

Traffic Congestion & More cars A Major City Health Hazard.

“Parking” –A First Step towards it’s
Mitigation in Mumbai MMR



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Final report

Submitted to MMR-Environment Improvement Society

By

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Date : 4th August,2014

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1 Preamble :

Importance of a logical parking policy – a TDM measure which can't be ignored anymore

When we think of logical parking policy for Mumbai we must consider that it is, perhaps, the most congested city with the lowest road space, public space as well as housing space per capita in the world. It is the city where the cost of housing and land is extremely high in relation to the incomes of people. It is a compact city. It has a very high share of public transport and walking trips as compared to trips by private vehicles. But it is steadily decreasing in favor of private vehicles and that is a very serious issue. The population of Mumbai has started to stabilize with a very low growth rate @0.4%pa during last decade. But, the growth rate of private vehicles is 9% pa (6% for cars and 18% for two wheelers) and that has led to an increase in the requirement of parking space (which grows by about *three times* that of the vehicles)

Our parking counts on major arteries and smaller lanes have shown that between 12 to 35% of road space (on different roads, excl freeways) is already occupied by parking. This represents 3 times increase over last 7 years. The invasion of the parking on the roads continues unabated. Parking has already become a right (or an entitlement) thru history, tradition, practice or by default! It is high time the municipality/state Government show guts to take the stand whether to tolerate such increasing profligacy in the use of scarce road space for (free and chaotic) private parking which is *compounding the congestion* and making the bus service very inefficient and unpopular . Are we waiting only to see the situation fast degenerating into a gridlock or road rage?

We are engaged with parking as a critical issue since 2002 when we made the first presentation on this subject to the then addl. Municipal Commissioner of Mumbai, shri Ratho, on the need to regulate parking. Since then we have been keeping track of parking situation in Mumbai (which is rapidly deteriorating) and also other cities in India. At that time parking was an issue which could be ignored as it was not *so uncomfortable*. Today it has become humongous and it is difficult to pretend it does not exist. It has become even visually oppressive but still there is a great reluctance in working towards a comprehensive policy to contain the parking mess. Fortunately, now it is recognized that parking is a serious problem affecting traffic and transportation in congested metros like Mumbai. Gross and extensive violation of traffic rules as well as parking has grown hand in hand during last decade. In the subsequent part of this report we provide some statistics to support what we all see everywhere!

What level of gridlock on road and parking rage will compel us to take some serious action is difficult to say, but parking increases traffic congestion is quite obvious to everybody. It also affects environment, **mostly indirectly** but quite substantially! In a city with only 2 sq.m per capita public space, (*among the lowest in the world!*), extra ordinary growth in parking (*almost all of it free*) has reduced space for buses and hence their speeds, productivity, popularity and user ship substantially. A significant reduction in speed has happened even for cars and other vehicles! This huge increase in use of road space per car also brings more vehicles on the shrunk road space – *a double whammy!*

2 Review of earlier studies on parking.

2-1 M V Asia Parking Study in Mumbai 2005

M V Asia made a study on parking in Mumbai in 2005 under technical assistance, MUTP and submitted its report in Feb 2006 to Municipal Corporation of Greater Mumbai.

It was recognized as early as 1970s when last CTS was carried out which recognized that increased car parking charges can be used as a mechanism for controlling car usage . There was also the realization that some kind of restraint mechanism would be needed. However it was felt that such a mechanism will not be easy and can be introduced in the medium term of about ten years. However, in the interim period, parking restraints can, to some extent, control the movement of traffic particularly cars. (page 1 and2 – Short Term Parking policy for Mumbai)

At *that* moment, too much car parking takes place on the street to the detriment of traffic flows and accessibility. Parking charges are far too low even by Asian standards. Besides, long term parking is as cheap as short term parking since there are steeply telescopic parking charges.

Cost of providing parking spaces in a multi story car park ranges between \$5000 to \$20,000 equivalents to Rs. 40/hr. (current charges Rs. 5-3/hr) recommended tariff by MV Asia (considering various limitations) were Rs. 10/first hr, Rs. 35 for 3 hrs, Rs. 130 for 8 hrs.

The study identified that to develop parking strategy, it is necessary to measure parking demand, existing car parking provisions, ability to accommodate this as well as other road traffic requirements. This would require extensive data collection to determine demand and supply for different areas of the city and a quantitative assessment of the ability of the road system.

It recognizes that road space is at a premium. Surveys carried out demonstrated that most parking is short term, however, there is a significant level of longer duration parking, also a significant level of illegal parking . It noted that *current* parking standards encourage rather than inhibit car use. Police resources as well as its powers are inadequate. Enforcement powers are fragmented and with cumbersome procedure and very low level of fines.

A major and specific recommendation was the proposal for a **unified Mumbai Municipal Parking Agency**. Its objective would be to decide how much parking was needed and how it would be used to satisfy wider transport policy objectives. (pages iv – vii)

It has suggested that a flat charge of Rs. 50 be charged for parking on roads at pay n park sites in the night from 8 pm to 8 am. (page 27)

The agency should be capable to provide necessary resources to effectively patrol and enforce regulations . There should be legal provision to specify penalty of sufficient scale to deter potential

offenders. To ensure that fine level is not eroded by inflation. Documentation and reporting system to ensure that offences once detected are tracked and targeted. (page 28)

*(We found that this report is lying in some corner, never discussed or referred to, nobody seems to have read this report and hence there is no question of any steps towards its implementation. Unfortunately, the policies that have been followed by the municipal corp and other agencies till date have been **quite contrary** to the demand management proposed by this study and which is followed by most progressive cities such as Singapore, Hon Kong, London etc and this focus applies **more to Mumbai** than these cities and this retrograde approach to parking has been one of the major (but not properly understood and hence conveniently ignored !) serious and grievous policy lapse in the management of traffic and transportation by Mumbai and other Indian cities of India!*

2-2 ADB Parking policy in Asian Cities (2009) :

This study aimed to provide a perspective on the key parking supply policy choices available for Asian Cities by

- Providing / highlighting relevant context on international debates on parking policy.
- Explaining the contrasting approaches to parking policy that are available.
- Providing a comparative perspective on Asian Parking policy trajectories by compiling set of information on key aspects of parking supply policy in 14 Asian cities and by presenting results of parking behavior surveys from 12 of them.
- Evaluating relevance for Asian cities of recent international academic and professional debate
- Considering whether approaches in Asian cities offer lessons for each other and for others.

cities covered in the study : Beijing, Guangzhou, Hong Kong, Tokyo, Seoul, Taipei , Dhaka, Ahmedabad.

States that Parking policy is important for urban professions including urban planning. Transport planning, traffic engineering, urban design and architecture, as well as parking industry and real estate professionals. Every level of government potentially has some interest and responsibility for parking policy but local government is a particularly important audience for this report.

For better parking policy it is vital to gain a clear understanding of the broad choices available. Based on international literature, the main alternatives can be categorized as:-

1. “Conventional” approaches (1a. Auto-centric and 1b. Demand-realistic) focus on ensuring adequate parking supply by using minimum parking requirements;
2. “Parking management” approaches - multi-objective and constraint focused -in which complex parking management is seen as a tool for wider policy goals- traffic limitation,
3. “Market –based” approaches, in which market prices are fostered and allowed to interact with parking supply and demand in the usual ways.

The study sought insight on the overall parking policy approaches being adopted in these Asian cities. It found distinct parking trajectories in the cities studied. Pathways that are the strongest candidates for possible emulation are presented first, followed by trajectories that seem more in need of reform. However none of the cities is perfect and all have elements worth studying.

1. Tokyo and Japan more generally, has a unique set of policies that have resulted in a remarkably market-oriented parking system with ubiquitous commercial market-priced parking. This has arisen as a result of three pragmatic policies : minimum parking requirements that are set very low and which exempt small buildings, very limited on street parking, **and a proof of parking rule(which requires access to a nighttime parking place to be secured before registering a car)**
2. Bangkok, Jakarta, Kuala Lumpur and Manila are “minimum parking requirement enthusiasts” with conventional parking policies that promote car ownership and use. However, relatively high off street parking standards for buildings have not solved their on street parking problems. Critiques of Western parking policies that rely on minimum parking requirements (the conventional approach) are relevant to these cities.
3. Ahmedabad and Dhaka (and *other South Asian cities*) face acute on –street parking problems as car ownership accelerates. They are trying to emphasize minimum parking requirements and local government-provided parking. Improving the weak management of on street parking is crucial but elusive so far. Unrealistic expectations prevail that parking will be cheap for users.
4. Several cities in the study (and international experience) demonstrate **that successful management of on-street parking is possible and is not restricted to high income locations. This is important since concern over on-street chaos drives much of parking policy.**
5. Effective enforcement is crucial to on-street parking management. Most of the success stories involve **shifting this responsibility from police to local authorities or to contractors.**
6. **The study highlights the high opportunity cost of parking in dense cities.** In such cities there are high-value alternative uses of any space devoted to parking. This implies that, if parking users are to pay their way, relatively high parking prices should be expected in Asian cities.
7. **Government subsidized parking is a regressive use of taxpayers’ resources in cities with modest car-ownership rates and is expensive, (applicable very clearly in Mumbai)** in light of the high opportunity cost of built space in dense cities. Unfortunately, it is being expanded in several cities, especially in mainland China and South Asia. Some high-income East Asian cities, such as Hong Kong, Taipei & Tokyo have government owned parking at close to market prices.
8. Pricing of parking is widespread in many Asian cities (although uncommon in some). Priced public parking plays a significant role in East Asia . Nevertheless, survey results show that a surprising proportion of parking is free of charge for motorists, even in dense cities with high property prices,**(and hence a very high opportunity cost for parking space)**
9. Private-sector off-street parking businesses can become significant when on-site parking is not **oversupplied (or over-required)**, if parking prices are not controlled and if government-subsidized supply does not crowd out the private sector. Tokyo, like most Japanese cities, has low minimum requirements but does not have policies to limit parking supply. Parking businesses charging market prices are ubiquitous across Tokyo.
10. Japan’s proof of parking regulation deserves wider understanding and possibly emulation. It was designed to solve parking problems, not to limit car ownership. It succeeds in placing

responsibility for night-time parking onto car owners. A key result of this policy is that many Japanese car owners lease residential parking in their neighborhoods at local market prices.

