BUS & COACH STATION DESIGN & OPERATION

Guidance for the safe design and operation of Bus Stations and Interchanges

June 2011

FOREWORD

"Travelling by bus and coach is a safe form of passenger transport in the UK, but it is equally important that bus and coach stations are designed in a safe, modern and user friendly way. I am pleased to be able to support and commend this best practice guide to all those involved in the design, planning and operation of bus and coach stations of the future to enable them to deliver an attractive, safe and environmentally friendly facility which will encourage passengers to make more journeys by buses and coaches".

Norman Baker,

Parliamentary Under –Secretary of State,

Department for Transport

INTRODUCTION

This guidance has been drafted by industry and government stakeholders to assist anyone responsible for health and safety in a bus or coach station. The group identified key hazards and risk associated with the operation and design of bus stations, and provides practical advice on how they can be managed effectively.

The Health and Safety at Work Act 1974 requires employers to ensure, so far as is reasonably practicable the health and safety of their employees when at work and to ensure others are not put at risk by their work activities. Employees also have a responsibility to take reasonable care of their own health and safety and that of others and to cooperate with their employer when managing health and safety at work.

The Management of Health and Safety at Work Regulations 1999 place requirements on employers to carry out an assessment of risks to the health and safety of their employees while at work, and others who may be affected by their work activities. Further details on how to successfully control health and safety risks at work may be found at the HSE web site Ref 1.

This guidance should be used by architects and designers as a reference document to provide insight into issues to be carefully considered as part of the design and development process.

It should however not be regarded as a definitive interpretation of the law. Following this guidance will help duty holders at bus and coach stations fulfill their legal commitments in respect of health and safety. Those with specific responsibilities include bus/coach station owner/leaseholders, bus and coach operators, bus and coach drivers, bus station staff, tenants, licensees and contractors.

DESIGN

1. KEY DESIGN / SAFETY ISSUES

This section looks at key issues regarding design and layout of bus stations. It is particularly relevant to the design of new bus stations. However many of the factors are equally relevant in reviewing the operation of existing bus station facilities and should be considered whenever any refurbishment activity is being carried out.

1.1 Key Safety Considerations

There are a number of key issues to consider:

1 At project inception a review should be undertaken of existing highway layouts and bus routes to ensure that they are considered when determining the most suitable location for new bus facilities. Land ownership issues should be considered, and any knowledge of future developments e.g. new shopping centres, which may affect traffic and pedestrian flows and routes to and from the preferred site.

A key consideration is to design the layout to minimise and manage pedestrian/ vehicle conflict.

2 Where possible consider the orientation of the bus station in respect of key local developments (shops; rail stations;) to ensure pedestrian routes flow directly to adjacent developments, minimising the need for vehicles to cross paths.

3 Consider all passenger/pedestrian routes (desire lines.)

4 Manage vehicle speeds.

1.2 Key Objectives

1 The safety of pedestrians and all bus station users.
2 The design and location of the bus station should encourage public transport use and interchange with other transport modes, encouraging sustainable travel.
3 The bus station should be located to meet the local authority's strategic plan for the town or city centre. If possible it should be flexible enough to accommodate existing and future levels of services (allowing for potential growth /competition) and take into account the nature and type of vehicle using it. It should be flexible enough to allow for current and future arrangements of bus operators and evolving vehicle designs.
4 To provide a bus station that is an attractive, modern, secure and welcoming facility safe by design and accessible for all, fully compliant with the Equalities Act 2010 (Ref2) and all other current legislation.

1.3 Managing Pedestrian Movements

Under key safety considerations the reduction of the risk of conflict between pedestrians and vehicles is one of the key design criteria of any bus station.

Whilst it may not be possible to eliminate all such conflicts, the design should minimise the need for pedestrians and passengers to cross the bus carriageway.

Consideration needs to be given to key pedestrian destinations adjacent to bus station including:

- Shopping centres
- Markets
- Rail stations
- Taxi ranks
- Car drop off area
- Schools and colleges
- Entertainment (cinemas, theatres, pubs)
- Hospitals and health centres
- Local government facilities.
- Future developments.
- Information points
- Toilets

This applies not only to passengers alighting or boarding buses, but also pedestrians who may wish to access neighbouring destinations.

There is a balance between locating a bus station centrally and managing pedestrian movements in and around the bus station.

Key aims:

1. Design to avoid conflict between buses and direct passenger routes;

2. Manage the direct routes of passengers (desire lines) where they occur;

3. Avoid the need for passengers and pedestrians to unnecessarily leave a concourse;

4. As far as practical have all facilities on a single concourse, minimising the requirement for pedestrians to cross vehicle lanes;

5. Consider designs that minimise conflict between pedestrians and vehicles;

6. Avoid bus circulation routes within town and city centres to and from the bus station to minimise traffic congestion and potential pedestrian and vehicle conflict

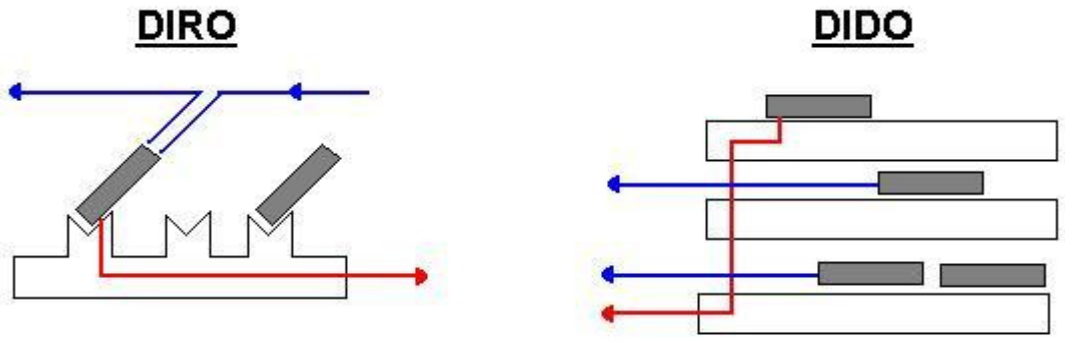
1.4 Alternative Designs

The two main types of bus or coach station design are Drive In Reverse Out (DIRO) and Drive In Drive Out (DIDO). Each has advantages and disadvantages and either may be appropriate, with design determined by local considerations.

