Professional Support Service

NORTHAMPTONSHIRE COUNTY COUNCIL

Northampton Inner Ring Road – can it be made more cycle-friendly?

Final Report

November 2008

Contents **Page**

1.0 Introduction.

As part of the developing Northampton town cycle network strategy the Highway Authority, Northamptonshire County Council, has asked Cycling England for some advice on ideas for part of the town's inner ring road. The northern section - including Grafton Street, Campbell Street, Upper Mounts and Lower Mounts has been highlighted as being on cyclists' desire-line and should feature as part of the cycle network. Although this section of the inner ring road is a multi-lane dual carriageway throughout much of its length, a request has been made for any suggestions as to if and how it may be made more cycle-friendly.

Rob Marshall (from the Transport Initiatives Consultancy), one of the Cycling England Local Authority Advice Team members, has been given the task of assisting with this request.

Meetings with Northamptonshire County council officers and subsequent site visits (on a bicycle) were undertaken. A photographic route 'cycle-through' has been compiled and is included as Appendix 1. The cycle-through highlights locations of interest, problems and issues, with suggested possible recommendations to improve cycle-friendliness. The measures are likely to encourage more people to cycle more often, with greater convenience and in a safer on-road cycling environment.

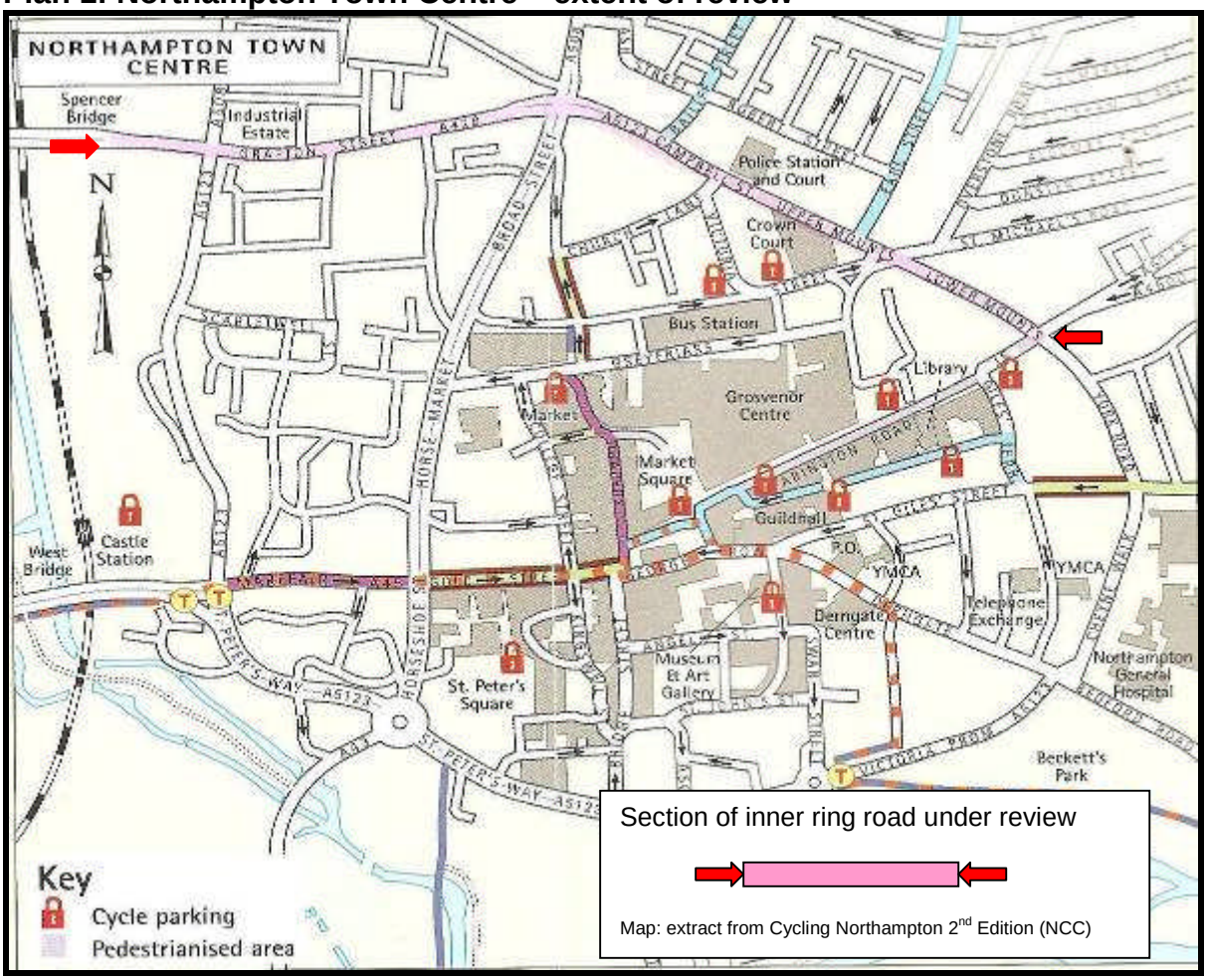
2.0 Background.

Grafton Street, Campbell Street, Upper Mounts and Lower Mounts form part of Northampton's 'inner ring road' which provides for motorised traffic outside the central area. This section is to the north of the town centre (see Plan 1 below). It is designed for motorised traffic, being in the main a two lane, dual carriageway configuration throughout. The junctions along it are, as to be expected, designed to maximise vehicle capacity - being traffic light controlled, multi-lane, designs. As with the multi-lane, link sections, the junctions are again expectedly very cycle-unfriendly. There is an urban 30mph speed limit throughout the section.

