

ANNEX D

**REVIEW OF INFORMATION
RECEIVED FROM HIGHWAYS
AGENCY LOCAL AGENTS,
BRITPAVE, AND THE VRMA**

**Highways Agency Area 1
Cornwall and Devon**

Joint response: Richard Tift, Parsons Brinckerhoff and Clive Park, Highways Agency (by email dated 30/10/03):

'There is very little concrete barrier on the Area 1 network, the information below therefore relates to metal barrier systems.

No. of repairs per annum: approx 255

Repair cost per annum: approx £140,000

(Please note this excludes traffic management as in Area 1 this is a lump sum duty. The amount does however include Term Contract Preliminaries).

Repairs are carried out generally within the 7 day period required under the term contract. Traffic delays due to these repairs are negligible as they are carried out off peak and at night during the summer holiday period.

For the 5 years between 1998 and 2002 inc. there have been 286 injury accidents in Area 1 involving vehicles hitting safety barriers. With regard to the casualties involved in these accidents 3.6% were fatalities, 14.3% were serious in severity and 82.1% were slight in severity.'

**Highways Agency Area 2
Somerset, Avon, Wiltshire, Gloucestershire & Oxfordshire**

Malcolm Wilkinson, Highways Agency (by email dated 03/10/03):

'We have no lengths of concrete median barrier in the Area'

Graham Wanless, Atkins Highways and Transportation (by email dated 03/11/03):

'we do not have any concrete median barriers within Area 2. However at Avonmouth Bridge we do have a metal (Varioguard) median barrier at Avonmouth bridge (M5 MP142/1.3 to MP143/7.4 - Total Length = 1609m).

There has been one hit resulting in repair of the Varioguard to date. (Installation by others - estimated 2000). This occurred during April 2001 with a repair cost of £4,565.06.'

**Highways Agency Area 3
Hampshire, Surrey, Berkshire, Oxfordshire and Surrey**

Anne Roberts, Raynesway Construction Southern Ltd. (by letter dated 17/10/03)

'We are sorry to say that we are unable to provide the information you have requested but note that we have forwarded your request for the information to the managing agent for the area, Atkins.

We however take this opportunity to express our concerns regarding the use of concrete barriers on the network. As term maintenance contractors for the area we install and remove numerous short duration TM schemes on the roads everyday. To meet the requirements of Chapter 8 all TM schemes require a number of signs to be erected in the C/R. To carry this out our operatives have to cross the live carriageway to the C/R and use the gap between the two lines of metal crash barrier as a safe haven. In areas of concrete barrier this safe haven does not usually exist and the operatives are left standing on the edge of the outside lane.

As I am sure you are aware the high-speed roads to which this applies are already a high risk place of work and we believe the use of concrete barriers would significantly increase these risks still further. We trust this will be taken into consideration during your analysis.'

Hugh McCutcheon, Mott MacDonald (by letter dated 04/11/03)

'Within Area 3, concrete barrier in the median is limited to a short section on the A3 through Guildford, therefore the following information relates only to metal and wire rope safety fence. This information is based on the two years of data to date for the current Commission, which started on 1 September 2001. There have been a total of 2,086 incidents requiring repair work to be carried out on the median safety fence during the above two year period.

There is a considerable resource required to extract the data for the extent of repairs and costs, therefore we have limited the analysis of data to the month of July 2003, during which time there were a total of 96 incidents resulting in damage to the median safety fence. Details of the lengths of repair were as follows:

Length of Repair	Percentage
Up to 10 metres	64
10 to 20 metres	18
20 to 30 metres	11
30 to 40 metres	2
40 to 50 metres	1
Over 50 metres	4

The total cost for the repair of median barrier damaged during July 2003 - £124,000. However it should be noted that these costs do not include the preliminary attendance and the traffic management for the permanent repair, which are included in the Lump Sum Duties of the Term Maintenance Contractor. We do not have the historical data to comment on the whole life cost of the barrier systems.

The time required for the repair of safety fence has only been recorded since April 2003 and includes all safety fence repairs. For the period up to the end of August 2003, the average time to effect the permanent repair from the time of the incident was 4.1 days. The majority of the safety fence repairs are carried out overnight, causing minimal disruption to traffic.

We do not maintain records of the severity of injuries associated with impacts to barrier systems.'

