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THE ENVIRONMENT FOR NORTHERN IRELAND

TA 15/81

Pedestrian Facilities at Traffic Signal Installations

Summary: This Advice Note sets out the measures which can be adopted to assist pedestrians to cross the carriageways in safety at signalled junctions.

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TA 15/81

PEDESTRIAN FACILITIES AT TRAFFIC SIGNAL INSTALLATIONS

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1. SCOPE

This note deals with the provisions for pedestrians to cross roads at a junction controlled by traffic singles. Pedestrian facilities at situation other than junctions are dealt with in Departmental Standard TD/4/79 (reference 1) and Advice Note TA/10/80 (reference 2).

2. INTRODUCTION

When a traffic single installation is being designed or modified the nature and extent of pedestrian traffic flow has to be taken into account as well as that of vehicular traffic.

The object of providing pedestrian facilities is to assist pedestrians to cross in safety, whilst exercising due care and attention, with the minium delay to traffic.

There is a number of alternative methods of achieving this aim and this Note describes each. The Engineer has to consider which of these methods can be best applied to individual sites., knowing the pedestrian flow pattern, degree of saturation and the topographical layout.

It should be noted that the segregation of pedestrians and vehicles by means of under-passes or overpasses, can provide the safest means of achieving these objectives.

3. JUSTIFICATION

3.1 At signals which exist, or are to be provided, a separate pedestrian stage or one combined with a traffic stage may be required if either:-

(a) the flow of pedestrians across any one are of the junction is of the order of 300 per hour or more.

or

(b) the turning traffic flowing into any arm has an average headway of less than 5 seconds during the time that such traffic can flow and is conflicting with a pedestrian flow of at least 50 pedestrians per hour.

These flows should be taken as the average of the 4 busiest hours over any weekday.

3.2 In special circumstances, e.g., where there is an above average number of inform of handicapped pedestrians, then a facility may be required even though it cannot be justified in the terms of para 3.1.

4. TYPES OF FACILITY

4.1 At locations where it is intended to provide a facility consideration should be given to the installation of a full pedestrian stage as described in para 4.3, if the capacity of the junction permits. Alternatively one of the techniques can be given in paragraphs 4.4 to 4.6 should be used.

4.2 No Pedestrian Signal

The presence of traffic signals at an intersection, even without the provision of red and green man displays, does provide assistance to pedestrians in crossing the arms of a junction. This is particularly so where refuges are available and in many cases no further facility is necessary.

An extended all red period between two traffic stages to assist pedestrians is not recommended. This practice leads to increased delays to traffic and to driver disobedience since the extended period will always be present even when there are no pedestrians.

Where a school crossing patrol operates for a short period of the day then a key switch, under the control of an authorised person, may be provided to introduce an extended all red period for that time in which the school crossing patrol exists. A means of overriding the facility should the key be left in may be desirable.

4.3 Full Pedestrian Stage

With this facility, all traffic is stopped whilst pedestrians are signalled across all arms of the junction. This method will cause delay to traffic. The facility should only be called by demand from push buttons which should be provided at all points where pedestrians may cross. Figure 1 shows the typical arrangement and stage diagram.

Although pedestrians may be allowed to cross any of the approaches to an intersection there will usually be one upon which the pedestrian problem is most acute. The pedestrian stage should immediately follow the end of the vehicle stage on this approach.

When an early cut-off stage is provided the pedestrian stage must not immediately follow this stage if a left-turn manoeuvre is permitted on the side road concurrently with the early cut-off stage.

The controller should be arranged to ensure that on termination of the pedestrian period the right of way will revert to a nominated stage in the absence of other demands.

The duration of the invitation to cross period when a green man is displayed is dependant upon the width of the carriageway and is usually of the order of 6-10 seconds. It is followed by a clearance period. An "all-red" period, when a red man is displayed to pedestrians concurrently with a red signal to traffic, must be included in the cycle before the "starting- amber" is shown to the traffic. On multi-stage installations the stages may not always appear in strict cyclic order. Unusual stage sequences should be examined and potentially dangerous stage changes should be inhibited. Care should be taken to ensure adequate clearance time exists for vehicles before the start of a pedestrian stage, particularly after any unusual stage changes.

