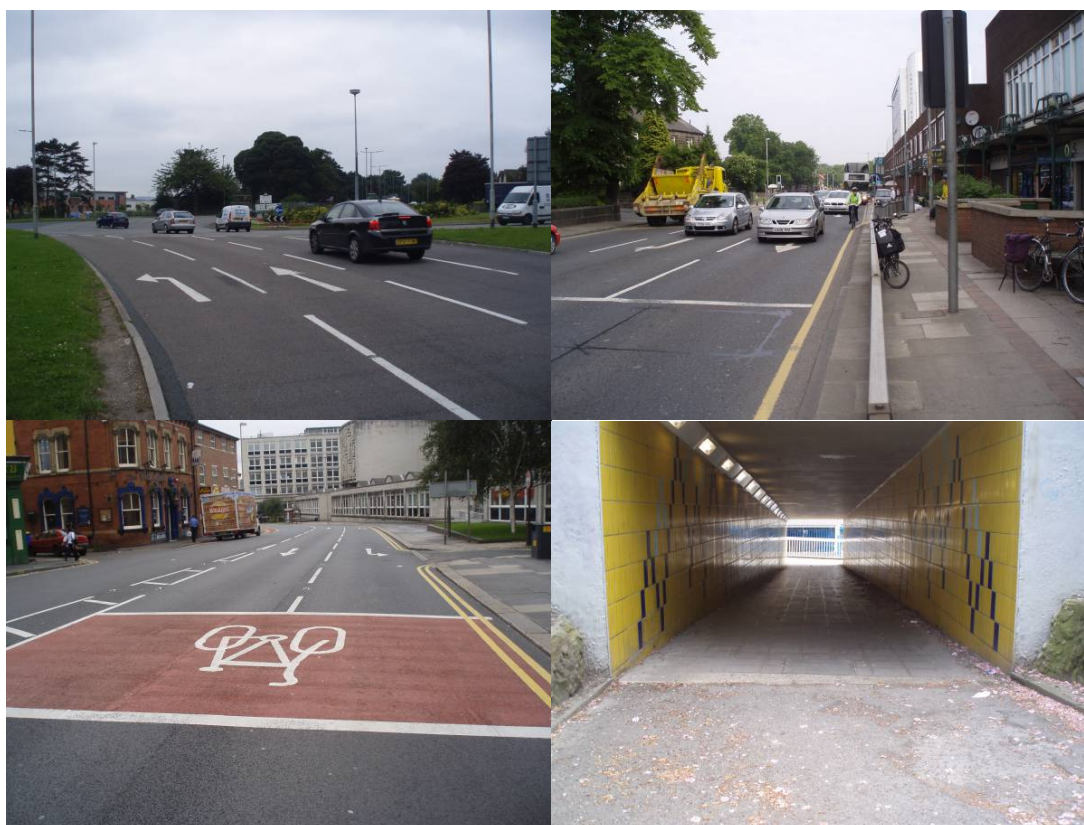


# Stage 2 – A660 Otley Rd Cycling Study

## Cycle Audit

## Leeds Cycling Action Group





## Final Report

October 2008



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## 1.0 Introduction

This report is the result of a commission by Leeds Cycling Action Group to Transport Initiatives to carry out a Cycling Study of the A660 Otley Road from just north of the ring road to the A58 junction just outside the city centre.

The study is in two parts

**Stage 1 - A Cycle Skills Network Audit (CSNA)** this audit graded the roads and paths by the level of skill required to cycle safely on them and identified barriers to cycling such as the Lawnswood Roundabout. This study showed that some sections of the road with adequate width cycle lanes (at least 1.5m wide) or bus lanes are suitable for cyclists to use trained to Level 2 of the Bikeability national cycle training scheme to cycle along, but without making right turns onto or off them. If more of the road was rated at this level it would be suitable for more people trained to cycle to Level 2 to use. The audit also graded each pedestrian crossing by Bikeability level. Use of crossings by Level 2 cyclists can enable them to effectively complete right turn manoeuvres by either cycling or walking to a nearby crossing.