DIRO layouts typically encourage passengers to go directly to the concourse from where desire lines can be better controlled and there is a low risk of endangering members of the public. This is likely to reduce the footprint of the site and allow concentration of facilities and passengers in one securely managed concourse. The design involves reversing on departure and it is essential to address the potential for pedestrians to access the bus carriageway area through the introduction of control measures.

Larger bus or coach stations may require a number of passenger islands creating, increasing risk associated with passenger conflict. The provision of separate islands not only leads to passenger movement across carriageways, but also dispersal of passengers which reduces the benefits of centrally located facilities. Security cover can also be more difficult due to the dispersed nature of the passengers.

The drawing below summarises the interaction of vehicle maneuvering lines, (in blue) with alighting passengers desire lines (in red).



The key advantages and disadvantages are summarised below:

	Advantages	Disadvantages
DIRO	1. The smaller footprint provides a more efficient use of space. 2. Pedestrians separated from buses in a single enclosed concourse, providing full weather protection which can accommodate all customer facilities. 3. Creating a concourse means CCTV and RTI screens can be used more efficiently. 4. Concourses have improved security; they can be remotely locked outside operational hours and are better suited to CCTV. 5. Enclosed concourses allow for retail units, cash points, telephones and vending/ticketing machines in a safe environment. 6. Greater control over desire lines by directing people from the bus into the concourse area and on to designated exits. 7. Bay doors linked to induction loops only allow passengers onto the maneuvering area once a bus has arrived. 8. Undercover passenger transfer between stands with no conflict with maneuvering buses.	1. Buses are required to reverse on departure. 2. If passengers alight and do not go into the concourse they enter an apron with multiple buses reversing and there is an increased risk of injury. 3. Increased risk of alighting passengers walking across the vehicle apron if sufficient deterrents are not in place. 4. Procedural instructions need to be issued to operators on how to use facilities (give way to reversing buses, enter drive through lane ASAP, avoid two adjacent vehicles reversing simultaneously etc). 5. Increase 'dwell time' for bus maneuvering on and off stand. 6. Risk of vehicle collision with infrastructure. Vehicle restraint barriers need to be provided.

	Advantages	Disadvantages
DIDO	1. Avoids reversing maneuver (unless required in relation to layover) 2. Less dwell time for maneuvering on/off stand. 3. Reduced risk of passengers walking in drivers' blind spots while buses are reversing. 4. Construction costs of Island type construction can be cheaper than DIRO. 5. Reduced risk of infrastructure collision due to parallel parking.	1. Less efficient use of space – may require separate islands and the need for passenger to cross carriageways 2. Shelter islands might feel less safe at night than concourse environments if not properly designed and managed 3. Mobility impaired passengers have to cross carriageways and negotiate dropped kerbs. 4. As passengers wait in a number of different locations additional RTI screens are required. 5. Can be difficult to cover with CCTV; would require a full CCTV audit/review to ensure best possible coverage 6. Opportunities to take shortcuts between islands creates extra desire lines in high vehicle traffic areas requiring more safety features to be incorporated into the station design. 7. Passengers subject to inclement weather whilst using uncovered crossings 8. Islands create additional crossing points, each of which increases the risk of a bus colliding with a station user. Multiple crossing points with pedestrian right of way can also impede the smooth flow of buses through the bus station.

Design Considerations

The design stage affords the opportunity to create a safe environment which minimises risk to all users. Addressing the points below will help achieve these aims.

1. Pedestrian Crossing points
    - Type of crossing – controlled (signals) or uncontrolled
    - Type of material used
    - Crossing design – raised platform or level with carriageway
    - Location
    - Sightlines
    - Lighting
    - Additional treatments (e.g. lights in carriageway) use of tactile materials on footpath to crossing point.
    - Standard design - (design on private sites may be different to local authority standards)

2 Deterring passengers entering bus aprons at vehicle entry/exit points
    - Use of deterrent paving
    - Use of barriers to control access of pedestrians and vehicles
    - Location of access points (relative to key passenger destinations and desire lines)
    - Signage
    - CCTV coverage with audio messaging.

3. Restrict access for passengers boarding and alighting from buses by use of any combination of the following
    - Automatic doors
    - Internal and external barriers
    - Internal and external direction signage
    - Ensure buses "plug" into boarding points
    - Reduce the requirement for buses and coaches not to double park – resulting in passengers stepping onto bus apron

4. Restraint Barriers
    - Assess and minimise risk of injury to bus passengers and driver and those waiting on the concourse
    - Protect buildings

5.Provision of Layover facilities
    - Location
    - Drivers access to site facilities
    - Clearly marked and designated parking bays

6. Effective lighting throughout bus station (with particular reference to bus apron) consideration must to be given to glare and mirror effect of glazed screens due to different illumination level.

7. Effective drainage design.

8. CCTV

- Monitors safety of passengers and drivers within concourse and shelters
- Monitors safety of bus apron and crossing points

9. Signage – consistent; kept to a minimum (use pictograms where possible) meaningful and kept up to date

10 All kerbs at boarding points within the bus station should be appropriate for passenger loading/unloading requirements

11. Facilities

- Welfare facilities (rest room/eating and drinking area)
- Separate toilets for drivers and the public.
- Smoking facilities (if any and in line with legislation)
- Driver and public information points
- Other toilet facilities (especially for the mobility impaired and baby changing facilities)

12 Natural approach lines should be as direct as possible.

13 Road markings – apart from statutory road markings (when appropriate) consideration should be given to additional marking to inform passengers (e.g. look left).

