Combined Factsheets - Contents

Note: Grey factsheet titles shall be available at a later date.

C1 – Designing for Cycling

Amendments:

Introduction

The cyclist has to steer, power and balance their vehicle simultaneously. They have a manoeuvrable vehicle but they are as vulnerable as pedestrians to injury. This combination gives designing for cycling its special characteristics as outlined below:

- The bicycle is a vehicle – when designing for cycling, criteria such as sightlines, horizontal and vertical alignment should all be carefully considered. Cyclists should not be required to dismount on cycle routes.
- Bicycles are muscle powered – so design should aim to minimise wasted energy, for example due to stopping, hills and sharp corners
- Bicycles have no crumple zone – People are vulnerable on a bike. Most design for cycling aims to reduce exposure to danger generally by separating cyclists from motorised traffic.
- The most important deterrent to cycling is perceived danger – Worldwide experience demonstrates that people need to feel that they can avoid mixing with heavy/fast traffic if they are to choose cycling as a means of transport. The Council's QuietRoutes network and segregated cycle tracks on main roads aim to tackle this issue.
- A design does not have to **have "cycle facilities" to** help cyclists (and vice versa)

Achieving good design for cycling can be achieved by following the six core cycle route design principles set out over the following factsheets.

On Foot By Bike

The City of Edinburgh Council

Relevant Factsheets:

Cycle Route Design Principles

Follow the six Core Principles / Outcomes, which together describe what good design for cycling should achieve.

Consideration should be given to improving existing streets as well as providing new infrastructure.

Cycle route core design principles include:

1. Safety
2. Directness
3. Comfort
4. Coherence
5. Attractiveness
6. Adaptability

1- Safety

Good infrastructure should help to make cycling safer and address negative perceptions about safety, particularly when it comes to moving through junctions.

Space for cycling is important but a narrow advisory cycle lane next to a narrow general traffic lane and guardrail at a busy junction is not an acceptable offer for cyclists.

2- Directness

Routes should be logical and continuous, without unnecessary obstacles, delays and diversions, and planned holistically as part of network.

This track works well on links but requires cyclists to give way at each side road. Cyclists often choose to stay on carriageway rather than take fragmented routes with built-in delay.

3-Comfort

Riding surfaces for cycling, and transitions from one area to another, should be fit for purpose, smooth, well constructed and well maintained.

Uncomfortable transitions between on-and off-carriageway facilities are best avoided, particularly at locations where conflict with other road users is more likely.

Relevant Factsheets:

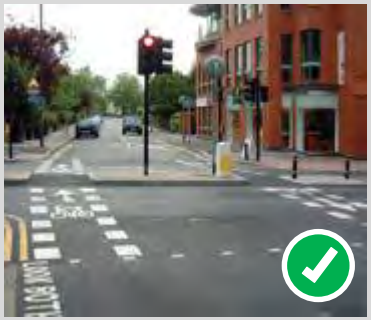
Segregated Cycle Lanes– Soft Segregation (C3) Cycle Lanes (C2)

Segregated Cycle Tracks – Hard Segregation (C4)

How these principles are applied will depend on site-specific conditions and on detailed design, but schemes should demonstrate that these issues have been taken seriously and have informed design decisions.

For further guidance:
- Making Space for Cycling (2014)
- DfT: Local Cycling and Walking Infrastructure Plans (2017)

4- Coherence



Infrastructure should be legible, intuitive, consistent, joined-up and inclusive. It should be usable and understandable by all users.

Neither cyclists nor pedestrians benefit from unintuitive arrangements that put cyclists in unexpected places away from the carriageway.

5- Attractiveness

Infrastructure should not be visually intrusive or add unnecessarily to street clutter. Well designed cycling infrastructure should enhance the urban realm.

Sometimes well-intentioned signs and markings for cycling are not only difficult and uncomfortable to use, but are also unattractive additions to the streetscape.

6 – Adaptability

Cycling infrastructure should be designed to accommodate users of all types of cycle, and an increasing numbers of users over time.

Where streets have been engineered primarily for use by motor vehicles, it is difficult to make infrastructure for cycling that is legible and adaptable.

Relevant Factsheets:
Segregated Cycle Lanes– Soft Segregation (C3)
Segregated Cycle Tracks – Hard Segregation (C4)
Cycle Lanes (C2)
Minimising Street Clutter (P7)

The Active Travel Action Plan

The Active Travel Action Plan (ATAP) sets out two parallel approaches to cycle infrastructure in Edinburgh. Firstly developing a 'QuietRoutes' network with an emphasis on catering for less confident cyclists, secondly moving towards a Cycle Friendly City.

'QuietRoutes'

This is a network of cycle routes, known as QuietRoutes, which will feel attractive and safe to people of all ages and abilities.

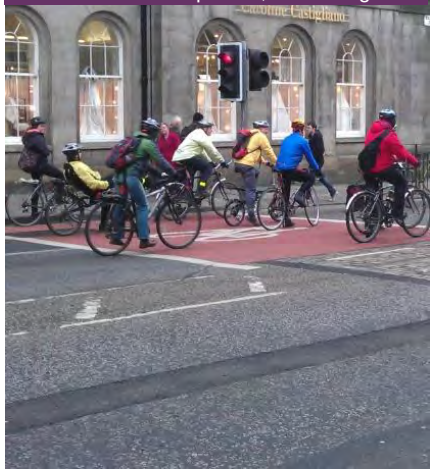
Quiet Route on Canal Path, Edinburgh

The City of Edinburgh Council

Cycle friendly city

The Cycle Friendly City programme aims to make travel by bike anywhere in the city convenient and attractive.

Advanced Stop Line, Edinburgh



The City of Edinburgh Council

Advisory Cycle Lane, Edinburgh

The City of Edinburgh Council

Relevant Factsheets:

Signalled Crossings at or near junction (G5)
Creating Active Travel Networks (P2)
Speed Reduction & Traffic Management (G6)
Cycle Lanes (C2)

QuietRoutes

The QuietRoute network in Edinburgh seeks to maximise the potential for **everyone's everyday trips** to be made easily, directly and enjoyably by bike. It is focussed on making cycling a realistic travel option for an ever increasing proportion of people: children, the elderly, men and women, not just a confident minority who are happy to cycle in busy traffic

The developing network consists of traffic-free paths (including cycle paths in parks and greenspace), quiet roads and separate cycle tracks on main streets. It seeks to provide for both utility and leisure journeys.

QuietRoutes should be designed to achieve the Sustrans National Cycle Network standard (i.e. they should be suitable for use by an unaccompanied 12 year old).

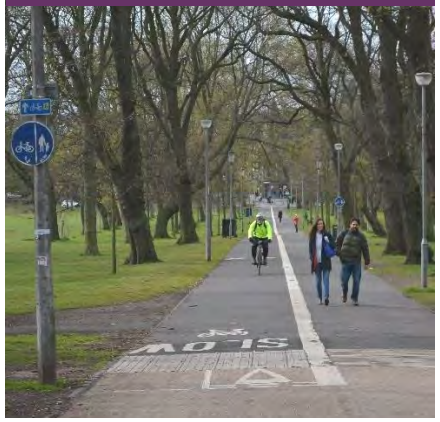
Segregated Cycle Tracks

The City of Edinburgh Council

Mandatory Cycle Lanes

Google Maps, 2017

Off-Street Paths



The City of Edinburgh Council

Cycle Streets

Google Maps

Technical standards that are suitable for QuietRoutes are based on Sustrans National Cycle Network Design Guidance.

These images illustrate how some of the key components of QuietRoutes can be applied to our streets to provide safe and attractive routes for people of all ages and abilities, especially for those who are new to cycling as means of transport.

Click the link for more information: Edinburgh QuietRoute network

Relevant Factsheets:

Segregated Cycle Lanes – Soft Segregation (C3) Cycle Lanes (C2)

Segregated Cycle Tracks – Hard Segregation (C4)

While much of the QuietRoutes network will be off-road or on quiet **roads, to effectively 'join up' and to create** reasonable directness, the QuietRoutes network needs to negotiate some busy streets and junctions.

At these points, the aim will be to retain a high standard of safety and convenience.

This will generally mean using protected separate cycle tracks, or potentially wide mandatory cycle lanes complemented by parking and loading restrictions.

Well defined routes through any busy junctions are also essential.

On the QuietRoutes network, coherence is of the utmost importance. A single 'missing link' can seriously undermine the effectiveness of a route or the entire network.

Toucan Crossing, Rankeillor Street, Edinburgh

The City of Edinburgh Council

Segregated cycleway, St Leonards Street, Edinburgh

The City of Edinburgh Council

Continuous footway, Middlefield, Edinburgh

The City of Edinburgh Council

Toucan crossing, Buccleuch Street, Edinburgh

The City of Edinburgh Council

Streets and paths that are part of this network should be designed in consultation **with the Council's Cycle** Team. As a general guide, the following principles / standards will apply:

Local streets

The emphasis will be on providing a high standard of safe crossings where these streets join or cross secondary or strategic streets.

Secondary streets

Physically segregated cycle facilities (using kerb or similar) will generally be necessary.

Strategic streets

Physically segregated cycle facilities (using kerb or similar) will always be necessary.

Relevant Factsheets:

Segregated Cycle Lanes – Soft Segregation (C3)
Segregated Cycle Tracks – Hard Segregation (C4)
Cycle Lanes (C2)
Crossings (G4)
Signalled Crossings at or near junctions (G5)

Cycle Friendly City

The Cycle Friendly City programme aims to make travel by bike anywhere in the city convenient and attractive.

This will be achieved by:

- Citywide application of cycle friendly street design
- Varying degrees of separation from traffic

This involves provision for cyclists on main roads as well as crossings linking up quieter side roads.

Whilst recognising the multiple pressures and constraints in space on the road network, this programme is designed to make cycling feel as convenient, safe and comfortable as possible for day to day cyclists on the roads, including; commuters, shoppers and anybody going from A to B.

Advanced Stop Lines

The City of Edinburgh Council

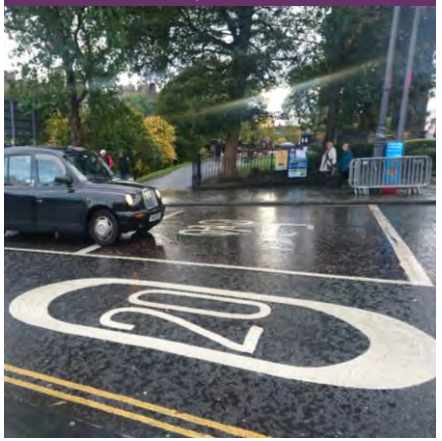
Toucan Crossings

The City of Edinburgh Council

Cycle Lanes

The City of Edinburgh Council

20mph Zones



The City of Edinburgh Council

These images illustrate what cycle specific measures can be applied and how some of the traffic management measures can be designed with cyclists in mind to make cycling in Edinburgh safe, convenient and attractive for larger numbers.

View the most up to date cycling and walking routes in Edinburgh using the QuietRoutes and cycle parking map compiled by the City of Edinburgh Council.

Maintenance & Signing

Maintenance is crucial to the continued success of both on and off street cycle routes.

Poor surfaces, overhanging vegetation, ponding, worn markings, broken glass, poor lighting etc, all affect cyclists more quickly and more seriously than motorists and area continuous source of complaint.

It is therefore essential that cycle tracks, both on and off road, are inspected and maintained on a similar basis to the rest of the road network.

The City of Edinburgh Council

The City of Edinburgh Council

The quality, frequency and coherence of signing is crucial to the successful operation of cycle routes. Continuity of destinations is also crucial.

Particular attention must be given to signing off-road routes from the main road network.

Cycle signing must be maintained on the same basis as other road signs.

Adhere to the hierarchy of destinations in the Active Travel Action Plan Signage Guidance Document, please contact the Active Travel Team for details

Contact the Cycle Team for additional detailed guidance.

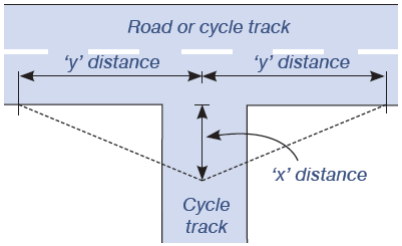
The City of Edinburgh Council

Key Parameters

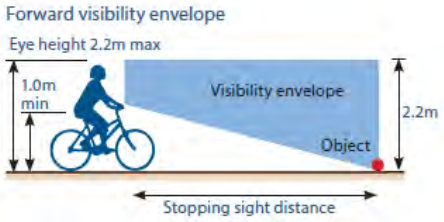
Visibility at Junctions

Recommended X distances for cyclists are:

- 4m preferred
- 2m recommended
- 1m where geometry is tight



If these visibility requirements cannot be achieved the alternative is to use the full range of markings and signs available to make clear the need to cyclists to slow down.



Visibility: Link design parameter: traffic free				
Type of cycle route	Design speed	Min. Stopping sight distance	Sight distance in motion	Min. Radius of curve
Commuter route	20 mph	25 m	80 m	25 m
Local access route	12 mph	15 m	50 m	15 m

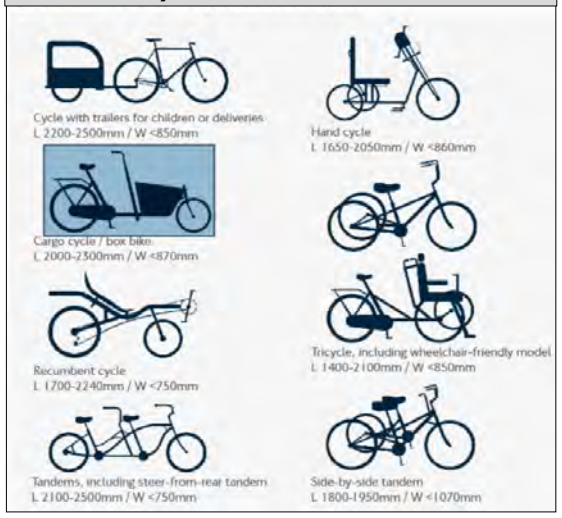
Gradients	
3%/1:30	Preferred
5%/1:20	Desirable maximum
7%/1:12	Normal absolute maximum
>7%	For short lengths

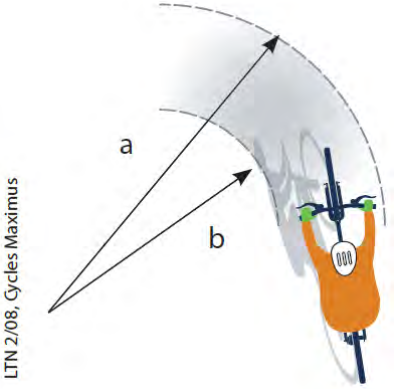
In hilly areas, many roads have steeper gradients but can still make acceptable cycle routes

Visibility at Junctions											
85%ile speed (kph)	20	25	30	40	45	50	60	70	85	100	120
'y' distance (m) on road	14	18	23	33	39	45	59	120	160	215	295

Source: Manual for Street & TD 42/95

Indicative dimension of typical 'non-standard' cycles





Images: Sustrans, HfCD, 2014

Cycle parking and manoeuvring at low speeds: minimum dimensions				
	Overall Width (mm)	Overall Length (mm)	Minimum turning circle (mm)	
			Outer radius (a)	Inner radius (b)
Conventional bicycle	700	1800	1650	850
Tandem	700	2400	3150	2250
Bicycle and trailer	800	2700	2650	1500
Cargo trike	1200	2600	2300	100

Note: a wider range of adapted bikes are used for disability cycling: their design requirements will generally fall within the ranges in this table

Relevant Factsheets:
Cycle Lanes (C2) Signalled Crossings at or near junctions (G5) Crossings (G4)

Separating Cyclists from Traffic

On-street cycle lanes (integrated with general traffic)

- Mandatory cycle lanes
- Advisory lanes
- Bus lanes

Google Maps, 2017

The City of Edinburgh Council

The City of Edinburgh Council

On-street segregated cycle facilities

- Cycle track with soft segregation
- Cycle track with hard segregation
- Shared footway

The City of Edinburgh Council

The City of Edinburgh Council

The City of Edinburgh Council

Off-street cycle paths

- Shared pedestrian/cycle paths
- Segregated pedestrian/cycle paths
- Separate pedestrian /cycle paths

The City of Edinburgh Council

The City of Edinburgh Council

Google Maps, 2017

Other facilities

- Cycle streets
- Contra-flow cycling

Google Maps, 2017

The City of Edinburgh Council

Degree of Protection from Motorised Traffic

Protecting cyclists from motorised traffic is a crucial component of encouraging cycling. But, in deciding what, if any infrastructure is needed, there is a need to balance the following:

- Quality of provision for cycling, taking into account the target user group
- Danger to cyclists with/without infrastructure costs
- Impact on other street users

A key factor will be whether the street or junction is on the QuietRoutes network. If it is, a significantly higher degree of protection will ne necessary.

The table on the following page (12) gives guidance on the type of infrastructure that should be considered, depending on the key variables of the volume and speed of the motorised traffic.

Hard Segregated Cycle Track, Edinburgh

The City of Edinburgh Council

Traffic Calming Side Road Entry Treatment

Google Maps, 2017

Relevant Factsheets:

Segregated Cycle Lanes – Soft Segregation (C3)
Segregated Cycle Tracks – Hard Segregation (C4)
Speed Reduction andTraffic Management (G6)

Degree of Protection Required for Cycling and Cycle Friendly Cities

Flow / Speed Table

Flow (2 way)	Expected 85th percentile speed			
	20 mph Limit		30 mph Limit Medium	40 mph Limit High
	<20 mph Very Low	>20 mph Low		
Very Low Less than 1,500 vpd, Or 150 vph	Quiet Street	Quiet Street	Rural quiet road or cycle lanes	Cycle lanes or tracks
Low 1,500-3,000 vpd, Or 150-300 vph	Quiet Street or cycle lanes	Quiet Street or cycle lanes	Cycle lanes or tracks	Cycle lanes or tracks
Medium 3,000-8,000 vpd, Or 300-800 vph	Cycle lanes or segregation from traffic	Cycle lanes or segregation from traffic	Cycle lanes or segregation from traffic (QR)	Cycle lanes or segregation from traffic (QR)
High 8,000-10,000 vpd, Or 800-1,000 vph	Cycle lanes or segregation from traffic (QR)	Cycle lanes or segregation from traffic (QR)	Cycle lanes or segregation from traffic (QR)	Segregation from traffic (QR)
Very High Greater than 10,000 vpd	Cycle lanes or segregation from traffic (QR)	Cycle lanes or segregation from traffic (QR)	Cycle lanes or segregation from traffic (QR)	Segregation from traffic (QR)

Relevant Factsheets:
Segregated Cycle Lanes – Soft Segregation (C3)
Segregated Cycle Tracks – Hard Segregation (C4)
Cycle Lanes (C2)
Quiet Routes (C1)

Roundabouts and Tram Tracks

Roundabouts

Cycle lane interaction with roundabouts is a particularly complex area.

The Council is currently developing its approach to this and a guidance factsheet will be made available as soon as practicable. It will take into account current national guidance and experience from elsewhere. It should be noted that this experience has resulted in a strong desire to avoid the use of peripheral lanes.

For more detailed guidance, please refer to the guidance provided by the Sustrans Design Manual. For more information contact the City of Edinburgh Council Active Travel Team.

Tram Tracks

Cycle lane interaction with tram tracks on the carriageway is another complex area.

The Council is currently developing its approach to this and a guidance factsheet will be made available as soon as practicable. It will take into account current national guidance and experience from elsewhere

For guidance on this issue, please contact the City of Edinburgh Council Active Travel Team for more information.

Image References

Introduction
Main image: The City of Edinburgh Council

Cycle Route Design Principles
Safety – top image: The City of Edinburgh Council
Safety – bottom image: Google Maps [ONLINE]. Available at: https://goo.gl/UacgQa [Accessed 06 December 2017]
Directness– top image: The City of Edinburgh Council
Directness– bottom image: Sustrans Technical Information note No.12: Side Road Crossings [ONLINE]. Available at: https://goo.gl/c1t2EM [Accessed 06 December 2017]
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Comfort – bottom image: London Cycling Design Standards – Chapter 1 [ONLINE]. Available at: http://content.tfl.gov.uk/lcds-chapter1-designrequirements.pdf [Accessed 12 December 2017]
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Attractiveness– top image: London Cycling Design Standards – Chapter 1 [ONLINE]. Available at: http://content.tfl.gov.uk/lcds-chapter1-designrequirements.pdf [Accessed 12 December 2017]
Attractiveness– bottom image: London Cycling Design Standards – Chapter 1 [ONLINE]. Available at: http://content.tfl.gov.uk/lcds-chapter1-designrequirements.pdf [Accessed 12 December 2017]
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Segregated cycleway: The City of Edinburgh Council
Continuous footway: The City of Edinburgh Council
Toucan crossing at Buccleuch Sr: The City of Edinburgh Council

Cycle Friendly City
All images: The City of Edinburgh Council

Maintenance & Signing
All images: The City of Edinburgh Council

Key Parameters
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Mandatory cycle lane: Google Maps [ONLINE]. Available at: https://goo.gl/maps/JZ6V834USxo [Accessed 02 February 2017]
Advisory cycle lane: The City of Edinburgh Council
Bus lane: The City of Edinburgh Council
Cycle track with soft segregation: The City of Edinburgh Council
Cycle track with hard segregation: The City of Edinburgh Council
Shared footway: The City of Edinburgh Council
Shared pedestrian/cycle paths: The City of Edinburgh Council
Segregated pedestrian/cycle paths : The City of Edinburgh Council
Separate pedestrian/cycle paths : Google Maps [ONLINE]. Available at: https://goo.gl/maps/CPcv8h4aJkH2 [Accessed 02 February 2017]
Cycle streets: Google Maps [ONLINE]. Available at: https://goo.gl/maps/Kp6BrKG3ePM2 [Accessed 02 February 2017]
Contra-flow cycling: The City of Edinburgh Council

Degree of protection
Hard segregated cycle track: City of Edinburgh Council
Traffic calming: Google Maps [ONLINE]. Available at: https://goo.gl/7Dj8Vj [Accessed 07 December 2017]

Index

C2 – Cycle Lanes

Amendments:

Cycle Lanes

Advisory Cycle Lane

The City of Edinburgh Council: Advisory Cycle Lane with red chipped surface, Edinburgh

Advisory cycle lanes delineate an area of the carriageway for cyclists and provide a recommend line of travel for cyclist. They instruct vehicles not to enter unless avoidable and can legally be overrun.

Mandatory Cycle Lane

Google Maps, 2017: Mandatory Cycle Lane

Mandatory cycle lane is a dedicated area of the carriageway for protecting cyclists from traffic. Vehicles are not permitted to cross mandatory cycle lanes with exceptions for emergency vehicles and vehicles entering/existing private driveways and turning movements.

Advisory Cycle Lanes

Advisory cycle lanes delineate an area of the carriageway for cyclists and provide a recommend line of travel for cyclist. They instruct vehicles not to enter unless avoidable and can legally be overrun.

- Traffic Regulation Orders (TROs) are not required for their introduction.
- They are cheap to install. They are marked by using a broken white line (Diagram 1004) with cycle symbols (Diagram 1057)
- They should be fully protected by waiting and loading restrictions at times when the highest demand for cycle use is expected.
- The hours of operation of these restrictions need to balance the needs of cyclist with other demands, for example loading for businesses and overnight car parking.

They can be used with centre line removal to encourage vehicles to leave nearside space free for cyclists.

Like mandatory cycle lanes, advisory cycle lanes should be continued through priority junctions using the same broken white line and cycle symbol.

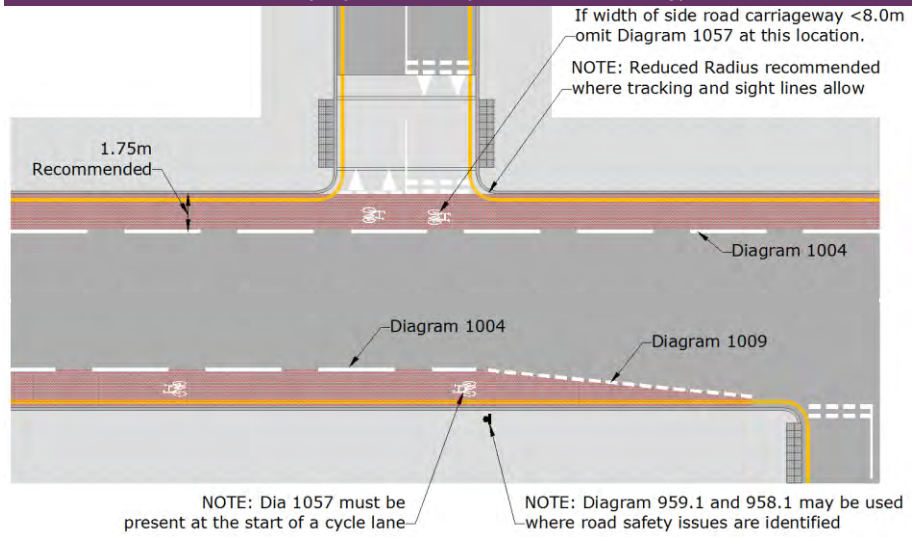
Waiting restriction markings (Diagrams 1017 or 1018.1) should be 50mm wide in 'Environmentally Sensitive' areas such as World Heritage Site and Conservation Areas.

See Traffic Signs Manual Chapter 5 for more detail.

Material for cycle lane

Red chipped asphalt should be used. However initial installation with lining only can be considered to reduce cost.

Advisory Cycle Lanes (illustrative drawing)



Dimensions

- Recommended width 1.75m
- Maximum 2m (adjacent to inset parking bays)
- Minimum 1.5m - Lanes narrower than 1.5m are only acceptable in exceptional circumstances, such as feeder lead-in lane to advanced stop line (ASL) (1.2m Minimum)

Side road

- Cycle lane red chipped asphalt continues cross the side road entry with broken lines (1004)
- One cycle logo in front of the entry lane. Two cycle logos if side road width >6 m

Mandatory Cycle Lanes

A Mandatory cycle lane is a dedicated area of the carriageway for protecting cyclists and is relatively cheap to install.

- Traffic Regulation Orders (TROs) are not required for their introduction (TSRGD,2016).
- They are marked by using a continuous white line (Diagram 1049 or 1049B) with cycle symbols (Diagram 1057) in the lane, where it begins and at any joining points.
- They should operate at all times unless there are clearly justified reasons not to do so.
- Vehicles are not permitted to cross mandatory cycle lanes with exceptions for emergency vehicles and vehicles entering/exiting private driveways and making turning movements.

Cycle lane provision should be continued through priority junctions using a broken white line (Diagram 1004 or 1010) and cycle symbols.

Diag. 958.1 'with flow cycle lane ahead' sign only allowed when cycle lane is not clearly visible to drivers.

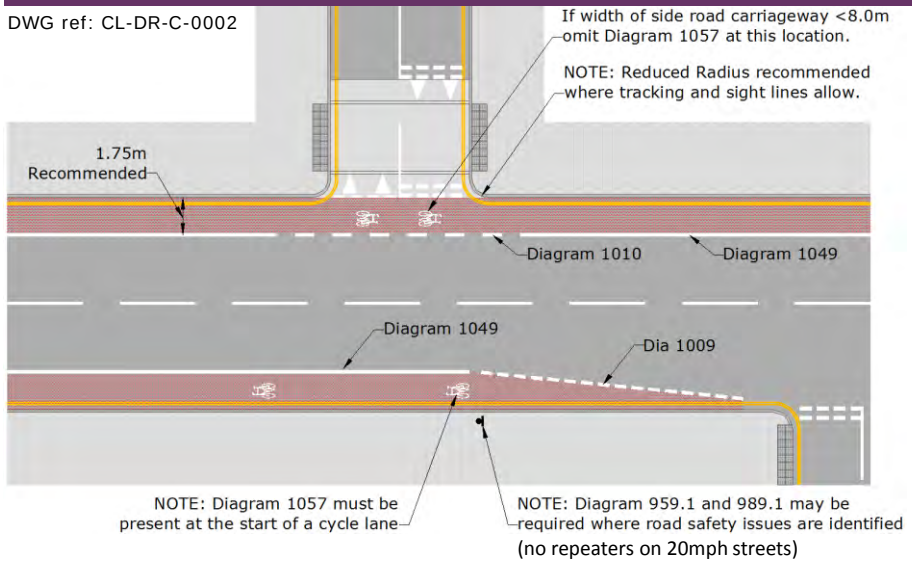
Waiting restriction markings (Diagrams 1017 or 1018.1) should be 50mm wide in 'Environmentally Sensitive' areas such as World Heritage Site and Conservation Areas.

Fore more detail see: Traffic Signs Manual Chapter 5.

Material for cycle lanes

Red chipped asphalt should be used. However initial installation with lining only can be considered to reduce cost.

Mandatory Cycle Lanes (illustrative drawing)



Dimensions

- Recommended width 1.75m
- Maximum 2m (Diag. 1057 cycle symbol is used in lane)
- Minimum 1.5m - Lanes narrower than 1.5m only acceptable in exceptional circumstances, such as feeder lead-in lane to ASL (1.2m minimum)

Mandatory Cycle Lanes (advisory through side road junction)

LCDS, 2016

Relevant Factsheets:
Designing for Cycling (P1) Speed Reduction and Traffic Management (G6)

Parking and loading

There are 5 options in which advisory and mandatory cycle lanes can integrate with parking and loading. The most common way to integrate Parking and Loading is with a single yellow line imposing waiting restrictions.

The four other ways are detailed in the soft segregation factsheets.

Crossings

Lanes are continued through uncontrolled crossings and stopped at controlled crossings and started again immediately after them.

See integration with refuge islands.

Side roads

For details on side road treatments see Advisory Cycle Lanes and Mandatory Cycle Lanes factsheets.

Bus stops

Where advisory and mandatory cycle lanes meet a bus stop box the cycle lane will stop (red chipped surface is continued through) and continue immediately after the bus stop box. See hard segregation factsheet for alternative approaches – 'floating' bus stops.

LCDS, 2016


LCDS, 2016


LCDS, 2016

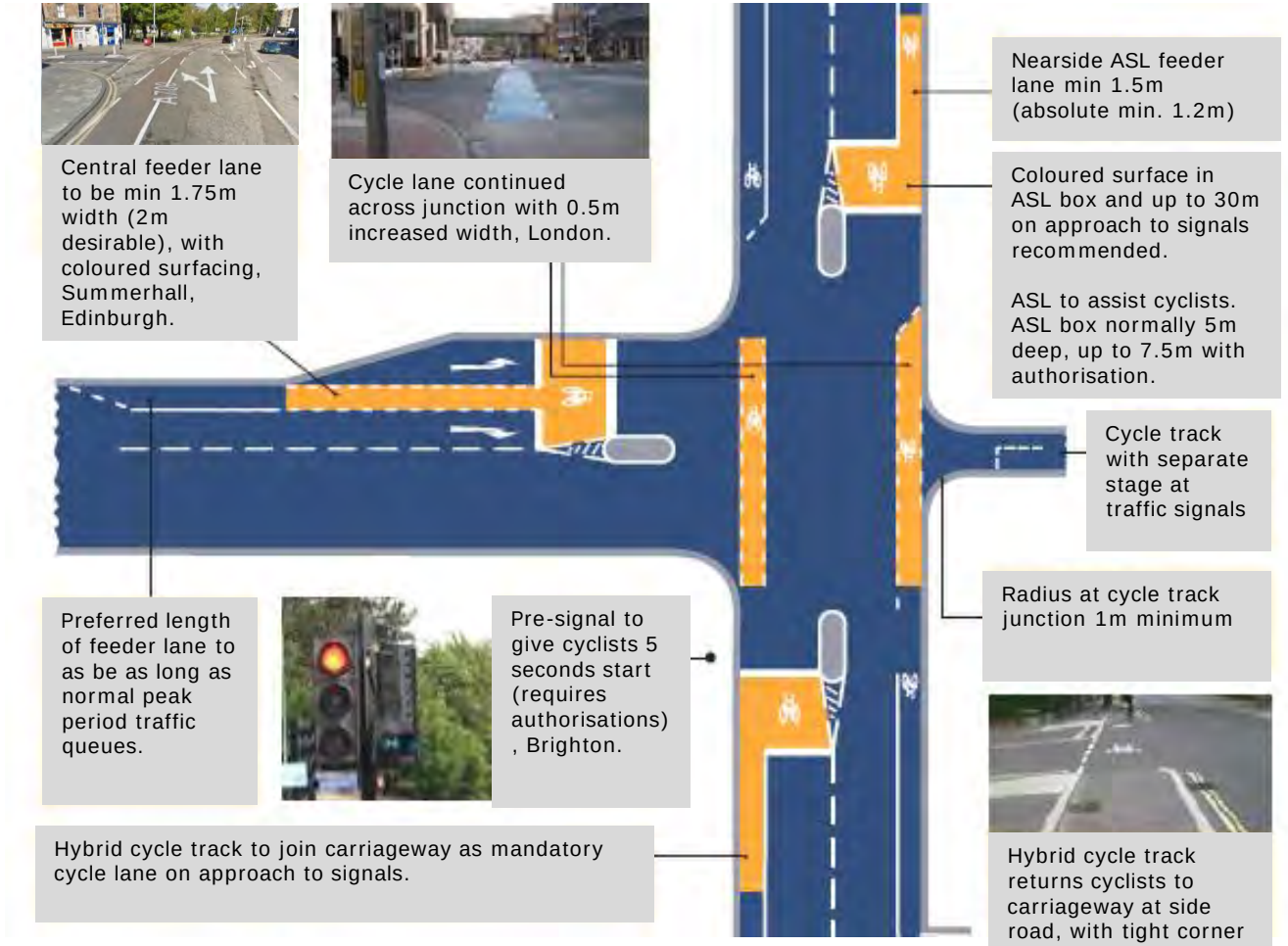

DfT, 2016

Relevant Factsheets:
Segregated Cycle Lanes: Soft Segregation (C3)
Segregated Cycle Tracks: Hard Segregation (C4)
Designing for Cycling (P1)
Mandatory Cycle Lanes (C2)
Advisory Cycle Lanes (C2)

Advisory and Mandatory Cycle Lanes: Integration with Junctions

Central feeder lane to be min 1.75m width (2m desirable), with coloured surfacing, Summerhall, Edinburgh.

Cycle lane continued across junction with 0.5m increased width, London.



Nearside ASL feeder lane min 1.5m (absolute min. 1.2m)

Coloured surface in ASL box and up to 30m on approach to signals recommended.

ASL to assist cyclists. ASL box normally 5m deep, up to 7.5m with authorisation.

Cycle track with separate stage at traffic signals

Radius at cycle track junction 1m minimum

Preferred length of feeder lane to as be as long as normal peak period traffic queues.

Pre-signal to give cyclists 5 seconds start (requires authorisations) , Brighton.

Hybrid cycle track to join carriageway as mandatory cycle lane on approach to signals.

Hybrid cycle track returns cyclists to carriageway at side road, with tight corner radii and raised crossing.

Dashed markings used to show continuity of lanes through junctions, London. (LCDS, 2016)

Note: coloured surface in drawing should be replaced by red chipped surface in Edinburgh Image source: SUSTRANS, HfCD, 2014, some pictures from Google Maps, 2017

Relevant Factsheets:
Segregated Cycle Lanes: Soft Segregation (C3)
Segregated Cycle Tracks: Hard Segregation (C4)

Image References

Cycle Lanes
Advisory Cycle Lane: The City of Edinburgh Council 2016
Mandatory Cycle Lane: Google Maps [ONLINE]. Available at: https://goo.gl/maps/JZ6V834USxo [Accessed 20 November 2017]

Mandatory Cycle Lanes
Mandatory Cycle Lanes (advisory through side road junction: TfL, London Cycling Design Standards, 2016
Parking and Loading: TfL, London Cycling Design Standards, 2016
Crossings: TfL, London Cycling Design Standards, 2016
Side Roads: TfL, London Cycling Design Standards, 2016
Bus Stops: DfT, Improving Lewes Road in Brighton for buses, cyclist and pedestrians, 2016 [ONLINE]. Available at: https://www.gov.uk/government/case-studies/continuous-cycle-lanes-on-main-radial-route-lewes-road-brighton [Accessed 20 November 2017]

Advisory and Mandatory Cycle Lanes: Integration with Junctions
Main Image: SUSTRANS, Handbook for Cycle Friendly Design, 2014
Central feeder lane: Google Maps [ONLINE]. Available at: https://goo.gl/unn436 [Accessed 20 November 2017]
Cycle lane continued across junction: SUSTRANS, Handbook for Cycle Friendly Design, 2014
Hybrid cycle track: SUSTRANS, Handbook for Cycle Friendly Design, 2014
Pre-signal: SUSTRANS, Handbook for Cycle Friendly Design, 2014
Dashed markings: TfL, London Cycling Design Standards, 2016

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C4 – Segregated Cycle Tracks: Hard Segregation

Amendments:

Segregated Cycle Tracks – Hard Segregation

Segregated on-street cycle tracks involve the use of features such as kerbs, separating strips, islands, grass verges or planting to create a continuous physical barrier, the **"buffer" between moving** or parked vehicles and cyclists.

The buffer can be designed to provide additional amenities for the street – cycle stands, trees or planting and loading space.

See widths for buffer for various uses on Buffers / Islands factsheet.

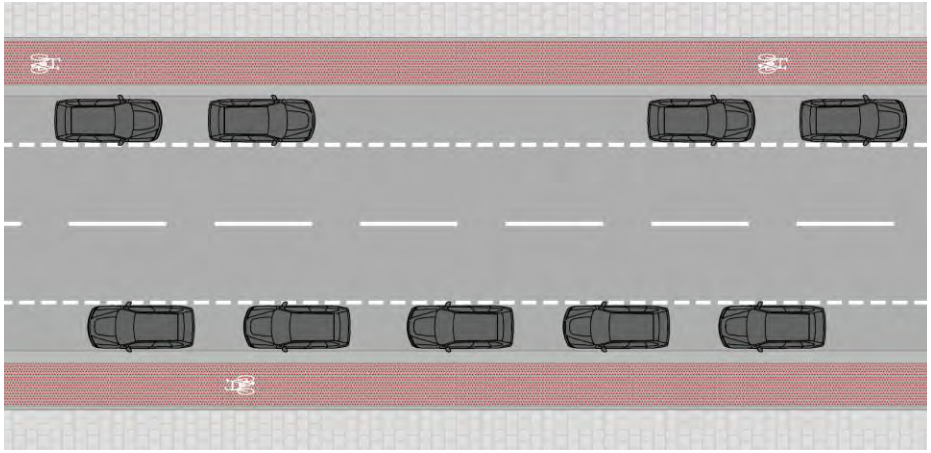
The main planning and design challenges arise at junctions and in relation to kerbside activity, particularly at bus stops and where parking and loading take place.

Waterloo Street, Glasgow

The City of Edinburgh Council

Bunhill Row, Islington (contraflow)

LCDS, 2015



DWG ref: HS-DR-C-0002

- One-way with flow in each direction – Given sufficient space this will often be the best option. Provides more straight forward design at junctions, especially non-signalised side roads.
- Two-way in one direction – Requires less space than one-way but junction design is usually more challenging and less easy to integrate at ends of facility. Can work well when there is more demand for parking/loading and bus stops etc. on one side of the road.
- Central cycle tracks – Exceptional circumstances only.

Relevant Factsheets:
Buffers / Islands (C4) Parking and Loading (G9) Street Trees (F5)

Segregation and User Needs

Balancing user needs

Designers' obligations under the Equality Act (2010) are particularly significant, given that segregated cycle lanes/tracks can introduce infrastructure that could be difficult to negotiate for people with protected characteristics under the Act.

It will usually be impossible for the designer to fully meet all user needs in designing segregated cycle infrastructure. Even the same user group may have different needs at different times. For example a blind person will benefit from a clear kerb to a cycleway when walking along a footway, but this same kerb will be a barrier to crossing the cycleway.

Overall, the design should aim to balance user needs appropriately, taking into account the ability of different user groups to adapt as well as relative numbers. Bear in mind that cyclists using a segregated cycleway will include children, older people and others who are less confident on a bike, as well as more confident individuals.

Actions

- Engage access groups and representatives; and
- Prepare an Equality and Rights Impact Assessment (ERIA) to address the issues in the table and arising from any consultation process.

Key user considerations when designing segregated cycle track /lanes

(Adapted from London Cycling Design Standards, 2015)

User Groups	Considerations
Cyclists	• Providing a clear and obvious route/path • Enabling a good cruising speed (10 – 15 mph) in locations where fewer conflicts are likely • Encouraging low speeds and courteous behaviour in locations where more conflicts are likely.
Pedestrian movements	• Pedestrian desire lines and legibility of infrastructure • Catering for desire lines including providing formal/informal crossing points • Considering trip hazards.
Blind or partially sighted people	• Provision of crossing points with tactile paving, and dropped or raised as appropriate • Physical segregation between cyclists and other users should be detectable by those with little or no vision; ground level detection should be available to ensure that long cane users can identify the segregated area
People using wheelchairs, pushchairs or buggies, or those with ambulant disabilities	• Provision of crossing points as for blind/ partially sighted people • Enabling easy access to footway from taxis and likely blue badge parking (including sections of yellow lines likely to generate such parking) • Provision of parking for blue badge holders.
Bus and coach infrastructure	• Pedestrian access to stops • Cycle provision at the stops • Interaction between waiting passengers and passing cyclists
Parking and loading	• Retaining and managing kerbside activity: appropriate line markings and enforcement, timing of deliveries • Potential for insetting bays or 'floating' them (between the cycle lane/track and the general traffic lane) • Access for blue badge holders
Personal security	• Appropriate lighting and visibility to and from the cycle facility where it is separate from the main carriageway
Motor vehicle access	• Breaks in segregation at junctions and to allow access to properties

Relevant Factsheets:
Segregated Cycle Lanes – Soft segregation (C3)
Pedestrian Desire Lines (P2)
Equality & Rights Impact Assessment (P2)
Crossings (G4)
Tactile Paving (M4)

Cycle Tracks on Hills

Cyclists can move much faster downhill than uphill. This is a key design consideration in Edinburgh.

Key considerations

Provision of infrastructure

If there is only space for segregation on one side of the road, provision should be made uphill because the difference in speed between cyclists and other traffic is much greater.

One-way cycle tracks

The buffer, and ideally cycleway, should be wider downhill.

Two-way cycle tracks

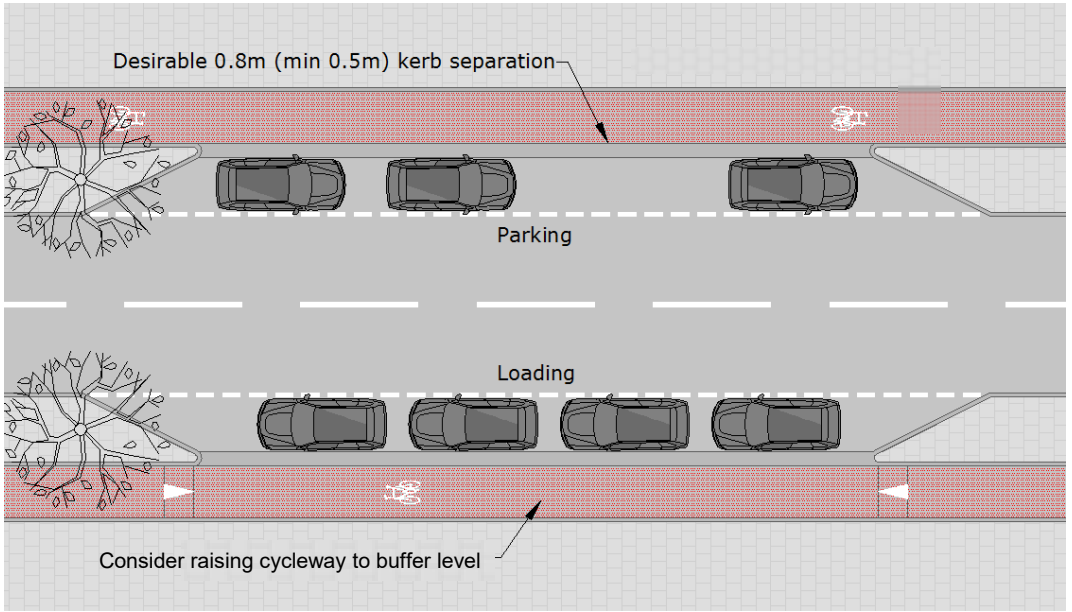
Other things being equal, uphill cyclists should be next to the buffer and traffic to reduce speed differentials.

Downhill speed reduction

Measures to reduce cyclists' speeds including raised areas and deviations in the cycle track should be considered.

Junctions

Intervisibility between driver and cyclist is critical on downhill approaches to side roads. Consider 'bending out' one-way cycleway.



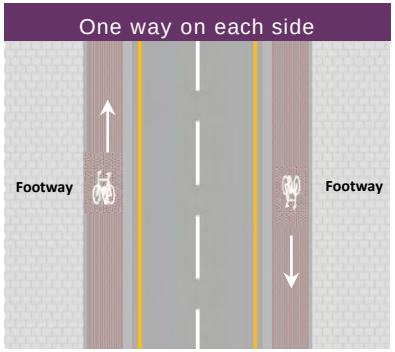
DWG ref: HS-DR-C-0010

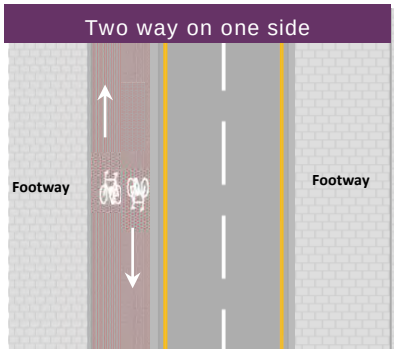
One and Two-way Cycle Tracks

A key design choice in providing segregated cycle ways is whether to have a one way track on each side of the road or two-way on one side. (Two-way on each side or one way on one side may sometimes also be options).

One way tracks on each side is sometimes seen as the norm and this layout has the advantage of being intuitive and easy to extend incrementally. In new development it should be the default option. However space constraints and other factors (see pros and cons table) can favour the two-way option.

	One way on each side	Two way on one side
Pros	• Intuitive design and road position. • Usually easier to integrate at junctions. • Usually easier to integrate into an un-segregated road layout at start and end of facility. • Related to above, usually needs less traffic management.	• Requires less space. • Scope to position cycleway on side of street that has less frontage activity or fewer conflicts with major side roads. • Greater cyclist 'presence' because larger numbers on the track. • Scope to increase separation of faster downhill cyclists from parked/loading vehicles if the cycle track is on the downhill side of the road. • More flexibility to deal with 'tidal' flows.
Cons	• Needs more road width than two way on one side. • Inability to locate track to minimise conflicts (e.g. At major junctions or with loading/parking). • Because of above, likely to create many conflicts with parking and loading on constrained streets.	• Unintuitive design, cyclists in unexpected places and travelling in opposite direction to expected. • Harder to integrate at junctions, especially at signalled junctions. • Harder to integrate into an un-segregated road layout at start and end of facility.





The City of Edinburgh Council

Visualisation of protected two-way cycleway on Haymarket terrace. Two way track used because the lesser overall space requirement means loading can be retained **and 'floating' bus stops** installed.

Two-way Cycle Tracks: Opportunities and Challenges

Opportunities
Ability to create a segregated cycle facility where there is no space for one-way cycle tracks on both sides of the road.
Where kerbside activity or side road access may be reconfigured so as to take place largely on one side
Arterial roads such as dual carriageways with infrequent crossings
One-way systems and gyratories
Where buildings, businesses or side roads are entirely or largely on only one side

Challenges
Can be unintuitive and generate risks associated with motorists and pedestrians not looking both ways when crossing a track
Complex arrangements at junctions and side roads, often with some confusion about priorities (see section 5.3.4 for more details)
Complex transitions to one-way, with-flow cycle provision
Connectivity for cyclists to and from the track can be difficult to manage
Need for greater use of signal controlled crossings for the above reasons

St Leonards St, Edinburgh

The City of Edinburgh Council

Buccleuch St, Edinburgh

The City of Edinburgh Council

The use of a centre line (to TSRGD diagram 1008) and/ or cycle symbols (diagram 1057) on two-way tracks can remind users that the track is two-way, and will help distinguish it from an adjacent footway.

TSRGD 2016 allows use of route numbers, cycle loops and arrows. Half width centre lines (diagram 1008) can also be used.

Widths: One-way and Two-way

Even small increases in cycle track width are beneficial. So in constrained situations a 2-way path 2.1m or 2.2m wide can create better riding experience for cyclists than 2.0m.

If cycle use is modest, local reductions to 1.25m for a 1-way path and 1.75m for two-way path may be acceptable in very constrained locations.

Footway and cycleway widths should reflect likely pedestrian and cycle flows. In streets with high pedestrian flows the footway should usually be wider than the cycleway.

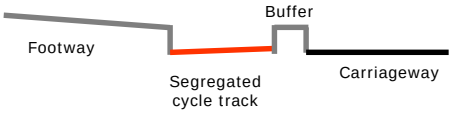
Table 1. Minimum cycle track widths

Widths	One-way	Two-way
Absolute min	1.5m*	2.0m*
Desirable	1.75m	2.5m
High flows	2.0m +	3.0m +

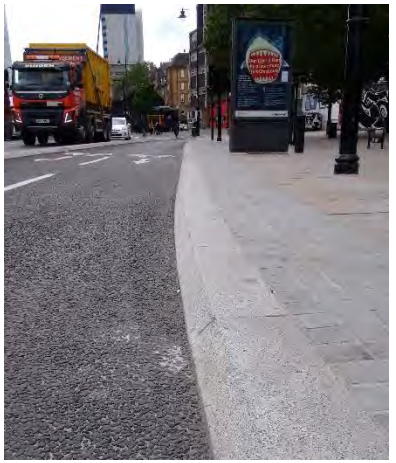
*A reduction of up to 0.25m may be acceptable in some cases

Cross Section

A key issue for segregated cycle tracks is level differences between pedestrians, cyclists and motor traffic.



When deciding cross section, address the issues highlighted in 'Segregation and User Needs' factsheet.



The City of Edinburgh Council

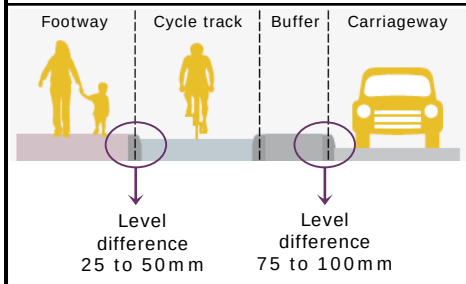
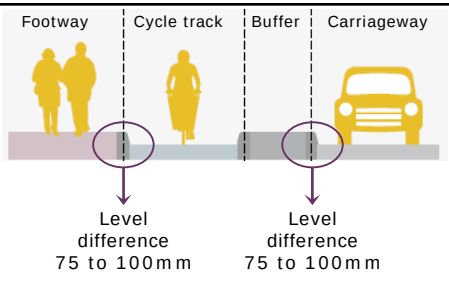
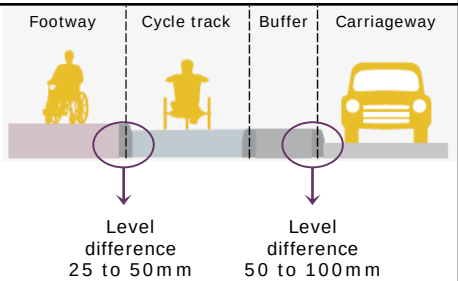
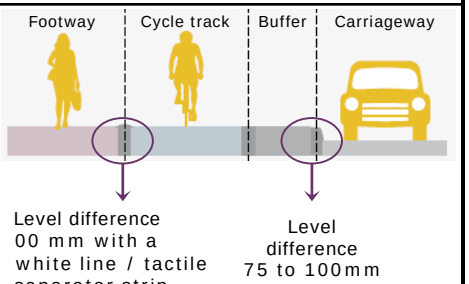
Cycle track kerbs

A full or half height battered kerb should be used to maximise the effective width of the cycle track. See Splay / Battered Kerb for Cycle Tracks for more information.

Buffer / islands

The type of separation used has a direct relationship with the degree of protection and subjective safety offered to cyclists. See Buffers/Islands factsheet for details.

Cycle Track Cross Section Options

Option 1	Option 2	Option 3	Option 4
			
Cycle track at intermediate level	Cycle track at carriageway level	Cycle track and buffer at same intermediate level	Cycle track at footway level
Pro's • Relatively easy for pedestrians/loading to cross. Discourages cycle encroachment on to footway • 50mm kerb can be detected by visually impaired users. **Con's** • Potentially complex drainage (consider gaps in the buffer). • Kerb <50mm difficult to detect for visually impaired users.	**Pro's** • Potentially cheaper than Option 1 especially if gaps in buffer for drainage. • Very clear pedestrian/cycle separation. **Con's** • Inconvenient/difficult to cross cycleway.	**Pro's** • Cheaper than Option 1 with raised buffer. • Easier to cross than Option 1 with raised buffer. **Con's** • Lower kerb to carriageway means less disincentive for parking/loading using cycleway.	**Pro's** • Easy to cross cycleway. • Simple drainage. **Con's** • Tactile separation of cycleway/footway takes more space than kerb. • More potential for cyclist encroachment on to footway.
Likely to be preferred for new construction in locations with medium to high pedestrian activity; except where pedestrian crossing movements are highest.	Likely to be preferred in areas of lower pedestrian activity where existing kerb line can be retained.	Likely to be preferred over option 1 for cost reasons where parking/loading pressures are lower.	Likely to be preferred where frequent pedestrian crossing of cycleway is expected. e.g. busy shopping street.

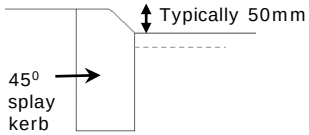
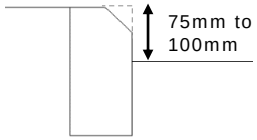
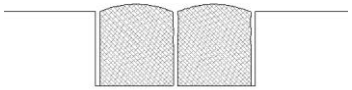
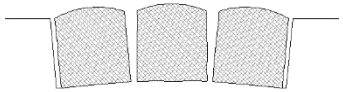
Diagrams adapted and modified from London Cycling Design Standards, 2016

Relevant Factsheets:

Integration with Parking and Loading (C4) Buffers/ Islands (C4)

Kerbs and Other Separation Options

Footway to cycleway

Option 1 / 3	Option 2	Option 4.1	Option 4.2	Option 4.3
		 Corduroy tactile slab	 Setts or blocks	 Setts

- The kerb facing the cycle track should be a Splay / Battered kerb (45 degree face) as this presents less of a danger to cyclists of catching their pedals, allowing them to utilise the full width of the cycle track. This is particularly relevant where the track installed is at the minimum desirable width.
- Retaining an existing vertical kerb can be acceptable if the cycle track is wider and/or use is likely to be modest.
- Transitions from angled kerbs to other profiles can be complex to construct and so it is recommended that angled kerbs are used consistently on a link.
- Tactile slabs provide a standardised warning for blind and partially sighted users, however they are not well suited to laying on curves.
- Setts or blocks provide a non-standardised alternative option better suited for laying on curves and less visually intrusive. Depending on the profile of the top surface, they may offer a greater deterrent to cyclists (particularly option 4.3).

Buffer/Separation Strip

Buffer materials

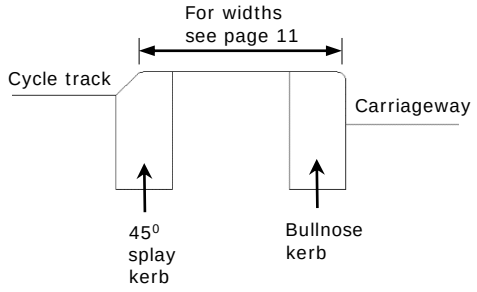
Narrow buffers

- Splay kerb and bullnose kerb (see option 1.1) with:
  - Asphalt infill with (anti-skid) coating; or
  - Setts or blocks infill;
- Integrated single block (See option 1.2 adjacent);

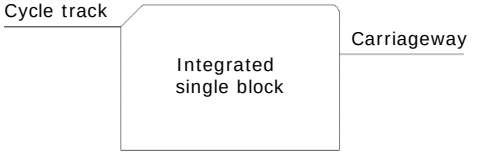
Wider buffers

- As above, simply larger, but <u>not</u> integrated single block (see option 2);
- Other infill options available for wider buffers are:
  - Paving;
  - Verges with or without tree planting; or
  - Inset parking and/or loading areas.

Option 1.1



Option 1.2

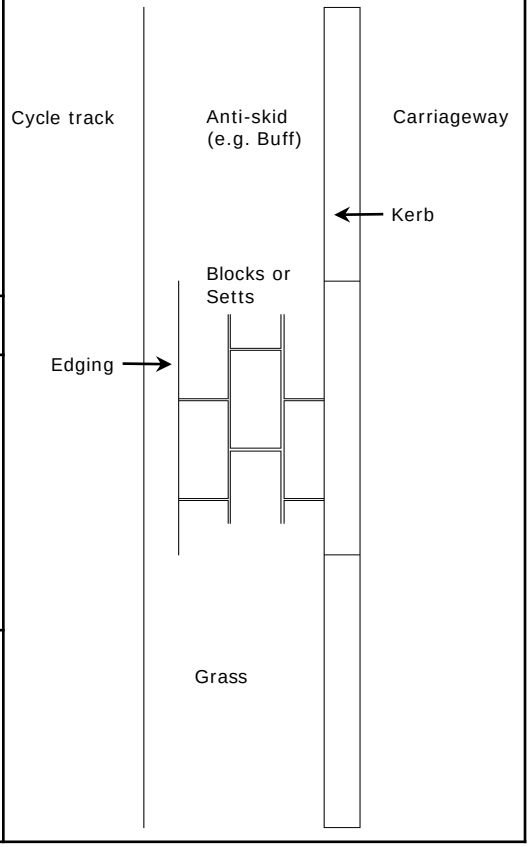


Option 2

As option 1.1 but with larger upstand from cycle track to buffer.

Infill Options

<u>Plan view</u>



Buffers / Islands

Buffers or islands are used to protect cyclists from moving traffic. They also provide a space for people entering or leaving vehicles at the kerbside, loading / unloading and for pedestrians to pause when crossing the road.

The type and width of buffer (e.g. island, verge, etc.) has a major influence on how safe users of the cycle track will feel and on activities such as loading / unloading.

The greater the width of the buffer, and the more continuous it is, the higher the degree of protection, but this has to be balanced with availability of space and meeting other user needs.

The appropriate width depends on many factors and an assessment of risks on a site-by-site basis.

Width of cycle lane/track, frequency and size of gaps and type of kerb all need to be considered in relation to access by vehicles for maintenance, cleaning, clearing of leaves and winter gritting.

Kerbside activity affects the width of the buffer and gaps required in the buffer strip.

A green verge/strip for trees, Utrecht

Stand alone kerb, Copenhagen

Hard surface area for cycle parking/ loading space or protection for pedestrians wanting to cross the road Illustrative London scheme

Hard surface buffer zone in Buccleuch Street, Edinburgh

Images: top and bottom left (LCDS, 2016), bottom and top right (The City of Edinburgh Council)

Buffer / Island Widths

Absolute min. width (m)	Desirable width (m)	Situation
0.25[1]	0.5	No parking or loading permitted/likely. Absolute min. required back to back kerbs.
0.4[2]	0.5	At the beginning of the segregation to accommodate a flexible post (100mm wide)
0.6[2]	0.6[2]	At the beginning of the segregation to accommodate a blank bollard (300mm wide)
0.5	0.8+	Where an adjacent parking or loading bay is provided. Prioritise widening on downhill gradient.
1.0	1.0+	Where any planting other than trees is included in the island
1.0	1.2+	For uncontrolled / informal pedestrian crossings of the cycle track
0.9[3]		For an island with low-level signal pole
1.5	2.0	For an island with trees
0.7[4]		For an island with a traffic signal pole
0.25[1]	0.5	For controlled pedestrian crossings
1.8		Where pedestrians or wheelchair users from disabled or community transport vehicles set down
4.5	5.0	At priority junctions to accommodate one vehicle turning in and giving way to the cycle track

Notes:
1.Not acceptable for two-way cycleway if significant numbers of buses of HGVs use inside lane.
2.Based on 200mm clearance on road side and 100mm on the cycle side
3.This assumes 450mm clearance to carriageway, 250mm signal head width and 200mm clearance to cycleway
4.7m width assumes a cranked signal pole to make the best use of space. A wider island would be required if the pole is not cranked

Key considerations

- Consistency of width of the cycle facility and of the adjacent general traffic lane .
- Consistency of island width.
- Gradient - wider buffer is more important downhill.

Relevant Factsheets:
Integration with Parking and Loading (C4) Integration with Side Road Provision (C4)

Start of segregation

If the cycleway would otherwise appear to form part of the carriageway, the start of a segregation island/buffer should be marked with a bollard/flexible post;

Using a demountable bollard in breaks in the segregating island allows access for maintenance vehicles.

Generally omit the bollard or flexible post:

- where segregation breaks and recommences at a pedestrian crossing.
- where markings clearly direct other road users away from the buffer (with hatching as necessary).
- when there is good visibility (well-lit at all times of day and night) and visual contrast between kerb and carriageway surface.
- on a link, where a mandatory cycle lane becomes a segregated cycle track without any likely turning movements at that location.

Signs/equipment/bollard on buffers/islands

- 100mm clearance between a sign/equipment/bollard and the cycle track.
- 200/300mm clearance between equipment/bollard/sign and carriageway

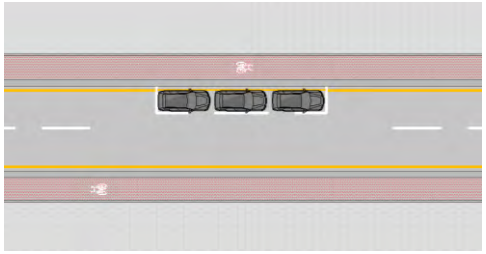
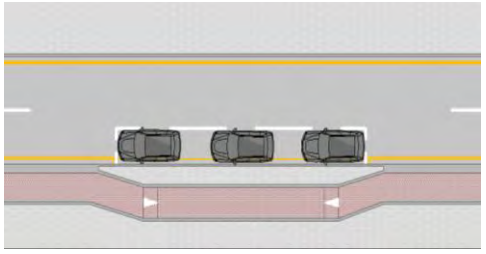
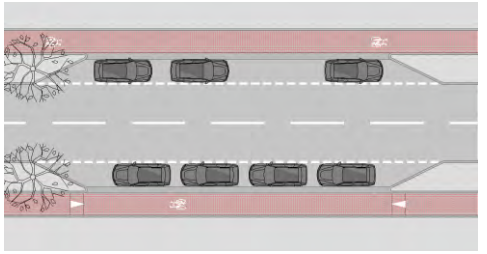
Where effective width of a one-way cycle track is 2m wide or more, the risk of providing 100mm clearance to a sign is low. Risk will increase with two-way cycle movement and where space dictates that overtaking and passing manoeuvres are likely to bring cyclists close to the kerb edge.

Bollard at the end of a segregated cycleway, showing the greater clearance to the carriageway

Image: SUSTRANS

Relevant Factsheets:
Street Furniture (F1)

Integration with Parking / Loading : Options

	A1. Floating Parking Bays	A.2 Floating Loading Island	B. Parking / Loading Bays inset into separating island
			
Suitability according to:			
Traffic flow	Allows use of bays for traffic movement at busy times.	Allows use of bays for traffic movement at busy times.	Less disruptive to traffic flow while bays are in operation.
Parking / loading needs	Works better for short term, off-peak parking/loading and small deliveries	Any / All especially for high volume and size deliveries	As A.2.
Space	Least space requirement.	Medium space requirement.	Biggest space requirement.
Cost	Lowest	Medium	Highest
2-way cycle track	OK	OK	OK

Option A.1: Floating Parking/Loading Bays

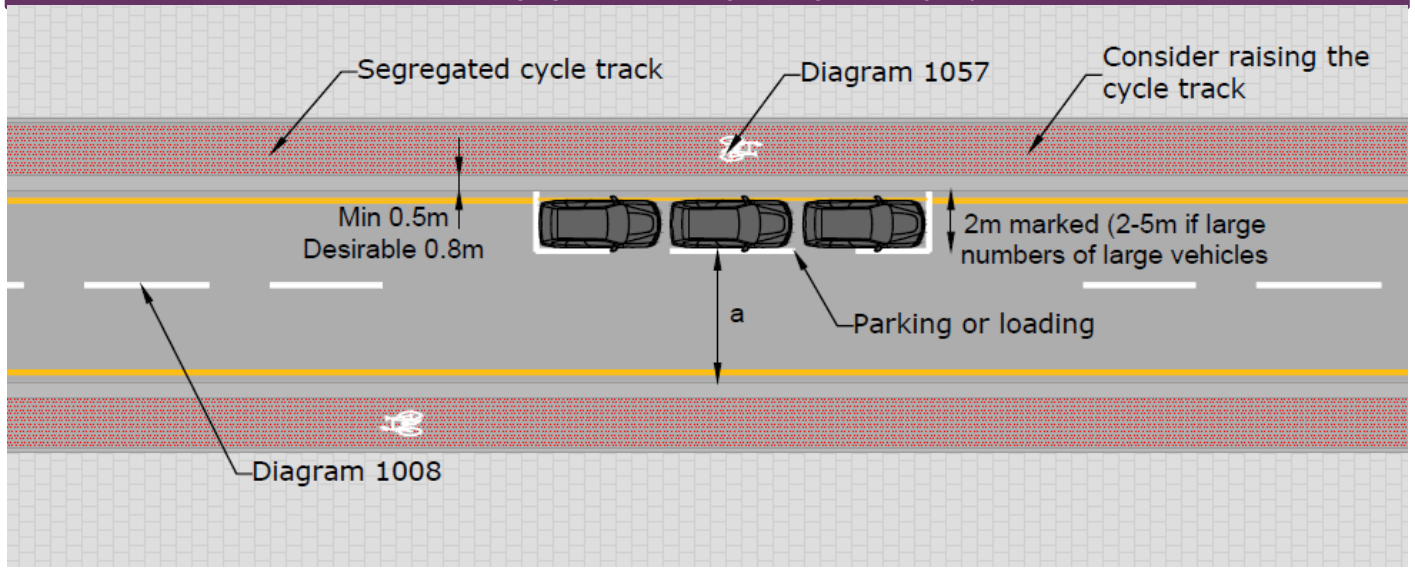
Clearly defined parking/ loading bays should be located outside the segregated cycle track with a min 0.5m (desirably 0.8m+) buffer zone for door openings.

This type of solution should be the default. However issues such as high cyclist speeds downhill or major issues with interaction between loading vehicles and overtaking traffic warrant consideration of alternatives.

Other options include:

- Raised loading islands where kerbside storage is needed during loading/unloading.

Hard segregation at Floating Parking / Loading Bay



DWG ref: HS-DR-C-0001

Absolute min. residential carriageway width (a)	Situation
4.3m	One way or low flow 2-way
5.0m	Low to medium flow 2-way, minimal buses or large vehicles
6.0m	Medium flow 2-way, low bus flow (≤10 per hour in both directions)
7.0m	Higher flows and/or ≥10 buses per hour in both directions)

Design requirements

Cycle track Width: 1.75m desirable, 1.5m absolute minimum.

a. ≥ 4.3m abs (≥7 on strategic streets with busy bus routes)
   If 3.8m ≤ a ≤ 4.5m remove centre line

b. =2m generally

Relevant Factsheets:
Buffers / Islands (C4) Segregation and User Needs (C4) Kerbs and Other Separation Options (C4)
Carriageway Widths (G2)

Option A.2: Floating Loading Islands

Loading islands should be provided if more space is needed for door openings and stacking goods.

Design Requirements

Loading island:

a. See Option A.1 See widths table page 6.

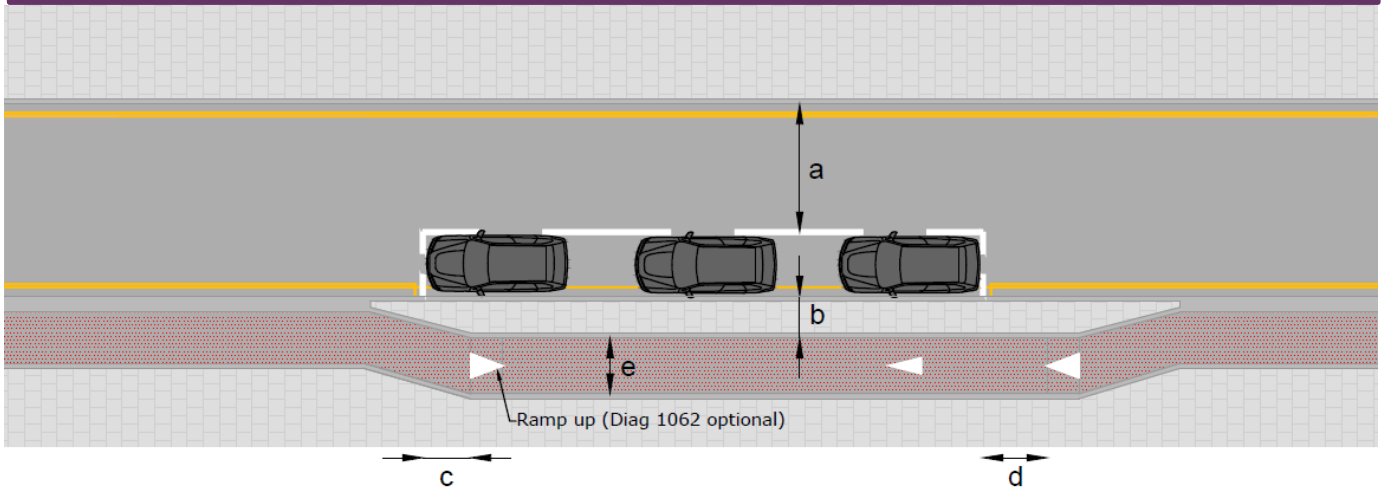
b. 1.5m preferable, 1.2m desirable min, 0.8 absolute min. (1.8m where disabled parking or community vehicles set down)

c. 1.5m max.

d. 2.0m min (to allow space to load/unload from rear of vehicle)

e. Local reductions to 1.25m (1-way) or 1.75m (2 way) may be acceptable

Hard segregation at Loading Island



DWG ref: HS-DR-C-0011

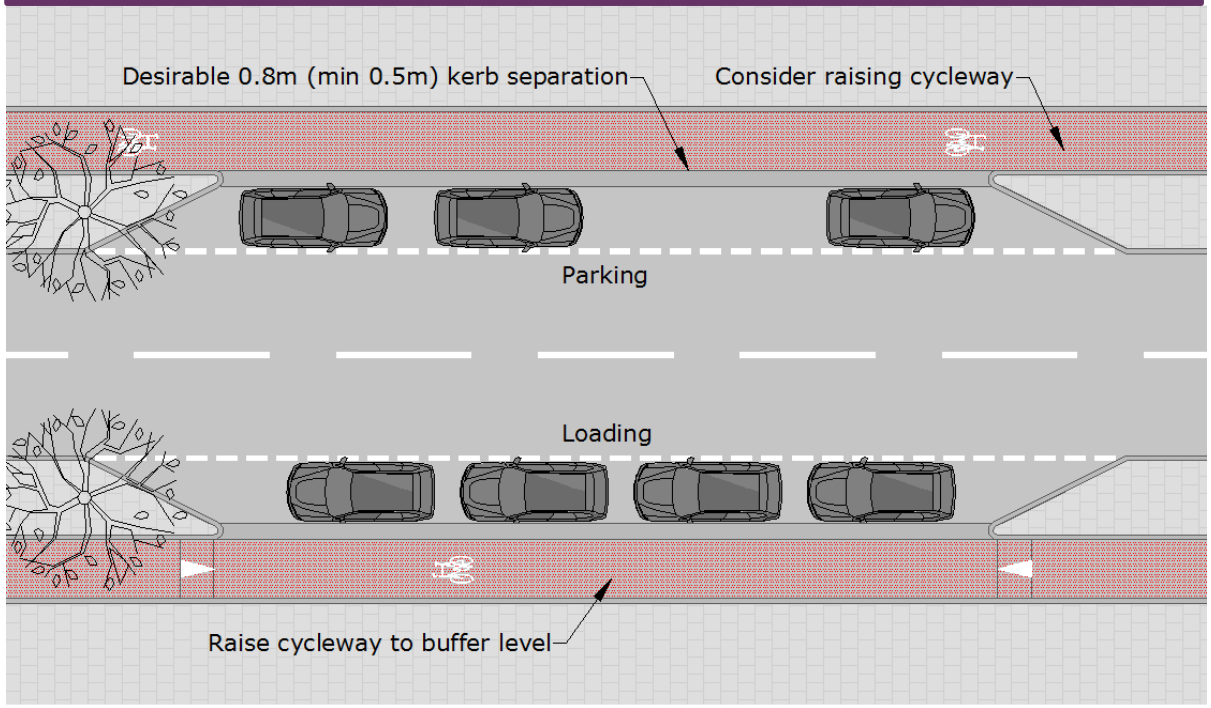
Option B: Parking/Loading Bays inset into separating island

Parking / loading bays can be positioned between the cycle track and moving traffic in inset bays.

A separation island (desirable width of 0.8+) or soft segregators if cycle track is on carriageway level, can be used to provide protection between the cycle track and the bays. This will minimise the risk of collision between cyclists and car doors.

Separation using car parking in Newham, London (LCDS, 2016)

Inset Parking and Loading bays



DWG ref: HS-DR-C-0010

Relevant Factsheets:
Buffers / Islands (C4) Segregation and User Needs (C4) Kerbs and Other Separation Options (C4)

Integration with Bus Stops : Options

	A. Floating bus stop 1.Bus shelter located on island 2. Bus shelter located on footway	B. Cycle track through bus boarder	C. Shared use footway
Suitability according to:			
Cycle flows	All	Better at medium to low	Less suitable the higher the flow
Type of cyclist use	Any/all	Any/all but harder to negotiate than A	Less suitable for significant commuter flows, especially if pedestrian numbers are significant.
Bus passenger numbers	Any - best option for high numbers	Suggest suitable for max 12 buses per hour stopping	Similar to B, comparative suitability depends on other factors
Available space	Biggest space requirement	2nd biggest space requirement	Smallest space requirement
Budget	High	Medium	Medium to low
Uphill/downhill (ie cyclist speed issues)	Better than B for downhill	Downhill problematic – suggest vertical cyclist traffic calming if used	Potentially better than B but worse than A for downhill
2-way cycle track	Consider inter-visibility of cyclists and bus stop users particularly carefully	Poor - only consider exceptionally	Better than B, worse than A
Key advantages	• Clear separation of cyclists and pedestrians • No conflict with bus passengers as they are getting on or off buses	• Less space and lower cost than option A • Layout easy to 'read' and less visually contrived than A	• Simple layout • Can work with less space than A or B
Key disadvantages	• Highest space requirement	• Risk of collisions between boarding/alighting passengers and cyclists – especially downhill (high cycle speeds)	• More potential for pedestrian / cycle conflict than A • Lack of clarity
Key design considerations	Generally best but needs the most space.	Essential to clearly signal to cyclists that bus users have priority - (raised) informal zebra	Only likely to be suitable in situations where bus passenger numbers or cyclist speeds are low

Consultation

Any proposal for cycling provision at a bus stop should involve consultation with pedestrian user groups and bus operators.

Floating Bus Stop Considerations

Volume of users

The likely number of waiting passengers must be taken into account when considering the size of bus boarder islands and other issues, such as the location and design of shelter on the islands. In cases where regular overspill of pedestrians onto the cycleway appears likely, the benefits of providing a protected cycleway must be balanced with the disadvantages of conflict at a floating bus stop. Measures to reduce conflicts that may result from overspill should be considered.

Vulnerable users

The provision and design of floating bus stops in close proximity to schools, hospitals, sheltered housing etc. should be given careful consideration as these are likely to generate larger than normal numbers of vulnerable bus users.

Visibility

Ensure that the placement and design of bus shelters considers the visibility of pedestrians crossing the cycle track from the footway so that the intervisibility between pedestrians and cyclists is not compromised. Consider omitting advertising end panels

Crossings

- Crossings should be on main pedestrian desire lines.
- Footway level crossings are preferred to emphasise pedestrian priority and to encourage speed reduction and courtesy from cyclists, especially where the cycle track is two way.
- Use flush kerbs and tactile paving where appropriate.
- Provide road markings on either side of the cycle track at the crossing locations to advise pedestrians of the direction of travel of cyclists.
- Use Diagram 1057 of Chapter 5, Traffic Signs Manual and "SLOW" markings to encourage cyclists to reduce speed.

Type

- Crossings over segregated cycle lanes can be uncontrolled or controlled.
- A Zebra-style cycle track crossing (allowed in TSRGD, 2016) with tactile paving and narrower stripes can be used for bus stop access and is recommended.
- In situations where large numbers of pedestrians (especially the most vulnerable pedestrians) and large numbers of cyclists are expected, it may be appropriate to consider installing a formal zebra crossing with suitable tactile paving.

Materials

Generally it will be appropriate to continue the contrasting red-chipped asphalt of the cycleway through the floating bus stop area for clarity of the cycle route and to assist users with visually impairments.

At the busiest bus stops in areas with flagged footways, use of smooth blocks in a visually distinct material may be appropriate.

Uncontrolled crossing, Brighton

Sustrans

Controlled crossing, Hoe Street, London

Google Maps, 2017

Relevant Factsheets:

Integration with Bus Stops (C4)
Buffers/Islands (C4)
Segregation and User Needs (C4)
Kerbs and Other Separation Options (C4)
Tactile Paving (M4)

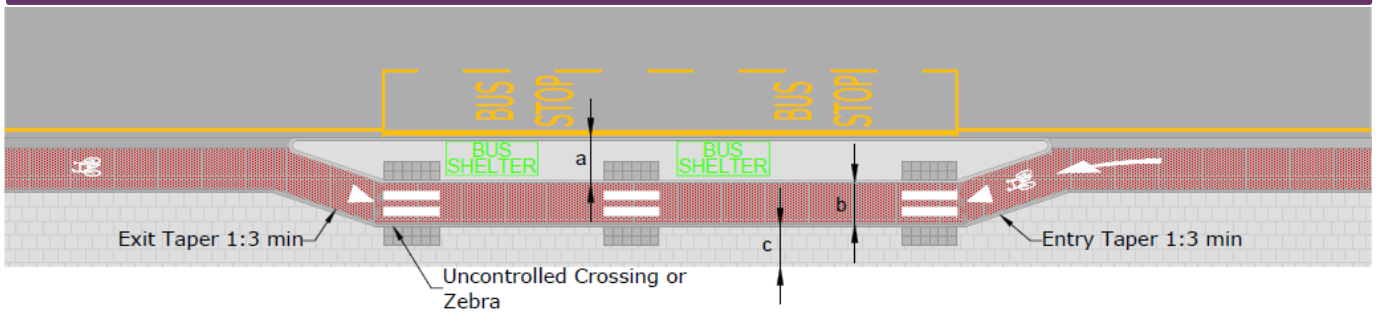
A.1: Floating Bus Stops – Bus shelter located on island

At floating bus stops passengers board and alight from an island between carriageway and cycle track.

Option 1

Where widths allow, the bus shelter can be located on the island. Access to bus shelter/stop on the island is provided by uncontrolled or mini zebra crossings.

Floating Bus Stop – Bus shelter located on island



DWG ref: HS-DR-C-0017

Floating Bus Stop, Brighton & Hove (LCDS, 2016)

Widths for bus shelter on island

(shelter is set back min 0.5m from the front kerb edge)

	Desirable Minimum			Absolute Minimum		
(a) island	Shelter width +0.5m front +0.5m back set back (Min 2.2m with cantilever bus shelter)					
(b) cycleway	1.5m (1-way) 2.5m (2-way)			1.2m (1-way) 2.0m (2-way)		
	Low ped. use	Medium ped. use	High ped. use	Low ped. use	Medium ped. use	High ped. use
(c) footway	2.0m +	2.5m +	3.0m +	2.0m +	2.5m +	2.5m +
Total width for 1-way	5.7m (4.3m + shelter width)	6.2m (4.8m + shelter width)	6.7m (5.2m + shelter width)	5.4m (3.7m + shelter width)	5.65m (4.75m + shelter width)	5.9m (5.0m + shelter width)
Total width for 2-way	6.7m (5.3m + shelter width)	7.2m (5.8m + shelter width)	7.7m (6.3m + shelter width)	6.2m (4.5m + shelter width)	6.45m (5.55m + shelter width)	6.7m (5.8m + shelter width)

Relevant Factsheets:
Buffers / Islands (C4)
Segregation and User Needs (C4)
Kerbs and Other Separation Options (C4)

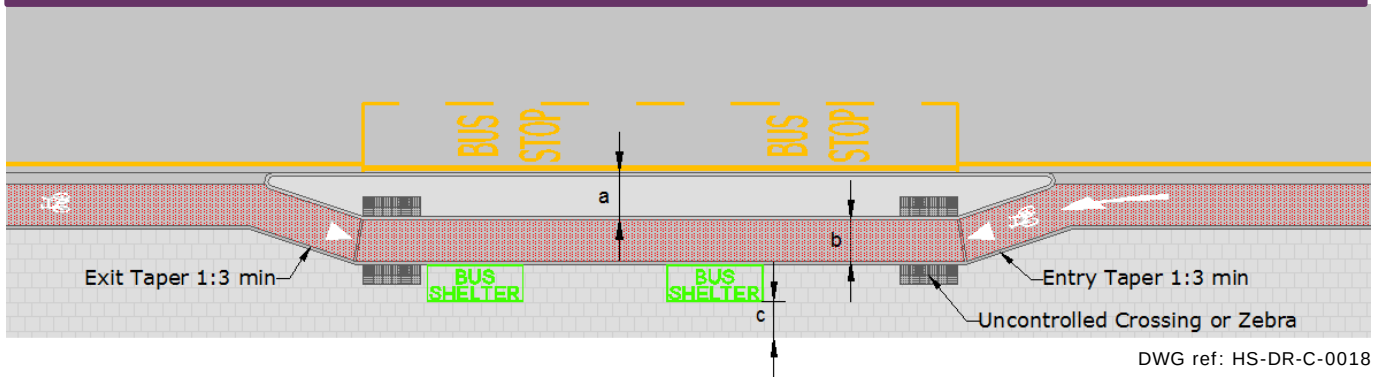
A.2: Floating Bus Stops – Bus shelter located on footway

At floating bus stops passengers board and alight from an island between carriageway and cycle track.

Option 2

If widths do not allow locating the shelter on the island, it can be located on the footway instead. Access to island for boarding / alighting is provided by an uncontrolled mini zebra crossings. Only marginal space savings over option 1 are possible.

Floating Bus Stops – Bus shelter located on footway



DWG ref: HS-DR-C-0018

Widths for bus shelter on footway

(shelter is set back min 0.5m from the cycleway kerb edges)

	Desirable Minimum			Absolute Minimum		
(a) island	2.0m			1.5m		
(b) Cycleway	1.5m (1-way) 2.5m (2-way)			1.2m (1-way) 2.0m (2-way)		
	Low ped. use	Medium ped. use	High ped. use	Low ped. use	Medium ped. use	High ped. use
(c) footway	Shelter width + 0.5m back set back					
	2.0m	2.5m	3.0m	2.0m	2.5m	3.0m
Total width for 1way	5.5m (5.3m + shelter width)	6.0m (5.8m + shelter width)	6.5m (6.3m + shelter width)	4.7m (4.5m + shelter width)	5.2m (5.0m + shelter width)	5.7m (5.5m + shelter width)
Total width for 2way	6.5m (6.3m + shelter width)	7.0m (6.8m + shelter width)	7.5m (7.3m + shelter width)	5.5m (5.3m + shelter width)	6.0m (5.8m + shelter width)	6.5m (6.3m + shelter width)

Relevant Factsheets:

Buffers / Islands (C4)

Segregation and User Needs (C4)

Kerbs and Other Separation Options (C4)

B - Bus Boarder – Cycle track through bus boarder

A bus boarder like footway extension can be created in line with the segregated cycle track, raised at footway level. The shelter is located on the footway edge whilst boarding/alighting takes place on the bus boarder/ cycleway section.

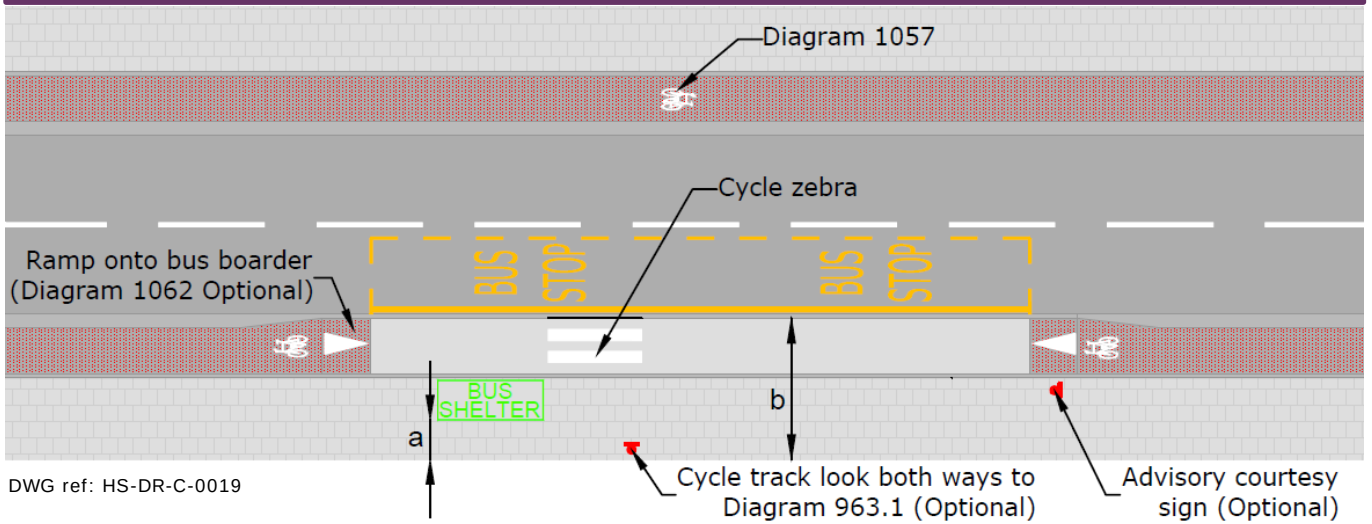
Combined Cycle Track and Bus Boarder, London

LCDS, 2016

Cycleway material

Careful consideration should be given to cycleway material, in particular use of blocks to denote pedestrian priority.

Bus Boarder – Cycle track through bus boarder



DWG ref: HS-DR-C-0019

Widths (applicable to one-way cycle tracks)

a: clear footway zone behind/in front of bus shelter

- min 1.5m behind shelter front panel (absolute min 0.9m clear of end panel) applicable to footways with low volume pedestrian use
- min 3.0m (absolute min 2.5m) applicable to high volume pedestrian use footways e.g. retail/high streets, high density residential

b: min 4.2m/5.2m respectively (0.5m buffer, 1.5m cycleway, 0.5m clearance, 0.2m cantilever shelter, 1.5m/2.5m clear footway)

Bus shelter location

Option 1: Locate shelter min 0.5m from the kerb edge

Option 2: Locate shelter max 0.5m from building line

Relevant Factsheets:

Buffers / Islands (C4) Bus Stop Box (PT2) Bus Boarder (PT2)

Segregation and User Needs (C4) Kerbs and Other Separation Options (C4)

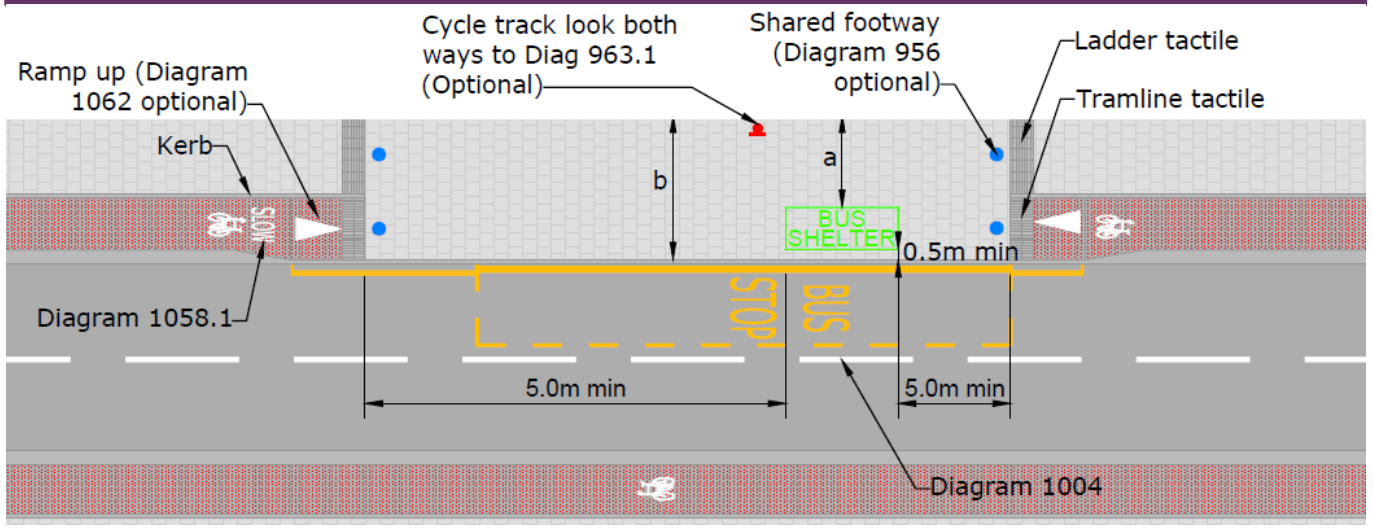
C: Bus Boarder – Shared use footway

A bus boarder like footway extension can be created in line with the segregated cycle track. The shelter is located at the kerb edge for ease of boarding/ alighting.

Both the footway and footway extension will require a Redetermination Order for shared use.

Unsuitable for higher use bus stops where waiting passengers are likely to occupy the full footway width

Bus Boarder – Shared use footway



DWG ref: HS-DR-C-0020

Widths

a: clear zone behind/in front of bus shelter (measured to side panel or front panel whichever is the smaller distance)

– min 3m (absolute min 2.5m) applicable to footways with low volume pedestrian use

– min 4m (absolute min 3m) applicable to high volume pedestrian use footways e.g. retail/high streets, high density residential

b: Absolute min 3.2m with cantilever shelter, 3.0m + shelter width for other shelter types, 3.0 with no shelter. Add 1.0m for busy footways.

One way/Two way

Both clear width (a) and total width (b) should be increased wherever possible for a two way cycleway.

Relevant Factsheets:
Buffers / Islands (C4) Bus Stop Box (PT2) Bus Boarder (PT2)
Segregation and User Needs (C4) Kerbs and Other Separation Options (C4)

Integration with Side Roads

At crossroads and T-junctions vehicle priority is given to traffic on the major road. Priority is usually indicated by give-way or stop-lines and associated signs.

For cyclists, key issues relate to the safety and comfort of moving ahead through a priority junction while motorised traffic seeks to turn in or out of the minor road, and the safety, comfort and directness of cycle turns into and out of junctions.

Consider continuous footway, raised entry treatments, reduced corner radii, reduced side street width and making the side street one way.

