead traffic in Boroughbridge Rd. across the Carr Lane junction. It is suggested that these initially be indicated simply by continuous white lines; it may be necessary in the light of experience to provide a physical divider to the left of the cycle lane. The other important issue is the provision for cyclists to move from the kerb to these lanes. This should not pose more problems than the current manoeuvre, and is probably best allowed to occur along a length of road rather than encouraged at one point. This again is a matter worthy of careful study.

5.1.9 Proposals of these kinds have been made for several junctions. Sketch plans have been prepared for each and are contained in Appendix 4.

5.1.10 Throughout the above paragraphs the emphasis has been on careful experiment. With this in mind preferred sites have been identified for each of the experiments. These are:

Blossom St. and Lendal Bridge for advisory cycle lanes;
the southern end of Lendal Bridge for an advanced stopline;
the Piccadilly approach to Coppergate for a full width advanced stopline, once Parliament St. has been converted to a part time foot street;
the Water End approach to Boroughbridge Rd. for a between the lanes cycle lane.

5.2 The development of a cycle route network.

5.2.1 In some cases there is no obvious solution which would assist cyclists to continue using problem sites. The best solution in these circumstances is to provide alternative routes. While this can be done for isolated stretches of route, there is some attraction in trying to establish a network of accepted

routes to cater for the main cycle movements. In some cases the routes have already been established by cyclists and need no further identification; in others existing illegal routes could be made legitimate. Some existing routes could also be selectively improved. The approach to identifying the network and its possible improvements has therefore been based on the origin-destination data, study of existing routes, and an analysis of alternative routes to avoid particular problem junctions.

5.2.2 Analysis of Figures 4.1 and 4.2 indicates clearly that the main movements converge on the city centre. Eight major movements have been identified from Bishopthorpe Road, Tadcaster Road, Poppleton, Clifton, Rowntree-Mackintosh, Heworth/Layerthorpe, Hull Rd./University and Fulford. While the main need is for access to the city centre, some links across the centre are almost certainly justified. In addition four orbital movements are particularly large and worthy of consideration. One runs from Holgate Rd. via Scarborough Bridge to Bootham, a second runs north of Bootham from Clifton Rd. to the hospital and college and a third from Rowntree Mackintosh to Tang Hall. The fourth is not an exisitng route, but one which could be provided to divert traffic from Skeldergate Bridge by constructing a new bridge at Butcher Terrace/Maple Grove. This is a longstanding proposal, and was the subject of a specific question in the surveys.

5.2.3 Of the radial routes suggested, three follow existing main roads for which there is no obvious alternative (Tadcaster Rd., Layerthorpe and Fulford Rd.) and we suggest that ways be studied of making these safer for cyclists. A further two are wholly new routes on which substantial development work will be required. The first of these, from Clifton via an existing path to Marygate and through Museum Gardens, will be particularly important as a bypass to the very difficult Bootham Gillygate junction. The second, from Rowntree Mackintosh, is of lower priority. The final three are already in use, but require improvement. The Terry Avenue route is generally acceptable except near Skeldergate Bridge, where parking intrudes, and at the junction with Bridge St., where signals are proposed. The Cinder Lane route is less satisfactory; much of the path is substandard, giving rise to conflicts with pedestrians; its use is illegal, and the exit via Salisbury Rd. is difficult. Major improvements are proposed to overcome these problems. The Thief Lane/Heslington Rd. route is generally adequate, but requires improved signing and junction modifications at its outer ends, and improved access to Fishergate Bar at its inner end. Proposals are made in the summary report. That for Fishergate Bar involves a new route from Kent St. to Paragon St. and a right turn facility into the Bar, and is part of the rerouteing proposals discussed in para. 5.2.5.

5.2.4 On the two existing orbital routes, the main barriers are bridges. On the Wilton Rise/Scarborough Bridge route it is suggested that ramps be provided to enable cyclists to wheel their machines rather than carrying them. On the Grosvenor Rd./

Bridge Lane route the same could be done, but since the bridge crosses a railway line with only three trains per hour a level crossing may be more appropriate.

5.2.5 The origin/destination data has been collected in sufficient detail to enable fuller study to be made of the appropriate routes to enable cyclists to avoid complex junctions. An example is given here of the treatment of the analysis of the Fishergate Gyratory complex, which attracted 61 mentions (Table 4.8, including mentions for Tower St. and Skeldergate Bridge). Figure 5.2 indicates the origin/destination survey points relevant to the junction, and the main origin/destination pairs involved. A total of 4541 cycle journeys are estimated to pass through the four survey points in a typical day; given the layout of the junction, this is likely to represent the total cycle movements. Of these, 2794 were analysed in detail; the remaining 40% were on minor movements with under 40 cyclists per day, most of which are likely to be represented in terms of their ability to reroute by other major movements. A total of four possible diversionary routes were identified: via Ouse Bridge via Cemetery Rd. and Fishergate Bar, using the new route proposed from Kent St. to Paragon St. via the proposed new Maple Grove/Butcher Terrace Bridge via Fishergate Bar (these are mainly cyclists already using the Bar, but include some currently using Piccadilly).

