Transport for London
Surface Transport

Management System Document - Procedure

Road Safety Audit

Document reference: SQA-0170 Issue: 4

MAYOR OF LONDON

CONTENTS

1 Purpose

1.1 The purpose of this document is to prescribe the Transport for London (TfL) procedure for carrying out Road Safety Audits.

1.2 A specific objective for the Mayor's Transport Strategy is to reduce road traffic collisions on the TfL Road Network (TLRN). This will be achieved in part through the systematic application of Road Safety Audit principles to ensure that all measures, when implemented, are as safe as practicable.

1.3 This procedure will be used to identify which schemes require road safety audit and set the standard for carrying out Road Safety Audits.

2 Scope

2.1 This procedure must be followed by all persons who have involvement in the planning, design or construction of changes to the TLRN and those who are commissioned to undertake Road Safety Audits.

2.2 This procedure shall apply to all measures proposed on the TLRN that involve permanent change to the highway. This includes work carried out under agreement with TfL resulting from developments alongside or affecting the TLRN.

2.3 Temporary traffic management schemes will not generally require auditing. However, where a temporary traffic management scheme is to remain in operation for a period of six months or more then a Road Safety Audit should be undertaken. Consideration should also be given to auditing temporary traffic management schemes that are to remain in operation for a period of less than six months if a significant impact on the highway network is anticipated.

2.4 Road Safety Audits are not considered necessary for maintenance works that solely involve a like-for-like replacement or refurbishment of existing street features.

2.5 This procedure is commended to other highway authorities within Greater London.

2.6 This procedure should be followed when TfL undertakes Road Safety Audits on non-TLRN schemes (e.g. borough schemes), with the exception of occasions when Paragraph 2.7 below is applicable.

2.7 This procedure does not apply to trunk roads including motorways. Road Safety Audits for schemes on these highways should be carried out according to the latest safety audit standard in the Design Manual for Roads and Bridges (DMRB), currently HD19/03.

3 Process Inputs and Outputs

3.1 Inputs

- The need to carry out a Road Safety Audit has been identified or requested by the Client Organisation.

3.2 Outputs

- All phases of the Road Safety Audit are completed and documented.
- Any required design changes to the scheme are documented and implemented.

4 Procedure

4.1 Scope of the Audit

4.1.1 A Road Safety Audit considers the road safety implications of all measures and their impact on the network under all anticipated operating conditions. The effects on all classes of road user are considered.

4.1.2 Care should be taken to ensure that attention is paid to the effects on vulnerable groups, for example the very young, the elderly, people with a disability and generally, pedestrians, cyclists and riders of powered two wheeled vehicles.

4.1.3 Whilst a Road Safety Audit is applicable to an individual junction or section of the network, it is important that the road safety implications of the measures as they interface with other parts of the highway network are given due consideration.

4.1.4 The Road Safety Audit will not consider non-road safety related issues and is not a technical check to confirm compliance to Standards. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, make reference to a design standard without touching on technical audit.

4.1.5 Road Safety Audit should not be used as a means of selecting between various design options that are under consideration. The Design Manager may request a Road Safety Audit on separate options but not expect a definitive judgement on which option is preferable. The Audit Team will assess each option individually and make recommendations accordingly. The decision on which option to develop will remain entirely with the Design Manager.

4.1.6 The Road Safety Audit is not an opportunity to:

a) query why other measures are not being proposed; or

b) comment on the operational characteristics of the proposals where there are no adverse safety implications.

4.1.7 Road Safety Audit does not cover health and safety legislation issues concerning the construction, maintenance and use of the road.

4.1.8 Road Safety Audit does not consider structural safety.

4.2 When to Audit

4.2.1 Road Safety Audit and subsequent actions shall be undertaken following completion of each of four specific stages of a scheme's development. These stages are:

a) Stage 1 - A Road Safety Audit should be undertaken as soon as practicable following completion of the preliminary design. The scheme design should be sufficiently progressed such that all significant features are clearly shown.

b) Stage 2 - A Road Safety Audit should be undertaken on completion of detailed design and before the preparation of any works orders or tender documents. At this stage, the Road Safety Audit Team will consider all the detailed aspects of the scheme. The scheme design should be sufficiently progressed such that it could be constructed without further development.

c) Stage 3 - A Road Safety Audit should be undertaken when the works are complete, as soon as practicable after opening to traffic. In any case, the Road Safety Audit should be carried out within four weeks of the scheme becoming fully operational. The Design Manager may also deem it prudent to carry out a Road Safety Audit on a scheme before it becomes operational so that any issues arising can be addressed prior to opening to traffic. Where a Road Safety Audit is carried out before the scheme becomes operational, a further Road Safety Audit should also be carried out as soon as practicable after opening to traffic so that actual road user behaviour can be observed.

d) Stage 4 – Road Safety Audits should be carried out at defined stages following implementation of a scheme:

i) Stage 4A - A Stage 4A Road Safety Audit should be prepared using 12 months of collision data from the time the scheme became operational and 36 months of collision data from prior to the commencement of works. The collision records should be analysed in detail to identify:

- locations at which personal injury collisions have occurred;
- personal injury collisions that appear to arise from similar causes or show common factors;
- how the Scheme may have affected collision patterns and rates.

ii) Stage 4B - The Design Manager should decide if a Stage 4B Road Safety Audit needs to be prepared. The Design Manager's decision should be led by the results of the Stage

4A report, the scale of changes instigated by the original scheme and any issues highlighted since the completion of the scheme. A Stage 4B Road Safety Audit should be prepared using 36 months of collision data from the time the scheme became operational and collision data for the 36 months prior to the commencement of works.

4.2.2 For some smaller, simple schemes the Design Manager may request the Road Safety Audit Team to carry out a combined stage 1 & 2 audit on the overall design of the scheme. It should be recognised, however, that a combined stage 1 & 2 audit has the disadvantage of identifying potential safety issues late in a scheme's development when corrective action may be more difficult.

4.2.3 For large, complex schemes, particularly with accelerated programmes, the Design Manager may consider it appropriate to undertake Interim Road Safety Audits. Aside from being undertaken at an interim stage, Interim Road Safety Audits shall be carried out following the same procedures as for the formal audit stages. Interim Road Safety Audits do not replace the formal audit stages, which must still be undertaken in full.

4.2.4 All pre-construction Road Safety Audits shall have a maximum shelf life of 2 years. Should a scheme not begin the next stage in its development within 2 years of the completion of the previous Road Safety Audit, the scheme should be re-audited. This is to ensure that due consideration has been given to the scheme's interface with the current highway network.

4.2.5 Road Safety Audits should be repeated if any element of a scheme is significantly changed subsequent to a Road Safety Audit having been undertaken.

4.3 Appointing the Safety Audit Team

4.3.1 The organisation conducting the Road Safety Audit will appoint members to the Road Safety Audit Team from individuals that have the necessary qualifications and experience.,

4.3.2 The Road Safety Audit Team will consist of at least two members although there is no upper limit to the size of the team. One member of the team will be appointed as the Audit Team Leader.

4.3.3 The Design Manager must be satisfied as to the independence and competence of the team to undertake the Road Safety Audit. The use of personnel from previous Road Safety Audit work does not guarantee their suitability to audit all schemes on the TLRN.

4.3.4 On occasions a member of staff with the appropriate training, skills and experience may accompany the Road Safety Audit Team as an Observer in order for them to gain experience of the audit process. The Road Safety Audit Team Observer is encouraged to contribute actively to the audit process.

4.3.5 If there are any unusual or specialist measures to be audited the Audit Team Leader may elect to appoint an appropriate specialist to advise the Road Safety Audit Team.

4.3.6 The Design Manager must be satisfied that members of the proposed Road Safety Audit Team have adequate and relevant training, skills and experience. For TfL staff this will be assessed through TfL's performance review system. For individuals from outside of TfL this will be demonstrated either by submission of a curriculum vitae to the Design Manger, inclusion on an approved list, or membership of an appropriate professional organisation.

4.3.7 Each curriculum vitae should consist of no more than 3 pages of information. The curriculum vitae should demonstrate that the experience and training in Road Safety Audit, Collision Investigation or Road Safety Engineering is relevant to the scheme to be audited, in terms of scheme type and complexity. Other relevant experience, covering areas such as highway design, traffic management and highway maintenance, should also be demonstrated on the curriculum vitae.

4.3.8 The following list gives guidance on acceptable training, skills and experience for Road Safety Audit Team members:

a) Audit Team Leader

- A minimum of 4 years Collision Investigation or Road Safety Engineering experience; and
- Attendance of a 10-day recognised formal Collision Investigation or Road Safety Engineering course; and
- Completion of at least 5 Road Safety Audits in the past 12 months as an Audit Team Leader or member; and
- A minimum of 2 days Continuing Professional Development Record (CPD) in the fields of Road Safety Audit, Collision Investigation or Road Safety Engineering in the past 12 months.

b) Safety Audit Team Member

- A minimum of 2 years Collision Investigation or Road Safety Engineering experience; and
- Completion of at least 5 Road Safety Audits as Audit Team Leader, Member or Observer in the past 24 months; and
- Attendance of a 10-day recognised formal Collision Investigation or Road Safety Engineering course; and
- A minimum of 2 days CPD in the fields of Road Safety Audits, Collision Investigation or Road Safety Engineering in the past 12 months.

4.3.9 The most appropriate candidates for Audit Team Leader and Audit Team Member are individuals whose current employment involves Collision Investigation or Road Safety Engineering on a regular basis. This should

ensure that auditors are well versed in the most recent practices and developments in the field. Those who have not undertaken such work on a regular basis in the previous 2 years are unlikely to be acceptable.

