Section 10
Toll Plazas

SECTION 10

TOLL PLAZAS

10.1 General

The Concessionaire shall provide required number of Toll Plazas for collection of toll as per the Concession Agreement. The fee collection system shall be speedy, efficient and user friendly. The design of the Toll Plazas should be such that they are aesthetically pleasing and efficient and the fee collection staff should be quick, courteous and adequately trained before deployment.

10.2 Location of Toll Plaza

The location of Toll Plaza shall be indicated in Schedule-C of the Concession Agreement. Their locations shall be decided keeping in view the following factors:

(i) Land availability,

(ii) Stream of traffic on Toll Plaza,

(iii) Visibility for the approaching traffic,

(iv) Reasonably away from road intersections and/or rail crossings,

(v) Free from risk of flooding and submergence, etc.

10.3 Land for Toll Plaza

Adequate land for Toll Plaza shall be acquired to permit the provision of a minimum number of 8 toll lanes including all other buildings and structures to be accommodated at the Toll Plaza location. Land shall be acquired by the Government at its own cost. However, the Government may, if so specified, require the Concessionaire to procure the same on behalf of the Government.

10.4 Lay out and design of Toll Plaza

10.4.1 Stage construction of Toll Plaza in respect of number of toll lanes shall be allowed. However, other structures as envisaged in the Concession Agreement shall be provided at the initial stage itself.

10.4.2 *General Lay Out*

(i) Lane width = 3.2 m in general and 4.1 m for oversize vehicles.

(ii) Median (a) Width = 1.8 m (b) Length = 50 m

(iii) Transition - 1 in 10 may be provided from two-lane section to the widened width at Toll Plaza on either side.

(iv) Provision for future expansion: The office building shall be located taking into consideration the future expansion.

Typical layout plan of 2+2 Toll Plaza is given in Fig. 10.1.

10.4.3 *Number of Lanes at Toll Plaza*

The number of lanes at the Toll Plaza in initial stage should be corresponding to the forecast traffic for at least 5 years.

Forecast traffic – Forecast traffic in terms of vehicles/day for the vehicles classified under tollable category. Non-tollable vehicles need not

be considered for calculation of number of toll lanes, as they would be allowed to pass through a separate lane.

Peak hour factor – Percentage of traffic travelling during peak hour to average daily traffic.

The number of toll lanes for the Toll Plaza may be derived using Table 10.1.

Table 10.1 : Number of toll lanes in each direction (Semi Automatic toll gates)

Forecast Traffic (in vehicles/day) total of both directions	Peak Hour Factor			
	6%	7%	8%	9%
Less than 7,000	2	2	2	2
7,000-12,000	2	2	3	3
More than 12,000	3	3	4	4

10.4.4 If at any time, the queue of vehicles becomes so large that the waiting time of the user exceeds three minutes, the number of toll lanes shall be increased so that the maximum waiting time is brought down to less than three minutes.

10.4.5 *Toll Collection System*

A minimum semi-automatic system for toll collection shall be adopted. In this system, the collection of tolls and recording data would be made through electronic equipment. Within a period of 5 years from COD, at least one booth for either side traffic shall be upgraded to toll collection with the help of smart card.

For smooth and efficient functioning of toll collection, the following arrangements/ facilities shall be provided:

(i) The staff posted at the counters shall be provided with sufficient equipment and small denomination notes/coins at the start of each shift.

(ii) Intercom facility shall be provided between booths and the office of the Supervisors.

(iii) If any booth is closed for any reason, incoming traffic shall be guided into the adjoining working booth with the help of appropriate signs.

(iv) The entire fee collection complex shall be adequately guarded.

10.4.6 *Vehicle Counting Classifier (VCS) Unit*

Each lane shall be equipped with micro-controller based vehicle counting and classifier and battery backup to collect data in the case of power failure.

10.5 Toll Booths

Toll booths may be provided of prefabricated materials or of brick masonry. The toll booths shall have adequate space for seating of toll collector, computer, printer, cash box, etc. It

should have provision for light, fan and air conditioning. The typical details of toll booth are given in Fig. 10.2.

10.6 Road works

Vehicles are required to decelerate while entering the toll lane, stop for payment and then accelerate and merge in the main line traffic of the highway. All these operations of vehicles at Toll Plaza are prone to oil/POL spillage on the surface, which may have cut-back action on bituminous surface. Therefore, concrete pavement would be preferred in the Toll Plaza area including tapering zone, from durability and long term serviceability consideration. The rigid pavement shall be designed as per IRC:58. For this work, use of paver shall not be insisted.

10.7 Traffic Signs

10.7.1 A well thought out strategy should be evolved for providing traffic signs at the Toll Plaza, in accordance with IRC:67.

10.7.2 Signs should be placed along the Project Highway, roadway of Toll Plaza to guide and render assistance to the drivers approaching Toll Plaza. It is necessary to remind the driver about the existence of Toll Plaza one km ahead with a repeater sign 500 m ahead. Stop sign shall always be used in combination with certain road markings such as stop line and the word 'STOP' marked on the pavement.

10.7.3 The Toll Plaza sign should be supplemented by the sign advising the users of the notified toll rates for various types of vehicles. Typical details of road signs required for toll purpose are given in Figs. 10.3 to 10.8.

10.8 Road Markings

10.8.1 The road markings shall be in accordance with Section 9 of this Manual. The road markings for the Toll Plaza area shall consist of lane markings, diagonals, chevron markings. Single centre line is provided at the centre of carriageway at toll gate to demarcate each service lane. Diagonal markings for central traffic island and chevron markings at side traffic island shall be provided to guide the approaching and separating traffic.