A copy of Stage 1 of this Study is shown as **Appendix 3**.

**Stage 2 - A Cycle audit** - this looks at the areas highlighted in the CSNA as problems or barriers - Level 3 or higher - and makes suggestions for improving conditions for cyclist to lower the cycling skills Level required to use them. This would enable more trained cyclists to use the road. It also includes data on cycling levels and accidents on the corridor.

A Cycle Audit is a methodical review of the existing site conditions of an area, route, road or junction. Recommendations are suggested to make the route more cycle friendly and so increase its potential for encouraging more people to cycle more often. Increasing cycling has many benefits for both individuals and society as a whole

## 2.0 The Benefits of Increasing Cycling

**Individual benefits** - saving time, money and improving health and fitness levels

**Society benefits** - reduced pollution, congestion and less expenditure on health problems such as obesity

A recent study by consultants SQW set the economic benefits of increasing cycling at nearly £400 per cyclist per year in terms of reduced costs of congestion, pollution and health care costs.

For further details see <http://www.cyclingengland.co.uk/encouraging-cycling/benefits-of-cycling/>

### 3.0 Methodology

- 3.1 Following a successful grant application from Leeds Cycling Action Group to Leeds City Councils NW Area Committee, Transport Initiatives, a sustainable transport consultancy have been commissioned to carry out this study. Transport Initiatives were chosen for their expertise in all matters cycling and for their pioneering work in linking cycle auditing to Bikeability levels.

The work has been undertaken by Tim Pheby of Transport Initiatives in the following manner:

- I. **Site visits:** carried out in June and July 2008 by cycle. All sections of the route rated as Level 3 or higher were cycled, photos taken of issues and recommendations made for improvements. This included an on site meeting at the Arndale Centre with members of the Leeds Cycling Action Group, Sustrans and the U Travel Active project manager.
- II. **Research:** cycling flow and accident data has been examined and plans of a proposed bus lane from Woodhouse lane to Headlingley Lane briefly examined
- III. **Review against 5 core principles:** The road has been examined with reference to the five basic cycling infrastructure requirements
  - Convenient
  - Accessible
  - Safety
  - Comfortable
  - Attractive

Tim Pheby is the former English Regions Cycling Development Team Regional Coordinator for Yorkshire and the Humber so has a unique knowledge of cycling in the county. He is also one of Cycling England's advisers to local authorities so brings national knowledge. He has worked as a traffic engineer for the City of York, Cambridgeshire County Council and the London Borough of Camden.