4.4 Parallel Pedestrians

Where it is possible to permanently prohibit some turning movements a combination of pedestrian and vehicle stages can be installed. see Figure 2a. By virtue of banned turns pedestrian facilities can be provided across appropriate arms. In order to reduce the possibility of vehicles turning illegally kerb radii should be squared off (see layout drawing).

This facility can be usefully employed at a "T" junction with a one way street where road widths permit, by installing a triangular island in the mouth of the side road. The left and right turning movements from the side road pass either side of the island and pedestrians can cross safely from the island across the main road between the segregated flows when the side road traffic has the right of way. Figures 2a and b illustrate this facility.

4.5 Staggered Pedestrian Facility

Where carriageway widths permit it is possible to economise on cycle time by provisions of a large island in place of the normal refuge. Pedestrians can negotiate one half of the carriageway at the normal stop line when traffic on that approach is held on red. Normal pedestrian signals are shown during this period. The other half of the carriageway is controlled by separate signals which are located at the opposite end of the island and pedestrian right of way is demanded by push button. The pedestrian stages matures concurrently with the commencement of the green on the other traffic stage so that sufficient reservoir space is necessary only to accommodate turning vehicles. A clearance stage may be desirable in some instances to ensure the reservoir is empty at the commencement of Stage B. Vertically louvred amber and green signals should be provided at these sites and angled towards turning traffic to avoid misleading indications (sometimes known as see-through). The minimum size of the centre refuge recommended for this application is 10 m x 2.5 m. The arrangement is illustrated in Figure 3.

4.6 Displaced Pedestrian Facility

If the junction is close to capacity, a pedestrian facility should be considered away from the junction. The crossing may be provided across the full width of the carriageway and not more than 50 m from the mouth of the junction. The stage is incorporated within the junction signal cycle and the stage position chosen to impede the minimum of traffic flow.

In the illustration, Figure 4, the stage B should be demand dependant and omitted from the cycle if no pedestrian demand is received. It may also be desirable to precede stage B with a clearance stage to prevent traffic queuing over the crossing at the termination of stage A.

Pedestrians should be diverted towards the crossing by means of the minimum practical length of guard railing.

A displaced pedestrian facility closer than 50 m to a junction should not be of the pelican type.

5. PEDESTRIAN DISPLAY SEQUENCE

5.1 The normal pedestrian display sequence at a junction signal installation is as given in the following table:

Pedestrian Signal	Vehicle Signal	Period
1. Red Standing Man	Green	Dependant upon cycle time
2. Red Standing Man	Amber	3 seconds
3. Red Standing Man	Red	Minimum to clear traffic in the Junction
4. Green Man	Red	6 -12 seconds depending upon carriageway width and pedestrian density
5. No Signal (black out)	Red	See Note Below
6. Red Standing Man	Red	1 -3 seconds, but see Note below
7. Red Standing Man	Red & Amber	2 seconds

NOTE: The time of the periods 5 and 6 together (in seconds) should be equal to the width of the carriageway in metres divided by 1.2.

5.2 In parallel pedestrian facilities, to ensure that the green man period is of fixed duration, vehicle stages which are associated with a pedestrian facility should also be of fixed duration. If the variation in traffic demand is such as to justify vehicle actuation alternative staging is possible but great care must be taken to avoid confusion to pedestrians.

6. EQUIPMENT RELEVANT TO PEDESTRIAN FACILITIES AT JUNCTIONS

6.1 Signal Lanterns

Pedestrian Signals to Diagram 4002 of the Traffic Signs Regulations and General Directions (Reference 3) are provided and mounted in accordance with Regulation 35. Where "Green Man" displays are given to pedestrians concurrently with moving traffic care in position of these lanterns should be taken to ensure that misleading indications do not exist.