The section is used by cyclists, however, presumably because it is direct and there are few other convenient alternatives. On the site visit, cyclists were observed cycling on the road – though as many were also seen using the footways unlawfully. Consequently, there are aspirations to include the route as part of the developing town-wide network if it is possible to make the link more cycle-friendly.

As shown in London and in a growing number of UK towns and cities, high volume links and junctions can be adjusted to make them more cycle-friendly. Redistribution of carriageway space and more cycle-friendly measures at junctions make this possible.

Plan 1: Northampton Town Centre – extent of review



3.0 Application of advice.

The role of the bicycle as an important element in the mix of urban transport modes is universally acknowledged. This is supported by a considerable range of policies at both national to local level. Design guidance is clear about creating direct, convenient routes that are, in the main, on the road and not based on converted footways.

"Cyclists should generally be accommodated in the carriageway. In areas with low traffic volumes and speeds, there should be little need for dedicated cycle infrastructure. Cyclists generally prefer lightly trafficked routes that enable them to keep moving with minimum deviation from their desire lines." Manual for Streets, 2007.

"Pedestrians and cyclists need direct access to commercial, retail, education and employment areas. Non-motorised users are particularly affected by indirect routes because of the additional physical effort required and the disproportionate increase in journey time over the typically short overall journey distances that make up the majority of walking and cycling trips." LTN 2/08 Cycling Infrastructure Design, 2008, 1.4.1, p.12.

It is imperative, therefore, that town and city centres, neighbourhood centres, employment and residential areas can be easily and conveniently accessed by bicycle. This is the principle of *permeability*.

3.1 Permeability

"A key consideration for achieving sustainable development is how the design can influence how people choose to travel. Street networks should, in general, be connected. Connected, or 'permeable', networks encourage walking and cycling, and make places easier to navigate through. They also lead to a more even spread of motor traffic throughout the area and so avoid the need for distributor roads with no frontage development." Manual for Streets, 2007.

There is some debate about providing full permeability for motorised traffic to the same extent as for pedestrians and cyclists - as implied by Manual for Streets, which is unclear on this (though the 'spirit' of enhanced permeability for pedestrians and cyclists is evident). By increasing the opportunities for motorised traffic to make direct, convenient journeys, then this 'permeability for all' approach can increase the capacity of the road network to cater for inappropriate use of cars, for relatively short trips (under 3 miles). Short, local trips are, of course, clearly the domain of the bicycle rather than the car. More worryingly, creating permeability for all modes is likely to *encourage* people to drive when they could walk or cycle.

The Department for Transport, in the latest cycling design guidance, however, is quite clear that cyclists should be given advantage over motorised traffic and that they are afforded greater access and convenience:

"The network of routes for non-motorised users therefore needs to be planned at a finer scale than the highway network, based around the principle of providing small connected blocks of development so that walk and cycle distances are minimised ….. Signed cycle routes can offer "fine grain" networks with greater accessibility than for

motor traffic by using quiet residential roads, contra flow schemes, paths alongside rivers and canals, disused railways, vehicle restricted areas and parks. ."
LTN 2/08, Cycling Infrastructure Design, 2008, 1.4.2, p.13.

The concept of *'filtered permeability'* should guide the planning, design and implementation of all transport related infrastructure proposals.

3.2 Filtered permeability.

This is the principle followed in most European towns and cities that have been demonstrably successful in restraining car use whilst encouraging high levels of cycling. It means separating sustainable modes from private motor traffic in order to give them an advantage in terms of speed, distance, and convenience.

In European mainland cities like Frieburg, Gronigen and Zwolle, the principle of filtered permeability is the main reason for their success as places where car use is at a relatively low level when compared with walking, cycling and public transport use. Here, through-traffic is confined to restricted network of main roads. Suburbs and townships are often designed as culs-de sac for cars, making it not very convenient to drive between suburbs and to the town centre. Bridges, tunnels and cycle paths, in addition to bus (or tram) priority measures and systems, provide a convenient, direct and much more *permeable network* for the sustainable modes of travel. Residents use these alternatives, particularly cycling, because it is quicker and more convenient than driving. Interestingly, apart from in town centres where cyclists mix safely and easily with pedestrians, cyclists are generally segregated from cars *and* pedestrians through the provision of well-designed cycle routes.

If there is to be a substantial shift to travel by sustainable modes, particularly cycling, then permeability should be looked at as how we differentiate the modes that should be encouraged and promoted against those modes that should be discouraged and restrained.

4.0 Underlying principles and assessment

The road network is the most basic (and important) cycling facility available, and the preferred way of providing for cyclists is to create conditions on the carriageway where cyclists are content to use it, particularly in urban areas. There is seldom the opportunity to provide an off-carriageway route within the highway boundary that does not compromise pedestrian facilities or create potential hazards for cyclists, particularly at side roads. Measures that reduce the volume or speed of motor traffic benefit other road users by making the roads safer and more pleasant for them to use. Seldom do measures provided for cyclists on the carriageway and that also reduce traffic speeds affect actual traffic capacity, particularly at peak traffic times, when most of our towns and cities experience queues of traffic. Giving cyclists advantage, convenience and additional safely benefits will encourage others to cycle when they too see the benefits. Ultimately, this helps to reduce overall car use and congestion.

Planning and designing high quality infrastructure involves developing individual site-specific solutions, but there are some common requirements that need to be satisfied. The underpinning principle is that measures for cyclists should offer positive provision that reduces delay or diversion and improves safety. Table 1 shows when **on-road or off-road provision** might be suitable. When designing improvements to cycle infrastructure, the **hierarchy of provision** (Table 2) offers useful guidance on the steps to be considered. Additionally, the **core principles of good cycling infrastructure** should also guide choices and design – these are included at Appendix 2.

