Midland Metro
Wolverhampton City Centre Metro
Extension Cycling Strategy
Midland Metro Wolverhampton City Centre Extension

Cycling Strategy

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1 Introduction

This report sets out details of the work that has been undertaken to develop a strategy to accommodate and support cycling in the vicinity of the Midland Metro Wolverhampton City Centre Extension (WCCE). The overall strategy, and the subsequent routes that are proposed, are based on the analysis of cycling activity, the interaction of cycling and other road users and the realistic options of infrastructure provision.

WCCE is proposed as part of a long term plan for network expansion of Midland Metro and to support major regeneration within the city centre. The extension would bring significant transport improvements and help regenerate the heart of the Black Country. It aims to provide a direct tram link between the existing tram route in Bilston Street, the bus station in Piper’s Row and the railway station and canal side area. The alignment could be extended to New Cross Hospital as part of the SW’s route from Wolverhampton - Wednesfield - Willenhall - Walsall - Wednesbury.

Official UK Government figures of casualties on the roads suggest that cycling fatalities and serious injuries in 2012 hit a five-year high on Britain’s roads. According to “The Times”, this reflects the boom in cycling among people of all ages and backgrounds. The proposal of new cycling routes in Wolverhampton and the subsequent network modifications that are proposed in this strategy intend to prioritise road safety of cyclists and generally of all road users and as far as practical to prevent cycling casualties. No fatalities due to tram and cycling interactions have been recorded in Wolverhampton.

1.1 Methodology

In developing this strategy, the following methodology has been adopted:

- Review of literature, technical documentation, relevant online sources for various existing tram networks and previous design work for the Midland Metro.
- Review of current proposals for the Wolverhampton Interchange Project (WIP).
- Review of current cycling facilities including a video survey of local routes that was undertaken in 2009.
- Identification of possible future cycling routes in the vicinity of the WCCE.
- Identification of possible issues arising from interactions between cycles and trams, and options for resolving these
- Recommendation of an overall strategy.

The strategy is set out in sections to reflect this methodology.
2 Literature Review

The literature review has referenced a range of technical information, local and national strategy documents, previous work, proposals for local developments and other relevant articles. The most relevant items drawn from this review are summarised as follows.

2.1 Policy and Guidance Review

2.1.1 The Interaction of Cyclists and Rapid Transit Systems (MVA for DETR, June 1998)

This report was completed between 1996 and 1998 to provide guidance on safely accommodating cyclists and light rail systems and also to investigate the potential to combine both cycling and rapid transit in a highway environment.

The report examined the three tram systems in operation at that time, in Sheffield, Manchester and Blackpool. The main research activities included surveys of passenger and cyclists’ experiences and views, video surveys to gain first hand data at key locations, reviews of Stats19 and anecdotal accident data and reviews of proposed schemes.

Overall, the report notes that achieving statistically significant results was difficult due to the limited number of sites available for investigation, poor response rates for many surveys and insufficient data on accidents and experiences to calculate trends. However, the report did manage to gather sufficient information via a variety of methods to conclude:

“The main difficulties experienced by cyclists … relate to the track. There are real and perceived possibilities of a wheel getting trapped in the flange groove. Problems appear to arise regardless of tyre thickness. A fatal accident in Sheffield was attributed to a trapped wheel. Even an un-trapped wheel guided by the flange groove destroys gyroscopic action and the rider, as a result, may fall off. However, cyclists groups expressed the view that this was a significant problem only when combined with pressure from other traffic”.

The report also reaches secondary conclusions:

- That the low levels of cycle-tram interaction meant that there were no reported cycle-tram collisions but that trends in other European countries showed that increased exposure to conflict situations increases the interaction and risk.
- That statements and policies with regard to cycling and cycle-tram interactions are not backed up by firm or proven solutions.
- That filling of the flange groove on tram tracks is not practicable.
- That there is a problem with the under-reporting of cycle accidents.
- That where trams share road space with other vehicles, cycling close to or between the tracks is an acceptable practice.
- That unless a tram-only route is ballasted, it is very likely that cyclists will continue to use it, especially if no adequate parallel route is available.

The guidance goes on to include recommended layouts, in particular demonstrating ways in which cyclists can be safely guided around tram stops.

As regards inter-linking of modes, the report concludes:

- That no UK Light Rapid Transit (LRT) systems permit the carriage of cycles.
- That the provision of cycle parking facilities at tram stops may help to promote use of cycles as an access mode, although these must be high quality, secure and free of charges. This offers potential to significantly increase use of an LRT system, especially when accompanied by local highway facilities for cyclists.
2.1.2 Cycle Friendly Infrastructure - Guidelines for Planning and Design (CTC 1996)

The guidance sets out options for designing effective infrastructure generally.

It goes on to discuss safety concerns, specifically:

- That priority can be given to both trams and cycles through sensitive design.
- That there are concerns over wheel-trapping and crowding on narrow routes.
- A preference for a low kerb between cycle routes and tram tracks or different surfacing.
- A safe clearance (in excess of 1m) between trams and the kerb should be used.
- That where cyclists cross tram tracks, these crossings should be as close to right angles as possible.