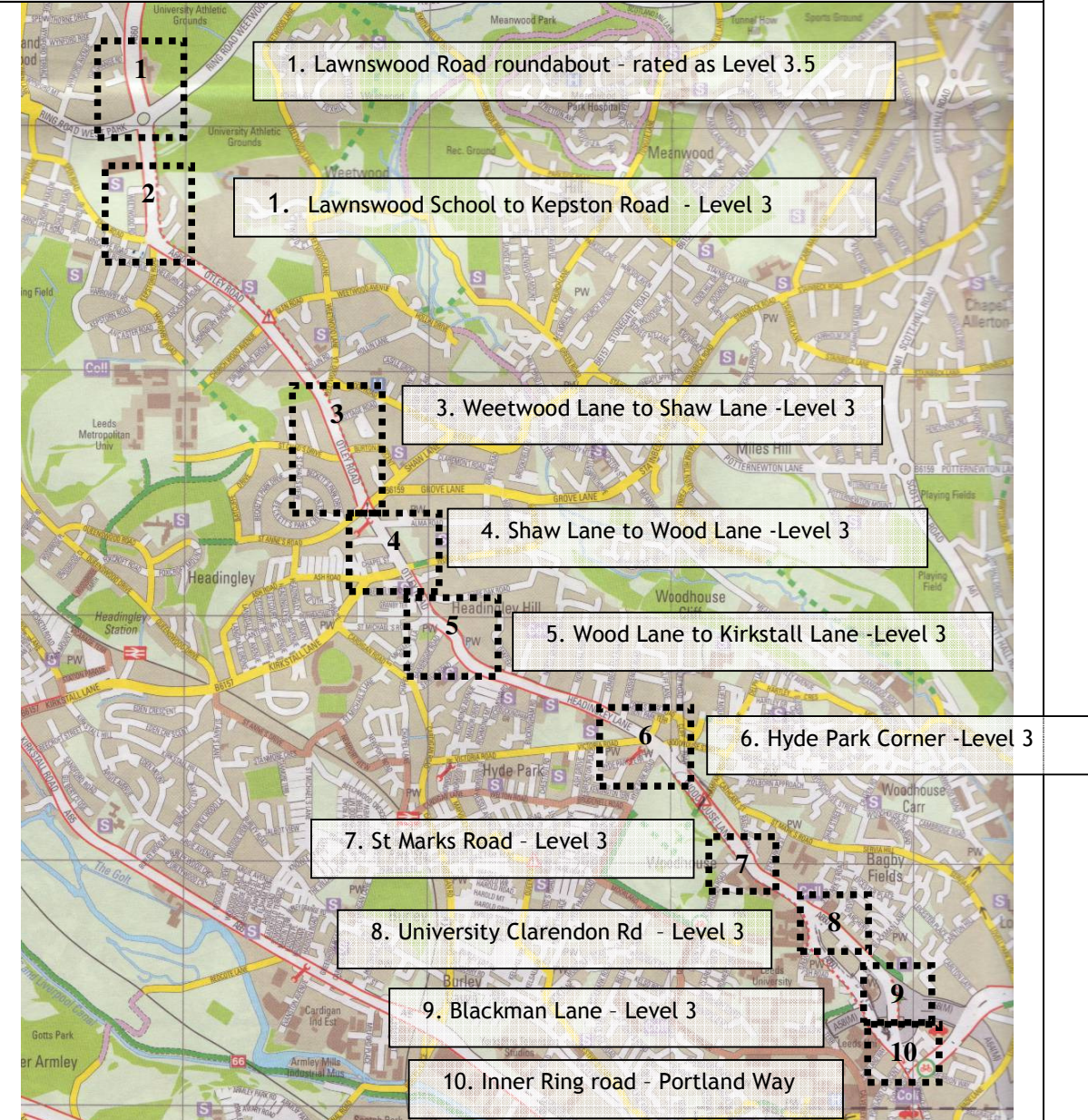


## 4.0 Background

**4.1 Site Description** - The section of the A660 Otley road studied is 3.5 miles long and links the city centre to the Universities, sports grounds, shops and cafes in Headingley. It is an area with a large student population and also has a thriving local community. It is a heavily trafficked road with limited scope for widening due to the closeness of frontages. Proposals to run a Super tram down this corridor were not accepted for funding.

**4.2 Cycle audit** - was carried out on the 10 sections of the A660 which were rated in Stage 1 of the cycling study as Level 3 or above - suitable for experienced cyclists - shown below

**Figure 1 - A660 Otley Road – Cycle Audit Sections 1-10**



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A detailed cycle audit for each of the 10 sections is shown in **Appendix 1** of this report with photos of issues noted on site along with recommendations for improving conditions for cycling.

