Gloucestershire County Council

Bus Stop Specifications

February 2006 (updated 2010)

Gloucestershire County Council

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Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Approved by
1	0	First Issue	November 2004	
2	1	Second Issue.	February 2006	
3	2	Updated by GCC	2008	
4	3	Updated by GH	2010	

Contents

1 Introduction

Task Order 3602 requested the design of standard bus stop layouts for use in Gloucestershire with specific emphasis on: -

1. Vehicle and passenger access.

2. Bus stop location and layouts.

3. Bus shelters.

4. Real time passenger information (RTPI) requirements.

2 Recommendations

2.1 Vehicle and passenger access

2.1.1 In most circumstances raised bus stop platforms are to be constructed using bus stop access kerbs 160mm high with a splayed face of minimum offset 120mm to avoid damaging bus bodywork (see Figure 9).

2.2 Bus stop locations and layouts

2.2.1 Boarder or kerb-side stops are preferred (see Figures 4, 5, 6, 7 & 8).

2.2.2 Bus stop cages are to be marked to Diagram Nos. 1025.1, 1025.3 or 1025.4 and may have a green coloured surface where parking is a problem (see Figures 1, 2 & 3).

2.2.3 Where parking is a problem additional parking/waiting restrictions may be required to enable buses to access stops (see Figures 5, 7 & 8) in accordance with *'The Disability Discrimination Act 1995'* and *'The Public Service Vehicle Accessibility Regulations 2000'*.

2.2.4 Bus bays are only to be used where there is restricted carriageway width, a bus must remain stationary for a prolonged time or where overtaking a stationary bus would be dangerous.

2.2.5 Bus stops should be on pedestrian desire lines and clearly visible to both passengers and drivers.

2.3 Bus shelters

2.3.1 A bus shelter is to be provided on stops where more than 10 passengers/day board, sufficient footway width is available and in rural areas exposed to bad weather and infrequent service.

2.3.2 A cantilever shelter, with end panels, is considered the best compromise of protection and personal safety.

2.3.3 Shelters should be positioned at the 'exit' end of the bus stop approximately 2m from the flag so that passengers face the oncoming bus (see Figure 10) and should provide seating, lighting, service information and litter bins.

2.3.4 Shelters should normally be brightly coloured to be easily identified, in conservation areas and rural locations however a more subtle colour may be more appropriate.

2.3.5 Shelters should be large enough to accommodate the average number of passengers (during the stop's busiest hour) at each stop allowing $0.4m^2$/passenger.

2.3.6 Construction is to be of vandal resistant materials whilst allowing maximum visibility.

2.3.7 All new bus shelters are to be RTPI compatible.

2.3.8 It is recommended that all shelters are directly illuminated if new lamp columns are introduced; care must be taken to ensure that they do not obscure advertising panels on shelters and that they do not create an obstacle for pedestrians.

2.4 Real time passenger information (RTPI)

2.4.1 RTPI assists in promoting public confidence in bus services.

3 Vehicle and passenger access

3.1 Bus stop access kerbs.

3.1.1 Improving accessibility to buses requires attention to both the horizontal gap between the bus and the kerb side, and the vertical difference (step height) between the footway and the bus floor.

In recent years service providers have developed improvements in bus technology with both low floor and kneel down buses covering many routes, as a result of these improvements the need for the installation of bus stop access kerbs needs to be considered on a case by case basis.

New disability legislation coming into effect in 2014 states all bus service providers will be required to run low floor buses on all services. In the transition period prior to this legislation comes into force consultation with the relevant bus services should establish when service providers will be switching to low floor buses, this will allow designers to determine whether the use of raised kerbs is feasible.

3.1.2 Reducing the step height is an important factor in improving accessibility to buses by the mobility impaired and may be achieved by deploying a ramp from the bus to the footway or raising the footway to provide level access.

3.1.3 In recent years kerbs have been developed specifically for use at bus stops having heights of between 160mm and 220mm. Where these kerbs are used the footway level has to be raised by between 35mm and 95mm forming a bus stop platform improving bus access for all passengers, especially the mobility impaired.

3.1.4 A standard kerb has a height above the carriageway surface of 125mm but to provide level access a kerb height of approximately 160mm is required.

Research has been undertaken by various local/unitary authorities throughout the country to establish the most appropriate kerb height above carriageway level.

A summary of findings from a range of consulted parties discussing the appropriateness of raised kerbs is included overleaf:

Consultee	Need/Priority of Measures	Suggested Kerb Upstand
GCC Integrated Transport	• Gloucestershire County Councils Integrated Transport Unit (ITU) Team have stated they wish to be fully consulted on any scheme involving the installation of new bus stops. • A preference has been stated for a kerb upstand of 125mm and 140mm high kerbs at bus stops.	125mm/140 mm
Stagecoach	• Stagecoach have raised concerns regarding the ability of busses to "dock" at raised kerbs. Docking at raised kerbs increases the likelihood of damage to bus bodywork and could also incur in increased tyrewall wear. • Drivers have been asked to think about the type of entrance on the bus being driven and recognise the type of kerb at the stop they are approaching before undertaking a manoeuvre.	125mm
Other Local/Unitary Authorities	• Transport for London (TfL) suggests a kerb height of either 125mm or 140mm should be used under normal circumstances however their entire network is operated using low floor buses unlike Gloucestershire. • Consensus from other local/unitary authorities suggests that standard kerbs set at 160mm height should be used under all normal circumstances.	125mm/160 mm
Local Disability User Group (Gloslifestyles)	• In rural areas raise kerbs would be of most benefit as most private operators are working with very old vehicles that are not wheelchair accessible. • However they will all have to comply with legislation in the end. It would be short sighted not to start preparing for 2014.	Raised kerbs in rural areas, thought needs to be given to preparing for 2014.
Local Elderly User Group (GOPA)	• GOPA feel that anything that makes public transport more accessible - whether in the design of vehicles (buses, trains, taxis etc.), or the design of access points (bus-stops etc.) - is desirable for older people and anyone else with mobility issues. • Whenever, a new bus-stop is being built, or an existing bus-stop is being significantly repaired, or up-graded, it should be done with a view to making it as DDA compliant as possible – even if rural bus operators have not yet caught up with the legislation. • At least one of GOPA's Trustees has suggested that the priority for any 'spare' money in the Highways Department's coffers, over and above what is already allocated to maintenance, should be spent on repairing the damage sustained as a result of the recent severe weather.	Not specified only that access points should be designed with elderly users in mind and in compliance with the DDA.

In summary of the consultation findings, bus kerbs provide a clear problem to bus providers especially on lay-bys with limited manoeuvrability. As a result of the findings raised kerbs on lay-bys should be avoided particularly where manoeuvrability is an issue in urban locations.

Raised kerbs should be considered where on-street bus stops are provided/to be installed, research needs to be undertaken by the designer to establish the type of busses and users using the facility to justify a need for raised kerbs prior to legislation being enforced in 2014. Raised kerbs should be limited to situations where there is only a clear demand for such a facility and agreement made with the County Councils Integrated Transport Unit.

On routes where low floor and kneel down buses operate the agreed GCC policy is to avoid installing bus stop access.

Consultation should be undertaken on an individual basis to ensure service providers are satisfied with the facilities provided.

3.1.5 These kerbs have been developed as an alternative to the boarding ramp required by *'The Public Service Vehicle Accessibility Regulations 2000'* (the maximum angle of a bus boarding ramp shall be 7° [1:8]), which arose from *'The Disability Discrimination Act 1995'*. There is no obligation under either of these directives to provide raised kerbs but their use will negate the need to deploy the ramp saving time.

3.1.6 The following three kerbs have been specifically designed for use at bus stops and are generally available: -

- Kassel Kerb 160 or 180 mm high.
- Charcon Access Kerb 160 or 220mm high.
- Marshalls Bus Stop Kerb of variable height up to 200mm.

3.1.7 All kerbs are manufactured from hydraulically pressed un-reinforced concrete of similar colour. The Kassel Kerb has a wide (300mm) upper surface textured with a diamond pattern, the Charcon Access Kerb may be supplied with a marker bump to assist the bus driver to position the bus immediately adjacent to the kerb and the Marshalls Bus Stop Kerb comes in two parts giving its variable height.

3.1.8 Supply costs for these kerbs are also similar and Burdens provided the following costs: -

- Kassel Kerb - £110.10/m + £370.00 delivery
- Charcon Access Kerb - £104.59/m + £95.00 delivery
- Marshalls Bus Stop Kerb - £96.47 +£399.00 delivery

3.1.9 Conventional kerbs have also been installed with a similar upstand to the specialist kerbs and are substantially cheaper; they do not however provide sufficient lateral clearance resulting in damage to bus bodywork.

3.1.10 Due to their weight, all of these kerbs require handling by mechanical means to comply with Health & Safety legislation.

