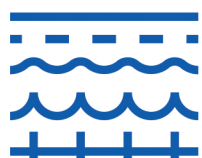


# ECG Guidelines on Safe Yard Design

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DRAFT 1, MAY 2020



**ECG**

The Association  
of European  
Vehicle Logistics

## Foreword

The ECG Guidelines on Safe Yard Design are the result of the work of the ECG Health & Safety Working Group. They are the results of studies, research and on-site visits carried out by the members of the working group.

The Guidelines aim at providing guidance on how to design a safe yard by highlighting the main health and safety risks which can arise from the layout of a yard and providing hints on how to address them.

One of the biggest potential benefits of these Guidelines is to provide an industry standard for designing (or re-designing) yards and to encourage the industry to move towards standardisation of design features in order to benefit the drivers who visit many different facilities.

This version of the document is a first draft. We welcome any comments and remarks which you may have by sending us an email at [info@ecgassociation.eu](mailto:info@ecgassociation.eu).

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## Section I: Site entrance

The design and layout of the site entrance is a key consideration as it provides the first impression of a compound or a yard. It is vital that the site entrance is designed in such a way that it conveys a 'safety-first' mind-set. A well-designed site entrance should provide a broad range of information in an **easy-to-understand** and **easy-to-remember** format. Some key considerations when designing the site entrance are:

- Informing drivers on how to safely get to the truck loading/unloading area
- Instructing drivers on how to behave after they park their truck
- Reminding drivers of safety risks on the site
- Highlighting specific rules of the compound/site
- Identifying points of help and emergency contacts

To minimize information clutter, a site entrance should **not** provide safety instructions for loading/unloading.

### 1. Signage & Visuals at site entrance

The site entrance board of yards should contain the following minimum information explained in Table 1.

Item	Description
1	To ensure drivers wear Hi-Viz at all times
2	To ensure drivers wear safety shoes at all times
3	To remind drivers that passengers are not allowed with them (unless they are trainees with a trainer driver)
4	To remind visitors/drivers that no photography is allowed at any time
5	To remind pedestrians/drivers that cars have priority at all roads and crossings
6	To remind pedestrians/drivers to always follow walking paths
7	To remind pedestrians/drivers to never run
8	To remind pedestrians/drivers not to use mobile phone while walking
9	To remind visitors/drivers that smoking is not allowed except in designated areas
10	To remind visitors/drivers that drinking is prohibited on site
11	To remind visitors/drivers to not listen to radio at any time
12	To remind pedestrians/drivers not to use mobile phone while working
13	To remind drivers that wearing the seatbelt is compulsory during driving
14	To remind drivers of the speed-limit in the yard
15	To remind drivers not to overtake
16	To remind pedestrians/drivers not to use mobile phones while driving
17	Yard name, to ensure drivers are entering the correct yard
18	Truck site map, with clear explanation of different areas and how to manoeuvre into truck bays
19	Numbers for emergency and damage
20	Yard operation times + last truck time

*Table 1 Minimum mandatory information on site entrance board*

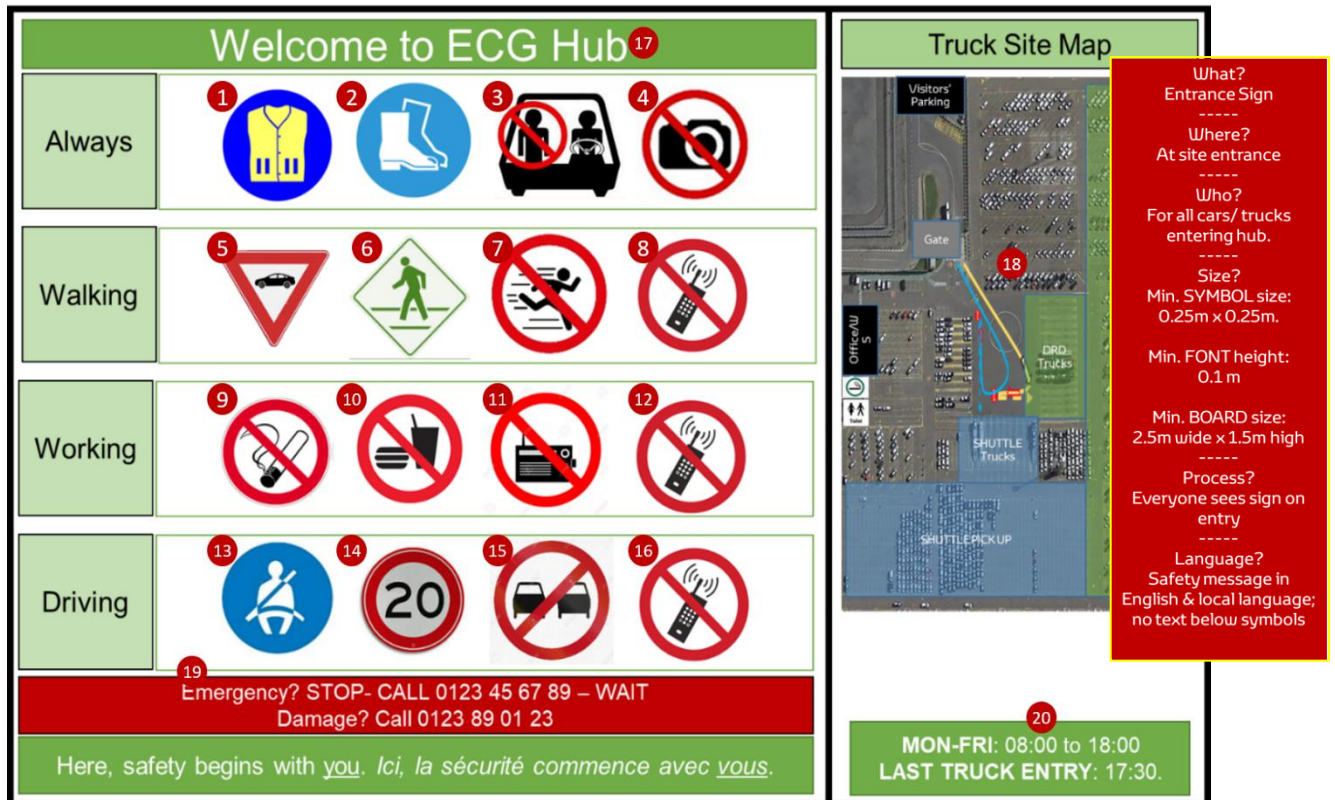


Figure 1 Minimum safety rules to be displayed at yard entrances

All symbols used on the board must be in line with the **1968 Convention on Road Signs and Signals** and **ISO 7010** guidelines where possible. All **symbols** must be **reflective** and at least **0.25m x 0.25m**. The ideal **board size** is **2.5m wide x 1.5m high**.

In addition to the mandatory information, yard operators can choose to display further site-specific information as well. For example, in some yards the use of helmets is required at all times. If that is the case, this should be depicted with the international helmet PPE symbol on the board.

## 2. Processes

People entering the yard can be broadly classified into three categories:

- 1) Truck drivers
- 2) Yard operators – i.e. people who work in the yard itself (e.g. moving cars in yard) **and** Regular visitors – i.e. people who visit the yard more than once every 6 months
- 3) Visitors – i.e. people who visit the yard less than once every 6 months

To ensure safe operations, it is advised to provide each category with the correct safety information. The following sub-sections detail what information should be provided to each group.

### 2.1 Truck drivers

Truck loading and unloading is a high-risk operation in any yard. Therefore, truck drivers must be provided with a handy reminder of the basic safety rules, as well as further instructions on safe loading. These instructions can be provided in the form of an “**Entry card**”.

The **front side** of the truck driver entry card should match the information displayed at the site entrance (Fig. 1). The front side (Fig. 2a) should only depict *general* H&S symbols or rules, including any rules specific to truck drivers. As with the site entrance, all symbols used on the board must be in line with the 1968 Convention on Road Signs and Signals and ISO 7010 guidelines.

The **rear side** of the entry card (Fig. 2b) should focus solely on the loading process. It is critical to show the 5 “Loading Safety Fundamentals” as defined by the ECG Safe Loading Process<sup>1</sup> guide:

- 1) How to lash safely to prevent fall-from-heights
- 2) How to walk safely to prevent slips and trips
- 3) How to securely park cars on deck, chock and lash to prevent roll-offs
- 4) How to use chocks and drop-holes to prevent drive-offs
- 5) How to lock decks to avoid deck collapses and entrapment

The rear side of the card can also include Site-specific or OEM-specific information.

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<sup>1</sup> [ecgassociation.eu/publications-and-reports/hs/](http://ecgassociation.eu/publications-and-reports/hs/)



Health & Safety Rules					Truck Site Map	
Always						<p>Where? Given to all truck drivers on arrival</p> <p>Who? All truck drivers</p> <p>Size? Landscape A3 sheet (2-sided)</p> <p>Process? On arrival at gatehouse, drivers are given sheet &amp; sign document to confirm they have read &amp; understood rules</p> <p>Language? In drivers' language (multiple)</p>
Walking						
Working						
Driving						
<p>Emergency? Stop - Call 0123 45 67 89 - Wait</p> <p>Damage? Call 0123 89 01 23</p>						
<p>Here, safety begins with <u>you</u>. Hier begint de beveiliging bij jou.</p>					<p>MON-FRI: 08:00 to 18:00</p> <p>LAST TRUCK: 17:30.</p>	

Figure 2(a) Front side of truck driver entry card

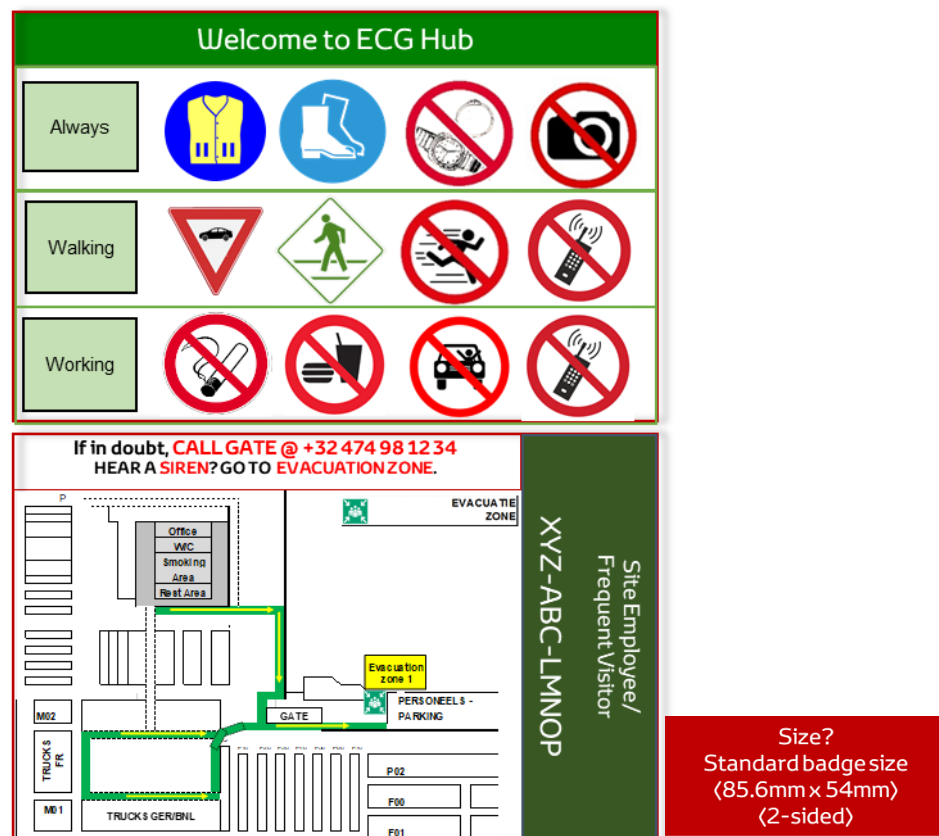
Loading & Unloading Rules		<p>Where? Given to all truck drivers on arrival</p> <p>Who? All truck drivers</p> <p>Size? Landscape A3 sheet (2-sided)</p> <p>Process? On arrival at gatehouse, drivers are given sheet &amp; sign document to confirm they have read &amp; understood rules</p> <p>Language? In drivers' language (multiple)</p>
ECG Golden Rules	OEM Specific Rules	
<p><b>1. Lash safely to prevent falls-from-height</b></p> <p><b>2. Walk carefully to avoid Slips &amp; Trips</b></p> <p><b>3. Confirm parking + check on exit + lash before releasing car to prevent roll-offs</b></p> <p><b>4. Use chocks/drop-holes + visual judgement to reduce drive-off risk</b></p> <p><b>5. Look &amp; Lock to avoid entrapment in truck</b></p>	<p>This side should display OEM/Yard Specific rules</p>	

Figure 2(b) Rear side of truck driver entry card

## 2.2 Yard Operators/Regular Visitors

Yard operators or regular visitors should be introduced to the safety rules of the yard. The introduction should consist of a theoretical training component (presentation, video, one-on-one talk), as well as a practical component (how to secure cars, how to enter/exit cars, where to park cars, etc.). The yard operator or regular visitor should be also assessed to ensure they have fully grasped the material.

