



WIDEMARSH STREET, HEREFORD

CITY CENTRE REFURBISHMENT

KERB DESIGN REVIEW

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Executive Summary

This review has been undertaken at the request of Herefordshire Council following a number of reported trip incidents since the opening of Phase One of the five phase refurbishment works in Widemarsh Street, Hereford.

The multi-disciplinary Design Team, comprising of Amey Consulting staff, Hamilton-Baillie Associates, Powell Dobson Urbanists and Anthony Jellard Associates have reviewed their design process both based upon the design standards available at the time the design was prepared (Spring / Summer 2009) and also the current standards.

They have concluded that the design addresses all user groups needs, follows national best practice and compares favourably to similar schemes installed and schemes currently being designed in the UK.

Incidents of trips and falls can be expected in every street, regardless of the nature of the paving and materials. The quality of construction and workmanship do not appear to be contributing to the problem and the scheme is being delivered to a high standard in accordance with the design specification.

Local authority liability for paving extends to areas of poor maintenance or inadequate construction, neither of which is evident within the new works. There have been very few cases relating to alleged defects in design, and Court rulings repeatedly state that road users are responsible for their own safety and have a duty to take the road as they find it.

It is the considered view of the multi-disciplinary Design Team that it is likely upon the removal of construction fencing and screens, and the return of some vehicular traffic to the street will combine to create the appropriate response to the observed circumstances, particularly once the full length of the street and kerb arrangements become visible.

Recommendations have been suggested within the review report, including interim measures and will provide opportunities for further thorough review and provide a basis for decisions on what further measures, if any, may be required.



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Stage 1 Road Safety Audit Exception Report

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1. Background

1.1. Design History

- 1.1.1. The concept design for Widemarsh Street was commissioned by Herefordshire Council and produced by Hamilton-Baillie Associates on the 10th February 2009. This was in addition to the Hereford Town Centre Streetscape Design Strategy document also commissioned by Herefordshire Council and produced by Hamilton-Baillie Associates(HBA), which was subsequently approved and adopted by Herefordshire Council in April 2009.
- 1.1.2. Amey were subsequently instructed to work alongside Hamilton-Baillie Associates (HBA) and their preferred landscape architects (Powell Dobson, and Antony Jellard Associates) to develop and progress the design up to Contract Documentation stage and subsequently tender and appoint a principal contractor. The tight delivery programme was agreed with Herefordshire Council and required an early 2010 (Jan/Feb) start on site with completion by the start of the Christmas shopping period, to meet both client and stakeholder expectations.
- 1.1.3. The innovative HBA design raised a number of design debates in the course of developing the final scheme design. A main feature being:
 - The proposal to utilise a low kerb face
- 1.1.4. The low kerb face initially proposed was 25mm, which in the opinion of the Amey Designers was felt to be unsuitable and could cause a trip issue. This aspect was debated within the newly formed 'Multi-disciplinary Design Team' with Amey initially recommending a 75-100mm kerb face to Herefordshire Council both to reduce any potential trips and also to address the national criticism that some shared space schemes were attracting from partially sighted and blind organisations.
- 1.1.5. Within some of these schemes the removal of the traditional kerb face resulted in the loss of the key aid of navigation in town centre environments. Within the adopted Streetscape Strategy, Section 04 (in Appendix E) recommended that kerbs should have a face of 25-50mm, consequently a compromise was agreed by the Design Team at 50mm for the proposed design in order to comply with Herefordshire's own adopted Streetscape Strategy.
- 1.1.6. Whilst discussing the kerb face issues, it was noted by all of the Design Team that they had all observed numerous schemes where the kerb and carriageway channel had been specified in the same material and placed adjacent to one another. Combined with a low kerb face, this resulted in very poor definition of the kerb face and it was felt an increased risk of tripping. Consequently a contrasting porphyry section was introduced to provide a colour and textural contrast to the kerb.

- 1.1.7. Within the design, variations in kerb height were required for specific reasons, 0-6mm at the informal pedestrian crossing points to comply with the Department of Transport National Guidance, a 25mm high section within each loading bay to cater for disabled car users gaining access to the footway and also to allow shop owners easier access for their loading trolleys (Phillip Morris and Son made a specific request). Some kerb heights were required in order to ensure consistent cross-falls for the footway and carriageway design to drain effectively, however the majority of the design utilises the 50mm face.

1.2. Road Safety Audits

- 1.2.1. Following completion of the preliminary design, a Stage 1 Road Safety Audit was commissioned and undertaken by a joint Amey / Herefordshire Council Audit Team on the 22nd June 2009. This subsequently raised a number of design related issues and resulted in a Stage 1 Exception report being produced based upon the designer's comments and signed off by Herefordshire Council on the 15th September (Appendix F).
- 1.2.2. Following the completion of the final design, a Stage 2 Road Safety Audit was undertaken by the same Audit Team on the 15th September 2009 prior to the scheme going out to Tender. This again raised a number of design related issues and resulted in a Stage 2 Exception Report being produced and signed off by Herefordshire Council on the 25th February 2010 (Appendix F).
- 1.2.3. It would be normal practice (and recommended by the Design Team) for a formal Stage 3 Road Safety Audit to be undertaken following the completion of the scheme to fully assess the scheme in its 'normal' operating environment. ie open to vehicular traffic 18 hours per day.
- 1.2.4. It is further recommended that consideration be given to undertaking a Stage 4 Road Safety Audit after 12 months of the scheme being completed.

1.3. Street Environment

- 1.3.1. This report is based upon the reported trip incidents primarily in the Phase 1 section (see Appendix A photo no.002) of the overall scheme. A small number of trips have also occurred in Phase 2 (recently completed at the time of writing this report-see Appendix A, photo no.001).
- 1.3.2. Phase 1 essentially covers the narrowest section of Widemarsh Street, typically 7.5m wide. Prior to the scheme being implemented, the existing footways were constructed out of concrete pavers, concrete kerbs and the carriageway constructed from macadam. Pedestrians largely walked on the carriageway section due to the existing footways being narrow, typically 1.3m wide and of varying cross falls and longitudinal falls. The general condition and state of repair was poor, with many macadam reinstatements, undulations and potential trip issues.
- 1.3.3. Whilst the previous poor surface condition of the footway and carriageway surface was evident, the actual kerb face / height along this section was also sub-standard, and coupled with a very poor longitudinal gradient, the kerbs vertical geometry varied immensely and were not consistent.
- 1.3.4. Whilst the typical kerb face / height in a general Highways environment would be 125mm, it should be noted that the kerb face / height through Phase 1 prior to the works was only 80mm maximum, with many sections well below that-(Please refer to Appendix A, photos 003,007,009,011,013,017 –All Phase 1, and photos 019,023-Phase2).
- 1.3.5. These photographs not only illustrate the existing kerb face / heights were lower than the 'typical' height, but that there was little if any regularity along shop frontages and certainly not along the street as a whole. The longitudinal gradients along the shop frontages are also highlighted within the photographs, and illustrate the lack of any consistency which when combined with the varying kerb line resulted in a very poor walking surface for all user groups.
- 1.3.6. To conclude, the new kerb face / height is not drastically different from the previous, with sections remaining largely unchanged. The minimum kerb height installed is 40mm (Basler / Symonds boundary and White Stuff) and maximum kerb height is 70mm (West Cornwall Pasty Co), other than the informal pedestrian crossing point (kerbs 0-6mm) the remaining area average the 50mm height. The main difference is that not only is the walking surface more consistent in terms of surface finish and cross-fall / gradient making it easier for all to walk over, but the kerb and it's longitudinal gradient is far more consistent which provides better Highway drainage and an enhanced visual appearance. (Please refer to Appendix A, photos 004,010,018,020 which all demonstrate the 'after' scenario when referenced to some of the photos listed in point 1.3.4 above).

