B.PAC
Let's Be Better
www.bpac.in

Supported by

A report

'Road Safety and Traffic Intervention Project' in Hoodi Main Road

Submitted to

Mr. Pradeep Singh Karola

Managing Director

BMRCL

March 2017

Introduction

In 2016 August, TE Connectivity India Pvt Ltd supported B.PAC and WRI India to do a road safety inspection of Hoodi Main Road. The road being a one way with high volumes of traffic during peak hour has become a safety concern for the commuters and pedestrians.

Under this initiative, WRI Sustainable Cities committed to conduct a Road Safety Inspection in Bangalore on Hoodi Main Road. This Report documents the findings and recommendations from this Inspection.

About the Stretch

Hoodi Main Road is a connector road connecting 2 major sub arterial roads. The section selected for this inspection is 1.2 km long and is located between Whitefield Main Road and Kundalahalli road. Hoodi Main road is a main corridor in the eastern part of the Bangalore city in the Whitefield area. This area is dominated by commercial/business and industrial areas.

Figure 0-1 shows the location of the study corridor in Bangalore.

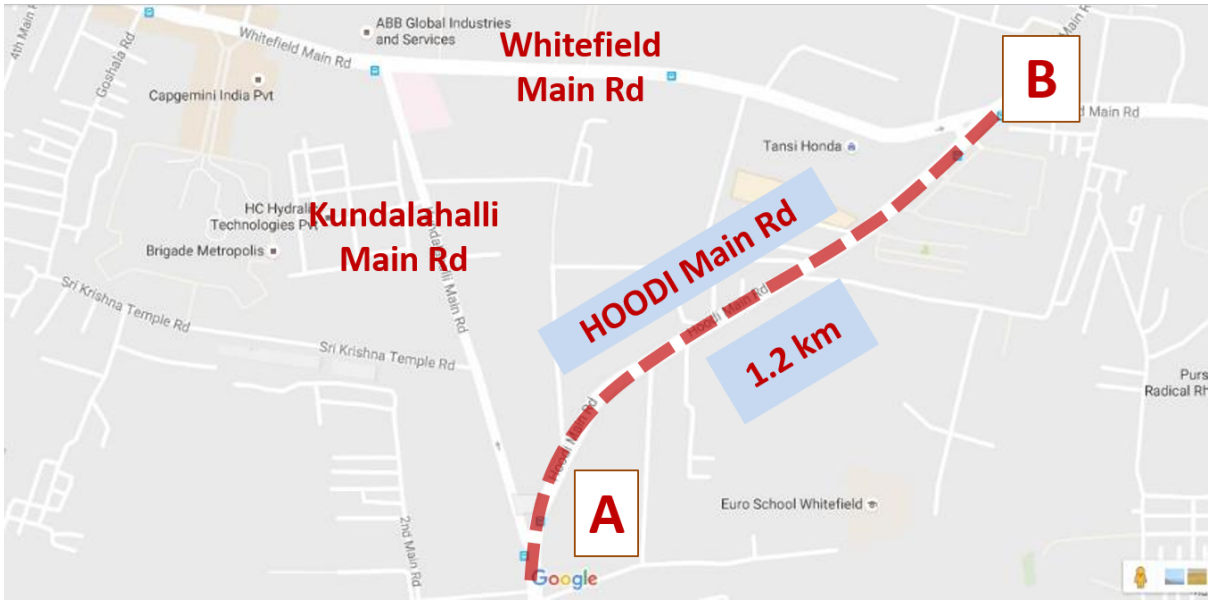

Figure 0-1 Map of Hoodi Main Road

The Hoodi Main Road has a Right-of-Way width that varies between 24m to 26m along different segments of the corridor. Similarly, the number of lanes and cross-section varies across the corridor.

