

## Technical Note No. 4

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Project: Proposed Aldi foodstore – Straight Mile, Llay

Title: **Pedestrian Crossing Provision**

Date: 10 December 2020

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### 1.0 Introduction

1.1 This Technical Note has been prepared by Cameron Rose Associates on behalf of Aldi Foodstores Ltd and has been prepared in response to the committee decision to grant planning permission to application reference P/2020/0623 with an amendment to Condition 17.

1.2 For the avoidance of doubt condition 17 states:

*'No development shall commence until details of the zebra crossing, bus stop, all footways and signage within the public highway have been submitted to and approved by the Local Planning Authority. The approved scheme shall be fully implemented prior to the first use of the development.'*

1.3 Committee members granted consent to the development on an amendment to the above wording of Condition 17. Whilst the wording was not formally agreed by Committee, Cllr Bithell's proposed an amendment be made to the crossing type, from a Zebra crossing to a Pelican crossing.

1.4 This amendment was put before Committee by Cllr Bithell with the good intentions that it would provide a safer form of crossing. Such an approach to highway design is to be welcomed; however it must also be considered by traffic engineering professionals as it may not be the case that a signalised crossing is appropriate for the location or whether it is indeed safer.

1.5 This Technical Note examines the pedestrian crossing design guidance set out in the following documents, in order to consider whether a Pelican crossing is more suitable at this location than a Zebra crossing:

- Local Transport Note 1/95 (LTN 1/95) – The Assessment of Pedestrian Crossings
- Local Transport Note 1/95 (LTN 1/95) – The Design of Pedestrian Crossings
- Design Manual for Roads and Bridges

## **2.0 Pelican Crossing or Puffin Crossing**

- 2.1 Prior to considering whether or not a signal controlled crossing would provide a better crossing form over a Zebra crossing; it is important to consider the reference to a Pelican crossing in full.
- 2.2 Cllr Bithell's requested amendment was for a "*Pelican Crossing*"; however, such a crossing form is no longer installed on the UK highway network.
- 2.3 The practice of installing new Pelican crossings stopped circa 1996; with the approval of Puffin crossing forms.
- 2.4 The differences between a Puffin and a Pelican are essentially:
- There are no pedestrian overhead signal aspects;
  - The inclusion of kerb-side detectors. These cancel pedestrian demands which are no longer required; and
  - On-crossing detectors. These extend the all-red time.
- 2.5 It is important to identify the difference between these crossing types if the term is to be used in a condition. It is accepted however that both a Pelican and a Puffin crossing are both signal controlled crossing forms.
- 2.6 For the purposes of this Technical Note, the term Pelican crossing has been replaced with Puffin crossing as it is this form of signal controlled crossing that is the alternative option to the Zebra crossing in the UK.

### 3.0 Is a Crossing Required

- 3.1 The current guidance uses a numerical measure to assess the degree of conflict between vehicles and pedestrians, with a reduced numerical measure for special circumstances. The degree of conflict is determined by multiplying the number of vehicles per hour (V) squared by the number of pedestrians crossing per hour (P) over a 100m section. The average of the four highest hours is taken to represent what is called  $PV^2$ .
- 3.2 With the introduction of the current national guidance in Local Transport Note 1/95 in 1995, there was a move away, nationally, from the explicit use of  $PV^2$  to a framework approach. However, it is still considered an important measure to act as an initial starting point to see if a particular location justifies further investigation and justification for the provision of a controlled crossing.
- 3.3 When assessing a request for a crossing, if the value of  $PV^2$  is less than  $0.2 \times 108$ , no formal crossing facilities are required. If the value of  $PV^2$  is above  $0.2 \times 108$  then there should be a more in-depth framework assessment carried out, in line with the advice in Local Transport Note 1/95.
- 3.4 However to maintain a consistent approach the framework assessment should also be based upon a  $PV^2$  approach. This can be achieved through adjusting the value of  $PV^2$  to take account of the composition of the pedestrian flow, the width to be crossed, the speed limit and 85%ile speed of the road and the difficulty encountered crossing the road in terms of time spent waiting and crossing.
- 3.5 However, there are circumstances that the proposed guidance may not fully address the issues of concern such as when close to proposed new developments. For this situation there may be little existing pedestrian movements. However, because of the proposals significant volumes would result. Yet the application of the modified  $PV^2$  calculation would not imply the provision of a pedestrian facility because the number of new pedestrians generated by the above circumstance would not be known.

3.6 Therefore, in these circumstances, due consideration should be given to the provision of pedestrian/cycle crossing facilities if the traffic flow for the four busiest hours is above 480 vehicles per hour (two way) or the number of heavy goods vehicles is 300 vehicles per hour (two way) or above. After carrying out a preliminary survey of the proposed site a decision should be reached on whether a crossing is justified or not based upon experience at previously installed sites, judgement and knowledge of local factors.