#### **4.3 Bus Lane Proposals - Woodhouse Lane and Headlingley Lane**

A Plan has been received during the study of proposed Bus lanes and although not examined in detail some general comments are made below:

1. Woodhouse Lane along Woodhouse Moor - bus lanes are proposed on each side of the road with some road widening - this section was rated as Level 2.5 for cyclists in the Cycle Skills Network Audit and the bus lanes - if wide enough and useable by cyclists would not effect this grading. However no lane widths are shown on the Bus lanes nor is it clear from the plans if cyclists will legally be allowed to use the lane (Cyclists are allowed to use Bus lanes unless specifically excluded in the traffic orders). Also the existing Advanced stop lines for cyclists at traffic signals appear to be removed in these proposals
2. Headlingley Lane from Hyde Park Corner to the Original Oak Pub - an outbound bus lane is proposed which again would not affect the rating of Level 2.5 for cycling if they are wide enough and legally useable. Inbound the existing cycle lane is not shown so the road grading would go up from level 2.5 to 3 which would be a worsening of conditions for cyclists and have implications for cycle training of students and school children.

The plans need further study to see how they could effect cyclists with recommendations of how cycling can be better integrated into them if they proceed.

The plan received showing the proposed bus lanes is shown in **Appendix 2**.

#### 4.4 Cycle flows on the A660

Counts of inbound cyclists are undertaken by Leeds City Council in the morning peak between 7.30-9.30am on Woodhouse Lane south of Rampart Road over 4 days in May and June. (See Figure 2 below for the location)

The table below shows the counts from 2002 and show that cycling is variable and appears to be increasing. (No data for 2003 has been supplied)

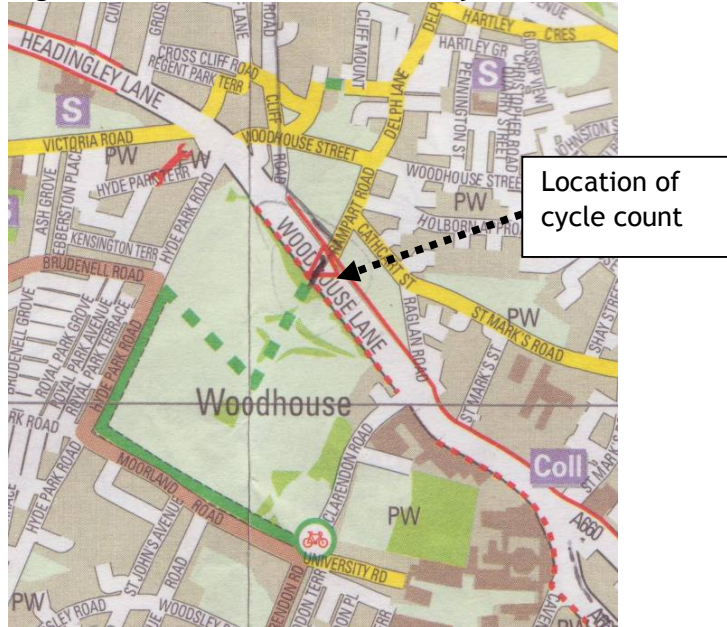
**Table 1 - Inbound peak hour Cycle flows on Woodhouse Lane**

Year	2002	2004	2005	2006	2007 (rain)	2008
Cycle counts ave	96	103	127	126	114	129
Peak flow		117	170	140		

The A660 is ranked as the busiest corridor for cycling in Leeds on these counts which are probably an underestimate as they do not include outbound cyclists.

The counts also do not include cyclists using the paths and cycle tracks on Woodhouse Moor or on the signed cycle route comprising Brudenell Road, Hyde Park Road or Moorland Road.

**Figure 2 - Location of inbound cycle count on Woodhouse Lane**



**Recommendation** - For Leeds to consider including outbound cyclists in counts and to set up automatic counters on the cycle tracks sections to count off-road cyclist.



Also to count cyclists across Woodhouse Moor both on the existing cycle track and paths across the Moor and the signed cycle route.

