PMC SPEEDBREAKER GUIDELINES FOR PUNE

CONTENTS

FIGURE FOR REFERENCE

1.0. INTRODUCTION:-

Improving Road safety and ensuring reduction in road accidents is a matter of top concern for all engineers in PMC. Speed breakers is one the most important safety measure. Speed breakers are being installed by concerned engineers in PMC without complying with standards. There is lack of clarity about speed breaker standards hence PMC road department has prepared a simple guideline / toolkit for installing speed breakers. The guidelines regarding the locations, geometric design, type of speed breaker to be constructed have been provided in revised version of IRC:99-2018 under the section of "Traffic Calming Measures" which have been adopted along with standard operating procedure to be followed for installing speed breakers on urban roads.

In the year 2016 The Speed breaker Committee was formed under the chairmanship of Additional Municipal Commissioner (Spl) in order to make improvements and standardization in the construction of speed breakers. The speed breaker committee comprised of experts and activists working in Urban Transport sector. Speed Breaker Guideline was presented to this committee on 24th Jan 22 and was accepted by them being a technical document prepared in accordance with IRC guidelines. All the road engineers and ward officers are hereby requested to study this guideline and follow the process mentioned in the SOP in order to have a standard design and implementation for speed breakers.

2.0. CATEGORIES OF ROADS IN URBAN AREAS :-

Roads in the city are divided into following categories :-

A) Arterial roads & Sub Arterial / major roads / Mobility corridor (W > 24 m)

-CATEGORY 1

B) Collector roads / Feeder roads / Minor roads (W 12-24 m)

- CATEGORY 2

C) Local roads /Residential roads / neighborhood roads (W up to 12 m)

- CATEGORY 3

D) High Pedestrian Activity Zones (HPZ) – These are the zones where there is large pedestrian activity observed. Places where there are Schools, Hospitals, commercial establishments, transit stations etc. It can be present in any of the above 3 categories of roads. Types of Speed Breakers in IRC

a) Speed Bumps

b) Speed Breaker / Hump (2 types circular & trapezoidal speed hump)

c) Speed Table / Raised Pedestrian Crossing (RPC)

d) Raised Junctions

3.0. MID BLOCK CROSSING RECOMMENDATIONS

- Mid-block crossing should be provided between intersections with spacing as given in IRC:103-2012
- Raised crossing or table top crossing are recommended at mid-block crossing. The level of the raised crossing should match with the height of the footpath (as per USDG guidelines clause 4.1.4 pg 17).
- Crossing should have proper signage and illumination. Reflective paint markings, cats eye, bollards to be used for high visibility.

Table 3 Standards for Mid-Block Pedestrian Crossing

• Residential Areas	• Spacing Range: Every 80–250 m • Coordinated with entry points of complexes; location of bus/ train stops, public facilities, etc.
• Commercial/ Mixed Use Areas	• Spacing Range: Every 80–150 m
• High Intensity Commercial Areas	• Pedestrianization if possible.

4.0. TYPES OF SPEED BREAKERS

CATEGORY 1	Bump	Hump		RPC
Width > 24 m		Circular	Trapezoidal	
Junction	-	-	-	-
Mid block	-	yes	-	yes (HPZ)

CATEGORY 2	Bump	Hump		RPC
Width = 12-24 m		Circular	Trapezoidal	
Junction	-	Yes	-	-
Mid block	yes (HPZ)	yes	-	yes (HPZ)

CATEGORY 3	Bump	Hump		RPC
Width < 12 m		Circular	Trapezoidal	
Junction	yes (HPZ)	-	-	Raised Junction
Mid block	Yes (for width <9.0 m)	Yes	Yes	yes (HPZ)

5.0. SPEED BUMPS

- Speed bumps are precast circular profile bumps made of plastic or rubber material.
- These are available in modular pieces which are nailed to the road surface.
- Speed bumps can get damaged and dislocated in case of heavy traffic movements & hence not used on major roads.
- Speed bumps can be used on Local /neighborhood /residential roads. (having 9.0 m width & below)
- Speed bump proposed dimensions :-
- Width = 300 mm ,height = 75 mm

Some Photos of Speed Bumps – Local Streets

Figure 1: road bump on narrow residential sreet

Figure 2:road bump in indian market street

Figure 3: road bump in residential street

6.0. TYPES OF SPEED HUMPS

Speed breakers are commonly used to reduce the speed & maintain efficient traffic flow by reducing speed differences among the road users.