6.2 Push Button Units

Push button units as shown in Diagram 4003 (Ref 3) should be provided when required in accordance with Regulation 35. Additional push button units are necessary on refuges where pedestrians may be trapped at the end of the pedestrian stage.

6.3 Audible Signals During Pedestrian Stages

Authorisations are being made by the Department on an individual basis for the use of audible signals at selectedd junctions. The objective is to provide a significant assistance to visually handicapped pedestrians. The signals are authorised by the Secretary of State only if the following conditions, which supersede the Annex to Internal Advice Note 2/80, (Ref 4) are met.

6.3.1 A full pedestrian stage must be included in the signal cycle with a pedestrian crossing facility at each approach to the intersection and identical pedestrian indications given simultaneously on each such facility.

6.3.2. The invitation to cross period (green-man) shall last for a minimum of 5 seconds and shall not start until the red stopping signal has been given to all traffic for a sufficient length of time for turning vehicles to have cleared all pedestrian crossing facilities.

6.3.3 Audible signals shall be provided at each end of the pedestrian crossing facility at each approach.

6.3.4 The audible signals shall be activated only whilst the green man signal is indicated to pedestrians and shall be fail-safe in this respect, so that no malfunction of the signal equipment would allow them to operate at any other time.

6.3.5 The black out period plus 'red standing man'/red to traffic period (see para 5.1 above) shall be of sufficient duration to allows pedestrians to cross between the kerbs at either end of the longest pedestrian crossing at the intersection at a maximum walking speed of 1.2 m per second.

6.3.6 The starting amber for the traffic stage following the pedestrian stage shall not be indicated before the red-man signal is indicated to pedestrians.

6.3.7 Where the intersection is included in an Urban Traffic Control scheme of any description, no plan capable of being operated by the central control shall be employed unless the above requirements for the pedestrian stages are met fully.

6.4 Crossing Studs

The crossing place should be indicated by two rows of studs each of the dimension given in the Regulations, reference 3, and set out as shown in Diagram 1055 of the Regulations. The width of the crossing place is dependant upon the site conditions but is normally in the range 2.4 to 5 metres. Exceptional numbers of pedestrians may require the width to be increased to 10 metres, the approval of the Secretary of State is required for crossing widths in excess of 5 metres. It is recommended that the footway at the crossing position should be provided with a drop kerb to assist pedestrians.

6.5 Central Refuges

These refuges, with illuminated bollards, are normally installed to help to channel road traffic and to offer some assistance to pedestrians. Advice on the design of such refuges may be found in Technical memorandum H 11/76 (Reference 5).

6.6 Guard Rails

It is desirable in some cases to restrict the crossing of pedestrians to certain approaches at an intersection and guard rails can be used to prevent pedestrians crossing at dangerous places (for example where filtering traffic may be moving at times unexpected by pedestrians). Guard rails should always be provided on large islands where staggered pedestrian movements are allowed.

Guard railing used should comply with the requirements of British Standard 3049/1976 (Ref 6) which sets out the requirements for installing metal rail.