Following successful completion of the introduction, they can receive a permanent card with the safety rules imprinted, as shown in Fig. 3 below.



## 2.3 Visitors

Upon arrival on site, visitors should be briefed on the site safety rules at the gatehouse. This can be done using a 2-sided A3 sheet as shown in Fig. 4 below:



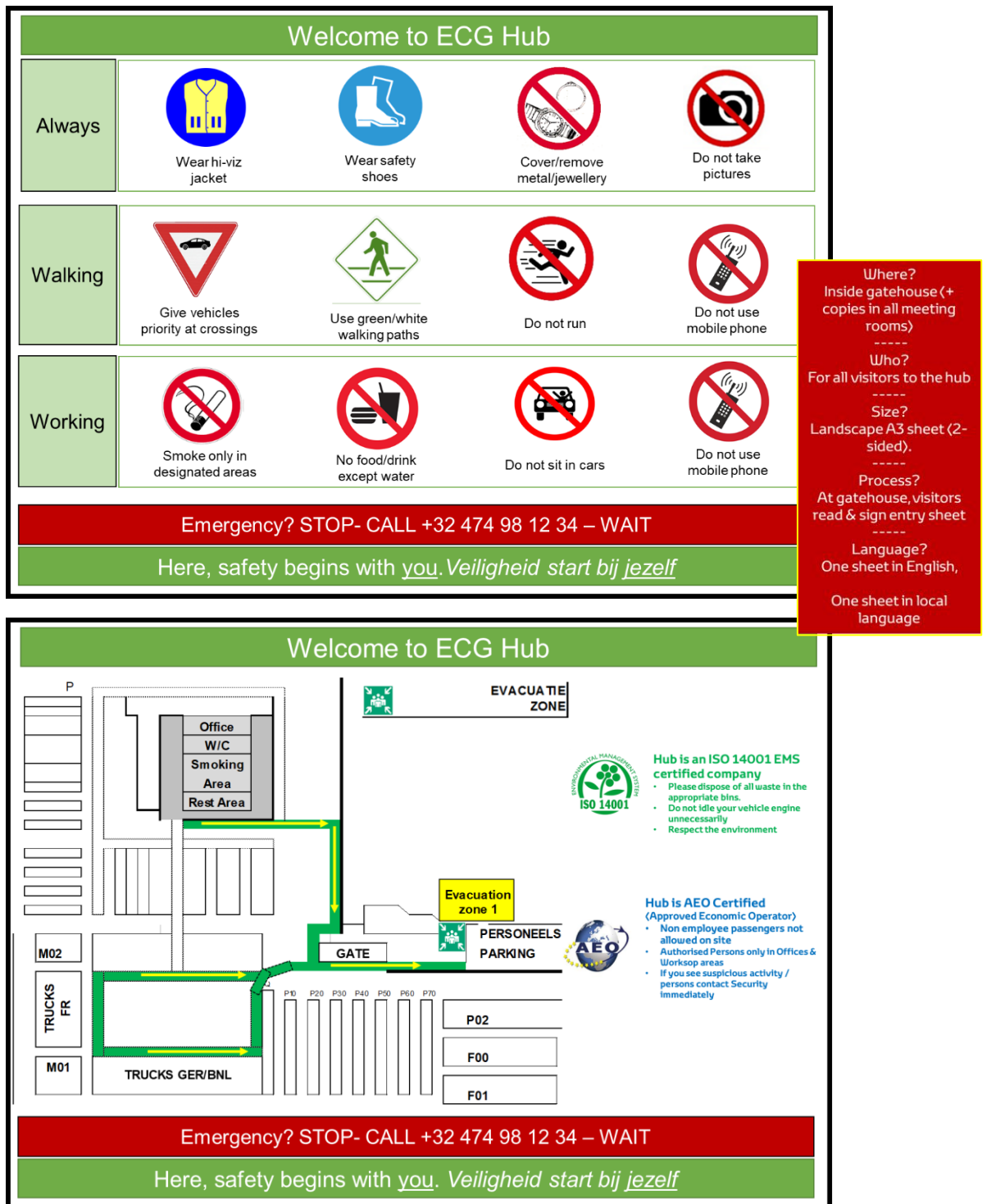


Figure 4 Sheet to instruct site visitors

The front side of the sheet should match the information on the site entrance board (Fig. 1), but with added text to clarify the meaning of the symbols. The rear of the sheet should explain the emergency evacuation processes, as well as any other site-specific information.

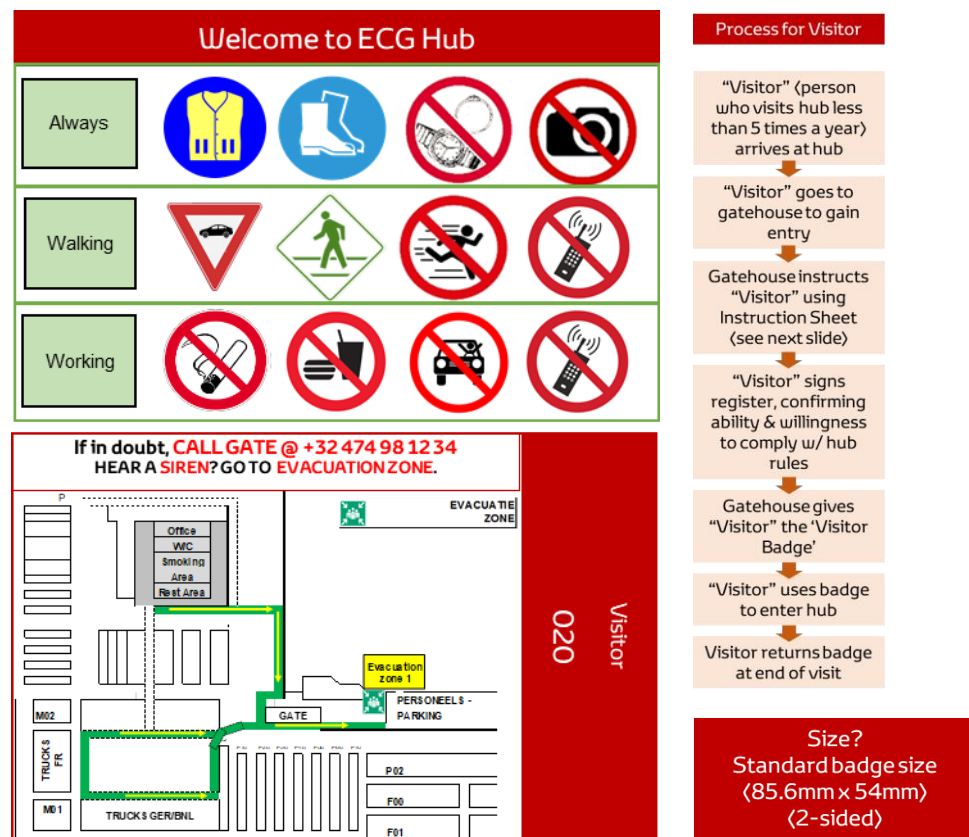


Figure 5 Card for site visitors

It is important to ensure that the colours of the site visitors' card (Fig. 5) and those of site workers (Fig. 3) are significantly different, so that they may be identified at a distance.

### 3. Lighting Levels at Site Entrance

The minimum lighting level in Truck Loading/Unloading areas should be as specified in paragraph 5.1.4. Yard lighting of the existing ECG Operations Quality Manual<sup>2</sup>, in line with EN 12464-2:2007.

<sup>2</sup> See [ecgassociation.eu/publications-and-reports/quality-manuals/](http://ecgassociation.eu/publications-and-reports/quality-manuals/).

## Section II: Truck Loading/Unloading Area

The truck loading/unloading area is a core operational area within a yard. By definition, this is the area where trucks are parked so that cars may be loaded and/or unloaded.

Due to the loading/unloading operations, this area is strewn with hazards such as moving cars (both powered and rolling), multiple staff engaged in work including people working at height. Furthermore, loading/unloading areas are often exposed to harsh environmental conditions such as restricted visibility, and can have slippery surfaces due to rain, sleet or snow.

As a result, **this area is prone to the highest safety risks in a yard**. The risks include (but are not limited to):

- Roll-offs (i.e. when a car rolls-off of its own volition)
- Drive-off from truck deck (i.e. when a car drives-off due to poor handling)
- Fall-from-height (i.e. when a person working on a truck falls from height)
- Car-man collision (i.e. when a powered or rolling car collides with a person)
- Truck-man collision (i.e. when a powered or rolling truck collides with a person)
- Car-car collision (i.e. when a powered/rolling car collides with another powered/rolling car)

Left unchecked, these risks can (and do) lead to severe, and even fatal accidents. It is therefore vital to clearly design a loading area from a safety-critical perspective.

### 1. Layout & Design of Truck Loading/Unloading Area

The layout and markings in the loading/unloading area are chosen to address specific risks.

#### 1.1 Paint Colours/Road Markings to be used for Truck Loading Areas

The dimensions of the truck loading area are enforced by road paintings and markings. Four primary colours can be used for the road markings, with each colour signifying an aspect in accordance with the various national legislations in Europe.

- a) Yellow** lines are used to indicate the truck parking bay itself. The colour yellow is used as it is the most visible of all the different colours and allows truck drivers to have a clear view of the bay from the cabin.
- b) Green** lines indicate that an area is safe for people to stand on. No vehicle should ever drive over any green lines. Within green lines, pedestrians always have sole priority.
- c) White dotted** lines indicate designated walkways for people. While pedestrians can use these paths, they need to exercise caution, as **moving vehicles always have priority over pedestrians**. White dotted paths are combined with **white shark-teeth** to remind pedestrians that they do not have priority.
- d) Red lines** indicate an area where cars turn. This area must always be clear of other cars and pedestrians.

- e) The median line and directional arrows are marked in accordance with national road marking rules.

## **1.2 Types of Truck Loading Areas Layouts**

Broadly speaking, there are 4 different types of truck bays:

1. **Straight-reverse-in type** – Figure 6a
2. **Straight-drive-in type** – Figure 6b
3. **Angled-reverse-in type** – Figure 6c
4. **Angled-drive-in type** – Figure 6d

Each type has its own distinct advantages and disadvantages as shown in Table 2. The justification for minimum dimensions of the truck loading area are provided in Table 3.