The degree of the effect of hump in terms of speed reduction depends upon the profile , height , gradient, length and the material used in design.

Further we will discuss regarding:

Circular hump and trapezoidal hump

6.1 CIRCULAR HUMP

The profile of circular shaped hump is based on the shape of a circular arc with a varying radius and a chord length. Circular shaped humps with rises less than assumed 10 cm will result in higher speeds than those mentioned. Rises that are higher than 10 cm may cause damage to vehicles. For roads with bus traffic, the table indicates the speeds at which buses can reasonably pass the individual humps. Fig. 3.1 of IRC 99-2018 gives the geometrical details of circular Hump.

Material – can be constructed in bitumen material due to easy maintenance

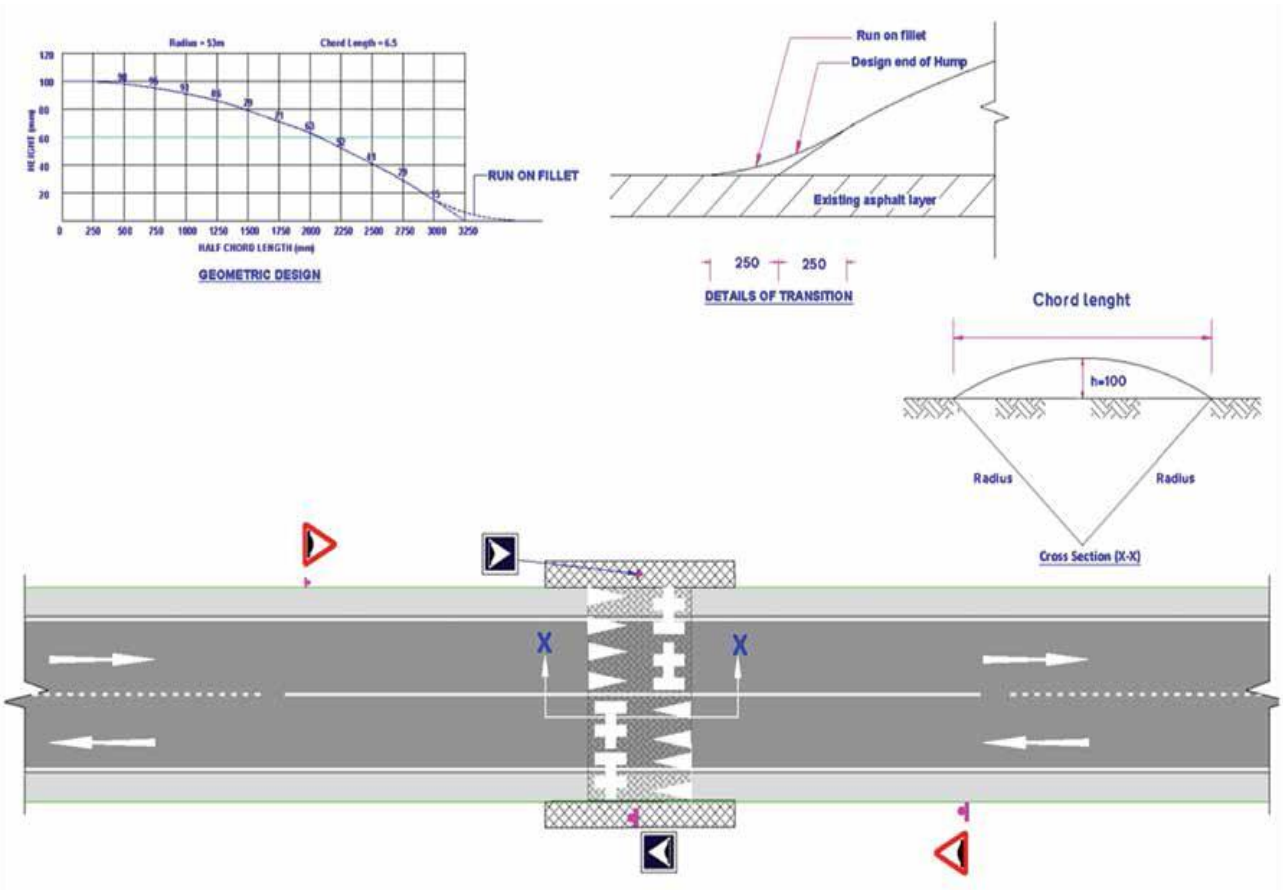

Figure 4: geometric details of circular road hump IRC 99-2018

6.2 TRAPEZOIDAL HUMPS

A hump, which constitutes 100 mm raised, flat section of a carriageway with ramps on both sides is called a trapezoidal hump. If designed correctly, the discomfort is moderate for cars, whereas Lorries and buses must pass very slowly. Fig. 3.2 of IRC 99-2018 gives geometric details of trapezoidal hump.