10.8.2 The road markings shall be in accordance with provision of IRC:35. Thermoplastic paint with reflective glass beads shall be used as road marking material. Typical details of road markings at Toll Plaza are given in Fig 10.9.

10.9 Toll Plaza Complex

10.9.1 The size of the office complex depends on the minimum requirement of facilities such as toilet, bathroom, store, rest room, traffic aid post, medical aid post, etc. All these depend on the size of Toll Plaza and may vary as per the need of a particular location/ area.

10.9.2 The following facilities shall be provided at Toll Plaza complex:-

(i) Office complex with toilet, bathroom and rest room.

(ii) Traffic aid post (refer Section-13)

(iii) Medical aid post (refer Section-13)

10.10 Check/Barrier Gate

A boom barrier is generally placed at the exit of each lane to avoid passing of any vehicle without payment of toll. Electrically operated barrier gates shall be used.

10.11 Lighting

10.11.1 The Toll Plaza complex shall have continuous and reliable electric supply system for efficient functioning.

10.11.2 *Interior Lighting*

The toll booths and facility building office shall be illuminated adequately. Indoor lighting should be with fluorescent lamps. Lighting should be provided in such a manner that glare is avoided or minimised. The level of illumination shall be 200 to 300 Lux as per IS:3646 (Part II).

10.11.3 *Exterior Lighting*

Lighting of the Toll Plaza is important for enhancing the night visibility. The lighting system shall consist of the following major components:

(i) High Mast lighting.

(ii) Lighting on both side approaches to the Toll Plaza.

(iii) Canopy lighting of complex.

(iv) Back up arrangement in case of power failure.

(v) Highway lighting around Toll Plaza.

10.11.4 *High Mast Lighting*

IS:1944 (Part I & II) recommends 30 Lux of average illumination on road surface and ratio of minimum to average illumination as 0.4. Normal low light poles are not able to give the required lighting conditions. It is, therefore, necessary to install high mast. The 30 m height of the mast is considered suitable to have uniform spread of desired level of illumination in the Toll Plaza area for frequent and safe movement of vehicles.

10.11.5 *Highway Lighting*

Lighting in 100 m length on both side approaches of Toll Plaza shall be provided to enhance the safety on highway and to make the drivers conscious of their approaching the toll gate.

10.11.6 *Canopy Lighting*

A higher level of illumination upto 100 Lux by providing 150-watt metal halide lamps shall be provided at the toll gate and at toll booth locations. 1000-watt halogen lamps shall be provided at the selected nodes of space frame of the canopy to ensure uniform illumination of the area.

10.12 Water Supply

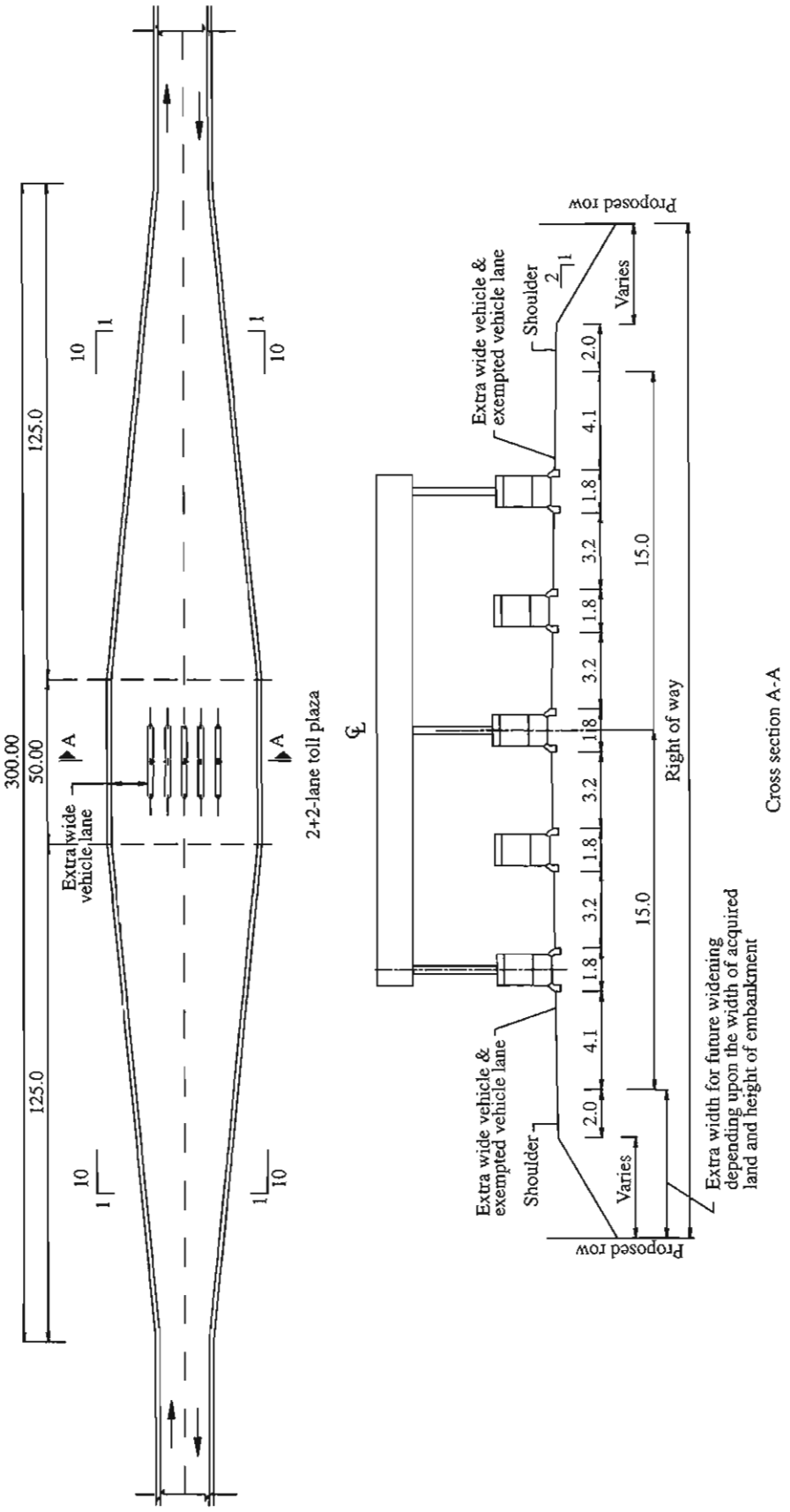
Adequate water supply shall be provided. For working out water requirement and internal drainage system, reference may be made to IS:1172, IS:5339 and IS:1742.