There are 2 major, intersections on this corridor, which are Whitefield Main Road- Hoodi Main Road intersection and Kundalahalli Main Road- Hoodi Main Road intersection. In addition to these major intersections, there are 3 minor intersections, including several small access streets that connect into this corridor. Besides, the Whitefield main road becomes one way from Kundalahalli main road- Whitefield main road intersection till Whitefield Main Road- Hoodi Main Road intersection and Kundalahalli main road becomes one way from Kundalahalli Main Road- Hoodi Main Road intersection to Kundalahalli main road- Whitefield main road. Thus forming a one way triangle. Since vehicles have

to go roundabout these 3 intersections, to reach their offices on the Hoodi Main road, there are many instances of vehicles moving against the traffic illegally on the Hoodi main road.

The land-use along this corridor is predominantly commercial and industrial, including high-rise office complexes. The commercial uses include convenience or grocery stores, banks, offices, vehicle service shops, restaurants, etc. In addition, there are two large shopping complexes. High density residential areas are mainly located along the back-side of commercial properties and connected via small access streets.

The corridor is accessible to private vehicles, motorised two-wheelers, buses, cycles and pedestrians. For the city's transit system, the Bangalore Metropolitan Transport Corporation (BMTC), the buses operate with mixed traffic, and as there are only two stops, both are at the two major intersections, thus the buses are not required to stop on this stretch.

The variety of office complexes and commercial uses generate significant pedestrian crossing movement along the Road. Coupled with considerably high speeds, the corridor can be characterized as a heavy-movement corridor.

Based on traffic survey in December 2016, the maximum traffic volume on the Hoodi Main Road during peak hour from 7PM to 8PM is 8326 PCU. Below is a volume fluctuation from 8AM to 8PM measured on the stretch.[1]

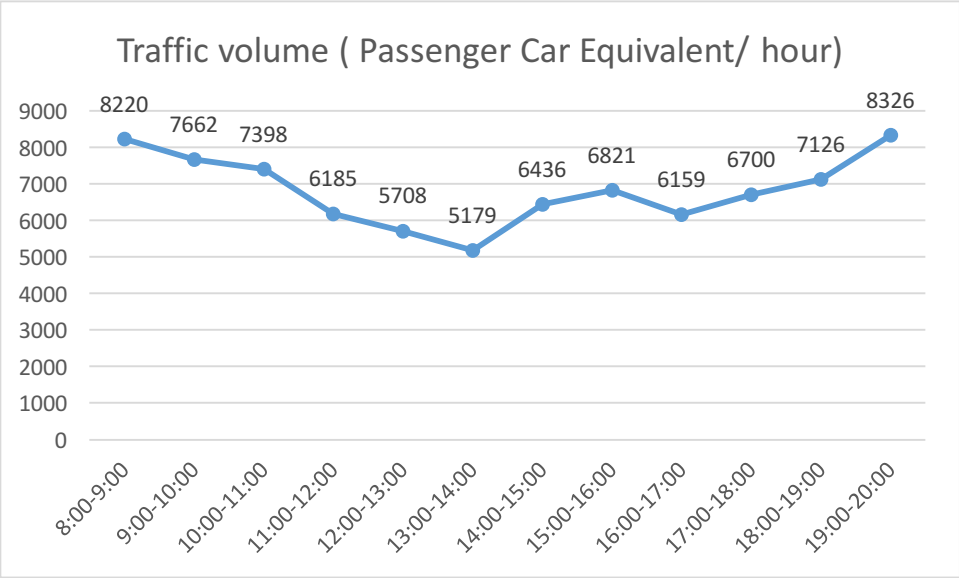

Figure 1-2 Traffic Volume Count on the stretch

The cumulative traffic count for the Hoodi Main road is highest from 7PM-8PM. The Volume/ capacity ratio for the peak hour traffic is approximately 1.15.[2]

[1] The PCU counts are based on IRC SP041:Guidelines for design of At Grade Intersection in Rural and Urban Areas 1994. The design capacity of a 2 lane one way may be taken to vary from 1400-2400PCU/ hour.
[2] Since there are no markings, and the width of Right of Way varies from 24-26m , 6 lanes can be assumed to function. Keeping the peak capacity/ lane at 1200 this suggests the peak hour volume/ capacity is over 1.15.

