AQA
Realising potential

A-LEVEL

A-LEVEL GEOGRAPHY
(7037)

Marked investigation with commentary

EXAMPLE NEA INVESTIGATION

An example investigation folder with completed proposal form and examiner commentary

Assessing the sustainability of the Cheltenham transport plan for the CBD.

Version 1.0 November 2017

Contents

2018 candidate record form

A-level Geography
NEA Independent fieldwork investigation (7037/C)

Please attach the form to your candidate's work and keep it at the centre or send it to the moderator as required. The declarations should be completed by the candidate and teacher as indicated.

Centre number

Click here to enter.

Centre name

Click here to enter text.

Candidate number

Click here to enter.

Candidate's full name

Click here to enter text.

Work submitted for assessment **must** be the candidate's own. If candidates copy work, allow candidates to copy from them, or cheat in any other way, they may be disqualified.

Candidate declaration

Have you received help/information from anyone **other than** subject teacher(s) to produce this work?

☒ No ☐ Yes *(give details below or on a separate sheet if necessary).*

Click here to enter text.

Please list below any books, leaflets or other materials (eg DVDs, software packages, internet information) used to complete this work **not** acknowledged in the work itself. Presenting materials copied from other sources **without acknowledgement** is regarded as deliberate deception.

Click here to enter text.

From time to time we use anonymous examples of candidates' work (in paper form and electronically) within our guidance materials to illustrate particular points. If your work appears in AQA materials in this context and you object to this, please contact us and we will remove it on reasonable notice.

I have read and understood the above. I confirm I produced the attached work without assistance other than that which is acceptable under the scheme of assessment.

Candidate signature.

Date Click here to enter a date.

Teacher declaration

I confirm the candidate's work was conducted under the conditions laid out by the specification. I have authenticated the candidate's work and am satisfied (to the best of my knowledge) that the work produced is solely that of the candidate.

Teacher signature.

Date Click here to enter a date.

NEA proposal

To be completed by the candidate

Candidate number	Candidate's full name
Click here to enter.	Click here to enter text.

Investigation title: Assessing the sustainability of the Cheltenham Transport Plan for the CBD

How the title links to the specification content

The title links to a local place study (3.2.2.4) in this case it will be Cheltenham and to focus it even more the CBD of Cheltenham at Boot's Corner. This is to ensure the investigation is manageable in the time. It will also focus on the sustainable management of cities (3.2.3.8) looking at sustainable transport systems and pedestrianisation.

Planned investigation hypothesis or question/sub-questions

The hypothesis is that the Cheltenham transport plan will improve the sustainability of Cheltenham economically, socially and environmentally. By sustainability I mean the protection of the natural environment whilst protecting the quality of life of the stakeholders now and in the future. After consultation with my teacher it was advised that the main focus should be on environmental and social sustainability.

Investigation focus – indication of how the enquiry will enable the candidate to address the investigation title and explore the theme in relation to the chosen geographical area

The first requirement is to describe the Cheltenham transport plan and explain the changes that are planned and how they will increase the sustainability, eg for environmental sustainability, NO2 meters have shown that average annual pollution levels are over the EU limit and so pedestrianisation at Boot's Corner in the CBD is proposed to reduce the pollution levels from vehicles. For social sustainability the conflict with traffic and the need for a central community space are important. These could help in rebranding Cheltenham.

Planned methodology – indication of qualitative and/or quantitative techniques including primary and, if relevant, secondary data collection techniques. Indication of the planned sampling strategy or strategies

Data collection – secondary data from the County Council shows the details of the plan and provides air pollution and traffic count data which can be used to create flow maps. Primary data – the views of local businesses could be canvassed showing the costs and benefits to them. Questionnaires, traffic count and pedestrian count data which is both quantitative and qualitative could be collected to assess the gravity of the issue. Air pollution could be measured with sticky cards on lampposts.

Data collection: ☒ Individual ☒ Group

To be completed by the teacher

Teacher approval for the investigation or details of any necessary amendments that need to be made before approval can be given

An interesting and relevant local issue in the national context of EU regulations for air pollution. Good blend of primary and secondary data collection with opportunities for quantitative and qualitative data. Primary data – air pollution monitoring may be difficult owing to vandalism, the weather and possibly permission. Secondary data may be better and more reliable. Good to see that you have narrowed the sustainability to just environmental and social only. Sensible to focus on environmental and social as easier to collect data, but maybe even this is too much.

☐ Approved ☒ Approved subject to the implementation of amendments above ☐ Resubmission required

Full name: Click here to enter text.

Teacher signature.

Date: Click here to enter a date.

To be completed by the teacher
Marks must be awarded in accordance with the instructions and criteria in the specification.

Area	Level	Overall level	Mark	Comment
Area 1. Introduction and preliminary research **10 marks** (a) To define the research questions which underpin field investigations (AO3)	3	3	7	The research hypothesis is clearly identified with clear and appropriate sub-questions. The justification from the specification is identified and explained and precisely linked to the specification with a range of Harvard referenced literature sources. The theoretical context is identified, but could be further developed, eg by looking at the factors that affect the identity of a town and then how it should be rebranded. In this case it is vital to understand why people come to Cheltenham because the pedestrianisation may improve air quality, but the inconvenience to car drivers could reduce visitors. Maybe electrical cars could be explored further as these could reduce pollution without reducing access. Harvard references are given and show a dependence on the textbook and well known geographical case studies. More in depth research from a greater range of sources would be desirable at A-level.
(b) To research relevant literature sources and understand and write up the theoretical or comparative context for a research question (AO3)	3			
Area 2. Methods of field investigation **15 marks** (a) To observe and record phenomena in the field and devise and justify practical approaches taken in the field including frequency/timing of observation, sampling, and data collection approaches (AO3)	4	4	14	A detailed data collection programme has been devised utilising a range of primary and secondary data which is sourced. The sampling is explained, but not always justified with reference to other options. The locational detail is clear. The approaches used are appropriate with summary data as evidence. It was creative to enhance the individual data with the group data on noise pollution, especially as this enabled simultaneous readings, adding another perspective to the study. Enactment of the data collection is thorough with an honest and realistic explanation for the lack of a comprehensive set of results on every hour. More adventurous methods using equipment are not utilised, eg pollution recording cards instead easier methods are chosen. On the whole the methods are appropriate and informative, but perhaps the complete picture is lost in places. The sample sizes are appropriate and statistically valid, except for the noise transects which need to be more than five sites. The quality of the data recording is very good with a clear evaluation of the issues. There is an attempt to make the data more valid by collecting on a weekday and a Saturday, but both are in the summer holiday possibly skewing the data and leading to a misrepresentation of the situation.
(b) To demonstrate practical knowledge and understanding of field methodologies appropriate to the investigation of human and physical processes (AO3)	4			
(c) To implement chosen methodologies to collect data/information of good quality and relevant to the topic under investigation (AO3)	4			