14 Consideration should be given to the control/prevention of unauthorised vehicles on site.

15 Coach facilities

- Consider if left and right hand drive vehicles can be accommodated.
- Consider access arrangements for loading/unloading of passengers and luggage as this could take place at many points around the vehicle.
- Consider waiting area arrangements for this group in terms of sufficient seating, waste bins etc.
- Look at ways to prevent passenger access to adjacent carriageways
- Consideration be given to loading and unloading of tow trucks.

Procedures for loading/unloading, conditions of use of facilities and on site operation need to be established and communicated to all coach operators.

16. Rear loaded minibuses

17. Bicycles

Ref 3 Good Practice Guide for Bus Station Design: Martin Robertson Bursary: Item 7 Design Standards for further details

1.5.1 Design process

1 Stakeholders

Consideration should be given to potential stakeholders at various stages that may include:

- Owners of bus station (e.g.: PTE /local authority / shopping centre).
- Local authority/PTE.
- Bus, coach and rail operators.
- Landowners directly affected by development
- Local community groups (e.g. access and disability groups.)
- Town centre partnerships.
- Police, fire brigade, ambulance and other emergency services.

In addition pre planning applications with planning department, building control, highways departments, access officer, police, architectural liaison officer, and utilities providers.

2 Pressure from developers and limited budgets

There may be pressures to compromise on the size of any proposed bus station due to financial constraints or proposed developments (e.g. for retail or commercial purposes) occupying part of the proposed development.

These must not conflict with minimum design standards or overall capacity requirements which in turn could jeopardise safety.

Ref 3 Good Practice Guide for Bus Station Design: Martin Robertson Bursary

- Item 4 Design Capacity of Stands

- Item 7.1.2 Dimensions of Stands

3 As part of the design process there should be a full assessment of any scheme including:

- Designer risk assessments.
- Specific project issues and risk logs.
- Project reviews.
- Safety audits.
- Road safety audits (stages 1,2 and 3)
- Vulnerable user audits
- CDM (Construction Design & Management) regulations compliance.
- Environmental audit

Timescales for undertaking project reviews and safety audits should be considered on a project-by-project basis and agreed and signed off as part of the agreed project management procedures for the scheme.

4 Full size bus tests.

When carrying out a vehicle test use a suitable site, e.g. a disused airfield, football ground parking area or similar to check the proposed designs. It is not desirable to rely solely on computer aided design for determining dimensions and layouts. Trials can reveal some of the real or practical issues.

Wherever possible the proposed layout should be set out as full size together with access and exit routes onto the public highway. Operators should be asked to provide a range of vehicles of the type that are to use the facility to replicate the manoeuvres that will take place once operational. Key manoeuvres include bus access and exit of the facility, pulling up to and away from stands, passing vehicles on adjacent stands, other stationary vehicles and vehicles entering/exiting layover bays.

In carrying out these tests the conditions relevant to mobility impaired users should be replicated (e.g. use of bus ramp) to establish suitability.

Ref 3 Good Practice Guide for Bus Station Design: Martin Robertson Bursary

2.0 HEALTH & SAFETY

2.1 Health & Safety Policy and Risk Assessment

The safe management of bus stations and interchanges falls primarily to the owner and/or operator of the bus station.

(Ref 3 Good Practice Guide for Bus Station Design, Martin Robertson Bursary)

There are a number of issues that should be considered as part of an effective management system, including:

- Maintenance of structure;
- Emergency procedures in the event of an accident or incident;
- Fire risk assessment & effective evacuation plan;
- Safety and welfare of passengers;
- Operation of bus services;
- Procedural instructions for bus operators.
- Code of conduct for bus drivers.
- Control of contractors visiting the site.
- An adequate level of insurance cover is maintained.

2.1.1 Organisation

Duty holders should ensure that they have clearly defined responsibilities and relationships in place in order to promote a positive health and safety culture.

Structures and processes are needed which:

- Establish and maintain effective management control within an organisation.

- Promote co-operation between individuals, safety representatives, unions and other groups so that management of health and safety becomes a collaborative effort. This should be helped by effective staff involvement and communication externally between station owners, operators and other groups.

- Ensure that information is communicated effectively both within and between organisations.

- Secure the competence of employees, by effective training and the issue of clear and concise information and instruction.

- Establish regular structured meetings with bus operators, facility owners, tenants etc. in order to ensure familiarisation with management and organisational arrangements in order to discuss topics and areas of common concern.

- Establish a planned Inspection and Reporting regime.

2.1.2 Planning and Implementing

There should be a planned and systematic approach to implementing the health and safety policy through an effective health and safety management system.

There is a legal requirement to make a suitable and sufficient assessment of the risks to the health and safety of those who will use the bus station. This will include the bus station owner's staff, bus station tenants and license holders , sub-contract staff, drivers, contractors, visitors and members of the public.

The duty to manage risks will primarily fall on the owner of the bus station. However, bus operators also have a duty to assess risks associated with their activities.

This should include a risk assessment of their drivers' use of bus stations; not just the risks to their own employees but also how their drivers' conduct can impact on the safety of others.

It would be good practice for the station owner and bus operators to co-ordinate efforts to control risk and share their findings.

Risk assessment of bus stations should be seen as separate and distinct to risk assessments carried out during design and construction. These two are linked, as how the bus station is used affects the design and vice-versa.

Hazards identified in the assessment may be due to the movement of vehicles or the behavior of drivers or pedestrians. More specific guidance regarding these is elsewhere in this document. It is good practice for bus station owners to produce a Bus Station Users Agreement with bus and coach operators they should abide by. This will detail all contractual arrangements between owners and station users..

This may include, amongst other things, rules regarding:

- Speed limits;
- Driving instructions (e.g. priority to reversing vehicles, use of reversing aids, turning engine off when stationary);
- Acceptable practices regarding where and when passengers board or alight;
- Good practice (e.g. drivers must be on stand ready to start boarding 3 minutes prior to departure, with advice on where to stop if stand is occupied);
- Incident reporting procedure;
- Layover points; and
- Emergency procedures

This agreement may also take into account the following:-

- Stand allocation procedure;
- Information and publicity provision;
- Cleaning;
- Complaints procedure;
- Departure charges; and
- Drivers' code of conduct

2.1.3 Measuring Performance

Some form of monitoring is essential to establish if policies and procedures for health and safety is effective. This should take the form active and reactive monitoring.