4.3.10 An Audit Observer should have acceptable levels of training, skills and experience prior to accompanying the Road Safety Audit Team in order that they gain worthwhile experience from the audit. For guidance, an Observer should have:

- A minimum of 1 year Collision Investigation or Road Safety Engineering experience.
- Attendance of a 10-day recognised formal Collision Investigation or Road Safety course.

4.4 Independence of the Road Safety Audit Team

4.4.1 It is central to the auditing procedures that no member of the Road Safety Audit Team has had any connection with the design of the measures being audited and should maintain this independence throughout the audit process.

4.4.2 The requirement for Road Safety Audit Team independence does not preclude direct contact between the Road Safety Audit Team and Design Team. There may be times where there is clear benefit in allowing this to happen, for example in clarifying the Audit Brief. Alternatively, direct contact may be unavoidable if the Client Organisation and Design Organisation are one and the same. It is of paramount importance, however, that the Road Safety Audit Team maintains its independence. The Design Team should not in any way influence the outcome of the audit by discussing any design considerations or issues with the Road Safety Audit Team.

4.4.3 The Road Safety Audit Team is not permitted to go beyond making recommendations in broad terms. In making detailed recommendations the Road Safety Audit Team may be seen to be taking on design responsibilities and hence, lose its independence from the design process.

4.4.4 The Road Safety Audit Report will be reviewed within the Road Safety Audit Team and issued to the Design Manager as final. Any issues within the Road Safety Audit Report that the Design Manager disagrees with, are considered to be outside the terms of reference, or irrelevant to the Road Safety Audit should be addressed through the Road Safety Audit Response Report.

4.4.5 Neither the Client Organisation nor the Design Organisation should petition the Road Safety Audit Team to change the content of the Road Safety Audit Report.

4.4.6 All contact between the Design Organisation and Road Safety Audit Team must be recorded. The Road Safety Audit Team will keep a record of contact with the Design Team on the audit file.

4.5 Initiating the Road Safety Audit

4.5.1 The Design Manager initiates the Road Safety Audit process at the appropriate stages of a scheme's development ensuring that sufficient time is available to complete the full procedure. This shall include an allowance for the incorporation of changes into the design that may arise from the Road Safety Audit.

4.5.2 The Design Manager ensures that the Road Safety Audit Team is given due notice of when the proposals will be ready for the Road Safety Audit and agrees with the Audit Team Leader the date by which the Road Safety Audit Report will be issued. For guidance, Design Managers should anticipate allowing between three and six working weeks for the delivery of audits, depending on the complexity of the scheme, from issue of a complete audit brief. Complex schemes may take considerably longer than this.

4.5.3 The Design Manager liaises with the Design Team to prepare the Audit Brief utilising the audit brief checklist as shown in Appendix F.

4.5.4 The Audit Brief is forwarded by the Design Manager to the nominated Audit Team Leader for consideration. The Audit Team Leader may direct any requests for clarification of the Brief to the Design Manager, who will liaise as appropriate with the Design Team.

4.5.5 If the Audit Team Leader considers the Audit Brief inadequate, ultimately it may either be rejected or, if appropriate, an earlier stage of Road Safety Audit undertaken.

4.5.6 Where the Design Manager considers it unnecessary for a Road Safety Audit to be carried out, a note is put on file, countersigned by the relevant Client Manager. This note must clearly state why a Road Safety Audit is not considered necessary. A model non-audit note is shown in Appendix G.

4.6 The Audit Brief

4.6.1 The Audit Brief is central to the Road Safety Audit procedure. It defines the scope of the Road Safety Audit and contains all the information necessary to give the Road Safety Audit Team a full understanding of the scheme.

4.6.2 The Audit Brief is prepared utilising the audit brief checklist as shown in Appendix F and shall include, if appropriate:

a) an instruction to carry out the Road Safety Audit as per this procedure (SQA-0170);

b) scheme title;

c) a description of the section of carriageway or junction to be audited;

d) a description of the purpose and key elements of the scheme;

e) scheme drawings to scale ('as-builts' for stage 3 and 4 audits);

f) traffic signal and phasing diagrams;

g) any known departures from standard;

h) schedules of traffic orders;

i) all previous Road Safety Audit Reports relating to the scheme;

j) all previous Road Safety Audit Response Reports relating to the scheme;

k) appropriate sized plans of the scheme for the Road Safety Audit Team to mark up and include in the Road Safety Audit Report (either A4 or A3 sized sheets);

l) traffic / pedestrian flow data (where available);

m) where the proposal contains new or modified traffic signals and detailed designs have already been prepared and had a design/safety check undertaken by TfL's Traffic Directorate, copies of their design/safety checklist must also be forwarded to the Road Safety Audit Team;

n) confirmation of construction dates and, if appropriate, staged construction programmes (stage 4 Road Safety Audits only);

o) details of other notable events that have occurred since construction (stage 4 Road Safety Audits only); and

p) any other information relating to existing features, that in the opinion of the Design Manager, will be required by an Road Safety Audit Team that has no prior knowledge of the proposals or existing conditions.

4.6.3 Stage 4 Road Safety Audit Briefs that do not contain robust construction dates will be rejected by the Audit Team Leader and the Design Manager will be advised to commission a collision investigation study instead.

4.7 Performing the Road Safety Audit

4.7.1 The Road Safety Audit Team carries out the Road Safety Audit as described in the Audit Brief.

4.7.2 The Road Safety Audit Team must consider the measures from the viewpoint of all the road users that may be anticipated to use the scheme and where appropriate, may use a combination of driving, walking and cycling through the scheme to assist their evaluation and ensure they have a comprehensive view.

4.7.3 At each stage of the Road Safety Audit process all members of the Road Safety Audit Team must visit the site of the scheme together during daylight.

4.7.4 At Stage 3, and in addition to the daylight site visit as required by Paragraph 6.7.3 above, all members of the Road Safety Audit Team must visit the site of the scheme together during the hours of darkness to

identify hazards particular to night-time operation. Seasonal variation will sometimes necessitate undertaking night-time site visits at a late hour. In such cases the Audit Team Leader may elect to defer the night-time visit for up to 4 months, particularly if the personal safety of the Road Safety Audit Team is considered to be an issue. When deferring the night-time site visit the Road Safety Audit Report will be issued in draft until such time as the night-time visit is undertaken. A note will be made in the draft Road Safety Audit Report as to when the night-time site visit is planned.

4.7.5 The Road Safety Audit Team should also consider the effects of different weather conditions that may affect the operation of the scheme.

4.7.6 The Audit Team Leader shall invite representatives from the police to accompany the Road Safety Audit Team to offer their views for the Stage 3 Audit. Where it proves not to be possible to arrange the site visit to accommodate this, the police should be invited to submit their views in writing to the Road Safety Audit Team.

4.7.7 Significant issues that may be identified at any Road Safety Audit stage should be notified to the Design Manager as soon as possible. This is to give the best chance for resulting modifications to be undertaken at the earliest opportunity or to ensure that expeditious action can be taken to remedy a potentially hazardous situation. This is particularly important for problems identified during the Stage 3 Road Safety Audit.

4.7.8 The Road Safety Audit issues guidance lists shown in Appendix A indicate the general aspects that it may be necessary to consider when undertaking a Road Safety Audit. They are provided for guidance only and should not be used as the basis for carrying out an audit or as ‘tick’ sheets. Nor should they be taken as a comprehensive list of issues to be considered when undertaking an audit.

4.8 Road Safety Audit Report

4.8.1 For each scheme presented, the Road Safety Audit Team carries out the audit and prepares a Road Safety Audit Report.

4.8.2 The Road Safety Audit Report shall be structured in logical sequence within headings, and must include details of:

a) key parties to the audit;

b) the section of highway being audited, the audit stage and the membership of the Road Safety Audit Team;

c) details of site visits undertaken including the prevailing weather conditions;

d) description of the purpose and key elements of the scheme;

e) details of previous Road Safety Audits and responses, including an assessment of resolution of problems raised therein;

f) specific safety problems identified, supported by the background reasoning and the type of collision likely to occur;

g) recommendations, in broad terms, for resolving any of the potential safety problems identified during the audit;

h) A3/A4 size plans of the scheme, marked up and referenced to problems;

i) a validity statement signed by the Road Safety Audit Team confirming team membership and independence from the Design Team. An example of a validity statement is shown in Appendix B;

j) a schedule of drawings and documents examined; and

k) details of 'before and after' collision analysis (stage 4 audits only).

4.8.3 Problems and recommendations should normally be set out under headed sections in the report that follow those of the guidance lists. If appropriate, however, they may be set out in an alternative format, such as geographical order.

4.8.4 Auditors must avoid making recommendations using words such as 'consider' or 'monitor' as they are too weak and may be ignored by clients.

4.8.5 Illustrative Road Safety Audit Reports are shown in Appendix C for a Stage 1 Road Safety Audit and Appendix D for a Stage 4B Road Safety Audit. These should be adapted as appropriate for other stages of Road Safety Audit. Note that these reports are published only to give examples of the style and layout for acceptable Road Safety Audit Reports.

4.8.6 The Road Safety Audit Report is checked by the Audit Team Leader to ensure that it does not contain issues considered to be outside the terms of reference, or irrelevant to the Road Safety Audit. The ultimate decision as to the content of the Road Safety Audit Report rests with the Audit Team Leader.