1.4. Pedestrian Usage

- 1.4.1. At the time of writing the report it was felt appropriate to obtain the most recent 12 hour pedestrian count for the street, if available. Whilst any member of the public tripping and injuring themselves is undesirable, it is unfortunately a fact of life and one that continues to occur in any environment. Therefore, being able to compare the number of recorded incidents with the total number of pedestrians (utilising a 12 hour pedestrian count) for the street would help to quantify the scale of the incidents. Whilst not detracting from the concern they have caused to everyone connected to the project, this type of comparison is usually the basis for most types of highway improvement works, safety related works etc. and so is felt beneficial to undertake.
- 1.4.2. The most recent count was undertaken in August 2004, (please refer to Appendix I) which is not ideal as Herefordshire Council policy would be to use data up to 3 years old only, but this will still serve as a valuable data source. Consequently, a new 12 hour pedestrian count will be conducted over the course of the remaining construction programme.
- 1.4.3. This data illustrates that on Wednesday 11th August 2004 between 07:00 – 19:00 a total of 12,523 pedestrians walked along Widemarsh Street (two-way flow). Therefore an approximate weekly total would be 87,661 pedestrians. The review period for the reported incidents is 10 weeks, therefore based on this historical data an approximate total number of pedestrians over this period is 870,661, the total reported actual trip incidents being 58 in total.
- 1.4.4. This statistic does seem to demonstrate the vast majority of the public seem to have negotiated the new environment without issue.

1.5. Consultation

- 1.5.1. Consultation was undertaken by Herefordshire Council, with all the street traders and residents within the street and numerous official stakeholders (including representatives from both the Royal National College for the Blind and Vision Links, formerly the Herefordshire Association for the Blind whose office is based in the street) being invited to attend a meeting / exhibition at 'Saxty's'- (one of the traders along the street) to view the preliminary design. This also coincided with the formal launch of the newly adopted Hereford Town Centre Streetscape Strategy document.
- 1.5.2. This event held on the 13th July 2009, from 15:30pm – 20:00pm was jointly staffed by Herefordshire Council, Amey, Powell Dobson Urbanists and Anthony Jellard Associates and Ben Hamilton-Baillie. As well as various drawings and illustrations (which highlighted the 50mm high kerb face-see Typical Section-Appendix B and General Arrangement Drawing-Appendix D), material samples were on display for both visual and tactile purposes. A presentation was delivered by Ben Hamilton-Baillie for both the launch of the Strategy and also in relation to the scheme.
- 1.5.3. The event was well received and no issues were raised in respect to the proposed kerb height / face.
- 1.5.4. Following this, a second meeting/exhibition was arranged at the same venue on 2nd November 2009, held from 14:00 – 20:00. In addition to computer generated 3-dimensional architectural drawings, a selection of the contract drawings were displayed too illustrating the detailed work to be undertaken. These drawings illustrated the paving layouts, materials, paving bond and kerb details again clearly illustrating the proposed kerb face / height.
- 1.5.5. Again, material samples were on display for both visual and tactile purposes, including an example of the metal tactile studs fixed into a piece of sandstone to replicate the actual tactile paving that would be installed.
- 1.5.6. Again no issues were raised by the attendees in respect to the proposed kerb height.
- 1.5.7. It is felt that whilst experience from two previous public realm schemes highlighted sometimes contrasting views from the general public (Eign Gate and Hightown), further consultation could have assisted the Design Team and Client in the final design of the scheme.

2. Trip Issue

2.1. Introduction

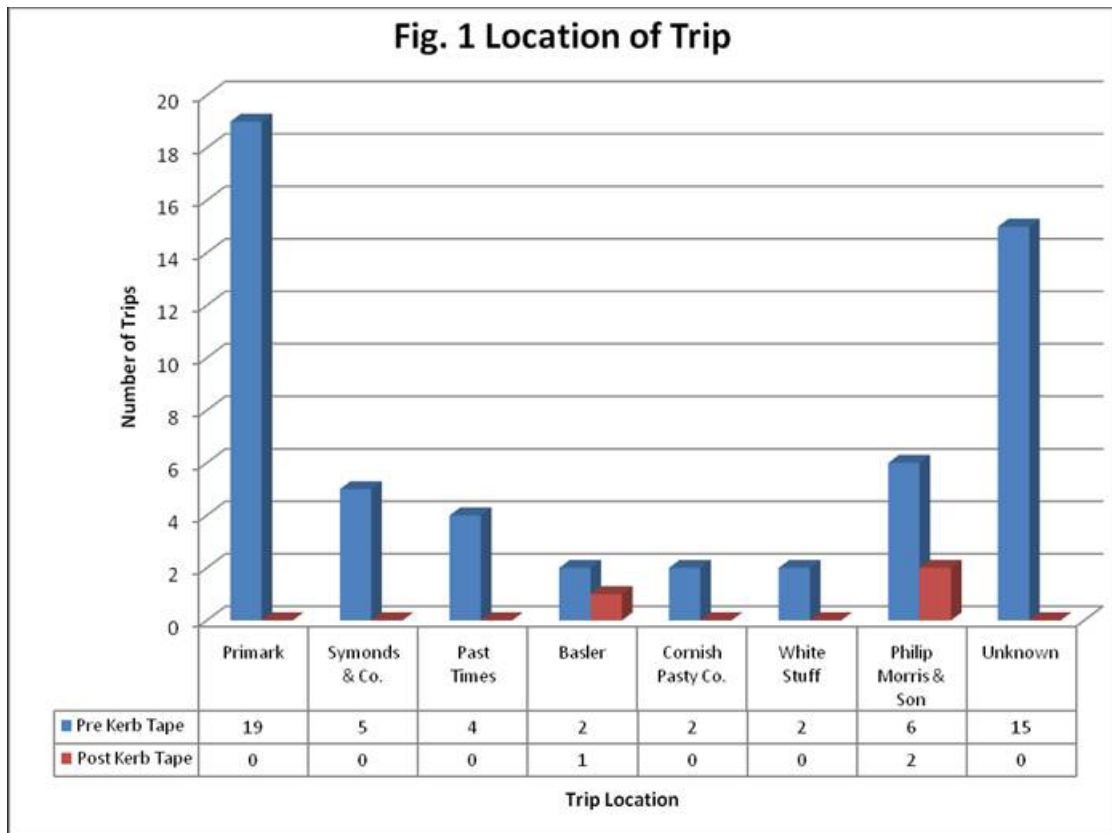
- 2.1.1. The previous Hightown scheme had flush kerb lines as dictated by the National design guidance available at the time. Following the completion of that scheme, a temporary macadam ramp, approximately 2.5m long was constructed in the carriageway to allow for the transition between the flush kerb and carriageway surface and the existing kerb with a face, 60mm high (this ramp length has been maintained within the new paving works). It had always been the intention of Herefordshire Council to continue with this type of design as and when funding was forthcoming. However, since then guidance on the design of shared space has changed. Please refer to Appendix A, photo no.005 which illustrates the existing situation on the opposite side to 'Basler' outside the 'Cornish Pasty Shop'.
- 2.1.2. The first reported trip incident occurred on Saturday 1st May 2010 outside 'Basler', at the transition point between the previous Hightown scheme and Phase 1 of Widemarsh Street.
- 2.1.3. At the time of this incident, a section of the carriageway had been fenced off to stop any delivery vehicles from Bewell Street reversing onto the newly installed carriageway surface (there is a 7 day curing period required for the mortar prior to any vehicle loadings). The Site Team thought that the presence of this fenced off area had probably distracted the pedestrian and may have contributed to the fall. As a result once the 7 day period had elapsed the fencing was removed, and vehicles started to access this section of Widemarsh Street almost immediately.
- 2.1.4. However, more tripping incidents were reported and have continued as the works have progressed. These have been recorded via the info@herefordshire.gov.uk and mainly via Garrick House. Following these individual reports, it was decided to collate these. An official 'trip register' has been produced by the Amey Watchman Team to record as much information as possible to enable any identified issues to be reviewed, (Please refer to Appendix G).