5.2.6 Table 5.1 indicates, for each of the origin/destination movements with more than 40 trips per day, the numbers estimated to pass each of the four survey points, the total trips, and the most appropriate diversion route(s). In total it is estimated that the routes could take the following:

Ouse Bridge: 893 (32%)

Cemetery Rd: 684 (24%)

New bridge: 479 (17%)

Fishergate Bar: 372 (13%)

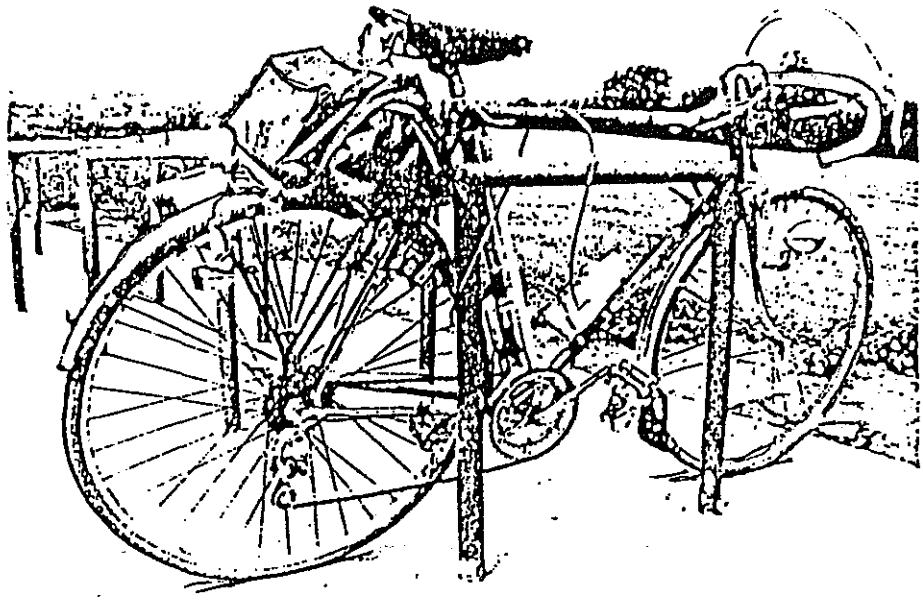
This leaves 396 (14%) still travelling through the junction between Skeldergate Bridge and Kent St. for whom there is little alternative, but the problem of the gyratory could clearly be substantially reduced. A similar analysis would be possible at other junctions, and could be refined by basing it on zone to zone movements.

5.3 The treatment of parking problems

5.3.1 The surveys indicated clearly that cycle parking problems were focussed on the city centre. The predominant problem is one of security of the cycle and its contents, although walking distances and cover from the elements were also major issues. Respondents gave surprisingly high estimates of preparedness to walk to and from secure, covered sites and to pay

for them. However, these are hypothetical questions which are notoriously difficult to interpret.

5.3.2 The suggested approach is to base solutions on the identified problem locations (predominantly Parliament St.) and the preferred types of readily available parking facility. Since 'Sheffield' racks (figure 5.3) were the most popular and are inexpensive and efficient in use of space, it is suggested that these be provided in the main. However, new lockable racks which protect the cycle and its contents are now available (figure 5.4) , and it is suggested that a limited number of these be introduced experimentally at a flat rate of 10p per parking act. If they are considered environmentally unacceptable in Parliament St. it may be worth considering their free use in a slightly more remote site.