4.1 On- or off-road provision?

Table 1 – type of cycle facility

(from LTN 2/08,1.3.1 Table 1.1)

Factor	On-road or off-road?
High traffic volume/speed routes	Off-road generally preferred, but see next item
Large number of side road junctions or property accesses along route	Makes on-road more attractive, as it reduces the potential for conflict at these locations
Busy pedestrian traffic along the route	On-road preferred, as it reduces the potential for conflict
High levels of on-street parking	Makes on- road less attractive, but needs careful consideration in view of the potential for increased conflict using off-road provision
High levels of HGV traffic	Makes on- road less attractive, but needs careful consideration in view of the potential for increased conflict using off-road provision

Following a site visit and several rides along the section in question, and looking at the route against the guidelines in Table 1, it is evident that the link:

- has relatively high traffic volumes (and possibly high vehicle speeds outside peak times when traffic is more free-flowing)
- there are a large number of side road junctions or business property accesses, filling stations along the route
- relatively high levels of pedestrian activity is evident along some sections of the adjacent footways
- footways/verges are limited in width and/or are cluttered with street furniture, guard railing, posts, unlawfully parked vehicles, etc.
- there are numerous multi-lane, traffic-light controlled junctions along the route
- there are some uphill sections where cyclists need extra space

Looking at Table 1 and at the practicality of providing a route on an off-road cycletrack, it is clear that **on-road facilities are more appropriate**, useful and deliverable than trying to provide off-road measures. This view is taken even though the traffic volumes might otherwise suggest an off-carriageway solution. The practicality, cost and difficulty in achieving a good standard, off-road facility (and on both sides) of this section make it impossible to deliver. A well-intentioned, but low level of service shared-use cycletrack 'compromise' will result, which many cyclists may choose not to use anyway.

4.2 Hierarchy of Provision approach.

A cycle-friendly network and the links within can be achieved by a combination of measures to manage the impact of motorised traffic to provide conditions in which cycling is relatively safe and convenient. The range of measures is summarised in Table 2, the Hierarchy of Provision. The hierarchy elements are not mutually-exclusive – for example, reducing traffic speed on links may enable junction geometry to be tightened enabling cyclists and pedestrians to be better provided for. It is clear that creating space for cyclists by taking space away from pedestrians, or introducing shared-use facilities, is the least acceptable course of action.

Table 2 - Hierarchy of Provision approach to design
(from LTN 2/08, 1.3.3, Table 1.2)

Consider first	Traffic volume reduction
	Traffic speed reduction
	Junction treatment, hazard site treatment, traffic management
	Reallocation of carriageway space
	Cycle tracks away from roads
Consider last	Conversion of footways/footpaths to shared-use for pedestrians and cyclists

4.2 Interpretation of design guidance.

4.2.1 Traffic volume and speed reduction.

Looking at the hierarchy of provision principles (Table 2), firstly consideration should be given to **traffic volume reduction**. The road presently functions as a strategic inner ring road and there are no plans to change this.

Next down the list, traffic **speed reduction** is, however, much more feasible. Although there is a posted 30mph speed limit, the design of the route does little to ensure that this is complied with. This is not to say that 30mph is deemed an appropriate speed – where cyclists and traffic coexist, this is not. 20mph is considered and advised to be much more appropriate, particularly where the two modes are in close proximity and there are no dedicated measures to provide some form of segregation or protection. There will always, however, have to be compromises and until there is considerably less reliance, use and acceptance of the car as the dominant mode of travel, measures that provide safer and more convenient conditions on roads will continue to be necessary. There is growing recognition that traffic does not have to travel at 30mph in and around town and city centres and that 20mph routes are deliverable.

During peak hours, reductions in traffic speeds will not affect traffic capacity or worsen congestion since vehicles will inevitably be delayed and queued at junctions – link speed is not a factor under these conditions, it is junction capacity. Measures such as average speed cameras (rather than the more ineffectual static camera or variable message signs (VMS)) will give effective speed reduction over the entire link, not just at static camera or VMS locations. Physical traffic-calming measures such as ramps and cushions are not likely to be appropriate, practical or cost-effective on roads of this strategic importance. Additionally, many such measures can be cycle-unfriendly if not carefully designed and constructed. This does not mean to say that more subtle, practical, cost-effective, ‘psychological’ measures, such as simply reducing traffic lane widths, should not be considered to help with speed reduction and reallocation of road space.

The combination of average speed cameras with reduced lane widths will provide considerable opportunities in a review of the available carriageway space given that lower vehicle design speeds can be used. Ideally, a speed of 20mph will create safer conditions for all road users, particularly pedestrians and cyclists. At junctions and across side road turnings, where cyclists are most vulnerable, this speed reduction will make all the difference. A check of all accident records and a review against mode hierarchy and other transportation policies may give surprising support for such measures. It is likely to be far more cost-effective and deliverable than any other measures recommended here. However, unless there is a commitment to a reduced speed initiative, other measures lower down the hierarchy of provision will be required.

4.2.2 Junctions

Although accident figures were not provided, traditionally, cyclists are vulnerable at junctions, even more so at multi-lane junctions which have dedicated left turn lanes with

vehicles approaching at inappropriate speeds.
Measures that make on-road conditions at and on the approaches to such junctions safer and more convenient will benefit cyclists and encourage more cycling. Therefore, **junction treatment** measures are advised in the hierarchy of provision checklist. Junctions throughout the section are all traffic light controlled and have multi-lane approaches and are generally cycle un-friendly. Measures to make them safer and more convenient

should be implemented. Review of the junctions throughout the link and the introduction of Advance Stop Lines (ASLs) is recommended. See the note below on ASLs.

