

Category 1 Standard

S1371 Station planning



Please read the Written Notices
attached to this standard

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1 Purpose

- 1.1 The purpose of this Standard is to define the space requirements for public areas and staff accommodation in stations.
- 1.2 This standard applies to:
- a) New stations
 - b) New assets within existing stations.
 - c) Altered assets within existing stations.
- 1.2.1 When work is proposed that:
- a) does not involve alterations to the primary structure of the station, and;
 - b) is defined as clause 1.2 b) or c) (new or altered assets within existing stations) and;
 - c) where it is impossible to comply with the headroom, platform width and room size requirements of this Standard without major re-building/alteration to the existing structure of the station, then the following conditions apply:
 - i) Risks that are introduced by the proposal shall be identified, assessed and evidenced ALARP by the proposer;
 - ii) Proposals shall be demonstrably optimal in relation to the compliant state for new stations;
 - iii) Proposals shall always comply with the minimum dimensions set out in sections 3.5.2, 3.10.5.3, 3.11.2.4, 3.11.7.3, and 3.13.3 of this Standard.
- 1.2.2 The reason for these sections is to recognise that the structure of an existing station may not be able to accommodate some of the constraints of this standard in terms of linear dimensions, available floor area or volume. If this is the case the onus is on the Supplier (as proposer) or other proposer to identify all risks associated with their proposal and to prove and evidence that these are ALARP in accordance with other relevant Category 1 Standards.
- 1.2.3 The Supplier (as proposer) or other proposer must also be able to demonstrate that their proposal is the best that can be achieved under the circumstances, offering optimal compliance to the standard. This will typically mean an analysis of available options. If these conditions are satisfied and if the minimum dimensions listed in the relevant sections of this Standard can also be met then a concession application is not required.
- 1.2.4 All dimensional requirements for passageways, stairways, and run-offs are not affected by this note.

- 1.3 For Temporary Works not in place for more than six months and where it is impossible to comply with the spatial requirements in this standard as a consequence of installing the Temporary Works eg. headroom, platform width, room size, run-offs, then the following conditions apply instead:
- a) Risks that are introduced by the proposal shall be identified, assessed and evidenced ALARP by the proposer to LU, and;
 - b) Proposals shall be demonstrably optimal in relation to the compliant state

Note:	To achieve the condition that produces the best possible result proposers will have to account for customer service impacts in their assessment of what is 'optimal' e.g. congestion and journey times. This may entail seeking additional support from the technical content manager of this standard (see Responsibilities section clause 4.3) on more complex or congested station routing, congestion and passenger flow issues.
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2 Scope

- 2.1 This Standard applies to the spatial aspects of station planning in the following areas:
- a) Public areas within stations
 - b) Operational staff accommodation
 - c) For normal operation and evacuation
- 2.2 This Standard addresses and supports spatial planning issues of:
- a) Passenger flow
 - b) Ticket hall
 - c) Access and Interchange facilities
 - d) Secondary income facilities
 - e) Operational staff accommodation
 - f) Station Operations Rooms and Control Facilities
 - g) Ticket issuing facilities
 - h) Platforms
 - i) Evacuation
 - j) Public facilities
- insofar as they relate to Station planning.
- 2.3 This Standard shall also be used to identify the station 'footprint'.

3 Requirements

3.1 Introduction

- 3.1.1 Stations and Premises shall comply with category one standards, the Building Regulations and relevant British standards. Where any conflicts arise between Building Regulations and this standard, compliance with this standard shall take precedence except where a breach in the Law would arise.
- 3.1.2 Space for normal operations in stations shall be planned to:
- a) minimise congestion;
 - b) be resilient to surges in demand and train service disruption;
 - c) provide sufficient non-passenger space to enable staff to function efficiently.
- 3.1.3 Station size shall be determined by the space requirements of all activities, e.g. ticket purchase, retailing, vending, passage through the gateline, wayfinding, access to and from platforms, waiting for trains, boarding and alighting from trains and staff accommodation.
- 3.1.4 Station planning shall ensure that obvious routes with minimum travel distances, which are free from obstructions, have good lines of sight and avoid dead ends and hiding places.
- 3.1.5 New stations shall be designed to ensure that persons of reduced mobility can move between street and train via step-free routes between levels, which comprise of lifts, ramps and level access between platform and trains.