Material to be used – raised platform using 100 mm blocks & ramps can be constructed in bitumen material due to easy maintenance

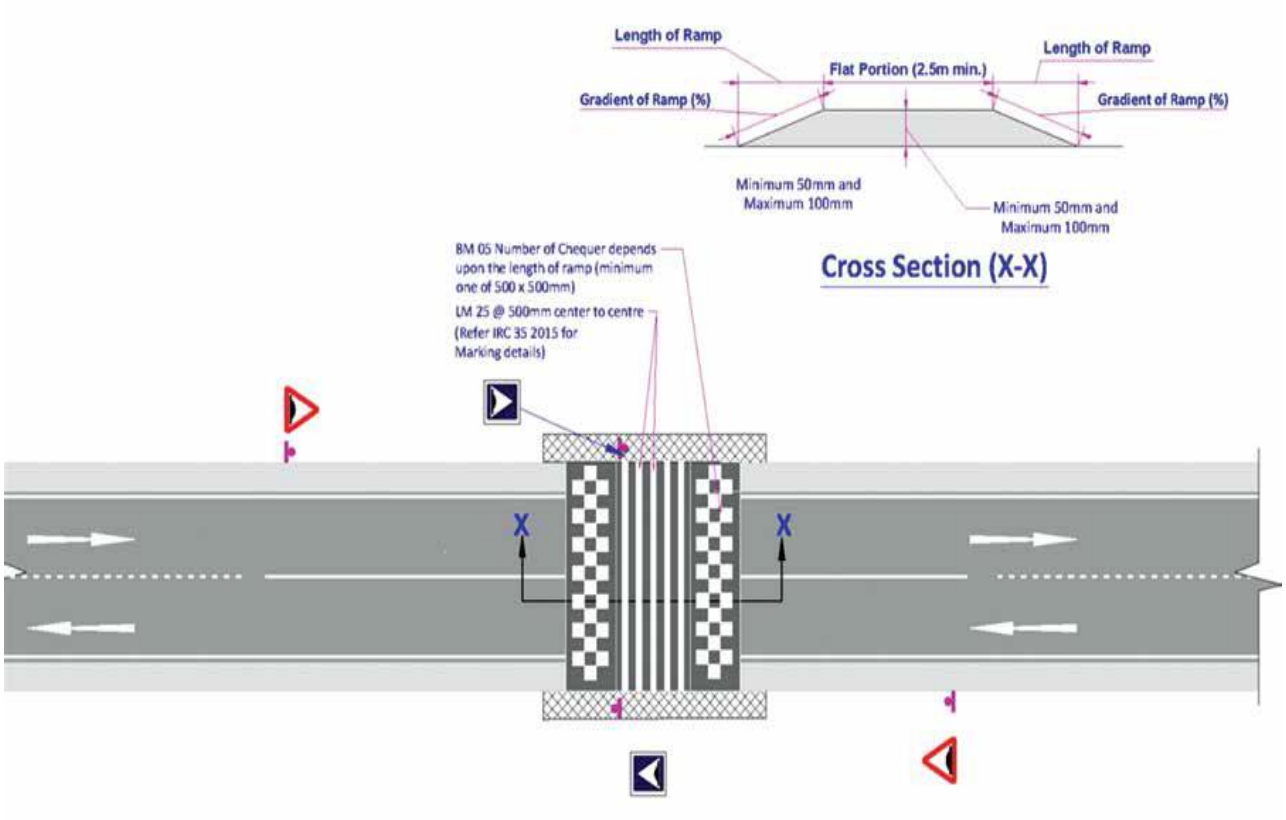

Figure 5: geometric details of trapezoidal road hump IRC 99-2018

For pune city desired Speed of 30 Kmph to be considered for Major roads and 25 kmph for minor roads and accordingly referring to Table no. 3.1 & 3.2, IRC 99-2018 Circular Hump or Trapezoidal Hump to be selected.

Proposing for PMC limits Desired Speed considering Major road above 24 m width & minor road 12-24 m width.