Active monitoring gives an organisation feedback on its performance before an accident or incident. An active monitoring system could incorporate a variety of elements:

- Random speed monitoring;
- Analysis of drivers' breaches of code of conduct;
- Audits of infrastructure (e.g. integrity of walkways, automatic doors);
- Analysis of security/anti-social behavior incidents;
- Annual review of risk assessments; and
- Inspection of sites.

Information from active monitoring should be used to proactively review and improve management systems, if necessary.

Reactive monitoring systems are by definition triggered after an event and include identifying and reporting:

- Injuries or cases of ill health ;
- Near misses (those with the potential to have caused serious injury, ill health or loss);
- Unidentified or poorly controlled hazards;
- Weaknesses or omissions in performance standards; and/or
- Other losses, such as damage to property;

2.1.4 Auditing and Review

Auditing and performance review constitutes the 'feedback loop' which enables an organisation to reinforce, maintain and develop its ability to reduce risks and to ensure continued effectiveness of health and safety management.

All control systems deteriorate over time. This may be as a result of complacency or because control systems become obsolete.

The aims of auditing should therefore be:

- Effective management arrangements are still in place;
- Adequate risk control systems exist and are implemented;
- Appropriate workplace precautions are in place.

Reviewing performance should be continuous and undertaken at different levels within an organisation, taking into account the results of audits and observations by supervisors and managers in a position to identify and remedy failures implementing workplace precautions as and when they occur, rather than waiting for a future planned audit.

Ref 4 Management of Health and Safety at Work Regulations 1999, Regulation 3(1)

3.0 Pedestrian Issues

Introduction

A major risk to people within any bus station/interchange is interaction with moving vehicles, thankfully such instances are rare but when they occur can be serious.

For this reason a risk assessment should be made at design stage in respect of anticipated pedestrian movements to and from the bus station and within the site , taking into account any "desire lines" (generally the shortest route between two points) of the pedestrian.

A review of this risk assessment should be made as soon as is practicable once the station is fully operational

3.1 Pedestrian Walkways

Walkways, where practicable, should always be as direct as possible in order to avoid the potential for pedestrians to take short cuts. They should guide the pedestrian along the route they are required to follow to access to all possible destinations.

Such walkways should be covered or enclosed to encourage pedestrians to keep to the path particularly in poor weather.

Large clear pictorial signs should guide passengers to their destination options. Consideration should also be given to visually impaired passengers in terms of directional information and action taken to ensure routes are left clear of seats, bins, signs etc wherever possible.

To guide the pedestrian to their destination, barriers should be considered as part of the safety arrangements on road perimeters, which will help to prevent unauthorised access to road areas. Consideration should be given to the appropriate positioning, height and construction of any barriers.

In considering the smoking policy the impact of pedestrian movement to any designated area should be taken into account.

Management Supervision of Pedestrians

It is the responsibility of the operational management team to ensure so far as reasonably practicable, the safety of pedestrians (including drivers/inspectors) and consideration must be given to information and training provided.

This might include some or all of the following:

- Broad understanding of H&S duties and responsibilities
- Awareness of the operational risk assessment process and detail
- Total understanding of any monitoring arrangements in place
- Conflict Management Training

3.2 Crossings

Pedestrian crossings should be clearly defined and recognisable to passengers and drivers alike by means of road marking, kerb alignment, signing and lighting.

Crossings should be positioned at an appropriate distance from the front of a marked bus box in order to ensure a reasonable sight line for a pedestrian waiting at a crossing.

Any pedestrian crossing should be at right angles to the carriageway to avoid users having to turn their head more than 90 degrees to observe oncoming vehicles.

Regard should be given to visually impaired pedestrians with appropriate use being made of tactile paving. Consideration of audio information should also be made.

3.3 Management Supervision of Drivers/Inspectors/Contractors and Others

It is the responsibility of operational managers to ensure not only their own staff but all other persons with legitimate reason to work on the site are able to undertake their duties without risk of harm to themselves or others. To ensure this is the case a safe method of working needs to be established and agreed beforehand.

3.4 Stand Configuration

Pedestrian accommodation and access in bus stands should ensure people waiting/queuing do not create an obstacle for the safe movement of other passengers around the bus station.

The width of a bus stand should facilitate a ramp to accommodate a standard reference wheelchair or double buggy. Ref 2 Equality Act 2010.

3.5 Vehicle Loading/Unloading

To ensure passengers leaving or boarding a bus at a stand are only able to do so via a designated route, pedestrian barriers should be considered to reduce the risk of passengers gaining access to carriageway areas whilst using a stand..

This can be achieved by having electronic doors at each stand, activated via a road sensor which detects the presence of a bus. These ensure passengers cannot directly access the carriageway until a vehicle is present at the stand. Consideration should be given to the risk of a passenger becoming stuck on the carriageway side of the doors.

It should not be possible for the doors to be manually opened by the public or a bus driver. In the event of an emergency evacuation designated doors should be capable of being programmed to open automatically whilst others should be then capable of being opened manually. A robust and effective monitoring and repair system should be in place to ensure the effective operation of automatic doors.

Consideration should be given to special safety requirements required for loading and unloading luggage when coaches use a bus station. Where possible specific bays should be designed for coaches where kerb lines, barriers, and standing areas take into account the room required for opening and lifting of side locker doors for loading/unloading luggage. Consideration should also be given to current and planned DDA requirements for coaches, and the variety of wheelchair lifts currently used on vehicles.

3.6 Car or Taxi Drop Off/Pick Up point.

To allow public transport use where coach facilities are included in the bus station design, a designated car/taxi drop off area, segregated from the main bus station, is desirable. In choosing its position consider the distance passengers have to carry luggage.