3.2 Passenger flow data

- 3.2.1 The calculations for station areas shall use the average flow per minute which shall be derived from the peak 15 minutes flow. UTS gates are the exception, which shall be designed to cater for the average flow per minute derived from the peak 5 minute flow (see section 3.3.2).
- 3.2.2 Should peak fifteen minute passenger flow data be unavailable (e.g. for a new station), the factors from the following table shall be applied to the flow for the shortest peak period available (either peak 3-hours or peak 1-hour) to give the peak flows in the shorter periods. Hence:

The average flow per minute over the peak 15 minutes = $\frac{\text{the peak 15 minute flow}}{15}$

Peak	Station fare zone	Factor applied to peak 3-hour flow to give peak hour flow	Factor applied to peak hour flow to give peak 15 min. flow	Factor applied to peak 15 min. flow to give peak 5 min. flow (see UTS gateline below)
AM peak	Zones 1,2&3	0.45	0.27	0.4
	Zones 4,5&6	0.48	0.27	0.4
	Other zones	0.53	0.27	0.4
PM peak	Zones 1,2&3	0.41	0.26	0.4
	Zones 4,5&6	0.39	0.26	0.4
	Other zones	0.39	0.31	0.4

3.2.3 Passenger areas derived from methodologies contained in this document shall be the net areas available after allowing for the requirements of amenities and facilities as specified in other relevant Category 1 Standards.

3.3 Ticket hall

3.3.1 General

3.3.1.1 When planning the layout of a ticket hall, all activities related to amenities and facilities, as specified in other relevant Category 1 Standards, that are expected to take place within the ticket hall shall be identified and incorporated. Conflicts with passenger flows shall be designed out. These activities include ticket selling, gatelines, queuing and secondary revenue activities.

3.3.2 UTS gateline

3.3.2.1 The formula for calculating the required number of UTS gates at a station is split into three parts.

- 1) The first part of the formula calculates the number of gates needed to accommodate the ENTRY flow through the gateline;
- 2) The second part of the formula calculates the number of gates needed to accommodate the EXIT flow through the gateline;
- 3) The third part of the formula adds either one or two additional gates to the combined number of ENTRY and EXIT gates calculated in parts one and two (This is the 'X' shown in 3.3.2.3).

3.3.2.2 The formula shall initially be used twice, once to calculate the number of gates needed in the AM peak and then again to calculate the number of gates required in the PM peak. If a station has a high level of usage (i.e. tourist, shopping, etc) then the busiest period of gateline activity may be found to be outside the AM and PM weekday peak times, in which case a third calculation for the number of gates will be required. The highest figure from all of these calculations shall then be used as the required number of UTS gates.

3.3.2.3 The formula for the total number of gates is as follows:

$$\text{roundup}\left(\frac{5 \min \text{ EntryFlow}}{25 \times 5}\right) + \text{roundup}\left(\frac{\text{Total Number of Exiting Passengers}}{25 \times 2}\right) + X$$

3.3.2.4 The calculations for the entry and exit flows shall be from the same period of gateline demand (all station users **except** interchangers) using forecasted flows. If forecasted flows are not available, then the result based on current demand levels may be used. When using current demand, the rounding exercise takes place after an increase of 20% has been applied to the results from the first two parts of the calculation (i.e. before X is added).

3.3.2.5 The inputs for the UTS gateline formula are:

- a) The peak 5 min entry flow into the station (converting from 15 minute entry flow if appropriate, see section 3.2.2).
- b) *Total Number of Exiting Passengers*; this is the sum of all passengers exiting the station from *each* train service. The formula assumes all trains arrive concurrently and all exiting passengers must now pass through the gateline in 2 minutes.

Note: It is important that before combining the *Number of Exiting Passengers* from each of the train services, the train service that contributes the highest number of exiting passengers has its contribution increased by 25% (this is to allow for a gap in service).

- c) $X = 1$ if total (without X) is less than or equal to 10 gates, or $X = 2$ if total (without X) is more than 10 gates.