3.1.11 It is understood however that a manufacturer is experimenting with producing kerbs from recycled plastic that may overcome this weight problem provided they are sufficiently durable and aesthetically acceptable.

3.1.12 Laying problems may be encountered as they must be laid to a straight horizontal and vertical alignment to prevent unsightly gaps; the carriageway adjacent to the kerbs may therefore require re-grading to this alignment in order to maintain a consistent kerb height.

3.1.13 The units of kerb shall be laid to a tolerance of $\pm$ 6mm vertically and not more than 3mm in 3m when checked with a 3m straight edge horizontally.

3.1.14 The Marshalls kerb being a two part system is potentially more difficult to lay accurately.

3.1.15 The Kassel Kerb was initially considered to be superior as the shape of the kerb is designed to guide the bus tyre ensuring the bus stops close to the kerb resulting in a narrow horizontal gap between the kerb and the bus; it has however proved to cause damage to bus bodywork and tyres during operation.

3.1.16 Damage is caused because the wheel track at the front of a bus is up to 150mm narrower than the rear; the bodywork of the bus therefore extends approximately 100mm beyond the tyre. The overhanging bodywork will therefore scrape against the kerb if the tyre is in contact with the kerb or lower onto the kerb when kneeling.

3.1.17 This problem is particularly acute when the stop is in a lay-by, has a raised platform of extensive length or when kerbs in excess of 160mm high are used (bus ground clearance has been measured at 165mm). The problem can be exacerbated by the vertical alignment of the road resulting in the effective kerb height varying along the length of the stop. Where the site characteristics indicate that the front overhang of the bus is likely to sweep over the footway, then the height of the kerb should be such that there is adequate clearance.

3.1.18 Due to this damage bus operator, Stagecoach (Sholto Thomas, Operations Director), have instructed their drivers not to run their tyres against Kassel kerbs. they have also expressed a preference for the 160mm high Charcon Access Kerb based on their companies' experience in Wales.

3.1.19 The benefits of these kerbs are lost however if buses are unable to reduce the horizontal gap by manoeuvring close to (within 200mm) and parallel with the raised platform. A variety of bus stop layouts have therefore been designed, specifically the boarder stops, and restrictions may be applied to achieve the desirable vertical and horizontal gaps.

4 Bus stop locations and layouts

Kerb-side, bus bay and bus boarder or ½ boarder bus stop layouts have been designed in accordance with: -

- Quality Bus Infrastructure – a manual and guide (TAS).
- London Bus Initiative Partnership – Bus Stop Layouts For Low Floor Bus Accessibility (TfL).
- Design of bus stops (IHT).
- Bus showcase handbook (Centro).
- Inclusive Mobility – A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure (DfT).

4.1 Bus Stop Consultation

Gloucestershire County Council has a commitment to installing and upgrading bus stop and shelter facilities, but recognises changes to the streetscape may concern local residents and businesses. In order to satisfy the GCC requirements the following consultation needs to be undertaken as a minimum:

- Letters and outline plans (if appropriate) to be distributed to affected residents within 25 metres of the new facility.
- Local councillors and other relevant stakeholders to be consulted.
- Objections from the consultation to be reviewed by the appropriate Stakeholder Manager.
- A decision on the objections should be notified by the Stakeholder Manager to the relevant consultees.

4.2 Equality Impact Assessment

In accordance with the Disability Discrimination Act of 2005 Gloucestershire County Council is obliged to carry out an assessment of the effect on disabled people of all its functions and actions.

This process includes identifying and assessing opportunities to make a positive impact on the lives of disabled people as well as assessing ways to remove, avoid or mitigate barriers or other negative effects on disabled people.

4.3 Kerb-side stops

Kerb side stops are the bus service providers preferred method of stopping for pick-up and set down points. Kerb side stops provide advantages in terms of greater service reliability, reduced stopping times and improvements to accessibility at stops.

4.3.1 Problems frequently occur at kerb-side stops due to parked vehicles preventing buses accessing them.

4.3.2 The most common way of preventing this is by marking the bus stop in accordance with 'The Traffic Signs Regulations and General Directions 2002' to Diagram No. 1025.1 (the cage) which incorporates the bus stop clearway marking and sign to Diagram No. 974 preventing all vehicles other than buses stopping during a stated period.

4.3.3 Except where parking will definitely not be a problem or there is insufficient space all bus stop cages should be extended to provide an entry clearance of 15m and an exit clearance of 9m giving a total bus stop length of 37m.

4.4 Bus bays

4.4.1 In general, bus bays should only be used where road width is limited or where buses may wait for prolonged periods due to timetable reasons or where overtaking a stationary bus would be dangerous.

4.4.2 It is considered more appropriate that general traffic be delayed for a short period of time while a bus drops off and picks up passengers, than a bus is delayed from exiting a bus bay by traffic flow.

4.4.3 Bus bays provide clearly identified bus stops; they can however be considered by motorists as a safe stopping place, they should therefore be marked in accordance with 'The Traffic Signs Regulations and General Directions 2002' to Diagram No. 1025.3 or 1025.4 (see Figures 1, 2 & 3).

4.4.4 Many existing bus bays do not meet the recommended layout for modern buses (20m entry taper, 18m bus stop and a 15m exit taper giving a total length of 53m) and should be remodelled or removed.

4.5 Bus boarders

4.5.1 Bus boarders are generally employed in urban areas where buses encounter problems accessing stops due to vehicles parking and deliveries. A bus boarder provides kerb side access by projecting a short section of the footway into the carriageway parallel to the kerb line.

4.5.2 There are two forms of bus boarder: -

a) Full width boarders project approximately 2m into the carriageway to enable a bus to avoid parked vehicles. A bus boarder for a single stop would require approximately 13m of kerb space without a shelter or 17m with a shelter.

b) Half width boarders are a compromise design extending from 500mm into the carriageway (typically 1.0 – 1.5m) and may be used where carriageway width is limited and a full boarder would cause unacceptable delays to other road users. Because the design is a compromise it requires more kerb space; approximately 27m being required to accommodate a single bus.

4.6 Coloured surfacing

Highlighting the bus stop cage with coloured surfacing may help to indicate to other road users that it is an area strictly for buses. At present red surfacing is frequently used for cycle lanes and traffic calming, an alternative colour such as green may therefore be appropriate.

4.7 Bus stop requirements.

4.7.1 Clearly visible to driver and passengers.

4.7.2 Near pedestrian routes to minimise walking distances.

4.7.3 Close to pedestrian crossings.

4.7.4 Located where they are well lit and there is natural surveillance, but away from pubs, clubs, off-licences and fast food take-aways.

4.7.5 Named with locally recognisable names to promote the sense that the service is part of the local community (name should be as in GCC 'NaPTAN' bus stop database).

4.7.6 Located where adequate footway width can be provided.

4.7.7 Clear of junctions, bends, traffic signals or other traffic hazards.

4.7.8 Stops may be located close to the exit zig-zags of pedestrian crossings provided stationary buses do not obstruct crossing vision.

4.7.9 Ensure stops remain un-obscured by trees, foliage, traffic signage or parked vehicles.

4.8 Bus stop platform

Experience has shown the length of the raised platform may be reduced at most stops to 4m at the 'exit' end of the stop. This length is sufficient as the majority of modern buses are designed for single person operation and have a single door at the front allowing the driver to collect fares.

4.9 Bus shelters

4.9.1 The bus shelter should be positioned at the 'exit' end of the bus stop approximately 2m from the flag so that passengers face the oncoming bus.

4.9.2 Bus shelters may only be installed where sufficient footway width is available; the minimum width for installing a cantilever shelter with no end panels is the width of the shelter plus 0.45m with the solid or glazed panel should be at the back of the footway.

4.9.3 'Inclusive Mobility – A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure' published by the Department for transport recommends: -

There should be sufficient space either to the rear of the shelter, or in front of it if the shelter has to be placed at the back of the pavement, to allow easy pedestrian movement. Where shelters are provided in newly built areas there should be a clear obstacle free footway width of at least 2000mm, preferable 3000mm. These dimensions should also be used where practical, when improvement work on highways is being carried out.

However, it is recognized that at many existing stops it is not possible to achieve these standards. Where there are physical constraints, a clear footway width of 1500mm is acceptable, with an absolute minimum of 1000mm over a limited distance (for example, that occupied by the shelter provided it is not more than 6 metres long).

4.10 Bus shelter specifications

4.10.1 Shelters are to be: -

a. Constructed of vandal resistant material.

b. For reasons of personal security bus shelters should be manufactured from transparent materials.

c. Where transparent material is used colour contrast bands at least 150mm wide are to be applied at heights of 900mm to 1000mm and 1400mm to 1600mm from the ground.

d. Where practicable shelters are to be lit during the hours of darkness, in remote rural areas this may be achieved by the use of solar panels.

e. Shelters owned by Gloucestershire County Council are to be dark blue in colour; shelters owned by parish councils or bus companies may be of any colour appropriate to the environment in which they are situated provided it complies with c above.

f. Where sufficient footway width is available, see 4.7 above, seating is to be provided.

g. All new shelters are to be RTPI compatible.

