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CODE OF PRACTICE FOR CONSTRUCTION AND MAINTENANCE OF ROAD GULLIES

(First Revision)

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INDIAN STANDARDS INSTITUTION
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CODE OF PRACTICE FOR CONSTRUCTION AND MAINTENANCE OF ROAD GULLIES

(First Revision)

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Indian Standard

CODE OF PRACTICE FOR CONSTRUCTION AND MAINTENANCE OF ROAD GULLIES

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 23 December 1985, after the draft finalized by the Water Supply and Sanitation Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Road gullies are commonly constructed in roads and pavements for drainage of surface water. This standard was first published in 1975 with a view to giving guidance on construction and maintenance of road gullies. Salient changes made in this revision are:

a) provision for providing curb inlet without gully chamber has been given. Figures for combination inlet gully have been given.

b) vertical gully gratings have been included.

c) criteria for arriving the minimum length of pipe for connecting gully chamber and the manhole for storm water drain have been included.

d) guidelines for selecting type of gully grating have been given.

e) precast RCC gully gratings system has been included.

0.3 For the purpose of deciding whether a particular requirement of this standard in complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This code of practice covers methods for construction, installation and maintenance of road gullies used in drainage works.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 **Drain** — A conduit or channel constructed to carry off, by gravity, liquids other than sewage or industrial wastes, including surplus underground, storm or surface water; it may be an open ditch, lined or unlined, or a buried pipe.

2.2 **Gutter** — The artificially surfaced and generally shallow, waterway provided at the margin of a highway for surface drainage.

2.3 **Curb** — The stone margin of a side walk.

3. CLASSIFICATION

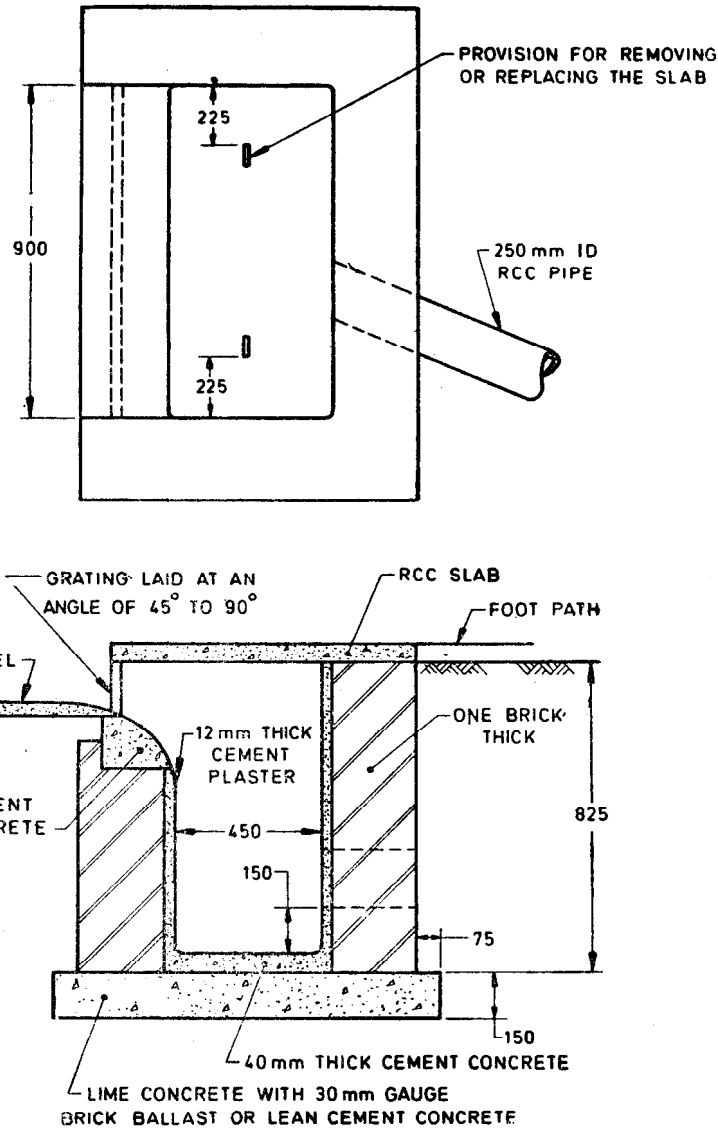
3.1 Storm water inlets used for carrying surface water to the underground conduit may be classified into three major groups as given in **3.1.1** to **3.1.3.**

3.1.1 *Curb Inlets* — A curb inlet has an opening in curb piece through which the gutter flow passes. This type of inlet offers little or no obstruction to the flow of traffic. They are comparatively less liable to clogging. These may be of two types as given in **3.1.1.1** and **3.1.1.2.**

3.1.1.1 *Curb inlets with gully chambers* — In this, the gutter flow first enters into the gully chambers and then through a pipe, it flows into the main storm sewer. A typical illustration of the same is shown in Fig. 1.