Table 2 Types of truck loading areas

	Reverse-in Straight Bays	Drive-forward Straight Bays	Reverse-in Angled Bays	Drive-forward Angled Bays
<b>Parking Manoeuvre</b>	Reverse-in	Drive-in	Reverse-in	Drive-in
<b>Leaving Manoeuvre</b>	Drive-out	Drive-out	Drive-out	Drive-out
<b>Space Requirement</b>	- Requires large area in front on trucks to allow trucks to reverse back straight-in	- Requires large space in front and behind trucks to allow trucks to reverse and pull-out safely (severely limiting storage area for cars)	+ Requires reduced space in front for trucks to reverse in and pull out	- Requires reduced space in front, but also requires space in the back for trucks to pull in safely
<b>No. of bays</b>	+ Straight bays allow more bays side-by-side		- Horizontal angle of the bays reduces the number of bays	
<b>Ease of loading/unloading</b>	- Cars must make sharp turns to load/unload (unless load lines are being used)		+ Cars make gradual turn onto truck (unless bay angle is opposite to traffic flow angle in which case the turning is worse)	
<b>Risk: Truck-Car Collision</b>	+ Significantly reduced risk of truck-car collision as traffic is separated	- High risk of truck-car collision as truck uses same road as loading/unloading cars	+ Significantly reduced risk of truck-car collision as traffic is separated	- High risk of truck-car collision as truck uses same road as loading/unloading cars
<b>Risk: Truck Man Collision</b>	- Potential risk of truck-man collision or truck-truck collision if reverse-in not performed correctly	+ Potential risk of truck-man and truck-truck collision reduced, but still exists due to blind corners (e.g. if parking between two trucks)	- Potential risk of truck-man collision or truck-truck collision if reverse-in not performed correctly	++ Potential risk of truck-man and truck-truck collision reduced, but still exists; blind driving reduced (bay is visible even if trucks are parked on either side)

	Reverse-in Straight Bays	Drive-forward Straight Bays	Reverse-in Angled Bays	Drive-forward Angled Bays
<b>When should it be used?</b>	When there is enough space in front of truck bays to allow trucks to reverse in straight	Low loading traffic yards, where there is a lot of space in front and behind trucks	Where there isn't enough space in front or behind truck lanes, and the number of truck lanes is not critical. Also good for loading cars with large turning circles	Low loading traffic yards, where there is sufficient space in front and behind trucks, and the number of truck lanes is not critical. Also good for loading cars with large turning circles
<b>Additional Risk Control Measures</b>	<p>1) Ensure enough room at front for "straight" reverse (reversing while turning creates blind-spot = truck-man collision risk)</p> <p>2) Add poles to ensure truck is reversing straight into bay, and not on adjacent walking paths (see above for risk)</p> <p>3) Install wheel humps to prevent roll-off, but to also ensure trucks pull in and out slowly (truck-man collision)</p> <p>4) Ensure trucks on site beep when reversing in</p>	<p>1) Ensure enough room at back for "straight" pull-in (pulling in between two trucks while turning = truck-man collision risk)</p> <p>2) Create traffic management system to ensure both pedestrians and cars stop moving while a truck is pulling in (to reduce truck-car and truck-man collision risk)</p>	See Reverse-In Straight bays.	See Drive-In Straight bays



*Table 3 Justification for minimum dimensions of truck loading area*

Symbol	Description	Safety Consideration
<b>a</b>	Distance between front of truck bay and front pedestrian path	Ensures that truck drivers are able to see persons on the walking path in front of their truck ( <b>minimizes truck-man collision risk</b> )
<b>b</b>	Length of truck bay	Dependant on length of longest truck, fully extended (yard-by-yard). Ensures that ramps do not extend into an area where people work ( <b>minimizes slips, trips and falls risk</b> ).
<b>c</b>	Width of truck bay (including lines)	Widest truck in Europe is 2.55 m at ground level (2.9 m max with extendable decks on top). Extra space on either side to ensure chocks/lashes/other material are not on driver working area between trucks ( <b>minimizes slips, trips and falls risk</b> ).
<b>D</b>	Length of 'working area behind truck'	Length of longest car rounded up to the nearest meter. Ensures that the longest car can be parked at the bottom of the ramps without protruding into the driving area ( <b>minimizes car-car collision risk</b> )
<b>e</b>	Turning supplement	Additional area between road and working area to allow larger cars to turn 90° into parking bay in one manoeuvre ( <b>minimizes car-car collision risk</b> )
<b>f</b>	Width of road – Truck bay to median	Standard half-width of double roads to ensure cars can pass head-to-head w/o a high risk of accidents ( <b>minimizes car-car collision risk</b> )
<b>g</b>	Width of road – Median to parking pedestrian path	Standard half-width of double roads to ensure cars can pass head-to-head w/o a high risk of accidents ( <b>minimizes car-car collision risk</b> )
<b>h</b>	Width of pedestrian path in front of truck bays (including lines)	Sufficient space to allow two persons to walk side-by-side, and ensure no one has to walk on unmarked area ( <b>minimizes car-man collision risk</b> )
<b>i</b>	Width of 'driver working area' between truck bays (including lines)	Sufficient space to allow two persons to walk side-by-side and/or two drivers to work back-to-back. Ensures drivers do not have to stand in a truck bay while working ( <b>minimizes truck-man collision risk</b> )
<b>j</b>	Width of walking path connecting truck bays to parking areas (incl. lines)	Sufficient space to allow two persons to walk side-by-side, and ensure no one has to walk on unmarked area ( <b>minimizes car-man collision risk</b> )

Symbol	Description	Safety Consideration
<b>k</b>	Width of pedestrian path adjacent to parking area (incl. lines)	Sufficient space to allow two persons to walk side-by-side, and ensure no one has to walk on unmarked area ( <b>minimizes car-man collision risk</b> )
<b>l</b>	Minimum area in front of truck bays (for all bays)	To allow for safe reverse-in/drive-out (minimize truck-truck, truck-man and truck-car collision risk)
<b>m</b>	Minimum area behind trucks (for drive-in bays only)	To allow for safe drive-in (minimize truck-truck, truck-man and truck-car collision risk)

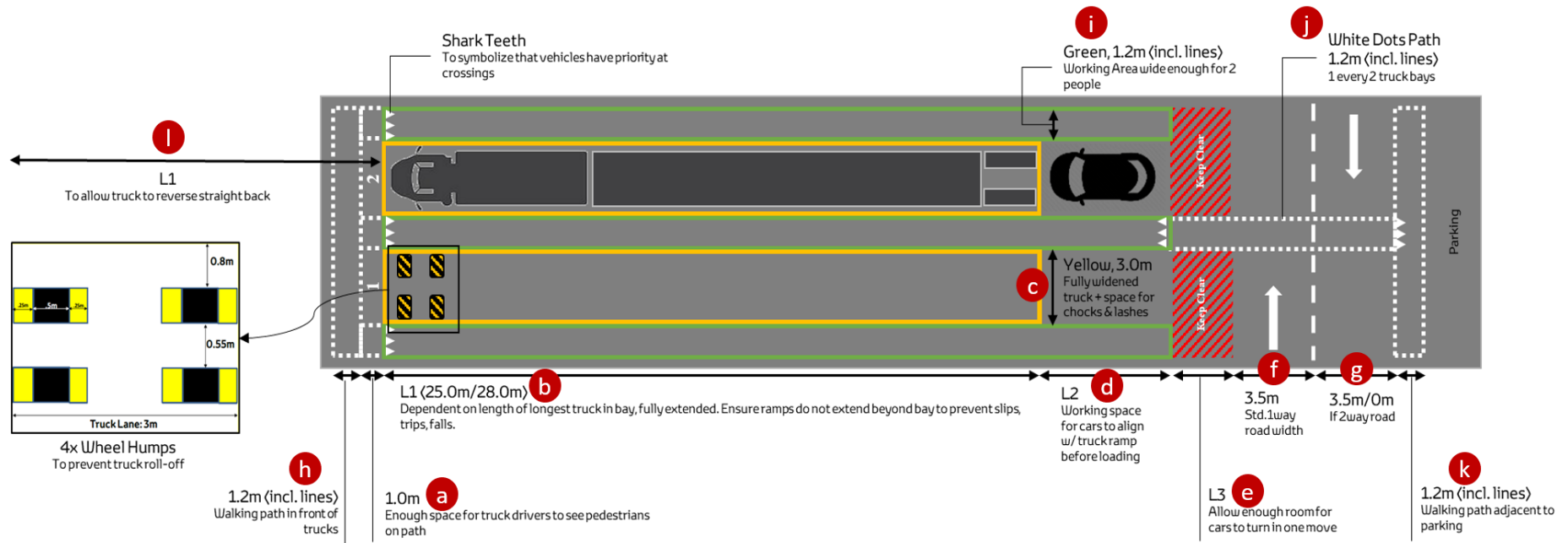


Figure 6a Layout of a truck loading area – **straight-reverse-in type**.

L1 = length of longest truck, fully extended; L2 = length of longest car; L3 = calculated circle of widest/longest car

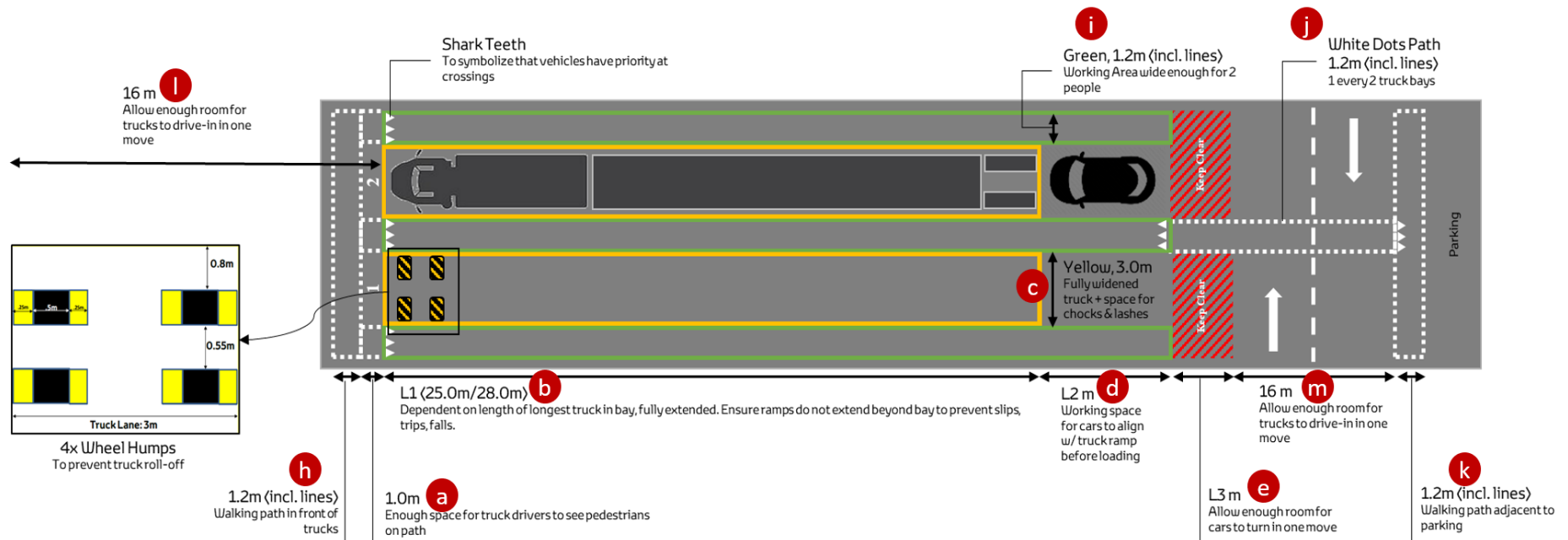


Figure 6b Layout of a truck loading area – **straight-drive-in type**

L1 = length of longest truck, fully extended; L2 = length of longest car; L3 = calculated, depending on turning circle of widest/longest car