4.11 Bus stop flag

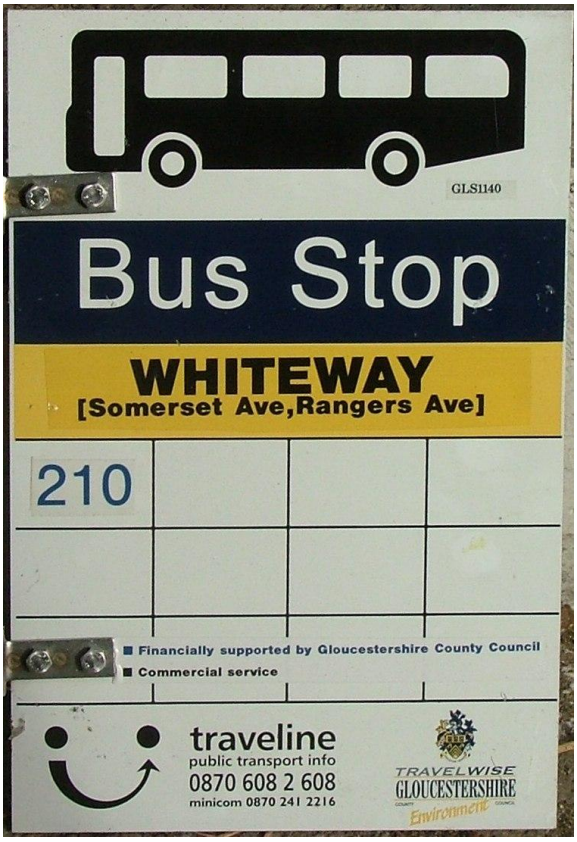
4.11.1 'London Bus Initiative Partnership' states that the bus stop flag '*serves as an indication to passengers of where to wait at the stop and where to board the bus. To drivers it serves as a marker to indicate where the bus should be positioned at the stop. These guidelines are based upon the bus stopping with the flag level with the rear of the front doors.'*

This location has presumably been chosen due to the position of doors varying according to the bus manufactured.

4.11.2 The flag should have a mounting height of 2.3m in normal situations and be at least 450mm wide and 400mm high. Route numbers should be at least 50mm high (see photo below).

4.11.3 All bus stop flags should be in accordance with GCC's Bus Information Strategy (April 2005).

4.11.4 In most instances it is preferred to mount bus stop flags on shelters in order to avoid street clutter if the manufacturer offers a suitable mounting. Alternatively existing street furniture may be considered to mount the bus stop flag on as long as the flag is clearly visible and at an appropriate mounting height.



5 Bus shelters

'Quality Bus Infrastructure' states that the long term objective should be to provide a bus shelter at every stop that is used by a significant number of passengers on a regular basis (more than 10 per day).

5.1 Bus shelter priority.

5.1.1 In the short term bus shelters are to be provided on the following priority basis: -

a) Is the site exposed to bad weather?

b) Passenger waiting time/buses per hour; how long do passengers have to wait for the next bus?

5.2 Bus shelter styles

5.2.1 Roof only supported on tubular legs – gives no protection from wind or driving rain but provides minimum intrusion into the footway.

5.2.2 'Cantilever' consisting of roof and front or back wall – provides little protection from wind and driving rain but has little intrusion into the footway, if footway width permits ¼ or ½ end panels may be fitted to improve protection. This option is considered the best compromise for protection and personal safety.

5.2.3 'Tunnel' consisting of roof, front and back walls – useful for sites with limited space but can be draughty.

5.2.4 'Enclosed' consisting of roof and four walls – provides the best protection for passengers but requires additional footway width and should be provided with two accesses to avoid entrapment. This style of shelter should only be used when misuse is considered highly unlikely.

5.3 Bus shelter good practice

5.3.1 Shelters should be large enough to accommodate the average number of passengers at each stop allowing $0.4m^2$/passenger (passenger volume data may be available from bus company ticket records).

5.3.2 Provide maximum protection from the weather and passing vehicles whilst ensuring that approaching buses are visible to waiting passengers who themselves are visible to the bus driver.

5.3.3 Shelters should be sited to cause minimum obstruction of the footway and create minimum visibility obstruction for road users.

5.3.4 Shelters should not be closer than 500mm from the kerb face in order to avoid fouling bus mirrors. The bus driver may also tend to stop further from the kerb face than is desirable.

5.3.5 Entrance and exit should be at least 1000mm wide to accommodate wheelchair users and double-buggies.

5.3.6 Where a shelter has a kerb side access the shelter should be set back at least 1200mm from the kerb to allow a wheelchair to turn into and out of the shelter.

5.3.7 Construction should be from vandal-resistant materials which are easy to clean and repair if damaged.

5.3.8 Glazing may be of toughened glass or clear polycarbonate. When polycarbonate glazing is used it should have a graffiti resistant coating applied.

5.3.9 Shelters should be brightly coloured to be easily identifiable by the visually impaired, if constructed from clear glazing a brightly coloured band 140 – 160mm wide should be provided 1500mm from the ground.

5.4 Bus shelter facilities

5.4.1 Lighting, this is particularly important in the dark winter mornings/evenings and can contribute towards a feeling of personal security; the lighting should be controlled by a photo cell and may be on a timer to be switched off after the last bus and on 30 minutes before the first bus.

5.4.2 Bus shelter lighting is to provide a minimum illuminance of 10 lux measured 1.5 m above the ground.

5.4.3 Seating may be flip up or perch type made of wood, plastic or plastic-coated metal and should be in bright, warm colours.

5.4.4 Litter bins should be provided attached to the bus stop flag to encourage a clean passenger waiting area and should not obstruct pedestrian or passenger movements and must be emptied regularly to reduce nuisance such as smells and flies.

5.4.5 Public telephones have been introduced at some stops however with the widespread use and coverage of mobile telephones this is no longer considered a priority.

5.4.6 Printed passenger information may be displayed in an information board; these are available in a variety of sizes, the minimum size should be 720 x 210 mm.

5.4.7 The information board is to be mounted where it is unlikely to be obstructed by waiting passengers, boards may therefore be mounted inside the shelter where they are protected from the elements and on the same post as the flag where they are less likely to be obstructed.

5.4.8 All new shelters should be RTPI compatible and must be capable of supporting the 35kg weight of the display and if the bracket for the RTPI display or the display itself has a possible hand hold should be capable of also supporting a person hanging from it. The current preference by the Integrated Transport Unit (ITU) Team in Gloucestershire is for Clearchannel manufactured shelters, which satisfy all these requirements. Consultation must be undertaken with ITU on all schemes that involve the installation of new or replacement shelters.

6 RTPI display requirements

The following requirements have been supplied by Ferrograph the supplier of GCC's preferred design through ACIS.

In order for a shelter to be "RTI ready" the following will be available: -

6.1 It is to be supplied with mains power (230 Volts AC, 6 Amps) and fitted with a separate Residual Current Device (RCD) or Earth Leakage Circuit Breaker (ELCB) for the exclusive use of our display.

6.2 Suitable armoured or braided mains flex is to be provided between the RCD and the display. At least 1 Metre of spare flex should be available at the point the display is installed for termination purposes. The outer sheath of the armoured cable should be earthed.

6.3 The shelters should have a display-mounting bracket in the roof and a suitable location for an antenna to be mounted on the roof or on top of the bracket with a draw cord back to the display area.

6.4 Two fixing points should be provided, tapped to accept M10 bolts.

6.5 The bracket should be installed at the end of the shelter from which a bus would approach from; this allows the display to be in the line of sight of people stood at the bus stop.

6.6 Entry to the display of the power and antenna cables will be through two glands towards the centre of the top surface of the display as shown on the drawing below. The bracket must accommodate the cables and glands.

6.7 A minimum gap of 50mm should be available between the back of the display and any adjacent wall etc to allow access to the displays rear mounted diagnostic sockets.

6.8 Sufficient headroom (minimum 2.1 Metres) must be preserved once the displays are installed.

6.9 The design of the shelters should be such that they are both mechanically suitable for the installation of the display and that the drainage of rain water is routed safely away from the display and mains supply housing.