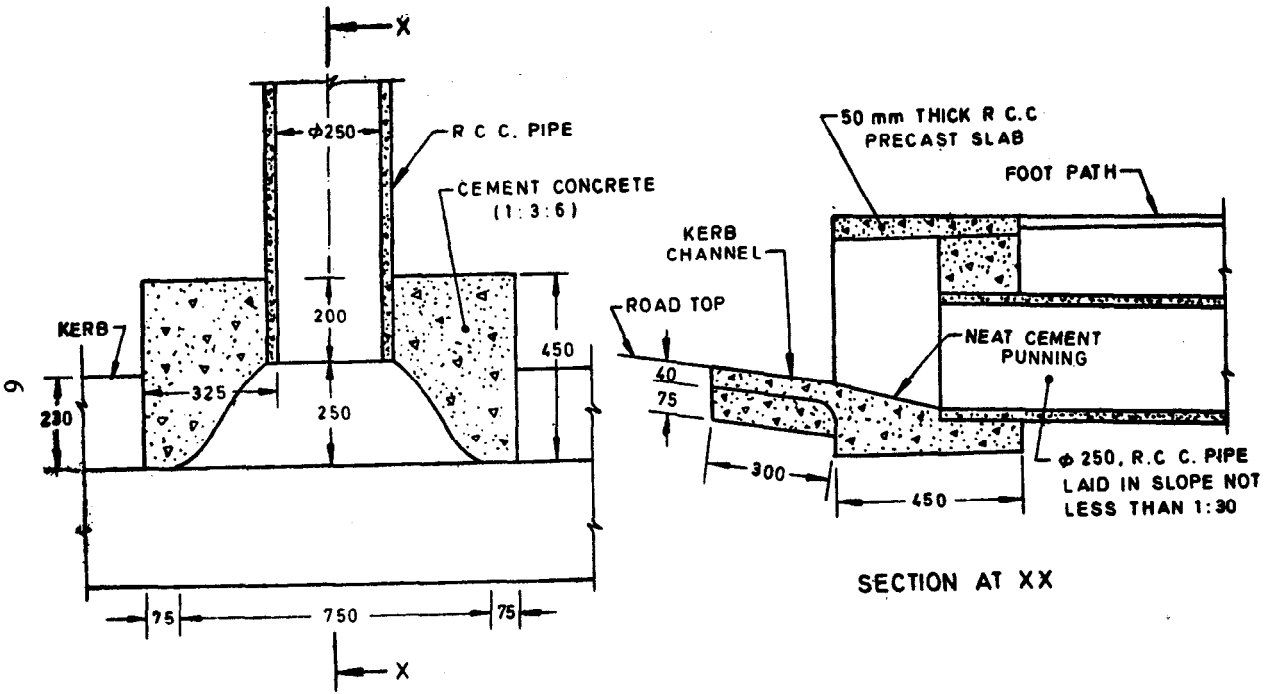
3.1.1.2 *Curb inlet without a gully chamber (bell mouth opening)* — Most often, it does not become conveniently possible to clean gully chambers, especially so in respect of those provided on roads passing through areas away from cities and thus it remains full of deposits. This defeats the very purpose of providing an efficient drainage system. In such situations a bell mouth opening can be provided with great advantage. In this, there is no gully chamber and the drainage pipe conducts gutter flow directly into the storm sewer. A typical illustration of bell mouth opening is shown in Fig. 2.

3.1.2 *Gutter Inlets* — A horizontal opening in the gutter covered by one or more grates through which the gutter flow passes, is called a gutter inlet. Grates with slots parallel to the curb are the least subject to clogging and provide the best inflow condition but they will admit also more rubbish



All dimensions in millimetres.

FIG. 1 DETAILS OF CURB INLET TYPE ROAD GULLY



All dimensions in millimetres.

FIG. 2 DETAILS OF BELL MOUTH OPENING

which may clog the drain. Further they offer obstruction to traffic. Gutter inlets with an opening perpendicular to the direction of flow are preferred. Though it clogs more quickly than the parallel bars but is better in respect of the convenience of the public and the non-clogging of the drains. The distance of opening between the bars is kept 25 mm. The cast iron frame is hinged at one of the shorter sides with openings of 25 mm. Cast iron gratings shall conform to IS : 5961-1970*. The gutter inlet may either have a single gully cover or a double one depending upon the quantity of flow. Typical cross-sections of the single and double gullies are shown in Fig. 4 and 5 respectively. Details of mosquito-proof cast-iron gully covers are given in Fig. 6. Wherever necessary, provision of water seal may be considered.