3.3.2.6 The *Number of Exiting Passengers* shall, where possible, be **extracted** from individual train alighting load survey data for each train service or, if this is not available, using the following formula applied to each train service.

$$\text{Number of Exiting Passengers} = \left(\frac{\text{Peak 15 min Alighters} - \text{Peak 15 min Interchange}}{15} \right) \times \text{train service headway}$$

where:

- a) Train Service Headway is the time in minutes between trains in the peak hour in the period being considered;
- b) For different train services that share one or more platforms, (e.g. Circle and District at St. James's Park) a combined Train Service Headway shall be used;
- c) the maximum *Number of Exiting Passengers* exiting the station from a single train shall be the 'practical crush capacity' for the train stock type on the line;
- d) The Total Number of Exiting Passengers shall be the sum of all the Number of Exiting Passengers for each train service (including the rule that the highest Number of Exiting Passengers from all of the individual train services shall be increased by 25%).

3.3.2.7 The minimum number of UTS gates shall be three in each ticket hall.

3.3.2.8 A number of the gates provided shall be wide aisle gates according to the size of the gateline:

Size of gateline	Minimum wide aisle gates required
Up to 6 gates ¹	1
Up to 12 gates	2
Up to 18 gates	3
More than 18 gates	4

¹Uni-directional gatelines only

3.3.2.8.1 A bi-directional gateline shall always have at least two wide aisle gates.

3.3.2.9 The UTS gateline formula assumes that both the entry and exit capacity of a UTS gate is 25 passengers per minute. A wide aisle gate in uni-directional mode also has a capacity of 25 passengers per minute, so can be included in any UTS gateline calculations.

3.3.2.10 Where a single wide aisle gate is installed and used in bi-directional or First Come First Served mode the throughput of the gate is 7 passengers per minute and hence cannot be used to make up the number of gates in any UTS gateline calculations.

- 3.3.2.11 UTS gatelines shall be sited so that all gates are readily accessible to passengers moving in an expected manner through the ticket hall. The width of a UTS gateline shall be determined as follows:

gateline width = number of automatic gates x walkway width + (no. of gates + 1) x stanchion width + gateline equipment as required from the table below.

- 3.3.2.12 Entry or exit gate shall be grouped to one side of the gateline (i.e. they shall not alternate between entry and exit)

- 3.3.2.12.1 Where:

Automatic gate type	Walkway width mm	Stanchion width mm
Pneumatic	620	267
Electric (Mk. 1 and Mk. 2)	620	155
Wide aisle	1080	155

- 3.3.2.12.2 Additional gateline equipment

Gateline equipment	Position	Pneumatic gate – Dimensions	Electric gate – Dimensions
Combined manual/ equipment gate with luggage port	Adjacent to ticket office	Height: 1300mm Width: 1750mm Opening: 1400mm (towards exit)	Height: 1300mm Width: 1700mm Opening: 1300mm (towards exit)
Manual gate – single leaf/ with luggage port	Adjacent to ticket office	Height: 1300mm Width: 1394mm Opening: 900mm (towards exit)	Height: 1300mm Width: 1350mm Opening: 900mm (towards exit)
Luggage chute	In line with gateline	Height: 1300mm Width: 500mm Opening: 960mm tall x 400mm wide	Height: 1300mm Width: 500mm Opening: 960mm tall x 400mm wide

- 3.3.2.13 Where wide aisle gates are installed, there shall be no requirement for additional gateline equipment as listed in 3.3.2.12.2, except where stipulated in 3.3.2.14.
- 3.3.2.14 The combined manual/equipment gate shall be required at stations where no wide aisle gate is fitted and where large pieces of equipment, such as parts for escalators or lifts etc. will be required to pass through the gateline. At other stations the single leaf manual gate shall be used.
- 3.3.2.15 The decision as to whether the gateline needs luggage chutes and the quantity will depend on the passenger profile for that station. E.g. stations with high tourist traffic, such as airports, shall need luggage chutes.
- 3.3.2.16 The following items shall be positioned in the ticket hall.