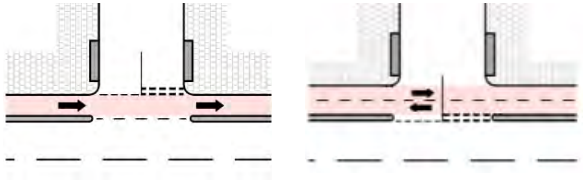
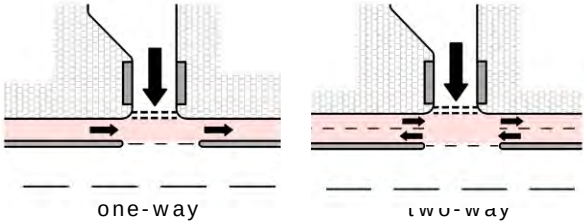
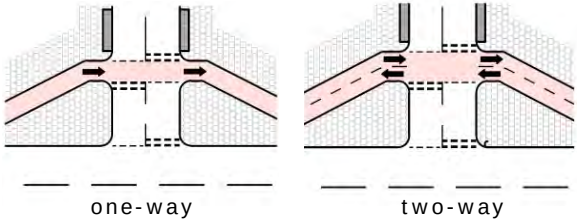
Highway Code (rule 183): **'When turning, give way** to any vehicles using a bus lane, cycle lane or tramway from either **direction'.**

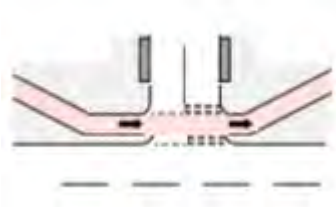
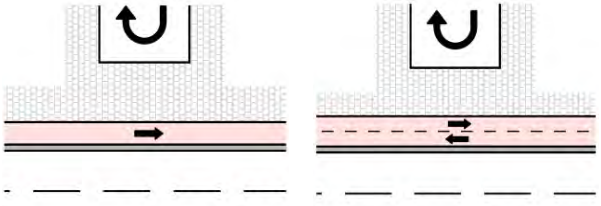
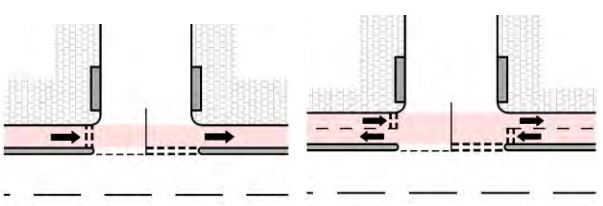
Summary of options for cycle-friendly interventions at priority junctions

Reduce speed on main road and turning	Changes to geometry that support speed reduction include: continuous footways, raised tables, kerb realignment, reduced corner radii, reduced width of junction mouth and footway build-outs. Continuous footways and raised entry treatments can address common risks on turning and suggest visual priority for cyclist and pedestrians.
Ensure good visibility	Preventing or restricting parking and loading close to the junction is an important supporting measure in most cases, helping to maintain good visibility. It is particularly important in relation to cyclists travelling relatively fast downhill.
One way side street or one way plug	Generally consider to avoid conflicts between vehicles turning into the side street and cycle track users.
Road Closure	Illuminates vehicle/cycle and vehicle/pedestrian conflicts but often creates wider issues.
Change or reverse priority / Ban specific movements	Banning movements or changing priority can help address specific conflicts between turning motorised vehicles and cyclists and enhance the directness, safety and comfort of a cycle route. Wider traffic management implications of these changes must be considered.
Convert to signalised crossing or junction	This approach should only be employed of other measures appear unlikely to be effective.
Road markings through junction	Visual priority can be supported by a combination of TSRGD diagram 1057 cycle symbols, dashed diagram 1010 markings across the mouth of the junction and coloured surfacing. These interventions raise road user awareness of the presence and legitimacy of cycling and specific cycle movements.

Relevant Factsheets:
Cycle Lanes (C2)
Segregated Cycle Lanes – Soft Segregation (C3)
Priority Junctions (G7)
Corner Radii (G6)

Cycle Track Options

Option 1	Option 2	Option 3
		
No Deviation	One-way Side Streets (out)	Bending Out
Pro's • Direct Cycle Route. • Minimal space requirement. • Simple layout. **Con's** • Potential conflict with vehicles turning into side road (worse for two-way). Best For • Low flow or very low flow side roads. One-way (e.g.<800vpd), two-way (e.g. <100 vpd), in particular cul de sacs as drivers will nearly all be familiar with the layout. • Good Visibility. • No parking / loading close to junction. (upstream) Potential Show Stoppers • Parking / Loading obstructing inter-visibility of cycleway users and drivers especially if there are significant flows into the side road. • For two-way cycleways, anything other than very low flows presents significant risks, especially for through roads where drivers are less likely to be familiar with layout. Measures to reduce these (e.g. banning right turns into side road) should be considered.	**Pro's** • Direct Cycle Route. • Minimal space requirement. • Simple layout. • Significantly reduced potential for conflict compared with option 1 (especially for two-way). **Con's** • Potential inconvenience from one–way street. Best For • Higher Flow side roads. • Parking or loading close to junction on main road. Potential Show Stoppers • No alternative route for diverted side road traffic.	**Pro's** • Space / time for vehicles turning into side street to give way to cycleway users. **Con's** • Needs more space. • More complex layout - adds to visual clutter, • Tends to require deviation of pedestrians from their desire lines. Best For • Higher volume two–way side roads (or one-way in) • For two-way cycleways, worth considering for all side streets. Potential Show Stoppers • Lack of space.

Option 4	Option 5	Option 6
 one-way cycleways only	 one-way two-way	 one-way two-way
Bending In	Full Closure	Cyclist give way
Design • Waiting/loading ban imperative over "bent in" section. • Consider replacement of segregation by mandatory lane to increase drivers awareness of cyclists over "bent in" section. **Pros** • Cyclists more visible than bending out **Cons** • Needs more space. • Complex layout - adds to visual clutter, • May require deviation of pedestrians from their desire lines. **Best For** • Higher volume two–way side roads. **Potential Show Stoppers** • Lack of space. • Avoid for two-way cycle tracks.	**Pros** • Removes cycle/vehicle and pedestrian vehicle conflicts. **Cons** • Requires alternative route for side road traffic. • When turning movement is not possible, need to allow refuse vehicles (potentially large delivery vehicles) through closure. **Best For** • Any situation where road closure is a realistic option and doesn't cause any significant knock-on problems. **Potential Show Stoppers** • Issues relating to turning in side road and alternative routes for side road traffic.	**Pros** • Though undesirable, may be only safe option (e.g. not enough space to bend out two-way cycleway at busier side road) **Cons** • Inconvenience for cycle users. • Discourages cycleway use. **Best For** • Situations of last resort when no other option is safely deliverable. **Potential Show Stoppers** • N/A, but highly undesirable especially for higher cycle flows. **Design** • Consider a degree of bending out to make it easier for cyclists to assess safe crossing options.

Option 1: Continuing cycle track without deviation

At side roads, hard segregation will be interrupted but route will continue on the same line as cycle track.

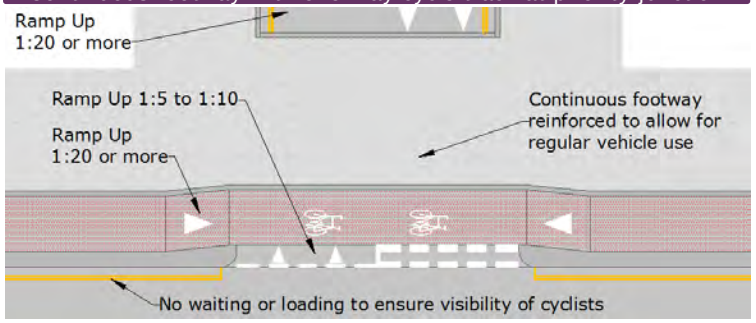
Key design issues

- End/recommence hard segregation 0-5m (maximum) from side road to maintain cyclist security. Consider using flexible posts to delineate end of separation and for visibility, safety and durability.
- Red chipped surface continues with cycle symbols to highlight cyclists' presence.
- Minimise corner radii and side street carriageway width.
- 'Continuous footway', raised side road crossing and cycle track for further vehicle speed reductions.
- Entry to and from side roads should be reviewed to ensure appropriate sightlines and speeds.
- Diagram 1010 (not elephant's footprint markings) to define cycle lane if at carriageway level.

Transition across junction should be straightforward for users, and design – London Shoreham (LCDS, 2016).

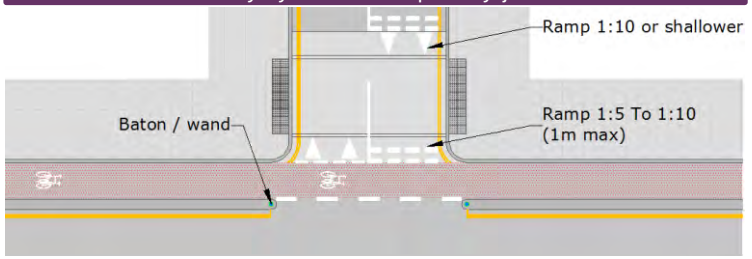
- Consideration should be given to applying give-way markings for vehicles turning from the main carriageway into the side road, should space be available to do so, but the treatment relies more on visual priority than on any specific use of signing. This is likely to work well in combination with continuous footway and cycleway treatments.
- Reintegrating cyclist with other traffic in the area around the priority junction is not recommended. Where considered, refer to TRL report PPR703, Trials of Segregation Set-back at Side Roads (2014).

Continuous footway with one-way cycle track at priority junction



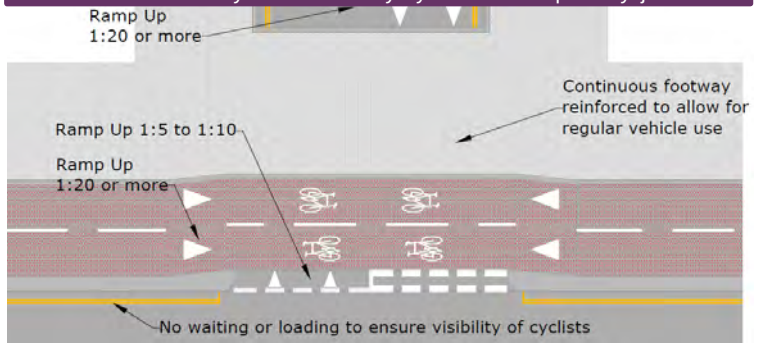
DWG ref: CF-DR-C-0008

One-way cycle track at priority junction



DWG ref: HS-DR-C-0021

Continuous footway with two-way cycle track at priority junction



DWG ref: CF-DR-C-0018

Relevant Factsheets:
Crossings (G4) Continuous Footways (G7)

Option 2: One–way side roads

Turning movements in to side road can be banned (using a one way plug) to avoid risks related to the visibility of cyclists to motorised traffic turning into the side road.

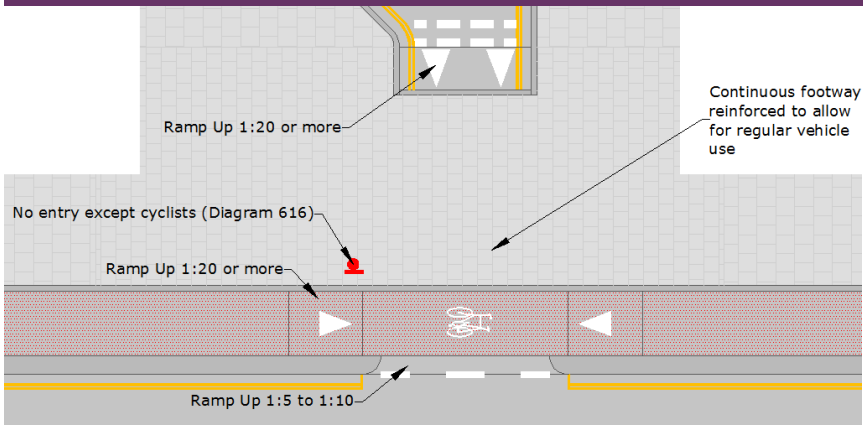
Key design issues

- Raised side road crossing and cycle track for further vehicle speed reductions.
- This is likely to work well in combination with continuous footway and cycleway treatments.
- One-way away from main road can be considered. This required similar treatment to two-way but can be beneficial to reduce width of side road.

One-way side road, Magee Road, London

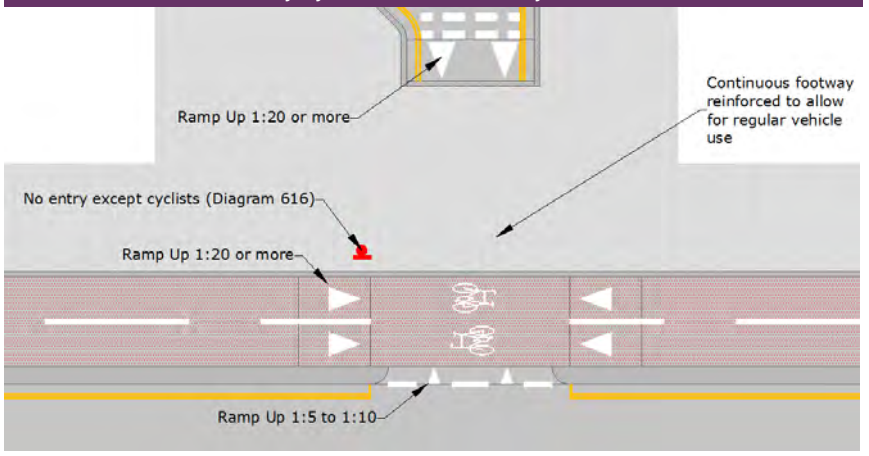
Google Maps, 2017

One-way cycle track at one-way side street



DWG ref: CF-DR-C-0004

Two-way cycle track at one-way side street



DWG ref: CF-DR-C-0017

Relevant Factsheets:
Crossings (G4) Continuous Footways (G7)

Option 3: Bending-out

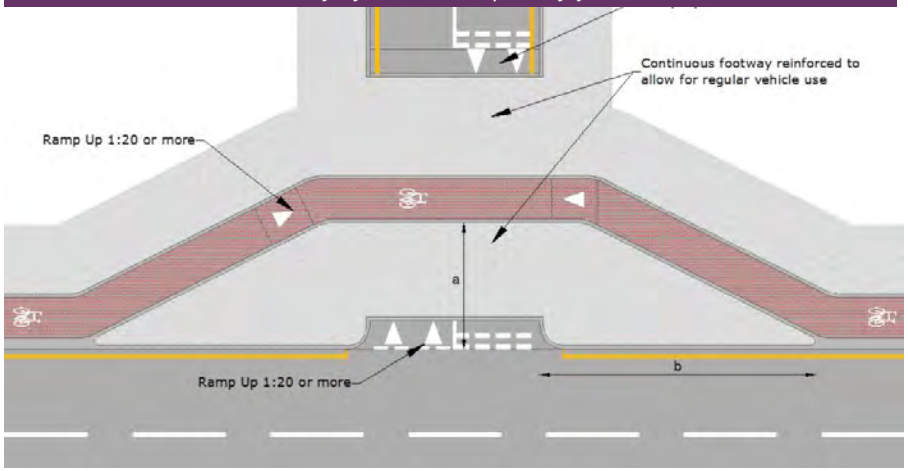
For two-way tracks crossing two-way side **roads, 'bending-out' by at** least 4.5m is the recommended option. Where island separation is wide, this can be achieved with little or no deviation of the cycle track.

City of Edinburgh Council

Key design Issues

- Red chipped surface continues with cycle symbols to highlight cyclists' presence.
- Minimise corner radii and side street carriageway width.
- Continuous footway or raised side road crossing and cycle track for further vehicle speed reductions.
- Reintegrating cyclists with other traffic in the area around the priority junction is not recommended. Where considered, refer to the options presented in TRL report PPR703, Trials of Segregation Set-back at Side Roads (2014).

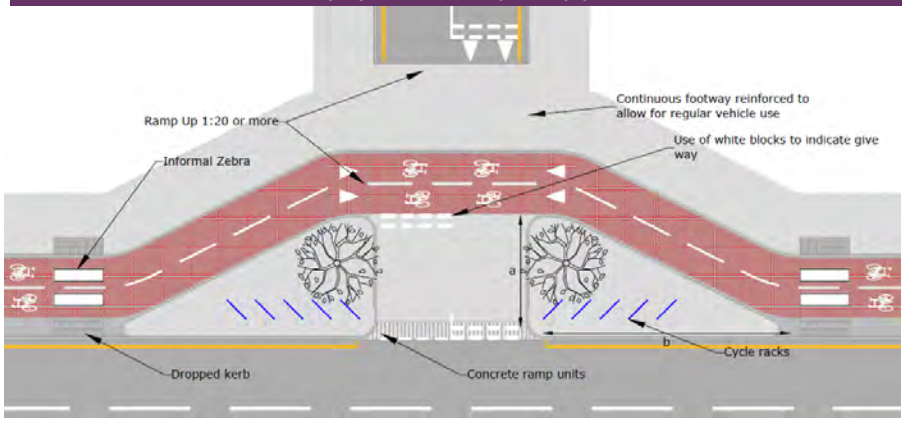
One-way cycle track at priority junction



DWG ref: CF-DR-C-0005

a: Min 4.5m
b: Desirable 10m

Two-way cycle track at priority junction



DWG ref: CF-DR-C-0019

Relevant Factsheets:
Crossings (G4) Continuous Footways (G7)

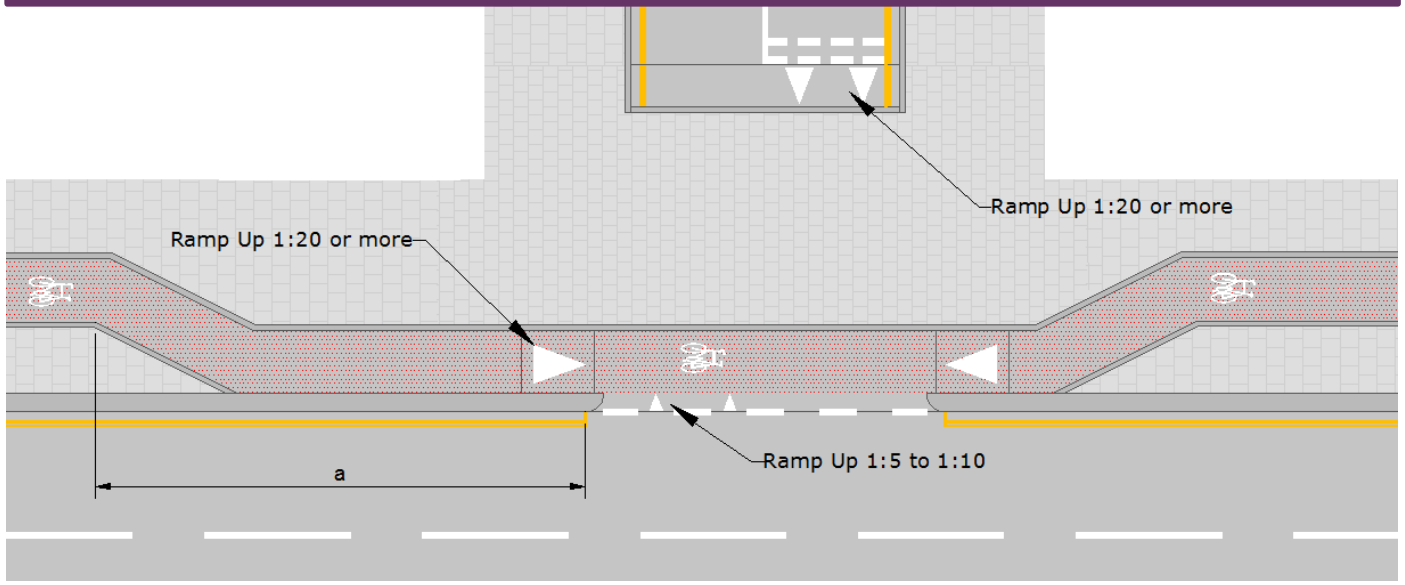
Option 4: Bending-In

"Bending in" the cycle track towards the junction mouth aims to bring cyclists into the view of the turning traffic.

Key design issues

- This design relies on visibility of cyclists as they approach the junction mouth. The key risk is that the driver turning into the side road does not see a cyclist approaching it.
- It is critical that parking and loading are banned upstream of the junction and that there is a sufficiently long run-in to the junction which is free of parking and loading.
- Red chipped surface continues with cycle symbols to highlight cyclists' presence.
- Minimise corner radii and side street carriageway width.
- Preferably, continuous footway or raised side road crossing.
- Reintegrating cyclists with other traffic in the area around the priority junction is not recommended. Where considered, refer to the options presented in TRL report PPR703, Trials of Segregation Set-back at Side Roads (2014).

Continuous footway - Bending-in one-way cycle track



DWG ref: CF-DR-C-0013

a: min 15m - no parking or loading. A greater distance is required downhill and less uphill.

Relevant Factsheets:
Crossings (G4) Continuous Footways (G7)

Option 5: Full Closure

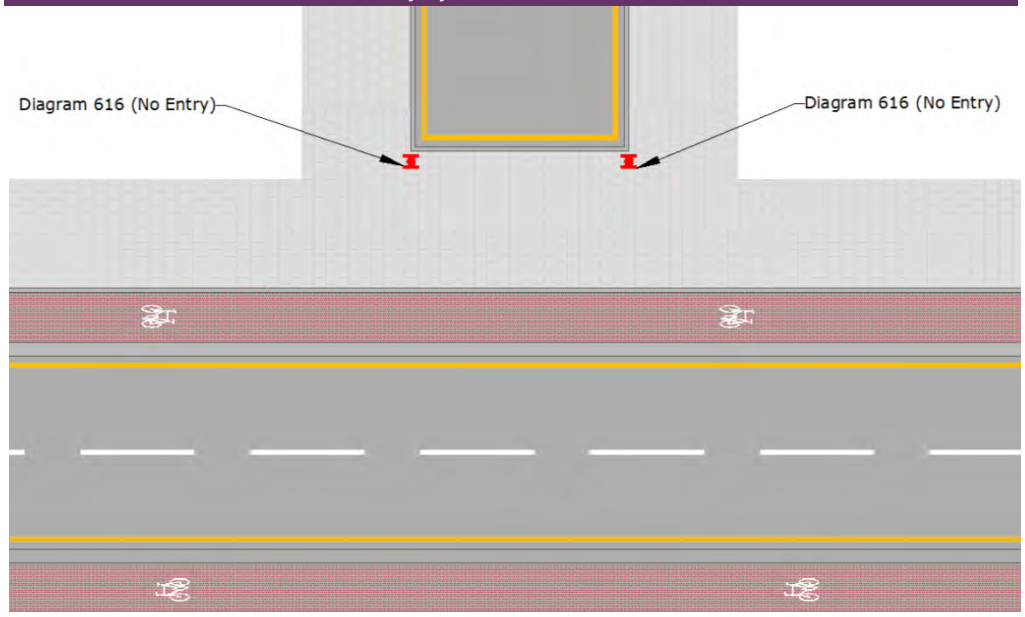
Full closure of the side road aim to remove cycle, vehicle and pedestrian conflicts.

This option requires an alternative route for side road traffic to access the main road and this should be given due consideration.

Design considerations

- Parking closer to main road should be removed to allow turning manoeuvre on side roads.
- The clear unobstructed width of the side road should allow turning manoeuvres of refuse vehicles. If not possible consider option 2.

One-way cycle track – Full Closure



DWG ref: HS-DR-C-0022

Option 6: Cyclists Give-way

Cyclists giving way at side roads should be avoided wherever possible because:

a) This makes using the cycle track relatively slow and inconvenient.

b) Consequently the cycle facility is less attractive, less likely to encourage people to cycle and less likely to be used.

c) Cyclists have to check in several directions to see if there are any approaching vehicles or pedestrians.

This option should be considered where:

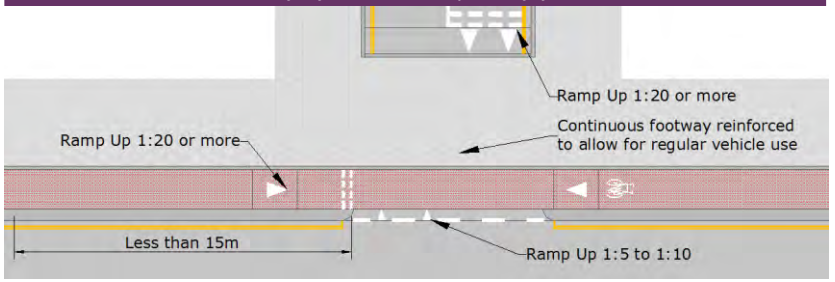
a) A 2-way cycleway crosses a side road with more than low flows (i.e. >100 vpd, 2-way), where traffic can enter from the main road, without bending in. Higher flows are likely to be acceptable where is it reasonable to expect that most drivers will be familiar with the layout, particularly when the side road cannot be used as part of a through route and flows on the main road are modest (<10,000 vpd, 2-way)

b) A with-flow 1-way cycleway crosses a side road without bending in and with potential poor intervisibility between cyclists and motor vehicles turning into the street.

Grange Avenue, Bradford (Google Maps, 2017)

- Reintegrating cyclists with other traffic in the area around the priority junction is not recommended. Where considered, refer to the options presented in TRL report PPR703, Trials of Segregation Set-back at Side Roads (2014).
- Bending in – If some degree of bending in is possible, this should be considered in order to make it easier for cyclists to assess crossing opportunities.

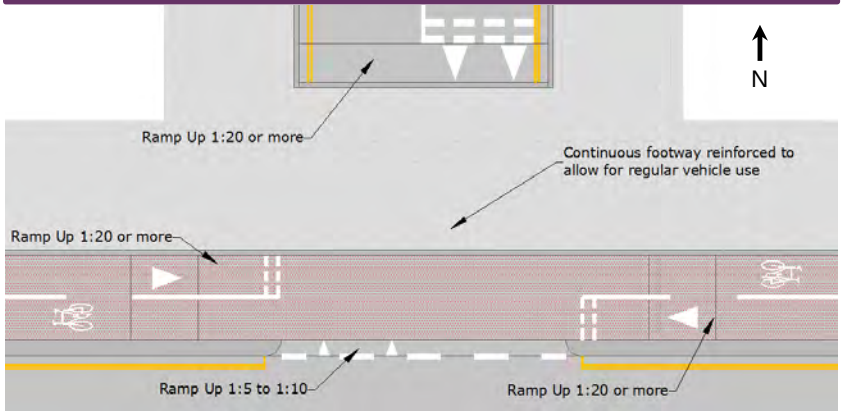
One-way cycle track at priority junction



DWG ref: CF-DR-C-0007

Any loading, parking or bus-stop less than 15m upstream of the junction will mean that inter-visibility between cyclists and turning vehicles is likely to be poor.

Two-way cycle track at priority junction



DWG ref: CF-DR-C-0014

The most significant conflict in the above example is turning vehicle into the side road vs. cyclist travelling west.

Relevant Factsheets:
Crossings (G4) Continuous Footways (G7)

Integration with Crossings

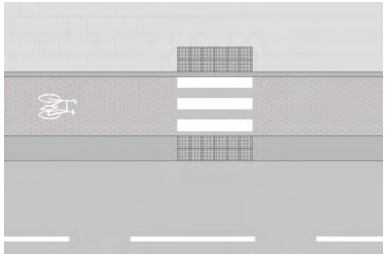
The Council is currently developing its approach to the integration of cycle tracks with pedestrian crossings.

Page 33 provides guidance on pedestrian crossing of the cycle track including levels. Further guidance in detail is being prepared in due course which will take into account current national guidance and experience from elsewhere. For guidance on this issue, please discuss with the City of Edinburgh Council Active Travel Team.

Pedestrian Crossings of the Cycleway

Design principles

- Crossings should be on main pedestrian desire lines.
- Drainage issues must be considered for all crossings.
- Use flush kerbs and tactile paving appropriately.



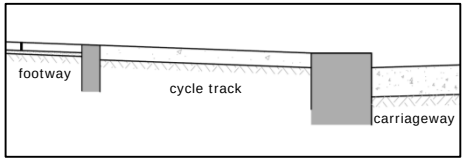
Footway level (raised) crossings are preferred to:

- Emphasise pedestrian priority;
- Reduce cyclist speeds; and
- Encourage courtesy from cyclists (especially where the cycle track is two way).

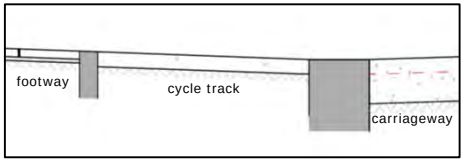
Google Maps, 2017

Cycle track at footway level

Cross section away from crossing

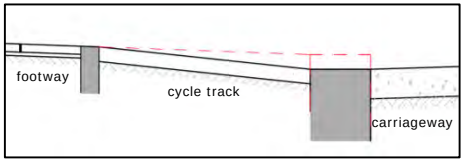


Cross section at crossing point



Option 1 (desired) Carriageway is raised to footway/cycle track level to provide level access for pedestrians

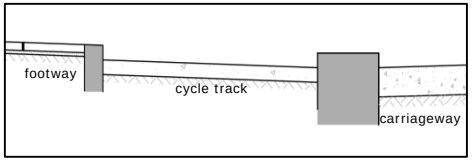
Cross section at crossing point



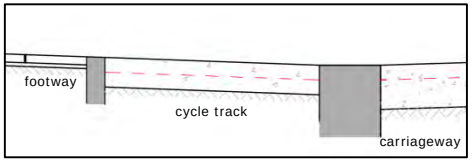
Option 2 Cycle track vertically aligned at crossing point to provide dropped kerb access for pedestrians

Cycle track at carriageway level

Cross section away from crossing

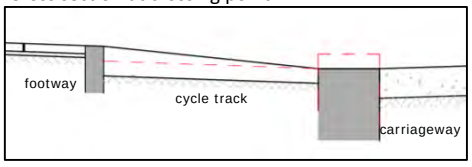


Cross section at crossing point



Option 1 (desired) Cycle track and carriageway are raised to footway level to provide level access for pedestrians

Cross section at crossing point



Option 2 Cycle track vertically aligned at crossing point to provide dropped kerb access for pedestrians

Integration with Signal Controlled Junctions

Improvements to cycle safety and comfort, and to the directness and coherence of cycle routes may be achieved through remodelling, removing or introducing signal control at junctions, particularly where signal timings can be changed to reallocate time between road users and generate time saving benefits for cyclists.

Care should be taken to avoid introducing signal control where it is not justified. This can result in increased journey times for all users and is costly to install and maintain.

Over-complicated signal staging and operation can lead to excessive waiting times for cyclists and an increase in frustration and non-compliance.

Summary of options for cycle-friendly interventions at signal-controlled junctions

Using ASLs and feeder lanes	Advanced stop lines (ASLs) can help cyclists move away from a safer, more advantageous position at a signal-controlled junction at the start of a stage and so, selectively, can assist cycle movements through a junction.
Managing conflict with turning vehicles	This may be done by giving cyclists an advantage in time or space, or by seeking to move the point of crossing conflict away from the junction itself (managing the conflict).
2 stage cycle right turn	As part of a segregated cycling system or a wider strategy on a route or a series of junctions to keep cyclists in a predictable position on the nearside, cyclists can be assisted with right turns by staying on the nearside and making the turn in two stages.
Cycle bypass of signals	In some instances, particularly through signalised T-junctions, cyclists making certain movements may be permitted a bypass of the signal control.
Signalisation to remove conflict	Complete separation at junctions involves signalling cyclists separately to remove all conflicting movements with other users. This tends to increase delays.
Banning selected motorised vehicle movements	Generally in conjunction with other measures listed here, certain vehicle movements can be banned to improve cycle safety and directness. The wider traffic management implications must be considered
Convert to a priority junction	Signal removal can have some beneficial effects where the volume and mix of traffic and nature of conflicting movements does no longer justify the existence of a signal-controlled junction.
Remove all vehicle priority and declutter	As part of an integrated area-wide approach, designers may explore the potential benefits of removing signal control altogether in order to promote more consensual road user behaviour. This may still include features to encourage drivers to give way to pedestrians and cyclist.

LSDG 2016 Fig. 5.7

Two stage right turn and early release at signal junctions

The illustrative junction design presented here demonstrates how a soft segregated cycle route can continue through a signal controlled junction by using two-stage rights turn and early release arrangement trailed in London. This can also apply to hard segregation.

Two-stage left turn marking at junction in Stockholm (top); and cyclists in different streams in Copenhagen (bottom) – left turners are heading to the waiting area to the right.

All images: (LCDS, 2016)

Two-stage right turn and early release arrangement (from SQA0651)

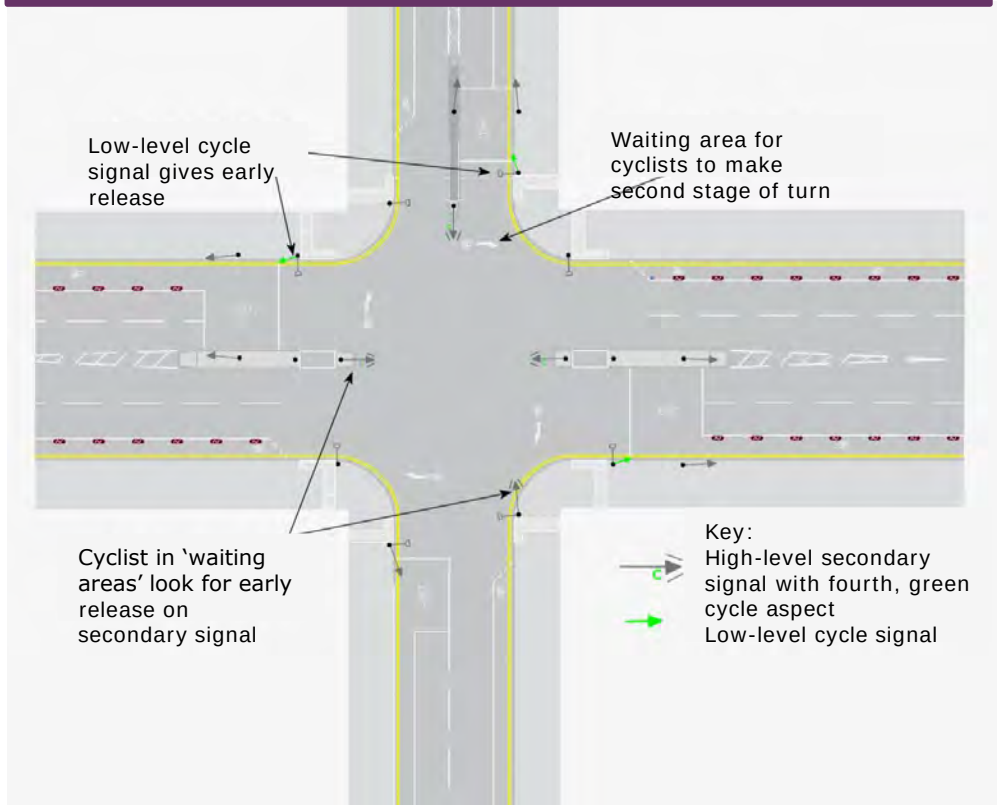


Diagram adapted from LCDS, 2016

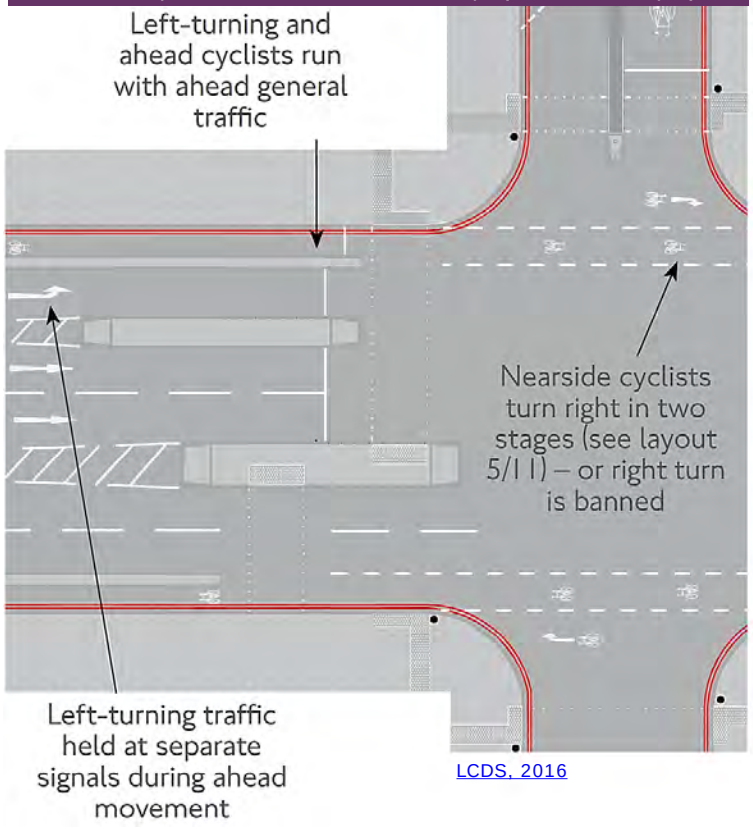
A minimum horizontal clearance of 450mm (or 200mm in space constraint areas, see Street Furniture factsheet) should be provided between the edge of the carriageway and a low-level cycle signal. Less clearance is needed to a cycle track, indicatively a minimum of 250mm but to be determined on a site-specific basis.

Relevant Factsheets:
Street Furniture (F1)

Holding the left turn at signalled junctions

The illustrative junction design presented here demonstrates how a segregated cycle route can continue through a signal controlled junction by using a two-stage right turn and early release arrangement trailed in London.

Indicative layout for 'hold left turn' concept (London example)



LCDS, 2016

Visualisation showing proposal for 'hold left turn'

LCDS, 2016

A minimum horizontal clearance of 450mm (or 200mm in space constraint areas, see Street Furniture factsheet) should be provided between the edge of the carriageway and a low-level cycle signal.

Less clearance is needed to a cycle track, indicatively a minimum of 250mm but to be determined on a site-specific basis.

Relevant Factsheets:
Street Furniture (F1)

Cycle Gate at signal junctions

A 'cycle gate' is an alternative method of giving cyclists some time and space to move away from a junction ahead of motorised vehicles.

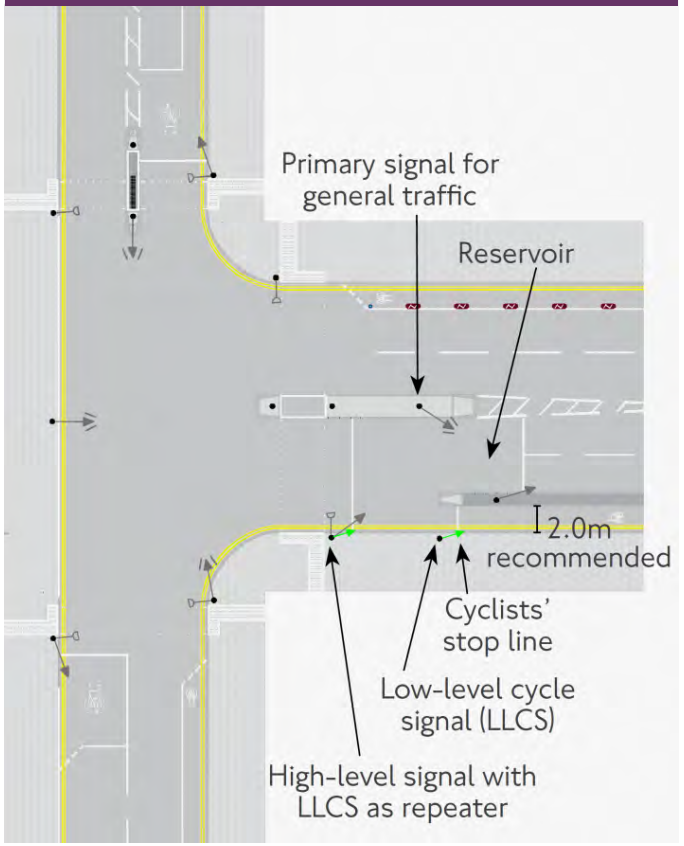
Layout principles

- The cycle lane/track on the approach must be physically segregated, at least 1.5 m wide, preferably 2 m, to allow for overtaking.
- The general traffic stop line should be positioned behind the advanced cycle stop line.
- The segregating strip should widen to allow clearance for mounting the traffic signal head; for a signal head mounted in front of a traffic signal pole, the segregating strip should be at least 1.3 m
- The distance from the first cycle stop line to the advanced stop line at the junction (the depth of the reservoir) should be at least 15 m; this is to disassociate the two stop lines from each other and reduce the see through issue between the two sets of traffic signals

Cycle gate at Bow: (top) segregated approach and first cycle stop line, and (bottom) advanced cycle stop line. Trial low-level cycle signals (used as repeaters) are mounted below the main signal heads.

Images and diagram: (LCDS, 2016)

Indicative layout for cycle gate (London example)



Signal layouts with dedicated cycle phases may also be considered. Typically this is appropriate where one or more arms of the junction allow access for cyclists only, but it may also be applied where cyclists are physically segregated from other traffic.

Image References

Segregated Cycle Tracks – Hard Segregation
All images: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]

One and Two-way Cycle Tracks
Visualisation Haymarket Terrace: The City of Edinburgh Council

Two-way Cycle Tracks: Opportunities and Challenges
All images: The City of Edinburgh Council

Cross Section
Kerb image: The City of Edinburgh Council

Buffers / Islands
Green verge, Hard surface area for cycle parking, and stand alone kerb: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]
Hard surface buffer zone: The City of Edinburgh Council

Start of Segregation
SUSTRANS: Junctions and crossings: cycle friendly design (draft) [ONLINE]. Available at: https://www.sustrans.org.uk/sites/default/files/images/files/Route-Design-Resources/Junctions_and_Crossings_06_02_15.pdf [Accessed 25 October 2017]

B – Parking/ Loading Bays inset into separating island
Separation using car parking: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]

A.1: Floating bus stops – bus shelter located on island
Floating bus stop, Copenhagen: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]

Floating Bus stop Crossings
Uncontrolled crossing: Sustrans: Inspiring Infrastructure: Continuous Cycle Lanes on Lewes Road, Brighton [ONLINE]. Available at: http://www.sustrans.org.uk/article/inspiring-infrastructure-continuous-cycle-lanes-on-lewes-road-brighton [Accessed 02 February 2017]
Controlled Crossing, Hoe Street, London: Google Maps [ONLINE]. Available at: https://goo.gl/maps/KWsLVFbvDDo [Accessed 02 February 2017]

B – Bus Boarder – Cycle track through bus boarder
Image: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]

Option 2: One-way side roads
One-way side road, Magee Road, London: Google Maps [ONLINE]. Available at: https://goo.gl/maps/5EjWmpuMTKF2 [Accessed 02 February 2017]

Option 3: Bending
Bent-out cycle track 1: The City of Edinburgh Council

Option 2: One-way side roads
One-way side road, Magee Road, London: Google Maps [ONLINE]. Available at: https://goo.gl/maps/5EjWmpuMTKF2 [Accessed 02 February 2017]

Option 6: Cyclists Give-way
Grange Avenue, Bradford: Google Maps [ONLINE]. Available at: https://goo.gl/maps/D4WcCxVGDpE2 [Accessed 02 February 2017]

Pedestrian crossing of the Cycleway
Image: Google Maps [ONLINE]. Available at: https://goo.gl/maps/FeiF5NuDhK42 [Accessed 02 February 2017]

Two stage right turn and early release at signal junctions
All images: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]

Hold the left turn at signal junctions
All images: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]

Cycle Gate at signal junctions
All images: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]

Index

C5 – Contraflow Cycling on One-way Streets

Amendments:

Contraflow Cycling on One-way Streets

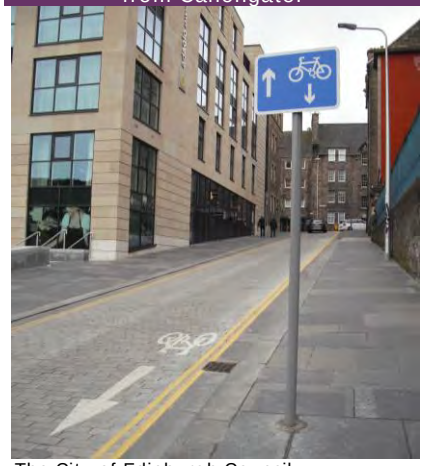
There will be a presumption that all streets will be two-way for cyclists.

Where one-way streets are implemented to manage motor traffic, cyclists should always be exempted from the one-way restriction*.

Benefits

- Improves the permeability, accessibility and directness of the road network for cycling.
- Provides a journey time advantage for cycling.
- Avoids displacing cycle users onto busy alternative routes.
- It aids route-finding because every street is available for two way cycling.
- Contraflow cycling is generally a low cost measure.
- Formalising contraflow cycling is likely to reduce cycling on the footway.
- Universal formalisation of contraflow is likely to reduce motorist/cyclist conflict on one-way streets due to the removal of the driver's sense that cyclists should not be there.

Unsegregated cycle contraflow using contemporary road setts on New St, Edinburgh, island entry from Canongate.



The City of Edinburgh Council

Safety

Contraflow cycling has a potential positive overall impact taking the wider network into account (i.e. by using a contraflow, cyclists often avoid using other, busier, streets).

Research** and UK experience suggests that permitting contraflow cycling has a number of safety-related benefits, including:

- Encouraging cyclists to shift from arterial routes to quieter streets.
- Reducing footway cycling

Other findings include that:

- Very narrow streets down to 3m or less need not be excluded if they have very low traffic volumes.
- Safety issues were most common at intersections or where visibility was poor.

Safety risks can be mitigated by:

- Making the contraflow cycling operation clear at intersections and parking lot / garage entries.
- Using contraflow entry and exit treatments – with appropriate signing, markings and physical segregation where traffic movements merit protection.
- Addressing visibility and traffic encroachment issues, using physical segregation where necessary.

Road safety audits should compare the proposed contraflow route to any alternative route that has to be used in its absence.

One Way Plugs/False One Ways

This type of measure, with a very short section of the street made one way for motor vehicles (either in or out) should always be considered alongside a full one way solution. It will generally be less inconvenient for drivers but can suffer from non-compliance and there may be issues for turning vehicles. See page 3.

In low traffic 20mph streets there is a presumption in favour of unsegregated contraflow cycling. See pages 4-6 for more detail.

Further Guidance:

- Sustrans Design Manual: Chapter 4 – Streets and roads (2015) draft

*The only exceptions are likely to be very busy one-way streets with no scope for a safe contraflow facility.

**"Traffic Safety on One-way Streets with Contraflow Bicycle Traffic" – Federal Highway Research Institute – Germany, 2002

Relevant Factsheets:

Designing for Cycling (C1)
Cycle Lanes (C2)
Segregated Cycle Tracks: Soft Segregation (C3)
Segregated Cycle Tracks: Hard Segregation (C4)

Types of Contraflow Cycling, Street Widths and Parking

Contra-flow cycling can take place in:

- 'non-segregated' carriageway (by using only signs) or one way plugs
- Advisory or mandatory contraflow cycle lanes
- contraflow bus lanes
- Segregated cycle tracks (one-way or two-way) alongside the one-way carriageway

When considering installing a cycle contraflow, each situation should be assessed on its merits. However, contraflow cycling should not generally be considered for streets with a free road width of less than 3.5m. This will ensure that, in the majority of cases, cyclists will be able to pass an oncoming motor vehicle without having to dismount.

One-way contraflow cycle track on carriageway with kerb separation, Hill Street, Birmingham (Sustrans Design Manual: Chapter 4 (2015) draft)

Parking

Parking on streets with a contraflow lane – can be either parallel or echelon, in both cases these should have a buffer zone.

- Echelon parking should be arranged so cars are reversed in and pull out forwards facing oncoming cyclists to give a clear view. Perpendicular parking is not preferred as it is often hard for drivers to see cyclists.

Gradient

A contraflow cycle lane can be less appropriate on a street with a steep gradient as this can increase the speed differential between cyclists and motor vehicles.

Contraflow cycling with advisory cycle lane, adjacent echelon parking with frequent cycle symbols, Penarth (Sustrans Design Manual: Chapter 4 (2015) draft)

Contraflow cycle lane, London (City of Edinburgh Council)

Contraflow cycle lane, Northcote Road, London (City of Edinburgh Council)

Contraflow cycle lane, Rankeillor Street, Edinburgh (City of Edinburgh Council)

Contraflow cycling with advisory cycle lane on a one way street , Ebury Street, London (Google Maps)

Relevant Factsheets:

Designing for Cycling (C1)
Cycle Lanes (C2)
Segregated Cycle Tracks: Soft Segregation (C3)
Segregated Cycle Tracks: Hard Segregation (C4)

One Way Plugs

There are two types of one way plugs that can be considered for use in Edinburgh, these are shown on this page in the drawings opposite.

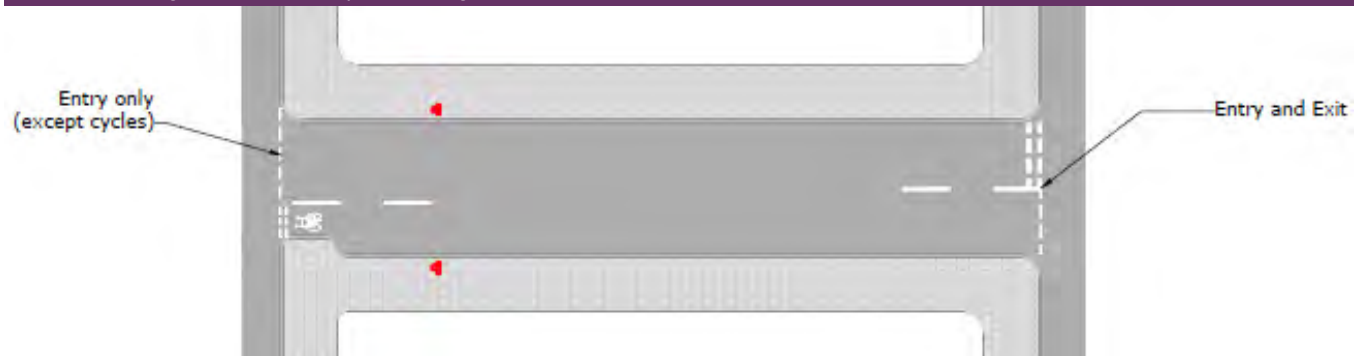
Both allow normal access and egress at one end of the street. The other end of the street is restricted to either access only or egress only for motor vehicles. The decision over which to use should be taken based on the unique location requirements.

Using the "one way in, two ways out" option may be preferred where the street is likely to be used by larger vehicles that may find it difficult to turn.

The "two ways in, one way out" option may be suited to a side street where traffic has/causes difficulty when joining the main road at the proposes "in-only" end.

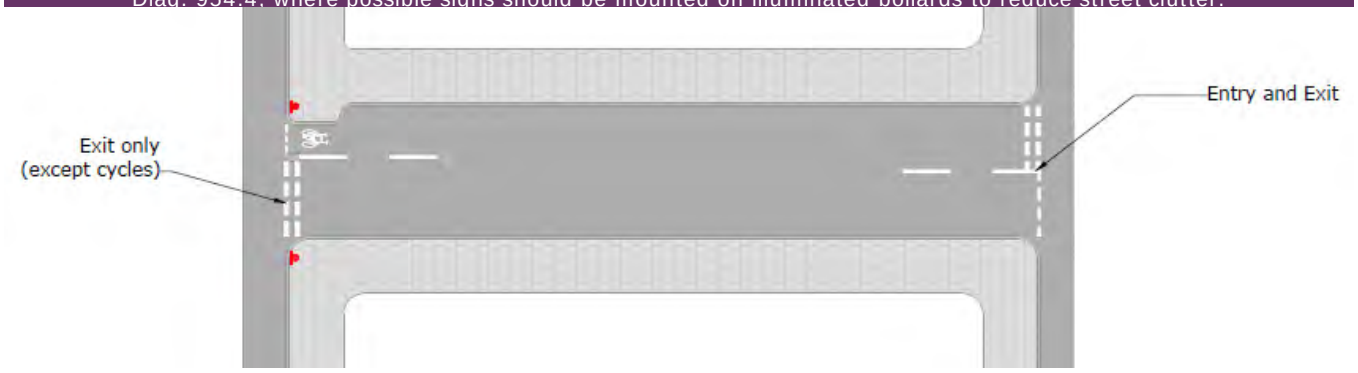
Cyclists should always be exempted from one-way plug restrictions.

One way plug - two ways in, one way out. Note that appropriate signage should be provided using Diag. 616 and Diag. 954.4, where possible signs should be mounted on illuminated bollards to reduce street clutter.



Drawing 5145925-CC-C-0002

One way plug – one way in, two ways out. Note that appropriate signage should be provided using Diag. 616 and Diag. 954.4, where possible signs should be mounted on illuminated bollards to reduce street clutter.



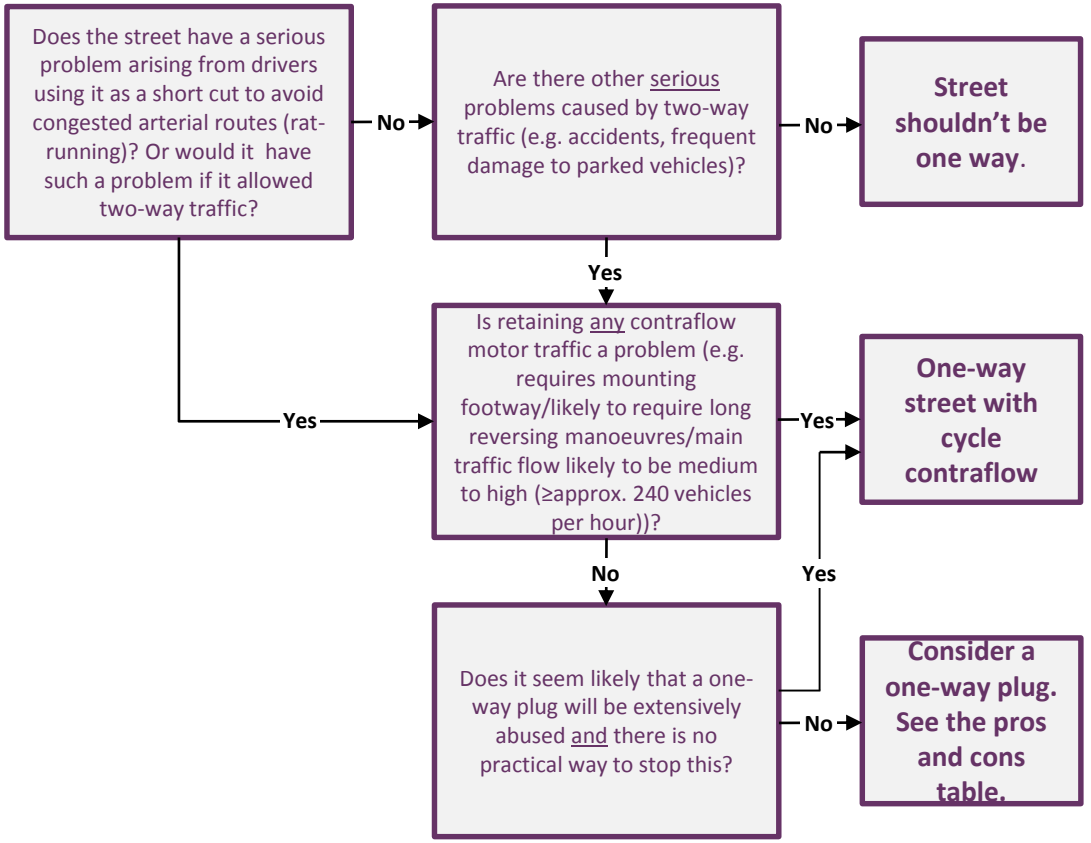
Drawing 5145925-CC-C-0003

1-Way Streets or Plugs Decision Tree

In general, the decision process for considering one-way street/one-way plug options should be as laid out in this decision tree.

A one-way plug, with a very short section of the street made one way for motor vehicles (either in or out) should always be considered alongside a full one way solution.

It will generally be less inconvenient for drivers but can suffer from non-compliance and there may be issues for turning vehicles.



One-Way Plugs – Pros and Cons:

Type of facility	Pros	Cons
2 ways IN, 1-way OUT for motor traffic	• Useful for removing access onto a main road where there are problems created by joining vehicles.	• Potential for motor vehicles to become 'trapped' in street because they can't turn around
	• Depends on local circumstances, e.g. which direction of one-way helps prevent 'rat-running'	
1-way IN, 2 ways OUT for motor traffic	• No issue of motor vehicles becoming 'trapped' in street because they can't turn around	• Egress from the "one-way" end is maintained – generally more problems are caused by traffic joining, than by traffic turning off a main road.
	• Depends on local circumstances, e.g. which direction of one-way helps prevent 'rat-running'	
Both	• Inconvenience to drivers is significantly less than full one-way street - ability to both enter and exit one end of street • Drivers will encounter motor vehicles as well as cyclists in the opposing direction. • Motor vehicle speeds likely to be lower than in full one-way streets	• Relatively low likelihood of drivers who contravene the restriction being caught in the act of doing so means non-compliance is more likely to be a problem than with a full one way. Consider the likely consequences of infringements and measures to minimise (e.g. road narrowing).

Contraflow Types Details

The table opposite classifies the different types of contraflow that can be employed in the City of Edinburgh. It describes each of these and provides some details of what they comprise.

This table should be used in conjunction with the decision tree and tables 2, 3 and 4 on the following pages to identify the appropriate type of contraflow for different locations.

*Careful consideration should be given to use of a mandatory cycle lane. These are not enforceable by CEC, so enforcement relies on the Police. To enable CEC enforcement a TRO to prohibit waiting and/or loading also needs to be promoted. Mandatory cycle lanes also prohibit the use of the area for bus stops.

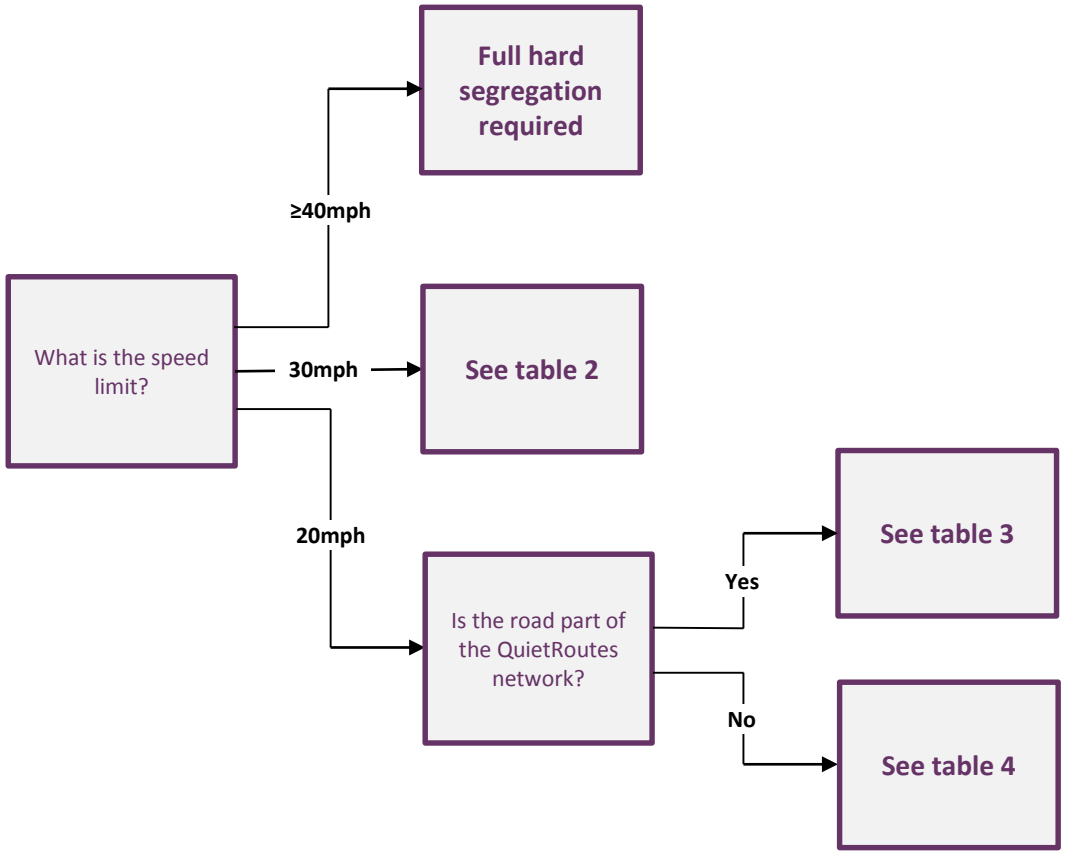
Table 1. Types of contraflow

Ref.	Contraflow Type	Description	Features
P	One way plug	Unsegregated except at plug	• Some form of lane or segregation at plug • Signs and markings • Otherwise as 'U'
U	Unsegregated	No lane or segregation	• Signs • Consider markings (e.g. cycle symbols with arrows) • Consider lane/ segregation at entry and/or exit and/or at difficult locations • Consider providing gaps in parking to allow space for cyclists to pass oncoming motor vehicles
A	Advisory	Advisory cycle lane, allows motor vehicles to encroach	• Signs • Consider segregation at exit (especially) and/or entry • Consider mandatory lane, and/or parking/loading restrictions or segregation at difficult locations
M	Mandatory*	Solid white line. Vehicles should only encroach on lane if they are crossing the lane to a driveway, access or parking/loading bay	• Signs • consider segregation at exit (especially) and/or entry • Implement complementary parking/loading restrictions • Consider segregation at difficult locations
S	Segregated	Hard or soft segregation to keep motor vehicles out of cycle lane (though crossing it to accesses etc can be permitted).	• Signs • Physical segregation. This may be soft or hard. Hard segregation preferred at higher traffic volumes and on QuietRoutes

Contraflow Type Selection

The decision tree opposite provides guidance as to the appropriate level of segregation required for cycling contraflows on roads of different speed limits.

It links with tables 2,3 and 4 on the following pages which provide further information about the options available in different situations.



Contraflow Type Selection Continued

The tables opposite and on the following page provide guidance as to the type of segregation to be employed for different street situations.

The type of contraflow decision tree on page 5 provides guidance as to which table is most appropriate. These tables should also be used in conjunction with table 1 which provides more detail on the segregation type.

Table 2. Suggested Segregation methods for contraflow cycle facilities in a 30mph speed limit

Peak Hourly Flow (vehicles/hour)	Suggested Segregation Type[1,4]
< 30	U+, generally A
30 – 60	A+, generally M
60 – 120	M+
≥ 120	S

Table 3. Suggested Segregation methods for 20mph QuietRoutes[2,3]

Peak Hourly Flow (vehicles/hour)	Expected Average **Speed ≤20mph?**	Suggested Segregation Type[4,5]
< 30	Yes	U
	No	U+
30 – 60	Yes	U+
	No	A+
60 – 120	Yes	A+
	No	A+, if possible M or S
120 – 240	Yes	A+, if possible M or S
	No	S
≥ 240	Yes	S
	No	

Notes to tables:

1. Any contraflow cycle lanes on a 30mph road on the QuietRoutes Network should be hard segregated.
2. Always consider using a one-way plug first. See page 3.
3. Enhanced segregation should be considered in locations with additional problems for cyclists, in particular poor forward visibility or likely higher speeds.
4. U+, A+, M+ means that you should consider means of segregation from U, A, M respectively upwards, starting with the least segregated option (unless the table says otherwise). You should generally consider speed reduction measures to bring average speeds below 20mph before considering a higher level of segregation. Hybrid solutions, as per note 3, should be considered.
5. Other factors such as street width and car parking often constrain or influence marking/segregation options. The level of marking/segregation should not be increased just because there is space to do so. However, marking/segregation should be increased if it seems likely that there will be appreciable benefits in relation to the cost and any negative impacts.

Contraflow Type Selection Continued / Use of Red Chips

Table 4. Suggested segregation methods for 20mph streets that are not on QuietRoutes[1,2]

Peak Hourly Flow (vehicles / hour)	Expected Average **Speed ≤20mph?**	Suggested Segregation Type[3,4]
< 30	Yes	U
	No	U+
30 – 60	Yes	U
	No	U+
60 – 120	Yes	U+
	No	A+
120 – 240	Yes	A+, if possible M or S, especially at higher speeds
	No	
240 – 480	Yes	M or S, preferably S, especially at higher speeds
	No	
≥ 480	Yes	Always S (Hard)
	No	

Notes to table:

1. Always consider using a one-way plug first. See page 3.
2. Enhanced segregation should be considered in locations with additional problems for cyclists, in particular poor forward visibility or likely higher speeds.
3. U+, A+, M+ means that you should consider means of segregation from U, A, M respectively upwards, starting with the least segregated option (unless the table says otherwise). You should generally consider speed reduction measures to bring average speeds below 20mph before considering a higher level of segregation. Hybrid solutions, as per note 2 should be considered.
4. Other factors such as street width and car parking often constrain or influence marking/segregation options. The level of marking/segregation should not be increased just because there is space to do so. However, marking/segregation should be increased if it seems likely that there will be appreciable benefits in relation to the cost and any negative impacts.

Use of a Red Chipped Surface

The use of a red chipped surface helps draw attention to a cycle lane. However installation over small areas is relatively expensive. Guidance is provided below as to when to consider using red chips for cycle lanes:

- Use red chips in contraflow lanes, including short lengths at plugs and entry/exit points, when resurfacing the whole street.
- The safety value of red chips versus cost should be considered when installing contraflow but <u>not</u> resurfacing the whole street.

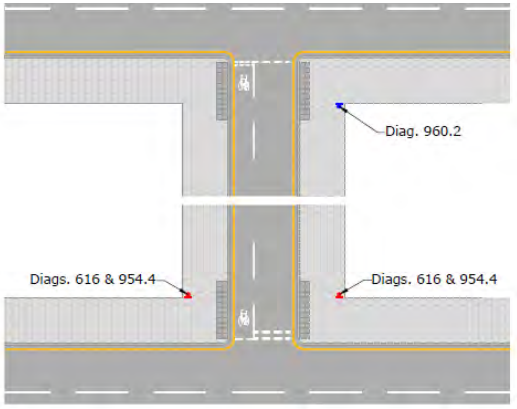
Contraflow with minimal segregation

Use on quiet streets, where risk of encroachment onto cycle side is low.

DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- NO RED CHIPPING REQUIRED
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE

Contraflow on very narrow streets – no lane delineation even at junctions

One-way contraflow on the narrow Ironmonger Lane, London. Note the Diag. 960.2 signage (Google Maps).

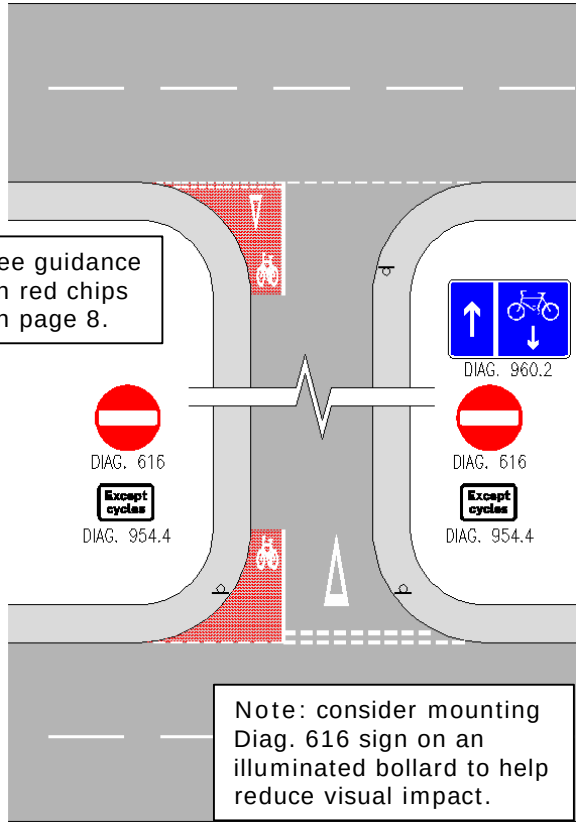


Drawing 5145925-CC-C-0001

Contraflow with enhanced markings and minimal physical segregation

Use on quiet streets, with straightforward entry/exits with some risk of encroachment by motor vehicles.

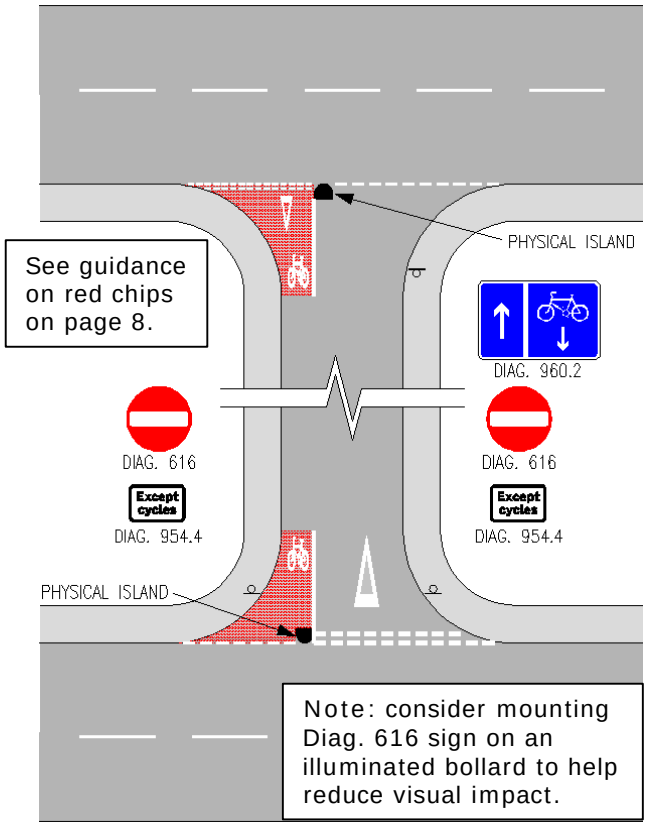
DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE



Contraflow with physical protection at entry and exit, but minimal markings

Use on quiet streets with higher risk of encroachment especially if HGV/Bus use is significant. Protection is generally more important at cycle-only exits.

DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE

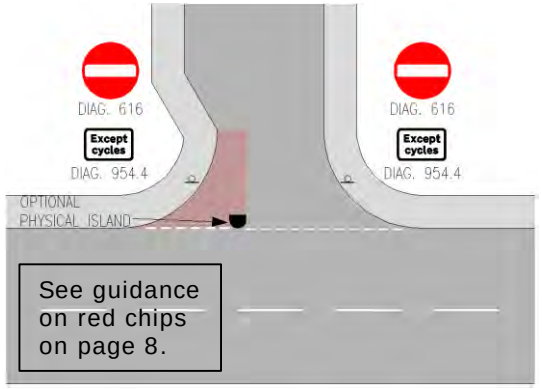


Contra-flow options (drawings from One Way Street Review, WSP PB)

Contraflow cycle lane entry at false one way junction (one way plug)

Physical protection required if vehicles, especially HGVs, are likely to encroach. (Less likely here than at the exit from a contraflow lane)

DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- RED CHIPPING SURFACE FINISH TO CYCLE LANES



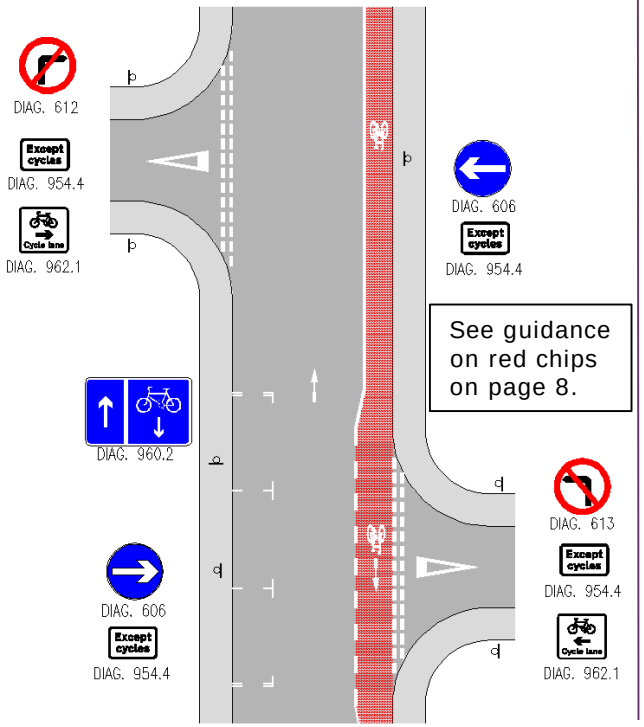
One-way contraflow cycle lane exit at false one-way, Penarth (Sustrans)

Ensure exit from any protected section of cycleway is not blocked by parked cars.

Contraflow cycle lane with side streets

Typical detail for general use. If the side road has a continuous footway, remove give way markings etc.

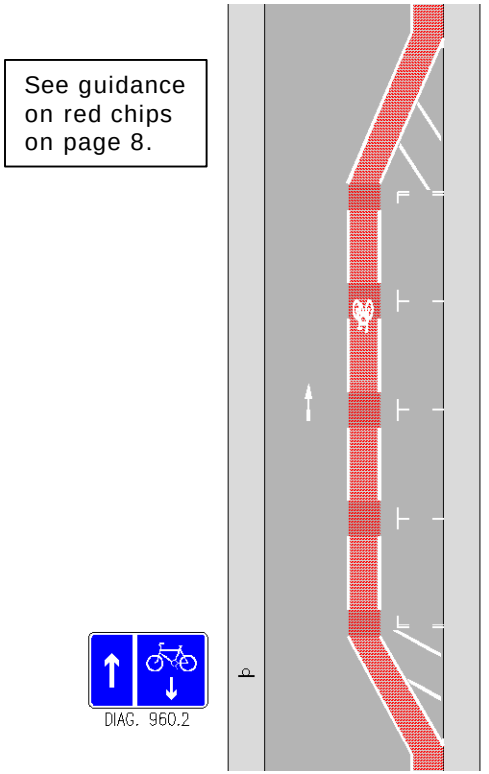
DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- CYCLE LANE SHOULD INCREASE BY 0.5m AT JUNCTIONS
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE



Contraflow cycle lane adjacent to parking bays

May create a pinch point on narrow streets where either cyclists or vehicles may need to give way, acceptable on quiet streets.

DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- TAPER ON APPROACH 1:10; EXIT 1:5
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE

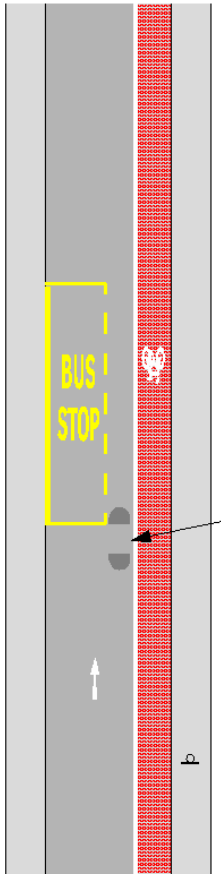


Contra-flow options (drawings from One Way Street Review, WSP PB)

Relevant Factsheets
Continuous Footways (G7)

Contraflow cycle lane passing a bus stop

Optional refuge for pedestrians crossing behind bus acts as extra cyclist protection.



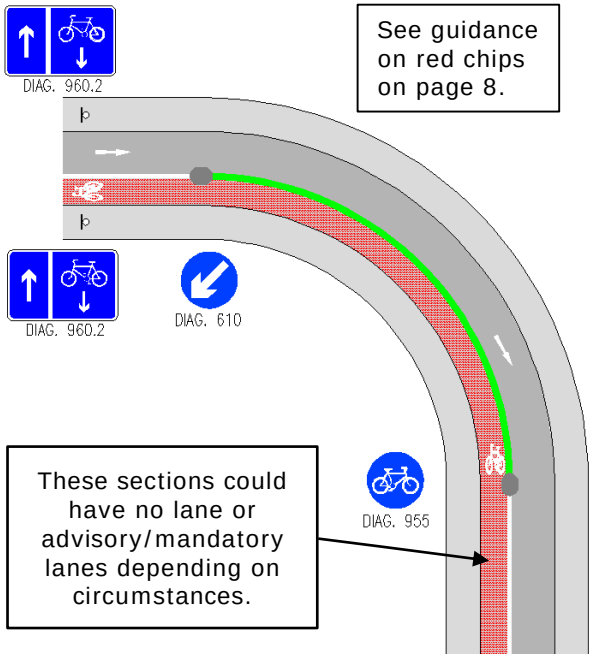
DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE
- CYCLE LANE SEGREGATION CONSIDERED FOR STREETS WITH HIGH SPEEDS OR TRAFFIC VOLUMES

See guidance on red chips on page 8.

Contraflow cycle lane with reduced forward visibility

Physical segregation prevents vehicle encroachment particularly where contraflow on inside of bend, and where reduced visibility.

DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- GREEN LINE INDICATES PHYSICAL SEGREGATION
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE



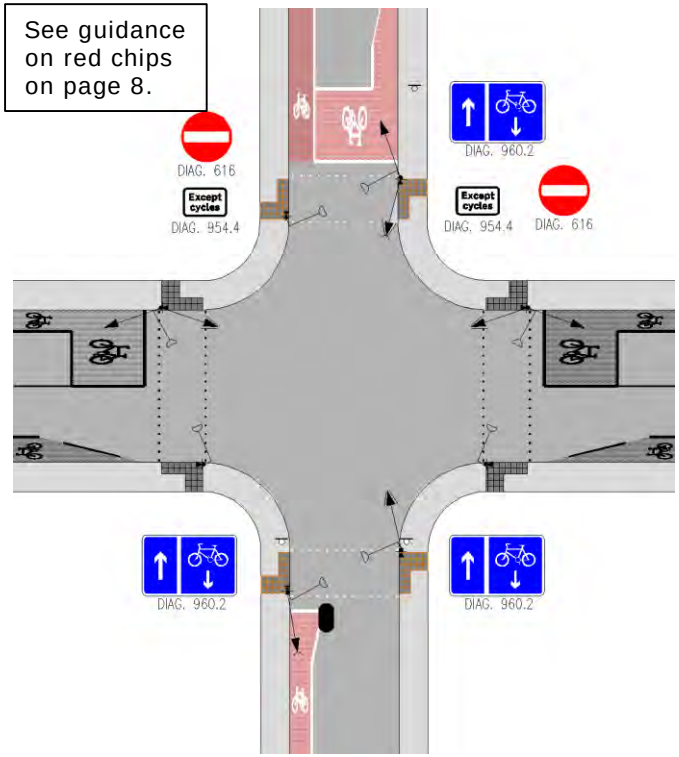
See guidance on red chips on page 8.

Contraflow cycle lanes at signalised junctions

With protection at contraflow exit.

DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- CYCLE FEEDER LANE 1.5m MIN
- ADVANCED STOP LINE WIDTH 4m MIN
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE

See guidance on red chips on page 8.



Contra-flow options (drawings from One Way Street Review, WSP PB)

Relevant Factsheets
Continuous Footways (G7)

Image References

Contraflow Cycling on One Way Streets

Images: City of Edinburgh Council

Contraflow Cycling

Birmingham: Sustrans Design Manual: Chapter 4 (2015) draft [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/images/files/Route-Design-Resources/4_Streets_and_roads_05_03_15.pdf [Accessed 04 April 2018]

Penarth: Sustrans Design Manual: Chapter 4 (2015) draft [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/images/files/Route-Design-Resources/4_Streets_and_roads_05_03_15.pdf [Accessed 04 April 2018]

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Northcote Road: City of Edinburgh Council

Rankeillor Street: City of Edinburgh Council

Ebury Street: Google Maps (2012) [ONLINE]. Available at: https://bit.ly/2JjJjLU [Accessed 04 April 2018]

Contraflow on very narrow streets

Ironmonger Lane: Google Maps (2016) [ONLINE]. Available at: https://bit.ly/2KtbCqR [Accessed 16 May 2018]

Contraflow cycle lane entry at false one way junction (one way plug)

One-way contraflow cycle lane exit at false one-way: Sustrans: Inspiring Infrastructure Case Study [ONLINE]. Available at: https://www.sustrans.org.uk/article/inspiring-infrastructure-arcot-street-penarth [Accessed 04 April 2018]

Index

C7 – Cycle Parking

Short and Long Stay Cycle Parking – Design Principles

This sheet provides general design principles for providing short and long stay cycle parking in both existing streets (retro-fitting) and new developments. It should be used as an accompanying sheet for providing cycle parking of all types elsewhere in this factsheet.

Short Stay Cycle Parking

Should be provided for visitors to key destinations such as shops, community centres, museums, libraries, health centres and parks.

To be effective, short stay cycle parking should:

- ❑ Be near destination entrances and more convenient than nearby car parking spaces.
- ❑ Directly link to cycle routes and be provided on cycle desire lines.
- ❑ Be sited on a well-drained surface, overlooked and lit.
- ❑ Be easily accessible with a short route from the street with no steps and any doors easy to negotiate.
- ❑ Be easy to use (no lifting or dragging needed) and allow at least one wheel and frame to be locked.
- ❑ Not present an obstruction to mobility or visually impaired users and be suitable for their use.
- ❑ Not block or obstruct pedestrian movements and desire lines and vehicle access.
- ❑ Accommodate non-standard bicycles with a variety of locking points to support different bicycle types (preferably 20% of spaces).
- ❑ Minimise visual impact on surroundings and be well integrated with the public realm, especially in conservation areas and the World Heritage Site.
- ❑ Provide facilities for electric bicycle charging.

Long Stay Cycle Parking

Should be provided for residents at homes; employees at workplaces; students at educational institutions and passengers at transport interchanges.

To be effective, long stay cycle parking should:

- ❑ Include the principles set out for short stay parking.
- ❑ Be secure (access controlled) and weather protected (covered).

Additional Principles for New Developments

To be effective, cycle parking should:

- ❑ Include the principles set out for short stay and long stay parking.
- ❑ Be future-proofed. Locations chosen should have capacity to increase amount of cycle parking as demand increases.
- ❑ Accommodate non-standard bicycles (minimum 20% of all spaces; preferably higher).

Short stay cycle parking on footway within building curtilage – Sheffield stands in echelon

The City of Edinburgh Council

Long stay cycle parking on carriageway – hinge top units

The City of Edinburgh Council

Relevant Factsheets:

Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

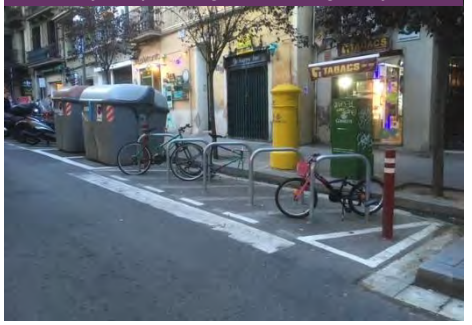
Cycle Parking Options for Short Stay

This sheet provides an overview of the short stay cycle parking options suitable for different locations, both for retro-fitting cycle parking on existing streets and for cycle parking in new developments.

Details of the cycle parking types are provided on the subsequent pages. The table is not exhaustive, with different options than those identified in this table potentially more appropriate depending on the situation.

	Short stay cycle parking	
Location	Preference	Type of cycle parking preferred
On carriageway (incl. build outs)	Preferred if space within building curtilage not available	Retro-fitting • Sheffield stands [pg 23-25] • Portable rack units for temporary use for assessing demand [pg 33]
		New developments • Sheffield stands with protection islands, trees or planters [pg 23-25]
On footway	Retro-fitting Not preferred If used, minimum footway widths shall be maintained	• Sheffield stands [pg 23-25]
	New developments Not permitted unless located on a purpose built footway extension or kept within the furniture zone	
Off-street	Preferred for new developments and large premises with external space within curtilage e.g. schools, health centres, supermarkets and large employers	• Sheffield stands (preferably covered) [pg 23-25] • Standalone storage units [pg 28-29]

Cycle parking on carriageway



Barcelona, Nazan Kocak

Cycle parking in car space

The City of Edinburgh Council

Short stay cycle parking in tree planting zone

Umea, Nazan Kocak

Cycle Parking Options for Long Stay

This sheet provides an overview of the long stay cycle parking options suitable for different locations, both for retro-fitting cycle parking on existing streets and for cycle parking in new developments.

Details of the cycle parking types are provided on the subsequent pages. The table is not exhaustive, with different options than those identified in this table potentially more appropriate depending on the situation.

	Long stay cycle parking	
Location	Preference	Type of cycle parking preferred
On carriageway (incl. build outs)	Not preferred, but acceptable if off-street space unavailable	• Hinge top units [pg 26-27]
	New developments Not permitted *	
On footway	Retro-fitting Not preferred Only allowed where there is an existing footway build-out or a new footway extension is built to accommodate it	• Hinge top units [pg 26-27]
	New developments Not permitted *	
Off-street	Retro-fitting Most preferred	Retro-fitting • Hinge top units [pg 26-27] • Standalone storage units [pg 28-29] • Two tier storage where space is constrained [pg 32]
	New developments Required [pg 13-22]	New developments • Garages [pg 30] • Standalone storage units [pg 28-29] • Storage cages [pg 31] • Two tier storage where space is constrained [pg 32]

* Long-term cycle parking for new developments cannot be met on existing or new streets. In exceptional circumstances where it is impossible to provide cycle parking in the new development the Council may seek a contribution towards a public secure cycle parking hangar.

Hinge top units

The City of Edinburgh Council

Off street parking

The City of Edinburgh Council

Retro-fitting Cycle Parking

It is essential to provide appropriate and attractive cycle parking at key origins and destinations to encourage cycling as a means of transport, to show non-cyclists that it is a viable option and that cyclists are welcomed.

The flow chart below summarises the overall process to assess the need for and retro-fit cycle parking in various street types and land uses (trip generators and attractors). When installing new cycle parking in a street, any existing cycle parking that does not fit with the current guidance should be improved.

Audit existing cycle parking

Survey where short and long stay cycle parking is provided and how well it is utilised, including any obvious overspill.

Determine user needs

Speak to existing and possible users, for example local cycle groups, local community councils, cycle advocacy groups, resident associations, local businesses, and employees.

Estimate existing and future demand

Consider the various land uses that generate and attract cycle trips, to determine the requirements for short and long stay parking. Use table in Section 2.4 of the Edinburgh Design Guide and advice in Section 6.2 of Cycling by Design. Forecasting tools can also help.

Identify suitable locations

The potential locations and places for on-street and off-street cycle parking should be suitable to accommodate the identified demand (both for short and long stay parking).

See pages 1-3, 5-12

Identify appropriate cycle parking facilities

Cycle parking options / types are provided at the end of this factsheet.

See pages 2-3, 23-34

Guidance is provided in the form of illustrative examples for identifying suitable locations for the following street types and uses:

- High streets – including town centres and neighbourhood shopping streets
- Residential streets – in high and medium density residential areas
- Employment streets and workplaces – including industrial areas
- Community destinations – including libraries, museums, GP surgeries, sports centres, parks etc.
- Educational institutions – including nurseries, primary and high schools, higher education etc.

Relevant Factsheets:
Designing for Cycling (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Cycle Parking on Carriageway (incl. new build outs) – Design Principles

Table below should be used in conjunction with the design principles on page 1 of this factsheet. TRO and/or Redetermination Orders will be required for locating cycle parking on carriageway or new build outs.

Considerations	Short Stay *Sheffield stands; Portable rack units;*	Long Stay *Hinge top units*
How many spaces per individual location?	2-20 spaces per location	Depends on demand assessment (see page 4 for advice)
	At least 20% of cycle parking spaces should be able to accommodate non-standard cycles, particularly where 10 or more spaces are provided. For information on non-standard bikes see https://wheelsforwellbeing.org.uk/	
How many locations per length of street?	Shopping streets – every 100-150m Other streets – adjacent to demand generators (schools, libraries, community centres, major employers, major shops, corner shops), but only where cycle parking cannot be accommodated within the curtilage	Every 150-200m in areas with identified level of general demand. Otherwise, adjacent to specific building(s) where demand has been identified, but only where cycle parking cannot be accommodated within the curtilage
Where to site?	As close as possible to junctions and crossings for accessibility, whilst maintaining visibilities and safe distances required by the ESDG (see G6 and G4 factsheets) and/or Traffic Sign Manual Chapter 6 In converted car parking spaces on streets where car parking is permitted at all times In "lee" (shelter) of existing footway build outs and within new purpose built footway build outs.	
Where not to site?	Within intervisibility zones at junctions or within controlled area of crossings (as required by G6 and G4 factsheets and/or Traffic Sign Manual Chapter 6) Within 'Bus Box' area at bus stops and bus boarders (see PT2 factsheet) to avoid obstructing access or egress onto buses Where likely to impact on Public Transport, particularly in bus lanes (see PT3 factsheet) On utility access points On pedestrian desire lines and crossings At waste and recycling collection access points Streets with 30 mph speed limit or above (except within footway build out) At a location where the first logical move away from the parking is along the tram tracks	
How to make sure access/egress is safe and convenient?	Site adjacent to a kerb	

Relevant Factsheets:

Key Parameters (C1)
Footway Widths and Zones(P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
De-cluttering Assessment (P7)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
Zigzags (G4)
Visibility (G6)
Bus Lanes (PT3)
Bus Box and Bus Border (PT2)

Cycle Parking on Footways (incl. existing build outs)– Design Principles

Table below should be used in conjunction with the design principles on page 1 of this factsheet.

Considerations	Short Stay *Sheffield stands*	*Long Stay* *Hinge top units*
How many spaces per individual location?	2-10 spaces per location Depends on demand assessment (see page 4 for advice)	Not preferred Should only be used where there is an existing footway build-out or a new footway extension is built to accommodate it
	Where possible, 20% of cycle parking spaces should be able to accommodate non-standard cycles, particularly where 10 or more spaces are provided. For information on non-standard bikes see https://wheelsforwellbeing.org.uk/	
How many locations per length of street?	On shopping streets – every 100-150m Other streets – adjacent to demand generators (schools, libraries, community centres, major employers, major shops, corner shops) but only where cycle parking cannot be accommodated within the curtilage	
Where to site?	Footways, provided clear effective footway widths can be maintained As close as possible to junctions and crossings for accessibility, whilst maintaining visibilities and safe distances required by the ESDG (G6 and G4 factsheets) and/or Traffic Sign Manual Chapter 6 Aligned with existing street furniture, particularly in "lee" ("shelter") of large elements of street furniture such as phone and utility boxes, fixed litter bins, and downstream of bus shelters Existing build outs can provide good locations where sufficient/clear space is available.	
Where not to site?	Where an effective clear footway width for the street type cannot be maintained Out of alignment with existing street furniture On pedestrian desire lines and crossings (or within 3m of dropped kerb or tactile paving, at the closest point) At bus stops, to avoid obstructing passenger access or egress On utility access points Within visibility splays at junctions Where seasonal temporary street furniture is located, e.g. dining facilities outside cafés At waste and recycling units access points Near loading spaces to avoid conflict with vehicle door openings and blocking access points for goods vehicles At a location where the first logical move away from the parking is along the tram tracks	

Relevant Factsheets:

Key Parameters (C1) Pedestrian Desire Lines (P2) Designing Inclusive Streets (P2) Bus Stops (PT2)
Footway Widths and Zones(P3) De-cluttering Assessment (P7) Zigzags (G4)
Street Furniture (F1) Reduced Clear Kerb Zone (F1) Visibility (G6)

Cycle Parking Off-Street – Design Principles

Table below should be used in conjunction with the design principles on page 1 of this factsheet.