Highways Agency Area 8

Bucks, Herts, Beds, Essex, Cambs, Northants, Oxon, Leics

Dave Staddon, Carillion-URS (by email dated 03/12/03):

'I have attached a 'pdf' file, this report indicates the number of Cat. 1 defects to Fence and barrier (RTA damage) to all of the routes within Area 8 since the start of the MAC Contract - 01 September 2001.

With regards the repair cost - the average cost is approx. £1600 per RTA, this figure includes for traffic management

All Cat. 1 Safety Fence damage is repaired within 7 days of notification of the damage - all repairs are carried out at night.'

Survey Defect Report

Priority : Category 1 Defect

Cross Section Position : Left Footway, Left Outside Verge, Left Verge, Right Footway, Right Outside Verge, Right Verge

Action Type : FB : Accident Damage

	Left Footway	Left Outside Verge	Left Verge	Right Footway	Right Outside Verge	Right Verge	Total
A1	0	0	40	0	2	91	<u>133</u>
A14	0	3	70	4	1	291	<u>369</u>
A1M	0	4	25	2	0	87	<u>118</u>
A421	0	0	8	0	0	12	<u>20</u>
A428	0	0	1	0	0	14	<u>15</u>
A43	0	0	3	0	0	20	<u>23</u>
A45	0	0	26	1	0	117	<u>144</u>
A5	3	1	28	0	1	19	<u>52</u>
A6	7	0	0	2	0	3	<u>12</u>
M1	0	3	607	4	4	1178	<u>1796</u>
M11	0	0	43	4	2	135	<u>184</u>
M45	0	0	3	0	0	4	<u>7</u>
M6	0	0	10	1	0	10	<u>21</u>
Total	<u>10</u>	<u>11</u>	<u>864</u>	<u>18</u>	<u>10</u>	<u>1981</u>	<u>2894</u>

Highways Agency Area 10

Merseyside, Cheshire, Greater Manchester and the Wirral

Martina Chaplin, Highways Agency presenting a report compiled by Jean Kalibbala, Atkins Highways and Transportation (by letter dated 26/11/03)

1. Types of barriers

There are two types of vehicle restraint systems used on the area 10 section of the highways network i.e. concrete and metal safety barriers. At the moment only the metal ones are used as the permanent vehicle restraint systems. Concrete barriers are only used as a temporary measure on sites where major or long term works are being carried out for example the Thelwall viaduct.

Below are the different types that are used on this section of the highways network.

i. Metal Safety Barriers

Tensioned Corrugated Beam (TCB)

Open Box Beam (OBB)

Double Rail Open Box Beam (DROBB)

Tensioned Rectangular Hollow Section (RHS)

ii Concrete Safety Barriers

Temporary Vertical Concrete Barriers (TVCB)

2. Number and extent of repairs

Since July 2002, when Atkins Consultants became the managing agents for area 10, there have been 2577 accidents on this section of the network involving safety barriers which have led to permanent repairs being carried out.

3. Costs

i Repair to Existing Barriers

The costs below include removing all damaged barriers and posts, replacing them with new ones, reconnecting and re-tensioning; and make good to all work disturbed.

No.	Item Description	Unit	Cost (£)
1	Tensioned Corrugated Single Sided Beam		283.64
2	Tensioned Corrugated Double Sided Beam		301.68
3	Single Sided Open Box Beam		294.53
4	Double Sided Open Box Beam		326.46
5	Single Sided Double Rail Open Box Beam		378.45

ii. Traffic Delay Costs

Majority of the repairs do take place outside peak hours (especially in the night). There are no significant delays caused as a result of these repairs.