Equipment	Position	Dimensions
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Gateline attendant's point (GLAP), where no other place of safety is available (see 3.8.1 for definition).	Adjacent to the gateline, but not necessarily part of the gateline. Usually close to the Ticket Hall Station Control Unit (THSCU).	Height: 2300mm Width: 990mm Depth: 1240mm
Ticket Hall Station Control Unit (THSCU) (see 3.14.5.1 for definition).	Adjacent to the gateline	Height: 1802mm Width: 429mm Depth: 473mm

3.3.2.17 The following items are also required.

Equipment	Position	Dimensions
Station Control Unit (SCU) (see 3.14.5.1 for definition).	Installed within a secure enclosure (e.g. ticket office) and with a clear view of the gates.	Width: 432mm Depth: 430mm
Smartcard readers	As specified in section related to smartcard readers below	Height: 1038mm Width: 325mm Depth: 157mm

3.3.3 Smartcard readers

3.3.3.1 General

3.3.3.1.1 Smartcard readers are to be used to validate Oyster and other future smartcards.

3.3.3.1.2 In addition to being fitted to each UTS gate, smartcard readers shall be installed in the following circumstances:

- a) at ungated stations;
- b) by each manual gate;
- c) where applicable when there is an interchange between LU and National Rail train operating companies' services involving either:
 - i) cross platform interchange on island platforms;
 - ii) the same platform;
 - iii) between platforms via a passageway or stairways or both;
- d) at entrances and exits used during special events which do not have UTS gatelines.

3.3.3.1.3 The number of smartcard readers required for each of these circumstances and any other requirements are detailed in the sub-sections below.

3.3.3.1.4 The position of smartcard readers shall be located at each site so that they are readily accessible to passengers moving in an expected manner. The position shall not encroach into run-off areas, ticket issuing window queuing areas or passageways. Their exact location shall be site specific.

3.3.3.1.5 The formula assumes that each smartcard reader will have a throughput of 25 passengers per minute.

3.3.3.2 Ungated stations

3.3.3.2.1 The number of smartcard readers shall be sufficient for the number of people requiring smartcard validation during the peak daily passenger flow. The number of smartcard readers shall be determined as follows:



$$\text{Number of smartcard readers} = \left\lceil \frac{\text{Peak 5min (entry+exit)} \times 38}{25 \times 5 \times 100} \right\rceil \text{rounded up} + 1$$

- 3.3.3.2.2 It shall be assumed that the number of passengers requiring smartcard validation during the peak 5 minutes is 38% of the sum of the peak 5 minute total entry and exit passenger flows. This figure is subject to ongoing review.
- 3.3.3.2.3 Forecast data shall be used to carry out this calculation. If however only current passenger flow data is available, the peak 5 minute flow shall be increased by 20% before rounding up and adding one to arrive at the total number of smartcard readers required.
- 3.3.3.2.4 If peak 5 minute passenger flow data is not available then this shall be derived from peak 1 hour or peak 3 hour data using the factors given in the section on Passenger Flow Data.
- 3.3.3.2.5 There shall be a minimum of two smartcard readers at each ticket barrier line, appropriately sited to aid passenger flows and throughput.
- 3.3.3.3 Manual gates**
- 3.3.3.3.1 Each manual gate shall have one smartcard reader.
- 3.3.3.3.2 The Smartcard reader shall be located on the paid side of the gateline close to the manual gate in a location that is available to passengers entering and exiting the station.

3.3.3.4 Interchange stations between LU and National Rail train operating companies' services

3.3.3.4.1 The requirements for each of the three situations (see 3.3.3.1.2 c)) are:

- a) cross-platform interchange on island platforms
 - i) smartcard readers shall be evenly spaced a maximum of 30 metres apart, however;
 - ii) if only part of the length of the platform is used for cross platform interchange, the number of smartcard readers shall be as follows:

Length of interchange part of platform	Number of Smartcard readers required
Less than 60 metres	2
60 to 90 metres	3
Over 90 metres	4

- b) same platform interchange.
 - i) smartcard readers shall be evenly spaced a maximum of 30 metres apart.
- c) between platforms via a passageway or stairways or both.
 - i) There shall be a minimum of two smartcard readers located near the passageway or stairways in each alternative route, appropriately sited to aid passenger flows and throughput.