2-3 “Choc-A-Block” (parking measures to address mobility crisis as a part of Right to Clean Air campaign – 2009) by centre for Science & Environment, New Delhi

1. Demand for land for a car is estimated at 3 parking spaces per car. Total cars occupy more than 10% of Delhi’s urban area in 2009-(in 2014, it could be double! forest cover is only 11.5%)
 2. In U.S. the parking space/ car is assumed to be 372 sq.m or equal to 5 times (that in India) or equivalent to 15 parking spaces !
 3. A car is allotted 23 sq.m of public land for parking and circulation, *mostly free*, whereas a poor family cannot find 25 sq.m for its basic residence!
 4. Personal vehicles in Delhi dominate parking demand to the extent of 95% (cars & 2 wheelers) Public transport buses occupy about 3%.
 5. Surveys conducted by Delhi metro in the vicinity of metro stations show high parking spill over on the carriageways(*in the adjacent areas*) due to inadequate parking facilities at the stations.
 6. In the US cities, motorists spend about 4-14 min to *find* kerb parking space, thus each parking space generates several minutes of *additional driving and burning fuel*. *Motorists in INDIAN cities also indulge in such driving, with help of drivers, to find parking space or avoid payment!*
 7. Actual peak parking volumes are found to be upto 3 times more than the designated parking spaces in several areas in Delhi.
 8. As the demand for office space increases it is more difficult to prevent illegal conversion of basement parking spaces into other uses.
 9. Among metros, Delhi has one of the highest ratio of space under roads to the total area of the city. *As compared to Delhi, Mumbai is poor in terms of a ratio of no. of km under road to the total area. For each sq.km of area, road length is about 12km in Delhi whereas in Mumbai, it is only 4.5 km! Consequently no of cars/km of road length for Delhi is a little under 100 whereas it is little over 400 in Mumbai (compiled by us from various sources)*
10. Powers of DDA and MCD with respect to parking have not been modified from 1957 (when the incidence of parking was quite minimal which has increased by several times during last two decades!)(page 9)

2-4 Parking within Comprehensive Transportation study for MMR – 2008

By Lea International Ltd. in jt venture with Lea Associates South Asia P.Ltd.

The study gives Guidelines for Parking Policy, through operation and management of parking spaces right from types of parking, regulations, need for marking & clear signage, need for review, institutions involved and their powers and responsibilities. They are as follows-

1) Types of parking

- a) Major differentiation within the parking policy is made to distinguish between the length of time of parking and its associated location. The duration is either 2 hours & more than 2 hours
- b) Further decision can be taken eg. Short term parking on street and long term parking shall take place off street.
- c) Other forms of space provision – In addition to designated spaces shall be allocated at appropriate locations for use by police, diplomatic cars with approved “CD” sticker
- d) Residential permits to those who apply to the local authority. On being able to substantiate that they are residents.
- e) Disabled spaces will be allocated and will be properly designated and shall have lane marking and pole mounted signs.

2) Parking standards to be reviewed once every 10 years & necessary modifications will be made.

3) Regular monitoring of parking provision in all buildings and buildings found deficient in provision vis a vis current building rules shall be required to pay a parking facility fee in proportion to the extent of violation w.r.t the required provision. *The revenue will be used for augmenting parking facilities (both on street and off street) in the area.*

- a) Private sector shall be encouraged to *build and operate parking facilities to augment parking capacity in deficient zones.*
- b) Efforts shall be made to develop park and ride facilities at all public transport interchanges in the city (*the study did not observe whether there is any space at such interchanges – it is negligible in most interchanges and hence this suggestion is rather superfluous*)
- c) While imposing restrictions to the movement of specific type of vehicles effort shall be made to provide adequate parking facility at the terminal or interface points.
- d) Efforts to identify locations for truck terminals/private sector participation shall be encouraged in development and operation of these sites)
- e) Existing statutes shall be amended to make it mandatory for owners and operators of stage and contract carriers to park their vehicles in garages when they are not in operation.
- f) Adequate parking spaces for taxis in all public parking places.

4) Parking Regulation-

- a) In restrictive parking areas on street parking shall be prohibited on all roads within the area except at places where it is specifically permitted by authorized road signs and marking
- b) Chief of Police to be authorized person to notify parking regulations, parking fees to be charged at each location

5) Prohibition of parking

- a) The local body from time to time designate some areas where parking will be prohibited (either permanently or on a time specific basis(eg.during the business day) Typical zones where parking will be prohibited are:
- i) Bus only lanes
 - ii) School entrance zones
 - iii) Pedestrian crossing zones
 - iv) Suspended bays

6) Signs and markings

City will be responsible to provide clear signs to identify type of parking control.

- i) Combination of *on lane markings and pole mounted signs. On lane markings to designate times of parking. This will be by use of yellow lines in or near the gutter, on kerb marking designate loading & unloading times.*
- ii) *Double yellow lines designate parking prohibition for 24 hours*
- iii) *Post mounted signs to designate the regulations applying to various restrictions. These will specify times when parking is permitted or prohibited, days when restrictions apply and the users are legitimately permitted to use the bays.(italics by us)*

Following guidelines have been explicitly mentioned in the report

The city will designate areas where parking is permitted /prohibited. Spaces & prohibitions will be clearly marked in consistent manner.

1) Markings will be a combination of **on lane painted information, curbside paint markings & pole mounted markings.**

- i) **Bus stop locations**-Correct locations to be identified with due consultations. ***Parking of vehicles in these spaces to be strictly prohibited.***
- ii) Pedestrian crossing
- iii) Off street car spaces
- iv) Taxi & auto rickshaw ranks-Most appropriate locations for waiting areas for taxis and auto rickshaws etc. in locations convenient to major uses such as hospitals, rail & bus stations, government buildings and sports facilities.
- v) Specifically designated bays for disabled persons, doctors, diplomats residents etc.

2) Tariff setting

- i) The setting of tariffs for parking is to be calculated ***to cover costs of administration and operation of the system. The costs paid by motorists for parking are determined from estimates of turnover & usage & will be adjusted at the end of each year according to revenue received and expenditure incurred. It is not a policy of the city administration to penalize motorists to the point where the price for parking exceeds the costs of the control (the report refers only to the cost of administration and not the cost of land or price necessary to" manage demand "***

3) Enforcement regulations -

- i) Local police shall be responsible for enforcing parking regulations.
- ii) They shall assign ***adequate*** no.of police personnel of appropriate rank for surveillance & enforcement of parking regulations in each zone, each zone to have a tow truck to facilitate eviction of offending vehicles.

iii) Tow trucks shall be requisitioned from private enterprises to facilitate enforcement of parking regulations.

4) Enforcement & penalties-

- a) Parking policy once enacted by the city empowers the police to enforce regulations contained within the clauses & the police will exercise their powers to enforce these rules.
- b) Police & city will train and employ persons as traffic wardens who will monitor the space usage on behalf of the police. They will be instructed to issue parking violation notices & to record the reason for violations & time and location. These violation notices will then be acted upon by the police who may issue a summons to the owner of the vehicle. A more severe penalty for vehicle in serious violation- like immobilizing the vehicle.

5) Operations and maintenance –

- a) By local authorities (municipal corporation / council) respectively.
- b) Private sector should be encouraged to operate & maintain the public parking facilities.
- c) A clear and transparent procedure shall be adopted for selection of contractors.
- d) Ensure standardized operation & maintenance through a standard training programme for staff of the contractors involved in operation & maintenance.

6) Institutional responsibility-

This will be the responsibility of the local civic authority. It will also monitor the operations and maintenance of facilities and **ensure uniform standards at all locations.**

Regular monitoring of parking provisions in buildings

Setting tariff as discussed above.

Local police to be responsible for enforcement of parking regulations & regular surveillance for parking offences.

All fees namely, operational and maintenance contract fees, parking fees parking development fees etc collected by local civic authorities, local police shall be credited to a parking fund. An appropriate authority in the local civic authority shall operate this fund exclusively for provision of parking facilities and for procurement of equipment and services for all concerned agencies.

Need for reviewing the parking norms in MMR

With changed economic scenario in Mumbai there is increased vehicle availability levels and demand for origin end and destination end parking is rapidly increasing. With existing low parking spaces per unit area, this situation **is resulting in uncontrolled parking of the vehicles on street.**

To overcome this problem it is desirable to review the parking norms in DC regulations for development expected in new and Greenfield areas. If more parking spaces/unit area are proposed, public may resist as they have to pay more for parking space hence a balanced parking standard needs to be prepared keeping in mind the growth of private vehicles in MMR by 2031.