3.7 The modified formula for  $PV^2$  is defined as:

**$PV^2$  Adjustment factor ( $EP \times UC \times PW \times PB \times RW \times CT \times VS \times CS$ )**

Where;

- **EP** Percentage of Elderly pedestrians (EP). If the percentage of elderly pedestrians is less than 10%, a factor of 1 should be used. If more than 10%, then use the following formula  $(100+EP)/110$  (Elderly defined in terms of visual appearance and is a judgement of the enumeration staff generally taken as over 60)
- **UC** Percentage of unaccompanied children. If there are not more than 10% of unaccompanied children, use 1. If there are more than 10%, use the following formula:  $(100+UC)/110$
- **PW** Percentage of pedestrians with prams/pushchairs, wheelchairs or blind (white sticks or guide dogs). If not more than 5% use 1. If more than 5% then use the following formula:  $(100+PW)/105$
- **PB** Percentage of bicycles crossing. If not more than 15%, use 1. If more than 15%, use following formula:  $(100+PB)/115$
- **RW** Road width. If not more than 7.3m, use 1. If more than 7.3m, use the following formula:  $W/7.3$

- **CT** Time to cross (seconds) this reflects the difficulty in crossing in terms of the volume of traffic and complexity of the location (e.g. presence of junctions or other features). If it takes on average less than 26 seconds cross, use 1. If it takes between 26 and 40 seconds to cross, use 1.2; if it takes between 41 and 60 seconds to cross use 1.4; and if it takes over 60 seconds to cross, use 1.6 (the above crossing times include both waiting time and crossing time).
- **VS** Vehicle speeds; if 85th percentile speed is less than 30 use a factor of 1 If between 30 and 35 use 1.1 If between 36 and 40 use 1.2 If between 41 and 45 use 1.3 If between 46 and 50 use 1.4
- **CS** If proposal is located where a road divides a substantial community or is outside a school, clinic, community centre, home for the elderly or busy shopping centre adjust as follows: Proposed location is on a road that causes community severance or outside a school or clinic, home for the elderly etc. then apply 1.1. If the proposed site is close to two of the above use a factor of 1.25. If a proposed site is close to three or more of use a factor of 1.4.

3.8 If the adjusted  $PV^2$  is greater than  $0.6 \times 10^8$  considerations should be given to either a zebra crossing or a pelican crossing.

**P= number of pedestrians crossing per hour**

3.9 The pedestrian attraction of the proposed foodstore has been estimated on the basis of comparable survey data contained within the TRICS database. As per the Transport Assessment, survey data for discount foodstores has been used to assess the likely traffic attraction of the proposed development.

3.10 The average pedestrian trip rates are summarised below in **Table 3.1**, the full calculation and output from TRICS is attached in **Appendix A**.

**Table 3.1: Discount Foodstore Pedestrian Trip Rates per 100 sqm GFA**

| Peak Period                    | Arrivals | Departures | Two-Way |
|--------------------------------|----------|------------|---------|
| AM Peak<br>(0800 – 0900)       | 0.336    | 0.209      | 0.545   |
| PM Peak<br>(1700 – 1800)       | 1.354    | 1.481      | 2.835   |
| Weekday Daily                  | 15.300   | 15.077     | 30.377  |
| Saturday Peak<br>(1200 - 1300) | 3.266    | 3.438      | 6.704   |
| Saturday Daily                 | 24.529   | 24.828     | 49.357  |

3.11 The quantum of pedestrians attracted by the 1,941 sqm GFA Aldi foodstore, based on these trip rates, is summarised in **Table 3.2**.

**Table 3.2: Discount Foodstore Vehicular Trip Attraction**

| Peak Period                    | Arrivals | Departures | Two-Way |
|--------------------------------|----------|------------|---------|
| AM Peak<br>(0800 – 0900)       | 7        | 4          | 11      |
| PM Peak<br>(1700 – 1800)       | 26       | 29         | 55      |
| Weekday Daily                  | 297      | 293        | 590     |
| Saturday Peak<br>(1200 - 1300) | 63       | 67         | 130     |
| Saturday Daily                 | 476      | 482        | 958     |

3.12 It should be noted that not all pedestrians attracted to the proposed Aldi store will cross Gresford Road. However adopting a robust assessment and assuming 60% of pedestrian will cross at this location, results in the following total number of pedestrians crossing during the peak periods:

- AM Peak – 7 pedestrians (two-way) or one pedestrian every 8.5 minutes;
- PM Peak – 33 pedestrians (two-way) or one pedestrian every 1.8 minutes; and
- Saturday Peak – 78 pedestrians (two-way) or one pedestrian every 47 seconds.

**V = number of vehicles per hour**

3.13 The two way vehicle flows on Gresford Road are as follows, for a future assessment year with the development in place:

- AM Peak – 597 vehicles per hour;
- PM Peak – 725 vehicles per hour; and
- Saturday Peak – 524 vehicles per hour.

**PV<sup>2</sup> per 100 million**

3.14 The results for each peak are therefore as follows:

- AM Peak – 2.495;
- PM Peak – 17.346; and
- Saturday Peak – 21.417.