Considerations	Short Stay *Sheffield stands (preferably covered);*	Long Stay *Hinge top units; Standalone storage units; Two tier storage (in constrained areas only)*
How many spaces per individual location?	Depends on demand assessment (see page 4 for advice) but for retail a minimum of 1 customer and 1 employee space should be provided At least 20% of cycle parking spaces should be able to accommodate non-standard cycles, particularly where 10 or more spaces are provided. For information on non-standard bikes see https://wheelsforwellbeing.org.uk/.	
How many locations per length of street?	At every trip generator (schools, libraries, community centres, major employers, major shops, corner shops), located within the building curtilage	
	As close as possible to main entrance to premises, where provision for cycle parking within building curtilage is not possible	
Where to site?	Within the curtilage of premises (communal areas) In car parking places Near entrances, and be more convenient than nearby car parking spaces Overlooked and lit places and preferably covered by the premises CCTV if available Visual impact of facility should be considered and minimised	
		Secure places where access can be controlled for security purposes (e.g. through issuing keys, passes or codes)
Where not to site?	Places that require lifting or dragging of bikes to access On pedestrian desire lines and crossings On utility access points At waste and recycling units access points Near loading spaces to avoid conflict with vehicle door openings and blocking access points for goods vehicles At a location where the first logical move away from the parking is along the tram tracks	

Relevant Factsheets:
Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

High Streets and Neighbourhood Shopping Streets

Likely users of cycle parking

- Short stay for shoppers and visitors
- Long stay for employees and residents

Location	Short stay options	Long stay options
On carriageway	• Sheffield stands • Portable rack units	• Hinge top units
On footway	• Sheffield stands	*Not permitted – see notes in page 6*
Off-street	• Sheffield stands (preferably covered)	• Hinge top units • Standalone storage units

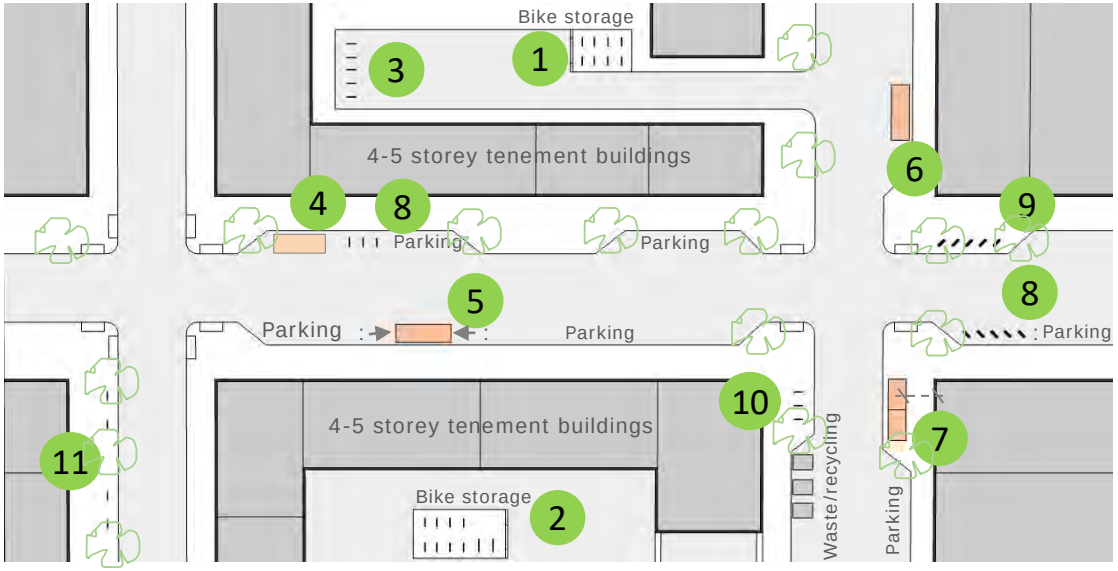
On carriageway (or build out) cycle parking	Footway cycle parking	Off-street cycle parking
• Where car parking is permitted 24/7, allocate 1-2 car parking places per location for cycle parking. • Where cycle parking is not possible on the main street, locate cycle parking for short stay (1) and long stay (2) on nearby side streets. • Stands on build outs (3) should be well sited to avoid pedestrian desire lines and crossings.	• Only locate Sheffield stands (4) where clear footway width can be maintained. • Cycle parking on the footway near building lines (5) should be avoided, unless in the "lee" of buildings or aligned with existing permanent street furniture. • Stands may be sited perpendicular (6), in echelon (4) or parallel (7) to the kerb at busy building entrances, providing footway widths are maintained. • Stands should be at least 3m from bus stops (7) and dropped kerbs, and not obstruct loading bays (6). • Long stay cycle parking (8) should not be located on the footway in main shopping streets, and should only be located on side street footways if clear footway width is achievable.	• Access controlled long stay cycle parking for employees (and residents) can be located in car parking places (9), front or back gardens, or communal areas (10). Note additional permissions may be required for cycle parking in front gardens, particularly for listed buildings or in conservation areas. • Sheffield stands (preferably covered) can be provided for short stay parking for shoppers / visitors (9) (11).

Relevant Factsheets:
Key Parameters (C1)
Footway Widths and Zones(P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
De-cluttering Assessment (P7)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
Zigzags (G4)
Visibility (G6)
Bus Lanes (PT3)
Bus Box and Bus Border (PT2)

High and Medium Density Residential Streets

Likely users of cycle parking
- Long stay for residents
- Short stay for visitors

Location	Short stay options	Long stay options
Off-street	• Sheffield stands (preferably covered)	• Hinge top units • Standalone storage units
On carriageway	• Sheffield stands • Portable rack units	• Hinge top units
On footway	• Sheffield stands	*Not preferred – see notes in page 6*



Off-street cycle parking	On carriageway (or build out) cycle parking	Footway cycle parking

• Access controlled long stay cycle parking for residents can be located in car parking places (1), front or back gardens (2) or communal areas. Note additional permissions may be required for cycle parking in front gardens, particularly for listed buildings or in conservation areas.
• Short stay cycle parking for visitors can be located as above, but for ease of use without access control (3).
	• Where car parking is permitted 24/7 on street, locate:
	  • long stay cycle parking on carriageway (4) (5) or build out (7).
	  • short stay cycle parking stands on carriageway (8) or build out (9).
	• Where cycle parking is not possible on the main street, locate cycle parking on side street carriageway (6) or build out (7) (10).
	• Cycle parking on build outs (7) (9) (10) should be well sited to avoid pedestrian desire lines.
		• Short stay visitor parking stands can be located on the footway only if a clear footway width is maintained.
		• Stands may be sited perpendicular, in echelon or parallel to the kerb (11), providing footway widths are maintained.
		• Stands should be 3m from bus stops and dropped kerbs and not obstruct loading bays.

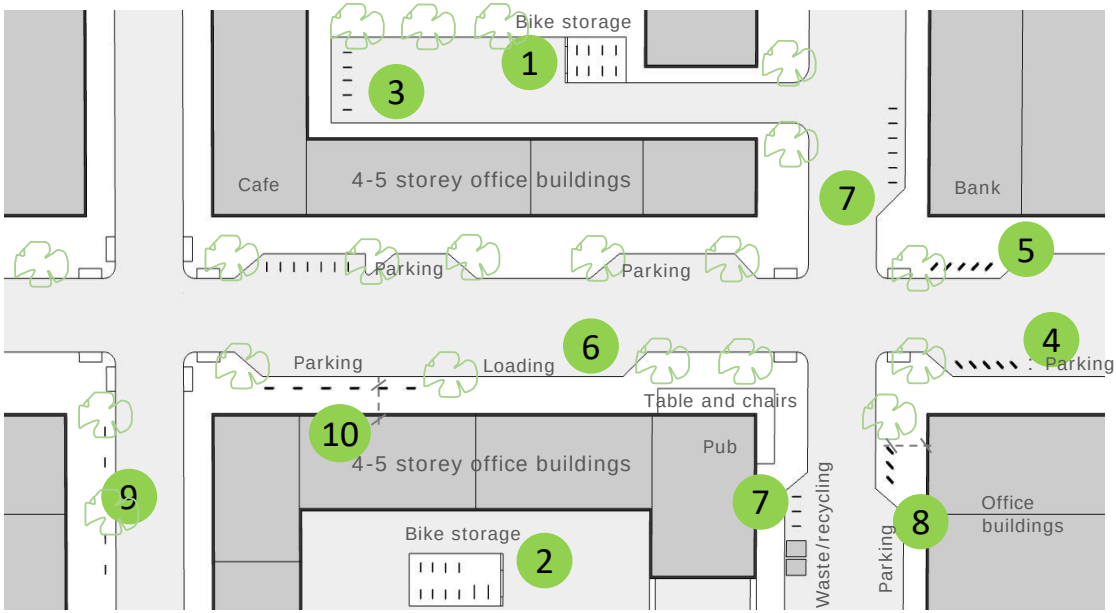
Relevant Factsheets:

Key Parameters (C1)
Footway Widths and Zones(P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
De-cluttering Assessment (P7)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
Zigzags (G4)
Visibility (G6)
Bus Lanes (PT3)
Bus Box and Bus Border (PT2)

Employment Streets

Likely users of cycle parking
- Long stay for employees
- Short stay for shoppers and visitors

Location	Short stay options	Long stay options
Off-street	• Sheffield stands (preferably covered)	• Hinge top units • Standalone storage units
On carriageway	• Sheffield stands • Portable rack units	• Hinge top units
On footway	• Sheffield stands	*Not permitted – see notes in page 6*



Off-street cycle parking	On carriageway (or build out) cycle parking	Footway cycle parking
• Access controlled long stay cycle parking for employees can be located in car parking places (1), front or back gardens (2) or communal areas. Note additional permissions may be required for cycle parking in front gardens, particularly for listed buildings or in conservation areas. • Short stay cycle parking for visitors can be located as above, but for ease of use without access control (3).	• Locate Sheffield stands for long and short stay parking on carriageway (4) or on a build out (5) (6). • Where cycle parking is not possible on the main street, locate cycle parking on side street carriageway (7) or build out (8). • Cycle parking on build outs (5) (6) (8) should be well sited to avoid pedestrian desire lines and crossings.	• Short stay visitor can be located on footway only if a clear footway width can be maintained. • Stands should be 3m from bus stops and dropped kerbs and not obstruct loading bays. • Cycle parking on the footway near building lines should be avoided, unless in the "lee" of buildings or aligned with existing permanent street furniture. • Stands may be sited perpendicular, in echelon or parallel (10) to the kerb, providing footway widths are maintained.

Relevant Factsheets:

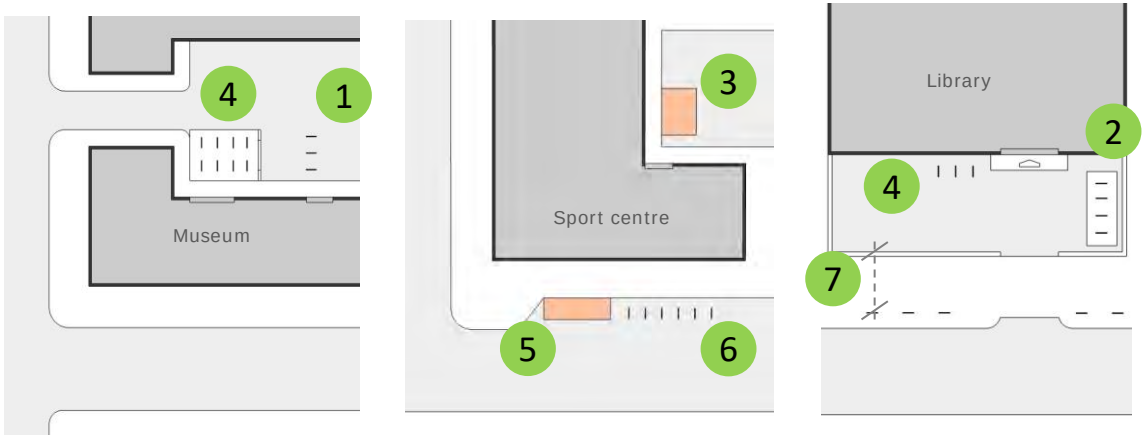
Key Parameters (C1)
Footway Widths and Zones(P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
De-cluttering Assessment (P7)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
Zigzags (G4)
Visibility (G6)
Bus Lanes (PT3)
Bus Box and Bus Border (PT2)

Community Destinations

Likely users of cycle parking

- Short stay for visitors of community destinations such as libraries, museums, GP surgeries, sports centres, parks etc.
- Long stay for employees

Location	Short stay options	Long stay options
Off-street	• Sheffield stands (preferably covered)	• Hinge top units • Standalone storage units
On carriageway	• Sheffield stands • Portable rack units	• Hinge top units
On footway	• Sheffield stands	*Not permitted – see notes in page 6*



Off-street cycle parking	On carriageway (or build out) cycle parking	Footway cycle parking
• Access controlled long stay cycle parking for employees can be located in car parking places (1), front (2) or back gardens (3) or communal areas. Note additional permissions may be required for cycle parking in front gardens, particularly for listed buildings or in conservation areas. • Short stay cycle parking for visitors should also be located in the same areas near entrances but for ease of use without access control (4).	• Locate hinge top units (5) for long and Sheffield stands (6) short stay parking on carriageway or on a build out. • Where cycle parking is not possible on the main street, locate cycle parking on side street carriageway or a build out within 50m of the main street. • Cycle parking on build outs should avoid pedestrian desire lines and crossings.	• Short cycle parking can be located on the footway only if a clear footway width is maintained. • Stands should be 3m from bus stops and dropped kerbs and not obstruct loading bays. • Cycle parking on the footway near building lines should be avoided, unless in the "lee" of buildings or aligned with existing permanent street furniture. • Stands may be sited perpendicular, in echelon or parallel (7) to the kerb, providing clear footway widths are maintained.

Relevant Factsheets:
Key Parameters (C1)
Footway Widths and Zones(P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
De-cluttering Assessment (P7)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
Zigzags (G4)
Visibility (G6)
Bus Lanes (PT3)
Bus Box and Bus Border (PT2)

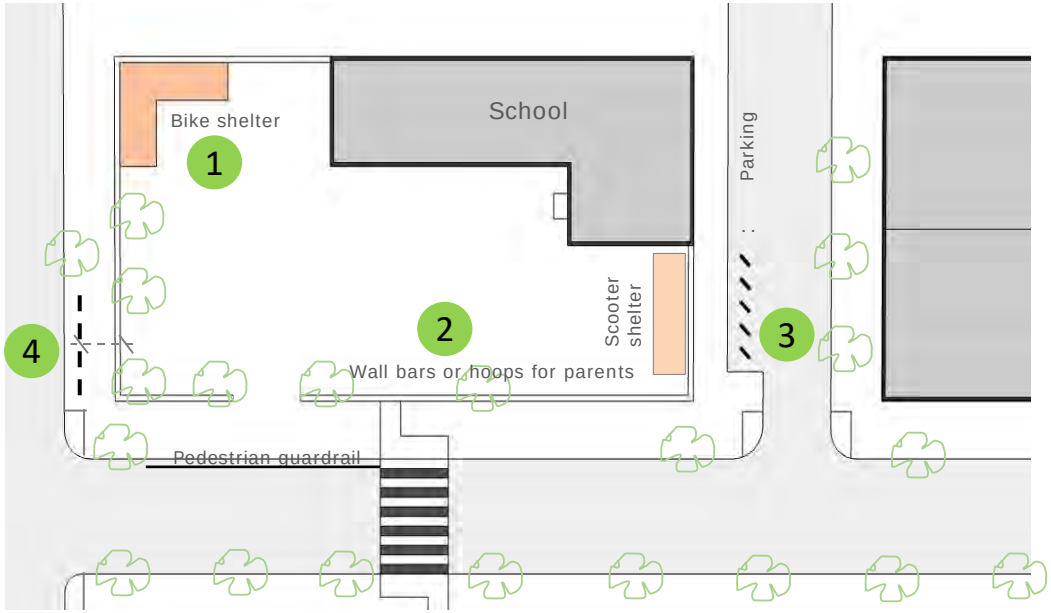
Educational Institutions

Likely users of cycle parking

- Long stay for students, teachers, lecturers and other staff.
- Short stay for parents and visitors of nurseries, primary schools, high schools and universities.

See page 16 for more information.

Location	Short stay options	Long stay options
Off-street	• Sheffield stands (preferably covered)	• Hinge top units • Standalone storage units
On carriageway	• Sheffield stands • Portable rack units	• Hinge top units
On footway	• Sheffield stands	*Not permitted – see notes in page 6*



Off-street cycle parking *Most preferred*	On carriageway (or build out) cycle parking	Footway cycle parking *Least preferred*
• Long stay cycle parking for pupils can be located in car park areas as well as in front or back yards (1) of the educational institution building(s). • At schools, cycle parking should be located within the educational institution's secure grounds, so additional access control measures are not required. • Some spaces can be allocated for parents picking up or dropping off (2) children and other visitors.	• Locate Sheffield stands for long and short stay parking on side street build out; or on-carriageway (3) if there is no build out. • Cycle parking on build outs should avoid pedestrian desire lines and all crossings, including informal crossings in 'safer school' streets.	• Stands for short stay parking can be located on adjacent side street footway only if a clear footway width is maintained. • Stands should be 3m from bus stops and dropped kerbs and not obstruct loading bays. • Cycle parking on the footway near building lines should be avoided, unless in the "lee" of buildings or aligned with existing permanent street furniture. • Stands (4) may be sited perpendicular, in echelon or parallel to the kerb, providing clear footway widths are maintained.

Relevant Factsheets:
Key Parameters (C1)
Footway Widths and Zones(P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
De-cluttering Assessment (P7)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
Zigzags (G4)
Visibility (G6)
Bus Lanes (PT3)
Bus Box and Bus Border (PT2)

Cycle Parking in New Developments

Cycle parking forms an integral part of any planning application. This should include details of where the cycle parking will be located, type of parking, purpose (short or long term), number of spaces and access considerations.

Cycle parking in new developments, including those altering existing buildings or spaces, should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and guidance set out in this factsheet.

Cycle parking should be considered at the Masterplan stage and major developments should submit a transport assessment and travel plan, detailing required off-street long term parking facilities as well as on-street short term visitor parking. It should accommodate any target levels of cycling and have scope to increase provision if necessary.

The assessment of cycle parking numbers should take into account the location and nature of the development, the ease of reaching it by cycle, including the planned future network and the Council's targets for increasing cycle use.

The flow chart below summarises the overall process to assess the need for cycle parking in various new development types and land uses. Individual pages provide specific advice and design principles for each new development type.

When considering cycle parking for new developments, it is important to assess and understand the implications for mobility impaired and visually impaired users in terms of:

- Placement of facilities in public areas which may cause an obstruction or hazard
- Access to/from facilities for those who may be using adapted bikes

Determine quantity of cycle parking required

Use table in Section 2.4 of the Edinburgh Design Guide - Parking standards for each relevant planning-use class.

Identify type of cycle parking required (through assessment of likely users and length of stay)

Identify who will use cycle parking, how long they will need to park, and appropriate levels of weather and theft protection. Specify ratio of long to short stay e.g. 90% long stay for residents, 10% short stay for visitors.
See pages 1-3 and 14-22.

Identify preferred location

Identify the optimal location for each type of cycle parking, e.g. within secured area for residents, outside and overlooked for visitors.
See pages 14-22 and 23-36 for cycle parking options.

Relevant Factsheets:

Designing for Cycling (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Residential Cycle Parking for Flats

Cycle parking should be provided for:

- Residents for long stay
- Visitors for short stay

Long stay for residents

All residents should have access to secure long stay cycle parking (access restricted, only for residents issued with keys, passes or codes).

It should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

Options in order of preference:

- Level accessed, fully enclosed, weather-protected communal parking within the building in secure parking area (residents' access only) at ground level. This is only acceptable above or below ground level if there is a cycle friendly lift provided.
- Cycle stores, accommodated within the footprint of the new development and directly accessed from street and/or dedicated active travel infrastructure.
- Cycle parking within secure car parks is acceptable, if suitable dedicated cycle access and egress provision is made. It should be on the ground floor (or the floor where you enter the car park) and near the lifts and stairs. Cycle users should be able to trigger any car parking barrier, or a gap of at least 1.5m to the side of the barrier is provided. Any ramps should be a maximum of 5% gradient.

Electric bicycle charging should be available in the main cycle parking area.

For larger developments, a combination of cycle-parking options and locations which support different bicycle types will be required. A maximum of 80% of all cycle parking spaces can be one type. At least 20% of cycle parking shall be suitable for use by non-standard bicycles (such as adapted bikes, tandems, cargo bikes and bike trailers).

How bike security, assess control and its maintenance will be sustained over the years should be addressed in a long-term site management plan/proposals.

Short stay for visitors

Short stay cycle parking should be provided in addition to secure access restricted long stay cycle parking, and never as a replacement. As well as visitors, lower security cycle parking often proves popular with residents, for example for short stops at home or for new residents that have not yet gained access to the secure cycle parking area.

Short stay cycle parking should be:

- Sheffield stands (see pg 23-25) or similar, located within the development
- Within 25m of the main building entrance for flats
- Overlooked by nearby buildings for natural surveillance
- Preferably weather protected (covered)

Visitor cycle parking may be provided in access free ground level car parking areas, on-carriageway, but not on footways unless located on a purpose build footway extension or between a furniture or planting zone.

The need to lift and drag; negotiate steps; long convoluted routes between bike stores and the street; and doors that are difficult to open when wheeling a bike must be avoided.

Weather protected, accessed controlled parking for residents

Cycle Hoop

Short stay cycle parking in tree planting zone

Umea, Nazan Kocak

Relevant Factsheets:

Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Residential Cycle Parking for Houses

Cycle parking should be provided for:

- Residents for long stay
- Visitors for short stay

Long stay for residents

All residents should have access to secure long stay cycle parking.

Cycle parking should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

When a house has a garage, this should accommodate cycle parking area (see pg 30 for details).

Otherwise, cycle parking may be provided in externally accessed private rear gardens.

Short stay for visitors

Short stay cycle parking should be provided in addition to secure access restricted long stay cycle parking, and never as a replacement. Short stay parking may be used by visitors or for cycle-based deliveries.

Short stay cycle parking should be:

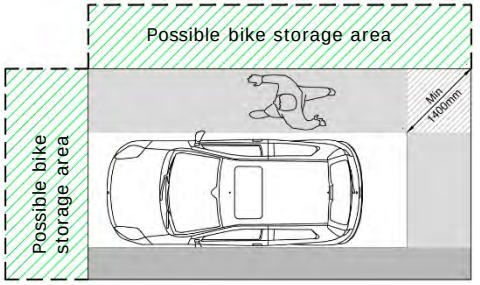
- Sheffield stands (see pg 23-25), located within the development
- Overlooked by nearby buildings for natural surveillance
- Preferably weather protected (covered)

Visitor cycle parking may be provided in access free ground level car parking areas, on-carriageway, but not on footways unless located on a purpose build footway extension or between a furniture or planting zone.

Cycle parking on footway for visitors outside terraced houses in the furniture zone

Atkins

Cycle parking area in a garage or driveway



The City of Edinburgh Council

Relevant Factsheets:

Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Educational Institutions

Cycle parking should be provided for:

- Students and staff for long stay
- Visitors and parents for short stay

All students and staff should have access to secure long stay cycle parking.

Short stay parking should be provided for parents, visitors and students.

Cycle parking should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

Scoter stands within bike parking area

The City of Edinburgh Council

Pupils / Students

All pupils should have access to weather protected cycle parking, located within the school, college or university premises.

For nursery and primary school pupils:

- Sheffield stands should include a bar at 0.4m above ground to allow for small bicycles
- Scooter stands should be provided alongside bike stands
- Location determined to maximise personal safety with natural surveillance

For secondary and further education students:

- 75% of cycle parking should be easy access (no key, pass or code needed to enter) with natural surveillance and preferably CCTV
- 25% of cycle parking should be security controlled (key, pass or code needed to enter), preferably a mixture of parking types (see pg 23-34 for options)
- Located within 50m of entrance to school/college building

Staff

Members of staff should have access to long stay secure cycle parking.

Cycle parking should be:

- Access-restricted (key, pass or code needed to enter)
- Weather protected – essential
- Within 50m of workplace entrance
- On the same floor as workplace entrance, or with cycle-friendly lift provided if above or below ground floor
- Located close to any changing / shower facilities

The parking type provided is dependent on demand.

Visitors

Visitors do not include pupils but may include parents dropping off children.

Cycle parking should be:

- Within 25m of main entrance to school, college or university
- Preferably covered (weather protected)
- Overlooked with natural surveillance, and/or with CCTV

Visitors cycle parking may be provided in access free ground level car parking areas, on-carriageway, but not on footways unless located on a purpose build footway extension or between a furniture or planting zone.

The University of Edinburgh cycle parking facilities

Emma Crowther, Edinburgh University

Relevant Factsheets:

Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Retail Establishments

Cycle parking should be provided for:

- Visitors (shoppers and deliveries) for short stay
- Employees for long stay

Cycle parking should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

Cycle parking outside shopping centre access provides good natural surveillance and minimal diversion from desire lines

Atkins

Visitors

Cycle parking at high streets, large shopping precincts and shopping centres should be:

- Cycle stands located within 25m of shopping area, near entrances
- Weather protected - essential
- Overlooked with natural surveillance, and/or with CCTV

Cycle parking may be provided within multi-storey car parks if suitable access and egress provision is made. This should be on the ground floor (or the floor where you enter the car park). Cycle users should be able to trigger any car parking barrier, or a gap of at least 1.5m to the side of the barrier is provided. Any ramps should be a maximum of 5% gradient. Passing motorists should be alerted to the availability of free cycle parking to encourage a mode switch.

Cycle parking at individual shops and small shopping precincts should be:

- Located within 15m of shop entrance
- Provided as small clusters of stands rather than one big group
- Preferably weather protected
- Overlooked with natural surveillance, and/or with CCTV

Two tier racks should not be used at retail establishments as most visitors tend to only park for a short amount of time, and two tier racks may discourage users as they are inconvenient.

Cargo Bikes

At retail outlets, there is the potential for a large number of cargo bikes undertaking deliveries. Therefore, new retail establishments should provide a greater amount of non-standard cycle spaces than the minimum 20% suggested. Cycle parking for delivery bikes should be located conveniently, depending on the loading / unloading requirements.

Employees

All employees should have access to secure cycle parking. This should be:

- Access-restricted (key, pass or code needed to access)
- Weather protected - essential
- Within 50m of workplace entrance
- On same floor as workplace entrance, or with cycle-friendly lift if within building
- Located close to any changing / shower facilities

Cycle parking on ground floor of car park provides weather protection and natural surveillance

Atkins

It is essential that car parking does not impact on cycle parking and there is sufficient space to manoeuvre a bike.

Relevant Factsheets:

Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)
Visibility (G6)

Workplaces

Cycle parking should be provided for:

- Employees for long stay
- Visitors for short stay

Cycle parking should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

Employees

All employees should have access to secure cycle parking. This should be:

- Access-restricted (key, pass or code needed to enter)
- Weather protected - essential
- Preferably internal, directly connected to workplace; or, located within 50m of workplace entrance with onward route to entrance under cover, lit and feel safe to use after dark
- On same floor as workplace entrance or with cycle-friendly lift, if within building
- Located close to any changing / shower facilities

Workplaces that attract shift work may have a particularly high demand for cycle parking with employees arriving and leaving at times when public transport is scarce.

Employees should be able to cycle as close as possible to the cycle parking e.g. through the use of dropped kerbs and dedicated cycling facilities. 'Cyclists dismount' signs should be avoided.

They should have access to e-bike charging facilities.

Cycle parking may be located in a secure car park if cycle users can trigger the barrier or or a gap of at least 1.5m to the side of the barrier is provided. This should be on the ground floor (or the floor where you enter the car park). Ramps should be within acceptable gradients (a max. 5%).

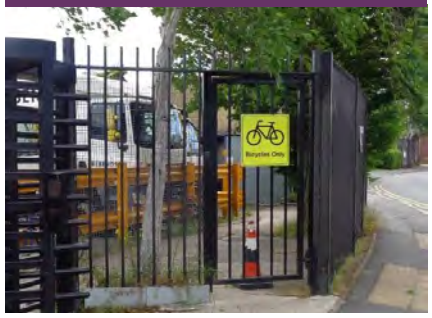
Visitors

Cycle parking for visitors to workplaces should be:

- Located within 25m of workplace main entrance
- Weather protected - desirable
- Overlooked with natural surveillance, and/or with CCTV

Visitors cycle parking may be provided in access free ground level car parking areas, on-carriageway, but not on footways unless located on a purpose build footway extension or between a furniture or planting zone.

Dedicated, secure site entrance (from public highway) for cycle commuters



Atkins

Secure parking for both cycles and cars provided by the use of two gates

Cambridge Council

Access-controlled and weather protected stand-alone storage unit immediately outside main workplace entrance

Atkins

Relevant Factsheets:
Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Minimum Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Health-Related Destinations

Cycle parking should be provided for:

- Employees and patients for long stay
- Visitors and day care patients for short stay

Cycle parking should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

Employees (at all types of facility)

All employees should have access to secure cycle parking. This should be:

- Access-restricted (key, pass or code needed to access)
- Weather protected - essential
- Located within 50m of workplace entrance
- On same floor as workplace entrance or with cycle-friendly lift, if within building
- Located close to any changing / shower facilities

Cycle parking may be located in a secure car park if cycle users can trigger the barrier or or a gap of at least 1.5m to the side of the barrier is provided. This should be on the ground floor (or the floor where you enter the car park). Ramps should be within acceptable gradients (a max. 5%).

Patients and Visitors to Hospitals

Cycle parking should be:

- Located within 50m of main entrance (25m for health centres and GP clinics)
- Weather protected (not all needs to be, but essential that at least some covered spaces for long stay are provided)
- Overlooked with natural surveillance, and/or with CCTV

Visitors cycle parking may be provided in access free ground level car parking areas, on-carriageway, but not on footways unless located on a purpose build footway extension or between a furniture or planting zone.

Mixture of weather protected and open cycle parking for short and long stay cycle parking

Atkins

Off-street units (eg located in car parks) should be weather protected. For better protection and natural surveillance, three sides should be enclosed with transparent material.

Relevant Factsheets:
Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Minimum Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Community Destinations

Cycle parking should be provided for:

- Short stay for visitors of community destinations such as libraries, museums, sports centres, parks etc.
- Long stay for employees and visitors

This should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

A cluster of stands beside tennis courts – sufficient provision for shorter stays

The City of Edinburgh Council

Employees

All employees should have access to secure cycle parking. This should be:

- Access-restricted (key, pass or code needed to access)
- Weather protected - essential
- Located within 50m of workplace entrance
- On same floor as workplace entrance or with cycle-friendly lift, if within building
- Located close to any changing / shower facilities

Cycle parking may be located in a secure car park if cycle users can trigger the barrier or or a gap of at least 1.5m to the side of the barrier is provided. This should be on the ground floor (or the floor where you enter the car park). Ramps should be within acceptable gradients (a max. 5%).

Visitors – Long Stay (over an hour)

Cycle parking for long stay visitors should be:

- Located within 50m of workplace main entrance
- Weather protected - essential

Visitors – Short Stay (up to 1 hour)

Cycle parking for short stay visitors should be:

- Located within 25m of workplace main entrance
- Preferably weather protected

Overlooked with natural surveillance, and/or with CCTV

Visitors cycle parking may be provided in access free ground level car parking areas, on-carriageway, but not on footways unless located on a purpose build footway extension or between a furniture or planting zone.

At large sites, e.g. parks, minimum 20 stands should be scattered around the area if cycling is permitted throughout, or concentrated at points where cycle routes end.

People often travel to parks by bike, and then go for a walk or a run once they've arrived. Sheffield stands at entry points help to facilitate these trips.

Relevant Factsheets:
Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Minimum Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Tourist Accommodation

Cycle parking for tourist accommodation sites should be provided for:

- Visitors and employees for long stay

Tourist accommodation sites includes (but is not limited to) hotels, guesthouses, hostels and camp sites.

Cycle parking should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

Employees

All employees should have access to secure cycle parking. This should be:

- Access-restricted (key, pass or code needed to access)
- Weather protected - essential
- Located within 50m of workplace entrance
- On same floor as main entrance or with cycle-friendly lift, if within building
- Located close to any changing / shower facilities

Cycle parking will be particularly appreciated by shift workers for whom public transport may not be available when shifts start/finish late at night or early in the morning.

Visitors (long stay – overnight)

Accommodation premises should provide access to secure cycle parking for visitors staying over night. This should be:

- Access-restricted (key, pass or code needed to access)
- Weather protected - essential
- Located within 50m of workplace entrance
- On same floor as the main entrance or with cycle-friendly lift, if within building

Visitors may arrive at accommodation in the evening. Ensure that cycle parking feels safe to access in hours of darkness.

Cycle parking for employees and visitors may be located in a secure car park if cycle users can trigger the barrier or or a gap of at least 1.5m to the side of the barrier is provided. This should be on the ground floor (or the floor where you enter the car park). Ramps should be within acceptable gradients (a max. 5%).

Relevant Factsheets:
Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Minimum Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)

Cycle Parking at Public Transport Stations and Stops

Cycle parking should be provided for:

- Public transport users and employees for long stay
- Public transport users and visitors for short stay

Cycle parking should meet the appropriate cycle parking standards in Edinburgh Design Guidance Section 2.4 and the design principles set out for short and long stay parking on pages 1-3 of this factsheet.

Cycle Parking at Bus Stops

Cycle parking at bus stops should be:

- Located within 25m of bus stop and on the same side of the road as the stop it is serving
- Preferably weather protected
- Overlooked with natural surveillance, and/or with CCTV

Cycle Parking at Tram Stops

Cycle parking at tram stops should be:

- Located within 25m of tram stop and preferably on both sides of tram tracks not in the middle island platform
- Preferably weather protected
- Overlooked with natural surveillance, and/or with CCTV
- Designed so that the most logical move away from the cycle parking is not along the tram tracks

Cycle Parking at Railway Stations and Bus Stations

Cycle parking at railway stations and bus stations should be:

- Located within 50m of main station entrance
- Overlooked with natural surveillance, and/or with CCTV
- Weather protected (not all needs to be, but essential that at least some covered spaces for long stay are provided)

At new bus or train stations with ticket barriers, a combination of short-stay easy-access parking (e.g. at the station entrance) and longer-stay more protected parking (platform side of ticket barriers) is ideal.

Two tier storage parking (see pg 32) may be used in combination with other parking option, to a total of 50% of all cycle parking spaces. Two tier parking is efficient where space is limited, however may discourage some cycle users.

Cycle parking located close to bus stop can attract good level of use at stops with high-frequency services

Atkins

Two tier parking used in combination with Sheffield stands

Atkins

Relevant Factsheets:

Key Parameters (C1)
Footway Widths (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
Footway Zones(P3)
Minimum Kerb Zone (F1)
Designing Inclusive Streets (P2)
De-cluttering Assessment (P7)
Bus Stops (PT2)

Sheffield Stands

Cycle stands on carriageway

Barcelona, Nazan Kocak

Sheffield stands on footway (parallel)

The City of Edinburgh Council

Custom (long) Sheffield stand for non-standard bikes

The City of Edinburgh Council

Key requirements and considerations

- Preferred location is on carriageway. Can also be located footway, but only where clear minimum footway widths are maintained (see overleaf), and off-street locations when covered.
- Made from brushed stainless steel or match the street furniture standards.
- Can be installed perpendicular, in echelon or in parallel, but should be oriented at right angles to any slopes.
- Stands on carriageway should have a bollard at both ends of the stand run to protect parked cycles from cars.
- Should contain reflecting banding and tapping rail to assist visually impaired people (at the end a perpendicular run, or on all if echelon/parallel).
- Should be an integral part of the footway or carriageway. Fixings should be a cored fixing into the footway/carriageway (see pg 25 for exceptions).
- On footways, should be placed in 'furniture zone' adjacent to the kerb. Occasionally they can be located at the back of the footway in "lee" of existing street furniture to avoid street clutter.
- Should not block pedestrian crossing or dropped kerbs, especially when provided parallel to kerb.
- Parallel stands could be used where recommended footway width cannot be maintained with perpendicular or echelon orientation.
- Parallel siting can replace the function of pedestrian guardrail in some places (except at school entrances). Consult P5 Pedestrian Guardrail factsheet before replacing any guardrail with stands.
- Visual impact can be reduced if placed between other items of street furniture, especially tree planting within an organised street furniture zone on-footway.
- Off-street units (eg located in car parks) should be weather protected (covered). For better protection and natural surveillance, three sides should be enclosed with transparent material. These units will have larger footprints.

Benefits

- Can be installed as a run with as many or as few stands as required at the location.
- End stand of the run can accommodate non-standard cycles.
- Can be oriented to suit location, space availability and street layout.
- Crossbar provided for smaller cycles.

Drawbacks

- When installed on carriageway, a TRO may be required as well as consultation with stakeholders.
- Can increase street clutter if installed inappropriately on footways.

Suitable for

Short stay parking:

- On carriageway
- On footway
- Off-street

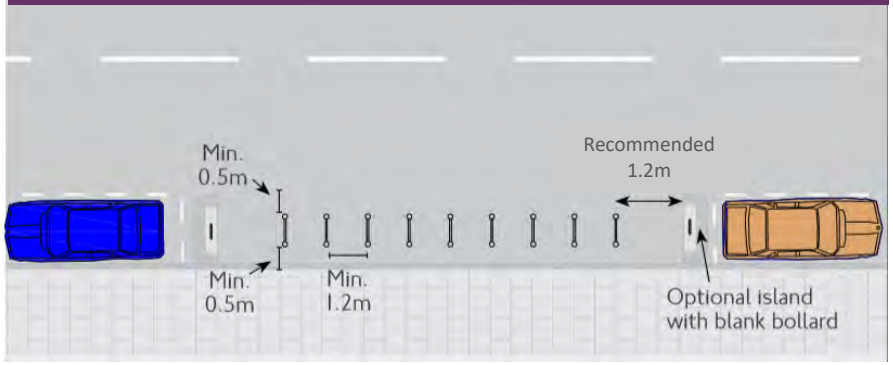
Long stay parking when used with covers and secured entry

Residential areas

Non-residential areas

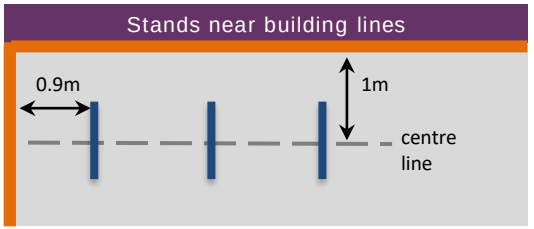
Sheffield Stands – Layout Options

In carriageway – perpendicular stands with bollards at each end of the run

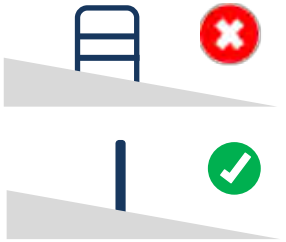


London Cycle Design Standards, 2016 (Edited)

Stands near building lines



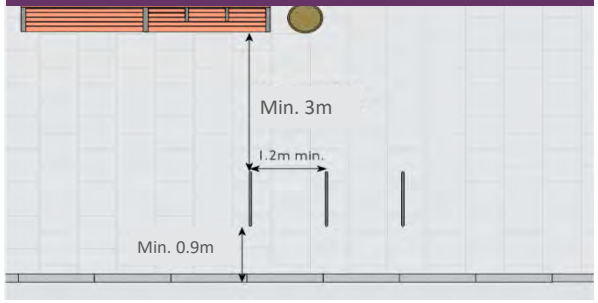
Stands should be oriented at right angles to any slopes



Stands should preferably be located on carriageway (perpendicular or echelon), with bollards at both ends of the run of stands.

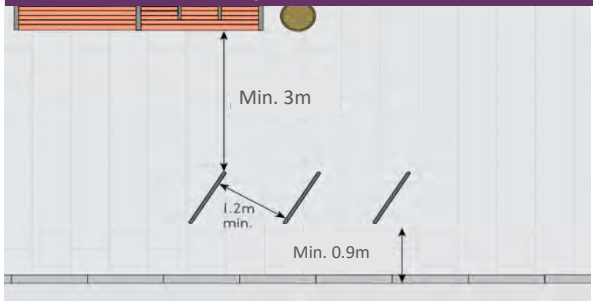
Stands can be located on wider footways on new development streets in the furniture zone without compromising the minimum desired footway widths (see P3 Footways).

On footway – perpendicular stands



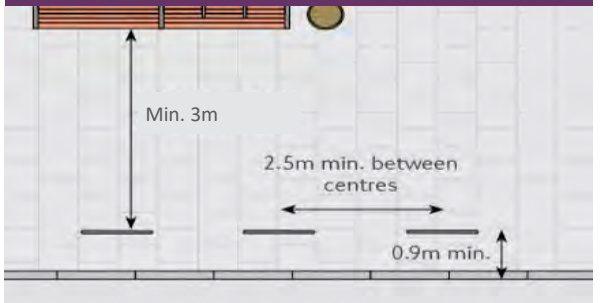
London Cycle Design Standards, 2016 (Edited)

On footway – echelon stands



London Cycle Design Standards, 2016 (Edited)

On footway – parallel stands



London Cycle Design Standards, 2016 (Edited)

When located on footways, minimum clear footway width should be 3m on high streets, neighbourhood shopping streets and strategic streets; 2.5m on employment streets, high density residential streets and secondary streets; and 2m on other streets.

Where more then 2 units of longer Sheffield stands for non-standard bikes are present (see next page for details), minimum clear footway space should be measured from those stands.

Relevant Factsheets:

Key Parameters (C1)
Footways (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
De-cluttering Assessment (P7)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
Pedestrian Guardrail (P5)
Visibility (G6)

Sheffield Stands – Construction Details and Fixings

Standard Sheffield stands with a tapping rail should be built to the dimensions specified in the drawing to the right. For Sheffield stands designed for use by longer, non-standard cycles, the length of the stand should be increased to 1.5m.

Stand shall be fabricated from Grade 304 dull polished stainless steel or from mild steel, galvanized to BS EN ISO 1461:2009.

All joints shall be continuously welded with a minimum throat thickness of 5mm.

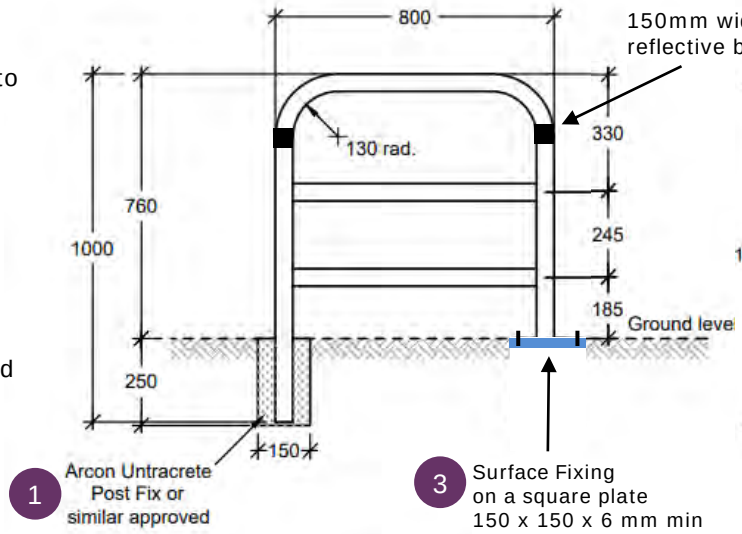
To assist visually impaired people, stands should have 150mm wide contrasting colour banding, used on TRANSPORT SS bollards by Furnitubes or similar approved.

It is preferred that stands are installed using a core fixing (1).

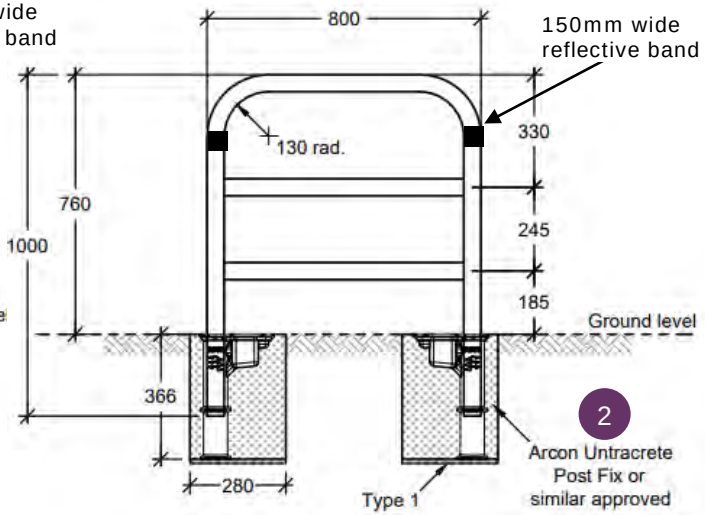
Retention sockets (2) are most appropriate for locations where cycle parking is temporary or seasonal, or where the cycle parking may need to be removed to allow street activities.

Foundations (1,2) shall be 150mm Ø Arcon Ultracrete Post Fix or similar approved.

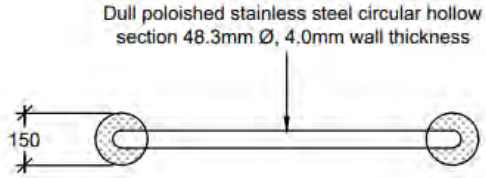
Surface fixing (3) is permittable only in exceptional circumstances where utilities in the ground do not allow core fixing or retention sockets.



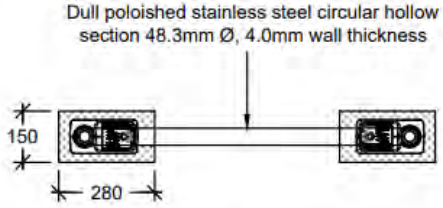
ELEVATION



ELEVATION



PLAN



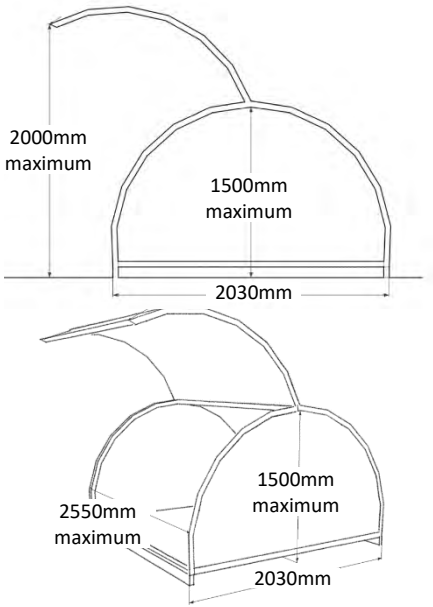
PLAN

Hinge Top Units

Hinge top units

The City of Edinburgh Council

Dimensions of a standard hinge top unit



Key requirements and considerations

- For hinge-top units retrofitted into the street, agreement in advance must be made with the Active Travel team. All Council-installed hinge-top units must be part of the Council's ongoing contract for the maintenance and running of secure on-street cycle parking hangars.
- Employers may retrofit hinge-top units into their private car parks (not onto public carriageway) but will be responsible for managing these units, not CEC.
- A standard unit fits 6 bicycles and it preferred that two units are provided at each location facing each other 'hub-style', as long as a 2 metre gap between units can be provided. See next page for standard layout.
- Where clear footway width for the street type can be maintained (see overleaf), access may be provided from the footway.
- Location should be overlooked (preferably from main windows) by the destination served, to deter theft or vandalism. If possible, position units by wall or hedge to avoid interfering with views from main windows.
- Units shall be securely fixed to the carriageway. Avoid units jutting out beyond line of parking into the carriageway. Units should not be removed or placed on green space.
- Where possible avoid siting near frontages of listed buildings; ideally find a non-listed building in the same street or a building obscured by a front wall/hedge.

Benefits

- Provides secure and dry cycle parking for users. Suitable for long term cycle parking.
- Can be installed on carriageway or in designated areas to avoid obstructing footways.
- Can accommodate larger cycle types.
- Can be combined with other infrastructure such as on-street bin stores to make more efficient use of allocated road space.

Drawbacks

- Can have a large footprint per cycle.
- Could be subject to vandalism or inappropriate use. Require management and maintenance.
- Cannot be placed on private land. TROs may be required when locating on carriageway.

Suitable for

Long stay cycle parking on carriageway

Residential areas

Non-residential areas

Not permitted for

Short stay cycle parking on footways

On new streets and/or any adopted areas within new developments

Hinge Top Units – Layouts

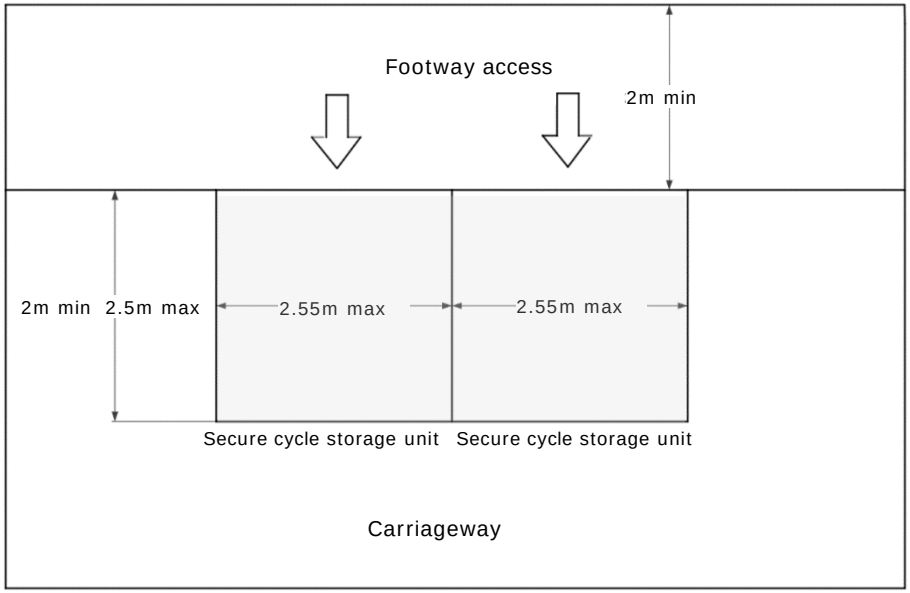
It is preferred that two hinge top units are provided at each location.

The preferred layout is face to face 'hub-style', as long as a gap of 2 metres between units is provided.

If face to face is not possible, access to the units may be provided from the footway, providing the following minimum footway widths similar to Sheffield stands in page 24 are maintained. Minimum clear footway width should be 3m on high streets, neighbourhood shopping streets and strategic streets; 2.5m on employment streets, high density residential streets and secondary streets; and 2m on other streets.

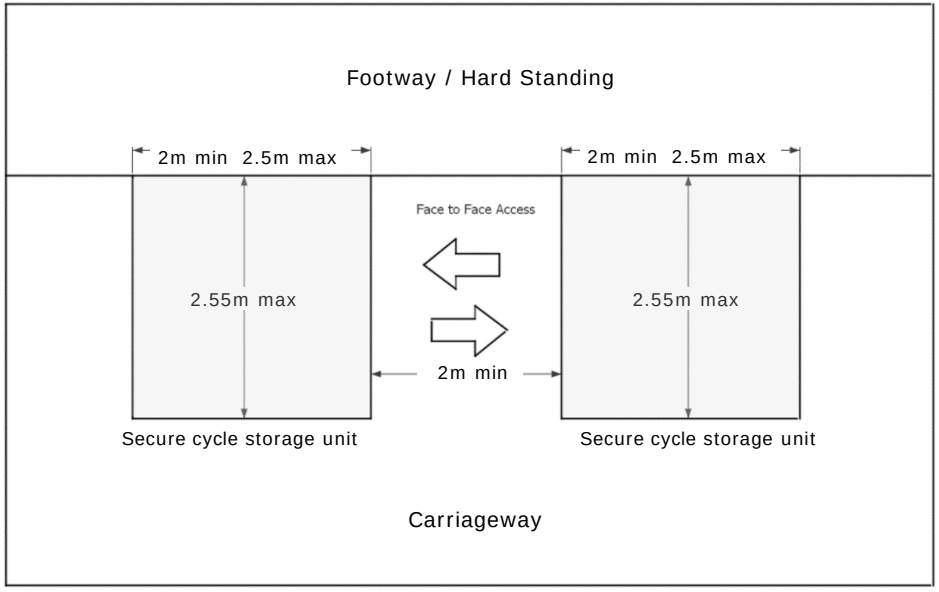
If clear footway width cannot be not maintained, access to the unit from the carriageway may be acceptable but only in exceptional circumstances, where road safety has been carefully considered.

Access from the footway – standard layout



The City of Edinburgh Council

'Hub style' (face to face) – standard layout



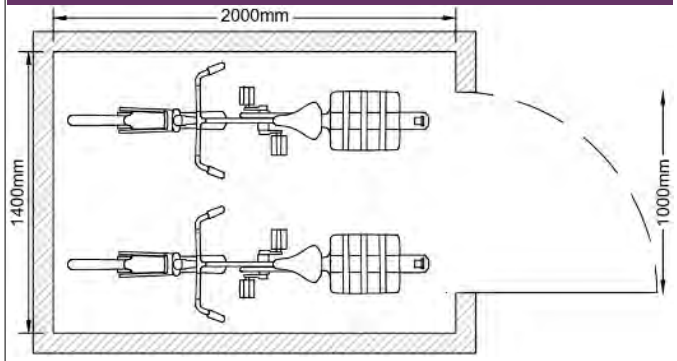
The City of Edinburgh Council

Relevant Factsheets:

Key Parameters (C1)
Footway and Zones (P3)
Street Furniture (F1)
Pedestrian Desire Lines (P2)
De-cluttering Assessment (P7)
Reduced Clear Kerb Zone (F1)
Designing Inclusive Streets (P2)
Pedestrian Guardrail (P5)
Visibility (G6)

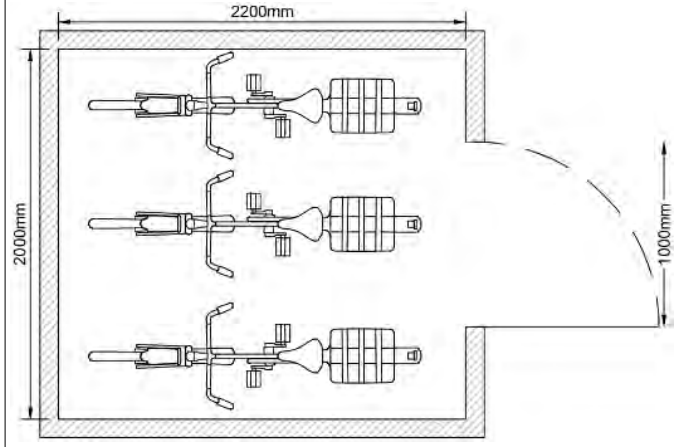
Standalone Storage Units

Standalone storage units: two cycles



DWG Ref: 5145925-CP-DR-C-0002

Standalone storage units: three cycles



DWG Ref: 5145925-CP-DR-C-0002

Key requirements and considerations

- Large enough to accommodate demand.
- Can be accommodated within the main dwelling, such as in the porch or as a unit in the garden. Note additional permissions may be required in front gardens, particularly for listed buildings or in conservation areas.
- All facilities should be lockable.
- Green roofs should be considered as part of the development's sustainable rainwater management strategy.
- At least 20% of cycle parking, particularly in new developments, should be able to accommodate non-standard bikes, such as adapted bikes, tandems, cargo bikes and bike trailers.
- Could include two tier parking in certain situations (see pg 32 for details).

Benefits

- Secure, long term storage of cycles.
- Convenient, off-street location for users.
- Potential for multiple bicycle storage.
- Reduces on-street storage, so reduces clutter.
- May also be used for storing mobility scooters, scooters and trailers.

Drawbacks

- Large units, so only suitable where these is space to include them (i.e. more suited in new developments).
- Relatively expensive to construct.

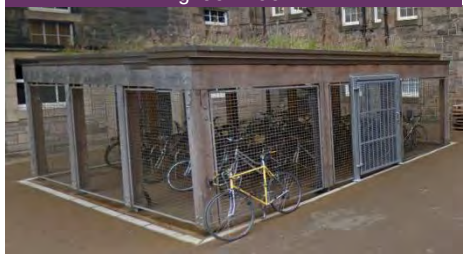
Suitable for

Off-street long stay parking

Residential developments

Offices

Large standalone storage unit with green roof



Cycle parking at the University of Edinburgh (Google Maps, 2016)

Not permitted for

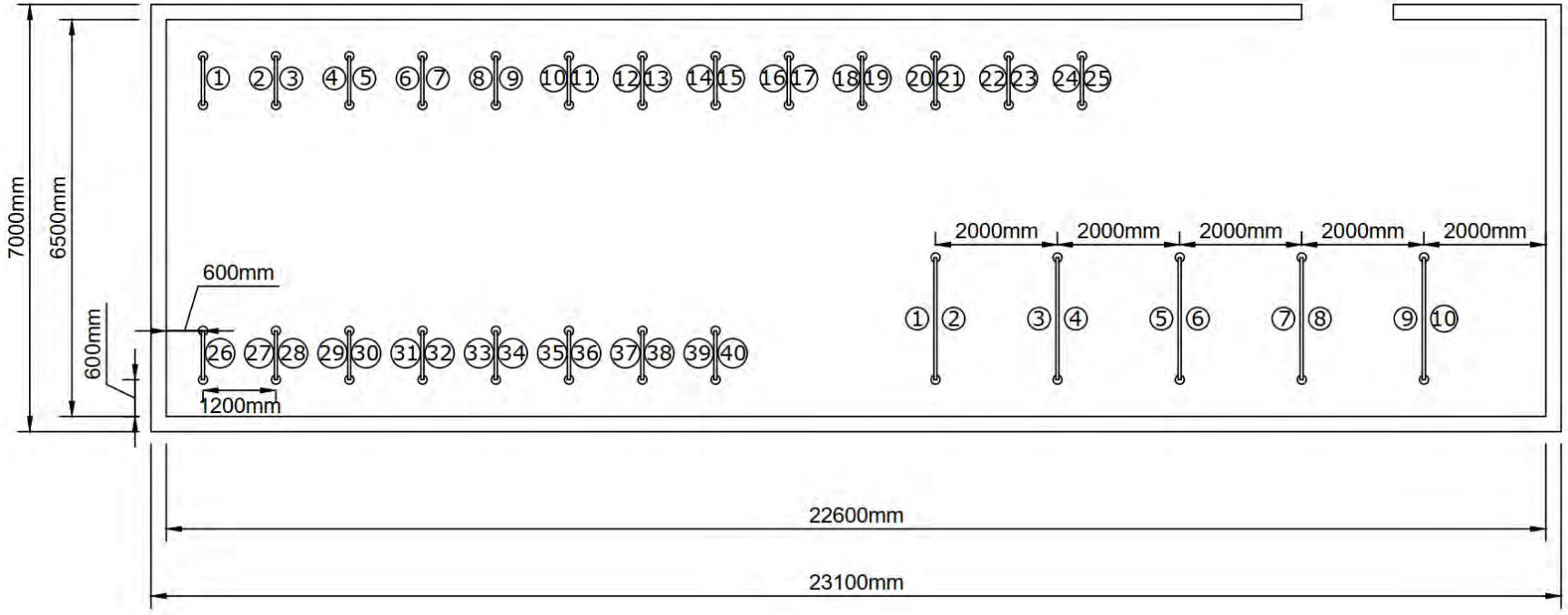
Short stay parking on footways

On new streets and/or any adopted areas within new developments

Standalone Storage Units – Layout for Larger Units

The diagram below is provided as a guide for a larger standalone storage unit, with the required dimensions to sufficiently store 50 bikes on Sheffield stands and 10 non-standard bikes on custom Sheffield stands.

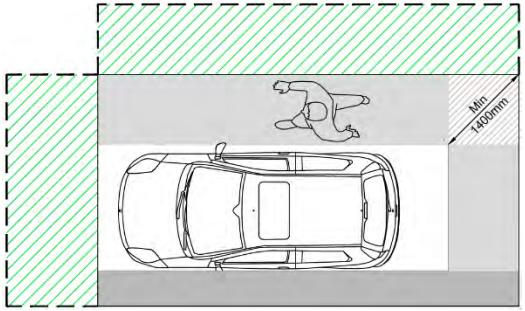
Alternative or bespoke proposals need to meet the considerations discussed in the previous pages.



DWG Ref: 5145925-CP-DR-C-0001 P02

Garages

Garage standard dimensions



Minimum dimensions of garage 3300mm x 6000mm

Circulation space (minimum width 1000mm) to allow cyclist pushing bicycle past parked vehicles

Area allocated to allow vehicle door opening (maximum 450mm)

Minimum circulation space required allow access to cycles without need to remove vehicle

Area which could be used for the storage of cycles

DWG Ref: 5145925-CP-DR-C-0003

Key requirements and considerations

- Minimum dimensions of 3.3m x 6m for single vehicle garage.
- Cycle storage corridor of 0.65m (1 bicycle) to 0.75m (2 bicycles) parallel to vehicle or 1.0m added to length where width is constrained.
- Secured with Mortice lock.

Benefits

- Secure, long term storage of cycles.
- Convenient, off-street location for users.
- Potential for multiple bicycle storage.
- Reduces on-street storage, so reduces clutter.

Drawbacks

- Large units, so only suitable where these is space to include them such as new developments.
- Relatively expensive to construct.

Suitable for

Long stay cycle parking:

- Off-street

Residential buildings

Garage blocks

Not preferred for

Short stay cycle parking

Locations with limited space

Storage Cages

Cages within communal area assigned to individual dwellings

Cycle parking guide for new residential developments (2010), Cambridge Council

Key requirements and considerations

- Should be convenient and attractive to encourage use.
- Inappropriate placement can see bikes left in public areas with less security and negative impact on the public realm.

Benefits

- Secure, long term storage of cycles.
- Convenient, off-street location for users.
- Potential for multiple bicycle storage.
- Reduces on-street storage, so reduces clutter.
- Can be retrofitted into existing spaces and buildings.

Drawbacks

- Large units, so only suitable where there is building space to include them.

Suitable for

Off-street locations

Residential developments

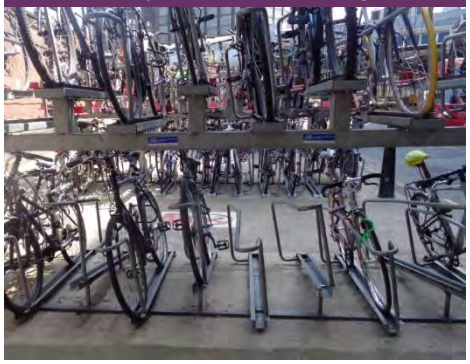
Offices

Not preferred for

On-street locations

Two Tier Storage

Example of two tier storage



Atkins

Edinburgh University bike storage, Emma Crowther

Key requirements and considerations

- Should be provided along with more lower level cycle parking facilities to cater for users who may have difficulty with the two tier system.
- Due to the future maintenance requirement of two tier racks relative to Sheffield stands, for new developments providing <50 storage spaces, these should all be provided as single-storey Sheffield stands. Where >50 bikes on Sheffield stands are required, at least 50% of the capacity should be met by single storey racks.
- Two tier racks should only be used in combination with other cycle parking types. No more than a maximum of 50% of cycle parking at a location should be two tier storage.
- Instructions on their safe operation should be visible to all users.
- Clear space for the cycle to be wheeled (rather than lifted) onto the ramp.
- Reasonable horizontal and vertical spacing to allow access for locating and locking cycles easily.
- Should be in line with Cycling by Design standards stated in section 6.2.

Benefits

- High density storage.
- Enables secure, long term storage.

Drawbacks

- Not as secure as lockers or cages.
- More difficult for users to operate.
- Often not suitable for non-standard cycles.

Suitable for

Off-street long stay cycle parking

Areas of high demand

Transport interchanges

Constrained space locations

Not preferred for

Short stay cycle parking on street

Retail establishments

Portable Rack Units for assessing cycle parking demand

Car shaped cycle racks

Malmo, Nazan Kocak

Portable cycle racks for assessing demand

Katowice, Nazan Kocak

Key requirements and considerations

- When located on carriageways, experimental TRO can be used to assess cycle parking demand at locations.
- 0.45m minimum clear width should be provided between any part of parked cycle and carriageway.
- Minimum clear width should be provided between any part of parked cycle and rear of footway (see Sheffield Stands page 24 for required widths).
- The colour should be sympathetic to local environment, usually black or stainless steel.

Benefits

- Offers a visual demonstration of cycling efficiencies over driving.
- High capacity single units.
- Can be used to respond to short term spikes in demand – festivals, events, seasonal demand, etc.
- Experimental TRO can be used for their temporary installations.
- Easy to move or relocate.
- Straightforward for users.

Drawbacks

- TRO is needed for permanent installation.
- The units may require more space than other options and lack flexibility of shape.
- The units are less secure if they are not cored into the ground.
- The size and aesthetic of the units may make them inappropriate in visually sensitive areas such as the World Heritage Site.

Suitable for

Short stay cycle parking:

- On carriageway

High demand locations

Short term demand (e.g. festivals)

Locations with space

Long stay cycle parking to assess demand:

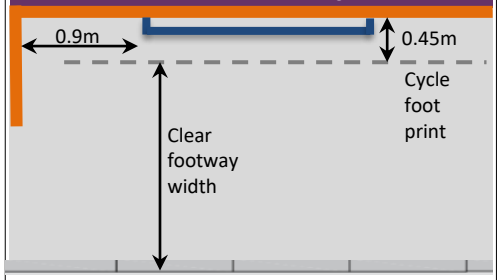
- On carriageway in shopping and employment streets

Not preferred for

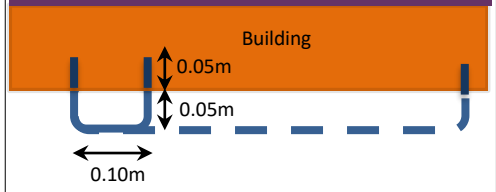
Locations with limited space

Wall Bars and Loops

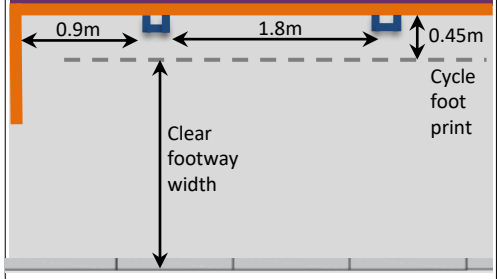
Wall bars near building lines



Wall fitting of bars or loops



Wall loops near building lines



Key requirements and considerations

- Made from brushed stainless steel or match the street furniture standards.
- Suitable if property owner owns the building but not the land around it.
- Specific consent is required for use on protected buildings.
- Minimum clear footway width should be 3m on high streets, neighbourhood shopping streets and strategic streets; 2.5m on employment streets, high density residential streets and secondary streets; and 2m on other streets.
- Wall Bars (and Loops) will be installed at 0.75m height to avoid confusion with pedestrian handrails.
- should not be installed in locations where pedestrian handrails may be required
- should not obstruct possible desire line of a blind or partially sited pedestrian

Benefits

- Makes use of existing streetscape.
- Low cost and easy to install.

Drawbacks

- Less secure if it doesn't allow both cycle wheel and frame to be locked together
- May not be suitable for non-standard cycles.
- Can increase street clutter.
- Can be unsightly if installed inappropriately, especially on historic buildings. Listed building consent will be required for extensions or additions to listed buildings. Planning permission may also be required, depending on the proposal. It is strongly advised that specialist advice be sought prior to carrying out any works to a listed building.
- Only appropriate for short term storage.

Suitable for

Short stay cycle parking on footway

Not suitable for

Long stay cycle parking

New Developments unless they are part of the building design and kept within the building line

Wall bars in front of a shop

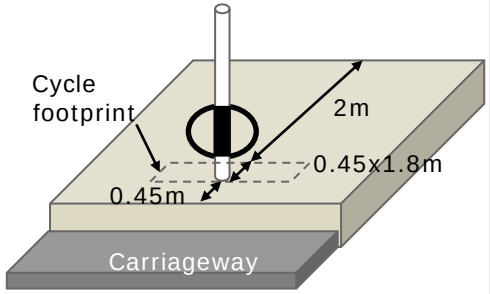
Nazan Kocak

Cycle Parking Hoops on Poles

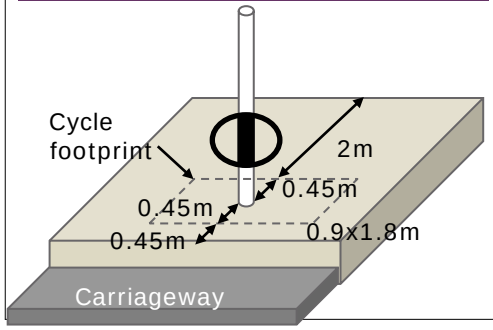
Cycle Parking Hoop

The City of Edinburgh Council

Single sided hoop layout



Double sided hoop layout



Key requirements and considerations

The key requirements and considerations for this option are:

- The colour should match the street furniture standards, in general powder coated black is preferred for cycle hoops.
- The hoop diameter should be circa 0.4m.
- The fixing for signage poles should have a diameter of 0.76m.
- The hoops should be fitted to existing sign posts and bollards. Appropriate permission must be gained from CEC before installing hoops on existing infrastructure.
- The fixing should be cylindrical and be fixed with secure or shearing nuts.
- Cycle hoops can be provided in a single or double sided arrangement.
- A 0.45m x 1.8m footprint should be allowed for per cycle.
- Minimum clear footway width should be 3m on high streets, neighbourhood shopping streets and strategic streets; 2.5m on employment streets, high density residential streets and secondary streets; and 2m on other streets.
- Minimum clearance of 0.45m should be provided to the edge of the kerb from the front of the cycle footprint.
- Places where on street car parking is allowed, single sided hoops should be used.
- They should not be installed adjacent to designated disabled bays.

Benefits

- Easy, quick and inexpensive to install.
- Makes use of existing street furniture.
- Less visually intrusive design.

Drawbacks

- Can increase street clutter if there is a high concentration of cycle hoops.
- Inappropriate installation can damage existing infrastructure.
- Less secure.
- Not appropriate for long term parking.

Suitable for

Short stay parking

Visually sensitive areas because hoops are less intrusive within the streetscape

Not suitable for

Long stay cycle parking

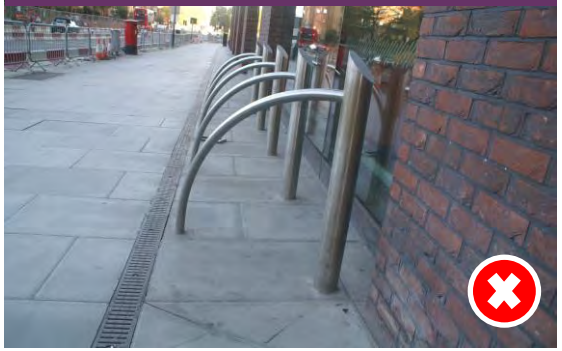
Non-standard cycles

New Developments

Unsuitable Cycle Parking Examples

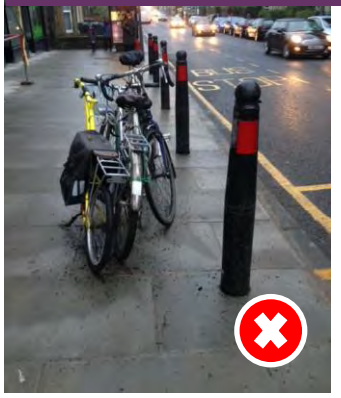
The Council will not approve non-standard units, layouts or sittings of cycle parking when they are retro-fitted on existing streets or provided in new developments if they are deemed as not fit-for-purpose and/or comply with the requirements of this factsheet. Some of such examples are illustrated here.

Too close to building line

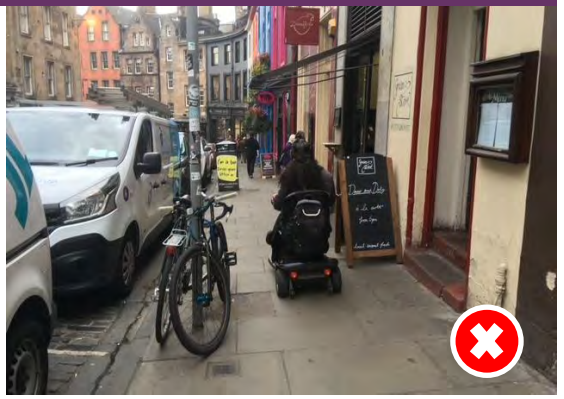


John Parkin

Causing street clutter and obstruction



Nazan Kocak



Nazan Kocak

Near the shop entrance but too close to building line and no tapping rail

John Parkin

Sub-standard racks don't support bikes

Nazan Kocak

Wheel benders

Nazan Kocak

Image References

Short and Long Stay Parking
All images: The City of Edinburgh Council

Cycle Parking Options for Short Stay
Cycle parking on carriageway: Barcelona, Nazan Kocak
Cycle parking in car space: The City of Edinburgh Council
Short stay cycle parking in tree planting zone: Umea, Nazan Kocak

Cycle Parking Options for Long Stay
All images: Nazan Kocak

Residential Cycle Parking for Flats
All images: Nazan Kocak

Residential Cycle Parking for Houses
Cycle parking on footway: Atkins
Cycle parking area in a garage or driveway: The City of Edinburgh Council

Educational Institutions
Scoter parking: The City of Edinburgh Council
The university of Edinburgh cycle parking: Emma Crowther, Edinburgh University

Retail Establishments
Cycle parking outside shopping centre: Atkins
Off-street parking: The City of Edinburgh Council
Cycle parking on ground floor of car park: Atkins

Work Places
Secure parking for both cycles and cars: Cycle parking guide for new residential developments (2010), Cambridge Council
Dedicated secure parking: Atkins
Access controlled and stand-alone storage unit: Atkins

Health Related Destinations
All images: Atkins

Community Destinations
All images: The City of Edinburgh Council

Cycle Parking at Public Transport Stations and Bus Stops
All images: Atkins

Sheffield Stands
Cycle stands on carriageway: Barcelona, Nazan Kocak
Cycle stands on footway : The City of Edinburgh Council
Custom made stands for non-standard bikes: The City of Edinburgh Council
Layout options (edited): Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 02 February 2017]

Hing Top Units
All images: The City of Edinburgh Council

Standalone Storage unit
Image: Google Maps [ONLINE]. Available at: https://goo.gl/maps/jxrMno7bZ24YAMFB9 [Accessed 19 July 2021]

Storage Cages
Image 1: Cycle parking guide for new residential developments (2010), Cambridge Council. Available at: https://www.cambridge.gov.uk/media/6771/cycle-parking-guide-for-new-residential-developments.pdf [Accessed 19 July 2021]

Portable Rack Units
All images: Nazan Kocak

Two Tier storage
Image 1: Atkins
Image 2: Emma Crowther, Edinburgh University

Wall Bars and Loops
Wall bar: Nazan Kocak

Cycle Hoops on Poles
Cycle hoop: The City of Edinburgh Council

Unsuitable Cycle Parking
Image 1-2: John Parkin
Image 3-6: Nazan Kocak

Index

F1 – Street Furniture

Amendments:

Street Furniture Layout

Key considerations

In order to keep Edinburgh streets clear of clutter, every element of street furniture should be justified by:

- how it will be used and
- who will use it (and what their special requirements are).

Aim to give each piece of street furniture multiple functions, avoid clutter and create a furniture zone where possible. Also consider surrounding use, context, scale and materials

Using street furniture for multiple functions:

- Cycle racks can be used as a barrier
- Planters can be used as seating and barriers
- Lighting columns used for signage and CCTV
- Integrated phone kiosks, wayfinding and lighting elements

Location:

- Maintain a clear walking zone
- Maintain a clear kerb zone
- Ensure wheelchairs can pass easily
- Don't obstruct access and pedestrian desire lines
- Do not obstruct driver views and sightlines at junctions
- maintain safe access to street lighting columns doors
- Avoid conflict of location in relation to existing street trees, street lighting, CCTV, bins, etc.

Rationalised furniture Zone

City of Edinburgh Council

Cluttered street furniture with obstructed footways

Evening Standard

Alternative solutions for tight spaces:

- Where furniture would infringe on a clear walking zone, relocate to side streets
- Locate service boxes and signal controllers in building recesses
- Integrate post boxes and cabinets into building structures where appropriate
- Consider reduced set back from the kerb

Spacing street furniture:

- Care must be taken to provide adequate space for movement and turning between street furniture, taking into account users of wheelchairs, prams, crutches, canes etc.
- On retail/high streets provide frequent seating and litter bins, ideally at least every 100m.

Relevant factsheets:

Designing Inclusive Streets (P2)
Waste Management (F4)
Minimising Street Clutter (P7)
Street Trees (F5)
Footways (P3)
Street Lighting (F6)

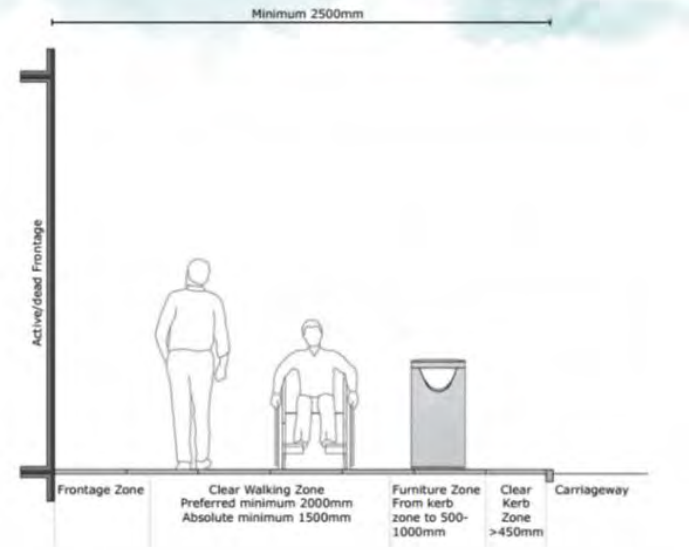
Furniture Zone

A furniture zone groups furniture elements to create a more legible street layout. The width and/or inclusion of the furniture zone should be determined by footway and kerb constraints.

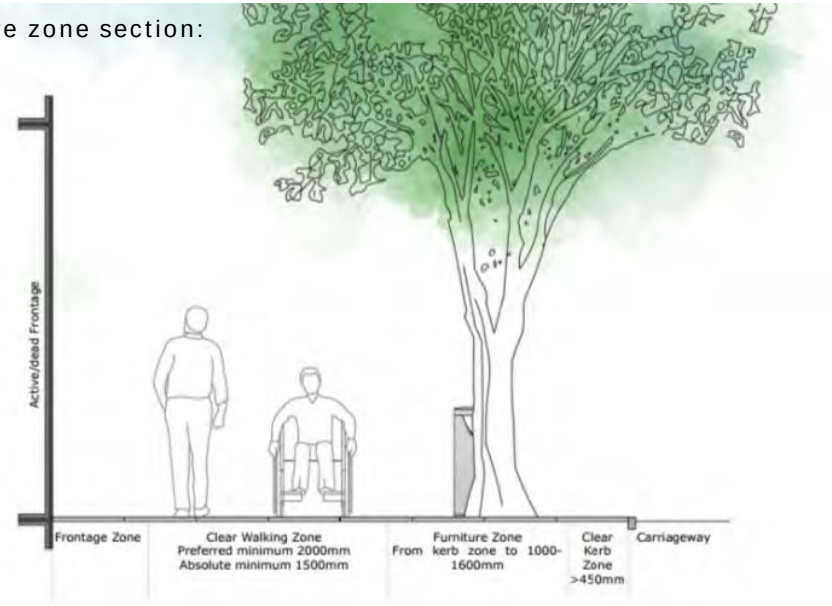
Design considerations

- Consider furniture zones on Retail / High streets and footways ≥ 2.5m
- Maximise the unobstructed width of the footway by creating a compact furniture zone
- Consider reducing clear kerb zone in narrow footways or near cycle lanes/tracks.

0.5-1m furniture zone section:



1-1.6m furniture zone section:



Suitable elements:

- Wayfinding signs;
- Bins;
- Cycle stands parallel to the kerb;
- Lighting / CCTV;
- Bollards / barriers;
- Seats;
- Control boxes and exceptionally, utility cabinets.

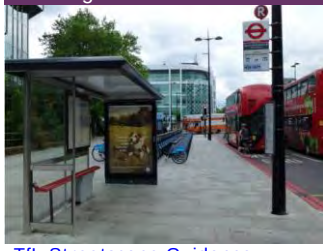
Kerbside Furniture Zone

TfL Streetscape Guidance

Suitable elements:

- As 0.5-1m plus
- Street trees;
- Planting/planters (if suitable drainage);
- Cycle parking angled at greater than 45 degrees to kerb line;
- Telephone boxes;
- Suitable cantilevered bus shelters.

Larger Furniture zone



TfL Streetscape Guidance

Relevant factsheets:

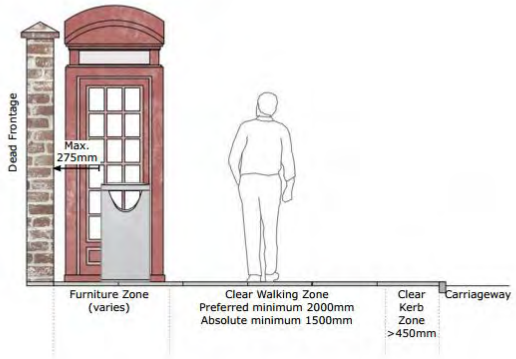
Waste Management (F4)
Minimum Kerb Zone (F1)
Reduced Clear Kerb Zone (F1)
Footway Zones (P3)
Street Trees (F5)
Street Lighting (F6)
Bus Stops (PT2)
Seating (F2)

F1 - Street Furniture Layout: Furniture Zone

Factsheet

1.6-2m furniture zone:

Constrained footway with no active frontage:



Pedestrian congestion on footways at bus stops and street furniture pinch-points

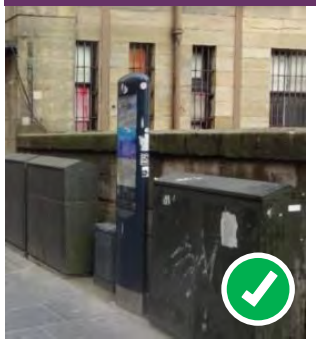
Atkins, 2016

Suitable elements:

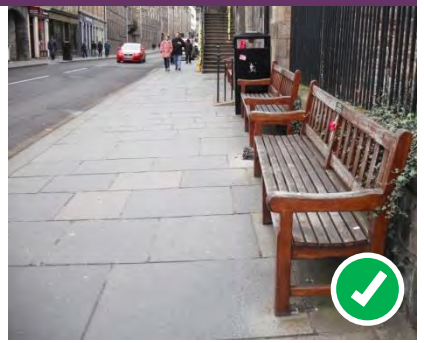
- As 1-1.6m plus:
- Approved kiosk type structures
- Bus shelters
- Larger street trees

The furniture zone may be located at the back of the footway where there is no active frontage and if footway space is constrained. Street furniture to be located a maximum recommended distance of 275mm away from the building line.

Furniture zones located at the back of the footway



Atkins, 2016



The City of Edinburgh Council

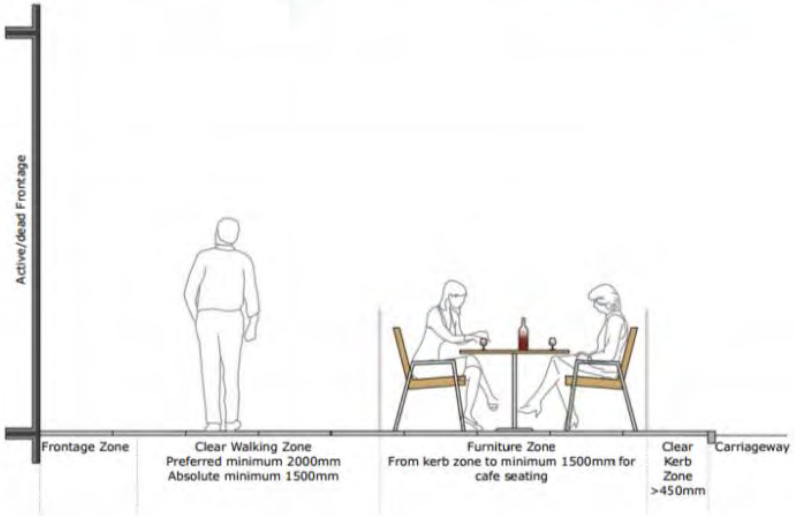
Relevant factsheets:

Footway Zones (P3)
Street Trees (F5)
Use of Tables and Chairs on Footways (P3)
Pedestrian Comfort (P2)
Bus Stops (PT2)
Minimum Kerb Zone (F1)

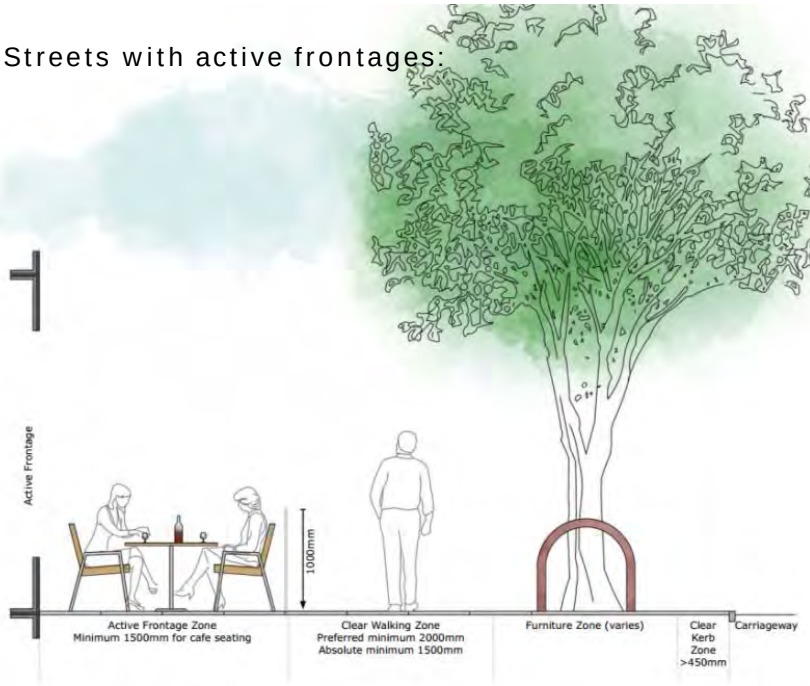
F1 - Street Furniture Layout: Furniture Zone

Factsheet

Furniture zone including café style seating:



Streets with active frontages:



Suitable elements:

- As 0.5-2.0m depending on width plus:
- Enclosed/demarcated café style seating areas.

Enclosed/demarcated café style seating areas

The City of Edinburgh Council

The City of Edinburgh Council

Tables and Chairs on Wide Footways

The City of Edinburgh Council

George Street Permitted Tables and Chairs

Atkins, 2016

Relevant factsheets:

Use of Tables and Chairs on Footways (P3) Minimum Kerb Zone (F1) Street Trees (F5)

Reduced Clear Kerb Zone (set back from carriageway)

To achieve clear walking zones, particularly in narrow footways in 20-30mph streets, a reduced minimum kerb zone should be considered.

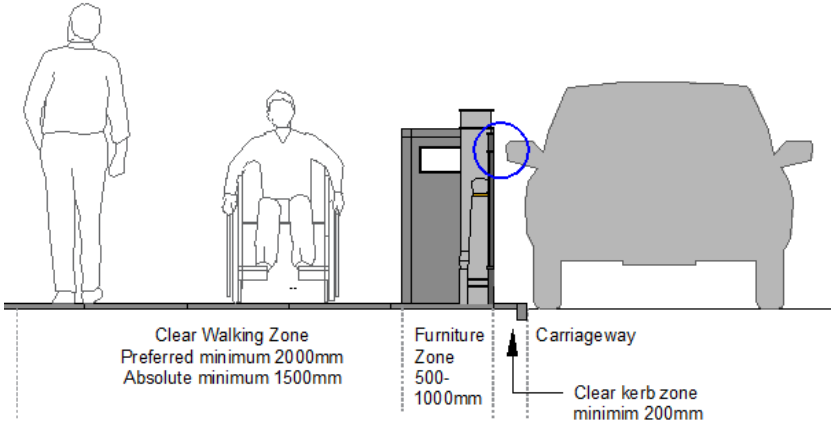
A reduced clear kerb zone is most suitable where the likelihood of vehicle overhang is low (e.g. outwith bus stop areas); vehicle overrun is unlikely; and any kerb side where cyclists are the only vehicles passing.

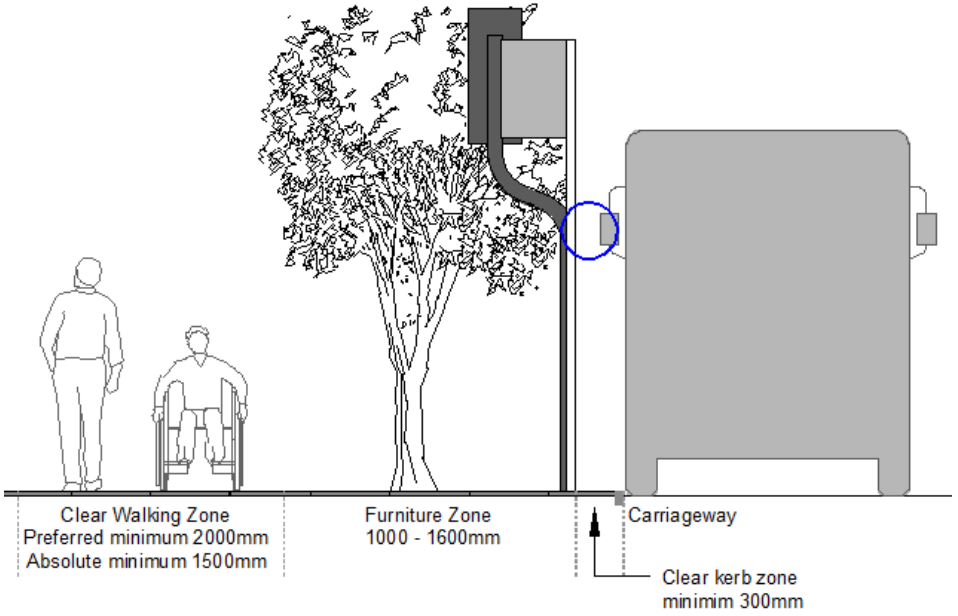
It is suitable to consider:
- 200mm minimum for low level street furniture (height ≤1200mm) and
- 300mm for high level street furniture (e.g. >1200mm).

Cranked or swan neck signal poles should be considered on narrow footways.

Departure from the National Guidance

There are various guidance (e.g. DMRB, TA57/87 and Traffic Signs Manual) which advise to have a minimum 450mm lateral clearance from the edge of the carriageway, or more where there is a severe camber or crossfall. This assists to prevent damage by vehicles, bearing in mind their likely swept paths. Historically there are many street furniture (including guardrail) located closer to the kerb edge than 450mm in Edinburgh. Our experience shows that the vast majority of these where located according to the key principles set out in this guidance, and no reports have been made regarding damage by vehicles.