#### 4.5 Cycling Accidents on the A660

The last 5.5 years accident data has been supplied by Leeds City Council and shows the following reported cycle accidents in each year:

Year	2002	2003	2004	2005	2006	To Sept 2007	Totals
Lawnswood roundabout	na	0	0	3	1	2	7
Lawnswood roundabout to Kirkstall Lane	6	5	4	4	10	1	30
Kirkstall Lane to Clarendon Road	5	12	4	11	10	7	49
Clarendon road to Inner Ring Road	1	0	2	2	1	1	7
<b>Totals</b>	<b>12</b>	<b>17</b>	<b>10</b>	<b>17</b>	<b>21</b>	<b>11</b>	<b>93</b>

Of these 93 reported accidents 17 were classed as serious injuries and the other 76 as slight.

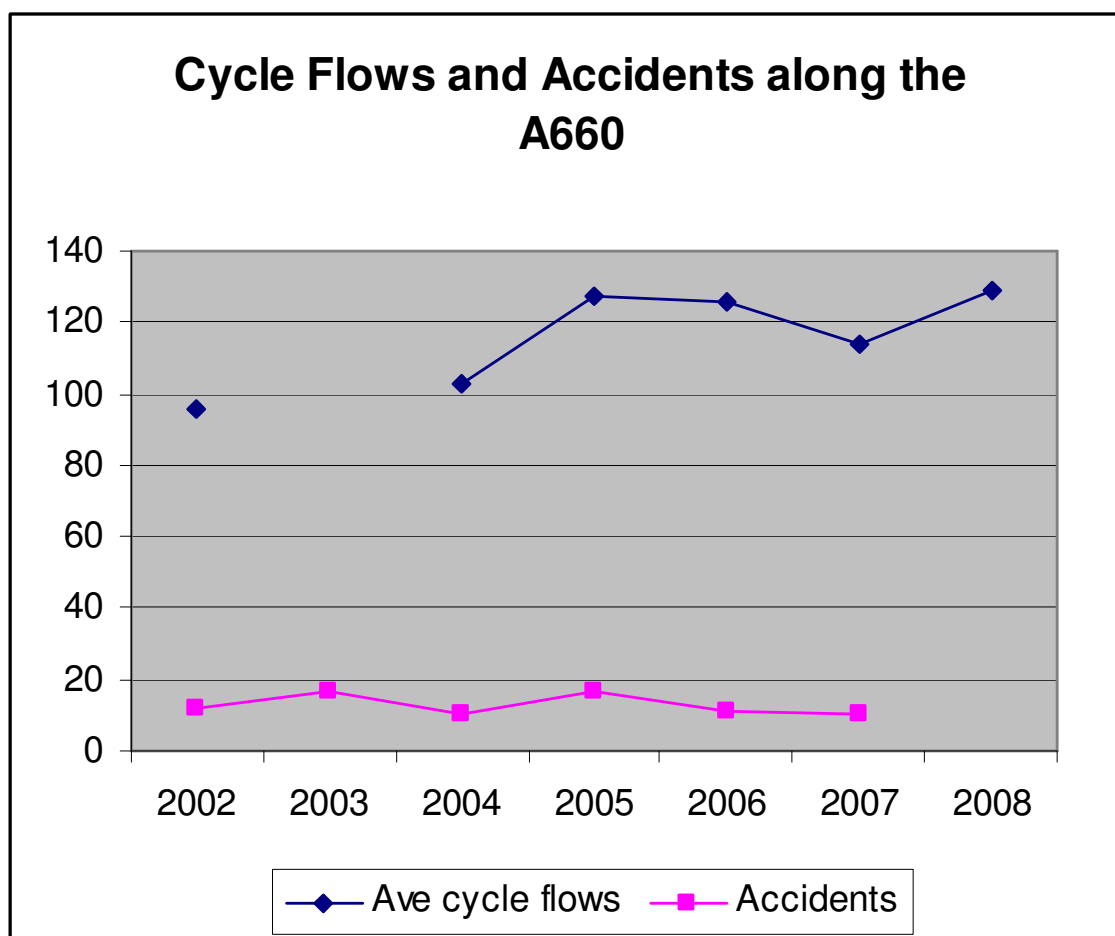
**Commentary:** These figures are considered fairly high given the number of cyclists using the road and show that the section of Headingley Lane from Kirkstall Lane to Clarendon Road has the highest number of accidents, over 50% of the cycle accidents reported on this section of the A660.