Enforcement

All recommendations and measures need strict enforcement. This is especially important for on street parking particularly on bus routes and main roads. To minimize the impact of motorized parking on other road users. Gross violations such as pavement parking also needs to be strictly dealt with, since this inconveniences pedestrians who in turn use the roads to walk on thus adversely affecting the traffic flow. While one can expect public dissatisfaction in the beginning, once it is made clear through public education campaigns that parking is not a right and is strictly enforced by the police (and control of parking will lead to better facility for majority of citizen, including the pedestrians and cyclists) over time one can expect change in public perception. This requires the police enforcement to be uniform, fair and well publicized.

These reviews indicate the adoption of following strategies-

Long Term Measures

- a) Actions to continue to reduce parking demand through development control norms in core areas in tandem with increased public transportation accessibility.
- b) Discouraging higher FAR/ ground coverage in congested areas.

Medium Term Measures

- a) New developments and regulations to be approved through traffic impact assessment
- b) Encourage private parking facilities and terminals in areas on BOT basis.
- c) Provision of parking facilities in critically deficient areas with intro of park & ride systems.

Short Term Measures

- a) Establishment of differential parking norms and guidelines based on public transport services.
- b) *Appropriate pricing with respect to real cost to discourage use of personalized vehicles.***
- c) *On street parking in critical areas to be banned & in residential areas to be priced.***

Planning Standards for New Developments

MCGM in its 1990 development control rules set out the amount of parking to be provided in each new development. These rules seem to be in favor of providing “sufficient” parking to accommodate the car trips that are likely to be generated. This does not take into consideration the impact on the surrounding areas and streets. This policy “relieves “ municipal corporation of any responsibility . But its overall impact on trip generation can be adverse. Parking that needs to be provided in an area would depend upon:

1. Existing levels of traffic
2. Accessibility of public transport
3. Pre existence of car parking
4. The level of acceptable existing parking demand

A developer would provide parking to meet the expected demand from the users including that from the people who would wish to drive to work (*with the cost of cars becoming very very small as compared to the cost of residences /work places*) adding to traffic congestion! If demand management policies are to be followed, parking should only be provided to take care of servicing

requirements of the building and not that of commuters. Other cities which have recognized this problem have moved to a policy of parking maximum and not that of parking minimum(*which development rules have continued to provide and encourage even after the study report of MV Asia ! more about the same in the subsequent chapters!*) (pages 29, 30) (*comments in bracket in Italics are from the author*)

2-5 Parking Survey conducted by Lea Associates, Mumbai – 2006

For LBS marg, Saki Vihar Road, VN Puraog marg M.G.Road (connection between SV road and linking road near Oshiwara) and S.V road In greater Mumbai. Their observations for two major arteries can be summarized as follows :-

LBS Marg - Parking ***demand is less than the supply*** except during peak periods. Maximum demand/supply ratio was observed during 11.00 to 12.00 hours on west side of the carriageway and 17.00-18.00 hrs on East side of the carriageway. Further they have stated that the **Two wheelers**, Four wheelers and Trucks were predominant with **23.9%**,27.9% and 18.3% share respectively on West side of the carriageway and with 11.9%,20.7% & 23.3% share respectively on East side of the carriageway, and that the average parking duration on West side and East side of LBS marg was 2.3 & 2.2 hrs respectively.

S.V.Road - the report states that the Parking ***demand is less than the supply*** even during peak periods. Maximum demand/supply ratio was observed in the interval of 10.00 to 10.30 hrs on West side of the carriageway & 10.30 to 11.00 hrs on East side of the carriageway. Two wheelers, Four wheelers and Auto rickshaws were predominant with 27.9%,30.4% & 27.5% share respectively pm West side of the carriageway and with 30.6%,30.4% and 29.7% share respectively on East side of the carriageway & Average parking duration on West side and East side of Swami Vivekananda Road was 0.6 and 0.6 hrs respectively.

As a part of comprehensive traffic study in Mumbai 2006 Lea associates provided above observations . Further in this study , we have given a comparison of the parking counts exactly on these road in 2013 . We find that during the intervening period between these two counts , there is a huge increase in on street parking as the the increase in demand is not matched by an increase in the supply of the space which has remained unchanged! (Comparison and comments follow in subsequent part of this study)

2-6 Our comments on above studies

While this is a part of the comprehensive transportation study for MMR , it lacks any sense of importance to the parking of vehicles *as becoming a monumental challenge - gravity* of which

has been understood by other studies but **is missing in Lee comprehensive study** . It has discussed about operational procedures in detail and provided data from parking surveys saying that the supply of parking exceeds in most of the roads and that the proportion of short term parking is about 80% and parking is dominated more by vehicles other private cars. There is no focus on the trends - very obvious even in periods earlier. **This lack of importance to parking as a serious issue (which is rapidly becoming dangerous) & as a vital demand management tool has to be revisited again. And we feel this study should help MCGM, MMRDA and the Government of Maharashtra to bring parking under serious focus without which public transport orientation of the entire transportation strategy for Mumbai city and MMR will be quite inadequate. We also hope that current study (in 2014) undertaken by Lea in Mumbai should look into parking in an appropriately serious manner.** Since this study is considered comprehensive and definitive. The Lea parking policy formulation (or the lack thereof !) needs to be **reviewed & discussed by all agencies & stake holders!** We trust this study will be a help in that direction.

On the other hand, other studies – especially the ones from ADB study on Asian cities and CSE study on Delhi as a part of clean air campaign as well as even MV Asia study for Mumbai have clearly focused on the need of regulated and *properly priced* parking(preferably market based- which includes the cost of land **and** construction !) Both of these studies (and several other studies – notably ITDP compilations for European , American and Chinese cities - not quoted here) have strongly focused on “*parking maximums rather than minimums!*” **Annexure-1** on Parking policies and Practices followed by London is very revealing and it is clear that parking restraints have contributed in no small measure to the reduction in car trips by 12% and increase in Bus trips by 62% over last decade as cited by Economist

2-7 Comparison of parking inventory between Lea (2007) & MESN (2013) on same roads in suburbs

Road	Length Km	LEA	MESN	% incr	pcu/km	
		2006	2013	ov.2006	2006	2013
V N Puro Marg	3.8	442	1352	206	116	356
saki vihar Rd	2.5	509	920	81	204	368
m.g. Rd – goregaon	1.7	179	330	84	105	194
L B S Marg	9.3	1314	2526	92	141	272
Total	17.3	2444	5128	110	141	296

S.V. Rd – Bandra-Borivali	23	232	3308	1326	10	144
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All these are major arteries. They carry mixed traffic. L B S Marg and Saki Vihar rd Have large industrial/commercial activity

The parking is observed on both sides of the road. The above data provides

The data equated to a PCU i.e. all vehicles – trucks, buses, autos, 2 wheelers are equalized

Based their length and converted into a passenger car equivalent.

If we consider that the avg length of a car is 4 meters, there can be a maximum of 250 cars /km on one side

Provided there are no openings and crossings of the road. We counted that openings and crossings account for 15 to 20% of road length of the above roads.

We believe that there is some error or non comparable reporting for S V Rd for 2006 count and hence the increase in 2013 looks very high.

even without considering S.V.Road, the increase of 110% is very high and cannot be ignored

3 Current status of Parking in Mumbai

Population of cars did not create any perceptible problems till 1986 when Maruti made availability of cars easier The no. of cars and other vehicles on roads in Mumbai increased as follows :

3-1 Growth in vehicles on road

Year	No of cars	2 wheelers	Taxi	autos	BEST buses	other buses	Comm. Vehicles
1971	83360	24786	15951	7	1320	1006	24204
1981	150711	78474	29623	4465	2049	1318	38447
1991	344951*	242008	34338	24577	2712	3017	49660
2001	460870*	440517	62447	109014	3430	3778	56626
2010	7002362*	967479	60279	107853	4313	4347	69049
2013 est	900000*	1250000	55000	110000	4500	4600	Na
Growth	11 times	48 times	3.5 times	25 times	3.5 times	4.5 times	3 times
Est 2016	1100000*	1500000	65000	170000	5000		

*Above figures are from basic transport statistics compiled by MMRDA * the no. of cars includes approx 30% registered outside Mumbai RTO offices to avoid octroi but such cars are Mumbai resident. Hence no. is corrected.*

While the growth in the number of cars (and more distinctly - two wheelers , accelerated between 1981 to 2010 , it is showing signs of stabilizing (not so for two wheelers though!) . One of the reasons cited for this is the physical lack of parking spaces ! Even then an increase in absolute number beyond this level is creating serious problem. As more and more towers with high fsi are coming up far and away , the impact of increased trips and lengths by cars /two wheelers will be felt more.

The paid parking on road was introduced in early nineties – (mostly restricted to the southern tip of island city within a total area of 8 sq km in A ward-[Table 3-2 below](#)). This continues even today although to a lesser extent.

