Cycling Strategy: Technical Guidance South Gloucestershire Council



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- Sustrans (2012) Technical Information Notes (TINs) 29: Lighting of Cycle Paths, 2012
- Sustrans (2013) Technical Information Notes (TINs) 05: Cycle Network Signing
- Sustrans (2014) Handbook for Cycle Friendly Design
- TfGM (2014) Cycling Technical Design Guidance
- TfL (2014) London Cycling Design Standard

# Glossary

| ASL         | Advanced Stop Lines for cyclists   |
|-------------|--|
| CIHT        | Chartered Institute of Highways and Transportation                               |
| CIL         | Community Infrastructure Levy – developer funding for infrastructure on/off site |
| CLG         | Department for Communities and Local Government                                  |
| СТС         | Cycling Touring Club – national cycling charity                                  |
| DfT         | Department for Transport   |
| GIS         | Geographic Information Systems   |
| JLTP3       | West of England Joint Local Transport Plan 3                                     |
| NPPF        | National Planning Policy Framework   |
| ONS         | Office of National Statistics  |
| ROWIPS      | Rights of Way Improvement Plans  |
| Section 106 | Developer funding for on-site infrastructure                                     |
| SUDS        | Sustainable Drainage Systems   |
| TfGM        | Transport for Greater Manchester   |
| TfL         | Transport for London   |
| VRA         | Vehicle Restricted Area  |

## Introduction

This Technical Guidance should be read in conjunction with the South Gloucestershire Cycling Strategy. The Strategy sets out the vision for cycling in South Gloucestershire with the Technical Guidance acting as a living document, setting out the core design principles for the provision of cycle infrastructure within South Gloucestershire. The Technical Guidance will be regularly updated as required to adapt to future innovation within cycle infrastructure and thinking.

Each section of this Technical Guidance covers a key cycle design principle, and outlines what approach will be generally applied within South Gloucestershire. In doing so, we have called upon a wide range of existing cycle design guidance, and identified what we consider to be the best fit for South Gloucestershire. The guidance signposts users to the recommended document.

The guidance provided within this document must be applied to all new developments where infrastructure is being planned, and should be referred to at all stages of the planning process. It will also be used by the Council both when improving existing infrastructure, and in the design of new routes.

This document also provides guidance on the development of cycle networks. A hierarchy of cycle routes provides detail of what is expected according to each tier of the hierarchy. Common characteristics and design specifics of all parts of the cycle network are signposted to best practice guidance.

### Who Benefits from cycle infrastructure?

The general public

- Access to employment: cycling offers greater opportunities for the majority of the population, regardless of age, gender or income level, to travel greater distances and access different destinations including employment centres.
- Health implications: investing in cycling can counteract the rise in sedentary lifestyles and make a huge contribution towards increasing personal well-being and mitigating stress related illnesses.
- Attractive streetscapes and enhanced public realm: a street environment, appealing to the human senses and through prioritising cyclists and pedestrians, creates a more pleasant and desirable setting where people want to live and visit.
- Lower cost of living: promoting and catering for cycling, as an alternative mode of urban mobility, reduces the reliance on motorised travel and its associated costs.

Society

- Increased productivity: suitable cycling provision and promotion of facilities can increase business
  profitability with a healthier and more active workforce having less sick days and higher concentration
  levels.
- Reduced healthcare costs: reducing pressure on public sector financial resources could be achieved by cycling for twenty minutes a day to help minimise the risk of many diseases relating to lack of exercise.
- Minimising infrastructure costs: prioritising cycling reduces the development costs associated with building expensive and large infrastructure to accommodate large swathes of motorised vehicles.
- Improved street safety: cyclists increase street vitality, liveability and natural surveillance and create opportunities for community interaction. This can enhance the perceived and actual levels of safety and reduce the level of criminal activity on a street.

Developers

• Space efficiencies: cycling provision takes up less space than designating development land to accommodate motorised traffic and static vehicles. This reduces costs and helps towards maximising profits from developments.

- Traffic assessments: by prioritising cycling and cyclists in local urban areas and ensuring trips by bicycle are more attractive and convenient, the level of opposition from neighbouring settlements about traffic related impacts on the surrounding area could be reduced. Active travel infrastructure is usually cheaper than highway improvements that cater for motor vehicles.
- Development approvals: adhering to the vision and public policy objectives around sustainable transportation in the Local Development Framework, Core Strategy and Joint Local Transport Plan, increases the likelihood of a development proposal being approved. This helps to achieve the principles set out in National Planning Policy Framework (NPPF) Section Four: Promoting Sustainable Transport (para 17, 35).
- Enhanced reputation: successfully accommodating and prioritising cyclists and pedestrians within new or infill developments will raise overall standards for cycling provision and have a positive impact on the green image of the developer.

### Our Design Principles

The design principles set out in this document have been adopted through reviewing the UK's best examples of cycle design and merging those designs and policies in order to meet the following targets set out in the South Gloucestershire Cycling Strategy:

- To get more people cycling, more safely, more often
- To provide safe and accessible cycling for users aged from 8 to 80 years on all routes
- Cycling will account for 10% of commuter trips by 2020
- To maintain and improve our cycle network
- Cycling will be the fastest way to get from A-B for most short journeys

Design guidance in this document is based on the Sustrans five key principles as well as the locally important issue of Access for All:

Coherence

• Continuous and seamless connections linking journey origins to trip attractors which are easily recognisable and legible for cyclists to follow intuitively.

#### Directness

 Designing a strategic cycle network around key desire lines with minimal delays, detours and obstructions by junctions, crossings, physical barriers or infrastructure that may impede momentum and priority.

#### Safety

 Routes must generate a high perception (and actuality) of safety and personal security. This involves limiting conflict between different travel modes, designating routes along active frontages and suitably retrofitting existing environments on case by case basis.

#### Comfort

Developing highly sustainable, yet simple and appropriately proportioned cycle infrastructure, which
minimises visual and sound pollution from vehicular traffic and avoids cyclists from making
complicated manoeuvres.

#### Attractiveness

• Maximising opportunities for the network to compliment surroundings contributes towards the quality of the public realm and increases the level of exposure to pleasant (green) environments.

Access for All

• In addition to the above design principles, access for all must be considered at all stages of designing and developing a cycling network. It is absolutely imperative that every part of the network is

accessible by all types of bicycle and all types of user, regardless of ability, ages 8-80, including disabled users and safe routes to schools.

These cycle design principles will underpin the development and implementation of a successful cycle network in South Gloucestershire. It is important that South Gloucestershire regularly reinforce them at the outset of the planning process. South Gloucestershire Council will consult regularly with neighbouring authorities to ensure that design principles are complementary, particularly on cross boundary routes.

## **Network Planning**

The Cycling Strategy document has outlined the existing, planned and aspirational parts of the South Gloucestershire cycling network. Developments taking place on or near the cycle network will seek to maximise its usability by incorporating it into their design process.

Delivering a successful cycle network requires all key stakeholders to work to the same message on providing good quality, well-designed cycle infrastructure. Department for Transport guidance states that it is important to focus efforts on stimulating cycle growth through catering for cyclists needs from ages 8-80.

The diagram below set out key steps which must be considered when developing or designing cycle routes in South Gloucestershire. Note that particular attention must be given to consulting with key stakeholders who have been involved in the development of this guidance, throughout the process of designing new cycle infrastructure, as recommended in South Gloucestershire's Community Engagement Strategy.

Designing a successful cycle network is a crucial stage of strategic planning. This process can be adapted according to local circumstances.

### Stages of Network Development

#### 1. Engagement with South Gloucestershire's Transport Development Control Team at an early stage

Essential in order to ensure that cycling is built into proposals from the first stages.

On developing a network, innovation will be welcomed and reviewed by relevant local authority parties to ensure they meet the six core principles of cycling within South Gloucestershire of:

- 1. Coherence
- 2. Directness
- 3. Safety
- 4. Comfort
- 5. Attractiveness
- 6. Access for all

#### 2. Apply the Cycle Strategy aims to new cycle infrastructure

The aims of the cycle strategy can be found in the strategy document accompanying this guidance.