Suitable furniture examples for 0.2m set back:

- Bins
- Bollards
- Guardrails

Suitable furniture examples for 0.3m set back:

- Bus flags, real-time information
- Traffic signals
- Sign posts

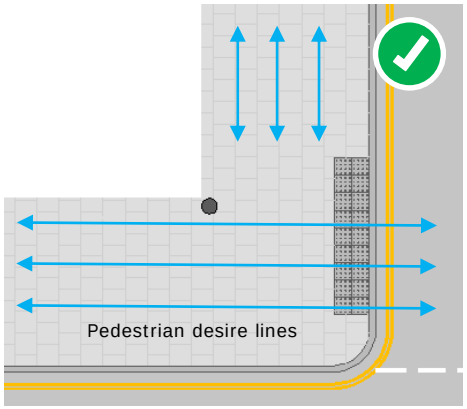
- Bus shelters set back should be 500mm
- Cycle stands parallel to the kerb should be set back 500mm.
- Cycle stands perpendicular or angled to the kerb should be setback 600mm.

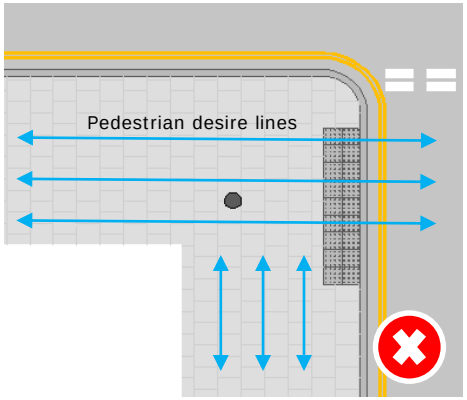
Relevant factsheets:

Footway Zones (P3) Cycle Parking (C7)

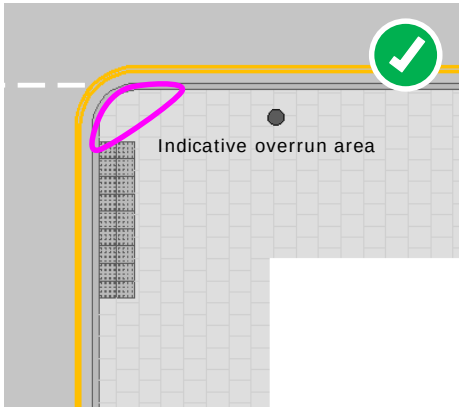
Street Furniture Layout at Junctions

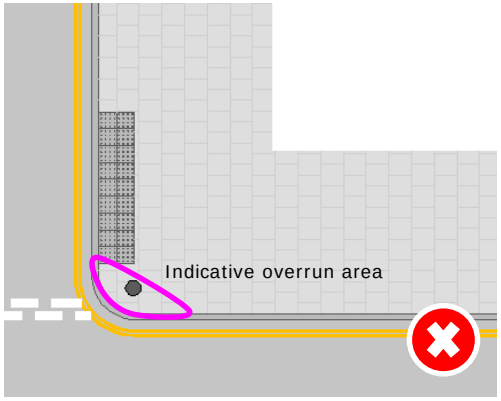
Street furniture (e.g. sign poles) should not be placed where they obstruct pedestrian desire lines.



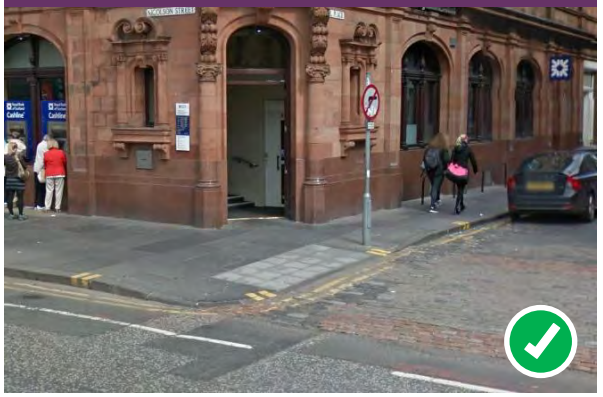


Street furniture (e.g. sign poles, trees) should not be placed where they will be in a tight corner radii overrun area, unless specifically required to prevent the overrun from occurring.





Sign pole placed outwith overrun area and does not significantly obstruct pedestrian desire lines



Google Maps, 2017

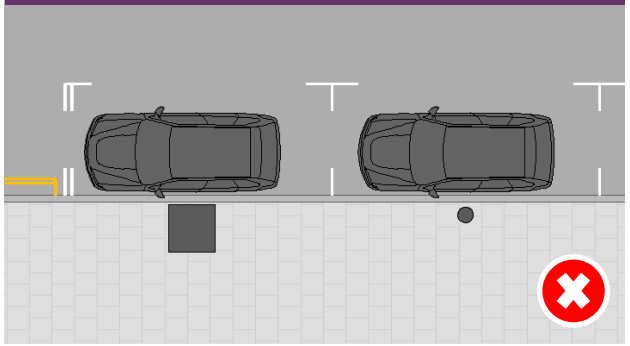
Relevant factsheets:
Footway Zones (P3)

Street Furniture Layout in Controlled / Allocated Parking Areas

Where street furniture with a reduced clear kerb zone is required on a narrow footway, do not locate street furniture in areas of controlled/allocated parking where it will obstruct exit from the passenger doors of a vehicle.

In controlled/allocated parking areas, street furniture with a reduced kerb zone should be located between parked cars to reduced the likelihood of obstructing exit/entry to a vehicle.

Controlled/allocated parking with street furniture obstructing exit from vehicle.



Controlled/allocated parking with street furniture located between allocated parking spaces.

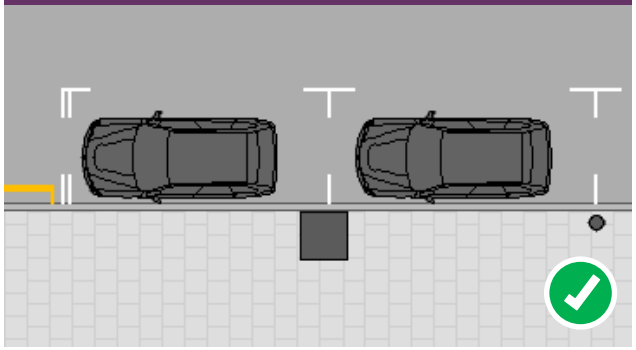


Image References

Street Furniture Layout

Rationalised Street Furniture: City of Edinburgh Council

Cluttered street furniture with obstructed footways: Glenn Copus , (2012), *Clutter: Camden High Street* [ONLINE]. Available at: http://www.standard.co.uk/news/london/camden-has-the-uks-most-cluttered-high-street-8252483.html [Accessed 1 November 2016].

Furniture Zone

Kerbside Furniture Zone: Transport for London, (2015), *A Street Furniture Zone Located at the Front of the Footway* [ONLINE]. Available at: https://consultations.tfl.gov.uk/policy/streetscape-guidance/user_uploads/draft-streetscape-guidance--all-sections-.pdf [Accessed 8 November 2017].

Larger Furniture Zone: Transport for London, (2015), *A Metal Bench on Leytonstone Highstreet* [ONLINE]. Available at: https://consultations.tfl.gov.uk/policy/streetscape-guidance/user_uploads/draft-streetscape-guidance--all-sections-.pdf [Accessed 8 November 2017].

Sections: Atkins 2016

Furniture Zone

Furniture zones located at the back of the footway (Right image): The City of Edinburgh Council

Pedestrian congestion on footways at bus stops and street furniture: Pedestrian Comfort Factsheet. (Atkins 2016)

Furniture Zones located at the back of the footway (Left Image): Footway Zones Factsheet. (Atkins 2016)

Furniture Zone

Suitable Elements Left Image: The City of Edinburgh Council

Suitable Elements Right image: City of Edinburgh Council , (2015), *illustrative example of same street reconstructed as an ATAP Quiet Route* [ONLINE]. Available at: http://www.edinburgh.gov.uk/downloads/file/7165/edinburgh_street_design_guidance_v101 [Accessed 1 November 2016].

Tables and Chairs on wide footways: The City of Edinburgh Council

George Street Permitted Tables and Chairs: Atkins (2016)

Sections: Atkins (2016)

Street Furniture Layout at Junctions

Sign pole in overrun area: Google Maps (2016) [ONLINE]. Available at: https://goo.gl/L7iD8B [Accessed 8 November 2017]

Index

F2 – Seating

Amendments:

Seating

Providing adequate seating is a key way to make streets more inclusive. It provides areas for rest, comfort and social interaction.

In areas of high footfall (such as retail streets) seating opportunities should be provided frequently, ideally every 100m. Seating should be Equality Act compliant and offer a range of options for different users. Refer to

In areas of lower footfall, especially along residential streets, seats should also be placed where they relate to local facilities for concentrations of people (e.g. GP surgeries, libraries, shop units etc) and near playgrounds.

The Scottish Government, 2010

Where to locate seating:

- Take advantage of views, sunny spots, i.e. facing south east to south west, or sheltered areas;
- Locate where people naturally congregate;
- Where space is available, seats can be placed within the Frontage Zone at the back of the pavement in front of blank walls or fences.

Charlie Holland, 2015

Where not to locate seating:

- Obstructing the Clear Walking Zone;
- Obstructing the Kerb Zone;
- Obstructing access;
- Areas where there is not a need for rest;
- Areas without natural surveillance.

Relevant Factsheets:
Street Furniture and Landscape as Traffic Management (G6)
Equality Rights Impact Assessment (P2)
Designing Inclusive Streets (P2)
Furniture Zones (F1)

Design Considerations

'Informal seating' opportunities can be provided in multiple ways

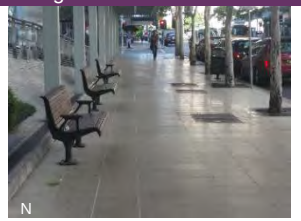

A

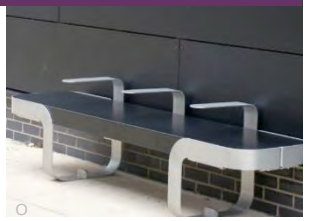
B


C

Seats can be located in frontage zones in front of blank walls or fences


M


N


O

There are multiple opportunities for seating within the furniture zone, dependent on width


D


E


F


G

There are multiple opportunities for seating within the wider public realm


P


Q


R

Proximity to waste bins should be carefully considered: Seat and waste bin at least 1m apart


H


I

When set back from the footway, seats should be located on hardstanding to aid maintenance


S


T

Seating can be used in traffic management


J


K


L

Relevant Factsheets:

Street Furniture and Landscape as Traffic Management (G6)

Furniture Zones (F1)

Designing Inclusive Streets (P2)

Equality Rights Impact Assessment (P2)

For all images references, please refer to main document: Edinburgh Street Design Guidance.

F2 – Seating: Design Considerations

Factsheet

Important seating design considerations: ease of maintenance/ replacement, durability, comfort, arm rests, back rests, leg support.

Recycled Plastic/ Composite

Langley Design, 2016

Concrete; Scottish Parliament

Timber; Kings Building Gateway, University of Edinburgh

Bluton, 2016

Galvanised steel

David Ogilvie, 2017

Seat dimension standards	
Recommended height from floor	450-500mm
Recommended depth	300-400mm
Minimum width of seat	500mm

Seat dimension standards	
Arm rests	Should be placed about 200mm above seat level. May be omitted on some seats to allow better access for wheelchairs or parents with pushchairs
Back Rests	Should be provided in all instances to assist older and disabled people, except where located within visual proximity to other seats with a back rest.
Minimum width of seat	May vary but should not extend beyond the profile of the seat to avoid creating a trip hazard. The base plate should not be visible.
Free drainage of water	To ensure longevity and overall functionality.

Material considerations

Type	Advantages	Disadvantages
Timber	• Comfortable • Suitable for a range of street types • Suitable for longer resting	• Easily vandalised • Less durable • More maintenance required
Stainless Steel	• Less easily vandalised • Less maintenance • Urban aesthetic • More design styles • Very durable	• Cold/Less comfortable • Stays wet for longer periods
Natural Stone/ Concrete	• Durable • Less easily vandalised • Range of vandal-proof options • Can provide security/bollard function	• Less common • Less easy to replace parts • Expensive • Cold/Less comfortable
Composite/ recycled plastic	• Low maintenance requirements • Rot proof/weather/graffiti resistant • Sustainable	• Lower aesthetic qualities

Image References

Seating

Where to Locate Seating: The Scottish Government , (2010), *How to Achieve Better Outcomes* [ONLINE]. Available at: http://www.gov.scot/resource/doc/307126/0096540.pdf [Accessed 1 November 2016]

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Design Considerations

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F3 – Signage

Amendments:

Signage

Street signage provides a vital role in communicating street functions and management regimes, to ensure appropriate user behaviours. However with additional signage comes clutter, often the result of incremental additions. The council has a presumption in favour of minimising street signage where it can be lawfully reduced and to continually review existing signage in line with the Traffic Signs Regulations and General Directions (TSRGD, 2016).

Many of Edinburgh's streets have very narrow footways, which can become obstructed through excessive use of sign poles. Poles can often have considerable visual impact in residential suburban streets.

Designers are encouraged to review best practice in design and location with a view to reducing impact of signage. Existing posts, columns and structures should be used wherever possible.

Please refer to the Minimising Street Clutter Factsheet when designing schemes and reviewing signage.

Seek approval from Street lighting prior to any apparatus being attached to a street lighting column or pole.

Design requirements

- All traffic sign poles should be grey. The back panel for signs should match the pole colour.
- Poles should be located to minimise obstructing the footway, though traffic signs must be clearly visible from the carriageway and as per TSRGD 2016 requirements.
- Sign poles should not be situated in the middle of the footway.
- Where possible, poles for signs should be positioned to the rear of the footway or 300mm from the kerb edge (450mm in bus stop areas), ensuring that the clear footway zone (min 1.5m – see Street Furniture) is not obstructed.
- Sign poles located at the back of the footway should be positioned in recesses where practicable, allowing a clear building line to be retained.
- Head height clearance of 2.3m is recommended, with 2.1m an absolute minimum.
- Sign illumination should be kept to a minimum and informed by TSRGD 2016 guidance, with greater use made of reflective diamond grade material (see Minimising Street Clutter).

The City of Edinburgh Council: Existing pole used to accommodate new 20mph signage (small sign used) on Canongate, Edinburgh.

Historic environment

Signage design or placement exemptions may be considered for schemes proposed in the World Heritage Site and across conservation areas, as appropriate and requested from the Scottish Government.

Image: Designing Streets. Over utilisation of signage on cyclist/ pedestrian paths should be avoided.

Relevant Factsheets:
Minimising Street Clutter: Traffic Signs (P7)
Street Furniture Layout (F1)
Footways (P3)

General sign design requirements for street signage

Pedestrian wayfinding signage

- Pedestrian wayfinding signage should be designed to provide a for a range of user groups including: residents, tourists and business visitors. The content of the signage should take into account the needs of these user groups and align with a signing strategy that is consistent across the city.
- Pedestrian signage is particularly important near public transport interchanges and complex road junctions where pedestrian routes may not be intuitive.
- Design advice is provided in TSRDG (Section 7, Part VIII) on suggested pedestrian signing styles, and the use of bespoke pedestrian signing products may be considered as part of a wider roll-out of products to ensure a consistent form and style.
- Additional information can be added to fingerposts, including recognisable symbols; distance in metres (or yards); or time in minutes (5min walk = 400m).

Directional signage for cyclists

- Cycle routes to local and major destinations often differ from vehicular traffic and so require separate directional signage.
- Cycle signage guidance is managed by the Active Travel Team; any new signage required should be discussed with this team.
- Where possible, avoid erecting additional signposts by adding cycle signage to existing posts, while ensuring a minimum 2.3m height clearance.
- Other cycle signs such as sign 955 ('pedal cycle only') and 956 ('shared use route') can be placed on street furniture, including bollards.
- These signs may be considered in diameter sizes of 100mm or 150mm (for bollards), 270mm (for illuminated bollards), 300mm (for sign posts), 450mm (for illuminated use).
- Cycle routes should be designed to minimise the use of "Cyclists Dismount" and "End of Route" signs. They should only be used in exceptional circumstances.

Traffic signs

- The font height for traffic signs should be guided by the speed limit for that particular stretch of road. Signs on roads with low speed limits can have smaller x-heights than signs on higher speed roads.

Controlled parking signs

- Edinburgh City Centre is largely comprised of 'controlled parking zones' (CPZs), providing marked and signed areas where permits are required to park.
- Parking signs must be clearly visible to motorists at all times to enable consistent, unchallengeable parking control.
- Parking bay signs should be spaced no more than 30m apart and not more than 15m from the end of a bay.
- Vertical signs should be designed to provide a clear message while minimising sign size.
- TSRGD 2016 allows flexibility to avoid doubling up of signs and lines. The presumption is that the designer will look to minimise the number of these except where there is a site specific need for more.

Waiting and loading signs

- Where waiting or loading restrictions are in force everyday, 24 hours a day, the restriction is imposed solely by road markings and therefore all 'at any time' signs can be removed.
- Waiting / loading signs in areas with temporal variations in restrictions are required every 60m.
- See Minimising Street Clutter Factsheet for further information.

Temporary signs

- The need for temporary signs should be reviewed to minimise their use. The placement of temporary signage should be monitored and immediate removal of these signs implemented upon the sign becoming redundant.
- Specific provision and timescale for the siting and removal of temporary signs must be detailed in all contracts and must be enforced thoroughly.
- See Schedule 13 of TSRGD 2016 for detailed design guidance.

Relevant Factsheets:
Minimising Street Clutter: Traffic Signs (P7)

Image References

Signage
Dual sign pole: City of Edinburgh Council
Over utilisation of signage: Designing Streets

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F6 – Street Lighting

Amendments:

Street Lighting

Lighting is a critical component in the design of high quality public realm and it has an important role in supporting place-making across the city.

Lighting should be considered as an integral part of the design in any new development, from the pre-application / planning in principle stages through to the detailing planning as well as the road construction consent (RCC) stage, Section Works and listed building consents.

Street lighting can contribute to:

- Improving road safety;
- Encouraging walking, cycling and the use of public transport.
- Discouraging crime and vandalism;
- Making residents and street users feel safe;
- Assisting emergency services to identify locations, reducing response times;
- Permitting the effective use of CCTV during the hours of darkness;

Key lighting principles

- Lighting should be appropriate to context and street function.
- Lighting should illuminate both the carriageway and the footway.
- The height of the street lighting units should be appropriate to the cross-section of the street.
- In general wall mounted lighting options should be considered, especially in city centre areas.
- Lighting columns should be placed so that they do not impact on the available widths of footways.

See "Street Lighting Management Arrangements" and "A Sustainable Lighting Strategy for Edinburgh" 2012 (Appendix A and B) for further principles and details.

Energy Efficient Lighting

Legislation on the use of Energy using or related Products (EuP/ ErP), together with greater awareness on the use, handling and disposal of hazardous materials has driven changes to luminaires used in the street lighting market.

The introduction of Light Emitting Diodes (LED), which have seen rapid growth in their efficacy and more recently their optical control, are now offering energy savings in excess of 50% over conventional lighting.

The rapid growth of the latest energy efficient lamps and the full implications of the EuP/ErP legislation has seen increased costs for maintaining conventional SOX and SON lamps as they are gradually being withdrawn from the market place.

LED lighting is sometimes considered to appear "darker" than conventional lighting. This is due to the fact that it can be more effectively targeted at areas that need lit, resulting in less spillage of light into gardens etc.

There are many benefits of LED technologies, including energy savings and the associated carbon production, greater control of were the light goes, reducing light pollution and the impact on the natural environment, removing glare and a shift to 'white' light which allows better colour recognition.

The City of Edinburgh Council

The City of Edinburgh Council

Relevant Factsheets:

Road Construction Consent (G11)

Street Furniture Layout (F1)

New Lighting Schemes

New lighting schemes should consider:

- Location within street hierarchy which will determine the type of equipment, level and tone of lighting. See A Sustainable Light Strategy for Edinburgh (2012) Appendix B for details including column heights;
- Historic research evidence produced to inform the lighting design solution;
- The use of luminaries appropriate to the urban environment and sensitive to conservation areas and the World Heritage Site;
- The family of columns to be used;
- The need to retain, replace or replicate any historic or original street light fittings;
- The mounting height, wall bracket, column and lantern style;
- The source type and luminance of the lighting. In most cases a neutral white light colour will be used within a given range of temperatures; and
- Lighting levels, which should seek to achieve compliant lighting levels with good uniformity that will achieve safety for pedestrians and road users.
- The extents of the development and its interface/tie-in to the existing surrounding area out with the boundary of the site.

Operating System

The use of a Central Management System (CMS) has been included as part of the roll out of energy efficient lanterns across the city and new street lighting must be compatible with this system.

This will allow the lighting levels in streets to be remotely altered via an office computer. This will make this change process significantly easier and more cost effective.

A CMS will also provide an easy mechanism to adapt lighting levels in response to changing demands on the service and changing dynamics of traffic flows and street usage in future years.

Prior to a new site being adopted, the commissioning of the new system will consist of scanning the barcodes which are on each respective unit (the Node/Cut-outs/As built Drawing) and these will be entered into the CEC asset management system when the maintenance period ends.

Maintenance

The relevant lighting classes should be maintained by an appropriate luminaire cleaning and light source replacement routine and accounted for by the designer with reference to local policies. For CEC, this is a 6-year maintenance and clean regime with a design life of L80/B10 or greater at 100,000 hours for LEDs.

Lighting designs must utilise raising and lowering columns where vehicles are prohibited such as on pathways. The orientation of the unit must be considered when in proximity to walls or fences. New assets will be numbered in accordance with CEC guidelines so that faults can be reported by the public, pillar schematics should be provided for ease of fault finding.

The City of Edinburgh Council: LED Lantern

Further Guidance:

- The City of Edinburgh Council: Street Lighting Management Arrangements
- The City of Edinburgh Council: A Sustainable Light Strategy for Edinburgh (2012)
- BS 5489-1: 2013 - Code of Practice for the Design of Road Lighting – Part 1: Lighting of Roads and Public Amenity Areas
- PAN 51: Planning, Environmental Protection
- PAN 77: Designing Safer Places.

The City of Edinburgh Council: Asset numbering plate

Relevant Factsheets:

Road Construction Consent (G11)

Street Furniture Layout (F1)

Locating Street Lighting

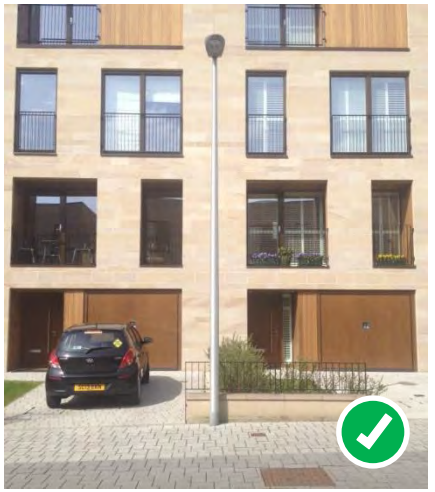
Individual lighting column positions should be checked on site for existing roads, or against the road design for new roads, to ensure that they are feasible, and for aesthetic acceptability.

The major issues that are encountered at this stage include:

- overhead power lines or other hazard;
- underground power lines or other utility services;
- trees, including potential growth and accounting for summer foliage;
- dropped kerbs;
- minimizing obtrusive light;
- locations on property boundaries and away from windows;
- avoiding locations where lighting columns could be struck by a vehicle.
- avoiding locations within 2m of electric vehicle charging points

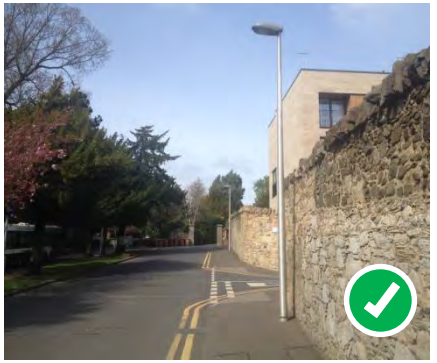
General principles

- Lighting columns should NEVER be located in the carriageway space.
- Where possible placement of lighting columns should be staggered, not all on one side of the street, to ensure both sides of the street are sufficiently lit. However single sided lighting may be a good solution in combination with street trees.
- Light columns should be placed at the back of the footway/service strip and either in between properties or in line with property boundaries.
- The placement of the lighting columns must ensure maintenance access, in difficult to reach locations, raising and lowering columns may be used.
- Shared surfacing can bring challenges to the suitable placement of lighting columns. Additional service strips or alterations to the landscaping detail may be required to avoid utility clashes with lighting assets. Normally columns in shared surface areas will require retention sockets.



The City of Edinburgh Council: Good positioning of lighting column between properties at rear of shared space.

The City of Edinburgh Council: Good positioning of lighting column off carriageway and at property boundary.



The City of Edinburgh Council: Good example, with consideration in new development given lighting in relation to junction and tie in with existing roads.

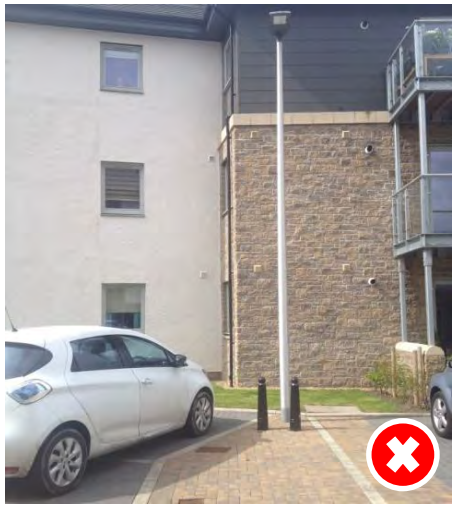
The City of Edinburgh Council: Good positioning with clear service strip area and demarcation line for ownership, also no tree/bushes planted near the columns.

Relevant Factsheets:
Road Construction Consent (G11)
Street Furniture Layout (F1)

The City of Edinburgh Council: Poor positioning of street lighting, this should never be located in the carriageway space.

The City of Edinburgh Council: Poor positioning of street lighting, it could be placed further back in the footway so that it does not unnecessarily reduce the clear footway zone.

The City of Edinburgh Council: Poor positioning of street lighting, unclear to public/home owners whether the column is located in a service strip of front garden.



The City of Edinburgh Council: Poor positioning of street lighting, unclear whether the column is located on carriageway/footway/shared space and erecting bollards for protection from vehicles has a negative impact on street clutter.

Relevant Factsheets:
Road Construction Consent (G11) Street Furniture Layout (F1) Minimising Street Clutter (P7)

Options

Wall mounted

This is the preferred option, especially within city centre areas, and new developments should accommodate the future provision of wall mounted street lighting.

Wall mounted on Clerk Street

Wall mounted on St Mary's Street

Back of footway

Where wall mounting is not practicable, the lighting should be located at the back of the footway. If the footway includes an additional cycleway and/or grass verge, the set back of the columns needs additional thought and their continuity of positioning along the entire road also needs to be carefully considered to ensure optimum positioning.

At back of footway on New Street

At crossings

At puffin and toucan crossings, careful consideration should be given to the positioning of lighting columns to ensure good lighting of the crossing without excessive street clutter. Consideration should be given to mounting signal heads etc. on lighting columns, especially where separation would narrow the footway significantly.

Located at crossing on Princes Street

All images: The City of Edinburgh Council

Supply Pillars

Consideration must also be given to the location of feeder pillars/supply cabinets.

Pillars should be positioned in the vicinity of the new entrance to developments with additional cabling and ducting provided out with the site boundary for future expansion. Where additional pillars are required within a site, these should be positioned where they can utilise several circuits, typically this would be at a junction, and located away from the front of any new property

Relevant Factsheets:
Road Construction Consent (G11)
Street Furniture Layout (F1)

Options Continued

Front of footway

The preference should always be to locate lighting columns at the back of the footway.

However, in some instances there may be an obstruction here (e.g. a cellar, which is quite common in Edinburgh) or the carriageway width is excessive. In such cases it may be more appropriate to have the lighting columns at the front of the footway.

At front of footway on Jeffrey Street, Edinburgh

Similarly, in Conservation Areas it is sometimes either required, or more appropriate to locate the street lighting columns at the front of the footway.

When locating new lamp columns near the front of the footway, there is a need to balance risk of vehicle impact with the potential for obstructing pedestrian movement.

The advice provided in BS5489-1:2013 on lighting column set back from the footway edge gives high priority to absolutely minimising the risk of a vehicle/column impact, with a recommended set back from the kerb edge of 800mm. However, following this guidance would result in significant obstruction to pedestrians on many Edinburgh footways.

The majority of existing front-of-footway mounted lighting columns in Edinburgh are mounted much closer to the kerb edge, many 300mm or less. Some of these will be for the reasons noted above (eg cellars), some simply because they pre-date specific set back guidance.

When placement at the back of the footway is not possible, the presumption should be in favour of using the set backs from the front of kerb recommended in table 1. The exception to this is where there is considered to a significant risk of collision with the lighting column - in such cases, the set back recommended by BS5489-1 should be adopted.

At front of footway on Calton Road, Edinburgh

Table 1: Recommended lighting column set back from front of kerb when back of footway location is not possible

Speed Limit	Set back[a]
20 mph	0.3 m
30 mph	0.45 m
40 mph+	See note b

Notes:

a) At junctions with side roads, lighting columns on the primary road should be placed at least 800mm back from the *side road* kerb line. (they should be 0.3m/0.45m back from the main road kerb line as appropriate)

b) Lighting columns should not be placed at the front of footways on roads with a 40mph+ speed limit. If, in exception circumstances, they are, there should be a presumption in favour of following the guidance in BS5489-1:2013.

All images: The City of Edinburgh Council unless stated otherwise

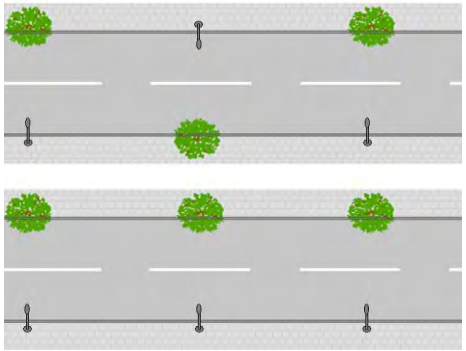
In the Vicinity of Trees

Where possible, lighting columns should not be located close to trees. If this is unavoidable, they should be sited so as to minimise issues such as incorrect photocell operation; impaired maintenance access; and damage to luminaire, column, foundation and electrical cables. The following general principles apply:

- In new streets where trees are to be planted, the lighting should be designed in consultation with the landscape architects and/or by taking into account the landscaping plan or the tree schedule. Lighting should be shown on the hard and soft landscaping plans.
- Where there is an alternative location, away from the tree, then utilise this location and reconfigure the design accordingly.
- Lighting columns when first installed should be sited so as not to require substantial cutting back of trees, taking into account the fully mature spread of the tree.
- Careful siting of trees and luminaires can help to minimize interference with the performance and operation of the lighting by the foliage.
- In tree-lined roads, lower mounting heights than usual may be used to bring luminaires below the tree canopy. Consider the impact on the photocell operation.
- It may be possible to locate a column underneath the tree canopy but it must be at least 1m clear above the lantern and the designer must be sure that this space will not be encroached upon at a later date.
- When locating columns amongst trees, lanterns must be clearly visible when standing at the mid point between columns
- Ideally street trees should be located on the opposite side of the street from lighting columns. If this is not possible, they should be halfway between lighting columns with at least 5m clearance between the face of the lighting column and the anticipated tree canopy extent.

Good example of street lighting and trees located within a new development in a common area without conflict.

Example layouts of trees and lighting columns, to minimise conflict.



Further guidance

- Recommendations for trees in relation to design, construction and demolition, including some guidance relating to lighting schemes, are given in BS 5837.
- Lighting columns should be located away from mature and newly planted trees and roots in accordance with NJUG Guidance.

All images: The City of Edinburgh Council

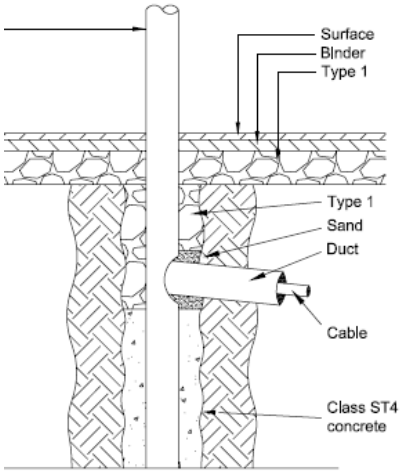
Relevant Factsheets:
Road Construction Consent (G11) Street Furniture Layout (F1) Street Trees (F5)

Utilities

Consideration should be given to ensure access to existing public utilities is maintained and to ensure that safe access for new utilities and street lighting maintenance can be provided.

General principles

- Lighting columns should be positioned so as to avoid conflict with overhead lines.
- It must be assumed that 'live' services are present underground.
- Cables within ducts shall be laid in footways, footpaths or service strips unless otherwise approved by the Engineer in writing.
- Cable routes to be agreed with CEC street lighting engineer prior to works commencing on site.
- Where ducting is terminated at a column, the duct shall be reduced as necessary by means of an adaptor and smaller duct to ensure the cable is fully protected entering the base of the lighting column.
- Road crossing ducting should have no joints, be positioned directly opposite a street lighting column or pillar and installed at the required depth.



Smaller duct protecting the cable between the main duct and the lighting column.

All Images: The City of Edinburgh Council

Further Guidance

- HSG47 'Avoiding danger from underground services'
- HSG185 'Safety in excavations'
- NJUG publications No. 1, 2, 3 & 4.

Relevant Factsheets:
Road Construction Consent (G11) Street Furniture Layout (F1)

World Heritage Sites

Historic street lighting forms an integral part of Edinburgh's streetscape. Its historic quality significantly contributes to the historic atmosphere of the city, contributing to its overall historic authenticity and integrity.

Design requirements:

- The City of Edinburgh Council: A Sustainable Light Strategy for Edinburgh (2012)

Further information:

- Edinburgh World Heritage: A History of Street Lighting in the Old and New Towns of Edinburgh World Heritage Site (2012)

Images: The City of Edinburgh Council unless stated otherwise

Old town

In the Old Town, the general approach has been to illuminate the wider streets by means of high level lighting fixed to the buildings, with wall-mounted reproduction gas lanterns in the narrow closes and wynds.

New town

In the New Town, the general approach has been to use railing-mounted lamps comprising reproduction oil lanterns on standards made of mild steel (copying wrought iron originals) or (more authentically) cast iron.

Lighting schemes for streets of the New Town should take into consideration the relationship of the position of the lighting to building facades, especially palace frontages, which are one of the most distinctive architectural attributes of the New Town.

For night-time appearance issues, see Conservation areas p10.

Palace frontage, Moray Place (Google Maps)

Railing mounted lamp, Charlotte Square

Reproduction lantern, Old town, North Bridge

Column/railing mounted lamp, Greyfriars Bobby

Conservation Areas

The daytime appearance of any installation in a conservation area should relate to the surroundings, so individual appearance, location and scale should all betaken into account in the design. Advice on these points should be sought from the Planning Service at an early stage.

For night-time appearance, the quality of lighting, observed effect, light source colour temperature and colour rendering properties are all important criteria that should be taken into account in the design.

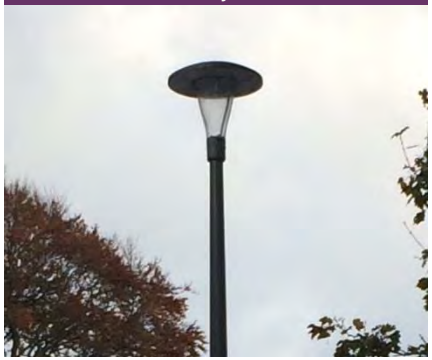
The best lighting effect might be achieved by careful blending of the various lighting measures chosen for individual features within the conservation area.

Historic lighting columns

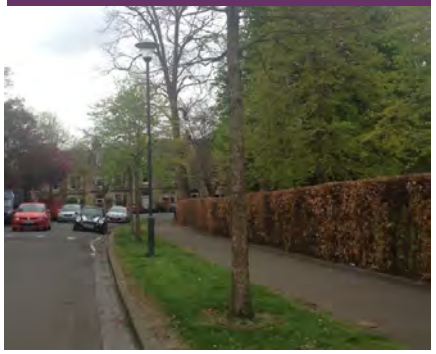
These should be maintained and consideration given to reproductions.

When it becomes necessary to replace equipment following damage or other causes, ideally equipment should be replaced with identical or similar currently approved equipment.

Example of lantern that is currently used by CEC



Street lighting located in grass verge in conservation area



Street lighting located at the rear of footway in conservation area

Street lighting located at the front of footway in conservation area

Images: The City of Edinburgh Council

Relevant Factsheets:
Road Construction Consent (G11)
Street Furniture Layout (F1)

Cycleways and Paths

General Rules

- Street furniture (lighting columns and sign posts etc.) should never be located where they obstruct the path. They should be located out with the path where possible, with a set back clearance of 0.5m preferred.
- Any signs should have a minimum height of 2.5m. Signage should be attached to existing columns where possible.
- If the cycleways are not designed to allow vehicular access, raising and lowering columns should be used for ease of maintenance.
- Luminaires should use cycleway optics for optimum column spacing and uniformity.
- Where a column is to be installed in soft ground, an area of hardstanding should be installed around it where possible. The hardstanding should extend to the path edge.
- Where there are areas of foliage or tree cover, this should be regularly maintained to ensure that the cycleway/path remains well lit.

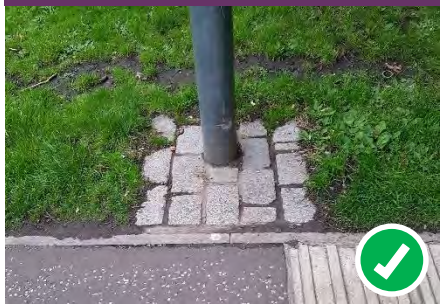
Combined Cycleways/footways

Where there are combined cycleways/footways next to a road with a grass verge between, it is recognised that there can be a significantly increased width for the lighting column to cover. Therefore, in these cases it is generally acceptable to have the lighting column in the verge.

In these situations, it is vital that the cycleway/footway is provided with an adequate level of lighting.

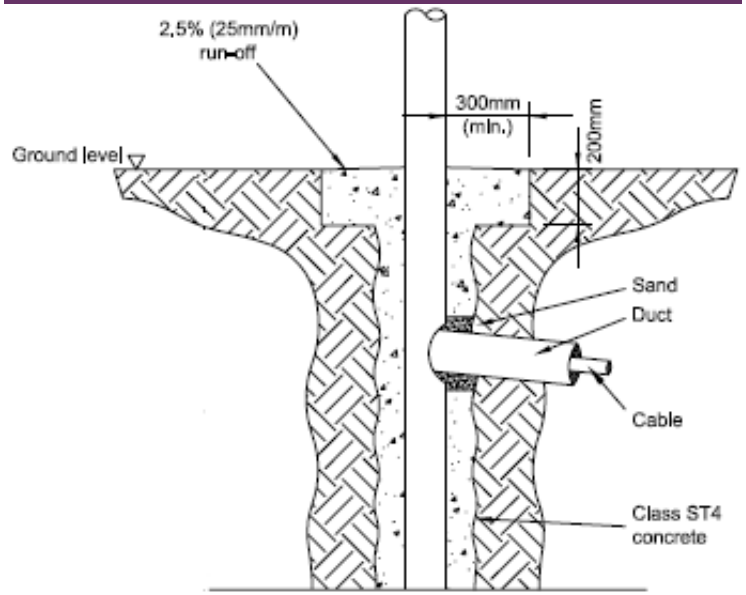
For further guidance refer to the Sustrans document: Technical Information Note No. 29 - Lighting of Cycle Paths. It should be noted that LED lighting is generally used for cycleways in Edinburgh, typically allowing a column spacing of 35m.

Hardstanding area for lighting column in soft ground. Note the hardstanding extends to the path edge.



Cycleway clear of obstructions Middle Meadow Walk, Edinburgh

Hardstanding detail for lighting columns in soft ground



Images: The City of Edinburgh Council

Relevant Factsheets:
Street Furniture Layout (F1) Off-street cycle paths (C8) Footpaths (P6)

Reducing Street Clutter

Lighting columns can assist to reduce street clutter as they may be used to support other items of street furniture, for example:

- Crossing controls
- CCTV cameras
- Wi-Fi communications
- Traffic signals

This should only be carried out with the permission of The City of Edinburgh Council Street Lighting Service. No signage is to be placed on heritage lighting columns.

It should be noted that although lighting columns can be used to reduce street clutter, this should not result in signs being overused on a single lighting column as shown adjacent. An excess of signs on a lighting column can increase loading on the column to a unacceptable level.

It is important to note that traffic signage must have a clearance of 2.25m from ground level to plate, and be located away from the carriageway edge to avoid clipping.

Overuse of signs on lighting column

Putting any sign on a lighting column requires permission although it is generally expected that columns can carry signage of total area up to 0.3m^2, larger signs will require further discussion. In all instances consider using the minimum permissible dimensions by the TSRGD 2016.

All images: The City of Edinburgh Council

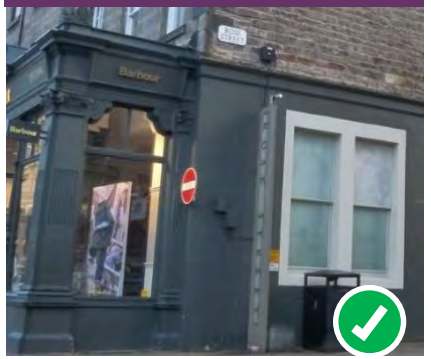
Illuminated Traffic Signs and Bollards

Reducing the number of illuminated sign and bollards on the road network can have a positive impact on street clutter.

See DfT Circular 01/2016, The Traffic Signs Regulations and General Directions 2016 p.17 for a list of signs that must remain illuminated during the hours of darkness.

Illumination requirements to be assessed on a case by case basis with a presumption in favour of removing lighting and reflectorising signs/bollards.

Low profile LED signage used due to sensitive location, avoiding the need for a sign column, Rose St



Non-lit bollard

Good example of use of a lighting column for signage, Dean Terrace

Relevant Factsheets:

Road Construction Consent (G11) Street Furniture Layout (F1) Minimising Street Clutter (P8)

Signage (F3)

Image References

Street Lighting
All Images: City of Edinburgh Council

New Lighting Schemes
All Images: The City of Edinburgh Council

Locating Street Lighting
All Images: The City of Edinburgh Council

Options
All Images: The City of Edinburgh Council

Options Continued
Jeffrey Street: The City of Edinburgh Council
Calton Road: The City of Edinburgh Council

In the Vicinity of Trees
All Images: The City of Edinburgh Council

Utilities
All Images: The City of Edinburgh Council

World Heritage Sites
Palace Frontage: Google Maps (2017) [ONLINE]. Available at: https://goo.gl/pCXno2 [Accessed 21 March 2018]
Reproduction Lantern: The City of Edinburgh Council
Railing Mounted Lamp: The City of Edinburgh Council
Column/Railing Mounted Lamp: The City of Edinburgh Council

Conservation Areas
All Images: The City of Edinburgh Council

Cycleways and Paths
All Images: The City of Edinburgh Council

Reducing Street Clutter
All Images: The City of Edinburgh Council

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G1 – Street Geometry and Layout

Street Geometry and Layout

1 Amendments:

G1 - Street Geometry and Layout

The design process should start by considering the street as a place for people and then continue by balancing this with their transport role, especially for pedestrians, cyclist and public transport users.

Designers should have a clear understanding of the function of a particular street and propose street geometry and layout improvements that will reflect the role of the street, whether it is primarily a retail (high) street, a low density residential street, a place for social and cultural activity; or whether it has a strategic, secondary or local role for movement.

Street geometry and layout should be used to influence road user behaviour, for example helping to reduce vehicle speeds and thus improving safety, particularly for pedestrians and cyclists.

Examples of changes to our streets' geometry and layout arising from this approach will include:

- Appropriate dimensions, priorities, materials, furniture and planting to reinforce reduced speeds and 20mph streets;
- 'Tight' corner radii and reduced forward visibility, slowing down turning vehicles and making side roads easier to cross;
- Narrower vehicle lanes, consistent with promoting slower traffic speeds which give more space to pedestrians and cyclists, whilst keeping enough width for buses to operate efficiently where appropriate;
- Crossings on desire lines wherever possible, including where this brings the crossing very close to a side road junction;
- Accessible and appropriate road crossings for pedestrians and cyclists (e.g. dropped kerbs, 'puffin' and 'toucan' crossings);
- Pedestrian phases and advanced cycle stop lines at all signalled junctions;
- Wider use of raised road junctions, including without specific vehicle priority, to help reduce vehicle speeds and to give pedestrians more priority;
- Introduction of 'continuous pavement' side road crossings on streets busy with pedestrians, giving greater priority to people travelling on foot;
- Generally not reinstating centrelines on the 20mph network, other than on strategic routes;
- Introducing street trees and soft landscaping to conserve and enhance townscape character; to use as traffic calming measure to reduce speeds and to encourage walking and cycling.

The City of Edinburgh Council

Relevant Factsheets:
Pedestrian Desire Lines (P2)
Crossings at or Near Junctions (G5)
Crossings (G4)
Carriageway Widths (G2)
Street Furniture (F1)
Priority Junctions (G7)
Speed Reduction and Traffic Management (G6)
Street Trees (F5)
Omitting Centre Lines (G3)

Image References

All Images: City of Edinburgh Council

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G3 – Omitting Centrelines

Amendments:

Omitting Centrelines

Omitting centrelines on single carriageway streets and roads can help to create safer and more appealing places.

Centreline removal introduces an element of uncertainty that causes drivers to instinctively reduce their speed.

Benefits include:

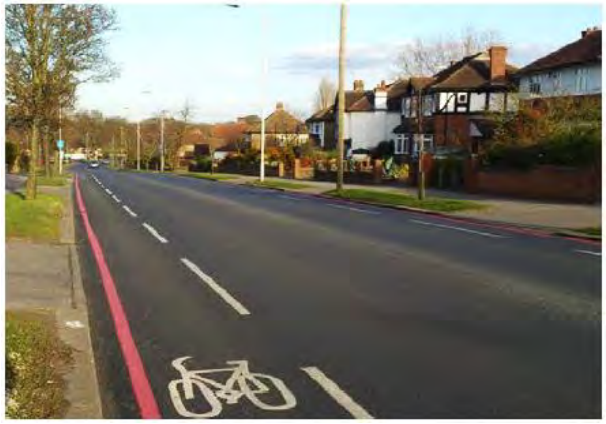
- safer streets
- potential to re-allocate space to benefit all users
- reduction of visual clutter
- positive effect on the character of the street.
- reduction of construction and maintenance costs

Omitting centrelines should always be considered when white lines are being refreshed or carriageways are being resurfaced.

Generally omit centreline on streets that have only one general traffic lane in either direction, unless these have a particular hazard (see page 3):

- 20mph streets (except on strategic streets), except multi-lane streets, on approaches to signalled junctions.
- Rural/no frontage streets 5.5m wide or narrower

Benefits for cyclist are discussed by:
Shackel, S. C. and Parkin, J. (2014) Influence of road markings, lane widths and driver behaviour on proximity and speed of vehicles over-taking cyclists. Accident Analysis & Prevention, 73. pp. 100-108. ISSN 0001-4575.



Centreline removal & Cycle lane widening
Before & After TfL. 2014. Centreline Removal Trial.

Relevant Factsheets:
Minimising Street Clutter (P7)
Traffic Management & Speed Reduction (G6)

Supporting Information

Centreline removal trial London, UK

Investigating the impact of centreline removal on traffic speeds across three sites in London

Key functions

Opportunity

The Mayor's Better Streets initiative challenged TfL to justify any road marking.

Benefits

The investigation showed that at all three sites there was a statistically significant reduction in traffic speed; drivers were more cautious due to the loss of perceived safety a centreline provides. Collision data will be tracked at these sites for the next three years to ascertain the long-term effects of centreline removal.

Implementation

A study was conducted at three sites across London to judge the effect of removing centrelines on traffic speeds and accidents.

Applying in London

While it is not suitable to remove markings at all locations, it is desirable to remove clutter where possible.

Source: London Streetscape Guidance, 2016

Manual for Streets 2 recognises that centrelines are not an absolute requirement, noting that by omitting centreline markings on carriageways, a reduction in traffic speed has been successfully achieved on busy routes in urban areas as well as village settings.

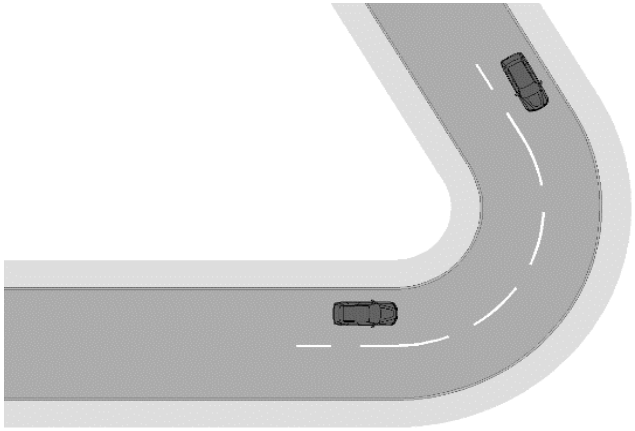
TRL Report 641: 'Psychological' traffic calming states "Lack of a centre line can make drivers concerned about meeting other vehicles head-on, thus increasing the perceived risk, which can reduce speeds.

Source: TRL Report 641 (2005)

Risk Mitigation

There may be safety concerns with removing the centreline marking along the full length of a route. The following consideration should be given to types of risk mitigation:

1. Where it is likely vehicles may cross over onto opposite lane at significant bends provide centreline markings in the road.
2. Where it may be particularly unclear to a driver at a side road junction that the main road is two-way, (for example if the previous road crossed will have been one-way) provide centreline road markings on main road at priority junctions.
3. Consider adding cycle lanes to emphasise to drivers the space available to pass one another as well as a moving cyclist
4. Where two roads with omitted centrelines meet at a "Give Way" junction, provide two dashed centrelines on the minor road.



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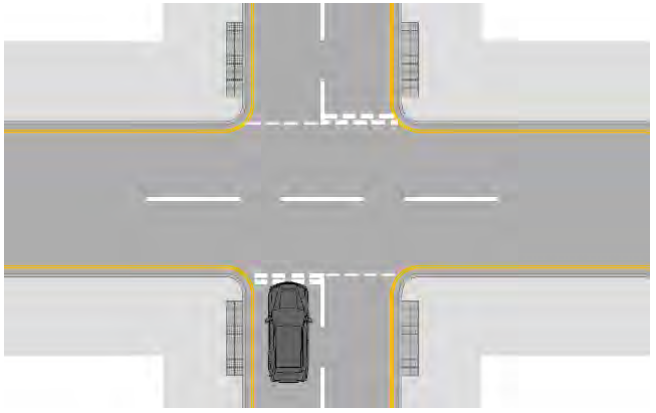

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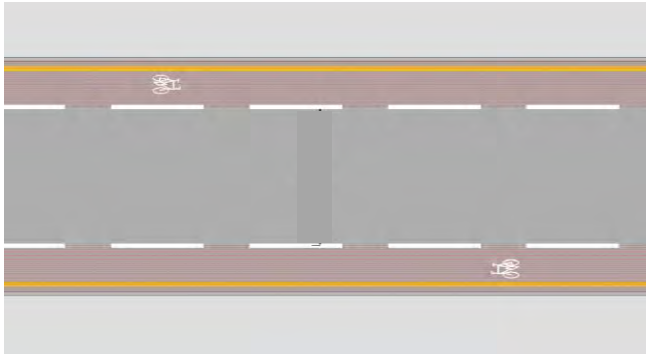

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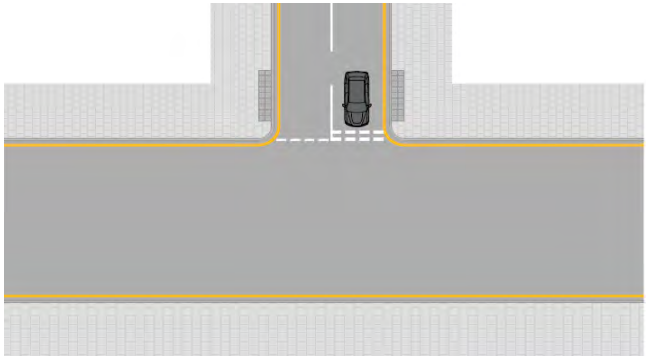

4.

All diagrams: The City of Edinburgh Council Sketches

Image References

Omitting Centrelines

All images: Transport for London: Centreline Removal Trial, 2014 [ONLINE]. Available at: https://www.tfl.gov.uk/cdn/static/cms/documents/centre-line-removal-trial.pdf [Accessed 1 February 2017]

Supporting Information

Case study: Transport for London: London Street Design Guidance, 2016 [ONLINE]. Available at: http://content.tfl.gov.uk/streetscape-guidance.pdf [Accessed 1 February 2017]

'Psychological' traffic calming: TRL Report 641 'Psychological' traffic calming, 2005 [ONLINE]. Available at: http://www.20splentyforus.org.uk/UsefulReports/TRLREports/Psychological%20traffic%20calming_TRL_2005.pdf [Accessed 10 March2017]

Risk Mitigation

All diagrams: CEC Sketches

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G4 – Crossings

Amendments:

12/1/18 – Note clarifying that sheet refers principally to stand-alone crossings – this page and page 13
02/05/18 – Note referencing factsheet G7 on page 5 and minor edits on the drawings on page 6

Note: This factsheet refers principally to stand-alone crossings rather than crossing points at signalled junctions

Crossings

Road crossings play a key role in improving conditions for pedestrians and cyclists.

Opportunities for pedestrians and cyclists to cross should be provided frequently enough to ensure that movement is not significantly constrained by motor traffic.

Crossings providing higher pedestrian priority over motor traffic (e.g. zebras) should be considered in streets with high pedestrian volumes (e.g. retail streets).

Crossing design should seek to maximise convenience for users, particularly by allowing them to follow desire lines.

Providing crossings at or near junctions is critical to delivering the 'QuietRoutes' cycle network.

Crossing options

Uncontrolled
- Dropped Kerb
- Build Outs
- Raised Tables / Junction
- Continuous Footway
- Refuge Island

Controlled
- Zebras / Tigers
- *Toucan*
- *Puffin*

Footbridges and underpasses

Only be considered under exceptional circumstances.

Typical combined crossing, Edinburgh

The City of Edinburgh Council

Refuge Island Crossing, Edinburgh

The City of Edinburgh Council

Special considerations

1. In Edinburgh special consideration is to be given to Crossings at or near Junctions to maximise convenience for pedestrians and where necessary cycle users. For further details please see factsheets on crossings at or near junctions.

2. Continuous Footways put pedestrian priority into practice by creating a continuous pedestrian environment rather than one that is interrupted at every side road. They should always be considered as part of new or renewals projects, particularly in retail/high streets and other important pedestrian routes.

Relevant Factsheets:
QuietRoutes (C1)
Pedestrian Desire Lines (P2)
Footbridges and Underpasses (G4)
Crossings at or near Junctions (G5)
Continuous Footways (G7)
Corner Radii (G6)

Key design principles

Design will vary depending on context, however:

- Provide direct crossings and avoid staged crossing arrangements if possible.
- Ensure that the pedestrian/cycle environment is uninterrupted and easy to use.
- Consider reduced corner radii and raised tables to improve pedestrian and cycle priority.
- Provide protection / speed reduction / controls appropriate to function of crossing and traffic flow.

Desire lines

Locations for crossings should always align with desire lines.

This means most crossings will be at or near junctions to maximise convenience for pedestrian and cycle users.

Consider if there are opportunities to combine pedestrian and cycle crossings where appropriate.

"Tracing studies mark pedestrian movement lines onto a map of the area. As these build up pedestrian desire lines and highly trafficked routes become more obvious, giving a graphical representation of the volume and direction of pedestrian movement." (Here & Now Public Life Street Assessments)

How many crossings?

Pedestrian and cyclist safety and convenience should be the first consideration in street design. But impacts of crossings on other forms of transport, especially public transport, should be considered as well. Therefore before introducing a new crossing, consider the following:

- Does an existing crossing already sufficiently provide for the relevant movement or desire line?
- Would providing a new crossing cater for movements currently served by the existing crossing – can that crossing be removed?
- What type of crossing is necessary? – signalled; zebra; island; informal?

For aspects of crossing design that are not covered within this Guidance*, please refer to the UK Guidance by Department for Transport:

- Local Transport Note (LTN 1/95): The Assessment of Pedestrian Crossings, 1995
- Local Transport Note (LTN 2/95): The Design of Pedestrian Crossings, 1995
- Traffic Advisory Leaflet 5/05: Audible and Tactile Signals at Signal-Controlled Junctions, 2005
- The Zebra, Pelican and Puffin Pedestrian Crossings Regulations and General Directions 1997

* If there is a conflict between this Guidance and the UK Guidance documents, the Edinburgh Street Design Guidance should be used.

Relevant Factsheets

Signalised Crossings (G4)
Zebra/Tiger Crossings (G4)
Corner Radii (G6)
Crossings at or near Junctions (G5)
Traffic Management & Speed Reduction (G6)
Pedestrian Desire Lines (P2)
Tactile Paving (M4)

Choosing a Crossing Type

Several factors need to be considered when determining what type of crossing to install.

1. Factors for all crossings:

a) Volume of road traffic:
As volume of traffic increases, it is more likely that a formal crossing is the right solution.

b) Speed of road traffic:
As speed of traffic increases, it is more likely that a formal crossing is the right solution.

c) Volume of pedestrians and cyclists crossing: The greater the number of people crossing, the more likely it is that a formal crossing is needed.

d) How wide is the road being crossed?
The wider the road, the more likely it is that a formal crossing is needed. Consider local reduction in width and/or providing a central refuge.

Uncontrolled dropped kerb crossing Bruntsfield

The City of Edinburgh Council

Zebra crossing Waverly Bridge

The City of Edinburgh Council

Toucan crossing Bruntsfield Place

The City of Edinburgh Council

Puffin crossing Nicholson Street

Google Maps 2016

2. Factors for cycle crossings:

a) Is the crossing on the **proposed** 'QuietRoutes' network?

Yes:
Provide a formal crossing (tiger or toucan) if 2-way daily traffic flows are greater than 3000.

Generally provide a toucan crossing if traffic flows are greater than 8000.

A refuge island can be used as an alternative for flows between 3000 and 6000 where there is space for an island 3m wide or more.

No:
As above, but potential cyclist and pedestrian use should also be a factor in this case.

Contact the Council's Active Travel and Road Safety team **for 'Road Safety Scoring System' to assist with** determining the type of crossing.

Relevant Factsheets:

Uncontrolled Dropped Kerb Crossings (G4)
Signalised Crossings (G4)
Crossings at or near Junctions (G5)
Refuge Island Crossings (G4)
Zebra/Tiger Crossings (G4)
Design Speed (G1)
QuietRoutes (C1)

Designing Convenient & Direct Crossings

Crossings should be convenient and easy to use and as such they should:

- Be as direct as possible
- Be single stage wherever possible (and take into account delays to pedestrians and cyclists versus vehicles).
- Minimise width to be crossed by providing build-outs etc.
- Minimise the amount of Guardrail and street clutter.

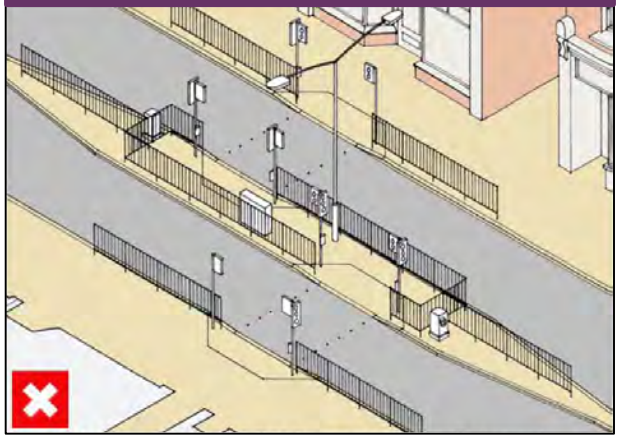
Minimum crossing width is 2.4m however wider crossings are preferred for pedestrian comfort.

If redesigning the crossing with a central refuge, see page 12.

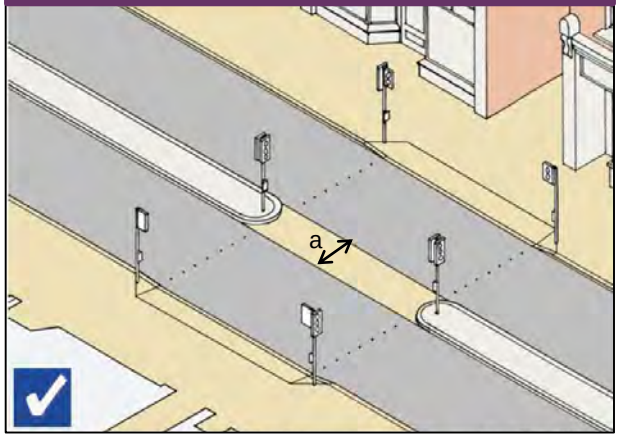
Tactile paving has been omitted from the illustrations for clarity, however all crossings must use compliant tactile paving.

Avoid use of guardrails – follow 'The City of Edinburgh Council Guardrail Assessment' if considering its use.

Typical crossing



The same crossing redesigned for convenience



Note: See page 12 for values of a.

Phase 1: Remove guardrail and simplify crossing

Phase 2: Align crossing with desire lines

Phase 3: Increase crossing width for ease of use

Source: CIHT - Street Design For All

Relevant Factsheets:

Signalised Crossings (G4)
Pedestrian Guardrail (P5)
Tactile Paving (M4)
Flush / Dropped Kerb Detail (G4)
Pedestrian Desire Lines (P2)
Minimising Street Clutter (P7)

Uncontrolled Drop Kerb Crossings

These basic crossings aid people crossing the road by dropping the kerb or raising the carriageway to help make crossing the road easier for everyone.

Typical locations

- At road junctions to help pedestrians cross the side street to continue their journey.
- At strategic points on a busy street where there is no need for a controlled crossing such as a zebra or puffin.
- Crossings should always be on pedestrian desire lines, see factsheet G7 for further details.

Waiting / loading restrictions

- Double yellow lines or white bar markings can be used across a crossing point to help avoid parking along a dropped kerb crossing.
- They should always be used in situations where parking appears to be likely.

Width of dropped kerbs

- Be equal on both sides and be directly in line with each other
- 1.8m min width (desirable width 2.7m) with 1:12 max gradient
- There should be a level area (900mm minimum width) along the rear of the dropped crossing to allow easy passage for wheelchair and mobility scooter users who are not crossing the road (Dropped Kerb Detail 1). Where footway width does not allow max gradient and at least 900mm level area, drop the level of the whole footway width (Dropped Kerb Detail 2).
- Dropped kerb flush (no more than 6mm raised) with the carriageway.

Tactile paving

- Must be used at all crossing points in a contrasting grey colour.
- Should extend across the entire width of the dropped kerb.

Existing dropped kerb crossings should be reviewed and compliant, with tactile paving provided.

Other options

Build-outs, refuge islands and raised carriageways (including continuous footways) can all be used to further assist pedestrians.

Build Out

The City of Edinburgh Council: Widening the footway/narrowing carriageway – Bruntisfield Edinburgh

Refuge Island

The City of Edinburgh Council

Continuous Footway

Jacobs: Enables pedestrian priority through visual continuity

Raised Table

Google Maps 2017: Raising the carriageway to create a raised table/ shared surface.

Relevant Factsheets:

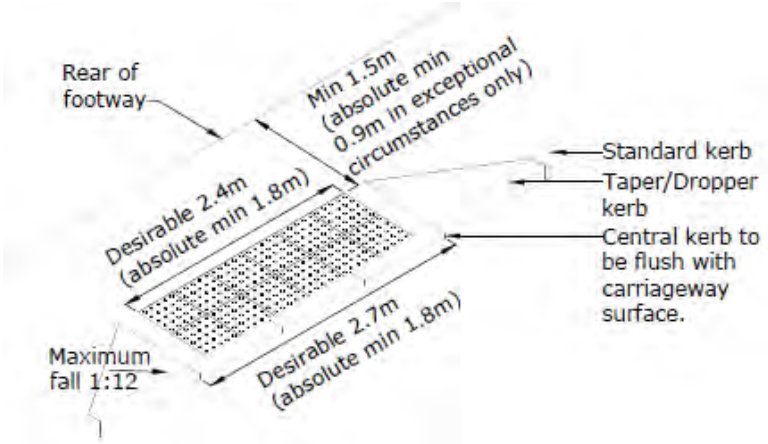
Flush / Dropped Kerb Detail (G4)
Crossings at or Near Junctions (G5)
Signalised Crossings (G4)
Refuge Island Crossings (G4)
Zebra / Tiger Crossings (G4)
Tactile Paving (M4)
Continuous Footways (G7)

Flush / Drop Kerb Detail

For pedestrian and cycle access

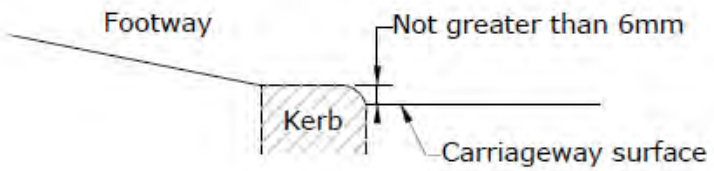
Dropped Kerb Detail 1

DWG Ref: 5145925-3D-DR-C-0002



Kerb Tolerance

DWG Ref: 5145925-3D-DR-C-0002

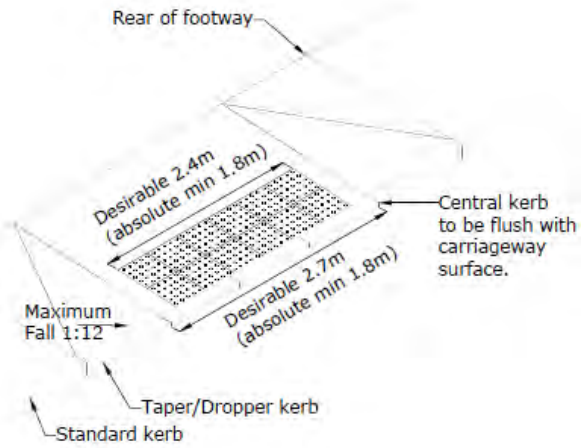


- 2 rows of Blister Paving as required on the dropped footway.
- Dropped kerb crossings should be protected from parking and loading at all times.

Only use Detail 2 if Detail 1 is not feasible

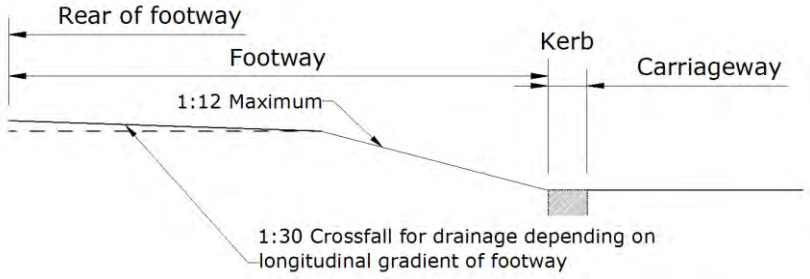
Dropped Kerb Detail 2

DWG Ref: 5145925-3D-DR-C-0007



Section through Dropped Crossing

DWG Ref: 5145925-3D-DR-C-0002



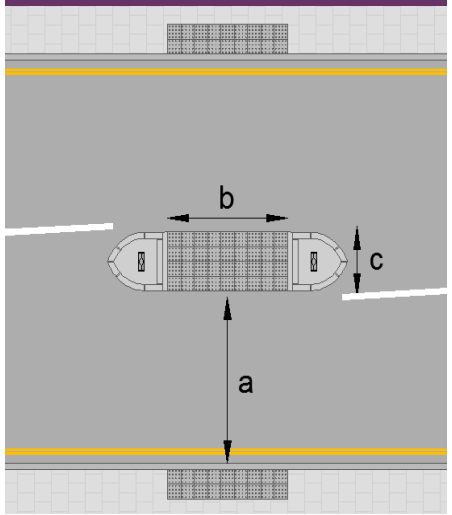
Relevant Factsheets:
Blister Paving (M4)
Signalised Crossings (G4)
Refuge Island Crossings (G4)
Zebra/Tiger Crossings (G4)

Refuge Island Crossings

Refuge islands, created by **installing 2 'D' islands can:**

- create a central waiting zone to aid the movement of disabled and elderly users
- enable pedestrians and/ or cyclists to cross carriageway in two stages as part of a controlled or uncontrolled crossing
- provide a protection zone for right turning vehicles/cyclists

Refuge Island Crossing



DWG ref: CJ-DR-C-0004

Traffic lane width (a)

Refuge islands should not be used where road width is too narrow to install an island of suitable width.

"*... lane widths in the range 3.1m – 3.9m (inclusive) should be avoided at refuges because this can lead drivers to take inappropriate risks to overtake cyclists. At lane widths of 3.0m or less, drivers will tend not to attempt to pass a cyclist at the narrowing. Where lane widths are 4.0m or more, overtaking can be achieved safely by most vehicles...*" (Sustrans, Streets and Roads (draft), 2015).

Island dimensions (b and c)

The width of refuge 'D' islands is based on user requirements. Refuges should be as wide and long as is necessary to cater for anticipated pedestrian/cycle usage.

Dimension of 'a' (Kerb to island clearance)

Speed Limit	Max	To Be Avoided		Min
		Cycles on Carriageway (=no cycle bypass)	No Cycles on Carriageway (= with Cycle bypass)	
40mph	10.5m	<4.5m (pref 5m)	<3.5m	See Left
30mph	10.5m	<4.0m	<3.0m	See Left
20mph	10.5m	3.1m – 3.9m	<2.75m	2.75m*

* overtaking a cyclist will not be possible at 2.75m.

Dimension of 'b' and 'c' (Island dimensions)

	Max	Min (Pedestrians)	Min (Cyclists)
b	5.0m	2.0m	2.0m
c	3.0m	1.8m (1.2m absolute)	2.0m absolute 2.5m desirable 3.0m allows for trailers

Lighting

Only consider the installation of additional lighting over the pedestrian refuge to improve safety after dark, if there is not already sufficient street lighting.

Keep left bollards

Should be provided if there is a safety concern regarding visibility. "*In deciding whether or not a bollard is required, designers need to consider how visible the traffic management feature in question would be in the absence of a bollard".* DfT - TAL 3/13 (2013)

Diagram 610

In 20 mph zones consider the use of Diagram 610 mounted on a post.

In 30 mph zones consider the use of Diagram 610 mounted on an illuminated bollard.

Relevant Factsheets:

Uncontrolled Drop Kerb Crossings (G4)
Crossings at or near Junctions (G5)
Minimising Street Clutter (P8)
Soft Segregation: Integration with Crossings (C3)
Hard Segregation: Integration with Crossings (C4)
Speed Reduction and Traffic Management (G6)

Refuge Island Crossings at or Near Junctions on Main Roads

Location of crossing

- Locate crossings on desire lines unless there is a physical obstruction - typically as near as possible to the junction, accommodating a turning manoeuvre. Consider banning turns

Design considerations

- Assess which side to place the refuge island crossing, where it will best meet crossing needs and least impact turning movements and traffic flow.
- Undertake vehicle tracking (swept path analysis) for large vehicles. If this indicates the refuge island should be relocated off the pedestrian desire line, consider banning turn(s) as the preferred option instead.
- Consider using build outs on side roads to bring the refuge island closer to the junction.

Dimensions

(a),(b) and (c)

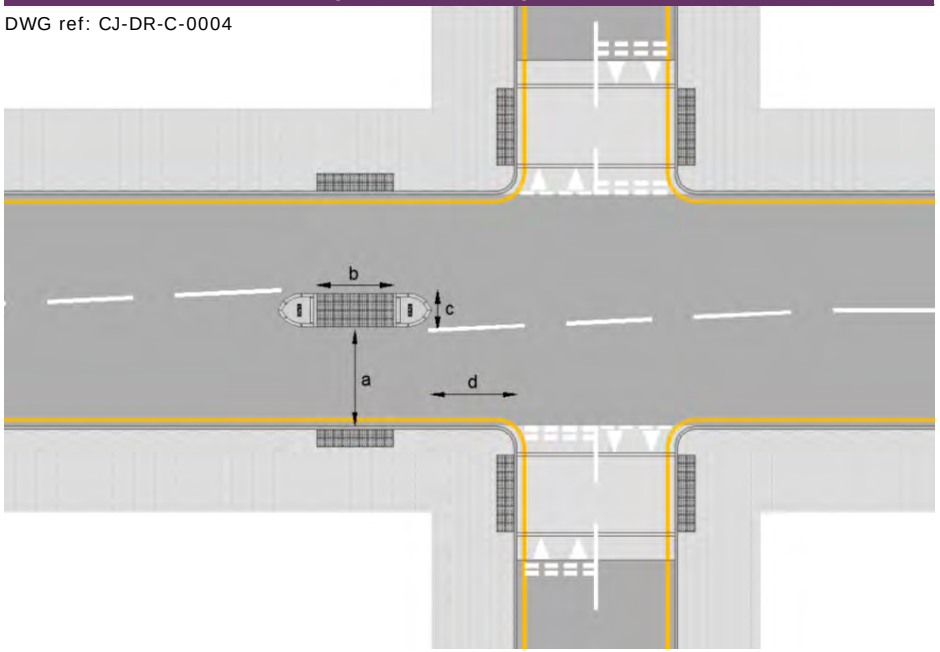
Details for these dimensions can be found on the Refuge Island Crossing factsheet.

(d)

The aim will usually be to minimise this distance in order to enable crossing movements on desire lines. However must be set such that turns can be made by vehicles that are likely to regularly require to do so (e.g. delivery vans, potentially refuse vehicles).

Refuge Island Crossing at Junction

DWG ref: CJ-DR-C-0004



Relevant Factsheets:

Uncontrolled Drop Kerb Crossings (G4)
Zebra / Tiger Crossings (G4)
Pedestrian Desire Lines (P2)
Crossings at or near Junctions (G5)
Refuge Island Crossings (G4)
Corner Radii (G6)
Priority Junctions (G7)

Zebra / Tiger Crossings 1

The 2016 edition of the Traffic Signs Regulations and General Directions **(TSRGD) allows 'Tiger'** parallel cycle crossings at zebras.

- Should be located on or very close to pedestrian desire lines.
- Consideration should be given to creating a raised table which can improve pedestrian/ cycle priority, especially for tiger crossings.

Furniture

- Belisha Beacon (amber coloured globe atop a black and white pole) illuminated at night.
- Set back 450mm from kerb face (may be less on narrow footways - see Minimum Kerb Zone factsheet) and 500mm from tactile paving.
- Consider mounting on lighting column.

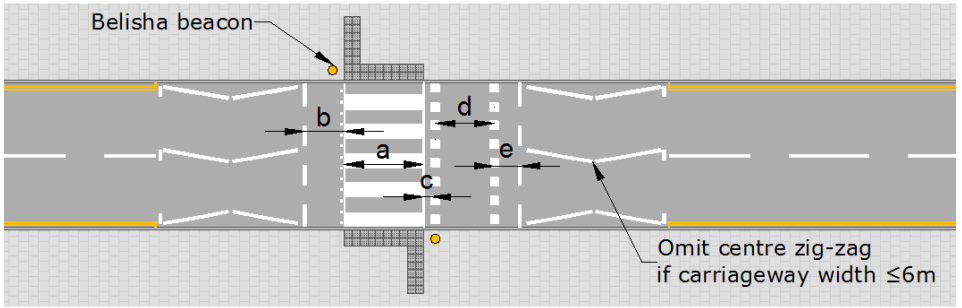
Dimension	Min / Max	Desirable
Pedestrian Crossing Width (a)	2.4 – 10.0m	3.2m
Clear Distance (b)	1.1 - 3.0m	1.7m
Distance between pedestrian and Cycle crossing (c)	0.4m	0.4m
Cycle crossing width (d)	1.5 – 5m	3.0m
Clear Distance (e)	1.1 – 3.0m	1.1m

If the crossing distance is:

- <10m – Single Crossing Point
- >10 and <15m – Single Crossing point with Refuge Island
- X>15m – Zebra not suitable

These are unlikely to be suitable if there are two or more lanes per direction.

Special care needs to be taken in designing a staged Tiger crossing to allow for the requirements of cyclists.



DWG ref: CR-DR-C-0001

Zebra Crossing

The City of Edinburgh Council: Zebra/Tiger Crossing on High Street, Edinburgh

Other considerations

- Guardrail only to be installed following a formal Guardrail Assessment.
- Bus stops to be sited downstream of crossings.
- To achieve suitable crossing locations and balance the demands on kerb space, it will usually be appropriate to use 4 or fewer zigzags on streets with a 20mph limit (2 on 'downstream' side).

Further information:

- Local Transport Note (LTN 2/95): The Design of Pedestrian Crossings, 1995
- TSRGD 2016

Relevant Factsheets:

Flush / Dropped kerb Detail (G4)
Minimising Street Clutter (P7)
Pedestrian Desire Lines (P2)
Crossings at or Near Junctions (G5)
Minimum Kerb Zone (F1)
Distance to crossing studs (G4)
Tactile Paving (M4)
Zigzags (G4)

Zebra / Tiger Crossings 2 – Pros and Cons

Advantages of Zebra/Tiger compared to signalised

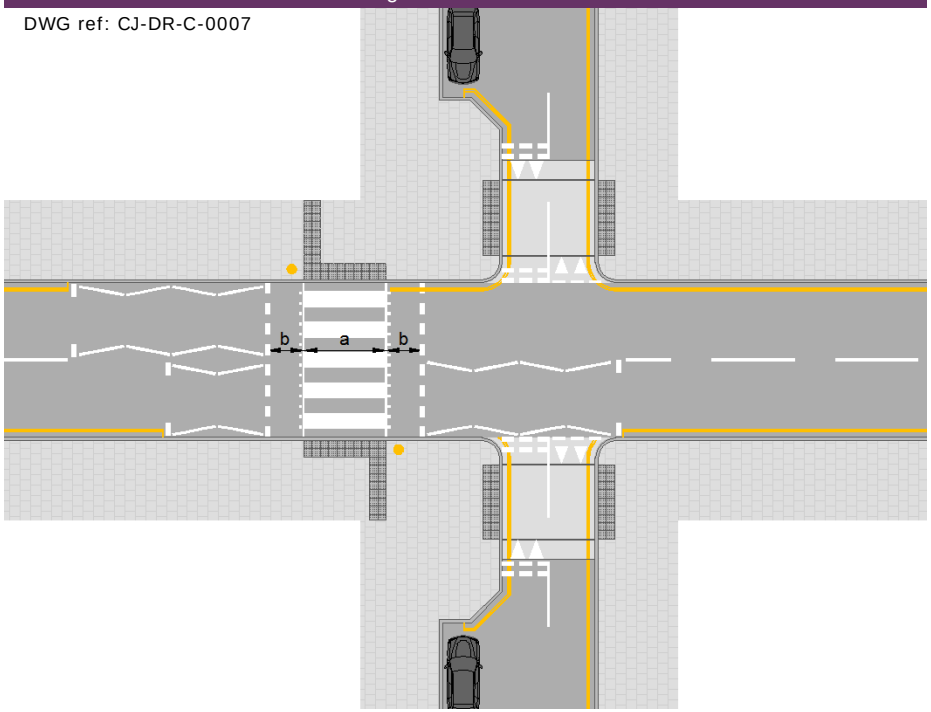
- Visually more prominent (lines on the road very visible).
- Belisha beacons can be seen from all directions.
- Minimal delay for pedestrians or cyclists crossing.

Disadvantages of Zebra/Tiger compared to signalised

- Pedestrians have more confidence in signalised crossings. This is particularly an issue for visually impaired or young/old pedestrians.
- There could be issues around visibility of pedestrians or cyclists crossing, especially on long crossings.
- Where there are high pedestrian flows these crossings can heavily impact on motor vehicle movement.

Zebra Crossing at Junction with Build-outs

DWG ref: CJ-DR-C-0007



Often crossings will be located at or near junctions to align with pedestrian and cyclist desire lines.

To enable Zebra and Tiger crossings to be as close to junctions as possible consider the following:

- Build outs to reduce width of side roads.
- Reducing corner radii.
- Banning higher volume left turns that conflict with crossing.
- Raised Side Street entries/continuous footways.

For further details on how all of the listed options can be applied to best locate a crossing, see Factsheet: Crossings at or near Junctions – Layout Option 1

For dimensions (a) and (b) values see Zebra/Tiger Crossings factsheet.

Zigzag area

- In order to achieve suitable crossing locations and to balance demands on kerb space, it will usually be appropriate to use 4 or fewer zigzags on streets with a 20mph limit (2 on the exit side of crossings once drivers are beyond the crossing).
- Where crossings are very close to side roads, there is little or no benefit to extending zigzags across side road junctions as vehicles will not park in front of these, unless the zigzags are required to be extended beyond the side road junction.

Relevant Factsheets:

Flush / Dropped kerb Detail (G4)
Minimising Street Clutter (P7)
Pedestrian Desire Lines (P2)
Crossings at or Near Junctions (G5)
Distance to crossing studs (G4)
Corner Radii (G6)
Tactile Paving (M4)
Zigzags (G4)
Priority Junctions (G7)

Zebra / Tiger Crossings on Exit of Roundabouts

Where it is considered beneficial to place a Zebra near a roundabout they should be:

- Raised or made continuous to give pedestrians priority.
- They should usually be placed 5m back from the stop line to allow for at least one vehicle to queue.

Zebra Crossing at Roundabout
Waverley Bridge, Edinburgh

The City of Edinburgh Council

Zebra Crossing at Roundabout
George Street, Edinburgh

The City of Edinburgh Council

Signalised Crossings

A signalised crossing is a formal type of pedestrian and/or cycle crossing with push button controls.

A Puffin crossing is pedestrian signalised crossing.

A Toucan crossing is a pedestrian and cyclist combined signalised crossing.

A Pegasus crossing is a pedestrian and equestrian combined signalised crossing (none in Edinburgh at present).

Design principles

- Locate crossings on desire lines.
- Keep furniture to a minimum.
- Primary push button on right side.
- Avoid use of guardrails – follow Guardrail Assessment if considering its use.
- Tactile paving with tails required.
- Bus stops to be sited downstream.
- Anti-skid surfacing may be reduced in length or omitted in lower speed (20 mph) environments.

Toucan Crossing
St. Leonard's Street, Edinburgh

The City of Edinburgh Council

Crossing widths

Type	Puffin	Toucan or Pegasus
Desirable	3.2m	6.0m
Minimum	2.4m	4.0m
Maximum	10.0m	10.0m

For further information

Sheet G5 – crossings at or near junctions

Department for Transport:

- Guidance on the use of Tactile Paving Surfaces, 1998
- Local Transport Note (LTN 1/95): The Assessment of Pedestrian Crossings, 1995
- Local Transport Note (LTN 2/95): The Design of Pedestrian Crossings, 1995 (NB see sheet G5 re distance to junctions)
- Traffic Advisory Leaflet 5/91: Audible and Tactile Signals at Signal-Controlled Junctions, 2005

Relevant Factsheets:

Crossings at or near Junctions (G5)
Pedestrian Desire Lines (P2)
High Friction Surfacing (M5)
Tactile Paving (M4)
Minimising Street Clutter (P7)
Designing Convenient and Direct Crossings (G4)
Flush / Dropped Kerb Detail (G4)
Bus Stops (PT2)
Pedestrian Guardrail (P5)

Signalised Crossings of Wider Roads

Design principles

- Aim to minimise delays, particularly to pedestrians and cyclists, but taking account of public transport and other road users.
- A single –stage crossing is generally preferred, especially for cyclists
- Consider building-out footways to reduce width to be crossed before considering islands and especially before considering a 2 stage crossing
- Islands should generally be at least 2m (straight across- single stage), 3m (staggered)
- If considering a straight across 2 stage crossing the central refuge needs to be wide to reinforce the impression of two separate crossings. 4m or more is advised (London Streetscape Guidance, p123).
- Special care is needed for any 2 stage crossing used by cyclists, as they will have less time to understand the split nature of the crossing while on the island. Unless the 2 –stage nature is obvious, through width or otherwise, there should be some stagger.
- Reduced offset for any stagger increases convenience for users , especially cyclists, of 2 stage crossings.

Crossings of wider roads – stages and islands

Road Width - m*	Crossing stages	Island?*	Stagger
<11m	single	Consider for wider widths	Na
11 to 15m	Single preferred	If practicable	No if single stage Yes if two stage and island <4m
>15m	Generally two	Yes	Consider no stagger if wide island (>= 4m) is possible. (see design principles - crossings used by cyclists require special care)

Note: This factsheet refers principally to stand-alone crossings. Wider single-stage crossings without islands are often acceptable at signalled junctions.

Use of Guardrail on islands

- There is presumption against the use of guardrail
- Kerb upstands are preferred to guide users.
- Refer to CEC Guardrail protocol

Staggered crossing on the central Island on Princes St, Edinburgh

Google Maps 2017

Staight across two stage crossing at the junction of Pancras Rd and Euston Rd, London

Google Maps 2017

Relevant Factsheets:

Crossings at or near Junctions (G5)
Pedestrian Desire Lines (P2)
High Friction Surfacing (M5)
Tactile Paving (M4)
Minimising Street Clutter (P7)
Designing Convenient and Direct Crossings (G4)
Flush / Dropped Kerb Detail (G4)
Bus Stops (PT2)
Pedestrian Guardrail (P5)

Distance to Crossing Studs

The distance between the stop line and crossing is largely intended to avoid small pedestrians being in the blind spot of the drivers of large HGVs (see Fig. 1). However employing the full 3m distance now advised in TAL5/05 is likely to result in crossings being further from the pedestrian/cycle desire line, figures 2a and 2b illustrate this point.

Taking the above into account a distance of 1.7m from a stop/give way line to crossing studs should generally be used when seeking to locate crossings, particularly toucan crossings, on desire lines. 3m is advised for mid-link crossings.

Risk to smaller pedestrians resulting from the 1.7m distance can be mitigated by installing advanced stop lines or "Keep Clear" areas, see G5 – Layout Options.

Maintaining pedestrian/cyclist desire lines encourages the use of formal crossings and is likely to deter users from crossing the road at dangerous locations (TRL, Factors Influencing Pedestrian Safety: A Literature Review 2006: p.47).

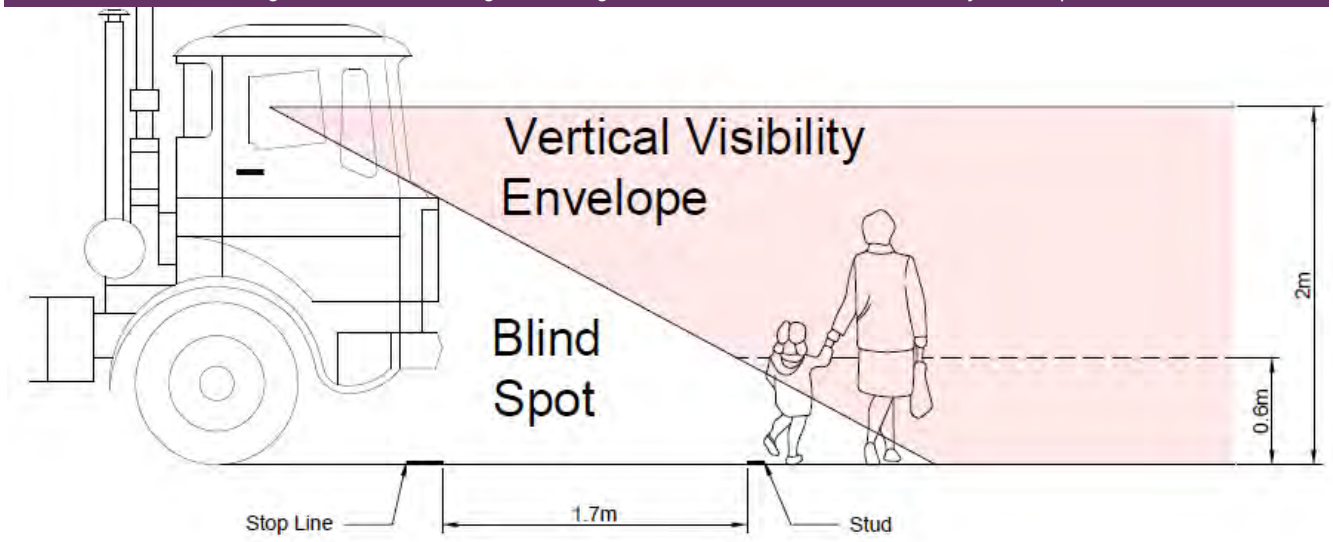
In addition, locating crossings on pedestrian/cyclist desire lines is crucial for delivering "QuietRoutes" networks.

Widening the crossing width should encourage crossing within studs and should always be considered, especially where the 1.7m stop line to studs distance is used.

Existing guidance

- Traffic Signs Manual Chapter 5 provides a minimum distance of 1.1m (Zebra) or 1.7m (Toucan) and a maximum of 3.0m.
- Transport Advice Leaflet 5/05 recommends a minimum distance of 3.0m to ensure high-fronted vehicles waiting at the stop line can clearly see pedestrians at the crossing.

Fig. 1. Illustrative Diagram of High-fronted Vehicle Vertical Visibility Envelope

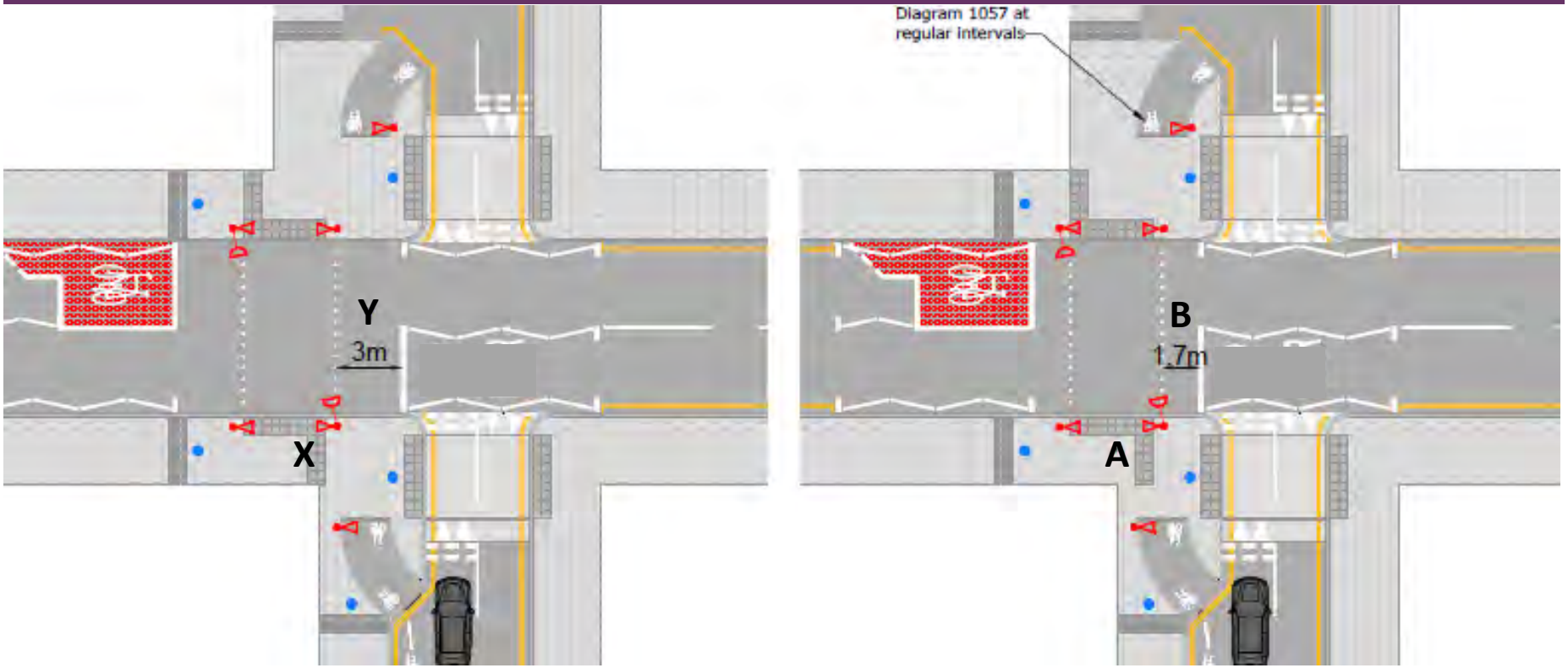


Relevant Factsheets:
Crossings at or near junctions (G5)
Pedestrian Desire Lines (P2)

Fig. 2. Impact of stop line to crossing studs distance on location of toucan crossings relative to desire lines.