3.1.3 *Combination Inlets* — The curb and gutter inlets acting as a unit is known as combination inlet. Such road gully chamber shall be provided with horizontal as well as vertical gratings. A typical illustration is shown in Fig. 3.

4. LOCATION OF INLET

4.1 The inlets are so located that no water should flow across the streets or outside berms in order to reach the storm sewers. This requires that the inlet be placed on the corners at intersections and at sufficiently frequent intervals that the gutters are not overloaded (at each road crossing inlets are placed in each direction so as the flow is intercepted before it crosses the road). Further in case of long stretches of roads, these are placed at distance of 18 to 36 metres depending upon the grating of the road channel and the area to be drained. Typical plan and cross-sections showing the location of the inlets are shown in Fig. 7.

4.2 In the road cross sections curbs are provided either on one side or both sides depending on the width of the road. Further the road cross section is so designed that it slopes towards the road curbs. Sometimes in the initial stages the width of the road is kept less than the finally proposed and in such cases the road gullies may be located at the edge of the ultimate proposed width of the road curbs so as to avoid their being shifted at a later date. A typical plan showing the location of such a road gully is shown in Fig. 7.

5. CONSTRUCTION OF ROAD GULLIES

5.1 The gullies may be either of curb inlet or gutter inlet type according to the details in Fig. 1 to 5. The size of the chamber to be

*Specification for cast iron gratings for drainage purposes.

constructed varies with the type of the gullies to be constructed according to the details given in Fig. 1 to 5. The chambers are constructed with sides of brick masonry with one brick thick, and in the bottom 40 mm cement concrete (M 15) flooring is provided over 150 mm thick lime concrete or lean cement concrete. At the top CI grating is kept about 25 mm lower than the level of the road curbs so as to admit the storm inflow. The chamber is connected to the sewer by means of 150 mm/250 mm internal dia RCC pipe in case of single gullies and double gullies respectively. The length of this pipe in metre between the road gully chamber and the manhole of the storm drain shall not be less than 1/40 times the normal diameter of pipe in mm (that is, for 150 mm connection pipe, length shall not be less than $\frac{150}{40} = 3{\cdot}7$ m, and for 250 mm connection pipe, the length shall not be less than $\frac{250}{40} = 6{\cdot}25$ m). The invert of the outlet pipe is kept 150 mm above the bed of the chamber so as to act grit chamber as well and to minimize the chances of the sand entering the drain as also to act as cushion when it rains in torrent and thus avoid scouring of bed.

5.2 Double gullies are provided only in case of main roads having metalled width of 9 m and above, where the inflow to be intercepted is expected to be heavy and in rest of the case, generally single gullies are provided.

6. ROAD GULLY GRATING

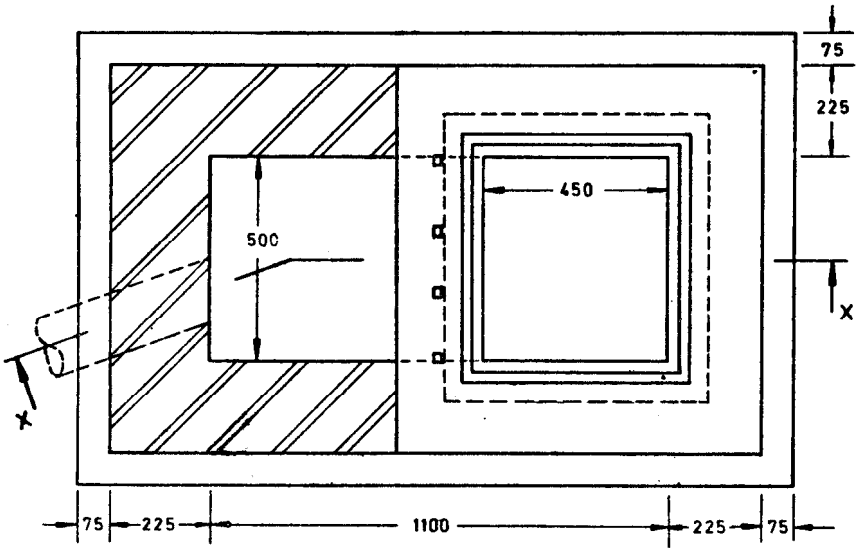
6.1 Generally cast iron gratings shall conform to IS : 5961-1970*. Alternately the gratings made with 16 mm dia mild steel bars welded to 40 × 6 mm mild steel flats/angles frame may be provided. RCC gully gratings may also be used. A typical illustration of RCC gully gratings is shown in Fig. 8.