For Circular Hump (Rise= 10cm) Table 3.1				
Road Type	**Desired speed**	**Radius**	**Chord Length**	**Bus Speed during passage**
Arterial/Majorroad (width 24.0 m & above)	30 kmph	20 m	4.0 m	15 km/hr
Collector roads/Minor roads (width 12-24.0 m)	25 kmph	15 m	3.5 m	10 km/hr

For Trapezoidal Hump (Rise= 10cm) Table 3.2				
Road Type	**Desired speed**	**Length of Ramp**	**Gradient**	**Bus Speed during passage**
Arterial/Majorroad (width 24.0 m & above)	30 kmph	1.0m	10.0%	10 km/hr
Collector roads/Minor roads (width 12-24.0 m)	25 kmph	0.8 m	12.5%	5 km/hr

6.3 SPEED TABLE / RAISED PEDESTRIAN CROSSING

- This comprises of a platform which raises the carriageway and has ramps on both sides for vehicles.
- This type is used in conjunction with mid-block pedestrian crossing, and can be done where footpaths are available on both sides.
- This serves dual purpose as speed breaker to reduce speed and as universally accessible pedestrian crossing.
- Dimensions of Raised pedestrian crossing

a) Width of platform – 5000 mm (as per IRC 99 2018 fig 3.6) to accommodate wheel base for heavy vehicles (proposing minimum 3000mm)

b) Height of platform - height should match with footpath, maximum 150 mm

c) Ramp length – 1700 mm as per IRC 99-2018

Material to be used – raised platform using 100 mm blocks & ramps can be constructed in bitumen material due to easy maintenance.

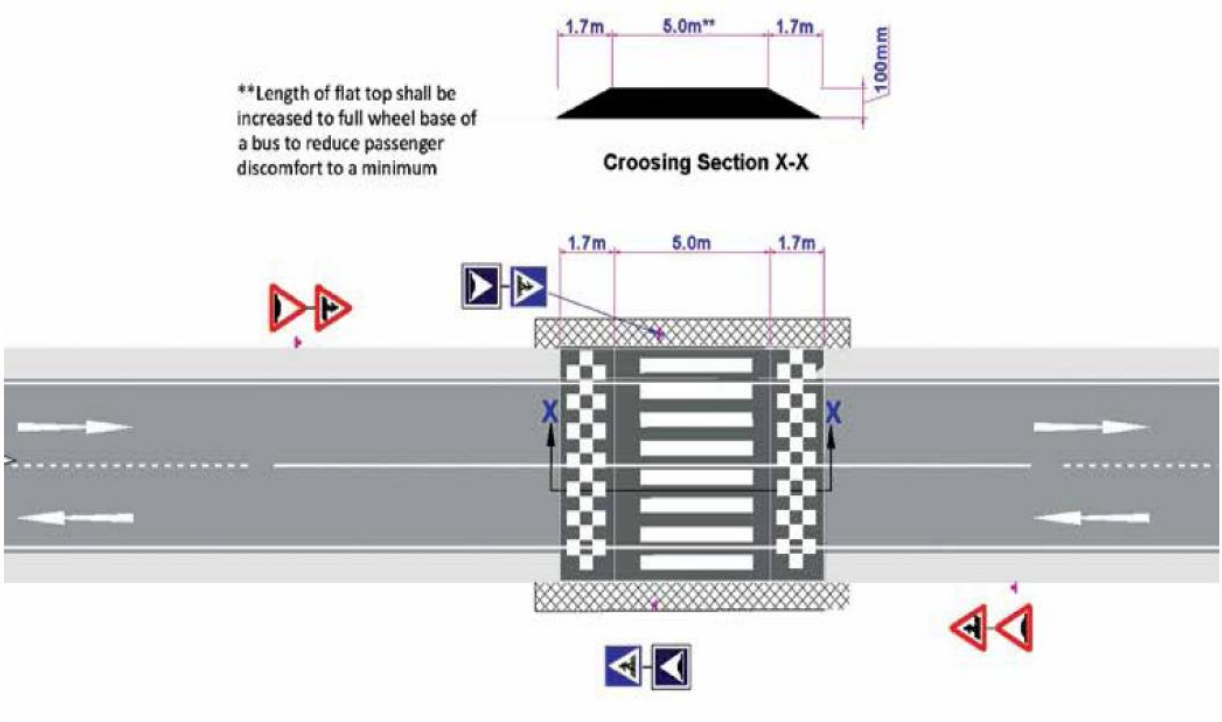

Figure 6: geometric details for speed table/raised pedestrian crossing IRC 99-2018