The trip issue has been reported in the local press with the local Ward Member also publicly asking for any trip information. Whilst all information is useful in any analysis this may have had the adverse effect in encouraging a 'claim culture' approach by some. The Site Team have also witnessed insurance claim people loitering in the street and shop owners have witnessed them approaching members of the public who have fallen or tripped in an unacceptable manner.

2.2. Analysis of recorded incidents

- 2.2.1. The 'trip register' (Appendix G) covers a 10 week period, from Sat 1st May 2010 to Sat 10th July 2010.
- 2.2.2. The register contains 68 entries, however there are in fact 58 recorded tripping incidents, the remaining being people wanting to register their concerns or reporting the same incident etc. and therefore all of the following analysis is based upon the 58 recorded trips.
- 2.2.3. From the analysis of the original *info@herefordshire.gov.uk* forms it was apparent that one of the main problems encountered was the lack of basic information provided and a lack of consistency in recording the information from the public. The basic location, time of the fall, direction of travel (ie. crossing up/down the kerb), any specific cause for the trip/fall and contact details were not evident, although there are a number of people who did not want to leave contact details.
- 2.2.4. Therefore, the Watchman Team in association with the Amey Site Team produced a list of basic data requirements in order to try and update existing and collect better information to allow the Design Team to review the issues to the best of their ability.
- 2.2.5. Consequently, the 'Trip Register' in Appendix G has been updated and refined, with the Watchman Team trying to re-contact and obtain further information.
- 2.2.6. On the 29th June 2010, the Site Team laid grip tape onto the kerb top along the western side of Phase 1 which was the area with the most incidents at the time. This followed complaints from the Managers at both 'Basler' and 'Symonds and Co' who wanted barriers erected in the street to stop the tripping. The tape was to be a trial to see if it highlighted the kerb and reduced the tripping incidents. The temporary measure was deemed simpler, preferable and more sustainable than any barriers. A more permanent version was researched which could be considered if the tape proved to have a positive effect. Kerb tape was subsequently applied to the remainder of Phase 1 and all of Phase 2 on the 19th July 2010.
- 2.2.7. The following categories of information were extracted from the register and form the basis for the analysis;
 - Location of trip
 - Time of day that trip occurred
 - Gender of person tripping
 - Tripped up or down kerb
 - Local or visitor
 - Reason for tripping

2.3. Location of trip



Please refer to Figure 1.

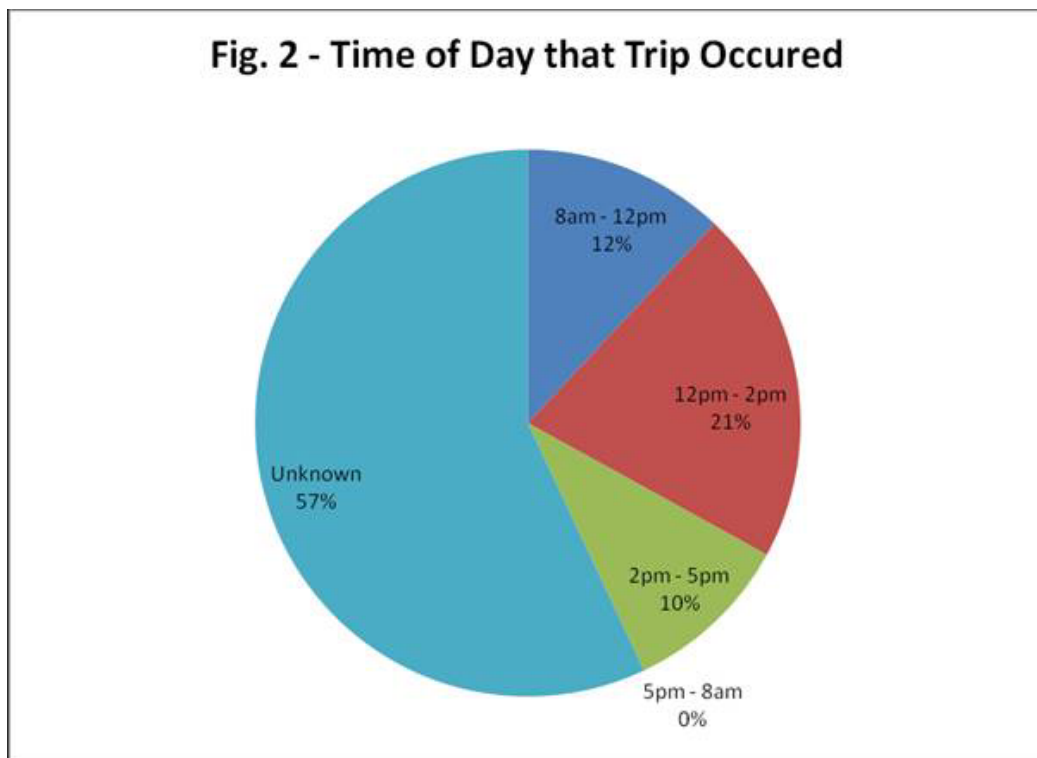
Phase 1

The area with the largest number of recorded trip incidents is outside ‘Primark’ with 19 no. This is perhaps not surprising bearing in mind the footfall of this shop compared to the other smaller retailers along the street and that the entrance/exit doors allow greater quantities of pedestrians to enter/leave their premises. It is also worth noting that this shop borders Phase 2 and that the site compound fencing and associated noise from the construction works are likely to have had an effect on pedestrians. The next highest area being ‘Symonds and Co’ with 5 no., ‘Pastimes’ with 4 no. and then ‘Basler’, ‘Cornish Pasty’ and ‘White Stuff’ all with 2 no. Regrettably, 15 no. of the reported trips have not been able to have their location confirmed either due an absence of contact details and the Watchman Team being unable to make contact with them.

