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C.No. 26/DGP/CAMP/RSA/2018, Dt : 09.05.2018

Dear Sir

Sub: 2nd Conference on National Security Strategy - Regarding

Ref: 1). Letter No.41/32/2018-NPM/BPR&D, dated: 04.04.2018.
2). Better Traffic Management.

Kindly find the document on "**Better Traffic Management**" is enclosed as an attachment.

Submitted by the Group:

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With warm regards

Your's



09/05/2018

(T.KRISHNA PRASAD)

To:
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BETTER TRAFFIC MANAGEMENT

The spectacular growth of vehicular traffic in developing countries has resulted in traffic congestion, pollution, longer journey time and increased road accidents. In the last couple of decades, Indian Metropolitan Cities have experienced rapid urbanization, unprecedented growth of Industry, Commerce and Employment and thereby adding millions of vehicles. Today the Indian Metros like New-Delhi, Mumbai, Kolkata, Chennai, Bangalore and Hyderabad have between them more than 15 million vehicles. But there has been no commensurate growth in the road infrastructure. The resultant scenario is that there are too many vehicles on the road occupying a limited space. Therefore, the greatest challenge for civic authorities and Police in these cities is Traffic Management, more than providing civic amenities and security to citizens.

The enormous traffic problems of Indian Metropolitan cities can be attributed to the following:

- a) Indian cities do not have a good mass public transport system, except Mumbai and Kolkata wherein the commuter rail system caters to the needs of transportation of millions of commuters. DTC and BMTC are the only public transport system in Delhi and Bangalore respectively. Other cities do not have organized public transport systems. This has resulted in an increase in personalized modes of transport like two-wheelers and cars which consume the road space and result in congestion.
- b) The rise in income levels of urban households in general and metropolitan cities in particular has raised the standard of living. Economic prosperity has created huge demand for consumer products as well as increasing the capacity of people to go in for luxuries like personal vehicles etc. This has resulted in an enormous growth in number of vehicles purchased. Table 1 indicates the growth of vehicular traffic in major metropolitan cities:

Table 1: Total Registered Motor Vehicles in Metropolitan cities of India

(in thousands)

| Sl. No. | Cities | 2001 | 2004 | 2008 | 2016 |
|---------|-----------|------|------|------|------|
| 01 | Ahmadabad | 846 | 1075 | 1410 | 3198 |
| 02 | Bangalore | 1593 | 1891 | 3175 | 7008 |
| 03 | Chennai | 1257 | 2015 | 2240 | 4457 |
| 04 | Delhi | 3635 | 4237 | 4844 | 8500 |
| 05 | Hyderabad | 951 | 1356 | 1811 | 2327 |
| 06 | Kolkata | 664 | 875 | 1120 | 2809 |
| 07 | Mumbai | 1030 | 1199 | 1640 | 2333 |

The vehicular growth of a single metropolitan City i.e. Bangalore can be seen in the following table and graph:

Table-2 Vehicle Populations in Bangalore City:

| Year | 1980 | 1985 | 1990 | 1995 | 2000 | 2004 | 2008 | 2012 | 2017 |
|-----------------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|
| Total Vehicles | 175325 | 306589 | 601059 | 870659 | 1438057 | 2157480 | 3175130 | 4453000 | 7258889 |

Figure: 1: Growth of Vehicles in Bangalore:

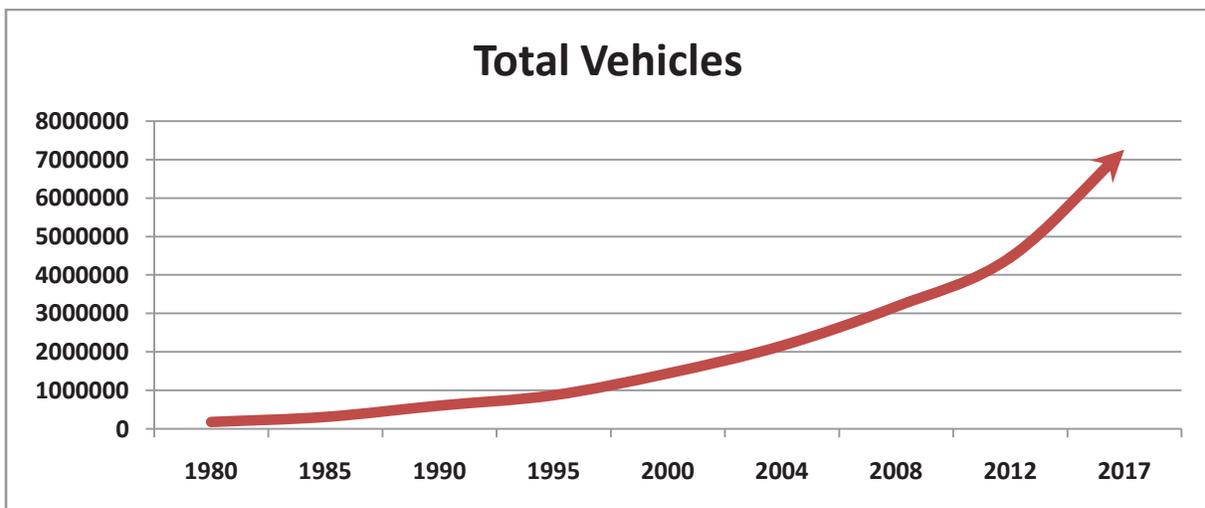


Figure-1: Graph Showing growth of vehicles in Bangalore city:

(source: Bangalore city traffic police)

- c) The increased intensity of traffic, combined with the inherited radial pattern of roads, has resulted in acute traffic congestion in and around the Central Business Districts in the cities. People moving from one part of the city to another part have to travel through the Central Business Districts (CBD) leading to huge congestion in the CBD area, e.g.: a person in Bangalore travelling from Jayanagar to Malleswaram has to unnecessarily pass through Hudson Circle. Lack of core ring roads connecting different parts of the city has resulted in heavy congestion in the city center of all metros.
- d) The limited road space available is further reduced due to on-street parking. Off-street parking facilities, multi-level car parking or parking lots are insufficient in the city. This has resulted in congestions in commercial areas of Indian cities.
- e) It is difficult to differentiate commercial areas with residential areas in urban towns. Residential areas have free commercial activity leading to congestion, pollution and narrowing the road space due to parking. A city ideally should have 17% of its area for traffic and transportation. At present only around 8% is available for this purpose in metros.
- f) The major problem of traffic management in Indian cities is the existence of multiple agencies or departments who work in isolation. The municipal corporations are responsible for road maintenance, Urban Development authorities are responsible for road development, Traffic Police is responsible for traffic regulation and enforcement, Transport Corporation is responsible for providing public transport etc. The functioning of these agencies is not properly co ordinate. The agencies are doing their jobs independently and thus conclusive and inclusive actions are not possible. Many at times, Police is not consulted during road construction and creation of transport infrastructure.
- g) Rampant indiscipline among road users is largely attributed to frustration due to traffic congestion. Most of the road users are not aware of the traffic rules and regulations. There is no proper mechanism either in Transport department or in Traffic Police to

educate the road users about the traffic rules and regulations. Lack of adequate training and professional approach amongst the traffic policemen are the main reasons for poor enforcement. Since the Transport department is not fully computerized, the violators of traffic rules booked by traffic police go scot-free as it is very difficult to trace the offenders. The automation enforcement system introduced in Traffic Police in Bangalore city, a few years ago, has resulted in imposition of penalty on only about 20% of the total traffic violators.

In order to overcome the traffic problems in Metropolitan cities the following strategic management solutions are recommended:

1. Integration of Land use and transport planning:

Transport planning is intrinsically linked to land use planning and both need to be developed together in a manner that serves the entire population and yet minimizes travel needs. In short, an integrated master plan needs to internalize the features of sustainable transport systems. In developing such plans, attention should be paid to channel the future growth of a city around a pre-planned transport network rather than develop a transport system after uncontrolled sprawl has taken place. In city municipal Corporations and Urban Development Authorities sustainable representations should be given to transport planners as well as representatives from transport department and traffic police. All new layouts formed in the outskirts should have a minimum of 20% area earmarked for transportation and traffic purposes. Zoning regulations should not be relaxed as it will lead to danger for traffic related problems due to mis land use.

2. Priority to the use of public transport:

It is well known that public transport occupies less road space and causes less pollution per passenger-km than personal vehicles. As such, public transport is a more sustainable form of vehicles. Therefore, the State Governments should promote investments in public transport as well as measures that make its use more attractive than in the past. Towards this end, the State Governments should encourage all

metropolitan cities as well as other cities with a population of more than one million to start planning for high capacity public transport systems. In doing so, they should look at various proven technologies around the world, including the use of available waterways. They should adopt a technology that would best suit the city requirements in the next 30 years. The Police leadership in the state should prevail upon the Government to initiate adequate measures to promote public transport and reduce personalized vehicles.