7.0. THE FOLLOWING ARE THE BASIC REQUIREMENTS FOR ANY TYPE OF SPEEDBREAKER-

1. Speed Hump should be as per IRC 99-2018.

2. Any type of Speed Breaker should be constructed for full width of the carriage way.

3. Retro reflective paint markings to be provided for speed breaker as per IRC 35- 2015

4. Retro reflective cautionary sign board “Stop Sign”, “Speed Limit Board” and “Speed Breaker Ahead” to be fixed at a distance of 40 m in advance of the speed breaker location (as Per IRC -67).

5. Cat’s eye to be fixed along the full length of speed breaker on both sides to demarcate its boundary for clear visibility to the vehicle driver.

6. There should be min 100m distance between two speed breakers as per IRC 99-1988

7. (1^{st} warning –set 1)

A set of 6 nos yellow transverse bars 200mm wide & 600mm apart (Thermoplastic Rumbler strips) 5 mm height to be provided 50 m advance of the speed breaker location as a 1^{st} warning to the vehicle driver. No of sets can be increased based on intensity of the case.

8. (2^{nd} warning –set 2)

A set of 6 nos yellow transverse bars 300mm wide & 1000mm apart (Thermoplastic Rumbler strips) 15 mm height along with road blinkers to be provided10- 20 m advance of the speed breaker location as a 2^{nd} warning to the vehicle driver to reduce the speed immediately.

9. At the location of speed breaker there should be sufficient streetlights available. Roads above 18m to have dividers. Refuge Island to be provided in median and RPC at midblock

10. Provision to be made to avoid water logging near the speed Breaker location.

11. Routine/periodical painting of speed humps, zebra crossing to be done properly. (3 months / 6 months / 9 months depending upon the traffic conditions and type of roads.

7.0 SCHEMATIC DIAGRAM SHOWING BASIC REQUIREMENTS FOR ALL SPEED BREAKERS

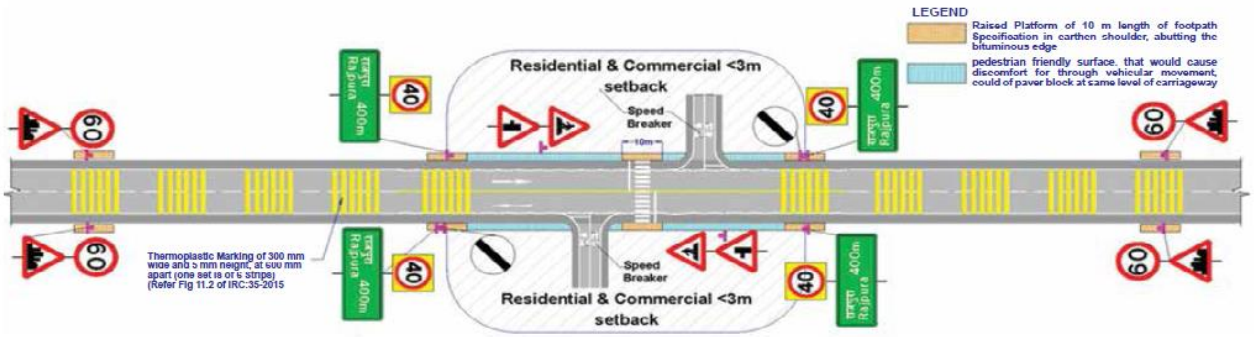

Figure 7:speed breaker diagram (residential & commercial)