2a: 3m distance from stop line to studs

2b: 1.7m distance from stop line to studs



DWG ref: CJ-DR-C-0008

X. Likely cycle/pedestrian conflict due to poor visibility

Y. Temptation to cross in gap between stop line and crossing point

A. Cycle desire lines further from building front, better visibility

B. Narrower gap, lower temptation to use for crossing

Relevant Factsheets:
Crossings at or near junctions (G5)
Pedestrian Desire Lines (P2)

Zigzags

In order to achieve suitable crossing locations and to balance demands on kerb space, it will usually be appropriate to use 4 or fewer zigzags on streets with a **20mph limit (2 on 'downstream'** side).

Zigzag length

Zigzags are intended to improve inter-visibility between drivers, pedestrians and cyclists using crossings.

However the Department for Transport guidance does not require them at signalled junctions. This leads to significant inconsistencies in visibility between 'stand alone' crossings and crossings at traffic signalled junctions. A signalised junction should never be installed simply because it does not require zigzags.

Design principles

20mph Streets

4 zigzags are normally sufficient 'upstream of crossing, 2 'downstream' (due to reduced stopping distances)

Consider reducing upstream zigzags to 2 in following circumstances:

- Need for loading or disabled parking.
- Crossing can be placed on a 'build-out' with parking/loading in bay. Where a 'build-out cannot be achieved consider using a flat-topped road hump to encourage slower speeds on approach to the crossing.

Always reduce number to 2 if the alternative would be to replace the crossing with a signalled junction with the equivalent of 2 zigzags length , or less of a waiting/ loading ban on it's approach.

30mph Streets

8 zigzags are normally sufficient upstream, 4 or less downstream.

Consider reducing number of zigzags similarly to 20mph streets. 2 zigzags are only likely to be appropriate if parking/loading is in a bay, or if the crossing is in a build out.

Do not replace the crossing with a signalled junction simply to minimise the impact on parking and loading.

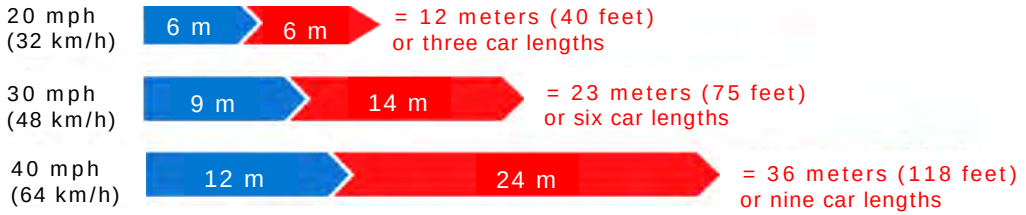
Consider reducing speed limit, accepting larger parking / loading impact, or using fewer zigzags (always reduce downstream zigzags in preference to upstream).

40mph Streets

8 or more zigzags are essential upstream.

Downstream numbers may be reduced in exceptional circumstances.

Typical stopping distances



The distances shown are a general guide. The distance will depend on your attention (thinking) distance, the road surface, the weather conditions and the condition of your vehicle at the time.

Average car length – 4 metres (13 feet)

Source: Highway Code Stopping Distance Diagram

Relevant Factsheets:
Minimising Street Clutter (P7) Crossings at or near junctions (G5)

Bridges and Underpasses

There is a presumption against pedestrian and cycle bridges and underpasses which can present personal security & safety concerns. These will only be considered under exceptional circumstances.

Where there is no other alternative, bridges and underpasses should be designed to be convenient, pleasant and safe to use and should preferably involve raising or lowering the carriageway to ensure that pedestrians and cyclists face minimal changes in level.

For further guidance:

- Sustrans Design Manual – Handbook for cycle-friendly design
- BD 29/17 - DESIGN CRITERIA FOR FOOTBRIDGES
- TA 90/05 - THE GEOMETRIC DESIGN OF PEDESTRIAN, CYCLE AND EQUESTRIAN ROUTES
- TD 36/93 - Subways for Pedestrians and Pedal Cyclists Layout and Dimensions

Bridges

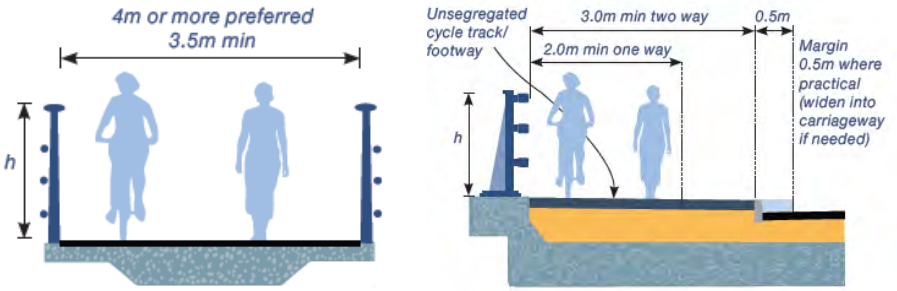
- 1 in 20 approach gradient preffered
- Avoid the use of steps
- Good visibility

Parapet height *(h)*

- 1.4m preferred for cyclists, but many existing bridges operate well with lower heights
- 1.8m for equestrian use (mounted)
- Effective width of bridge reduced by 500mm at each parapet
- For advice on substandard parapet heights, refer to Sustrans Technical Information Note 30.

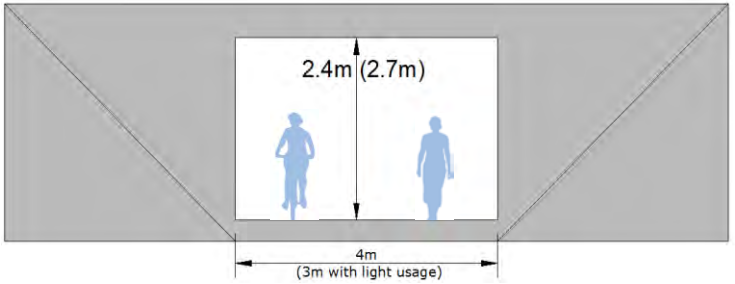
Underpasses

- 45 degree min angle of wing wall
- Good visibility
- Well lit
- Dimensions shown are minimum recommended for new underpasses
- Dimensions in brackets apply to underpass lengths > 23m
- Many existing underpasses operate well with lower head rooms and appropriate warning signs
- Headroom of 3.7m required for equestrians (mounted)
- A greater width, or walls receding towards the top, increases natural light and reduces security issues at the ends.



Bridges – Typical Sections and Parapet Height (Sustrans Design Manual - Sustrans, HCfD, 2014)

Typical Section (Unsegregated)



Typical Section (Segregated)

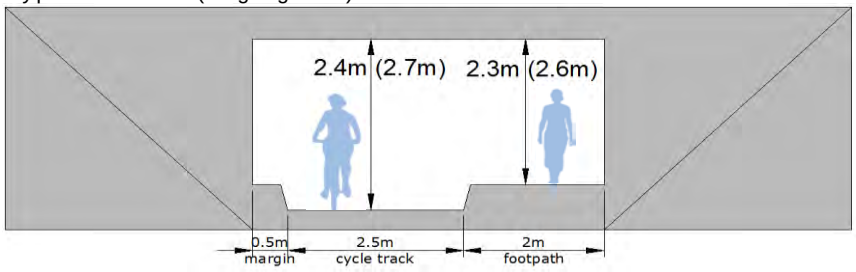


Image References

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Typical Combined Crossing: The City of Edinburgh Council 2016
Refuge Island: The City of Edinburgh Council 2016

Choosing a Crossing Type
Uncontrolled dropped kerb crossing – Bruntsfield: The City of Edinburgh Council 2016
Zebra / Tiger crossing– Waverly Bridge: The City of Edinburgh Council 2016
Toucan crossing - Bruntsfield Place / Leamington Terrace: The City of Edinburgh Council 2016
Puffin crossing – Nicholson Street / Nicholson Square: Google Maps. [ONLINE]. Available at:https://goo.gl/xtuEpB [Accessed 5 December 2016]

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All images: Street Design for All (2014) [ONLINE]. Available at: http://www.civicvoice.org.uk/uploads/files/street_design_2014.pdf [Accessed 5 December 2016]

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Build Outs - Widening the footway/ narrowing carriageway – Bruntisfield Edinburgh: The City of Edinburgh Council 2016
Continuous Footway: Jacobs
Refuge Island: The City of Edinburgh Council 2016
Raised Table: Google Maps [ONLINE]. Available at: https://goo.gl/maps/tKvtYsukkXU2 [Accessed 5 December 2016]

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Zebra Crossing: The City of Edinburgh Council 2016

On Exit of Roundabouts
Zebra crossing– Waverly Bridge: The City of Edinburgh Council 2016
Zebra crossing– George Street: The City of Edinburgh Council 2016

Signalised Crossings
Toucan crossing, St. Leonard's Street: The City of Edinburgh Council

Signalised Crossings of Wider Roads
Princes St: Google Maps. [ONLINE]. Available at: https://goo.gl/YDuwez [Accessed 11 December 2017]
Euston Road Google Maps. [ONLINE]. Available at: https://goo.gl/PS97db [Accessed 11 December 2017]

Distance to Crossing Studs
Illustrative Diagram of high-fronted vehicle vertical visibility envelope: The City of Edinburgh Council 2016

Zigzags
Stopping distance diagram: The Highway Code [ONLINE]. Available at: http://www.highwaycodeuk.co.uk/general-rules-techniques-and-advice-for-all-drivers-and-riders---control-of-the-vehicle-117-to-126.html [Accessed on 5 December 2016]

Bridges and Underpasses
Bridges – Typical Sections and Parapet Height: Bridges & Underpasses Factsheet. [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/file_content_type/sustrans_handbook_for_cycle-friendly_design_11_04_14.pdf [Accessed on 5 December 2016]

Index

G5 – Signalled Crossings at or Near Junctions

Amendments:

Signalled Crossings at or Near Junctions

Why provide crossings at or near junctions?

There are four main reasons for locating crossings at or as close as possible to junctions.

1. Increasing convenience for pedestrians and cyclists: research has shown pedestrians choose crossing locations that minimise walking distance and time (TRL, Factors Influencing Pedestrian Safety: A Literature Review 2006).
2. Encouraging use of formal crossings: people often ignore offset crossings and follow shorter desire lines. This can involve crossing the road in relatively dangerous locations where the drivers' attention is focused on a formal crossing. Research has shown only about 1 in 4 people divert from their route to use a formal crossing (see TRL report above).
3. Locating cycle crossings near junctions reduces the extent of pedestrian/cycle conflict. (See G5-2)
4. Locating crossings at junctions is critical for the creation of 'QuietRoutes' cycle routes. These enable cyclists to use linked quiet streets and off-road paths to avoid main roads. If the necessary crossings are not at junctions, the 'QuietRoutes' will be complex and slow to use and therefore will not attract users.

Permitting vehicles to turn (especially left-turn) from side roads through crossings very close to junctions is less likely to be appropriate where average speeds on the main road are high (e.g. over 30mph); particularly if traffic volumes mean that gaps in traffic tend to be short or where traffic volumes on the main road are overly high.

In these situations the relevant turns should be prevented, or the crossing moved further from the junction - though distances of less than 20m will often be appropriate to encourage use of the formal crossing.

Deviation from national guidance

Based on the reasons and evidence given on this page and the next two pages, the guidance in LTN 2/95 regarding the distance of crossings from junctions should no longer be the starting point for crossing design in Edinburgh. See **'Crossings close** to junctions - Evidence and risk **mitigation'** sheet.

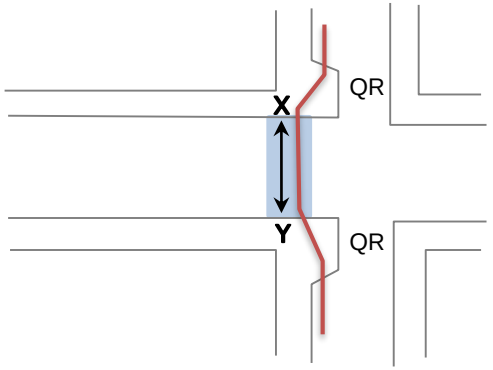
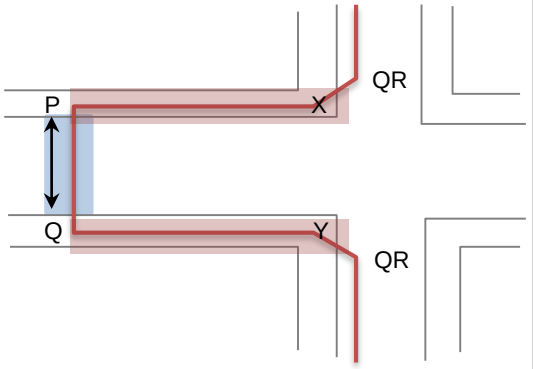
Toucan Crossing
Rankeillor St / Clerk St

The City of Edinburgh Council

Toucan Crossing
Bruntsfield Pl. / Leamington Terrace

The City of Edinburgh Council

Relevant Factsheets:
Crossings (G4)
QuietRoutes (C1)
Corner Radii (G6)
Pedestrian Desire Lines (P2)
Visibility (G6)

	Crossing close to junction	Offset Crossing
Locating crossings close to junctions helps make walking and cycling more convenient. There is no evidence that this is unsafe; however there are several reasons why this is likely to be safer than offsetting crossing locations. (See Evidence and Risk Mitigation factsheet.)		
All crossings		
1. Helps encourage walking and cycling.	More likely to be on desire lines.	Extra walking/cycling distance X to P plus Q to Y.
2. Better for people with reduced mobility.	Shorter, fewer turns and less conflict.	Significant extra distance, extra turns and more conflict.
3. Encourages use of formal crossings.	Users are less likely to ignore crossing.	Users are more likely to ignore crossing.
Toucan Crossings		
4. Reduces cyclist / pedestrian conflict.	Pedestrian/cycle conflict focused at X and Y.	Pedestrian/cycle conflict from X to P to Q to Y.
Effect on cycle route via Side Roads ('QuietRoutes')		
5. Helps to create attractive cycle routes.	Route is convenient. Potential for 'QuietRoute' (QR) to be as direct as a parallel main road.	Route is inconvenient. No potential for 'QuietRoute' (QR) to be as direct as a parallel main road.

Relevant Factsheets:
Crossings (G4) Evidence and Risk Mitigation (G5) QuietRoutes (C1)
Pedestrian Desire Lines (P2)

Evidence and Risk Mitigation

Evidence to support departure from guidance

National Guidance from Local Transport Note 2/95 recommends a minimum distance of 20m for signalised crossings to junctions and a minimum of 5m for Zebra Crossings.

However, following this guidance often makes it impossible to provide crossings on, or even near to, desire lines. The implication has often been provision of guardrails in an attempt to force use of the crossing.

Edinburgh Council completed a review of 55 crossings in Edinburgh which are sited within 15m of a junction. It found no evidence of safety issues due to the crossings' proximity to junctions.

All the accident reports for 5 years were reviewed and there was no evidence that any accidents were due to the proximity of the crossing to a junction. 10 of these crossings were found to be within 6m of a junction and so accident data for 10 years was reviewed. There was again no evidence that any accidents at these crossings were due to the proximity of a junction.

In total 166 accident reports were reviewed and none of them identified an accident occurring on account of a vehicle turning left or right at a nearby side road striking a pedestrian, cyclist or vehicle.

See typical layouts of long established crossings.

Puffin Crossing
Nicholson Street at Nicholson Square

Google Maps, 2016

Toucan Crossing
Leonard Street at St Leonard Lane

The City of Edinburgh Council

Deviation from national guidance

Based on the reasons given on this page and the preceding two pages and the evidence cited on this page, the guidance in LTN 2/95 regarding distance of crossings from junctions should no longer be the starting point for crossing design in Edinburgh.

Factors that will reduce / mitigate risks	
Visibility of crossing from side streets	Visible crossing poles etc. are likely to alert drivers of the presence of a crossing as they approach along a side road and will help ensure drivers actively look for signals at the junction.
Tight geometry	This will help to reduce the speed of turning vehicles.
Raised side road entries	These will help to reduce the speed of turning vehicles.
Proximity of crossing to junction reduces potential speed of turning vehicles at the crossing	If a crossing is very close to a junction mouth, there is minimal time for acceleration before there is any conflict with a crossing cyclist or pedestrian.
Locating crossing to reduce numbers of conflicting movements with limited visibility	Although the risks appear low, other factors being equal, it is prudent to locate crossings such that turning movements are as low as possible from side roads onto the crossing. Usually the turning movement with the most limited signal visibility will be the left turn on to the crossing. Consideration should also be given to locating the crossing to minimise the likelihood of vehicles queuing through a crossing. This will be as a result of vehicles making right turning manoeuvres into a side roads. It may, in some cases, be more appropriate to locate the crossing downstream of the side road.

Relevant Factsheets:
Corner Radii (G6) Priority Junctions (G7) Traffic Management & Speed Reduction (G6)

Examples of Existing Crossings Near or at Junctions in Edinburgh

Cramond Road South / Barnton Avenue

Google Maps, 2016

Toucan - Two Way Side Street
1998 (± 2)

Bruntisfield Place (at Leamington Terrace)

The City of Edinburgh Council

Toucan - Two Way Side Street
1998

Whitehouse Road / Barnton Avenue West

Google Maps, 2016

Toucan; (staggered junction) - Two Way Side Street (on both streets)1998 (± 2)

Nicholson Street at Nicholson Square

Google Maps, 2016

Puffin – Two Way Side Street
1990s

St Leonards Street at St Leonards Lane

The City of Edinburgh Council

Toucan (staggered junction) - Two Way Side Street (on both streets)

Buccleuch Street at Buccleuch Terrace

Google Maps, 2016

Toucan - Two Way Side Street
2015

Clerk Street at Rankeillor Street

The City of Edinburgh Council

Toucan – One Way Side Street (in away from junction)
2015

Dalry Road near Caledonian Place

Google Maps, 2016

Pelican – Two Way Side Street
1990s

Existing Crossings Near Junctions (<15m) in Edinburgh

Crossings near junctions – Edinburgh Statistics	
Crossing distance from junction (m)	Total number of crossings <15m from junction
0	1
3	2
4	5
5	1
6	1
7	5
8	6
9	2
10	3
11	5
12	9
13	4
14	7
15	4
Grand Total	55

Puffin crossings

1. Lanark Rd at Baberton Ave
2. Milton Rd at Magdalene Dr
3. Nicolson St at Surgeons Hall
4. Saughton Rd North at Broomhall Ave
5. Grassmarket at Cowgatehead
6. Minto St at Duncan St
7. Dundee St at Fowler Terr
8. Portobello Road at Fishwives Causeway
9. Ferry Rd at Clark Rd
10. Longstone Rd at Kingsknowe Rd North
11. St John's Rd at Featherhall Ave
12. Stevenson Rd at Balgreen Rd
13. Main St at Silverknowes Rd, Davidsons Mains
14. Liberton Gardens at Little Road
15. Broughton Rd at East Claremont St
16. Melville Dr at Jawbone Walk
17. West Port at Kings Stables Rd
18. Main St at The Green, Davidsons Mains
19. Balgreen Road at Saughtonhall Drive/Saughtonhall Drive at Balgreen Road
20. London Rd at Cambusnethan St
21. Milton Rd West at Durham Rd
22. Old Dalkeith Rd at Kingston Ave
23. Joppa Rd at Morton St

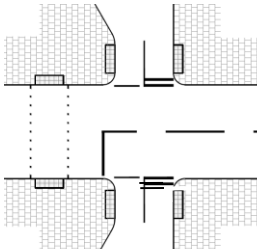
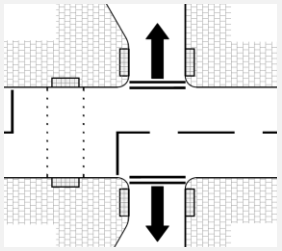
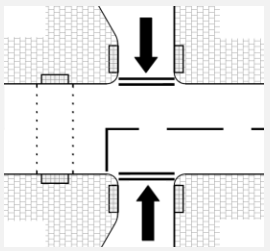
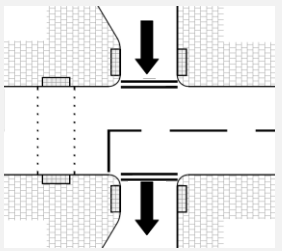
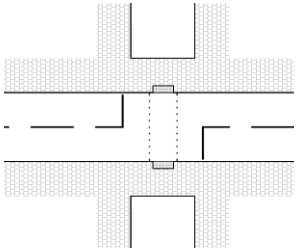
Pelican crossings

1. Dalry Rd near Caledonian Pl
2. South Clerk St
3. (Lutton Pl) Newington Rd
4. Morningside Rd at Steels Pl
5. Drum Brae Sth at Drum Brae Ave
6. South Bridge
7. Gorgie Rd at Murieston Lane
8. Abbeyhill at Abbeyhill Cres
9. St Leonard's St at Parkside St
10. Inverleith Row at Goldenacre Terr
11. Easter Rd at Brunswick Rd
12. Duddingston Rd West at Meadowfield Dr
13. Easter Rd at Albert St
14. Dundee St at Murdoch Terr
15. Craigentinny Rd at Loaning Rd
16. Oxgangs Rd at Caiystane Dr
17. Main St at Manse Rd, Kirkliston
18. Craigentinny Rd at Britwell cres
19. Easter Rd at Lorne St
20. Leith Walk at Balfour St
21. Whitehouse Rd at Braehead Rd
22. Buccleuch St at Buccleuch Pl
23. Grange Rd at Tantallon Pl

Toucan crossings

1. St Patrick Square
2. Broughton Rd at McDonald Rd
3. Cramond Rd South at Barnton Ave
4. Bruntsfield Pl at Leamington Terr: Toucan Crossing
5. Whitehouse Rd at Barnton Ave West: Toucan Crossing
6. Marionville Rd at Retail Park West
7. Broomhouse Rd at Forrester Park Ave
8. Kirkliston Rd at Roseberry Ave, S Queensferry
9. Marionville Rd at Retail Park East

Crossings Options: Summary Table (Puffin and Toucan)

Option 1	Option 2	Option 3	Option 4	Option 5
				
Two Way Side Streets	One Way Side Plugs/Streets Away from main road	One Way Side Plugs/Streets Towards main road	One Way Side Plugs/Streets Forming through route	Closed Side Streets
Pros • Least disruption to movements from side road. **Cons** • Turning movements on to crossing (unless banned). • May not fully align with desire lines. • Can leave build out quite congested. **Potential Show Stoppers** • Very narrow side road makes it impossible to get crossing on desire line. • High volume of left turns from the side road on to the crossing that's not suitable for banning.	**Options 2-4: Common "One Way" Pros** • Larger, less congested, easier to navigate build outs. • Brings crossing closer to junction and better aligned with desire lines. **Options 2-4: Common "One Way" Cons** • One way streets can restrict access for residents and businesses to the wider road network. • Require contraflow cycling **Pros** • Avoids turns from side roads on to the crossing. • Facilitates locating stop line very close to junction mouth. **Cons** • Requires space for vehicles to turn in side roads (plugs) • Diversion of prohibited movement **Potential Show Stoppers** • Where a one way plug is used, the side streets must be wide enough for cars to make a turn in the road.	**Pros** • Avoids risk of illegal reversing manoeuvres. **Cons** • Maintains turns that conflict with crossing (unless banned). **Potential Show Stoppers** • Access for refuse vehicles from other end of side roads. • High volume of left turns from the side road on to the crossing that's not suitable for banning.	**Pros** • Avoids left turn on to crossing. **Cons** • See Options 2 and 3. **Potential Show Stoppers** • Potentially forms a rat run corridor via side streets. • See option 2 and 3.	**Pros** • Best Crossing Option for cyclists and pedestrians. • Reduced traffic in side streets. • Ease of pedestrian movement across side road. • Crossing can be optimally aligned with desire lines. **Cons** • Significantly restricts access for motor vehicles. **Potential Show Stoppers** • Side streets must be wide enough for cars to make a turn in the road. • Access for refuse vehicles. (see factsheet for design solutions) • Access problems for residents.

Relevant Factsheets:

Soft Segregation: Integration with Side Roads (C3)
Hard Segregation: Integration with Side Roads (C4)
Pedestrian Desire Lines (P2)
Continuous Footways (G7)

Layout Option 1

Place Crossing on the side of junction that best aligns with desire lines and creates the fewest conflicts with vehicles, especially left turns across the crossing.

Design considerations

- Use continuous footways/raised side street entries to reduce speeds.
- Drivers at side roads should be able to see at least one signal head.
- Use tight radius corners to slow vehicles entering/exiting side roads and bring the crossing as close to the junction as possible. (See G4 – distance to crossing slides)
- Distance 'd' is generally desirable as 1.7m to help keep crossing close to desire line.
- Largest vehicles may be unable to make turning manoeuvres,. Refuse vehicles should be able to access/exit the side road but it is not essential that all turns can be made.
- Avoid banning turns if possible. Route diversion causes inconvenience and potential knock-on traffic impacts. Evidence (p3) suggests these turns do not introduce significant risk. Other features, including tight geometry, mitigate risk.
- If heavy left/right turns from side roads conflict with the crossing, consider banning those manoeuvres, especially if main road traffic speeds/volumes are high.

Narrow side streets

Where the side streets are narrower than 8m Option 1 may be difficult to achieve. Consider Options 2 , 3 and 4.

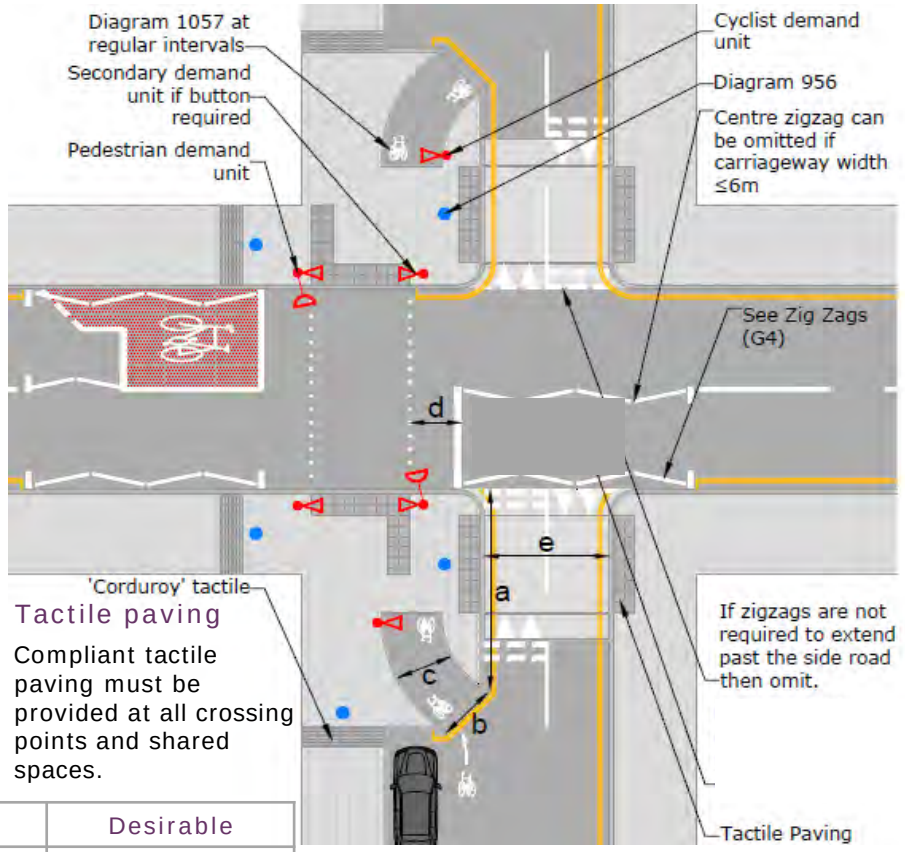
Use buildouts on side roads to:

- Bring crossing as close to desire line as possible and to minimise cycle/pedestrian conflict.
- Provide workable access to and egress from the crossing for cyclists.
- Minimise crossing distance on side roads.

Tactile paving

Compliant tactile paving must be provided at all crossing points and shared spaces.

An example Toucan Crossing Layout



DWG ref: CJ-DR-C-0001

Dimension	Min	Desirable
Build out depth (a)	2.3m	Site Specific
Taper/cycleway width (b)/(c)	2.0m	+2.5m
Distance to stop line (d)	1.7m	1.7m (max 3m)
Side road width (e)	4.5m	Site Specific

Relevant Factsheets:

Tactile Paving (M4)
Flush / Dropped Kerb Detail (G4)
Priority Junctions (G7)
Distance to crossing studs (G4)
Pedestrian Guardrail (P5)
Corner Radii (G6)
Minimising Street Clutter (P7)
Zigzags (G4)

Layout Options 2, 3 & 4

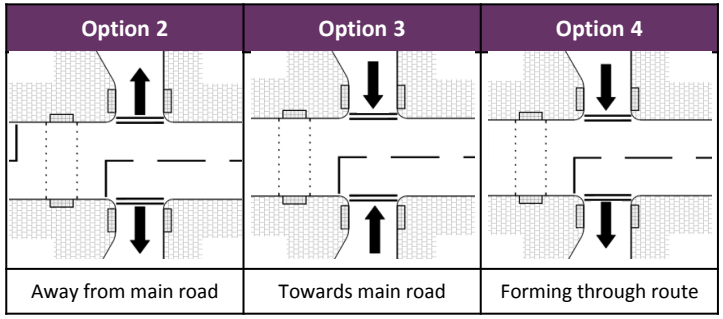
One way plug/street options have the potential to reduce turning movement conflicts and enable the crossing to be closer to cycle and pedestrian desire lines by narrowing the side street.

Additional design considerations (to be read in conjunction with layout Option 1):

- When one-way is away from the side road, 'square off' the radius nearest the stop line to allow crossing to be as close as possible to desire line.
- For option 4 use similar layout as option 1. See Option 1 design considerations
- Optional ASL at mouth of side road junction should be considered on a case by case basis.
- Distance 'd' is desirable as 1.7m to help keep crossing close to desire line. (See G4 – distance to crossing slides)

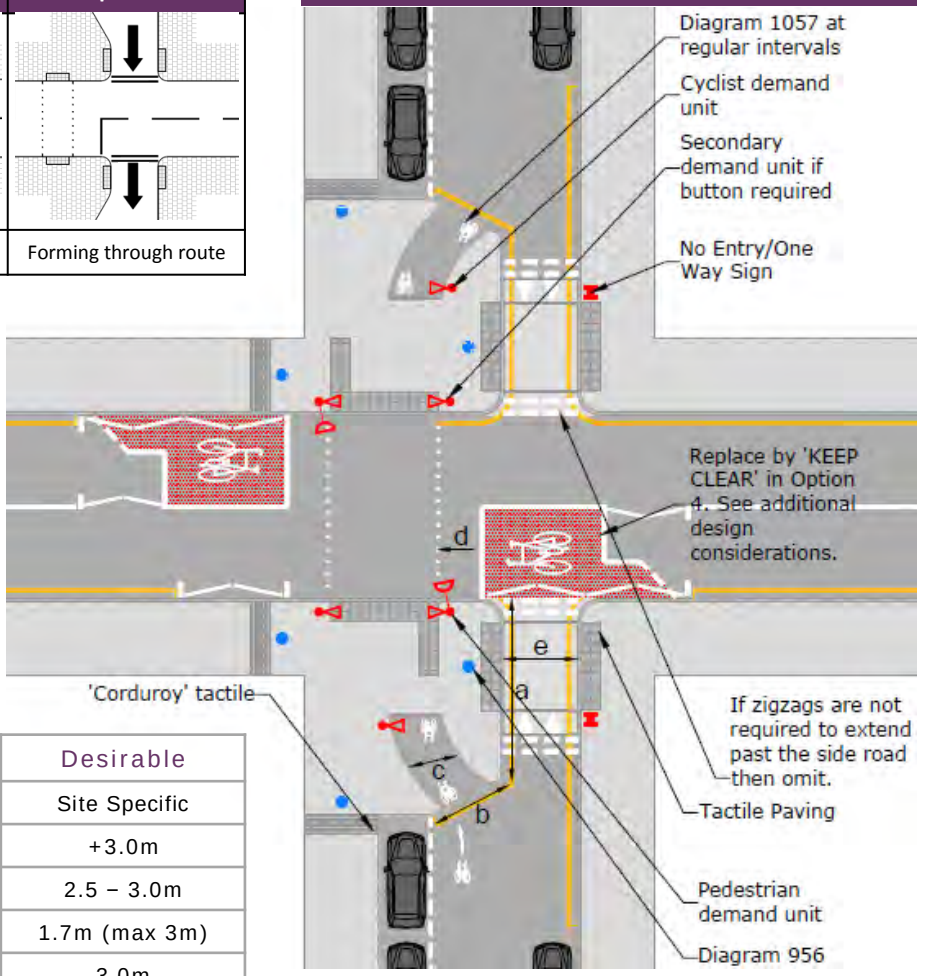
One way plugs/streets

- Cyclists should always be exempted from the one-way restriction. Consider if any special facilities are required.



- Consider making side street(s) one way either at junction ("plug option"), or whole street.
- Where the plug is one way in away from the main road, room needs to be left to allow cars to make a turn in the side road.

An example Toucan Crossing Layout (Option 3)



DWG ref: CJ-DR-C-0002

Dimension	Min	Desirable
Build out depth (a)	2.3m	Site Specific
Taper width (b)	2.5m	+3.0m
Cycleway width (c)	2.0m	2.5 – 3.0m
Distance to stop line (d)*	1.7m	1.7m (max 3m)
Side road width (e)	3.0m	3.0m

* See G4-distance to crossing studs

Relevant Factsheets:

Tactile Paving (M4)
Flush / Dropped Kerb Detail (G4)
Priority Junctions (G7)
Distance to crossing studs (G4)
Pedestrian Guardrail (P5)
Corner Radii (G1)
Minimising Street Clutter (P7)
Zigzags (G4)

Layout Option 5

Closure or continuous footway

Layout specific design considerations (to be read in conjunction with layout Option 1):

- Where continuous footways are used consideration should be given to turning by large vehicles and avoiding damage to poles etc.
- Parking closer to main road should be removed to allow turning manoeuvre on side roads.
- Distance 'd' is desirable as 1.7m keeps the crossing close to desire line. (see G4 – distance to crossing studs).

Closed end

- Locate the crossing as centrally as possible.
- Maximise crossing width for pedestrian and cyclist comfort.
- Consider refuse collections. Is there a need to allow access over the closure? E.g. one way for refuse vehicles only.

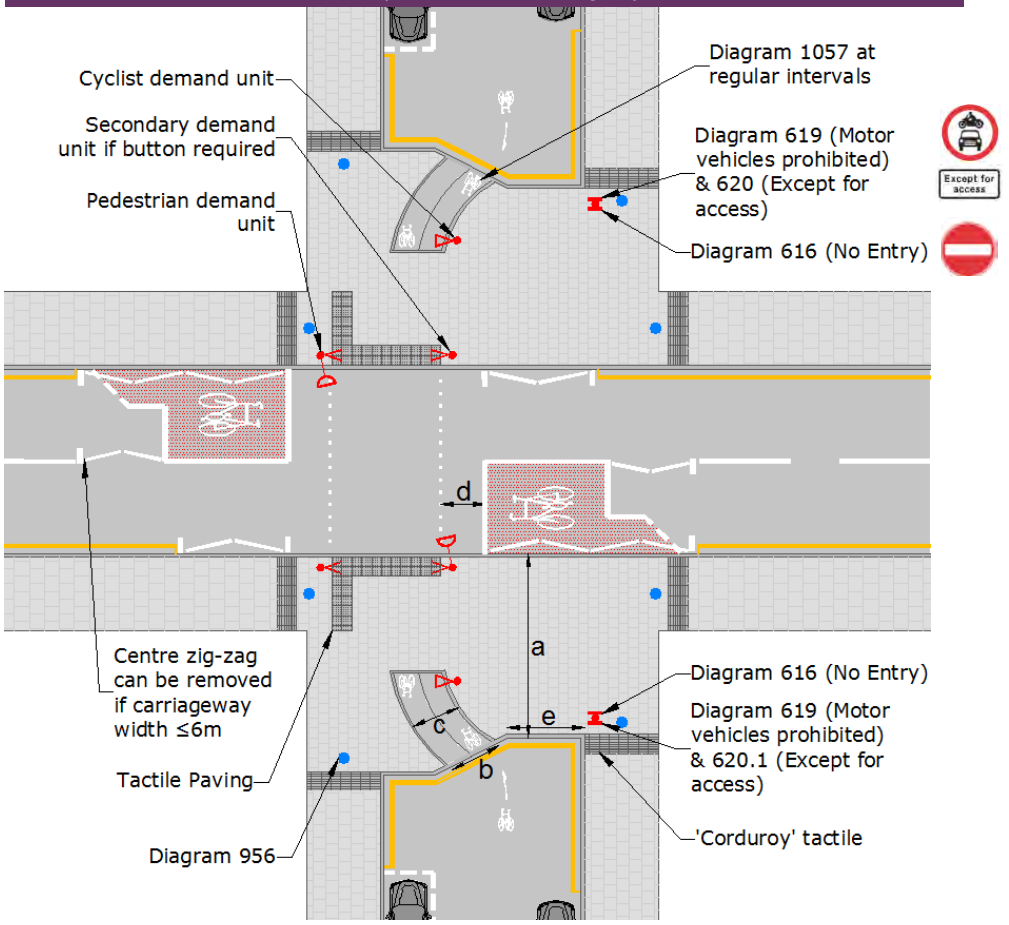
Tactile paving

Compliant tactile paving must be provided at all crossing points and shared spaces.

Dimension	Min	Desirable
Continuous Footway width (a) (Flow> 600 pedestrians / peak hour)	2.4m (3.0m)	6.0m
Taper width (b)	2.5m	+3.0m
Cycleway width (c)	2.0m	2.5 – 3.0m
Distance to stop line (d)*	1.7m	1.7m (max 3m)
Refuse vehicle entry width (e)	3.0m	3.0m

* See "Layout specific design considerations" and G4-distance to crossing studs

An example Toucan Crossing Layout



DWG ref: CJ-DR-C-0003

Relevant Factsheets:
Tactile Paving (M4)
Flush / Dropped Kerb Detail (G4)
Continuous Footways (G7)
Distance to crossing studs (G4)
Pedestrian Guardrail (P5)
Minimising Street Clutter (P7)
Zigzags (G4)

Image References

Signalled Crossings at or Near Junctions
Toucan Crossing Rankeillor St / Clerk St: The City of Edinburgh Council 2016
Toucan Crossing Bruntsfield Pl. / Leamington Terrace: The City of Edinburgh Council 2016

Evidence and risk mitigation
Puffin Nicholson Street at Nicholson Square: Google Maps [ONLINE]. Available at: https://goo.gl/maps/t2bRemfzVDF2 [Accessed 5 December 2016]
Toucan Leonard Street at St Leonards Lane: The City of Edinburgh Council 2016

Examples or existing crossings at or near junctions in Edinburgh
Cramond Road South / Barnton Avenue:
Bruntisfield Place (at Leamington Terrace):The City of Edinburgh Council 2016
Whitehouse Road / Barnton Avenue West: Google Maps [ONLINE]. Available at: https://goo.gl/maps/N9wHj5JqcUG2 [Accessed 5 December 2016]
Nicholson Street at Nicholson Square: Google Maps [ONLINE]. Available at: https://goo.gl/maps/PrFeWRFmUy82 [Accessed 5 December 2016]
St Leonards Street at St Leonards Lane: The City of Edinburgh Council 2016
Buccleuch Street at Buccleuch Terrace: Google Maps [ONLINE]. Available at: https://goo.gl/maps/HyiYhub5rto [Accessed 5 December 2016]
Clerk Street at Rankeillor: The City of Edinburgh Council 2016
Dalry Road near Caledonian Place: Google Maps [ONLINE]. Available at: https://goo.gl/maps/QRALFYjjtrw [Accessed 5 December 2016]

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G6 – Speed Reduction and Traffic Management

Amendments:

Speed Reduction and Traffic Management

Design should be used to influence driver behaviour to reduce vehicle speed to levels that are appropriate for the local context and deliver safe streets for all.

- Designing Streets

Managing the speed of motor vehicles is a critical function of urban street design. Firstly, lower motor vehicle speeds enhance safety, for every 1 mph reduction in average speed, casualties fall by 6% [TRL 421]. Secondly, lower motor vehicle speeds help people to feel safer walking and cycling, and so are an important component of encouraging active travel and creating pleasant places.

As far as is practicable, speed reduction should be achieved through an integrated approach to street design in preference to the addition of conventional traffic calming features. This approach is most likely to be feasible in new development areas or when carrying out full reconstruction..

For more information refer to Achieving Appropriate Traffic Speeds, Department for Transport's Manual for Streets (1)

Overview -1

Street features that support/attract activity can influence the speed at which people drive.

- Consider incorporating features such as street art, street trees, soft landscaping, active frontages, closer building lines, seating etc. to encourage people to stay in a space or navigate through it.
- Use soft landscaping and street furniture strategically to tighten the carriageway at key points to reduce speed.

Changes in priority or no priority at junctions can be used to interrupt flow and therefore bring overall speeds down.

- Different surface materials indicate changes in priorities. Contrasting surface materials highlight crossings and suggests drivers should slow down.
- Re-balance priorities towards high pedestrian activity and flexible use to encourage a calmer, low-speed environment and considerate behaviour by all.

Street dimensions can have a significant influence on speeds.

- Keep block sizes small in new developments.
- Vary carriageway widths (through on-street parking and loading bays, build-outs, refuge islands, street furniture elements etc.)
- Altering street dimensions includes footway and carriageway widths and corner radii.

Soft landscaping

Designing Street, 2010

Pedestrian Priority

Sustrans Design Manual Chapter 7, 2010

Short lengths of streets

Google Maps, 2016

Relevant Factsheets:
Omitting Centrelines (G3)
Priority Junctions (G7)
Street Furniture Layout (F1)
QuietRoutes (C1)
Carriageway Widths (G2)
Setted Streets (M6)
Sustainable Urban Drainage Systems (W1)
Drainage (W2)
Street Trees (F5)
Shared Space (P8)

Overview -2

Reductions in forward visibility are associated with reduced driving speeds.

- Reducing visibility by street alignment, such as introducing sharp bends helps reduce speeds at junctions.

Physical features involving vertical or horizontal deflection can be very effective in reducing speed.

- Domed or flush median strips can visually narrow widths yet allow for overrun by buses or emergency vehicles if necessary.
- Physically narrow carriageway widths (through widening footways or constructing segregated cycle lanes/tracks)
- Vertical elements (e.g. lamp posts) along the carriageway edge give an accurate gauge of speed and distance for drivers.

Materials such as cobbled surfaces and setts can help reduce speed because of their appearance and physical characteristics.

- Changes in colour and surface texture visually narrow carriageways. Keep the variety of materials to a minimum to reduce cluttering and maintenance.
- Create transitions at road entry points to emphasise a reduced speed setting.

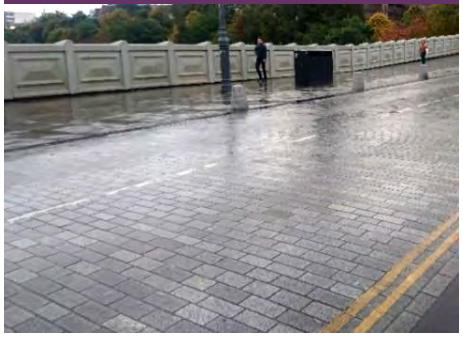
Reduced visibility

Designing Street, 2010

Visual Narrowing

Sustrans Handbook for Cycle Friendly Design (draft), 2014

Contrasting materials



Atkins, 2016

Relevant Factsheets:
Omitting Centrelines (G3)
Priority Junctions (G7)
Street Furniture Layout (F1)
QuietRoutes (C1)

Carriageway Widths (G2)
Setted Streets (M6)
Sustainable Urban Drainage Systems (W1)
Drainage (W2)
Street Trees (F5)
Shared Space (P9)

Corner Radii - 1

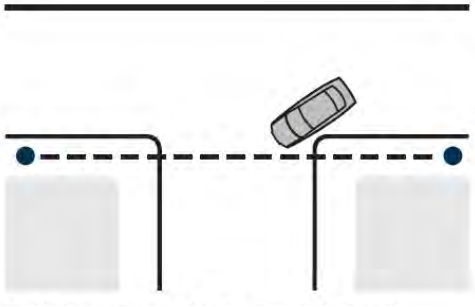
At junctions, corner radii should be minimised to ensure that crossings are as close as possible to the pedestrian desire line.

Reducing turning radii:

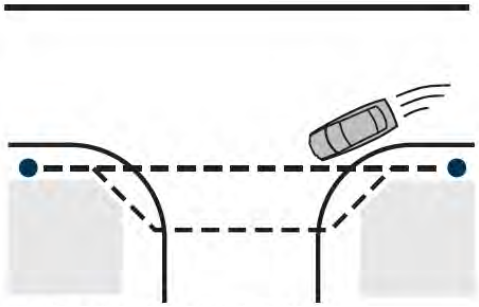
- increases pedestrian safety by shortening crossing distances
- increases pedestrian visibility
- decreases vehicle turning speed

The length of crossings should be minimised by keeping side street carriageways as narrow as possible (4.5m-6m desirable at entry points to local streets).

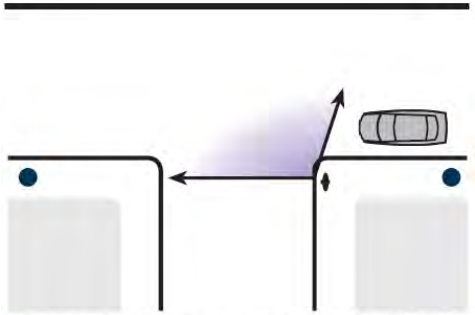
Effect of corner radii on pedestrians



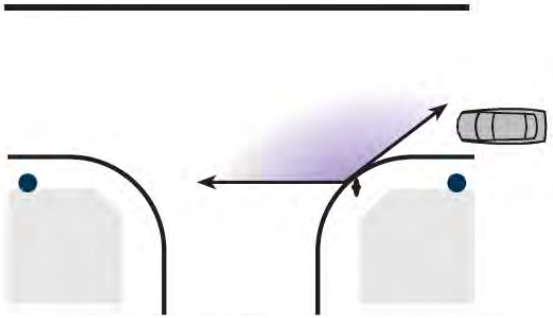
- Pedestrian desire line is maintained
- Vehicles turn slowly (10-15 mph)



- Pedestrian desire line deflected
- Detour required to minimise crossing distance
- Vehicles turn faster (20-30 mph)



- Pedestrians do not have to look further behind to check for turning vehicles
- Pedestrian can easily establish priority against slow moving vehicles



- Pedestrians must look further behind to check for fast turning vehicles
- Pedestrian cannot normally establish priority against fast turning vehicles

All images: Designing Streets, 2010

Large vehicles will generally not be frequent users of local side streets, and only used as the control vehicle to assess the risk(s) associated with their infrequent use of the full width of the carriageway to turn and of corner overrun.

The designer should adopt the most pedestrian friendly design unless there is a compelling reason to deviate from this.

Further guidance:

Designing Streets

Manual for Streets (1)

Relevant Factsheets:

Pedestrian Desire Lines (P2)

Crossings at or Near Junctions (G5)

Carriageway Widths (G2)

Street Furniture (F1)

Priority Junctions (P7)

Corner Radii - 2

Maximum corner radii

The table below sets out the maximum and desired corner radii for different street types.

The following factors need to be considered to achieve a balance between the needs of pedestrians and cyclists, and the ability to make vehicular manoeuvres:

- Volume of pedestrians, cyclists and motor vehicles and
- Width of major and minor roads

Use of full carriageway width

Use of the full carriageway width to turn will be appropriate in all local and, in most cases, secondary streets where:

- speed limits are 30mph or less;
- vehicle flows on the main street are moderate; and/or
- large vehicles are expected to make turns infrequently (e.g. for refuse vehicle collections and domestic deliveries only).

Overrun of corners

When constructing junctions on strategic/secondary streets, it may be appropriate to provide over-run areas to cater for occasional large vehicles, whilst retaining a tight radius (e.g. 3m) for cars. Footway corners should be strengthened to allow overrun of larger vehicles.

Where a medium-high frequency of large turning vehicle movements is anticipated, consider the placement of street furniture to reduce the likelihood of vehicle overrun on the footway; ensuring that adequate visibility at the junction is maintained. These measures can be combined with raising the junction.

Vehicle tracking

When determining corner radii, allowing the use of the full carriageway width to turn and strengthened footway surface area, the following control vehicle types will be tracked:

- Emergency vehicles for all streets
- Refuse vehicles for all local streets
- 12m bus for secondary streets and 15m bus for strategic retail streets
- 16.5m articulated HGV for all strategic streets.
- Ensure sufficient corner radii on 'abnormal load routes'.

Maximum corner radii (desirable in brackets)

<table>
<tr><th colspan="2">Minor Street</th><th colspan="7">Strategic</th><th colspan="7">Secondary</th><th colspan="7">Local</th></tr>
<tr><th colspan="2">Place Type</th><th>R/NF</th><th>IE</th><th>LDR</th><th>MDR</th><th>HDR</th><th>SSE</th><th>R/HS</th><th>R/NF</th><th>IE</th><th>LDR</th><th>MDR</th><th>HDR</th><th>SSE</th><th>R/HS</th><th>R/NF</th><th>IE</th><th>LDR</th><th>MDR</th><th>HDR</th><th>SSE</th><th>R/HS</th></tr>
<tr><td rowspan="3">Major Street Type</td><td>Strategic</td><td colspan="2">9</td><td>6</td><td colspan="4">6 (3)</td><td rowspan="2">9</td><td rowspan="2">9(6)</td><td rowspan="2">6(3)</td><td colspan="4" rowspan="2">6 (3)</td><td colspan="2" rowspan="2">9(6)</td><td rowspan="3">6(3)</td><td colspan="4" rowspan="3">3(1)</td></tr>
<tr><td>Secondary</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Local</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="2">9(3)</td></tr>
</table>

Key:
R/NF – Rural Road / No Frontage
IE – Industrial Employment
LDR – Low Density Residential
MDR – Medium Density Residential
HDR – High Density Residential
SSE – Service Sector Employment
R/HS – Retail / High Street

Relevant Factsheets:
Pedestrian Desire Lines (P2)
Crossings at or Near Junctions (G5)
Carriageway Widths (G2)
Street Furniture (F1)
Priority Junctions (P7)

Visibility

Reducing forward visibility for lower speeds

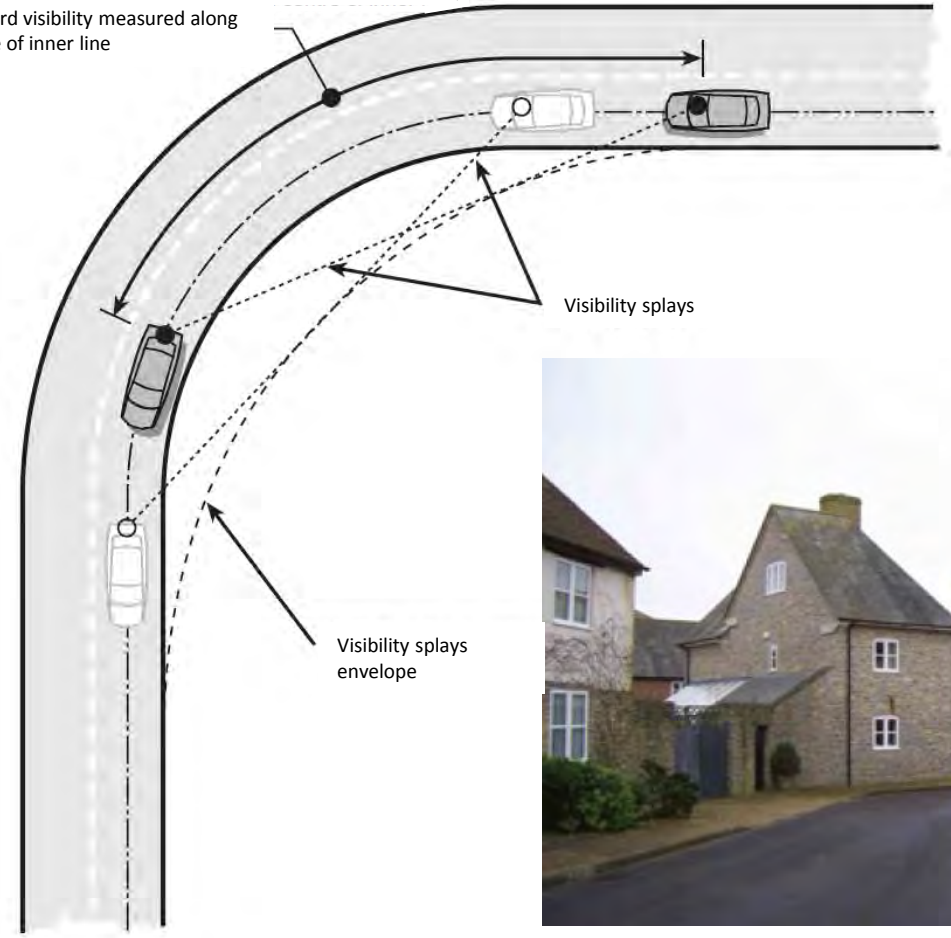
Where the speed limit is 20mph it is desirable to reasonably restrict forward visibility to control traffic speed without the need for use of physical traffic calming measures.

The minimum forward visibility, i.e. the distance a driver needs to see ahead to stop safely for obstructions in the street, is equal to the minimum Stopping Sight Distance (SSD) shown overleaf.

In 20mph streets it will be acceptable for SSDs to be below 25/22m.

It is checked by measuring between points on a curve along the centreline of the inner traffic lane.

Consideration should be given to vertical geometry and any other obstructions.



All images: Designing Streets, 2010

Further guidance:
Designing Streets
Manual for Streets (1)

Relevant Factsheets:
Pedestrian Desire Lines (P2)
Crossings at or Near Junctions (G5)
Carriageway Widths (G2)
Street Furniture (F1)
Priority Junctions (P7)

Reducing Visibility at Junctions

Research carried out for *Manual for Streets 2* has found no evidence that reducing visibility at junctions (between vehicles on the major and minor arms) will result in an increased risk of injury or collisions.

Research into cycle safety at T-junctions found higher cycle collision rates are associated with greater visibility.

The absence of wide visibility splays will encourage vehicles to emerge cautiously.

Further guidance:

- Designing Streets
- Manual for Streets (1)

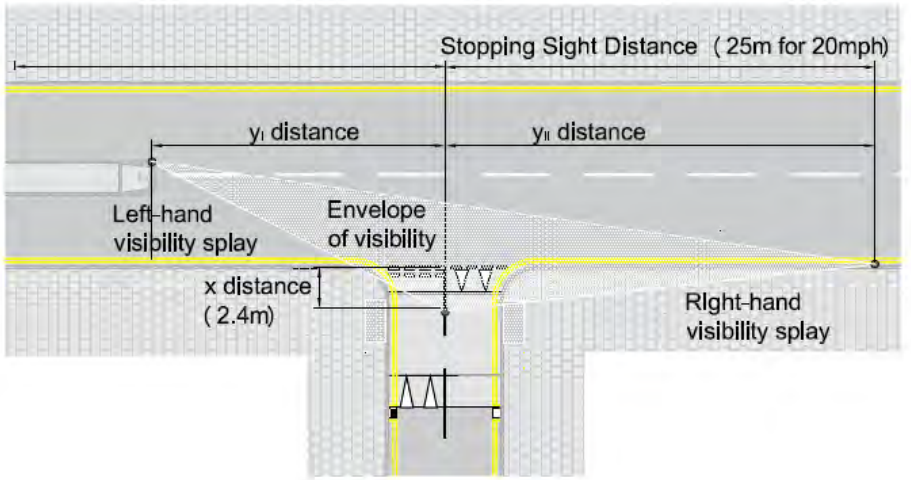
X distance

(Measured from Give Way line along minor street)

- Desirable: 2.4m in most streets
- Maximum: 4.5m because longer X distance enables drivers to look for gaps on approach to the junction which may increase capacity, but also increases the possibility that drivers fail to take into account pedestrians and cyclists.
- Minimum: 2m can be used in 20mph streets with low traffic flows, but using this value will mean that the front of vehicles slightly overhangs the major street

Y distance

- This is usually based on recommended SSD (Stopping Sight Distance) values. Based on the research carried out, a reduction in visibility below recommendations will not lead to significant issues.



Source: Transport for London: London Cycling Design Standards, 2016

Stopping Sight Distances (SSD)												
Speed	Km per hour	16	20	24	25	30	32	40	45	48	50	60
	Miles per hour	10	12	15	16	19	20	25	28	30	31	37
SSD	Meters	9	12	15	16	20	22	31	36	40	43	56
	Adjusted for bonnet length	11	14	17	18	23	25	33	39	43	45	59

Subject to local conditions, where the combined proportion of HGV's and buses is greater than 5% of the traffic flow, SSD should be reviewed in line with the recommendations of paragraphs 10.1.6 to 10.1.13 of Manual for Streets 2. The Y distances stated are based on moderate gradients. Where streets are steeper (i.e.> 5%), reference should be made to the calculation in paragraph 10.1.5 of MfS2

Relevant Factsheets:
Pedestrian Desire Lines (P2)
Crossings at or Near Junctions (G5)
Carriageway Widths (G2)
Street Furniture (F1)
Priority Junctions (P7)

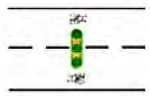
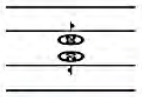
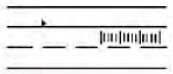
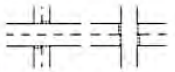
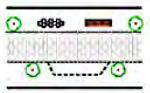
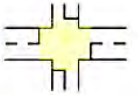
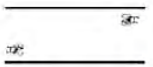
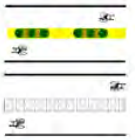
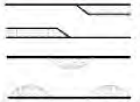
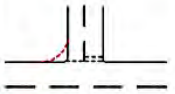
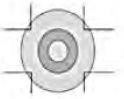
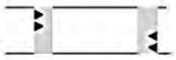
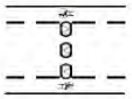
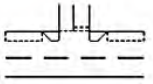
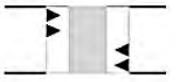
Traffic Management Measures

A wide variety of measures can be introduced to deliver better places and safer streets for everyone.

When designing streets, consideration should be given to introducing measures and features that have a dual function and positively contribute to a space to make it look and feel like a reduced-speed environment. In many cases, conventional traffic calming measures will remain appropriate.

The table identifies strategies and types of design interventions aimed at speed reduction and place enhancement that can result in traffic calming, both on links and at junctions:

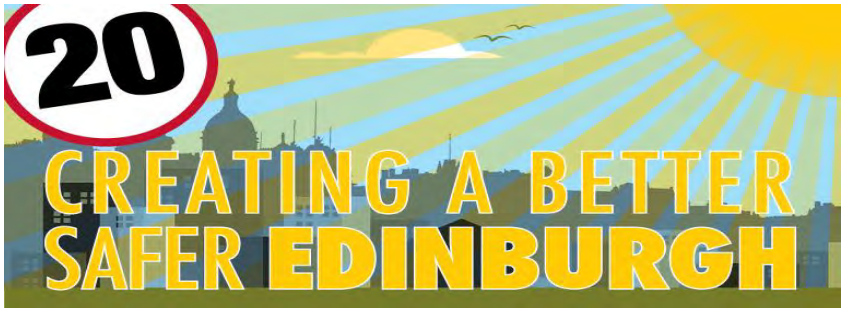
Overview

Area-wide traffic management – on links					**– at junctions**	
Filtered permeability 	Speed limits 	Speed cameras 	Emphasise place over movement 		Change in priority 	Signalise 
Calming through street design – on links					**– at junctions**	
Formal / informal crossings 	Streetcape enhancements 	Rebalance priorities 	Objects, eg parking 	Street trees/ planting 	Street art 	Change in materials/colour 
Centre line removal 	Apparent lane narrowing 	Median strip 	Modal filter with cycle bypass 	Lane deflecton / chicane 	Tighten geometry 	Implied roundabout 
Physical traffic calming – on links					**– at junctions**	
Sinusoidal speed humps 	Raised table (sinusoidal profile) 	Cushions (cycle-friendly gaps) 	Footway build-outs 		Entry treatment 	Raised table (sinusoidal) 

Source: Transport for London: London Cycling Design Standards, 2016

Relevant Factsheets:
Street Trees (F5)
Omitting Centrelines (G3)
Priority Junctions (G7)
Corner Radii and Visibility (G6)
Crossings (G4)

Designing for 20mph



The City of Edinburgh Council

By April 2018 approximately 80% of the urban road network in Edinburgh will comprise of 20mph speed limit zones with the remaining strategic roads having a maximum of 30 or 40mph.

Click here for more information about 20mph for Edinburgh

20mph roundel on Waverley Bridge, Edinburgh

The City of Edinburgh Council

Existing streets in 20mph zones

When undertaking medium to large scale capital schemes on existing streets, designers should review street layout and geometry and existing speed reduction measures with a view to ensuring that the new street layout helps reduce speeds.

Signing for 20mph zones

In order to create a 20 mph zone, it is a legal requirement that "measures" are installed to ensure that low speeds are maintained throughout. Such measures now include 20 roundels and repeater signs.

Design speed on new streets

All new streets should have a design speed of 20 mph with the exception of:

- streets on strategic public transport corridors which may be designed for 30 mph; and
- streets with no or few frontages which may be designed for 30 mph or higher speeds.

Developers will be asked to contribute a fee to promote a suitable order to introduce a 20pmh speed limit zone within the development and subsequently install all necessary signs/markings/traffic calming features as required at no cost to the Council. Contact the Development Management Team for details.

Further guidance:

Designing Streets

Manual for Streets (1)

Some of the key design aspects of 20mph streets include:

- tight corner radii (e.g. 1m for residential local streets);
- narrow carriageway widths (through widening footways or constructing segregated cycle lanes/tracks etc.);
- varied carriageway widths (through on-street parking, build-outs, refuge islands etc.);
- normally omitting centre line on street that has only one general traffic lane in either direction;
- reduced forward visibility;
- street structure e.g. short lengths of streets between junctions;
- changes in priorities at junctions
- surface materials (e.g. setts)
- street furniture and soft landscaping (e.g. tree lined streets);
- high pedestrian activity and bringing building line closer to footway edge;
- road humps, speed tables and speed cushions; and
- 20mph signs and road markings (e.g. "20" roundels, false humps).

Relevant Factsheets:

Omitting Centrelines (G3)
Carriageway Widths (G2)
Street Furniture Layout (F1)
Setted Streets (M6)
Corner Radii and Visibility (G6)
Street Trees (F5)

Street Furniture and Landscaping in Speed and Traffic Management

Consideration should be given to the use of alternative means to design out street clutter and promote pedestrian priority by using street furniture and soft landscape for traffic management. These are especially likely to be appropriate in new developments but should be considered in comprehensive renewals projects or when a new traffic calming scheme is being considered.

	Speed Reduction / Control	Access Control	Transition Points	Protection/Buffer
Traditional approach	• Speed bumps • Build-outs • Raised tables • Chicanes • Median Strips • Signage	• Barriers • Bollards • Signage	• Bollards • Kerbs • Signage	• Corduroy • Bollards • Barriers • Guardrails
Alternative Approach	• Vertical elements (trees, lampposts, etc.) to increase speed Perception • Physical/Visual Narrowing • Edge Friction • Transition Points	• Transition Points • In-situ planters • Street Trees • Lighting Columns • Cycle Parking • Benches	• Street trees • Physical/Visual Narrowing • Signs/gateway features	• In-situ planters • Street trees • Lighting columns • Green verge • Benches • SUDS features/Swales

Speed Perception with vertical elements

Sustrans, 2014

Access Control with street furniture

The Scottish Government, 2010

Transition points at road entry

Mike Biddulph, 2016

Street trees in a green verge

City of Edinburgh Council

Relevant Factsheets:

Street Furniture Layout (F1)
Street Trees (F5)
Seating (F2)
Sustainable Urban Drainage Systems(W1)

Vertical Traffic Calming

In many situations complete street re-design will not be an affordable way to deliver speed reduction. However there are a number of traffic calming measures available that reduce speeds and/or encourage walking and cycling.

If other forms of traffic calming are not deemed adequate to bring down traffic speeds, provide the following forms of road humps:

- raised entry treatments locally at side roads
- raised tables and/or continuous footways across the full extent of a junction or crossing areas to encourage motorists to make careful turning movements and improve safety for cyclists and pedestrians.

General Considerations:

Use materials that have a visual contrast with the carriageway surface to create spatial awareness.

Use build-outs to narrow pedestrian crossings where suitable.

Note that road humps should not be used under or over bridge structures.

The following vertical deflection types should not be used due to adverse effects on cyclists:

- Rumble-strips.
- Humps with vertical upstands or steep ramps.
- Ramps with uneven or slippery surfaces.

Entry Treatment with Asphalt Table

Raised Table at Junction

Type of Flat-topped Hump to be Avoided

Cycle-friendly Speed Cushions

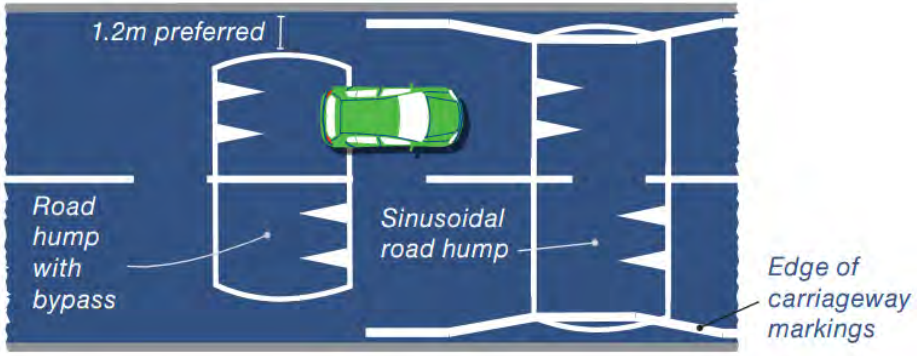
All images: Transport for London: London Cycling Design Standards, 2016

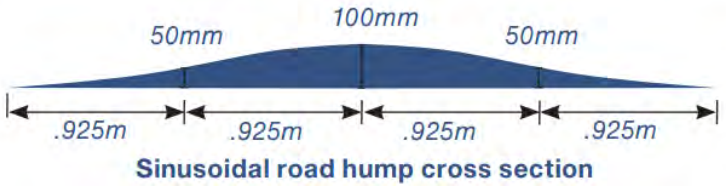
Relevant Factsheets:
Priority Junctions (G7)
Crossings (G4)

Speed Humps and Cushions

Sinusoidal road humps

Where cyclists are expected to travel over a vertical feature, a sinusoidal hump should be used. These are more comfortable and allow cyclists to maintain speed.

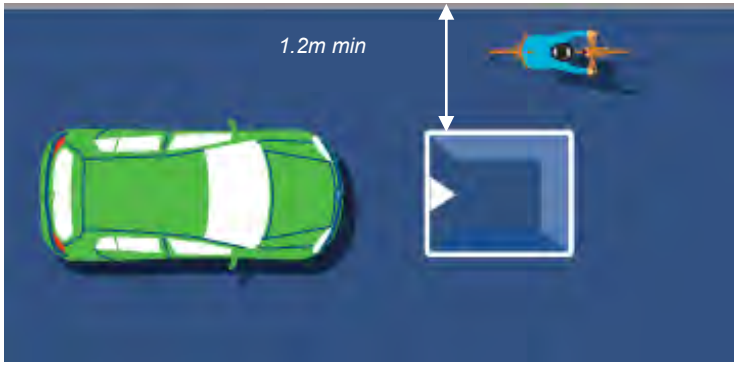




Sinusoidal road hump cross section

Speed cushions

Humps should not be used on routes used by emergency vehicles. Speed cushions are an alternative, but adequate gaps for cyclists should be provided. This should include 1.2m-1.5m between kerb and feature or at least a 1.5m gap between parked vehicles and feature in streets where the kerbside is generally occupied by parked cars.



Sustrans Handbook for Cycle Friendly Design (draft), 2014

Relevant Factsheets:

Cycle Friendly Traffic Management

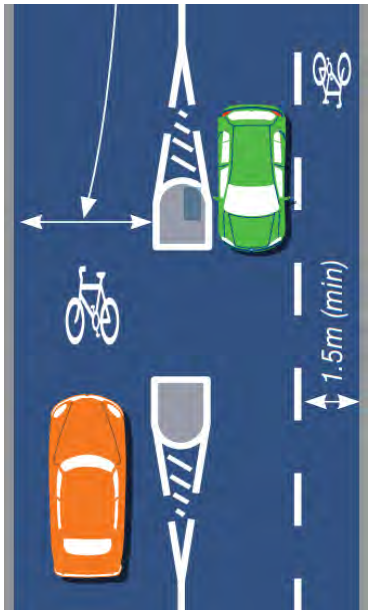
Horizontal features

Refuges, narrowings and chicanes reduce the available space for vehicles thereby reducing speeds. However cyclists should not be disadvantaged by creating uncomfortable narrow passing places.

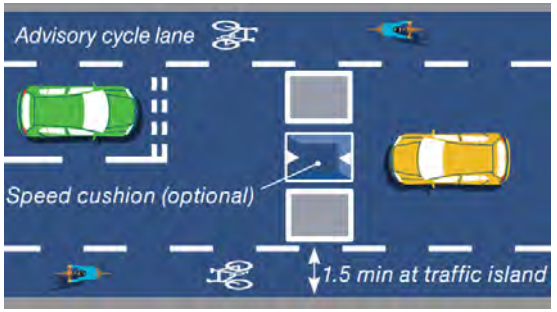
General considerations:

- Cycle facility should be continued past the refuge/narrowing.
- If carriageway widths are not sufficient, consider removal of the horizontal features and potentially replacements with alternatives (e.g. zebra crossings).
- Mandatory cycle lanes should be the default provision where feasible.
- Cyclists should not have to merge abruptly with traffic after the horizontal feature.
- Specific thought should be given to how segregated cycle lanes (hard or soft) are integrated with the traffic management. Route continuity and if possible, infrastructure type should be retained for the cyclist past the refuge / narrowing.

Recommended width depends on speed, but avoid gaps of 3.1-3.9m. Where pinch point can not be removed consider cycle symbol centrally



Sustrans Handbook for Cycle Friendly Design (draft), 2014



Sustrans Handbook for Cycle Friendly Design (draft), 2014

Cycle Bypass, Boswall Parkway, Edinburgh

The City of Edinburgh Council

Cycle bypass

- Preferred minimum cycle lane width of 1.75m (1.5m absolute min) should be maintained.
- Transition to and from the bypass should be considered.
- Adequate drainage should be provided - gully grating hazards or raises to footway that create debris-traps should be avoided.
- Mechanical sweeping should be allowed for.
- Bypasses should be protected from parking or loading.

Lane widths at pinch points with no cycle bypass

Speed limit	Lane width (m)	
	<5% HGV	>5% HGV
20mph	2.5m max	3.0m max
30mph	4.0m min(1)	4.0m min(2)

[1] 3.0m if frequent traffic calming measures along route

[2] Increase to 4.5m where 85%ile speeds exceed 30mph

Relevant Factsheets:

Cycle Lanes (C2)
Crossings (G4)
Soft Segregation: Integration with Crossings (C3)
Hard Segregation: Integration with Crossings (C4)

Image References

Speed Reduction and Traffic Management

Overview 1

Soft Landscaping: Designing Streets, 2010 [ONLINE]. Available at: http://www.gov.scot/resource/doc/307126/0096540.pdf [Accessed 1 February 2017]

Pedestrian Priority: Sustrans Design Manual Chapter 7, 2010 [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/images/files/Route-Design-Resources/Junctions_and_Crossings_06_02_15.pdf [Accessed 1 February 2017]

Short lengths of streets between junctions: Google Maps [ONLINE]. Available at: https://goo.gl/maps/PHqfzbVYBZw [Accessed 21 December 2016

Overview 2

Reduced Visibility: Designing Streets, 2010 [ONLINE]. Available at: http://www.gov.scot/resource/doc/307126/0096540.pdf [Accessed 1 February 2017]

Visual Narrowing: Sustrans Handbook for Cycle Friendly Design (draft) (2014) [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/file_content_type/sustrans_handbook_for_cycle-friendly_design_11_04_14.pdf [Accessed 1 November 2016].

Contrasting Materials: Atkins 2016

Corner Radii -1

All images/diagrams: Designing Streets, 2010 [ONLINE]. Available at: http://www.gov.scot/resource/doc/307126/0096540.pdf [Accessed 1 February 2017]

Visibility

All images/diagrams: Designing Streets, 2010 [ONLINE]. Available at: http://www.gov.scot/resource/doc/307126/0096540.pdf [Accessed 1 February 2017]

Reducing Visibility at Junction

Visibility envelope: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: http://content.tfl.gov.uk/lcds-chapter5-junctionsandcrossings.pdf [Accessed 14 February 2017]

Traffic Management Measures

Overview: Transport for London: London Cycling Design Standards 2016 [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit [Accessed 14 February 2017]

Designing for 20mph

All images: City of Edinburgh Council

Street Furniture and Landscaping in Speed and Traffic Management

Speed Perception: Sustrans , (2014), Traffic Calming using Trees, Bristol [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/file_content_type/sustrans_handbook_for_cycle-friendly_design_11_04_14.pdf [Accessed 1 November 2016].

Access Control: The Scottish Government , (2010), Visual Narrowing to minimise vehicle speeds [ONLINE]. Available at: http://www.gov.scot/resource/doc/307126/0096540.pdf [Accessed 1 November 2016].

Transition Points: Mike Biddulph, (2016), Southville (Milford Street) [ONLINE]. Available at: http://www.rudi.net/node/22035 [Accessed 1 November 2016].

Edge Friction: City of Edinburgh Council

Vertical Traffic Calming

All images: Transport for London: London Cycling Design Standards (2016) [ONLINE]. Available at: https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit#on-this-page-2 [Accessed 1 November 2016].

Speed Humps and Cushions

All images: Handbook for Cycle Friendly Design (draft) (2014) [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/file_content_type/sustrans_handbook_for_cycle-friendly_design_11_04_14.pdf

Cycle Friendly Traffic Calming

All diagrams: Sustrans Handbook for Cycle Friendly Design (draft) (2014) [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/file_content_type/sustrans_handbook_for_cycle-friendly_design_11_04_14.pdf [Accessed 1 November 2016].

Cycle Bypass: City of Edinburgh Council

Index

G7– Priority Junctions – Side Street Crossings

Amendments:

Priority Junctions

Priority arrangements are put in place at most crossroads and T-junctions where traffic signals are not required. Vehicle priority is given to traffic moving along the major road with the use of Give Way or Stop Lines and signs.

Design principles

- Locate crossings on pedestrian desire lines.
- Minimise corner radii to reduce vehicle turning speeds.
- Minimise street clutter (note that there is a presumption against the use of guardrails).
- Consider continuous footway, raised table or build-outs to increase pedestrian priority.
- Consider retaining original road features (kerb lines and particularly surface materials where practicable) in the World Heritage Site and Conservation Areas as long as they support other design principles and the Council's commitment to pedestrian and cycle priority (see Page 11).

Crossing width

Crossing widths should safely and comfortably accommodate the observed/expected pedestrian flows on footways.

- Normal minimum: full width of footway.

Carriageway design

- For new minor streets, provide a one-lane approach to the junction as standard.
- Provide a right turn lane only if motor vehicle flow on the minor street is anticipated to be high and traffic modeling identifies issues of congestion.
- Build-outs may be used to reduce the overall crossing distance over side roads (should be considered for carriageways with clear width >6.5m).

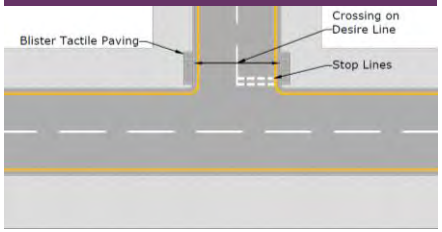
Cycling provision

- Continue cycling facilities across the side road and integrate with side road provision in accordance with cycling design standards.

Drainage

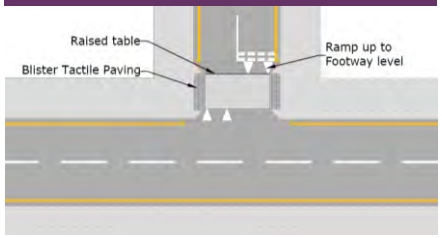
- Use CCTV drainage surveys to determine drainage design where extensive changes are planned.
- Relocate existing gullies if required to avoid having drains on crossings.

Crossing on desire lines



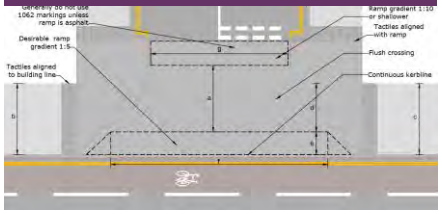
DWG Ref: CF-DR-C-0020

Raised table with build-out



DWG Ref: CF-DR-C-0021

Continuous footway



DWG Ref: CF-DR-C-0011

Relevant Factsheets:

Crossings at or near junctions (G5)
Minimising Street Clutter (P7)
Pedestrian Desire Lines (P2)
Cycle Lanes – Integration with Side Roads (C2)
Speed Reduction &Traffic Management (G6)
Corner Radii (G6)
Drainage (W2)

Side Street Crossing Types

Types

- Continuous footways and raised tables are the preferred option as they provide a high level of priority for pedestrians; Where these are not used (for example for cost reasons), kerbs should always be dropped on the direct pedestrian desire line. (ie not requiring deviation into side street)
- Standard dropped kerbs will be used in many locations when pedestrian flow is lower – reducing corner radii should always be considered.
- Build-outs should be considered to reduce carriageway widths and pedestrian crossing distances; and
- Refuge islands should be considered to reduce pedestrian crossing distance where build-outs are not suitable. They should be provided on busy roads where the carriageway is in excess of 10m wide and two-stage crossing is required. Keep left signs or lighting on the island may be omitted (TSRGD, 2016).

See Pages 3 and 4 for a table and decision trees providing guidance on the use of different crossing types.

Continuous footway, Leith Walk

City of Edinburgh Council

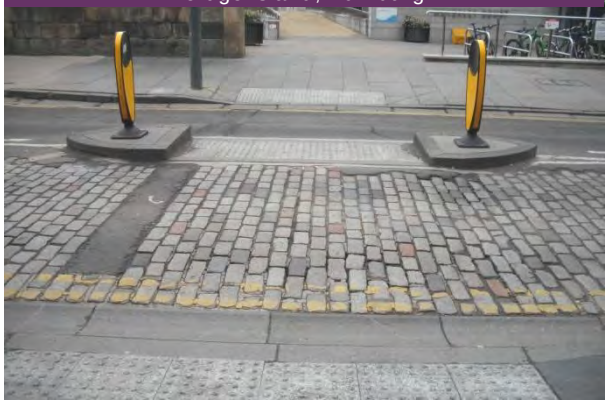
Build-out, Stafford Street, Edinburgh

Google Maps, 2017

Raised tables

Google Maps, 2017

Refuge island, Edinburgh



The City of Edinburgh Council

Relevant Factsheets:

Crossings at or near junctions (G5)
Speed Reduction & Traffic Management (G6)
Refuge Islands (G4)
Crossings (G4)
Corner Radii (G6)

Crossing Types Guidance

The tables on this page provide guidance as to the crossing type to be used in different situations. However it must be noted that at the busiest junctions, signals may be employed to control traffic and/or provide crossing opportunities.

Major Street		Strategic or Secondary (30mph)							Strategic or Secondary (20mph)							Local						
Place Type		R/NF	IE	LDR	MDR	HDR	SSE	R/HS	R/NF	IE	LDR	MDR	HDR	SSE	R/HS	R/NF	IE	LDR	MDR	HDR	SSE	R/HS
Minor Street	Strategic	1	1	1	1	2	2	2	1	1	1	1	2	2	2							
	Secondary	1	1	1	1	2	2	2	1	1	1	1	2	2	2							
	Local	3	3	4	4	4	5	5	3	3	4	4	5	5	5	3	3	4	4	4	4	5

Key:
R/NF – Rural Road / No Frontage
IE – Industrial Employment
LDR – Low Density Residential
MDR – Medium Density Residential
HDR – High Density Residential
SSE – Service Sector Employment
R/HS – Retail / High Street

Ref.	Suggested side Road Crossing Type
1	Dropped crossing but consider the need for build-outs or refuge islands.
2	Normally dropped crossing but consider raising the entire junction.
3	Normally dropped crossing but consider raised entry treatment for higher use footways/cycle routes.
4	See side road decision tree A.
5	See side road decision tree B.

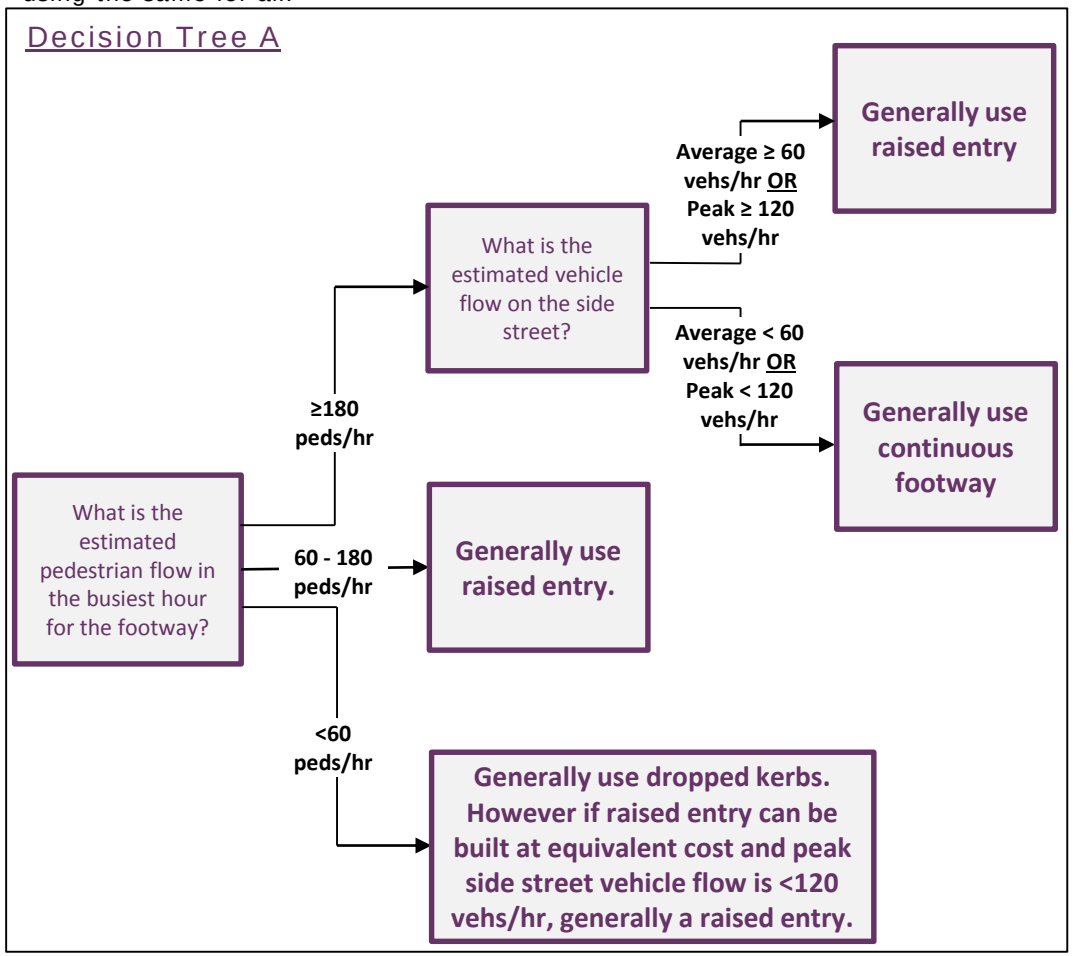
Relevant Factsheets:
Crossings at or near junctions (G5)
Speed Reduction & Traffic Management (G6)
Refuge Islands (G4)
Crossings (G4)
Corner Radii (G6)

Crossing Types Guidance – Decision Trees

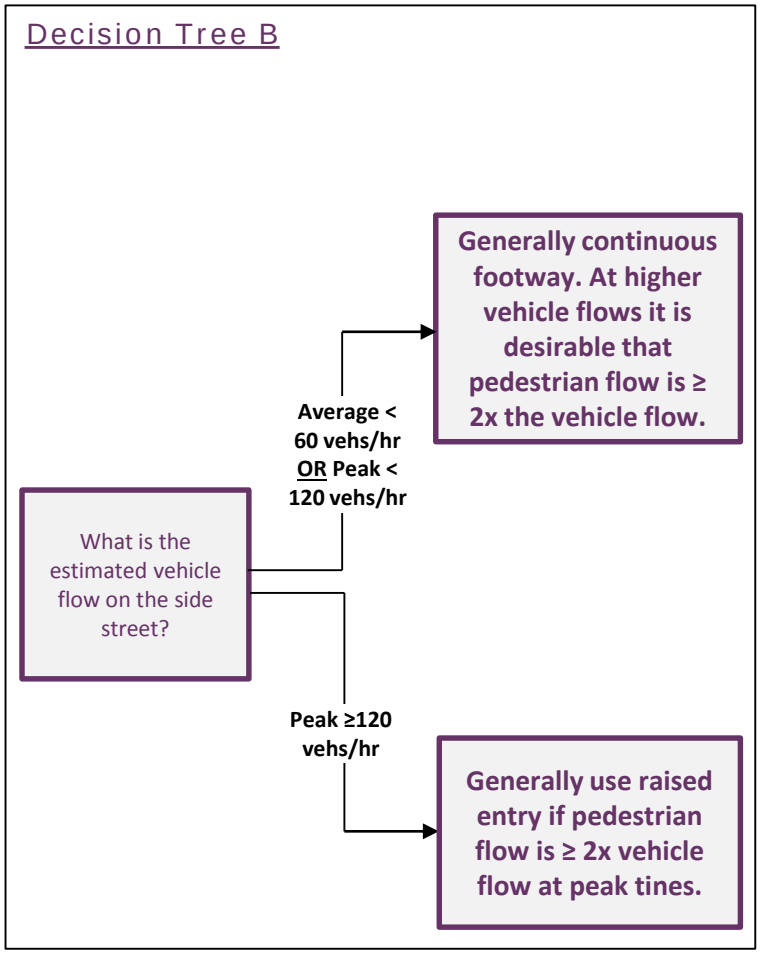
Consistent Treatments of Side Streets

Use these decision trees for guidance on crossing types, but when dealing with two or more side roads, there should be a presumption in favour of using the same for all.

Decision Tree A



Decision Tree B



Relevant Factsheets:

Crossings at or near junctions (G5)
Speed Reduction & Traffic Management (G6)
Refuge Islands (G4)
Crossings (G4)
Corner Radii (G6)

Uncontrolled Drop Kerb Crossings

These basic crossings aid people crossing the road by dropping the kerb or raising the carriageway to help make crossing the road easier for everyone.

Typical locations

- At road junctions to help pedestrians cross the side street to continue their journey.
- At strategic points on a busy street where there is no need for a controlled crossing such as a zebra or puffin.
- Crossings should always be on pedestrian desire lines, see factsheet G4 for further details.

Waiting / loading restrictions

- Double yellow lines or white bar markings can be used across a crossing point to help avoid parking along a dropped kerb crossing.
- They should always be used in situations where parking appears to be likely.

Selection

Uncontrolled drop kerb crossings are most likely to be appropriate for locations where there is a short crossing distance and relatively low levels of pedestrian and/or motor traffic. Factsheet G4 provides more detail on the crossing selection process and the factors that must be considered.

Details

Factsheet G4 provides more information about the detailing of uncontrolled dropped kerb crossings. However in general:

- Tactile paving must be used at all crossing points in a contrasting grey colour.
- They must be situated on pedestrian desire lines.
- The should have a width of not less than 1.8m.

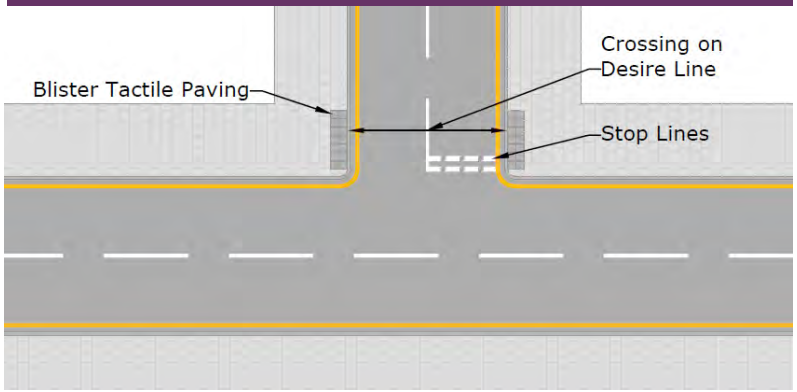
Uncontrolled dropped kerb crossing on build out, Bruntsfield

The City of Edinburgh Council

Uncontrolled dropped kerb crossing, Kirkliston

The City of Edinburgh Council

Uncontrolled dropped kerb crossing with tactile paving – Note: Crossing should remain on desire line even when this means putting the tactile paving on the radius.



DWG Ref: CF-DR-C-0020

Relevant Factsheets:

Crossings at or near junctions (G5)
Minimising Street Clutter (P7)
Pedestrian Desire Lines (P2)
Cycle Lanes – Integration with Side Roads (C2)
Speed Reduction &Traffic Management (G6)
Crossings (G4)
Corner Radii (G6)
Drainage (W2)

Raised tables

Raised tables are used to give increased pedestrian priority at side road crossings- though they retain a clear carriageway and as such do not send such a strong signal of pedestrian priority as a continuous footway.