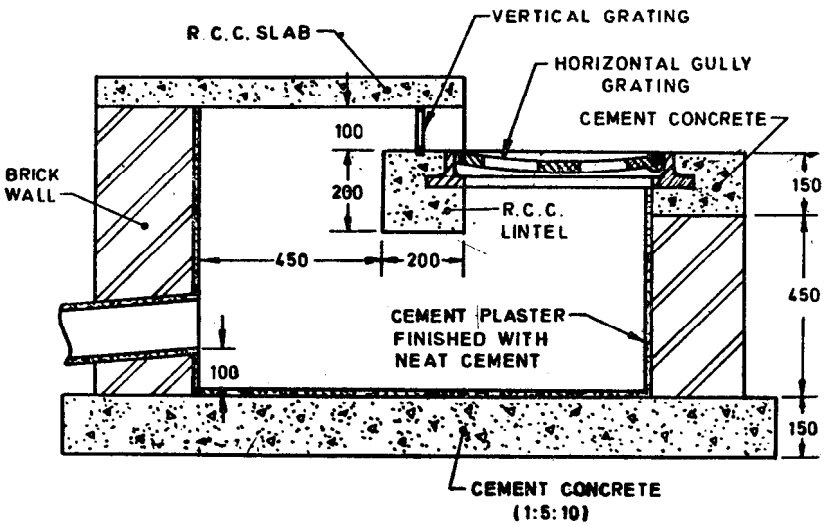
7. MAINTENANCE OF ROAD GULLIES

7.1 These inlets work only during the rainy season, and for the rest of the year these are mostly out of use. As such, regular preventive maintenance is essential. This preventive maintenance work relates to systematic and periodical inspection of the whole system. The main aim of maintenance is to keep the system clean and unobstructed.

7.2 The inlets and drains may get clogged due to sand, grit, organic matter, leaves and other road materials carried by rain or wind. These may also get clogged due to penetration of roots of nearby trees through some joint or crack.

*Specification for cast iron gratings for drainage purposes.

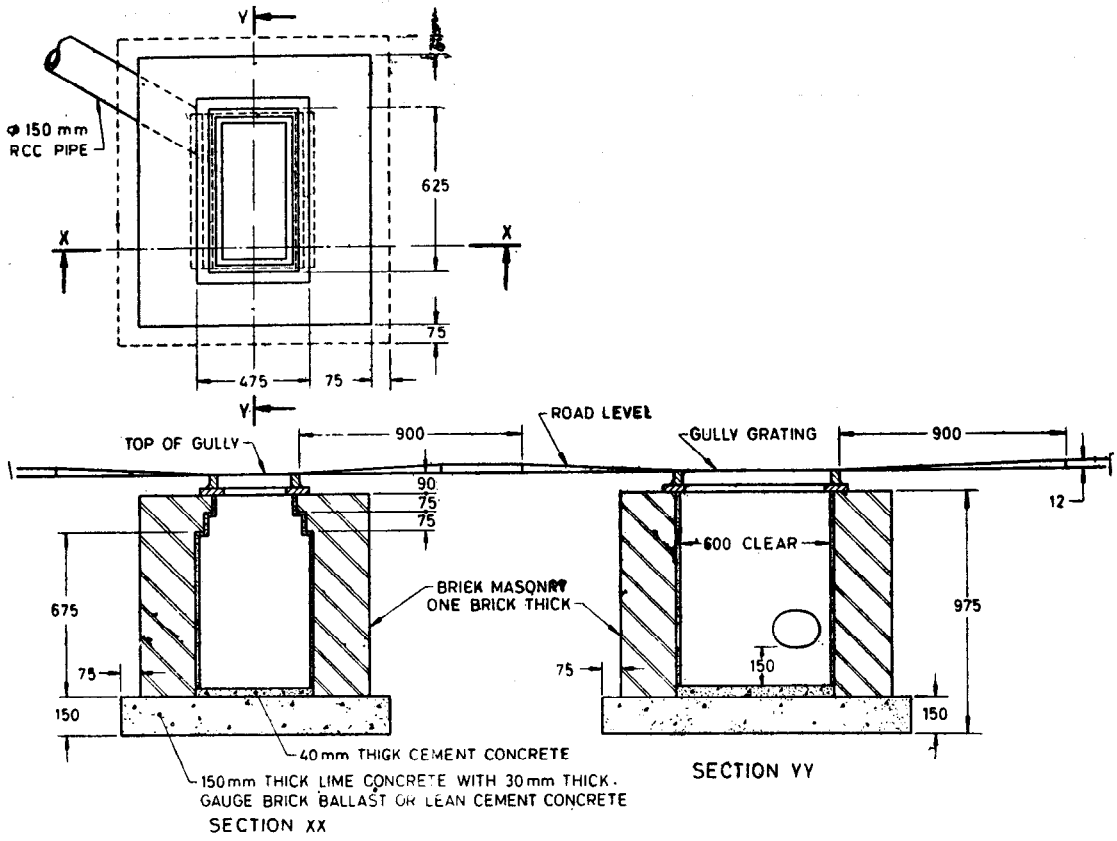




SECTION AT XX

All dimensions in millimetres.