3-2 Notional and actual no. of parking spaces under Pay & Park in A Ward

sr. no	pay and Park sites	no of spaces	Actual parking	info board Yes/No	double parking
1	ramchandani marg	96	111		
2	Mahakavi Bhushan marg	287	311		
3	Fort byelanes,Area I & II	594	611		
4	Sooraji Vallabhdas Rd	81	93		N
5	Walchand hirachand Rd	53	62		
6	Shiv sagar Ram Gulam rd	68	79		
7	Mumbai Samachar Marg	120	138		
8	Mudranna Shetty marg	58	68		
9	Badruddin Tayyabji marg	40	51		N
10	M.G.Rd,near museum	50	96		N
11	MJP market location-1,2,3	197	215		
12	Dorabji Tata(N.S.road)	197	211		
13	IMCE rd, churchgate	17	20		N
14	Veer Nariman Rd	54	61		N
15	Adi Marzban Rd	40	49		N
16	Vinay Shah/Goenka marg	95	78		N
17	Vidhan Bhavan Marg	85	103		
18	Shahid Bhagat Singh marg	64	93		
19	Sir P.M.Rd	118	114		N
20	Green Street	45	55		N
21	M.Karve Marg Eros jn.	40	50		
22	Hutatma chowk no.2	89	94		
23	Island opp Eros Cinema	78	83		
24	Jehangir Art Gallery&V.B	97	111		
25	Horniman Circle,V.N.Rd/homji	429	468		
26	Kaikushru Dubash Rd.	129	137		
27	University Rd	75	99		N
28	Ramjibhai Kamani Marg	202	210		
29	Narottam Morarji Rd-B.Est	115	122		
30	Walchand hirachand Rd	120	135		
31	free press journalmarg	137	148		
32	BEST Rd/mandlink Rd	43	73	N	N
33	hutatma chowk no.3	55	62		
34	hutatma chowk no.4	76	79		
35	N.C.P.A Rd	69	76		N
36	regal cinema island	24	36		N
37	jamnalal bajaj marg	114	96		
38	J.N.hardia marg	217	238		
39	jamshedji tata Rd/petro house	68	81		N
40	G.N.Vaidya marg	86	118		
41	Jeevan Bima marg-oppLic	65	88	N	N
42	Dinshaw Waccha Marg	82	83	N	N
43	S.A.Brelvi Marg	68	65	N	
44	Bomanji Cawsji Behram rd.	263	271		
45	MG road(Wt side)hospital lane	86	97		
46	Nathibai Thakarsi rd,D Mulla	150	176		
47					
	total A ward	5335	5915		

Two other parking lots could not be identified. They are reported to have 306 parking spaces, making the total number of spaces to 5641. MCGM allots parking lots in sq.m, we have converted these areas into parking spaces by dividing the area in sq.m by 13.75 (net parking area per space) In addition there is no clarity about vehicles parked on both sides of the road as to whether they are Covered under pay & park scheme or not.

Why roads are clogged?



- 8 lak cars on 2050 km roads
- 1/3 vehicles parked on road all the time **mostly free**

- parked vehicles occupy 20% lane lengths
- compared to 5%, 10 yrs back.

Table 3-3 shows the *pay n park sites/spaces in Mumbai*

Table 3-3 Pay & Park sites/spaces and net realization by MCGM from Service providers

No of locations			No of spaces ---1				License fees-Rs.cr			Rs /space/p.a.--2			Rs/space/hour --3		
Bef nov 12	Nov12	Nov13	Bef nov 12	Nov12	Nov13		Bef nov 12	Nov12	Nov13	Bef nov 12	Nov12	Nov13	Bef nov 12	Nov12	Nov13
72	81	81	4889	7636	7636	Island city	5.25	9.61	10.91	10738	12585	14288	3.6	4.2	4.8
13	11	11	856	1087	1087	suburbs	0.51	1.51	1.75	5958	13891	16099	2.0	4.6	5.4
85	92	92	5745	8723	8723	Total	5.76	11.12	12.66	10026	12748	14513	3.3	4.2	4.8

Information contained in the above table is compiled from answers provided by MCGM to our RTI queries in last 4 years-

- 1 No.of spaces arrived at by dividing total parking area by 13.75 sq m (@ 5.5*2.5m per space)
- 2 derived by dividing total license fee by no of spaces
- 3 Based on utilization of 300 days and 10 hours per day, thus 3000 hours per space in a year

3-4 Current policies and practices for parking (At grade, on street)

Current policy can be best described as parking practices! Vehicles parked mostly for free in an in disciplined manner. A very small part (4%) of the parking is under pay and park which too is poorly priced.



Regulation of parking is **substantially absent** in all areas other than this area and even in this part of the city, there is still anarchy! There were about 92 parking lots with over 8000 parking spaces (in addition 4000 spaces are for two wheelers) of MCGM in the city till about an year ago & Municipality has a gross earning of Rs. 12 cr for a period of 12 months between Nov 2012 to Nov 2013. (*as reported to us in an RTI query in 2013*). Out of these, more than half were in A ward. That proportion is going down to some extent. In addition there are a few pay n park sites at MMRDA and under most flyovers operated by MSRDC as well as some sites operated thru the ward offices for which exact no. of spaces is not available. At a gross level, we can estimate that the total at grade sites in Mumbai should be about 150 (with approx 12,000 parking spaces all over Mumbai.) Under reporting is at least 20% In fact, there is a reason to believe that there are some “informal arrangements” that exist in many parts but primarily in south Mumbai.

Nowhere there are *any parking boxes painted on the road* which tell the motorists exactly how & where the cars can be parked. This is the standard practice followed all over the world ensuring that all the cars are parked within defined areas and this discourages wrong or double parking which affects traffic adversely. There are many cases of overcharging in view of very low rates and high demand. The municipality is developing web based universal payment system which would enable people to pay accurate payment based on entry and exit time properly identified thru the web system and prevent the parking lot operators or their staff from overcharging. However this has been a “non-starter”! It is rather odd that the municipality is developing a sophisticated and expensive system to monitor very few parking spaces and at very low parking tariff, and trying to prevent the motorists from being “overcharged” – A classic example of how we ignore the basic issues to ensure that the parking is restricted, regulated and properly priced. If that happens there is no *need to worry about the honesty of the parking attendants!*

Municipality and other authorities such as MSRDC & MMRDA have steadfastly ignored the simple and basic rule of marking the parking boxes, so that it is easy to account for the parking and to find out all the illegal parking, which is more than 90% today. Since there are no markings and the parking lots are

offered in terms of sq m , the operators often pack more vehicles than what the space permits. This leads to congestion.

3-5 **FSI Assisted Parking (off street inside premises)**

When the incidence of parking started increasing rapidly, it was felt necessary to provide for parking within the residential and commercial area based on the “need”. It was felt if we insist that adequate parking space is provided for the residents or commercial users of a building, it will reduce the parking on road. Old buildings did not provide for any parking spaces within the buildings and as a result, as the cars became cheaper in relation to the housing ,almost all flats in housing societies found buying a car affordable. (between 1980 and 2010, a two bed room flat in medium locality saw a price increase from Rs. One lakh to Rs. 1.50 cr – an increase of 150 times ! But during the same time, the cost of car (Maruti) increased from Rs. 60,000 to Rs. 3 lakhs – i.e. an increase of only 5 times ! This has a tremendous effect on parking. Earlier, finding a space for parking was hardly an issue. But now it has become a very important issue.

It was provided that every flat upto an area of 400 sq ft must be provided with one parking space and a flat with area more than 750 sq ft (i.e. 2 bed room) should have two parking to be provided under D.C. Rules. This became effective from all the constructions from 2005 onwards. There is a corresponding provision of parking for commercial uses. In all this regulation which was hailed as progressive, one important aspect was simply forgotten and that relates to provision of free fsi (each parking space requires provision of fsi equal to 200 to 230 ft) Hence a two bedroom flat with a carpet area of 750 sq ft requires an additional built up – or area under stilts- to the extent of 400 sq ft.

Extra fsi for public Parking under D C 33(24)

As if this was not found enough, it was decided in 2008 that under certain (minor) conditions, a builder should provide within a tower spaces for public parking at his cost and hand over the same to the municipality to operate the same against an fsi of 400 sq ft per parking space (which can be utilized for building additional flats/offices. *These additionally constructed flats/offices will get parking spaces as per the existing broader policy of two spaces per flat.* In short, this will increase the otherwise available fsi by about 2 times and there will be surfeit of parking. Whether such parking spaces will be filled or not is a moot question. But basically this leads to concentration of very rich households in such societies for which government has provided a lot of benefits in the form of fsi to increase the ownership of cars thru huge subsidy for increased motorization in the center of the city which is against the principles of sustainable mobility! (pl see **Annexure 2** which tells us the land use for residences and parking – for both residents & “public” facilitated by this section)

Previous experience of use of such parking spaces has been poor. This is not likely to be an exception. Perhaps if we increase the fee of on road parking effectively (and prevent free parking) there is a possibility that the use of such parking facility will go up. But we need to ask a question whether such

indirect but very large parking will be useful or detrimental as many additional cars from a relatively smaller area will be hitting the congested roads increasing the congestion further.