2.1.3 Guidance on Tramways - Railway Safety Publication 2 (Office of the Rail Regulator, 2006)

This technical guidance sets out recommendations and requirements for tramway design, including the following requirements in relation to cyclists:

- Where a tram cannot pass a cyclist safely on the carriageway, provision should be made for cyclists where reasonably practicable, either a separate cycle lane, by providing an alternative direct route or by providing a one-way cycle lane within the carriageway.
- Care should be taken to avoid pinch points with cycle lanes along the route, and where roadside platforms are provided.
- Where cycle lanes cannot be provided, the clearance between rail and kerb should be a minimum of 1000mm, and consideration should be given to the removal of obstacles from that area, e.g. by the provision of drainage incorporated into the kerbs. This clearance is intended to provide a clear route for cyclists in the absence of trams and, combined with the removal of obstacles from that area, reduces the likelihood of sudden movements by cyclists towards the tramway. It is not intended to provide clearances for trams to pass cyclists.

![Figure 2.1: Clearances between tramway and cycle lane](Guidance on Tramways - Railway Safety Publication 2 2006, Office of the Rail Regulator, Figure 1)
• To avoid the risks from unauthorised parking of vehicles fouling the DKE, the width of the cycle lane (between the kerb and the nearest edge of the line shown in the appropriate diagram of the Traffic Signs Regulations and General Directions 2002) should not be greater than 1000mm and the edge of the line nearest to the tram track should be at least 200mm from the DKE (as shown in Figure 2.1).

• Where it is necessary for cycle lanes to cross tram tracks, these intersections should be, as far as possible, at right angles to the tracks. Where the achieved crossing angle is less than 60°, consideration should be given to alternative crossing layouts and other measures that mitigate the risks faced by cyclists. Consideration should be given to measures that raise awareness of the presence of rails in the carriageway such as signage or use of texture.

2.1.4 Trams and Bikes: Towards Good Practice in Light Rail Planning (Chris Wood, TransPlan)

Chris Wood’s paper is one of a number produced in the mid-1990’s exploring the issues of cycle-tram interaction. The paper reviews existing studies and concludes with a number of key points of good practice.

Particular relevance is accorded to the following items:

• Gutter running must be avoided. At normal speeds 2m between the kerb and DKE is required. At low speeds widths down to 1m may be adequate provided the first 0.5m of footway is clear of obstructions. Providing narrow cycle lanes does not prevent cars parking at the kerb in the long term (they soon realise that trams will not smash their vehicles out of the road).

• Street tracks should be positioned to allow cyclists to cross at angles over 45°.

• It is desirable to provide easy, safe and secure pedal cycle access to stops and stations.

• All light rail stops should be provided with secure cycle parking facilities.

• Publicity material must view cyclists as adults and legitimate road users. It should seek to encourage cycling as an even more environment-friendly mode than light rail and attempt to win car drivers over to combinations of bike/tram, not to win cyclists over to pure tram use.

2.1.5 Cycling Strategy for Wolverhampton (Wolverhampton City Council, August 2005)

The second cycling strategy for Wolverhampton sets out Wolverhampton City Council’s (WCC) priorities and policy, from 2005 onwards, as regards encouraging increased use of cycles in the city and is still applied in the city. The following items are pertinent to the WCCE scheme:

Priority 1 - Provide cycle routes and secure parking to encourage cycling for:
• School
• Work
• Shopping
• Health centres
• Bus station, Metro stops and railway stations

Policy C2 - All highway and major development schemes will be subject to a cycle audit to ensure that schemes provide and improve facilities for cyclists. The Institution of Highways and Transportation Cycle Review guidelines and current best practice will inform this audit.

Policy C3 IV - The preferred order for consideration to make the city’s highways and infrastructure cycle friendly is traffic reduction, traffic calming, junction treatment, and traffic management. Redistribution of the carriageway and lastly cycle lanes and cycle paths will be considered. Shortcuts and contra-flow lanes for cyclists will only be installed where they are safe for all road users.
Policy C5 - WCC will seek to expand the provision of secure cycle parking provision and other facilities for cyclists in the following locations:

a) Wolverhampton City Centre shopping area
b) Bus station, railway station and Metro stops, including new facilities within the interchange development and any extensions to Midland Metro

Policy C6 - The needs of cyclists will be taken into account in all road improvements, traffic management, traffic enforcement and bus priority schemes. Cyclists will, wherever possible and safe, be exempt from road closures.

2.1.6 Black Country Core Strategy (Dudley Metropolitan Borough Council, Sandwell Metropolitan Borough Council, Walsall Metropolitan Borough Council and Wolverhampton City Council, February 2011)

The Black Country Core Strategy (BCCS) forms the basis of the Black Country authorities’ local development plans. Policy TRAN 4 of the BCCS, Creating Coherent Networks for Cycling and for Walking, outlines clearly the objectives of the four local authorities to promote sustainable transport.

Spatial objectives:
The development of sustainable modes and encouraging people out of their cars, particularly for short and commuter journeys, is critical. Places need to be connected with attractive, convenient, direct and safe routes available to users and providing real choice.

Policies:
- Joint working between the four local authorities will ensure that the Black Country has a comprehensive cycle network based on integrating the four local cycle networks, including common cycle infrastructure standards.
- Sustainable transport requires new developments to link the existing walking and cycling networks. The links should be safe, direct and not impeded by infrastructure provided for other forms of transport. Where possible, existing links including the canal side should be enhanced and the networks extended to serve new developments. New developments should have good walking and cycling links to public transport nodes and interchanges.
- Cycle parking facilities should be provided at all new developments and should be located in a convenient location with good natural surveillance, e.g. in close proximity of main front entrances for short stay visitors or under shelter for long stay visitors.