Area	Level	Overall level	Mark	Comment
Area 3. Methods of critical analysis **20 marks** (a) To demonstrate knowledge and understanding of the techniques appropriate for analysing field data and information and for representing results, and show ability to select suitable quantitative or qualitative approaches and to apply them (AO3)	4	4	16	All the techniques utilised for analysing the data are appropriate, but there is a propensity towards more basic, although effective methods. The balance between quantitative and qualitative enhances the outcome of the investigation as the quantitative data provides evidence of the problem and the qualitative data provides the opinions of the public on the solution. The use of group data to help synchronise data over an area (the noise pollution data) and to provide a greater coverage of the public (questionnaires) than individual is sensible. Data analysis does reference the two sub-questions and does comment on the accuracy and reliability of the data and even suggest ways of improving the accuracy. The analysis is detailed, but not always as comprehensive as it could be. Also the findings are not always linked to the wider context, eg how will these changes impact on Cheltenham in the future? The investigation is thorough in its analysis of individual components, but lacks in developing links between the sets of data. However, the concept of sustainability is explored in detail utilising the results gathered.
(b) To demonstrate the ability to interrogate and critically examine field data in order to comment on its accuracy and/or the extent to which it is representative, and use the experience to extend geographical understanding (AO3)	4			
(c) To apply existing knowledge, theory and concepts to order and understand field observations (AO2)	4			
Area 4. Conclusions, evaluation and presentation **15 marks** (a) To show the ability to write up field results clearly and logically, using a range of presentation methods. (AO3)	3	3	10	The results are presented using graphical, cartographic and statistical analyses although not all at the same level of sophistication, eg the photographs, although titled, need annotated geographical text to be fully utilised. The sections are logical, but the segregation into sections rather than as an integrated format leads to a more disjointed and less holistic outcome. The evaluation of the methods is the most thorough, but the evaluations of the results and conclusions are briefly mentioned. The link to a wider context is not fully explored especially in relation to energy generation because the sustainability of electric cars depends on the source that the electricity comes from, eg whether it is renewable or not. The ethical dimensions are explored, but again as a discrete paragraph rather than integrated into the whole. The sub-questions and hypothesis are reflected upon. The quality of writing enables the reader to follow the line of argument with supporting evidence even though the grammar and sentence structure could be improved. In places the sentences are too long. However, the outcome is informative, relevant and creative. The investigation is written coherently and the results reflect on the question.
(b) To evaluate and reflect on fieldwork investigations, explain how the results relate to the wider context and show an understanding of the ethical dimensions of field research. (AO3)	3			
(c) To demonstrate the ability to write a coherent analysis of fieldwork findings in order to answer a specific geographical question and to do this drawing effectively on evidence and theory to make a well-argued case. (AO3)	3			
	Total (60 marks)		47	

Details of additional assistance given

Record here details of any assistance given to this candidate which is beyond that given to the class as a whole and beyond that described in the specification (*continue on a separate sheet if necessary*).

No extra assistance was given. The student creatively used group data from a class data collection field day to enhance their individual data collection. The reason for doing this was to provide synchronised data for their noise data collection.

Concluding comments

The investigation has explored a local issue which is relevant to most large towns and cities. The advantage is that the Cheltenham transport plan is in its feasibility phase so this will provide an ongoing opportunity to develop further investigations as it comes to fruition. The strengths of this investigation are the clear, contemporary focus and embedded geographical concepts, the thorough data collection and appropriate presentation and analysis. The weaknesses are in the lack of integration and order of the investigation and some aspects of the evaluation are omitted or weak.

Clear title indicating geographical and locational context.

Assessing the sustainability of the Cheltenham transport plan for the CBD

Area 4.1 contents showing investigation sequence. Logical structure.

Contents

Area 1.1 a clear, achievable title, backed with appropriate sub-questions.

Area 1.2 evidence of Harvard referenced research linked to the specification and key concepts.

3.3.4.1 evidence of an exploration of the wider context as well as the detail of a local place study.

Introduction

Sub-questions – how will the Cheltenham transport plan deliver a more environmentally sustainable transport system?
How will the Cheltenham transport plan deliver a more socially sustainable transport system?

Ever since the 1980s sustainability as a concept (the idea that development initiatives protect the natural environment while also enhancing the quality of life for the local people) has been integrated into planning decisions, mainly to reduce environmental impact and to provide a higher quality of life for the residents and visitors to a town or city. Bedzed was one of the earliest schemes in London, but now sustainable ideas are more widespread with examples in Freiburg [1], Germany and Masdar, UAE. The main aim is to produce a carbon neutral environment and reduce pollutant gases through transport improvements, incorporating greener spaces with conservation of buildings as well as renewable energy [2]. In Masdar this has been done through computer controlled cars run on solar energy along magnetised tracks (see photograph 1 below)[3].

Photograph 1 showing the magnetised vehicle system run on solar power in Masdar, UAE.

[1] AQA Geography Human Geography Oxford 2016 Simon Ross et al page 174
[2] AQA Geography Human Geography Oxford 2016 Simon Ross et al page 174 and specification 3.23.8)
[3] Photograph taken by David Weeks in Masdar city

Area 1.2 reference to local secondary sources providing evidence of the issue explored.

This investigation will focus on a local place study (3.22.4 of the specification), Cheltenham, through the Cheltenham Transport plan which aims to improve transport methods as well as utilising the open spaces created by pedestrianisation to provide a stronger identity and brand. In the Cheltenham Transport plan[4] the improved transport systems and pedestrianisation of the main roads crossing the high street will aim to reduce car exhaust pollution to below the EU limits and to provide a focal point at the PVLI center of town. The County have received money from the Government to achieve this partly because Cheltenham has been assigned an 'Air Quality Management Area'. There are many different aspects of sustainability (economic, social, environmental and political), but in order for this investigation to be manageable it will focus on environmental and social sustainability mainly through the pedestrianisation of Boot's Corner, the PVLI, Geographical center of Cheltenham. The Air Quality Management Area has led to NO^2 sensors being set up and these have shown two areas where the annual levels exceed the maximum recommendation (40 µg/m³) laid down by the EU. These two areas are the Bath Road and Boot's Corner where there are high levels of traffic in confined spaces where a lot of people live or footfall is high. The Liberal Democrat's local news sheet refer to the Council's proposals for alleviating this.[5] The figures for these areas are Bath Road (photograph 2) average of 43.8 µg/m³, Boot's Corner (Photograph 4) average of 40.2 µg/m³ with a control at the Town Hall (Photograph 3) of 22.2 µg/m³. [6] The Cheltenham Transport plan, by pedestrianising Boot's Corner, aims to reduce the traffic flow by 97% by 2026 therefore lowering the NO^2 pollution as well as increasing safety, promoting sustainable transport such as walking, cycling and going by bus, and creating an opportunity for a community space. Other advantages will be to reduce traffic noise and protect buildings from acidification. Socially this could promote the town as a festival center and provide a meeting place.

The Borough Council were contacted regarding this investigation and as the Transport plan is in its feasibility stage they were keen to provide support and have shown an interest in the questionnaire results. So far, two elements of the Transport plan have been implemented and Boot's Corner is in the next phase this autumn. This will mean that further data could be collected once the changes are made in order to determine the feasibility of the scheme. The Cheltenham Transport plan is not only aiming to remove cars from the High Street area, but also to promote cycling by providing more flexible routes and where possible cycle lanes. There are also more stands for securing bikes. Cycling creates zero emissions, provides free exercise and creates more space on the roads. They are also promoting the use of buses especially through the Park and Ride system with two Park and Rides around Cheltenham.

[4] Cheltenham Transport plan published by Gloucestershire County Council and Cheltenham Borough Council 2014
[5] Focus Liberal Democrat news Summer 2017.
[6] Air Quality updating document for Cheltenham Borough Council Jan 2010.

Area 2.1/2/2 good balance of primary and secondary data collection methods along with quantitative and qualitative approaches. Sampling is addressed and the detail of the data collection is sufficient for repetition by a non-specialist (2.2). The justification is clear, but not always linked in detail to the sub-questions (2.1). The summary table is appropriately included in the appendix.

Methodology

This investigation will collect primary data on traffic and pedestrian flows at Boot's Corner on a weekday and a Saturday in order to determine the nature of the problem at Boot's Corner. A questionnaire will also be carried out to at least 25 (this is a statistically significant number) members of the public at Boot's Corner on the weekday. The investigation will also use secondary data provided in the Cheltenham Transport plan and the documents on the Air Quality Management Area as well as photographs from Google and other sources.