Advanced Stop Lines

Advanced Stop Lines are now widely used at traffic light controlled junctions and can give some additional safety and added advantage to cyclists. Indeed the guidance is clear that ASLs should be the default provision at all traffic light controlled junctions. They must, however, be designed and implemented to a good standard and not compromised by unsubstantiated concerns about capacity reduction and traffic lane widths.

The presence, width and location of associated ASL lead-in lanes is just as important (if not more so) than the ASL itself. Indeed, the signing regulations (TSRGD) and other guidance (LCN 2/08) are quite clear on the need for, and specification of, ASL lead-in lanes. Many designers choose to include 'non-complying' ASLs and safety audits continue to approve them. ASLs *must* be accompanied by good standard lead-in lanes. The latest DfT guidance in LTN 2/08 is clear*: "it may be better to use a wide advisory lane, accepting that some vehicles may encroach, rather than a narrow mandatory one. It may be necessary to reduce the width of the adjacent traffic lanes to accommodate the lead-in lane. A substandard traffic lane width may be acceptable where there is limited use by HGVs. The provision of nearside lead-in lanes that are as long as the normal peak time traffic queues can help to keep the route to the ASL clear of queuing vehicles."* LTN2/08, 9.4.8.

Guidance on ASLs is available at the Cycling England website:

http://www.cyclingengland.co.uk/site/wp-content/uploads/2008/10/a09_advanced_stop_lines.pdf

Local Transport Note LTN 2/08, section 9.4

4.2.3 Reallocation of carriageway space on link sections

a) Bus/cycle lanes.

Many urban area road networks give priority to buses through the provision of bus lanes, bus gates, access restrictions, etc., in order to give buses and advantage over other traffic. Combined bus/cycle lanes have considerable merit in terms of delivery

and acceptability and cost-effectiveness. Bus lanes provide instant high quality cycle routes. Bus lanes on primary routes provide cyclists with direct routes to and around urban centres. Bus lanes are popular with cyclists and are generally preferred over off-road measures that invariable give-way to side roads and minor accesses. The continuity and segregation afforded cyclists by bus lanes is widely appreciated. A 4.5m wide combined bus/cycle lane is the desirable width specification. Along the Northampton roads in question, this will require removal of one traffic lane between the links.

Recommendation: bus/cycle lanes be considered and how this is compatible with traffic management and longer term transport strategies for Northampton.

Further information on bus/cycle lanes is available at:

LTN 2/08: Cycling Infrastructure Design, DfT 2008, section 6.

Cycling England Design Checklist: http://www.cyclingengland.co.uk/site/wp-content/uploads/2008/10/a10_bus_lanes_and_bus_stops.pdf

b) Cycle lanes and 'hybrid' cycle lanes.

Although combined bus/cycle lanes throughout the route, associated with bus/cycle priority measures at junctions is the preferred approach, it is likely that this will not be achievable in the short to medium term, or not at all if there is not the political will to support it. In the short term, the most useful and deliverable approach will be to reallocate road space to provide cycle lanes – these can be standard mandatory or advisory designs or consideration may be given to 'hybrid' cycle lanes (see note below on 'hybrid' cycle lanes).

There is considerable carriageway space available throughout the link with a two lane dual carriageway specification. Off-carriageway cycle tracks have been dismissed as impractical and inappropriate. Road closure, traffic volume and speed reduction are *hierarchy of approach* solutions that appear equally unlikely – although average speed camera monitoring is effective, though still little-used. This leaves on-carriageway measures as a practical, deliverable approach to giving cyclists heightened safety, added convenience and route continuity. The measures proposed should have little if any effect on the route's traffic capacity.

Cycle lanes to a good specification are generally well appreciated by cyclists, particularly the more experienced cyclist undertaking utility trips, primarily journeys to work. Many such cyclists will already be using the links and junctions in question

already. The recommendation here is to review the existing carriageway width in favour of introducing edge-of-carriageway cycle lanes. This will ensure that that existing cyclists have safer more convenient dedicated facilities and that other potential cyclists may be encourage do use their bikes rather than their cars.

Mandatory cycle lanes (bounded by a solid white line that vehicles may not cross) are to be preferred, though **advisory cycle lanes** (bounded by dashed white line that vehicles may cross if necessary) may be more appropriate and practical at certain sections. Continuity and adequate width are key elements of their design. Lanes should not stop at side road junctions, through lanes through refuges or at other constrained sections of the link.

1.5m mandatory cycle lane with additional buffer strip between parked vehicles.

Traffic lane removed from former two-lane configuration to create wide advisory cycle lane with buffer strip.

Maintaining cycle lane continuity through crossing zig-zag markings ('virtual cycle lanes') by extending pigment through the markings in place of the cycle lane lines.

Cycle lanes should not be discontinued on the approach to junctions, better to maintain the cycle lanes at the expense of traffic lane width (traffic may over-run if needed).

Widths should ideally be 2m, but 1.5m is acceptable. Surface lane colouring is not necessary except at locations where added conspicuity and effectiveness is required, e.g. across side roads, through zig-zag markings ('virtual cycle lanes') and narrower sections through refuges, traffic lanes on junction approaches and ALS lead-in lanes.

Attention is brought to the concept of **'hybrid' cycle lanes** (see note below) that are a common feature in parts of continental Europe, particularly in the Netherlands. It is considered that there may be sufficient space to consider this type of design. 'Hybrid' cycle lanes are being considered in some of the Cycling Towns, particularly in Cambridge. Northampton, if interested, would be well-advised to work with Cambridge in the development of routes that use this technique.

Recommendation: consider the use of innovative 'hybrid' cycle lanes.