4.8.7 The Road Safety Audit Report is submitted direct to the Design Manager, but may be simultaneously copied to the Design Team for information to expedite the response process. Once issued, the Road Safety Audit Report is final and all issues raised in it must be addressed by way of the formal response procedure, except where a stage 3 dark site visit is deferred. When a stage 3 dark site visit is deferred the Road Safety Audit Report should be issued in draft until such time that the site visit has been carried out.

4.8.8 Issues raised in previous safety audit reports that have been addressed by way of alternative action approved by the Client Manager in a Road Safety Audit Response Report should not be raised as a problem again.

4.8.9 The Road Safety Audit issues guidance lists should not be included in the Road Safety Audit Report.

4.8.10 Issues that are beyond the scope of the Road Safety Audit, but that the Road Safety Audit Team believes should be brought to the attention of the Design Manager may be included within Section 4 of the Road Safety Audit Report. These issues could include areas where maintenance /

repair / renewal may be required**,** operational concerns or existing poor provision**.** Such issues should be clearly identified as being beyond the scope of the Road Safety Audit and should not be integrated into the main Problem and Recommendation section of the report. Section 4 of the Road Safety Audit report is not intended as an opportunity for the audit team to undertake a full appraisal of the existing site conditions, and only issues that are regarded by the Audit Team as significant should be included.

4.9 Responding to the Road Safety Audit Report

4.9.1 The Design Manager reviews the Road Safety Audit Report and ensures that all problems identified in the report are given due consideration.

4.9.2 If necessary, the Design Manager may consult the Design Team, requesting the Design Team's response to the Road Safety Audit Report.

4.9.3 All issues raised in the Road Safety Audit Report must be addressed in the Road Safety Audit Response Report. This report will contain details of how the Client Organisation proposes to implement recommendations made in the Road Safety Audit Report. Where the Design Manager disagrees with the recommendations made in Road Safety Audit Report, or decides that the solutions recommended are not suitable given relevant constraints, the Road Safety Audit Response Report justifies alternative action from that recommended in the Road Safety Audit Report.

4.9.4 The Client Manager reviews the Road Safety Audit Response Report and considers the content in relation to the Road Safety Audit Report.

4.9.5 The Client Manager either concurs with the recommendations of the Design Manager in the Road Safety Audit Response Report or decides on an alternative action. If deciding on alternative action the Road Safety Audit Response Report will be amended accordingly. The Road Safety Audit Response Report is then signed off by the Client Manager.

4.9.6 The Design Manager instructs the Design Organisation or others if applicable, in respect of changes required to the scheme arising from the Road Safety Audit, as detailed in the Road Safety Audit Response Report. It is important that the Design Organisation do not begin to make changes to the scheme without the express instruction of the Design Manager.

4.9.7 A scheme should be submitted for Road Safety Audit again if significant changes are made to it as a result of a Road Safety Audit.

4.9.8 The Design Manager forwards a copy of the Road Safety Audit Response Report to the Audit Team Leader for information.

4.9.9 The Road Safety Audit Response Report must be completed before the next stage in the scheme's development is begun.

4.9.10 Appendix E shows a model Road Safety Audit Response Report.

4.9.11 When incorporating Road Safety Audit recommendations into scheme designs the Design Organisation is responsible for reviewing and amending any design risk assessments required by health and safety legislation.

4.10 Filing and Archiving

4.10.1 The Design Manager ensures that all documents relating to commissioning and managing the Road Safety Audit are collated and placed in the audit file. These must include:

a) the Road Safety Audit Reports;

b) Copy of the Road Safety Audit Response Report; and

c) all related correspondence and background papers.

4.10.2 The Audit Team Leader ensures that all working documents supplied as part of the Audit Brief, including plans and maps are collated and retained.

4.10.3 It is the responsibility of the Design Manager to retain a copy of the signed final Road Safety Audit Report and original Road Safety Audit Response Reports.

4.10.4 Filing and retention arrangements for Road Safety Audits must pay due regard to complying with the Freedom of Information Act.

5 References

5.1 Design Manual for Roads Bridges (DMRB) Volume 5 Section 2, HD19/03' published by The Stationary Office

5.2 Guidelines for Road Safety Audit 2008 published by the Institution of Highways and Transportation.

6 Definitions

General

6.1 Road Safety Audit

The staged evaluation of the safety of changes to the highway during design, implementation and subsequent operation. It seeks to identify potential safety hazards that may affect any type of road user. This evaluation is carried out during the design stages (stages 1 & 2), as closely as possible after the measures become operational (stage 3) and at 12 and 36 months after the measures become operational (stages 4A & 4B). Road Safety Audit is compulsory for schemes on the TLRN.

6.2 Interim Road Safety Audit

The application of Road Safety Audit to a Scheme at intermediate stages during the preliminary design, detailed design or construction stages. It is not mandatory or a substitute for the formal stages of audit.

6.3 Audit Brief

The instructions given to the Road Safety Audit Team to undertake the audit. It defines the scope of the audit and provides sufficient information that the Road Safety Audit Team can carry out the requested audit.

6.4 Road Safety Audit Report

The report prepared by the Road Safety Audit Team, which describes potential safety problems identified within the proposals and recommends actions to overcome or mitigate them.

6.5 Safety Audit Response Report

The report describing how the recommendations made in the Road Safety Audit Report will be implemented and/or why any of the recommendations made in the Road Safety Audit Report cannot or will not be incorporated into the proposals. These were formerly known as Exception Reports.

6.6 Scheme

All works that involve construction of new highway or permanent change to the existing highway layout or features. This includes changes to road layout, kerbs, signs and markings, lighting, signalling, drainage, landscaping and installation of roadside equipment. A like for like replacement of any of the above features does not constitute a change.

6.7 Road Safety Engineering

The design and implementation of physical changes to the road network intended to reduce the number and severity of collisions involving road users, drawing on the results of Collision Investigations.

6.8 Collision Investigation

The collection and examination of historical collision data over a period of time in order to identify patterns, common trends and factors that may have contributed to the collisions.

Audit Roles & Responsibilities

6.9 Client Organisation (Highway Authority)

The organisation with overall responsibility for the scheme to be audited. This will generally be the highway authority or asset owner for the route on which the scheme is to be implemented.

6.10 Design Manager

The person who is responsible for commissioning the Road Safety Audit, preparing and issuing the Audit Brief and ensuring that the Road Safety Audit Response Report is properly completed and signed off.

6.11 Client Manager

The person who has responsibility to approve actions that the Design Manager wishes to take. The Client Manager has particular responsibility to sign off the Road Safety Audit Response Report and any proposal to dispense with a Road Safety Audit.

6.12 Design Organisation

The organisation(s) commissioned to undertake the various stages of the design and supervision of implementation of the measures.

6.13 Design Team

The team within the Design Organisation undertaking the various stages of the design and supervision of implementation of the measures. The Design Team has responsibility for assisting the Design Manager in compiling the Audit Brief and writing the Road Safety Audit Response Report.

6.14 Road Safety Audit Team

A team, of at least two people, independent of the Design Team, comprising of staff with appropriate levels of road safety engineering experience and collision investigation and prevention experience, that carries out the Road Safety Audit.

6.15 Audit Team Leader

The person with overall responsibility for carrying out the Road Safety Audit and certifying the report.

6.16 Audit Team Member

Any other individual who is appointed to the Road Safety Audit Team.

6.17 Audit Observer

An individual who accompanies the Road Safety Audit Team for training purposes.

6.18 Specialist Advisor

Specialist appointed by the Audit Team Leader to advise the Road Safety Audit Team on occasions when a scheme includes unusual or specialist measures outside the experience of the Road Safety Audit Team.

7 **Documentation**

7.1 Appendix A - Model Road Safety Audit Issues Guidance Lists

7.2 Appendix B - Model Audit Team Statement

7.3 Appendix C - Model Stage 1 Safety Audit Report

7.4 Appendix D - Model Stage 4B Safety Audit Report

7.5 Appendix E - Model Response Report

7.6 Appendix F - Model Audit Brief Checklist

7.7 Appendix G - Model Non-Audit Note on File

8 **Document Control**

ISS	DATE	PURPOSE	BY	CHK	APP
SMS-007					
0	Nov 03	Draft, issued for comment			
1	May 05	Issued for use	PDC	CF,GF,PW	CM
SQA-0170					
1	Dec 06	Amended and renumbered from SMS-007 and issued for comment	DB		
2	Feb 07	Issued for use	AH	CF	RTR
3	Mar 09	Amended following review Reformatted and issued for use	MB	GD	CF
Issue	**Date**	**Change Summary**	**Author**	**Checker**	**Approver**
4	Jul 11	Earlier version amended following review Reformatted from old styles and issued for use	MB	GD	LM

Appendix A - Model Road Safety Audit Issues Guidance Lists

Appendix A - Model Road Safety Audit Issues Guidance Lists

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A1

Location audited .....

Audit stage .....

Junctions

Item No.	Description	Comments
1	Are carriageway and lane widths adequate?	
2	Are entry/exit alignments satisfactory?	
3	Is the form of control appropriate to the situation?	
4	Is there adequate deflection at roundabouts?	
5	Is there unacceptable conflict between turning vehicles?	
6	Are traffic islands properly located?	
7	Is forward visibility acceptable?	
8	Could forward visibility be obstructed by parked vehicles, bus stops, etc.?	
9	Are side road sight lines adequate?	
10	Are side road "stop" signs/markings necessary rather than "give way"?	
11	Is lighting adequate?	
12	Are advanced warning signs required?	
13	Are road markings adequate and unambiguous?	
14	Are dropped kerbs required?	
15	Is tactile paving required?	
16	Have drainage issue been addressed?	
17	Are pedestrian guardrails required?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A2

Location audited .....