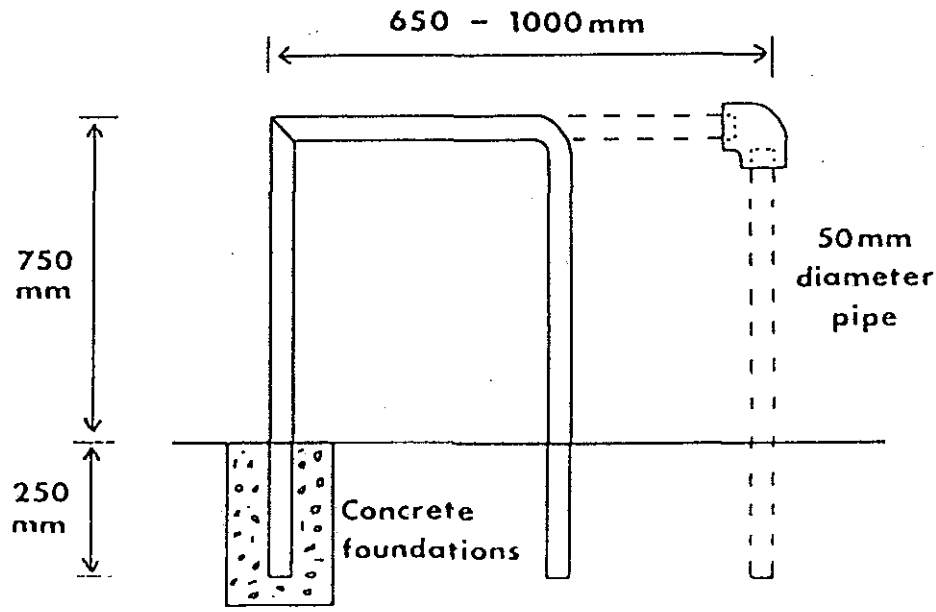
Application: Recommended as the basic style of cycle parking stand for short and medium term applications in public areas: shopping centres, public buildings, tourist attractions, etc. Also suitable for industrial long term use if provided with cover and placed in a guarded location. Each stand can accommodate two cycles.

Advantages: Accommodates any type of cycle without damage and enables the frame and both wheels to be secured thereto with the owner's chain and lock. Environmental impact and hazard to pedestrians are negligible. Maintenance-free.

Disadvantages: The lack of security for accessories and luggage makes this type of stand unsuitable for long term parking in public places.

Location: Stands may be mounted on the highway or on any vacant or underused piece of land. For maximum security stands should be placed where they can be observed by passers-by – not hidden at the side or rear of buildings – and away from access by motor vehicles. In shopping areas several groups of a few stands each are preferable to a few groups of many. This will increase their convenience to cyclists and therefore maximize their use. Where possible stands should be provided with some simple form of cover or be placed in the lee of a building.

Construction: The stands are non-proprietory, but are easy to build. The simplest methods of construction are to bend a suitable length of galvanized pipe or to assemble the stand with conduit and angle pieces. The stands illustrated were made by welding together three lengths of pipe. The stand ends should be embedded in concrete and it is preferable that the pipe be plastic coated. Groups of stands may be mounted obliquely where space is limited.



Minimum spacing between stands 900mm *Maximum in-line distance from wall 700mm*

FIGURE 5.3
'SHEFFIELD' CYCLE STAND
(COURTESY OF CYCLISTS' TOURING CLUB)

Table 5.1 Fishergate Gyratory Analysis: Origin-Destination Matrix and Alternative Routes

Destination District	Origin District			
	23/36	26	28	29
2/27	76P 76B	417F 121P 538B	88S 51T 139B,C	294S 93T 23P 410C
24				73S 73A
25	95F 95D	76F 31P 107D	73S 123T 196A	118S 41T 159E
26			73S 73A	235S 235A
29	88S* 88A	53P 41T 94A		
59	57F 57D	41T 15P 57F 113D	73S 31T 104A	206S 31T 237E

Key:

XXF	24 hour flow via Fishergate Bar
XXP	24 hour flow via Piccadilly
XXS	24 hour flow via Skeldergate Bridge
XXT	24 hour flow via Tower Street
S*	origin and destination reversed
$\overline{XXA}$	total flow, assumed capable of rerouteing via Ouse Bridge
$\overline{XXB}$	total flow, assumed capable of rerouteing via Cemetery Rd./Fishergate Bar
$\overline{XXC}$	total flow, assumed capable of rerouteing via Butcher Terrace Bridge
$\overline{XXD}$	total flow, assumed capable of rerouteing via, or already using Fishergate Bar
$\overline{XXE}$	total flow, rerouteing not generally possible
B,C	50/50 split assumed between Fishergate Bar and Butcher Terrace

6. REFERENCES

1) The Institution of Highways and Transportation. Providing for the cyclist. I.H.T. London 1983.

2) Hudson, M. et al. Bicycle planning: policy and practice. Architectural Press, London. 1982.

3) Department of Transport, Cambridge - Hills Road: signalled intersection with cycle facility. Traffic Advisory Unit Leaflet. DTp. London 1983.

4) Kuijper, D.H. Cycling in a Dutch town: the blown up cycle lane. PTRC SAM 1983, Seminar K, PTRC London 1983.

7. APPENDICES

The appendices to this report, which are available separately, are as follows:

Appendix 1. Questionnaire survey forms.

Appendix 2. Detailed tabulations of results.

Appendix 3. Accident locations.

Appendix 4. Sketch plans for proposed measures.