Technique	Justification	Location and sampling	Description of method	Problems encountered	Solutions proposed
Primary, Traffic count Sub-question 1 environmental sustainability.	To establish the impact of pedestrianising a major link road across the town. To assess the pattern of traffic on a Thursday and Saturday under similar weather conditions. This data can be used to plot the changes in traffic volume and type during the course of a day.	Boot's Corner (see map 1 and 2). On the Thursday the traffic count was completed in 5 minutes by creating a tally chart twice every hour. On the Saturday this was completed on the hour in order to compare the differences. The sampling was stratified rather than systematic as time periods were chosen rather than every hour. This was to make the data collection reflect the main changes in traffic during the day and to provide breaks for the recorder.	The road is one way and so only one direction was counted. A tally chart was created of the different vehicles that passed the observer in a five minute period. On the Thursday this data collection was carried out on the half hour and the hour. On the Saturday it was carried out on the hour.	The flow rate meant at peak times there could be vehicles missed as there were so many vehicles to count.	Using someone else to record whilst I counted would be useful as you would not have to look down to add to the tally chart. Cars were most likely to be missed.

Area 2.1 clear explanation of appropriate secondary data sources.

Secondary Traffic Count Sub-question 1 Environmental sustainability	These figures have been collected by the County Council and are for longer periods of time (usually annually) and show changes over the years. The figures enable a flow map to be created to see the pattern of traffic flow around the CBD and the proposed impact of pedestrianisation. The County Council used sophisticated traffic modelling to predict the changes in traffic volume.	See Map 2 for the locations of the different counts. The sampling was stratified as it was decided by the County Council.	The data was recorded by the County Council sometimes using traffic counts, some were estimated and some taken from roadside counts by employees. It is not clear how the frequency with which the recordings were taken, except the overall figures are for the year.	Not knowing the way in which the estimates are calculated	Further research with the County Council to determine this, but for the scope of this investigation these figures are being used as comparisons so this extra research is unnecessary.
Primary, Pedestrian count Sub-question 2 Social sustainability	To establish the volume of pedestrian flows and how they vary during the day. Also to observe the conflict between the traffic and pedestrian	Boot's Corner junction. The pedestrian count was taken at the same time periods as the traffic counts. Consequently stratified sampling	It was very difficult to count accurately so I counted the people waiting for the light to change and then added on anyone who ran across or suddenly decided to cross.	At busy times it was very difficult to count accurately as people were moving and some people crossed before the lights changed. Also some people ran	I took three counts for three changes of the light and then took an average at peak times to try to create a more reliable result. I also took

Area 2.1 pilot survey enabled actual questionnaire to be more accurate, but pilot questionnaire and results not included in the appendix.

	flows.	was used.		to the crossing. It was particularly difficult because there were two directions being counted.	photographs (see photos 5 to 11 taken over the Thursday and Saturday at key times. I have used the photographs to help standardise the results.
Primary, Questionnaire. A pilot questionnaire was carried out with friends and this was used to create a questionnaire to use with the public. Sub-question 1 Environmental sustainability and sub-question 2 Social sustainability.	To establish the different views on pedestrianisation of Boot's Corner, but also sustainable transport more widely. To determine the need and feasibility of the scheme. A pilot questionnaire was carried out among a group of friends to determine the structure and questions of the questionnaire to be used with the public.	The pilot questionnaires were checked with a group of Church friends to enable improvements to be made. A lot of constructive feedback was received. The actual questionnaires were carried out at Boot's Corner on Thursday 10th August throughout the day. Stratified sampling was used to ensure a representative sample in terms of age and gender. The improvements from the pilot	The questionnaire was short, it took less than a minute to ask. It was quantitative (opinion ratings for the Transport plans) and qualitative (asking for reasons why they believed the Transport plan was a good idea or not). The questionnaire also assessed the public's view of the community space. The questionnaires took place throughout the day and in front of Boot's Corner so	In the Pilot I used a c for cars and cycles so I changed the coding. In the pilot I did not differentiate between visitors and locals. It was suggested that I record the answers rather than giving the questionnaire out as some of the questions needed explaining.	After carrying out the questionnaire it would probably have been more reliable if I carried out 15 questionnaires on the Thursday and 15 on the Saturday as more local people tend to go into the town on a Saturday.

Area 2.3 photographs provide a useful visual image, but there are too many and the inherent bias in taking them on a certain day, in a certain direction, in a certain weather and by a certain person has not been recognised.

		questionnaire were implemented to improve reliability such as identifying visitors and locals. The questionnaires were only carried out on the Thursday as I was able to achieve a sample size of 25. There was a refusal rate of 50% so I didn't do any more on Saturday.	the members of the public knew the location.		
Primary, photographs taken on 10th and 19th August. Secondary, Google photographs taken since 2006. Sub-question 2 Social sustainability.	The photographs were used partly to show changes at this junction since 2006 (Photograph 16) and partly to enable the pedestrian count to be more accurate (Photographs 5-8). They were also used to show motorists and pedestrians abusing the crossing which led to at least 10	The photographs were taken at Boot's Corner during many of the pedestrian counts, but also when situations developed which could have been dangerous such as when the light was red, but buses were blocking the traffic and so some started crossing. Others would then follow like sheep and some	The photographs pointed towards the crossing. Other photographs were taken to show the improvements for cyclists and buses that have already been enacted. (Photographs 13 to 15)	I missed some of the dangerous situations such as when an old man walked directly into the road on a red light and the cars had to avoid him. Also when a young male pedestrian started arguing with a van driver despite the pedestrian light being red. The van driver drove towards him in a road rage incident.	To have a camera set to take photographs at regular intervals throughout the day.

Area 2.1/2.2 tabular format showing methodology is effective, ensuring that all aspects of methodology criteria are considered. Detailed explanation of methods adopted.

	situations where accidents could have happened showing the need to improve this crossing. (See photographs 9 to 12). The other photographs show attractive features of the area used to make it more sustainable.	motorists after being frustrated at being stuck behind a bus would suddenly accelerate towards the crossing creating a potential accident. In many cases pedestrians jumped the red light and once a motorist did. Also some pedestrians struggled to cross in the 10 seconds given.			
Primary. Noise readings taken on Tuesday 19th September with the help of my class to address sub-question 1.	The noise readings were used to establish the noise levels created by the traffic compared to background levels and how this changed with distance decay from Boot's Corner. In the light of the field work experience the loudest noise turned out to be a busker, but this	The noise readings were taken with a noise meter reading in decibels. Systematic sampling was used with students stationed every 25 m in both directions from Boot's Corner at ten locations with students in pairs taking simultaneous readings three	The background noise was recorded three times over a 2 minute period to give an average and the loudest recording was also recorded at each location.	Recording a noise reading is very difficult as the needle fluctuates a lot. Also a loud noise from e.g. a bus may not be recorded in the two minute time period. We synchronised watches to time the start, but as we could not see each other there could have been errors here.	Perhaps a reading every minute for five minutes would have been more effective. Perhaps it would be better to wait longer and just record the loudest sound.

Area 2.1 clear methodology description and justification. Efficient use of the Cheltenham transport plan as a source of secondary data. However, it could be biased and so contrasting views from the newspapers or politicians would have been interesting.

	was a positive noise.	times during the day. These times were 11.00am, 12.00am and 1.00pm.			
Secondary, Cheltenham Transport plan documents. Sub-question 1 Environmental sustainability and sub-question 2 Social sustainability.	These documents outline the aims of the Cheltenham Transport plan (See Appendix) and give details of the data recorded by the County Council such as traffic counts. They show the plans for the community space in detail.	Not applicable	The data has been collected by the County Council or the Government. The Cheltenham Transport plan has been on the County Council website and many of the politicians have referred to it in their news publications.		

Data presentation – photographs

Photograph 2 – Lower Bath Road. Canyon like streets trap the air pollution. This street had the highest pollution level.

Photograph 3 – Town Hall and Montpellier Gardens. This area provided a control or background pollution level.

Area 3.1 presentation and analysis. Photographs provide a visual impression which is helpful to the investigation, but they could have been annotated to identify the geographical features being discussed and analysed.

Area 3.1 presentation and analysis. The number of photographs could be reduced as there is a tendency towards repetition.