3.15 The adjusted factors have been calculated as follows:

- **EP** = 10% therefore a factor of 1 is used;
- **UC** = 10% therefore a factor of 1 is used;
- **PW** = 5% therefore a factor of 1 is used;
- **PB** = 2% therefore a factor of 1 is used;
- **RW** = 6.7 metres therefore a factor of 1 is used
- **CT** = between 26 and 40 seconds to cross, therefore a factor of 1.2 is used;
- **VS** = between 30 and 35 mph, therefore a factor of 1.1 is used;
- **CS** = not applicable no community severance.

3.16 The adjusted results for each peak are therefore as follows:

- AM Peak – 3.293;
- PM Peak – 22.896; and
- Saturday Peak – 28.270.

3.17 Therefore based on the assessment criteria set out above it is concluded that a formal crossing facility is required.

#### **4.0 Zebra Crossing or Puffin Crossing**

4.1 The amendment sought was predicated on the assumption that a Puffin crossing provides pedestrians with a safer crossing point to that of a Zebra crossing. However, this is not the case LTN 1/95 states:

*'The purpose of a crossing is to provide pedestrians with a passage across a carriageway. Each type of crossing has advantages and disadvantages; the type chosen should be appropriate to the circumstances of the site and the demands and behaviour of road users.'*

4.2 It is incorrect to consider that there is a hierarchy of pedestrian crossings, where one form is safer than the other. If this is the case it would stand to reason that the 'less safe' crossing forms would never be installed.

4.3 However it is correct to say that one form of crossing may be safer than another form given a particular situation. Therefore, it is necessary for a competent Traffic Engineer to make an assessment as to which crossing form would work the safest and most efficient given a certain situation.

4.4 LTN 1/95 identifies factors to be considered in determining what form of pedestrian crossing is required. It notes:

*'factors most likely to have a bearing on the choice of pedestrian crossing type are:*

- *difficulty in crossing;*

- *vehicle delays during peak periods;*
- *carriageway capacity;*
- *local representations;*
- *cost (including maintenance);*
- *vehicle speeds.'*

LTN 1/95 goes onto state that:

*'There are a number of possible options for action when considering the provision of pedestrian crossings. These include:*

- *do nothing;*
- *provide traffic management (including refuge island);*
- *provide a Zebra crossing;*
- *provide a signal-controlled crossing.'*

- 4.5 In considering these factors the traffic engineer can determine whether a crossing is needed or not (refer to **Section 3.0** of this report) and which crossing form would be favoured over other forms.
- 4.6 Local Highway Authorities and Traffic Engineers consider that Zebra crossings do not introduce any additional danger to the road environment and in comparison with puffin crossings are very similar in operational safety terms. Reference is made to paragraph 4.2 above in this regard.
- 4.7 It is important to note that vehicles and pedestrians are positively controlled by signal-controlled crossings where vehicles have precedence over pedestrians until such time as a red signal is called, whereas pedestrians are given precedence over vehicles at Zebra crossings.

- 4.8 LTN 2/95 sets out a series of general requirements, which had been taken into account when determining the proposed crossing form on Gresford Road. These considerations concluded that a zebra crossing would be the safest and most efficient crossing form at this location.
- 4.9 Set out below in **Section 5.0** is why a Puffin crossing has been ruled out of the proposals based on the assessment criteria detailed in LTN 2/95.

## **5.0 Why a Puffin Crossing Should not be Installed**

- 5.1 Design Manual for Roads and Bridges states that zebra crossings should be considered where pedestrian flows are 1100 people per hour or less (averaged over the four highest hours) and where vehicle flows are 500 vehicles per hour or less (averaged over the four highest hours). From the assessment carried out in **Section 3.0** it can be concluded that the pedestrian flow potential is significantly lower than 1100 people per hour and the peak hour traffic flows are not significantly above 500 vehicles. Therefore if these were averaged out over the four highest hours in the day they would on average be less than 500 vehicles per hour.
- 5.2 Based on this simple initial criteria assessment as set out in Design Manual for Roads and Bridges; the need for a Puffin crossing is not evident.
- 5.3 Proximity to an existing signal junction is a key factor in considering what crossing form should be used. There is a need to balance a conflict of control methods to that of safety and efficiency.
- 5.4 Turning first to safety, the forward visibility afforded an approaching vehicle of the crossing differs from a Zebra crossing and a Puffin crossing. A Puffin crossing requires a view to both the crossing point and the primary signal head; whereas the visibility to the Zebra crossing is to the crossing point only.