Summary of the Key Findings and broad intervention areas

This stretch is an active commercial and industrial zone in Bangalore that generates a large volume of vehicular traffic. There were medium volumes of pedestrians observed at several locations of this corridor; however, the limited number of safe crossings in addition to high vehicular speed on this one way stretch were an issue. Since the road was earlier a 2 way road, there is a presence of median with wide gaps for vehicles to merge, but it is indiscriminate and can cause accidents.

This road curvature on this stretch reduces sight distance of bus stops located around the curve and the on-street illegal parking at the intersections reduces the driver's field of vision, especially when there are conflicting vehicular movement. The footpaths has vendors and utility along specific segments that creates critical issues for pedestrians as they are forced to walk on the carriageway, exposing them to higher speeds. The footpaths are uneven and there is lot of undulation due to property entrances which forces pedestrians onto the carriageway.

The carriageway has no lane marking causing vehicles to speed and motorcycles to weave dangerously around larger vehicles. While the marked speed is 40 km/hr, excessive widths allow vehicles to travel at higher speeds.

This stretch has several minor access roads feeding into it from the adjacent housing and industrial areas. The visibility splays of drivers entering onto the main road via these lanes are reduced by the roadside obstructions including poles and trees. This is critical at major intersections and turns.

Although the intersection at Whitefield- Hoodi road is signalized, the intersection meeting Kundalahalli – Hoodi main road is not. It was also observed that the signal phases did not provide a pedestrian crossing phase.

The following counter safety measures are proposed to address these issues:

- Enforce no-parking at footpaths and make it even and unobstructed for pedestrians to walk. It is also necessary to splay exiting side access lanes for better driver visibility.
- Remove/relocate poles, trees, and other obstructions on the corner of the intersection to improve visibility of the intersection.
- Provide adequate pedestrian crossings at intersections and tabletop crossing at midblock locations. The design for these crossings, with sufficient median refuge is also recommended.

Bangalore Metro Rail Phase 2, Section R1 Extension

(Baiyappanahalli Station to Whitefield Station)

The Hoodi Main road alignment may change due to Namma Metro R1 extension line construction, which is expected to occur soon, the above counter measures shall be implemented in phased and time bound manner.