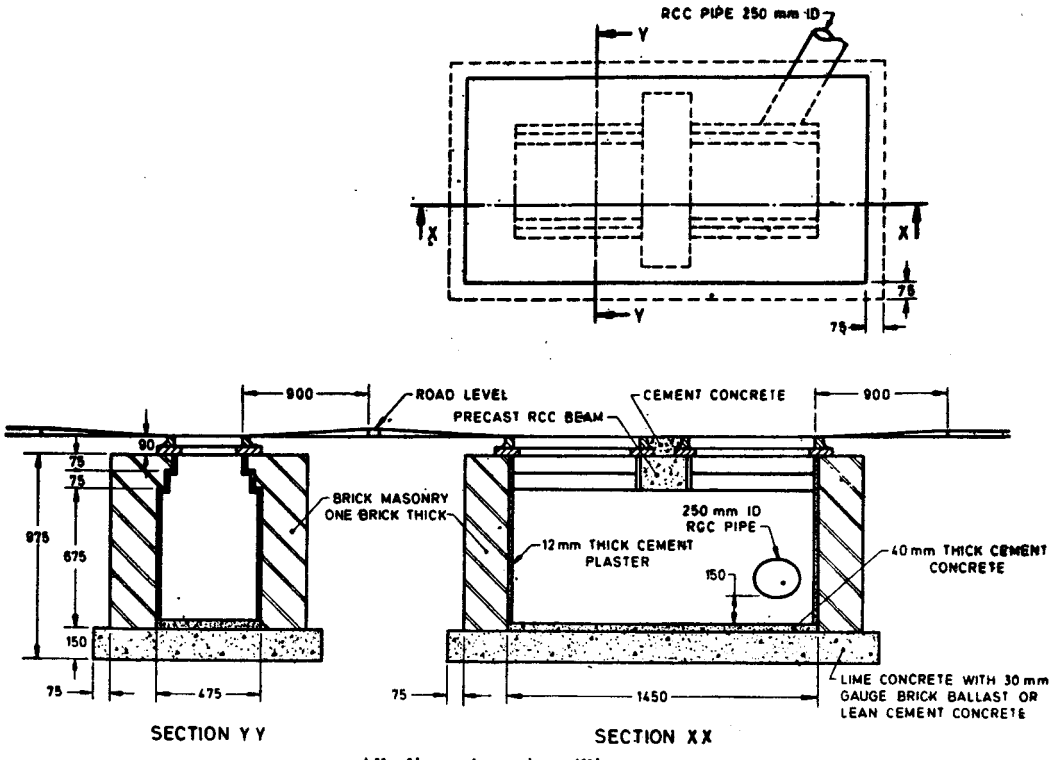
FIG. 3 DETAILS OF COMBINATION INLET TYPE ROAD GULLY WITH HORIZONTAL AND VERTICAL GRATING



All dimensions in millimetres.

NOTE — Top level of the gully grating should be about 25 mm below the channel level of curb and channel drain.