Any vehicle using this area should not create any hazard by its entry, parking, maneuvering or alighting of passengers. These factors should be considered as part of the Risk Assessment process during design and initial operation stages.

3.7 Passenger Information Systems

The provision of accurate information for passengers ensures that they are fully aware of where to go in the bus station. It is appropriate to consider during design the provision of information helping the pedestrian around the bus station.

The following should be provided:

- Proper grouping of the position of departure points to common routes or destinations;
- Large central displays in main concourse areas;
- Electronic timetable displays in main pedestrian areas;
- Electronic timetable displays specific to each stand;
- Printed timetables in cases on each stand;
- Tactile service information (e.g. Braille) for the visually impaired;
- Audio announcements /hearing aid loop systems; and
- Where appropriate Real Time Information linked to rail and other transport (e.g. light rail) information

Ref 2 Equality Act 2010

3.8 Help Points

Where help points are provided passengers should also be able to make verbal contact with an assistant, information on how the visually impaired can speak to someone and call buttons positioned at a height suitable for the disabled passenger should be provided.

3.9 Raising Public Awareness of H&S Issues

Use should be made of statutory and general information signs to raise safety issues at the bus station determined by the risk assessment. Use could be made of fixed information points as well as audio facilities.

Relevant information may include:

- Signs warning about accessing carriageway areas;
- Information on action in the event of emergency; and
- No smoking signs;

Use should be made of poster cases to raise public awareness of Health and Safety issues through promotions and campaigns.

4.0 Vehicles

The design and manufacture of vehicles is specified by legislation.

The following aspects are relevant to safe operation of vehicles in bus stations:

4.1 Mirrors (rear view)

A bus must have at least two mirrors. They are usually convex to achieve the mandatory field of view, but this distorts the image. Increasing the number or size of mirrors might improve rear vision, but restrict forward or side vision. The size and position of the nearside mirror must not be a potential hazard to people at bus stops.

When "taking over the vehicle", drivers must ensure that the side of the vehicle is just visible . This gives relativity to the image.

Whilst an interior mirror might be provided, vision through any rear window may be unreliable due to potential barriers (e.g. standing passengers, staircase, engine casing, body structure, etc). An interior mirror can therefore only be considered an aid to on-board passengers, not external pedestrians.

4.2 Reversing Aids

Vehicle specifications vary, and equipment fitted to vehicles can range from a basic minimum to reversing cameras and proximity warning systems. These devices are merely an aid to reversing, with rear view mirrors the main reversing tool.

- All buses and coaches have reversing lights which come on automatically whenever reverse gear is engaged. These lights provide a visual warning to people behind the vehicle, and illuminate an area to the rear during darkness to aid vision.

- Most buses and coaches are voluntarily fitted with reversing alarms to notify people the vehicle is reversing. They operate automatically whenever reverse gear is engaged, but might have an over-ride switch to prevent illegal operation between the hours of 23.30 and 07.00. Drivers should re-engage automatic operation during daylight hours.

- This is less likely to be the case where reversing cameras have been fitted.

- The use of hazard warning lights helps identify when a bus or coach is reversing, these lights acting as a warning to other drivers.

- Some operators provide Closed Circuit Television (CCTV) to assist reversing and improve other aspects of passenger safety (e.g. boarding/alighting). However, a camera might still leave blind spots due to restriction of the field of view, adverse light conditions, or obscured camera lens. Checking the image from the associated monitor also distracts from watching mandatory mirrors, forward view, doors and interior saloons. If a vehicle has a reversing CCTV monitor it should be checked prior to the start of the maneuver and scanned with both mirrors during the maneuver. Such a system is a supplement to normal reversing and not be solely relied on.

- Proximity warning devices are audible and should be monitored during reversing. Other alternatives (e.g. radar, ultrasound) might also be used

- The use of a banksman to aid reversing should be avoided, and only used as a last resort. There must be an agreed safe system supported by training for all bus station users.

4.3 Vehicle Condition

Operators and drivers must ensure the body and windows of a bus and coach is in clean and good condition to enable that the field of view is always available to the driver. There should be an operating procedure for this especially in period of inclement weather and at DIRO bus stations.

The driver is always responsible for the condition of his vehicle whilst it is on the road. The design of bus station bays should consider that the driver should be able to see the vehicles condition without having to step on the carriageway. Operators should ensure that wherever possible walk round checks are not conducted in a bus station. If there is a requirement for this agreement should be reached with the bus station owners for the use of a designated safe area where checks can be undertaken supported by a safe system of work and training.

4.4 Breakdowns

Where breakdowns occur in a bus and coach station it is essential there is an agreed safe system of work to cope with a vehicle repair or recovery understood and followed by all personnel. Only trained and authorised people should investigate and repair defective vehicles and recover them to a place of safety. Unauthorised personnel and members of the public should be kept away from the repair area. Any repair or recovery to vehicles on a Bus Station should be carried out in accordance with the Bus Station Users Agreement.

4.5 Other vehicles

Access to a bus station carriageway is primarily for buses and coaches, there are sometimes cases where the bus station design or operating circumstances might require access by other vehicles (e.g. delivery vehicles, taxis, emergency services or refuse collection). These vehicles should be controlled by contingency plans, local rules and training, developed as part of the routine risk assessment process. Consideration should also be given to buses with tailgate lifts.

5.0 Drivers

The Bus Station User Agreement will establish the safe system of driving within the bus station which will be adopted by all users. It is the operator's responsibility to ensure they train and manage drivers to meet these requirements.

GENERAL SAFETY GUIDANCE

Drivers are responsible for their own actions and the safety of persons who may be affected by their manoeuvring. To regulate the safe and orderly movement of vehicles in a bus station, the following guidelines should be adopted:

- Drivers must look out for, and give priority to, pedestrians in all areas especially at the designated pedestrian crossings. They should be aware bus station staff, duty managers, VOSA and unauthorized members of the public who could be on the carriageway.

- At all times, the driver of any vehicle must adhere to the maximum speed restriction which applies within the bus station.