- Likely to be more suitable than a continuous footway where side road traffic is medium to high (i.e. over approx. 60 average, 120 peak vehicles per hour).
- The ramp approach from the major street should be as steep as possible to slow turning vehicles and maintain pedestrian desire lines; typically 1:5 to 1:10 gradient (1:20 on bus routes).
- Where existing kerb height is >75mm, carriageway or footway heights should be adjusted, generally aiming for the side road entry not exceeding a 75mm rise above carriageway level. This is to enable a steep ramp with minimal grounding risk.

Build-outs

- Build-outs may be introduced on existing side roads or as part of new minor street layouts, to reduce carriageway widths and pedestrian crossing distances. Where appropriate they may be used to accommodate street furniture and/or tree planting.
- Build-outs should be considered for streets where new traffic management arrangements (such as one-way working) are to be employed, on-street parking is to be introduced, or where a pedestrian safety issue has been identified.
- Build-outs are composed of the same surface material as the adjacent footway, drainage channels are detailed accordingly.

Note
In the World Heritage Site (WHS), for obvious reasons it is important that original features are retained and that development is particularly sympathetic to the surroundings. Therefore where there are historic kerb lines in the WHS, these should be retained.

A raised table side road entry treatment in London

TfL Streetscape Guidance, 2015

A side road build out on Lorne Street/Leith Walk, Edinburgh

Google Maps, 2017

Continuous Footways

A continuous footway surface should be considered across minor side street junctions, particularly where there are medium or high pedestrian flows and low vehicle flows on the side street.

Continuous footways have considerable potential to improve conditions for pedestrians. As such they are particularly appropriate in streets such as:

- Retail / High Street
- Service Sector Employment
- High Density Residential
- Other streets with a high pedestrian flow

It is likely to be helpful (e.g. for driver and pedestrian understanding) if a series of side roads on the same street all have a similar continuous footway treatment.

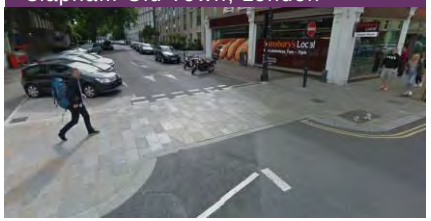
The table on page 3 indicates where continuous footways should be considered in Edinburgh.

Guidance on flows for continuous footways:

- Generally the minor street will be a local route with low levels of traffic (particularly HGVs) – average flow of approx 60 per hour or less (peak 120 per hour).
- Generally the major street will have medium or high pedestrian flows (likely in excess of 180 pedestrians/ peak hour), or otherwise be important for pedestrians.

Continuous footways are treated as road humps and should be designed such that they comply with The Road Humps (Scotland) Regulations 1998 and The Road Humps and Traffic Calming (Scotland) Amendment Regulations 1999.

Clapham Old Town, London



Google Maps

Clapham Old Town, London

Jacobs

Legal Status

Despite their resemblance to a point closure, continuous footways should be considered part of the public carriageway and therefore Rule 170 of the Highway Code applies: pedestrians only have priority over vehicles once they have stepped onto the crossing.

Note that the design of crossings with no kerb upstand or tactile paving, means that pedestrians, particularly children or those with visual impairments will assume priority and may not notice the side road. The layout therefore places the onus on the motorist to take care when approaching the junction. For this reason, continuous footways are most appropriate where both the major street and minor street are designated as 20mph. If the main road has a 30mph speed limit they may also be considered on a case by case basis.

Relevant Factsheets:
Crossings (G4)
Hard Segregation – Integration with Side Roads (C4)
Cycle Lanes – Integration with Side Roads (C2)
Soft Segregation – Integration with Side Roads (C3)

Continuous Footways: Layout and Ramp Gradients

Appropriate side road clear carriageway width for continuous footway implementation:

- Min 3.50m one-way, to allow contra-flow cycling
- Min 4.5m – (desirable Max 6.5m) two-way. Note: continuous footways are likely to be less effective in delivering assumed pedestrian priority where the crossing area is wide.

Road Safety Audits and Equality Impact Rights Assessments are standard requirements.

In the World Heritage site consideration should be given to indicating the historic kerb line, most likely by retaining a kerb embedded in the new continuous footway feature.

Tactile Paving

There is a presumption in favour of the use of tactile paving at continuous footway crossings. However, where the two way traffic flow is less than 20 veh./hr and the carriageway width over the ramp is less than 5m, tactile paving can be omitted.

Two design approaches (for further information, see the Design Details Options factsheets on the following pages) can be considered depending on the setting:

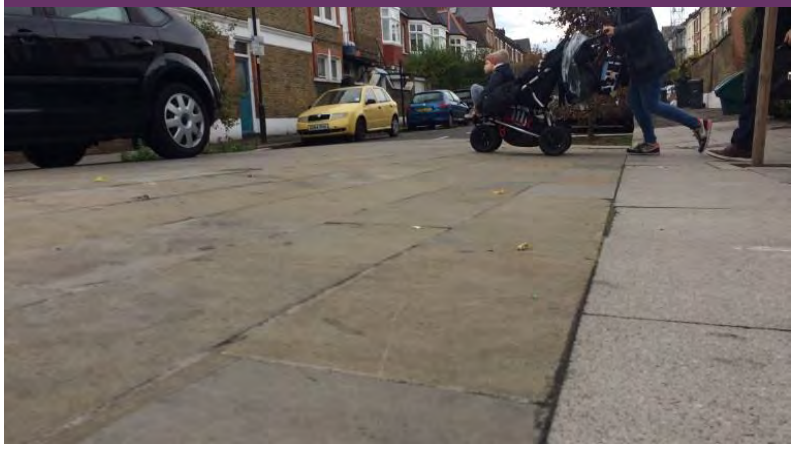
1. Continuous footway with ramped approach on both sides
2. Continuous kerbline and no ramp on the major street side

The ramp approach from the major street should be as steep as possible to:

- Slow down turning vehicles
- Ensure adequate footway clear width on crossing width.
- Maintain the pedestrian desire line

A steep ramp of around 1:5 is desirable. However care should be taken to minimise the risk of vehicle grounding.

Clapham Old Town: 300x600 Yorkstone slabs used for carriageway areas. However the contrast in tone between the two areas is undesirable.



The City of Edinburgh Council

Steep ramp gradients are inappropriate where they are likely to be used by buses. In this case the gradient should be approx. 5.5% (i.e. 1.8m for a 100mm ramp, 1.35m for a 75mm ramp).

Signs and Markings

- Give Way road markings to be provided as per design detail drawings.
- However these may be omitted altogether on streets with very low traffic volumes.
- Where vehicle count exceeds 60/hour or significant numbers of large vehicles are expected markings may be included on both ramps.
- There is generally a presumption against the use of bollards to delineate the crossing. Street furniture may be considered on wider streets to provide some delineation.

Relevant Factsheets:

Crossings at or near junctions (G5)
Block Paving (M3)
Footway Materials & Surfacing (M1)
Design Details: Option 1 (G7)
Asphalt Footway (M2)
Design Details: Option 2 (G7)

Design Details : Layout Option 1

Continuous footway with ramped approach on both sides

- Suitable for two-way or one-way side streets.

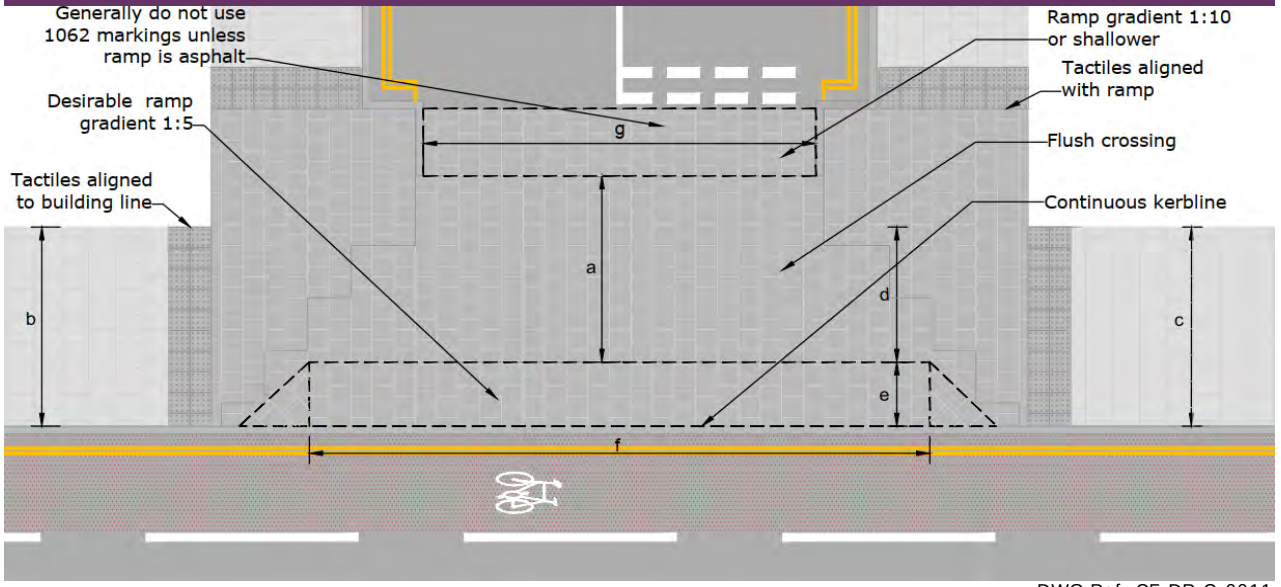
Crossing width (a)

- The width over the continuous footway (a) should not be less than the width of the approaching footways (whichever is the greater of b or c)
- The ramp approach from the major street should maximise dimension (d) – i.e. the width of the continuous footway walking surface measured forwards from the building or wall line, and minimise dimension (e). To reduce the speed of turning vehicles the ramp should be as steep as possible (1:5 is desirable). This gradient may need to be varied to avoid grounding issues.

Ramp widths

- Width (g) should generally be 4.5m to 6.5m with appropriate build-outs to achieve this. Where it is less than 5m and two-way vehicle flow is <20 p/h, tactile paving can be omitted.
- Width (f) should generally be 2-4m greater than width (g) to allow for vehicle turning circles.

Continuous footway with ramped approach on both sides

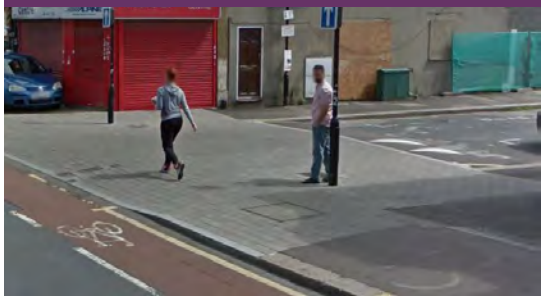


DWG Ref: CF-DR-C-0011

Continuous footway with medium sized setts, The Pavement, Clapham.

Google Maps

One-way street with ramped approach. Forrest Street, London.



Google Maps

Design Details : Layout Option 2

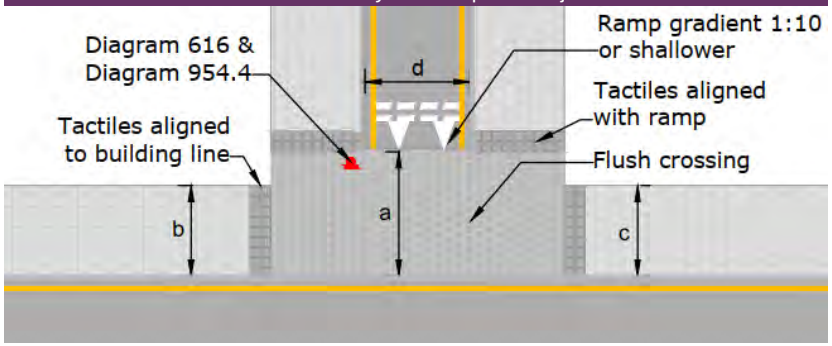
Continuous kerbline and no ramp on the major street side

- Suitable for one-way streets, but only one-way outbound onto a major street.
- The major street carriageway should rise gently to the intersection with the side road and have a maximum kerb height of 25mm.

Crossing width (a)

- The width over the continuous footway (a) should not be less than the width of the approaching footways (whichever is the greater of b or c)

Continuous footway no ramp on major street



DWG Ref: CF-DR-C-0016

Side road width at rear of continuous footway(d)

This should generally be 4.5m or less. Not wider than 6.5m or narrower than 3.5m (to allow contraflow cycling). Where it is less than 5m and two-way vehicle flow is <20 p/h, tactile paving can be omitted.

One-way side road (exit only) ramp on side street and no ramp on major street, Kennington Park Rd / Magee St.

Jacobs

Google Maps, 2016

Relevant Factsheets:
Contra-flow Cycling on One-way Streets (C5)

Continuous Footways: Construction and Materials

Construction

For any location, the base must be designed to take into account of anticipated loadings, traffic volumes and ground conditions.

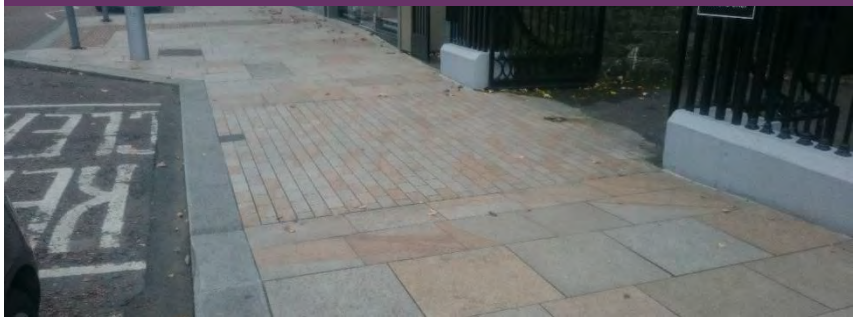
- Recommended minimum slab thickness of 75mm where vehicle overrun is anticipated, up to 150mm depths for higher vehicle flows.
- Consider reinforced small slab paving and rigid sub-base on side roads with frequent HGV use.

BS 7533 Part 12 should be referred to for sub-structure advice for footways that are overrun by vehicles.

Note that:

- ramps are particularly susceptible to compaction and may be constructed of setts or asphalt if vehicle count is above 60/hr or the junction is used by significant numbers of large vehicles.
- the structure should still allow for routine maintenance and services access, without needing to break paving slabs.

Pros - Good matching of materials and continuous, straight kerbline gives impression of continuity, small pavers stand up well to heavy vehicle loadings.
Cons – Footway drops to carriageway level (due to levels at front and rear of footway) - not ideal for mobility impaired people and reduces effect on vehicle turning speeds, edge of smaller pavers corresponding exactly with gateway means footway/roadway distinction is retained to some extent



City of Edinburgh Council

Street furniture used to provide some delineation and define a carriageway space for turning vehicles.

Jacobs

Surface materials

- Paving flags rather than asphalt should generally be used to ensure a visual contrast with the carriageway.
- Flag materials should visually match the adjacent footway to provide a continuous footway across the junction face.
- Smaller units with a reinforced base layer are recommended. The smaller units should be extended into adjacent 'pure' footway in order to avoid a clear footway/carriageway edge.
- Setts (new or reclaimed) should not generally be used for the main footway surface as they are usually a carriageway material. They may be used for ramps, see page 12. If used for the main footway surface in special circumstances, they should be flat topped.
- Where the footway under consideration has an asphalt surface, consult the Active Travel team for guidance on the materials to be used.

Relevant Factsheets:
Crossings at or near junctions (G5) Minimising Street Clutter (P7)

Design Details : Construction

This sheet gives more information on where to use various construction materials/specifications according to likely loading.

Ramp construction

- The ramp should employ either identical blocks to the footway, or setts, precast units or blocks of similar tone to the footway. This is to help ensure visual continuity of the footway.
- In circumstances where Vehicle Count exceeds 60/hour, or especially if significant numbers of large vehicles are expected, setts or asphalt may be used.

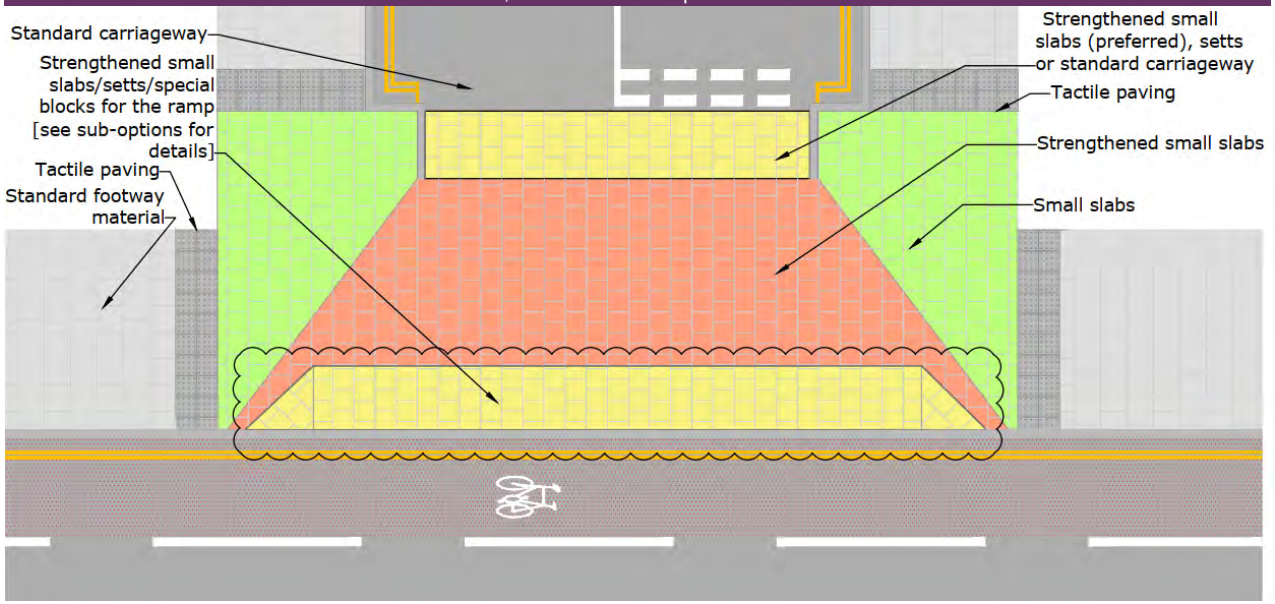
Two alternative ramp details available within Option 1 are described here.

Option 1a uses a dropped kerb with a ramp section built up from small element paving or special blocks.

Option 1b builds up the ramped section from setts or special blocks and employs quadrant kerbs.

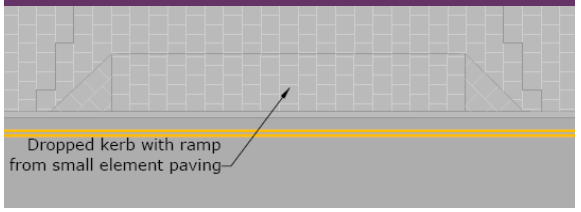
Both of these options are acceptable and the most appropriate should be selected based on the location where it is being installed.

Continuous footway with ramped approach on both sides – material details. Note that the colours are only to demarcate between materials, these do not represent the actual colours to be used!



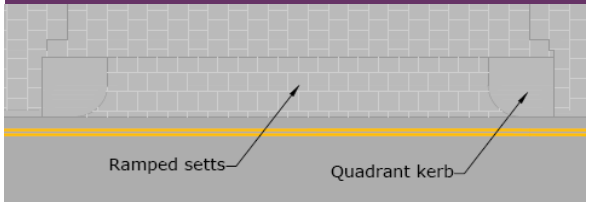
DWG Ref: CF-DR-C-0022

Option 1a – dropped kerb



DWG Ref: CF-DR-C-0023

Option 1b – ramped setts



DWG Ref: CF-DR-C-0024

Image References

Side Street Crossing types
Build out: Google Maps [ONLINE]. Available at: https://bit.ly/2k4wmKj [Accessed 17 May 2018]
Raised table: Google Maps [ONLINE]. Available at: https://goo.gl/maps/tKvtYsukkXU2 [Accessed 07 February 2017]
Continuous footway: The City of Edinburgh Council
Refuge island: The City of Edinburgh Council

Uncontrolled Drop Kerb Crossings
Bruntsfield: The City of Edinburgh Council
Kirkliston: The City of Edinburgh Council

Raised Tables / Build Outs
Build out: Google Maps [ONLINE]. Available at: https://goo.gl/maps/78ehpQMP73B2 [Accessed 07 February 2017]
Raised table: TfL Streetscape Guidance [ONLINE]. Available at: https://consultations.tfl.gov.uk/policy/streetscape-guidance/user_uploads/draft-streetscape-guidance--all-sections-.pdf [Accessed 09 November 2017]

Continuous Footways
Top Image: Google Maps [ONLINE]. Available at: https://goo.gl/cXZnN3 [Accessed 09 November 2017]
Bottom Image: Jacobs

Layout and Ramp Gradients
Images: The City of Edinburgh Council

Design Details: Option 1
The Pavement, Clapham: Google Maps [ONLINE]. Available at: https://goo.gl/oRfn8a [Accessed 17 November 2017]
Forrest Street: Google Maps [ONLINE]. Available at: https://goo.gl/sEpCe5 [Accessed 20 November 2017]

Design Details: Option 2
Left Image: Jacobs
Right Image: Google Maps [ONLINE]. Available at: https://goo.gl/maps/k217SMPCunG2[Accessed 05 December 2016]

Construction and Materials
Top Image: The City of Edinburgh Council
Bottom Image: Jacobs

Index

M1 – Footway Materials & Surfacing

Amendments:

Footway Materials and Surfacing

Footways generally require a surface material and a kerb or channel edge. Surfacing of footways in Edinburgh varies from a basic asphalt surface to paving flags including precast concrete units and natural stone.

Special materials

It should be ensured that these materials can be readily sourced. These materials should also be recorded in the Street Gazetteer to inform that a special material shall have to be reinstated following any maintenance works.

Historic environment

Original historic materials and paving are protected by planning legislation. See principles and details set out in Paving the way, CEC (2008) and Setts and the City, Edinburgh World Heritage (2004). Please note that these are not public documents but may be available upon request at the discretion of The City of Edinburgh Council.

India street has different areas of setts.

Edinburgh World Heritage, 2016

There are many historic streets that retain their original stone paving as paving flags, setts or horonised surfacing. Some streets also retain granolithic concrete which also has historic importance.

Original dolerite setts and channel with sandstone kerbing (probably Hailes).

Edinburgh World Heritage, 2016

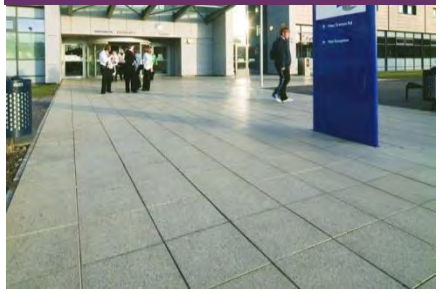
Original historic kerbs and channels and those replaced in high quality schemes in Edinburgh are either whinstone or granite.

Coal hole Cover

The Manhole Covers of Spitalfields, 2011

A number of traditional historic features remain in the streets (natural stone lighting blocks, mounting blocks and cast iron coal covers) and should be retained and restored.

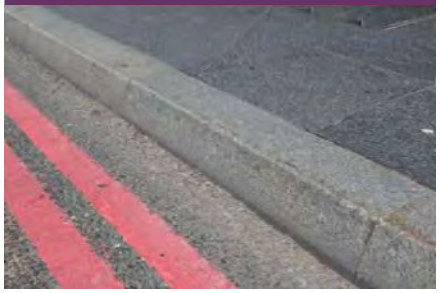
Smooth Conservation flags



Marshalls, 2016

There are other types of surface that may be used outwith conservation areas which include mono blocks and precast units.

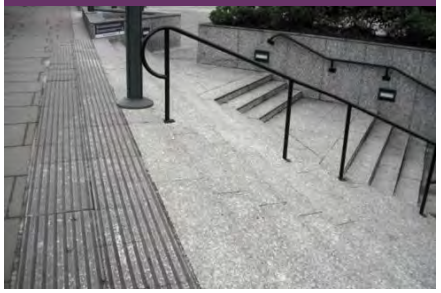
Standard PCC Road Kerb



Transport for London, 2015

In many contexts concrete kerbs and channels are acceptable.

Tactile Paving in Correct Locations



The City of Edinburgh Council

Footpaths may also require tactile paving of concrete or natural stone.

Relevant Factsheets:

Tactile Paving (M4) Setted Street (M6) Footway Paving (M3)

Key Principles

Footways should be laid with consistent fabric treatment for the length of the street. The street will be defined either as the section identified as having a specific street type, or that relates to a particular urban form and context.

In areas outside or adjoining public streets such as squares and public spaces, there are opportunities to introduce a wider variety of materials and paving styles that respond to modern design proposals.

There will be a presumption for the use of natural paving materials in key public spaces (see page 4 for details).

Construction

Footways should be constructed without awkward or abrupt changes in level, with suitable engineer designed sub-base/construction designed for the anticipated loadings. Well constructed footways reduce the risk of failure which leads to trip hazards.

All surfaces for pedestrians should be well drained, even, firm, non-slip and free from glare in both wet and dry conditions. The slip resistance of the footway surface must meet the requirements of HD 39/01.

New footways should have residual weed killer spread prior to the sub base being laid.

Water channels

Water channel covers, gratings, etc. should be flush with the surface.

Flat water channels should be a contrasting color and of a size and shape that does not trap small wheels (typically, channels 200mm wide are problematic).

Gratings should be at right angles to the line of pedestrian flow so as not to trap small wheels, etc. with openings no more than 13mm.

Tactile surfaces

Suitable tactile paving should be used where appropriate, including blister paving to identify pedestrian crossing places and hazard paving at steps and ramps. Se M4.

Stainless steel studs should be avoided as they are a potential slip hazard.

Protection from parking and vehicle over run

To protect pedestrians and pavements from vehicular overrun, some footways require additional street furniture. Alternative solutions to the use of

Bollards, such as cycle racks or planters, should be considered in these situations.

Where bollards are to be installed they should add to and respond to the wider design and layout of the street.

Reinstated paving should match surrounding paving materials.

Boundary protection

Care must be taken to ensure protection is provided for boundary walls and entrance features, especially within streets in conservation areas.

Flush Drainage Channel

The City of Edinburgh Council

Avoid the use of stainless steel tactile paving studs.

The City of Edinburgh Council

Relevant Factsheets:

Tactile Paving (M4)
Equality Impact Rights Assessment (P2)
Footway Paving (M3)
Drainage (W2)
Designing Inclusive Streets (P2)
Corner Radii (G6)
Minimising Street Clutter (P7)

Materials Overview

Asphalt Surfacing, Edinburgh

The City of Edinburgh Council, 2014

Concrete Flag Paving, Edinburgh

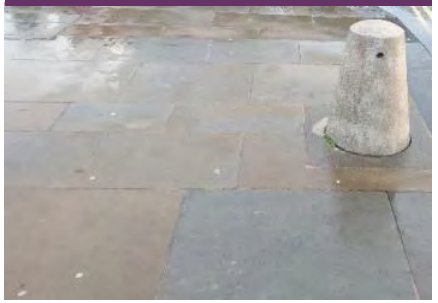
Marshalls, 2016

Resin Bound Paving, Edinburgh

Central Landscaping Service

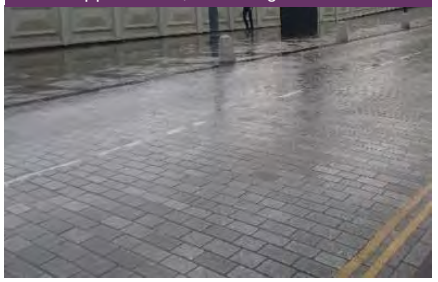
Type	Advantages	Disadvantages
Asphalt	• Fast and simple construction • Joint free finish • Durable • Easy to replace • Difficult to match surface level/colour when reinstated • Coloured surfaces available	• Lower quality aesthetic • Unsuitable for areas of importance • Low cost • High loading values
Concrete Paving/ Artificial Stone	• Widely available • Cost effective • 20-40 year lifespan • Can be reinforced • Easy to replace	• Liable to crack (dependent on thickness and sub-base) • Unsuitable for areas of civic importance • Some maintenance required
Natural Stone	• High quality • Range of finishes, colours and sizes available • Durable • Relatively low maintenance • Suitable for areas of historical importance • Long life span (60+ years)	• High material cost • Skilled installation • Difficult to colour match replacements • Some stone prone to staining • Liable to crack (dependent on thickness and sub-base)
Setts	• Extremely durable • Historic significance and place identity • Low maintenance • Long life span	• High cost • Uneven surface (except for flat topped setts) • Difficult to remove • Difficult to lay with other materials • Prone to deformation
Resin bound Gravel	• Permeable • Hard wearing • Relatively low maintenance • Do not fade	• Require solid base • Skilled installation required • Seamless repairs difficult

Natural Stone Paving, Edinburgh



Atkins 2016

Flat topped setts, Edinburgh



Atkins 2016

Relevant Factsheets:
Asphalt Footway (M2) Footway Paving (M3) Setted Streets (M6)

Recommended Material by Street Type

Russell Gardens Edinburgh. Out-with Conservation area. Medium density residential street with asphalt footway.

Google Maps, 2016

Out-with conservation areas

	Rural roads / No frontage	Industrial Employment	Low Density Residential	Med Density Residential	High Density Residential	Service Sector Employment	Retail / High Streets
Strategic	Asphalt				Concrete paving / Asphalt	Natural stone / Concrete paving	
Secondary							
Local							

Princes Street Edinburgh. Conservation area retail street paved in natural stone.

The City of Edinburgh Council

In conservation areas

	Rural roads / No frontage	Industrial Employment	Low Density Residential	Med Density Residential	High Density Residential	Service Sector Employment	Retail / High Streets
Strategic	Asphalt		Concrete paving / Asphalt			Natural stone	
Secondary							
Local							

Relevant Factsheets:
Asphalt Footway (M2) Footway Paving (M3)

Image References

Footway Materials and Surfacing

India Street has different areas of setts: Edinburgh World Heritage , (2016), *Setts in the City* [ONLINE]. Available at: http://www.ewht.org.uk/[Accessed 1 November 2016].

Original Dolerite setts: : Edinburgh World Heritage , (2016), *Setts in the City* [ONLINE]. Available at: http://www.ewht.org.uk/[Accessed 1 November 2016].

Coal-hole Cover: http://spitalfieldslife.com/2011/01/05/the-manhole-covers-of-spitalfields/

Smooth conservation flag: Marshalls, (2016), *Conservation Smooth Ground Silver Grey, Edinburgh* [ONLINE]. Available at: http://www.externalworksindex.co.uk/entry/33486/Marshalls/Conservation-smooth-concrete-paving/[Accessed 1 November 2016].

Standard PCC road kerb: Transport for London, (2015), *Concrete Kerb* [ONLINE]. Available at: https://consultations.tfl.gov.uk/policy/streetscape-guidance/ [Accessed 1 November 2016].

Tactile paving in correct locations: The City of Edinburgh Council

Key Principles

Flush Drainage Channel: The City of Edinburgh Council

Stainless Steel Tactile Studs: The City of Edinburgh Council

Materials Overview

Ashphalt Surfacing, Edinburgh: City of Edinburgh Council, (2014), *Ashphalt Surfacing, Edinburgh* [ONLINE]. Available at: http://www.edinburgh.gov.uk/downloads/download/715/road_construction_guidance [Accessed 1 November 2016].

Concrete Flag Paving, Edinburgh: [ONLINE]. Available at: http://www.externalworksindex.co.uk/entry/33486/Marshalls/Conservation-smooth-concrete-paving/

Resin Bound paving, Edinburgh: [ONLINE]. Available at: http://www.centrallandscapingservices.co.uk/about-us/

Natural Stone Paving, Edinburgh: Atkins (2016)

Setts, Edinburgh: Atkins (2016)

Recommended Material by Street Type

Asphalt Footway Edinburgh: Google Maps. [ONLINE]. Available at: https://goo.gl/maps/7v3nn2EbEiP2 [Accessed 5 December 2016]

Princess Street Paving: The City of Edinburgh Council

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M2 – Asphalt Footway

Amendments:

Asphalt Footway

Bituminous material is used for the construction of many of the footways, cycle tracks and off-street paths in the city.

Typically there are 3 types of bituminous surfacing; these are Hot Rolled Asphalt (HRA), Dense Asphalt Concrete and Close Graded Asphalt Concrete Surface Course.

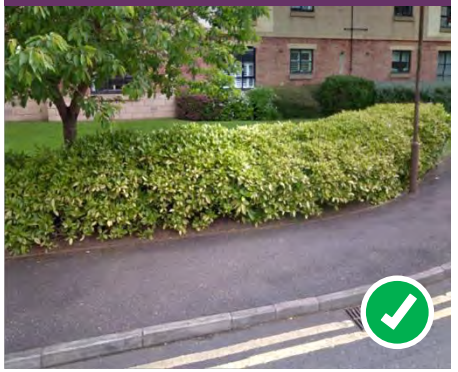
Where to lay asphalt

- Footways carrying shallow utilities.
- Footways where vehicles regularly mount the kerb.
- Cycle lanes and tracks.
- Shared footway/cycleways.

Construction requirements

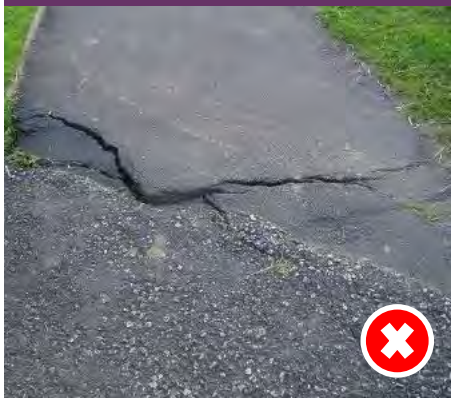
- All bituminous materials should be machine-laid, except where this is considered to be impossible/impractical.
- Surface should be smooth, free from roller marks and other irregularities and non slip with a suitable gradient to allow for drainage of surface water.
- If overlaying an existing surface, any potholes should be filled and any loose material removed to create a solid foundation. Any joints should be sealed with hot bituminous material or equivalent treatment.
- Should be rolled by mechanical rolling - only in very constricted areas will a hand-roller or vibrating plate compactor (whacker plate) be used.
- Any additional depth shall be made up with well consolidated Type 1 material.
- Utility Frames in footways should be flush with footway surface.
- All utility ducts should have a minimum of 450mm cover from the finished surface level.
- Where the footway is constructed on a poor sub-grade or is subject to vehicular overrun, these should be designed in accordance with HD 39/16.
- For the prevention of frost damage refer to HD 39/16.

Asphalt footway, Edinburgh



Google Maps, 2016

Failed Asphalt Paving



Barlborough Life, 2008

Special Requirements

New developments

Footways fronting development sites, which require to be upgraded, must be done so in accordance with the City of Edinburgh Council's (CEC) specification. This is applicable to the full length of footway approaching the entry of the development site. Where necessary these works may be extended to the opposite footway to provide a comprehensive solution (i.e. crossings). In addition, where existing vehicle crossovers / dropped kerbs are no longer required, these must be removed and reinstated to the CEC specification.

Cycleways

Cycleways should be laid using a surface course of asphalt containing red chips.

Crossfall

- Typical Crossfall 2.5%; Maximum 3.0%; Absolute Minimum 0.5%.
- This allows the footway to drain naturally whilst not affecting PRM (people with reduced mobility) users experience of the footway.
- It is recommended to amend kerb height where the crossfall is less than 2.5% (no less than 75mm height generally, or 60mm in shared street contexts).
- Paths may be constructed with a central crown where appropriate.

Depth and special requirements: hot rolled asphalt

	Clause*	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	910	Hot Rolled Asphalt	40/60 pen	30	HRA 15/10 F surface 40/60 BSEN13108-4
	909	Chippings (white)			6mm nominal size white limestone chippings spr rate 750m3/tonne
	912	Chippings (red)			6mm nominal size red chippings spr rate 750m3/tonne
Binder Course	906	Dense Binder Course Asphalt	40/60 pen	50	AC 20 DENSE BIN 40/60 bsen13108-1
Sub-base	803	Type 1		150	

* Volume 1 Specification for Highway Works

Image References

Asphalt Footway

Asphalt footway, Edinburgh: Google Maps Street View 2016. [ONLINE]. Available at: https://goo.gl/maps/7v3nn2EbEiP2 [Accessed 05 December 2016]

Failed Asphalt Footpath: Barlborough Life. [ONLINE]. Available at: http://barlboroughlife.com/?p=1179 [Accessed 02 November 2017]

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M3 – Footway Paving

Amendments:

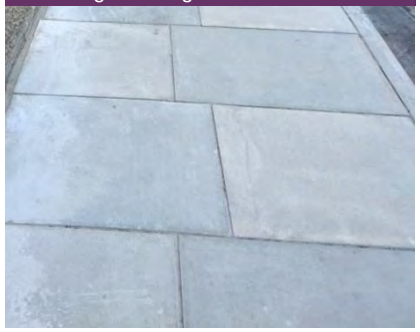
Concrete Paving / Artificial Stone

The types of paving flags used in Edinburgh include precast concrete units and various styles of artificial stone. The layout and pointing of concrete paving is very important to achieve a good quality, long lasting finish.

Where to lay concrete paving

Extensive new areas of paving across retail, service sector and residential street types.

Transverse stretcher bond using rectangular flags.

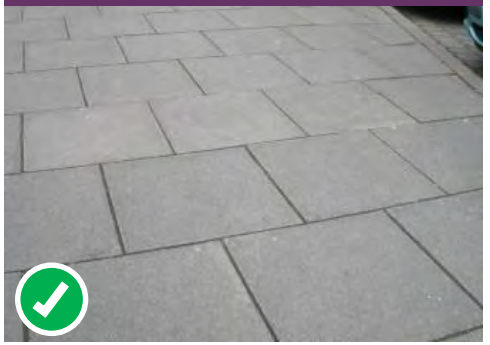


The City of Edinburgh Council

Design considerations

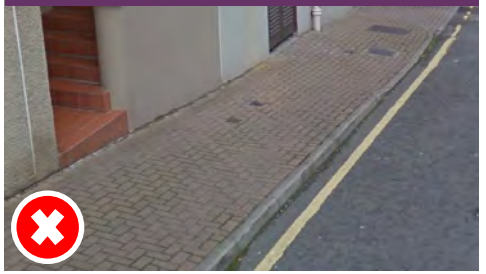
- Larger slabs help maintain a smooth surface.
- Maximum dimensions 900 x 600 x 65mm.
- Minimum recommended paving dimensions for footways: 300x 450 x 65mm. Smaller module paving such as block paving should generally be avoided for footways. Continuous footway crossing points should utilise fibre reinforced paving flags.
- There are some situations where smaller unit flags are beneficial (e.g. for continuous footway treatments and pub frontages etc.). Otherwise they should generally be used sparingly as edging details or small areas of demarcation.
- Paving flags should be laid in a staggered bond arrangement to strengthen the stability of the paving course.
- Loading should be considered when designing joints, edging and sub-structure.
- Where vehicular overrun is likely, strengthened footways should be used to protect the paving, or measures should be taken to stop overrun, e.g. bollards or increased kerb height.
- Do not use chamfered edge paving. This will help to avoid trip hazards.
- Careful detailing is needed for the interface with inspection covers

Large flags in a neutral colour help to reduce visual clutter and create an even surface for pedestrians.



© Paving Expert, 2017

Small pavers increase clutter and can create an uneven surface for walking on.



GoogleMaps, Hawthornbank Lane 2016

Relevant Factsheets:

Corner Details (M3)

Inspection Cover Details (M3)

Special Requirements

Joint detail

- Joints shall be filled to refusal with semi dry mortar, coloured to approval, and key pointed
- Joints between flags to be 5-10mm (± 1mm)
- Excess mortar and sand should be thoroughly cleaned from flags
- Flags which are laid against curving edges and kerbs shall be cut to fit the radius, with joints not exceeding 7mm
- The use of mortar to infill gaps will not be permitted. Flags must abut all surfaces, utility features and other street furniture with these joints not exceeding 7mm
- Posts shall pass through core drilled flags to ensure good fitting

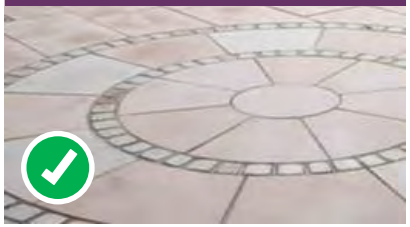
Post Detail: X = 60mm – 230mm

Marshal, 2017l

Flag cutting: curves

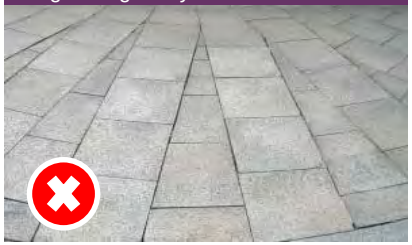
- On circular/curving areas flags to be radially cut on both edges to suit the proposed radius
- Flags to be cut using a 2:1 maximum ratio in plan to the following tapering changes: width varying, length 600mm with a 300mm taper, length 900mm with a 450mm taper.
- Tapering sections of flags must be kept to a minimum, avoiding slivers of paving

Advised Tapering Style



Rock Unique, 2017

Tapering only some sections of flags irregularly is not advised.

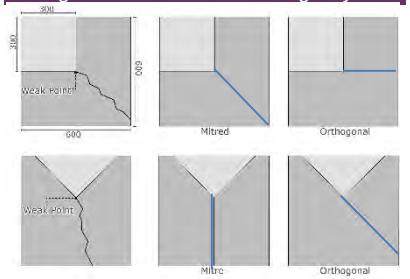


© Pavingexpert, 2017

Flag cutting: notches

- When notching >25% of a flag's area, either mitre or orthogonally cut to best match surrounding paving design, or ensure cut flag is sufficiently bedded on concrete to avoid fracture;

Flag Weakness & Notching Styles



Atkins, 2017

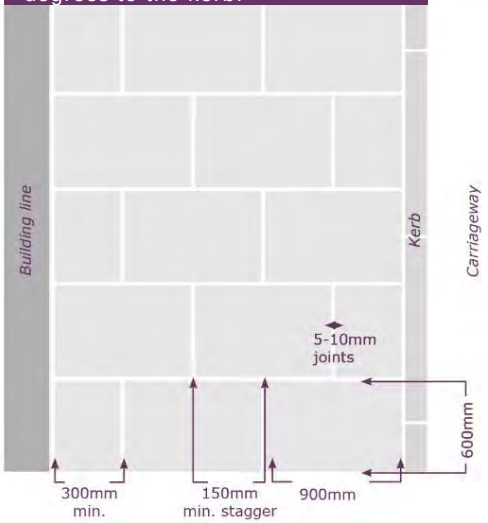
- Generally, mitred and diagonal cuts should be avoided/minimised;
- Residual slab lengths of less than 150mm should be avoided.

Laying detail

- Completed panels to be protected from the elements for no less than three days
- Flags are not to be laid if the temperature is below 3ºC on a falling thermometer or below 1ºC on a rising thermometer

Paving patterns

Paving units laid in a regular transverse stretcher bond at 90 degrees to the kerb.



Atkins, 2017

British standards

Precast concrete flags shall be:

- hydraulically pressed, complying with BS EN 1339:2003
- laid in accordance with BS 7533-4:2006
- designed in accordance with BS 7533-12:2006

Relevant Factsheets:
Corner Details (M3) Inspection Cover Details (M3)

Natural Stone

Common natural stone pavers in Edinburgh are Sandstone, Caithness, and Granite. In general natural stone is extremely durable but can deteriorate if the wrong type is specified for the conditions and usage.

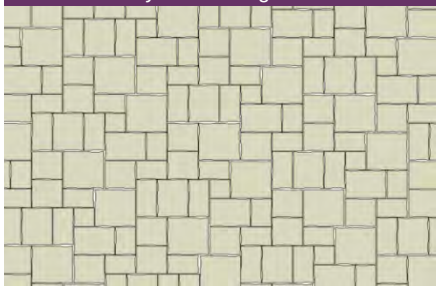
Where to lay natural paving

- Suitable for areas of civic importance or conservation areas.
- Commonly used in new retail developments.
- Sandstone paving should be used within the New Town for historic continuity.
- Caithness, granite and whinstone kerbing are appropriate materials for use within the old town.
- See table: 'Recommended footway materials for street types' Factsheet for further detail.

Design considerations:

- Small module paving (i.e. less than 450-600mm) should generally be avoided for footways. Larger unit paving (300x450mm) should be the smallest unit used.
- Loading should be considered when designing joints, edges and structure.
- Where vehicular overrun is likely, the height of kerbs should be increased to protect the paving.
- Specify hard trimmed edges.
- Surrounding context will determine the paving finish.
- Careful detailing needed for interface with inspection covers (see relevant factsheet)
- If laid in an approved course, it should never have 4 corners meeting and joints should have a minimum spacing of 3m.
- In some cases laying in a random paving pattern may be appropriate.

Random Layout Paving Pattern



Natural stone type considerations:

The characteristics of the stone, especially compressive strength and water absorption, must first be established before specifications are finalised.

British standards

All natural stone paving to

- comply with BS EN 1341:2001
- laid in accordance with BS 7533-4:2006
- designed in accordance with BS 7533-12:2006

Sandstone paving: High St Edinburgh

The City of Edinburgh Council

Granite Setts: George Street, Edinburgh

Edinburgh World Heritage, 2004

Caithness Stone flags: Royal Mile, Edinburgh

External Works

Relevant Factsheets:

Corner Details (M3) Inspection Cover Details (M3) Recommended footway materials for street types (M1)

Special Requirements

Road Construction Consent (RCC) – maintenance issues

The City of Edinburgh Council request that an additional 1 - 5% of natural stone materials be ordered for maintenance purposes. This percentage will depend on the size of the proposed development and will be negotiated at the road construction consent stage.

The delivery of these materials will be made to the Council at the end of the development. The materials will be delivered to a Council depot and will be fully palletised. A goods return slip will be obtained from the RCC inspector with 7 days notice being given, to enable the operators of the depot to prepare for the delivery. The costs to pallet and deliver the materials will be at the developer's expense with no costs attributed to the Council.

Joint detail

- Joints shall be filled to refusal with semi dry mortar, coloured to approval and key pointed
- Joints to be 5-10mm (± 1mm)
- Excess mortar and sand should be thoroughly cleaned from flags
- Flags which are laid against curving edges and kerbs shall be cut to fit the radius, with joints not exceeding 7mm
- The use of mortar to infill gaps will not be permitted. Flags must abut all surfaces, utility features and other street furniture with joints not exceeding 7mm
- Posts to pass through core drilled pavers to ensure good fitting

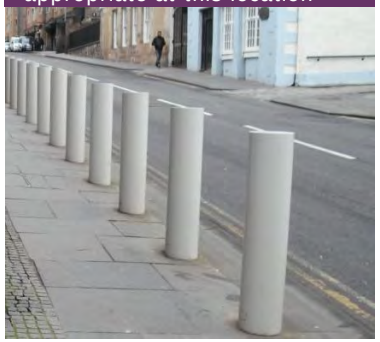
Flag cutting

- On circular/curving areas flags to be radially cut on both edges to suit the proposed radius
- Flags to be cut using a 2:1 maximum ratio in plan to the following tapering changes: width varying, length 600mm with a 300mm taper, length 900mm with a 450mm taper.
- Tapering sections of flags must be kept to a minimum, avoiding slivers of paving
- When notching >25% of a flag's area, either mitre or orthogonally cut to best match surrounding paving design or ensure cut flag is sufficiently bedded on concrete to avoid fracture
- Generally, mitred and diagonal cuts to be avoided/minimised
- Residual slab lengths of less than 150mm should be avoided

Laying detail

- Completed panels to be protected from the elements for not less than three days;
- Flags are not to be laid if the temperature is below 3ºC on a falling thermometer or below 1ºC on a rising thermometer.

Bollards in paving integration, installation is good however bollards may not be appropriate at this location



The City of Edinburgh Council

Relevant Factsheets:
Corner Details (M3) Inspection Cover Details (M3) Minimising Street Clutter (P7)

Natural Stone Finishes

	Finish Type	Advantages	Disadvantages
	Cropped	• Good slip resistance	• Uncomfortable to walk on
	Fair Picked	• Smooth surface	• Can wear down to polish
	Bush Hammered	• Good skid/slip resistance	• Difficult to clean
	Flame Textured	• Good for pedestrian use • Easy to clean	• Discolours some stones
	Polished	• Contemporary aesthetic	• Poor slip resistance
	Sawn	• Best long-term skid/slip resistance • Good for pedestrian use • Easy to clean	
	Chiselled	• Good slip resistance	

Natural stone finishes with poor slip resistance should not be used for new or replacement outdoor paving.

Historic Paving

The majority of the original paving in Edinburgh is natural sandstone flags or features and whinstone honorising.

Protecting historic paving

In order to protect remaining areas of natural stone paving they need to be clearly identified to everyone involved in commissioning, specifying and authorizing before undertaking works.

There should be a presumption in favour of retaining and repairing areas of historic paving.

Materials for repairs

The closest currently-available match for Hailes/Central Belt sandstone is Scout Moor sandstone produced in Lancashire. Before specifying sandstone the consistency of the product should be confirmed with samples.

In some situations it may be suitable to make small scale repairs using stockpiled original sandstone slabs. These resources are scarce and their use should be agreed with Planning.

Repair of surviving historic stone paving will be required using appropriate traditional materials and detailing. Where new natural stone paving work is proposed it should respect the existing palette of traditional materials and where possible be based on site-specific research into the original materials, dimensions, tooling, bedding and other details.

Principles for undertaking repairs

- Repairs should match the original as closely as possible in terms of type, size, colour, density and tooling.
- Repairs to paving must be undertaken in accordance with the specification below. Note that the use of Portland cement should be avoided.
- Depending on the context, where fragmentary or very small areas (<5M2) of historic paving survive, it may be appropriate to consolidate them into larger groupings with CEC approval.
- Where individual paving stones are broken and need to be replaced, the replacement material should match the original.

For further details on repair principles and specifications **see: "Paving the Way" (2008).**

Note that this is not a public document and will only be released at the discretion of the City of Edinburgh Council upon request.

Charlotte Square Sandstone Paving

The City of Edinburgh Council "Paving the Way"
Image: N. Haynes

Relevant Factsheets:
Footway Materials and Surfacing (M1) Natural Stone (M3) Setted Streets (M6)

Specification for Repairs

When undertaking work to original paving, one must get specialist advice from a suitable qualified architect/ stone consultant and from lime mortar specialists.

Method of working

- Compile a pre-work photographic record and submit to the Council's Conservation team
- Number all existing flags to be lifted with chalk/biodegradable spray.
- Prepare a drawing of existing paving layout and mark with numbers (to prevent unnecessary cutting when relaying)
- Lift all paving flags and lay aside under a protective cover until required
- Retain and lay aside kerb stones as required
- Kerbs with badly broken or chipped ends to be trimmed square
- Stones less than 400mm long to be discarded
- Lay kerbs to radius and levels on a normal concrete base with lime mortar bedding
- Second hand sandstone (using a matching stone type) to be used to replace excessively damaged flags, as directed
- Prepare base for slabs and lay according to the pointing and concrete specifications below
- Point joints in kerbs and flags with mortar noted below
- Ensure all work is covered / protected from frost, sun, wind or rain during the initial setting time

Bedding and sub-base under stone paving

Stone slabs should be laid onto a suitable engineer designed concrete slab.

Stone slabs can be laid on a bed of mortar 25-30mm (earth damp) about 7 days after the concrete is placed, depending upon the weather conditions, consisting of 2 parts Hourdex to 5 parts well graded, sharp sand such as Gowrie Concrete Sand.

Mixing of the Hourdex and sharp sand should be kept to a minimum of 1 hour board time before placing.

Hourdex is relatively fast setting and if the work is laid in bays of concrete a day joint should be formed. Curing would be as for any concrete – regularly lightly watered for the first couple of days then intermittently for at least a week.

The area should be protected from traffic for the first 28 days. Foot traffic should be acceptable after 48 hours.

The sub base should be free-draining, clean, screened 50-75mm stone, well compacted (150mm) with a geo-textile membrane to prevent rapid loss of water from the concrete.

Pointing to flags and kerbs

To be 1:2 lime / sand. Lime to be St Astier NHL5 or similar. Sand to be well graded sharp quarried concrete sand.

Corner Details

Natural stone footway

Paved corner detail

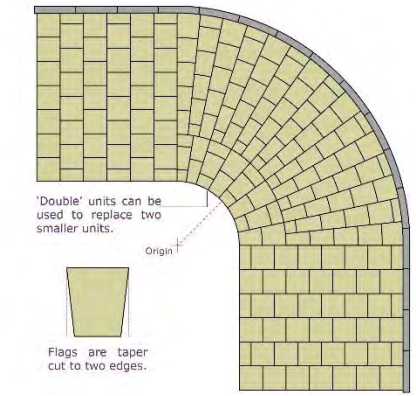
When using natural stone on corner details (radius <10m and a rotation of 45 degrees or more), use fan radius layouts (also known as 'splayed radius' and 'spoked radius').

Continue the laying pattern with staggered or random joints to match adjacent paving.

Pavers to have a double taper with two cut edges. No unit to breach the 2:1 maximum plan ratio, with double pieces used to replace two single pieces if plan sizes are too small.

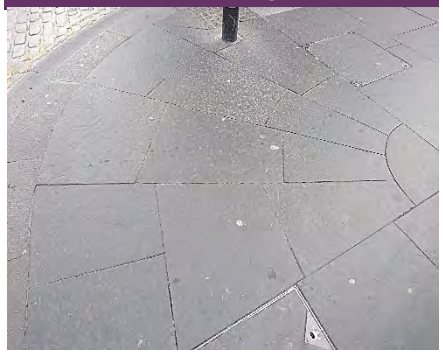
Where the origin of the radius is paved, a single "Cap Stone" should be used, to avoid small tapering flagstones. When the radius is >90°, two or more cap stones may be used.

Plan Layout Cornering Detail



Atkins, 2017

Advised Cornering In-Situ



The City of Edinburgh Council

Concrete paving / artificial stone

Paved corner detail

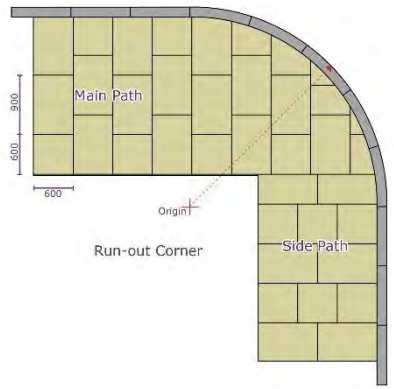
For concrete/artificial stone footways, a run-out corner detail should be used as the junction of two flagged pavements. The main path should be "run out" to intercept the kerb line and cut to suit, while the subsidiary path should be cut to abut the rear edge of the main path.

If it is not apparent which of the two paths is the main footway, follow this hierarchy:

The main path will be:

- the path that runs alongside the major carriageway, or
- the path that carries most pedestrian traffic, or
- the path that is wider.

Run-out Corner Detail



Atkins, 2017

Porphyry Flagstone Run-out Corner

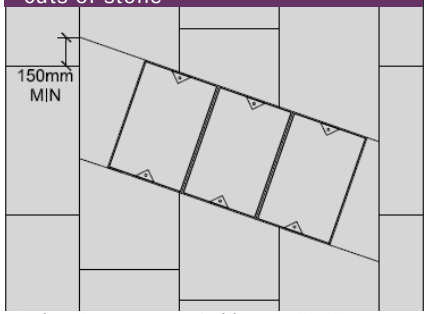
Atkins, 2017

Relevant Factsheets:
Natural Stone (M3) Concrete Paving/Artificial Stone (M3)

Inspection Cover details

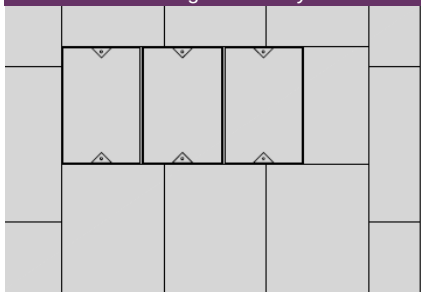
- Recessed inspection covers should be provided on high amenity value streets
- Agreement must be obtained from the owner of that manhole cover, chamber cover or surface box before changing it to any other design.
- Inspection covers should not be used unless agreement is gained from the owner prior to changing it.
- All covers must also have the owners mark on it. E.G. SW, SGN BT etc to identify who it belongs to. Off the shelf items may not be acceptable.
- Replace any obsolete service covers
- Covers to be laid flush with ground material
- Covers and frames to be of a suitable strength rating in accordance with BS EN124
- Flags arranged around manholes to have joints not exceeding 7mm
- When notching 25% of a flag's area, either mitre or orthogonally cut to best match surrounding paving design, or ensure cut flag is sufficiently bedded on concrete to avoid fracture (see image right-centre).

Plan layout detail diagonal inspection covers – avoid small cuts of stone



London Streetscape Guidance, 2016

Plan Layout detail for inspection covers set in high amenity streets

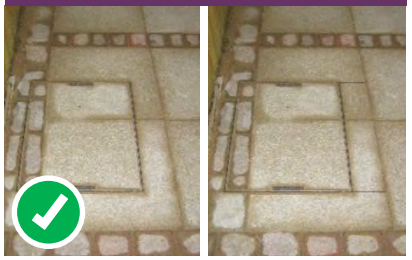


London Streetscape Guidance, 2016

Continue paving orientation and pattern

London Streetscape Guidance, 2016

Notching around inspection covers



© Pavingexpert, 2017

Avoid 'framing' manhole features

Road Construction Guidelines for Development, CEC, Chapter 4

Design out small paving cuts and used recessed paved covers where applicable

Atkins, 2016

Where associated with tactile paving, retain orientation consistency

London Streetscape Guidance, 2016

Avoid 'framing' manhole features

Road Construction Guidelines for Development, CEC, Chapter 4

Relevant Factsheets:
Natural Stone (M3)
Concrete Paving /Artificial Stone (M3)

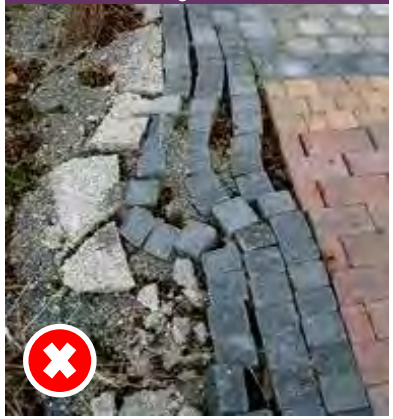
Edges

Detailing of edges, insertions and level changes within paving should be resolved before construction.

Design teams must consider how a scheme terminates, where edges are located and how to best tie-in with adjoining street materials.

All flexibly laid footways, and asphalt, must have a suitably robust edge restraint detail to prevent the footway moving or crumbling at the edges.

Pavement failure due to insufficient edge structure



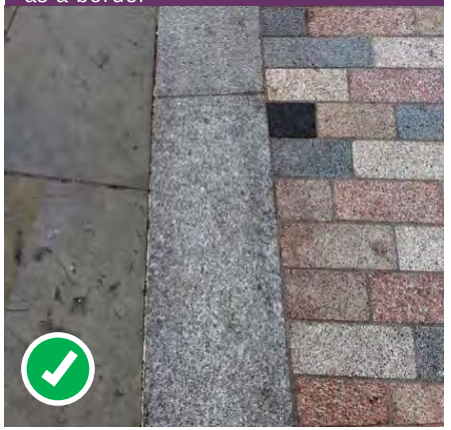
Edge treatments should:

- Be detailed to provide a smooth transition between new and old materials, with appropriate edge restraints as required, ensuring alignment resilience.
- Where possible, materials should terminate at a point which responds to the surrounding built character, for example, where a building frontage ends, or is aligned to a prominent feature such as a wall or street tree.
- Aim to avoid making a transition across an inspection cover as this will require additional work in cutting surface materials and result in the creation of small fragments of paving.
- Be free at edges (i.e. Not restrained by fixed features such as buildings, kerbs etc.). The edge must be capable of withstanding the lateral pressures exerted by the pavement and its traffic.
- Be designed in collaboration with drainage details as appropriate.

Edges for concrete paving, artificial stone and asphalt footways can utilise 50mm x 150mm hydraulically pressed flat top concrete edging (set flush) to BS EN 1340:2003, installed on a 200mm x 100mm ST4 concrete foundation, haunched on both sides.

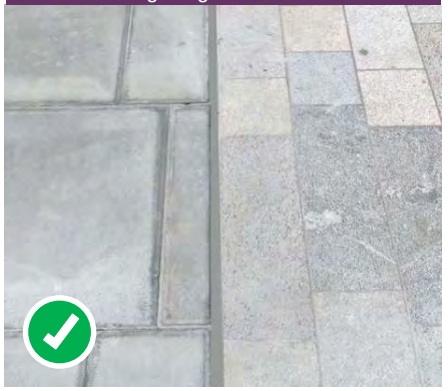
Edges for natural stone footways should be sympathetic to the adjoining paving materials, i.e. natural stone flush kerbs or a soldier course of setts as appropriate.

Yorkstone transitioning to granite setts with a flush granite kerb acting as a border



London Streetscape Guidance, 2016

900x600mm concrete slabs transitioning to granite



London Streetscape Guidance, 2016

Image References

Concrete Paving / Artificial Stone

Transverse stretcher bond using rectangular flags: The City of Edinburgh Council

Large Flag: Paving expert [ONLINE]. Available at: http://www.pavingexpert.com/flag_patterns_01.htm

Small Pavers: Google Maps (2016) [ONLINE]. Available at: https://goo.gl/hXzScx

Special Requirements

Post detail: Marshalls [ONLINE]. Available at: http://www.marshalls.co.uk/commercial/paving/products/bollard-surround-unit-webfa044020

Advised Tapering Style: Rock Unique [ONLINE]. Available at: http://www.rock-unique.com/natural-stone-for-exterior-use/patio-slabs/beige-sawn-sandblasted-sandstone-paving.html

Tapering only some sections of flags...: [ONLINE]. Available at: Available at: http://www.pavingexpert.com/cut_in06.htm

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Paving units laid in regular...: Atkins (2016)

Natural Stone

Random layout paving: [ONLINE]. Available at: http://www.pavingexpert.com/flag_patterns_01.htm

Sandstone paving, Edinburgh: The City of Edinburgh Council

Granite Setts, George Street: Setts and the City, Edinburgh World Heritage (2004)

Caithness Stone Flags, Royal Mile: [ONLINE]. Available at: http://www.externalworksindex.co.uk/entry/41012/A-and-D-Sutherland/Caithness-Flagstone-paving-for-external-applications/

Special Requirements

Bollards in paving integration: The City of Edinburgh Council

Historic Paving

Image: The City of Edinburgh Council – "Paving the Way" (2008)

Corner Details

Plan Layout Cornering Detail: Atkins (2017)

Advised Cornering In-Situ: The City of Edinburgh Council

Run Out Corner Detail: Atkins (2017)

Porphyry flagstone run-out corner: Atkins (2017)

Inspection Cover Details

Plan layout detail diagonal inspection covers – avoid small cuts of stone...:London Streetscape Guidance (2016)

Plan layout detail for inspection covers set in high amenity streets: London Streetscape Guidance (2016)

Continue paving orientation and pattern: London Streetscape Guidance (2016)

Notching around inspection cover: [ONLINE]. Available at: http://www.pavingexpert.com/cut_in04.htm

Avoid 'framing' manhole features (left): Road Construction Guidelines for Development, CEC, Chapter 4

Design out small paving cuts and used recessed paved covers where applicable: Atkins (2016)

Where associated with tactile paving...: London Streetscape Guidance (2016)

Avoid framing manhole features (Right): Road Construction Guidelines for Development, CEC, Chapter 4

Edges

Pavement failure due to insufficient edge structure: [ONLINE]. Available at: http://www.pavingexpert.com/blocks04.htm

900x600mm concrete slabs transitioning to granite: London Streetscape Guidance (2016)

Yorkstone transitioning to granite setts with a flush granite kerb acting as a border: London Streetscape Guidance (2016)

Index

M4 – Tactile Paving

Amendments:

Tactile Paving

Image: London Streetscape Guidance, 2016

A tactile paving flag is one that has a distinctive raised surface profile that aids partially sighted/ visually impaired users navigating their way around the street environment. Different surface profiles indicate different types of hazards.

Types include:

- Blister
- Ladder / Tramline
- Corduroy
- Platform Edge (Lozenge)
- Guidance

Blister tactile paving has to be provided at all controlled and uncontrolled crossing points. [NB. Exception for **'continuous footway'** crossings].

Colour

- Tactile paving in Edinburgh should be of a contrasting grey colour (red & buff may be used only in exceptional circumstances if there is a special requirement).
- Within asphalt surfacing this should be light grey; in flagged areas this should be charcoal grey.

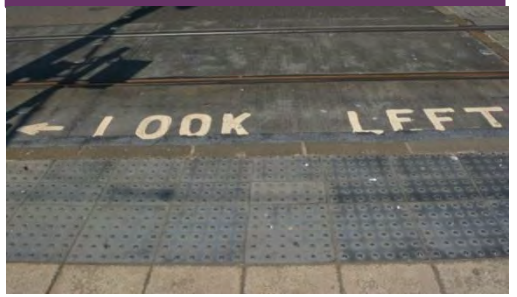
Inspection chambers

- Inspection chamber covers inside the tactile paving zone should be replaced with a recessed cover in-filled with tactile paving.

Temporary tactile

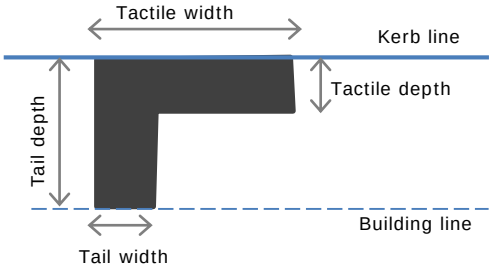
- Stick on tactile flags are available for temporary situations if it is not possible to install standard tactile flags.

Tactile Paving In Use



The City of Edinburgh Council

Tactile paving terminology used in this guidance



Relevant Factsheets:

Crossings (G4)
Flush/Drop Kerb Detail (G4)
Signalled Crossings at or Near Junctions (G5)
Shared Space (P8)
Continuous Footways (G7)

Departures from National Guidance

The following departures from National Guidance should be used by designers working on existing schemes or on new streets in Edinburgh when designing tactile paving at controlled crossings.

Use of contrasting colour

Research shows that partially sighted people often use the contrasting colour of tactile paving to guide them through the streetscape. However, there is less evidence that the specific colour used makes the space more legible.

Therefore, all tactile paving in Edinburgh should be of a contrasting colour that tones with the general footway colour; NOT RED as stated in the national guidance. The use of red coloured tactile paving will be considered ONLY in exceptional circumstances on a case-by-case basis, in particular where the use of red paving is considered essential to avoid high- risk safety issues.

Crossing tactile tails is not allowed

The crossing of tactile tails can cause confusion for visually impaired users and should be avoided. To avoid tails crossing, the tail associated with the crossing with lower pedestrian demand should be terminated at least 800mm from the other tail.

The use of reduced width tactile tails and tactile paving at the kerb edge (800mm instead of 1200mm)

Research undertaken in 2010 by University College London concluded that 'the blister profile is readily detectable when it is 800mm wide' as it will always capture a person's stride. We have therefore reduced the width used for all tactile paving surfaces from 1200mm to 800mm; two rows of 400x400mm flags (reduced from three).

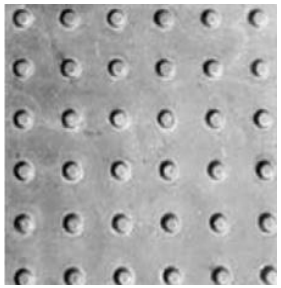
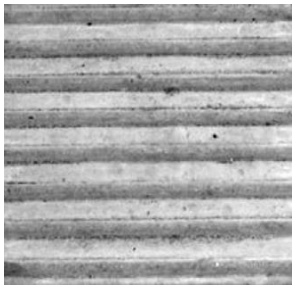
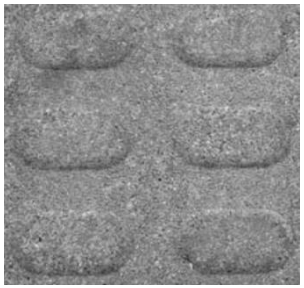
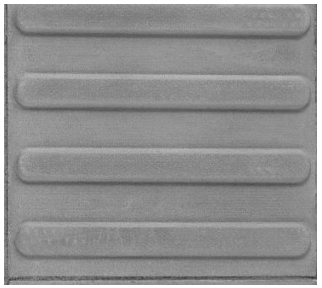
Recording departures from National Guidance

- Consistency in application is of fundamental importance for legibility and so any deviations from national guidance and the national approach to tactile provision should be carefully justified.

- This is achieved through referencing the ESDG in respect to Tactile Paving where the departure has been recommended by that factsheet.

Relevant Factsheets:
Crossings (G4) Flush/Drop Kerb Detail (G4) Signalled Crossings at or Near Junctions (G5)

Types of Tactile Paving Used in Edinburgh (colour: contrasting grey)

Tactile Type				
Blister	**Ladder / Tramline**	**Corduroy**	**Platform Edge (Lozenge)**	**Guidance**
				
Function				
• To mark where to cross the carriageway for visually impaired people	• To delineate between segregated cycle and pedestrian surfaces on a shared use route.	• To mark a hazardous situation	• To mark the edge of all on street platforms (Tram Stops).	• To guide visually impaired pedestrian where traditional indicators such as kerb (in height) are absent.
Location				
• Use at all uncontrolled and controlled crossings. • Use at the kerb of all zebra and controlled crossings, as well as across the footway itself as a 'tactile tail'.	• Use at the start and end of a cycle route on and level with the footway. • Use at end of segregated track, including where entering share space. • Use at any pedestrian/ cycle route junctions where pedestrians with visual impairments may unknowingly walk on to the cycle track. • Use as a repeater marking for above.	• Use at the top and bottom of stairs. • Use at the foot of a ramp to an on-street light rapid transit platform, but not any other ramps.	• Use at raised street platforms such as Tram Stops.	• Use where pedestrians need to be guided around obstacles. • Use where a number of visually impaired people need to find a specific location. • Use in transport terminals to guide people between facilities.

Blister Paving

Colour / Material

- Contrasting grey
- Concrete or natural stone depending on the surrounding material.
- Metal studs are not to be used.

Application

- Two rows of 400 x 400mm tactile, for a total of 800mm deep at the narrowest point across the full width of the flush crossing.
- Tactile tails will form an 'L' shape at the crossing and are to be 800mm wide.
- Flag widths shall only be cut square and be equidistant between rows of surface texturing, except where against a building or fence line.
- Flags shall be laid so that the texture pattern is square with the crossing.
- Concrete infill around obstructions should not exceed 25mm in width and should be the full depth of the flag and similarly coloured.
- Flags must be 400 x 400 x 65mm thick.

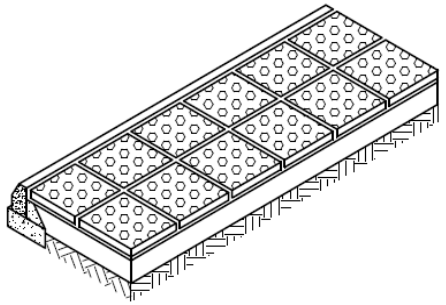
Relevant standards:

- Precast concrete Flags must comply with BS EN 1339:2003
- Natural stone flags must comply with BS 7533 Part 4:2006
- Placement should comply with Guidance on the use of Tactile Paving Surfaces, DETR, 1998 for other issues that are not dealt with in this guidance.

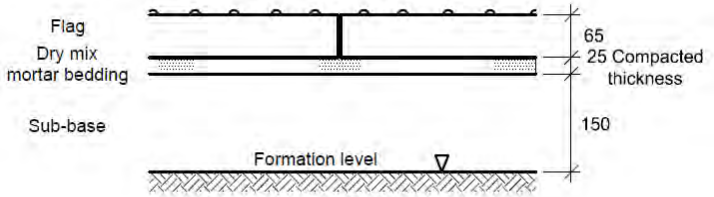
Blister Paving

Contrasting Grey

Blister Paving Details



DWG ref: SD11506



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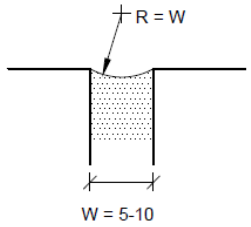
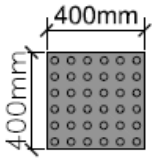


DETAIL OF POINTING

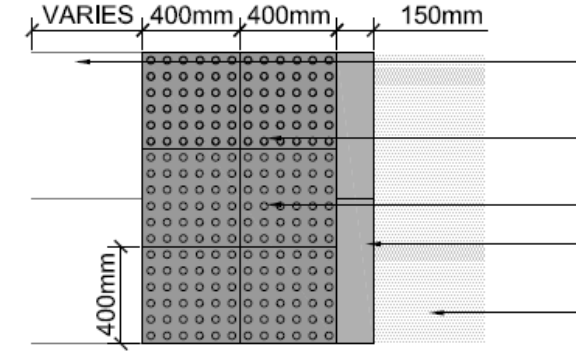
DWG ref: SD11501

Relevant Factsheets:
Crossings (G4)
Flush/Drop Kerb Detail (G4)
Signalled Crossings at or Near Junctions (G5)
Shared Space (P8)

Detailed Layout



Application: All Crossings
Size: 400 x 400 x 65mm
Colour: Contrasting Grey



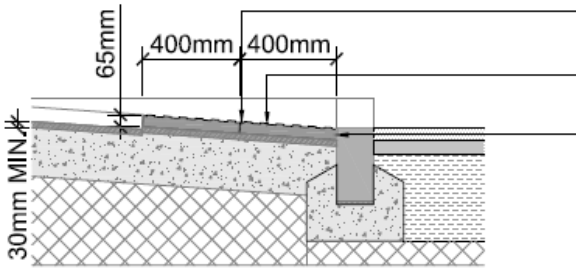
FOOTPATH PAVING TO FINISH FLUSH WITH TACTILE PAVERS

400x400mm BLISTER TACTILE PAVERS

LAYING: STACKBOND, BUTT-JOINTED

ROADSIDE DROP KERB TO FINISH FLUSH WITH TACTILE PAVERS AND ROAD SURFACE

EXISTING ROAD SURFACE/REINSTATED ROAD SURFACE TO ENGINEER'S DETAIL AND SPECIFICATION



1:12 MAX FALL TO MEET FOOTPATH AND ROADSIDE

400x400x65mm BLISTER TACTILE PAVERS LAYED ON 25mm MIN/ DRY MIX MORTAR BEDDING

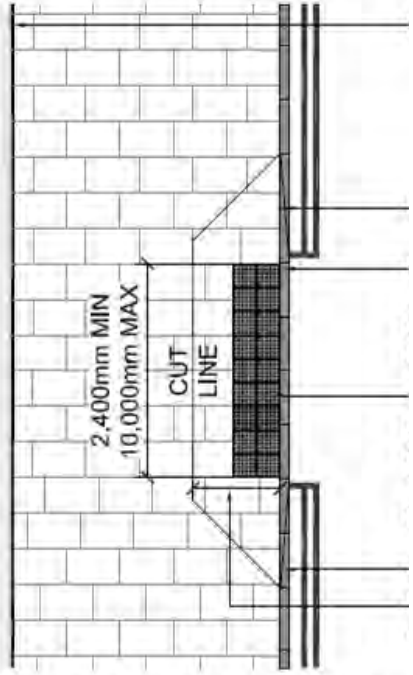
BUTT-JOINTED, FINISH FLUSH WITH FOOTPATH PAVING END DROP-KERB

BLISTER TACTILE PAVING PROFILE

DWG ref: Adapted from London Streetscape Guidance

Relevant Factsheets:
Flush/Drop Kerb Detail (G4) Signalled Crossings at or Near Junctions (G5) Crossings (G4)

Layout at Uncontrolled and Controlled Crossings



BUILDING LINE

DROPPED KERB

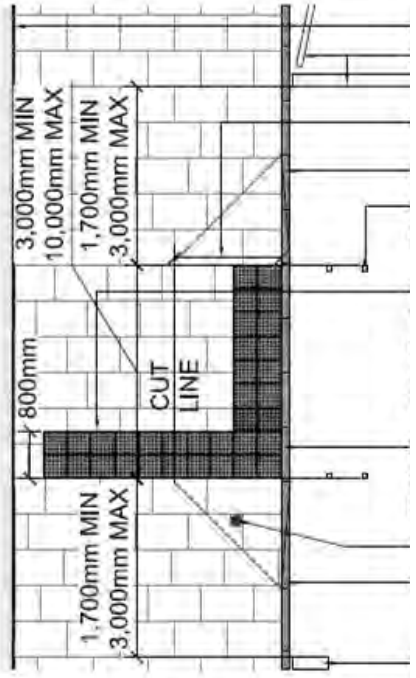
KERB FLUSH WITH CARRIAGEWAY (MAX TOLERANCE +6mm)

800mm DEEP. WIDTH VARIES DEPENDING ON CROSSING TYPE/WIDTH

DROPPED KERB

MAX GRADIENT 1:12

UNCONTROLLED TACTILE CROSSING - PLAN



BUILDING LINE

PAINTED ROAD MARKING

MAX GRADIENT 1:12

DROPPED KERB

STUDS ALIGNED TO TACTILE FLAGS

TACTILE TAIL 800mm DEEP & MAX WIDTH 4800mm LONG (SEE VARIATION A & B)

KERB FLUSH WITH CARRIAGEWAY (MAX TOLERANCE +6mm)

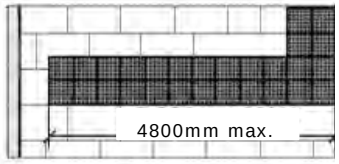
TRAFFIC SIGNAL POLE

DROPPED KERB

PAINTED ROAD MARKING

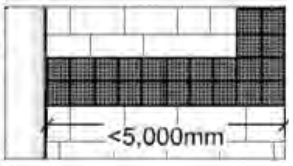
CONTROLLED TACTILE CROSSING - PLAN

VARIATION A



Maximum tail length is normally 4800mm. If the gap between the tail end and the rear of the footway is < 1000mm, run the tactile paving to the building line (or any other obstacle/street furniture e.g. seating, bins). Otherwise retain tactile length as 4800mm. This length needs to be assessed on a site-by-site basis according to pedestrian flows and desire lines.

VARIATION B

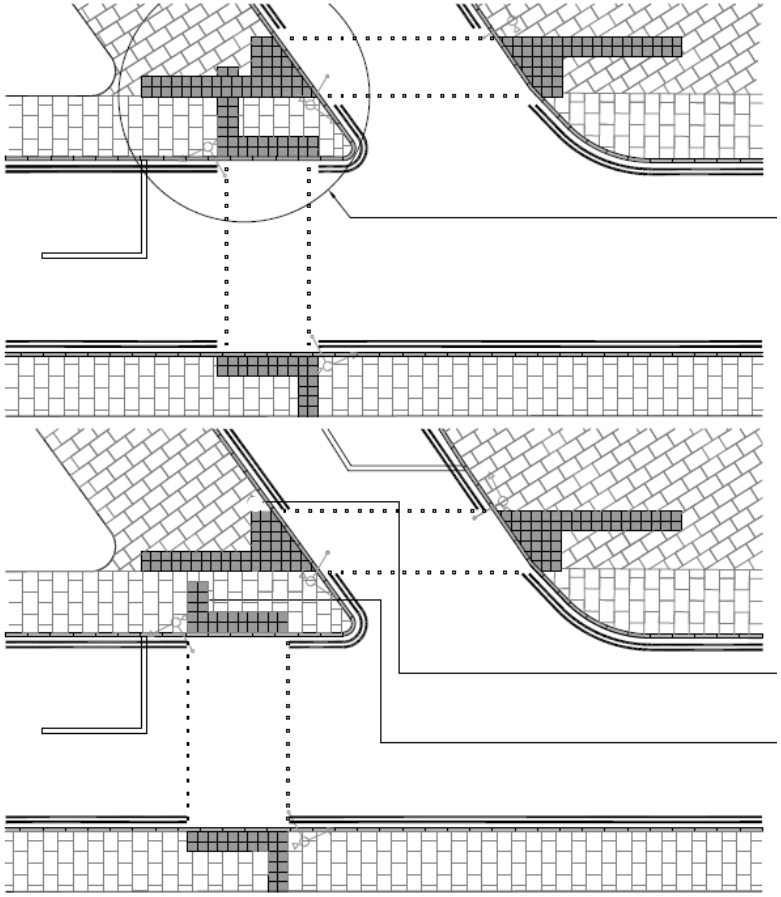


Maximum tail length is normally 4800mm. If the footway width is < 6000mm, run the tactile paving to the building line (or any other obstacle/street furniture e.g. seating, bins). This length needs to be assessed on a site-by-site basis according to pedestrian flows and desire lines.

DWG ref: Adapted from London Streetscape Guidance

Relevant Factsheets:
Flush/Drop Kerb Detail (G4) Signalled Crossings at or Near Junctions (G5) Crossings (G4)

Tactile Tail Layout at Signalised Crossings



AVOID CROSSING TACTILE PAVING TAILS

PLAN

NOT ACCEPTABLE - CROSSING TAILS SHOULD NEVER OCCUR

CONSIDER LOCATING ADDITIONAL PUSH BUTTON IF CROSSING WIDTH >3.5M PROVIDE IF WIDTH >4M

TACTILE PAVING TAIL HAS BEEN MOVED TO CAPTURE PEOPLE FROM SECONDARY ROUTE

PLAN

ACCEPTABLE

The tail associated with the crossing with lower pedestrian demand should be terminated at least 800mm from the other tail

DWG ref: Adapted from London Streetscape Guidance

Relevant Factsheets:
Flush/Drop Kerb Detail (G4) Signalled Crossings at or Near Junctions (G5) Crossings (G4)

Ladder and Tramline Paving

Function

- To mark the pedestrian and cycle entrances to shared use footways (cycle/pedestrian).
  - Laid transverse to denote the pedestrian path.
  - Laid longitudinal to denote the cycle path.

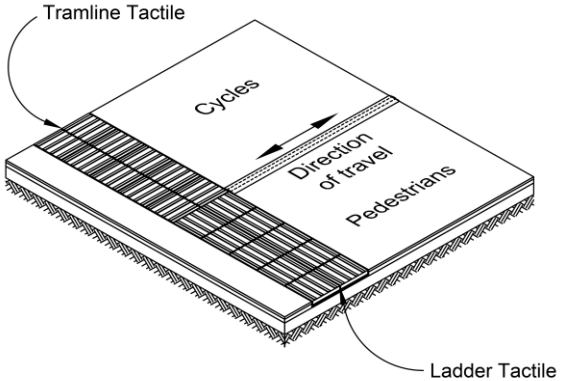
Locations

- Use at shared footways.
- Use at the start and end of a cycle route on and level with the footway.
- Use at any pedestrian / cycle route junctions where pedestrians with visual impairments may unknowingly walk on to the cycle track.

Application

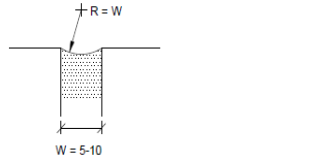
- Flags shall be laid for pedestrians so that the bar pattern runs perpendicular to the direction of travel. For Cyclists, the flags shall be laid so that the bar pattern runs parallel to the direction of travel..
- Concrete infill around obstructions should not exceed 25mm in width and should be the full depth of the flag and similarly coloured.
- Flags must be 400 x 400 x 50mm or 70mm thick.
- While national guidance for ladder and tramline recommends a 2,400mm wide application for this material, 800mm will be adopted.
- Skid resistant material to be trailed, contact Active Travel Team for details.

Ladder and Tramline Placement Details

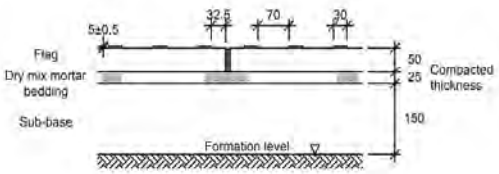


DWG ref: SD11509

Ladder and Tramline Paving Details



DETAIL OF POINTING DWG ref: SD11501



DWG ref: SD11509

SECTIONAL ELEVATION

Note:

CEC are currently trialling a bespoke ladder/tramline unit which aims to improve the grip offered by this paving. For further information please consult with the Active Travel Team.

Ladder and Tramline Paving

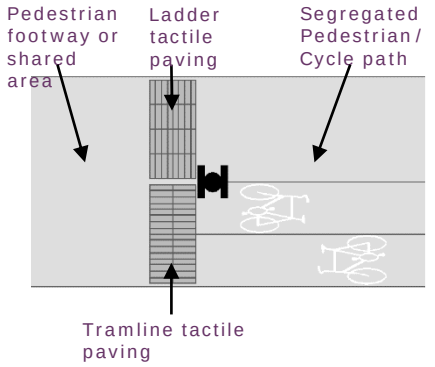
Contrasting Grey

Relevant standards

Precast concrete Flags must comply with BS EN 1339:2003

Natural stone flags must comply with BS 7533 Part 4:2006

Comply with Guidance on the use of Tactile Paving Surfaces, DETR, 1998 for other issues that are not dealt with in this guidance.



Relevant Factsheets:

Shared Space (P8)
Signalled Crossings at or near junctions (G5)
Soft Segregation: Integration with Bus Stops (C3)

Corduroy Paving

Function

- To mark a hazard but NOT to mark shared footway entrance to/from cycle or pedestrian routes.
- NOT to define edge of kerb when level with carriageway.

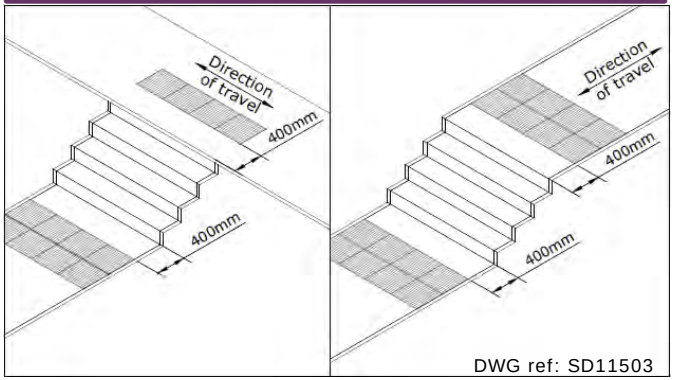
Location

- At the top and bottom of stairs.
- At the foot of a ramp to an on-street light rapid transit platform, but not at any other ramps.
- On the approach to level differences
- Can be used to indicate separation of cyclists and pedestrians on a segregated path.

Application

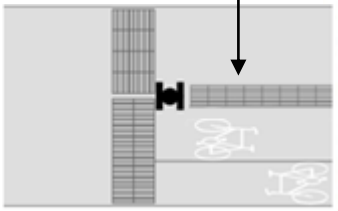
- Flags shall be laid so that the texture pattern runs perpendicular to the alignment of the hazard.
- Flags widths shall only be cut square, and equidistant between rows of surface texturing, except where against a building or fence line.
- Concrete infill around obstructions should not exceed 25mm in width and should be the full depth of the flag and similarly coloured.
- Flags must be 400 x 400 x 50mm or 70mm thick.

Corduroy Placement Details



DWG ref: SD11503

Segregated cycle track with corduroy paving 1 ROW



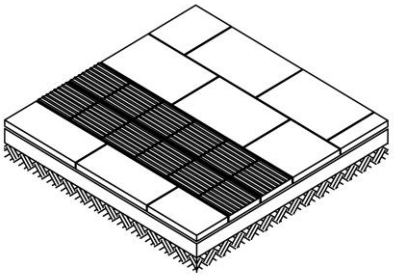
Corduroy Paving

Contrasting Grey

Relevant standards

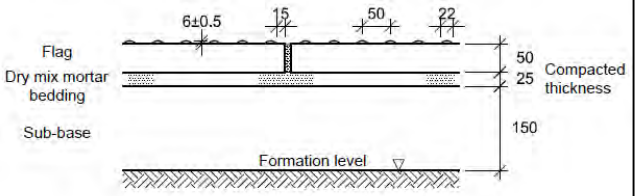
- Precast concrete Flags must comply with BS EN 1339:2003
- Natural stone flags must comply with BS 7533 Part 4:2006
- Comply with Guidance on the use of Tactile Paving Surfaces, DETR, 1998 for other issues that are not dealt with in this guidance.

Corduroy Paving Details



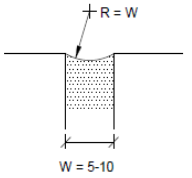
PAVING LAYOUT

DWG ref: SD11503



SECTIONAL ELEVATION

DWG ref: SD11503



DETAIL OF POINTING

DWG ref: SD11501

Relevant Factsheets:

Shared Space (P8)

Signalled Crossings at or near junctions (G5)

Soft Segregation: Integration with Bus Stops (C3)

Platform Edge (Lozenge) Paving

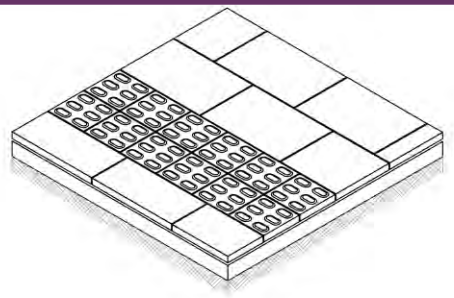
- Platform Edge Paving must be 400x400mm paving units, with rows of lozenge-shaped rounded raised ridges 6mm high, 150mm in length, 83mm in width and equally spaced at 50mm intervals.
- Lay in one 400mm wide row and set back a minimum of 500mm from edge.
- Extend for full width of hazard.
- Edge of Platform should also be marked with a white line.
- Concrete infill around obstructions should not exceed 25mm in width and should be the full depth of the flag and similarly coloured.
- Flags must be 400 x 400 x 50mm or 70mm thick.

Relevant standards

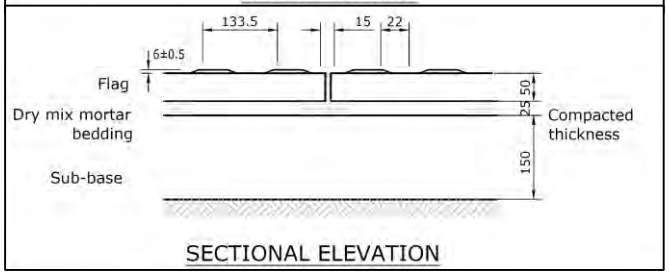
- Precast concrete Flags must comply with BS EN 1339:2003
- Natural stone flags must comply with BS 7533 Part 4:2006
- Comply with Guidance on the use of Tactile Paving Surfaces, DETR, 1998 for other issues that are not dealt with in this guidance.