The Lawnswood Roundabout accident figures may appear low but very few cyclists were observed using it.

The accident data requires a more detailed study, which is beyond the scope of this report, to see if there are any common factors involved.

A graph of the average cycle flows and accidents from the tables above shows a gradual increase in cycling while there has been no increase in cycle accidents. This is backed up by other studies where cycling has increased but cycle accidents have not in London and Hull.

**Figure 2 - Average Cycle Flows and Accidents on the A660 from 2002 - 2008**



No cycle flow data has been provided for 2003.

## 5.0 Summary of Cycle Audit for A660 Otley Road and Woodhouse lane

### 5 Core principles of good cycling infrastructure.

**5.1 Convenient** - *routes should be direct, based on desire-lines. Detours and delays will deter and inconvenience users. There should be advantage and convenience for cyclists and good, clear signing.*

- The A660 is a direct route linking Headingley to the City centre and follows desire lines. There are no sections where it is considered that cyclists have advantage and many sections are inconvenient to use with queuing traffic and lack of road space holding up cyclists. There is no direction signing specifically for cyclists along the road though the road signs give adequate information about destinations.

**5.2 Accessible** - *the cycling infrastructure should form a coherent entity, linking all trip origins and destinations; routes should be continuous and consistent in standard.*

- The A660 has various types of cycling infrastructure - good width cycle lanes on some sections which tend to stop at crucial junctions. Cycle tracks are provided along one section near the inner ring road.

**5.3 Safe** - *designs should minimise casualties and perceived danger for cyclists and other road users. Measures that reduce traffic flows, speeds and reallocate carriageway space are likely to result in fewer conflicts with vehicles. For off road routes natural surveillance is important.*

Parts of the A660 feel dangerous to cycle along especially

- The Lawnswood roundabout which is probably one of the most cycle unfriendly junction in Leeds with multiple lanes of fast moving traffic to contend with.
- The section by the Arndale Centre which is congested with queuing traffic inbound in the morning peak
- The one way system south of Blackman Lane with fast left turning traffic to the Inner ring road posing danger.

**5.4 Comfort** - *cyclists need smooth, well-maintained surfaces, good transitions over flush kerbs and gentle gradients. Routes should avoid complicated manoeuvres and interruptions. Traffic-calming should be cycle-friendly. Cycle paths and lanes should be of adequate width.*

- Many parts of the A660 have good road surfaces apart from the section from the Arndale Centre up to Weetwood Lane which has potholes, poor road surfaces in places and gully covers which could trap a cycle wheel.

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**5.5 Attractive** - *routes must be attractive to cyclists on subjective as well as objective criteria. Aesthetics, urban design, quality of materials, noise and integration with the surrounding area are important.*

- The A660 is busy and noisy in the peak hours but runs through attractive areas such as Woodhouse Moor and the lively Headingley shopping area.

## 6.0 Recommendations

- 6.1 From the detailed cycle audit some broad recommendations can be made for improving cycling conditions along this section of the A660 to enable more people to cycle along it safely. The aim being to lower the Bikeability grading of more of the route to below Level 3.

### 6.2 Engineering -

#### *a. Traffic Lane Reduction -*



The number of traffic lanes entering the Lawnswood roundabout should be reduced to encourage slower traffic speeds and make the junction safer to use by experienced cyclists.