- Dipped headlights must be used during hours of darkness, though specific bus station operating procedures may call for dipped lights to be used all day in the bus station.

- While passengers should remain seated until the bus comes to a complete stop, some passengers may decide to stand early, so extra care needs to be taken when braking.

- Where specified in the Bus Station Users Agreement, drivers should turn off their vehicle's engine upon halting. The park brake must be fully applied and the transmission returned to neutral.

- Drivers on arrival and prior to departing from a stand should check the park brake is applied and the transmission is in neutral. When departing select the correct gear to depart the stand before releasing the park brake applying delicate use of the accelerator sufficient maneuvering away from the bay.

- Once vehicle doors are closed, and a manoeuvre begins, the driver should not stop to take on more passengers.

- Drivers must always wear a high visibility vest or jacket in all designated areas and when crossing the carriageway to the lay over bays use the designated walkway.

- Drivers must never operate other equipment while driving in a bus station; (e.g. setting destination indicators or counting cash).

- It is important drivers receive training in procedures relevant to the bus stations they operate in, and operators should provide confirmation that this is the case.

- When emergency situations arise in a bus station, drivers must follow any instruction given by persons controlling the emergency.

- Drivers are responsible for the safe docking and deployment of vehicle ramps to aid the safe boarding and alighting for all passengers, especially mobility impaired passengers.

- Drivers must always use designated walkways if needing to traverse the bus station carriageway and ensure passengers do the same if necessary.

- Passengers must only be set down in designated places. Where the driver is unable to use the allocated bay, the driver should wait for it to become vacant if this will not cause obstruction; or follow the laid down operating procedure for the bus station.

5.1 Drive in Reverse out (DIRO) Bus Station Operating procedures

The bus through lane must be clearly marked; guidance for using a Drive in Reverse out Bus Station is outlined below. General safety guidance must always be followed.

5.1.1General

a) Drivers of vehicles reversing from any part of the bus station, other than a stand, should give way to drivers of those vehicles reversing from a stand. When moving in a straight line and two buses attempt to reverse simultaneously the vehicle on the right is given priority to avoid simultaneous movements.

b) Where conflict may arise between vehicles, the driver of the vehicle at the rear should yield and leave sufficient space for the vehicle in front.

5.1.2 Entering and Exiting the Bus Station

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Drivers should look for vehicles which are about to, or have started moving and give them priority. Similarly any person on the bus station carriageway should also be given priority.

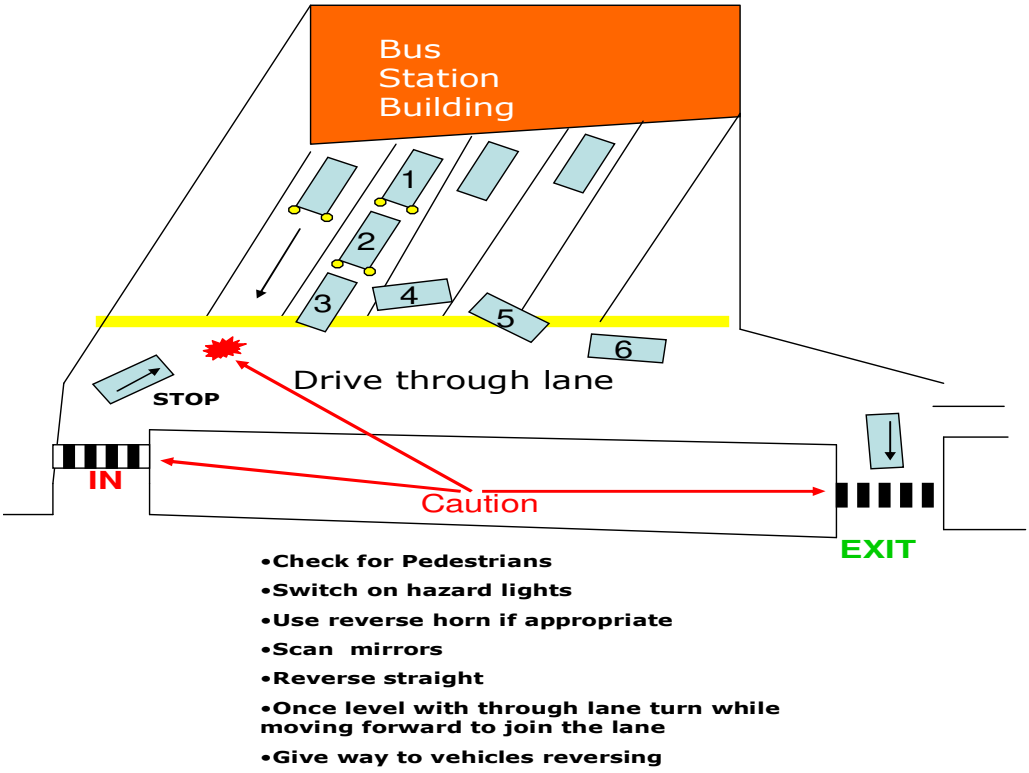
5.1.3 Driving into and away from a stand

a) When approaching the required stand, check it is clear and proceed via the drive through lane. Do not cut across the rear of other stands. Remain in the drive through lane until you reach the turning point for the stand, whilst watching for pedestrians and reversing vehicles.
Turn into the stand. Approach the stand slowing to avoid late braking and align the vehicle tight and square to the kerb.

b) Reversing the bus when clear, should be reversed straight from the departure stands, the vehicle wheels be positioned so reversing movement can only be in a straight line. Scan both rear view mirrors and any reversing camera monitor and any reversing aid. The driver should reverse until the rear of the vehicle is at the edge of the line marking the running lane if available. The forward manoeuvre can then be commenced, so that the bus can proceed and immediately rejoin the drive through lane.

c) Reversing aids and audio alarms should be used.