Govt has sanctioned 16 such proposals most of them in central Mumbai, totaling to around 21000 parking spaces. Considering that an *additional 300/400 sq.ft free fsi has been given for each parking space*, the value of this incremental fsi is huge (rs. 6300 cr at the bare minimum @Rs. 10,000/sq ft, but if we add the additional parking that got generated , the value will be much more !). When this was brought to the notice of MCGM, it decided to charge the premium on such fsi through which MCGM collected Rs.410 cr. This premium too is several times the annual parking that is collected and this premium is not even used for improving the conditions of on street parking! In other words. *This entire exercise has turned out to be increasing the density of land use in a negative and subsidized manner !*

One of the parking lots at Apollo mill redevelopment into high luxury flat has been recently opened to the public. We visited the parking facility. We saw a few tourist buses parked. Which was a welcome change, as they would be otherwise parked on main roads, causing hindrance to flow of the traffic. Otherwise , there was no traffic of any cars before in the lane adjacent to the plot.

3-5-1 Parking at Apollo- BMC public pay & park

CBRE as service provider, who in turn,

subcontracted the work to NK group who are running the operation through

Guards	6
Cashiers	4
Housekeeping	4
Total staff :	14

	min	max
Total no of parking spaces -	630	630
Approx. no of spaces filled per day	350	400
% occupancy	56	63
Daily collection (12-15 K) Rs.	12000	15000
Total income/mth Rs.lakhs	3.6	4.5
Collction per occupied space per day	34	38
Manpower cost p.m	5.5	5.5
Electricity consumption	4.5	4.5
for ventilation	1.5	1.5
Total operational cost /mth Rs.lakhs	11.5	11.5
Operational loss / mth Rs.lakhs	-7.9	-7.0

This facility does not cover even the operational cost per month. We were charged a tariff

of Rs.15 at the minimum, but considering that the collection / occupied space per day is only Rs.36 makes the figures inconsistent. The cost of construction and the land is several times that of operations cost And “external cost to the city” is even larger and negative because *it encourages parking and buying multiple cars by providing a huge subsidy – more than the cost of dwelling for a family below the poverty line!*

3-6 Parking Tariff in Mumbai

The tariff was unchanged since the beginning more than 20 years back till last year. It was Rs.5 for the first hr and then declining to Rs. 3 for incremental hours as the no. of hrs increased. Recently, there was a revision for the first hour at Rs. 10 **but for 3 hours, it is only Rs. 20 and for 6 hours only Rs. 30.** Now monthly pass has been introduced at key locations in south Mumbai at Rs. 1250 i.e. Rs. 50 for each

working day or an average of Rs. 5 to Rs. 6 per hr for a 8 hour working day. Total revenue earned by the Municipal Corporation from these operations is Rs. 12 cr/pa.(at a net earning per space under Rs. 3/hr!) Compared to this, revenue earned by London at Rs. 350 cr for public parking (reported by ITDP study) is quite significant, especially when a lot of vertical private parking within malls and other places is excluded from this. In fact, we have reason to believe that the parking revenue earned by Mumbai airport (at a tariff of Rs. 60 for half an hour and Rs. 125 for an hour) is more than what Municipal Corporation earns from the entire city!

In effect, the revision really affects only those *who park for short time and not really to those who park for a long time which is contrary to the basic objective of discouraging long term parking.* We understand that there are a lot of informal arrangements whereby a parking space costs anything between Rs. 2000 to Rs.2500 per month for a guaranteed space in south Mumbai.

Prices of comparable cars (especially at the lower and middle end) and auto fuel are quite comparable between India and most other countries. The ratio of parking fee per hr and auto fuel per litre is lowest in India. Current parking tariff in most cities is less than Rs. 5/hr and in Mumbai , average hourly tariff for first three hours is Rs. 7 as compared to price of Rs. 80+ per litre for petrol- *which is ten times higher than for three hours of parking !* On the other hand, parking fee of about \$6 for one hr is 4 times that of the price of petrol in London and in most other cities in Europe or even USA !

3-6-1 Comparison of Parking Tariff – Current & Proposed by MCGM & MESN

Current feb 14	Proposed by MCGM *			upto no.	PROPOSED NOW++		
Rs/hr	A	B	C	of hours	A	B	C
.10/15	60	40	20	1	40	30	20
20	75	50	25	3	100	80	60
30	100	70	35	6	200	150	100
55	180	70	35	9	300	225	150
65	210	140	70	10-15	350	225	150
1250	?	?	?	monthly	7000	4500	3000
to make it more palatable/acceptable				It is suggested	5000	3000	2000

A is island city, B is for western suburbs and C is eastern suburbs as per MCGM. We propose high volume/demand as A grade, medium vol/demand as B grade and low volume/demand as C grade, irrespective of whether such violations are in city or suburbs

Parking tariff should not be telescopic. We should discourage long term parking. Typically, daily rates for parking must be much higher than the average fare for AC buses. These should encourage switch from bringing a car to office and keep it parked for 8 hours or more. Higher tariff will encourage car pooling.

How Fair Parking Fees can contribute to modal shift within overall policy

In fact, part of parking revenue can be used to subsidize high quality/frequency AC bus service for commuters. this can be a powerful impetus to modal shift. It is possible that such intelligent and comprehensive pricing strategy can achieve modal shift of 10 to 20% and this can contribute substantially to reduce congestion and its associated negative effects. Like all other services, we can achieve “ price discovery “ thru experimentation.

3-6-2 Projections - what new parking policy can achieve by April/Dec 2015

No.of Pay & park locations	No of spaces	Location	Rs/space/hour*	Rs./space/p.a.	Net license fee/p.a Rs.cr #
800	40000	Island city	20	60000	240
800	40000	Western suburbs	18	54000	130
500	20000	Eastern suburbs	16	48000	50
2100	100000	Total for MCGM	n.a	n.a	420

* Rs/space/hr is based on an estimated weighted avg.of Rs.20/30/40 as avg rates for different class of locations and based On the characteristic of each particular area.

This is based on 60% of gross payment from final users to the service provider for 3000 hrs per year

3-6-3 Resi. area night parking on roads – projected fees & revenue by 2015

Proposed fee by mcgm per space			area	annual net revenue to mcgm		
pa -Rs	Night –Rs	Hr-Rs		spaces	net fee-Rs *	Rs.cr
3960	10.8	1.1	island city	30000	2376	7.1
2640	7.2	0.7	western	30000	1584	4.8
1320	3.6	0.4	eastern	15000	792	1.2
			Total	75000		13.1

* The net fee to be received by MCGM is estimated to be 60% of what the users pay to the service provider

3-7 Parking Discipline, Fines and Compliance

Parking fine data obtained from traffic police for 2005-2011 indicates following:-

- No. of cases apprehended range between 8.75 to 7.11 lakhs p.a.(there is a steady to declining trend in no. of cases)
- A total amt of fine collected ranges bet Rs. 4.20 cr. to 5.84 cr p.a.
- The amount per case was in the range of Rs.59 to Rs.75, In addition, during the same period towing vans apprehended cases in the range of 4.47 to 3.35 lakhs p.a.
- No. of towing vans increased from 59 in 2006 to 154 in 2012, but the no. of cases remained stagnant around 3 lakhs. in this period. What is however *interesting is that no. of cases per van per day went down from 17 to 6. Perhaps this indicates that towing van is not a very effective instrument for preventing wrong parking.* The amount collected is small, but the space occupied by this operation is rather large. It also has a higher nuisance value.

As far as the policy for parking on roads is concerned, there is very little that is attempted. During the 22 years on road Pay N Park is provided in Mumbai, very little has been developed by way of a system which can have some impact. MMRDA has organized pay n park in BKC (about 1000 spaces- very lower prices and highly congested) and MSRDC is providing *long term very low cost parking under various flyovers (about 1500 spaces)which is encouraging malpractices!* . When the contracts are awarded they are in terms of no. of sq meters and no mention of equivalent car spaces (ecs) is observed. The marking of parking boxes is conspicuous by its absence. The general principle followed is that minimum price above which tenders are invited is 60% occupancy. Many tenders are at full price recovery, meaning that whatever in theory the contractor earns is given by him to the municipal corporation by way of fees. Obviously, these are no charitable bodies. They pack more cars and charge higher fees. MSRDC charges, in effect, less than Rs, 2 per hr for parking under the flyovers. But again here we see a lot of vehicles- old and new- parked for days and months! There is variable fee from case to case basis.

Web assisted parking to ensure “correct” prices are charged by parking attendants!