These aims should be developed in line with key influencing factors on cycling in South Gloucestershire, such as:

- Bristol Parkway Station the key railway station in South Gloucestershire offering the opportunity for multi modal travel integration.
- North Fringe new development (Cribbs/Patchway New Neighbourhood) and associated opportunities for improving the cycle network.
- Increasing connectivity between the North Fringe and East Fringe and smaller market settlements.
- Collaboration with neighbouring local authorities to form an integrated and comprehensive cycle network in the West of England and beyond.

Where the Cycling Strategy has identified a strategic or major cycle route through or adjacent to a development site, developer contributions (Community Infrastructure Levy (CIL) or Section 106) will be sought in order to facilitate the development of the cycle route. Within the remainder of the development, local cycle routes will provide safe and convenient access to the strategic or major cycle route.

#### 3. Links to employment, education and services via active travel

The cycle network should provide access to employment, education and other key services via safe and attractive cycling routes. It is essential that new developments connect into the existing and proposed cycle network as defined in the Cycling Strategy.

The following map shows the main or high trip attractors in South Gloucestershire.



Key trip attractors within South Gloucestershire include:

- Major employment sites, including Abbey Wood, Aztec West and the Enterprise Areas at Avonmouth / Severnside, Filton and Emerson's Green
- Educational facilities, such as the University of West England
- Large attractions such as The Mall at Cribbs Causeway, are trip attractors for a significant proportion of the population.
- Whilst these predominantly lie within the North Fringe of the city of Bristol, the key market towns of Yate and Thornbury, are also important trip attractors.
- Transport interchanges, including the railway stations of Bristol Parkway and Filton Abbey Wood, can also generate significant numbers of cycle trips as part of a multi-modal journey.
- Further afield, major trip attractors lying just outside the South Gloucestershire boundary include Southmead Hospital, Bristol city centre, and Keynsham and Bath, and providing good connections to such destinations will be crucial considerations when planning the cycle network.

Integration into the existing and proposed cycle network is crucial to the successful delivery. New developments will take the proposed and existing cycle network into consideration when planning connectivity from the site.

### 4. Implementing Schemes

Implementing the desired routes may require several legal processes to acquire land, implement traffic regulation orders, or change legislation. This is an important consideration so advice should be sought to prevent lengthy delays or disruptions. The Design Guidance Active Travel (Wales) Act 2013, stresses the

importance of considering different types of provision on most streets to deliver a comprehensive network instead of focusing on providing a limited number of designated routes.

Consideration should also be given, at an early stage, to the availability and suitability of sources of funding for the identified scheme, more information on funding sources can be found within the Implementation Plan section of the accompanying Cycle Strategy Document.

#### 5. Monitoring and Evaluation

Monitoring and evaluation is important for reviewing the success of route allocations and measures used to encourage more cycling. Depending on the objectives of the cycle network and also the specific route or street, methods of evaluation, such as automatic cycle counters, public observations and surveying, all contribute towards creating a better understanding of the success of the cycle network over a period of time

It is advised that new cycle routes should be fitted with automated cycle counters at key access points to monitor overall use and to assess the impact and success of new developments in encouraging cycling (Cycling England Design Guidance, C.05 Monitoring).

#### Cycle provision and the NPPF

The NPPF should be adhered to closely as this holds key information relating to the design elements of new developments with regards to cycling. Rights of Way Improvement Plans (ROWIPS) and other policy also reinforce the importance of providing for cycling and offer advice to authorities and developers on developments.

- NPPF (Para 17) Planning should actively manage patterns of growth to make fullest possible use of public transport, walking, and cycling and focus significant development in locations which are or can be made sustainable
- NPPF (Para 35) Give priority to cycle and pedestrian movements and have access to high quality
  public transport facilities. Create safe and secure layouts which minimise conflicts between traffic and
  cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones. The
  planning process should also 'consider the needs of people with disabilities by all modes of transport'.
- Section 60 of the Countryside and Rights of Way Act 2000 requires local highway authorities to prepare ROWIPS. There is considerable scope for using these plans to improve Rights of Way for cycle traffic but this mechanism is under-utilised at present.
- Section 106 Agreements under the Town and Country Planning Act 1990 can require developers to
  provide cycle network improvements that support both the development and the wider locality. Monies
  derived from CIL can also be used to promote a cycle network.

### Foundations of Cycle Network Design

In South Gloucestershire the shape of the cycling network will be affected by the area demographics, the urban grain composition and location of settlements. Local knowledge, stakeholder input, and integration with cycle routes already established within South Gloucestershire and its neighbouring authorities will help to shape the network as it grows.

The hierarchy of routes is located within the Cycling Strategy document whilst the characteristics of each individual route type will be provided at a later stage in this document.

### Permeability and Connectivity

To increase route options for cyclists, a network of permeable, interconnected streets is required. Providing more direct, convenient and pleasant connections between trip origins and destinations is a great benefit to users.

Design Guidance Active Travel (Wales) Act 2013 (2014) and London Cycling Design Standards (2014) both refer to a maximum distance that any new housing development should be from the cycle network. However, its important to remember that cyclists can use all parts of the highway network except those where it is expressly prohibited such as motorways and footpaths which have not been designated as shared use. Therefore all new roads built in South Gloucestershire will seek to cater for cyclists and provide a direct and accessible link to strategic or major cycle routes, as specified in the Strategy.

### Expectations for developers within South Gloucestershire

- 1. Major destinations or entrances within any new development must be located where they will assist in minimising journey distances and travel times for cyclists.
- 2. Cycle routes through new developments must provide direct access to local amenities and public transport facilities using desire lines and permeable structures to avoid unnecessary diversions.
- 3. Developers must demonstrate during the planning pre-application phase how they will ensure that new cycle infrastructure and routes will connect to the existing cycle network in the area, beyond the development site boundary.
- 4. Where new development affects the alignment of an existing route, the developer will be required to provide an acceptable alternative during the pre-application phase and show how this will improve the level of connectivity in the area.
- 5. Cycle routes, both interim and replacement, must meet the design standards within this Technical Guidance document. Sustrans 'Handbook for Cycle-Friendly Design' (2014) must be referenced in this instance.
- 6. Developers must show that cycling and walking will be prioritised in the planning pre-application phase and how this will be achieved.
- 7. Developers must submit an access statement highlighting how cyclists and pedestrians, will be suitably catered for throughout the development and in the local context.
- 8. Developers must conform to the expected cycle parking standards at residential, commercial, and recreational developments as well as at public transport interchanges (See Cycle Parking Section, page 32).
- 9. South Gloucestershire Council requires developers of employment sites to provide showers, lockers and changing facilities, unless exceptional circumstances prevent this, as a means of promoting walking and cycling to work.
- 10. Developers must consult with South Gloucestershire at pre-application stage regarding the aspirational cycle network.

#### Key reference documents

- 1. Sustrans 'Handbook for Cycle Friendly Design' 2014
- 2. Design Guidance Active Travel (Wales) Act 2013, 2014
- 3. CIHT 'Planning for Cycling' 2014
- 4. 'Cycling-Inclusive Policy Development Handbook', Godefrooij et al 2009

5. Cycling England Design Guidance, C.05 Monitoring

# **Route Hierarchy**

The DfT advise that local circumstances should be considered when designing new cycle routes as there is not a 'one size fits all' solution. Designers should assess the local environment and street characteristics to determine the most appropriate solution. Careful consideration must go into the type of segregation required based on the limitations and characteristics of the street.

The characteristics for each level of the cycle route hierarchy are set out below. This gives guidance on what cyclists will expect and the types of infrastructure appropriate to each route category.

### Strategic Cycle Routes

These are the core routes of the cycle network linking main settlements and areas of high employment or education. Cyclists of all abilities from ages 8 to 80 will be able to use strategic routes. They enable high volumes of cyclists to travel on the most direct route, forming the vital connections between key destinations and providing links to other parts of the cycle network.