6.10 Dimensions of the display are provided in the drawing below.

Appendix 1

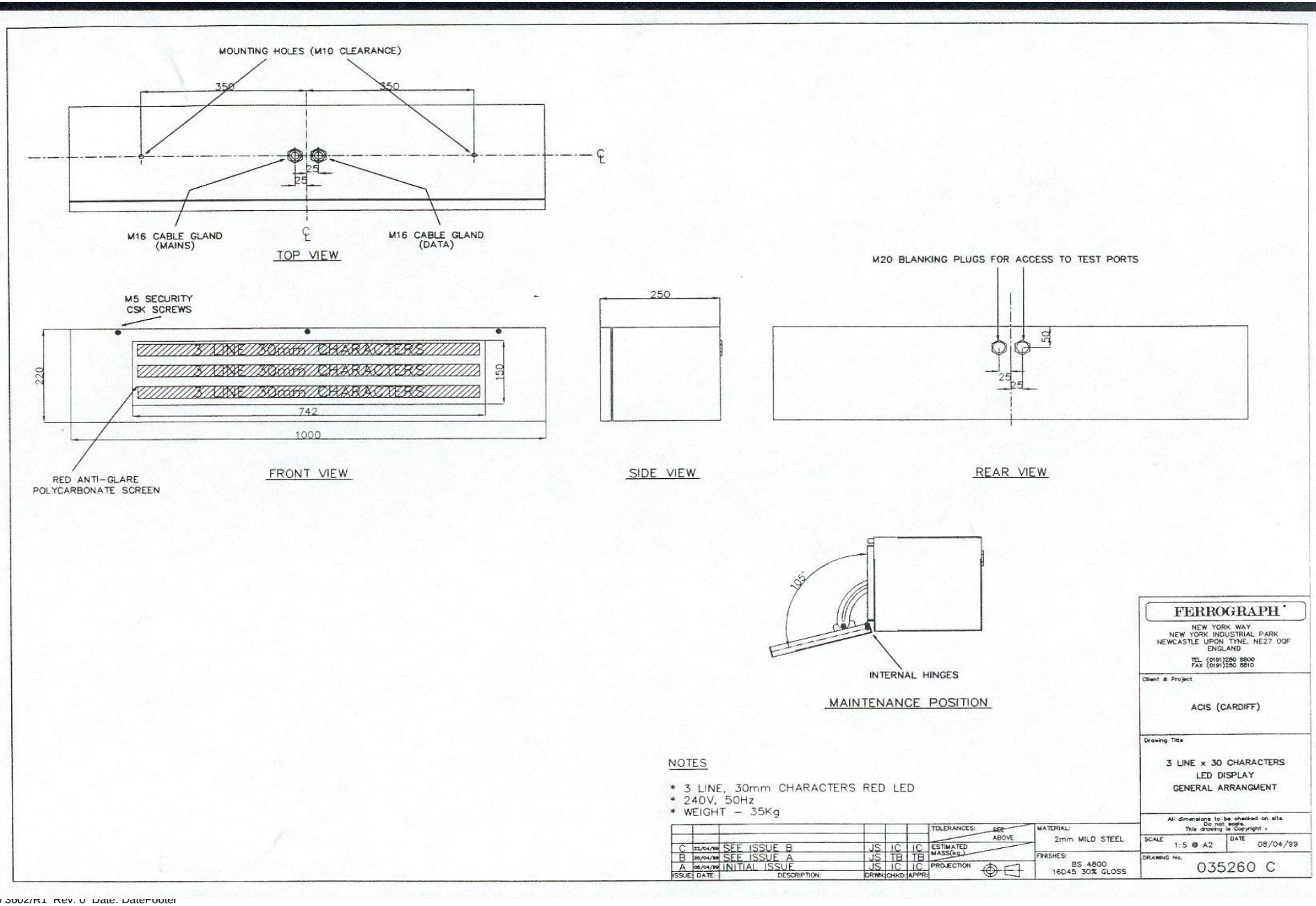
Typical details

Road markings: –

Figure 1 - Diagram No. 1025.1 - kerb-side and boarder stops.
Figure 2 – Diagram No.1025.3 - lay-bys where the bus stop does not use the whole lay-by.
Figure 3 – Diagram No.1025.4 - bus bays.

Bus stop layouts: -

Figure 4 - Kerb-side stop, unobstructed.
Figure 5 – Kerb-side stop, with parking on approach.
Figure 6 – Bus stop with full-width boarder.
Figure 7 – Bus stop with half-width boarder – narrow road width.
Figure 8 – Bus bay.
Figure 9 – Bus stop access kerb.
Figure 10 – Typical detail of kerb-side bus stop.


MOUNTING HOLES (M10 CLEARANCE)
350
350
25
25
M16 CABLE GLAND (MAINS)
M16 CABLE GLAND (DATA)
TOP VIEW
M5 SECURITY CSK SCREWS
3 LINE 30mm CHARACTERS
3 LINE 30mm CHARACTERS
3 LINE 30mm CHARACTERS
220
150
742
1000
RED ANTI-GLARE POLYCARBONATE SCREEN
FRONT VIEW
250
SIDE VIEW
M20 BLANKING PLUGS FOR ACCESS TO TEST PORTS
50
25
25
REAR VIEW
105°
INTERNAL HINGES
MAINTENANCE POSITION
NOTES
* 3 LINE, 30mm CHARACTERS RED LED
* 240V, 50Hz
* WEIGHT – 35Kg
ISSUE DATE DESCRIPTION DRWN CHKD APPR
C 22/04/99 SEE ISSUE B JS IC IC
B 20/04/99 SEE ISSUE A JS TB TB
A 08/04/99 INITIAL ISSUE JS IC IC
TOLERANCES: SEE ABOVE
ESTIMATED MASS(kg.)
PROJECTION
MATERIAL: 2mm MILD STEEL
FINISHES: BS 4800 16D45 30% GLOSS
FERROGRAPH
NEW YORK WAY
NEW YORK INDUSTRIAL PARK
NEWCASTLE UPON TYNE, NE27 0QF
ENGLAND
TEL (0191)280 8800
FAX (0191)280 8810
Client & Project
ACIS (CARDIFF)
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3 LINE x 30 CHARACTERS
LED DISPLAY
GENERAL ARRANGMENT
All dimensions to be checked on site. Do not scale.
This drawing is Copyright ©
SCALE 1:5 @ A2
DATE 08/04/99
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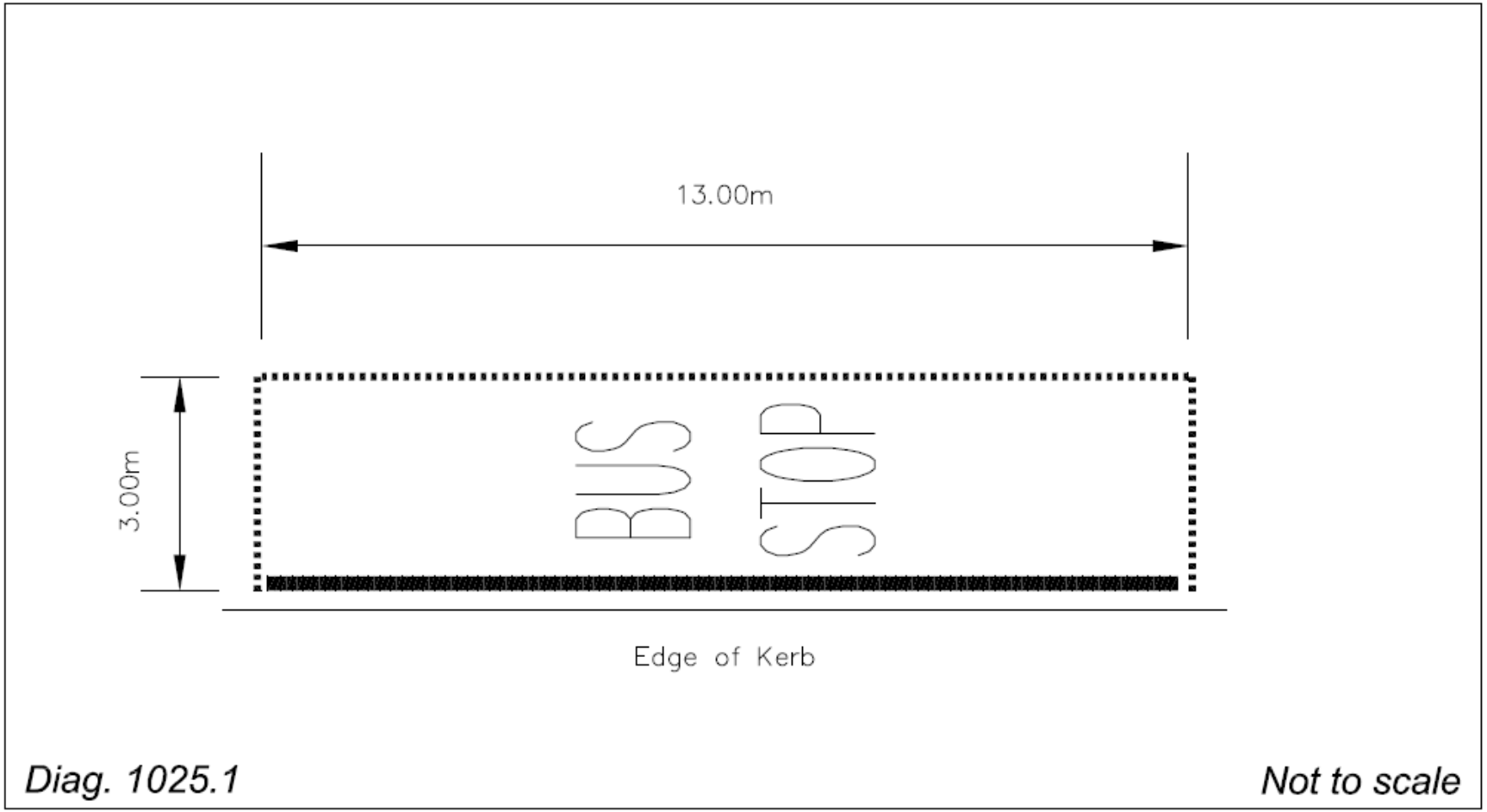