Justifications:
- The development of walking and cycling facilities are an integral part of the transport system, both on the highway network, canal corridors, public rights of way and on other paths. Comprehensive cycle and walking networks within the Black Country will enable communities to access employment, public transport interchanges, services and facilities in a sustainable way. Identifying and overcoming barriers to walking and cycling during development processes will encourage a renaissance of walking and cycling within the Black Country and help improve the health and the well-being of local communities. According to “The British Cycling Economy” every cyclist benefits from £230 annually to the UK economy due to health considerations, reduction of congestion, lower pollution levels and other factors.
- Walking and cycling strategies are incorporated within the West Midlands Local Transport Plan (LTP3) that documents the transport strategy and policies for the Metropolitan Area from 1st April 2011 until 2026.
- In order to achieve a coherent Black Country cycle network, the four local authorities have agreed to follow common cycle infrastructure design standards by adhering to Department for Transport publication ‘Local Transport Note 2/08 Cycle Infrastructure Design’. 
2.1.7 Review of the Wolverhampton Cycle Strategy (Wolverhampton City Council, March 2013)

The review provides comments and feedback with regard to the existing cycling strategy for Wolverhampton and explores more recent issues to help develop an updated strategy.

The document thoroughly deals with the ways that cycling supports the Wolverhampton City Council Corporate Plan:

- **Encouraging Enterprise and Business** - modal shift from private car to bicycle can support businesses by reducing road traffic, so making journey times more reliable, and by creating a healthier work force.
- **Empowering people and communities** - cycle training and promotion can give disadvantaged children and adults the confidence and opportunity to seek new social, educational and work-related challenges.
- **Re-invigorating the city** - new cycle routes can be a catalyst for the creation of more accessible and attractive neighbourhoods.

Additionally the document highlights:

- The investments to date and planned further investments in Wolverhampton City Centre (cycle parking being investigated at the new rail station, cycleway proposed alongside Metro on Railway Drive and contra-flow lanes being constructed in the city centre) and in i54 Enterprise Zone.
- The partnership working of many years to deliver cycling infrastructure, training and promotion and to develop policy.
- The benefits of cycling are recognised by many people and the Council seeks to overcome negative perceptions of cycling through a range of training activities that focuses mainly on children, but on adults too.

Regarding the revised Cycle Strategy for Wolverhampton, the documents deals with:

- The studies and schemes that have been implemented in Britain and have taken forward-thinking about cycling.
- Key concepts and design principles to promote cycling.
- The “Hub and Spoke” Concept - The physical layout of Wolverhampton lends itself to the development of a radial network of cycle routes joined up in the city centre and linked by an outer orbital route serving significant potential traffic generators such as Bilston, Wednesfield, New Cross Hospital, i54 and Tettenhall. Such a network would provide direct routes into the major destination of the city centre whilst also improving accessibility for trips within the suburbs that public transport finds uneconomic to serve.
- The Canal Network that offers traffic-free connectivity in Wolverhampton between significant trip generators such as the city centre, i54, Wednesfield/New Cross Hospital, Tettenhall and industry in south Wolverhampton.
- Promotion of cycling - consideration needs to be given to maintaining and enhancing the scope of cycling promotion activities. This may involve extending cyclist training to potential users of new cycling routes such as staff of businesses and other organisations located nearby. A revised cycle strategy for the city will allow a revision of the existing Wolverhampton cycling and walking map to show up-to-date route information. Digital media including the Council’s website can offer opportunities to showcase cycling opportunities as they arise.
2.1.8 Adjacent and Shared Use Facilities for Pedestrians and Cyclists (DfT guidance note LTN 2/04, 2004)

This Local Transport Note provides guidance on cycle routes within built-up areas. It recommends that the desirable minimum effective width of a shared-use footway should be 3m wide and the absolute minimum width as 2m wide. The desirable minimum width of a cycle only track is 2m with an absolute minimum of 1.5m. LTN 2/04 states “The minimum width should be considered as a starting point, with higher standards adopted if possible….. local conditions and opinion will need to be taken into account.”

To maintain an effective width the actual widths may need to be wider. Table 1 of LTN 2/04 recommends the following actual width increases in order to maintain the effective width:

- Add 200mm for a low up-stand up to 150mm (i.e. kerb);
- Add 250mm for a vertical feature up to 1200mm, (i.e. parapet).
2.2 Case Study Review

The interaction of cyclists and trams has been considered on other tram networks. Examples of considerations from UK tram systems in Edinburgh and Manchester along with international examples from Melbourne (Australia), Amsterdam (Holland) and Zurich (Switzerland) are detailed below.

2.2.1 Midland Metro Line 1
Midland Metro Line 1 between Birmingham and Wolverhampton was opened in 1999 and has been operational for 15 years. The majority of Line 1 runs off-street along a reinstated railway line, however there is a section of on-street running on the approach to Wolverhampton along Bilston Street. The tram runs with traffic along this section. There are no marked cycle facilities along this section, however the road is of sufficient width for trams to safely overtake cyclists. The DKE envelope is marked on carriageway, to give cyclists and vehicles waiting in the centre lane to turn right an indication of a safe area a safe carriageway area (see Figure 2.2).