Phase 2

'Phillip Morris and Son' have had a total of 6 no. reported trips, all on the loading bay side of the street (west) and again similar to 'Primark' have had until recently compound fencing and temporary pedestrian walkways in this area which again it is felt will have had an effect on pedestrians walking through the area.

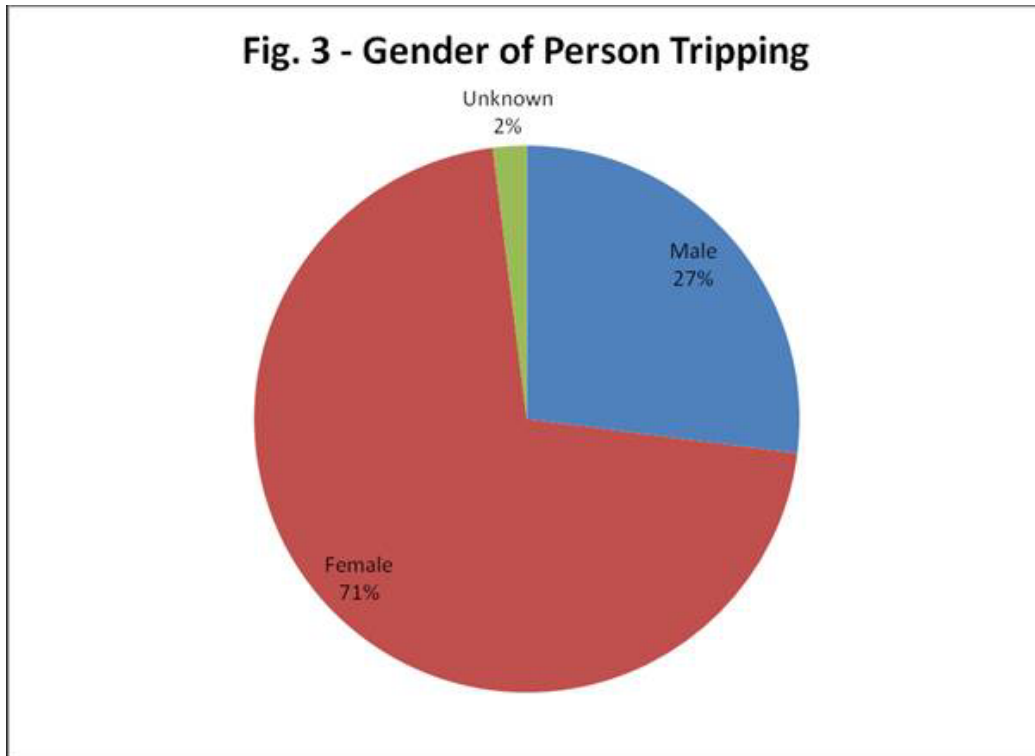
2.4. Time of day that trip occurred



Please refer to Figure 2.

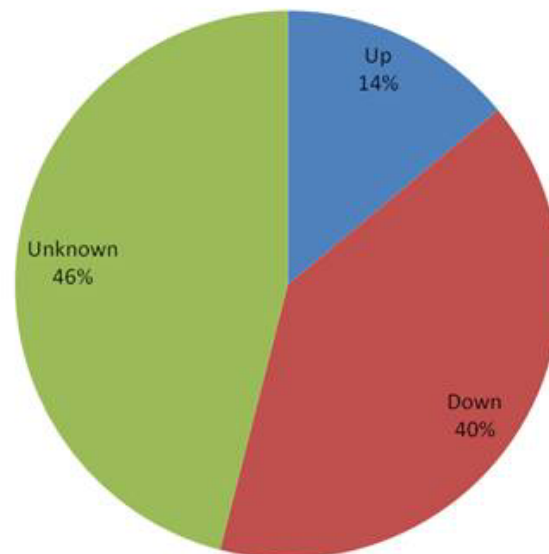
Unfortunately, 57% of reported incidents could not have the time of day established. From the data available the majority (21%) were between 12-2pm (assumed to be the core hours for lunchtime), with 12% of trips occurring 8am-12pm, and 10% 2pm-5pm. There are no reported incidents at night, and it should be noted that whilst the actual time may not have been recorded on some incidents, the remaining information recorded does suggest a daytime only issue.

2.5. Gender of person tripping



2.6. Person tripped up / down

Fig. 4 - Person Tripped up/Down



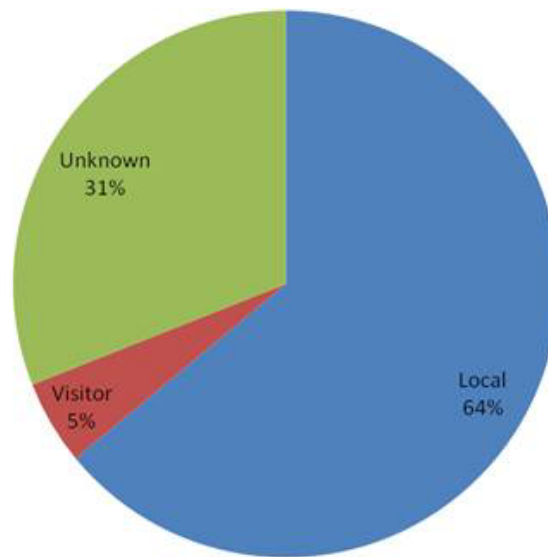
Although disappointing that 46% of the reported trips could not be confirmed either way, the remaining majority of 40% were people tripping down from the kerb, and 14% actually tripping up the kerb. This would seem to suggest that there is not a major issue in recognising the kerb face / height when walking along the carriageway section of the highway but there is when exiting shop doorways and crossing directly or walking along near the kerb edge and slipping off the kerb. Despite the carriageway section now only being 3.5m wide it appears some pedestrian's peripheral vision does not recognise the kerb on the opposite side of the street.