Further information on cycle lanes is available at:

LTN 2/08: Cycling Infrastructure Design, DfT 2008, section 7.
Cycling England Design Checklist: http://www.cyclingengland.co.uk/site/wp-content/uploads/2008/10/a11_cycle_lanes.pdf

'Hybrid' cycle lanes

'Hybrid' cycle lanes are much in evidence in the Netherlands but uncommon in the UK. They combine the best points of both on-road cycle lanes and off-road cycle tracks, whilst excluding the less useful aspects of both. They are on-road cycle lanes with some physical demarcation and provide the feeling of protection that less confident cyclists appreciate. They should be 2-3 metres wide and are uni-directional.	
	Cyclists have plenty of space in these hybrid cycle lanes, with room to overtake, and drivers are actively discouraged from using the cycle lane as parking because of the coloured surfacing and having to drive over a cobbled or textured divider. Importantly, at side roads, priority is maintained. And because the lanes are on-road, cyclists can be better seen by drivers, unlike a typical British-style pavement cycle track.

This information is extracted from the Cambridge Cycling Campaign website:

http://www.camcycle.org.uk/cycling2020/providingforcycling/hybridcyclelanes.html

5. Recommendations.

The Northampton Inner Ring Road is part of the town's strategic road network and as such has to deliver considerable vehicle capacity and access. Any measures that significantly affect this traffic function are unlikely to be politically acceptable and it would be pointless to suggest measures like road closure or traffic lane reductions. However, cyclists are using the route at present and will continue to do so since there are no convenient alternatives. The provision of off-carriageway cycletracks, arguably desirable given the traffic volumes, are not practical or appropriate and will not provide a good level of service for cyclists. On-carriageway road space re-allocation is possible, if reduced traffic lanes widths are acceptable. This will provide space for edge-of-carriageway cycle lanes and the introduction of ASLs at junctions.

1. Grafton Street, Campbell Street, Upper Mounts, Lower Mounts are used by cyclists and the sections should be made more cycle-friendly.

2. Consider the use of combined bus/cycle lanes as a first option.

3. Consider the use of 'hybrid' cycle lanes as a second option.

4. Consider providing on-carriageway cycle lanes should be provided throughout the link as a third option.

5. Junctions should be provided with ASLs to all arms.

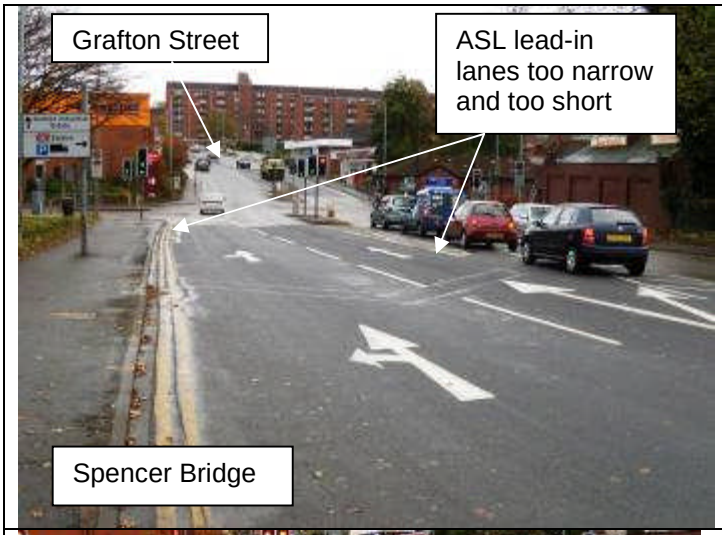
6. A review of the link should be undertaken to establish whether hybrid cycle lanes are feasible in addition to the use of standard cycle lanes - mandatory or advisory, (the former are preferred). 2m is the desirable, recommended with a minimum acceptable width of 1.5m.

7. Permeability for cyclists to/from St Giles' Terrace at the Lower Mount/York Road junction is important and should be designed into the scheme.

8. Additional pedestrian crossing arrangements should be considered at the Grafton Street/St Andrew's Road junction.

APPENDIX 1
Route 'cycle-through'

Spencer Bridge – Grafton Street junction



1 Spencer Bridge/Grafton Street junction.

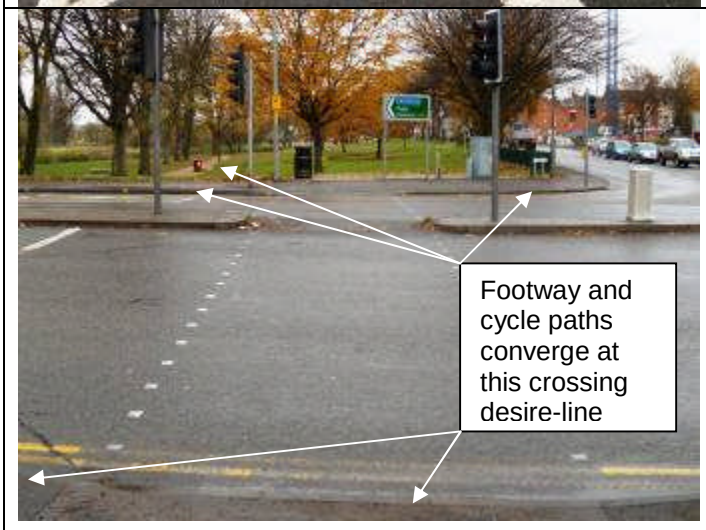
- multi-lane approaches
- wide traffic lanes: 7m into junction, 6m out
- no on-road cycle lanes
- ASL with substandard, short, lead-in lane
- 3m footway

Review traffic lane widths to provide continuous 1.5m advisory cycle lanes and good specification lead-in lanes to ASLs

2 ASL on Spencer Bridge.

- good to see that ASLs are provided at the junction
- well marked and surface coloured
- physical traffic island ensures that vehicles leave the lead-in lane clear
- substandard length lead-in lanes
- tight gap to get into ASL from lead-in lane when traffic is occupying the right turn lane

Review ASL specification and reinstate to good practice standards.