![Figure 2.2: Midland Metro Line 1 – Bilston Road on St running showing DKE markings.](image)

2.2.2 Edinburgh Trams

Edinburgh Trams, in 2009, issued a leaflet that provides useful information for cyclists and their interaction with the tramlines. The considerations that are mentioned include; cyclists should avoid the tram path, cross the lines at angles as close to 90° as possible, be careful on wet tracks as they can be slippery, and prefer the designated track crossing points (see Figure 2.3). The picture in Figure 2.2 is obtained from the Cycle/Tram Interface leaflet.
Figure 2.3: Special features for cyclists, complementary road markings and correct way of crossing the tramlines as obtained from the Edinburgh Trams leaflet

According to the same leaflet, a study was commissioned for the Tram and Cycle Integration in Edinburgh, but the outcomes of the study have not yet been published.

The 2005 Tram Design Manual by the City of Edinburgh raises the following issues for the interaction of trams and cyclists; the maximisation of the integration of the tram system with pedestrians and cyclists should be a priority; the Network’s objective is to minimise restrictions on pedestrians and cyclists, improve and extend the cycling routes and provide appropriate cycling parking facilities at tram stops.

Following a number of cycling accidents caused by tram lines, according to the Herald in October 2013, Edinburgh City Council’s measures to minimise the incidents include a road safety audit and extra signs warning cyclists to use marked cycle routes and cross the tracks at 90°.

2.2.3 Manchester Metrolink

Metrolink has followed a similar strategy to that of Edinburgh and has also issued a leaflet for cyclists to inform them about interaction with trams. The leaflet is called “Looking Out For Your Safety - Important Information For Cyclists” and aims to inform cyclists in areas that trams have not been operating for long. The guidelines include general instructions about safety as a
cyclist; preferring riding in cycle lanes where possible, being careful in wet weather conditions, using clear hand movements to indicate their intentions, etc. The guidelines also include more specific information about how to cross the lines and encourage use of toucan crossings where possible as shown in Figure 2.4.

![Figure 2.4: Example of a toucan crossing as obtained from the Metrolink leaflet](image)

2.2.4 Melbourne

The Bicycle Network in Australia has dealt with cycle-tram interaction issues as well. Their findings in 2004 indicate that the two most common tram track crashes in Melbourne are:

- The front wheel sliding out from under you on the tracks
- One or both wheels getting caught in the tracks.

Their suggestions to minimise the chance of cycle wheels slipping on the tracks focus “on the cycling behaviour; cross the lines at right angles, stay off the brakes and move your weight back on the saddle. More specifically, when crossing tram tracks cyclists are advised to stay off the brakes, stop pedalling and move their weight back on the saddle while they “coast” over the tracks. In the case that bikers have to slow down, they are recommended to do so before and after crossing the tram tracks. They are additionally advised to stay off the front brakes because if the front wheel slips they will lose control of the bike and risk falling. Moving back on the saddle will also take some weight off the front wheel and reduce the chances of slipping. The same is suggested for acceleration. Hence, accelerating over tram tracks may cause slips.”

2.2.5 Amsterdam Harbour

According to the Dutch centre of expertise on bicycle policy, problems that are related to bicycle wheels being trapped in tram and train lines can be solved with a special technique that fills the grooves in the rails and allows cyclists to cross the lines in a more oblique direction. This technique was first applied in the Amsterdam harbour area. Despite the fact that passing trams flatten the rubbery material, leading to wear and tear, the material can be easily replaced. The solution has now been applied to all main tram-bicycle crossings in the Amsterdam harbour area.
2.2.6 Zurich

Following the Amsterdam example and according to the same source, Zurich will test the durability of the embedded rubber profile. The rubber profile will be implemented over a length of 90 metres at a stop that is being completely renovated. The product should be able to endure the tram’s load and the wear caused by the weather. Rubber profiles were previously utilised in Zürich but were replaced quickly due to wear and tear. Now a completely new rail profile has been developed, allowing more room for the rubber filling in such a way that the sharp edge of the tram wheel does not cut through it.
3 Existing Situation

Current cycle routes in Wolverhampton are promoted through the Wolverhampton Bike Map, published by WCC. Based on this map, each of the current routes in the city, along with links between the city centre and the main cycle facilities on the ring road were cycled and videoed in 2009 by AECOM. Furthermore, on the 17th and 20th January 2014 an updated visual and photographic report of the network was conducted. The recent inspection was not conducted on all the cycling routes as attention was paid to the network around the WCCE. Data was analysed and used to build up an overview of the existing cycling situation. It was expected that modifications would exist in the network between the two inspections, but no major differences were identified in the network.

The key findings of this assessment were that:

- There are several on-road routes that include non-specific cycle facilities, including NCN 81 along Lichfield Street and these routes are generally in good condition.
- The existing off-road routes are in good condition around the A4150/A41 Bilston Road Island.
- The off-section of NCN 81 at the canal side needs some maintenance; however this is outside the remit of WCCE and is not considered further in this report.