The identified reasons for tripping are discussed in section 2.8. It is interesting to note that within the report "Effective kerb heights for blind and partially sighted people" published October 2009 by the University College London, the trials undertaken confirmed that blind and partially sighted people found it easier to detect kerbs faces when stepping up rather than down, this trend would seem to apply for ably sighted pedestrians too. Please refer to Appendix A, photos 030 and 031 illustrate the High Street in Tewkesbury where a low kerb height of 75mm has been used against a highly contrasting macadam carriageway surface. Note how the kerb height is not that apparent in Photo 030 when walking along the footway / wide kerb but it is quite clear there is a definite kerb line, but in photo 031 from the carriageway side the kerb height is quite evident. If within Appendix A, photos 025 and 027 are compared too, this again illustrates a clear kerb and carriageway but again the pedestrian's peripheral vision is needed to register the height difference when stepping down.

2.7. Local / visitor

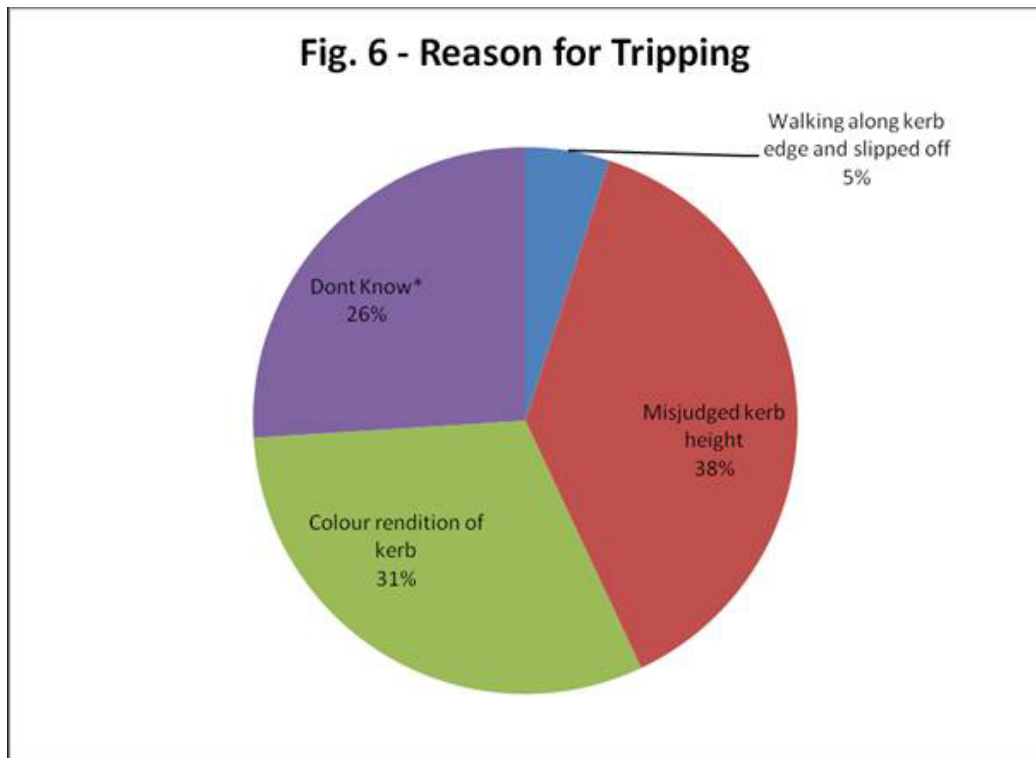
Fig. 5 - Local/Visitor

Please refer to Figure 5.



Some concerns were raised that visitors would find it particularly difficult to adapt to the new arrangements. However, from the data recorded the majority of the trip incidents have been attributable to local inhabitants (64%), with visitors equating to only 5%. Whilst it is disappointing that 31% are unknown, the other information on the data spreadsheet would lend support to these people being local too, ie 'tripped on my way to work' statements. It is also felt that based upon two of the previously constructed public realm schemes (which are in fully pedestrianised zones) it is to be expected that some of the local population would expect flush kerbs throughout the city centre, forgetting that Widemarsh Street is only pedestrianised for six hours a day. Visitors to any town or city are potentially more observant of their surroundings and this seems to be supported by the data.

2.8. Reason for Tripping



Please refer to Figure 6.

Three potential reasons for pedestrians tripping were identified from analysing the incident register:

- Fell off edge of kerb
- Colour rendition of material palette
- Misjudged kerb height

5% of pedestrians reported slipping / falling off the kerb, when walking along the footway (this has been witnessed by the Site Team). Unlike the 'traditional' narrow Highway kerb, typically 125mm wide, the current guidance for specifying wide kerbs is recognised for the aesthetic reasons in public realm schemes and to enhance the pedestrian dominance. However, this may encourage some pedestrians to walk far closer to the kerb edge, than a traditional kerb, (which is often taught to children and recognised by adults as a 'no go' 'danger area for pedestrians). This may be an area of design that is debated in future public realm guidance in non-fully pedestrianised environments.

31% of incidents were deemed attributable to claims that there was a lack of colour rendition between the materials specified, ie the footway, kerb and carriageway all 'looked the same'. Whilst all the materials acquire a consistent texture when wet, in the dry the kerb, footway and carriageway are three clearly different and distinct materials in terms of colour and texture, (see Appendix A, photos 001, 002). Lack of colour differentiation is therefore unlikely to be a factor. Within this total (31%), the majority of people tripped down the kerb.

38% of incidents were deemed attributable to misjudging the height of the kerb when crossing the carriageway area. It should be noted that the informal pedestrian crossing points have only just been completed at the time of writing the report and this may influence future pedestrian crossing movements. Within this total (38%), the majority of people tripped down from the kerb.

Unfortunately 26% of incidents have not been able to be analysed due to lack of information and not being able to re-contact the individuals so they have been classed as 'don't know'.

- 2.8.1. Following the introduction of kerb tape on the top edge of the kerbs along the western side in Phase 1, there has been a significant reduction in the number of incidents. The placing of the tape on the top edge serves both to highlight the kerb to pedestrians walking along the footway but also to any pedestrians who decide to cross the carriageway, see Appendix A, photos 026, 028.
- 2.8.2. There has been one recorded incident within the section with kerb tape, recorded on the 7th July by a third party. Thus whilst the appearance is not complimentary to the overall design it does seem to be an effective temporary measure. The possible permanent measures (if needed) are discussed further in section 6 and Appendix K.
- 2.8.3. In conclusion, from reviewing the available data there seems to be a number of possible reasons why a small number of the public using the street find the new design an issue:
 - The previous three public realm designs implemented utilised a 'flush' surface in line with the guidance at the time, two of which were in fully pedestrianised environments.
 - Two of these schemes utilised wide kerbs, silver grey in colour to provide a visual contrast with the surrounding paving material and to define specific areas.
 - Consequently the public have become accustomed to walking within the main shopping areas on a flush surface and perhaps expect the newly installed granite kerbs which are a similar width and colour to be flat too. With respect to the width and colour of the new kerbs, it has been recorded in technical journal articles, that post-construction feedback has highlighted that within town and city centres there is a lack of consistency in materials and approaches in design. This has had a negative effect on blind, partially sighted and disabled users. Whilst this is partly due to design standards changing and regular reviews etc. it is also due to the funding issues that many local authorities face and hence streetscapes sometimes develop in a 'piece meal' approach. Many authorities have now produced their own Streetscape Manuals including Herefordshire Council, to address this by taking a longer term and consistent approach, even if the required funding is not forthcoming. Hence the kerb style, size and colour have been specified to maintain a consistent approach, and one that takes account of the design preference for blind and partially sighted people, expressed through campaigns such as those of the Guide Dogs for the Blind Association.