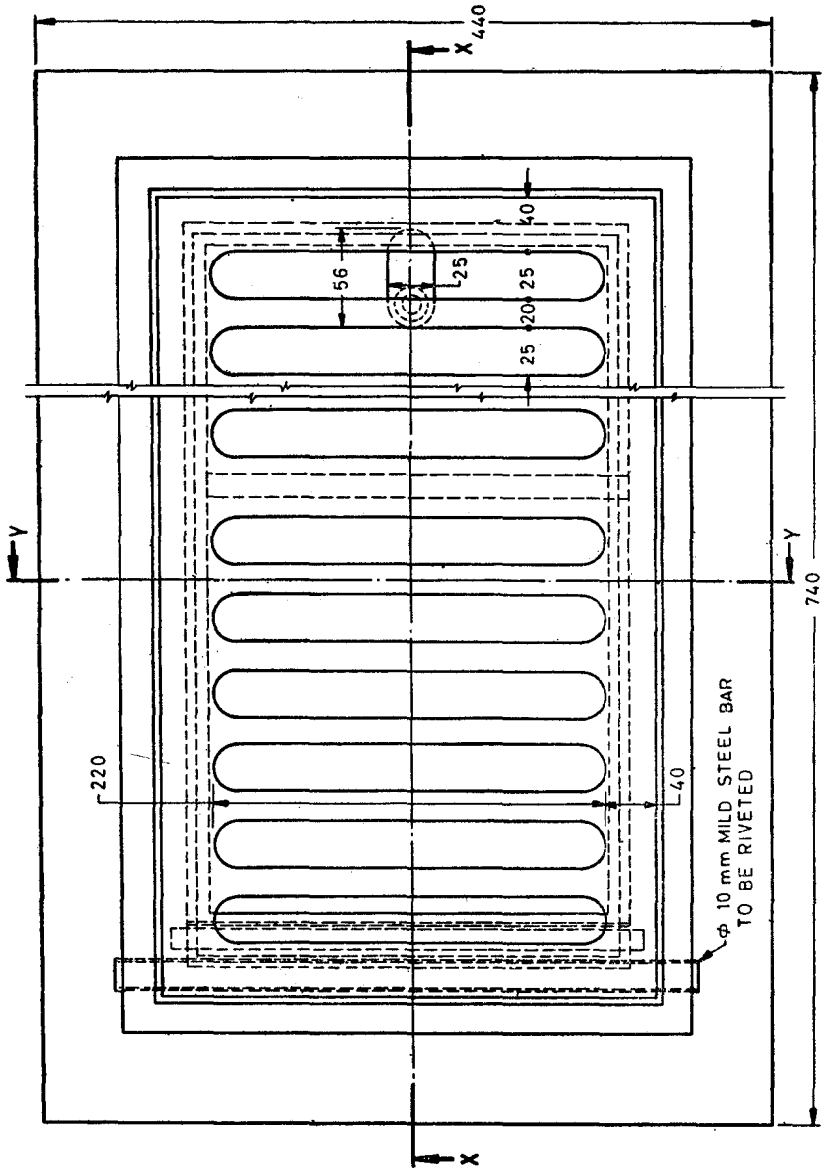
FIG. 4 DETAILS OF SINGLE GULLY CHAMBER WITH CI GRATING

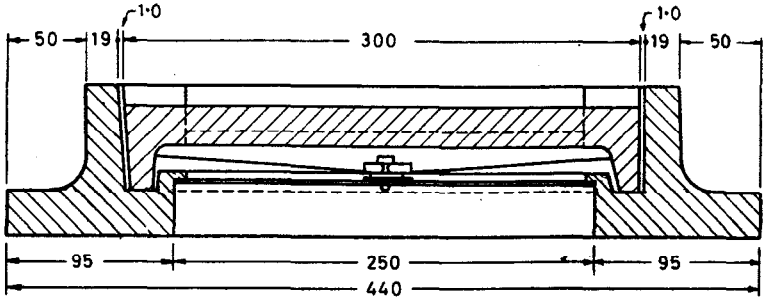


All dimensions in millimetres.

NOTE —Top level of the gully grating should be about 25 mm below the channel level of curb and channel drain.

FIG. 5 DETAILS OF DOUBLE GULLY CHAMBER WITH GRATING


440
X
40
56
25
25
25
20
25
Y
Y
740
220
40
10 mm MILD STEEL BAR
TO BE RIVETED
X



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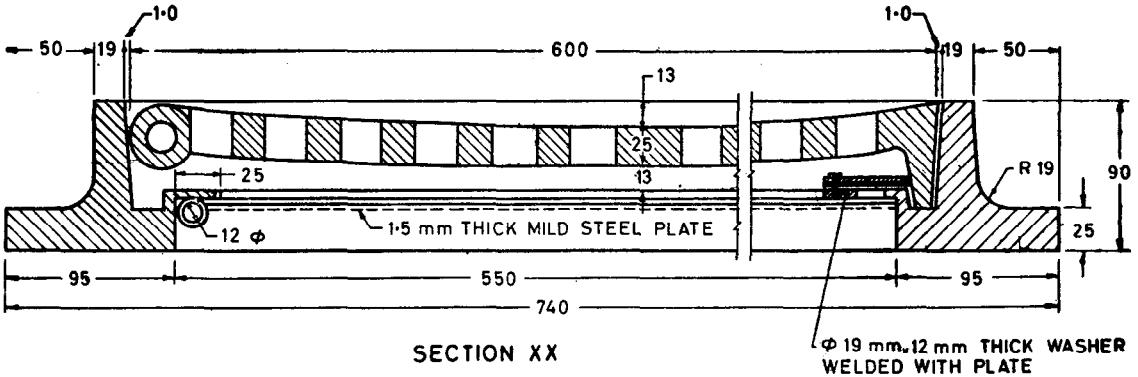


SECTION XX

NOTE — All dimensions are approximate.
All dimensions in millimetres.