3.3.3.5 Entrances and exits used during special events which do not have UTS gatelines

3.3.3.5.1 When additional entrances or exits which are used during special events do not have UTS gatelines, the number of smartcard readers shall be determined as follows:

Number of smartcard readers

$$= \frac{\text{Peak 5 minute passenger flow} \times 38}{25 \times 5 \times 100} \text{ rounded up} + 1$$

where:

- a) it is assumed that the passenger flow is one way;
- b) the maximum passenger flow either entering or leaving the station through this route is used;
- c) it is assumed that the number of passengers requiring smartcard validation during the peak 5 minute passenger flow is 38% of this peak. This figure is subject to ongoing review;
- d) there shall be a minimum of 2 smartcard readers at each additional entrance or exit, appropriately sited to aid passenger flows and throughput.

3.4 Run-offs

3.4.1 The following minimum lengths shall apply across the maximum width of the run-off types listed:

Run-off type	Minimum run-off length (For variable lengths see 3.4.4)
One way (Note: for one-way flow the direction is from the first to the second item)	
Escalator-Gateline	8m – 12m
Gateline-Escalator (when the ratio of the number of gates to each escalator is less than or equal to 4) ¹	6m
Gateline-Escalator (when the ratio of the number of gates to each escalator is more than 4) ¹	8m – 12m
Gateline-Passenger Conveyor (when the ratio of the number of gates to each Passenger Conveyor is less than or equal to 4) ¹	6m
Gateline-Passenger Conveyor (when the ratio of the number of gates to each Passenger Conveyor is more than 4) ¹	8m – 12m
Passenger Conveyor-Gateline	8m – 12m
Two way	
Escalator-Escalator	8m – 12m
Escalator-Passageway	6m
Escalator-Stairway	6m – 10m
Escalator-Platform ²	6m
Escalator-Street	6m
Gateline-Passageway	4m
Gateline-Platform ²	4m
Gateline-Street	6m
Passenger Conveyor-Escalator	8m – 12m
Passenger Conveyor-Passageway	6m
Passenger Conveyor-Passenger Conveyor	8m – 12m
Passenger Conveyor-Stairway	6m – 10m
Passenger Conveyor-Street	6m
Stairway-Gateline	6m – 10m
Stairway-Passageway	4m
Stairway-Platform ²	4m
Stairway-Street	4m

Footnotes:

- Note that the capacity of both an escalator and a Passenger Conveyor is 100 passengers per minute and the capacity of a UTS gate is 25 passengers per minute
- The run-offs from escalators, stairways and gatelines onto a platform shall be in addition to the platform width

- 3.4.2 Run-offs shall be before any change in direction, decision point or reduction in width.
- 3.4.3 Gatelines shall never be on platforms.
- 3.4.4 Run-off dimensions for escalators and Passenger Conveyors are measured from the equipment "combs".
- 3.4.5 The variable lengths of run-off shall depend upon the level of passenger flows as follows:
- a) for 'light flow' the minimum run-off length shown above shall apply;
 - b) for 'medium flow' the run-off length shall be:

$$\text{Run - off length} = \left(\text{minimum run - off} + \left(\frac{\text{peak hour flow} - 1000}{500} \right) \right) \text{ m}$$

where the minimum run-off is the lower of the lengths given in the table above;

- c) for 'heavy flow' the maximum run-off length shown above shall apply,
- where:

Light flow	= the maximum peak hour entry or exit flow, for the relevant station area, across the whole traffic day is less than 1000 passengers
Medium flow	= the maximum peak hour entry or exit flow, for the relevant station area, across the whole traffic day is between 1000 and 3000 passengers
Heavy flow	= the maximum peak hour entry or exit flow, for the relevant station area, across the whole traffic day is greater than 3000 passengers

- 3.4.6 The width of a run-off shall be consistent along its entire length.