Audit stage .....

Traffic Signals

Item No.	Description	Comments
1	Is the forward visibility of the signals acceptable?	
2	Are backing boards for signals required?	
3	Are additional signal heads required?	
4	Are mast arm signals required?	
5	Are advanced warning signs required?	
6	Are signal heads masked by street furniture, trees or other obstructions?	
7	Are private accesses affected by the signals?	
8	Is there intervisibility of signals between crossing streams?	
9	Are there any "see through" problems?	
10	Are additional refuges with signal heads needed?	
11	Are phasing, staging and timings (including intergreen and clearance periods) optimised for safety?	
12	Is speed assessment equipment needed?	
13	Will closely associated signals cause problem for pedestrians?	

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A2 (Continued)

Item No.	Description	Comments
14	Are right turning vehicles safely provided for?	
15	Can pedestrians cross safely?	
16	Are pedestrian guardrails needed?	
17	Will street furniture, trees or other obstructions mask pedestrians?	
18	Are dropped kerbs well located?	
19	Is tactile paving or other special facility for the disabled required?	
20	Are central reservations/refuges of sufficient width?	
21	Are "look left/look right" markings required?	
22	Is carriageway marking adequate and unambiguous?	
23	Are advanced stop lines for cyclists required?	
24	Are the signals easily visible at night?	
25	Are turning circles for large vehicles adequate?	
26	Is anti skid surfacing required?	
27	Do signal poles have adequate clearance from the carriageway?	
28	Do signal poles unduly obstruct the footway?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A3

Location audited .....

Audit stage .....

Pedestrians

Item No.	Description	Comments
1	Are footway widths adequate?	
2	Is the pedestrian footway obstructed by street furniture, signal posts, trees, etc?	
3	Are there dropped kerbs or continuous footways at side roads?	
4	Is the minimum safe width for shared footway/cycle achieved?	
5	Is there undue pedestrian/cycle conflict on shared facilities?	
6	Does any loading/parking/bus bay adversely effect pedestrian safety?	
7	Do channels or gullies, etc adversely effect pedestrian routes?	
8	Do access points/crossovers create problems for pedestrians?	
9	Does permitted footway parking create problems?	
10	Does observed illegal parking create problems?	
11	Is street lighting adequate for pedestrians?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A4

Location audited .....

Audit stage .....

Pedestrian Crossing Facilities
(Including Signals/Pelicans/Puffins/Toucans and Zebras)

Item No.	Description	Comments
1	Are the types of crossings and layouts appropriate for road width and speed limit?	
2	Are the crossings on the pedestrian desire lines?	
3	Are pedestrian guardrails required/adequate?	
4	Is forward visibility of crossings acceptable?	
5	Will pedestrians be masked by street furniture, guardrails, trees or on-carriageway obstructions?	
6	Are signals/beacons visible to traffic?	
7	Are signals/beacons visible to traffic turning out of side roads?	
8	Are additional signal heads required?	
9	Are mast arm signals required?	
10	Are pedestrian aspects well sited?	
11	Are there "see through" problems with pedestrian aspects?	
12	Are advanced warning signs needed?	
13	Are pedestrian push buttons appropriately sited?	
14	Is the length of the green man phase appropriate?	
15	Are zig-zag markings adequate?	

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A4 (continued)

Item No.	Description	Comments
16	Can pedestrians be seen at night?	
17	Is additional lighting required?	
18	Are dropped kerbs provided and well located?	
19	Will water pond at dropped kerb crossing points?	
20	Is tactile paving or other special facility for the disabled provided?	
21	Is there sufficient footway width for pedestrian storage (including prams and wheelchairs)?	
22	Is there sufficient footway width for cyclists at Toucans?	
23	Are crossing widths wide enough?	
24	Are staggered facilities orientated "left/right"?	
25	If staggered, will 'U' turn, left turn, right turn vehicles conflict with pedestrians?	
26	Is anti skid surfacing needed?	
27	Do signal poles/beacons have adequate clearance from the carriageway?	
28	Do signal poles/beacons unduly obstruct the footway?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A5

Location audited .....

Audit stage .....

Refuges

Item No.	Description	Comments
1	Are refuges of appropriate width?	
2.	Can prams and cycles be accommodated safely on the refuges?	
3	Do any refuges obstruct turning traffic?	
4	Will any refuges encourage pedestrians to cross where visibility is obscured?	
5	Are there dropped kerbs at all refuges intended for pedestrian use?	
6	Are any refuges poorly located in respect to loading/parking boxes?	
7	Is there sufficient carriageway width at the refuge?	
8	Will pinch-points be created for cyclists?	
9	Will refuges be visible at night?	
10	Do any refuges adversely affect private accesses?	
11	Should any refuges have "lollipop" beacons?	
12	Do any refuges obstruct the forward visibility of right turning traffic?	
13	Are refuges intended to protect right turners from following vehicles correctly sited?	
14	Are guardrails required?	
15	Is hatching/white lining adequate?	
16	Is tactile paving required?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A6

Location audited .....

Audit stage .....

Cycle facilities

(Cycle lanes on the carriageway)

Item No.	Description	Comments
1	Are signs and markings appropriate?	
2	Are the cycle lane widths appropriate?	
3	Does the creation of the cycle lane allow sufficient width for other vehicle lanes?	
4	Is the road surface of a suitable quality for cycling?	
5	Are the start/finish points of the cycle lanes safe and adequately marked?	
6	Is the provision of a coloured surfacing appropriate?	
7	Is there adequate provision at side roads?	
8	Is there adequate provision for right turns?	
9	Is there adequate provision at main road crossing points?	
10	Should the cycle lane be advisory or dedicated solely for the use of cyclists?	
11	Are gully grates of an appropriate design/alignment?	

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A6 (continued)

(Cycle tracks off the carriageway)

Item No.	Description	Comments
1	Are signs and markings appropriate?	
2	Are there adequate track and footpath widths?	
3	Are the cyclists and pedestrians appropriately segregated by the use of a longitudinal division and ladder / tramline tactiles?	
4	Do shared cycle/footway facilities have adequate flush dropped kerbs to enable cyclists to join / leave the facility safely?	
5	Is headroom adequate for cyclists, 2.4m to structures or 2.3m to signs?	
6	Is the vertical alignment of the cycle lane acceptable, particularly at side road junctions?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A7

Location audited .....

Audit stage .....

Motorcycle issues

Item No.	Description	Comments
1	Is the road surfacing of a consistent and adequate standard?	
2	Is there a need for anti-skid surfacing?	
3	Does on street parking obstruct sight lines?	
4	Do posts or rails have sharp edges, protrusions or parts that can entrap motorcyclists?	
5	Are inspection covers located in likely travel paths?	
6	Is there adequate visibility and delineation of central islands at night especially at mini roundabouts?	
7	Are road humps visible at night?	
8	Is the roadside environment forgiving? Avoid rocks and other non frangible hazards on islands?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A8

Location audited .....

Audit stage .....

Bus Facilities

Item No.	Description	Comments
1	Are bus lane widths sufficient?	
2.	Are contra-flow bus lane clearly signed and marked?	
3	Is the layout at the commencement of a bus lane safe?	
4	Is the layout at the termination of a bus lane safe?	
5	Are there adequate signs and markings?	
6	Is the layout of any special bus signals adequate?	
7	Are bus cages likely to cause obstruction?	
8	Could the location of a bus stop force general traffic to cross the centre line at unsafe locations?	
9	Do the locations of any bus stops significantly affect forward visibility?	
10	Do the locations of any bus stops adversely affect cycle tracks and shared paths?	
11	Are there adequate waiting areas for pedestrians around bus stops?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A9

Location audited .....

Audit stage .....

Loading/Parking

Item No.	Description	Comments
1.	Is there sufficient carriageway width for safe movement of traffic?	
2.	Do any parking/loading boxes obscure pedestrian crossing points?	
3	Do any parking/loading boxes obscure forward visibility?	
4	Do any parking/loading boxes create an unsafe chicane effect?	
5	Do any side road parking/loading boxes cause obstruction to entering/ egressing traffic?	
6	Do any parking/loading boxes obstruct inside "through" lane where right turning takes place?	
7	Do any parking/loading boxes obstruct crossovers or dropped kerbs?	
8	Do any parking/loading boxes obstruct cycle facilities?	
9	Are there any parking/loading boxes unsafely sited with respect to refuges?	
10	Do any parking/loading boxes create problems at bus stops/bus cages?	
11	Will evening/night time parking cause obstruction?	
12	Has the parking/loading box sufficient width to enable the safe opening of a stopped vehicle door?	

General Comments

Appendix A - Model Road Safety Audit Issues Guidance Lists

ISSUES GUIDANCE LIST A10

Location audited .....

Audit stage .....

General Issues

Item No.	Description	Comments
1	Are signs/markings adequate and unambiguous?	
2	Are footway widths adequate?	
3	Is vegetation likely to obstruct sight lines, forward visibility or pedestrian movement?	
4	Is there adequate provision for vulnerable groups (specifically the very young, the elderly and people with a disability and generally, pedestrians, cyclists and riders of powered two wheelers)?	
5	Is the provision of anti-skid surfacing at conflict points and bends adequate?	
6	Is there obstruction of forward visibility or sight lines by street furniture, signs, lamps columns, etc.?	
7	Is the provision of guardrails appropriate?	
8	Is high visibility guardrail necessary?	