- Limited access streets and minor roads in the city centre generally keep day time traffic levels low inside the ring road.
- Route finding is difficult on the on-road routes due to a lack of signing designed to meet the needs of cyclists.
- The pedestrianised town centre means that cyclists need to dismount or park a significant distance from the main shopping and services area within the pedestrian zone providing a dis-benefit compared to access by car (there are car parks within the shopping centres in the pedestrian zone).
- The NCN 81 route through the town centre incurs an excessive deviation around the station and canal basin area, as can be identified in Appendix A. However this is outside the remit of the WCCE scheme to resolve and is not considered further.
- Market Street is the only street in Wolverhampton's identified shopping quarter in which cycling is still permitted.
- Particular attention is required to develop a practical and legible cycling layout that safely meets the needs of cyclists accessing the bus station and the train station from the west side, as there are only a small number of connection options with the rest of the cycling network.
- Cyclists were observed travelling on the pavements of Princess Street, Market Street and Bilston Street. Following questions from AECOM staff, they revealed that they considered it safer, faster and more convenient.
• Cycle parking facilities exist but to a large extent they are not used by cyclists as they park their bikes in spots that they consider most convenient. In Lichfield Street, as illustrated in Figure 3.1, cycling parking facilities exist, however cyclists were observed to use lamp posts or traffic signs, even when exactly opposite the facility.
4 Proposed Future Strategy

4.1 Design Principles

In light of the literature review and assessment of the existing facilities, a cycling strategy has been developed in line with the development of WCCE. The WCCE Design Team acknowledge the desire of Wolverhampton City Council, Centro and national Government to increase the use of cycles to travel and to integrate cycling with public transport modes. The following design principles are therefore proposed for adoption throughout the scheme and have guided the choice of routes:

Principle 1: At each stage in the development of the scheme the proposals will be subject to an Institution of Highways and Transportation (IHT) cycling appraisal, or similar, with the results of the appraisal being fed back into the scheme development.

Principle 2: Where considered necessary, signed routes will be provided enabling cyclists to easily and safely by-pass the tram scheme with minimal additional delay to their journeys.

Principle 3: In line with WCC Policy, tram stops will be provided with secure cycle parking facilities where reasonable practicable.

Principle 4: In order to maintain the current levels of cycle access to the town centre, no cycle prohibitions will be introduced through the Metro scheme.

4.2 Proposed Cycle Routing

WCCE will extend the existing Midland Metro service to the bus station and the train station in Wolverhampton along Piper’s Row and Railway Drive. It is recognised that the introduction of tram services, stops and tracks within this area may present some concerns for cyclists.

Due to the constrained nature of the highway along the WCCE route, there is insufficient carriageway width along Piper’s Row to provide segregated facilities for cyclists. However, cyclists will not be prevented from cycling alongside the tram should they wish and, as such, a sufficient gap will be provided between the kerb and the tram tracks to provide enough width for cyclists to travel safely. However, due to constraints in the overall carriageway width, there will not be enough space between the edge of the carriageway and tram tracks for trams to travel side by side with cyclists. Therefore trams will sit behind cyclists, in much the same way as the significant numbers of buses which use Piper’s Row do so at the moment.

It is acknowledged that many less confident cyclists may be deterred by this arrangement due to the perception that the tram tracks present a hazard and not wish to cycle alongside the tram tracks in a constrained environment. Therefore alternative routes are highlighted that will allow cyclists to by-pass Piper’s Row should they wish to do so.

The details of the existing and potential future cycle route in the vicinity of WCCE are shown diagrammatically in Appendix A, The options take account of the adjustments of the City Centre Transportation and Public Realm Improvements, proposed by WCC in March of 2013. The public realm scheme will alter the cycling environment in the city centre along and to west of Garrick Street/Market Street/Princess Street.

In light of the issues highlighted above and the policies used to guide the scheme, it is suggested that the following cycle routing be adopted by WCC to facilitate the WCCE:

- Cyclists approaching Bilston Street Island from all directions will be signed to the rail station via the existing off-road cycle routes that converge at Bilston Street Island, and then follow the off-road cycle route northwards adjacent to the ring road. This route links to NCN 81 and will ensure that cyclists can avoid interaction with the tram on Piper’s Row and Railway Drive by using a fully segregated facility.
- Cyclists travelling northwards through the city centre, who wish to avoid using Piper’s Row, will be encouraged to divert along a new shared use facility on Bilston Street and then join the route via the off-road facilities at Bilston Street island to access the rail station and NCN 81. Alternatively they can continue along Market Street and Princess Street, utilising the measures installed as part of WCC Urban Realm improvements to access NCN 81 at Lichfield Street.
Cyclists using NCN 81 on Lichfield Street will continue to be able use a shared-use cycle facility provided across Railway Drive, avoiding the need to cycle adjacent to the tram track. A designated crossing facility will be provided to link cross the tram tracks to the canal side section of NCN 81.

The next stage of design will include a full cycle signing review and any identification of additional signage that may be required in order to make the cycle routes clearly legible.

Where cyclists cross tram tracks, appropriate markings are proposed to encourage cyclists to cross perpendicularly, reducing the chance of slipping on the rails.

A map of the proposed cycling network is displayed in Appendix A.

### 4.3 Routing During Construction

Cycle routing during construction will be similar to that proposed as the permanent solution described above. Therefore it will be important to ensure, where practical, that any cycle signing and routing changes are implemented at an early stage in construction of the WCCE, so that cyclists can avoid Piper’s Row during the works.

It is likely that Railway Drive will need to be closed to all traffic to maintain safety during construction. During this closure it is anticipated that cyclists using NCN 81 will be able to divert via the pedestrian footbridge to the south of Railway Drive, so that an excessive diversion is not incurred.
5 Specific Design Issues

This section details a number of locations where specific measures are required in order to accommodate the cycling strategy for WCCE.

5.1 Garrick Street/Market Street/Princess Street

This part of the cycle network is affected by recommended WCC’s City Centre Transportation and Public Real Improvement Scheme, and the selection of the cycling routes takes into consideration these changes.