3.5 Headroom in ticket halls, for horizontal circulation and stairways in public areas

- 3.5.1 The headroom in ticket halls, concourses, passageways and over stairways shall not be less than 3m (measured to the lowest point of suspended ceiling, equipment or permanent signage). However where there are local obstacles protruding downwards which make it impossible or impracticable to provide a 3m headroom, headroom shall be no lower than 2.4m (as measured above);

- a) over an area of no more than 2m x 2m in ticket halls and concourses, or
- b) over a length of no more than 2m in a passageway or over a stairway.

- 3.5.2 When work is proposed that:

- a) does not involve alterations to the primary structure of the station, and;
- b) is defined as clause 1.2 b) or c) (new or altered assets within existing stations) and;
- c) where it is impossible to comply with the headroom requirements of this Standard without major re-building/alteration to the existing structure of the station

then the following conditions apply:

- 3.5.2.1 Risks that are introduced by the proposal shall be identified, assessed and evidenced ALARP by the proposer.

- 3.5.2.2 Proposals shall be demonstrably optimal in relation to the compliant state for new stations.
- 3.5.2.3 Proposals shall always comply with the following minimum dimensions:
- a) Headroom - not less than 2.3m for areas of ceiling, beam soffits, CMS installations.
 - b) Headroom - not less than 2.1m for fixtures such as signage, CCTV cameras, information displays.

3.6 Concourse (unpaid side)

- 3.6.1 The area of the unpaid side of the ticket hall concourse shall be designed to offer a minimum of 1.0m² per passenger, for the forecast average flow per minute over the peak 15 minutes.

$$\text{Concourse area} = \left(\frac{\text{peak 15 minute flow}}{15} \times 1.0 \right) \text{m}^2$$

- 3.6.2 This area is inclusive of and not additional to gateline run-offs, ticket queuing space and amenities and facilities as specified in relevant Category 1 Standards.
- 3.6.3 If forecast flows are not available, then the result based on current demand levels shall be multiplied by 120%.

3.7 Ticket issuing arrangements

- 3.7.1 Tickets are sold from either Ticket Issuing Windows (TIW's) or Passenger Operated Machines (POM's). POMs include Few-Fare Machines (FFM's), Multi-Fare Machines (MFM's), Advanced Fare Machines (AFM's), Queue Buster Machines (QBM's) and any future automatic ticket issuing machines.

3.7.2 Number of TIWs and POMs

- 3.7.2.1 The number of TIWs and POMs shall be sufficient to ensure that at least 95% of passengers requiring tickets during the peak 1 hour of ticket sales shall not wait for more than 3 minutes.
- 3.7.2.2 The number of TIWs and POMs shall be determined for:
- a) existing stations (where ticket sales are known, ref. section 3.7.2)
 - b) new stations (where ticket sales are not known, ref. section 3.7.4)
- 3.7.2.3 There shall be an Assistance Window on the paid side of the gateline integral to the Ticket Office Suite.

3.7.3 Existing stations

- 3.7.3.1 The required number of TIWs

$$= \frac{\text{Peak 1 hour TIW sales} \times 95\% \times \text{average TIW transaction time (secs)}}{20 \text{ (no. of 3 minute periods in 1 hour)} \times 180 \text{ (no. of seconds in 3 minutes)}}$$

It shall be assumed that the average TIW transaction time for all stations is 60 seconds (this figure is constantly under review). Thus, on this basis:

$$\text{Number of TIWs} = \frac{\text{Peak 1 hour TIW sales} \times 95\% \times 60}{20 \times 180}$$

3.7.3.1 The required number of POMs

$$= \frac{\text{Peak 1 hour POM sales} \times 95\% \times \text{average POM transaction time (secs)}}{20 (\text{no. of 3 minute periods in 1 hour}) \times 180 (\text{no. of seconds in 3 minutes})}$$

It shall be assumed that the average POM transaction time for all stations is 45 seconds (this figure is constantly under review). Thus, on this basis:

$$\text{Number of POMs} = \frac{\text{Peak 1 hour POM sales} \times 95\% \times 45}{20 \times 180}$$

3.7.3.3 If only 3 hour ticket sale figures are available, then the peak 1 hour ticket sale figures shall be determined using the factors in the section on Passenger Flow Data.