*(Recommendations 1, 2, 3, 7 & 8 Appendix 1)*

#### *b. Speed Reduction - 20 mph zones*



The shopping area in Headingley by the Arndale shopping centre would benefit from a self enforcing 20 mph zone using speed cushions and a speed table by the Pelican crossing. This would also help pedestrians cross the road,

*(Recommendations 4.3 Appendix 1)*

**Speed Cameras** - The route does have speed cameras on some sections and more could be installed to slow traffic and reduce accidents e.g. on the Woodhouse Lane dual carriageway section



**c. Junction improvements -Roundabouts** - tackling the Lawnswood roundabout is considered the key to increasing cycle use along this corridor. In the short term re-marking the traffic lanes so that there are only 2 entry and exit lanes would be an improvement reducing conflict points and entry speeds. Also providing Toucan controlled signal crossings at this junction would help pedestrians and cyclists cross the road more easily  
(Recommendations 1, 2, 3, 7 & 8 Appendix 1)

**c. Traffic signals - Advanced Stop Lines**



At signalled junctions there should be consistent use of coloured advanced stop lines and lead in cycle lanes to enable cyclists to get to the head of queuing traffic and so reduce congestion.

(Recommendations 3,14, 4.7, 4.15, 5.5, 6.3, 6.8, 7.2, 10.5 Appendix 1)

**d. Reallocation of Road Space - cycle lanes continuity**



While there are some adequate width advisory cycle lanes on sections of the road i.e. at least 1.5m wide, they tend to stop before and after junctions where they are most needed. It is recommended that lanes are installed to link up with Advanced Stop lines and continue after junctions to ensure continuity.

(Recommendations 1, 8, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2, 3.8, 3.13, 4.1, 4.2, 4.3, 4.5, 4.6, 4.8, 4.9, 4.10, 4.15, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 6.1, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 7.1, 7.2, 7.3, 7.4, 8.1, 8.2, 9.3, 10.5 Appendix 1)

**Cycle/Bus lane widths** - The cycle lanes could also be wider 1.8-2.0 metres instead of a minimum of 1.5m. Wider lanes can help reduce traffic speeds on the main carriageway. On approaches to junctions where road widths may be constrained lanes 1.2m wide may be installed to enable cyclists to get past queuing traffic.

*(Recommendations 3.11, 6.11 Appendix 1)*

Some sections of Cycle lanes between junctions could be mandatory - marked with a solid white line - but this would require traffic orders to be advertised.

**Bus Lanes** - cyclists benefit from the existing bus lanes outbound on Woodhouse Lane. The Bus lane proposals for Woodhouse and Headingley Lane require further examination and audit to see how they might affect cyclists if implemented.

#### ***e. Off road routes -***



For novice cyclists cycle tracks could be developed around the Lawnswood Roundabout by converting the existing footways to shared use with pedestrians. The existing uncontrolled crossings would need to be widened in places to accommodate cyclists safely or converted to toucan signalled crossings though the cost of these is likely to be high.

*(Recommendations 4, 6, 8, 9, 11, 12, 13, 14 Appendix 1)*



The paths along and across Woodhouse Moor are being used by cyclists as they are more direct than the route around its edge and their use should be reviewed and conversion to shared used cycle tracks considered.

*(Recommendations 6.2, 6.12 Appendix 1)*



The footways and subway under the A660 by the Leeds Metropolitan University and Mutli storey car park could be converted to shared use cycle tracks to encourage novice cyclists - Level 1.

*(Recommendations 10.1, 10.2, 10.3 Appendix 1)*

However the rather dark and dingy subway under the slip road to the A58 should be filled in to provide a wider pavement. *(Recommendation 9.5 Appendix 1)*

#### ***f. Cycle parking -***



More could be provided along the route e.g. by the Arndale Centre and for the Headingley shops and at the University sites.

*(Recommendations 4.1, 4.13 Appendix 1)*

#### ***g. Maintenance Issues - Road surfaces***



While most of the roads and paths were well maintained the section of road from the Arndale centre to Weetwood lane was generally poor

*(Recommendations 3.4, 3.10, 3.12, 4.4, 4.10, 10.4 Appendix 1)*



**Vegetation** - the footways around the Lawnswood Roundabout had encroaching vegetation which narrowed the paths and reduced visibility. This should be cut back at the earliest opportunity.