3. Integrated Public Transport systems and last mile connectivity:

All cities have corridors that have varying densities of travel and hence need technologies that best match the level of demand on the corridor. This often requires different operators managing such systems. However, a good public transport system is one that is perceived by the user as a single system and allows seamless travel between one mode and the other as also between systems managed by different operators. Such seamless interchange is possible if proper inter-change infrastructure is available and users are able to use a single ticket over all such systems. Newly established aggregator taxi and Ride Share needs to be facilitated to reduce dependency on private vehicles. This is also requires that a single agency takes responsibility for coordination so that there is a common approach to public transport planning and management.

4. Unified Traffic Management Authority:

Traffic management being under different agencies in a city makes it difficult for co-ordination and implementation of the project. Who will prepare transportation plans – Development Authority as a part of overall perspective, Urban Development Plan or the Municipality or the Traffic Police Department?

In view of these, it has been often argued that metropolitan cities are required to have Unified Metropolitan Transport Authority (UMTA). This will help to co-ordinate different functions of different agencies and will enable to incorporate programmes and

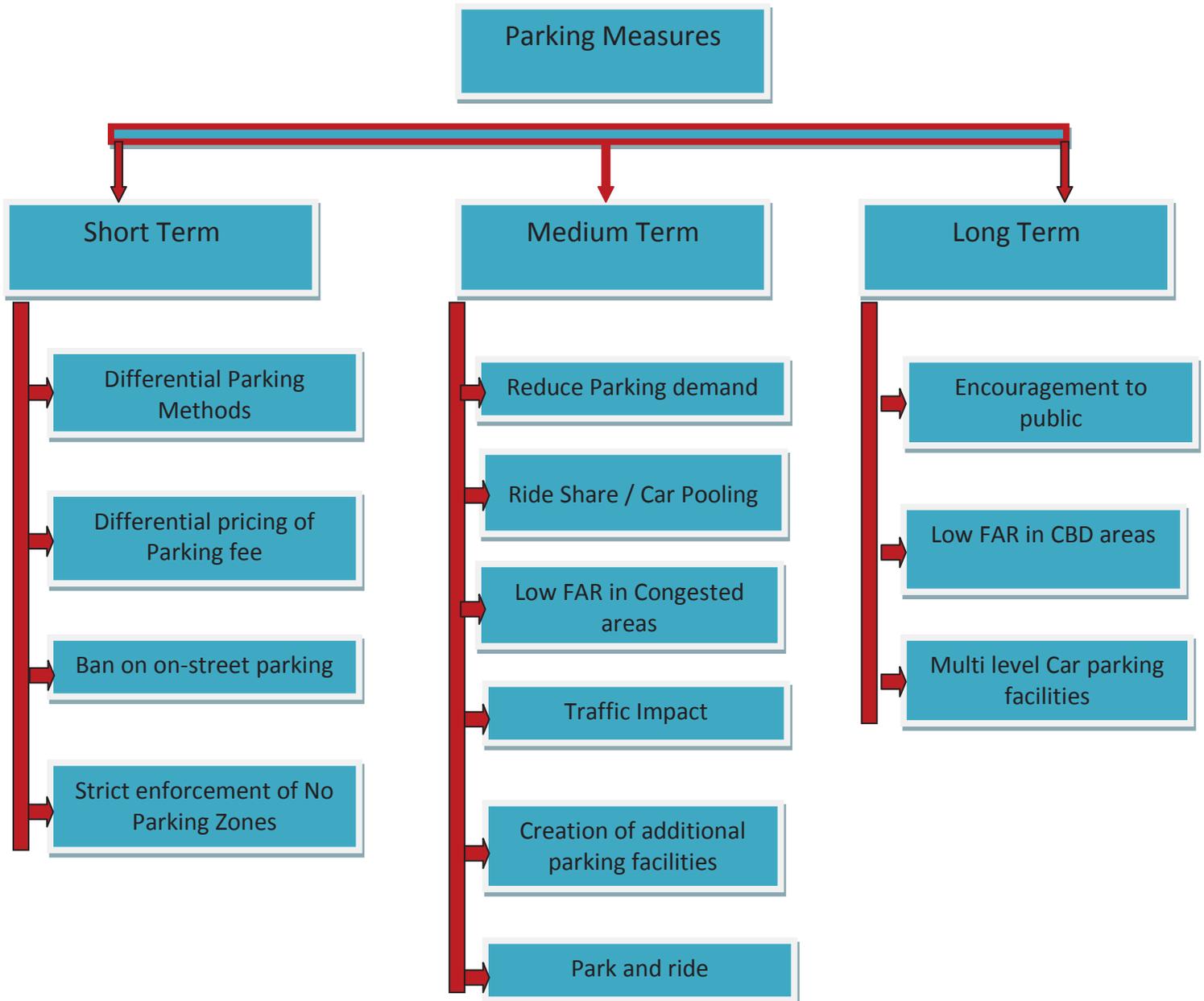
prepare integrated transportation development plans and programmes. The UMTA should be headed by the Commissioner of Police of the City for better co-ordination.