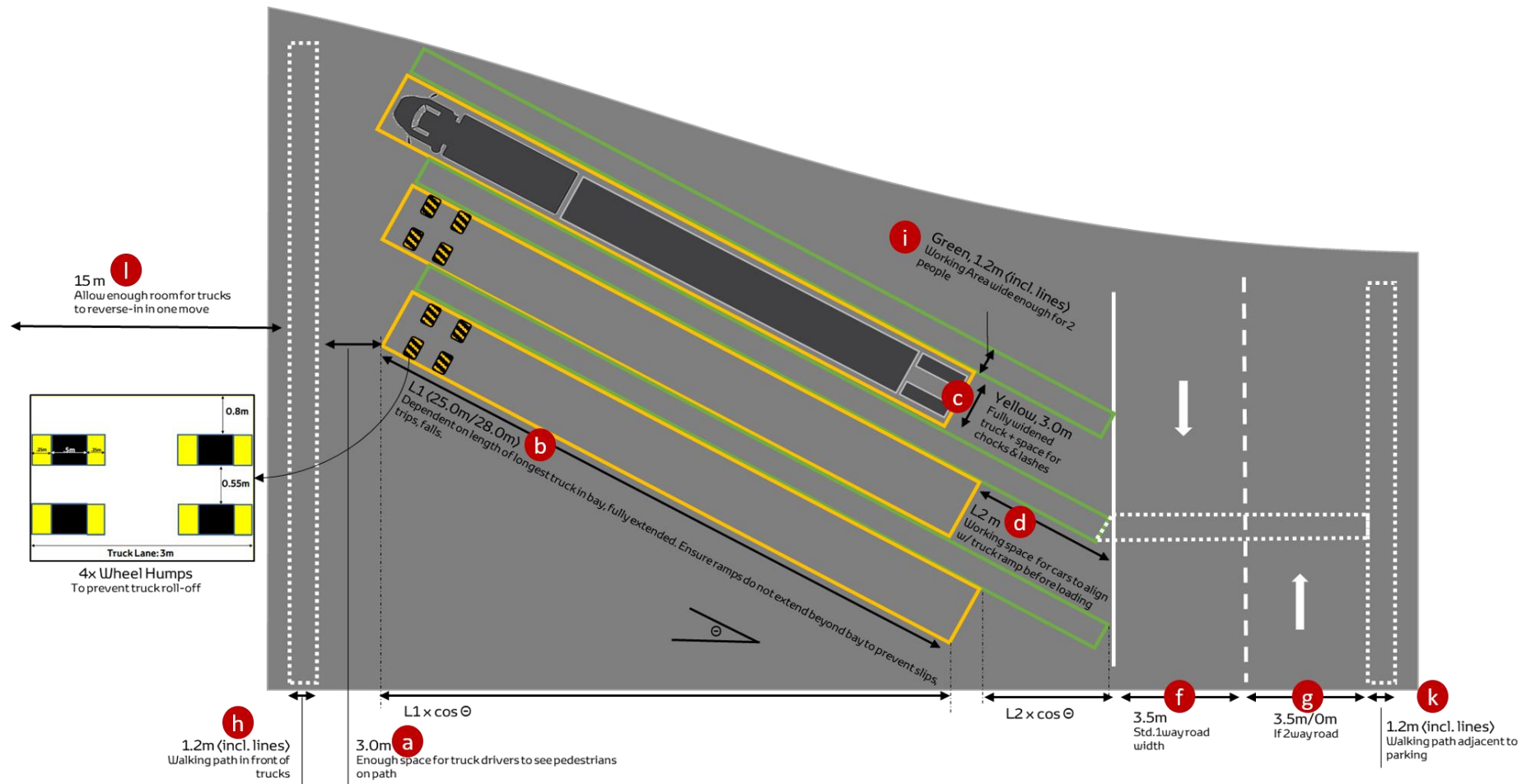


Figure 6c Layout of a truck loading area – angled-reverse-in type.

L1 = length of longest truck, fully extended; L2 = length of longest car

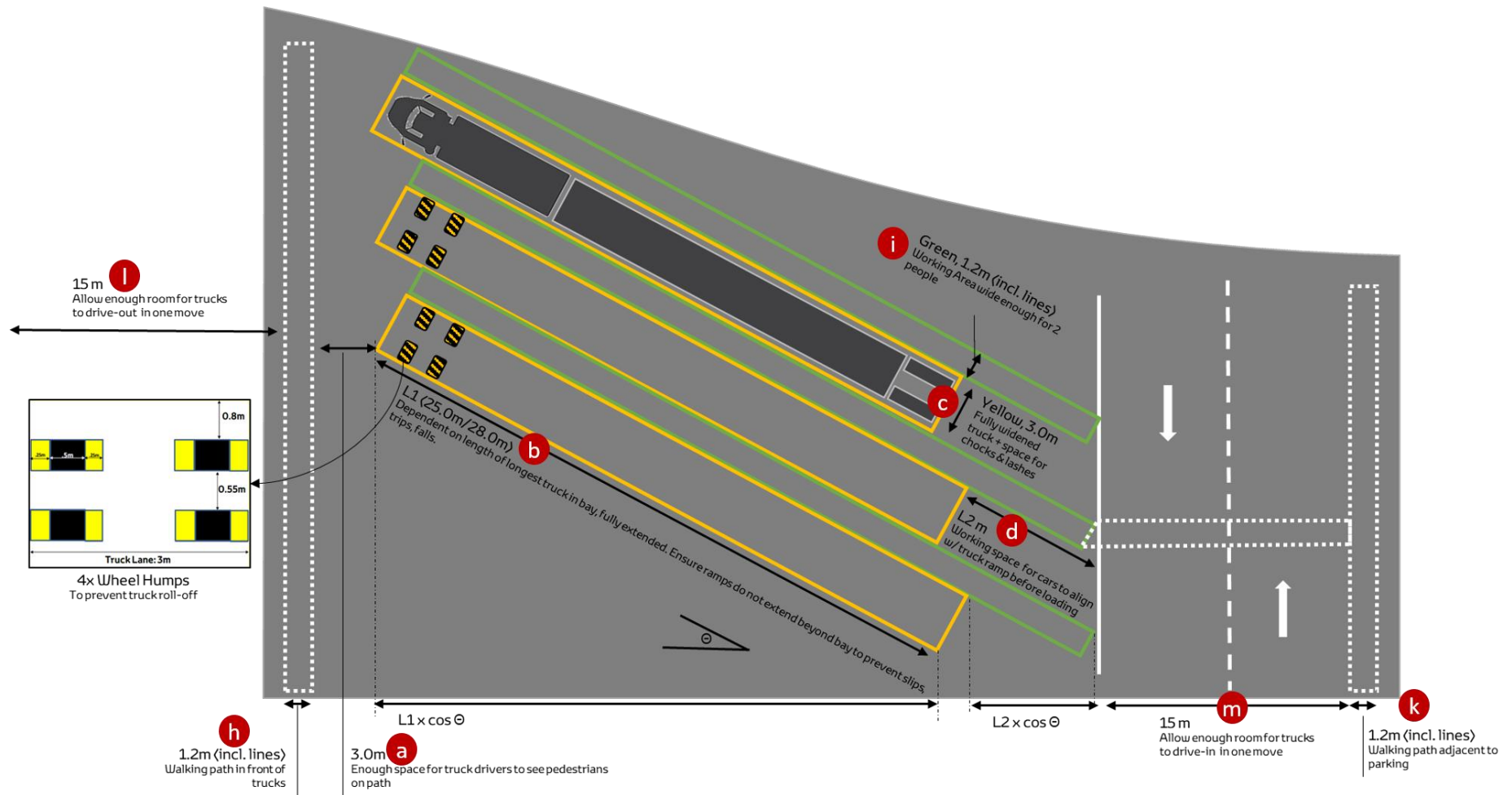


Figure 6d Layout of a truck loading area – *angled-drive-in type*

L1 = length of longest truck, fully extended; L2 = length of longest car



## 2. Processes in Truck Loading/Unloading Area

### 2.1 Driving trucks in loading areas

Multiple moving trucks pose significant risks to other trucks and pedestrians. It is therefore important to define priority and processes for truck manoeuvres.

- a) When arriving in a yard, trucks must always be made aware of the manoeuvre required to park their truck **to minimize the risk of traffic accidents**.
- b) Trucks that are pulling out of or reversing into a bay always have priority over any loading/unloading cars
- c) Truck pulling out always have priority over trucks parking
- d) When reversing in or pulling out of a bay, trucks must ensure that the trailer overhang does not cross the green lines on either side of the bay (See Fig. 7a and 7b).
- e) Where possible, yards must be designed so that trucks do not reverse in on the blind-side arc (i.e. when reversing in, trucks should be aligned completely straight in front of bay)
- f) In angled truck bays, trucks and cars should never enter a bay *against* the angle