Photograph 4 – Boot's Corner Again the canyon like streets and the high vehicle flows in close proximity to pedestrians make this a polluted area.

Photograph 5 – Thursday 10th August 0908. This shows the low pedestrian flow just after rush hour.

Area 3.1 repetition of same technique, adding little value to the enquiry. This series of photographs continues with limited comment over several pages.

Photograph 6 – Thursday 10th August 13.30. Pedestrian flows reach a peak.

Photograph 7 – 19th August 0908. Pedestrian flows similar to Thursday.

Photograph 10 – Pedestrians Jumping red light shown on pedestrian traffic light, car travelling too fast.

Photograph 11 – Difficulty for pedestrians with restricted mobility as 10 seconds is not enough time.

Photograph 12 – A family nearly hit as they saunter across on a red light. Girl looks worried.

Photograph 13 – On Saturday 19th August street music was played which raised the spirits and showed what could be done at this junction

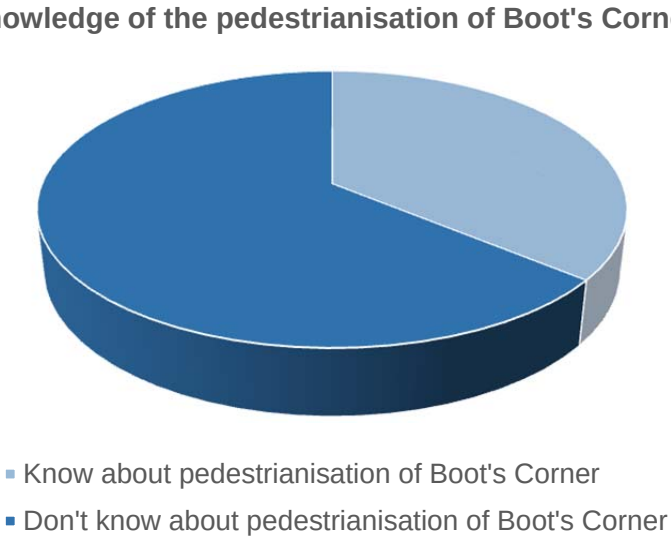
Photograph 14 – Location of community space after pedestrianisation. This is where the focal point would be.

Photograph 15 – Congestion caused by loading.

Photograph 16 – This is Boot's Corner taken by Google in 2006 for Google Maps.[1] This shows that there has been very little change at the junction over the last 9 years. Does that mean that change is not necessary or have traffic or pedestrian flows changed to create more conflict?

Data presentation – graphs

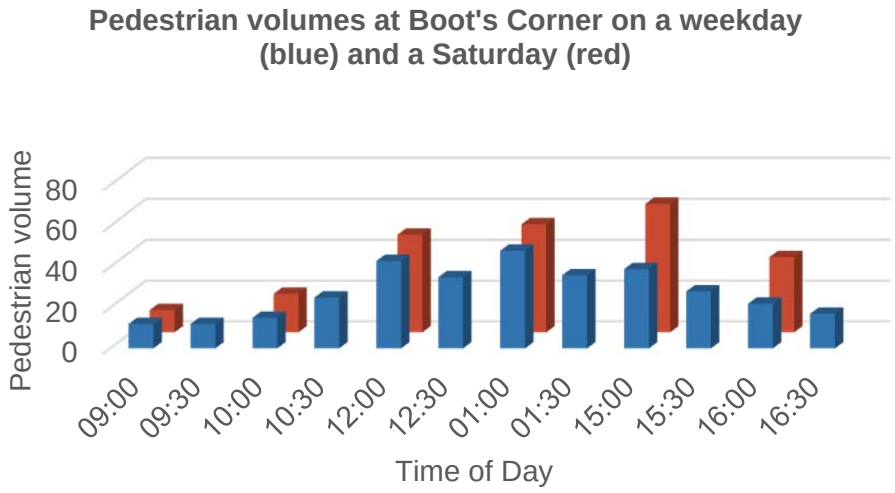
Graph 1 – Collation of answers from the questionnaire.



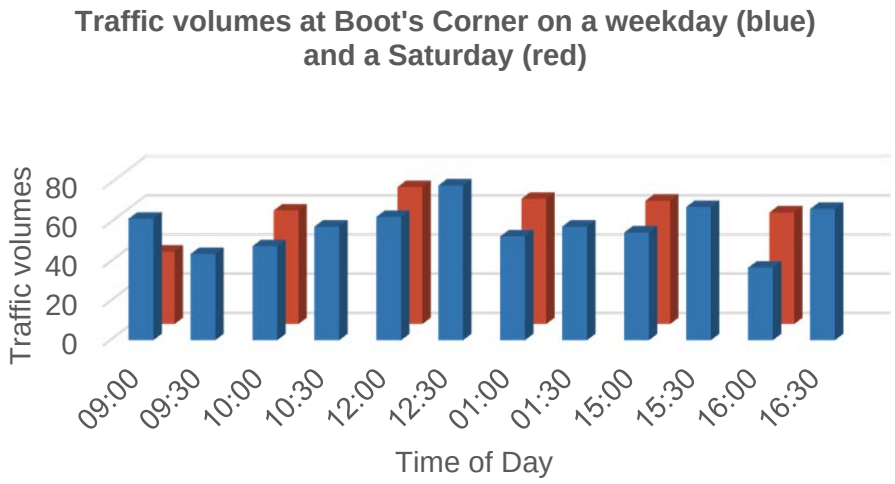
Area 3.1 the graphs shown are basic but appropriate and would be more effective if they were integrated with the text.

[7] Google Maps streetwise taken from 2006.

Graph 2 – Pedestrian volumes measured at Boot's Corner on the two days.

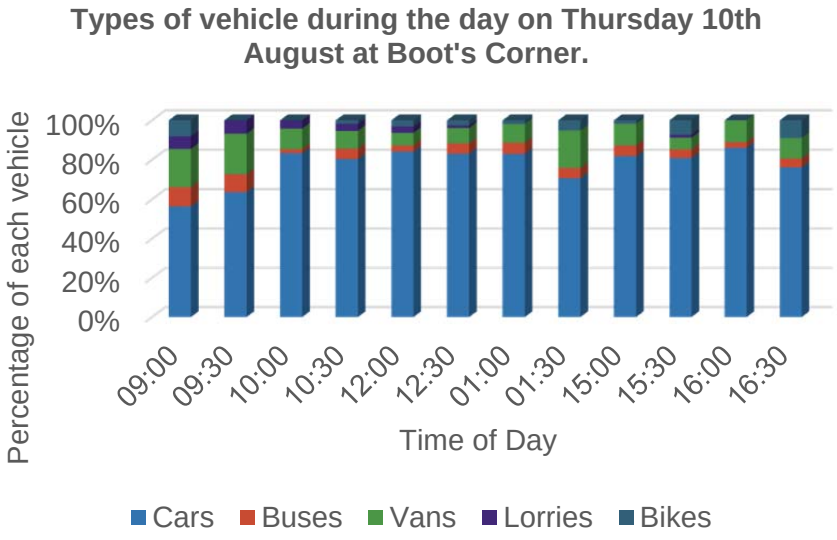


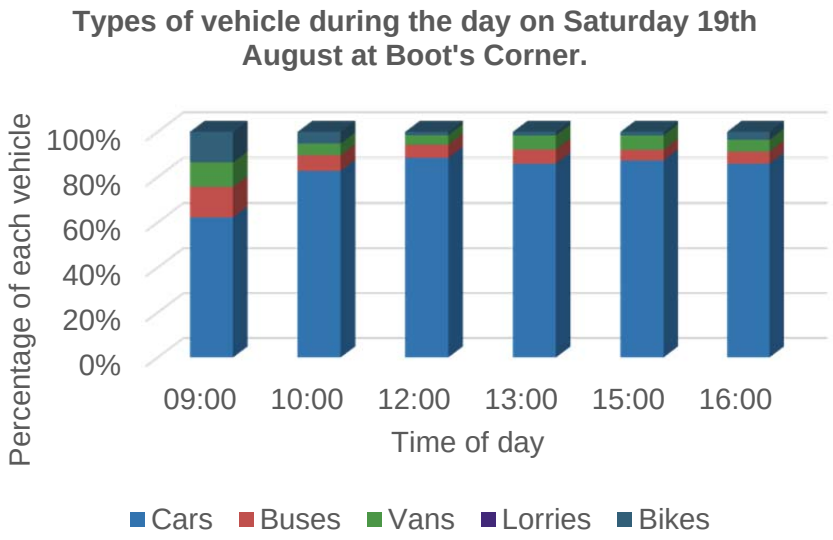
Graph 3 – Traffic flows measured at Boot's Corner on the two days.