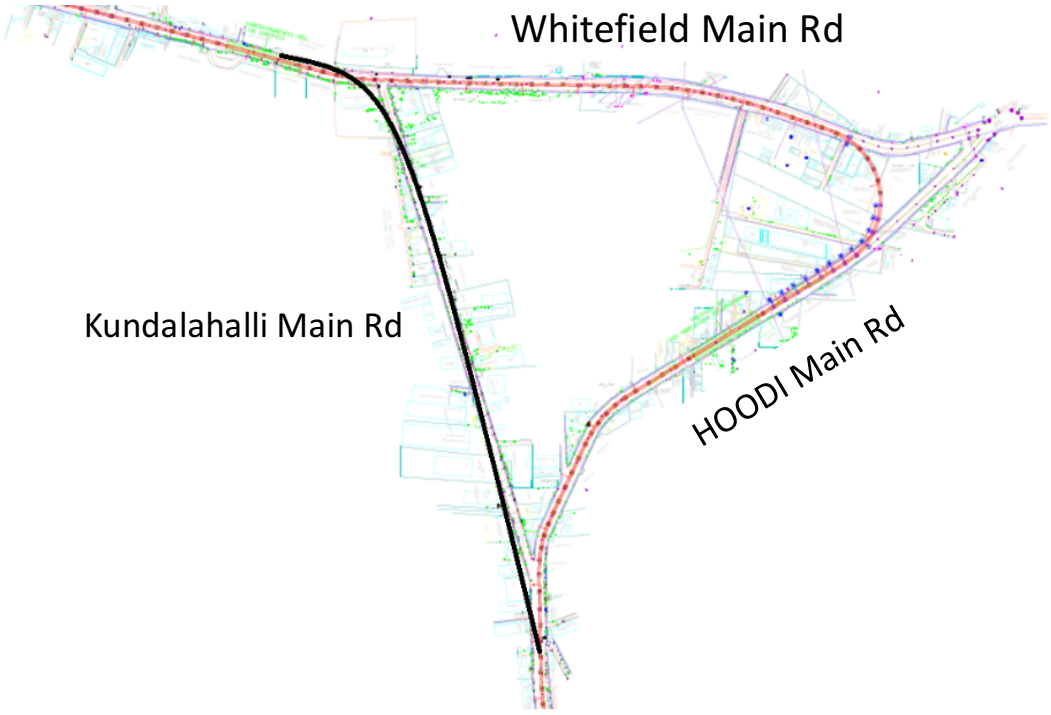

Figure 2 Metro Alignment on the Hoodi Main Road as procured form BMRCL

Considering that the road experiences high vehicular traffic volumes, and BMRCL may widen the right of way to accommodate the traffic, BMRCL should take the following precautions while constructing:

- Facilitate safe pedestrian crossing at regular intervals by virtue of both design and enforcement as mentioned above.
- Construction may cause traffic disruption. Based on the above figure the metro will be taking a gentle curve from the Whitefield main road on to the Hoodi main road avoiding the traffic signal at the intersection of the 2 roads. The traffic turning right from the intersection towards the Kundalahalli junction and the traffic turning left from the other end of the Whitefield main road will be divided by the metro pillars in the center. Considering this change following things should be considered:

- Earlier the street light had 2 bulbs with a central pole and were located in the center of the main road. With the metro pillars coming in the center and expansion of road width the street lights will be needed on both sides of the road.
- Restrict vehicular crisscrossing across mid blocks. Pillars may obstruct vision and the vehicle crisscrossing needs to be appropriately located and controlled using design intervention or manual interventions.
- Pedestrian crossing should not be in conflict with the vehicular crossing across the mid-block.
- As Whitefield has had issues of waterlogging in the past, it is necessary to ensure that the storm water drainage system is covered and in working condition. The footpath laid on top of the underground drains are even and usable, and is not disrupted due to maintenance in future. Thus, it will be necessary to ensure the mouth of the drain remains clear for the water to drain out.
- Speed needs to be reduced before each mid-block and preferably have table-top crossing.
- The pillars should be protected by a smaller median with reflective stickers.
- Intersections with smaller roads should be ideally signalized or manually controlled such that the traffic flow is not disrupted.
- Improve enforcement

- High vehicular volumes on this road and in the neighboring extensions leads to insurmountable traffic congestions. Metro construction may reduce the usable road space temporarily which may escalate the congestion further. A thorough study and implementation of an alternative solution will ensure reduction in congestion and improve traffic movement. Metro should ideally consult traffic police and provide these alternative solutions.
- Once the metro is completed and functional the station should be integrated with the bus stop and other IPT modes to improve last mile connectivity. For this the auto-rickshaw stands needs to be designed appropriately and all the above mentioned counter-measures will need to be implemented.

Conclusion

BMRCL should proactively work with other agencies like Bengaluru Traffic Police, Urban Local Body (BBMP), Bengaluru Water Supply and Sanitation Board (BWSSB), BESCOM etc to ensure that the commuters do not suffer during the construction and the construction work of the metro progresses smoothly.

In addition the BMRCL should appoint a team to study the traffic conditions and create an alternative solution for the anticipated issues that can arise due to metro construction in the vicinity.

Appendix

12 hour survey count in Hoodi Main Road during December

Time	Traffic volume (Passenger Car Equivalent/ hour)
8:00-9:00	5411
9:00-10:00	4433
10:00-11:00	3013
11:00-12:00	2809
12:00-13:00	2797
13:00-14:00	2943
14:00-15:00	2981
15:00-16:00	3002
16:00-17:00	3404
17:00-18:00	3281
18:00-19:00	3487
19:00-20:00	3483