- As mentioned in section 1.3 earlier, it should be noted that the actual kerb height has not altered dramatically in Phase 1. Claims that the new kerbs are too low or insufficiently prominent are therefore unfounded.
- The narrowness of the street in Phase 1 may also have a bearing on the trip issue. It has been observed by the Site Team that shoppers are generally looking in the shop windows either side of the street when walking through the area, especially as the street is on average only 7.5m wide between building facades. Within Phases 2-5 the street becomes significantly wider at 12.5m and therefore requires shoppers to consciously cross the carriageway and exercise more care if they want to view the shop displays.
- Whilst the construction works are in progress, a road closure is in force only allowing delivery vehicles mainly into Phases 4 and 5. This renders the remaining areas effectively fully pedestrianised. Many people have approached the Site Team assuming that once the scheme is complete it will be fully pedestrianised and not have to cater for vehicular usage. This combined with the general construction noise, compound fencing and natural disruption due to the temporary pedestrian routes created around the works may have had an impact on pedestrian behaviour.
- The specification of natural stone for all the paving is a radical departure for a highway environment in Herefordshire. Previously natural stone was only specified in the Hightown scheme, and only then in one small area, near to the 'Old House'. Whilst the materials specified have received very favourable responses from the general public via the Site Team, it could be the extensive usage is somewhat of a significant change for a small section the local population who are historically 'conditioned' to man made products, ie concrete and macadam that have more 'traditional' colours and rendition.
- There are no nationally agreed standards for kerb heights or details other than those in the Department of Transport "Design Manual for Roads and Bridges" (DMRB) which was written to cover traditional highway link design and general highway design schemes. International research has highlighted the difficulty of reconciling the benefits of kerbs for tactile guidance with the benefits of level access. Recent trials by the University of London reached no definitive conclusions and as yet the Department for Transport's research project on Shared Space offers no definitive guidance on the issue either. International research tends to be similarly inconclusive – the German, Swiss and Austrian national standards tend towards the use of kerb heights of between 30 - 50mm (see *Hinweise für barrierefreie Verkehrsanlagen* – (Guidance for barrier – free traffic spaces) – Deutsche Arbeitsgruppe Strassenentwurf Feb 2010).

3. Local Press Interest

3.1. General comments

- 3.1.1. There have been a number of positive press releases issued in the Hereford Journal newspaper by Herefordshire Council as well as regular Progress Bulletins issued to all stakeholders within the street. However the trip incidents have attracted un-complementary press articles in the Hereford Times Newspaper, specifically on the 10th June, 17th June, 24th June and lastly 1st July. Whilst there have been a small number of letters published, including supportive ones, the main thrust of the articles has been negative and could be claimed to have encouraged people to come forward reporting trips that were perhaps less significant.
- 3.1.2. Whilst obtaining as much information as possible is welcomed, it is noticeable how the time between some of the actual incidents occurring and the time of their reporting has increased and coupled with the inability for some complainants to be able to provide specific dates / times of incidents is slightly worrying perhaps suggesting a possible 'claim culture' approach by some. It is recognised however, that some members of the public have received significant injuries from their fall / trip.
- 3.1.3. It is recognised that any future negative press coverage is going to be an ongoing issue throughout the construction of the scheme and therefore continued monitoring of any trip issues is recommended.

4. Design

4.1. Design Team comments

4.1.1. The design and detailing of the street materials and kerbs are based on a range of well-established principles, adapted to suit the specific context and circumstances of Widemarsh Street. The overall aim of the street design is to create a coherent public space that can accommodate the complex bicycle and pedestrian movement patterns associated with a lively retail street, whilst accommodating low levels of slow-moving vehicles at certain times of the day. The kerb detailing and selection of materials are also intended to provide a coherent, robust and appropriate frame for the historic and varied architecture of this principle street.

4.1.2. "Streets for All-West Midlands, 2005"-Section 02 Ground Surfaces states:

"Maintaining kerb lines preserves the historical form of streets. Where the carriageway is still used for vehicles, even if in restricted hours and for the deliveries only, it is important to keep a kerb height of at least 25mm and to use different materials to define the separation". "People tend to look down".

4.1.3. NCBI (National Council for Blind of Ireland) recommend a minimum height of 40mm be maintained and whilst Chester's 'Public Realm Design Guide' currently in draft stage, states the following;

"Kerb heights will range from 40mm to 125mm. Higher kerbs increase traffic speeds by reinforcing the carriageway line. Lower kerb heights are easier for pedestrians to negotiate and create a more pedestrian friendly character, but can be less a deterrent to parking on the pavement".

4.1.4. The detailed specification of the kerb consists of a silver grey granite kerb, with a vertical face and a bull nose edge, 300 mm wide and set at 50 mm (2") above the porphyry granite setts of the carriageway. The alignment of the kerb is emphasized by parallel silver grey granite channels, 300 mm wide, set flush with the carriageway. The channel helps to reduce the apparent width of the carriageway in order to maintain a low-speed environment.

"Streets for All-West Midlands, 2005"-Section Section 06 Environmental Improvements states:

"Kerb lines should always be retained to maintain the visual continuity of the street and to eliminate the need for bollards".

4.1.5. The Guide Dogs for the Blind Association (Guide Dogs) first became aware of shared space issues caused by the removal of the traditional kerb in 2005. The latest guidance available at the time the design was being undertaken (spring/summer 2009) regarding recommended kerb heights and kerb profiles, was the "Pamela" report by the University of London conducted in May 2007:

This tested a 30mm high kerb face and stated:

“The kerb edge that was most acceptable to mobility impaired participants was the bullnose kerb, with 79% finding it to be acceptable in the pedestrian environment”.

4.1.6. The report also concluded that the 30mm kerb height ‘was not sufficient to be reliably detected by blind and partially sighted people’.

4.1.7. The height of the design kerb is based on the findings within the Pamela report and also similar precedents from a number of streetscape projects in the UK and in mainland Europe. The existing arrangements allow for wheelchair users and those with small-wheeled buggies and shopping trolleys to traverse the kerb with reasonable ease, whilst maintaining a clear physical and visual definition of footway and carriageway. The latter is especially important due to the location of the headquarters of Vision Links (formerly The Herefordshire Association for the Blind) in Widemarsh Street.