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Figure 1

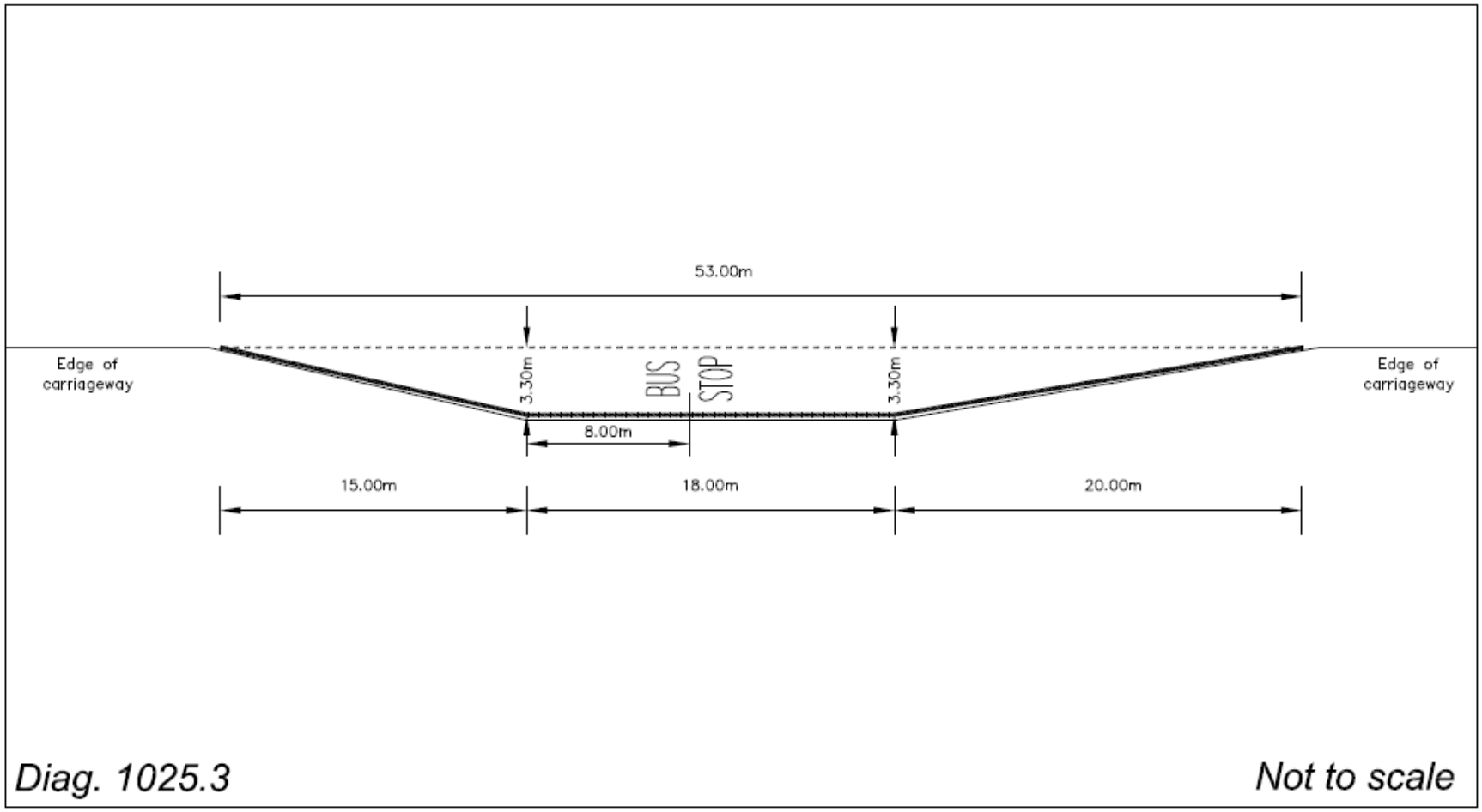

Figure 2

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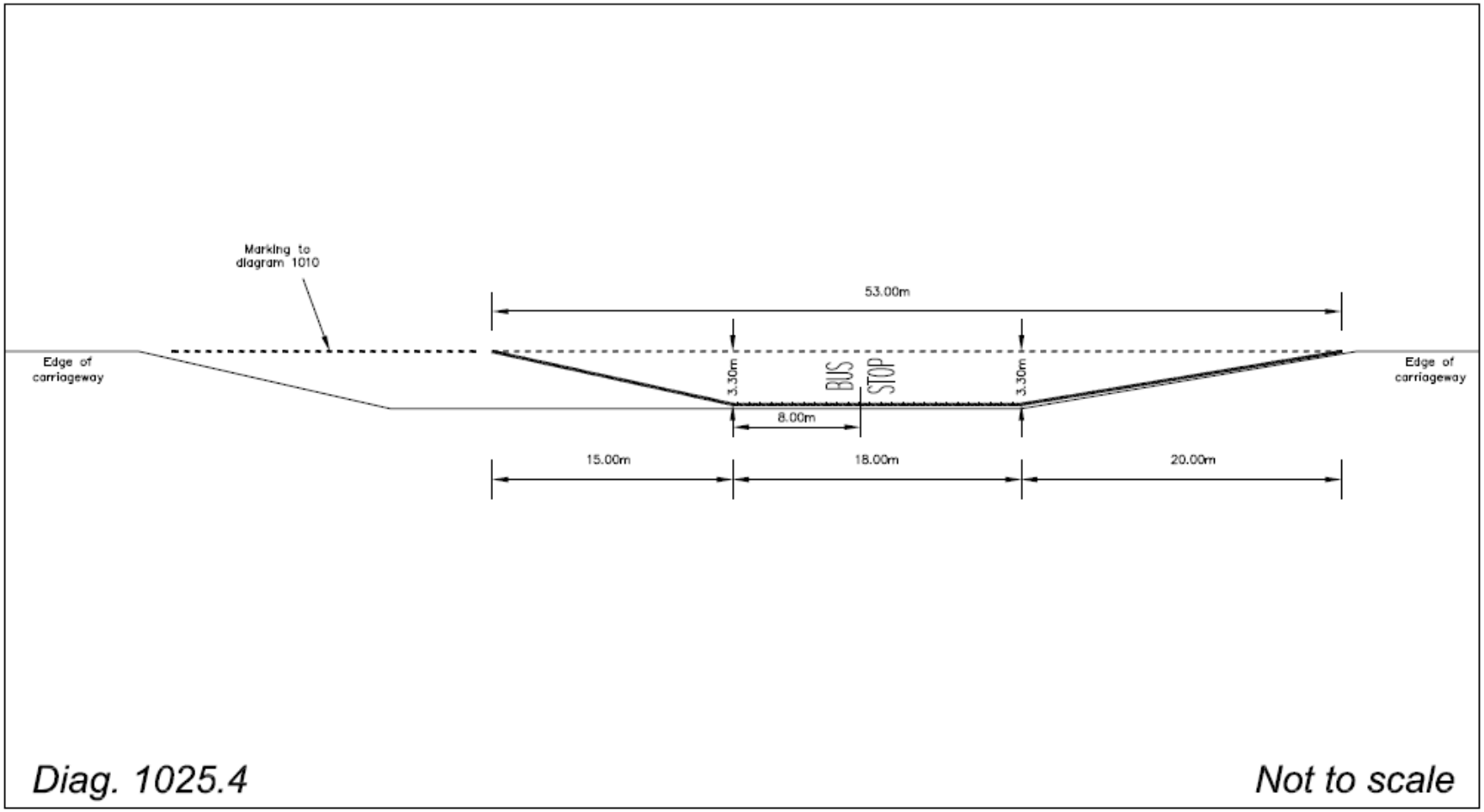