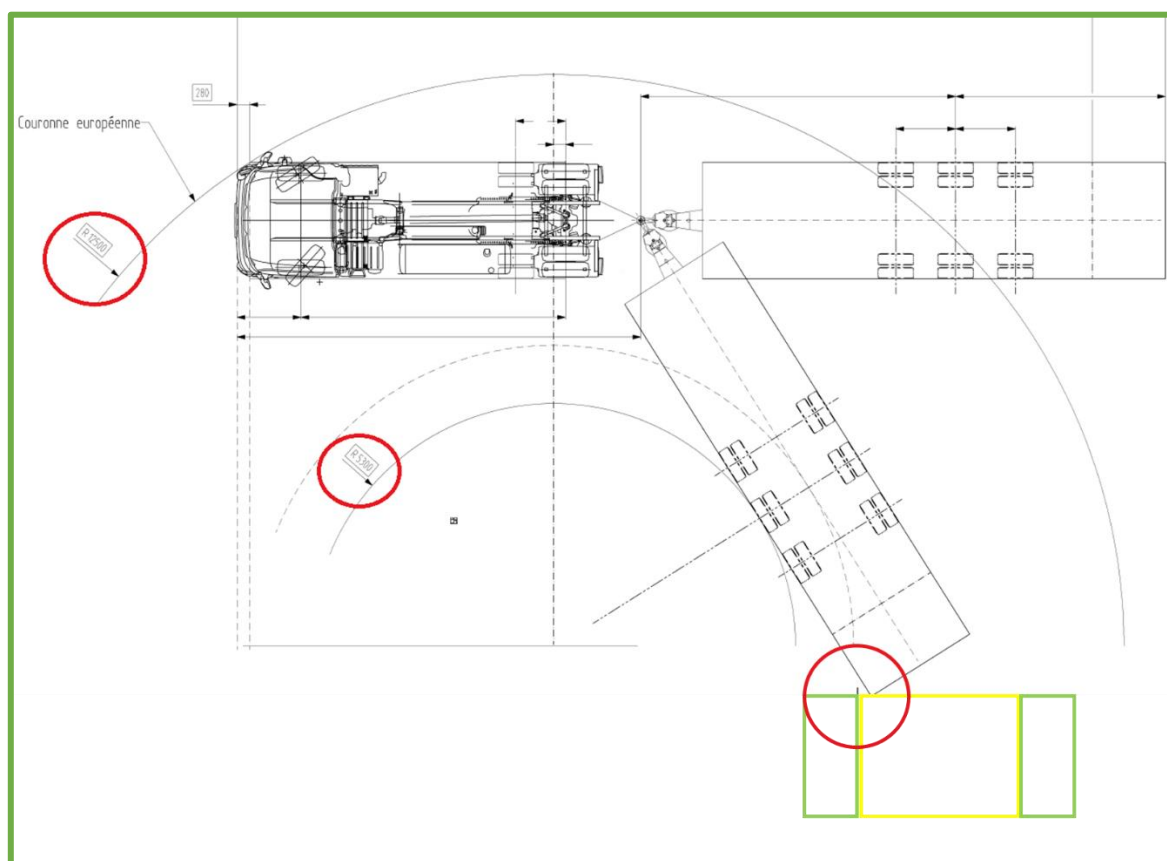
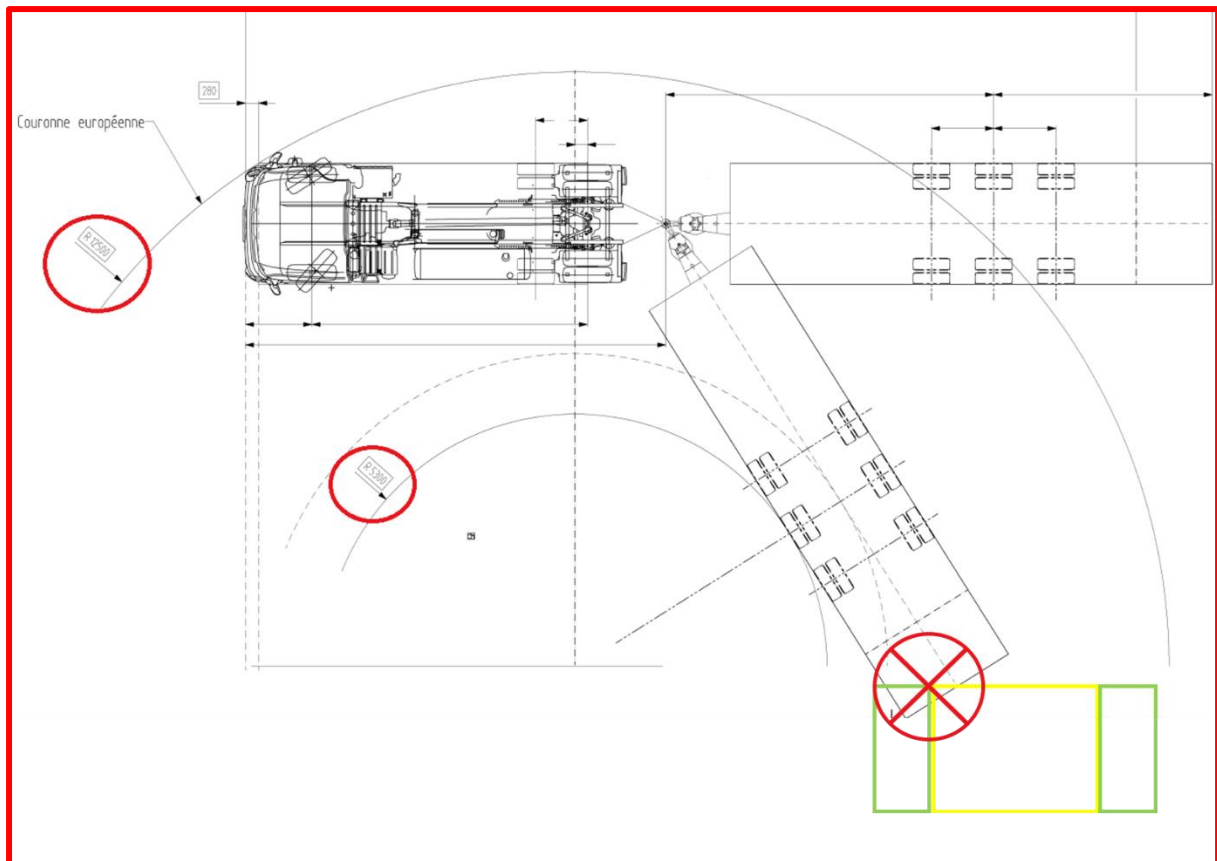


Figure 7a Truck pulling out of/in to bay correctly, without going over green lines



*Figure 7b Truck pulling out of/in to bay incorrectly, going over green lines*

## 2.2 Walking

When walking in loading/unloading areas particular attention must be paid to the high risk of car-man collisions. Where possible, the number of pedestrians in this area must be limited to truck drivers (who may be fetching or dropping off cars) and yard operators (who may be inspecting cars or preparing loads).

At all times, people must follow designated walking paths.

## 2.3 Loading/Unloading Operations

The main activity in any FVL compound is of course the loading and unloading of cars. Loading and unloading cars from trucks is a complex process and covered extensively in the sister manual to this guide: [ECG Guidelines Safe Loading Process](#). Drivers must, at all times, adhere to the steps and guidelines set out in that document.

## 3. Signage & Visuals in Truck Loading/Unloading Area

There are no minimum requirements as to what signs should be displayed in operational areas.

It is, however, recommended that any signage used in truck loading/unloading areas must:

- 1) Not obstruct any and all truck manoeuvres, to ensure there is no risk of collision
- 2) Not obstruct any cars being loaded/unloaded to and from the trucks

- 3) Be mobile and easily modifiable, to ensure that current, safety-critical messages can be targeted directly at drivers. Also prevents 'signage-fatigue' (where common signs become 'invisible' after extended periods of time').

It is preferable to have any notices to drivers displayed in loading offices which drivers visit to exchange documents before and after loading. Where possible, the messages must be conveyed pictorially, using ISO standard symbols. Any text-based messages must be translated to adequately cover the driver demographic in the yard.

#### **4. Lighting Levels in Truck Loading/Unloading Area**

The minimum lighting level in Truck Loading/Unloading areas should be as specified in the existing ECG Operations Quality Manual<sup>3</sup> and in line with EN 12464-2.

#### **5. Other Considerations**

##### **5.1 Wheel humps**

It is recommended that wheel humps be installed in each truck bay, as shown in Figures 6a-d. Wheel humps should not exceed 7cm in height (to prevent damage to cars loaded on trucks) and should be able to 'cup' the wheel to prevent truck roll-off in either direction.

Wheel humps also prevent trucks moving forward suddenly, reducing the risk of truck-man collisions with pedestrians on the walking path in front of the truck bays.

##### **5.2 Truck Shelters & Fall-from-height Protection**

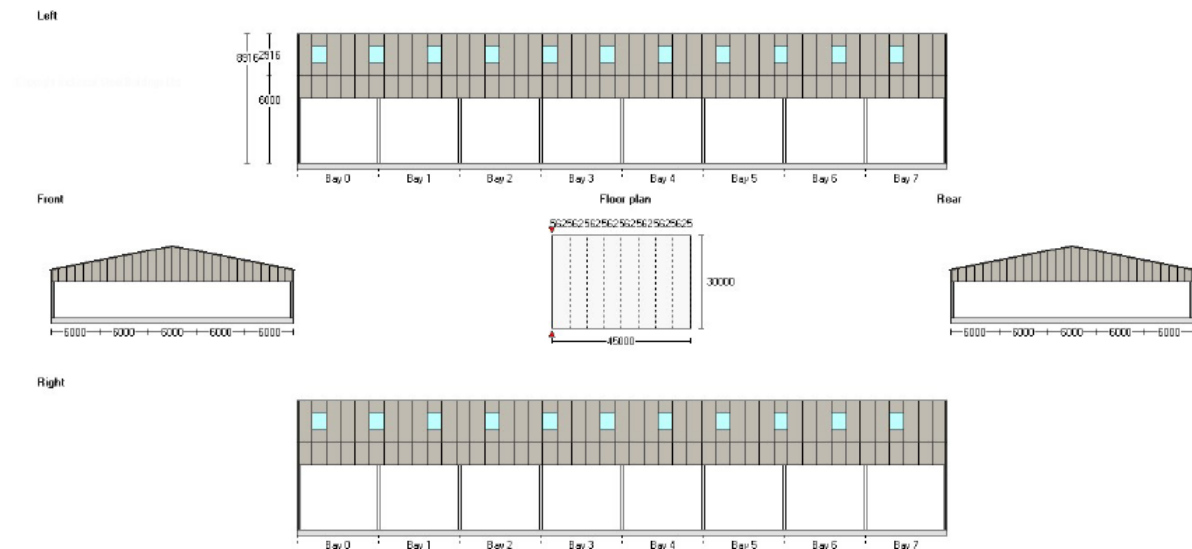
Where possible, truck loading areas must be covered using corrugated steel shelters. An example of an 8-bay truck loading shelter is shown in Fig. 8.

Shelters must provide adequate protection from weather elements but must not be obstructive to truck loading/unloading operations. They must also not pose any additional hazards to drivers (e.g. poorly lit pillars that drivers can walk/drive into).

If shelters are built, the roof can also be equipped with fall-from-height prevention lifelines.

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<sup>3</sup> See [ecgassociation.eu/publications-and-reports/quality-manuals/](http://ecgassociation.eu/publications-and-reports/quality-manuals/).



*Figure 8 Loading Shelter Structure*

### 5.3 Facilities for Drivers

It is the responsibility of the yard operator to ensure there are adequate rest facilities for drivers. These include, but are not limited to:

- Basic sanitary facilities
- Basic kitchen facilities for drivers to warm their food on their break
- Clearly signposted and sheltered smoking areas
- Waste disposal and refuse areas in accordance with any local, national or international environmental standards

### 5.4 Close-Circuit television (CCTV)

CCTV coverage is highly recommended for truck loading areas. This is for the safety and security of both the drivers and the yard operators. Any CCTV installed must follow the General Data Protection Regulation (GDPR) guidelines set out by the European Union (EU) for data recording, storing, distribution and usage. If CCTV is in use, drivers must be notified by adequate signage.

## 5.5 Fences & Poles

Each truck bay can be segregated by the means of fences, placed down the centre of the working path between two trucks. These serve two functions:

- 1) Preventing trucks from reversing onto walking paths (thus reducing the risk of a truck-man collision)
- 2) Preventing drivers from stepping backwards into a bay which a truck can reverse/drive into (also reducing risk of a truck-man collision)