10.13 Fire Fighting System

For protection of the Toll Plaza complex against fire hazards, adequate fire protection arrangements shall be made.

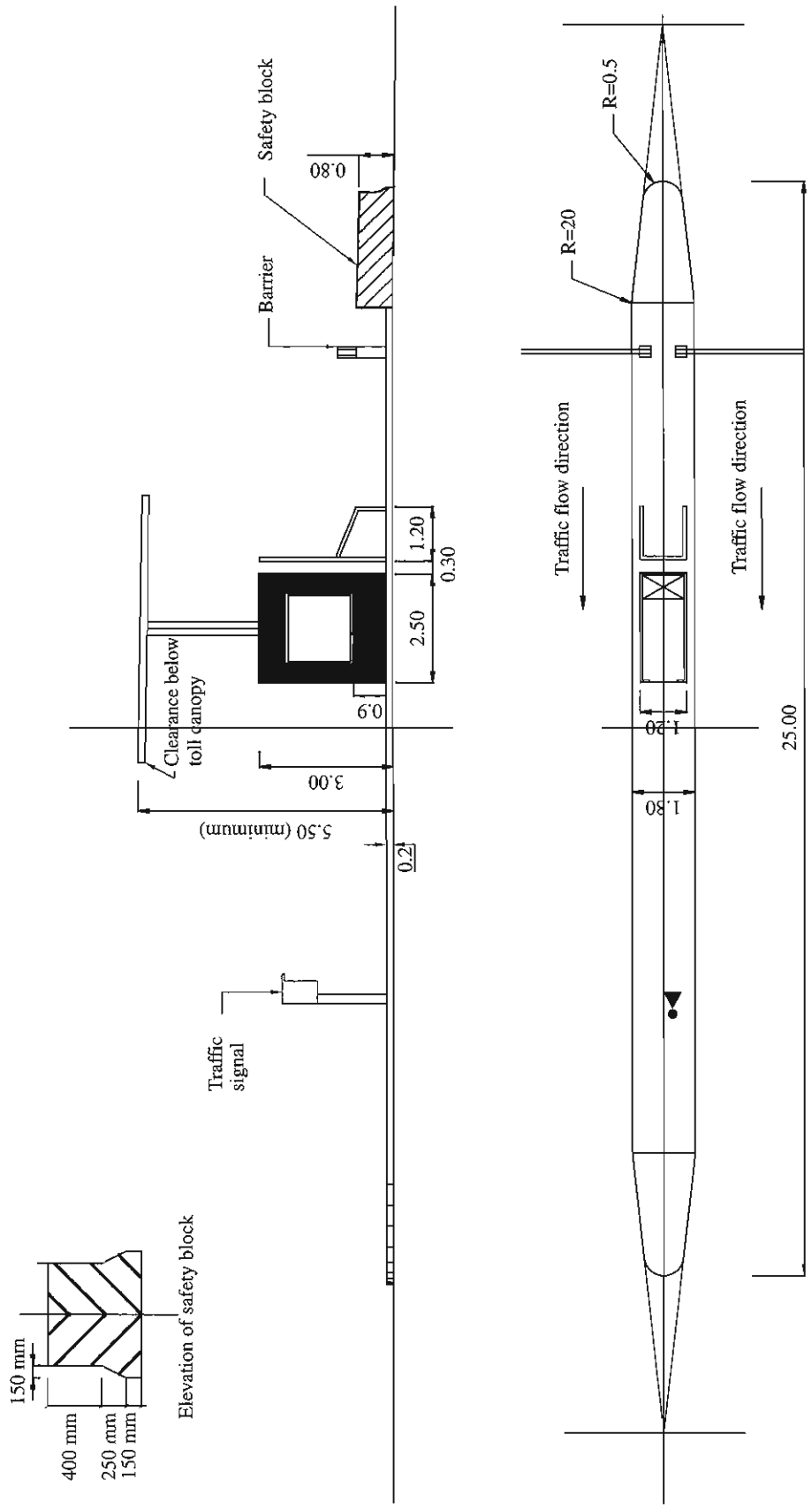
10.14 Report to be submitted

The design and layout of Toll Plaza complex, including all facilities shall be submitted to the Independent Engineer for review and comments, if any.