Figure 3

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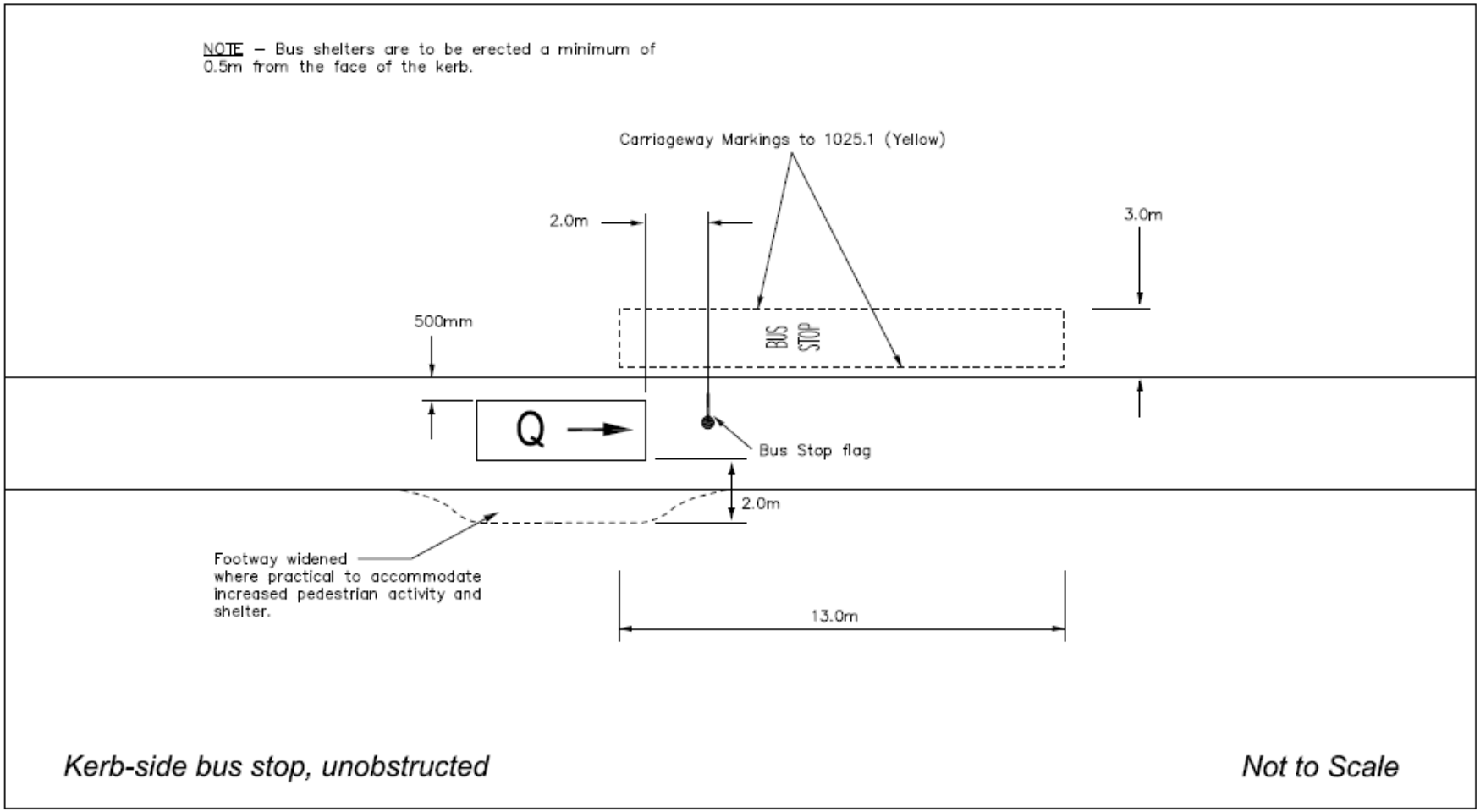