South Gloucestershire's strategic cycle routes are both on and off road. A design speed of 20mph will allow cyclists to travel efficiently and be given priority where possible to maintain momentum. Strategic routes should maintain a minimum width as described in the Common Characteristics section of this guidance.

In addition to standard cycling infrastructure found on all types of routes, the following measures are applicable to strategic cycle routes:

#### Early Start for Cyclists at Traffic Signals

An early start for cyclists at traffic signals provide cyclist specific traffic signal that give cyclists a 1-5 second head start at traffic signals. Cycle bypasses may also be considered in these instances to avoid the need to stop unnecessarily at traffic signals. Sustrans Handbook for cycle friendly design should be used for further details.

#### Grade Separation

Depending on the situation, grade separation may be necessary to provide sufficient levels for safety for cyclists. Excavating beneath a carriageway or constructing a cycle friendly bridge are expensive infrastructure investments so consideration must be given to more cost efficient means of continuing routes.

Bridge design must be carefully considered to ensure ease of use for cyclists and pedestrians. As with all cycle routes a gradual incline or gradient of 3% is desirable complete with guard-rails reaching a recommended height for cyclists of 1.4 metres. Sustrans provide best practice guidance for further details.

#### Innovative solutions

**Green Wave Traffic Signal -** Coordinated traffic lights allow cyclists maintaining a speed of 13mph to travel without needing to stop for red lights. Typically used in urban areas during the morning and afternoon peak. This encourages faster cyclists to travel at safe speeds, reducing conflict between users and allows cyclists to maintain their speed and conserve their energy. Can be combined with speedometer for cyclists and green lights in the ground to indicate if cyclists are in this green wave.

For additional support for the design and implementation of Strategic cycle routes please refer to:

1. Handbook for Cycle Friendly Design, Sustrans, 2014





### Major Cycle Routes

Major cycle routes are core leisure routes and routes linking the strategic cycle routes to secondary destinations. Cyclists of all abilities from ages 8 to 80 will be able to use major routes. They enable medium to high volumes of cyclists to travel on direct routes.

Major cycle routes should be designed with cyclist speeds of between 14 - 18 mph and should allow for cyclists to maintain these speeds wherever possible. Major routes should maintain a minimum width as described in the Common Characteristics section of this guidance.

The routes are crucial for bridging the gap between local routes and the major strategic cycle network. Traffic flows and speeds can be variable with an emphasis on managing the streets in a way that prioritises cycling and keeps traffic volumes and speeds to an acceptable minimum.

Measures applicable to strategic cycle routes such as early starts at traffic signals and grade separation can also be applied to major cycle routes. See Strategic Cycle Routes section above for further details.



MAJOR SHARED USE PATH





### Local Cycle Routes

Almost all roads throughout the urban areas of South Gloucestershire can be considered a local cycle route and as such, we are seeking to improve their attractiveness for cyclists. Local cycle routes act as feeder routes within urban areas, providing access to strategic and major cycle routes as well as local shops, schools and services. Cyclists of all abilities from ages 8 to 80 will be able to use local routes.

This particular type of route should be associated with a pleasant, quiet and inherently safe environment. This is an opportunity to engage in community led design projects and to think creatively about their various roles in the process of 'place-making'.

**Manual for Streets** provides the most comprehensive review of possible design ideas alongside visual guides produced by **Sustrans**. However, there are many good examples within other existing technical guidance such as that provided by **Transport for Greater Manchester and Transport for London**.

The following measures are applicable to local cycle routes:

#### Home Zones

Home Zones are streets that are primarily designed to meet the needs of pedestrians, cyclists, children and residents and the speeds and dominance of the car are reduced. **Guidance on Home Zones is contained within South Gloucestershire's Design Guidance: Living Streets**.

#### Filtered Permeability

On road cycle routes can provide an advantage to cyclists and pedestrians through the creation of short connections on sections restricted to motorised traffic. Cycling England offer best practice design guidance.

#### Cycle Friendly Streets

A Cycle Friendly Street should carry low volumes of motor traffic, high volumes of cycling, and provide cyclists with a level of service comparable to that provided by a high quality traffic free route. Crucially, in a similar fashion to Home Zones, cyclists should assume priority with motorists classified as 'guests' on the street. **See CIHT for further guidance.** 

#### Shared Space

Many urban streets are not wide enough for segregated cycling provision, in such circumstances the inclusion of measures which help reduce the speed of traffic, and the creation of space where all users can safely integrate is of upmost importance. This can take the form of distinctively paved junctions and textured pathways which provide a multifunctional, informal outdoor space that can be traversed, or utilised for different activities.

Careful consideration must be given to the visually impaired. **Sustrans** recommend that this measure should be implemented on roads where the average speed is below 15mph or where the cycle and pedestrian traffic outweighs the number of motorists.

For additional support for the design and implementation of local cycle routes please refer to:

- 1. Manual for Streets, Department for Transport, 2007
- 2. Planning for Cyclists, CIHT, 2014
- 3. Cycling Technical Design Guidance, Transport for Greater Manchester, 2014
- 4. London Cycling Design Standard, Transport for London, 2014
- 5. Living Streets, South Gloucestershire, 2013
- 6. Handbook for Cycle Friendly Design, Sustrans, 2014
- 7. Design Guidance, Cycling England



### **Rural Cycle Routes**

Nearly all rural roads can act as rural cycle routes. These provide feeder routes within rural areas, providing access to strategic or major cycle routes as well as local villages, shops and services. Cyclists of all abilities from ages 8 to 80 will be able to use rural routes. Rural routes are typically along quiet roads within the countryside and are characterised by their low traffic volumes.

Although the focus of increasing cycle levels tends to centre on urban areas, rural cycle routes form an integral part of the cycle network for both leisure, and utility journeys. Rural roads are the lifeblood of village communities and provide a means of accessing nearby, larger localities. Cycle routes should provide residents but also visitors with opportunities to cycle in a safe and pleasant environment using design solutions that are sensitive to the local environment.

Rural cycle routes will experience an infrequent and irregular flow of traffic travelling at speeds between 30mph and the National Speed Limit of 60mph. There are a number of measures that can help reduce the impact of traffic in and around villages, creating attractive and inviting conditions for residents or visitors cycling or walking in the area. **Sustrans suggest the following options**:

- Identify and strengthen key access points
- Emphasise village centre location
- Create visual and clearly visible features at key strategic nodes
- Implement interventions to mitigate speed levels and enhance public realm.

#### **Speed limits**

The prominence of the National Speed Limit across the UK countryside can potentially conflict with the objectives of enhancing the usability and appropriateness of rural roads for safe and attractive cycling routes. Both Sustrans and The Design Guidance Active Travel (Wales) Act 2013 offer solutions for rural cycle routes:

- Designated rural cycle routes should feature reduced traffic speeds through suitable, place-based measures.
- Alternative routes should be sought rather than retrofitting existing, high speed rural roads.
- Designated routes follow those roads experiencing less than 1,000 vehicles per day with traffic speeds
  of less than 40mph.

#### **Quiet Lanes**

Quiet Lanes are roads shared by vulnerable road users and motorised vehicles. They can be unmanaged and without treatment other than signage, or they can be managed with features such as narrowing, often involving the conversation of rural roads into single tracks. Materials, such as boulders and natural vegetation, could be used to narrow routes from 6 metres to between 3 and 3.5 metres to slow motorists whilst being sympathetic to the rural environment. For further guidance see the Network Planning chapter of this guidance.

For additional support for the design and implementation of rural cycle routes please refer to:

- 1. Handbook for Cycle Friendly Design, Sustrans, 2014
- 2. Design Guidance Active Travel (Wales) Act 2013, 2014



The following sub headings provide guidance to the common characteristics which can be found on all cycle route types.

Each section sets out the key design principles expected of any new cycle infrastructure and during the development of any existing route on the network. The sections will signpost to relevant documents from across the UK which already provide comprehensive design guidelines.