5. Parking Management:

Land is valuable in all urban areas. Parking places occupy large portions of such land. This fact should be recognized in determining the principles for allocation of parking space.

Levy of a high parking fee, that truly represents the value of the land occupied, should be used as a means to make the use of public transport more attractive. Preferences in the allocation of parking space for public transport vehicles and non-motorized modes as well as easier access of work places to and from such spaces would go a long way in encouraging the use of sustainable transport systems. Park and ride facilities for bicycle users, with convenient interchange, would be another useful measure. Simultaneously, a graded scale of parking fee, that recovers the economic cost of the land used in such parking should be adopted. The objective would be to persuade people to use public transport to reach city centers. The Police authorities and civic agencies should evolve a comprehensive parking policy for metropolitan cities which should contain short term and long term strategies for attaining optimal parking standards. Some of the suggested Parking Strategies are shown in Table -3.

Model Parking Strategy for Cities



6. Use of Cleaner technologies for Pollution Control:

New technologies always find it difficult to enter an established market and new auto fuel technologies would also face this problem. However, in view of their many advantages, they would be offered suitable concessions and benefits that would enable them to make an entry and compete with established technologies on more equitable terms. It is expected that such competition will also encourage established technologies to improve their performance characteristics and compete with the emerging choices/alternatives. Karnataka State Road Transport Corporation (KSRTC) has introduced Bio-fuel for use in its busses, on an experimental basis. 7.7% of ethanol is mixed with diesel to reduce vehicular pollution. Such innovation should be emulated for reducing pollution levels.

7. Encouragement to non-motorized transport:

Non Motorized transport like cycling should be encouraged for short trips. With increasing urban sprawl and rising income levels, non-motorized transport has lost its earlier importance. However, non-motorized modes are environmentally friendly and have to be given their due share in the transport system of a city. The problems being faced by them would have to be mitigated. First of all, the safety concerns of cyclists and pedestrians have to be addressed by encouraging the construction of segregated rights of way for bicycles and pedestrians. Apart from improving safety, the segregation of vehicles moving at different speeds would help improve traffic flow, increase the average speed of traffic and reduce emissions resulting from sub-optimal speeds. Such segregated paths would be useful not only along arterials, to enable full trips using non-motorist transport (NMT) but also as a means of improving access to major public transport stations. Such access paths coupled with safe bicycle parking places, would contribute towards increasing the use of public transport. Creative facilities like shade giving landscaping, provision for drinking water and resting stations along bicycle corridors would also be encouraged as they can mitigate, to a large extent, adverse weather conditions.

8. Effective Utilisation of Alternate Roads:

Generally in larger cities, many roads and streets remained underutilized. Whereas majority of the roads have traffic congestion and jams. There is a need to ensure optimal utilisation of the entire road network by utilising all the under-utilised roads and streets.

9. Pedestrial Facilities:

Pedestrians form a major proportion of commuters (about 25% to 30%). Though they are short distance travelers, they are spread all over the city. As facilities furnished for them are encroached upon by vendors or for road space, they have to spill on roads. These contribute to accidents also. One alternative for their facility and controlling their spill on roads is to provide railings along foot paths where provided or on the road covering about one meter width on either side of the road with openings at desired crossing points. Another alternative is to develop some narrow roads specially adjacent to major arterials as “pedestrians only” roads. But baby and foot paths at bus stops can also help in restraining their spill on to carriageways and reducing accidents.