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Figure 4

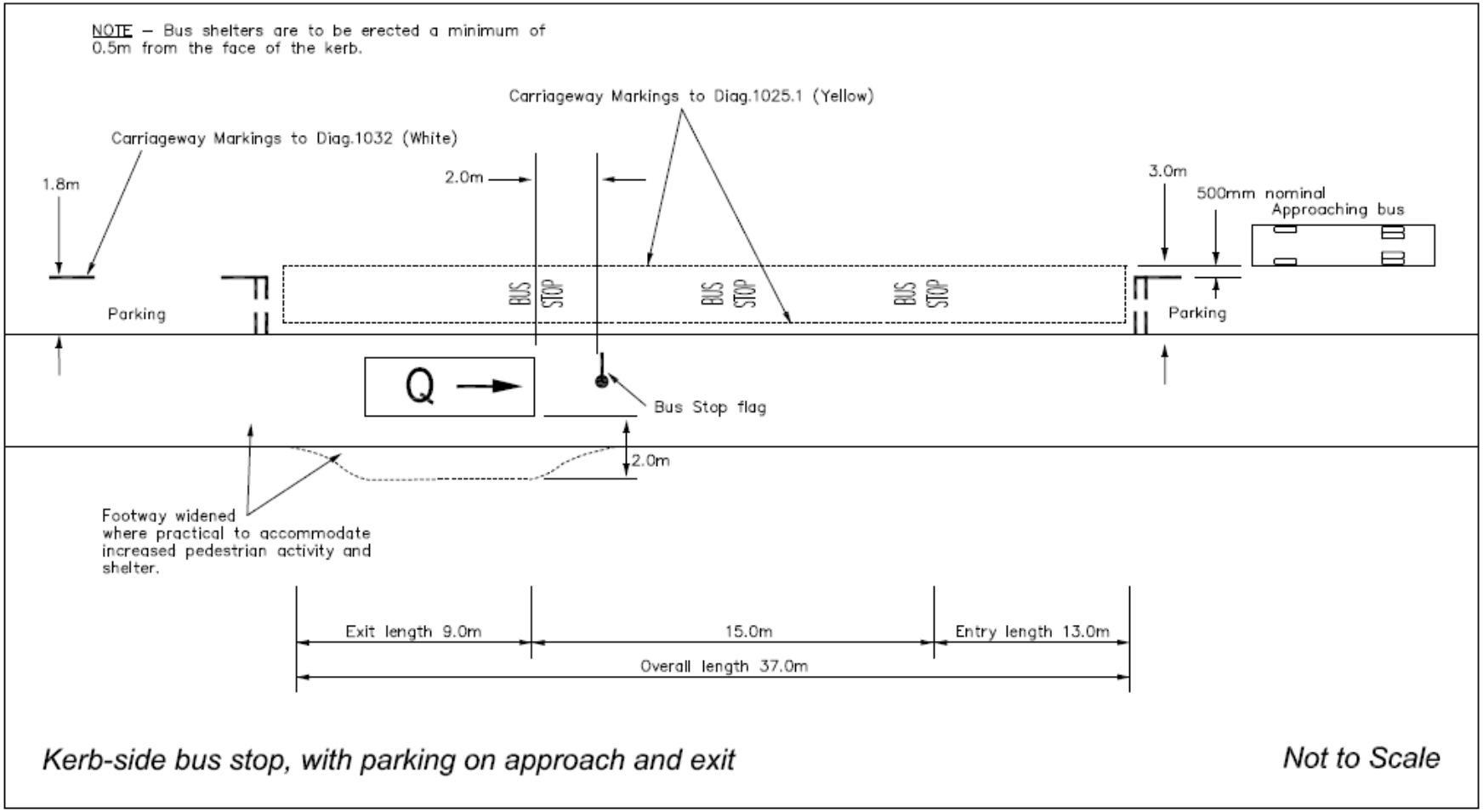

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Figure 5

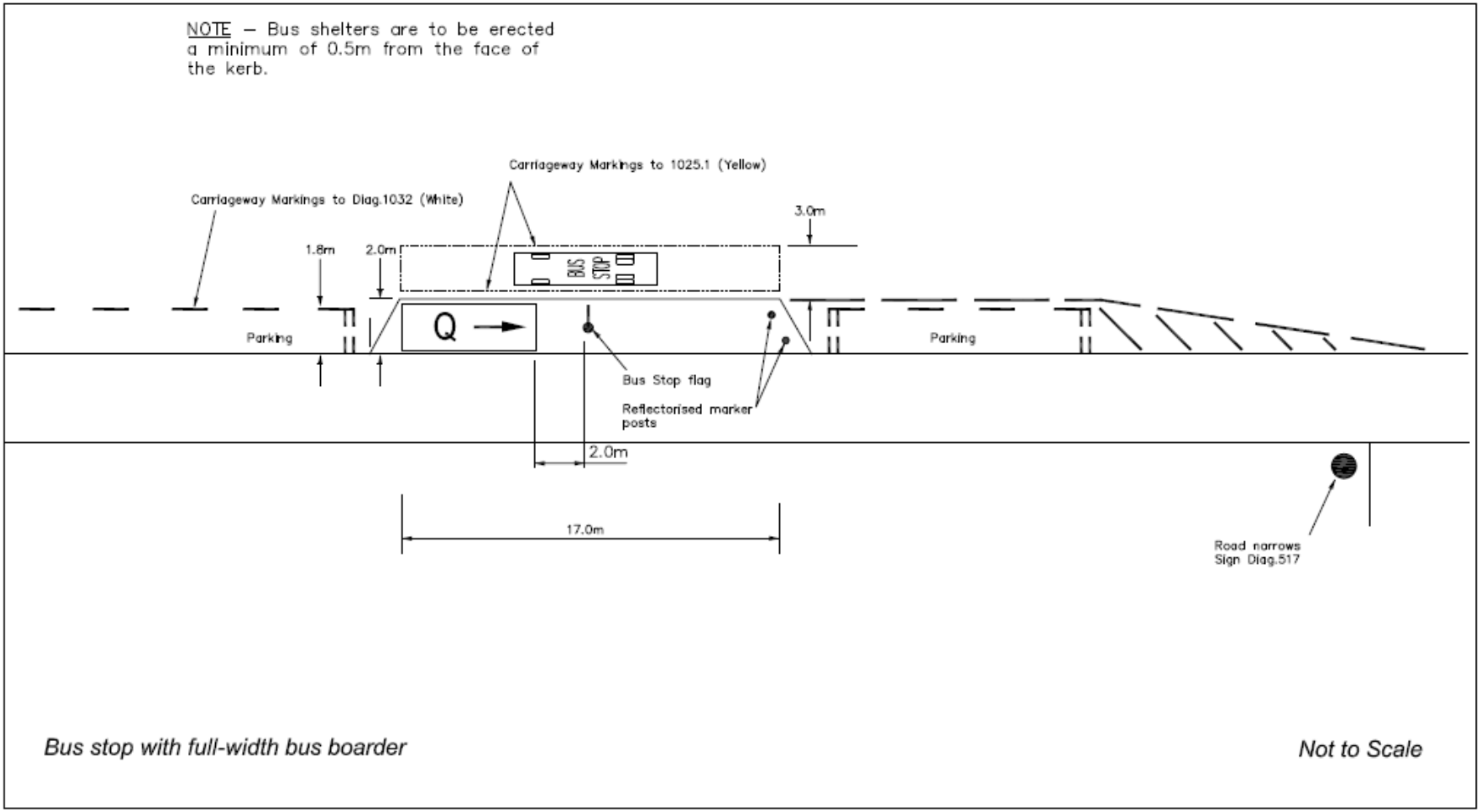

Figure 6

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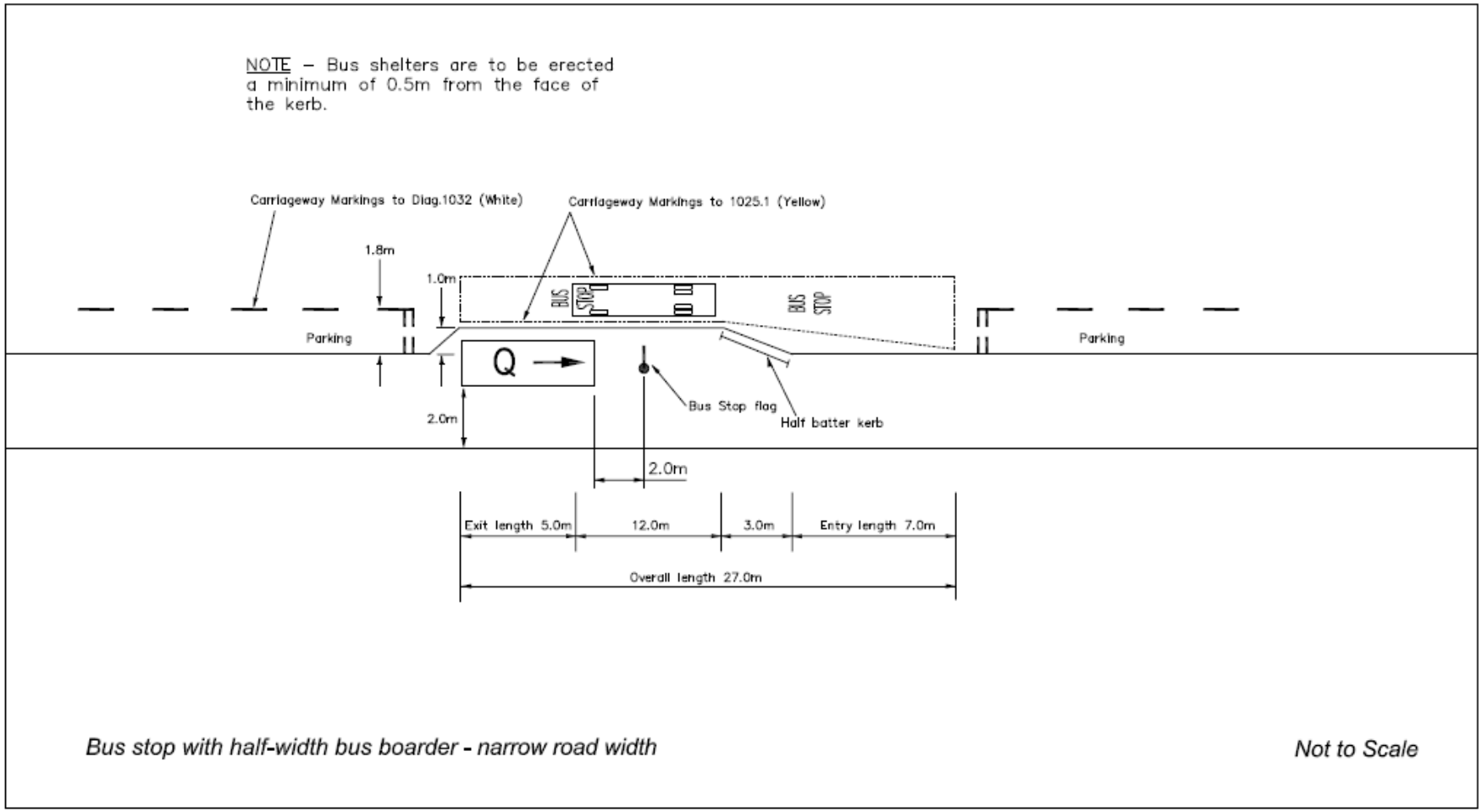