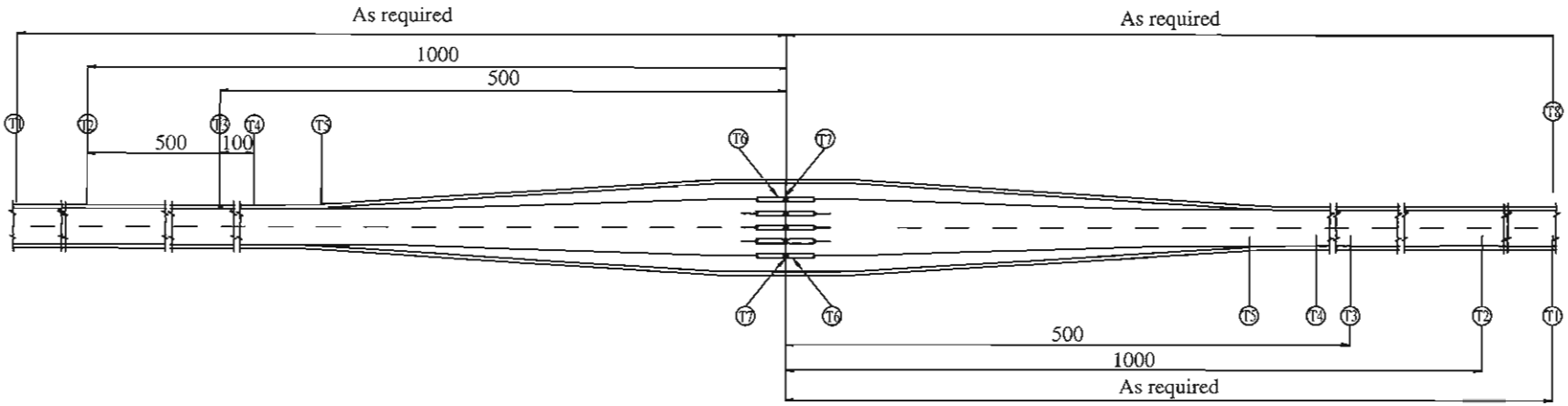
Note:
All dimensions are in metres.

Fig. 10.1 : General layout 2+2-lane toll plaza



Note:
All dimensions are in metres.