Drive in reverse out- bus stations (DIRO) Typical layout



This is a typical illustration; bus station layouts vary and wherever possible should have a drive through lane

5.2 Drive In Drive Out (DIDO) procedure

5.2.1 Driving into and away from a stand.

a. When approaching the required stand, check it is clear and proceed via the drive through lane. Do not cut across the rear of other stands and stay in the drive through lane until you reach the turn point for the stand. Some bus stations may form part of a highway so drivers must be vigilant for vehicles, cycles and pedestrians.
Turn into the bay approaching it at an appropriate speed to avoid the need for late braking and align the vehicle tight and parallel to the kerb.

b. When departing the stand check the vehicle mirrors and use all aids available.

c. Ensure no pedestrians are between the bus and any barrier.

- Drivers must be mindful that the rear of their vehicle will swing outwards, and avoid turning too sharply to avoid impacting the rear of the bus with any barriers, potentially trapping any pedestrians.

- Be particularly vigilant for motor cycles and cycles in bus stations that are part of the main highway.

REFERENCES

Ref 1 htpp://www.hse.gov.uk/PUBNS/books/hsg65.htm

Ref 2 Equality Act: 2010

Ref 3 Good Practice Guide for Bus Station Design: Martin Robertson Bursary: 2007

Ref 4 Management of Health and Safety at Work Regulations: 2003

Ref 5 Traffic Signs Manual: 2009

Ref 6 Public Service Vehicles: 1990 & 2000

Ref 7 Crime and Disorder Act 2008

Checklist

Reference	Aspect	Comment	Completed
1.1 Key Safety Considerations			

	Have existing highway layout and bus routes been reviewed?	These factors will influence the best bus station design	
	Has land ownership in vicinity of proposed bus station been identified?	These factors will influence the best bus station design	
	Have future development of adjacent sites been considered?	These factors will influence the best bus station design	
	Has the orientation of bus station in relation to existing and planned land uses been considered?	These factors will influence the optimum bus station design	
	Have potential passenger pedestrian desire lines been identified and considered?	It is important to identify all potential desire lines at an early stage in the design process	
	Have means of managing vehicle speeds been considered?	Layout should be considered as well as the use of speed monitoring equipment.	
1.2 Key Objectives			
	Has the safety of all users been factored into the design?	Safety considerations should include bus drivers, tenants, contractors as well as the public.	
	How will the design of the bus station encourage use of public transport, interchange and sustainable travel?	Attractive, well located facilities have the potential to increase use of public transport.	
	How does the bus station complement the development plan for the town/city centre?	The bus station design should not be done in isolation to the development plans for the area.	
	Is the design flexible to accommodate future levels of service and vehicle	The design should consider alternative vehicle types (e.g. articulated buses, longer buses,	

	type?	and different door locations) as well as changes in demand.	
	Is the proposed design attractive and welcoming and accessible to all, meeting Equality Act 2010 regulations?	The bus station needs to comply with all relevant legislation as well as presenting a safe, secure and pleasant environment for passengers.	
1.3 Managing Pedestrian Movements			
	Has the potential for conflict between pedestrians and vehicles been considered and reduced to an acceptable level?	Undertake detailed risk assessment	
	Have appropriate mitigation measures been included in the design and proposed management?	Prepare list of mitigation measures being proposed and reasons why not included as part of scheme.	
1.4 Alternative Design Considerations			
	Have alternative bus station configurations been considered as part of the design process?	Look at the options available e.g. DIDO, DIRO	
1.5 Specific Design Considerations			
	Has the design and layout of pedestrian crossing points considered a range of safety features?	Consideration should include traffic signal control, materials (including tactile surfaces), locations, sight-lines, lighting and relevant local authority standards,	
	How are/will passengers be deterred from accessing the bus carriageway areas?	Prepare list of mitigation measures being proposed/reasons why not included as part of scheme	
	What control measures are/will be in place for boarding and alighting passengers?	Prepare list of mitigation measures being proposed/reasons why not included as part of scheme.	
	How vehicles are/will be prevented for accidental incursion to passenger	Prepare list of mitigation measures being proposed/reasons why not	

	areas?	included as part of scheme	
	What provision is/will be in place for lay-over, including safe driver pedestrian access to site facilities?	Consider location of layovers in relation to drivers access to required facilities	
	What is/will be the standards of external/internal lighting?	Consider location of internal, external lighting to avoid glare and mirror affect on glazed walls where internal illumination levels are higher than external levels.	
	What provision has been made/is used for CCTV monitoring and recording of internal and external areas?	Consider camera locations and ensure all main risk areas are covered. Consider mixed use of fixed and pan, tilt and zoom cameras.	
	What type of signage is to be used?	Consider use of pictograms and keep all information current and up to date	
	Has consideration been given to kerb heights at bus boarding points?	Consider accessibility requirements and Equalities Act 2010.	
	Does the design include for key passenger and operators facilities?	Agree with clients (including bus and coach operators) the key facilities to be included as part of the scheme.	
	Have passenger and pedestrian desire lines to and from the facility been identified and considered?	Consider clearly identifying main entrance and exit points to the facilities to encourage users to use safe, direct routes.	
	Has the provision, type and layout of carriageway markings been carefully considered?	Markings should be clear, concise and meaningful. Provision of markings on footpaths to assist users should be considered.	
	Has access to site by unauthorised vehicles been considered as part of the	Markings and signage should be clear to reduce risk of unauthorised vehicles using site. Where possible provide	

	design process?	loading/unloading bays on public highway adjacent to facilities.	
1.6 Design Process / who should be involved.			
	Have all project stakeholders been involved at project initiation stage and throughout the development cycle?	Ensure formal consultation process with all stakeholders from project inception through to completion.	
	Have external influences (from developers and local authorities) been taken into account as part of development process?	Ensure external influences in relation to space and funding do not compromise safety considerations	
	Has the proposed site layout been set out full size and been tested by vehicles?	'Full size' bus tests are important and results should be recorded and the design amended accordingly.	
1.7 Policy and safe management of bus stations.			
	Has the facility owner/ operator developed an effective management system for the new facilities?	Consideration should be given to maintenance, emergency procedures, safety of passengers and other users, control of contractors using site, operation of bus services and procedural instructions to operators.	
2. Health and Safety Policy and Risk Assessment			
2.1Organisation			