7. REFERENCES

1. Departmental Standard TD/4/79
Pelican Crossings: Pelican Crossing Operation

2. Departmental Advice Note TA/10.80
Design considerations for Pelican and Zebra Crossings

3. Traffic Signs Regulations and General Directions 1981:

4. Internal Advice Note 2/80, RSTL 1 Department of Transport.

5. Technical Memorandum H 11/76

6. British Standard 3049/1976 - Pedestrian Guard Rail (Metal)

8. ENQUIRIES

FIGURES 1 - 4

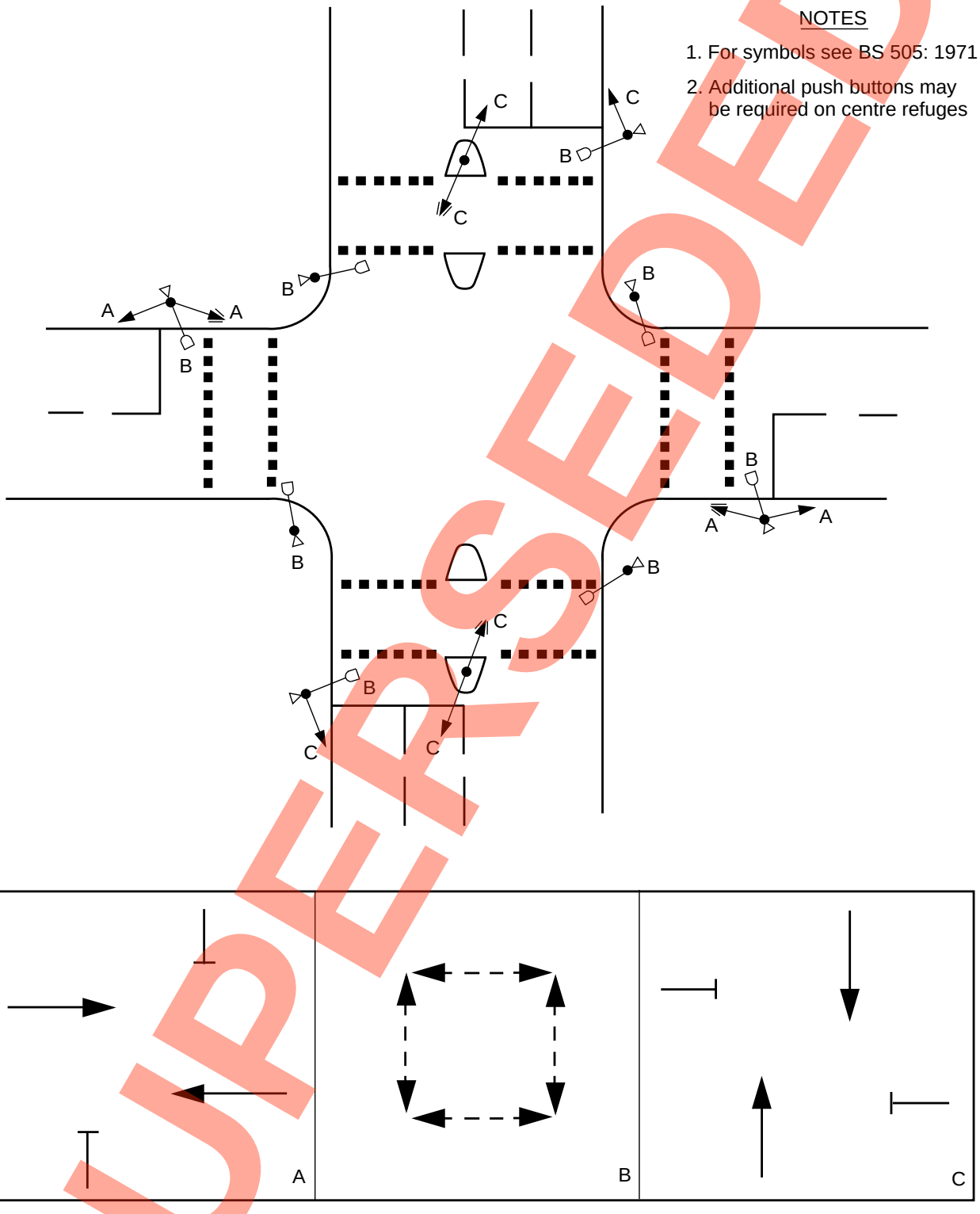

Fig.1. Full Pedestrian Stage