3 Spencer Bridge arm - crossing arrangements

- multi-lane junction
- no traffic light aspects to indicate if it is safe to cross
- wide carriageways (5.4m and 7.6m)
- central refuge (1.7m) too narrow

Provide pedestrian crossing facilities across this arm (and St Andrews Road south arm too). Widen crossing refuge island width (min 2m). This will also allow the ASL lead-in lane width to be widened out to 2m to fit the new refuge width.

APPENDIX 1

Spencer Bridge – Grafton Street junction

4 Grafton Street approach

- multi-lane approach
- pedestrian crossing available over this arm
- relatively wide carriageway (6.8m for two traffic lanes)
- ASL provided
- substandard width and length of ASL lead-in lane
- ASL markings worn

Review ASL provision and traffic lane widths to provide good specification ASL and lead-in lane. ASLs should be reviewed at all arms of this junction.

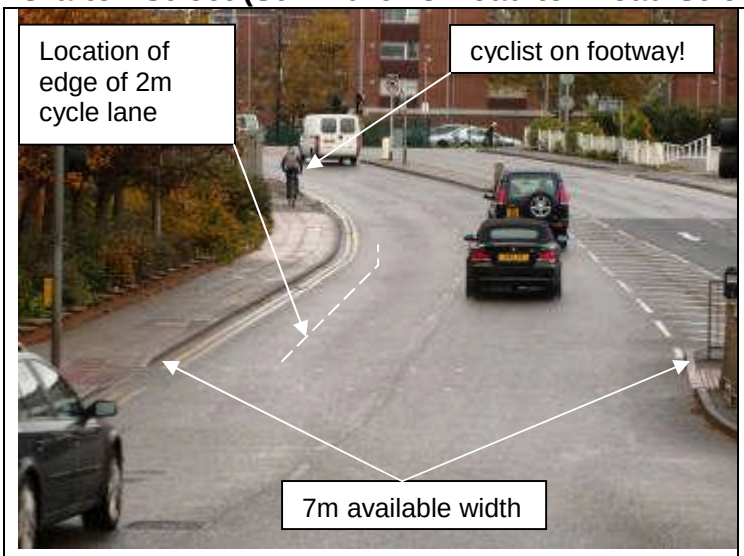
5 St. Andrews Road approach

- multi-lane approach
- 6.1m approach carriageway
- ASLs provided
- no lead-in lane
- set back ASL is of little use and would be better in line with nearside ASL (to provide access to Millers Meadow via crossing)

Review ASL provision to provide 1.2m minimum lead-in lane and redistribute remaining carriageway space (4.9m) between traffic lanes. One ASL will work better than the staggered arrangement.

APPENDIX 1

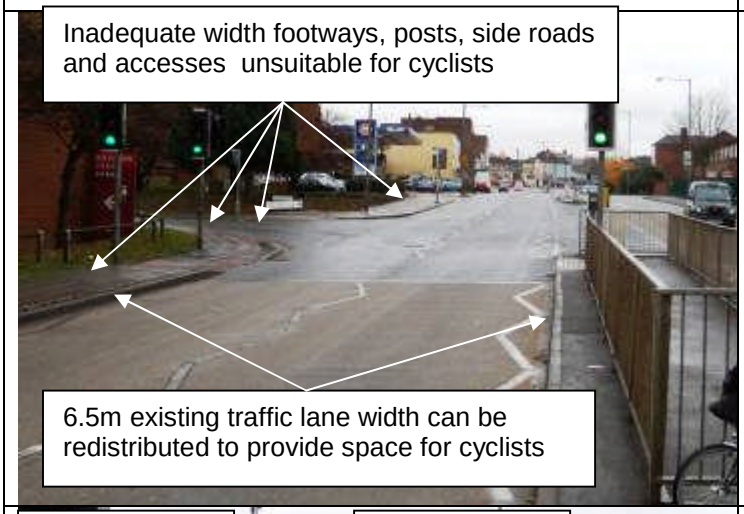
Grafton Street (St. Andrews Road to Broad Street) section



6 Grafton Street from Spencer Bridge junction.

- multi-lane dual carriageway
- wide carriageways (7m in each direction!)
- wide lanes encourage faster traffic speeds
- no measures for cyclists result in cycle-unfriendly conditions
- many cyclists use footways unlawfully for their own safety and convenience
- uphill sections more in need of dedicated space for cyclists

Review carriageway space to provide dedicated, continuous, on-road space (2m) for cyclists.



7 Grafton Street (Arundel Street)

- multi-lane, dual carriageway
- 6.5m width of existing traffic lanes
- no dedicated on-road space for cyclists
- footways, numerous accesses and side roads mean that off-road facilities cannot be provided
- pedestrian crossing refuge (3m)

Review carriageway space to provide dedicated, continuous, on-road space (2m is recommended, 1.5m minimum) for cyclists.