Area 3.1 the primary, quantitative data is presented using suitable graphs, but would be easier to interpret if graphs 3 and 4 were combined.

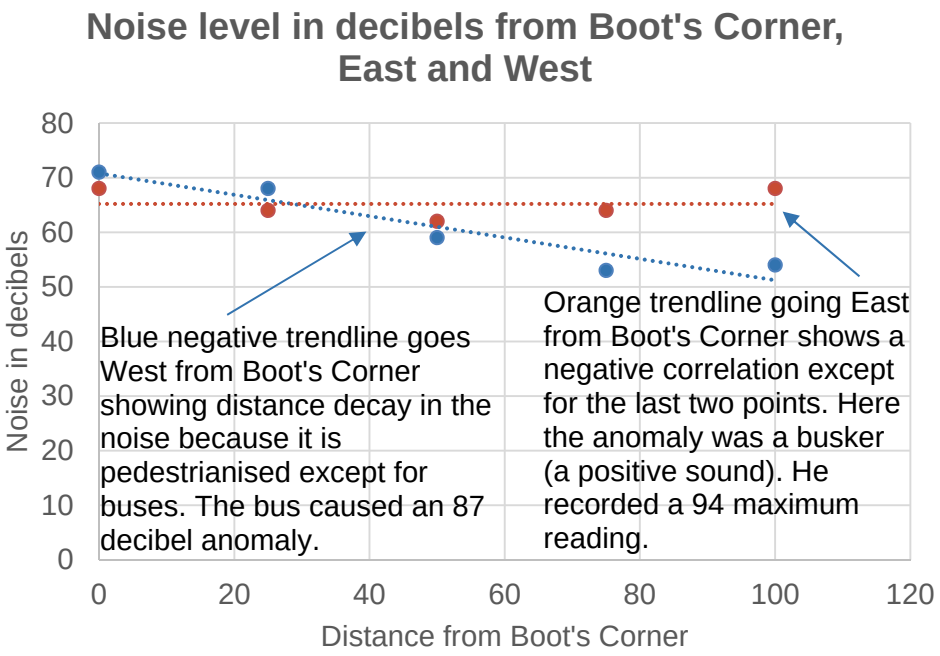
Graph 4 – Comparison of vehicle type on the two days.





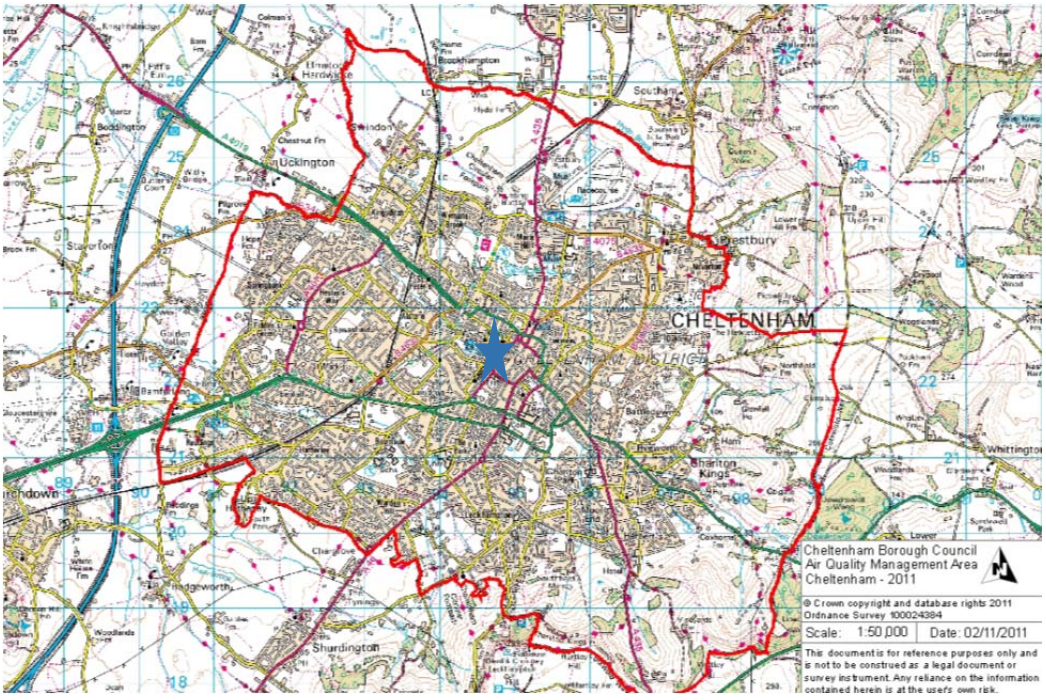
Area 3.1 a scatter graph is an appropriate way to present and analyse this data with trend lines and anomalies identified. However, a greater number of sample points would have enabled a Spearman's Rank analysis to have been applied to more accurately gauge the relationship.

Graph 5 – A scatter graph of the changes in noise level from Boot's Corner along two transects, one east and one west from Boot's Corner.