It is acknowledged that some recently constructed shared space schemes lacking a kerb and some schemes under design and exhibited to the public have attracted criticism from the Guide Dogs Association namely:

- New Road, Brighton 2006 - After surveys “showed blind and partially sight people found it more difficult to navigate in the shared surface, and it affected their confidence with most reporting they would no longer be able to use the area independently”. Sept 2007.
- Exhibition Road, South Kensington London- Recently exhibited, Kensington and Chelsea Council have now agreed to include a low kerb within the design following Guide Dogs pursuing a Legal Injunction against them - Guide Dogs website 2010.
- Manchester City Council, Belfast City and Matlock Town Council have stated that they will not accept Shared space schemes because of their tendency to discriminate against some disabled people and other pedestrians-June 2009 ‘Surveyor’ Magazine.

4.1.8. The low kerb is also important in allowing surface water to be channelled to drainage gullies along the street to provide a positive drainage system, particularly important given the offset carriageway alignment within the design. Minor variations in the kerb height allow for the inevitable inconsistencies along individual shop frontages and maintain, where possible, a consistent cross-fall gradient for both the footways and carriageway.

4.1.9. The design and detailing of the Widemarsh Street kerb is entirely consistent with the Hereford City Centre Streetscape Strategy. This aims to maintain the historic street pattern and alignment of footways and carriageways, whilst “paving design and detailing should aim to avoid significant changes in grade in order to maintain coherent barrier-free streetscapes with maximum accessibility” (Section 5.7).

4.2 Precedents

4.2.1 The Widemarsh Street arrangements draw on a number of recent examples of paving and kerb design intended for streets that are not fully pedestrianised. Most such schemes adopt a low kerb as part of the general paving arrangements. Please refer to Appendix A, photos 029-040 which illustrate some UK examples. Such precedents include:

- Chester, Cheshire

The regeneration of the streetscape between 2001 and 2004 adopts a simple 50 mm kerb height to distinguish the Yorkstone paving from the granite setts of the carriageways.

- Shrewsbury High Street, Shropshire

A similar 50-60 mm kerb is used to define the one-way carriageway along this historic High Street, combined with courtesy crossings at regular intervals (similar to Widemarsh Street).

- Blackett Street, Newcastle

A combination of two wide channels in silver grey granite and porphyry, separated by a 30-40 mm kerb are used to define the busy two-way bus route of Blackett Street where it traverses the busy Eldon Square in the centre of Grainger Town, Newcastle. The scheme forms one of the case studies identified by CABI in its publication "*This Way to Better Streets*". See <http://www.cabe.org.uk/case-studies/blackett-street-and-quayside/description>

- The Cut, Southwark, London

A recent street enhancement scheme by Transport for London uses a 30-50 mm kerb detail based on a 300 mm wide silver grey granite kerbstone. The scheme is designed to cope with complex and busy pedestrian and traffic movements outside the Old Vic Theatre.

- Ashford Ring Road, Kent

This award-winning streetscape project employs a similar design to Widemarsh Street, using Belgian bricks rather than porphyry setts, with parallel channels of granite set between a 50 mm kerb.

- The Market Place- Wells, Somerset
- Walworth Road, Southwark, London
- Warren Street, Stockport
- High Street, Tewkesbury
- Aberdare Town centre
- Merthyr Town centre
- Byng Place, Bloomsbury, Camden-Currently under design and consultation using 50mm kerbs

4.2.2 Other precedents for the use of low kerbs are drawn from a variety of schemes in France, in Bruges, and in other mainland European countries.

4.3 Current Design Guidance

4.3.1. Although published after the design was completed and approved by Herefordshire Council, a second report conducted by the University College London was issued in October 2009 (University College London report, October 2009 "Effective Kerb heights for Blind and Partially Sighted People") and continued and expanded upon the work undertaken in the earlier report of 2007.

4.3.2. The report Stated that: "the UCL trials confirmed that a 30mm kerb height was not sufficient to be reliably detected by blind and partially sighted people" and compared kerb heights between 20-120mm, and although recommended a height of 60mm or above, this was based on 1 participant out of a total of 36 failing to detect a 50mm kerb. It stated a 60mm height was detectable whether stepping up or down and also concluded that consideration should be given to avoid using 40mm high kerbs as they were less consistent in detection rates. Further practical tests would be required to determine if 50mm kerbs would be a problem in the wider population of people who are blind or partially sighted. It also stated that it is unlikely that the kerb edge profile makes a significant difference as long as the kerb face is approximately vertical.

- 4.3.3 Within the report, the angle of approach was studied and the findings concluded that the level of detection was not affected whether pedestrians approached at 90 degrees to the kerb face or on an oblique angle. It also reported that pedestrians found it easier to detect kerb faces stepping up rather than down.
- 4.3.4. Support for 50mm high kerbs has been forthcoming from some disabled groups in the UK-Stockport Disability Alliance wrote to Guide Dogs saying it was happy with a 50mm kerb height installed by Stockport Council in Warren Street, Stockport.
- 4.3.5. Based on the above examples within the UK and mainland Europe reviewing the current data available regarding low kerb specification and studies undertaken, the use of a 50mm kerb height is deemed to be generally acceptable in contexts such as Widemarsh Street.
- 4.3.6. Little general national guidance is available on the subject of kerb heights. However, a report on a scheme installed in Keswick Town Centre (The Market Place), Cumbria in 2004 was researched and interestingly concerned the issue of low kerbs. Please refer to Appendix J for the full report.
- 4.3.7. "The Market Place" utilised wide kerbs with a 50mm kerb face and had brought criticism from the local Neighbourhood Forum who were requesting alterations to make the kerbs 'flush'-similar to some views expressed regarding Widemarsh Street.
- 4.3.8. The Keswick report summarised the following:
- The scheme design had been approved by the local Highway Authority as well as key stakeholders (as Widemarsh Street has).
 - There was a precedent for the use of low kerbs in areas not fully pedestrianised (already established in the existing environment).
 - That the kerb provided both a key navigational aid to blind and partially sighted people and a positive drainage system which avoided the need to install a linear drainage channel which in their scheme was thought to be aesthetically unacceptable. In Widemarsh Street this had been discussed and dismissed as not being required if a kerb face was to be utilised as this would allow a positive drainage system (under most circumstances you either have one or the other). Installing linear drainage channels would also have been high risk due to the existing services within the carriageway and the uncertainty of their depths along the street.
 - That a kerb 'face' is a reasonably expected feature within the public highway. This has been a key definitive statement in countering damage claims nationally.
 - That in widening the existing footways, there should be less risk of tripping /falling over.
 - The financial and programme implications of any remedial works.



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- Finally, that the number of reported trips appears to be a very small minority of the total using the area. This is also the case in Widemarsh Street (see section 1.4 previously).