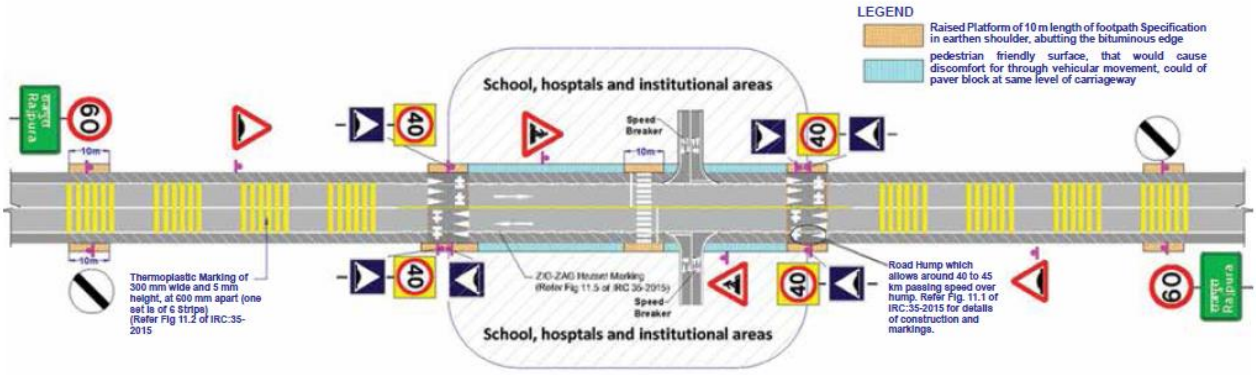

Figure 8: speed breaker diagram(school,hospital & institutional areas)

8.0 TYPES OF SPEED BREAKERS AS PER CATEGORY OF ROAD & SITE CONDITION

Case No.	Junction /Mid block	Category of Road	Type of Speed Breaker	Transverse Bars / Rumble Strips, Cats eye blinkers, signage posts, paint markings	Other
१	Intersection / Junction (Non-Signalized)	Arterial Road	Circular / Trapezoidal hump 10-20 m Before Zebra crossing for Non-signalized junctions for HPZ	• Zebra crossings on all arms. • Min 2 Sets of Transverse Bars 10-20 m Before Zebra crossing • Cats eye and Retro reflective thermoplastic paint markings • Signage posts	Signal Street lights Refuge island at Medians
२	Mid Block	Arterial Road	Circular /Trapezoidal hump in absence of footpath		Raised Pedestrian Crossing in presence of footpath
३	Intersection / Junction (Non-Signalized)	Collector Road	Circular / Trapezoidal hump 10-20 m Before Zebra crossing for Non-signalized junctions	• Zebra crossings on all arms. • Min 2 Sets of Transverse Bars 10-20 m Before Zebra crossing • Cats eye and Retro reflective thermoplastic paint markings • Signage posts	Signals Round abouts Street lights Refuge island at Medians
४	Mid Block	Collector Road	Circular /Trapezoidal hump in absence of footpath		Raised Pedestrian Crossing in presence of footpath
५	Intersection / Junction (Non-signalized)	Local Road	Speed Bump 5M before junction	• Min 1 Set of Transverse Bars 10-20 m Before stop line / junction edge • Cats eye and Retro reflective thermoplastic paint markings • Signage posts	Entire Raised Junction for High pedestrian zone
६	Mid Block	Local Road	Speed Bump		Raised crossing or Circular /Trapezoidal hump in presence of footpath

NOTE :- Speed breakers should not be constructed at Signalized Junctions

Application Form

1. Name of the Applicant
2. Location of speed breaker (area, name of road , land mark)
3. Photos of the suggested location.
4. Reason for making the application

9.0 SCRUTINY FORM (ROAD WIDTH >24 M)

1..	Prabhag No.		
2.	Name of the road		
3.	Width of the road		
4..	Name of the Applicant & date of Application		
5.	Adjoining Land Use		
6.	Necessity of the Speed Breaker		
7..	Divider present Yes/No	Roads above 18m to have dividers. Refuge island to be provided in median and RPC at midblock	
8.	Footpath on road Yes/No		
9.	Existing speed breaker (yes / no).		
10	Streetlights availability Yes/No		
11	Latitude		
12	Longitude		
13	Distance from the nearest Junction		
14.	NOC from traffic division Yes/No Outward No. Date		
15.	Opinion of road department (yes / no)		
16	Speed breaker location (Junction / Midblock)		
17	Speed breaker type (Bump / C or T Hump / RPC)		
18	Miscellaneous points		

Junior Engineer Pune Municipal Corporation	Deputy Engineer Pune Municipal Corporation	Executive Engineer Pune Municipal Corporation

10.0 SCRUTINY FORM (ROAD WIDTH 12- 24 M)

1..	Prabhag No.		
2.	Name of the road		
3.	Width of the road		
4..	Name of the Applicant & date of Application		
5.	Adjoining Land Use		
6.	Necessity of the Speed Breaker		
7..	Divider present Yes/No	Roads above 18m to have dividers. Refuge island to be provided in median and RPC at midblocks	
8.	Footpath on road Yes/No		
9.	Existing speed breaker (yes / no).		
10	Streetlights availability Yes/No		
11	Latitude		
12	Longitude		
13	Distance from the nearest Junction		
14.	NOC from traffic division Yes/No Outward No. Date		
15.	Opinion of road department (yes / no)		
16	Speed breaker location (Junction / Midblock)		
17	Speed breaker type (Bump / C or T Hump / RPC)		
18	Miscellaneous points		