- 5.5 In this case Gresford Road is lined on the site side by trees protected by a Tree Preservation Order and need to be retained. These trees and their overhanging growth mean that the primary signal head would be obscured from approaching vehicles. It is accepted that regular maintenance of the trees will address this matter, but this places an onus on the Local Highway Authority maintenance budgets which would be onerous and could be missed leading to signal head obscurity.
- 5.6 Signal head alignment resulting in see through and Puffin crossing overrun would also be an issue at this location. Drivers travelling along Gresford Road toward the Crown crossroads would suffer from a 'see through' issue; this occurs when traffic signal heads align and drivers mistake one signal for the other.
- 5.7 The see through issue along Gresford Road could result in pedestrian accidents as approaching driver may mistake the green signal given at the Crown crossroads for a green signal at the pedestrian crossing. When in fact the pedestrian crossing is a red signal. This would therefore lead to drivers passing over the crossing when not permitted to do so potentially resulting in a pedestrian to vehicle accident.
- 5.8 Puffin crossings require pedestrians to push the call button and wait for the green signal to be given. This differs from a Zebra crossing which is called by simply stepping onto the crossing. Whilst footfall would not be high at this location there is a potential for the wait time to result in pedestrian to pedestrian conflict, particularly on the non-site side of the Gresford Road crossing.
- 5.9 Pedestrian to pedestrian conflict in this situation occurs when a build-up of pedestrians occurs whilst waiting for the crossing to be called. In this case the waiting pedestrian would block the footway as the footway is only 1.8 metres wide on Gresford Road. When this footway blocking occurs pedestrian walking along Gresford Road are likely to pass by stepping into the live running lanes of the Road. If the pedestrians were walking on a south to north alignment, then they would be stepping into the carriageway with their back to the approaching traffic.
- 5.10 For the reasons above LTV 2/95 recommends a minimum width on the footway of 2.0 metres at the crossing point.

- 5.11 In addition to what the safest form of crossing would be at a certain location, consideration must also be given to operational efficiency. It is noted that Cllr Bithell, stated that a “*Pelican*” crossing should be provided “*irrespective of the flow of traffic ... the flow of traffic is irrelevant to me*”.
- 5.12 However, when considering the operational safety of a crossing form or a junction form the flow of traffic is directly relevant and must be taken into account.
- 5.13 The proposed crossing point is located 60 metres from the existing Crown crossroads signal junction. The delay time on vehicles associated with a Puffin crossing could be in the order of 45 seconds to 60 seconds. Whilst this sounds a short time-period when compared to a zebra crossing it is a long period. Zebra crossings can disrupt traffic for between 5 and 8 seconds which ultimately leads to less build up vehicle queues.
- 5.14 If a Puffin crossing is to be installed at this location there is a risk that the red signal at the crossing point could lead to vehicles blocking back into the Crown crossroads junction. There are no solutions to address this issue, it would simply occur and have to be accepted.
- 5.15 However, the blocking back raises a fundamental safety problem not associated with pedestrians but with vehicles passing through the Crown crossroads junction. Blocking vehicles into a junction create an obstacle within a sterile junction area. This means that traffic movements not turning down Gresford Road would have to weave past the queued traffic.
- 5.16 Weaving past queued traffic can lead to rear shunt or head on vehicle to vehicle conflict depending on the movement of flows which are released at that time in the signal phasing.
- 5.17 Consideration has also to be given with the increased potential for vehicles to turn through the junction and to be faced with a queue of traffic along Gresford Road. Drivers concentrated on the manoeuvre through the junction suddenly experiencing a queue of traffic blocked back from the Puffin crossing could result in a propensity for greater rear shunt accidents than a zebra crossing.

- 5.18 Blocking back along Gresford Road could also lead to driver frustration and greater risk taking and a nuisance for residents.
- 5.19 With regard to nuisance, consideration should be given to residents of Gresford Road. A zebra crossing is silent in its operation where as a Puffin crossing sends out an audible signal when crossing can take place because the cars are stopped by a red signal. This audible signal is a high pitched bleeping sound and would be an irritant to local properties that are in close proximity to the crossing point.
- 5.20 Consideration should also be given to the propensity for start/ stop of vehicles to occur. Because the delay time is less with a Zebra crossing there are fewer vehicles stopping and restarting engines and revving away from the crossing. The greater numbers of vehicles which will be stopped by the Puffin crossing (by virtue of its longer delay time) would result in a greater noise generation as vehicles restart and rev away from the crossing.
- 5.21 Finally, ongoing maintenance has to also be taken into account. The cost of maintaining a Puffin junction for the Council is significantly higher than a Zebra crossing and it requires a greater energy demand. Accordingly, the future cost imposition on the Council is greater and it further increases the Councils operating carbon footprint, which is a matter that all Councils are having to drive down through their 2030 zero carbon commitments.

## **6.0 Summary and Conclusion**

- 6.1 Assessment of the pedestrian and vehicle flows identifies and confirms a need for controlled crossing on Gresford Road associated with the proposed foodstore.
- 6.2 Highway design guidance set out in Design Manual for Roads and Bridges states that the demands at this location fit the criteria for a zebra crossing.
- 6.3 It has been stated that there is no hierarchy in crossing safety; there is no evidence to show one crossing performs better than another given the exact same environment. If there was a hierarchy of safety, then one crossing would be favoured over the other and the less favoured crossing form would not be installed anywhere in the UK.