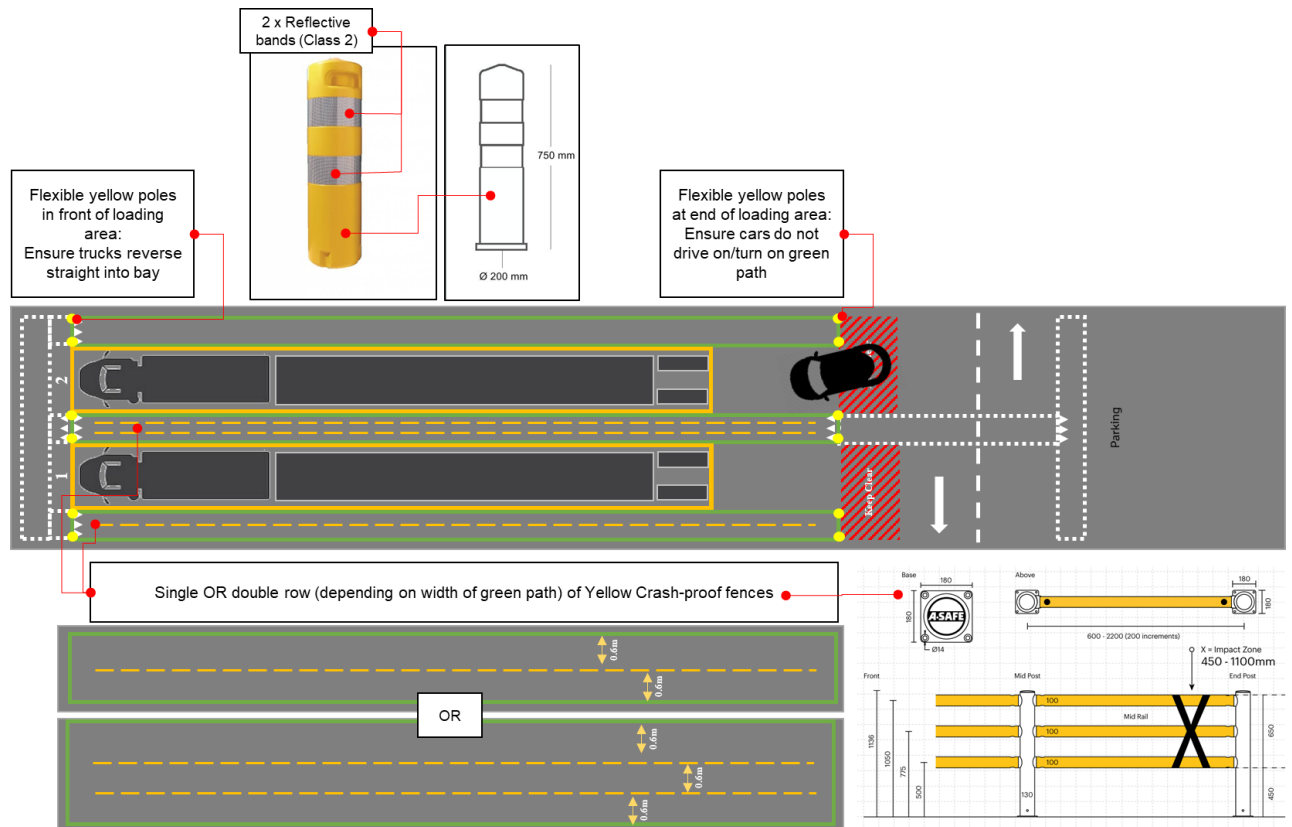


Figure 9 Fences & poles layout

## Section III: Yard Roads

Roads are the primary circulatory system in yards. Roads can be defined as any paved/asphalted surface which connects one or more parking/operational areas.

Road design should facilitate safe driving. Poor road design can directly lead to an increase in car-car and car-man collisions. It is therefore important to ensure there is enough room for the cars to manoeuvre safely.

### 1. Layout & Design of Yard Roads

#### 1.1 Dimensions of Yard Roads

All double roads should have a width of at least **6m**, and all single roads should have a width of at least **3m**. This is in line with the **minimum** dimensions specified by various national legislations in Europe. The exact width of the road in a yard should be calculated based on trials, as it is dependent on traffic volumes, sizes of cars (including any shuttle buses), maximum speed allowed, typical weather conditions and driving processes.

Roads that run in-between parking blocks may have different dimensions to those that run “inside” parking blocks. The dimensions of roads inside parking blocks should be determined through turning trials as a function of car sizes and manoeuvrability, and parking angles.

#### 1.2 Paint Colours/Road Markings to be used for Yard Roads

Furthermore, all roads should have the following minimum marks on the surface.

*Table 4 Recommended markings for yard roads*

Risk	Marking	Location & Quantity
Turning into wrong lane = car-car collision	(1) White arrow at each end of each lane	Centre of the road, 5m from start and end of each block (2 per block)
Edge of lane not visible = car-car collision at junction	(2) Yellow stop line + ‘STOP’ text, dimensions as per various national legislations in Europe (3) Two-way blinking cat’s-eyes in middle of the road	End of each block Centre of stop line at end of each block (1 per block)
Cars turn into block too early = car-car damage	(4) Green reflective pole to force cars to turn properly	1m Offset from top-right of each block (1 per block); on edge line of block parallel to street
Centre of double road junction not clear = head-on car-car collision	(5) Yellow reflective pole to mark double roads	Centre of each end of double road (2 per double road)
Traffic Priority at junctions not clear = car-car collision at junction	See (2)	
Cars drive too close to centre = head-on car-car collision	(6) White centre line clearly marked as per various national legislations in Europe (3m x 0.1m dash, 1m gap b/w dashes)	All along double roads
Traffic flow not clear = car-car collision	(7) Arrows to indicate traffic flow on double roads	End of each block in direction of traffic flow



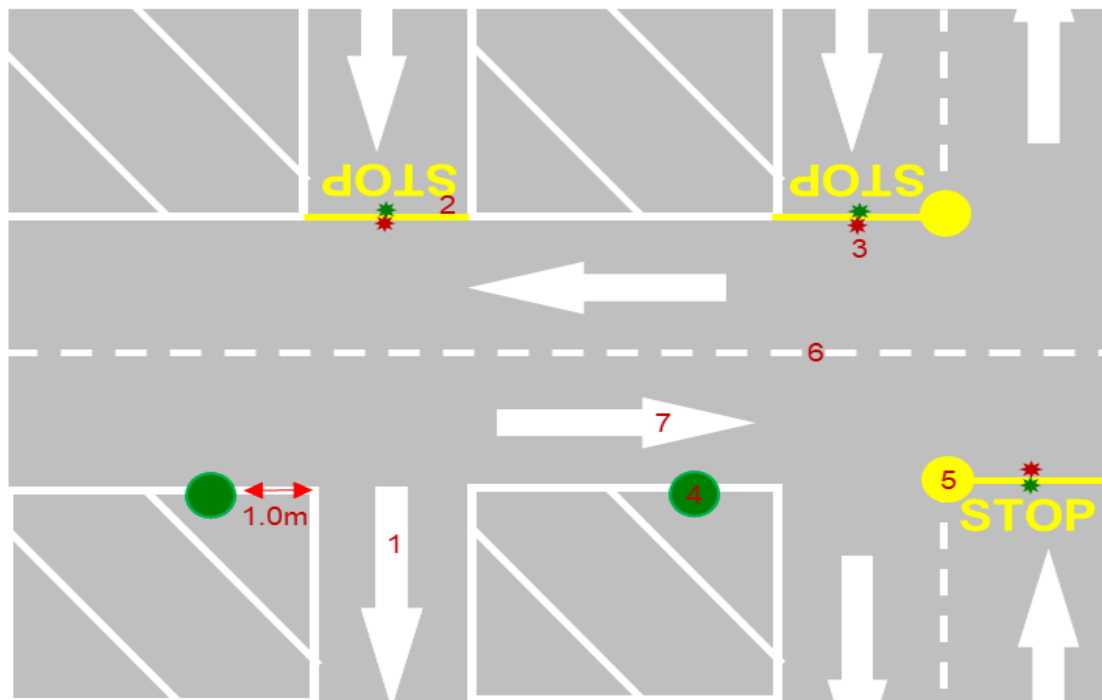


Figure 10 Yard markings

Safety poles may also be used on yard roads for different purposes, as shown in Figure 11.

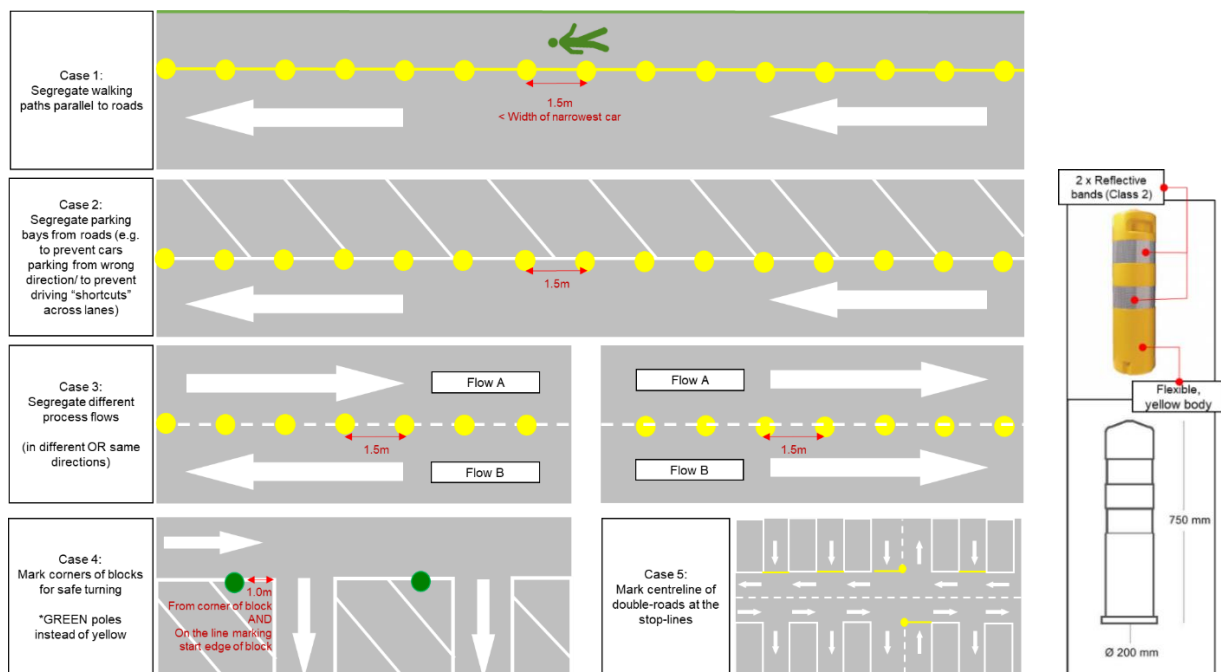


Figure 11 Use of poles for yard road markings

The reflective bands on the poles must be at least **Class 2** as specified in **EN ISO 20471**.

## 2. Signage & Visuals on Yard Roads

There are no minimum requirements as to what signs should be displayed on yard roads.

For the truck loading area, however, any signage used on yard roads areas should:

- 1) Not obstruct any car manoeuvres, to ensure there is no risk of collision
- 2) Not obstruct any people walking in/around yard
- 3) Be mobile and easily modifiable, to ensure that current, safety-critical messages can be targeted directly at drivers. Also prevents 'signage-fatigue' (where common signs become 'invisible' after extended periods of time').

Dynamic signs (i.e. digital signs where the message can be changed) can be used to great effect on yard roads, to remind drivers of any temporary diversions, prevailing environmental conditions, and even temporary speed limits in case of wet surfaces, fog, frost, ice, etc.

## 3. Lighting Levels on Yard Roads

The minimum lighting level on yard roads should be as specified in the existing ECG Operations Quality Manual<sup>4</sup>, in line with EN 12464-2.

## 4. Other Considerations

### 4.1 Speed bumps & "Sleeping-Policemen"

In order to physically reduce the risk of speeding, humps and "sleeping-policemen" can be installed in areas where speeding is likely to occur. This is typically on straight, long, open roads (>100m). Each set of speedbumps should be no more than 100m apart and are only recommended for roads where speed limits are 30 km/h or less.

### 4.2 Speed Radars

In addition to speed bumps, yard operators may install speed radars to ensure driver discipline whilst driving. Speed radars can be used to monitor the speed of cars on given yard roads. Data from speed radars should be regularly monitored and shared with truck drivers and operators to ensure they have an oversight of speeding incidents, as well as the associated risks.

Speed radars should be located and positioned based on the recommendation of the supplier/installation company, as well as past accident data which indicates whether there are any car-car collision hotspots.

### 4.3 Cameras

In some yards, speed radars may also be complemented by speed cameras for both safety and security reasons. Combining camera with speed radar data can allow people to be identified and re-trained.

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<sup>4</sup> See [ecgassociation.eu/publications-and-reports/quality-manuals/](http://ecgassociation.eu/publications-and-reports/quality-manuals/).