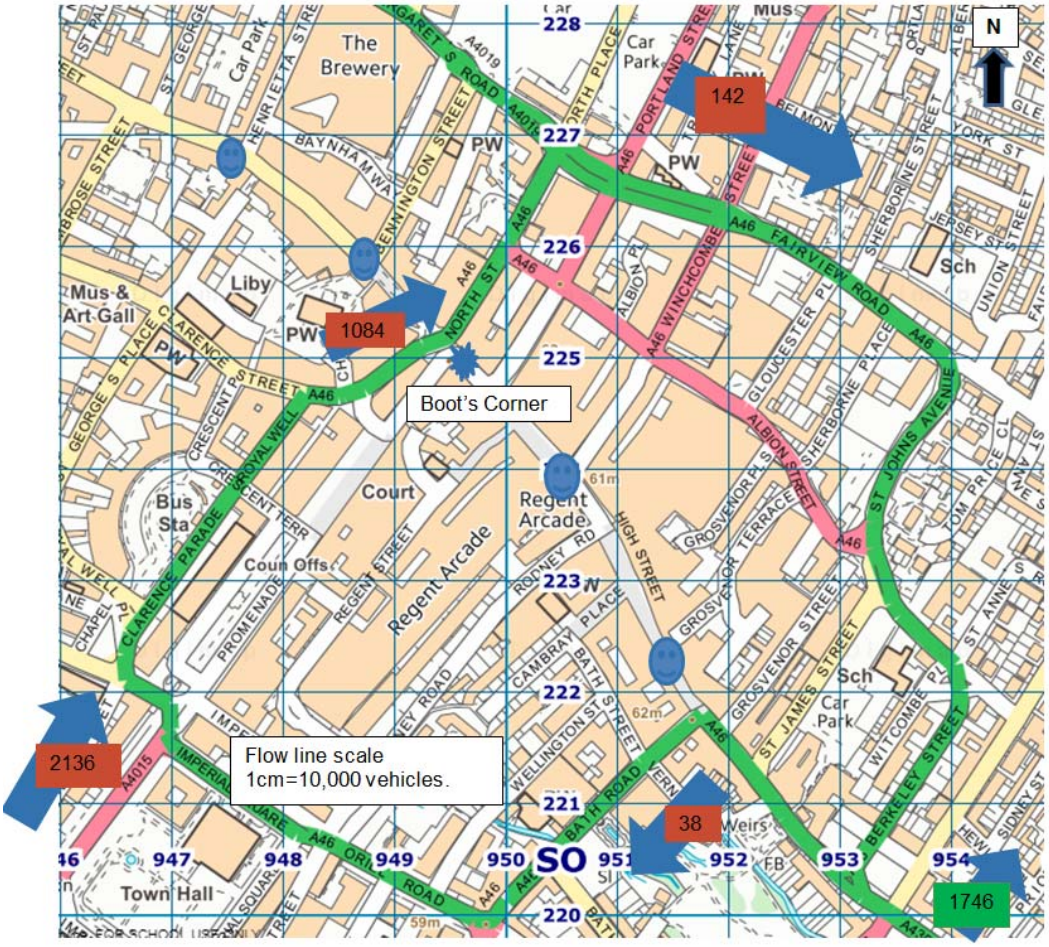


Data presentation – maps

Map 1 – Map to show the boundary of the Air Quality Management Area and the study area. Sourced from the County Council report. The ★ indicates the location of Boot's Corner.



Map 2. Map to show traffic flows around the one-way system in 2016 and the increase (green) or decrease since 2000. Scale 1cm=50m. Sourced from Digimaps[8]. The ✸ indicates Boot's Corner and the ☺ indicates the transect for the noise readings with ten locations.



[8] Digimaps OS map of Cheltenham Town Centre. 2017

Area 3.1/3.2 the inter-quartile range is correctly analysed and is used appropriately. There is a tendency to choose the methods to a formula such as one graph, one map, one statistic, rather than choosing the most suitable approaches for the data. The separation of the techniques from the interpretation of results produces a slightly disjointed outcome.

Statistical analysis

Comparing the public's views on the Boot's Corner pedestrianisation compared to the overall plan from the questionnaire.

Scores for the pedestrianisation taken from 25 members of the public based on a score of 10, totally agree and 1, totally disagree.

Score	Response number for Boot's Corner pedestrianisation	Response number for sustainable transport plan generally
1	2	1
2	0	0
3	3	1
4	0	1
5	2	1
6	1	1
7	4	4
8	1	7
9	6	8
10	6	1

To calculate the Inter-quartile range.
Boot's Corner

1,1,3,3,3,5,5,6,7,7,7,7,8,9,9,9,9,9,9,10,10,10,10,10,10.

Median = 8, Lower Quartile =5, Upper Quartile= 9.5, Interquartile range = 4.5

52% scored at or above a score of 8.

Transport plan as a whole

1,3,4,5,6,7,7,7,7,8,8,8,8,8,8,8,9,9,9,9,9,9,9,9,10.

Median= 8 Lower Quartile= 7, Upper Quartile= 9 Interquartile range= 2.

64% scored at or above a score of 8.

Data analysis

It is clear from the air pollution data for Boot's Corner stated earlier in this investigation that the present situation is not environmentally sustainable. Indeed the fact that Cheltenham has been designated an 'Air Quality Management Area' and is exceeding the EU limits for NO^2 prove this. Consequently the Borough Council is right to propose these road improvements, especially as these figures were for 2006 to 2008, ten years ago. The proposal to reduce the traffic by 97% by 2026 at Boot's Corner will lower the pollution nearer to the background levels of the town hall of 25 µg/m³. The fall in traffic of 34% by 2026 along the Bath Road will also help to reduce pollution levels there. These measures will therefore improve the air quality in the CBD and achieve some of the aims of the Air Quality Management Plan.

It is also clear from the primary data collected by this investigation that the traffic flows and pedestrian flows are high at Boot's Corner on both a weekday and a Saturday (Graphs 2 and 3). The photographs show that there is a high risk of a serious accident at this junction (Photographs 9 to 12). So, from a social sustainability point of view pedestrianisation is much needed. Socially the pedestrianisation will also enable the street music (Photograph 13) to be heard and space can be created for people to sit and listen in the community space area (Photograph 14). It is interesting to note the differences in the type of vehicles from the weekday to the Saturday. Graph 4 shows that on a weekday there are a lot more vans and lorries whereas on the Saturday they are mainly cars. Buses are similar on both days. This probably reflects that most of the traffic on the Saturday is leisure traffic, whereas on the Thursday there is business traffic also.

In studying the Boot's Corner area on a weekday and a Saturday for the whole day some observations were made. The volume of traffic increases to a peak around lunchtime on both days (Photograph 5 to 8) with some evidence of rush hour traffic earlier in the day. However, it is interesting to note that the speed of vehicles tends to be lower owing to the buses obstructing the road, the volume of traffic and the frequency with which the lights change i.e. every 40 seconds. Consequently the volume of traffic is self-limiting in busy periods. However, it was also noticed that in the middle of the day there is more conflict between pedestrians and motorists possibility because of the frustrations caused by traffic congestion and waiting for the crossing. On at least ten occasions the pedestrians crossed while the light was red causing the motorists to have to swerve or break to miss them. (Photographs 9 to 12). There was only one occasion where a motorist went through a red light. Also it was noticed that when the buses held up the traffic the pedestrians would cross on a red light causing others to cross that were not looking and raising the risk of an accident. The crossing time of 10 seconds was not enough for some mobility impaired pedestrians (Photograph 11) and so they were crossing once the lights had gone green for the vehicles.

In summary the junction is very busy with pedestrians and traffic and there is a high risk of an accident because of the conflict that this junction creates. Consequently it would be safer and less polluting to pedestrianise the junction. The junction already acts as an informal meeting point by the fountain and so the proposal to create a community space there is a good idea.

Area 3.2/3.3 the interpretation applies the data presentation findings to the two sub-questions and considers a range of viewpoints. Some of the assertions are not backed up with evidence such as the number of accidents at Boot's Corner. The analysis considers all the data sets and draws out interesting observations, with some link to the geographical or theoretical context.

Area 4.1/4.2 overall the investigation is well written with few literacy errors. The structure is clear but segregated in places.

Clear conclusions and valid, although not comprehensive evaluations.

Ethical considerations- In carrying out this investigation there will be a range of views represented and as the investigation involves a questionnaire there will be issues of involvement and confidentiality. In order to take these into account I decided not to ask people their age, but created wide categories so I could approximate this. I also completed the questionnaire so I could help explain the questions, this was necessary in some cases as a homeless person asked if he could take part. The success rate in asking the questionnaire was about 50%. To improve this rate I asked some people that had sat down to have their lunch. I made it clear the questionnaire would be quick and so if they were reluctant I moved away. I explained the reason for my research and that their answers would not be attributed to them, but collated anonymously. Many people expressed strong views and were very willing to engage. I aimed to avoid biasing their answers, but this was difficult at times when they did not understand the question so I had to give examples to help them.

With regard to the public's view from the questionnaires it is interesting to observe from Graph 1 that many do not know about the scheme. In talking to a representative from the Borough Council they said they have tried to make people aware through local newspapers, but it is interesting that they admit they have not carried out direct questionnaires or surveys. The questionnaire results show the public are very supportive of the moves towards a more sustainable transport plan for Cheltenham as shown by 64% scoring an 8 or above for the transport plan and 52% for the pedestrianisation of Boot's Corner. However, from the statistical analysis there was a greater diversity of opinion in support of the pedestrianisation with an IQR score of 4.5 as against an IQR score of 2 for the transport plan generally. The reason for this is that some members of the public fear the banning of cars from the Boot's Corner route will create problems elsewhere or they are adamant that it is the right of car users to access the CBD in their car. The County Council is aware of this disagreement, but as shown by Map 2 they believe that in most locations the traffic will decrease, hopefully because more people use Park and Rides or cycle or walk, and are looking at ways of providing extra car parking along some of the roads that will be altered and enhancing park and ride. The charges for car parking and park and ride will be critical too. It appears that the perception of the situation from the public's point of view maybe because of a lack of information or it could be because car drivers are inherently lazy (as many admitted) and don't want the inconvenience of changing their routines.