Fig. 10.2 : Recommended layout for traffic island with toll booth



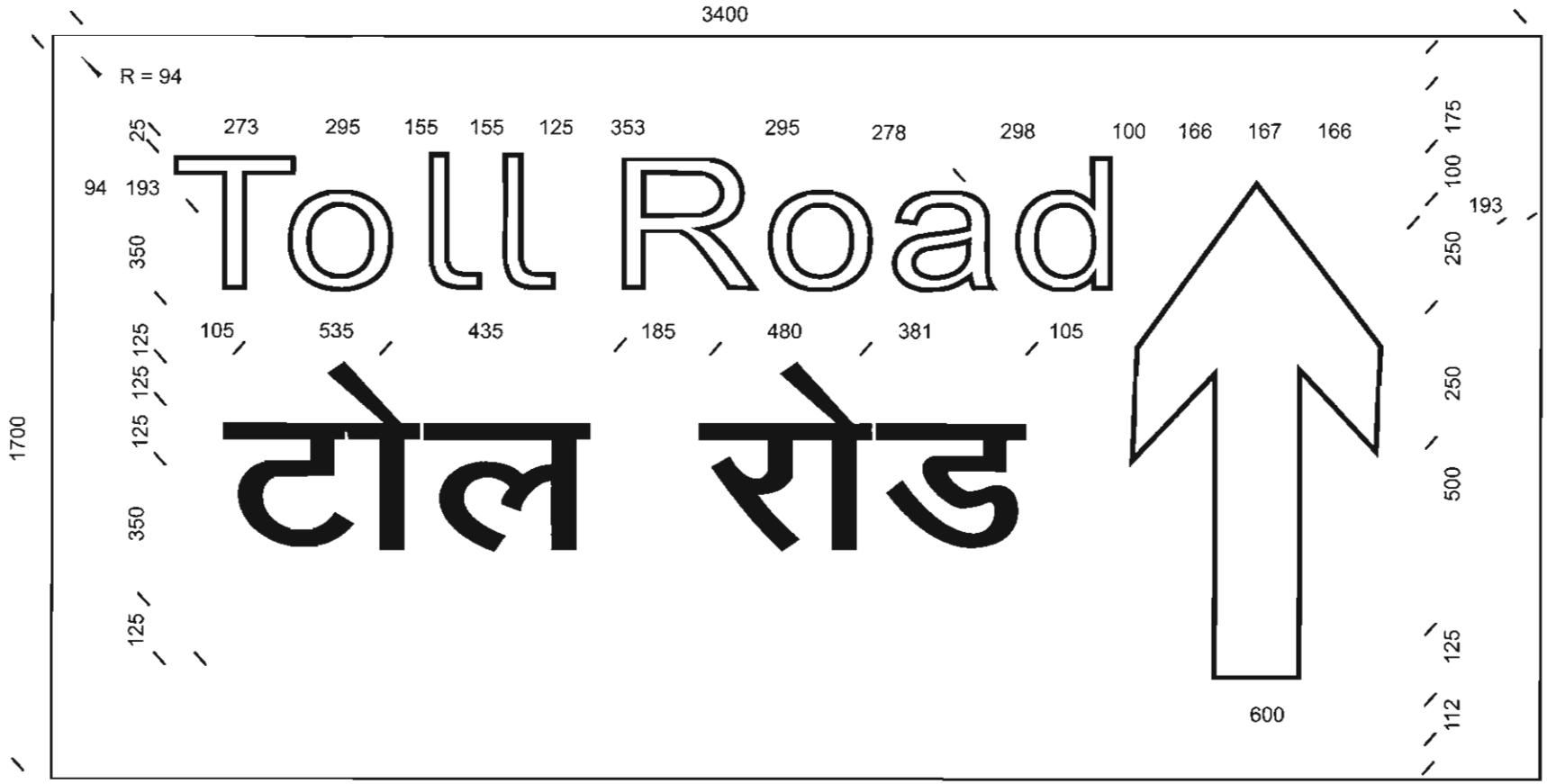
Toll related signs on highway

T1 Cantilever gantry sign for Toll Road start
T2 Cantilever gantry sign for Toll Gate 1.0 km
T3 Kerb sign for Toll Gate 500 m and toll rates
T4 Kerb sign for exempt vehicles
T5 Kerb sign for pictorial depiction of toll rates
T6 Kerb sign for exempt and over size vehicles lane direction sign
T7 Sign near the tollbooths displaying toll rates, exempt vehicles and complaint telephone number & address
T8 Cantilever gantry sign for toll road ends

Note:

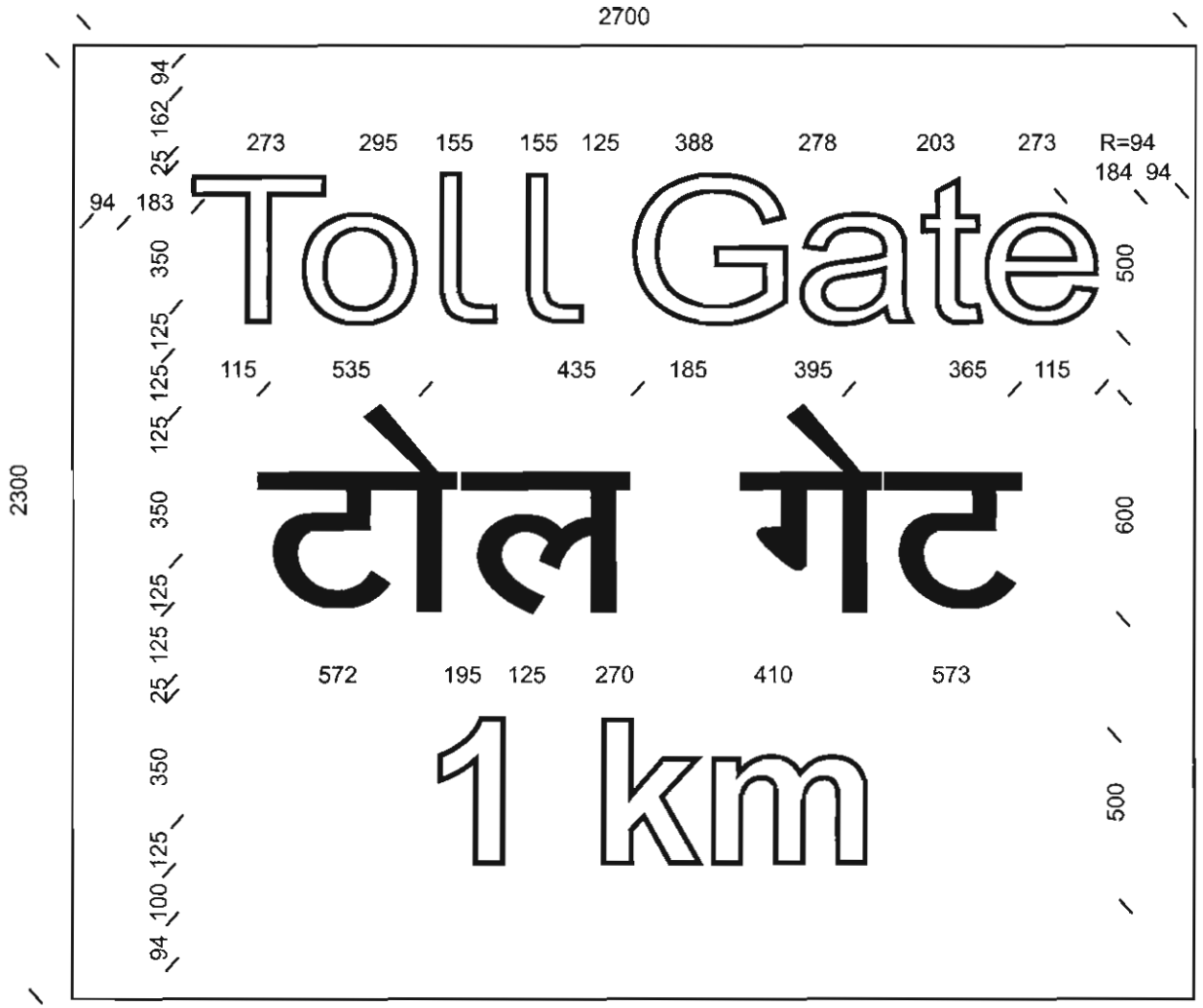
1. Generally road signs shall be in accordance with IRC 67-2001.
2. All dimensions are in metres.