Figure 7

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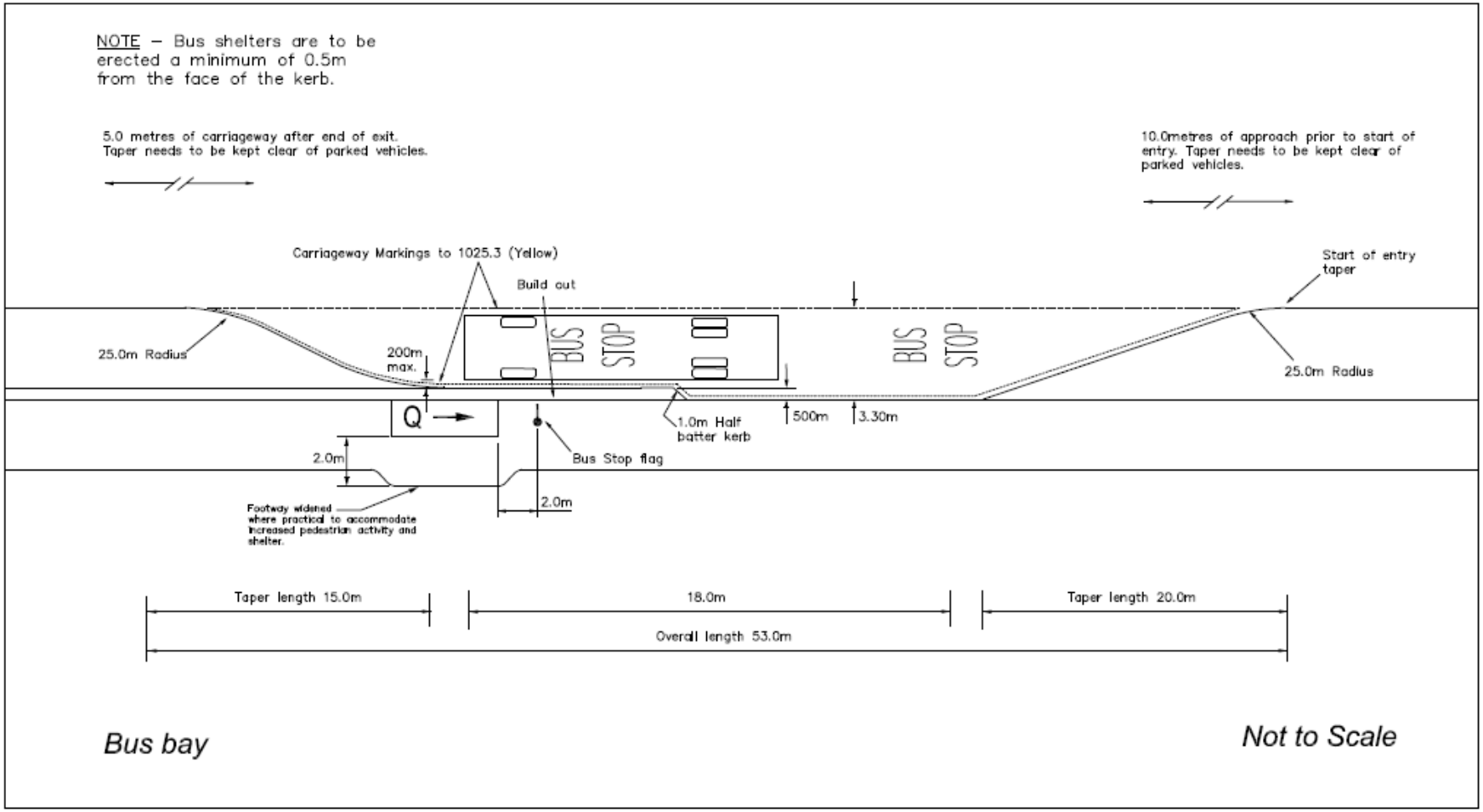
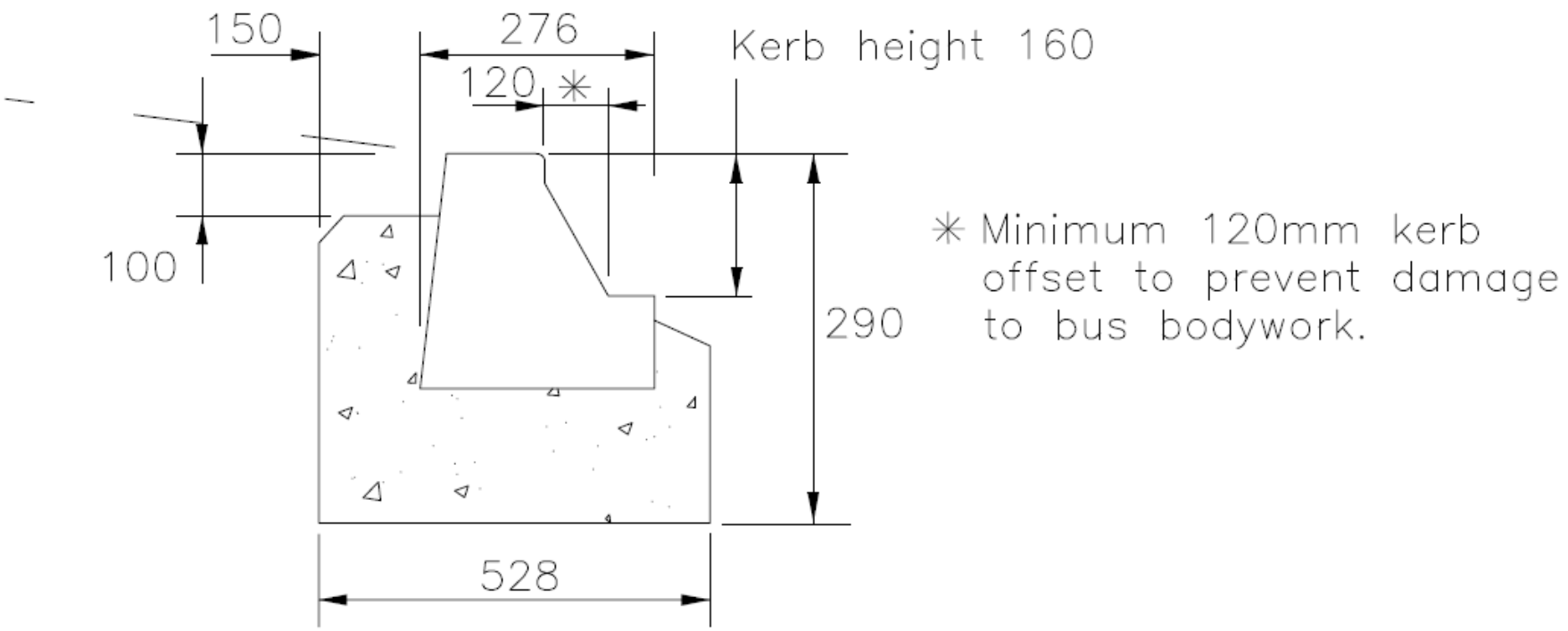

NOTE – Bus shelters are to be erected a minimum of 0.5m from the face of the kerb.
5.0 metres of carriageway after end of exit. Taper needs to be kept clear of parked vehicles.
10.0metres of approach prior to start of entry. Taper needs to be kept clear of parked vehicles.
Carriageway Markings to 1025.3 (Yellow)
Build out
Start of entry taper
25.0m Radius
200m max.
BUS STOP
BUS STOP
25.0m Radius
Q
1.0m Half batter kerb
500m
3.30m
2.0m
Bus Stop flag
2.0m
Footway widened where practical to accommodate increased pedestrian activity and shelter.
Taper length 15.0m
18.0m
Taper length 20.0m
Overall length 53.0m
Bus bay
Not to Scale

Figure 8



Bus Stop Access Kerb

Not to Scale

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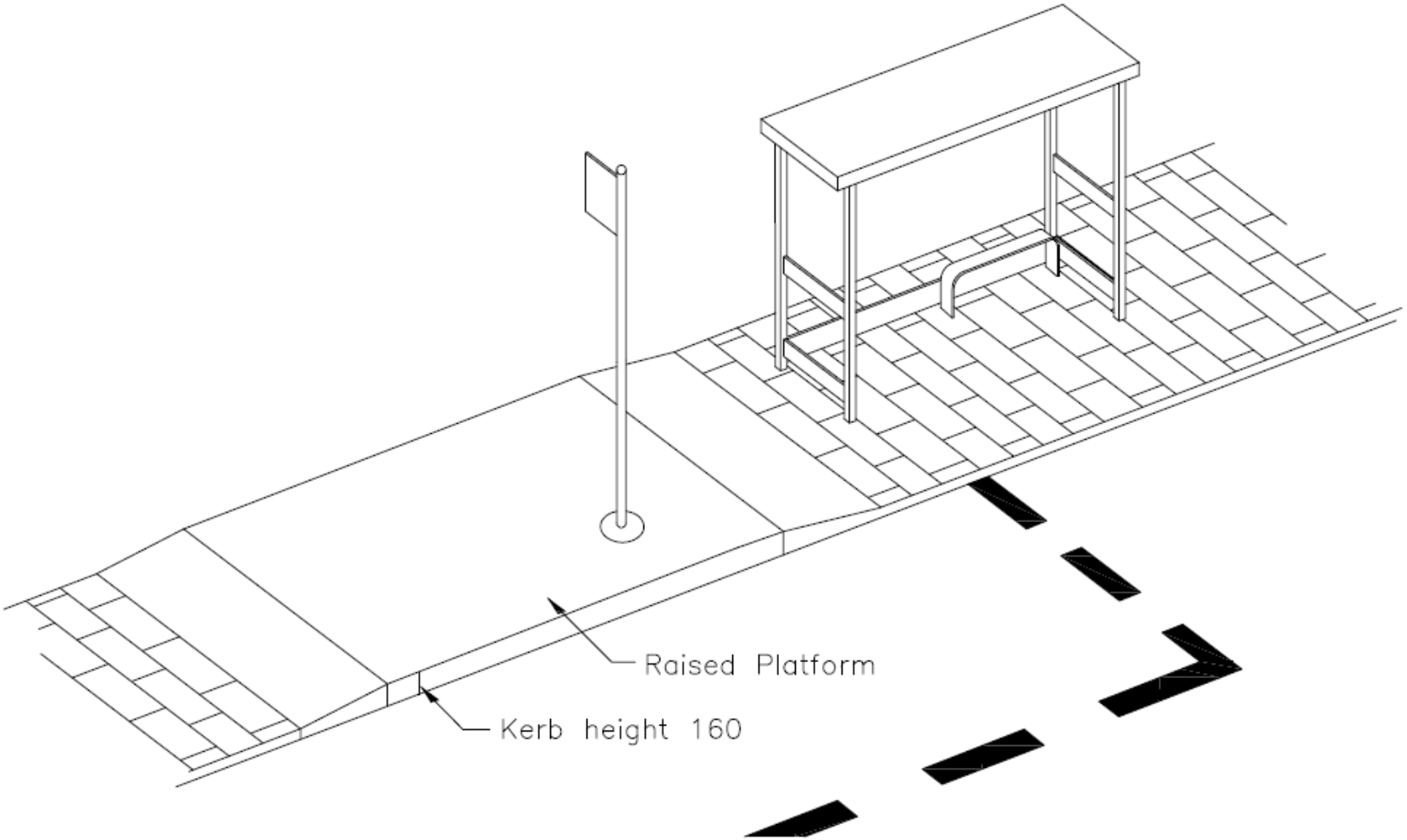
Figure 9



Typical Detail of Kerb-side Bus Stop

Not to Scale

Figure 10

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