- 6.4 It has been shown however; that one crossing form might be safer than another crossing form given specific circumstances of the local environment. This is the case with Gresford Road, a number of factors have been set out above which when considered conclude that a Puffin crossing could lead to a greater potential for accidents to occur than a Zebra crossing.
- 6.5 Impact on local residents has also been demonstrated to be higher with a Puffin crossing than a Zebra crossing; with noise nuisance being the principle issue.
- 6.6 Maintenance costs and carbon impact also significantly increase with a Puffin crossing compared to a Zebra crossing. This burden would have to be carried by Wrexham Council in the future.
- 6.7 In conclusion it has been demonstrated with due regard to Design Manual for Roads Bridges, LTN 1/95 and LTN2/95 that a Zebra crossing is the correct form of crossing for this location on Gresford Road. This conclusion is based on a comprehensive assessment of the crossing types, location parameters based on engineering experience of both the Developer's appointed Traffic Engineers and those appointed by Wrexham Council.
- 6.8 The conclusion is firmly for a Zebra crossing by the professional engineers for the key reasons that it would be operationally safer and more effective for pedestrians; particularly as this method prioritises the pedestrian, whereas a Puffin crossing prioritises the vehicle. The priority for the applicant is to provide the safest and most effective option and this is agreed independently by the Council's highway engineer too. There is no merit in Aldi installing the sub-optimum option in this locality which is the Puffin option.



## **APPENDICES**



## **APPENDIX A**

### **TRICS DATA**

Land Use : 01 - RETAIL  
Category : C - DISCOUNT FOOD STORES  
**MULTI-MODAL PEDESTRIANS**

Selected regions and areas:

|    |                                |        |
|----|--------------------------------|--------|
| 02 | SOUTH EAST                     |        |
|    | KC KENT                        | 1 days |
| 05 | EAST MIDLANDS                  |        |
|    | NR NORTHAMPTONSHIRE            | 1 days |
| 06 | WEST MIDLANDS                  |        |
|    | SH SHROPSHIRE                  | 1 days |
| 07 | YORKSHIRE & NORTH LINCOLNSHIRE |        |
|    | NY NORTH YORKSHIRE             | 1 days |
| 08 | NORTH WEST                     |        |
|    | MS MERSEYSIDE                  | 2 days |
| 10 | WALES                          |        |
|    | GW GWYNEDD                     | 1 days |
|    | PS POWYS                       | 1 days |

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area  
Actual Range: 1150 to 1900 (units: sqm)  
Range Selected by User: 900 to 1900 (units: sqm)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/07 to 27/11/12

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

|           |        |
|-----------|--------|
| Monday    | 2 days |
| Tuesday   | 3 days |
| Wednesday | 2 days |
| Friday    | 1 days |

This data displays the number of selected surveys by day of the week.

Selected survey types:

|                       |        |
|-----------------------|--------|
| Manual count          | 8 days |
| Directional ATC Count | 0 days |

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

|                                          |   |
|------------------------------------------|---|
| Edge of Town Centre                      | 4 |
| Suburban Area (PPS6 Out of Centre)       | 2 |
| Edge of Town                             | 1 |
| Neighbourhood Centre (PPS6 Local Centre) | 1 |

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

|                  |   |
|------------------|---|
| Industrial Zone  | 1 |
| Residential Zone | 2 |
| Built-Up Zone    | 1 |

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

|           |        |
|-----------|--------|
| Not Known | 1 days |
| A1        | 7 days |

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

|                  |        |
|------------------|--------|
| 5,001 to 10,000  | 2 days |
| 10,001 to 15,000 | 2 days |
| 15,001 to 20,000 | 1 days |
| 25,001 to 50,000 | 3 days |

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

|                    |        |
|--------------------|--------|
| 5,001 to 25,000    | 2 days |
| 25,001 to 50,000   | 1 days |
| 50,001 to 75,000   | 1 days |
| 100,001 to 125,000 | 1 days |
| 125,001 to 250,000 | 1 days |
| 500,001 or More    | 2 days |

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

|            |        |
|------------|--------|
| 0.6 to 1.0 | 2 days |
| 1.1 to 1.5 | 6 days |

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Petrol filling station:

|                                           |        |
|-------------------------------------------|--------|
| Included in the survey count              | 0 days |
| Excluded from count or no filling station | 8 days |

This data displays the number of surveys within the selected set that include petrol filling station activity, and the number of surveys that do not.

Travel Plan:

|     |        |
|-----|--------|
| Yes | 1 days |
| No  | 7 days |

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

|   |                                          |          |     |                     |
|---|------------------------------------------|----------|-----|---------------------|
| 1 | GW-01-C-01                               | LIDL     |     | GWYNEDD             |
|   | HIGH STREET                              |          |     |                     |
|   | BANGOR                                   |          |     |                     |
|   | Edge of Town Centre                      |          |     |                     |
|   | No Sub Category                          |          |     |                     |
|   | Total Gross floor area:                  | 1310     | sqm |                     |
|   | Survey date: FRIDAY                      | 10/07/09 |     | Survey Type: MANUAL |
| 2 | KC-01-C-02                               | ALDI     |     | KENT                |
|   | WELL ROAD                                |          |     |                     |
|   | MAIDSTONE                                |          |     |                     |
|   | Edge of Town Centre                      |          |     |                     |
|   | Built-Up Zone                            |          |     |                     |
|   | Total Gross floor area:                  | 1407     | sqm |                     |
|   | Survey date: TUESDAY                     | 27/11/12 |     | Survey Type: MANUAL |
| 3 | MS-01-C-02                               | ALDI     |     | MERSEYSIDE          |
|   | SMITHDOWN ROAD                           |          |     |                     |
|   | WAVERTREE                                |          |     |                     |
|   | LIVERPOOL                                |          |     |                     |
|   | Neighbourhood Centre (PPS6 Local Centre) |          |     |                     |
|   | Residential Zone                         |          |     |                     |
|   | Total Gross floor area:                  | 1200     | sqm |                     |
|   | Survey date: MONDAY                      | 18/06/07 |     | Survey Type: MANUAL |
| 4 | MS-01-C-03                               | ALDI     |     | MERSEYSIDE          |
|   | LAUREL ROAD                              |          |     |                     |
|   | ELM PARK                                 |          |     |                     |
|   | LIVERPOOL                                |          |     |                     |
|   | Suburban Area (PPS6 Out of Centre)       |          |     |                     |
|   | Residential Zone                         |          |     |                     |
|   | Total Gross floor area:                  | 1165     | sqm |                     |
|   | Survey date: WEDNESDAY                   | 20/06/07 |     | Survey Type: MANUAL |
| 5 | NR-01-C-01                               | ALDI     |     | NORTHAMPTONSHIRE    |
|   | DALTON ROAD                              |          |     |                     |
|   | CORBY                                    |          |     |                     |
|   | Edge of Town                             |          |     |                     |
|   | Industrial Zone                          |          |     |                     |
|   | Total Gross floor area:                  | 1345     | sqm |                     |
|   | Survey date: WEDNESDAY                   | 19/11/08 |     | Survey Type: MANUAL |
| 6 | NY-01-C-02                               | LIDL     |     | NORTH YORKSHIRE     |
|   | STATION ROAD                             |          |     |                     |
|   | THIRSK                                   |          |     |                     |
|   | Edge of Town Centre                      |          |     |                     |
|   | No Sub Category                          |          |     |                     |
|   | Total Gross floor area:                  | 1527     | sqm |                     |
|   | Survey date: TUESDAY                     | 11/10/11 |     | Survey Type: MANUAL |
| 7 | PS-01-C-01                               | ALDI     |     | POWYS               |
|   | RICH WAY                                 |          |     |                     |
|   | BRECON                                   |          |     |                     |
|   | Edge of Town Centre                      |          |     |                     |
|   | No Sub Category                          |          |     |                     |
|   | Total Gross floor area:                  | 1150     | sqm |                     |
|   | Survey date: MONDAY                      | 15/09/08 |     | Survey Type: MANUAL |

LIST OF SITES relevant to selection parameters (Cont.)

|   |                                    |          |                     |
|---|------------------------------------|----------|---------------------|
| 8 | SH-01-C-01                         | LIDL     | SHROPSHIRE          |
|   | CASTLE STREET                      |          |                     |
|   | HADLEY                             |          |                     |
|   | TELFORD                            |          |                     |
|   | Suburban Area (PPS6 Out of Centre) |          |                     |
|   | No Sub Category                    |          |                     |
|   | Total Gross floor area:            | 1900 sqm |                     |
|   | Survey date: TUESDAY               | 16/06/09 | Survey Type: MANUAL |

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

## MULTI-MODAL PEDESTRIANS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

| Time Range    | ARRIVALS |          |           | DEPARTURES |          |           | TOTALS   |          |           |
|---------------|----------|----------|-----------|------------|----------|-----------|----------|----------|-----------|
|               | No. Days | Ave. GFA | Trip Rate | No. Days   | Ave. GFA | Trip Rate | No. Days | Ave. GFA | Trip Rate |
| 00:00 - 01:00 |          |          |           |            |          |           |          |          |           |
| 01:00 - 02:00 |          |          |           |            |          |           |          |          |           |
| 02:00 - 03:00 |          |          |           |            |          |           |          |          |           |
| 03:00 - 04:00 |          |          |           |            |          |           |          |          |           |
| 04:00 - 05:00 |          |          |           |            |          |           |          |          |           |
| 05:00 - 06:00 |          |          |           |            |          |           |          |          |           |
| 06:00 - 07:00 |          |          |           |            |          |           |          |          |           |
| 07:00 - 08:00 | 4        | 1454     | 0.155     | 4          | 1454     | 0.034     | 4        | 1454     | 0.189     |
| 08:00 - 09:00 | 8        | 1376     | 0.336     | 8          | 1376     | 0.209     | 8        | 1376     | 0.545     |
| 09:00 - 10:00 | 8        | 1376     | 0.972     | 8          | 1376     | 0.827     | 8        | 1376     | 1.799     |
| 10:00 - 11:00 | 8        | 1376     | 1.663     | 8          | 1376     | 1.418     | 8        | 1376     | 3.081     |
| 11:00 - 12:00 | 8        | 1376     | 1.554     | 8          | 1376     | 1.436     | 8        | 1376     | 2.990     |
| 12:00 - 13:00 | 8        | 1376     | 1.618     | 8          | 1376     | 1.699     | 8        | 1376     | 3.317     |
| 13:00 - 14:00 | 8        | 1376     | 1.390     | 8          | 1376     | 1.290     | 8        | 1376     | 2.680     |
| 14:00 - 15:00 | 8        | 1376     | 1.218     | 8          | 1376     | 1.472     | 8        | 1376     | 2.690     |
| 15:00 - 16:00 | 8        | 1376     | 1.772     | 8          | 1376     | 1.599     | 8        | 1376     | 3.371     |
| 16:00 - 17:00 | 8        | 1376     | 1.690     | 8          | 1376     | 1.499     | 8        | 1376     | 3.189     |
| 17:00 - 18:00 | 8        | 1376     | 1.354     | 8          | 1376     | 1.481     | 8        | 1376     | 2.835     |
| 18:00 - 19:00 | 8        | 1376     | 1.109     | 8          | 1376     | 1.481     | 8        | 1376     | 2.590     |
| 19:00 - 20:00 | 8        | 1376     | 0.445     | 8          | 1376     | 0.491     | 8        | 1376     | 0.936     |
| 20:00 - 21:00 | 3        | 1415     | 0.024     | 3          | 1415     | 0.141     | 3        | 1415     | 0.165     |
| 21:00 - 22:00 | 1        | 1407     | 0.000     | 1          | 1407     | 0.000     | 1        | 1407     | 0.000     |
| 22:00 - 23:00 |          |          |           |            |          |           |          |          |           |
| 23:00 - 24:00 |          |          |           |            |          |           |          |          |           |
| Total Rates:  | 15.300   |          |           | 15.077     |          |           | 30.377   |          |           |