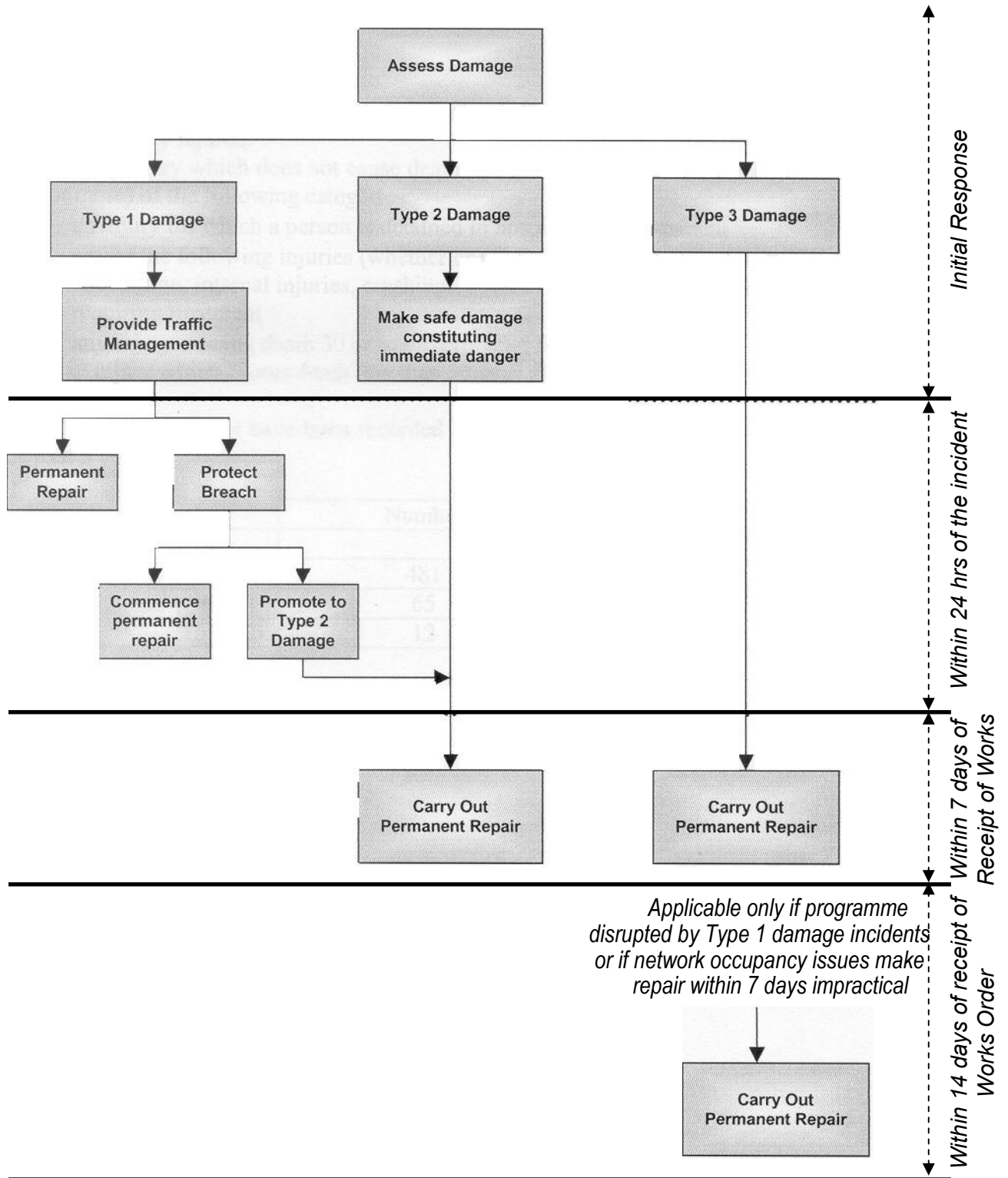
iii. Total Costs

Since the start of the contract in July 2002, Atkins Consultants Ltd on behalf of the Highways Agency has carried out repairs on metal safety barriers worth £1,247,594.57 (as on 21/11/2003).

4. Repair

The repair procedure follows two main stages i.e. temporary works to ensure that the damaged barriers are made safe and permanent works to restore the barrier to its original form.

i. Repair Flowchart



ii Time spent carrying out repairs.

This depends mainly on the type of post foundation. Safety fences whose posts have a socket foundation take a much shorter day to replace compared to those with a concrete foundation which will have to be dug up and replaced as well.

5. Injuries

Injuries are defined as follows

Slight: an accident in which at least one person suffers "slight" injuries, but no-one is seriously injured, or fatally injured.

Serious: an injury which does not cause death less than 30 days after the accident, and which is in one (or more) of the following categories:

- an injury for which a person is detained in hospital as an in-patient
- any of the following injuries (whether or not the person is detained in hospital): fractures, concussion, internal injuries, crushings, severe cuts and lacerations, severe general shock requiring treatment
- any injury causing death 30 or more days after the accident;

Fatal: an injury which causes death less than 30 days after the accident;

A total of 558 accidents have been recorded in the area 10 section of the highways network over the past 5 years.'