Noise data was collected with the help of my class as this enabled simultaneous readings to be taken. It showed a clear negative correlation (Graph 5) along the Western transect as the students moved away from the noisy traffic of Boot's Corner to the pedestrianised area. It showed that noise levels would drop on average about 15 decibels. However, when buses went past the noise level was above that at Boot's Corner (84) and when a busker on the Eastern transect started singing, using his PA equipment, it was even louder than a bus (94). In this case it was a positive sound, but if the monitoring of the quality of buskers by the County was lacking this could be a greater problem than the traffic!

Area 3.3 clear, balanced arguments are given, drawing on field evidence and placing the study in a wider geographical context.

Area 4.3 the conclusions are linked to the sub-questions and take into consideration different viewpoints.

However, it could be argued that there are ways that the Council could improve the scheme further by looking at relocating the buses because although they travel at lower speeds and are much safer they still produce particulate pollution and create noise and disruption. A cleaner alternative would be trams as shown in photograph 231 which shows trams and cyclists sharing a pedestrianised area in Bordeaux France. Ironically trams used to go along the High Street as shown in Photograph 221. The improvement of the priority for cyclists was acknowledged as now a cyclist can cycle across the CBD and even along parts of the pedestrianised area where a roadway has been created. However, a lot of the members of the public that were interviewed feel the area allocated for cyclists needs to be clearer as some ride irresponsibly.

Conclusions

The Cheltenham Transport plan, from the evidence given of lowered traffic volumes, 97% reduction in traffic flow at Boot's Corner, reduced vehicle exhaust fumes and the improvements for buses, cyclists and pedestrians will successfully enhance the environmental sustainability of the area (sub-question 1) by reducing air pollution, noise and generally creating a healthier environment more in tune with Cheltenham's green city image. Also the community space will provide an opportunity to introduce more plants possibly trees, increasing the biodiversity.

The Cheltenham Transport plan will also enhance the social sustainability (sub-question 2) by creating a safer pedestrianised crossing point at Boot's Corner which links the two parts of the town. The community Space, whichever option is selected, (the public prefer a small park over fountains, a band stand or a sculpture) will provide a meeting point and an identity for the town center when the Gold Cup Races and Festivals take place improving the identity and branding of the town. It will also encourage walking and cycling and as a statement in the news recently said, 40% of people don't walk briskly more than ten minutes a day, this can only enhance people's health.

There are dissenting views though, especially from car drivers, which should be considered and it seems that the Borough Council have done this by having a trial period after which adjustments will be made.

I believe that the Cheltenham Transport plan will be a success because people are always resistant to change. A set of traffic lights were installed at a busy junction near where I live and there was uproar at first, but then people realised that the junction operated more efficiently and the protests died down. People don't like change, but if we don't make changes to protect our environment then our quality of life will suffer.

Consequently, the Cheltenham Transport plan will improve the environmental and social sustainability of the town as well as possibly the economic sustainability as it may encourage more tourists and more race goers and festival goers as the changes become known. However, there are ways in which the Cheltenham Transport plan does not go far enough. The environmental sustainability would be enhanced further if trams were introduced to replace buses as bus exhausts produce particulates which cause lung conditions. The trams (as argued above) have higher carrying capacities and as more of our national electricity is now generated by solar and wind power this would be environmentally friendly. The Borough Council should consult the members of

the public through a questionnaire to find out their preferred option for the community space as this will empower the local people and enlist their support making this proposal more socially sustainable too.

Evaluation

The problems with the data collection methods and possible improvements are stated in the methodology justification table. The results of this investigation are limited by the fact that the data was collected in the summer holidays so there would be more visitors and less locals and so their views may be different. Also the traffic and pedestrian count data should have been extended to include the morning and evening rush hour as the secondary traffic data was taken at these times. The questionnaire should have asked the public about their preferred community space. The weather was similar on both days and so the results should be comparable, but to give a representative result readings should have been taken under wet conditions too.

In order to further develop this project it would be helpful to know the number of accidents that have taken place at Boot's Corner. Also once the pedestrianisation has taken place the investigation could be extended by repeating the primary data to see if the number of pedestrians increases, the noise level and NO^2 levels should decrease. A repeat of the questionnaires would see whether people's views change. Maybe the best solution for Cheltenham as a whole is to encourage electric cars by providing preferential parking and recharging stations.

Photograph 22

Area 4.2 the investigation considers ways to extend the data collection, analysis and conclusions, but not comprehensively. Little attention given to validity of conclusions.

Area 4.1 the investigation is over the word limit. Although this does not alter the marks it means that the focus and arguments in the investigation are not succinct and therefore tend to be self-penalising.

Photograph 23

Area 1.2 the bibliography shows the use of Harvard referencing and a range of research. Not all sources have been referenced, especially towards the end such as the walking statistic.

Bibliography

[1] AQA Geography Human Geography Oxford 2016 Simon Ross et al page 174
[2] AQA Geography Human Geography Oxford 2016 Simon Ross et al page 174 and specification 3.23.8)
[3] Photograph taken by David Weeks in Masdar city
[4] Cheltenham Transport plan published by Gloucestershire County Council and Cheltenham Borough Council 2014
[5] Focus Liberal Democrat news Summer 2017.
[6] Air Quality updating document for Cheltenham Borough Council Jan 2010.
[7] Google Maps streetwise taken from 2006.
[8] Digimaps OS map of Cheltenham Town Centre. 2017
[9] Photograph taken by David Weeks 2015
[10] Photograph provided by The Francis Frith Collection

Key

Green references are from reliable, up to date sources.
Blue references are from less reliable sources (either because they have a political persuasion or because they are not verifiable because they are not historically recent.

Area 1.2 evidence of data collection and summary tables, but pilot questionnaire and the actual questionnaire data recording sheet are omitted.

Appendices

Questionnaire results for Thursday 10th August.
Males – 12
Females – 13
15-30 years 8, 31-45 years 6, 46-60 years 6, >60 years 5.
Knew about it- Yes- 9, No 16.
Opinion
2, 2- 0, 3- 3, 4- 0, 5- 2, 6- 1, 7- 4, 8-1, 9- 6, 10- 6

Reasons- Positive- Safer, convenient (easier), Stronger linkage of parts of high street, Attract more tourists.
Negative- Inconvenient for car drivers, where else will cars go,
Transport in – Car- 9, Train- 2, Bus- 6, Cycle- 0, Walk- 8.
Easy to park, but expensive.
Opinion
1, 2- 0, 3- 1, 4- 1, 5- 1, 6- 1, 7- 4, 8- 7, 9- 8, 10- 1.

Reasons- Less pollution, Safer, Cycling easier, exercise, easier for mobility scooter, Parking for bikes and need a cycle lane, difficult to carry shopping when car away from centre. Keep car parks, Separate different types of transport. Encourages public transport.

Community space choice was between a sculpture 2, a band stand 13, a fountain 13 and a small park 17. 45 members of the public were asked their choice.

Crossing went to 10 seconds, between crossings 24 seconds. 5 near accidents either when pedestrians went on red light (road clear, or hurried across at last minute) or when cars were impatient to go and went on the orange with people on the crossing. Majority of the people involved were men, both as pedestrians and drivers.