The following modifications are proposed for this location:

- Signage on the approach to the junctions to identify the proposed cycling routes.
- Following the implementation of WCC’s public realm improvements, the traffic volumes on Princess Street would not justify the creation of an ASL or other specific facility for cyclists to turn right on Lichfield Street.
- At the junction of Garrick Street/Bilston Street/Market Street (see Appendix A), it is proposed that cyclists will be able to join the proposed segregated shared-use route onto Bilston Street. Cyclists moving south-bound on Market Street will be able to turn left on Bilston Street and exit the contra-flow cycle route, while cyclists moving north-bound on Garrick Street will be able to turn right on Bilston Street while crossing the contra-flow cycle route.
- Conversion of the existing crossing into a toucan crossing on the west side of Bilston Street (see figure 5.3).

![Figure 5.1: Junction of Princess Street with Lichfield Street, picture taken on Princess Street facing north-bound](image1)

- The road layout will change as part of implementation of WCC's City Centre Transportation and Public Real Improvement.
- As part of these works, the south-bound movement will become contraflow cycle lane only, all other traffic will travel north-bound.

![Figure 5.2: South-bound Market Street, north of Market Street / Tower Street junction](image2)

- The road layout will change as part of implementation of WCC's City Centre Transportation and Public Real Improvement.
- As part of the the works, the south-bound movement will consist of a contra-flow cycling route, A north-bound bus lane will be installed which can be used by cyclists.

![Figure 5.3: Existing crossing on Garrick Street at the junction with Bilston Street](image3)

- The existing layout will be altered by WCC's City Centre Transportation and Public Real Improvement.
- As part of the works, the crossing is proposed to be transformed into a toucan crossing through the WCCE scheme.
5.2 Bilston Street

A shared use route on the south-side of the tram lines is proposed (see Appendix A). The existing available pavement width is sufficient for the formation of this type of route because the available space is more than 3m throughout its length. In addition, there is an existing cycle parking facility opposite the existing St. George’s Tram Stop. The creation of additional off-road cycling facilities will contribute to a more cycle-friendly environment in the City Centre of Wolverhampton and may assist in more cycling trips.

The following modifications are recommended for this location:

- The insertion of traffic signs to indicate the shared-use route and the proposed cycling routes.
- Two tram signalling posts (see Figure 5.6) that are placed on the proposed route, approximately 15m before the proposed toucan crossing, encouraging travel at a safe distance from the tramline (more than 1m). These posts would be away from the cycle route.

5.3 Bilston Street/Piper’s Row Junction

For this junction two possible layouts are proposed as shown in Appendix A.

- Option A - north-side route across Piper’s Row
- Option B - south-side route via St George’s Parade

Option A

The existing off-road network on the Bilston Street Island is to be connected with the proposed Bilston Street shared-use route via three toucan crossings on Piper’s Row and a shared-use route of approximately 10m length on the footway between the proposed crossings. Currently the width of the footway varies from 3m to 4m and can therefore accommodate shared-use. The flow of pedestrians on this part of the network is relatively low, so it is anticipated that they will not be significantly affected by the proposal.

The following modifications are proposed for this location:
• The existing crossings should be converted into toucans (see Figures 5.7 to 5.10).
• The signs placed on the shared-use route should be relocated outside the shared use facility (see Figure 5.7).
• The insertion of traffic signs to indicate the existence of the shared-use route and other cycling routes.
• Complementary road markings to indicate the correct cycle movements in order to cross the tram lines in correct angles as suggested in *Guidance on Tramways - Railway Safety Publication 2* (Office of the Rail Regulator, 2006).

**Option B**

As illustrated in Appendix A, this option provides a less convoluted connection for cyclists to travel from the proposed shared-use facility on Bilston Street to the existing off-road network at Bilston Street Island. The current highway layout prevents this solution as the existing footway width is only 1.4m on the south side of Bilston Street. However Wolverhampton City Council have confirmed that footway widening can take place by taking some of the carriageway width at this location, as traffic volumes will decrease once the supermarket store closes, enabling the footway to be increased to a width that is suitable for shared-use.

The following modifications are recommended for this location:
• Widening of the footway on St. George’s Parade (see Figure 5.10).
• Creation of a toucan crossing on St. George’s Parade.
• Traffic signs to be inserted in order to indicate the shared-use route and other cycling routes.

Option B is recommended for this location, as this creates a more direct route for cyclists to reach the existing Bilston Street Island off-road routes, reducing delays for cyclists, as there are less signalised crossing points for them to negotiate.
5.4 Railway Drive

As part of the WCCE, Railway Drive will be closed to general traffic, with only trams and service vehicles using the road. This will reduce traffic along Railway Drive from around 700 vehicles per hour to one tram in each direction every six minutes and occasional service vehicles, significantly reducing the potential for conflicts with non-motorised users, and mitigating the impact of the reduction in available footway width. Railway Drive provides the primary link for cyclists between the city centre and the rail station and is part of Route NCN 81. There is an existing 3m shared-use cycle facility on the southern footway of Railway Drive.

The available width across Railway Drive Bridge is by restricted due to the width of the existing bridge. The introduction of the WCCE along this route necessitates some reallocation between footway and carriageway in order to safely accommodate the swept path of the trams, and avoid any potential conflicts with users of the footway, but this reduces the available footway widths.

The actual widths required across Railway Drive Bridge, taking into account an existing kerb height of 125mm, a proposed 50mm kerb height and existing 120mm parapet, are as shown in Table 5.1. These widths are detailed in DfT guidance note LTN 2/04 Adjacent and Shared Use Facilities for Pedestrians and Cyclists (section 2.1.8).