General Comments

Appendix B - Model Audit Team Statement

Appendix B - Model Audit Team Statement

Appendix B - Model Audit Team Statement

AUDIT TEAM STATEMENT (Stage 1 to 3 Audits)

We certify that we have examined the drawings and documents listed in Appendix A to this Safety Audit Report. The Road Safety Audit has been carried out with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the scheme. The problems identified have been noted in this report together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name: Signed: .....

Position: Date: .....

Organisation:

Address:

AUDIT TEAM MEMBER:

Name: Signed: .....

Position: Date: .....

Organisation:

Address:

Appendix B - Model Audit Team Statement

AUDIT TEAM STATEMENT (Stage 4A & 4B Audits)

We certify that we have examined the drawings and documents listed in Appendix A to this Safety Audit Report. The Road Safety Audit has been carried out with the sole purpose of identifying any feature that could be modified in order to improve the safety of the measures. The problems and changes in collision trends identified have been noted in this report together with associated recommendations for safety improvements.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name: Signed: .....

Position: Date:.....

Organisation:

Address:

AUDIT TEAM MEMBER:

Name: Signed: .....

Position: Date:.....

Organisation:

Address:

Appendix C – Stage 1 Safety Audit Report

Appendix C - Stage 1 Safety Audit Report

Appendix C – Stage 1 Safety Audit Report

Transport for London

A99 Western Avenue
Toucan Crossing

Road Safety Audit
Stage 1

Ref: 1019/011/A99/TLRN/2010

Prepared for:

TfL DRND

By:

TfL Better Routes and Places

Report Date: January 2006

Issue Version: A

Appendix C – Stage 1 Safety Audit Report

A99 Western Avenue Toucan Crossing
Stage 1 Road Safety Audit Report

Safety Audit Document Control Sheet

Audit Title: A99 Western Avenue Toucan Crossing

Audit Stage: 1

Audit Reference: 1019/011/A99/TLRN/2006

Prepared by: Tom Brown

Checked by: John Smith

Approved by: John Smith

Version	Status	Date
A	Audit report issued to Client	20/01/06
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This sheet is for TfL Quality Assurance purposes only. It is not a requirement of the Audit Terms of Reference.

Appendix C – Stage 1 Safety Audit Report

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 1 Road Safety Audit carried out on the A99 Western Avenue for the proposed Toucan Crossing.

1.1.2 The Audit was undertaken by TfL Better Routes and Places in accordance with the Audit Brief issued by the Client Organisation on 7th December 2005. It took place at the Palestra offices of TfL on 20th December 2005 and comprised an examination of the documents provided as listed in Appendix A, plus a visit to the site of the proposes scheme.

1.1.3 The visit to the site of the proposed scheme was made on 20th December 2005. During the site visit the weather was dry and the existing road surface was slightly damp. Traffic conditions were moderate to heavy.

1.2 Terms of Reference

1.2.1 The Terms of Reference of this Audit are as described in TfL Procedure SQA-0170. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the designs to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, have referred to a design standard without touching on technical audit.

1.2.2 Issues identified during the Audit and site visit that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in section 4 of this report.

1.2.3 Unless general to the scheme, all comments and recommendations are referenced to the detailed design drawings and the locations have been indicated on the A4 plan located in Appendix B.

1.2.4 This Audit has a maximum shelf life of 2 years. Should the scheme not progress to the next stage in its development within this period it should be re-audited.

1.3 Main Parties to the Audit

1.3.1 Client Organisation

Design Manager:	Robert Williams BEng (Hons.), MIHT – TfL DRND
Client Manager:	David Jones CEng, FICE, FIHT – TfL DRND

1.3.2 Design Organisation

Designer: Michael Edwards MIHT – ABC Consulting

1.3.3 Audit Team

Audit Team Leader: John Smith BEng (Hons.), MIHT – TfL BRaP

Audit Team Member: Tom Brown MIHT – TfL BRaP

1.4 Purpose of the Scheme

1.4.1 The purpose of the scheme is to provide an at-grade controlled crossing for pedestrians and cyclists across the A99 Western Avenue.

Appendix C – Stage 1 Safety Audit Report

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The Audit Team is not aware of any other audits having been carried out on the proposals.

3.0 ITEMS RAISED AT THE STAGE 1 ROAD SAFETY AUDIT

3.1 JUNCTIONS

3.1.1 PROBLEM

Location: A - Entry/Exit slip roads to/from the large gyratory, east of proposed crossing.

Summary: Slip Roads for major, grade separated junction may promote weaving on the approaches to the proposed crossing.

The existing major, grade separated junction giving access to/from the town centre for traffic leaving/joining the A99 is located only approximately 100m to the east of the proposed crossing. There is a lane drop arrangement on the eastbound approach and a lane gain arrangement on the westbound exit of this junction.

The lane gain/lane loss arrangement could be anticipated to minimise weaving and lane change manoeuvres on the approach/exit from the junction. During the site visit, however, the Audit Team observed that the existing junction arrangement promotes weaving as vehicles either leave or join the A99:

- Eastbound vehicles approaching the lane drop layout were observed waiting to the last moment before moving across to lane 1 to exit the A99 via the junction. Also, other eastbound vehicles were observed to move out of lane 1 into lane 2 shortly before the junction in order to remain on the A99,
- On joining the A99 via the lane gain layout westbound vehicles were observed to move to the right, out of lane 1, immediately on passing the nose hatching. This could either be because of ignorance of the lane gain arrangement or in impatience to progress with their journey.
- Because of the lane gain layout westbound drivers already on the A99, having passed over the junction flyover, have to move across to the left into lane 1 very soon after the junction if they wish to access Ferry Road.

There is also evidence of loss of control accidents occurring on the A99 immediately to the west on the junction, with the mangled remains of a lighting column in the northern footway and a bent section of guardrail on the central reserve.

The proposed crossing will be located in the midst of the weaving manoeuvres described in the preceding paragraphs. This increases the risk of collisions occurring should the crossing be located as proposed, above that that may be anticipated if the crossing were to be located on a section of road that had no significant weaving movements. In particular, there is an increased risk of shunt and loss of control collisions occurring, if drivers are preoccupied with changing lanes when the crossing is activated. Also, the risk of collisions involving crossing pedestrians/cyclists and vehicular traffic is increased as drivers may be concentrating on selecting their desired destination on approaching the junction and fail to observe the crossing.

RECOMMENDATION
The crossing should be relocated to a position where significant lane change manoeuvres are not taking place, provided that the new site meets the other criteria for locating a crossing, or the crossing should be grade separated to remove the potential conflict between pedestrians/cyclists and vehicular traffic.

3.2 PEDESTRIAN CROSSINGS

3.2.1 PROBLEM

Location: B - Eastbound and westbound vehicular stop lines.

Summary: Stop lines too close to Toucan crossing.

The A99 at this location is a 3-lane dual carriageway, with each lane being approximately 3.0m wide. The stop line will be laid at the normal maximum distance of 3.0m from the Toucan crossing.

The Audit Team is concerned that, with a relatively long crossing distance, pedestrians or cyclists may attempt to cross late in the stage. This may put them at risk of a collision with vehicular traffic, particularly if they are mobility impaired and unable to cross in the remaining time. This risk may be increased by the stop lines being set back from the crossing by only 3.0m as, with three relatively narrow lanes of approaching traffic, a driver may fail to see a slow moving pedestrian and proceed through the crossing on flashing amber.

RECOMMENDATION
Ensure that the invitation to cross is short to discourage pedestrians or cyclists from crossing late in the stage and that suitable detection equipment is installed to allow slow moving pedestrians time to complete the crossing. Investigate extending the distance of the stop lines from the crossing to more than 3.0m to improve intervisibility between drivers and crossing users.

Appendix C – Stage 1 Safety Audit Report

3.2.2 PROBLEM

Location: C – In-line approaches to the Toucan crossing.

Summary: In-line approaches may encourage pedestrians or cyclists to move out into the carriageway without due caution.

On the northern side of Western Avenue there will be in-line access to the Toucan crossing via a short cut through to Shepherds Avenue and on the southern side via a proposed footpath. These in-line approaches increase the risk of pedestrians or cyclists moving out into the carriageway without due caution, particularly when they are approaching late in the crossing green stage.

RECOMMENDATION
Ensure that a suitable level of deflection is provided on the approaches to the Toucan crossing to deter pedestrians and cyclists from moving out into the carriageway without due caution. This could be achieved through realignment of the approaches or installing staggered barriers.

3.2.3 PROBLEM

Location: D - Toucan crossing tactile paving.

Summary: Tactile paving layout may not be sufficient to prevent sight impaired pedestrians from walking out into live traffic.

Notwithstanding Problem 3.2.2, the tactile paving layout on the northern and southern sides of Western Avenue may not be of sufficient depth to prevent sight impaired pedestrians from walking out into live traffic when approaching in-line on the adjoining footpaths. It appears possible for pedestrians to reach the dropped kerb without stepping on any tactile paving. On reaching the dropped kerb there are only two rows of tactile paving, which may be insufficient to warn a sight impaired pedestrian that they are about to step out into the carriageway.

RECOMMENDATION
Ensure that 3 rows of tactile paving to a depth of 1.2m are installed at the dropped crossing where pedestrians can approach in-line as detailed in paragraph 1.5.1.2 of the DETR publication ‘Guidance on the use of tactile paved surfaces’.

3.2.4 PROBLEM

Location: Proposed lengths of guardrail at the Toucan crossing.

Summary: Guardrail may reduce intervisibility between pedestrians/cyclists and vehicular traffic.