FIG. 6 TYPICAL DESIGN OF MOSQUITO PROOF GULLY GRATING (CAST IRON)

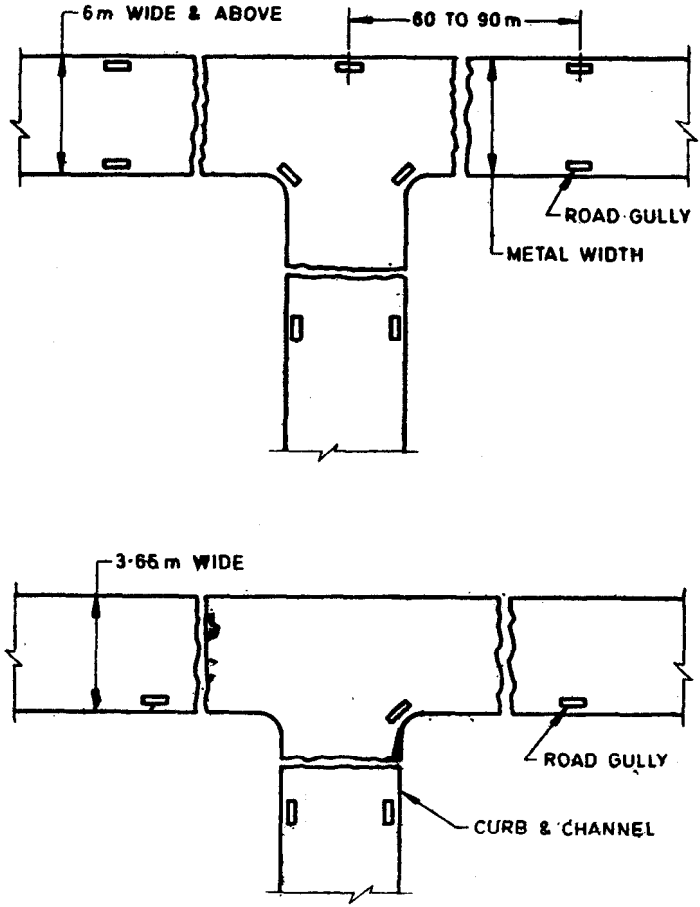
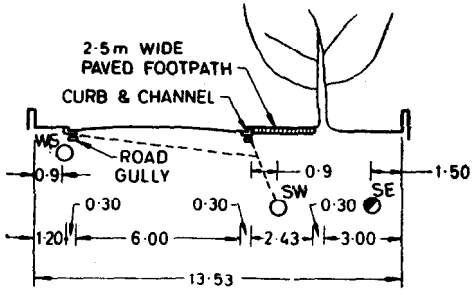
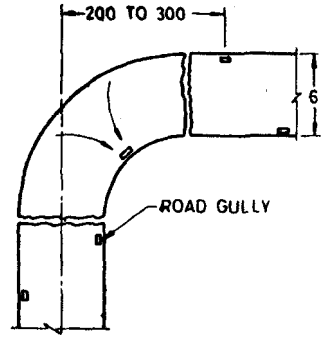


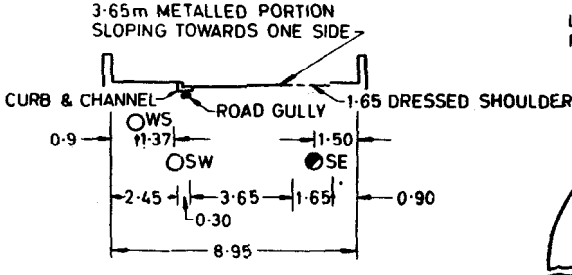
FIG. 7 LAYOUT OF ROAD GULLIES AT JUNCTIONS (*Continued*)



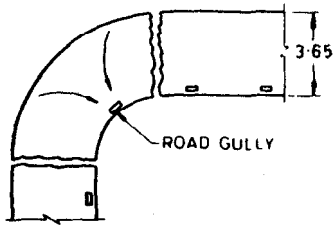
TYPICAL CROSS SECTION OF 6·00m WIDE ROAD



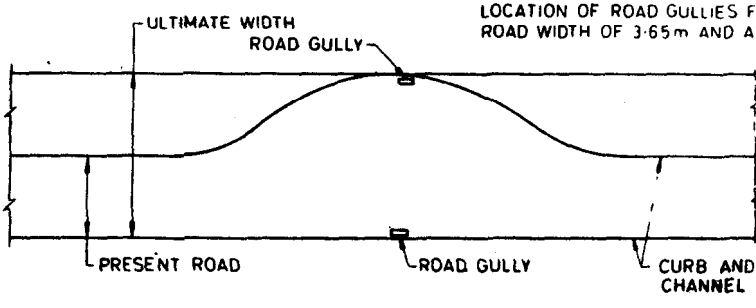
LOCATION OF ROAD GULLIES FOR ROAD WIDTH OF 6m AND ABOVE