<table>
<thead>
<tr>
<th></th>
<th>Shared-Use Footway</th>
<th>Cycle Only Track</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desirable Minimum</td>
<td>3.45m</td>
<td>2.45m</td>
</tr>
<tr>
<td>Absolute Minimum</td>
<td>2.45m</td>
<td>1.95m</td>
</tr>
</tbody>
</table>

Table 5.1: Minimum widths across Railway Drive

This shows that the existing shared use facility on Railway Drive falls below the desirable minimum width for a shared use facility.

Three potential options have been identified to improve the cycle route, all are illustrated in Appendix A. All options include a toucan crossing across Fryer Street to connect NCN 81 on Lichfield Street to Railway Drive and a toucan crossing across Railway Drive to connect cyclists to the bus station and the existing cycle parking facilities.

All options connect to facilities at the train station. The location of cycle parking as part of the WIP scheme has not yet been determined as part of the WIP project.

The proposed options and the required modifications are explained in detail below:

Option A

Cyclists moving east-bound will cross a new toucan crossing (see Appendix A) at the western end of Railway Drive, and then join a two-way shared-use footway for pedestrians and cyclists on the south-side in order to either continue towards the train station or NCN 81. Cyclists travelling west-bound will be able to cycle in the opposite direction along this facility.

As the WCCE necessitates the widening of the carriageway into the existing footway areas, the current desirable design width for the shared-use footway is 2.6 to 2.8m along the south-side of Railway Drive. Whilst this width is less than the desirable minimum of 3.45m, it is still within the absolute minimum width requirements of 2.45m.

Option B

In this proposal, a cycle only track is recommended on the north-side of Railway Drive. This will be connected with toucan crossings on Railway Drive. The proposed footway has a width that varies from 2.2 to 3m on the bridge and more than 3m for the rest of its length. The narrow section exists for around 10m on the eastern end of Railway Drive Bridge; although this falls below the desirable minimum of 2.45m, it is above the absolute minimum requirements.

It will, however, be difficult to physically prevent pedestrians from using the northern footway as it is still a desire line to the northern sections of the city centre and university. Therefore, how practical the implementation of the cycle only track is along this section of Railway Drive may be questionable.
Option C

We have considered whether cyclists could be accommodated on shared-use footways on both sides of Railway Drive, however as demonstrated above, the current design widths available fall below the absolute minimum widths of shared-use footways on the north-side, although this is only over a short 10m section. It is possible that as the design progresses and the track alignment is reviewed and revised, shared-use footways at the absolute minimum widths can be provided on both sides of the carriageway.

Recommendation

As noted above, the proposed options are both below desirable minimum standards but within absolute minimum standards. In Option A, pedestrians will be accommodated on both sides of the road, whereas in Option B they will be advised to use only the south-side. Although it is not a common practise to confine pedestrians to one side of the road, the specific geometric requirements of this location necessitate it.

There is very little to choose between the Options A and B in terms of cyclist provision. However it is noted that in reality it will be very difficult to prevent pedestrians from using the north-side of Railway Drive as proposed in Option B, as there are no physical measures available to prevent this. Therefore, although the southern footway is more heavily utilised by pedestrians, it is recommend that Option A, the shared-use footway on the southern-side Railway Drive, is pursued.

As the design of the WCCE progresses, it is recommended this position should be reviewed to determine whether absolute minimum width shared-use facilities could be accommodated on both sides of Railway Drive (Option C). This would spread the numbers of pedestrians and cyclists more evenly, reducing any potential conflicts.

Figure 5.11: Existing crossing and Advanced Stop Lane on Lichfield Street
- A kerb of 1.8m before the Advanced Stop Line is proposed to indicate the cyclists to move on the footway.
- Signs for the cyclists moving east-bound will be advised “join footway” and utilise the Toucan crossing.

Figure 5.12: Existing crossing on Railway Drive
- Installation of a toucan crossing to access the bus station.

Figure 5.13: Existing crossing on Fryer Street
- Transformation of the existing pedestrian crossing into a toucan.
The tram line will be placed on street. A crossing is advised to be placed at this location to connect Railway Drive with NCN 81.

In Option A, the shared-use route will remain on this footway.

The tram line will be placed on street. In Option B, the cycle track will replace on this footway. The majority of pedestrians use the opposite footway for their trips.
5.5 Piper’s Row

Piper’s Row will remain available for use by cyclists. There will be sufficient space for cyclists to safely cycle between the kerb and the tram tracks, however there is not sufficient space for a cyclists between the kerb and a moving tram.

Due to these physical constraints, alternative routes are proposed to encourage cyclists away from Piper’s Row. We do not therefore propose any facilities for cyclists on Piper’s Row as they will be encouraged to use alternative routes.

5.6 Lichfield Street/Piper’s Row/Fryer Street/Railway Drive Junction

For cyclists travelling east-bound on Lichfield Street, they will be encouraged to join the footway before the junction with Fryer Street and a toucan crossing will lead them to Railway Drive. There is enough footway width and area for the creation of a toucan crossing to safely accommodate them. For cyclists moving west-bound, another toucan crossing could be created on Lichfield Street so that they can cross it and be able to continue their journey.