The drawing shows that various lengths of 'standard guardrail to conform to landscape strategy' will be installed around the Toucan crossing. The existing guardrail at this location, on the central reserve, is not a high intervisibility type. If this type of guardrail is used intervisibility between pedestrians/cyclists and vehicular traffic will be much reduced. This increases the risk of collisions between crossing users and vehicular traffic.

RECOMMENDATION
Install a high intervisibility type of guardrail.

3.2.5 PROBLEM

Location: E - Eastbound approach to Toucan.

Summary: Existing tree reduces visibility of nearside signals.

There is an existing tree on the eastbound approach to the Toucan that may reduce visibility of the nearside signal head for approaching drivers. This may increase the risk of vehicle to vehicle shunts and collisions between crossing users and vehicular traffic if drivers fail to observe the signal.

RECOMMENDATION
Ensure that visibility of all signal heads remains unobstructed for approaching traffic.

Appendix C – Stage 1 Safety Audit Report

3.3 GENERAL

3.3.1 PROBLEM

Location: General.

Summary: Existing traffic speeds too high.

The speed limit on this length of the A99 is 40mph. The speed survey shows that actual speeds frequently exceed the speed limit, with some sites/periods having an 85th %ile speed in excess of 60mph and mean average in excess of 50mph. High approach speeds to the Toucan crossing may result in vehicle to vehicle shunts and collisions between pedestrians/cyclists and vehicular traffic.

RECOMMENDATION
Provide additional advance warning to drivers of the crossing through signs and road markings (e.g. extended zig-zags) and ensure that vehicular speeds on the approaches to the crossing are constrained to no more than 40mph.

End of list of Problems identified and Recommendations offered in this Stage 1 Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 1 ROAD SAFETY AUDIT THAT ARE OUTSIDE THE TERMS OF REFERENCE

Issues identified during the audit and site inspection that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in this section. These issues could include areas where maintenance / repair / renewal may be required, operational concerns or existing poor provision. In raising these issues, the Audit Team in no way warrant that a full review of the highway environment has been undertaken beyond that necessary to undertake the Audit as commissioned.

4.1 ISSUE

Location: Northern footway.

Reason considered to be outside the Terms of Reference: Existing maintenance item not affected by the proposals.

The existing footway on the northern side of the A99 in the vicinity of the proposed crossing is in a poor state of repair and could present a trip hazard to pedestrians. It should be resurfaced.

5.0 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in Appendix A. to this Safety Audit Report. The Road Safety Audit has been carried out with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the measures. The problems identified have been noted in this report together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name: John Smith BEng (Hons.), MIHT Signed: *John Smith*

Position: Principal Road Safety Auditor Date: *20/01/06*

Organisation: Transport for London
BRaP

Address: 7th Floor, Palestra
197 Blackfriars Road
London
SE1 8NJ

AUDIT TEAM MEMBER:

Name: Tom Brown MIHT Signed: *Tom Brown*

Position: Senior Road Safety Auditor Date: ***20/01/06***

Organisation: Transport for London
BRaP

Address: 7th Floor, Palestra
197 Blackfriars Road
London
SE1 8NJ

APPENDIX A

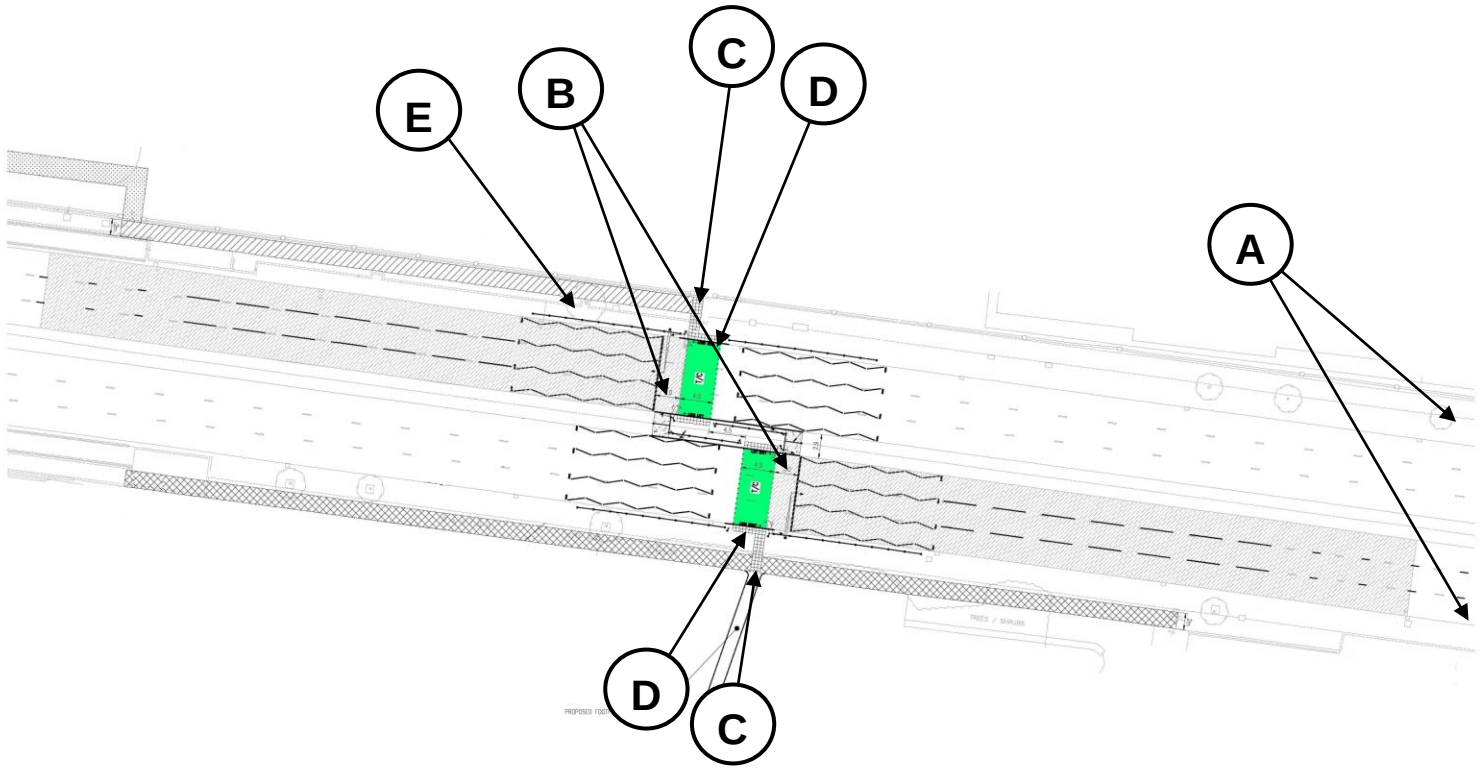
Documents Forming the Audit Brief

- Drg. P/A99/100-02 – General Arrangement.
- Pedestrian & Cyclist Counts, June 2005.
- Speed Reports Apr-05.
- Vehicle Flow Reports Apr-05.

APPENDIX B

Problem Locations

Appendix C – Stage 1 Safety Audit Report



Appendix D – Stage 4B Safety Audit Report

Appendix D - Stage 4B Safety Audit Report

Appendix D – Stage 4B Safety Audit Report

Transport for London

Trinity Street (Hampton)

Cycleway

Road Safety Audit

Stage 4B

Ref: 0999/040/B123/BOR/2006

Prepared for:

TfL Road Safety Research

By:

TfL Better Routes and Places

Report Date: **April 2011**

Report Version: **A**

Appendix D – Stage 4B Safety Audit Report

Safety Audit Document Control Sheet

Audit Title: Trinity Street (Hampton) Cycleway

Audit Stage: 4B

Audit Reference: 0999/040/B123/BOR/2011

Prepared by: John Smith

Checked by: Tom Brown

Approved by: John Smith

Version	Status	Date
A	Audit report issued to Client	April 2011
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This sheet is for TfL Quality Assurance purposes only. It is not a requirement of the Audit Terms of Reference.

Appendix D – Stage 4B Safety Audit Report

Transport for London
Directorate of Road Network Performance

London Road Safety Unit

Site Investigation Sheet – Stage 4B Road Safety Audit

Location Trinity Street			**File no.** 0999
Borough Hampton	**'Collins' Master atlas reference** P500 DJ66	**Road Type** BOR	**Node/Link/ Cell** Link 950-960 Node 960
Works start date:	**October 1999**	**Works completion date:**	**May 2000**

Accident data for the 36 month period before works and 36 month period after works:

Accidents per 12 month period in the 36 month period before works:	**Fatal**	**Serious**	**Slight**	**Total**
1st October 1996 to 30th September 1997	0	2	2	4
1st October 1997 to 30th September 1998	0	1	3	4
1st October 1998 to 30th September 1999	0	0	3	3
Total Accidents	**0**	**3**	**8**	**11**
Average Annual Accident Rate	**0**	**1**	**2.66**	**3.66**

Accidents per 12 month period in the 36 month period after works	**Fatal**	**Serious**	**Slight**	**Total**
1st June 2000 to 31st May 2001	0	0	6	6
1st June 2001 to 31st May 2002	0	2	7	9
1st June 2002 to 31st May 2003	0	0	3	3
Total Accidents	**0**	**2**	**16**	**18**
Average Annual Accident Rate	**0**	**0.66**	**5.33**	**6**