#### On-road cycle lanes

On road cycle lanes may be found across all levels of the hierarchy from Rural to Strategic. It is crucial that the design solutions are relevant and appropriate to each road and street. It is important to consider physical limitations, traffic flows and cycling demand as well as street function when determining the need for cycle lanes. For suitable widths/dimensions of cycle lanes please refer to table 1 on page 24 of this document.

There are four main types of on road cycle lanes which must be considered during the design phases:

#### 1. Mandatory Cycle Lanes

Bounded by a solid white line, they represent a dedicated on-road cycle facility for the exclusive use of cyclists. Access to side roads is permitted by a short section of advisory lane whilst double yellow lines are advised to prohibit parking on the cycle lane. A constant width should be maintained throughout the routes entirety. Any additional width required should be subtracted from traffic lane.



#### 2. Advisory Cycle Lanes

Small sections of coloured surfacing may be advisable when bridging a side road as well as an increase in the cycle lane width of 0.5 metres.

This may also be appropriate for central feeder lanes leading unto a junction and on the approach to an Advanced Stop Line (ASL). Roads with the centre line removed and a reduced carriageway of between 4.1 and 4.8 metres (depending on road dimensions), will be suitable for advisory cycle lanes between 1.5 and 2 metres in width.

#### 3. Shared Lanes

Conversion of traffic lanes into shared bus / taxi / cycle lanes is supported by the DfT who suggest a preferred road width of 4 - 4.5 metres and an absolute minimum distance of 3 metres to allow sufficient space for overtaking.

#### 4. Hybrid Lanes / Cycle Only Lanes

Hybrid lanes provide sufficient physical and psychological separation between different users with access

points to local thoroughfares or minor access roads requiring flush kerbs. The same wear course should be adopted as with fully segregated provision.

Hybrid cycle tracks must gradually make the transition to mandatory cycle lanes on the approach to major junctions. It is, however, desirable to continue hybrid cycle lanes through minor junctions along a raised table which acts as a mechanism for reducing motorists' speeds upon entry to a street.





There are opportunities for creative street furniture to distinguish the carriageway from the cycle lane, instead of a 50mm up stand. Intermittent segregation spaced between 2.5 and 10 metres away from each other, are cost efficient and allow for innovative design, e.g. planters, wands. This is the ideal design solution proposed by the CTC and would be recommended in this instance.

Alternatively car parking could be used as a buffer between the cycle lane and the road itself. If this method were to be used, the cycle lane must be wide enough to accommodate car doors opening, clear instruction and signage must be provided to allow for the driver to move comfortably and safely across the cycle lane and there must be 'gaps' within the parking at suitable times to allow for cyclists to turn right. Strict parking controls would have to be enforced to ensure that vehicles are not causing an obstruction.

The method of segregation must consider the **six key cycle design principles** (page 6) and must demonstrate this during planning stages.

#### **Key Considerations**

In line with the key principles of designing cycle routes, **continuity** and **directness** are important factors to consider when designing segregated provision.

#### 1. Bus Stops

Floating bus stops, otherwise referred to as bus stop bypasses, should be encouraged where there is available space.

2. Slippery Surfaces

Consideration must be given to the safety implications of narrow cycle lane widths because double yellow lines and white lines can be slippery to cyclists and motorcyclists when wet. The use of surface treatments should carefully consider the potential slip hazards for cyclists.

#### **Expectation within South Gloucestershire**

On-road cycle lanes must seek to employ either mandatory, advisory or shared space lanes based on the criteria set out in the technical guidance, however they should be seen as a departure from standards on strategic routes.

For additional support on the design and implementation of on road cycle lanes please refer to:

- 1. Design Guidance Active Travel (Wales) Act 2013, 2014
- 2. Space for Cycling, CTC, 2012
- 3. Handbook for Cycle Friendly Design, Sustrans, 2014

### Shared Use Paths

Shared use paths are pedestrian and cycle paths separate from the highway. Users can either be segregated through the use of lines or unsegregated whereby users manage their interactions with other users informally.

Pedestrian paths should be converted to a shared use path when traffic speeds exceed 40mph. Designs should allow for the shared use paths to be located either side of a strategic route and should be totally separated from the main carriageway which could be accomplished by through vegetation or installing street furniture.





Sustrans provides guidance on how best to design shared use paths within the 'Handbook for cycle friendly design' section 'Segregation of cyclists and pedestrians'

On existing roads and pavements the width of shared use paths will be dependent on local circumstances.

New developments should be able to achieve at least the target width as set out in table 1 on page 24 below.



These dimensions allow for social riding and overtaking as well as commuting. Additional clearance may be feasible by reallocating carriageway (where practical), whilst additional space may be required when navigating around bus stops to ensure maximum visibility.

On the approach to junctions, shared use paths should not deflect more than 45 degrees, with an optimum radius of 2 metres when turning into a crossing. This is an important consideration in the approach to busy roads. Cycle tracks have the option of being set back between 4 and 8 metres from the busy road, depending on available space, if cycling and vehicle flows are high and if junction visibility is poor.

#### Access for all

It is vital that when designing or upgrading a shared use path that all groups including pedestrians are accommodated for. Simple design principles such as tactile paving, clear signage, dropped kerbs, and a smooth surface must be used carefully. Paths must be free of obstruction and suitable alternatives provided where gradients are too steep. Carefully placed courtesy signs should be used to make all users aware that the space is shared.

#### Path construction

For details on types of path construction suitable within South Gloucestershire please refer to **Table H.8 'Path construction requirements, unsegregated shared use'** which can be found within the Sustrans **'Handbook for cycle friendly design'**.

For additional support on the design and implementation of on shared use lanes please refer to:

- 1. Handbook for Cycle Friendly Design, Sustrans, 2014
- 2. Shared Use Routes for Pedestrians and Cyclists, LTN 1/12, DfT 2012
- 3. TIN19: Segregation of Shared Use Routes, Sustrans, 2014

### **Traffic Free Connections**

These off-road routes, typically associated with former railway branch lines and old byways, can be integral and well used parts of a cycle network as strategic routes. Typically used for leisure and recreational pursuits by bicycle or foot, these routes should be accessible for cyclists of all abilities ages 8-80. It is important to assess the demand and the type of use on these routes to determine the level and type of provision required.

In the case of South Gloucestershire, long distance and often meandering traffic free routes, are vital interurban links and not only provide opportunities for recreational cycling but act as crucial commuter links. The following guidelines have been adopted from Sustrans and CTC guidance. Please refer to these documents for detailed guidance when designing a traffic free connection:

#### 1. Surface Course

Sustrans Path Construction Requirements for urban fringe or semi-rural traffic free routes suggests a machine laid, sealed surface is 'imperative' with bitumen suggested as a base course material. More isolated routes outside a 5km radius of an urban area or 2km outside a village environment may have an unsealed surface but there are key concerns surrounding maintenance, drainage and ease of travel for users.

#### 2. Surface Width

To facilitate social riding and two -way travel during peak hours, a minimum path width of 3 metres is required; particularly those acting as major access paths to trip attractors which may require additional width to cater for expected demand (4 metres). Strategic and Major routes are advised to have curve radii of 25 metres whilst any path intersections should have a minimum radius of 2 metres. To prevent cyclists or pedestrians from directly entering onto a road environment from a traffic free route, it is recommended that a tight geometry is maintained.

#### 3. Gradient and Terrain

Preferred path gradients for traffic free routes mimics those set out for the rest of the cycle network with 3% the preferred percentage incline rising to 5% for up to 100 metres and 7% for short, 30 metre bursts. The sharper the incline, the greater emphasis is placed on increasing path width.

#### 4. Points of Interest

As traffic free routes can often take an indirect course from place to place and are used for recreational as

well as utility cycling, it would be advantageous to enhance and promote natural and ecological features. Providing seating arrangements will provide comfort to users requiring a break.