Fig. 10.3 : Signages



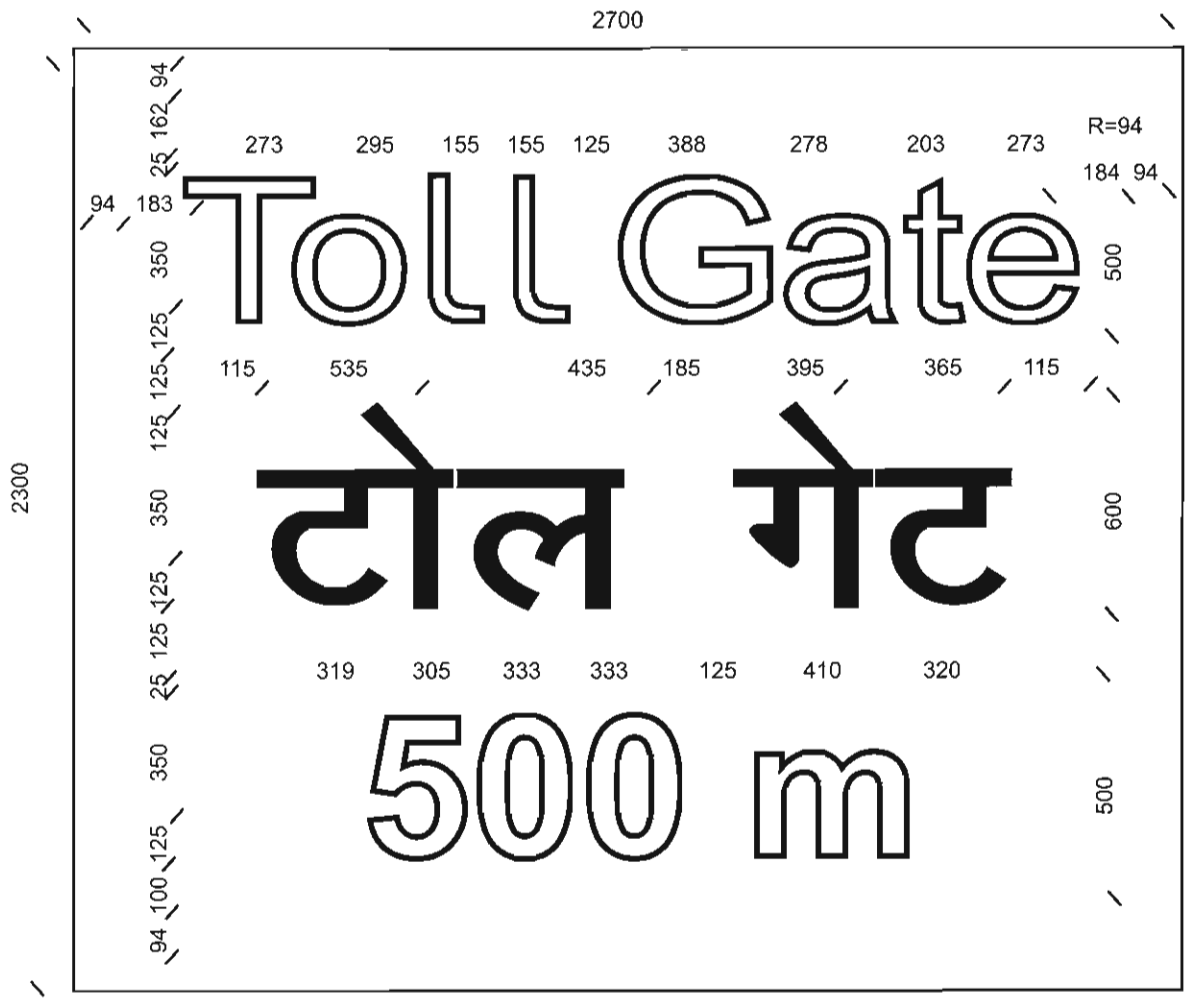
Note:
All dimensions are in mm.

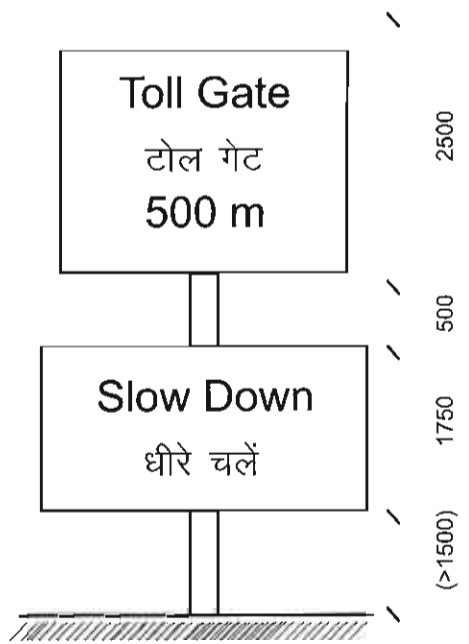
Fig. 10.4 : Overhead direction sign for toll road



Note:
All dimensions are in mm.