It is to help the motorists find whether there is a space in the parking lot. More particularly, this is to prevent the attendants overcharging the motorists. Since the fees are low and demand is high, it would have been more sensible to raise the official fee rather than develop such IT systems to enable motorists to continue pay rather low fees and thus encourage more congestion, disputes and long hour parking using valuable urban space grossly underpriced. It is a non starter so far

4 Field studies and surveys in representative areas of Mumbai

To study parking conditions on 3 secondary roads with focus on the effects on the congestion-& on environment, air quality and noise. The roads chosen are :

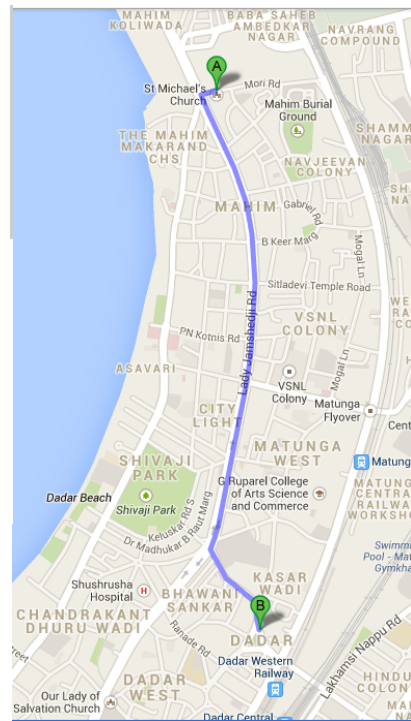
1 Lady Jamshedji road from Mahim Church to Plaza cinema at Dadar-2.5 km

Heavy parking on this road, at all times of the day. There are more than 15 bus stops on either side of this entire stretch, and parking incidence is **between 24% to as high as 90%** on both sides of the available road length on different stretches.(avg being 60%)

Lady Jamshedji Rd	2.5 km, 5 mins ● In current traffic: 15 mins
Senapati Bapat Marg	3.4 km, 6 mins ● No traffic information
Swatantrya Veer Savarkar Marg and Lady Jamshedji Rd	2.8 km, 6 mins ● No traffic information

Driving directions to Plaaza Cinema Dadar

A **St. Michael's Church**
Lady Jamshedji Road, Off Mori Road, Opposite Mahim Bus Depot, Mahim West, Mahim, Mumbai, Maharashtra, 400016
Mori Rd, Mahim, Mumbai, Maharashtra 400016



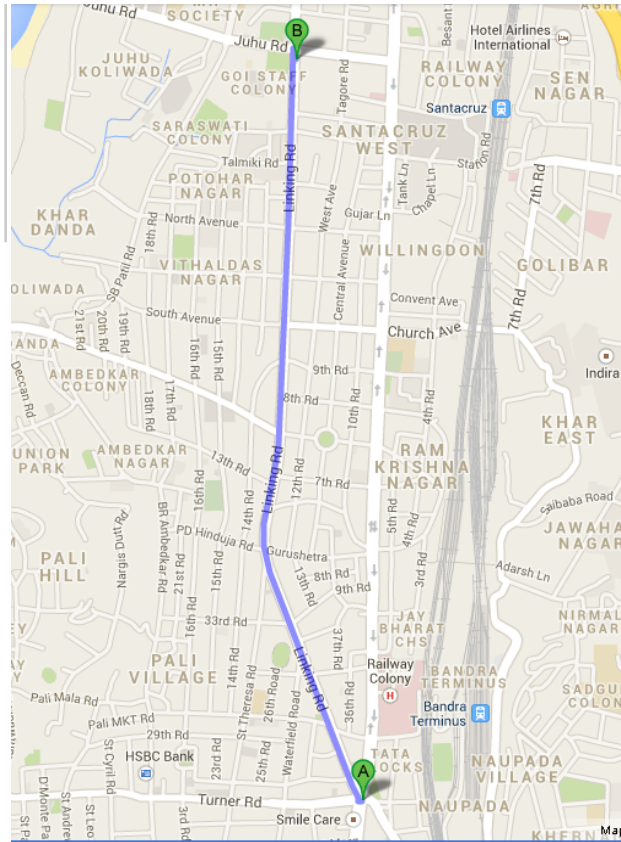
2 Linking Rd (where it starts from S.V.Road to Juhu police station-3 km)

A major road in the western suburbs. Predominantly commercial/shopping area

Linking Rd	2.9 km, 6 mins
	● In current traffic: 13 mins
Swami Vivekanand Rd	3.1 km, 7 mins
	● In current traffic: 13 mins
Swami Vivekanand Rd and Linking Rd	3.6 km, 8 mins
	● In current traffic: 17 mins

Driving directions to Santa Cruz West Police Station

A Samant Chowk
Gurunanak Marg, Bandra West
Mumbai, MH 400050



3 E Moses Rd from Worli Naka to Famous Studio-1.5 km

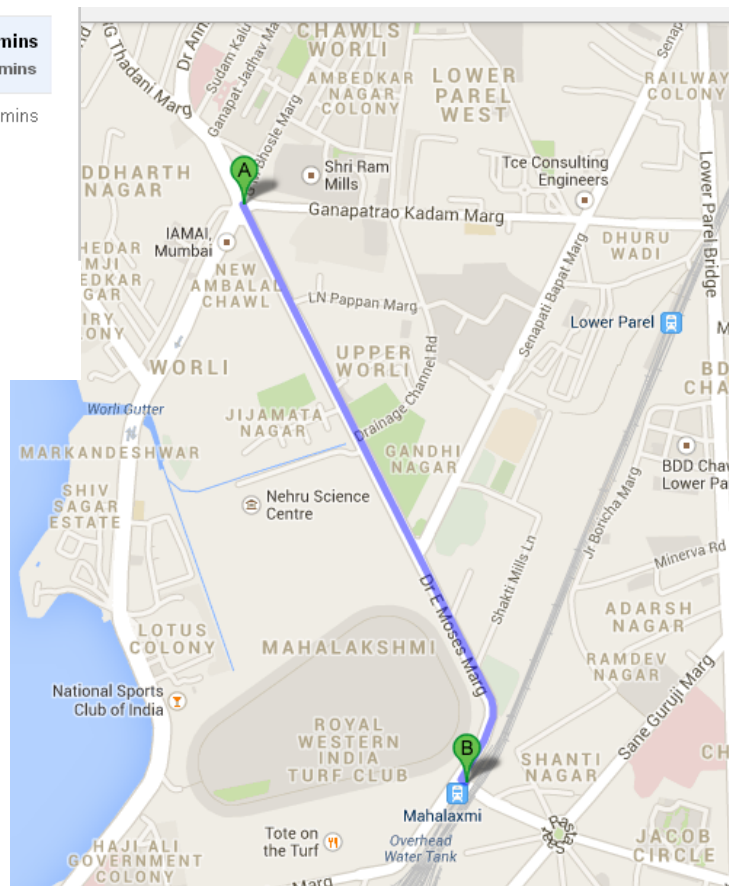
3 years back, this stretch of road experienced small amount of parking of vehicles. But after a lot of redevelopment leading to high fsi high cost residences/offices in this area, with substantial parking inside (assisted by very liberal doses of free fsi) the parking on the road has increased very substantially .The parking now occupies between **51 % & 75% of the road lengths** (see table). In addition to extremely high level of parking within the highrise commercial/residential buildings that have come up has doubled the parking load leading to very acute traffic congestion.

Dr E Moses Marg 2.0 km, 4 mins
 ● In current traffic: 10 mins

Or Walk 25 mins

Driving directions to Mahalaxmi, Bapurao Jagtap Marg, Arya Nagar, Mumbai, Maharashtra 400018

A Worli Naka Chowk
 Dr Annie Besant Rd, Lower Parel West, Mahalakshmi, Mumbai, Maharashtra



E Moses Road near Nehru Science Centre



L.B.S.Marg - Kurla



4-2 Parking inventory on selected roads, net space and ratio of parking utilization

Road	side	Length-km	Lane openings	Bus stops	Cars parked	2 wheelers	Space not av for parking km	Net space available in km	Ratio of space utilized by parking in %		
									Cars	2wheelers	total
Mahim church to Plaza	left	2.33	16	18	171	43	0.72	1.61	42	3	45
	Right	2.33	18	17	158	36	0.71	1.62	39	2	41
Worli naka to Mahalaxmi station	Left	2.00	6	6	232	55	0.37	1.63	57	3	60
	Right	2.00	6	8	138	25	0.17	0.63	87	4	91
Linking road jn to s'cruz police station	Left	2.81	20	10	121	30	0.64	2.17	22	1	24
	Right	2.81	16	11	146	56	0.63	2.18	27	3	30

Data collected by MESN Asso. Due to road work, the 1.2 km stretch between Mahalaxmi station to Nehru Science Centre has not been considered

space not available for parking – basis

- road openings @ 8m per opening of lanes
- bus stops - @ 20 m per bus stop
- building entrances/exits - @10% of total road length
- depending on the nature
- ratio of utilization on the basis of 4m/car parked & 1 m/bike parked