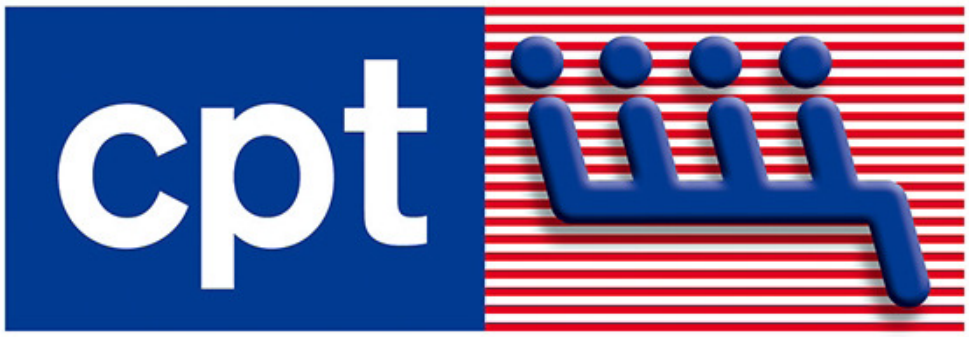
	Overall responsibility for health and safety in relation to the project needs to be clearly defined, agreed and a named individual be identified.	Co-operation between the team working on the project is paramount and the management process needs to be a collaborative effort.	
2.2 Planning and Implementing			
	Has a planned and systematic approach been adopted to implement a project specific health and safety management system?	Detailed risk assessment which clearly identifies project risks and responsibilities, mitigation methods, any residual risks that remain and how they are to be managed.	
	Does the management system make a clear definition between the design and construction stages and the operation stage of the development?	Clearly defined risk assessments required for the design and construction stage of the project and operation stage once all works are completed.	
	Has a drivers guide for the facilities been prepared by the facility owner?	Bus and coach operators should sign up to the operational guide prior to being allowed to use the facilities.	
2.3 Measuring Performance			
	Has a monitoring system been established to ensure policies for the control of health and safety risks are effective?	Need to consider active and reactive systems to cover feedback to organisations before and after an incident takes place.	
2.4 Auditing and Review			
	Has a review system been set up to provide feedback in the management and control cycle?	System needs to ensure effective arrangements in place, risk control systems exist and are implemented and workplace precautions are in place.	
3. Pedestrian Issues			
General			
	Has a review been undertaken of the existing pedestrian desire lines	Need to understand if there are existing desire lines that will remain once new facility	

	across and through the site?	completed	
	Has a risk assessment been undertaken at the design stage in respect of anticipated pedestrian desire lines?	Risk assessment will identify risks and any remedial action/mitigation method required.	
3.1 Pedestrian Walkways			
	Are the designated walkways as direct as possible and are they clearly defined. Special consideration needs to be given for people with mobility issues and visual impairment?	Clearly defined routes reduce risk of incidents and assist pedestrian movements through sites.	
	Has appropriate signage and flooring materials been considered in order to assist way finding?		
	Has consideration been given to the use of perimeter barriers to clearly define route and ensure segregation of pedestrians from risk areas such as bus carriageways?	Physical barriers reduce risk of accidents.	
	Have bus station staff been trained in management and supervision of pedestrians using the facilities?	Staff need to understand their health and safety duties and responsibilities in relation to the public using the facilities.	
3.2 Crossings			
	Has the location of pedestrian crossings been considered in relation to desire lines, site lines and traffic flows through the	Crossings on highway land need to be considered as part of the highways risk assessments.	

	site?		
	Has a consistent approach to the design and appearance of the crossings been considered that takes into account location i.e. private site, public highway or both?	Consideration needs to be given to crossing markings, signage and whether or not the crossing is controlled or uncontrolled.	
3.3 Stand Configuration			
	Has the configuration of bus stands been considered to avoid conflict between queuing and alighting passengers and accessibility requirements to satisfy Equalities Act 2010 legislation?	Internal and external layout to be carefully considered.	
3.4 Vehicle Loading / unloading			
	Has the configuration of bus stands been considered to ensure direct route provided from bus to concourse in order to reduce risk of passengers accessing bus carriageways?		
	Has consideration been given to the use of physical measures to reduce the risk of passengers accessing bus carriageways when alighting and boarding?	Consider type and height of physical barriers.	
3.5 Car and Taxi drop off /pick up point.			
	Has the location of this area been considered in relation to desire lines and route taken to facilities once passengers have	If appropriate provide designated passenger routes.	

	been dropped of or picked up?		
3.6 Passenger Information Systems			
	Has the location and height of the information displays been considered with type face and font size of the displayed information?	Agreed location of displays needs to be free from obstruction. Signage, CCTV cameras and viewing distances need to be considered.	
3.7 Raising Public Awareness of H & S Issues			
	Has consideration been given to raising awareness of health and safety issues to users of the facility?	Consider use of warning signs and poster cases to display appropriate information. Public Address systems can also be used.	
4.0 Vehicles			
	Has current and future vehicle design been considered as part of the design process?	The different lengths of vehicles and passenger door locations need to be considered at design stage.	
	Has consideration been given to the design being flexible so that it can accommodate future changes in vehicle design?		
	Has an operators 'condition of use' document been prepared for the facility, specifying the minimum standards for vehicles operators have to comply with in order for them to use the facility?	Detailed minimum standards for vehicles using the facility need to be agreed with operators e.g., vehicle cleanliness, use of reversing aids and mirrors, CCTV on buses, general vehicle condition, procedure in case of vehicle breakdown.	
5.0 Drivers			
	Has a set of operational guidelines been agreed with bus operators using the facility which clearly identifies the driving procedures to be adopted	The guidelines need to be site specific and take into account bus station layout (DIRO, DIDO), how drivers pull on and off stands and how they enter, drive through and exit the	

	by drivers in the facility?	facility.	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