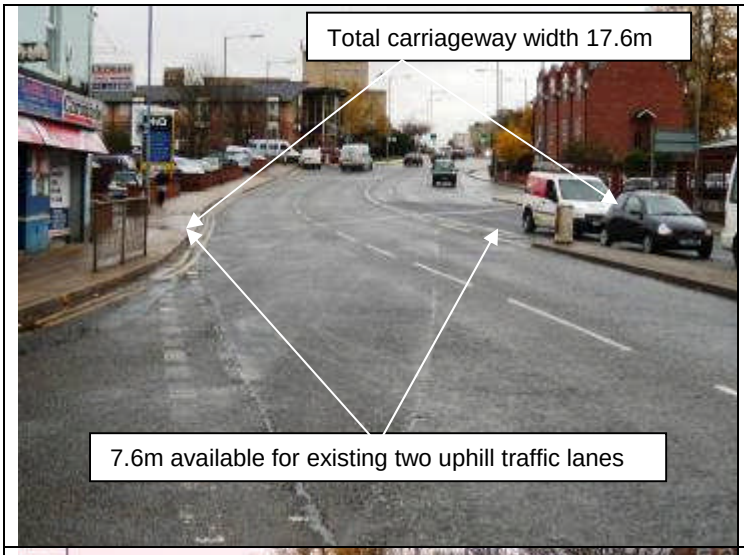
8 Grafton Street/Campbell Street junction

- multi-lane junction
- 3 lanes on Grafton Street
- 3 lanes on Campbell Street
- 10.8m approach on Grafton St.
- no measures for cyclists
- cyclists need to be at the head of traffic to get across this large junction within traffic light cycle time
- ASL with two lead-in lanes is possible here

Review carriageway space on all junction arms to provide ASL with lead-in lanes as appropriate.

APPENDIX 1

Campbell Street section.



9 Campbell Street (Broad St - Bailiff St)

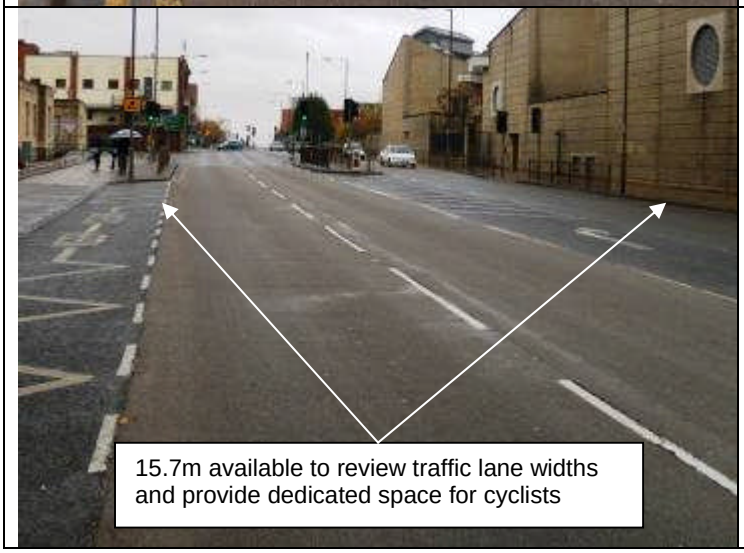
- multi-lane carriageways
- inappropriate speeds can be encouraged by wide traffic lanes
- no measures for cyclists
- uphill sections more in need of dedicated space for cyclists
- footways cannot be converted to shared-use
- numerous accesses and obstructions

Review carriageway space to provide dedicated, continuous, on-road space (2m is recommended, 1.5m minimum) for cyclists.

9 Campbell Street (Church Lane)

- multi-lane carriageway
- 12.8m available width
- no measures for cyclists
- uphill sections more in need of dedicated space for cyclists
- footways unsuitable for shared-use

Review carriageway space to provide dedicated, continuous, on-road space (2m is recommended, 1.5m minimum) for cyclists.



10 Campbell Street (Fire Station)

- multi-lane carriageway
- 15.7m available total carriageway width
- no measures for cyclists
- footways unsuitable for shared-use

Review carriageway space to provide dedicated, continuous, on-road space (2m is recommended, 1.5m minimum) for cyclists.

APPENDIX 1

Upper Mounts/Lower Mounts section

11 Upper Mounts (Earl Street)

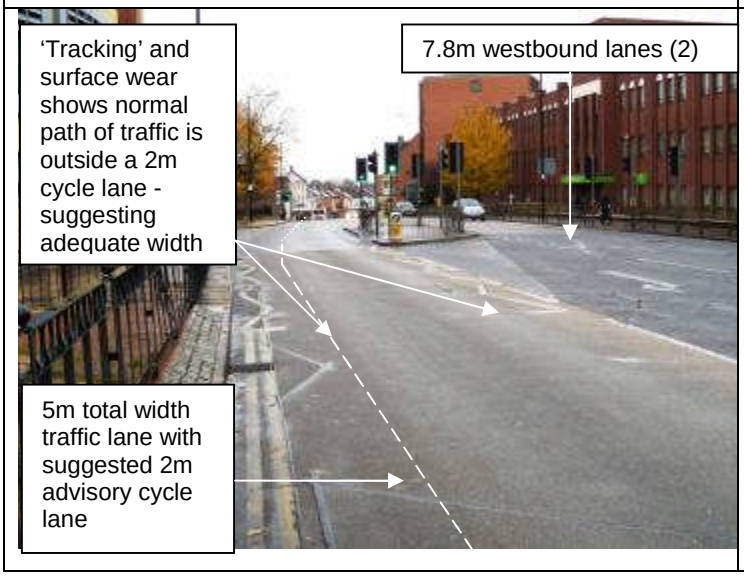
- multi-lane carriageway
- 13.7 total carriageway width
- multi-lane junction ahead
- no measures for cyclists
- footways unsuitable for cyclists

Review carriageway space to provide dedicated, continuous, on-road space (2m is recommended, 1.5m minimum) for cyclists. Approaching junction will require advanced advisory cycle crossover lead-in lane for straight-ahead cyclists.