The following modifications are recommended for this location:

- Conversion of the crossings on Lichfield Street, Fryer Street and Railway Drive into toucans (see Figures 5.11 to 5.13).
- Creation of a dropped kerb of 1.8m before the Advanced Stop Line on Lichfield Street to indicate to cyclists to move on the footway.
- Placing of signs for the cyclists moving east-bound on Lichfield Street to “join footway” and for cyclists moving west-bound to continue on Lichfield Street.
- The layout will be similar regardless of the selected option for Railway Drive.

5.7 Off-Road Network

The existing off-road cycle network at Bilston Street Island and the route parallel to the A4150 Ring Road was inspected as part of this review. The route visual inspection showed that the route appeared to be well maintained and marked in accordance with best practice; therefore no works are currently proposed as part of the WCCE. It is however proposed that the signing to the off-road network is reviewed by WCC as part the next stage of WCCE design in order to ensure the alternative routes to Piper’s Row are clearly marked and understandable to cyclists.
5.8 Cycle Parking Facilities

Five cycle parking facilities exist in the vicinity of WCCE. Their positions are:

- On the south-side of Lichfield Street east of the junction with Princess Street (see Figure 5.19).
- Opposite the tram stop in Bilston Street (see Figure 5.20).
- At the railway station (see Figure 5.21).
- At the north-side of the bus station next to Piper’s Row (see Figure 5.22).
- In the north-east corner of Garrick Street/St. George’s Parade Junction.

The position of the existing cycling facilities will remain unchanged after the construction of WCCE. The facilities at the Rail station will be relocated under the WIP project however the final location of this has not yet been determined. The existing facilities at the Bus Station are also well placed to serve the new Midland Metro stops on Piper’s Row.

Comments about their utility and security are provided below:

**Figure 5.19: Existing cycle parking on Lichfield Street**
- The facility was not observed to be used by cyclists.
- It was observed that cyclists chain to street furniture opposite this location.

**Figure 5.20: Existing cycle parking on Bilston Street**
- The facility appears to be used by cyclists.
- The shared-use route is proposed to be placed in front of it.
- Its position opposite the tram stop and the police station increases the feeling of security.

**Figure 5.21: Existing cycle parking on the railway station**
- The facility is considered successful as many cyclists use it.
- It will be moved due to the re-development of the railway station.
- Relatively secure due to its location opposite the British Transport Police.

**Figure 5.22: Existing cycle parking on the north-west of the bus station**
- It will be the finish point of the route that will connect the rest of the cycling network with the bus station.
- Level of surveillance needs to be increased.
- Covered parking would possibly lead to higher cycle parking numbers.
6 Summary and Next Steps

6.1 Summary

This report seeks to provide an overall strategy to accommodate and support cycling in the vicinity of the Midland Metro WCCE. The recommendations are proposed as one strategy. The strategy is based on a review of practice used on other tram systems, the analysis of existing cycling provision, the interaction of cycling and other road users and the realistic options of infrastructure provision to mitigate any potential impacts from introducing the WCCE.

Cyclists will still be able to use all of the routes that are currently available to them, however it is recognised that the introduction of WCCE will change the nature of Piper’s Row in particular, and some cyclists may not be comfortable using this route due to the constrained environment. Therefore, alternative routes will be provided in some locations and signed to help cyclists avoid Piper’s Row should they wish to do so. The alternative routes aim to be segregated, were reasonably practicable, and wherever reasonably possible these routes will follow the current best practice design guidance, such as LTN 2/04.

The measures recommended to mitigate the impact of WCCE on cyclists in the area are summarised below:

- Cyclists approaching Bilston Street Island from all directions will be signed to the rail station via the existing off-road cycle routes that converge at Bilston Street Island, and then follow the off-road cycle route northwards adjacent to the A4150 Ring Road. This route links to NCN 81 and will ensure that cyclists can avoid interaction with the tram on Piper’s Row and Railway Drive by using an existing fully segregated facility.
- Cyclists travelling northwards through the city centre will be encouraged to divert along a new shared-use facility on Bilston Street and then join the route via the off-road facilities at Bilston Street Island to access the rail station and NCN 81. Alternatively they can continue along Market Street and Princess Street to access NCN 81 at Lichfield Street.
- Cyclists using NCN 81 on Lichfield Street will continue to be able use a shared-use cycle facility provided across Railway Drive, avoiding the need to cycle adjacent to the tram track. A designated crossing facility will be provided to link cross the tram tracks to the canal side section of NCN 81.
- The next stage of design will undertake a full cycle signing review and additional signage may be required in order to make the cycle routes clearly legible.
- Where cyclists cross tram tracks, appropriate markings are proposed to encourage cyclists to cross perpendicularly, reducing the chance of slipping on the rails.

6.2 Next Steps

The cycle strategy has fully assessed the potential impacts on cyclists and developed reasonable mitigation measures to ensure that all cyclists can comfortably continue to use the highways following the implementation of WCCE. During the ongoing design of the WCCE, this strategy will be reviewed, the design parameters that can be achieved, particularly across Railway Drive. This stage of design will also confirm the type of track bed construction and enable the design to develop more detail around areas where groove rail protection may be required, i.e. at pedestrian and cycle crossing points.
7 References

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Appendix B

Existing cycling routes in Wolverhampton as obtained from Sustrans (2014). The yellow line illustrates National Route 81 which connects Aberystwyth and Wolverhampton via Shrewsbury and Telford.
Appendix C

City Centre Transportation and Public Realm Improvement - outcome of consultation and revised scheme map.