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

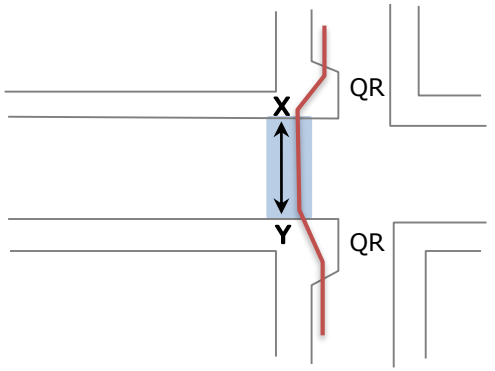
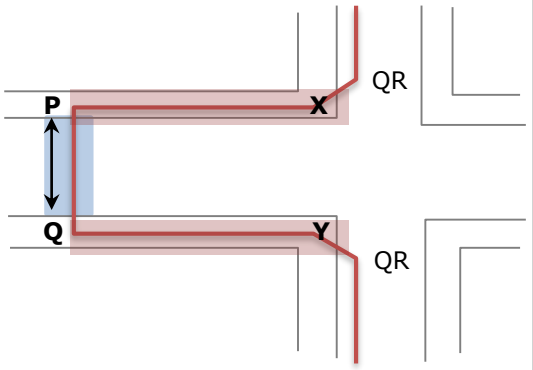
The City of Edinburgh Council

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.

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

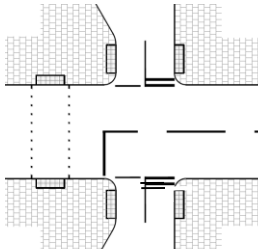
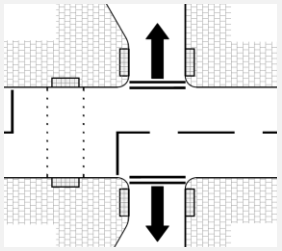
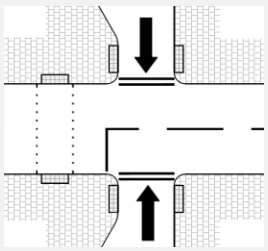
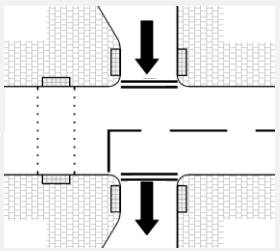
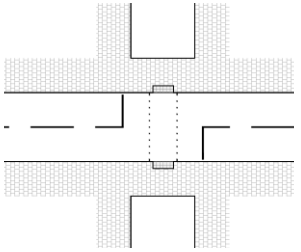
Pelican crossings

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.

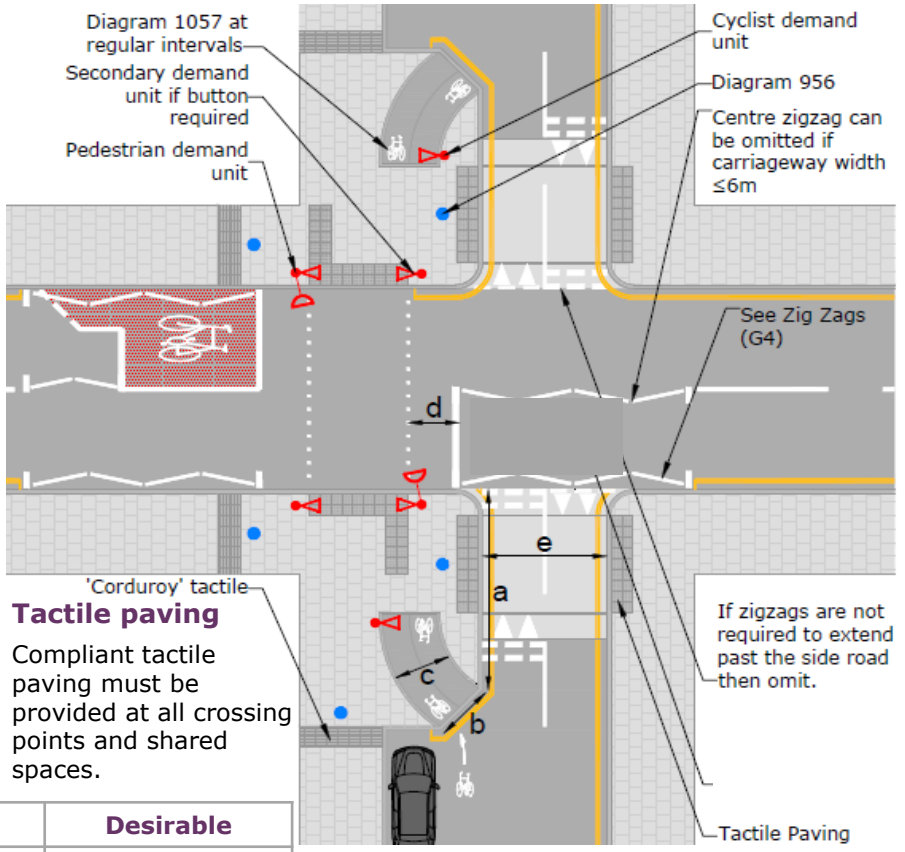
Use buildouts on side roads to:

- 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

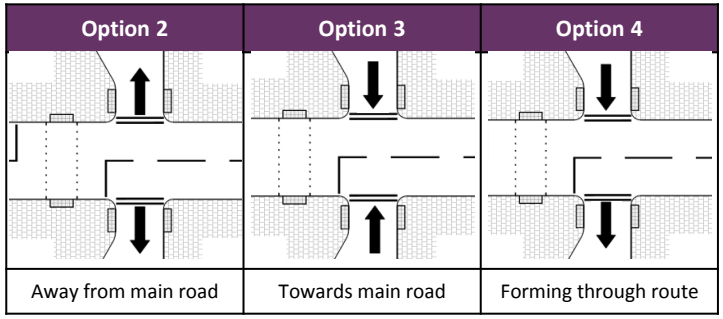
One way plug/street options have the potential to reduce turning movement conflicts and enable the crossing to be closer to cycle and pedestrian desire lines by narrowing the side street.

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)

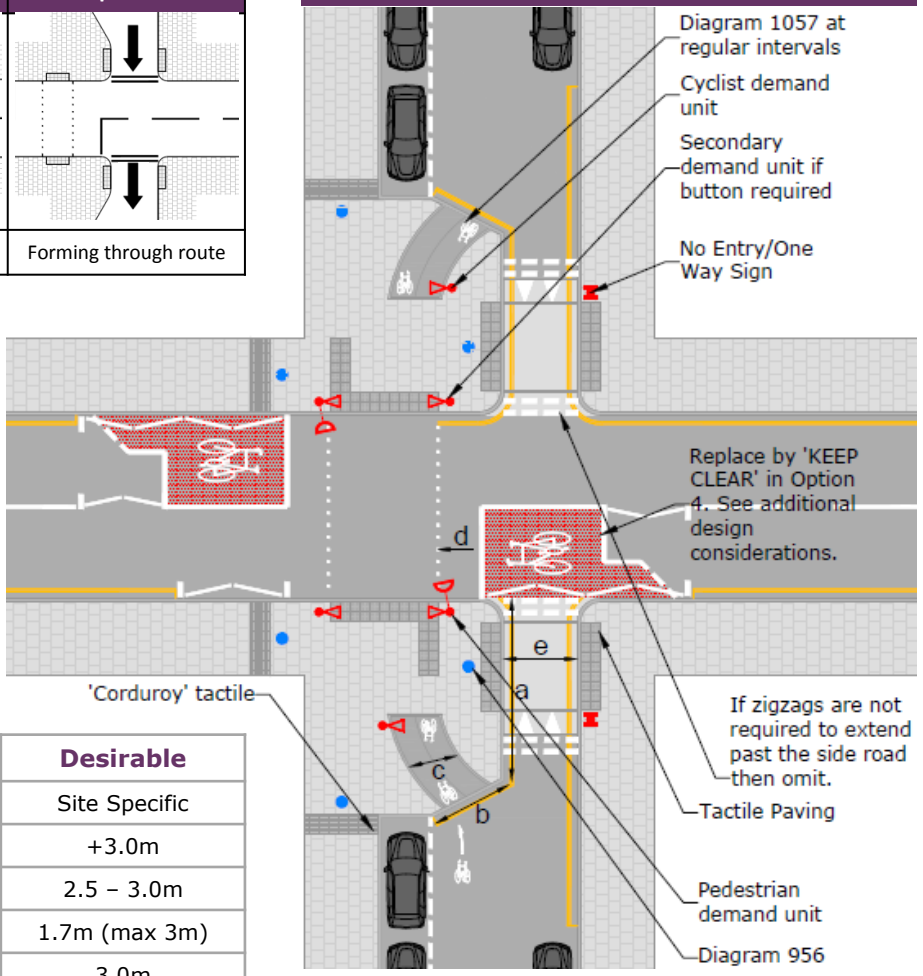
One way plugs/streets

- 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.

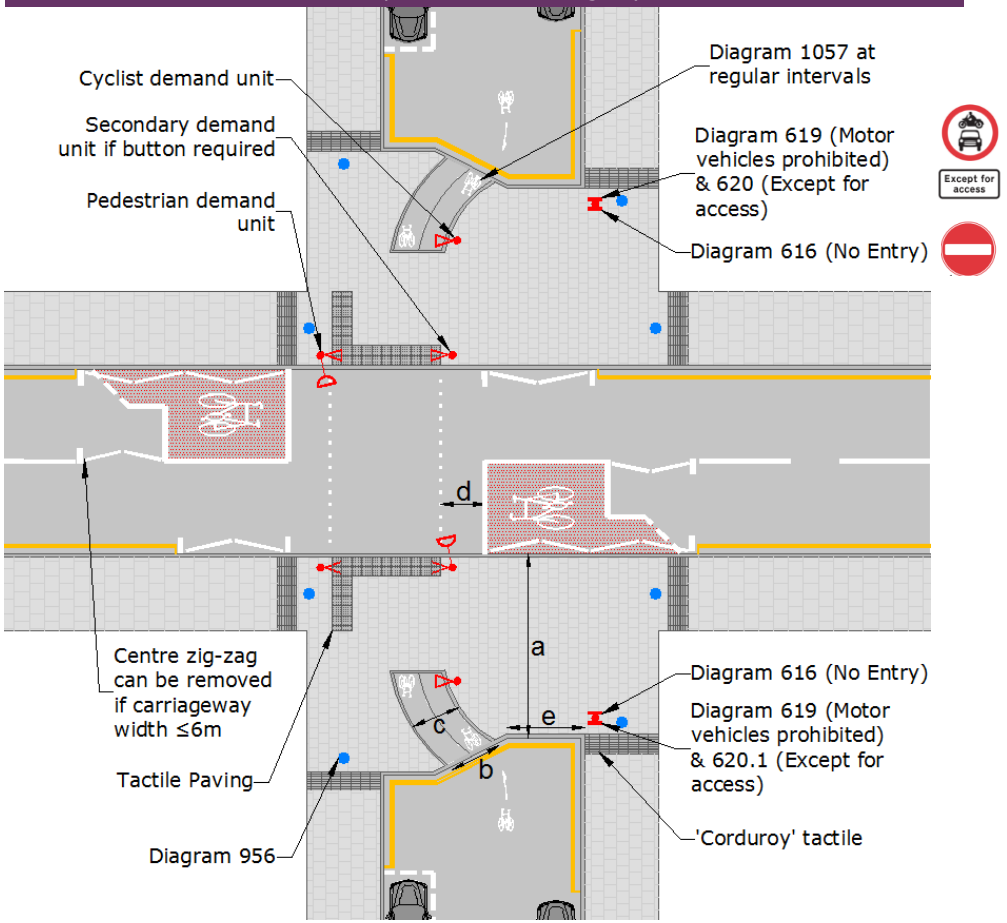
Tactile paving

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]

Index