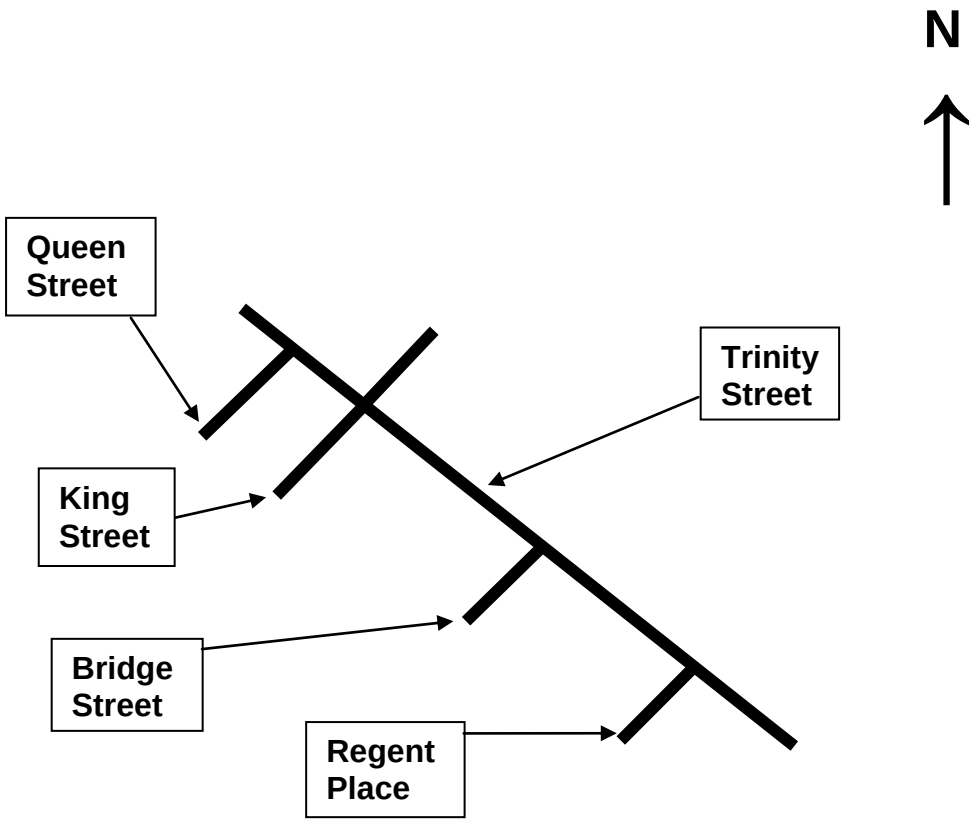
Appendix D – Stage 4B Safety Audit Report

Accident totals and percentages for the main accident types

	P2W	Pedal cycle	Ped	Wet	Dark	Right turn	KSI
Annual average number of accidents **before** works	0.66	0.66	0	1	1.33	0.33	1
Percentage of total	18.18	18.18	0	27.27	36.36	9.09	27.27
Annual average number of accidents **after** works	**2.33**	**2.33**	0	1	**1.66**	0.33	0.66
Percentage of total*1	**38.88**	**38.88**	0	16.66	27.77	5.55	11.11
*Comparative Rate - Inner Boroughs %*2*	*31.7*	*11.5*	*20.4*	*17.3*	*32.1*	*20.4*	*15.2*

- *1 - Bold type indicates where the post construction accident rate or proportion is higher than the pre construction rate.
- *2 - Proportion of relevant accidents as a percentage of total accidents in Inner Boroughs (see Table 2.3.1 of *Levels of accident risk in Greater London,* Issue 11, 2006). Shaded areas indicate where the % of the total number of accidents given for that location is greater than the comparative rate.

SITE LOCATION PLAN



Appendix D – Stage 4B Safety Audit Report

Trinity Street (Hampton) Cycleway
Stage 4B Safety Audit Report

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 4B Road Safety Audit carried out on the Trinity Street (Hampton) Cycleway using 36 months of reported accident data prior to commencement of the scheme and 36 months of reported accident data following completion of the scheme.

1.1.2 The Audit was undertaken by TfL BRaP in accordance with the Audit Brief issued by the Client Organisation on 6th September 2010. It took place at the Palestra offices of TfL on 27th September 2010 and comprised an examination of the documents provided as listed in Appendix A, plus visits during the hours of daylight and darkness, to the site of the scheme.

1.1.3 The visits to the site of the proposed scheme were made on 27th September 2010. During the site visits the weather was clear and the existing road surface dry.

1.2 Terms of Reference

1.2.1 The Terms of Reference of this Audit are as described in TfL Procedure SQA-0170. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the designs to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, have referred to a design standard without touching on technical audit.

1.2.2 Unless general to the scheme, all problem/recommendation locations have been indicated on the A4 plan located in Appendix C.

1.3 Main Parties to the Audit

1.3.1 Client Organisation

Design Manager: Robert Williams BEng (Hons.), MIHT – TfL DRND
Client Manager: David Jones CEng, FICE, FIHT – TfL DRND

1.3.2 Design Organisation

Designer: Michael Edwards MIHT – ABC Consulting

1.3.3 Audit Team

Audit Team Leader: John Smith BEng (Hons.), MIHT – TfL BRaP
Audit Team Member: Tom Brown MIHT – TfL BRaP

Report Version: A
Date: November 2005

2.0 SCHEME DETAILS

2.1 Prior to the introduction of the cycleway under study, Trinity Street was one way northbound with parking bays on one side of the carriageway and a single yellow line on the other. A segregated cycleway existed, on Trinity Street, between King Street and Queen Street to the north of the area with a shared footpath/cycleway to the south. There was also a cycleway on Regent Place, to the west of Trinity Street.

2.2 The scheme under study was constructed between October 1999 and May 2000 and was introduced to link the existing lengths of cycleway on Trinity Street. It is a two way cycleway, approximately 450 metres in length, on the west side of Trinity Street and is segregated from the one way (northbound) carriageway by a series of islands. There are raised platforms at the bus stop locations for the use of passengers crossing the cycleway. It is to be noted that the cycleway has priority over the traffic entering Trinity Street from the side roads. Reference is to be made to Appendix B for an 'as constructed' scheme layout.

3.0 COLLISION ANALYSIS

3.1 Introduction

This section is to be read in conjunction with the site investigation sheet preceding Section 1.0 of this audit and the stick diagrams and accident location drawings to be found in the appendices.

Accident data for the 36 month period (October 1996 to September 1999) prior to the construction of the cycleway has been analysed and compared with the accident data for the 36 month period (June 2000 to May 2003) following construction. Whilst comment has been given within this accident analysis section it is important to note that the small numbers of accidents make robust comparison between 'before' and 'after' data sets a matter of judgement. This is to be expected at a site of this nature and size.

It is to be noted that the Borough Engineer has indicated that no highway works were undertaken during the three year 'after' implementation period that could have had significant effect on the accident rate through the site.

3.2 Trend

During the 36 month period prior to the implementation of the cycleway there were 11 personal injury accidents recorded within the area under study at an average of 3.66 per year.

In the 36 month period following construction of the cycleway there were 18 PIAs recorded within the area under study at an average of 6 per year.

When tested, the 'before' and 'after' accident rates do not statistically indicate that the scheme has increased the overall risk of accidents occurring at this site.

3.3 Accident Types

The comparative analysis in the 'before' and 'after' periods between accident types indicates a significant increase from 2 per 3 years to 7 per 3 years in the cycle category. Also to be noted is the 'after' data cycle category having a percentage total 3.5 times higher than the comparative rate from 'Levels of accident risk in Greater London'.

3.4 Accident Locations

Attention is drawn to the junction of King Street and Trinity Street:

- 'After' period – 14 of 18 accidents of which 6 involved cyclists (43%).
  It can be noted that 12 of these 14 accidents involved a vehicle wishing to cross Trinity Street and continue along King Street.

Appendix F of this report contains a plan showing the permitted traffic movements at the junctions in the area under study. It is readily apparent that the accident rate is far higher at the cross roads layout at King Street than the T-junction layout at Bridge Street.

Reference is to be made to Problem 6.2.3 and the note that follows.

4.0 TRAFFIC CONDITIONS

Traffic surveys have been undertaken to identify any changes in use through the area since the implementation of the scheme. The data collected indicates only a marginal increase in motorised traffic flows. It is unlikely therefore that any alteration in the accident rate at the site can be attributed to this change.

Cycle usage has, however, increased as could be expected following the implementation of a cycle scheme. The data collected indicates a 54% rise in comparison to the pre-construction figures.

5.0 ITEMS RAISED AT THE PREVIOUS STAGES OF AUDIT

The Stage 1/2 and Stage 3 Road Safety Audits, carried out by external consultants, were made available to the Stage 4 Audit Team. Audit Response Reports also produced indicated that the recommendations arising from the problems raised had been incorporated within the scheme.

6.0 ITEMS RAISED AT THIS STAGE 4B AUDIT

It is to be noted that Problems 6.1.1, 6.2.1, and 6.2.2 do not have a connection with recorded collision history following the construction of the scheme. The Audit Team consider however that the implementation of the recommendations offered could have a beneficial impact on the safe performance of the facility.

Reference is to be made to section 3.3 of this report in relation to Problem 6.2.3.

6.1 PEDESTRIAN CROSSING FACILITIES

6.1.1 PROBLEM

Location: A – Zebra crossing adjacent to Bridge Street/Trinity Street junction.

Summary: Incorrect markings.

Road markings at the zebra crossing indicate that pedestrians should 'LOOK RIGHT' when preparing to cross in an easterly direction and 'LOOK LEFT' in a westerly direction. These markings have been placed with regard to the approaching motorised vehicles only, bearing in mind that Trinity Street is one way northbound. However, due to the cycleway being two way there is the potential for conflict arising from pedestrians not looking both ways and identifying southbound cyclists.