3.7.3.4 The calculated number of TIWs and POMs shall be rounded up to the nearest integer.

3.7.3.5 There shall be at least 2 TIWs and 1 Assistance Window per ticket hall.

3.7.3.6 There shall be at least 1 MFM and 1 AFM or 1 FFM per ticket hall.

3.7.3.7 There shall be at least 1 MFM for every 4 FFMs or AFMs in any combination.

3.7.3.8 There shall be space for at least 1 extra FFM or AFM for future ticket machines within the POM suite.

3.7.3.9 Where additional POM facilities are required and space is a constraint, consideration shall be given to installing QBM's.

3.7.4 Ticket selling requirements at stations without Ticket Issuing Windows

3.7.4.1 General

3.7.4.1.1 At ticket halls where there are no Ticket Issuing Windows open to the public, the secure suite will require a reduced set of rooms compared to a standard ticket office suite.

3.7.4.1.2 The number of POMs shall be calculated as in section 3.7.1.2, 3.7.2.2, 3.7.2.3, 3.7.2.4 and 3.7.2.6 assuming that all ticket sales are via the POMs.

3.7.4.1.3 There shall be space for at least 1 extra MFM and 1 extra FFM or AFM for future ticket machines within the POM suite.

3.7.5 New stations

3.7.5.1 New stations shall be allocated to one of the following categories:-

- a) City;
- b) Inner suburb;
- c) Outer suburb;
- d) Shopping;
- e) Terminus;
- f) Tourist.

3.7.5.2 Ticket buying patterns at stations in each of the categories vary as follows:

Category of station	Peak 1 hour ticket sales as % of forecast peak 1 hour entry flow	Peak 1 hour TIW sales as % of peak 1 hour ticket sales	Peak 1 hour POM sales as % of peak 1 hour ticket sales
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	A	B	C
City	5	31	69
Inner suburb	10	38	62
Outer suburb	11	42	58
Shopping	5	33	67
Terminus	6	35	65
Tourist	5	34	66

3.7.5.2.1 The figures in this table are subject to review due to the impact of the Future Ticketing Programme. For up to date figures, please contact the Technical Content Manager.

3.7.5.3 The number of TIWs and POMs at new stations in each category shall be calculated from the formulae used for existing stations given above and the relevant pair of percentages in the table above applied to the forecast peak 1 hour entry flows (i.e. columns A and B for TIWs and columns A and C for POMs).

3.7.6 Special events

3.7.6.1 Stations near which special events take place (e.g. sports events, exhibitions) shall have additional POMs, the number of which shall be determined by the LU Project Sponsor.

3.7.7 Spacing of TIWs and POMs

3.7.7.1 TIWs shall be 1.8m apart between centres.

3.7.7.2 The Assistance Window shall be 900mm wide minimum (this assumes that no ticket issuing equipment is required at this window. If ticket issuing equipment is required at this window then the minimum width required is 1.8m).

3.7.7.3 FFMs/AFMs/QBMs shall not be in groups of more than two without being separated by an MFM, or a 600mm boarded gap. This is to prevent overcrowding at machines, thus helping to achieve maximum use.

3.7.7.4 There shall be space adjacent to the POMs to display a fares list as specified in LU standard 1-313

3.7.8 Queuing distance in front of TIWs and POMs

3.7.8.1 The queuing distance in front of each TIW and POM shall be 4m. This space shall not overlap gateline or other run-offs.

3.7.9 Queuing Systems

3.7.9.1 Where there are more than two TIWs or three POMs, a queuing system, commonly known as a 'Uni-Queue', shall be considered.

3.7.9.2 The Uni-Queue shall be of sufficient capacity to contain the queue length expected at the station at peak times.

3.7.9.3 The Uni-Queue shall be designed in such a manner that it will not impede the flow of passengers around the ticket hall.

3.7.9.4 Where installed, a Uni-Queue shall be no less than 1.2 metres wide along the walkways, and no less than 1.8 metres wide along the ticket issuing windows. At the turning circle, there should be a minimum width of 1.5 metres across the angle of the corner.

3.7.9.5 Where the Uni-queue has an overall length in excess of 6 metres, then intermediate gates shall be fitted to enable the queue to be shortened by half at times where demand is low.