Using natural materials to reduce maintenance liabilities in the future, such as Sustainable Drainage Systems (SUDS) and defensive planting, to prevent soil erosion, can also contribute towards a routes visual amenity. Links to other destinations en route should also be provided to offer a choice of directions and destinations and to help reinforce the role of the route in the cycle network and the locality.



There must be emphasis on community involvement in the design of sculptures and artwork along the route as well as the development of links to points of interest and surrounding localities.

For additional support on the design and implementation of on shared use lanes please refer to:

- 1. Handbook for Cycle Friendly Design, Sustrans, 2014
- 2. Manuals for Streets, DfT, 2007
- 3. Space for Cycling, CTC, 2012

### Cycle Lane widths

Cycle lane widths will vary dependant on a number of variables. It is important that when designing a new route or developing an existing route that the desirable width set



out in table 1 below is adhered to. The dimensions listed below have been adopted from The Greater Manchester Cycling Design Guidance 2014, as they are deemed to be the most comprehensive.

On designing a new route or developing an existing route users of this guidance must strive to

achieve the desirable width and only in circumstances proved to be exceptional will the absolute minimum width be accepted. Developers/ planners must provide a reasoned evaluation to demonstrate this through preapplication stages.

For guidance on the type of cycle route required in different situations please refer to Sustrans diagram shown opposite.



Image Source: Handbook for Cycle Friendly Design, Sustrans, 2014

|   | Footway           | Cycle Facility | Buffer | Traffic Lane | Half Width | Full Width |
|---|-------------------|----------------|--------|--------------|------------|------------|
| Cycle Track - 1   | way               |                |        |              | 1          |            |
| Target  | >2.0m             | 2.5m           | >0.5m  | 3.5m         | >8.5m      | >17m       |
| Desirable min   | 2.0m              | 2.0m           | 0.5m   | 3.25m        | 7.75m      | 15.5m      |
| Absolute min  | 1.8m              | 1.5m           | 0.3m   | 3.0m         | 6.6m       | 13.2m      |
| Cycle Track - 2   | way               |                |        |              |            | -          |
| Target  | >2.0m             | 4.0m           | >0.5m  | 3.5m         | >10.0m     | 15.5m      |
| Desirable min   | 2.0m              | 3.0m           | 0.5m   | 3.25m        | 8.75m      | 14.0m      |
| Absolute min  | 1.8m              | 2.0m           | 0.3m   | 3.0m         | 7.1m       | 11.9m      |
| Hybrid Cycle Tr   | ack               |                | - 1    |              | 1          |            |
| Target  | >2.0m             | 2.5m           | n/a    | 3.5m         | >8.0m      | 16.0m      |
| Desirable min   | 2.0m              | 2.0m           | n/a    | 3.25m        | 7.25m      | 14.5m      |
| Absolute min  | 1.8m              | 1.5m           | n/a    | 3.0m         | 6.3m       | 12.6m      |
| Mandatory or A  | dvisory Cycle Lan | e              |        |              |            | _          |
| Target  | >2.0m             | 2.0m           | n/a    | 3.5m         | >7.5m      | 15.0m      |
| Desirable min   | 2.0m              | 1.75m          | n/a    | 3.25m        | 7.0m       | 14.0m      |
| Absolute min  | 1.8m              | 1.5m           | n/a    | 3.0m         | 6.3m       | 12.6m      |
| Light' Segregati  | ion               |                | -      |              | 1          | 1          |
| Target  | >2.0m             | >2.0m          | 0.7m   | 3.5m         | >8.2m      | >16.4m     |
| Desirable min   | 2.0m              | 2.0m           | 0.5m   | 3.25m        | 7.95m      | 15.9m      |
| Absolute min  | 1.8m              | 1.5m           | 0.3m   | 3.0m         | 6.6m       | 13.2m      |
| Shared Footway / Cycleway – segregated (Physical Segregation)   |                   |                |        |              |            |            |
| Target  | >5                | .0m            | >0.5m  | 3.5m         | >8.5m      | 17.0m      |
| Desirable min   | 5.                | 0m             | 0.5m   | 3.25m        | 8.25m      | 16.5m      |
| Absolute min  | 4.                | 0m             | 0.5m   | 3.0m         | 7.0m       | 14.0m      |
| Shared Footway / Cycleway – unsegregated (Physical Segregation) |                   |                |        |              |            |            |

#### Table 1: Cycle lane widths

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| Target        | 4.0m | >0.5m | 3.5m  | >6.5m | 13.0m |
|---------------|------|-------|-------|-------|-------|
| Desirable min | 3.0m | 0.5m  | 3.25m | 6.25m | 12.5m |
| Absolute min  | 2.5m | 0.5m  | 3.0m  | 5.5m  | 11.0m |

Source: Adapted from 'The Greater Manchester Cycling Design Guidance', 2014

### Traffic calming measures and cyclist advantages

Traffic calming measures aim to reduce traffic speeds and create a safe environment for cyclists and pedestrians. A number of measures commonly employed in residential areas are featured in DfT's 'Manual for Streets' (Section 7.4). Cyclist advantage allows the cyclist to gain over motorised traffic by increased permeability and reduced obstacles such as bus stops. The aim of this section is therefore to compliment this preceding guidance by indicating the considerations that must be taken into account for promoting cycling within these designs.

The main types of Traffic Calming measures are listed below.

#### 1. Speed cushions

Traffic Calming measures should avoid causing cyclist discomfort. Speed cushions are the preferred design solution, as cyclists can navigate these without having to deviate from their course nor interrupt their momentum. It is recommended that 1.2 metres clearance should be provided between the kerb edge and a speed cushion to allow sufficient clearance for cyclists. (See DfT Manual for Streets for further information).

#### 2. Visual narrowing

Visual narrowing is intended to encourage slower motor speeds. This can be achieved through design in the following ways:

**Creating a central reservation** - Narrow the perceived road width to between 2 and 2.5m by adding a low median strip in paint down the centre of an access road. This creates a large, flush central reservation that helps to visually reduce carriageway width and can also act as an informal pedestrian crossing. This option would also provide flexibility by allowing the occasional run over by larger vehicles.

**Removing the central white line** - a general traffic lane of between 3.5m and 5m may be suitable. Two directional cycle lanes of 1.5m (refer to table 1 page 24) should be accommodated on either side of the general traffic lane.

#### 3. Contra-flow cycle lane

Contra flow cycle lanes are useful in ensuring a joined up cycle network, especially in areas such as town or village centres where motor traffic must adhere to a one way flow. Contra flow cycling can provide greater connectivity for cyclists and avoid breaks in the network







No entry except for cyclists' signs must be clearly visible at Protected Entry Points with continued signage on the route visible to all users; drivers, cyclists and pedestrians (refer to Page 37 for guidance on signage).

Mandatory cycle lanes (requiring a Traffic Regulation Order) are the preferred option, at a preferred minimum width of 2m. Advisory cycle lanes would be permitted if it is deemed more appropriate for the setting and dimensions of the road. Again, clear signage along the street must be displayed.

The use of signage alone may be sufficient to permit contraflow in some cases, where the traffic flow is very low. Parking bay design must be considered to ensure cyclists visibility is not obstructed.

#### Cycle lane bypasses

Cycle lane bypasses aim to prioritise the cyclists flow through traffic calming measures i.e. at pinch points.

The advised bypass lane width is 1.5m. The design should ensure that cyclists are not required to make sudden changes in direction, instantly merge with traffic, or be visually or physically obstructed by parked vehicles.

Bypasses require regular maintenance. The design should minimise the need for excessive maintenance through good drainage and be wide enough to allow mechanical sweepers to pass through



#### Key considerations

In the interests of maintaining momentum and ensuring the overall attractiveness of cycling, the cyclist must not be impeded by these traffic calming measures.