4.3.9. The Keswick report concluded that the kerbs should remain in place.

5. Site Observations

5.1. Site Team comments

- 5.1.1. The Amey Site Supervision Team and some members of the Principal Contractor's staff have witnessed some members of the public tripping and occasionally falling over during the construction.
- 5.1.2. Although not systematic or fully objective, such observations are worth recording within this review.
- 5.1.3. The overall comments would seem to reflect the general lack of adequate observation by some pedestrians walking through the newly laid paving. Typical scenarios witnessed include:
- People walking along, whilst texting on their mobile phones.
 - People walking along the kerb edge, only to slip off.
 - Couples walking hand in hand, with one person seeing the kerb and stepping up whilst the other person seemingly doesn't see it and tripping.
 - A pedestrian showing a certain amount of impatience, rushing to get past slower moving pedestrians within the temporary pedestrian traffic management layout, and then catching their foot on the kerb.
 - Pedestrians seemingly not seeing the blue and yellow coloured plastic temporary ramps, and road cones and yet still tripping down kerbs next to these.
 - Pedestrians paying more attention to the shop window displays than where they are actually walking.
 - Some pedestrians obviously seeing the kerb, but despite stepping up or down still failing to judge the height effectively.

5.2. Architectural Site Visit comments

5.2.1. As part of the overall project management of the scheme, regular architectural input has been agreed, this is achieved by regular inspections in conjunction with the Amey Site Team. The general comments are:

- Inspections of construction progress confirm that the work is being carried out to a good standard in conformity with the design specification. The general quality of site supervision, organisation and workmanship is high, despite the limitations of operating in a very confined public space.
- The requirements for public protection such as site fences and screens mean that pedestrians have to be channelled between areas of operation. The presence of screens prevents the public from obtaining a clear overview of the street. The inevitable noise and activity generates significant disturbance and distraction, contributing to an unusually complex temporary street environment. This may explain the unusual incidence of trips in and around the construction site.
- During construction work, it has been necessary to exclude general traffic from using the street. This means that the character of the street differs from its eventual use, where some vehicular traffic will remain an important element at all times of day. This may be significant in that Widemarsh Street adjoins the pedestrianised areas of High Town and Maylord Street. At present pedestrians lack the visual clues to identify the street as different in character from the City Centre.

6. Conclusion and Recommendations

6.1. Conclusion

6.1.1. Some incident of trips and falls can be expected in every street, regardless of the nature of the paving and materials. However the high concentration of incidents during the peak of construction activity between May and July is unusual, and remains a cause for concern. The design team has considered every aspect of the project and its context to explore possible contributory causes, as well as reviewing potential remedial action. The following are the key conclusions:

- There are no inherent design problems associated with the use or configuration of the materials and kerb arrangements. Similar kerb details have been used extensively in other parts of the country and elsewhere without significant reports of problems from tripping or falls.
- The quality of construction and workmanship do not appear to be contributing to the problem. The scheme is being delivered to a high standard in accordance with the design specification. Local authority liability for paving extends to areas of poor maintenance or inadequate construction, neither of which is evident.
- The kerb detail is very similar in many respects to the previous kerb arrangements for Widemarsh Street. The new kerb detail provides strong visual demarcation between the grey granite and setts to highlight the change in grade.
- Construction activity and temporary screening limit the ability of pedestrians to observe and respond to the street as a whole. There is also increased distraction and discomfort caused by the limited space available for pedestrians and the presence of significant distractions in pedestrians' field of vision.
- The temporary absence of vehicles from the street may be causing pedestrians to associate the space with the fully pedestrianised areas of High Town and Eign Gate.

- It is recommended not to commit resources to any extensive permanent remedial action until the impact of the construction phase can be more fully assessed. Measures that may delay the construction programme would be likely to extend the period of discomfort and inconvenience, and would also impact on the key trading period in the run up to Christmas. There would appear to be little benefit in slowing or impeding the remaining works.
- The installation of tape to temporarily highlight the new kerb appears to be having some beneficial effect in reducing the frequency of reported trips. More significant measures (such as pedestrian barriers) to exclude the public from a greater area of the street would severely limit construction progress and deliveries, and do not appear to be justified by the emerging pattern of incidents.

6.1.2. It is the considered view of the multi-disciplinary Design Team that it is likely that the removal of construction screens, and the return of some vehicular traffic to the street will combine to create the appropriate response to the observed circumstances, particularly once the full length of the street and kerb arrangements become visible. The Stage 3 and Stage 4 audits (as part of the recommendations in section 6.2) will provide opportunities for further thorough review and provide a basis for decisions on what further measures, if any, may be required.

6.2. Recommendations

6.2.1. Based upon the above conclusion, the following action plan is recommended:

- Continue to monitor any reported trip issues and update the trip register throughout the construction phase of the project.
- Continue to install temporary black kerb tape on completed Phases of work as it seems to have had a positive effect in reducing the number of trips and does clearly highlight the kerb which allows the Highway Authority to demonstrate it is trying to address this issue until the scheme is completed and operating under 'normal' conditions.
- Arrange a current 12 hour pedestrian count for the street, ideally during a week day and a Saturday as part of the continued monitoring process.
- Once the project is complete, remove the kerb tape and undertake a Stage 3 Road Safety Audit to quantify how the scheme operates under 'normal' operation ie the part-time pedestrianisation order (10:30 - 16:30) both with and without vehicular traffic and at night-time.
- Review the Stage 3 Road Safety Audit findings accordingly and act appropriately.
- Following the road safety audit review, consider continuing monitoring any trip issues (if applicable).
- Undertake a Stage 4 Road Safety Audit approximately 12 months after completion of the scheme.

6.2.2 If it appears there is still an unacceptable level of tripping still occurring (it is fully accepted that the public highway environment is not risk free) then the following possible solutions (see Appendix K) could be considered depending upon whether the issue is localised or throughout the scheme:

- Painting the kerb surface, typically replicating the kerb tape installed, commercial road marking suppliers can provide a heat-on strip, which would be cost effective (circa £5,000) and a low residual maintenance risk / issue. This may also be a possible solution to any localised issues ie the transitional area between the southern end of Phase 1 and Bewell Street.

- A cut channel and insert within the kerb unit, however following a sample kerb being trialled initial concerns are this may have too high a residual risk in terms of maintenance as the strip has to be laid in sections and the joints would be subject to wear and once lifted could be a trip hazard in itself. Cost would also be in the region of £40 per LM, approx total cost @ £18,000.00 for the whole scheme.
- Introduction of double yellow lines and associated bar markings on the kerb similar to the existing situation. Whilst undesirable under the current brief, inconsiderate parking may become an issue following the completion of the scheme and the removal of the current marked restrictions.
- If a localised issue, and whilst not ideal and discouraged by the Disability Discrimination Regulations Act 1995, consideration could be given to the installation of bollards, although these could prove additional obstructions and hazards to a greater number of pedestrians using the street.

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