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is:  $COUNT/TRP*FACT$ . Trip rates are then rounded to 3 decimal places.

## Parameter summary

|                                          |                          |
|------------------------------------------|--------------------------|
| Trip rate parameter range selected:      | 1150 - 1900 (units: sqm) |
| Survey date range:                       | 01/01/07 - 27/11/12      |
| Number of weekdays (Monday-Friday):      | 8                        |
| Number of Saturdays:                     | 0                        |
| Number of Sundays:                       | 0                        |
| Surveys manually removed from selection: | 0                        |

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Land Use : 01 - RETAIL  
Category : C - DISCOUNT FOOD STORES  
**MULTI-MODAL PEDESTRIANS**

Selected regions and areas:

|    |                                |        |
|----|--------------------------------|--------|
| 06 | WEST MIDLANDS                  |        |
|    | HE HEREFORDSHIRE               | 1 days |
| 07 | YORKSHIRE & NORTH LINCOLNSHIRE |        |
|    | NY NORTH YORKSHIRE             | 1 days |
| 09 | NORTH                          |        |
|    | CB CUMBRIA                     | 1 days |
| 10 | WALES                          |        |
|    | SW SWANSEA                     | 1 days |

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area  
Actual Range: 969 to 1250 (units: sqm)  
Range Selected by User: 900 to 1900 (units: sqm)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/02 to 27/11/12

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Saturday 4 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count 4 days  
Directional ATC Count 0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Edge of Town Centre 1  
Suburban Area (PPS6 Out of Centre) 3

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Commercial Zone 1  
Residential Zone 2  
Built-Up Zone 1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

### Filtering Stage 3 selection:

#### Use Class:

A1

4 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

#### Population within 1 mile:

10,001 to 15,000

2 days

20,001 to 25,000

1 days

25,001 to 50,000

1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

#### Population within 5 miles:

50,001 to 75,000

1 days

75,001 to 100,000

1 days

125,001 to 250,000

2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

#### Car ownership within 5 miles:

0.6 to 1.0

2 days

1.1 to 1.5

2 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

#### Petrol filling station:

Included in the survey count

0 days

Excluded from count or no filling station

4 days

This data displays the number of surveys within the selected set that include petrol filling station activity, and the number of surveys that do not.

#### Travel Plan:

No

4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

#### LIST OF SITES relevant to selection parameters

|   |                                    |          |                     |                 |
|---|------------------------------------|----------|---------------------|-----------------|
| 1 | CB-01-C-01                         | ALDI     |                     | CUMBRIA         |
|   | KINGSTOWN ROAD                     |          |                     |                 |
|   | KINGSTOWN                          |          |                     |                 |
|   | CARLISLE                           |          |                     |                 |
|   | Suburban Area (PPS6 Out of Centre) |          |                     |                 |
|   | Residential Zone                   |          |                     |                 |
|   | Total Gross floor area:            | 1216 sqm |                     |                 |
|   | Survey date: SATURDAY              | 07/09/02 | Survey Type: MANUAL |                 |
| 2 | HE-01-C-01                         | ALDI     |                     | HEREFORDSHIRE   |
|   | EIGN STREET                        |          |                     |                 |
|   | HEREFORD                           |          |                     |                 |
|   | Edge of Town Centre                |          |                     |                 |
|   | Built-Up Zone                      |          |                     |                 |
|   | Total Gross floor area:            | 1219 sqm |                     |                 |
|   | Survey date: SATURDAY              | 04/03/06 | Survey Type: MANUAL |                 |
| 3 | NY-01-C-01                         | NETTO    |                     | NORTH YORKSHIRE |
|   | LAYERTHORPE                        |          |                     |                 |
|   | YORK                               |          |                     |                 |
|   | Suburban Area (PPS6 Out of Centre) |          |                     |                 |
|   | Commercial Zone                    |          |                     |                 |
|   | Total Gross floor area:            | 1250 sqm |                     |                 |
|   | Survey date: SATURDAY              | 21/05/05 | Survey Type: MANUAL |                 |
| 4 | SW-01-C-01                         | LIDL     |                     | SWANSEA         |
|   | PENTREGETHIN ROAD                  |          |                     |                 |
|   | PEN-LAN                            |          |                     |                 |
|   | SWANSEA                            |          |                     |                 |
|   | Suburban Area (PPS6 Out of Centre) |          |                     |                 |
|   | Residential Zone                   |          |                     |                 |
|   | Total Gross floor area:            | 969 sqm  |                     |                 |
|   | Survey date: SATURDAY              | 14/09/02 | Survey Type: MANUAL |                 |