(Recommendations 4, 5, 11, 13, 9.4b Appendix 1)

**Drain and service covers** -



There were a number of unsafe drain and service covers observed in the audit and they should all be checked and replaced where necessary



(Recommendations 3.2, 3.6, 9.2 Appendix 1)

**6.3 Cycle Monitoring** - cycle counting is only carried out in the morning peak inbound, it could be improved by including outbound cyclists as well and including the evening peak. A gap in the existing cycle monitoring exists across Woodhouse Moor which bypasses the cycle count on Woodhouse Lane. Automatic cycle counters on sections of cycle track would also be useful.

**6.4 Cycle accident study** - the cycling accidents could be studied in more detail to see if there are any common factors which could be treated, especially on the section between Kirkstall Lane and Clarendon Road. Slowing traffic has been shown to be an effective way of reducing road traffic accidents.

**6.5 Cycle training** - the earlier CSNA graded the road by Bikeability levels and showed that some sections of the A660 are suitable for Level 2 cyclists cycling straight on and turning left - shown as Level 2.5 on the plans - the aim of Stage 2 of the study is to get more of the Level 3 rated sections of the road down to this level by reallocating road space - more cycle lanes of adequate width or speed reduction measures such as short 20 mph zones by shopping centres.

**6.6 Cycle Promotion** - The existing Leeds cycle map shows traffic free paths in green, signed cycle routes in brown and suggested advisory routes in yellow as well as roads with cycle lanes on them - marked in red. However, it does not tell cyclists how easy or hard it is to cycle on these roads.

The Cycle Skills Network Audit shown in **Appendix 3** does this for the A660 and this could be extended to produce a cycle skills based cycle map for this corridor.

## 7.0 Conclusion

Cycling is increasing on the A660 inbound in the morning peak and cycle accidents have stayed around the same. There is great potential to increase cycling along this corridor with a range of infrastructure, training and promotional initiatives.

For infrastructure the main challenges are

- At the Lawnswood Roundabout. Providing safer conditions on-road for experienced cyclists and alternative tracks and crossings around it for novices
- On the congested road past the Arndale Centre. Making this more cycle and pedestrian friendly with continuous cycle lanes and a self enforcing 20 mph zone
- Linking up the cycle lanes on sections where they do not exist with the existing ones with advanced stop lines at signalled junctions and reviewing the width of existing cycle lanes to provide wider lanes

These infrastructure improvements should be combined with cycle training for schools, university students and residents as well as promotional literature and events.

The result of a combined approach should mean that many more people would choose to cycle along this corridor - reducing congestion, pollution and providing better fitness and health.



## 8.0 References to design guidance

The following website links provide comprehensive design guidance on cycling facilities

**Cycling England's** design portfolio - provides a useful checklist for a whole range of cycling measures both on road and off road as well as links to further design advice

<http://www.cyclingengland.co.uk/engineering-planning/design-checklist/>

[Cycling Infrastructure Design](#) (Consultation document) (DfT, 2007)

[Cycle Friendly Infrastructure](#) (IHT, DfT, CTC,BA, 1996)

[Manual for Streets](#) (DfT, 2007)

[London Cycling Design Standards](#) (Transport for London, 2005)

[National Cycle Network: Guidelines for Planning and Design Issue 2](#) (Sustrans/Arup, 1997)

[Traffic Advisory Leaflet 3/05 Cycling Bibliography](#) (DfT, 2005)

[Traffic Signs Regulations - General Directions 2002](#) (TSO, 2002)

[Policy, Planning and Design for Walking and Cycling](#), Local Transport Note 1/04 (DfT Consultation Draft, 2004)

[Adjacent and Shared Use Facilities for Pedestrians and Cyclists](#), Local Transport Note 2/04 (DfT Consultation Draft, 2004)

[Guidance on the use of tactile paving surfaces](#) (DfT, 1999)

[Sustrans Information Sheets](#)