Pedestrian and traffic count for Boot's Corner. Date Thursday 10th August – Fine weather

Time	Ped count for crossing 1	Ped count for crossing 2	Average count	Traffic count Cars	Buses	Lorries	Vans	Motorbikes	Bikes	Other	Total
9.00am	7	16	12	35	6	4	12	2	3	0	62
9.30am	13	10	12	28	4	3	9	0	0	0	44
10.00am	16 Near miss, van and old man. Crossing green	13	15	40	1	2	5	0	0	0	48
10.30am	25 Clash, man and van	24	25	45	3	2	5	1	0	2 (Ambulance)	58
12.00am	35	50	43	53	2	2	4	1	1	0	63
12.30pm	34	35	35	64	4	1	6	1	1	2 (Police)	79
1.00pm	41	54	48	44	3	0	5	0	1	0	53
1.30pm	29	42	36	41	3	0	11	2	1	0	58
3.00pm	39	38	39	45	3	0	6	1	0	0	55
3.30pm	32	23	28	55	3	1	4	1	4	0	68
4.00pm	20	23	22	31	1	0	4	0	1	0	37
4.30pm	13 Crossing time 10s, between 25 secs.	20	17	51	3	0	7	3	3	0	67

Pedestrian and traffic count for Boot's Corner. Date Saturday 19th August

Time	Ped count for crossing 1	Ped count for crossing 2	Average Count	Traffic count Cars	Buses	Lorries	Vans	Motorbikes	Bikes	Other	Total
9.00am	14	8	11	23	5	0	4	0	5	0	37
10.00am	13	24	19	48	4	0	3	0	3	0	58
12.00am	33	63	48	62	4	0	3	0	1	0	70
1.00pm	52	54	53	55	4	0	4	1	0	0	64
3.00pm	55	70	63	55	3	0	4	1	0	0	63
4.00pm	35	38	37	49	3	0	3	1	1	0	57

Commentary

Assessing the sustainability of the Cheltenham Transport Plan for the CBD

Area 1: Introduction and preliminary research (10 marks)

To define the research questions which underpin field investigations. (AO3)

The research hypothesis is clearly identified with clear and appropriate sub-questions. The justification from the specification is identified and explained and linked to the specification with a range of Harvard referenced literature sources. However there is limited rationale for the two sub-questions.

Level 3 (high): a research question(s) is securely identified that is explicitly linked to the specification.

To research relevant literature sources and understand and write up the theoretical or comparative context for a research question. (AO3)

The theoretical context is identified, but could be further developed, eg by looking at the factors that affect the identity of a town and then how it should be rebranded. In this case it is vital to understand why people come to Cheltenham because the pedestrianisation may improve air quality, but the inconvenience to car drivers could reduce visitors. Maybe electrical cars could be explored further as these could reduce pollution without reducing access. Harvard references are given and show a dependence on the textbook and well known geographical case studies.

Level 3 (low): supported by focused use of relevant literature sources. Theoretical and comparative contexts are consistently understood and stated.

Level 3

7 marks

Area 2: Methods of field investigation (15 marks)

To observe and record phenomena in the field and devise and justify practical approaches taken in the field including frequency/ timing of observation, sampling, and data collection approaches. (AO3)

A detailed data collection programme has been devised utilising a range of primary and secondary data which is sourced. The sampling is explained, but not always justified with reference to other options. The locational detail is clear. The approaches used are appropriate with summary data as evidence. It was creative to enhance the individual data with the group data on noise pollution, adding another perspective to the study.

Level 4: detailed use of a range of appropriate observational, recording and other data collection approaches including sampling. Thorough and well-reasoned justification of data collection approaches.

To demonstrate practical knowledge and understanding of field methodologies appropriate to the investigation of human and physical processes. (AO3)

Enactment of the data collection is thorough with an honest and realistic explanation for the lack of a comprehensive set of results on every hour. On the whole the methods are appropriate and informative, but perhaps the complete picture is lost in places.

Level 4 (low): detailed demonstration of practical knowledge and understanding of field methodologies appropriate to the investigation of human and physical processes.

To implement chosen methodologies to collect data/ information of good quality and relevant to the topic under investigation. (AO3)

The sample sizes are appropriate and statistically valid. The quality of the data recording is very good with a clear evaluation of the issues. There is an attempt to make the data more valid by collecting on a weekday and a Saturday, but both are in the summer holiday possibly skewing the data and leading to a misrepresentation of the situation. The use of class data to facilitate simultaneous readings of noise is a good idea, although the transects should have been longer to enhance the sample size.

Level 4: detailed implementation of chosen methodologies to collect data/ information of good quality and relevant to the topic under investigation.

Level 4

14 marks

Area 3: Methods of critical analysis (20 marks)

To demonstrate knowledge and understanding of the techniques appropriate for analysing field data and information and for representing results and show ability to select suitable quantitative or qualitative approaches and to apply them. (AO3)

All the techniques utilised for analysing the data are appropriate, but there is a propensity towards more basic, although effective methods. The balance between quantitative and qualitative enhances the outcome of the investigation as the quantitative data provides evidence of the problem and the qualitative data provides the opinions of the public on the solution. The use of group data to help synchronise data over an area (the noise pollution data) ensured a large sample.

Level 4: effective demonstration of knowledge and understanding of the techniques appropriate for analysing field data and information and for representing results. Thorough ability to select suitable quantitative or qualitative approaches and to apply them.

To demonstrate the ability to interrogate and critically examine field data in order to comment on its accuracy and/or the extent to which it is representative, and use the experience to extend geographical understanding. (AO3)

Data analysis does reference the two sub-questions and does comment on the accuracy and reliability of the data and even suggests ways of improving the accuracy. The analysis is detailed, but not always as comprehensive as it could be. Also the findings are not always linked to the wider context, eg how will these changes impact on Cheltenham in the future?

Level 4 (low): thorough ability to interrogate and critically examine field data in order to comment on its accuracy and/or the extent to which it is representative.

To apply existing knowledge, theory and concepts to order and understand field observations. (AO2)

The investigation is thorough in its analysis of individual components, but lacks in developing links between the sets of data. However, the concept of sustainability is explored in detail utilising the results gathered.

Level 4 (low): effective application of existing knowledge, theory and concepts to order and understand field observations.

Level 4

16 marks

Area 4: Conclusions, evaluation and presentation (15 marks)

To show the ability to write up field results clearly and logically, using a range of presentation methods. (AO3 strand 3)

The results are presented using graphical, cartographic and statistical analyses although not all at the same level of sophistication, eg photographs, although titled, need annotated geographical text to be fully utilised. The sections are logical, but the segregation into sections rather than as an integrated format leads to a more disjointed and less holistic outcome. The use of the class data to present a scatter graph to test the relationship of noise with distance from the traffic showed the benefits of pedestrianisation and also recognised that noise can be good or bad. However, the relationship could have been further tested with a Spearman's Rank correlation.

Level 3: clear ability to write up field results clearly and logically, using a range of presentation methods.

To evaluate and reflect on fieldwork investigations, explain how the results relate to the wider context and show an understanding of the ethical dimensions of field research. (AO3 strand 2)

The evaluation of the methods is the most thorough, but the evaluations of the results and conclusions are briefly mentioned. The link to a wider context is not fully explored, especially in relation to energy generation because the sustainability of electric cars depends on the source that the electricity comes from, eg whether it is renewable or not. The ethical dimensions are explored briefly, but with some clarity. The sub-questions and hypothesis are reflected upon.

Level 3: secure evaluation and reflection on the fieldwork investigation. Precise explanation of how the results relate to the wider context(s). Clear understanding of the ethical dimensions of field research.

To demonstrate the ability to write a coherent analysis of fieldwork findings in order to answer a specific geographical question and to do this by drawing effectively on evidence and theory to make a well-argued case. (AO3 strand 3)

The quality of writing enables the reader to follow the line of arguments with supporting evidence even though the grammar and sentence structure could be improved. In places the sentences are too long. However, the outcome is informative, relevant and creative. The investigation is written coherently and the results reflect on the question. However, the word limit is exceeded partly because the segregated nature of the write up tends to lead to repetition.

Level 3: focused ability to write a coherent analysis of fieldwork findings in order to answer a specific geographical question. Draws explicitly on evidence and theory to make an argued case.

Level 3

10 marks

Overall

Area 1: 7
Area 2: 14
Area 3: 16
Area 4: 10

Total: 47

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