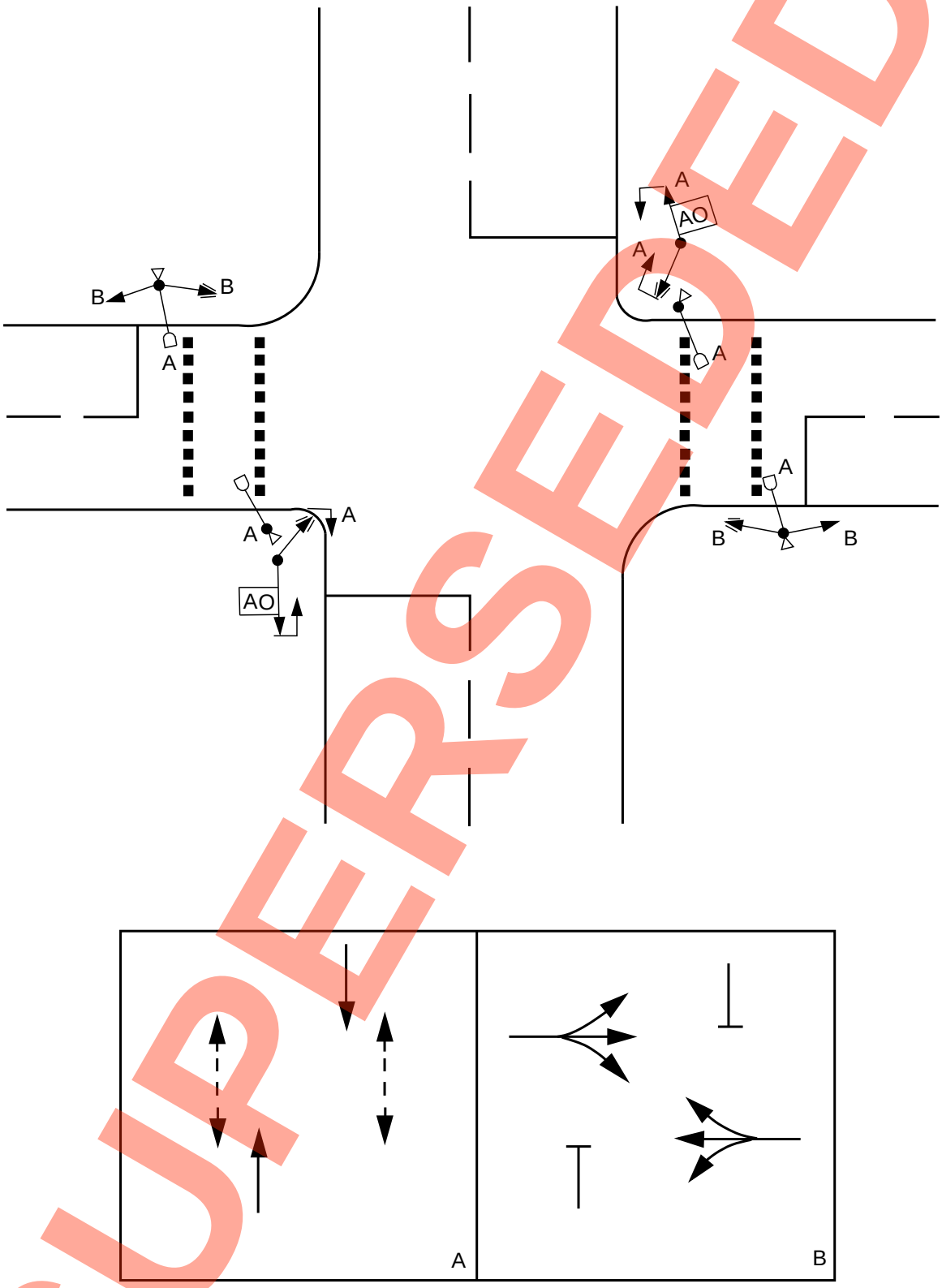

Fig. 2a. Parallel Pedestrian Stage

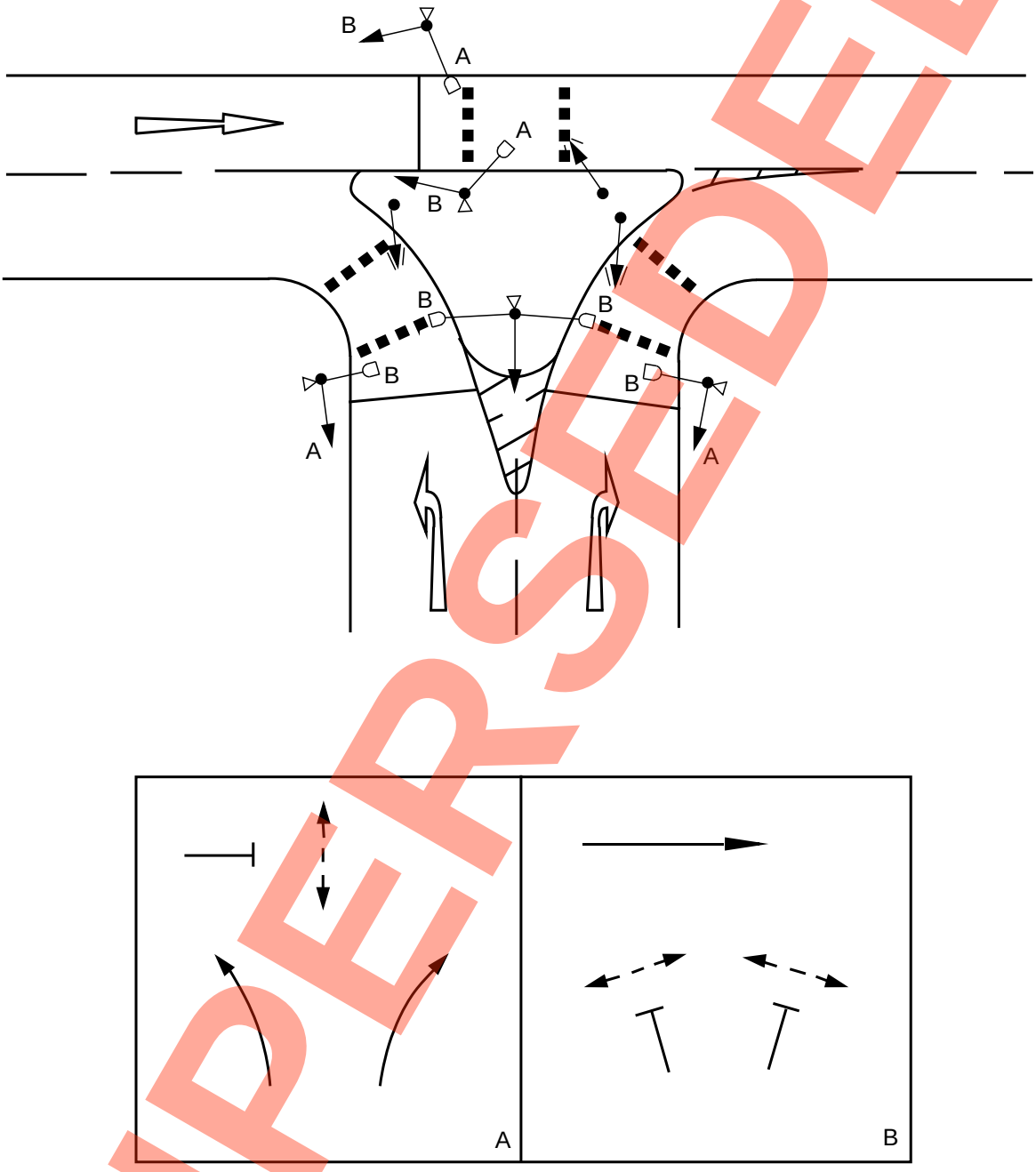

Fig. 2b. Parallel Pedestrian Stage
- one way street arrangement