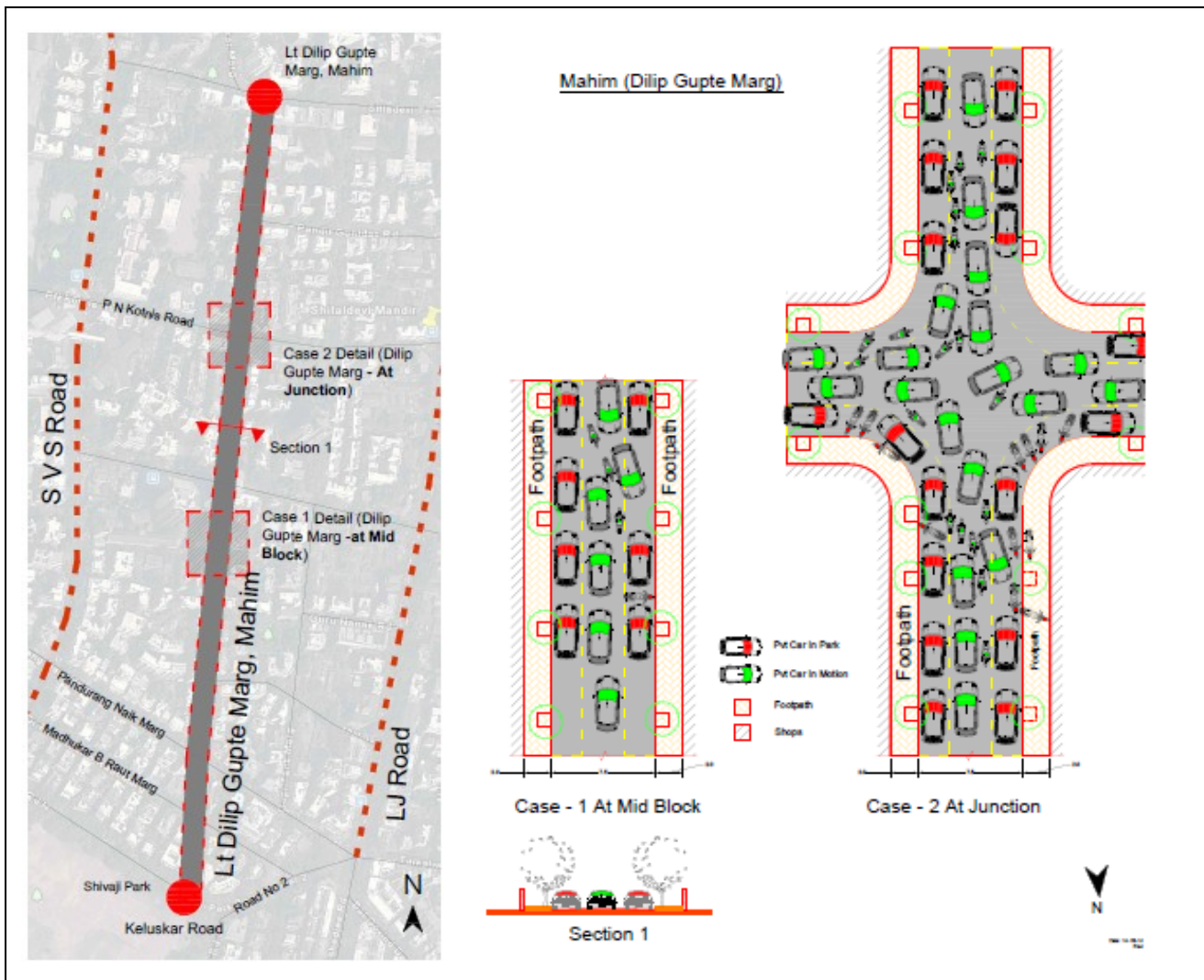
4-3 Parking in lanes adjacent to L.J.Road from Mahim to Shivaji Park

May-13

Name of road	Length-m	Total incidence of Parking			cars parked for 5 hrs or more	Quality of footpaths
		Left	Right	Total		
					2	3
Sittladevi to Sulbha Niwas	800	20		20	7	3
Sulbha Niwas to Rahul Maharaj Chowk		18	3	21	8	3
Dilip Gupte marg to Parchure Marg		28	9	37	19	2
Parchure m.m.to Shivaji Park		13	4	17	9	2
sub total	800	79	16	95	43	
<i>Sulbha Niwas to LJ road</i>	180	20	23	43	31	2
<i>Kokan Nagar to L.J.Road</i>	360	26	10	36	25	2
Rahul Maharaj Chk-Bombay Scottish school		19		19	10	1
Kataria marg	360	22	7	29	11	3
Dilip Gupte marg to L.J.road		20	6	26	12	3
<i>Sham biscuit to SVS road</i>	350	22	28	50	42	2
<i>Sham biscuit to L.J. road</i>		22	25	47	25	2
Dilip Gupte marg to SVS rd	280	12	5	17	9	2
<i>Pandurang Naik marg to L.J.rd</i>		13	14	27	17	2
sub total	1530	176	118	294	182	
Grand Total	2330	255	134	389	225	

- 1 *Width of carriageway for all these lanes is more or less 8 meters, which is approximately 2-3 lanes.*
- 2 *When there parking on both sides, it is quite difficult for vehicles to pass.*
- 3 *Traffic clash areas marked bold & in italics.*
- 4 *Quality of footpath marked on a scale of 1-5 (5 being excellent, and 1 very poor)*

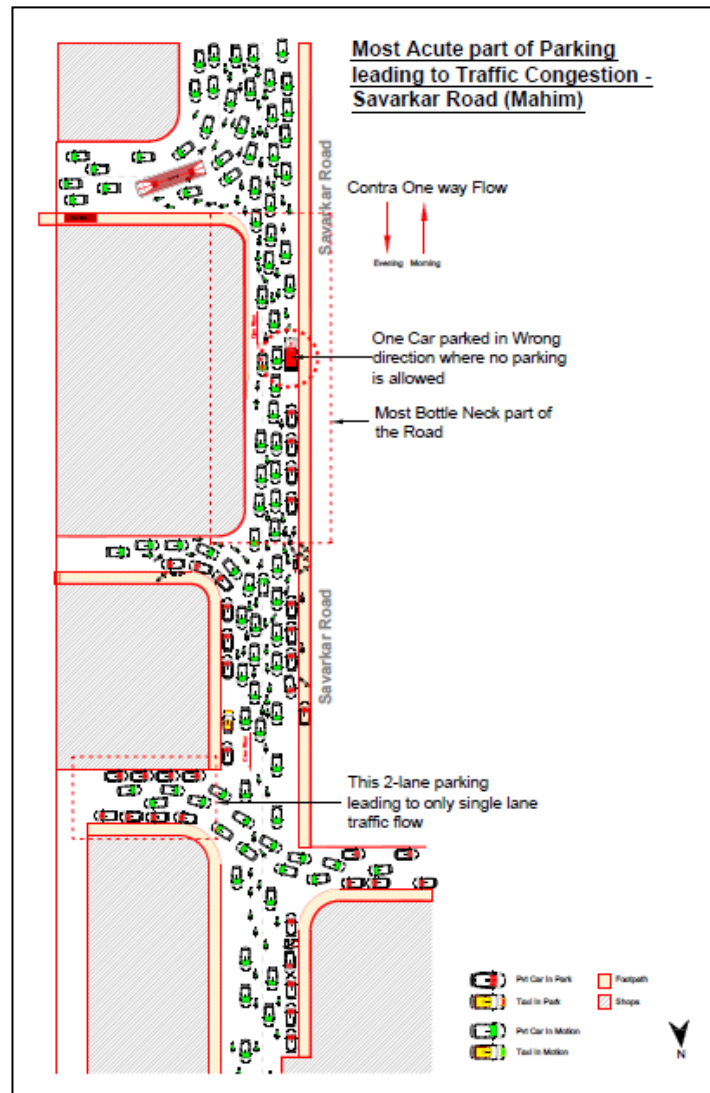
4-4 understanding of current parking practices leading to congestion



At Dilip Gupte marg lane , Mahim (btw high volume arteries of L J Rd and Savarkar Marg

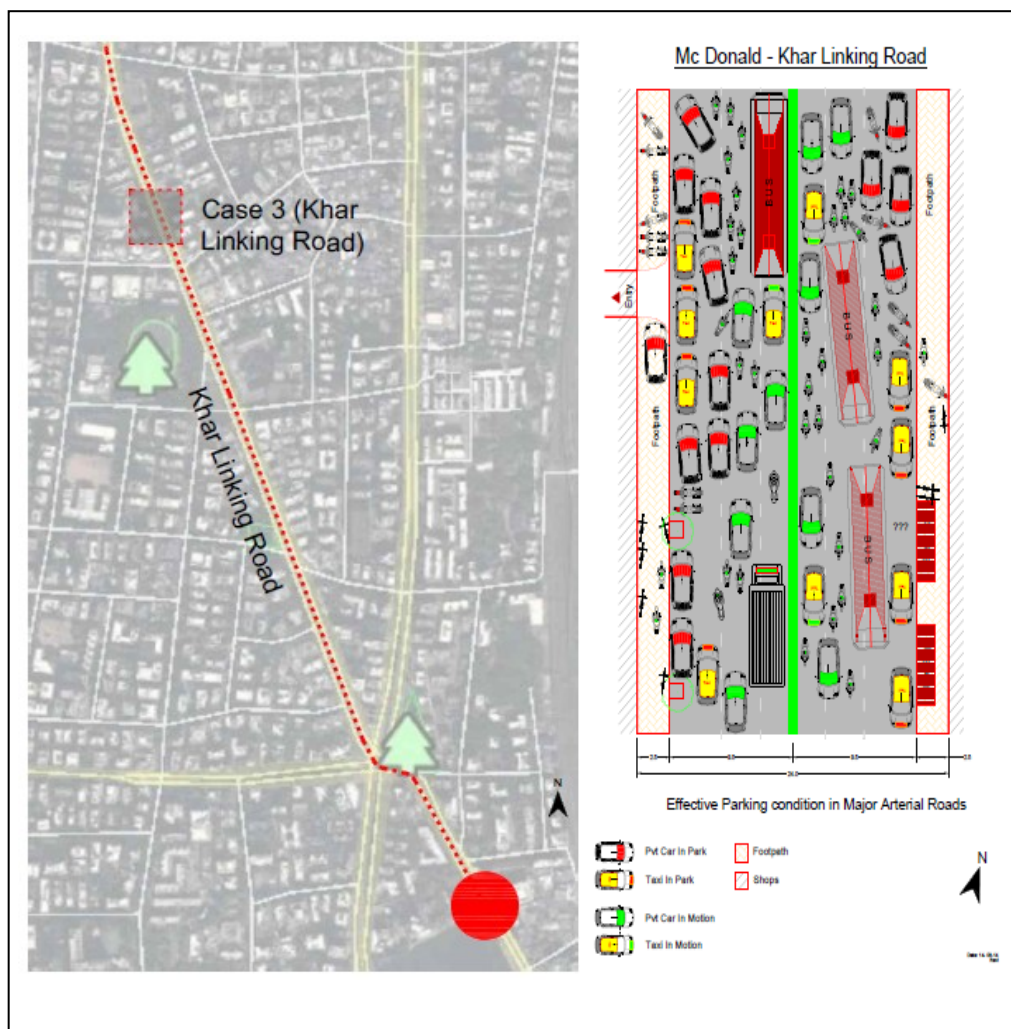
This is a relatively recent occurrence as a no. of side lanes and by lanes get spillover traffic and parking together for precisely the same reason that main arteries are choked. In this case, we have provided sketches for mid block as well as junction . There is a high incidence of parking (entire length one side parking with almost one third parking on the other side leading conflict between vehicles moving in both direction when only one lane is available for crossing. This conflict intensifies at the junction as shown in the diagram. This is simply not following of the basic rule of no parking at turns .