#### **Expectations for South Gloucestershire**

- Centre lines should be removed (where appropriate and safe to do so) to reduce traffic speed and allow advisory cycle lanes to be introduced on the carriageway. Reference should be made to Sustrans 'Principles and Processes for Cycle Friendly Design (2014).
- Traffic calming measures for motor vehicles are desirable where speed and traffic flow through an area require regulating. A 1.5 - 2m advisory cycle lane bypass should be provided on either side of the road. These should be regularly maintained and swept of debris and the design must prevent water pooling.
- Main routes with restricted one-way access to trip attractors should introduce contra-flow lanes with a width of 1.5 to 2 metres. Sustrans 'Handbook for Cycle Friendly Design' must be referenced in this case.

For additional support on the design and implementation of on shared use lanes please refer to:

- 1. Manual for Streets, DfT, 2007
- 2. Principles and Processes for Cycle Friendly Design, Sustrans, 2014
- 3. Handbook for Cycle Friendly Design, Sustrans, 2014

### Vehicle Restricted Areas

Vehicle Restricted Areas (VRA's) are typically found in more urban environments and can help to provide more direct routes between parts of town or offer access to shops.

Decisions must be made on a case-by-case basis as to whether the area under consideration for restriction should also consider permitting traffic flows. If any vehicle access is to be permitted, it may necessary to denote a vehicle track at grade level - design guidance for any VRA is that it should be of one grade.





Cycle access within all VRA's ideally should be formally permitted; restricted only when very busy. Temporary Traffic Orders may be trialled with different time restrictions put in place to determine when it would be necessary to permit or restrict cyclist access down the street. (DfT, *'Local Transport Note 2/08*, 2008)

These principles can also apply to minor access roads where there may be a need to close 'rat runs', or to residential streets, where motorised vehicles may need to be treated as guests in a space where cyclists and pedestrians have priority. 'Shared space' principles may be applicable here (CTC).

#### Key considerations

To cater for those with mobility issues, any VRA should be of one grade. Attention must be paid towards the location and type of tactile paving to help those with visual impairments to orientate around the space.

#### **Expectations for South Gloucestershire**

Segregation from vehicles can be successfully implemented on a main routes and local routes where practical and necessary.

For additional support on the design and implementation of on shared use lanes please refer to:

- 1. Local Transport Note 2/08, DfT, 2008
- 2. Space for Cycling, CTC, 2014

#### Junctions, crossings and grade separation

Junctions and crossings are often perceived as a major deterrent to future participation in cycling. The success of a cycle network will depend, to a large extent, on the prioritisation of cyclists at these points by using a host of small and larger scale interventions.

High quality, well-designed junctions can reduce collisions between road users and create easy decision making environments for cyclists.

There is a range of interventions and examples of best practise from Northern Europe on how to design cycle friendly road junctions. Cambridge Cycle Campaign, inspired by those examples, have complied a straight forward set of criteria that junctions should perform on strategic routes and main streets.

- Maintaining user separation through road junctions
- Reducing the likelihood of interactions with motorised or pedestrian traffic
- Ensuring excellent visibility at crossing points
- Avoiding piecemeal links and multiple stop-start manoeuvres.
- Reducing traffic speeds through junctions

These points provide the key features that junctions should provide in a cycle  $\,^{-\!1}$ 

network. However it is important to consider the individual circumstances and surroundings when retrofitting junctions. Sustrans, the Department for Transport and the Design Guidance Active Travel (Wales) Act 2013 as well as the CIHT, provide valuable insights into the possible approaches to junction design.

### A. Visibility

The DfT's *Manual for Streets* (2007) makes three clear recommendations for appropriate and realistic distances on the approach to joining another street:

- 1. 4 metres is a preferred distance; providing a good view of oncoming vehicles.
- 2. 2 metres recommended as minimum standard.
- 3. Exiting smaller and narrower streets were geometry is tight, may result in a limited visibility of 1 metre, realistically.

Reducing the radii at strategic and main road junctions, will help to enhance visibility at junctions. To reduce vehicle speed on entrance to a street, side road treatment is also recommended. If practical or feasible, cycle paths / tracks can also be set back to improve visibility.

### B. Cycle Refuge

Classified roads require a central refuge point when the number of lanes exceeds one in both directions or if traffic speeds and volumes exceed a certain threshold. Cambridge Cycle Campaign suggests a refuge length of 2.4 metres between traffic lanes. This may be expanded depending on cycle flow and vehicular traffic flow respectively. Right hand turns requiring refuge 'boxes' must be clearly demarcated and with a minimum width of 1.5 metres. This also depends on road dimensions with more space being provided through a reduction in lane diameter to 3 metres.

#### C. Advanced Stop Line (ASL)

Sustrans 'Handbook for Cycle Friendly Design' (2014) provides clarity to designers over the desired width requirements, by suggesting that Advanced Stop Lines should be provided at key junctions including the provision of central and nearside feeder lanes to give cyclists priority. A 1.5 metre clearance should be provided (1.2 at absolute minimum) on the feeder lane and 5 - 7.5 metres in the advanced stop box (coloured to help identify). Full segregation from vehicles in the feeder lane may be implemented at busier / main junctions.



The type of design approach will depend on the existing dimensions of the road. Road widths of 7.3 metres featuring two lanes of 3 and 2.8 metres would allow a nearside feeder lane of 1.5 metres. Smaller roads (5 metres) should persist with just a single, wide lane for vehicles of 3.5 metres and allow a feeder lane.

#### **D. Raised Junctions**

Raised Junctions, as a conventional traffic calming measure, can help mitigate traffic speeds on approach to a residential street. This may be suitable when retrofitting a street with excessive forward visibility, such as



long straight roads, or to erect an informal pedestrian crossing point. This measure could be attractively designed and would complement tighter radii and narrower carriageways at street entrances. It is important to ensure that this measure would be flush to enable a smooth transition.

#### E. Grade Separation

Depending on the situation, grade separation may be necessary to provide sufficient levels of safety for cyclists. Excavating beneath a carriageway or constructing a cycle friendly bridge are expensive infrastructure investments so consideration must be given to more cost efficient means of continuing routes. The CTC guidance is in favour of grade separation providing that it is sympathetic to cyclists needs.

Bridge design must be carefully considered to ensure ease of use for cyclists and pedestrians. As with all cycle routes a gradual incline or gradient of 3% is desirable complete with guard-rails (parapets) reaching a recommended height for cyclists of 1.4 metres.

Shared use bridges should enable sufficient passing clearances of 3.5 metres at least with 4 metres recommended by Sustrans to enable safe and comfortable passage. Road bridges with confined space and which may require shared pathways should be 3 metres for two way traffic or 2 metres for one way traffic pedestrians and cyclists. Narrowing the carriageway may help to provide sufficient width whilst also helping reduce vehicle speeds.

Segregated subway sections should feature a standard 2.5 metre cycle track and a 2.0 metre footpath with a 0.5 metre margin adjacent to the former to allow sufficient clearance from the wall. The height of the subway is a vital consideration with Sustrans recommending a suitable clearance of 2.7 metres from the cycle track and 2.6 metres from the footpath. Unsegregated subways, depending on their use and function, should be between 3 and 4 metres in width and 2.7 metres in height.