Junior Engineer	Deputy Engineer	Executive Engineer
Pune Municipal Corporation	Pune Municipal Corporation	Pune Municipal Corporation

11.0 SCRUTINY FORM (ROAD WIDTH UPTO 12.0 M)

1..	Prabhag No.	
2.	Name of the road	
3.	Width of the road	
4..	Name of the Applicant & date of Application	
5.	Adjoining Land Use	
6.	Necessity of the Speed Breaker	
7.	Existing speed breaker (yes / no).	
8	Streetlights availability Yes/No	
9	Latitude	
10	Longitude	
11	Distance from the nearest Junction	
12.	NOC from traffic division Yes/No Outward No. Date	
13.	Opinion of road department (yes / no)	
14	Speed breaker location (Junction / Midblock)	
15	Speed breaker type (Bump / C or T Hump / RPC)	
16	Miscellaneous points	

Junior Engineer — Pune Municipal Corporation

Deputy Engineer — Pune Municipal Corporation

Assistant Municipal Commissioner — Pune Municipal Corporation

12.0 SPEED BREAKER LOCATION

The following points should be considered while selection the location for the proposed speed breaker:-

- In areas with high pedestrian activity.
- Prior to mid-block zebra crossing.
- Near Transit stations.
- Subsidiary joint roads (on minor roads at 10 m prior to the junction with major road.
- Prior to bridges, railway crossings.
- Sharp turning where there is lack of clear visibility.
- Near black spots – where there is consistent record of accidents.
- Near public places like hospital, schools, colleges, old age homes, commercial buildings, office buildings.

12.1 AVOIDING SPEED BREAKERS

The following locations should be avoided while proposing Speed breaker:-

- At Signalized Intersections and very near to major intersections. Speed breakers to be min 50m away from intersections.
- On Highways / roads having speed limit above 50 kmph.
- Within 100m of existing intersection at mid-block.
- On road sections with Steep gradients
- On road curvatures / turnings
- on Bridges and Flyovers (Traffic calming measures can be provided)
- At Entry – Exit Gates of public buildings and transport amenities.

13.0 PROCEDURE FOR SPEED BREAKER PROPOSAL & APPROVAL

13.1 MAIN DEPARTMENT (ROAD WIDTH ABOVE 12.0 M)

- On receipt of speed breaker proposal, submit it to concerned traffic police department for their opinion / traffic NOC (Time limit 5 days)
- The concerned PI from traffic police department to make a site visit & give their approval / NOC (**Time limit 10 days**)

a) After getting NOC from traffic police department, prepare a detailed report of the same.

b) The concerned EE to cross check the above report.

c) The proposal to be put up for approval to HOD of department.

d) After getting approval the Tharav number to be obtained **(Time limit for a to d above 10 days)**

- Actual construction of speed breaker as per norms. **(Time limit 10 days)**
- A separate register should be maintained of the approved proposals.
- *Note : Construction of Speed Breakers should be prohibited during monsoon season (i.e. 1 June to 31st Oct)*

13.2 WARD OFFICES (ROAD WIDTH 12.0 M AND BELOW)

- On receipt of speed breaker proposal, submit it to concerned traffic police department for traffic NOC (**Time limit 5 days**)
- The concerned police officer from traffic police department to make a site visit & give their approval / NOC (**Time limit 10 days**).

a) After getting NOC from traffic police department, prepare a detailed report of the same.

b) The concerned Assistant Municipal commissioner (ward officer) to cross check the above report.

c) The proposal to be put up for approval to Zonal commissioner of the Parimandal.

d) After getting approval the Tharav number to be obtained from Zonal commissioner of the Parimandal. (**Time limit for a to d above 10 days**)

Actual construction of speed breaker as per norms. **(Time limit 10 days)**

- A combined register should be maintained of the approved proposals centralized at HO –road department.
- For speed breaker proposals approval should be taken from CE roads in case of road with above 12.0m & from zonal commissioner for Road width 12.0 m & below.