Type	Number	Percentage (%)
Slight	481	86.2
Serious	65	11.6
Fatal	12	2.2

BRITPAVE

Numerous comments have been made on a draft version of this report, and these are available on request to gwilliams@trl.co.uk.

John Donegan (by email dated 21/11/03)

'Britpave has been shown Appendix 1 of your unpublished report PR/SE/456/02 which relates to prices of various barrier systems.

Some of the data quoted came from SIAC and I fear it is producing misleading results. I can confirm that the rate quoted for a 500 m run of £127 includes all mobilisation, demobilisation and other fixed costs associated with a discrete site visit i.e. it assumes that this 500m is a one-off contract.

A more accurate figure of £45 per m is quoted for a 5000m length. In fact, this figure would be valid for any length greater than 1000 metres, and only in the event of short lengths in isolation where fixed costs become disproportionate to the cost of the actual barrier, would a higher rate be required.'

David Jones (by letter dated 09/10/03)

'I think that it is important that you take account of fatalities in your investigation.

In particular, cross-over accidents do occur with disastrous regularity. The attached Commons question shows that there are around 200 crossovers per year with around 40 deaths per year. With the Government giving the cost of a death at around £1million, these statistics need to be taken into account in your evaluation. There have been no breaches of concrete barrier.'

David Jones (by letter dated 17/10/03)

'All companies associated with the construction of concrete barriers in the UK are members of Britpave and they have decided that a global response from their trade organisation may provide the best means of response.

Over 100km of concrete barrier have been constructed in the UK. The vast majority service the median of our motorways and trunk roads with the first being produced in 1992. To date approximately 25% of the M25 orbital motorway is serviced by concrete barrier in the median.

To the best of our knowledge, and we would be surprised to learn otherwise, there have been no breaches of any of the concrete barrier constructed nor has there been any repair of the concrete barrier due to vehicle accident damage. Also, there has been no requirement for routine maintenance work.

We have no hard figures of the number of vehicle impacts to the concrete barrier but a simple journey around the M25 motorway would be able to record the number of locations where the concrete barrier can clearly be seen to have been scarred by vehicle impact.

Highways Agency have, through their appointed Consultant Engineers, specified a 50 year design life for concrete barrier and yet only a 20 year life for steel alternatives – we refer to the current project to crack, seat and overlay the M1 motorway between junctions 1 and 2 where Mouchel are the appointed engineers.

We do not believe that there are any specified requirements to apply remedial coatings to concrete barrier during its design life.

We have no information in respect of the severity of injuries sustained as a result of impact with concrete barrier save for the fact that there have been no cases of crossover accidents or breaches of the barrier.

Your client [Highways Agency] has access to all the information you require and given the time scale associated with this project we would respectfully suggest that you seek the assistance of Mouchel who are appointed by Highways Agency to manage the M25 Motorway, a road of high importance and high traffic flows. A route that comprises 25% concrete barrier and 75% steel barrier.'

Adrian Erwee (in Britpave report 14260: 'Review of TRL Whole Life Cost-Benefit Analysis of Median Safety Barriers Report')

'The cost per metre for removal of concrete barrier at the end of its life should be priced at £30.80/m for HVCB and £16.00/m for VCB in the WLC model. It is worth noting that much of the concrete material won can immediately be re-used after processing.'

'It is appreciated that traffic management costs need to be calculated for the installation phase of barrier. To this end, the placement rate for in-situ concrete barrier (VCB) can be estimated as 400m/day.'

David Jones (by email dated 05/11/04)

'Costs - Dutch Step Barrier:
Installation...£50 per linear metre
It takes 1 minute to pave 1 linear metre
It costs £20 per m to demolish/remove
It takes just 1 minute to demolish etc.'

VRMA

Martin Hall (by email to Danny Ruth, HA dated 24/09/04)

Numerous comments have been made on a draft version of this report, and these are available on request to gwilliams@trl.co.uk.

'Examples of pricing - DS TCB	£25 per metre	0.04 installation time
Posts	£23 per post	0.06 installation time
DS OBB	£37 per metre	0.04 installation time
Posts	£25 per post	0.06 installation time

The totals however would not exceed the greater of the installation times.
e.g. 4 days to beam includes the time to drive the posts.'

'Removal time for 1km of safety fencing would be approximately 6 hours'

'Removal for concrete is a minimum of 10 times the installation i.e. 250hrs which is an extremely fast removal programme.'