#### F. Crossings

Cycle crossings are an important element in traversing the road network and allowing quick, convenient and safe passage from trip origin to destination. Sustrans have compiled a useful guide towards selecting the most appropriate cycle crossing to introduce in different scenarios. It is again important to reiterate that crossing type should be assessed on a case-by-case basis.





| 85th Percentile Speed | Traffic Flow (Two Way Daily) | Type of Crossing  |
|-----------------------|------------------------------|---|
| <30mph                | < 2,000                      | Cyclists have priority at side road - raised crossing         |
| <30mph                | < 4,000                      | Cyclists have priority mid link - raised crossing             |
| <50mph                | < 6,000                      | Cyclists give way to road traffic (no refuge)                 |
| <35mph                | < 8,000                      | Zebra crossing shared with cyclists                           |
| <50mph                | < 8,000                      | Cyclists give way to road traffic plus central refuge (urban) |

| 85th Percentile Speed | Traffic Flow (Two Way Daily) | Type of Crossing   |
|-----------------------|------------------------------|--|
| <60mph                | < 10,000                     | Cyclist give way to road traffic plus central stage refuge (rural) |
| <50mph                | > 8,000                      | Signal controlled included Toucans                                 |
| >50mph                | > 8,000                      | Grade separated crossing (urban)                                   |
| >60mph                | >10,000                      | Grade separated crossing (rural)                                   |

For additional support on the design and implementation of on shared use lanes please refer to:

- 1. Handbook for Cycle Friendly Design, Sustrans, 2014
- 2. TIN12: Side Road Crossings, Sustrans, 2011
- 3. TIN17: Cyclists' Use of Zebra Crossings, Sustrans, 2011
- 4. TIN18: Toucan Crossings, Sustrans, 2011
- 5. Manual for Streets, DfT, 2007

### Roundabouts

Roundabouts are likely to be present at all hierarchy levels and often can become a barrier for the less experienced cyclist. Large conventional roundabouts pose problems for cyclists so various options should be considered depending on local context and the type of connecting routes. Sustrans and DfT have increasingly given preference to continental design roundabouts, as a more suitable design type for cyclists.

| Type of roundabout                      | Impact for cyclists   | Considerations   | Guidance   |
|---|---|--|--|
| Large roundabouts                       | Can pose problems<br>for cyclists   | <ul> <li>Re-design to<br/>compact/continental<br/>design</li> <li>Replace roundabout with<br/>traffic signals</li> <li>Provide segregated cycle<br/>tracks with Toucan or<br/>Zebra crossings of busy<br/>arms, or cycle priority<br/>crossings/raised tables</li> <li>Signal control of the<br/>roundabout</li> <li>Shared space solutions</li> <li>Note: Cycle lanes on the<br/>circulatory carriageway<br/>should be avoided</li> </ul> | Sustrans Handbook<br>for Cycle Friendly<br>Design (2014)   |
| Compact /<br>continental<br>roundabouts | Allows cyclists to<br>remain on road. Also<br>caters for<br>pedestrians or less<br>confident cyclists<br>with zebra<br>crossings. | <ul> <li>Perpendicular approach<br/>and exit arms</li> <li>Single lane approaches,<br/>4m</li> <li>Single lane exits, 4-5m</li> <li>External diameter (ICD)<br/>25-35m</li> <li>Island diameter (including<br/>overrun area) 16-25m</li> <li>Circulatory carriageway<br/>5-7m</li> <li>Single circulatory lane</li> </ul>  | Sustrans Handbook<br>for Cycle Friendly<br>Design (2014). See<br>Seven Dials<br>Roundabout, Brighton<br>for inspiration. |

| Mini roundabouts                                      | Low speeds and<br>single file traffic<br>provide good<br>environment for<br>cyclists  | <ul> <li>Roundabout capacity<br/>approx. 25,000 vehicles<br/>per day, consideration<br/>should be given to other<br/>options for cyclist where<br/>flows would exceed<br/>10,000 vehicles per day</li> <li>Single lane approach</li> <li>Domed central roundel</li> <li>Deflection of traffic</li> <li>Consider speed table</li> <li>Consider deflector islands</li> </ul>  | Sustrans Handbook<br>for Cycle Friendly<br>Design (2014)  |
|---|---|---|---|
| Informal<br>roundabouts /<br>shared space<br>solution | Low speeds and an<br>element of<br>uncertainty for<br>drivers should<br>provide cyclists and<br>pedestrians a more<br>welcoming<br>environment to<br>navigate through | <ul> <li>Existing traffic signal control replaced</li> <li>Strongly defined arrangement of footways and carriageway with a design based on shared space principles</li> <li>Paving materials and low kerbs used to define the areas for traffic circulation as a guide for drivers and other users,</li> <li>Physical clues are subtle and also emphasise the pedestrian desire lines through the space.</li> </ul> | Sustrans Handbook<br>for Cycle Friendly<br>Design (2014). See<br>Poynton Shared<br>Space for inspiration. |

### **Expectations for South Gloucestershire**

1. Any new roundabout planned within South Gloucestershire will take cyclists into consideration as part of its design.

2. Any changes to existing roundabouts undertaken by the Council will seek to improve the safety for cyclists.

# **Design Specifics**

### Cycle Parking

Cycle Parking is an integral component of a successful cycling network and a pre-requisite to normalising cycling as an everyday mode of transport for large numbers of the population. Creating space for cycle parking is an efficient use of available land. Comparatively large spaces are required for car parking. There are numerous factors that must be considered in the process of deciding the type, location and setting of cycle parking.

The Design Guidance Active Travel (Wales) Act 2013 (2014) suggests five broad location categories for deploying cycle parking which can be defined as:

- Retail Areas
- Employment Centres (Workplaces)
- Leisure Facilities
- Public Institutions
- Residential Neighbourhoods
- Transport Interchanges

#### Type of cycle parking

There is a great array of cycle parking design but the most commonly adopted is the Sheffield Stand (see dimensions opposite). Overhead shelters are a valuable investment where cycles are left for a prolonged period during the day. Sustrans 'Cycle Parking' document (2014), provides an effective diagram for illustrating the key attributes of the Sheffield Stand and its relatively simple design. Sustrans advise that stands should be embedded into the ground rather than bolted for security and stability or if they are part of a Toast Rack, stands should be welded to steel runners.

Image source: Sustrans Handbook for cycle friendly design (2014)



There are several key requirements that cycle parking should perform. The following table captures the most desirable parking attributes.

| Key Feature   | Description and Recommendation   | Guidance Material   |
|---------------|--|---|
| Accessibility | In line with the key principles of a successful cycle network, cycle parking   | Sustrans 'Cycle   |
|               | must be quick and convenient to access and stationed adjacent to building  | Parking' Draft (2014)                                     |
|               | recommended maximum distance from an entrance, as quoted by<br>Cambridge Cycle Campaign, is 50m, with parking facilities being located at<br>grade level or via a ramped entrance. Failure to provide this may result in<br>informal parking in more convenient locations and would affect the quality<br>and ease of access for disabled individuals. | Cambridge Cycle<br>Campaign' Space for<br>Cycling' (2014) |
| Security      | There must be sufficient levels of natural surveillance and 'eyes on the street' to mitigate bicycle thefts and the cycle parking must allow bicycles to be attached securely. Motion detector lights should be considered to improve visibility during the darker hours.  | DfT 'Manual for Streets<br>(2014)                         |

| Durabilit             | Cycle Parking design must be resilient to continuous use and adverse<br>weather conditions. Whilst lighting should also be provided and operational<br>during dark hours. It may be necessary to provide paid cycle facilities or to<br>collaborate with stakeholders to establish a secure bicycle facility where<br>there are high levels of cycling. This may manifest as a 'cycle hub'.   | Greater Manchester<br>Cycling design<br>Guidance (2014)  |
|-----------------------|---|--|
| Sufficien<br>Quantity | t There should be plentiful opportunities for individuals to park their bicycles<br>at large and small trip attractors. The provision available should meet<br>current and future demand. It is vital to ensure that overall capacity includes<br>space for visitors alongside the predicted amount of provision required on<br>a daily basis. It is recommended by Cambridge Cycle Campaign that the<br>number of cycle parking spaces is equal or exceeds the number of parking<br>spaces provided for motorists throughout a new and existing development  | Sustrans 'Cycle<br>Parking' Draft (2014)<br>Cambridge Cycle<br>Campaign' Space for<br>Cycling' (2014)  |
| Appropri<br>Siting    | <ul> <li>The location of cycle parking is important to maximise available capacity and to avoid any obstructions to pedestrians, particularly those with visual impairments. The aim should be to seamlessly integrate cycle parking into the immediate environment and for them to contribute towards the sense of place. A perpendicular cycle parking layout should be selected where there is a limited flow of pedestrians. On pavements or in areas where there is minimal space, cycle parking should be parallel to the kerb. The dimensions are as follows:</li> <li>Perpendicular - One metre spacing between stands and also from stand centre line to building edge for cycle parking against building frontage.</li> <li>Along Kerb - 2.5 metre spacing between stands and minimum 90cm distance to kerb edge and 1.8 metre gap to building frontage (accounting for pedestrian movement).</li> <li>Site locations for cycle parking vary depending on the context of the place but are generally either on the:</li> <li>Footway - Located in a pragmatic location which does not cause an obstructions to pedestrians.</li> <li><u>Off-Street</u> - In prominent locations and in close proximity to major entrances on site.</li> <li><u>Carriageway</u> - Carefully reallocating road space by removing car parking bays or utilising central reservations.</li> </ul> | TfL 'Workplace Cycle<br>Parking Guide (2006)<br>Sustrans 'Cycle<br>Parking' Draft (2014)<br>Sustrans 'Designing<br>Cycle Friendly<br>Infrastructure' (2014)<br>Cambridge Cycle<br>Campaign' Space for<br>Cycling' (2014) |
|                       | Manual for Streets states that eight bicycles can utilise the space occupied<br>by a motor vehicle with one metre intervals between a rack of stands to<br>allow sufficient access to easily park or collect bicycles.  |  |