RECOMMENDATION

Revise the markings to indicate the need to look both ways. It is to be noted that DfT approval will be required for such markings as they are not prescribed by TSRGD 2002.

6.2 CYCLE FACILITIES

6.2.1 PROBLEM

Location: General to the scheme.

Summary: Insufficient/incorrect signing and marking.

It was noted during the site visit that there is insufficient and incorrect cycle facility signing and marking at various locations throughout the area. This could lead to confusion with the resulting increased risk of conflict.

RECOMMENDATION

Review the signing and marking and provide sufficient measures appropriate for the facility in accordance with the requirements of the 'London Cycling Design Standards (2005)'.

6.2.2 PROBLEM

Location: General to the scheme.

Summary: Street furniture in cycleway.

At various locations there are posts placed in the cycleway to prevent motorised access to the facility. The posts are dark and do not appear prominent hence there is the potential for cyclists striking the posts.

RECOMMENDATION

Undertake measures in order that cyclists are aware of the presence of the posts.

6.2.3 PROBLEM

Location: B – Junction of King Street and Trinity Street.

Summary: Layout increases risk of conflict.

The Audit Team is concerned that the risk of conflict at this junction is increased due to the following issues:

- Road users entering or crossing Trinity Street from King Street were observed, due to the main carriageway being one way northbound, to be only looking to their right before carrying out the manoeuvre. This increases the risk of conflict with cyclists travelling southbound.

- The King Street junction is not clearly apparent to cyclists approaching from either direction thus increasing the risk of conflict with road users entering from King Street.
- Intervisibility between road users on King Street and southbound cyclists on Trinity Street is severely compromised by the adjacent building line.

RECOMMENDATION

Introduce a package of measures to address the concerns raised. These measures could include:

(i) The provision of a raised table on the cycleway at the King Street junction (to tie in with the raised table on the King Street approach).

(ii) Owing to the inability to improve visibility at the King Street junction the priority should be changed such that cyclists give way to the side road. The cyclist give way should be achieved by a series of comprehensive measures including signing, markings and horizontal deflection. It may be prudent to apply the same treatments to the other junctions along the route for consistency.

(iii) Centreline and direction indicating cyclist symbols on the cycleway. It could be prudent to apply these markings throughout the scheme.

(iv) Additions to the existing warning signing on the King Street and cycleway approaches to the junction.

7.0 CONCLUSIONS

7.1 During the 36 month period prior to the implementation of the cycleway there were 11 personal injury accidents recorded within the area under study at an average of 3.66 per year. In the 36 month period following construction of the cycleway there were 18 PIAs recorded within the area under study at an average of 6 per year. When tested, the 'before' and 'after' accident rates do not statistically indicate that the scheme has increased the overall risk of accidents occurring at this site.

7.2 The comparative analysis in the 'before' and 'after' periods between accident types indicates a significant increase from 2 per 3 years to 7 per 3 years in the cycle category. Also to be noted is the 'after' data cycle category having a percentage total 3.5 times higher than the comparative rate from 'Levels of accident risk in Greater London'.

7.3 Attention is drawn to the junction of King Street and Trinity Street:

- 'After' – 13 of 17 accidents of which 6 involved cyclists (46%).

With regards to this location, reference is to be made to Problem 6.2.3 of this audit report.

8.0 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in Appendix A to this Safety Audit Report. The Road Safety Audit has been carried out with the sole purpose of identifying any feature that could be modified in order to improve the safety of the measures. The problems and changes in accident trends identified have been noted in this report together with associated recommendations for safety improvements.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name: John Smith BEng (hons.), MIHT Signed:

Position: Road Safety Auditor Date:

Organisation: Transport for London
BRaP

Address: 7th Floor, Palestra
197 Blackfriars Road
London
SE1 8NJ

AUDIT TEAM MEMBER:

Name: Tom Brown MIHT Signed:

Position: Road Safety Auditor Date:

Organisation: Transport for London
BRaP

Address: 7th Floor, Palestra
197 Blackfriars Road
London
SE1 8NJ

Report Version: A
Date: November 2005

APPENDIX A

Documents Forming the Audit Brief

- Audit Brief Checklist
- 'As constructed' scheme drawing – No. 1859/249/1
- Scheme construction dates
- Stage 1/2 Road Safety Audit and Audit Response Report
- Stage 3 Road Safety Audit and Audit Response Report

Accident data was drawn directly from TfL BRaP's ACCSTATS database.

Report Version: A
Date: November 2005

APPENDIX B

‘As constructed’ scheme layout

Report Version: A
Date: November 2005

APPENDIX C

Problem Locations

Report Version: A
Date: November 2005

APPENDIX D

Accident Locations and Stick Diagrams 'Before' – October 1996 to September 1999

Report Version: A
Date: November 2005

APPENDIX E

Accident Locations and Stick Diagrams 'After' – June 2000 to May 2003

Report Version: A
Date: November 2005

APPENDIX F

Permitted traffic movements through area of study

Report Version: A
Date: November 2005

Appendix E – Model Response Report

Appendix E - Model Response Report

Appendix E – Model Response Report

Transport for London
Better Routes and Places

(Scheme Name)

Safety Audit Response Report

for:

Stage (X) Road Safety Audit

Ref: (XXXXXXX)

Report Date: (**Month Year)**

Report Version: **A**

Appendix E – Model Response Report

1.0 INTRODUCTION

1.1 This report details the Clients Organisation's response to the Stage (X) Road Safety Audit Report carried out on (scheme name) by (organisation). The safety audit was carried out during (month/year) and the results were issued in report reference (doc ref number).

1.2 This report was compiled by (name, organisation, position) on behalf of (client organisation).

1.3 The terms of reference of this response report are as described in TfL Procedure SQA-0170.

1.4 Where a safety audit recommendation is accepted, this report details the actions proposed to comply with the recommendation. Where a safety audit recommendation is rejected, this report details the justification for rejection.

Appendix E – Model Response Report

2.0 RESPONSE TO ITEMS RAISED AT THE STAGE (X) ROAD SAFETY AUDIT

2.1 SAFETY AUDIT PROBLEM REF (X.X)

Location: (As per safety audit report).

Summary: (As per safety audit report).

Detailed description of the problem: (As per safety audit report).

RECOMMENDATION
(As per safety audit report).

CLIENT ORGANISATION RESPONSE
Recommendation accepted: (description of the measures to be employed to implement the recommendation).

OR

Recommendation rejected: (justification for rejecting the safety audit recommendation).

Appendix E – Model Response Report (click on object to view full Audit Report)

3.0 CLIENT ORGANISATION STATEMENTS

3.1 Design Manager's Statement

In accordance with SQA-0170, I certify that I have reviewed the items raised in the Stage (X) Safety Audit Report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Senior Design Manager's endorsement of my proposals.

Name:

Position:

Organisation:

Signed: Dated:

3.2 Client Manager's Statement

I accept these proposals by the Design Manager.

Name:

Position:

Organisation:

Signed: **Dated:**

Appendix F – Audit Brief Checklist

Appendix F - Audit Brief Checklist

Appendix F – Audit Brief Checklist

CHECKLIST: SAFETY AUDIT BRIEF

The Audit Brief is central to the safety audit procedure. It defines the scope of the audit and contains all the information necessary to give the Audit Team a full understanding of the scheme. Please use this checklist to assist in the preparation of your Safety Audit Brief.

Scheme title	
Description of the scheme's purpose and scope	
Audit stage required	1 ☐ 2 ☐ 1/2 ☐ 3 ☐ 4A ☐ 4B ☐

Client Organisation details	**Design Organisation details**
Design Manager:	Design Team contact:
Client Manager:	
Organisation:	Organisation:
Contact details:	Contact details:

Documents provided for audit (tick)

- ☐ Site location plan
- ☐ Scale layout plans
- ☐ Construction / typical details
- ☐ Previous safety audit reports
- ☐ Previous safety audit exception / response reports
- ☐ Departures from standard
- ☐ Other information (please list):
- ☐ Traffic signal staging
- ☐ Accident data / plot
- ☐ Traffic counts
- ☐ Speed survey
- ☐ Scale as-built plan (stage 3 & 4)
- ☐ Construction dates (Stage 4)

Reference number(s) of previous TFL LRSU / BRaP audit report(s) for this scheme

WBS Code

Design Manager's Statement

I hereby request that a road safety audit is conducted on the above mentioned scheme in accordance with TfL's Safety Audit Procedure, SQA-0170.

Name Signed

Appendix F – Audit Brief Checklist

Organisation	Dated
BRaP Ref:	Date Received:

Appendix G - Model Non-Audit Note on File

Non-Audit Note on File

Scheme:

Audit Stage:

Description of scheme:

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.....

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.....

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.....

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During the process of preparing the Audit Brief for the above scheme, it was considered unnecessary to carry out a road safety audit for the following reason (tick applicable):

a) Maintenance works that solely involve a like-for-like replacement ☐

b) Refurbishment of existing street features ☐

c) Minor works that have a negligible effect on the TLRN ☐

d) Deferred to end of detailed design for a combined stage 1 & 2 audit ☐

e) Other (state): ☐

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.....

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Design Manager's statement:

I recommend that a safety audit is not carried out at this stage for the above noted reason.

Name: Signed:

Position: Dated:

Client Manager's statement:

I approve this proposal by the Design Manager.

Name: Signed:

Position: Dated