## Section IV: Load Preparation Areas

The load preparation area is one of several types of parking areas in a yard, where cars are stored before being loaded onto a truck. By definition, this is the *last* area where cars are stored before being loaded. To facilitate safe and efficient loading, cars in the load preparation area are “grouped” by truck.

Not all hubs have load preparation areas: in some hubs, drivers have to go and pick cars from central stock or other parking areas where the load may be scattered over a wide area. Clearly, load preparation areas provide a significant advantage in that they reduce the walking, searching and driving times for loading operations. Nevertheless, load preparation areas also pose certain risks as two different flows intersect within the load preparation areas (yard operators parking cars and truck drivers loading cars):

- Car-man collision (i.e. when a powered or rolling car collides with a man)
- Truck-man collision (i.e. when a powered or rolling truck collides with a man)
- Car-car collision (i.e. when a powered/rolling car collides with another car)

It is vital to ensure that load preparation areas are as safe as possible in order to minimise the risk of severe or even fatal injuries.

### 1. Layout & Design of Load Preparation Area

The layout and markings in the load preparation area are chosen to address specific risks.

#### 1.1 Paint Colours/Road Markings to be used for Load Preparation Areas

The dimensions of the load preparation areas are enforced by road paintings and markings. The primary colour to be used in this area is **white** in line with the various national legislations in Europe.

- White** lines should be used to define the parking slots, rows and columns, as well as the boundaries of any roads.
- White dotted** lines should be used to indicate designated walkways for operators and drivers. While pedestrians can use these paths, they need to exercise caution, as **moving vehicles always have priority over pedestrians**. White dotted paths are combined with **white sharks-teeth** to remind pedestrians that they do not have priority.
- On any roads around, or inside, the load preparation area the centre line and directional arrows (incl. dimensions) should be in accordance with national road marking rules.

#### 1.2 Load Preparation Area Layouts

Broadly speaking, there are 4 different types of preparation areas. Each type has its own distinct advantages and disadvantages as shown in Table 5.

Table 5 Types of load preparation areas

	1. Parking-Angle: Straight Fig. 11a	2. Parking-Angle: Straight Fig. 11b	3. Parking-Angle: Angled Fig. 11c	4. Parking-Angle: Angled Fig. 11d
<b>Parking Manoeuvre</b>	Drive-in	Drive-in	Turn-in	Turn-in
<b>Leaving Manoeuvre</b>	Drive-out	Turn-out	Reverse-out	Turn-out
<b>Space Requirement</b>	+ Requires long lane behind trucks, but can accommodate multiple lanes behind each truck bay	-- Requires even longer lane behind trucks (to allow cars to turn out in one manoeuvre)	+ Requires significant width, including roadway, but multiple cars can be parked in each column	+ Requires significant width, including roadway, but multiple cars can be parked in each column
<b>All cars pick-able?</b>	- No (requires cars in correct order) or homogenous load	+ Yes	+ Yes	+ Yes
<b>Ease of loading/unloading</b>	+ Simple drive-in/out	- Cars have to turn out into narrow lane	-- Cars have to turn in and reverse out instead of driving-in/out - 50% Cars have to turn-in to park from passenger side	- Cars have to turn in, but drive out it safer
<b>Risk: Car-Car Collision</b>	+ Significantly reduced risk of truck-car collision as yard & truck traffic is separated		-- Truck drivers/yard operators use common road to load from/park cars; cars reverse and turn in same roadway	-- Truck drivers/yard operators use common road to load from/park cars

	1. Parking-Angle: Straight Fig. 11a	2. Parking-Angle: Straight Fig. 11b	3. Parking-Angle: Angled Fig. 11c	4. Parking-Angle: Angled Fig. 11d
<b>Risk: Car Man Collision</b>	+ Segregated paths can be created down the centre of parking areas for people to walk; each driver picks from one lane; no driving whilst cars are being parked by yard operators		- Multiple truck drivers may be using same lane	
<b>When should it be used?</b>	When order of cars to be loaded is known/for homogenous loads	When there is enough space available, and priority for mixed loads	When space efficiency is needed, and all cars need to be pickable	Compromise between option 2 and 3
<b>Additional Risk Control Measures</b>	1) Ensure enough room behind truck loading area to turn and reverse car onto truck/trailer 2) Segregate lanes where possible to avoid interaction between different truck drivers + provide safe space for walking	1) Segregate lanes where possible to avoid interaction between different truck drivers + provide safe space for walking	1) Create procedures to ensure car-man segregation	1) Create clear procedures for car-man and car-car segregation