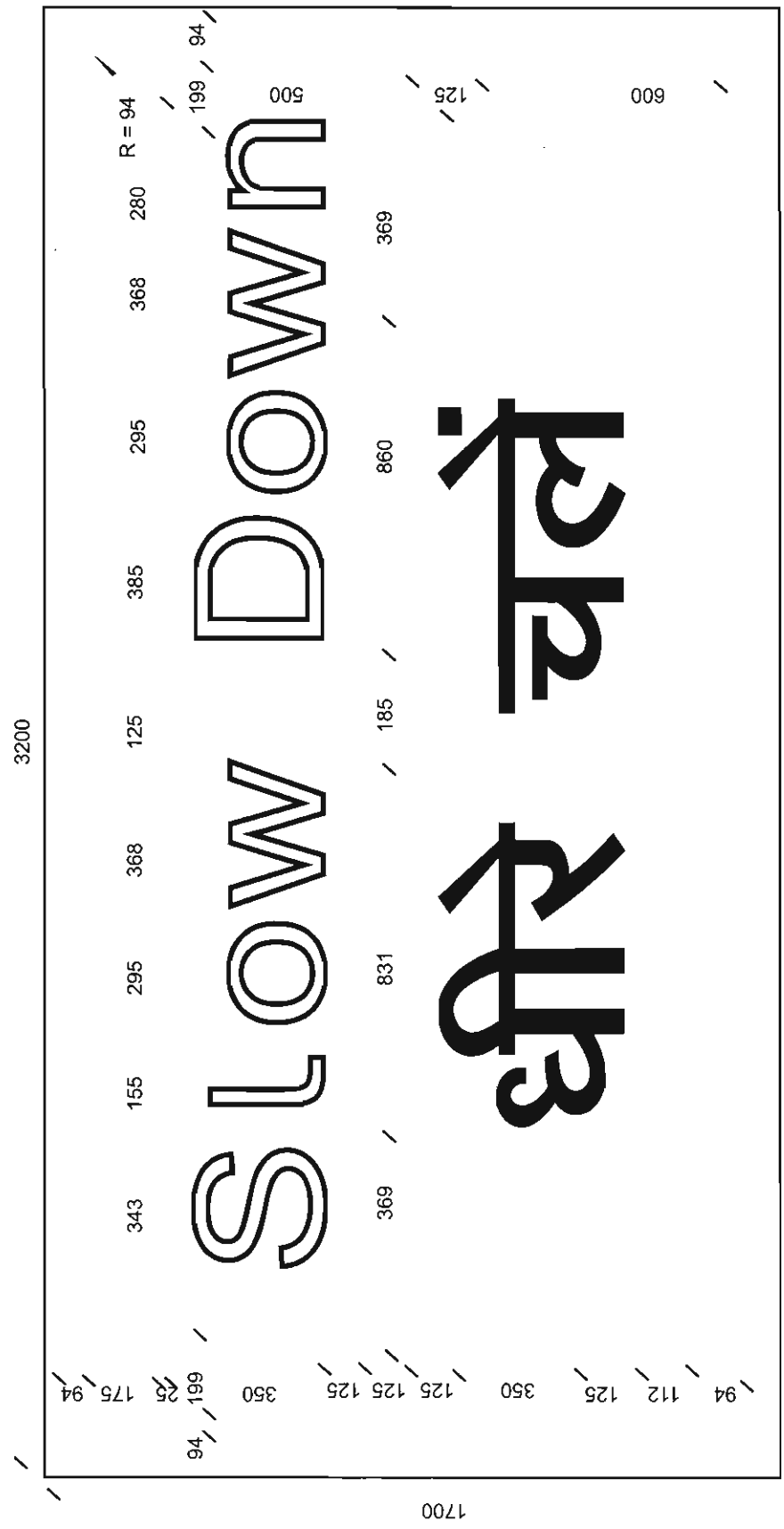
Fig. 10.5 : Overhead sign for toll gate





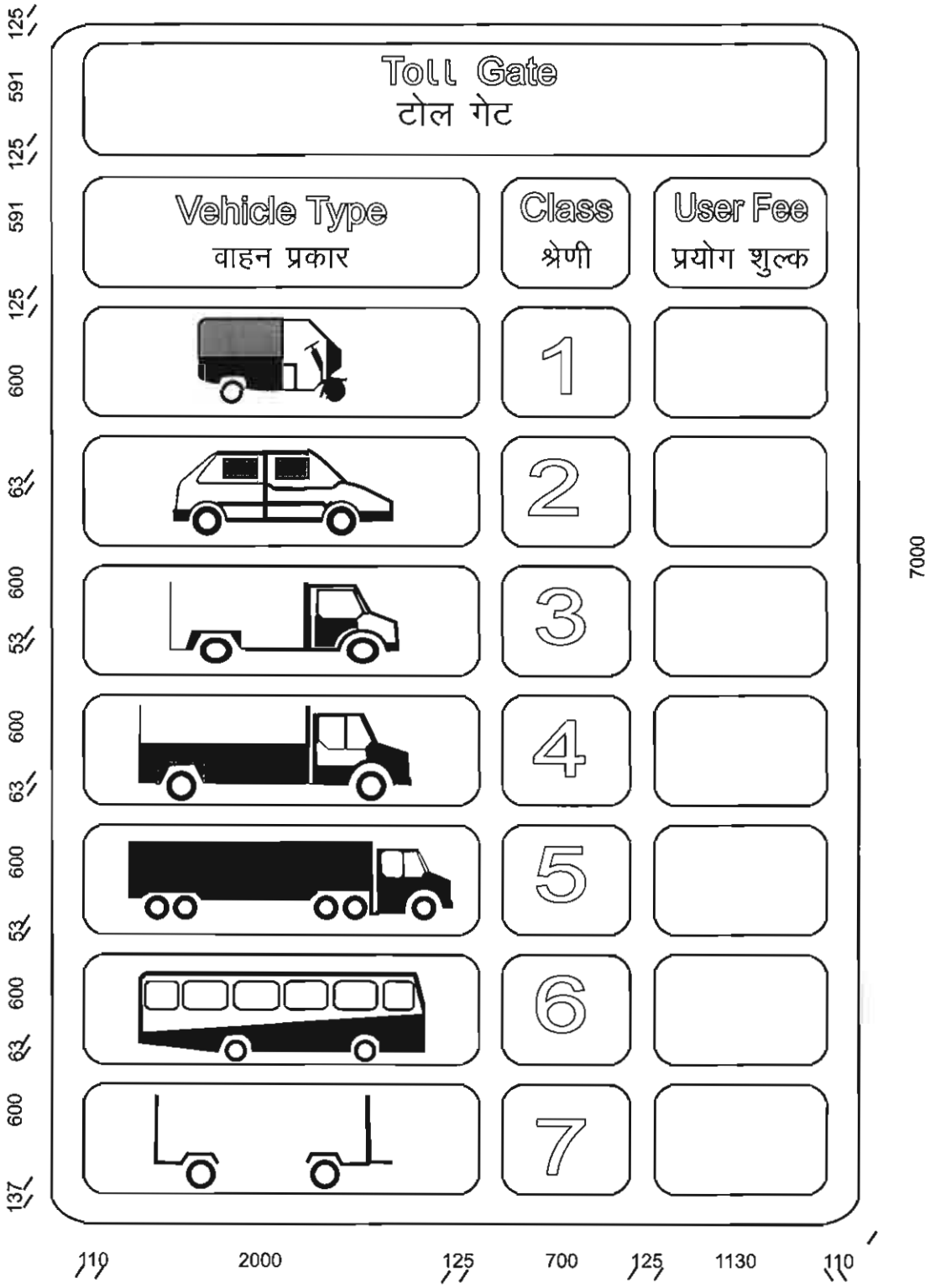
Note:
All dimensions are in mm.

Fig. 10.6 : Side mounted sign for toll gate (upper panel)



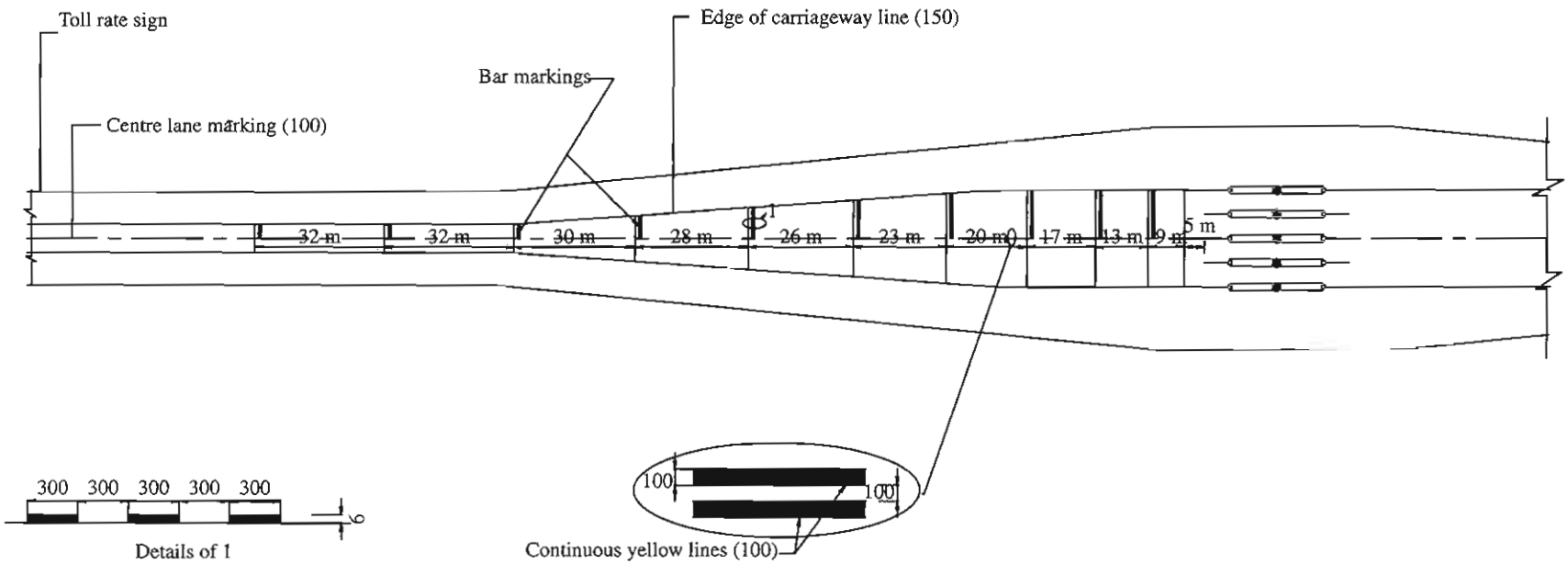
Note:
All dimensions are in mm.

Fig. 10.7 : Side mounted sign for toll gate (lower panel)



Note:
All dimensions are in mm.

Fig. 10.8 : Recommended sign layout for toll rates (side mounted)



Note:

1. Generally pavement marking shall be in accordance with IRC 35-1997.
2. All dimensions are in mm unless otherwise specified.

Fig. 10.9 : Pavement markings