Note: Construction of Speed Breakers should be prohibited during monsoon season (i.e 1 June to 31st Oct)

- **In case of special conditions approval for speed breaker to be taken from Hon. Additional Municipal Commissioner (PMC).**

14.0 CONTROLLING & RECORD KEEPING

1. A record of all speed breakers should be maintained by respective Concerned Engineers of road department in a centralized register at Main department.
2. The record should have all details such as type of speed breaker, location, date of installation, approval reference etc.
3. The records should be maintained & updated on monthly basis by all concerned & submit it to main department.
4. If any queries regarding this policy, please contact to the transport planner & urban designers in PMC

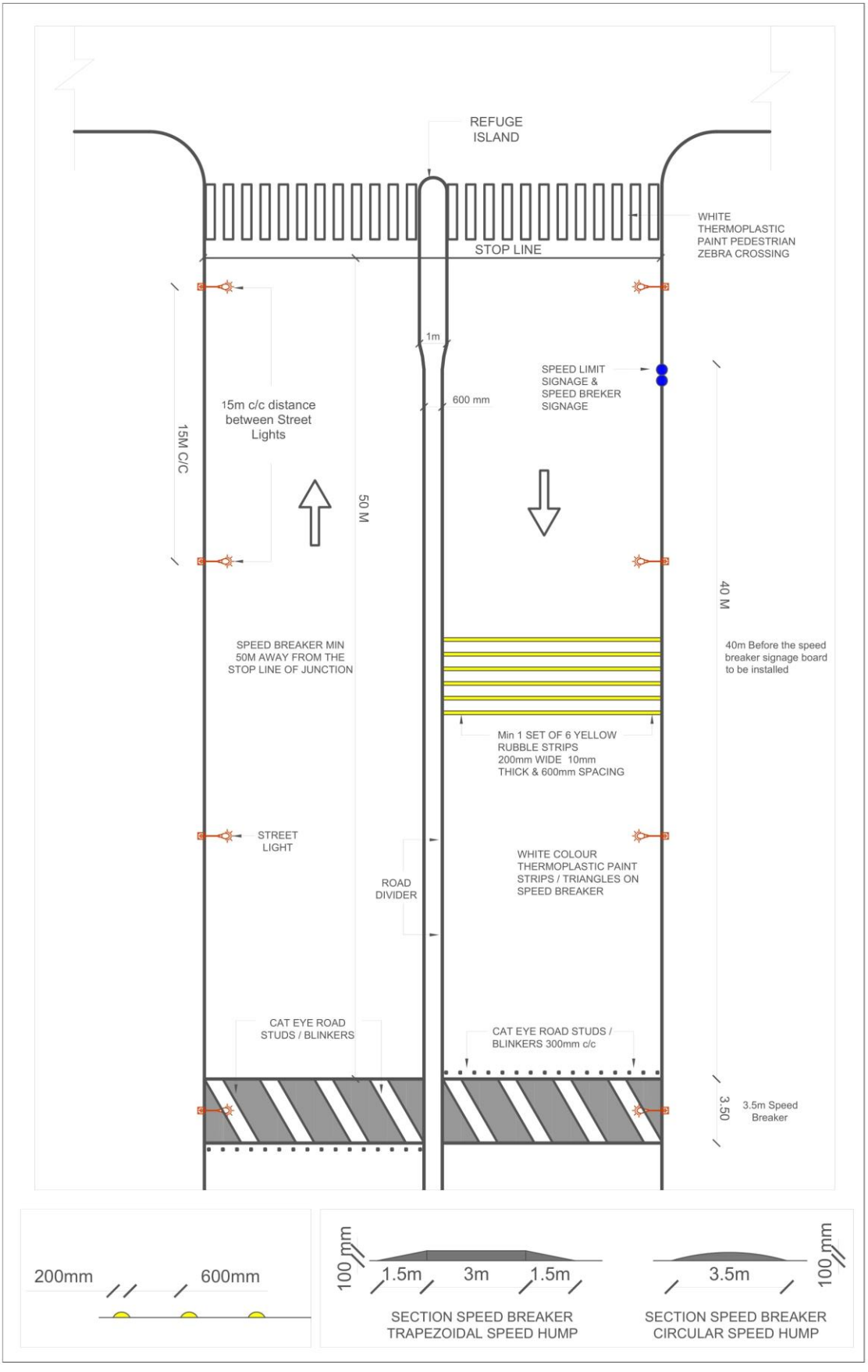

Figure 9: speed breaker typical DWG