The City of Edinburgh Council

Lozenge Paving Details



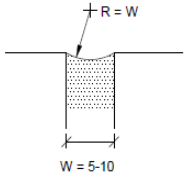
PAVING LAYOUT



SECTIONAL ELEVATION

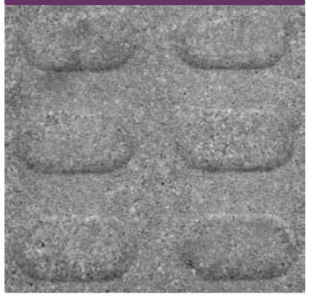
DRG ref: 3D-DR-C-0005

Lozenge Paving Pointing Details



DETAIL OF POINTING DWG ref: SD11501

Platform Edge (Lozenge) Paving



Contrasting Grey

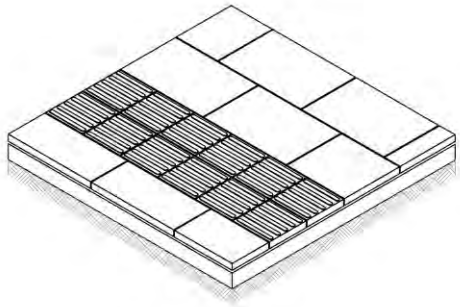
Relevant Factsheets:

Designing Inclusive Streets (P2) Equality & Rights Impact Assessment (P2)

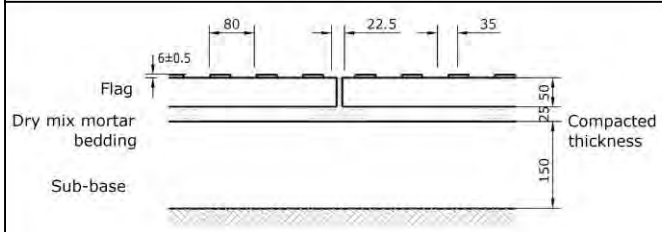
Guidance Paving

- Use to be used as a guide for the visually impaired where traditional indicators such as kerb lines have been removed or are not available.
- The profile of the guidance path surface comprises a series of raised, flat-topped bars running in the direction of pedestrian travel. The bars are 5.5mm (±0.5mm) high, 35mm wide and are spaced 45mm appart.
- The surface should be installed with the bars running in the direction of pedestrian travel.
- Laid 2 pavers, 800mm wide.
- There should be at least 800 mm unobstructed spaces either side of pavers.
- Pavers should be laid as straight as possible.
- Flag widths shall only be cut square and equidistant between rows of surface texturing, except where against a building or fence line.
- Concrete infill around obstructions should not exceed 25mm in width and should be the full depth of the flag and similarly coloured.
- Flags must be 400 x 400 x 50mm or 70mm thick.

Guidance Paving Details



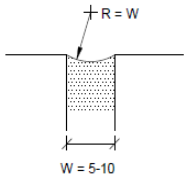
PAVING LAYOUT



SECTIONAL ELEVATION

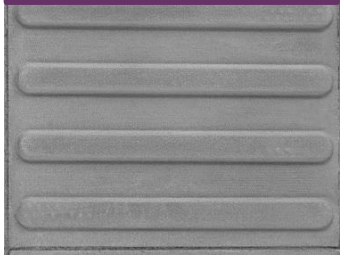
DWG ref: 3D-DR-C-0006

Guidance Paving Pointing Details



DETAIL OF POINTING DWG ref: SD11501

Guidance Paving



Contrasting Grey

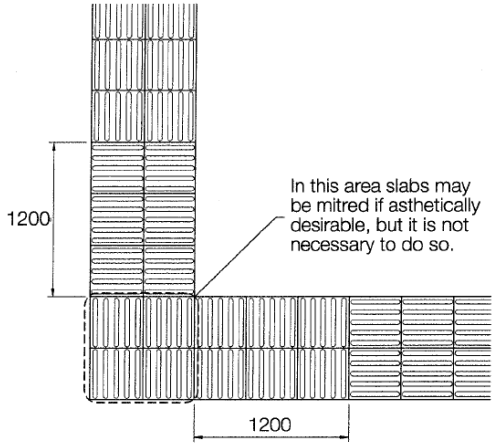
Use sparingly and only after local consultation with relevant local groups.

Relevant standards

- Precast concrete Flags must comply with BS EN 1339:2003
- Natural stone flags must comply with BS 7533 Part 4:2006
- Comply with Guidance on the use of Tactile Paving Surfaces, DETR, 1998 for other issues that are not dealt with in this guidance.

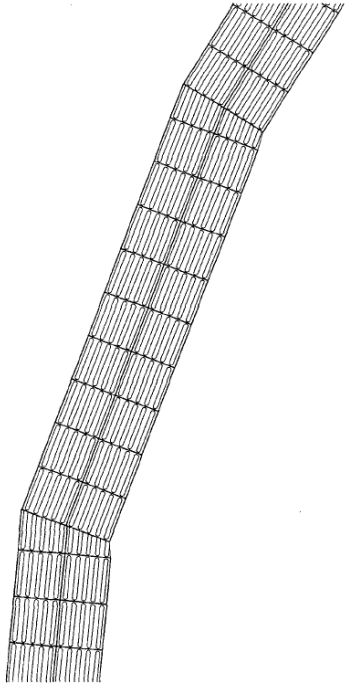
Layout

Layout of guidance path surface at a right angle turn



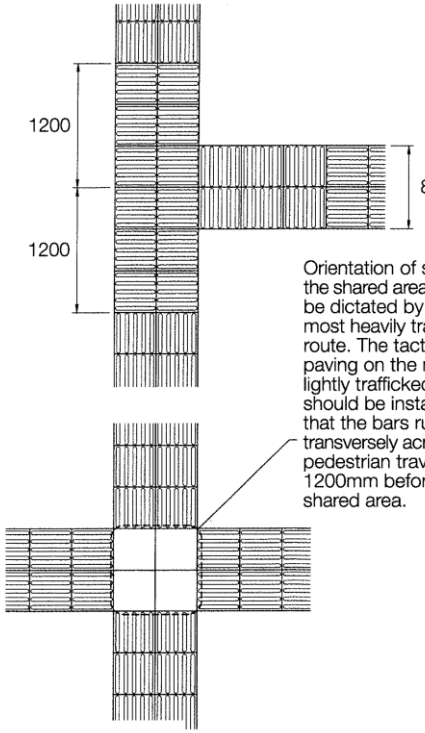
Notes: 1) Not to scale.
2) All dimensions in millimetres.

Layout of guidance path surface at a turn other than a right angle



Notes: 1) Not to scale.

Layout of guidance path surface at a 'T' junction and at a cross roads



Notes: 1) Not to scale.
2) All dimensions in millimetres.

DWG ref: DFT Guidance on use of tactile paving

Utility Inspection Covers

- The Council requires utilities, where possible, to provide covers which can be converted to take a tactile surface inlay.
- Access covers located within the layout of tactile paving should be in-laid to prevent visually impaired people missing the message being conveyed.

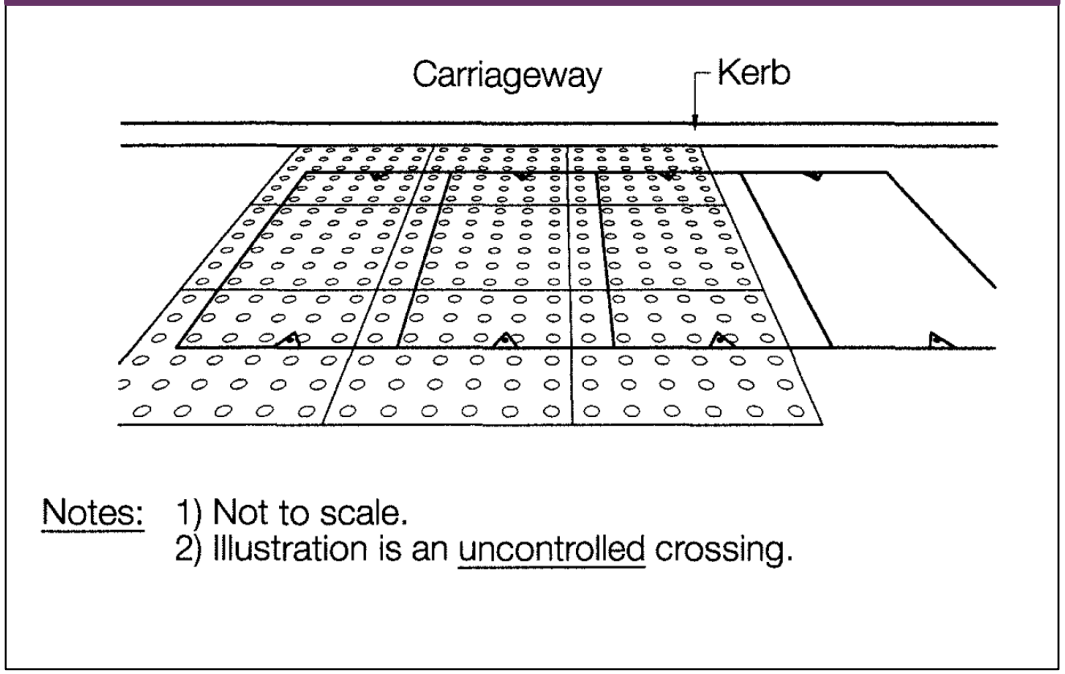
Stick on tactile

Tactile paving is available in a stick on format for use as a last resort option. This may be useful where:

- Excavation of block pavers would be difficult (e.g. on reinforced concrete).
- For temporary provision (during construction).
- Where existing dropped kerbs exists without tactile paving. However these will be replaced with permanent tactile paving when/if any capital scheme is undertaken along the extent of the street or nearby.

See Guidance on the use of Tactile Paving Surfaces, DETR, 1998 for other issues that are not dealt with in this guidance.

Tactile paving in laid into inspection cover



DWG ref: DFT Guidance on use of tactile paving

Image References

Tactile Paving
Image: London Streetscape Guidance, 2016
Tactile Paving in Use: The City of Edinburgh Council

Platform Edge (Lozenge) Paving
Image: The City of Edinburgh Council

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M5 – High Friction Surfacing

Amendments:

High Friction Surfacing

As a result of the citywide application of 20mph streets, high friction surfacing (HFS) is unlikely to be required in most streets within central Edinburgh.

DMRB document HD 36/06 considers trunks roads and high speeds (50mph+) and applies a minimum HFS treatment length of 50m. Applying this framework to 20mph streets is considered to be an overly conservative approach.

For this reason, it is the presumption that HFS is not required on 20mph streets unless there is a significant hazard identified. Due to lower speeds within central Edinburgh, treatment lengths of much less than 50m are usually appropriate. (See Minimum Treatment Length Factsheet for details).

The Design Manual for Roads and Bridges (DMRB, HD 36/06) determines factors for application include (but are not limited to):

- Site category
- Polished stone value (PSV),
- Investigatory level (IL) based on 50m approach to the feature (e.g. crossing)
- Traffic volume - commercial vehicles (cv) only (e.g. HGV, buses etc.)

The City of Edinburgh Council

HFS on large bend in the road with wet weather conditions, Albert Bridge (2012)

Related Factsheets:
Speed Reduction and Traffic Management (G6)
Crossings (G4)
Signalled Crossings at or near junctions (G5)

DMRB Application

The surface aggregate is the main contributor to skidding resistance and the micro-texture characteristics of a particular stone is measured by PSV test.

Site category, IL and volume of commercial vehicle (cv) are the determining factors for higher PSV aggregates and HFS use. ILs which are most applicable to Edinburgh streets are highlighted (in purple) in table 3.1.

Most urban streets in Edinburgh will be designed for low speeds and low ranges of commercial vehicles (cv/lane/day), especially in 20-30mph areas. This should be given due consideration when determining whether to provide HFS in an urban environment.

	Site Category (DMRB HD28/15)	IL*	Minimum PSV required for given IL, traffic level and type of site (HD36/06 – Table 3.1)									
			Traffic (cv/lane/day) at design life									
			0-250	251-500	501-750	751-1000	1001-2000	2001-3000	3001-4000	4001-5000	5001-6000	Over 6000
K	Approaches to pedestrian (including signal) crossings and other high risk situations	0.5	65	65	65	68+	68+	68+	HFS	HFS	HFS	HFS
		0.55	68+	68+	HFS	HFS	HFS	HFS	HFS	HFS	HFS	HFS
Q	Approaches to and across minor and major junctions, approaches to roundabouts and traffic signals.	0.45	60	65	65	68+	68+	68+	68+	68+	68+	HFS
		0.5	65	65	65	68+	68+	68+	HFS	HFS	HFS	HFS
		0.55	68+	68+	HFS	HFS	HFS	HFS	HFS	HFS	HFS	HFS
R	Roundabout circulation areas (excl mini roundabouts)	0.45	50	55	60	60	65	65	68+	68+	HFS	HFS
		0.5	68+	68+	68+	HFS	HFS	HFS	HFS	HFS	HFS	HFS
G	G1- Gradients 5-10% longer than 50m G2- Gradients >10% longer than 50m	0.45	55	60	60	65	65	68+	68+	68+	68+	HFS
		0.5	60	68+	68+	HFS	HFS	HFS	HFS	HFS	HFS	HFS
		0.55	68+	HFS	HFS	HFS	HFS	HFS	HFS	HFS	HFS	HFS

For further details about IL and site category see DMRB HD28/15 and HD 36/06.

Where it is identified that additional surface friction is required, the following should be considered:

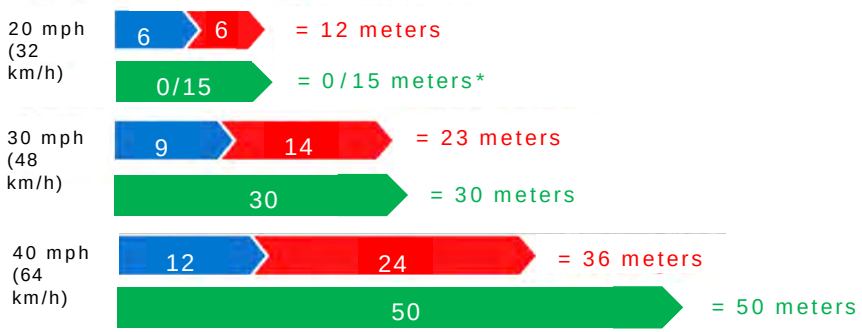
- Where surface aggregate PSV ≥ 60 can be sourced, HFS is unlikely to be required in 20mph streets.
- Where practical to source material with a high PSV (≥ 60 for 20mph, or PSV as in table 3.1 for 30mph+ streets) this is the preferred option over providing HFS.
- If this is not feasible, HFS treatment lengths should be reduced to suit the environment that it is to be applied (e.g. 20mph urban street etc.)
- Setts should have appropriate surface friction material properties, suitable to the site category as defined by HD 36/06.

Related Factsheets:
Minimum Treatment Length (M5)

Minimum Treatment Lengths

Where site conditions identify the need for high PSV or HFS and within urban streets, the minimum treatment lengths should be considered as below.

Stopping distance & minimum HFS treatment lengths



The distances shown are a general guide. The distance will depend on your attention (thinking) distance, the road surface, the weather conditions and the condition of your vehicle at the time.

Thinking Distance | Breaking Distance

Average car length – 4 metres (13 feet)

Highway Code Stopping Distance Diagram

The treatment lengths shown are the recommended minimum distances. These may require to be increased depending on the site specific conditions.

HFS Min Treatment Length

The HFS minimum treatment length calculations were determined using the stopping distance research by TRL: (TRL Report 367: High and low speed skidding resistance: the influence of texture depth).

NOTE:

- These values assume a negligible gradient and a direct approach to the hazard with good visibility.
- *A HFS treatment length of 0m applies when the above condition is met. When this is not met a minimum HFS treatment length of 15m is applied.
- These values are based on stopping distances for a standard car.
- These values are based on having a PSV ≥60 on approach to the hazard, prior to the HFS treatment.

The minimum treatment length should be increased as appropriate, depending on the site specific conditions, including but not limited to:

- Gradient of slope on approach to hazard;
- Geometry (e.g. significant bends on roads, reduced visibility, roads subject to icing etc.); and
- Traffic conditions etc.

See overleaf for additional requirements and risk mitigation measures, which must be read in conjunction with this factsheet.

Advanced stop line (ASL)

ASL red chippings generally have a PSV <60. So where an ASL is present the length of the HFS should be increased, equal to the length of the ASL.

Related Factsheets:
Speed Reduction and Traffic Management (G6)
Signalled Crossings at or near junctions (G5)
Crossings (G4)

Minimum Treatment Lengths

Risk mitigation measures

- Where the downhill gradient is greater than or equal to 2%, increase the length of high PSV/HFS by L (in metres), where:

$$L = \frac{G \times S}{20}$$

- G=% gradient, S=speed limit (mph)
- Note that this formula is only appropriate for roads up to 40mph.
- This formula provides stopping distances that are no less than those calculated by the relationship shown in Manual For Streets 2, paragraph 10.1.5.
- Provide a minimum of 15m HFS on 20mph roads with poor visibility on approach to a junction or crossing.
- Avoid reducing HFS on routes with significant bends where the speed limit exceeds 20mph.

Related Factsheets:
Speed Reduction and Traffic Management (G6)
Crossings (G4)
Signalled Crossings at or near junctions (G5)

Image References

High Friction Surfacing

20 advertisement: The City of Edinburgh Council

HFS, Church Road J4078 : The Church Road, Holywood (4) : Albert Bridge, 2012. [ONLINE]. Available at: http://www.geograph.ie/photo/2982714 [Accessed 26 April 2017]. Licensed for reuse under the Creative Commons Licence: https://creativecommons.org/licenses/by-nc-nd/2.0/legalcode.

Index

P1 – Street as a Place

Amendments:

Street as a Place: Desired Characteristics

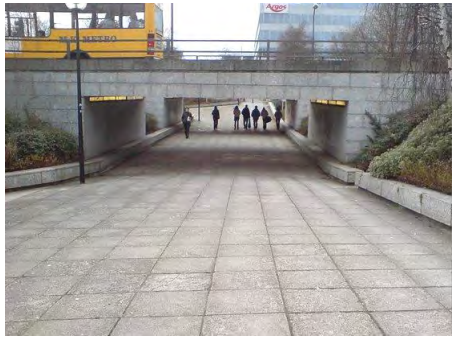
Streets are the main way people experience our city. Though the application of this Guidance, we are aiming to promote a better quality of life and sense of a place for Edinburgh's residents, businesses and visitors.

✓ welcoming
✓ Inclusive
✓ accessible to all

✓ easy to navigate

✓ attractive
✓ distinctive

✓ prioritises sustainable travel (walking, cycling and public transport)



✓ safe
✓ secure

✓ responds to environmental factors such as sun, shade, wind, noise and air quality

✓ resilient
✓ cost-effective
✓ impacts positively on the environment

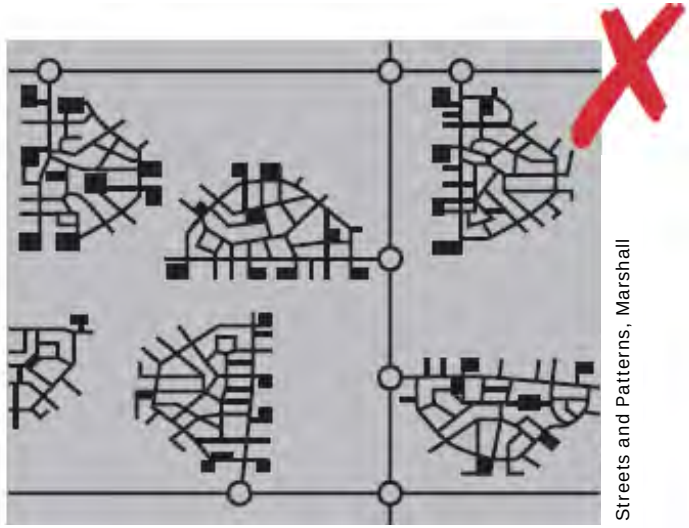
✓ respects key views, buildings and spaces
✓ reflects the needs of local communities

Images top-bottom and left-right: 1) Wikimedia Commons online 2) The City of Edinburgh Council 3) Google Earth 4) The City of Edinburgh Council 5) Geograph.org online 6) The City of Edinburgh Council 7) Transport for London 8) The City of Edinburgh Council

Urban Connectivity

Key principles

- In Edinburgh, new developments and alterations to existing street networks should be designed with multiple access points that connect with and complement, existing street patterns/types and sustainable travel network (Use ESDG Street Types Map to assess these).
- New cul-de-sacs are generally not advised. Alterations to existing cul-de-sacs are highly desirable to improve connectivity, especially on foot and by bike.
- The movement framework must support sustainable travel within and outwith the development and link between new and existing routes and places.



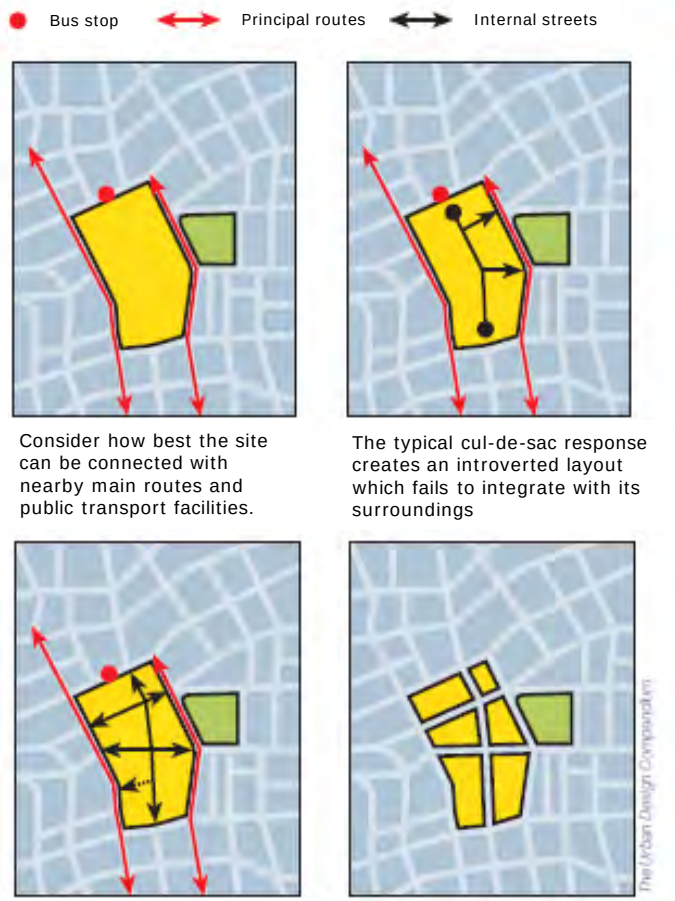
Streets and Patterns, Marshall

Internally permeable neighbourhoods lacking direct connections with one another – to be avoided.

Street geometry, layouts and provision for walking, cycling and public transport should, where practicable, comply with the Edinburgh Street Design Guidance and its technical manuals.

Further points of reference:

- Edinburgh Design Guidance
- Designing Streets



Consider how best the site can be connected with nearby main routes and public transport facilities.

The typical cul-de-sac response creates an introverted layout which fails to integrate with its surroundings

A more pedestrian friendly approach that integrates with the surrounding community – it links existing and proposed streets and provides direct routes to bus stops.

The street pattern then forms the basis for perimeter blocks which ensure that buildings contribute positively to the public realm

All images: Designing Streets

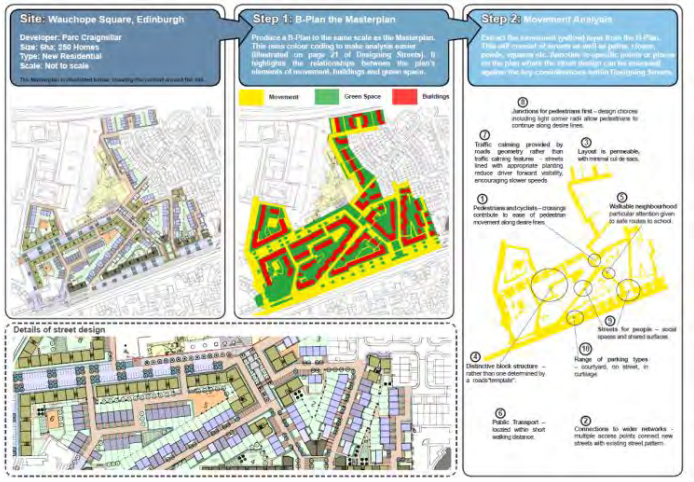
Demonstrating connectivity

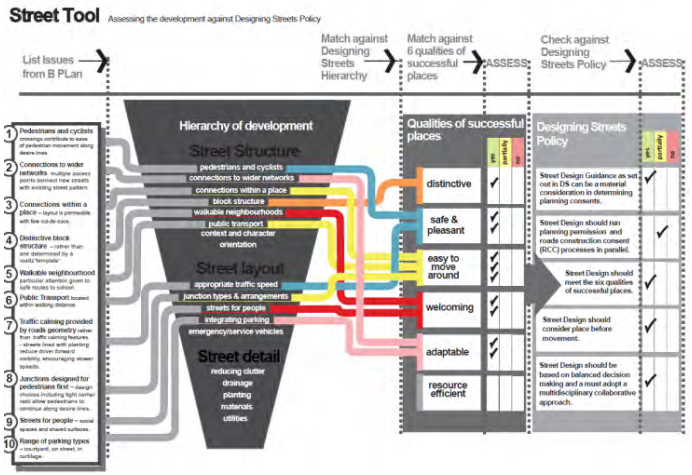
As Part of their joint Planning and Road Construction Consent (RCC) Application, developers are expected to use the Scottish Government's Street Technique process to demonstrate the existing street network and the role/impact of new connecting streets in their Quality Audit statements (Stage 1 and 2).

Relevant links:

Creating Place: Aligning Consents

Street Technique Guidance and case studies are available at www.creatingplacesscotland.org





Source: http://www.gov.scot/Resource/0043/00430581.pdf

Relevant Factsheets:

Road Construction Consent (G11)

Designing for Permeability in New Residential Streets

	Key Design Criteria
Vehicle speed reduction	❑ Short block structures can assist with reducing vehicle speeds by creating regular, close spacing of junctions. ❑ Irregular carriageway alignments including horizontal deflections can help reduce traffic speeds. Care should be taken to ensure that irregular layouts are intuitively navigable with good visibility of routes. ❑ Motor vehicle cul-de-sacs may only be used in permeable designs, if situations arise where restricted permeability is desired. However pedestrian and cycle access should continue beyond the cul-de-sac and care should be taken to ensure that this link is open and well overlooked. ❑ See factsheets G1 and G6 for further details.
Designing for walking and cycling	❑ Shorter distances between trip attractors and public transport increase the attractiveness of walking and cycling as the preferred mode of transport for certain journeys. ❑ Encourage direct barrier free routes to avoid cyclists needing to dismount. ❑ Junctions should give priority to pedestrians and cyclists by maintaining footway continuity or providing a side road build-out or raised table crossing (on lightly trafficked roads only). ❑ Avoid dead-end streets for pedestrians and cyclists. ❑ Narrow links enclosed by high boundary fences are not appropriate, as they are unattractive and reduce security with a lack of natural surveillance. ❑ See factsheets C1, P2 and P7 for further details
Designing for place	❑ Create a clear edge treatment to reinforce a change in urban character. ❑ Outward facing frontages help to improve active frontage and natural surveillance. ❑ Continuity of street scale and form should integrate effectively with the wider place. ❑ Short block structures and curvilinear streets can contribute to a varied street scene and contrasting sense of place within the development.
Designing for Public Transport	❑ Public transport routes should be designed into the proposed street structure to support public transport oriented neighbourhoods ❑ Streets on public transport routes (strategic and/or secondary streets) must be designed to accommodate reasonable anticipation of future level of services (for bus or sometimes tram use)

Relevant Factsheets:

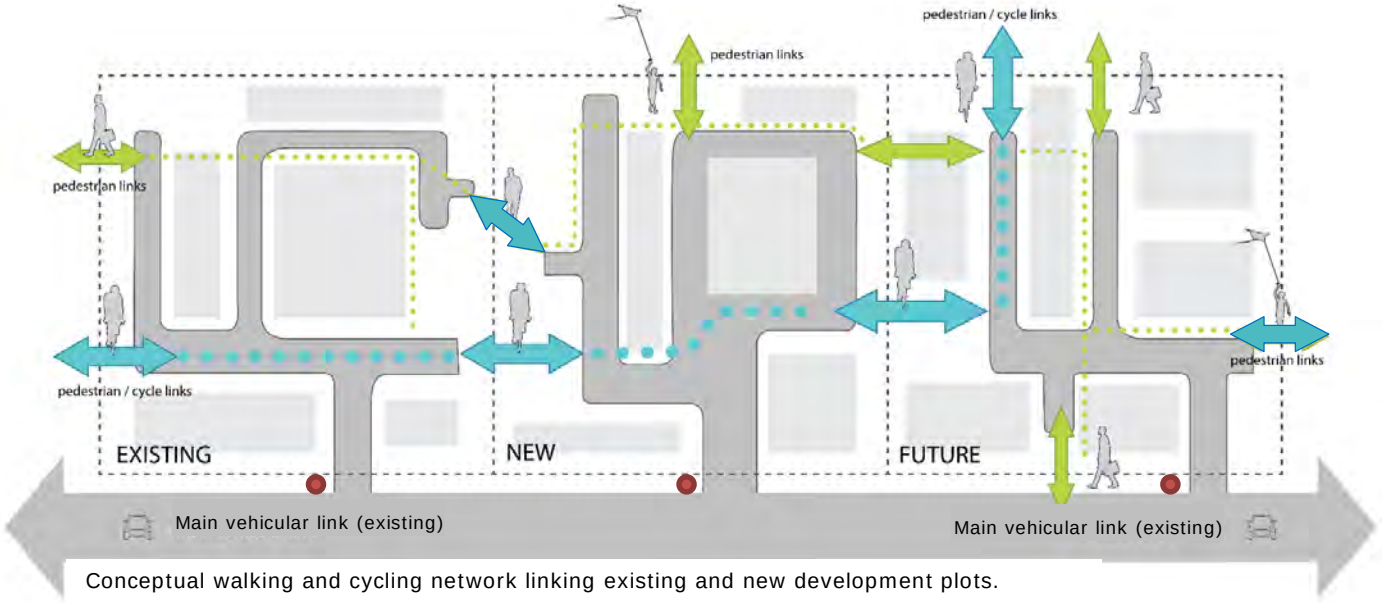
Bus Routes (PT1)
Crossings (G4)
Priority Junctions (G7)
Traffic Management and Speed Reduction (G6)
Crossings at or near junctions (G5)
Street Furniture Layout (F1)
Pedestrian Desire Lines (P2)

Creating Active Travel Networks

The Council requires new/future walking and cycling Quiet Route routes to be part of an integrated network, even if this is delivered across multiple master plans.

New walking and cycling provision must be internally and externally coherent and connected by minimising the distance between trip attractors and accommodating desire lines safely. There are many ways this can be designed within a development including:

- filtered permeability for pedestrians and cyclists with selective road closures for motor vehicles.
- dedicated off-street cycleways and footpaths that connect with wider walking and cycling networks.
- allocation of appropriate space or re-allocation of existing road space to footways and cycleways.
- allowing two-way cycling on one-way streets.
- Pedestrian and cycle priority at uncontrolled crossings
- traffic light phasing in line with anticipated cycle speeds.



Conceptual walking and cycling network linking existing and new development plots.

Indicative walking network

Indicative QuietRoutes cycle network

Bus stops

New walking and cycling routes must be designed to encourage good natural surveillance, by being:

- overlooked by surrounding buildings
- wide and open
- well lit
- accessible for maintenance vehicles.

Secured by Design principles should apply to the design of linking (non-trafficked) footpaths and cycleways.

Relevant Factsheets:

Designing for Cycling (C1)
Designing Inclusive Streets (P2)
Cycle Friendly City (C1)
QuietRoutes (C1)
Promoting Pedestrian Movement & Activity (P2)
Uncontrolled Drop Kerb Crossings (G4)

Creating Public Transport Oriented Neighbourhoods

New streets

Developers are required by The City of Edinburgh Council to demonstrate that the following has been considered:

- how new developments are designed to be public transport oriented so that they can be served by existing/altered, new or future bus/tram/train services
- Which streets should carry bus services
- how bus routes and stops form the structure and layout of these streets (by taking into account the relevant factsheets stated below)
- that proposed street structure and layouts support walkable neighbourhoods and access to public transport
- that footway and carriageway widths are suitable for the expected level of bus services, location and type of bus stops.

Google Earth, 2016

Google Earth, 2016

Existing streets

Designers are required by The City of Edinburgh Council to demonstrate that the following has been considered:

- That the layout of streets with bus services support bus operations (see relevant factsheets stated below)
- how footways and crossings on pedestrian routes to/with bus stops are designed to improve the use of and the access to public transport
- bus shelter locations and types are suitable for footway widths and do not create pinch points or reduce the pedestrian level of service.

The City of Edinburgh Council

The City of Edinburgh Council

Consultation with the **Council's Public Transport** team and Public Transport Operators is required on all of the items listed.

Relevant Factsheets:

Bus Routes (PT1)
Bus Stops (PT2)
Bus Priority (PT3)
Carriageway Widths (G2)
Footways (P3)

Image References

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Creating Public Transport Orientated Neighbourhoods

Pedestrian congestion on footways at bus stops: The City of Edinburgh Council

Pedestrian comfort on footways at bus stops: The City of Edinburgh Council

New streets, tram and bus links: Google Earth 2016, Street View at Princes Street. [ONLINE]. Available at: https://goo.gl/maps/MoNwENqH61G2 [Accessed 5 December 2016]

New streets, poorly located bus stop: Google Earth 2016, Street View at Bankhead Avenue. [ONLINE]. Available at: https://goo.gl/maps/YCFPRd9yJY82 [Accessed 5 December 2016]

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P2 – Promoting Pedestrian Movement and Activity

Amendments:

Promoting Pedestrian Movement and Activity

A positive sense of a place is fundamental for a richer and more fulfilling pedestrian experience.

To ensure high quality street design for pedestrians, designers should look to understand existing (and predicted) patterns of pedestrian movement and the experience and implications of the street layout.

General approach

- understand pedestrian experience, needs and movement
- accommodate/strengthen pedestrian desire lines
- assess and improve pedestrian comfort
- increase accessibility; and
- ensure streets are inclusive

Zebra crossing on pedestrian desire line, George Street, Edinburgh.

The City of Edinburgh Council

Entry treatment at uncontrolled crossing, Royal Mile, Edinburgh.

The City of Edinburgh Council

The City of Edinburgh Council

5m wide footway to accommodate high pedestrian flows, Princes Street, Edinburgh.

The City of Edinburgh Council

Ramp walkway to tram stop, Princes Street, Edinburgh.

The City of Edinburgh Council

Analysing Movement and Activity – Available Methods

Analysing existing streets

As part of the Design Brief, identify which data requirements are necessary for informing design decisions.

Pedestrian flow counts

To identify areas of highest footfall across the day and at different times of the week. This could include identifying specific user groups depending on the nature of the project.

Pedestrian comfort assessments

To ensure sufficient footway capacity.

Static activity assessments

To show frequent stationary pedestrian uses of the street such as sitting, waiting and standing.

Origin-destination assessments

To highlight how people move across a contained and measurable study area.

Pedestrian desire lines

To inform the placement of crossings and other pedestrian facilities.

Qualitative observations

To document pedestrian behaviours relating to urban configuration and road layout, as well as issues relating to pedestrian desire lines and urban severance.

Shared use interaction analysis (pedestrians & cyclists)

To provide evidence on desire lines, user behaviour and conflict issues.

Pedestrian Environment Review System (PERS)

Use the Transport Research Laboratory's PERS process where assessing the existing quality and condition of the public realm, as well as walking hazards and street clutter, inform and prioritise design proposals for improving conditions for walking.

Anticipating pedestrian movement on new streets

Design appraisal of the new street network, the location of trip attractors and land uses across a new development and existing pedestrian flow densities in the surrounding area can be used to forecast pedestrian demand across new streets (for further information: Walkable Neighbourhoods in Designing Streets).

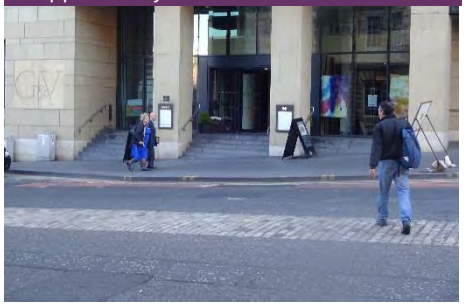
This process can also be used to estimate latent demand and the impact that proposed improvements will have on attracting new users.

HERE+NOW studies illustrate some of the available methods used **for 'public life' studies in** five town centres and streets in Edinburgh.

Complex pedestrian cross-flows supported by a shared space design layout.

The City of Edinburgh Council

Informal pedestrian crossing desire lines to major trip attractors supported by a central reservation.



The City of Edinburgh Council

Relevant Factsheets:

Footways (P3)
Pedestrian Desire Lines (P2)
Pedestrian Comfort (P2)
Crossings (G4)
Shared Space (P8)

Pedestrian Desire Lines

Designers should to accommodate key pedestrian desire lines and design interventions, that provide benefits relating to access, legibility and safety. Use analysing activity and movement techniques to establish priorities.

Avoid channelling or restricting pedestrian movements, unless a specific safety issue has been identified and no alternative options for mitigating the issue have been identified.

Understanding existing pedestrian desire lines

Video surveys can be used to track pedestrian origin-destination movements within a limited field of view. This can be useful for understanding complex crossing issues at key junctions.

On-street path following surveys can allow for pedestrian movements within a wider study area to be tracked to inform the placement of formal crossings, street furniture, parking and loading.

Other qualitative observations can be used for movement trends to highlight where the existing urban environment is lacking provision for pedestrians. This can include identification of informal pedestrian routes worn onto grass, or behavioural observations including informal crossings.

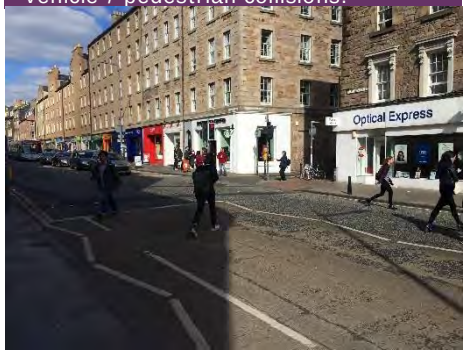
Planning for pedestrian safety

Investigate collision datasets alongside the analysis of pedestrian desire lines, to define existing safety issues for pedestrians.

Consider improving safety by:

- Changing conditions surrounding the desire line to minimise the potential for vehicle conflicts (such as providing a raised table for the desire line to reduce vehicle speeds on the approach, or by providing kerb build-outs to reduce the crossing distance).
- Relocating local trip attractors such as bus stops to shift pedestrian desire lines to a safer position.

Informal pedestrian crossing movements diagonally across junctions are a significant cause of vehicle / pedestrian collisions.



The City of Edinburgh Council

Raised profile on desire line – Cockburn Street Edinburgh

The City of Edinburgh Council:

Relevant Factsheets:
Corner Radii (G6)
Pedestrian Guardrail (P5)
Minimising Street Clutter (P7)
Crossings at or Near Junctions (G5)

Pedestrian Comfort

Pedestrian comfort is defined by the density of pedestrian movement in a given area of footway and by the quality of the walking experience from a **pedestrian's perspective.**

The Pedestrian Comfort Guidance for London (TfL, 2010) provides a comprehensive assessment process which can be used to provide a measure for pedestrian density based on the number of people passing a given space per minute (pedestrians per metre per minute – ppmm). Designers should refer to this guidance for acceptable levels of comfort across different urban settings.

- By analysing pedestrian flows and the available footway width for movement, it is possible to make recommendations on the placement of street furniture to avoid/minimise pinch-points and/or justify footway widening proposals.
- Pedestrian comfort assessments should be used to future proof streets by anticipating changes in pedestrian flows. Consider for example the proximity of new developments to an existing street, and the impact it will have on pedestrian flows in the future.
- Plan to accommodate the corresponding uplift in pedestrian flow by considering opportunities to widen footways or relocate street furniture that creates a pinch-point.

Sources of pedestrian discomfort

Pedestrian congestion on footways at bus stops and at street furniture pinch-points. Tables, chairs and advertising boards require to be better managed.

Atkins, 2016

Lack of footway capacity causing pedestrians to frequently walk out onto the carriageway.

The City of Edinburgh Council

Pedestrian / cyclist interactions on busy urban streets. Significant levels of footway cycling are likely to indicate that there is a lack of alternative safe places to cycle.

The City of Edinburgh Council

Lack of crossing width capacity resulting in pedestrians waiting on the carriageway

The City of Edinburgh Council

Relevant Factsheets:
Footways (P3)
Minimising Street Clutter (P7)
Furniture Zone (F1)
Locating Shelters on Footways (PT2)

Pedestrian comfort level (PCL) on footways

Comfortable

PCL A COMFORTABLE FOR ALL AREAS


A+ < 3ppmm
< 3% Restricted Movement


A 3 to 5 ppmm
13% Restricted Movement


A- 6 to 8 ppmm
22% Restricted Movement

The pedestrian environment is very comfortable at PCL A+ to A- with plenty of space for people to walk at the speed and the route that they choose.

PCL B B+ RECOMMENDED MINIMUM FOR ALL AREAS


B+ 9 to 11ppmm
31% Restricted Movement


B 12 to 14ppmm
41% Restricted Movement


B- 15 to 17 ppmm
50% Restricted Movement

PCL B+ is the recommended level of comfort for all area types. This level provides enough space for normal walking speed and some choice in routes taken.
At PCL B and PCL B- normal walking speed is still possible but conflicts are becoming more frequent and, in retail areas, people start to consider avoiding the area.

PCL C INCREASINGLY UNCOMFORTABLE


C+ 18 to 20ppmm
59% Restricted Movement


C 21 to 23 ppmm
69% Restricted Movement


C- 24 to 26 ppmm
78% Restricted Movement

The pedestrian environment is becoming increasingly uncomfortable, with the majority of people experiencing conflict or closeness with other pedestrians and bi-directional movement becoming difficult.

PCL D or E VERY UNCOMFORTABLE

Uncomfortable


D 27 to 35ppmm
100% Restricted Movement


E >35 ppmm
100% Restricted Movement

At PCL D walking speeds are restricted and reduced and there are difficulties in bypassing slower pedestrians or moving in reverse flows.

At PCL E people have very little personal space and speed and movement is very restricted. Extreme difficulties are experienced if moving in reverse flows.

Note: pedestrians per metre of clear footway width per minute (ppmm) is used to measure the crowding level on a footway

PCL for different area types for use in peak hours and for average maximum activity level

	HIGH STREET		OFFICE AND RETAIL		RESIDENTIAL		TOURIST ATTRACTION		TRANSPORT INTERCHANGE	
	Peak	Ave of Max	Peak	Ave of Max	Peak	Ave of Max	Peak	Ave of Max	Peak	Ave of Max
A	COMFORTABLE		COMFORTABLE		COMFORTABLE		COMFORTABLE		COMFORTABLE	
B+										
B	ACCEPTABLE				ACCEPTABLE		ACCEPTABLE			
B-	AT RISK		ACCEPTABLE				AT RISK		ACCEPTABLE	
C+	UNACCEPTABLE/ UNCOMFORTABLE				AT RISK	AT RISK	UNACCEPTABLE/ UNCOMFORTABLE			
C-			AT RISK	AT RISK					AT RISK	AT RISK
D					UNACCEPTABLE/ UNCOMFORTABLE					
E										
	Peak and Average of Maximum Activity levels have similar guidance as people visiting retail areas stated they were particularly sensitive to crowding.		The "at risk" level is set at a lower PCL during the Average of Maximum Activity than peak flows. This is because of the greater number of single travellers and the short duration of maximum activity.		The "at risk" level is set at a lower PCL than peak flows in Residential Areas to reflect the short time this is likely to occur. A site visit to Residential sites is particularly important to check if there is school activity or a bus stand in the area.		Peak and Average of Maximum Activity levels have similar guidance as people visiting tourist areas are likely to be particularly sensitive to crowding		The "at risk" level is set at a lower PCL during the Average of Maximum Activity than peak flows. This is because of the greater number of single travellers and the short duration of maximum activity.	

The Pedestrian Comfort Guidance for London (TfL, 2010)
An example can be found in Aldgate Gyratory the City of London Pedestrian Comfort Analysis

Designing Inclusive Streets

Public spaces and streets play a key role in improving accessibility and helping to create social cohesion and should be designed to consider the needs of all users.

Inclusivity is becoming important in the light of ageing population and the need to create safe environments for people of all abilities.

All streets should therefore be designed to be convenient, safe and welcoming for as wide a demographic as possible.

"Design should give special consideration to the young, old and those **with disabilities" and "free from barriers such as footway obstructions"**

Equality Act 2010

The Council has a statutory duty to take into account the diverse needs of everyone, regardless of age, gender or ability.

We need to make reasonable adjustments to comply with this duty.

Key requirements

Inclusive design must be embedded in the design process for all works on Edinburgh streets.

An inclusive approach to design should consider the needs of vulnerable users, particularly:

- People with visual impairments;
- People with mobility impairments including buggies;
- Wheelchair users;
- Elderly and young people;
- Gender equality;
- Ethnic minorities; and
- Visitors with language difficulties.

These user groups can be accommodated by employing the following design priorities overleaf and consultation with the Edinburgh Access Panel.

The City of Edinburgh Council

The City of Edinburgh Council

The City of Edinburgh Council

The City of Edinburgh Council

Relevant Factsheets

Minimising Street Clutter (P7) Promoting Pedestrian Movement and Activity (P2) Footways (P3)
Shared Space (P8) Flush / Drop Kerb Detail (G4)

Design priorities – check list

- ❑ Maintain sufficient effective clear widths (see Footway Factsheet) to accommodate wheelchair users on all footways.
- ❑ Minimise street clutter by undertaking a De-cluttering Assessment.
- ❑ Maintain surface materials in a good condition to avoid trip hazards.
- ❑ Provide consistent crossing facilities at regular intervals.
- ❑ Employ a consistent approach to tactile paving layout and design.
- ❑ Ensure good sightlines are maintained across the street.
- ❑ Provide places for rest at intervals appropriate to the street type – see Seating.
- ❑ Consider lighting improvements where there are issues of safety and security.
- ❑ Where a proposed layout deviates from a conventional configuration, such as that of a shared surface, a comprehensive consultation process should be conducted to ascertain wider user needs.
- ❑ Provide convenient and safe access to parks and green space, by providing dropped kerbs and parking restrictions at park entrances.

The City of Edinburgh Council

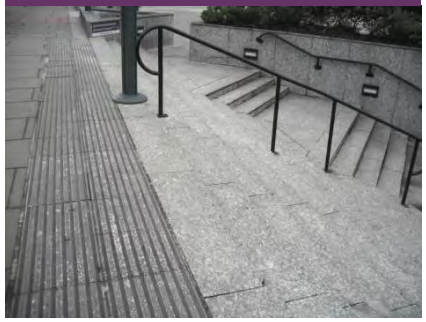
The City of Edinburgh Council

Relevant Factsheets
Crossings (G4)
Seating (F2)
Shared Space (P8)
Street Furniture (F1)
Minimising Clutter (P7)
Tactile Paving (M4)
Footways (P3)

Equality & Rights Impact Assessment (ERIA)

An Equality & Rights Impact Assessment should be completed for any scheme that involves a significant change to the existing street configuration.

Tactile paving and handrail to assist visually impaired, elderly and less mobile users etc. at Waverley Mall steps, Edinburgh.



The City of Edinburgh Council

Engagement process

The Edinburgh Access Panel provides advice on access arrangements for new developments and should be consulted where appropriate.

1. Engage with representatives from vulnerable user groups and consider their specific requirements throughout the design process; utilise Edinburgh Access Panel.
2. Maintain an ongoing dialogue with these groups where appropriate to ensure that design considerations are documented as part of the design development.
3. Provide feedback to the relevant user groups on a regular basis and demonstrate a consistent approach to consultation.

Jackson's Close, Edinburgh – slabs used in the central clear zone improve comfort underfoot

The City of Edinburgh Council

Relevant standards and information:

- Equality Act (Scotland) 2010
- PAN 78 Inclusive Design, 2006
- Designing Streets, 2010
- Inclusive Mobility, DfT, 2005
- Equality & Rights Impact Assessment Proforma, The City of Edinburgh Council

Relevant Factsheets:
Tactile Paving (M4) Shared Space (P8) Footways (P3)

Image References

Promoting Pedestrian Movement & Activity
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Analysing Movement & Activity – Available Methods
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Informal pedestrian crossing desire lines to major trip attractors supported by a central reservation: The City of Edinburgh Council 2016

Pedestrian Desire Lines
Informal pedestrian crossing movements... : The City of Edinburgh Council 2016
Pedestrians will often cross around a designated... : The City of Edinburgh Council 2016

Pedestrian Comfort
Pedestrian congestion on footways at bus stops and at street furniture pinch-points: Atkins 2016
Lack of footway capacity: The City of Edinburgh Council 2016
Pedestrian / cyclist interactions on busy urban streets: The City of Edinburgh Council 2016
Lack of crossing width capacity: The City of Edinburgh Council 2016

Pedestrian Comfort Level on Footways
Pedestrian comfort level diagrams. Pedestrian Comfort Guidance for London: Guidance Document (2010). [ONLINE]. Available at: http://content.tfl.gov.uk/pedestrian-comfort-guidance-technical-guide.pdf [Accessed 5 December 2016]

Designing Inclusive Streets
Clutter footway with insufficient clear width: The City of Edinburgh Council 2016
Clear footway width behind bus stop: The City of Edinburgh Council 2016
Tactile paving at refuge island: The City of Edinburgh Council 2016
Lack of crossing width capacity: The City of Edinburgh Council 2016

Design Priorities – Check list
Street design poor example: The City of Edinburgh Council 2016
Street design good example: The City of Edinburgh Council 2016

Equality and Rights Impact Assessment
Jackson's Close, Edinburgh – slabs: The City of Edinburgh Council 2016

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P3 – Footways

Amendments:
05/11/2018 – Guidance updated following ban on advertising boards

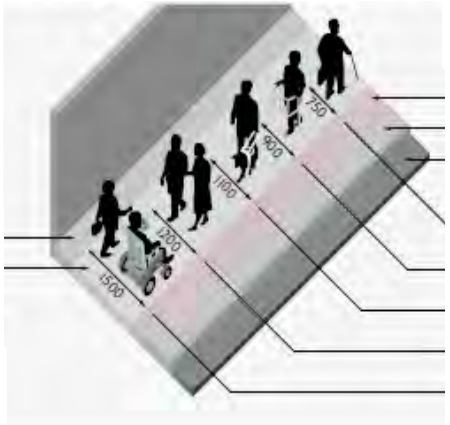
Footways

Footways should be installed on both sides of a street and are integral to the creation of an attractive and high performing public realm space.

All footways should be fit for purpose by having:

- sufficient width to comfortably accommodate pedestrian flows
- stable, trip free surfacing
- good continuity and legibility
- A standard kerb height of 75-100mm from carriageway level.

Footway width requirements (adapted from DfT, Inclusive mobility)



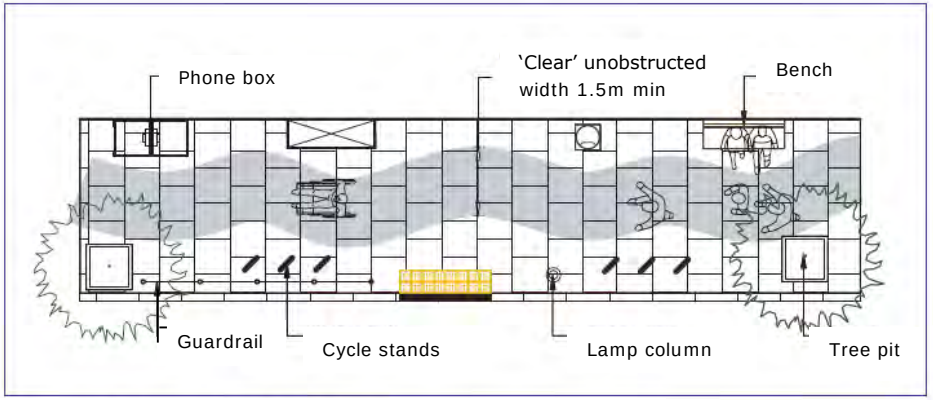
Source: London Streetscape Guidance, 2016

Furniture Zone (500-2000mm)
Kerb Zone (200-450mm)
Carriageway

750mm for person with walking stick
900mm for person with crutches or walking frame
1100mm for person with cane or guide dog
1200mm for visually impaired person being guided
1500mm for wheelchair user and ambulant pedestrian side-by-side

Princes Street footway, 5m wide

The City of Edinburgh Council

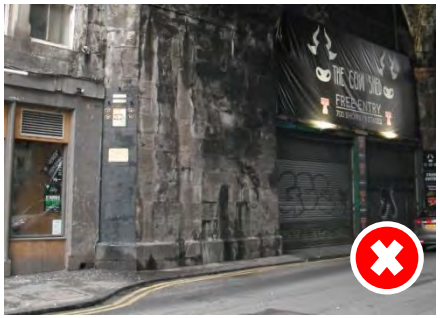


Considerations for maximising 'clear' footway width Source: London Streetscape Guidance, 2016

Relevant Factsheets:
Designing Inclusive Streets (P2)
Equality and Rights Impact Assessment (P2)
Minimising Street Clutter (P7)
Street Furniture (F1)

Footway Widths

The City of Edinburgh Council



The City of Edinburgh Council


Atkins 2016


The City of Edinburgh Council


Google Earth 2017

The City of Edinburgh Council

Footways should be of sufficient width to reduce crowding and risks of people being forced into the carriageway, particularly where there are high pedestrian flow rates.

The proportional relationship between the footway, buildings and the carriageway (with a presumption against reducing footway widths) should be respected.

There is no maximum width for footways; the minimum values may increase to accommodate practical requirements such as high pedestrian flows, provision for bus stops, and street furniture or to reflect the character of the area, by relating to the building line and scale of the street.

Relevant Factsheets:
Street Furniture (F1)
Locating Shelters on Footways (PT2)
Minimising Street Clutter (P7)
Pedestrian Comfort (P2)

P3 – Footways: Footway Widths

Factsheet

Table P3.1 below presents desired and minimum footway widths for different street types in Edinburgh, this applies to all new streets. For existing streets, design should aim to increase/conform to 'desired' footway widths, or if this is not possible, to 'minimum' widths. New Streets should be designed at least to desired widths. (see also notes to the table)

Street type	Rural / No Frontage		Industrial Employment Streets		Low Density Residential Streets		Medium Density Residential Streets		High Density Residential Streets		Service Sector Employment Streets		Retail/ High Streets	
	Min.	Des.	Min.	Des.	Min.	Des.	Min.	Des.	Min.	Des.	Min.	Des.	Min.	Des.
Strategic Streets	2	≥ 2m	2m	≥ 3m	2m	≥ 2.5m	2.5m	≥ 3m	2.5m	≥ 3m	Widths should be assessed using the methodology in P2 but should not be less than for high density residential streets.			
Secondary Streets	2	≥ 2m	2m	≥ 3m	2m	≥ 2m	2.5m	≥ 2.5m	2.5m	≥ 3m				
Local Streets	2	≥ 2m	2m	≥ 2.5m	2m	≥ 2m	2m	≥ 2.5m	2m	≥ 2.5m				

Notes to the table

- There is a required minimum footway width of 2m for streets serving more than 50 new dwellings.
- A minimum footway clear width of 1.5m should be carried through past driveways and dropped kerbs for crossings to allow wheelchairs/ prams to pass and avoid the ramps to dropped kerbs. See also factsheet P4.
- A 3m minimum footway width is to be provided outside schools and other buildings likely to generate concentrated pedestrian flows.
- An additional 0.5m should be provided where parked vehicles are likely to overhang the footway; alternatively the footway edge should be protected by bollards or chocks with the minimum set back from the kerb edge.

Reductions in minimum width

- When segregated cycle provision is being installed in existing streets, it may be acceptable to reduce footway widths below the minimum in the table.
- Footways may have reduced widths, over short lengths not exceeding 3m in long profile, to negotiate mature trees and other obstructions e.g. bus stops, but they should at no point be less than 1.5m from kerb edge to building line (exceptions may apply to WHS and Conservation areas).
- Where public utility services underlie the footway, special arrangements may be necessary at sections of reduced width to accommodate utilities in the carriageway or verge.

3m footway widening on Waverley Bridge has significantly enhanced footway capacity and improved crossing provision to the station.

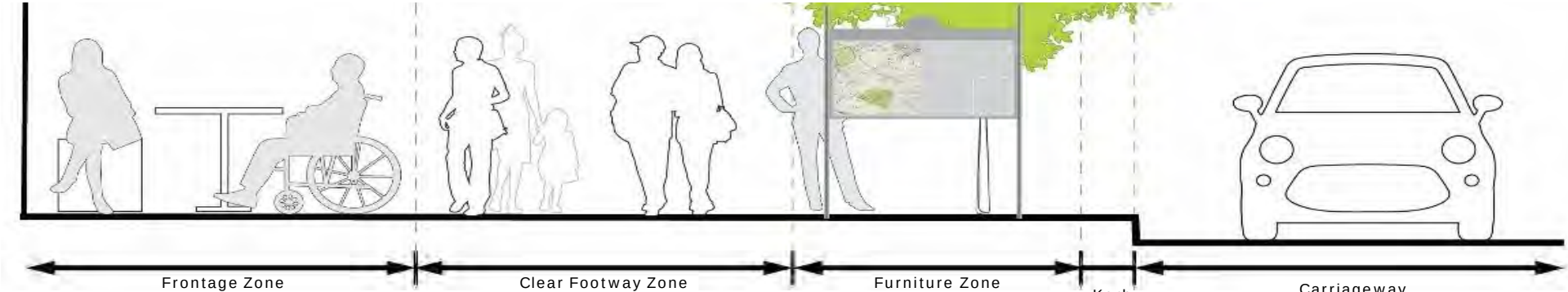
The City of Edinburgh Council:

Special streets

Historic streets may have consistently wider footways to recognise their role on processional routes or as important tourist destinations.

Relevant Factsheets:
Bus Routes (PT1) Minimum Kerb Zone (F1) Vehicle Crossovers on Footways (P4)

Footway Zones



- The *frontage zone* is the area directly adjacent to the property boundary.
- In streets with active frontages, if there is sufficient width for the clear footway and furniture zones, this zone may be occupied by activities such as tables and chairs.
- In residential streets, this zone is likely to be a private zone (gardens or driveways).
- Street furniture, such as lighting columns and cabinets may be placed in this zone - making sure that any obstruction of building entrances / windows is avoided.

- The *clear zone* is the area of the footway primarily designed for walking.
- Generally, no street furniture should be installed within the clear zone except lighting columns and sign poles.
- Attempts should be made to maximize the clear zone width, providing no less than the minimum clear width of 1.5m (2m in strategic retail streets)
- This zone should have a smooth surface, suitable for wheelchair users and people with impaired mobility.
- Where a footway is dropped to provide a flush crossing point or access, the aim should be that the full width of the clear zone remains level and not be part of the dropped approach to the crossing. See factsheet P4 for details.

- The *furniture zone* is the area used to provide street furniture including traffic signs and tree planting (sometimes lighting columns).
- A kerbside furniture zone may only be provided where adequate clear zone widths and kerb zone widths can be maintained.
- Street furniture should only be provided where it is appropriate for the location in both function and scale.
- All new lighting should be located at the back of the footway or mounted on buildings where possible, to maximise clear footway widths. Exceptions to this include situations where the column would obstruct windows, compromise security to a property, or streets with particularly wide footways.

- The *kerb zone* is the buffer space required between any item of street furniture and the carriageway edge, so as to avoid any overhanging part of a vehicle coming into contact with the street furniture.
- To maximise clear walking zones, particularly in narrow footways, the standard kerb zone of 450mm may be reduced to 200-300mm. See Minimum Kerb Zone Factsheet for details.

Relevant Factsheets:
Furniture Zone (F1)
Minimum Kerb Zone (F1)
Speed Reduction and Traffic Management (G6)
Street Lighting (F6)
Vehicle crossovers on Footways (P4)
Dropped Kerbs (G4)

The City of Edinburgh Council

Frontage zone requirements for seating are outlined in Licensing Tables and Chairs. Clear zone requirements must be maintained at all times by means of a barrier.

The City of Edinburgh Council

Designers should be mindful of the impact of street furniture on pedestrian activity and understand the implications on the clear zone when positioning bus stops, cycle stands, seating etc. which attract additional stationary pedestrian activities.

The City of Edinburgh Council

The furniture zone may be located at the back of the footway where there is no active frontage and if footway space is constrained. Street furniture to be located a maximum recommended distance of 275mm away from the building line.

The City of Edinburgh Council

Incremental additions of street furniture can reduce the usable clear zone width– note the position of the litter bin above will restrict access along the footway for wheelchair users.

Relevant Factsheets:
Furniture Zone (F1)
Minimising Street Clutter (P7)
Footway Widths (P3)
Minimum Kerb Zone (F1)

Use of Tables and Chairs on Footways

The application process for permitting outdoor dining provision is detailed in the City of Edinburgh **Council's** Tables and Chairs Applying for a Permit: Consent Guidelines and Terms and Conditions, April 2016.

The guidance provided in this document provides additional information on the placement and should be used to supplement the main application guidance.

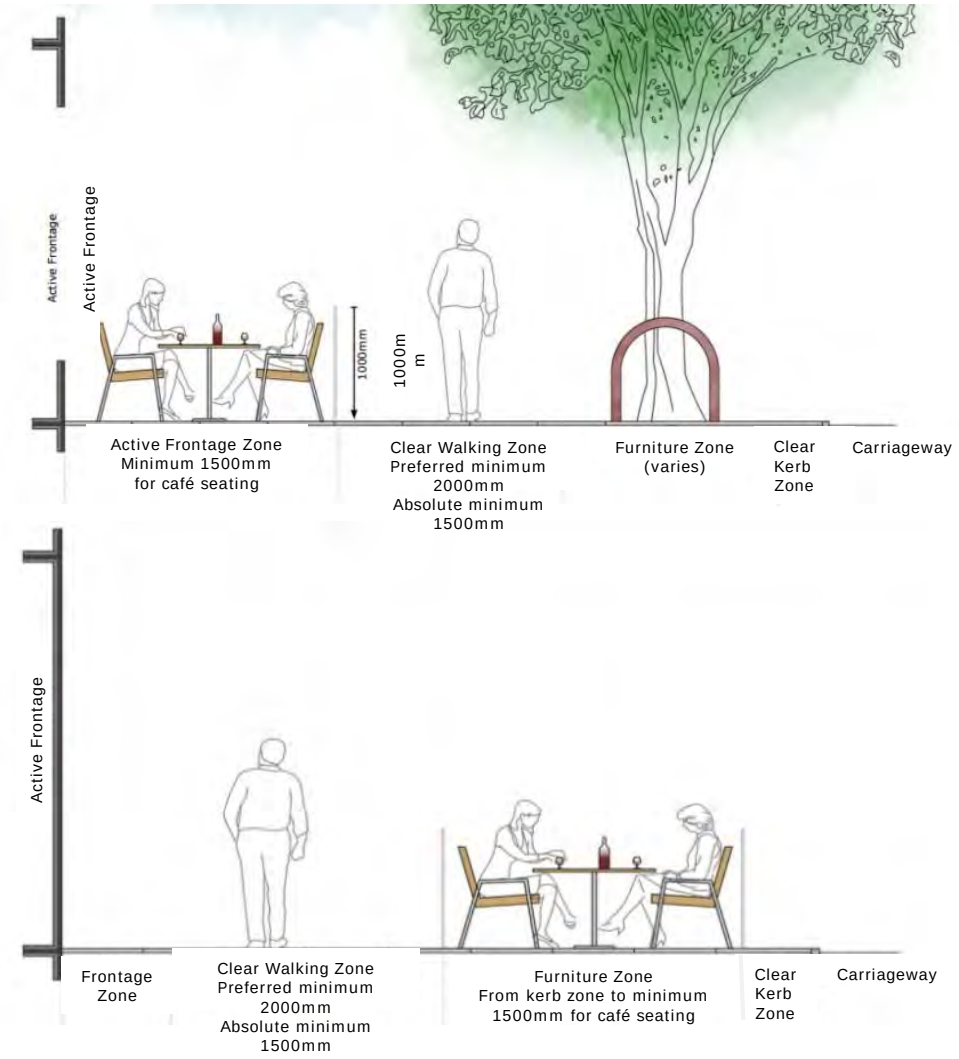
Inclusive design

Permitting the use of tables are chairs should not detrimentally affect vulnerable street users

Provision of solid barriers at either end of the permit area is a mandatory requirement and should be of a design suitable for the needs of people with visual impairments, providing a barrier:

- at least 1m in height from the footway level.
- extending the full width of the tables and chairs area.
- with a colour contrast to the surroundings.
- including a tapping rail or other physical horizontal element approximately 150mm above the ground to help guide people with visual impairments.
- Suitably robust and appropriately fixed to avoid collapse when walked in to.

- An absolute minimum clear zone of 1.5m is kept free of tables and chairs as well as other temporary or permanent items. Clear footway zone must not be used to service the tables.
- On footways with high pedestrian flows, the clear width may be increased to 3m or more, at the Council's discretion and in relation to pedestrian comfort levels, to avoid overcrowding.
- Tables and chairs are not permitted where pavement depth is <3m, unless the tables and chairs can be served directly from the doorway or frontage.
- A-boards should not be located in the clear walking zone.



Relevant Factsheets:
Street Furniture (F1) Designing Inclusive Streets (P2)

Use of Temporary Advertising Structures on Streets

On 17 May 2018, the Transport and Environment Committee approved a citywide ban on all temporary on-street advertising structures, such as advertising boards, also known as 'A' boards.

This is primarily to improve pedestrian safety and accessibility.

The ban comes into force on Monday 5th November 2018.

Structures that are not adverts

Temporary structures placed on a public street that do not have advertising on them, such as shop dressing items like planters and figurines, need written permission from the Roads Authority. To apply for permission, the relevant locality office should be contacted.

The city of Edinburgh Council

Relevant Factsheets:
Footway Widths (P3)
De-cluttering Assessment (P7)
Footway Zones (P3)
Furniture Zone (F1)
Designing Inclusive Streets (P2)

Use of Wayfinding Products on Footways

Ensure maximum user benefit is achieved and there are no negative implications on the pedestrian environment.

Pedestrian movement assessment

Totems should not block any major pedestrian flows or create pinch-points with buildings or other street furniture.

Pedestrian desire lines

Position totems adjacent to popular routes in a suitable viewing space, while not blocking or obstructing desire lines.

Maximising usage

Products should be located on the junction with the highest pedestrian flows and aligned to existing pedestrian routing (or chosen routes to be promoted) without obstructing key pedestrian desire lines.

Distance from kerbs

See Street Furniture Factsheet.

Product orientation

Position signs parallel or perpendicular to the kerb or building line to align aesthetically with the surrounding public realm. Totems should be orientated so the map panels directly face the greatest pedestrian flow at any given point.

Accessibility

Totem placement should ensure there is sufficient space surrounding it for full wheelchair access – a minimum distance of 1500mm is recommended. Similarly, totems should not be located on slopes or rough surfaces (such as grass) which may prevent wheelchair access. Content should also be displayed at recommended reading heights.

Proximity to pedestrian crossings

Signage should be located close to formal pedestrian crossings where possible, to reduce safety issues of people directly following the sign and crossing the road informally.

Alignment to existing signage provision

Any existing pedestrian signage which is retained should be taken into account throughout the high level placement strategy and detailed product placement. It should also be factored in to the signposting strategy stage.

Driver / pedestrian sightlines

Totems should be aligned away from the kerbside at junctions where possible. Do not block any driver sightlines of pedestrians which may enter road space – such as at crossings.

Avoid obscuring road signs

Placement should ensure no existing road signs (or other information boards, signage etc.) are obscured by any proposed totems or fingerposts.

Private land consideration

Private land boundaries should be considered when locating products and the likelihood of obtaining consent determined prior to any site visits.

Underlying services

Plans of underlying service utilities should be consulted when undertaking placement. Products cannot be installed within an approximate distance of 300mm from utility or service covers.

Impact of orientation on signposting directions

Parallel and perpendicular orientations of signage to the kerb and building lines are recommended to ensure routing is clear for users.

Impact of orientation on map crop

Orientation also impacts on the map crop and which destinations / routes are shown. Primary routing and information provision aims of each totem should therefore be carefully considered.

Relevant Factsheets:

Footway Widths (P3)
De-cluttering Assessment (P7)
Minimum Kerb Zone (F1)
Footway Zones (P3)
Street Furniture (F1)
Designing Inclusive Streets (P2)
Pedestrian Desire Lines (P2)

Image References

Footways
Princes Street 5m wide footway: The City of Edinburgh Council.
Footway Diagrams: TfL London Streetscape Guidance, 2016. [ONLINE]. Available at: http://content.tfl.gov.uk/streetscape-guidance.pdf [Accessed 02 November 2017]

Footway Widths
Insufficient footway width: The City of Edinburgh Council 2016
Sufficient footway width: The City of Edinburgh Council 2016
Bad example of footway/building proportions: The City of Edinburgh Council 2016
Good example of footway/building proportions: Google Earth. [ONLINE]. Available at: https://goo.gl/maps/cNe4hN6mzgn[Accessed 24 February 2017]
Bad example of footway width/street furniture for street: Atkins 2016
Good example of footway width/street furniture for street: The City of Edinburgh Council 2016

Footway Widths
3m footway widening on Waverley Bridge has significantly enhanced footway capacity and improved crossing provision to the station: The City of Edinburgh Council 2016

Footway Zones
Frontage Zone: The City of Edinburgh Council 2016
Clear Zone: The City of Edinburgh Council 2016
Furniture Zone: The City of Edinburgh Council 2016
Reduced Clear Zone: The City of Edinburgh Council 2016

Use of Tables and Chairs on Footways
George Street permitted tables and chairs: The City of Edinburgh Council 2016

Use of Advertising Boards on Footways
Clutter A-Boards on Shandwick Place: The City of Edinburgh Council 2016
Well positioned A-Boards on High Street: The City of Edinburgh Council 2016
A-Board in centre of footway on Cliffton Terrace: The City of Edinburgh Council 2016
A-Board in frontage zones on George Street: The City of Edinburgh Council 2016

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P4 – Vehicle Crossovers on Footways

Amendments:

Residential Footway Crossovers

Vehicle access to properties must not disrupt the continuity or level (see layout and Detail 3) of the footway.

Crossovers can provide access for single or multiple households. If necessary, the footway should be realigned and/or strengthened.

Location

- Do not reinstate redundant crossovers unless an historic feature (contact Planning).
- No new crossovers on retail and employment streets, with the exception of local streets.
- No crossover within 0.8m of any street furniture, trees, parking bays or bus stops.

Materials

- Crossover surfacing should match that of the surrounding footway.
- Where unit paving is used, smaller units may be required for durability if crossover is likely to be used by heavier vehicles.
- flat-topped setts can be used for historic streets or heavy use crossovers.

Widths

- Typical width for residential crossovers is 1.8m up to 4.5m for multiple dwellings or commercial crossovers to minimise risk of footway overrun.

Layout

- The ramp should be flanked with dropper kerbs (Detail1) or radius kerbs (Detail 2).
- Must provide a continuous footway surface highlighting to vehicles that it is a footway crossing.
- Max ramp depth will be 0.5m to leave the maximum possible level and clear walking zone behind the ramp (see details)
- Retain kerb edges (min. 25mm upstand) parallel to carriageway and residential boundary.
- Design crossover such that surface water runs into carriageway.
- In new streets, the whole width of footway must not be dropped to provide vehicle access (image 1 and 2). In existing streets, this approach is only acceptable if it is the only way to deliver an evenly graded clear walking zone of acceptable width or if there is an overriding historic reason (e.g. in WHS or Conservation areas – contact Planning). See Detail 3.

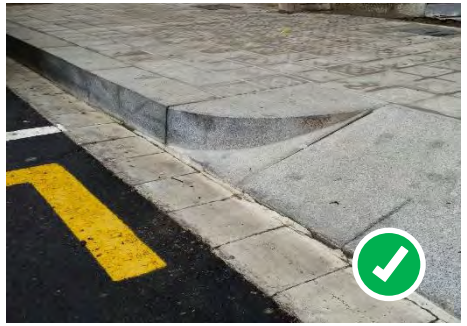
Rear of footway

- At least 1.5m wide evenly graded walking zone
- 0.9m absolute minimum ONLY in exceptional circumstances (e.g. providing disabled parking within property boundary)


The City of Edinburgh Council


The City of Edinburgh Council


The City of Edinburgh Council


The City of Edinburgh Council

Relevant Factsheets:
Vehicle Crossovers on Footways – Details (P4)
Footway Widths (P3)
Footway Materials and Surfacing (M1)

Commercial Footway Crossovers

Vehicle access to commercial property must not disrupt the continuity or level of the footway.

Crossovers can provide access for multiple dwellings (up to 50).

Footway is realigned and/or strengthened. Only in exceptionally heavy use (traffic volume) can it be designed as a side road.

Location

- Do not reinstate redundant crossovers unless an historic feature (contact Planning).
- No new crossovers allowed on retail and employment streets, with the exception of local streets.
- No crossover allowed at less than 0.8m from any street furniture, trees, parking bays or bus stops.

Materials

- Crossover surfacing should match that of the surrounding footway.
- Where unit paving is used, smaller units may be required for durability if crossover is likely to be used by heavier vehicles.
- flat-topped setts can be used for historic streets or heavy use crossovers.

Widths

- The width can vary between 1.8-4.5m for commercial vehicle crossovers to ensure no footway overrunning.

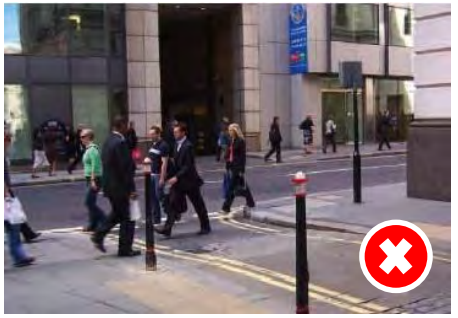
Layout

- Use configuration Detail 2 (toe crossing with radius /corner kerbs) with the area level with the footway behind the ramp strengthened to withstand heavier vehicles.
- Must provide a robust continuous footway surface highlighting to vehicles that it is a footway crossing.
- Max ramp depth will be 0.5m to leave the maximum possible level and clear walking zone (1.5m min) behind the ramp (see details).
- Retain kerb edges (min. 25mm upstand) parallel to carriageway and property boundary.
- Design crossover such that surface water runs into carriageway.
- In new streets, the whole width of footway must not be dropped to provide vehicle access (image 1 and 2). In existing streets, this approach is only acceptable if it is the only way to deliver an evenly graded clear walking zone of acceptable width or there is a historic reason (e.g. in WHS or Conservation areas – contact Planning). See detail 3.

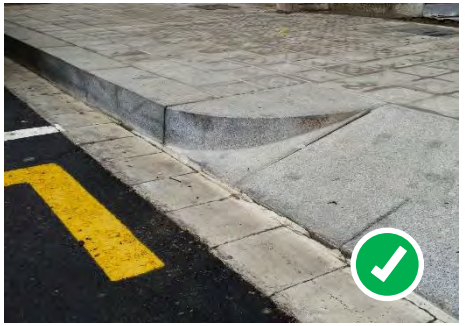
Rear of footway

- At least 1.5m wide evenly graded walking zone
- 0.9m absolute minimum ONLY in exceptional circumstances (e.g. providing disabled parking within property boundary)


The City of Edinburgh Council


Designing Streets


Access to historic street


The City of Edinburgh Council

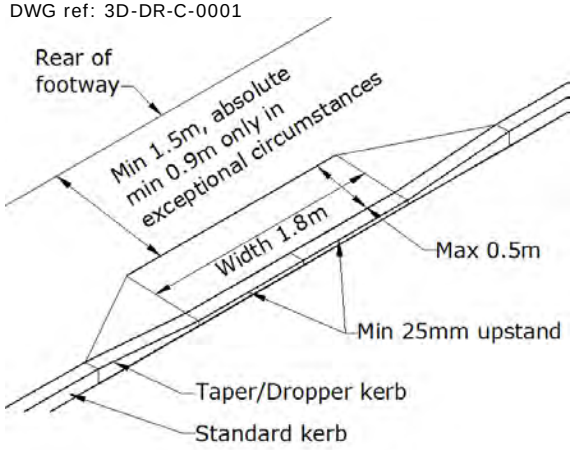
Relevant Factsheets:
Vehicle Crossovers on Footways – Detail (P4)
Footway Widths (P3)

Details

For motor vehicle access to private land.

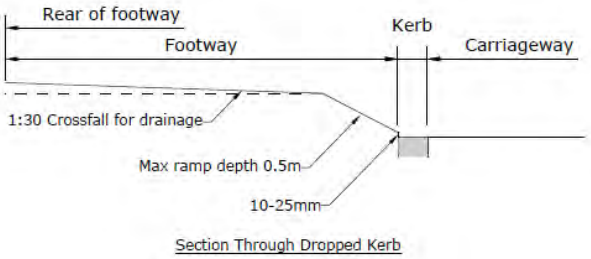
Detail 1 - Toe crossing with dropper kerbs*

DWG ref: 3D-DR-C-0001



Plan Of Vehicle Drop Kerb

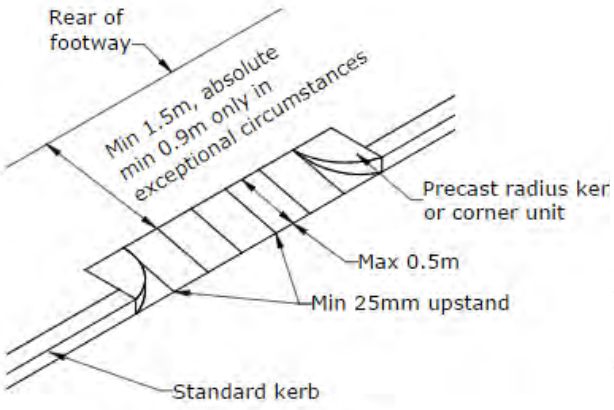
DWG ref: 3D-DR-C-0003



Section Through Dropped Kerb

Detail 2 - Toe crossing with radius/corner kerbs**

DWG ref: 3D-DR-C-0003



Plan Of Vehicle Drop Kerb

DWG ref: 3D-DR-C-0003

Notes:

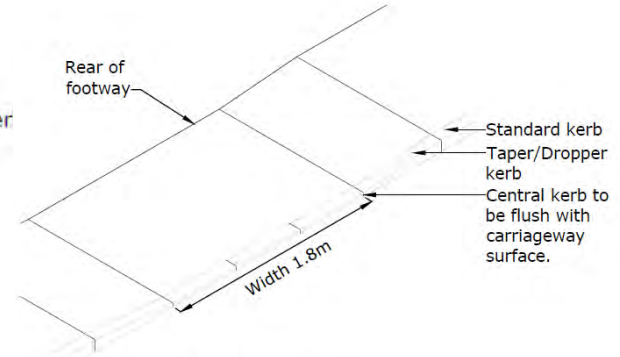
* Applicable for residential crossovers

** Applicable for residential and commercial

Consideration must be given to the potential for the grounding of vehicles using the crossover and how to mitigate the risk of this.

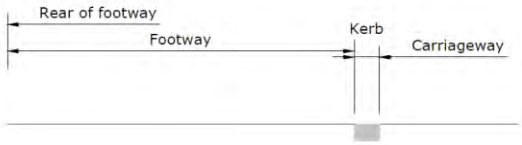
Detail 3 – Flush/drop kerb (Only for use if Details 1 or 2 are not deliverable due to footway being too narrow)

DWG Ref: 3D-DR-C-0008



Plan Of Pedestrian Drop Kerb

DWG Ref: 3D-DR-C-0008



Relevant Factsheets:

Footway Widths (P3) Dropped Kerbs (G4)

Image References

Vehicle Crossovers on Footways
Images left to right

1. The City of Edinburgh Council
2. The City of Edinburgh Council
3. The City of Edinburgh Council
4. The City of Edinburgh Council

Commercial Footway Crossovers
Images left to right

1. The City of Edinburgh Council
2. Designing Streets, 2010
3. The City of Edinburgh Council
4. The City of Edinburgh Council

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P5 – Pedestrian Guardrail

Pedestrian Guardrail Assessment	1	Amendments:

Pedestrian Guardrail Assessment

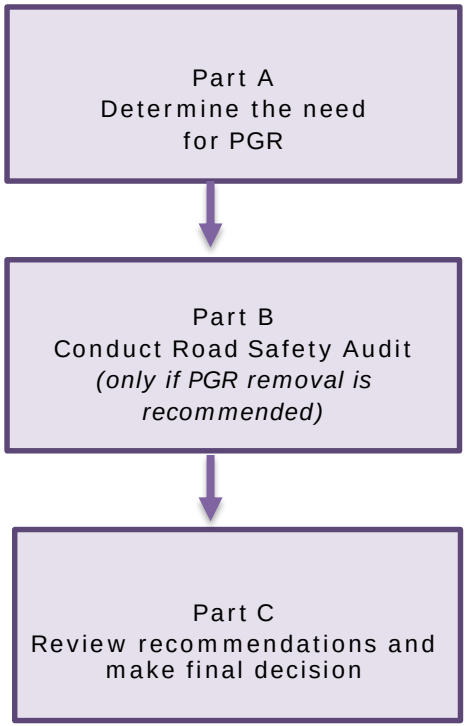
Pedestrian Guardrail (PGR) Assessment

The council has committed to review the need for existing pedestrian guardrail (PGR) and to minimise its use. This is aligned with Scottish Government guidance (Designing Streets) and a procedure is now in place to review existing and proposed PGR.

Pedestrian Guardrail Assessment (approved by the Transport, Infrastructure and Environment Committee 18 June 2012)

This process should be carried out at all locations of works where PGR exist or PGR is considered as part of the design of new streets / alterations to existing streets.

PGR Assessment Process



Key Principles

- initial presumption in new schemes that no PGR will be provided.
- a specific safety case must be made in order to retain or install PGR.
- an assessment process which demonstrates a clear audit trail of the decisions taken is required. This should be documented as part of the 3 stage assessment outlined in the Guardrail Assessment process

Cycle Parking

PGR is often used informally as cycle parking. When PGR is removed, facilities for cycle parking should be considered.

As a result of undertaking the PGR Assessment, designers can conclude one or more of the following outcomes:

1. No PGR or other barriers are required
2. Safety measures are required but PGR is not the appropriate solution
3. PGR should be retained or installed with a list of safety reasons.

Once finalised, email the signed copies of the PGR assessment form to:

transport.roadsafety@edinburgh.gov.uk

This will assist The City of Edinburgh Council with monitoring.

Relevant Factsheets:

Minimising Street Clutter (P7)
Crossings (G4)
Cycle Parking (C7)
Promoting Pedestrian Movement and Activity (P2)
Crossings at or near junctions (G5)
Footways (P3)
Pedestrian Desire Lines (P2)

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Pedestrian Guardrail Assessment

A unique ID reference number shall be allocated, as it is intended all assessments will be logged into a database.

Assessment of existing guardrail ☐ **ID**……
(attach site plan/sketch & photographs)

Assessment of proposed guardrail ☐
(attach project plan)

Assessment Location (and/or project/drawing reference)

……
……
……

For example:

Reduce vehicle-pedestrian collisions

Channel pedestrians to crossing points

Protect pedestrians from a significant difference in level

Prevent pedestrians spilling into carriageway where there are high pedestrian volumes

Guide visually impaired across staggered crossings

Prevent kerbside waiting / loading

What is the intended purpose of guardrail?

……
……
……
……
……
……

Was the guardrail installed as part of an AIP (Accident Investigation and Prevention) scheme?

☐ **No**

☐ **Yes – *provide the reason for installation***

……
……
……
……

For existing guardrail, is the guardrail considered <u>obviously redundant</u> without further investigation?

☐ **No** – *continue with the assessment (go to Stage 1)*

☐ **Yes** – *provide justification* ***and sign at the bottom of this page***

If yes, there is no need to fill out the remainder of the form. Complete Guardrail Removal Order. Don't forget to email the copy of this (signed) form to transport.roadsafety@edinburgh.gov.uk for accident monitoring purpose.

……
……
……
……
……
……
……

Site Assessor's Name and section ……

Signature…….. Date……

Peer Reviewer's Name and section ……

Signature…….. Date……

Once finalised, email the signed copies of this form to transport.roadsafety@edinburgh.gov.uk

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THE CITY OF EDINBURGH COUNCIL

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Part A Determining the need for guardrail

Stage 1 Place and movement context and road safety assessment

Describe the urban structure, character and identity of the location, in terms of different user groups and how they use the street. Note any attractors or activities that may affect the form and function of the street.

(i) Place: Character Assessment

……
……
……
……
……

Consider volumes and speeds and how users interact with each other. Is the street dominated by vehicles? Is it important for pedestrians? Does the layout give a sense of relative priorities between user groups?

(ii) Movement: Character Assessment

……
……
……
……
……

Consider any specific safety issues in relation to the location. For example, an unusual number of vulnerable road users, unusual peaks in flows, excessive vehicle speeds, awkward road geometry. Review accident statistics – is there an issue at this location?

(iii) Road Safety Issues

(For most locations, obtain and review 3-year accident statistics, ensuring the appropriate period is considered. Attach results to form.)

……
……
……
……
……

Stage 2 Street Type Assessment

Taking account of the Place and Movement Character assessment, allocate a Street Type to the location. Refer to Table 1 overleaf, and select the relevant ID number.

On the basis of the Stage 1 assessment Street Type is ☐

Consideration should be given to how appropriate guardrail is for different street types. The table overleaf should be used as a guide but not deemed to be a final decision.

How appropriate is guardrail in this street type?

……

Stage 3 Further Supporting Information

The use of guardrail is inappropriate in principle in certain street types, especially where a high degree of pedestrian priority is sought and vehicle speeds and flows are relatively low.

Is further supporting information required?

☐ **No** – (go to Stage 4)

☐ **Yes** – (state below what is required and why - then go to Stage 4)

State, if any, supporting information is required and/or desirable to help Stage 1, 2 and/or 3 assessments.
For some minor sections of guardrail being assessed, it may not be necessary to collate any or all of the supporting information. **Use professional judgement** as to when it is beneficial.

Pedestrian flows ……
Video survey/CCTV ……
Traffic flows ……
Speed limit vs mean speed ……
Other (specify) ……

	Character of street frontage/role for pedestrians				
	Retail / High Street **H**igh pedestrian flows	**Service sector employment and high/medium density residential** **M**edium pedestrian flows	**Low density residential** **L**ow pedestrian flows	**Employment (Industrial) with limited frontage access** **L**ow pedestrian flows	**No Frontage /Rural roads** **L**ow pedestrian flows
	Streets/roads with many junctions			Roads with few junctions	
Role of street for public transport and other traffic	Street category number				
Strategic: 'A' class roads, roads with intensive bus services or the highest general traffic levels, or roads signed as strategic routes to/from the city/city centre	1H	1M	1L	1F	1R
Secondary: Other roads, important for public transport and/or with a more than local role for general traffic	2H	2M	2L	2F	2R
Local: Other urban streets and roads; mainly residential streets, also minor rural roads	3H	3M	3L	3F	3R
Cycleways	4				
Footpaths, Home zones, Pedestrianised Streets	5				

Taking account of the Place and Movement Character assessment, allocate a Street Type to the location. Refer to the Council's existing street categorisation, as set out in Table 1 above, and select the relevant ID number.

Appropriateness of guardrail should be considered in principle as follows:-

- 1H Sometimes appropriate
- 2H Rarely appropriate
- 3H Rarely appropriate
- 1M Sometimes appropriate
- 2M Rarely appropriate
- 3M Rarely appropriate
- 1L Sometimes appropriate
- 2L Sometimes appropriate
- 3L Rarely appropriate
- 1F Sometimes appropriate
- 2F Sometimes appropriate
- 3F Rarely appropriate
- 4, 5 Rarely appropriate
- 1R Sometimes appropriate
- 2R Sometimes appropriate
- 3R Rarely appropriate

Street Type Assessment

Stage 4 Where are the predicted pedestrian desire lines, existing vehicle movements and conflict points between the two at this site?

A critical part of the guardrail assessment is to identify pedestrian and vehicle desire lines and then establish potential conflict points.

Assess pedestrian desire lines as if there is no guardrail, remembering that different pedestrian user groups may have different desire lines, particularly in relation to specific attractors.

Important desire lines, pedestrian and vehicular movements shall be plotted on a plan.

Remember to attach the plan to this form

a) Draw predicted pedestrian desire lines and vehicle movements on a street plan of the site.

IMPORTANT: If there is existing guardrail at this site **identify where desire lines would be if there was no guardrail present.**

b) Number the conflict points (where the desire lines and vehicle movements coincide)

c) Draw the locations of guardrail and label the sections A, B, C, etc.

d) Attach the plan to this form.

Stage 5 What is the severity of each predicted conflict point?

Pedestrian and vehicle desire lines commonly coincide but the fact that they do is not necessarily always a problem.

For each conflict point identified in Stage 4, state where the conflict might be significant and assess it against the five factors set out in the table below.

Also state which sections of guardrail are crossed by the desire lines being considered for each conflict point.

If the issue, under each factor, is not considered significant then the No box is ticked. If it is considered significant then details shall be provided.

Generally:-

Vehicle speeds of 20mph or less should generally not be a problem.

High levels of pedestrian flows at a specific location may be an issue.

Awkward geometry, such as a narrow footway may be an issue.

Visibility may be issue, is sub-standard. Do vehicles already slow down or not?

Other issues, such as steps, may be present.

Conflict Point 1			**Relevant Guardrail :**
Are there any particular concerns about …	**No** (tick)	**Yes** (tick)	Provide details, especially for **Yes**
…vehicle speeds?			
…volumes of conflicting movements?			
…awkward geometry?			
…visibility issue?			
…other issue (specify)?			

Insert as many tables as required for assessing all locations.

Conflict Point 2			**Relevant Guardrail :**
Are there any particular concerns about …	**No** (tick)	**Yes** (tick)	Provide details, especially for **Yes**
…vehicle speeds?			
…volumes of conflicting movements?			
…awkward geometry?			
…visibility issue?			
…other issue (specify)?			

INSERT FURTHER TABLES AS NECESSARY

If the issue, under each factor, is not considered significant then the No box is ticked. If it is considered significant then details shall be provided.

Assess guardrail not considered using the conflict point analysis
There may be other guardrail sections within the site, not associated with a specific conflict point. This guardrail should also be assessed, using the table below.

Guardrail Section:			
Are there any particular concerns about …	**No** (tick)	**Yes** (tick)	Provide details, especially for **Yes**
Generally:- …vehicle speeds? Vehicle speeds of 20mph or less should generally not be a problem.			
…volumes of conflicting movements? High levels of pedestrian flows at a specific location may be an issue.			
…awkward geometry? Awkward geometry, such as a narrow footway may be an issue.			
…visibility issue? Visibility may be issue, is sub-standard. Do vehicles already slow down or not?			
…other issue (specify)? Other issues, such as steps, may be present.			

Guardrail Section:			
Are there any particular concerns about …	**No** (tick)	**Yes** (tick)	Provide details, especially if **Yes**
…vehicle speeds?			
…volumes of conflicting movements?			
…awkward geometry?			
…visibility issue?			
…other issue (specify)?			

INSERT FURTHER TABLES AS NECESSARY

Stage 6 Confirm Problem Locations

Locations where there are no concerns in respect of all four criteria are deemed not to need guardrail.