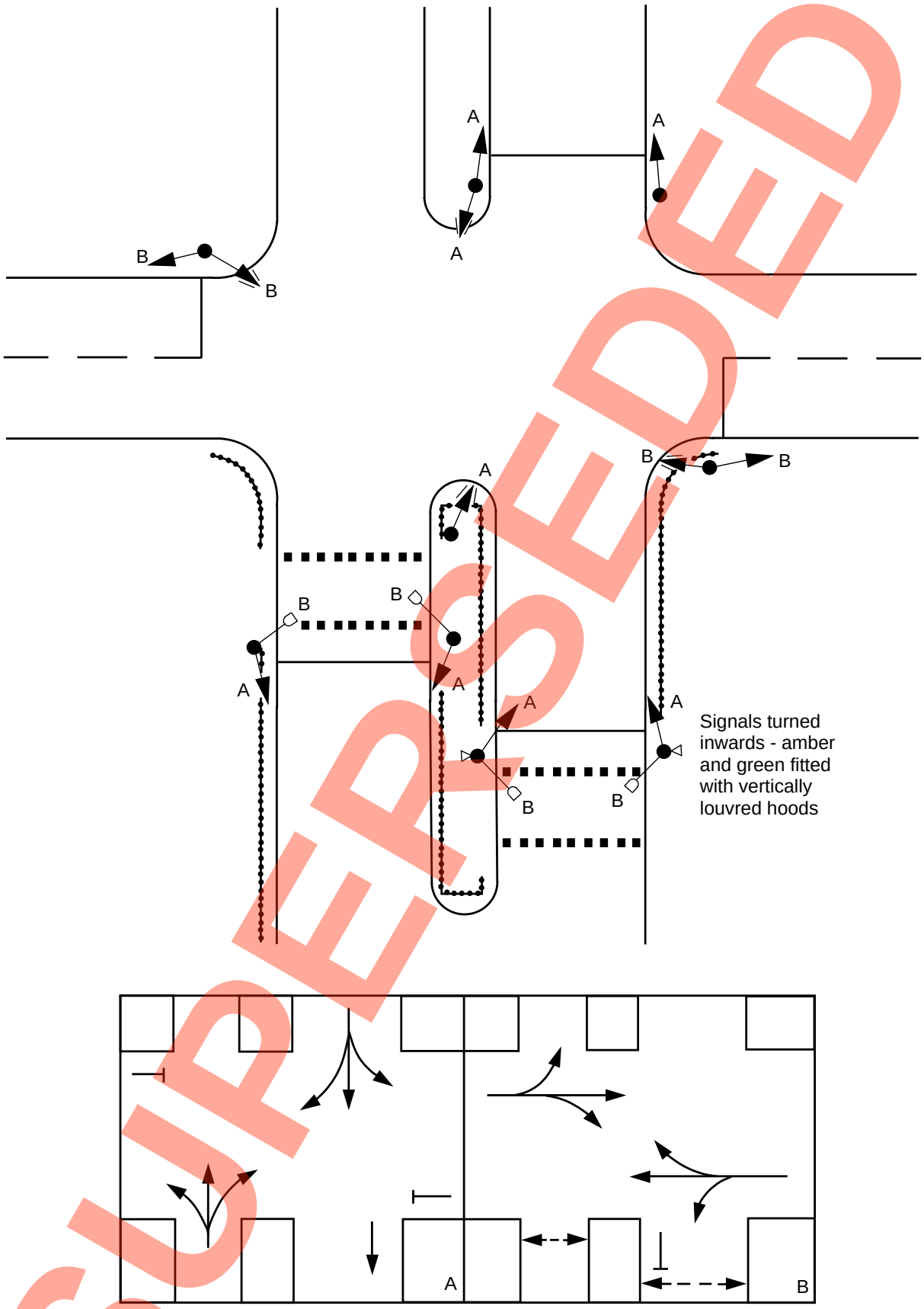

Fig. 3. Staggered Pedestrian Facility

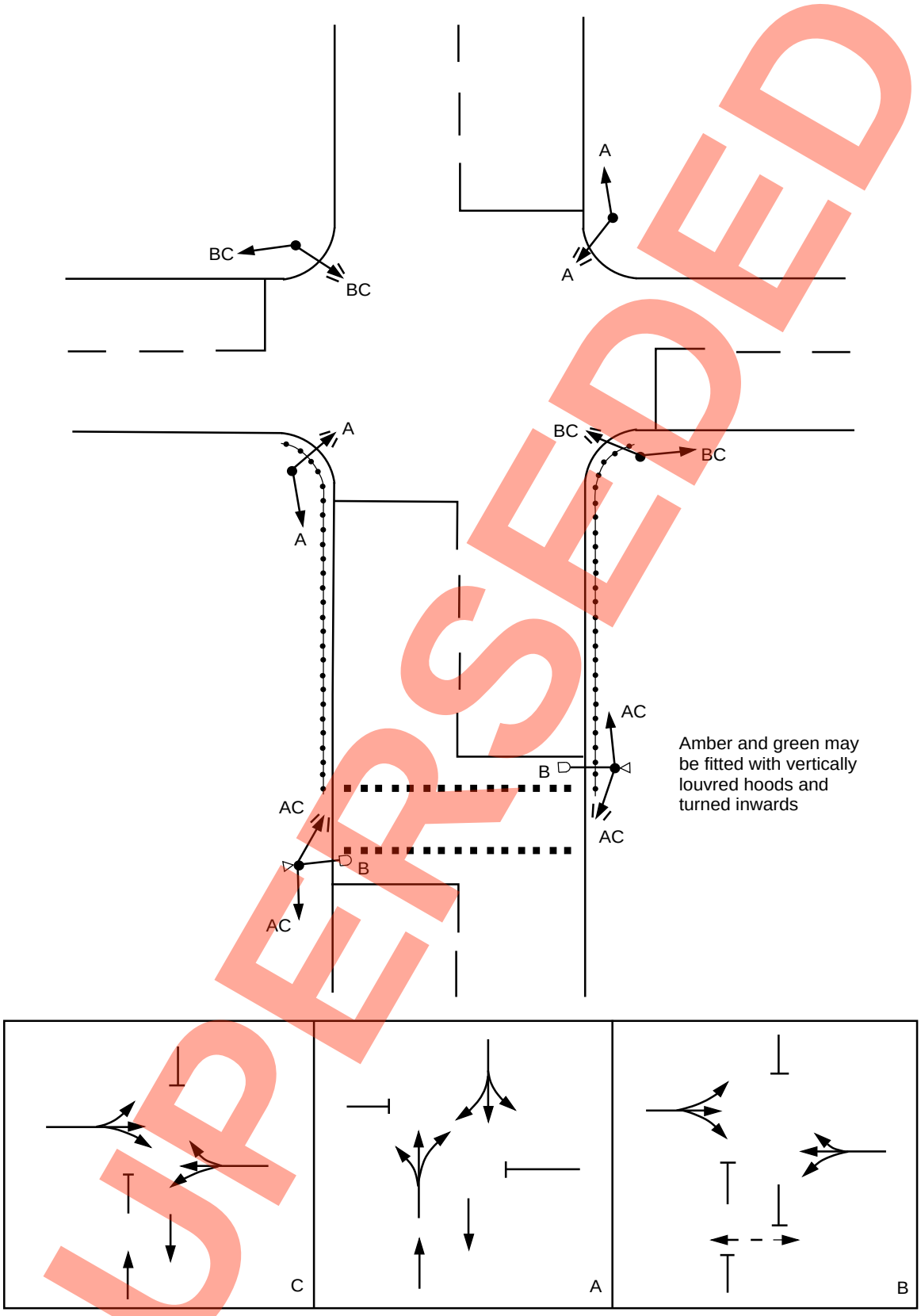

Fig.4. Displaced Pedestrian Facility