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

#### MANUALLY DESELECTED SITES

| Site Ref   | Reason for Deselection |
|------------|------------------------|
| CP-01-C-01 | 1                      |

## MULTI-MODAL PEDESTRIANS

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

| Time Range    | ARRIVALS |          |           | DEPARTURES |          |           | TOTALS   |          |           |
|---------------|----------|----------|-----------|------------|----------|-----------|----------|----------|-----------|
|               | No. Days | Ave. GFA | Trip Rate | No. Days   | Ave. GFA | Trip Rate | No. Days | Ave. GFA | Trip Rate |
| 00:00 - 01:00 |          |          |           |            |          |           |          |          |           |
| 01:00 - 02:00 |          |          |           |            |          |           |          |          |           |
| 02:00 - 03:00 |          |          |           |            |          |           |          |          |           |
| 03:00 - 04:00 |          |          |           |            |          |           |          |          |           |
| 04:00 - 05:00 |          |          |           |            |          |           |          |          |           |
| 05:00 - 06:00 |          |          |           |            |          |           |          |          |           |
| 06:00 - 07:00 |          |          |           |            |          |           |          |          |           |
| 07:00 - 08:00 | 3        | 1228     | 0.054     | 3          | 1228     | 0.054     | 3        | 1228     | 0.108     |
| 08:00 - 09:00 | 4        | 1164     | 0.645     | 4          | 1164     | 0.279     | 4        | 1164     | 0.924     |
| 09:00 - 10:00 | 4        | 1164     | 1.569     | 4          | 1164     | 1.826     | 4        | 1164     | 3.395     |
| 10:00 - 11:00 | 4        | 1164     | 2.707     | 4          | 1164     | 2.686     | 4        | 1164     | 5.393     |
| 11:00 - 12:00 | 4        | 1164     | 3.180     | 4          | 1164     | 3.073     | 4        | 1164     | 6.253     |
| 12:00 - 13:00 | 4        | 1164     | 3.266     | 4          | 1164     | 3.438     | 4        | 1164     | 6.704     |
| 13:00 - 14:00 | 4        | 1164     | 2.514     | 4          | 1164     | 2.492     | 4        | 1164     | 5.006     |
| 14:00 - 15:00 | 4        | 1164     | 2.901     | 4          | 1164     | 3.223     | 4        | 1164     | 6.124     |
| 15:00 - 16:00 | 4        | 1164     | 3.030     | 4          | 1164     | 2.707     | 4        | 1164     | 5.737     |
| 16:00 - 17:00 | 4        | 1164     | 1.869     | 4          | 1164     | 2.063     | 4        | 1164     | 3.932     |
| 17:00 - 18:00 | 4        | 1164     | 2.020     | 4          | 1164     | 2.364     | 4        | 1164     | 4.384     |
| 18:00 - 19:00 | 4        | 1164     | 0.774     | 4          | 1164     | 0.623     | 4        | 1164     | 1.397     |
| 19:00 - 20:00 |          |          |           |            |          |           |          |          |           |
| 20:00 - 21:00 |          |          |           |            |          |           |          |          |           |
| 21:00 - 22:00 |          |          |           |            |          |           |          |          |           |
| 22:00 - 23:00 |          |          |           |            |          |           |          |          |           |
| 23:00 - 24:00 |          |          |           |            |          |           |          |          |           |
| Total Rates:  | 24.529   |          |           | 24.828     |          |           | 49.357   |          |           |

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is:  $COUNT/TRP*FACT$ . Trip rates are then rounded to 3 decimal places.

## Parameter summary

|                                          |                         |
|------------------------------------------|-------------------------|
| Trip rate parameter range selected:      | 969 - 1250 (units: sqm) |
| Survey date range:                       | 01/01/02 - 27/11/12     |
| Number of weekdays (Monday-Friday):      | 0                       |
| Number of Saturdays:                     | 4                       |
| Number of Sundays:                       | 0                       |
| Surveys manually removed from selection: | 1                       |

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.