#### **Expectations within South Gloucestershire**

Cycle parking is a major consideration in the process of designing a cycle network and has a significant impact on individual willingness to adopt the bicycle for short urban trips. Care and attention must be paid towards providing the correct type of cycle parking in the right location to maximise usage.

- It is recommended that cycle parking provision goes beyond the accepted minimum standard to make cycling a more attractive proposition for short urban journeys. Providing a mix of Sheffield stands in addition to sheltered facilities would be ideal for workplaces and at key trip attractors.
- Clusters of organisations across the Northern Fringe, could be encouraged to collectively invest in either individual or shared dedicated cycle parking facilities (i.e. Cycle Hub) for employees and seek financial assistance through business grants.

#### Please reference the following documents:

- 1. Cycling Infrastructure Design, LTN 2/08/, DfT 2008
- 2. Manual for Streets 2, CIHT 2008

Handbook for cycle friendly design, Sustrans, 2014

### Cycle Lighting

Suitable cycle route lighting is a crucial, yet underestimated element of designing a cycle network. This should be an integral part of the street and carriageway layout from the initial design phases and can be retrofitted to improve existing routes where necessary.

Generally, most urban roads and many rural highways will already be illuminated by existing lighting measures with cycle routes benefiting from overspill lighting. However the following routes will require differing levels and types of lighting:

- Urban Routes
- Off Road / Canal Paths
- Subways

Urban cycle routes have often fallen victim to inconsiderate lighting arrangements where lighting columns, have directly impeded on the fluidity and width of a cycle route. Whilst it is recommended that key commuter links are well lit at regular intervals, opportunities to co-ordinate items onto a single pole to reduce street clutter. This could mean installing inconspicuous units to buildings. DfT's *Manual for Streets (2007)* also suggests that the height of street lighting should be appropriate to the cross section of the street and conform to the human scale.

Canal Paths and Off Road cycle routes will almost always require specific lighting but consideration must be given to a variety of key factors. Limiting light pollution, the level of ambient brightness and the extent to which the lighting equipment impedes and intrudes on nearby properties, are defining issues. This is in conjunction with potential vandalism issues and practical problems associated with installing, operating and maintaining route lighting. The increased focus on reducing carbon emissions and energy consumption means lighting levels do not need to be constant during hours of darkness. Energy efficient or solar lighting solutions should be utilised where possible.

Subway lighting must be constant and vandal resistant to ensure maximum visibility for cyclists and pedestrians at all times.

There is scope to be inventive with lighting on off road cycle routes, however, road safety must be considered as part of any lighting proposals.

#### **Expectation within South Gloucestershire**

- Lighting should be considered a major element in the design of successful streets that facilitate cycling during hours of darkness and which contribute towards the quality of the public realm in urban areas. Designs should be based on case by case analysis of the respective cycle route and its characteristics, considering the use, location, and capacity to install or retrofit existing lighting infrastructure.
- To avoid unnecessary street clutter, thought must be given to the strategic location of lighting on urban roads with a focus on overspill lighting from the road side reducing the need for instalation of additional lampposts to avoid putting pressure on the maintenance plan.
- It will be important or prioritise lighting on cycle routes identified as strategic or major within the Strategy document.
- Energy efficient solutions should be considered.

#### Please reference the following guidance:

1. Sustrans' Technical Information Notes (TINs)

- Tin29: Lighting of Cycle Paths, 2012





### Cycle Signage

Cycle-specific signage has numerous positive implications ranging from enforcing considerate driving and lane discipline, for all road uses, and helping to publicise the presence of cyclists and recommended cycle routes. This is particularly relevant in promoting and facilitating cycling across the network, including linkages with key destinations in South Gloucestershire.

Cycling specific signage should be:

- High Quality
- Coherent
- Consistent
- Frequent
- Well Maintained
- Appropriate

As well the above list, the following must be considered:

Minimise street clutter - Balance between sufficient signage and visual clutter. Excessive signage may also be a potential maintenance liability. DfT *Manual for Streets* (2007)

Surface markings - Designers should consider whether surface markings are more practical and applicable in certain situations than mounted signage.

Information - Directional signage displaying direction, destination and time (distance) should be integral to all signage design, including non-standard or temporary signs.

Visibility - The Traffic Signs Manual does suggest that signage for cyclists should be between 2.1 and 2.3 metres above carriageway level to maximise their visibility to cyclists horizontal and linear visual plane and to provide sufficient head clearance.

Continuation of routes - Design Guidance Active Travel (Wales) Act 2013 advises that 'Cyclist Dismount' and 'End of Route' signs are counterproductive and disruptive. These signs should be replaced by directional signage stating how a route continues or how other parts of the network can be accessed.

Priority – Cycle routes that allow priority for cyclists over motor vehicles at side roads and junctions must also allow clear visibility in order to improve the safety of routes for ages 8-80.

Shared use - The traditional cycle sign with a white bicycle on a blue background should continue to be employed to distinguish bicycle routes with the same palette appropriate for cycle routes shared with either pedestrians or buses / taxis.

#### **Coloured surfaces**

Coloured surfaces also provide an opportunity to assist with way-finding and to provide greater clarity but should only be applied sparingly in certain circumstances or situations. Colour should only be utilised in some circumstances where the cyclists require additional exposure and recognition. The DfT suggests that coloured cycle infrastructure, which in South Gloucestershire will usually be Green, and be confined to the following:

- Advanced Stop Lines and their feeder lanes
- Contra Flow Lanes





- Cycle Lanes Adjacent to Parking Allocations
- Junctions Dependant on Cyclist Manoeuvrability
- Potentially Vulnerable Cycling Locations i.e. Pinch Points
- Two Way Cycle Lanes

Surface markings and coloured surfaces have a limited lifespan. Future maintenance costs should be taken into consideration when selecting materials.

Reference should also be made to DfT's 'Signing the Way' (2011) document for attaining 'best practice' standards.

#### **Expectations within South Gloucestershire**

- High quality, but appropriate types and levels of signage which is sympathetic to the local environment.
- Signage should be placed in the most logical and obvious locations to reduce the need for additional wayfinding features en-route.
- All 'End of Route' and 'Cyclist Dismount' signs should be reviewed with the intention to remove and
  replace them if necessary with more positive and useful signs to help people complete their respective
  journeys.
- Reduction and or prevention of street clutter must be considered.
- Overall, reduce the need for vertical signage and allow the built environment, in central areas, to help dictate direction through textured surfaces, attractive and innovative way finding materials.

#### Please reference the following documents:

- 1. Signing the Way, DfT, 2011
- 2. Traffic Signs Regulations and General Directions, HMSO 2002
- 3. Traffic Signs (Amendment) (No2) Regulations and General Directions, HMSO 2011
- 4. Sustrans' Technical Information Notes (TINs)
  - Tin05: Cycle Network Signing, 2013
  - Tin27: National Cycle Network Signing and Route Branding, 2012