12 Upper Mounts/St Michael's Road junction

- multi-lane junction
- ASLs to some arms (not all)
- non-complying ASLs (no lead-in lanes)
- ASLs becoming worn
- cyclists can 'run out of green light time' crossing the junction (see LTN 2/08, 9.2.2)
- exposure to right turning traffic assuming right of way

Review carriageway space on all junction arms to provide ASL with lead-in lanes as appropriate. Ensure adequate green times to cover cyclists.



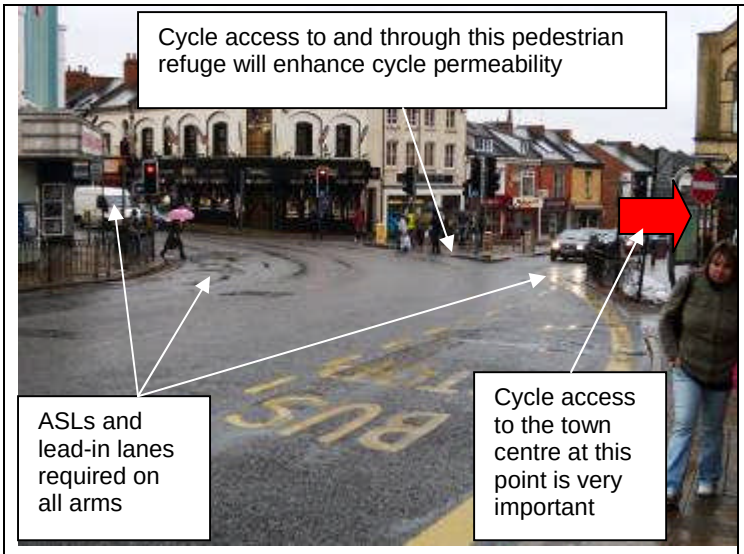
13 Lower Mounts (near Huntingdon College)

- single lane carriageway eastbound (5m)
- 2 lane carriageway westbound (7.8m)
- no measures for cyclists
- uphill sections (westbound) more in need of dedicated space for cyclists
- footways unsuitable for shared-use

Review carriageway space to provide dedicated, continuous, on-road space (2m is recommended, 1.5m minimum) for cyclists.

APPENDIX 1

Lower Mounts/Abington Road/York Road junction



14 Lower Mounts/York Road junction

- no measures for cyclists at this junction
- allows access to central area via St Giles' Terrace
- start of Lower Mounts uphill section requires added protection for cyclists
- existing relatively wide traffic lanes
- opportunity to allow cyclists to make banned turns to give advantage over traffic

Review junction to provide ASLs and provide cycle permeability for all cyclist desire-lines, particularly into the town centre.

APPENDIX 2

Core principles of good cycling infrastructure (LTN 2/08, 1.3.5).

Convenience - Networks should serve all the main destinations, and new facilities should offer an advantage in terms of directness and/or reduced delay compared with existing provision. Routes and key destinations should be properly signed, and street names should be clearly visible. Route maps should be made available, and on-street maps can be helpful. Routes should be unimpeded by street furniture, pavement parking and other obstructions which can also be hazardous to visually impaired pedestrians. Delay for pedestrians and cyclists at signalled crossings should be minimised. Trip end facilities should be clearly marked, conveniently located and appropriate for the likely length of stay. Designers should consider the future ease of maintenance, including access to vehicles for sweeping, trimming grass verges and surface and lighting repairs along off-road routes.

Accessibility - Cycling networks should link trip origins and key destinations, including public transport access points. The routes should be continuous and coherent (type and colour of surfacing may be used to stress route continuity as appropriate). There should be provision for crossing busy roads and other barriers, and in some areas there should be a positive advantage over private motor traffic. Routes should be provided into and through areas normally inaccessible to motor vehicles, such as parks and vehicle restricted areas. Safe access for pedestrians and cyclists should be provided during road works. The needs of people with various types and degrees of disability should be taken into account through consultation and design.

Safety - Not only must infrastructure be safe, but it should be perceived to be safe. Traffic volumes and speeds should be reduced where possible to create safer conditions for cycling and walking. Reducing traffic can sometimes enable the introduction of measures for pedestrians and cyclists that might not otherwise be viable. Opportunities for redistributing space within the highway should be explored, including moving kerb lines and street furniture, providing right turn refuges for cyclists or separating conflicting movements by using traffic signals. The potential for conflict between pedestrians and cyclists should be minimised. Surface defects should not be allowed to develop to the extent that they become a hazard, and vegetation should be regularly cut back to preserve available width and sight lines. The risk of crime can be reduced through the removal of hiding places along the route, provision of lighting and the presence of passive surveillance from neighbouring premises or other users. Cycle parking should be sited where people using the facilities can feel safe.

Comfort - Infrastructure should meet design standards for width, gradient and surface quality, and cater for all types of user, including children and disabled people. Pedestrians and cyclists benefit from even, well maintained and regularly swept surfaces with gentle gradients. Dropped kerbs are particularly beneficial to users of wheelchairs, pushchairs and cycles, and tactile paving needs to be provided to assist visually impaired people. Dropped kerbs should ideally be flush with the road surface. Even a very small step can be uncomfortable and irritating for users, especially if there are several to be negotiated along a route.

Attractiveness - Aesthetics, noise reduction and integration with surrounding areas are important. The environment should be attractive, interesting and free from litter and broken glass. The ability for people to window shop, walk or cycle two abreast, converse or stop to rest or look at a view makes for a more pleasant experience. Public spaces need to be well designed, finished in attractive materials and be such that people want to stay. The surfaces, landscaping and street furniture should be well maintained and in keeping with the surrounding area. Issues of light pollution should be considered, in addition to personal security in rural and semirural routes.