10. Intelligent Transport System(ITS):

Intelligent Transport Systems is a collective name for a number of technology-based approaches that are designed to improve the quality, safety and efficiency of transport networks. The systems often combine communication, processing and data storage modules to provide integrated travel information and traffic management systems from one or more organizations. The systems collect information about the current state of transport network, process that information, and either directly manage the network or allow the people to decide how best to use the network.

The important ITS user services are:

- 1) Area Traffic Control Systems for effective traffic signal system
- 2) En-route Driver Information System
- 3) Route Guidance
- 4) Travel Demand Management

- 5) Traveler Service Information
- 6) Emission Testing and Mitigation
- 7) Automation Challaning System / contact-less enforcement
- 8) Vehicle information and Communication System
- 9) Parking Guidance System

11. Traffic Regulatory Measures:

Many of the roads in metropolitan cities carry traffic volume more than the capacity of the road. The inevitable result is delay in journey time, congestion and accidents. This can be removed by imposing regulatory measures and using traffic control techniques so as to make the most economic use of the roads. The Traffic control measures include traffic signals, restriction of speed, parking of the vehicles etc. Traffic regulatory measures include regulating the traffic on roads in such a way that the vehicle capacity ratio is optimally maintained.

The fundamental approach in traffic management measures is to retain as much as possible the existing pattern of street but so alter the pattern of traffic movement on these so that most efficient use is made of the system. In doing so, minor alterations to traffic lanes, islands, curb etc., are inevitable and are part of management measures. Some of the well-known traffic management measures are:

- 1) Restrictions on turning movement
- 2) One way street
- 3) Tidal flow operations
- 4) Exclusive Bus-lanes
- 5) Closing side-streets
- 6) Alternate routes
- 7) Traffic gating

These measures are generally short term in nature. For example, conversion of two-way roads into one-way will solve the traffic congestion only for a few years. Once the volume of traffic increases, then one-ways also become congested in due course.

Bangalore city is also known as one-way city because of innovative one ways implemented during my tenure as Deputy Commissioner of Police (Traffic). Similarly, Mumbai is a good example of tidal flow operation wherein depending upon the peak traffic, additional lanes are provided for peak flow of traffic in the morning and the same is reversed for the evening peak traffic.

12. Introduction of staggered working timings for offices and educational institutions:

Staggering of working hours of offices and educational institutions result in spread over of peak hour. Presently, the peak hour starts at around 9.00 and ends at around 11.00 in the morning and starts at 5.00 in the evening up to 7.30 p.m Staggering of office and school timings will have a positive impact as traffic can be reduced during the above peak timings. Safe route to school project, initiated by the Bangalore Traffic Police, has largely helped in reducing traffic congestion as school starts before 9.00 a.m. Similarly, many IT industries have staggered their work schedules to suit smooth journey from residence to place of work. Similar staggering of office timings of State Government and Central Government departments may result in reducing traffic congestion during the traditional peaking timings.

13. Greater emphasis on educating road-users:

Road users must be explained about the traffic rules and regulations through different media like press, posters, pamphlets, slides in theatres, banners etc. If possible, the road users should be educated about the traffic rules and regulations by conducting awareness camps in which safety of road users should be taught. Habitual and repeated offenders should be made to undergo training sessions in the traffic training institutes established by the Traffic Police.

14. Modernisation of Traffic Police:

The existing strength of traffic police personnel is not sufficient to meet the requirements of unwanted situations like accidents, processions, traffic jams etc. Augmentation of traffic police strength should be done in a priority. Traffic police personnel should be trained in proper way to manage the traffic efficiently. The present

system of multi functional police work like law and order, crime and traffic management should be dispensed. The Traffic Police should have separate cadre, trained exclusively in traffic regulations and enforcement. Apart from this, they should be equipped with modern enforcement devices to bring greater discipline on roads. Some work has already happened in the B-TRAC Project of the Government wherein automatic enforcement has been introduced.

There is a strong resistance from the road users about the behaviour of traffic police. Hence, there is a need to educate the traffic police about human values, morals and respect to elderly persons etc., which are to be necessarily followed during discharging their duties.

CONCLUSION:

The above strategic Traffic Management options may be adopted by City police leadership and civic agencies to achieve traffic decongestions in all Indian cities. While some recommendations can be implemented in the short run, some would require a long term perspective. If implemented systematically these sustainable measures will go a long way in making our cities and urban areas more livable.