It may be the case that a section of guardrail is relevant to several different conflict points / desire lines. If there are significant concerns with **at least one of the** desire lines, categorise this guardrail as type 2

After all conflict points have been considered, based on your analysis in stages 1 to 5, categorise each guardrail location as either type 1 or 2 in the table below to confirm problem locations that require further assessment.

If two or more conflict points relate to the same guardrail sections and at least one of the conflict points raises significant concerns then this guardrail should be categorised as type 2.

1	Guardrail sections where there are no significant concerns and guardrail is not considered necessary	
2	Guardrail sections where there are some significant concerns and which need to be considered further in Stage 6	

For all type 1 Guardrail sections

- Guardrail considered unnecessary, therefore it is recommend guardrail is removed or not installed
- Do you feel after going through this process that a Road Safety Audit (RSA) is necessary to independently assess installation / removal of guardrail at these conflict points?

☐ **No**

☐ **Yes**, Order RSA (go to Stage 8)

For all type 2 Guardrail sections

- Continue assessment (go to Stage 7)

Site Assessor's Name and section ……

Signature…….. Date……

Stage 7 Determine Use of guardrail – Does/would the presence of guardrail contribute to the reduction of road danger and what alternatives are there to guardrail use?

Guardrail sections categorised as **type 2 in Stage 6** must be considered in more detail.

- Following on from the analysis in Stage 5 this question seeks to understand whether guardrail could be effectively employed towards achieving its stated purpose of materially diminishing road danger.
- For each conflict point explain how guardrail would make a contribution to reducing danger, specify how much guardrail is required to achieve that purpose.
- Consider if there are alternative mitigation measures that could be considered instead of guardrail. Also consider if any additional measures are desirable, as well as guardrail.
- Provide a breakdown of implementation costs.

Guardrail section	Contribution of guardrail to reducing danger	What guardrail is installed / proposed?	Alternative courses of action to reduce danger*	Cost Estimate

* Assess other possible course of action that could reduce road danger without the impacts that typically accompany the installation of guardrail. These may range in nature from comprehensive street design (e.g. replacement of roundabout with traffic signals) through to smaller scale traffic management measures to slow speeds etc, or other more indirect measures that remove the need for an intervention altogether.

Stage 7 Determine Use of guardrail (Continued)

Guardrail section	Contribution of guardrail to reducing danger	What guardrail is installed / proposed?	Alternative courses of action to reduce danger*	Cost Estimate

* Assess other possible course of action that could reduce road danger without the impacts that typically accompany the installation of guardrail. These may range in nature from comprehensive street design (e.g. replacement of roundabout with traffic signals) through to smaller scale traffic management measures to slow speeds etc, or other more indirect measures that remove the need for an intervention altogether.

Part B RSA Review, recommendations and final decision

Do you feel after going through this process that a Road Safety Audit (RSA) is necessary to independently assess installation / removal of guardrail at these conflict points?

☐ **No**, go to final determination (stage 9)

☐ **Yes**, order a RSA (go to Stage 8)

Stage 8 Safety Audit Recommendations and proposed exemptions

- Subject Part A recommendations to a RSA (use RSA request from)
- Summarise the recommendations of the safety audit by guardrail section. Guardrail sections not included in Stage 7 but identified as concerns by the safety audit should be added to the list. While this helps in understanding the particular concerns at each conflict point, the review also needs to consider how the safety audit recommends these concerns be overcome. This may involve measures other than guardrail.
- For each location where concerns were raised by the safety audit, indicate if and to what extent the recommendations are accepted and justification for any exemptions.

Guardrail section	RSA recommendations Regarding guardrail	Are they accepted?	Justification for proposed exemptions*
Stage 7 location:			
Stage 7 location:			
Stage 7 location:			
Stage 7 location:			
Other guardrail locations highlighted by safety audit :			

Other comments from the RSA not relating directly to guardrail

** It is acceptable not to adopt any specific RSA recommendation, but this must be justified. If a RSA response makes a guardrail recommendation that conflicts with the assessment proposal, a review process shall be undertaken for a final determination.*

Stage 9 Final Determination

Following the guardrail assessment and a review of the outcomes of the safety audit, a final decision needs to be drawn, weighing up all the information considered in the previous stages.

The guardrail assessment began with the consideration of an area of interest, and then progressed via a sieving process to identify specific locations where it is deemed to be an effective tool in addressing specific safety concerns.

Each of the locations where guardrail will be retained/proposed should be identified. Based on guardrail assessment illustrate the precise extent of proposed guardrail coverage on a map.

Cycle Parking

Is any guardrail to be removed currently useful for cycle parking (e.g. outside local amenity or shop, observed being used for cycle parking)? _____(Yes/No)

If yes, what alternatives will be put in place?

_____

Site Assessor's Name and section …….

Signature…….. Date……

Peer Reviewer's Name and section……..

Signature…….. Date……

Pedestrian Guardrail Assessment – Guidance Notes

These guidance notes provide supporting information to the CEC PGR Assessment methodology and PGR Assessment Forms.

Introduction

The Council's **Active Travel Action Plan** (ATAP) includes a commitment to review the need for existing pedestrian guardrail (PGR) and minimise its use. Scottish Government guidance, in the form of **Designing Streets**, and the Council's own guidance, Edinburgh Street Design Guidance (2015), recommend minimal use of guardrail.

One action of the ATAP is the development of an assessment process for the review and removal of PGR. This process will apply to existing sections of PGR and also any proposals for new sections of PGR, as part of improvement schemes.

PGR has been used since the 1930s, with significant increase in its use since the 1960s, when it was developed for traffic management purposes, as an inexpensive tool to separate pedestrians from motorised vehicles.

For many years, traffic management objectives have given priority to ensuring vehicles maintained free flow and speeds. However, a new approach is now becoming more prevalent, with a recognition that our streets need to share limited road space more effectively and there needs to be a greater emphasis on the majority of streets as places for social inter-action, rather than being mainly for movement of vehicles. Whilst PGR provides segregation that can reduce accidents, it does create a restricted pedestrian environment that impacts on the urban streetscape.

Legal Position

PGR has mainly been used to as a tool to reduce accidents between pedestrians and vehicles. However, there is no legal requirement for a Roads Authority to provide PGR. Whilst a Roads Authority has a general duty to carry out accident studies and take such measures as deemed appropriate to minimise those accidents, the burden of responsibility rests with the individual road user to travel in a manner appropriate to they conditions they encounter.

In this respect, the removal of PGR or not providing it should not, in the majority of situations, expose an individual Officer or a Roads Authority to liability. However, it is likely to be of assistance, if an assessment process has been undertaken, which demonstrates a clear audit trail of the decisions taken and their justification.

CEC PGR Assessment Process - Purpose

The Council's PGR assessment process seeks to establish a methodology that sets out logical staged approach to considering the need for PGR, with the objectives of ensuring consistency in the analysis, robust justifications and a clear audit trail.

The following sections provide guidance to assist with the PGR assessment and completion of appropriate forms. **However, it should be recognised that the assessment is not intended to be a basis 'tick box' process but does require the professional judgement of experienced staff.**

The methodology is presented below in 2 parts and 9 distinct stages.

Part A determines the necessity for having PGR, and Part B is where the recommendations go through a formal Road Safety Audit process and final decisions on installation, relocation or removal of PGR are made.

PART A: Determining the need for PGR

Stage 1(a) – Place context: built environment and socio economic factors

Describe the urban structure, character and identity of the study area. Note any particular attractors or socio-economic activities that may affect the form and function of the street.

Stage 1(b) – Movement context: assessing modal user groups

Review the street from the perspective of its use by different modal user groups. Consider volumes and speeds and how different user groups interact. Is the location dominated by motor vehicles? Is it important for pedestrians? Are there unusual peaks? Does the current carriageway/footway layout and built environment communicate a sense of relative priorities between user groups? Write a brief report.

Stage 1(c) – Road Safety Assessment:

Consider any specific issues in this location that might affect road safety, e.g. the presence of unusual numbers of vulnerable road users (e.g. schools), unusual peaks, excessive vehicle speeds, awkward highway geometry. What is there to learn from the historic casualty record? Write a brief report.

Stage 2 - Street Type Assessment

On the basis of the above, assign the location in question to one of the following street types. These help to clarify the importance of the location to pedestrians and motorised traffic and to describe a basic sense of relative priorities, and they also enable a 'first-pass' assessment of the appropriateness of PGR for the location in question. Where there are junctions, assess the type of each street involved. If street types do not apply, describe the type observed in similar terms.

- Appropriateness of PGR

The use of PGR should be considered is inappropriate in principle in certain street types, especially those where a high degree of pedestrian priority is sought and the volume & speed of motorised traffic are relatively low. If street types do not apply, assess the appropriateness of PGR in principle for the sui generis street type using the table in the form.

Stage 3 – Further Supporting Information

State, if any, supporting information is required and/or desirable to help Stage 1, 2 and/or 3 assessments. For some minor sections of guardrail being assessed, it may not be necessary to collate any or all of the supporting information. Use professional judgement as to when it is beneficial.

Stage 4 –Where are the pedestrian desire lines and coincidence points?

Vehicular desire lines are constrained by kerb lines (other than in Street Types 4 and 5); the traffic volumes on different arms at a junction are a measure of relative importance.

Pedestrian desire lines should be assessed on the assumption that there is no PGR, and will relate to crossing facilities, continued travel in a given direction across a junction, origins/destinations represented by doors/gates in nearby buildings, etc. Be aware that different pedestrian user groups may have different desire lines at different times of day. In shopping areas, and other locations with many pedestrian origins/destinations, there may be a multiplicity of desire lines. While few of these may be especially important, this pattern of movement presents particular challenges. Plot the important desire lines on a plan.

On the same plan, mark where important pedestrian movements and vehicular movements coincide. PGR is essentially a tool for influencing pedestrian desire lines, and Stage 5 is intended to identify those locations where this may be a desirable intervention.

Other than in Street Types 1L, 1F and 2F (and possibly 1R) PGR should not generally be considered in locations where no important desire lines coincide with vehicular movements.

Stage 5(a) –What are the severity of conflicts at coincidence points

Pedestrian and vehicle desire lines very commonly coincide, and the fact that they do is not necessarily a problem. This stage intends to identify where coincidences might lead to potentially dangerous conflicts and should include an identification of where there are other issues that may warrant the use of PGR or other measures such as trip hazards and school entryways. This should be determined according to an assessment against the 4 basic causal factors set out the table.

Stage 5(b) Other locations where PGR may be required

The following should identify locations where any of the above mentioned criteria give rise to concern even though it is not a major coincide of vehicular and pedestrian movement. It is intended to assess whether PGR may be a desirable intervention at these locations. At the end of stage 5 a list of coincidence points where there are issues that are considered severe enough to warrant consideration of PGR will be produced, and those locations taken forward into the stage 6 assessment.

Stage 6 – Confirm Problem Locations

Locations where there are no concerns in respect of all four criteria from Stage 5 are categorised as type 1 and are deemed not to need guardrail. The remaining guardrail is categorised as type 2.

It may be the case that a section of guardrail is relevant to several different conflict points / desire lines. If there are significant concerns with at least one of the desire lines, categorise this guardrail as type 2.

Stage 7(a) – Would the installation of PGR contribute to the reduction of road danger?

Following on from the above analysis this question seeks to understand whether PGR could be effectively employed towards achieving its stated purpose of materially diminishing road danger. For each potentially dangerous conflict described in Stage 5, explain how, if at all,

PGR would make a significant contribution reducing the danger. Specify how much PGR is required to achieve that purpose (in terms of the number of panels in each location) and explain why fewer or more panels would be appropriate. Mark all proposed PGR coverage on a map.

Stage 7(b) – What alternative courses of action exist that would reduce road danger?

Assess other possible course of action that could reduce road danger without the impacts that typically accompany the installation of PGR. These may range in nature from comprehensive street design through to smaller scale traffic management measures to slow speeds etc, or other more indirect measures that remove the need for an intervention altogether. Comment on cost/deliverability and impact on the need for PGR identified above.

PART B – Review recommendations and make final decisions

A decision should be taken as to whether a Road Safety Audit (RSA) for the site is necessary. The assessor should seek to balance the RSA cost with what will be gained above and beyond the information already gathered up to this point.

Stage 8(a) – Review by safety auditor (optional)

The results of the Part A analysis will be subjected to a safety audit. The audit will respond with a series of concerns for the Council to consider.

Stage 8(b) – Response to safety auditor

For each location where concerns were raised by the safety audit, Stage 8 needs to indicate if and to what extent the recommendations are accepted. Should exceptions be made from the safety audit's recommendations, justification needs to be provided. Locations from Stage 7 having no concerns raised by the safety audit should not be considered.

Stage 9 – Make a Final decision and record/report site for monitoring

Each of the locations where guardrail will be retained/proposed should be identified. Based on guardrail assessment illustrate the precise extent of proposed guardrail coverage on a map.

Following a review of the assessment form (and safety audit results if appropriate), the Council will make a final decision on the need to install, relocate or remove PGR as per the plan.

If there is **cycle parking on guardrail** which is to be removed, the team responsible for new cycle parking stands should be informed. They will choose cycle parking sites that best meet demand and if possible add new stands.

MONITORING AND RECORD KEEPING

Please send the copy of the signed form (and as appropriate any images, drawings, additional data, RUSA etc) to transport.roadsafety@edinburgh.gov.uk

P6 – Footpaths

Footpaths	1	Amendments:

Footpaths

A footpath is any delineated pedestrian route that is not directly adjacent to carriageway space.

Footpaths should be:

- 2m wide as a minimum in most settings.
- increasing to 3m when vehicular use is expected
- increasing to 3.3m under buildings to allow for 0.9m clear width around a parked car.

It is preferable for footpaths to be laid out in wider corridors (with a desirable 5m width between vertical obstructions, including the verge) so as to avoid creating a confined path network.

Shared use or segregated pedestrian/cycle paths should always be considered as an alternative to footpaths to enable additional cycling benefits.

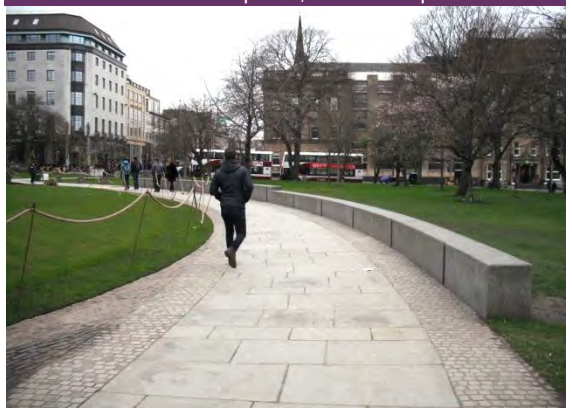
Meadows pedestrian and cycle path, 2m x 2m wide (buffer is to improve sightlines at the junction)

The City of Edinburgh Council

Inviting pedestrian link

Designing Streets 2010 (John Thompson & Partners, Queen Elizabeth Park)

St Andrew Square; 2.5m footpath



The City of Edinburgh Council

Relevant Factsheets:

Creating Active Travel Networks (P1)

Quiet Routes (C1)

Image References

Footpaths

Meadows pedestrian and cycle footpath, 5m wide: The City of Edinburgh Council

Inviting pedestrian link: Designing Streets 2010. [ONLINE]. Available at: http://www.gov.scot/Resource/Doc/307126/0096540.pdf [Accessed 16 May 2017]

St Andrew Square; 2.5m footpath: The City of Edinburgh Council

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P7 – Minimising Street Clutter

Amendments:

Minimising Street Clutter

The Council has the authority to select and position many types of street furniture, including signs, road markings, seating, cycle racks, bollards, street nameplates, trees and some bus shelters.

The design and positioning must consider the impact that the apparatus will have in terms of aesthetics, amenity and accessibility.

Conservation areas require additional de-cluttering processes.

Depending on the scope of works, a staged approach for de-cluttering existing streets should be adopted, utilising the following principles:

Relevant information:

- Reducing sign clutter (TAL 01/13, DfT, 2013)
- DfT Circular 01/2016, The Traffic Signs Regulations and General Directions 2016

Remove – Non-essential items are to be removed, with the presumption in favour of sign removal except where mandatory or direction signs that form part of a route

Merge – Rationalise features such as lighting and signage that could be combined to reduce the number of poles etc.

Relocate – Consider better placement of features, in particular, to reduce the use of poles.

Replace or repair damaged items that are legally required or remain useful.

Recreate the street – for large scale, transformational projects, complete redesign of the street utilising a 'blank canvas' approach, can embed the principles of minimal clutter from the start.

There is a need for balance. Seats, trees and cycle racks all make important positive contributions to streets. Direction signs are an essential component of the developing QuietRoutes network.

The City of Edinburgh Council: Successful application of de-cluttering on Castle Street to ensure the street acts as a stage for the wider urban realm.

Relevant Factsheets:
Street as a Place: Desired Characteristics (P1)
Promoting Pedestrian Movement and Activity (P2)

Traffic Signs

Traffic signs must comply with the TSRGD (2016). Where necessary the DfT permits the use of non prescribed signs in exceptional circumstances.

Design requirements

- Signage requirements, restrictions and potential visual impact should be considered during the development of any new scheme proposal.
- Undertake site surveys for all new signage to ensure coordination with existing signage.
- Identify signs that are not mandatory and may be used at the discretion of the Council (see De-cluttering Assessment)
- Assess the function of each mandatory and advisory sign, and determine whether they can be safely rationalised or removed altogether.
- Co-ordinate different signs and carefully consider the location of signs to reduce the number of poles required.
- In the World Heritage Site and Conservation areas, give extra consideration to the visual impact of signs and how this can be avoided or reduced.
- Locate signage onto buildings, walls and street furniture where possible, and reduce the use of poles (follow current Council guidance on obtaining approval from owners and any agreement from Planning and Strategy).
- Avoid using contrasting sized and shaped signs located together, as these may reduce the clarity of message for drivers and reduce the quality of the street scene.
- Do not use oversize grey or yellow sign plates except in very exceptional circumstances for safety critical warning signs.

TSRGD 2016 – Reducing sign clutter

2.09: Overuse of traffic signs blights our landscape, wastes taxpayers' money and dilutes important road safety messages. Research carried out by the Department to inform the Traffic Signs Policy Review showed that the number of traffic signs has doubled in the last 20 years. This is unsustainable, and bears out the need to reduce signing whenever possible. A culture change is needed in the way signing is used.

2.10: In June 2015 the Secretary of State asked Sir Alan Duncan MP to lead a task force looking into all the issues surrounding sign clutter and to make recommendations as to how this can be reduced further, building on the work TSRGD has already done. Ministers will decide how to take forward Sir Alan's recommendations, including amending TSRGD 2016 if needed.

2.11: Reducing sign clutter was a key aim of the revision of the Traffic Signs Regulations and General Directions. TSRGD 2016 contains a number of changes which will cut costs, complexity and sign clutter. It provides a modern framework that will mean far fewer signs need to be placed, and gives local authorities the right to remove many of their existing signs.

2.12: The Department sets the legislation governing what traffic signs look like and mean, but decisions about which traffic signs to place and where to place them is a matter for local authorities. TSRGD 2016 gives authorities more tools than ever before to tackle the scourge of too many signs.

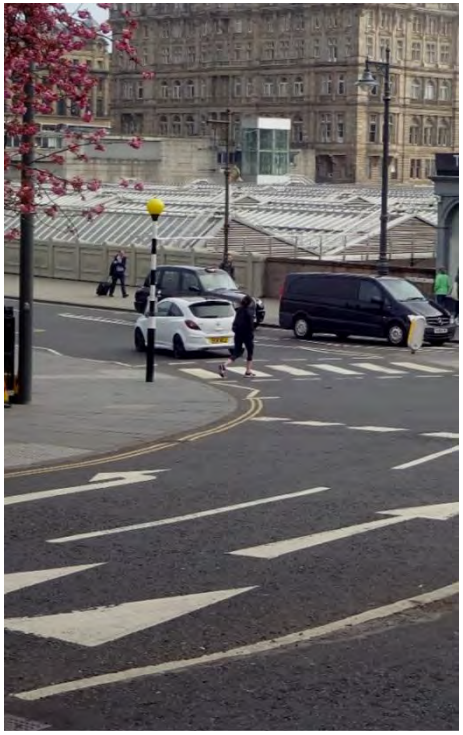
2.13: The Department expects authorities to be proactive in making use of these tools to get rid of unwanted and unnecessary signs, and design signing schemes to minimise visual clutter from the outset.

DfT Circular 01/2016, The Traffic Signs Regulations and General Directions 2016

Relevant Factsheets:
Footways (P3)

Road Markings

- As part of a review of street clutter, the size and quantity of thermoplastic markings should be reviewed as part of ongoing maintenance regimes.
- Proposed changes should be carefully considered where impacting on enforcement regimes, and require agreement with the Council's Enforcement Manager.
- Parking, loading and taxi ranks need to maintain the appropriate Traffic Regulation Orders.
- In Conservation Areas, single line and double yellow road markings should be 50mm in width.
- Centrelines should not generally be used in non-strategic 20mph streets (See Omitting Centrelines Factsheet for further guidance).
- Temporary signing and lining must conform to regulations if they are to be effectively enforced during the construction phase.



The City of Edinburgh Council

Surface Materials

- The visual appearance of surface materials can have a significant impact on the visual quality of the streetscape.
- Maintenance regimes are important for establishing a long term strategy to minimise incremental reductions in aesthetic quality.
- Use of materials on footways and carriageways should be appropriate for, and consistent with street types and usage.

The City of Edinburgh Council

Relevant Factsheets:

Footway Materials & Surfacing (M1)
Asphalt Footway (M2)
High Friction Surfacing (M5)
Omitting Centrelines (G3)
Footway Paving (M3)
Setted Streets (M6)
Zigzags (G4)
Tactile Paving (M4)

Street Furniture

Street furniture should be selected based on:

- Functional performance
- Context and character
- Durability and maintenance

Furniture which is underutilised, and affects pedestrian circulation, or is visually intrusive, should be considered for removal (see De-cluttering Assessment).

Equality / accessibility

Designers should consider the implications of street furniture placement for wheelchair users and people with visual and/or mobility impairments.

Materials palette

The palette of street furniture should be aesthetically consistent with surrounding elements.

Street lighting

Consider the daytime appearance of street lighting and select columns which are proportional to the character and scale of the street.

Always consider mounting lights onto buildings.

Licensing

Licensing of tables and chairs should be considered in terms of the impact of additional visual clutter, noise and litter. See factsheet P3 for details.

CCTV

CCTV cameras should be attached to street lighting columns or mounted onto buildings or shelters, where feasible, to avoid the need for additional supports.

Parking

TRSGD 2016 allows designation of parking using lining or signing alone, therefore it is unnecessary to do both. Consider using restricted parking zones (TSM Chapter 3 page 102) which minuses the need for signing and lining.

Related parking information should be positioned discreetly onto the ticket machine, or attached to existing posts or railings.

Google Earth 2017: CCTV support placed next to lighting column and buildings, creating street clutter. Leith Walk, Edinburgh

The City of Edinburgh Council: Bollards placed along large length of narrow footway on a busy street. The Royal Mile, Edinburgh

The City of Edinburgh Council: Light mounted on building. North Bridge, Edinburgh

The City of Edinburgh Council: Pay and display machine with information mounted on building. East Market Street, Edinburgh

Relevant Factsheets:
Street Furniture (F1)
Footways (P3)
Equality & Rights Impact Assessment (P2)
Designing Inclusive Streets (P2)

De-cluttering Assessment

Part A

Inventory Audit to create a database of the existing situation

See page 6

Conduct an on-street audit of an existing designated area, or a design review of a proposed scheme.

Capture relevant information relating to the type, location and condition of:

- Traffic signs
- Road markings
- Street furniture

Part B

Identify opportunities for de-cluttering and propose a preferred design solution

See pages 7-19

- Identify opportunities for de-cluttering.
- Determine if any change is required and then record recommendations in the Inventory Audit.
- Identify Quick Wins

Part C

Action the preferred design solution (engage with relevant agencies if required)

See page 20

Remove – Non-essential items are to be removed, with the presumption in favour of sign removal except where mandatory or direction signs that form part of a route

Merge – Rationalise features such as lighting and signage that could be combined to reduce the number of poles etc.

Relocate – Consider better placement of features, in particular, to reduce the use of poles.

Replace or repair damaged items that are legally required or remain useful.

Use Transport Advice Leaflet (TAL) 01/13 Department for Transport (DfT), Traffic Signs Regulations and General Directions (TSRGD) 2016 guidance and / or consult with the City of Edinburgh Council Active Travel Team for context specific de-cluttering.

Relevant Factsheets:
De-cluttering Assessment - Part A (P7)
De-cluttering Assessment - Part B(P7)
De-cluttering Assessment - Part C (P7)

Part A: Audit Inventory

An initial audit inventory creates a database of the type, location and condition of existing street furniture including signage, road markings and/or street furniture (depending on the project requirements).

Auditing as a priority where major street/traffic schemes are being planned and before proposing any new signage / furniture. Audits can be conducted on a scheme by scheme basis, or as an area-wide initiative.

For further information see:

- APPENDIX 4.3 – ASSESSMENT OF CONDITION OF TRAFFIC SIGNS - Traffic Signs Manual Chapter 8 Part 2 (2009)

The City of Edinburgh Council

Recommended inventory audit structure

Reference number	Item type	Description	Location / Placement	Quantity / Unit	Condition	Photograph	Existing issue	Action
Scheme reference / Item number	Traffic sign / Road marking / Street furniture	Detailed description including as appropriate: materials, sign content, size of item	Vertical measurement for sign position / horizontal measurement relative to kerb line	Number of items / Metric units as appropriate	Acceptable / Marginal / Unacceptable	Insert image for on-site audits	Can be lawfully removed / Clutters the footway / Can be better located	Retain / Modify / Remove

Relevant Factsheets:
De-cluttering Assessment - Part A (P7) De-cluttering Assessment - Part C (P7)

Part B: Opportunities for De-cluttering

Identify signs and street furniture that are unnecessary, no longer required as a result of TSRGD amendments, or need to be replaced or moved.

Detailed advice on the signing of restrictions and minimum sizes is provided in the Traffic Signs Manual (TSM)5, and additional de-cluttering guidance in TAL 01/13 (DfT) and TSRGD 2016.

Use the Design Flow Process (overleaf) to assess the size, number, placement, mounting and lighting of items and identify opportunities to minimise clutter.

For further information:

- Traffic Advisory Leaflet 01/13 Reducing Sign Clutter (DfT, 2013)
- Traffic Advisory Leaflet 01/12
- TSRGD 2016

All images: The City of Edinburgh Council

Traffic signs

Signage should be reviewed to identify redundant signs or poorly positioned items. This sign is no longer required under TSRGD 2016, the lines alone are sufficient (see page 9).

Road markings

Provision of road markings should be reviewed regularly. Where changes in access arrangements have been implemented, junction operations are likely to have been affected and it may be possible to remove some road markings.

Street furniture

Redundant wayfinding, guardrailing and poorly located signal controllers should be identified as part of the inventory audit and considered for removal or relocation.

Relevant Factsheets:

Footway Zones (P3)
De-cluttering Assessment - Part A (P7)
Use of Wayfinding Products (P3)
De-cluttering Assessment - Part C (P7)
Furniture Zone (F1)

De-cluttering Process for Traffic Signs

Q1. Can the item be lawfully removed without adversely impacting on safety or performance?
Investigate using Quick wins / TSRGD / Road Safety Audit

Remove

Yes → ✓ Remove

No → Go to Q2

Q2. Can the item be relocated or combined with another item to reduce physical clutter?
Investigate using Quick wins / TSRGD

Merge or Relocate

Yes → ✓ Modify

No → Retain

Quick Wins: Traffic Signs

Item	Status	Action	Example
'At any time' sign used in conjunction with double yellow lines / double kerb marks	The requirement for 'at any time' signs used in conjunction with double yellow lines / no loading marks has been withdrawn from TSRGD. Note that double kerb marks for 'no loading' are generally not as well understood as double yellow lines, so removing the vertical signs needs to be carefully considered in areas where there is a heightened risk of motorists stopping to load/unload.	Remove sign	
'Give way' road marking and a 'give way' sign at junction	It is not mandatory to provide a give way sign in conjunction with a give way road marking. In 20mph zones, the presumption is that a vertical sign is not needed unless there is a particular safety issue to be addressed. See Traffic Signs Manual Chapter 5, 2009.	Remove vertical give way signs in 20mph zones except where there is a significant visibility/safety concern.	
Waiting restrictions	Consider area-wide parking controls (such as Restricted Parking Zones) to reduce signage clutter and unnecessary lining.	Minimise use of signage / Remove road markings	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

Relevant Factsheets:
Signage (F3) Parking and Loading (G9)

Item	Status	Action	Example
20mph zone signs and repeaters	Standard size speed limit signs are only to be located at the entry point of a 20mph zone. Repeaters are not required on streets where traffic calming features are in place (e.g. humps, speed tables etc.)	Minimise	
Traffic calming warning signs in 20mph zones	Warning signs for Road Humps and other traffic calming features are not required and should only be considered if there is a specific safety concern.	Remove	
Traffic calming information signs in 20mph zones	The "Traffic calmed area" sign (diagram 883) is redundant in 20mph zones.	Remove	
Other traffic signs within 20mph zones	Generally use the smallest permissible sign size.	Assess and upgrade signage accordingly	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

Item	Status	Action	Example
Regulatory signs on both sides of the road and terminal speed signs	Many regulatory signs do not need to be placed on both sides of a road, including controlled parking zone signage and no entry signs. At junctions where the carriageway is less than 5m wide, 'No Entry'; No Motor Vehicles'; 'Pedestrian Zones' and 'Width restriction' signs are only required on one side of the carriageway.	Assess and remove unnecessary signage	
Diagram 957: shared use cycle signage	Often over-used. It does not require illumination and should not be placed at a footway pinch-point. Consider using roundel applied to footway instead.	Assess / minimise use / replace with a footway roundel	
Diagram 610 ('keep left') placed at pedestrian refuges and other islands	Diagram 610 ('keep left') placed at pedestrian refuges and other islands can in many cases be removed. These signs are not required by TSRGD 2016 and should only be considered for very significant safety concerns or on high speed roads.	Assess	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

Item	Status	Action	Example
Directional signs	Priority should be given to removing oversized and / or redundant signage in the city centre where 20mph zone standards can be applied	Replace / remove	
	Do not use oversized sign plates. Seek to avoid the use of 2 vertical posts. Signs mounted onto oversized pre-existing signs should be reduced in size, and rationalised to remove vertical posts	Assess size of plate, assess pole requirement / remove	
	Icons should be used instead of extensive writing on repeater tourist signs to reduce sign size. Consider opportunities to mount signage onto lighting columns where good sign visibility can be maintained, with lighting team consulted accordingly.	Assess / relocate	
Low level traffic signs	A number of signs should, where possible, be mounted on retroreflective bollards (TAL 3/13) so long as they can be clearly observed by motorists, for example: • mandatory turns (diagrams 606, 610 and 611) • cycling prohibition (diagram 951) • cycle routes or shared cycle / pedestrian routes (diagrams 955, 956 and 957).	Assess / rationalise existing high level signs onto bollards	
Illuminated traffic signs	Most signs no longer require illumination. See DfT Circular 01/2016, The Traffic Signs Regulations and General Directions 2016 p.17 for a list of signs that must remain illuminated during the hours of darkness.	Reflectorise signs that no longer require illumination	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

Relevant Factsheets:
Signage (F3) Street Lighting (F6)

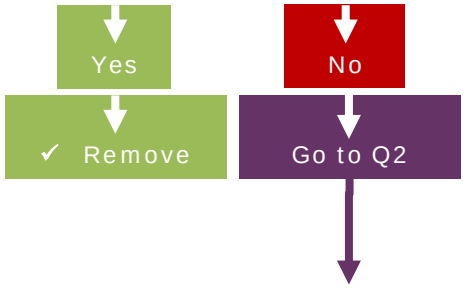
Item	Status	Action	Example
Speed limit signs below 20mph	Speed limit signs below 20mph require special authorisation from the Department for Transport; they may not be erected without an order.	Assess / apply as appropriate	
Repeater speed limit signs	The requirement to place repeater speed limit signs has been removed in TSRGD 2016. A risk assessment and continued review should be provided to ascertain how many speed limit signs are needed on a route. Yellow backing plates should be avoided except in exceptional, safety critical situations	Assess / minimise use	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

De-cluttering Process for Road Markings

Q1. Can the marking be lawfully removed without adversely impacting on safety or performance?
Investigate using Quick wins / TSRGD / Road Safety Audit / Centreline removal factsheet

→ Remove



Q2. Can the marking be relocated or combined with another item to reduce visual clutter?
Investigate using Quick wins / TSRGD

→ Merge or Relocate

Relevant Factsheets:
De-cluttering Assessment - Part A (P7)
De-cluttering Assessment - Part C (P7)

Quick Wins: Road Markings

Item	Status	Action	Example
Yellow box junctions	Assess traffic capacity / safety implications of removing or replacing with 'Keep clear'	Assess / remove	
Centrelines	There is a presumption in favour of no centrelines in 20mph zones. (See Omitting Centrelines Factsheet (G3) for further guidance)	Generally do not reinstate, except on strategic streets	
'Keep clear', 'slow' and 'no entry'	Assess safety implications of removing worded markings, such as 'keep clear', 'slow' and 'no entry'.	Assess / remove	
Speed Limit Surface Marking Roundels	Roundels can be used without the vertical signs, when used as a repeater marking. Where a roundel is used as an exit marking for a zone, at least one vertical speed limit sign is required. Surface roundels are not to be applied on historic streets with setts.	Assess / do not use on setted streets	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

Relevant Factsheets:
Omitting Centrelines (G3)

De-cluttering Process for Street Furniture

Q1. Can the item be lawfully removed without adversely impacting on safety or performance?
Review function of street furniture / Road Safety Audit

Remove

Yes → ✓ Remove

No → Go to Q2

Q3. Can the item be relocated or combined with another item to reduce physical clutter?
Review function of street furniture in context

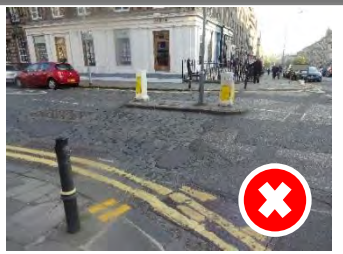
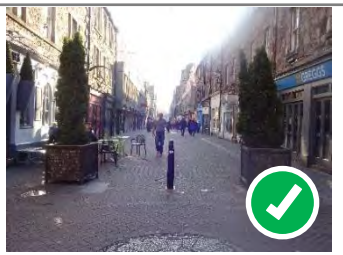
Merge or Relocate

Yes → ✓ Modify

No → Retain

Relevant Factsheets:
De-cluttering Assessment - Part A (P7)
De-cluttering Assessment - Part C (P7)

Quick Wins: Street Furniture

Item	Status	Action	Example
Bollards	Review function of the bollard and the safety / operational implications if removed. Consider replacing with other street furniture e.g. seating / cycle parking / containerised trees as appropriate.	Assess / consider removal / replacement with alternative	
Guardrailing	Follow existing approved guardrail process (2012) with a presumption for removal. (See Pedestrian Guardrail Factsheet (P5) for further guidance)	Assess / remove if appropriate	
Planters	Assess the condition and siting of planters. Remove/relocate if obstructing the clear footway width.	Assess / relocate if necessary	
Temporary signs	Ensure that temporary sign placement conforms to good practice and does not block the footway. When the temporary function has expired - remove the signage.	Assess / place appropriately / remove	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

Item	Status	Action	Example
Poles	Redundant poles should be removed as a priority, particularly where located in a central position, obstructing the footway. If required for event signage, consider installation of a retention socket for potential future use.	Assess / relocate / remove	
Cycle racks	Consider operational performance issues (for example cycle stands located too close to the building line to be usable). Ensure racks do not impinge on the minimum clear footway widths. Consider use of building mounted rails or loops.	Assess	
Street lighting	Mount lights onto buildings where feasible, especially when footways are busy with pedestrians. Locate at the rear of the footway.	Consider relocation on to building or to rear of footway	
Overhanging branches	Policy for trees that are overgrown to be cut back by owners. Failure to comply entitles the council to intervene and cut back foliage to an appropriate level at a charging out rate.	Remove / cut back branches	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

Relevant Factsheets:
Cycle Parking (C7) Street Furniture (F1) Street Lighting (F6)
Street Tress (F5)

Item	Status	Action	Example
Pavement cafés	Enforce layout to correspond with clear footway width requirements – Localities team distribute tables and chairs permits. (See Footways Factsheet (P3) for further guidance)	Assess	
Advertising boards (A-boards)	These should be removed as they are subject to a city wide ban as of the 5th November. (See Footways Factsheet (P3) for further guidance)	Remove	
Telephone boxes	Traditional red telephone boxes may be retained in conservation areas. Survey and build the case for removal or relocation of 'phone boxes' (e.g. used as advertising) where they are obstructing footways or shown to be redundant.	Assess	
Wheelie bins on the street	New developments to have Waste Management Strategy and reduce visibility of wheelie bins. (See Waste Management Factsheet (F5) for further guidance)	Assess and reduce impact	

For all images references, please refer to main document: Edinburgh Street Design Guidance.

Relevant Factsheets:
Use of Tables and Chairs on Footways (P3)
Use of A-boards on Footways (P3)
Furniture Zone (F1)
Waste Management (F4)

Part C: Action the Preferred Design Solution

Determining a course of action

- Action everything within the direct control of the Council.
- Work with other agencies to relocate or remove the apparatus.
- Issues such as maintenance and street cleaning need to be considered.
- Utilities companies need to be consulted regarding proposed relocation of manhole covers, cabinets, power lines, hydrants etc.
- Bus operators need to be consulted regarding the relocation of bus stop signs and/or shelters.
- Property owners need to be consulted regarding overgrown vegetation and drainage.

Post-implementation

- Carry out site inspections to ensure new installations are positioned as instructed and that they are appropriate for the location.
- Ensure that incremental additions to signage are avoided by maintaining a signage/street furniture database.

For further information see:

- Guidance note for local authorities - reducing sign clutter (TRL, 2010)

Waverley Bridge before de-cluttering, Google Maps 2017

Waverley Bridge after de-cluttering, Google Maps 2017

Image References

Minimising Street Clutter
De-cluttering on Castle Street: The City of Edinburgh Council

Road Markings / Surface Materials
All images: The City of Edinburgh Council

Street Furniture
CCTV: Google Earth [ONLINE]. Available at: https://goo.gl/maps/RqTpb4yuV692 [Accessed 02 February 2017]
Bollards: The City of Edinburgh Council
Lights: The City of Edinburgh Council
Pay and display machine: The City of Edinburgh Council

Part A: Inventory Audit
Image: The City of Edinburgh Council

Part B: Opportunities for de-cluttering
All images: The City of Edinburgh Council

Quick Wins: Traffic Signs (Tables)
'At any time' sign: The City of Edinburgh Council
'give way' sign and road marking: The City of Edinburgh Council
Waiting restrictions: The City of Edinburgh Council

'20' zone sign and repeaters: The City of Edinburgh Council
Traffic warning sign : The City of Edinburgh Council
Traffic calming information signs: The City of Edinburgh Council
Other traffic signs within 20mph zones: The City of Edinburgh Council

Regulatory signs: The City of Edinburgh Council
Diagram 957 signs: The City of Edinburgh Council
Diagram 610 signs: The City of Edinburgh Council

Directional signs (replace/remove): The City of Edinburgh Council
Directional signs (assess/remove): The City of Edinburgh Council
Directional signs (assess/relocate): The City of Edinburgh Council
Low level traffic signs: TAL 3/13 [ONLINE]. Available at: http://www.tsrgd.co.uk/pdf/tal/2013/tal-3-13.pdf [Accessed 20 June 2017]
Illuminated signs: The City of Edinburgh Council

Speed limit signs below 20mph:Google Earth [ONLINE]. Available at: https://goo.gl/maps/JKSWB5YHUED2 [Accessed 16 May 2017]
Repeater speed limit signs: CT Cooper, 2011 [ONLINE]. Available at: https://commons.wikimedia.org/wiki/File:Portsmouth_Road_to_the_southwest_in_Liphook,_Hampshire,_England_4.jpg [Accessed 25 May 2017]

Quick Wins: Road Markings (Tables)
Yellow box junctions: The City of Edinburgh Council
Centrelines: The City of Edinburgh Council
Keep clear, slow and no entry road markings: The City of Edinburgh Council
Speed Limit Surface Marking Roundels: The City of Edinburgh Council

Quick Wins: Street Furniture (Tables)
Bollards: The City of Edinburgh Council
Guard railing: The City of Edinburgh Council
Planters: The City of Edinburgh Council
Temporary signs: The City of Edinburgh Council

Poles: The City of Edinburgh Council
Cycle racks: The City of Edinburgh Council
Street lighting: The City of Edinburgh Council
Overhanging branch: The City of Edinburgh Council

Pavement cafes: The City of Edinburgh Council
Advertising boards: The City of Edinburgh Council
Telephone boxes: The City of Edinburgh Council
Wheelie bins on the street: The City of Edinburgh Council

Part C: Action the preferred design solution
Before image: Google Earth [ONLINE]. Available at: https://goo.gl/maps/Es2S1mefRiN2 [Accessed 21 June 2017]
After image: Google Earth [ONLINE]. Available at: https://goo.gl/maps/FY1bowqH3ws [Accessed 21 June2017]

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PT1 – Designing for Public Transport

Amendments:

Designing for Public Transport

Public transport is a central priority for the City of Edinburgh Council. It plays an essential role in the lives of the city's residents, workers and visitors.

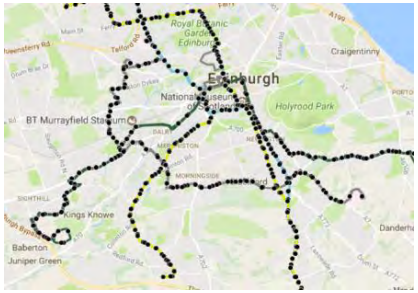
This section sets out the design requirements specific for bus routes, bus stops and bus priority measures.

Improvements to Edinburgh's bus provision will be sought in all new developments, works, and routine maintenance on existing streets.

There will be a presumption in favour of buses and their passengers through:

- providing and enabling bus services and their use by appropriate street pattern, layout and geometry
- improving provision for stops and interchanges
- giving buses priority over other motor vehicles

Bus routes



Lothian Buses online route map

Bus stops

The City of Edinburgh Council

Bus stops are the gateway between bus users and bus services – their quality has a significant impact on bus journey efficiency and the user's journey experience.

Bus priority

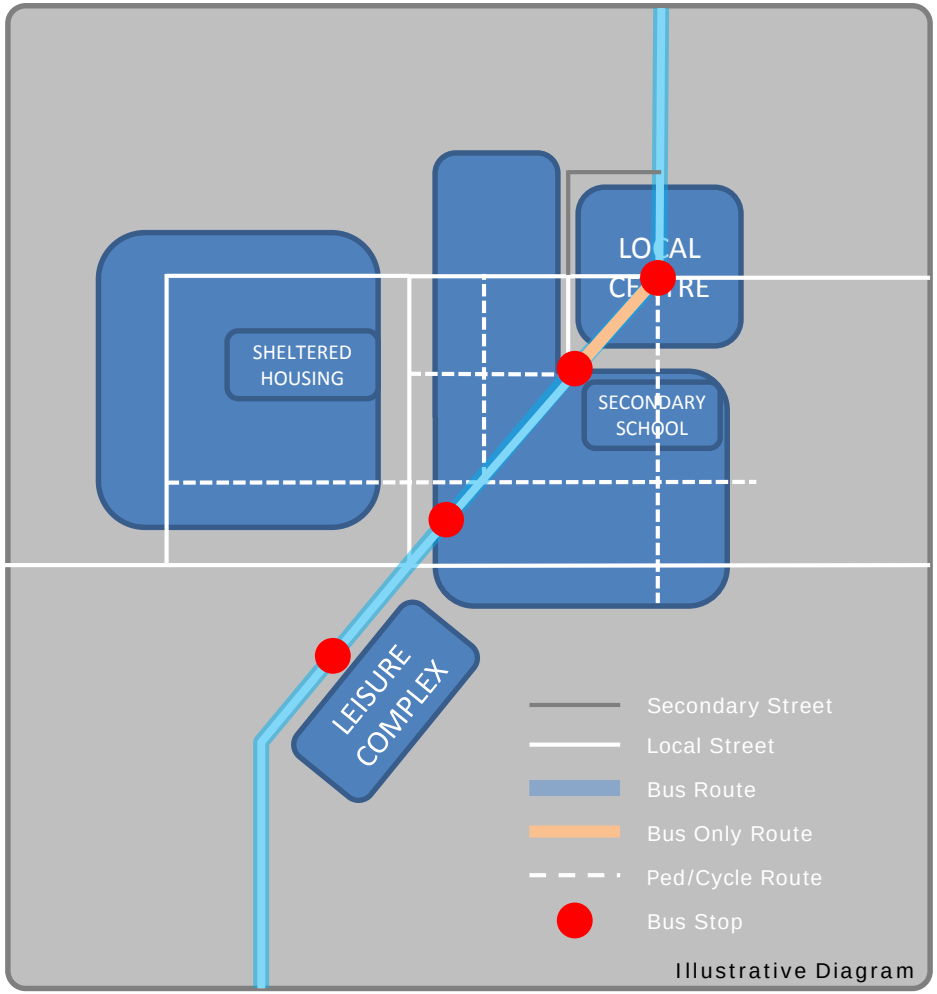
The City of Edinburgh Council

Bus priority measures secure fast, reliable journey times and can facilitate bus access over other vehicles.

Note: Advice relating to trams is not included in this document – Tram schemes will be significant stand-alone projects with specific design requirements and are therefore out-with the scope of this guide.

Relevant Factsheets:
Creating Public Transport Oriented Neighbourhoods (P1) Bus Stops (PT2) Bus Priority (PT3)

Bus Routes



Key principles

- Bus routes through/to a development should be considered at master planning stage. Masterplans should provide for all to have suitable access to bus services from the outset.
- Good pedestrian/cycling routes should be provided to Bus Stops/routes.
- Sheltered/retirement homes, schools, shops and similar services should be closer to bus stops.
- Large developments, such as leisure complexes and superstores, should have bus stops located near the entrance.
- New developments should be designed to avoid bus services having to deviate from the most direct route.
- Bus-only roads/bus gates can help ensure that routes are direct and permeate through a site.
- Cul-de-sacs require provision for adequate access and turning arrangements for Dial-A-Ride/Dial-A-Bus services.

Planning conditions may require developers to subsidise, support or provide bus services – for example, dedicated service alterations or upgrading existing facilities.

Where developments are located adjacent to an existing bus route, possible improvements to Bus Stops should be reviewed, at the **developer's cost.**

The provision of welfare facilities for bus drivers (e.g. toilets) at key bus stops should be considered in consultation with bus operator(s).

Relevant Factsheets:
Creating Public Transport Oriented Neighbourhoods (P1)
Placement & Location (PT2)
Bus Only Routes (PT3)

Carriageway geometry

- Minimum clear carriageway width for one-way bus operation, is 4.5m.
- Minimum clear carriageway width for two-way bus operation on a 20mph network is 6.50m, increasing to 7.0m minimum in ≥30mph areas.
- Carriageways may need to be widened at sharp bends or where the effective width is constrained by features adjacent to the running lane (e.g. loading bays where large vehicles/ mirrors may overhang).
- Local streets with fewer than 8 buses/hour (two-way) may be narrower; down to 6.0m.
- Alternatively "passing places" with gaps can be considered on lower frequency bus routes.
- Carriageway crossfall should not exceed 1 in 40, or 2.5%

Corner radii

Corner radii should be minimised. Options to accommodate larger vehicles whilst maintaining tight corner radii should be considered, taking account of carriageway width and the ability to 'overrun' the centre line or areas at the apex in exceptional circumstances.

Existing streets

Increases to corner radii to accommodate bus movements are generally unacceptable due to the impact on other sustainable modes of transport and on the general streetscape.

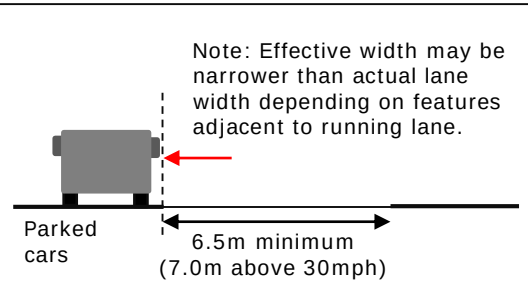
There may be exceptional cases where limited carriageway widening may be acceptable if it allows tight corner radii to be maintained and a significant benefit to bus movements is demonstrated.

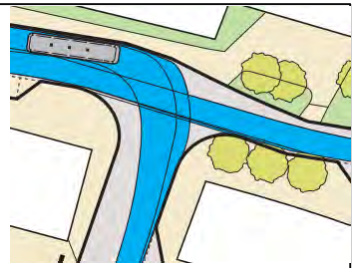
Routes to Bus Stops

Pedestrian routes to bus stops should be considered when upgrading existing or installing new ones.

Depending on the size of the scheme, designers should look for "quick wins" that would make the bus stop more user friendly. Examples of this include:

- Providing dropped kerbs on a main access route if not there already
- Removing street clutter
- Better facilities for wheelchair users and visually impaired users





Designing Streets

Cross-section diagram

Indicative diagram

See also factsheet C2- Carriageway Widths

Measured width of two buses.

Note that this dimension is for information only, the lane widths should be a minimum of 6.5m as advised above.

Image References

Designing for public transport
Bus Routes: Lothian Buses
Bus Stop: The City of Edinburgh Council
Bus Routes: The City of Edinburgh Council

Bus Routes
Carriageway geometry, bus tracking image: Designing Streets, 2010 [ONLINE]. Available at: http://www.gov.scot/resource/doc/307126/0096540.pdf [Accessed 1 February 2017]
Lothians Buses image: Lothian Buses

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PT2 – Bus Stops

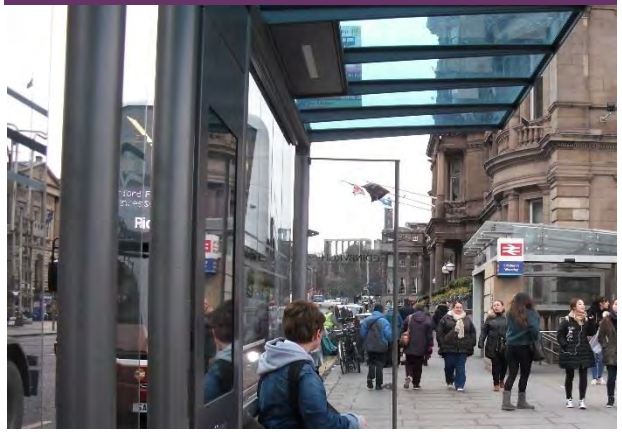
Amendments:

Bus Stops

Design principles

- Well located, serving trip origins and destinations and linked to walking / cycling corridors.
- Appropriate for the local context.
- Safe – protected from moving traffic.
- Secure – well lit and offering natural surveillance (or CCTV) and well maintained.
- The immediate bus stop environment and routes to the stop accessible to all.
- Informative – offering travel information and timetables.
- Well laid out with appropriate facilities for buses and passengers (e.g. Lighting, seating, litter bins, etc.)
- Ironworks should not be placed in the wheel track of a bus i.e. within 12m of the approach to the bus stop and 5m after the bus stop.

Bus stop at entrance to Waverley Station



The City of Edinburgh Council

Bus stop layout on Princes Street.

The City of Edinburgh Council

Relevant Factsheets:

Soft Segregation : Integration with Bus Stops (C3)

Hard Segregation : Integration with Bus Stops (C4)

Cycle Lanes: Integration with Bus Stops (C2)

Street Furniture (F1)

Placement & Location

The placement of bus stops dictates how useful they are to the areas and destinations they serve. It also determines how well bus stops integrate with other street functions such as building frontages, parking and pedestrian crossings.

Design principles

- Bus stops should be spaced approximately every 400m along a route, although closer spacing may be appropriate in town centres or to meet special needs (e.g. sheltered housing complex). If the existing spacing does not align with this guidance, designers should consider altering it in consultation with key stakeholders.
- Bus stops should be located at or near road junctions (or other pedestrian/cycle routes) to maximise route choice to the stop. This placement can help buses enter/exit the stop without being impeded.
- All new stops require consultation with nearby residents and businesses. Stops should not obstruct frontages, the use of shop blinds, or impact on key views.
- Bus stops must have adequate space for waiting passengers. Usually a shelter will be required. The space needed will depend on likely demand for the stop, but should be balanced with pedestrian flow on the footway and any cycle infrastructure.
- Bus journey times are affected by the number of stops on a route, so a careful balance must be achieved.
- Bus access to stops should not be obstructed by trees which must be considered when drawing up the landscaping design. Trees should also not be planted where they will grow over shelters or obscure bus stop flags.

Service frequency

- Where more than 25 buses per hour serve a location, consideration should be given to splitting bus stops (in consultation with operator(s)). This enables buses on different routes to serve separate stops.
- Bus routes with common destinations should share the same stop.

Access to Bus Stops

The accessibility of the whole journey should be considered. Adequate dropped kerb crossings and/or controlled crossing facilities within 50 metres of the stop should be considered as part of any bus stop improvements.

Where possible, crossings should be sited upstream of a Bus Stop. Pairs of Bus Stops should therefore be staggered, so that both are downstream of a single crossing. This arrangement means passengers do not have to cross in front of the bus, and the buses' departure is not delayed by passengers who have alighted.

Bus Stop Assessment Process

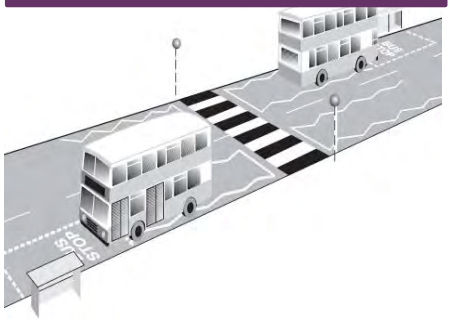
Once installed, a bus stop is considered a permanent fixture so should be positioned appropriately from the outset. Moving bus stops will only be considered if there would be clear benefits for passengers or the bus service.

Edinburgh Council's Public Transport team has an established mechanism for considering new or relocated Bus Stops, which must be followed in all cases. Details can be obtained from the Council's Public Transport team.

Split bus stops on Princes Street

The City of Edinburgh Council

Image: CEC Bus Friendly Design Guide



Relevant Factsheets:

Bus Priority: Signalised Priority (PT3)
Street Trees (F5)
Bus Routes (PT1)
Bus Stops: Layout (PT2)
Crossings (G4)

Layout

The layout of a bus stop will balance the needs of bus users and its impact upon the street/footway to ensure the stop environment is accessible to all users, and vehicles serving the stop.

Design principles

- Bus stops to incorporate a 2mx2m clear boarding area.
- Bus stop flag to be positioned at downstream edge of boarding area.
- The arrangement of the stop should result in passengers facing on-coming vehicles when waiting.
- Where street lighting is not sufficient, lighting should be provided for security and visibility of information at the stop
- Waiting passengers should be able to see the bus driver and vice versa
- Bus Stop infrastructure must not conflict with minimum sight distances. New road signs should not conflict with an existing bus stop – existing signs should be relocated.
- Adequate space should be provided downstream of the bus stop pole for waiting passengers to queue.

Utility access

Service covers should not be obstructed. No service covers should be present in the boarding area.

No stop furniture should be placed within 2m of an existing fire hydrant or obscure a fire hydrant sign.

Construction sequence in new developments

When development construction is based on several phases, after completion of the first phase and where possible, bus access should be facilitated without mixing with construction traffic during later phases.

Existing bus stops affected by nearby construction

Obstruction of passenger waiting areas and the boarding area by skips, scaffolding or other building equipment will not be permitted. Permits will not be granted in such circumstances.

Developers will be required to provide a re-sited temporary bus stop where absolutely necessary, restoring the original site on completion of the works.

During phased construction, bus access should be facilitated as soon as possible, without mixing with construction traffic during later stages.

Boarding area at Edinburgh bus stop

2m x 2m boarding area, free of service covers and obstacles

The City of Edinburgh Council

Relevant Factsheets:

Placement & Location (PT2)
Locating shelter on footway (PT2)
Bus Boarders (PT2)
Bus Boxes (PT2)
Bus Stop Kerbs (PT2)
Bus Laybys (PT2)

Footway condition

The footway must be of sound materials in satisfactory condition, with no trip hazards

Where no made up footway exists, an area of hardstanding is to be constructed to accommodate the shelter and boarding area.

No stop is to be located where there is an unrestrained rainwater outfall at the rear of the footway.

A crossfall gradient of less than 4% (1 in 25) is suggested. Existing footways may need to be re-graded.

Any changes to footways should consider impact on drainage and adjacent properties.

Clear Footway Width vs Shelter Provision – Factors to Consider

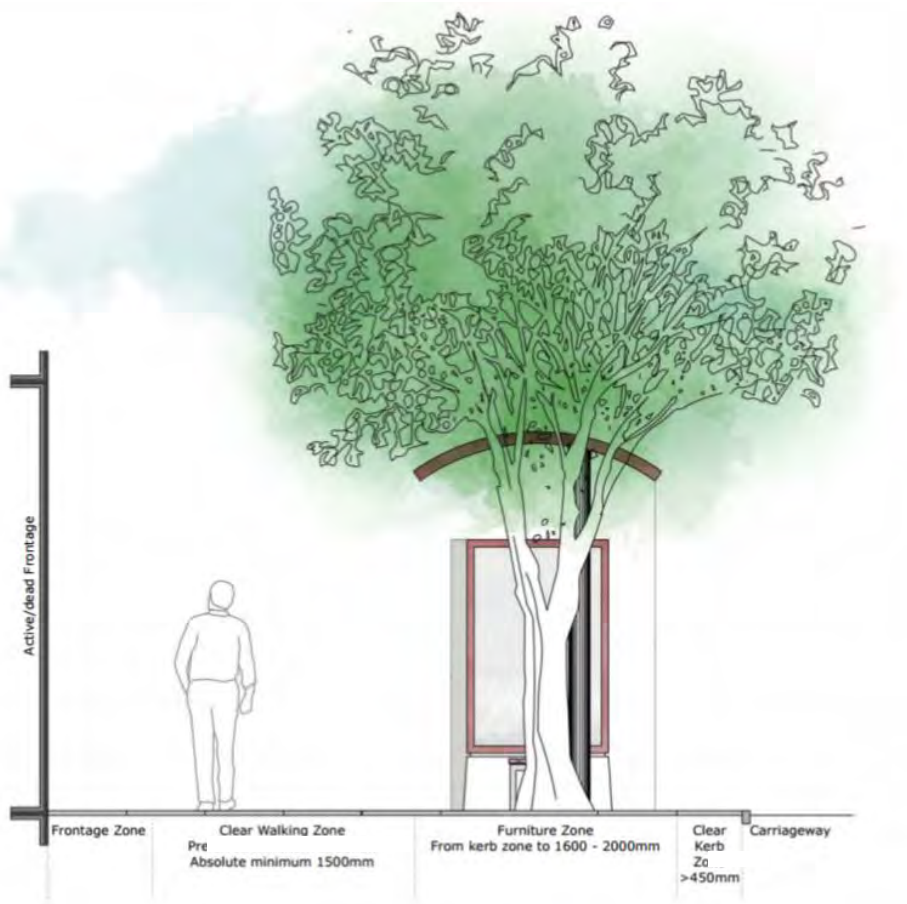
- Pedestrian flow vs volume of waiting bus passengers
- Can a bus boarder be provided and what is the impact of this on cyclists?
- Can the footway be widened?

Clear footway width

Clear Walking Zone	
3.0m	Preferred on busy routes
2.0m	Preferred
1.0m	Absolute minimum, exceptionally allowed if shelter <6m long

For existing bus stops where no work involving complete footway reconstruction is scheduled, the absolute minimum clearance between a bus shelter and the rear of footway is 1.0m.

When footway construction is scheduled, every effort should be made to increase this figure towards the desirable design standards, whilst taking account for other factors, including provision for cyclists and bus priority.



Relevant Factsheets:

Placement & Location (PT2)
Locating shelter on footway (PT2)
Street Furniture (F1)
Bus Boarders (PT2)
Bus Boxes (PT2)
Bus Stop Kerbs (PT2)
Bus Laybys (PT2)

Shelter or No Shelter?

Shelter or no shelter?

Shelters for waiting passengers should always be provided unless there is no space, or minimal demand for waiting (see below).

Shelters should not be provided where the minimum clear footway width cannot be achieved, or (generally) if the 2mx2m boarding area would be impeded.

Footway widening or provision of a bus boarder should be considered before concluding a shelter cannot be provided.

Stops which are predominately used for disembarking (usually outbound stops) may not require a shelter.

Bus stop without shelter

Compulsory components:

- Pole with a flag
- Travel information
- Lighting (if existing street lighting is not adequate)
- An area of hard standing at boarding area (2mx2m)

The pole and flag should be located on downstream edge of the boarding area – providing an aiming point of the driver to stop at.

Depending on the bus's approach to the stop (i.e. Angled rather than straight on) clearance of bus stop infrastructure from kerb may need to be greater.

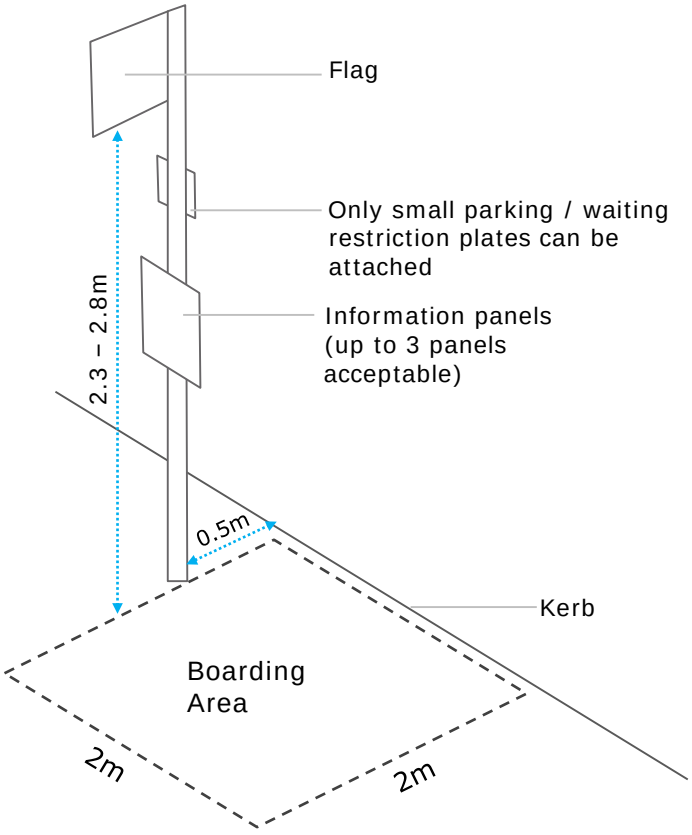
Optional components:

- Bus Tracker (real time passenger information)

Pole with flag

Bus Tracker

Images: The City of Edinburgh Council



Relevant Factsheets:
Placement & Location (PT2)
Bus Boxes (PT2)
Bus Boarders (PT2)
Bus Laybys (PT2)
Bus Stop Kerbs (PT2)

Bus stop with shelter

Compulsory components:

- Shelter (appropriate size and type)
- Seating or perches (if min footway widths allow)
- Roof pole with a flag
- Travel information
- Lighting (if existing street lighting is not adequate)

Optional components:

- Bus Tracker (real time passenger information)

Key considerations:

- Shelters are to be glazed (with the exception of advertising panels) to provide inter-visibility between the inside and outside of the shelter.
- Shelter should not obscure views of nearby amenities, particularly cash dispensing machines or night safes.
- Bus stop infrastructure must not be able to be used to gain access to adjacent properties (i.e. Consider the relationship between the roof and adjacent windows/roofs etc).

Types of shelter

Single sided (cantilever)

Cantilever

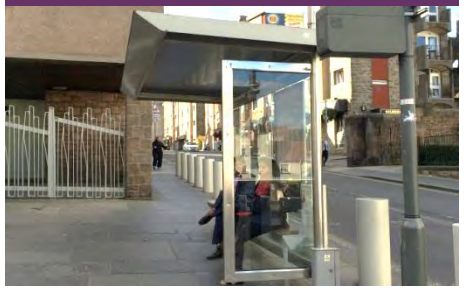
- Narrow profile (front panel only) will minimise obstruction to the footway.
- Provides limited shelter to passengers, particularly in exposed locations.
- To be used where available footway width prevents use of other shelter types.

Semi- enclosed

Full width

- Shelters with a roof and one or two end panels.
- End panels can be full or partial width.
- Provide adequate shelter to passengers and are easily accessible.
- Preferred option in most locations.

Partial width



Fully enclosed

Fully enclosed

- Shelter with a roof and four sides.
- Must have at least two access points.
- Provide good shelter in exposed locations.
- Limitations on access mean they should only be used where a semi-enclosed shelter would provide inadequate protection to passengers.

Images: The City of Edinburgh Council

Relevant Factsheets:
Placement & Location (PT2)
Bus Boxes (PT2)
Bus Boarders (PT2)
Bus Laybys (PT2)
Bus Stop Kerbs (PT2)

Locating Shelters on Footways

There are three potential arrangements for bus shelters in relation to a bus stop and location on a footway:

- Back to the kerb
- Centre of footway
- Back of footway

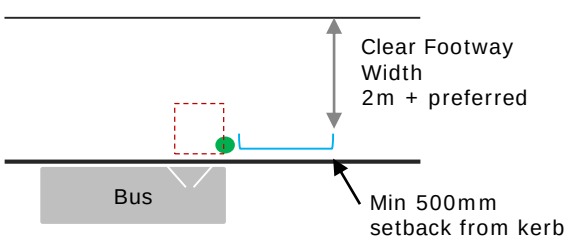
The most suitable arrangement at each location will depend on:

- Footway width
- Pedestrian flow on footway
- Adjacent frontage characteristics
- Orientation in relation to prevailing wind/weather

In all cases the absolute minimum clear footway width below must be achieved.

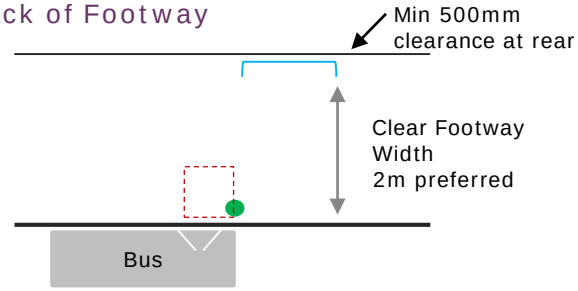
Clear footway width	
3.0m	Preferred on busy routes
2.0m	Preferred
1.0m	Absolute minimum, exceptionally allowed if shelter <6m long

Back to the kerb



Preferred option for NARROW footways (less than 3.3m)

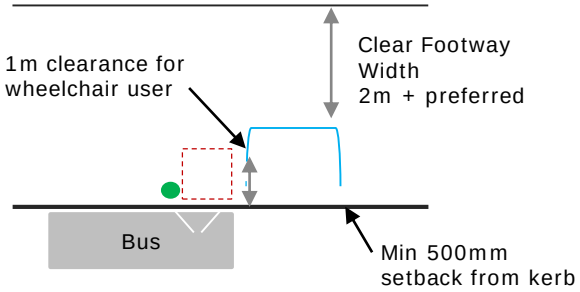
Back of Footway



Preferred option for footways between 3.3m and 4.5m where:

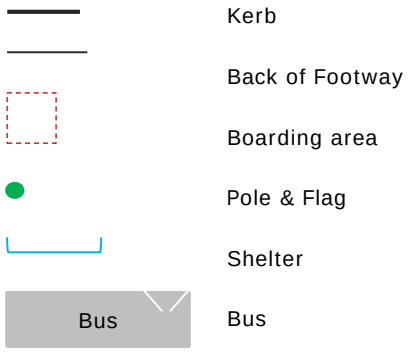
- There is no active frontage (walls, hedges, etc.)
- There is a high pedestrian flow on footway

Centre of Footway



Preferred option for WIDE footways (more than 4.5m)

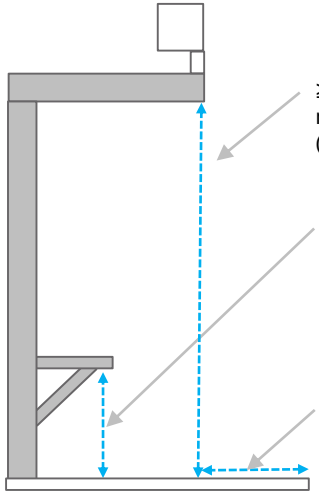
Legend



Relevant Factsheets:

Placement & Location (PT2)
Segregated Cycle tracks: Integration with Bus Stops (C4)
Bus Boarders (PT2)
Bus Laybys (PT2)
Bus Stop Kerbs (PT2)
Bus Boxes (PT2)

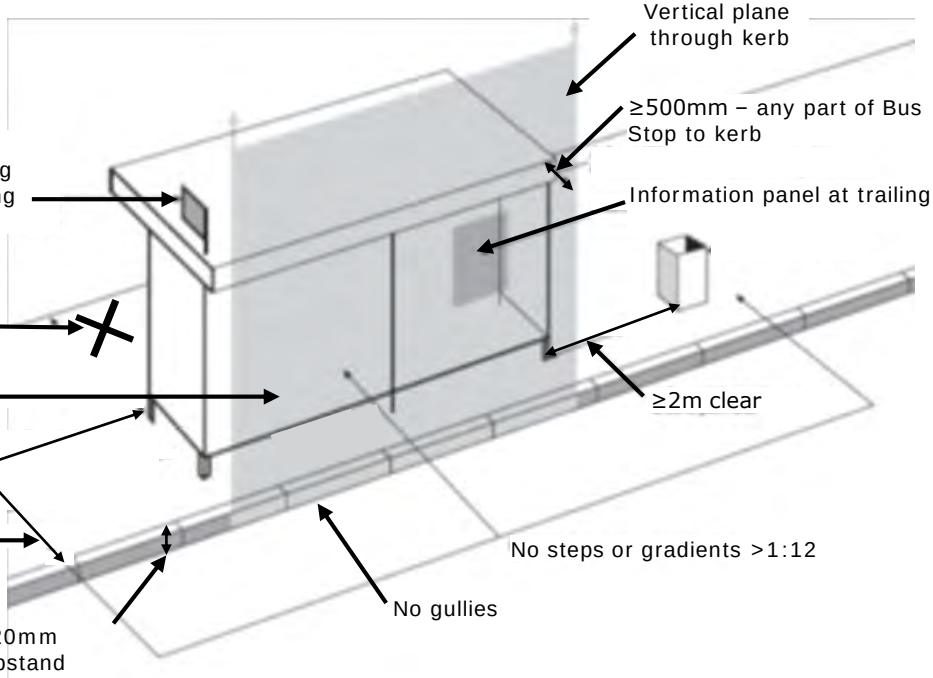
Key Dimensions



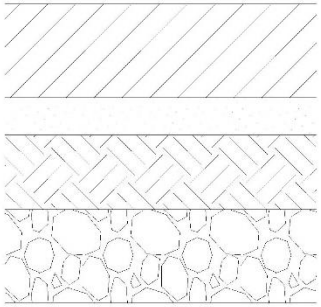
≥ 2.3m, generally maximum 2.8m (exceptional)

Perches 650mm, seats 500mm above the ground. On gradients the seating is divided into shorter level lengths centred at either 500mm or 650m.

500mm set back from kerb edge



Strengthened carriageway make up at bus stops



Surface course: 150mm thick 55/10 F surf 40/60 des

Binder course: 60mm thick AC 20 dense bin 40/60 rec

Base course: 120mm thick AC 20 dense bin 40/60 rec

Sub-base: 80 - 150mm thick Type 1 Mixture

Relevant Factsheets:

Segregated Cycle Tracks: Integration with Bus Stops (C4)
Bus Stop Kerbs (PT2)
Placement & Location (PT2)
Bus Boxes (PT2)
Bus Boarders (PT2)
Bus Laybys (PT2)

Bus Boarder

Bus boarders are built-out footways, (usually between on-street parking bays) offering an advantage to bus services by:

- Allowing buses to approach the stop straight-on.
- Improving boarding/alighting with a platform.
- Providing a wider footway near a stop.
- Reducing the length of protection from obstruction required for the Bus Stop approach.

All boarders:

- Should facilitate provision of a shelter at the stop (on or off the boarder).
- Should be protected with a bus box.

Boarder width

Narrow boarders (<2m) are to be installed by exception only, noting the risk that:

- Parking may not be deterred, and vehicles may encroach on carriageway.
- Buses may have difficulty stopping adjacent to boarding area.

Boarder length

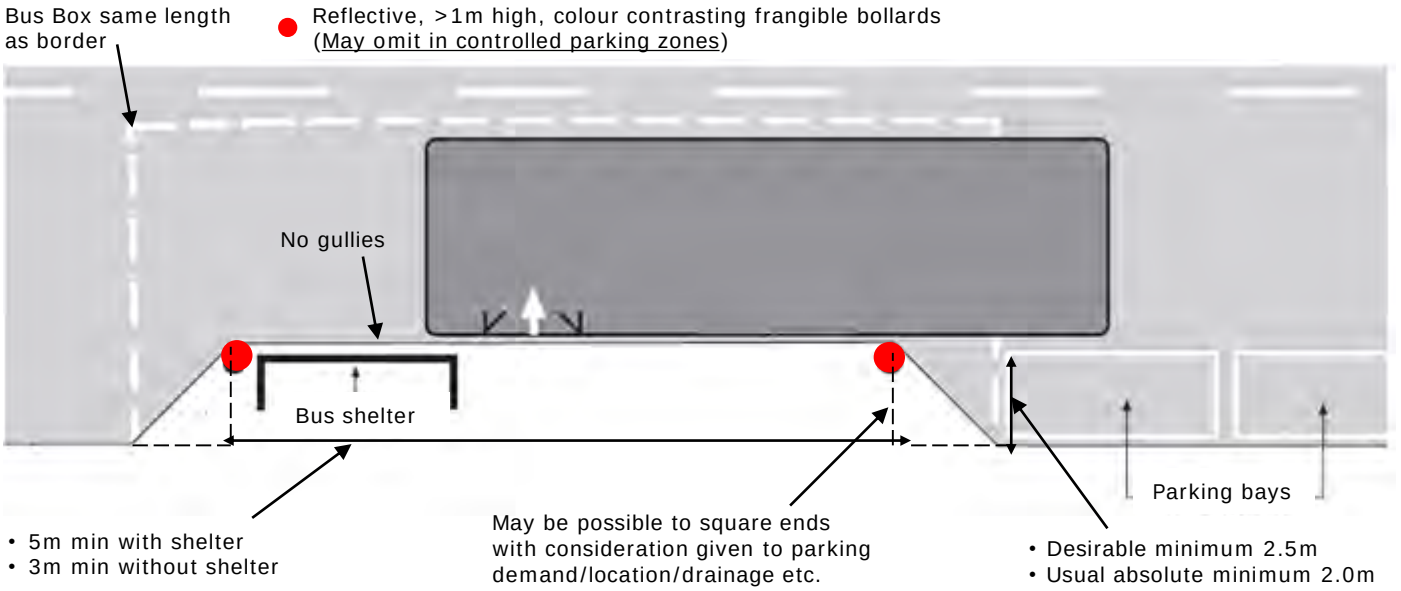
- Boarders should be no longer than necessary (generally 3-5m), to mitigate loss of parking capacity.
- The relative benefits of placing the shelter on the boarder (reducing obstruction to the footway but requiring additional length) should be considered.
- On routes where buses with a middle door operate, boarders should be an appropriate length to accommodate them.

Boarder and cyclists

- Boarders should not break or obstruct a cycle lane.
- Consider a 'floating bus stop'.

Bus Boarder

The City of Edinburgh Council



Relevant Factsheets:

Soft Segregation: Integration with Bus Stops (C3)
Hard Segregation: Integration with Bus Stops (C4)
Cycle Lanes: Integration with Bus Stops (C2)
Bus Boxes (PT2)
Bus Stop Kerbs (PT2)
Placement & Location (PT2)

Bus Box

A bus box indicates and protects the area of carriageway to ensure a bus can approach, straighten up, stop and exit a bus stop.

- Buses should be able to pull up within 200mm from the kerb.
- Bus box locations are calculated relative to the bus stop 'aiming point' – the boarding area and bus stop flag.
- Bus box marking should be renewed as part of regular road maintenance.

Recommended dimensions

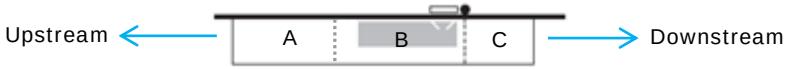
- Marked according to TSRGD Diagram 1025.1.
- Maximum length 37m, and generally no less than 19m dependant on alignment on approach/exit (see Bus Boarders).
- Standard 25m bus box suitable for a single stop only. Where service frequency demands two or more stops, the box should be extended accordingly to ensure approach and exit manoeuvres are accommodated.
- Consider extending box upstream if it is expected to be common for 2 or more buses to queue.
- Usually 3m wide, minimum 2.7m (by exception).

Shorter boxes at junctions and crossings

Where a bus stop is sited immediately upstream or downstream of a pedestrian crossing, road junction, or similar feature, the crossing/zigzags and other parking restrictions may protect the bus stop exit or approach from parked vehicles, allowing a shorter bus box to be provided.

'No Waiting' parking restrictions (Single/Double Yellow lines) must be accompanied by a 'No Loading' restriction if a shorter bus box is to be considered.

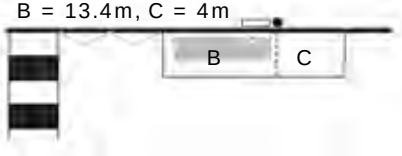
Example of a standard mid link bus box



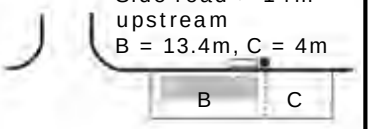
Standard Bus Box
A = 7.6m, B = 13.4m, C = 4m, A + B + C = 25m

Examples of Bus Box Approach Protected by Other Features (Equivalent to 25m box)

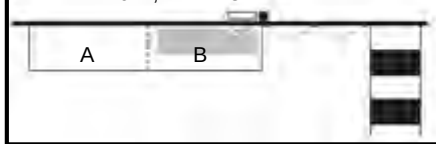
Pedestrian crossing > 14m upstream
B = 13.4m, C = 4m



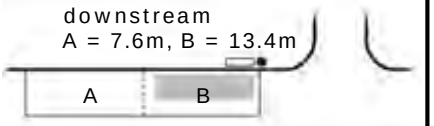
Side road > 14m upstream
B = 13.4m, C = 4m



Pedestrian crossing > 10m downstream
A = 7.6m, B = 13.4m



Side road > 10m downstream
A = 7.6m, B = 13.4m



Key

A = bus box approach	Front boarding area
B = bus box centre	Bus
C = bus box exit	Pole

Relevant Factsheets:

Soft Segregation: Integration with Bus Stops (C3)
Hard Segregation: Integration with Bus Stops (C4)
Bus Stop Kerbs (PT2)
Cycle Lanes: Integration with Bus Stops (C2)
Placement & Location (PT2)
Bus Boarder (PT2)

Bus Stop Kerbs and Bus Laybys

- Standard kerb height at bus stops: 100-120mm
- All buses on the network 'kneel' as standard operating practice and a 100mm upstand gives a gradient of 1:8 on the bus.
- Standard kerb profiles & types to match adjacent sections is preferred.
- Footway crossfall should be <1:25. If this cannot be achieved, regrading of the footway or alternative drainage solutions should be considered .
- Carriageway crossfall should be c.2.5%. If this cannot be achieved, regrading of the carriageway should be considered.

Special Bus Stop Kerbs

Special bus stop kerbs (i.e. Kassel kerb) are no longer used in Edinburgh as they can cause issues with bus ramps. Any existing installations should be replaced during planned renewal works.

Standard kerbs at Princes Street bus stop

The City of Edinburgh Council

Kassel kerbs at bus stop

The City of Edinburgh Council

Bus Lay-bys

Bus lay-bys can be useful on high speed roads or where buses need to wait at the terminus of a service. However they make it difficult for the bus to re-join traffic, resulting in delays.

Consequently there is a presumption against placing bus stops in laybys other than in exceptional circumstances, particularly at timing / terminating points or on high-speed rural roads. Similarly, there is a presumption in favour of removing bus laybys as part of projects affecting an existing layby.

Relevant Factsheets:
Layout (PT2)
Bus Boarder (PT2)

Turning Circles

Bus turning circles are used at bus route termini to allow buses to turn around for a return journey.

Where possible, consideration should be given to providing welfare facilities for bus drivers (e.g. toilets).

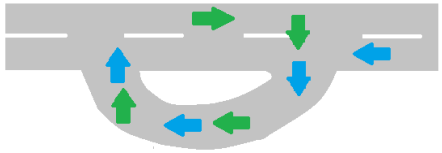
Turning circles should be constructed with high specification hot rolled asphalt surfacing on the running lanes. Monoblocks or similar materials are not recommended to be used in the running lanes due to insufficient strength.

Individual layouts are determined by the area available and the size of buses that use the terminal/turning circle.

Where more than one service is likely to use the turning circle, there should be sufficient width to allow a bus to overtake a parked bus.

There should be an area provided where a bus can park parallel to the kerb enabling boarding/alighting from the vehicle.

Where possible, consideration should be given to allowing access from all directions. This will mean that the turning circle cam be used more flexibly.



Contact the Road Construction Consent team for a detailed discussion.

Image References

Bus Stops

Bus stop at entrance to Waverley Station: The City of Edinburgh Council

Bus stop layout on Princes Street: The City of Edinburgh Council

Placement & Location

Split bus stops on Princes Street: The City of Edinburgh Council

Layout

Boarding area at Princes Street bus stop: The City of Edinburgh Council

Shelter or No Shelter?

Pole with flag: The City of Edinburgh Council

Bus Tracker: The City of Edinburgh Council

Bus stop with shelter

Cantilever: The City of Edinburgh Council

Full width: The City of Edinburgh Council

Fully enclosed: The City of Edinburgh Council

Partial width: The City of Edinburgh Council

Bus Boarder

Bus Boarder: The City of Edinburgh Council

Bus Stop Kerbs

Standard kerbs at Princes Street bus stop: The City of Edinburgh Council

Kassel kerbs at bus stop: The City of Edinburgh Council

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PT3 – Bus Priority

Amendments:

Bus Priority

Bus priority measures (lanes and/or selective detection) are a key policy for the City of Edinburgh Council, with the aim of ensuring that bus travel is as convenient, rapid and reliable as possible.

Design considerations

Bus priority measures:

- should be the default option whenever there is a benefit to bus journey times and/or reliability.
- should be considered in conjunction with provision for pedestrians and cyclists.
- can also be part of an urban traffic strategy, such as parking reviews.
- might not always be as quick and reliable as improving the flow of all traffic (e.g. At key junctions).
- should consider impact on residual traffic, particularly upstream buses.
- can achieve maximum success when integrated with a wider program such as real-time passenger information, improved waiting environments and more frequent services.

Options:

Bus-lanes

These allow bus services to bypass traffic congestion and are restricted to bus use at certain days or times. This should be enforced to ensure appropriate usage.

Bus-only streets/bus-ways

These segregated bus routes provide advantages to bus journey times and route permeability. Other users, including taxis, cycles and emergency vehicles, can also be granted use of unguided busways and bus only streets.

Signal priority and Traffic management/calming

Buses can access quicker routes by being allowed to make otherwise banned movements, or being prioritised by selective signals.

With-Flow Bus Lane

The City of Edinburgh Council

Busways (Guided / Unguided)

Richard Webb, 2005

Banned Turn Exemption

The City of Edinburgh Council

Contra-Flow Bus Lane

Julian Walker, 2013

Bus Only Streets / Gates

The City of Edinburgh Council

Relevant Factsheets:

Buses Priority and Traffic Management/Calming (PT3)

Bus Lanes (PT3)

Signal Priority (PT3)

Bus Lanes

Bus lanes should be considered where congestion and delay on the network impacts upon bus services.

Factors to consider:

- Number of buses/users that will benefit from the bus lane
- Significance of the priority/benefit delivered by the bus lane
- Impact on pedestrians
- Impact on potential for segregated cycle provision
- Impact upon general traffic and route capacity
- Use of bus lane by cyclists
- Use of bus lane by other vehicles (e.g. taxis, emergency services, motorcycles)

Bus lanes are generally provided with a designated kerbside to serve bus stops, but this may be located in the centre of the carriageway if necessary.

A Traffic Regulation Order (TRO) is required to delineate the extents, operating hours and relevant exemptions for each bus lane.

Operational hours

Most Edinburgh bus lanes currently operate Monday to Friday during peak hours of:

- 7.30-9.30
- 16.00-18.30

Note that these times are currently under review and may be revised following consultations.

Contra-flow bus lanes, bus gates and bus only roads operate all day.

Lane widths

- Desirable width is 4.5m which can permit 1.5 m mandatory or advisory cycle lane.
- Normal minimum width is 3.25m, absolute minimum width is 3.0m, but the wider the better for cycle safety.
- It is not acceptable to have 3.0m lane widths at locations buses are expected to pass one another as a 6.0m carriageway does not allow sufficient space for this.

Waiting restrictions

Parking and loading within bus lanes should be prohibited during operating hours.

Parking and loading may be permitted outside bus lane operating times, however the risk of over-staying vehicles may obstruct the bus lane operation.

Signs and road markings

Relevant signing and lining requirements are set out in the Traffic Signs Regulations and General Directions.

The location and configuration of required regulatory signage and its impact upon the street environment and clutter should be considered when deciding the precise extents of the bus lane.

Cycle lane markings should be considered within wide bus lanes.

Bus lanes will generally be constructed with coloured surfacing (red chipped asphalt), which will continue through side road junctions and crossings (although statutory markings will not).

Contra-flow bus lanes

Contra-flow bus lanes allow buses to avoid unnecessary diversions and maintain an efficient route.

Contra-flow lane widths

- <4.5m should be avoided when accounting for overtaking cyclists.
- 4.0 to 4.5m is generally suitable if the speed limit is 20mph, although a risk assessment should be undertaken on a site-by-site basis.
- <4.0m is not desirable but may be acceptable for short lengths/low traffic flows. A risk assessment should be undertaken.

Cyclists

Cyclists should always be permitted to use contra-flow bus lanes, unless there is an overwhelming safety reason not to. Sufficient width should be provided to enable cyclists to overtake comfortably at bus stops.

Relevant Factsheets:

Cycle Lanes (C2)
Bus Only Routes (PT3)
Buses Priority and Traffic Management/Calming (PT3)
Signal Priority (PT3)

Signal Priority

Traffic signals can be controlled to benefit bus services, or facilitate bus priority measures.

Signal priority for buses can be installed on a case by case basis but will be more effective as part of a wider strategy.

Signal priority for buses should be the default option where:

- There is any potential to reduce bus delays
- Average pedestrian/cyclist delays will not increase by more than the bus delay will reduce (take account of approximate numbers of users of all 3 types).

See signal priority factors table.

Signal priority options

- Signal timings
- MOVA / TRANSYT / SCOOT – variable signal timings and coordination between junctions.
- Selected Vehicle Detection (SVD)
- Advance areas
- Queue holding
- Virtual bus lanes

New or renewed signalised junctions should make use of these features to avoid delays to bus routes, which should be demonstrated when assessing the operation of a proposed arrangement.

Signal priority options can be considered in conjunction with the Council's Public Transport and Signals team.

Cyclists

The needs of cyclists at bus priority measures should be considered, and appropriate priority benefits should also be given to cyclists.

Automatic cycle detection or a push-button for cyclists may be required if signals do not detect cyclists.

In some cases, a cycle by-pass of the bus priority signals may be preferred.

Signal Priority Factors

Issue	Explanation
Bus frequency	The higher the frequency, the more likely it is that prioritising one bus will delay another.
Conflicting bus movements	Conflicting bus movements make it more likely that prioritising one bus will delay another. Less likely to be an issue at lower frequencies.
Which service to prioritise	Reliability is more important the less frequent the service is.
Interaction with pedestrian and cyclist delays.	Overall average delay per individual bus passenger/pedestrian/cyclist should be reduced. If not, signal priority should not be employed.

Relevant Factsheets:
Bus Lanes (PT3) Bus Only Routes Bus Priority and Traffic Calming (PT3)

Bus Priority and Traffic Management / Calming

Traffic management and calming can be used in two ways:

- To ensure bus-only infrastructure is just used by buses, and
- To moderate traffic speed whilst maintaining access for buses and passenger comfort.

Traffic management

Banned turn exemption

Allowing buses to make movements forbidden to other vehicles gives buses an advantage.

Physical measures to restrict movements by other vehicles will usually not be possible, restrictions should instead rely on signs and lines for communication.

Enforcement cameras

Cameras can be used to enforce against inappropriate use of bus lanes, bus gates and bus only streets.

Developers may be required to install cameras at relevant locations.

Cameras must be of a type and model approved by Department for Transport (DfT) for enforcement purposes.

Liaison with The City of Edinburgh Council will be required to ensure the camera is compatible with existing back-office systems.

Width restriction

Width restrictions should only be used if cyclists can bypass the restriction, otherwise a hazardous 'pinch point' can be created.

Because of the size of buses, width restrictions by themselves are unlikely to effective.

Traffic calming

Due to effects on passengers vertical traffic calming measures are not considered suitable on key bus routes with significant bus movements.

Traffic calming measures will generally only be appropriate on bus routes on 20mph local or secondary streets, with fewer than 10 buses each way per hour and in one or more of the following circumstances:

- Pedestrian/cyclist crossings
- Clear evidence of non-adherence to speed limit in absence of measures
- High pedestrian activity

Exceptionally, traffic calming may be justified on key bus routes where there are large numbers of cyclists and pedestrians, and there is desire to prioritise pedestrian and/or cycle movement.

Design considerations:

Where traffic calming is considered appropriate, bus-friendly designs should be used:

- All vertical traffic calming measures to be a maximum 75 millimetres high;
- All speed cushions to be 2.1m overall width including 0.55m side slopes on each side and 3m long;
- Waiting restrictions to protect each side of speed cushion for a minimum of 15m.
- Speed table/flat top humps to have 1.8m long ramps with a minimum 9 metre long plateau, including at side road entry treatments where side road is a bus route, or frequently used as a diversion route;

Relevant Factsheets:
Speed Reduction and Traffic Management (G6) Bus Routes (PT1) Carriageway Widths (G2)

Image References

Bus Priority

With-Flow Bus Lane: The City of Edinburgh Council

Contra-Flow Bus Lane: Julian Walker 2013 [ONLINE]. Available at: https://www.flickr.com/photos/wirewiping/11453043776/ [Accessed 02 February 2017]. Licensed for reuse under the Creative Commons Licence: https://creativecommons.org/licenses/by-nc-nd/2.0/legalcode.

Busways (Guided / Unguided): Richard Webb 2005 [ONLINE]. Available at: https://commons.wikimedia.org/wiki/File:Guided_Busway_West_Edinburgh.jpg [Accessed 02 February 2017]. Licensed for reuse under the Creative Commons Licence: https://creativecommons.org/licenses/by-nc-nd/2.0/legalcode.

Bus Only Streets / Gates: The City of Edinburgh Council

Banned Turn Exemption: The City of Edinburgh Council

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