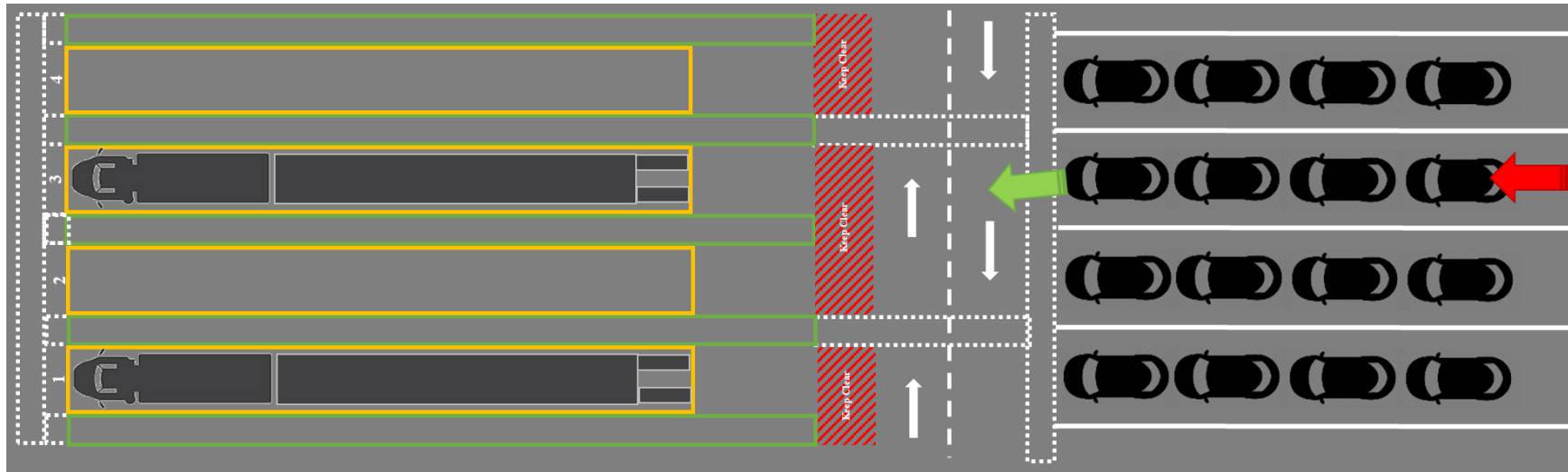


Figure 12a Straight bays, drive-in/drive-out

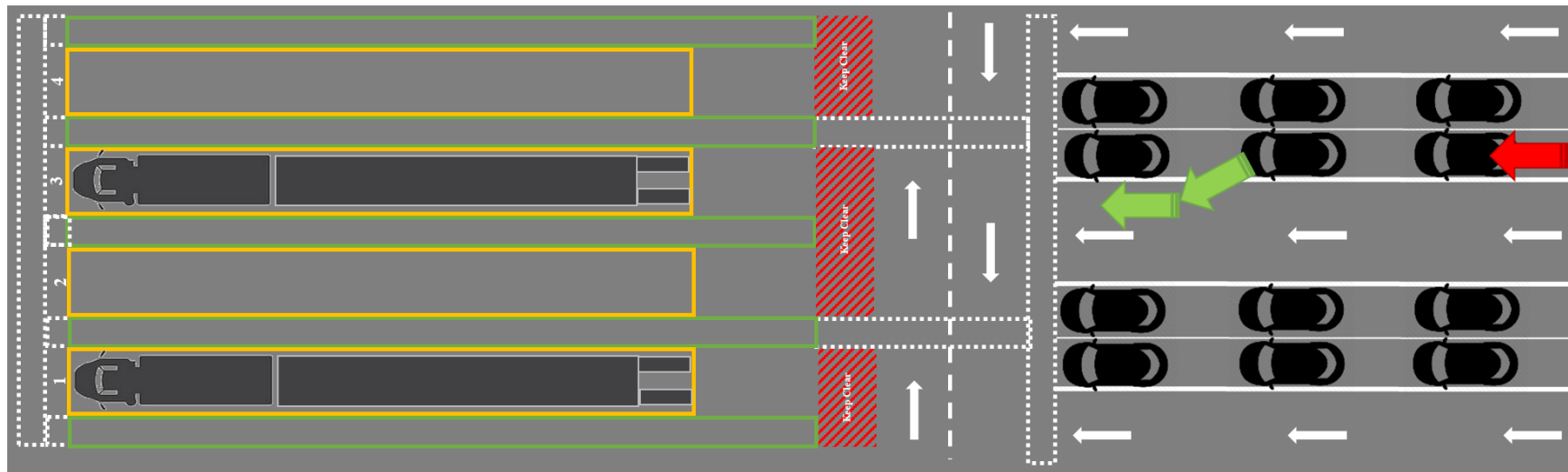


Figure 12b Straight bays, drive-in/turn-out



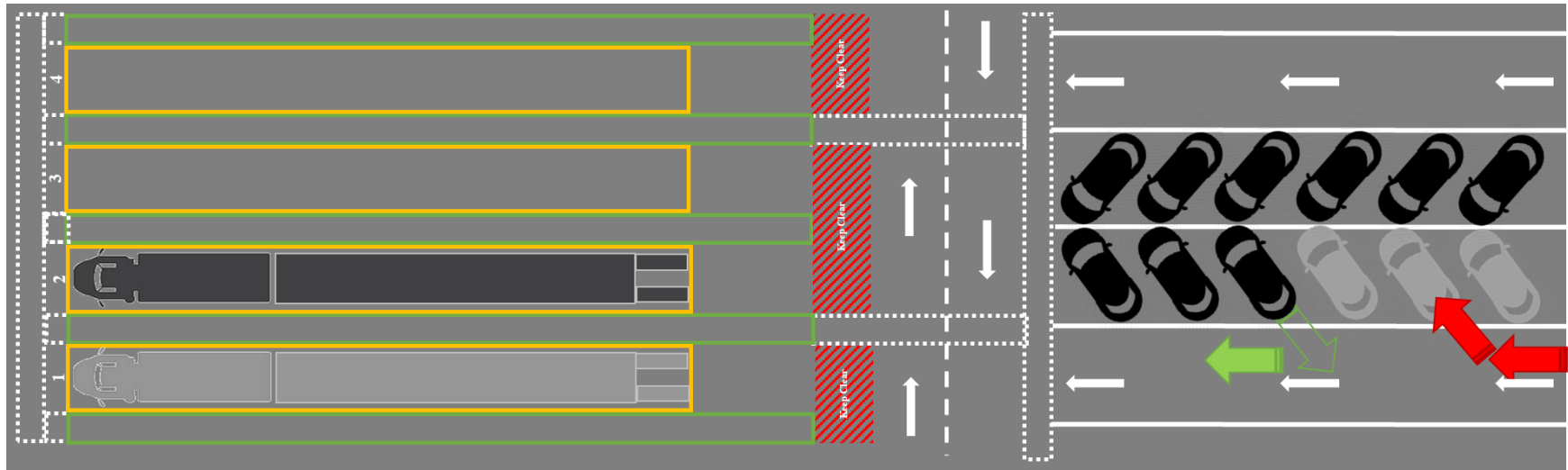


Figure 12c Angled bays, turn-in/reverse-out

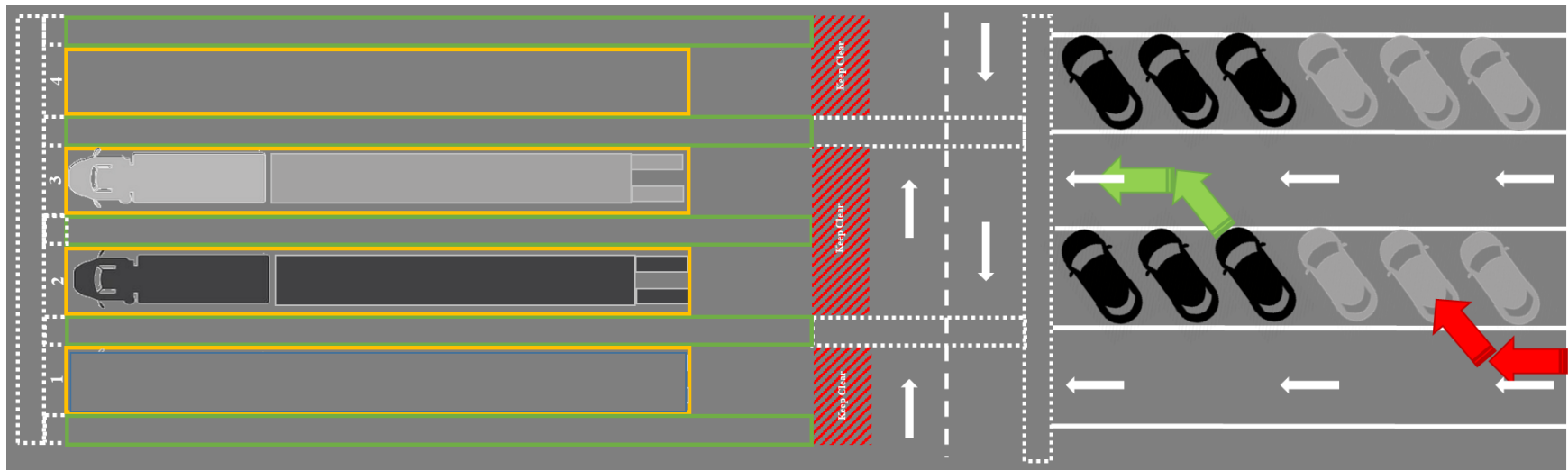


Figure 12d Angled bays, turn-in/turn-out

## 1.2 Dimensions of Load Preparation Areas

For straight bays, **the length** ( $l_{\text{straight}}$ ) of a bay should be:

$$l_{\text{straight}} = L + x$$

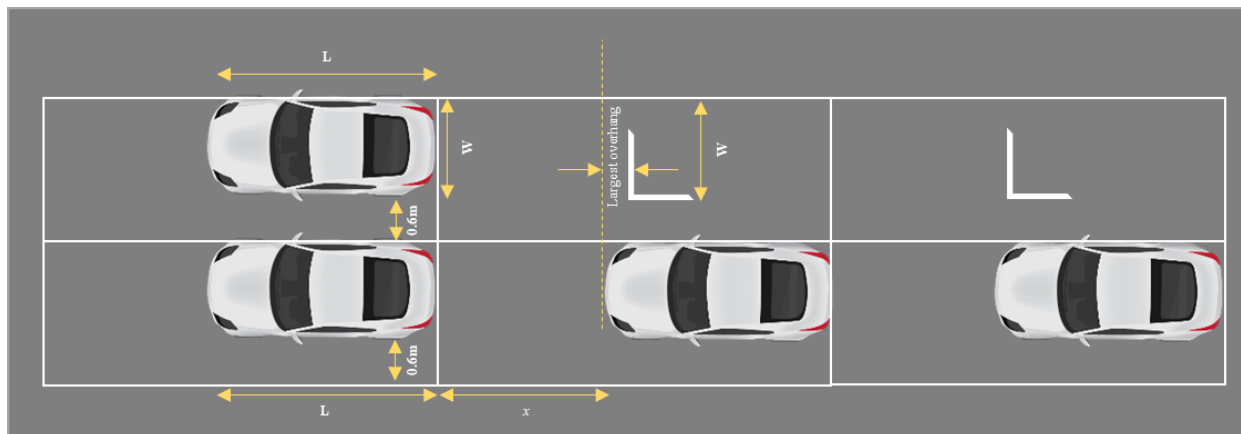
where  $L$  is the overall length of the longest car and  $x$  is the space required for a car to pull out of parallel parking in one manoeuvre. Please note that if the minimum bumper-to-bumper distance required is larger than  $x$ , or if the “drive-in, drive-out” layout is used (i.e. the cars do not have to turn out), then  $x$  should be replaced by the bumper-to-bumper distance.

**The width** ( $w_{\text{straight}}$ ) of straight bays should be:

$$w_{\text{straight}} = W + 0.6$$

where  $W$  is the overall width of the widest car. The additional 0.6m allows sufficient clearance between cars, and also creates a walking path between cars that is wide enough for operators to use when exiting. Please note that if the minimum side-to-side distance required between vehicles is larger than 0.6m, then the larger value should be used.

In order to ensure that the 0.6m is correctly used, it is essential for all LHD (left-hand drive) cars to be parked on the extreme *right* side of each bay, and for all RHD (right-hand drive) cars to be parked on the extreme *left*. This can be achieved by using cross axle marks in each bay as shown below:

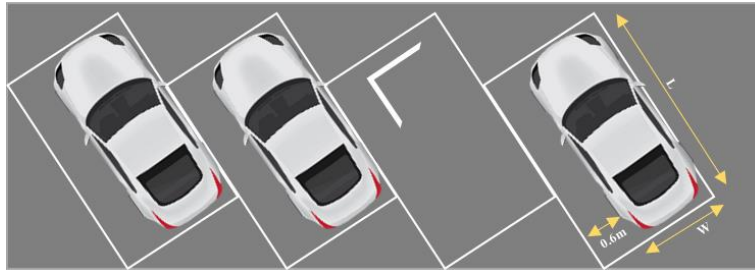


*Figure 13 Straight bays configuration for load preparation areas*

The same principles also apply for angled bays. For angled bays, the formula is:

$$l_{\text{angled}} = L \text{ and } w_{\text{angled}} = W + 0.6$$

The length  $l_{\text{angled}}$  and width,  $w_{\text{angled}}$  should be measured along the inclined planes as shown below:



*Figure 14 Angled bays configuration for load preparation areas*

## 2. Processes in Load Preparation Area

### 2.1 Driving

As mentioned earlier, two different flows intersect within the load preparation areas: yard operators parking cars and truck drivers loading cars. Where possible, these flows must be segregated physically, or procedurally.

For instance, when cars are being parked in a lane, a driver should not be picking from the same lanes to reduce the risk of car-car collisions. The exact rules and procedures to segregate the flows is at the discretion of the yard operators.

### 2.2 Walking

The intersection between truck drivers and yard operators also creates possible car-man collision risks. Care must be taken to physically segregate pedestrians, if possible, using cones, poles or other flexible barriers. At the very minimum, there must be processes in place to ensure no driving takes place in a lane whilst operators are parking and exiting from cars.

Safe walking processes should also apply to people, who must be made aware that cars always have priority. **Furthermore, there should be no walking between bumpers unless it is to access pedestrian paths.** Walking between bumpers is allowed for inspection purposes (e.g. opening/accessing tailgate, checking rear bumper for damages before loading, etc.) and for safe access to pedestrian paths.

## 3. Signage & Visuals in Load Preparation Area

As with the truck/loading area, there are no minimum requirements as to what signs should be displayed in load preparation areas.

Any signage used should:

- 1) Not obstruct any truck manoeuvres, to ensure there is no risk of collision
- 2) Not obstruct any cars being loaded/unloaded to and from the trucks
- 3) Be mobile and easily modifiable, to ensure that current, safety-critical messages can be targeted directly at drivers. Also prevents 'signage-fatigue' (where common signs become 'invisible' after extended periods of time').

It is preferable to have any notices to drivers displayed in loading offices which drivers visit to exchange documents before and after loading. Where possible, the messages must be

conveyed pictorially, using ISO standard symbols. Any text-based messages must be translated to adequately cover the driver demographic in the yard.

#### **4. Lighting Levels in Load Preparation Area**

The minimum lighting level in load preparation areas should be as specified in the existing ECG Operations Quality Manual.<sup>5</sup>

#### **5. Other Considerations**

##### **5.1 Poles & fences**

Poles (as shown in Section III) and fences can be used to segregate each lane and ensure there is no mixing between loads from different trucks. Such physical barriers can also be used to create a safe walking path down the middle of two adjacent parking/driving lanes.

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<sup>5</sup> See [ecgassociation.eu/publications-and-reports/quality-manuals/](http://ecgassociation.eu/publications-and-reports/quality-manuals/).

## Appendix 1 – Checklist

Area	Item	Minimum Level	Recommended Level	Comments
Yard Entrance	Site visuals	All 20 items shown as per standard (Fig. 1)	Any other symbols shown using ISO standard	
		All symbols readable from trucks (min. size as specified in this Guidelines)	All symbols categorized logically	
	Processes – Driver Card	All symbols/OEM specific rules shown as per standard (Fig 2a – 2b)	Additional symbols shown using ISO standard	
		Cards translated to different languages representative of hub		
		Cards systematically given to drivers on arrival	Drivers tested on their knowledge of site/loading rules	
			Drivers given bespoke cards on arrivals (based on their known weaknesses)	
	Processes – Visitor Card	All symbols/OEM specific rules shown as per standard (Fig. 5)	Visitors given training on arrival	
	Lighting	Lighting levels are per ECG recommendations	Well-lit area, beyond ECG recommendations	
Truck loading area	Layout & Design	Dimensions in line with Section II.1 of these Guidelines		
		Colours/markings in line with Section II.1 of these Guidelines		
	Processes	Truck manoeuvring in line with Section II.2; loading and unloading in line with ECG Guidelines Safe Loading Method	Truck auditors ensure safe manoeuvring, loading and unloading of trucks	
	Signage & Visuals		Truck loading rules, signage, guidance clearly visible and unobtrusive	
	Lighting	Lighting levels are in line with ECG Operations Quality Manual	Well-lit area, beyond ECG recommendations	
	Other Considerations	Basic facilities provided for drivers	Comfort facilities provided for drivers	
			Fences & poles for truck-man and car-man segregation	
			Loading shelter for protection from weather elements	
			CCTV cameras for safety	
			Fall-from-height protection	

Area	Item	Minimum Level	Recommended Level	Comments
			Roll-off prevention measures	
			Drive-off prevention measures	
Yard Roads	Layout & Design	Dimensions in line with Section III.1		
		Colours/markings in line with Section III.1		
	Signage & Visuals		Driving rules, signage, guidance clearly visible and unobtrusive	
			Dynamic signs reflect hazards	
	Lighting	Lighting levels are in line with ECG Operations Quality Manual	Well-lit area, beyond ECG recommendations	
	Other Considerations		Physical speed control (e.g. sleeping policemen, wheel humps)	
			Speed Radars	
			CCTV cameras for safety	
Load Prep Areas	Layout & Design	Dimensions in line with Section IV.1		
		Colours/markings in line with Section IV.1		
	Processes	Safe driving & walking in load prep areas	Auditor ensures safe walking & driving	
	Signage & Visuals		Driving and walking rules, signage, guidance clearly visible and unobtrusive	
	Lighting	Lighting levels are per are in line with ECG Operations Quality Manual	Well-lit area, beyond ECG recommendations	
	Other Considerations		Fences & poles for car-man segregation	