TYPICAL CROSS SECTION OF 3·65m WIDE ROAD



LOCATION OF ROAD GULLIES FOR ROAD WIDTH OF 3·65m AND ABOVE

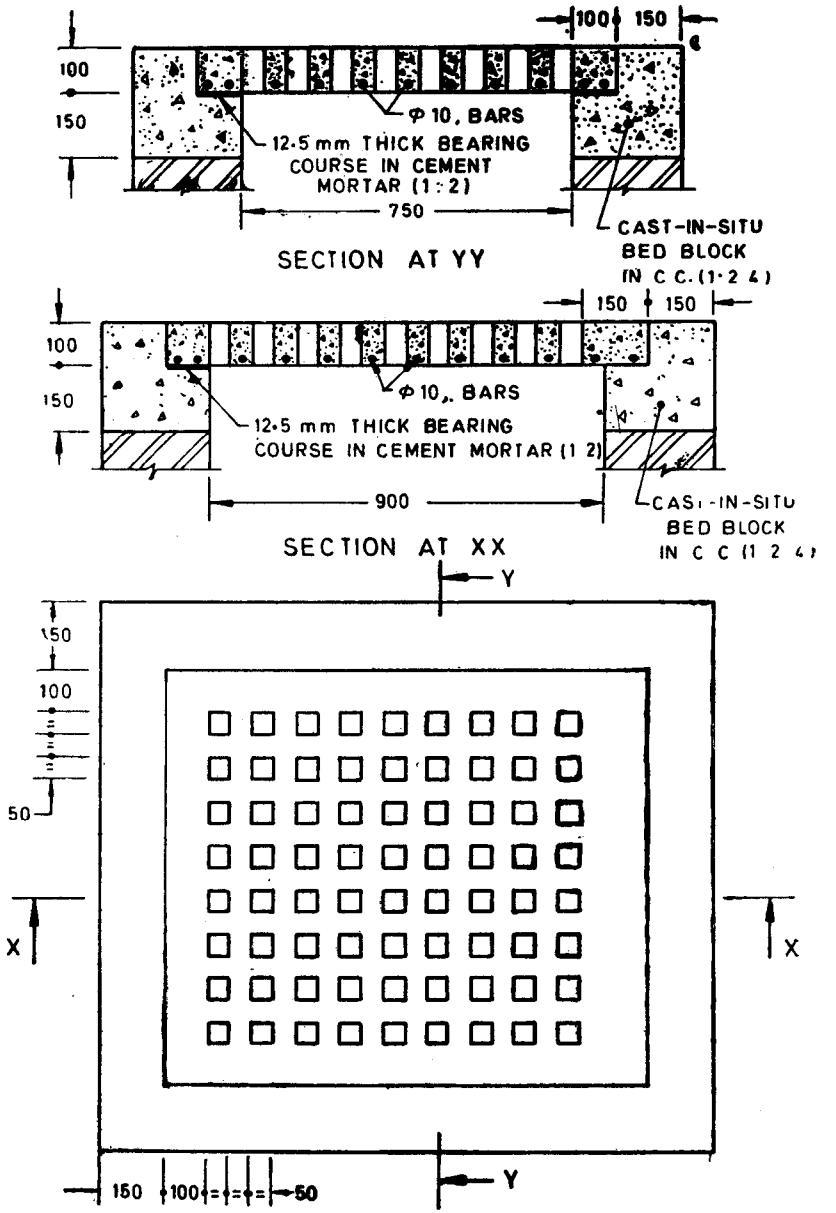


PLAN OF ROAD SHOWING ROAD GULLY FOR ULTIMATE ROAD WIDTH

WS = water supply pipe line
SW = storm water pipe line
SE = sewer pipe line

All dimensions in metres.

FIG. 7 TYPICAL ROAD CROSS-SECTIONS SHOWING LOCATION OF GULLIES



1. Clear cover under reinforcement shall be 20 mm.
2. The slab covers shall cast in R.C.C. 1 : 1 : 2

All dimensions in millimetres.

FIG. 8 TYPICAL DESIGN OF R.C.C GULLY GRATING

7.3 Well before the start of rainy season, it is essential to open the covers of all the street inlets and clean them thoroughly of any obstructing material manually. The mosquito proof flaps should be lowered so that water may flow through the inlets into the drains. The gully gratings should be checked to ensure that all bars are intact, and will not allow any materials of excessive size. In case any bars are broken, these should be either repaired or the gully gratings replaced. Where possible, these gully gratings should be flushed before the start of rainy season, with a water connection, obtained from the nearest hydrant. During the rains it should be ensured that the strom flow is passing properly through the inlets, and that there is no clogging of any particular inlet. Wherever any such clogging is noticed, it should be cleared immediately. During the rains it should be ensured that each inlet is opened, checked and cleaned of all deposits at least once a month. After the rains are over, the inlet should again be checked and cleaned of all deposits. The gully gratings and the bottom flap should be painted with anti-corrosive paint. After the paint is dried up, the bottom flap should be closed, so as to make the inlets mosquito proof.

(*Continued from page* 2)

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