It is important that marking of *parking boxes* and also where it is strictly not allowed and will lead to double /treble fine on the road is needed as a first step which can facilitate pay n park and deterrence due to regulation and fee and easier fining due to marking .



on Savarkar Marg, Mahim – in a bottleneck part

This is a bottleneck part of the main north south artery between Shivaji Park and Mahim Church . It is one way south wards in the morning and northwards in the evening. There was strict no parking until a few years back. But slowly the parking has crept on the road and now it is full parking on both sides. Besides, the parking is quite prevalent in the narrow 8 m wide east west lanes. As a result , on the main artery , 2 out of 4 lanes are unavailable whereas the pressure from both ends which have got 6 to 8u lanes increases during commuting hours. Bad parking leads to violation of one way rule too. Many a times, in the narrow part (shown in the drawing 2a) out of three lanes, if 1 is lost even by one car, it creates severe backlog and it is quite common.



1. on a main artery like Linking Rd at Mcdonalds, Bandra (w)

Linking rd is a major rd in the western suburbs . It has a typical configuration of 3+3 lanes with a median . This part of the road in Bandra/S Cruz is one of the biggest shopping centers in Mumbai and is also used by commuters from Santa Cruz and Juhu. There is a high volume of shoppers and walkers. Ideally this should be “a car free road” but that is not possible. But to allow parking in two lanes out of three quite extensively (sometimes even without a driver inside) and without any restriction or fee makes this road dysfunctional. The sketch depicts a very real and common situation. During mornings and evenings (and all day on Saturday /Sunday – shopping days) and most afternoons, there is a very slow thruptut of vehicles. Very few buses ply on this road knowing this problem. If there is a restricted (and fully paid parking with rates per every half an hour or part thereof at Rs. 30 but allowing stopping of vehicles only for alighting free) we can bring order to this and similar roads. Needless to say, the bus stops (there are two on this stretch) should be free from parking for a total distance of at least 50 m . It will help people make a choice in favor of buses.

As the congestion level increases, there is a stronger tendency for an increase in particulates as well as Carbon monoxide . These observations per unit of time clearly imply that pollution per km is quite under traffic congestion and a lot of it in the city is caused by the blockage of traffic arteries and lanes by parking

It must, however, be said that it is difficult to establish a strong direct correlation between parking and air quality. However, it is very obvious that indirect relationship is very strong and beyond doubt simply because excessive, unregulated and free parking on street and (even off street) affects the air quality through distinctly increased traffic congestion.

It reduces the available road space for carriageway in a significant manner (from main arterials like Moses Road, Linking Road) each having typically 3+3 lane with median configuration. Out of three lanes, one is totally gone due to parking and the second is also used either for parking or entry/exit from parking as well as buses that are forced to stand in the middle lane. Thus the available carriageway is reduced by 40 to 50%.

Secondly, and in a more important sense, such easily available (and free) parking allows motorists to have more cars and use them when not really necessary (such as for minor shopping etc)

When parking is virtually free, the cost of parking is never considered a factor in buying the first or second car. In cities like New York, London, Hong Kong and Singapore cost of parking is much more than fuel cost. And this affects the decision making of people with respect to buying a car.

Traffic congestion resulting from such parking materially affects the air quality, noise, space abuse and making public transport more people "unfriendly" This further compounds the vicious cycle. As public transport - notably buses in the context of Indian cities and especially in a linear city like Mumbai - suffers due to such severe obstacles from the people who are shaping and forming public policy with respect to land use and transport choices think that "unless we improve public transport" people cannot be expected to shift from cars to buses." This argument is totally self-defeating!

4-5 **case study 1** Trip time, Idle time on roads with high incidence of parking observations in the 1st fortnight of December

journey - O - D	total time	idle time	net time	idle	distance	avg speed(km/hr)	
	min	min	min	time%		km	gross
santacruz to Globus evening at 6.15 pm	40	12	28	30	6.4	9.6	13.7
globus to s cruz east evening at 8.25 pm	60	18	42	30	7.2	7.2	10.3
Mahim church to meethibai college via linking road, juhu at 2.39 pm	62	12	50	19	18	17.4	21.6
Meethibai college to Mahim church at 3.10 pm	70	20	50	29	14	12.0	16.8
from mahim church to makarand soc via portuguese ch N.C.Kelkar road, Spark middle lane upto Goa Portuguesa, then cadell road	30	12	18	40	6	11.2	18.7
	34	6	28	18	6	10.2	12.4
Total for 12 trips	296	80	216	27	57	12	16

	total time	idle time	net time	idle	distance	avg speed(km/hr)	
	min	min	min	time%	km	Gross	net
Average for a trip	25	7	18	27	5	12	16

These are all high parking density areas with both sides chaotic and free parking. They handle high traffic volume thru the day. Travel was undertaken thru auto and noting down the meter reading which provides distance covered, idle time besides fare. In some areas of the island city where autos were not available, we used stop watch and distance meter from the car. Our observations are quite reliable and we could observe a clear discernible pattern.

Observed idle time was as high as 27% for an average trip of 5 km, taking 25 min there are 8 start stop operations, which would also help us understand the waste of energy and excess emissions

4-6 case study 2 Traffic counts on Savarkar marg, Mahim at Mahim Durgah (avg / hr for 3 consecutive days)

	direction	cars	2 wheelers	PCUs	Passengers
Morning - peak	southbound	1536	936	2004	3708
Evening - peak	Northbound	585	667	919	1878

No buses / trucks allowed also no auto rickshaws

This road is a one way but a few vehicles *also travel in the contra direction*

There is more parking in evening on this bottleneck part of the contra one way road between Mahim church and Bombay Scottish School.

Width is 15 meter (with 5 effective lanes out of which 2 lanes are used for parking (It is not permitted at all!))

Comments on Tables 4-7 :

In the evening, the through put drops by half for both the pcus and passengers-(from 700 pcus per lane to 300 pcus per lane)

As a matter of fact 4 lanes are available in the morning and 3 lanes in the evening.

While no. of 2 wheelers per hour are 936 in the morning, about 2/3rd that of cars, in the evening, 667 2 wheelers are more than 585 cars, this is simply because, they can weave in the traffic, and actually carry more passengers which is an interesting phenomenon indicating increasing dominance of 2 wheelers in the use of 2 wheelers in the city in such areas. We have observed that average no. of persons carried by 2 wheelers is same as that of cars i.e.1.5. This also tells us that if we can mark the lanes, and insist on lane discipline, the traffic through put could be higher and smoother, resulting into fewer emissions.

We understand that traffic police, who control the signal manually at St.Michael church Mahim, give a little preference to traffic from L.J.Road, which consists of buses, whereas, traffic from Savarkar marg is restricted only to pvt vehicles. This bias may also contribute to some extent in reduction of through puts.

Above observations on the same road for morning, evening in opposite directions do indicate the effect of congestion, which gets heightened due to one extra lane blocked by parked vehicles. In a rather simplified manner, 33% decrease in space through one additional lane of parking in the evening, we have a through put drop of 50%. There is no one to one correlation, but a significant tendency can be detected leading to a significant increase in emissions, as there is a stop-start behavior for about 15 times per hour in the evening, whereas it is only 3-4 times in the morning.

5 Findings from Emission study conducted to assess Air Quality and Noise levels at Test and Control Roads

(On comparable roads with/ without parking)

In recent years concern about exhaust emissions from motor vehicles has been increasing. Exhaust emissions are a major contributor to air pollution due to the rapidly growing number of vehicles on roads in Indian cities such as Mumbai.

The effects of poor air quality on human health are far reaching, but principally affect the body's respiratory and cardiovascular systems. Individual reactions to air pollutants depend on the type of pollutant a person is exposed to, the degree of exposure, the individual's health status and genetics. The fuel combustion in vehicles is one of the major causes of presence of carbon monoxide, hydrogen sulfide etc. Other sources of air pollution include particulate matter (PM), ozone, nitrogen dioxide, and sulfur dioxide.

The traffic congestion and near grid lock situation has worsened due to rapid & substantial increase in parking on one/both sides of most roads, reducing the effective carriage way & forcing the vehicles to be driven in start- stop mode, half clutch mode as well as at very slow speeds which lead to partial combustion of the fuel, increasing the levels of the atmospheric pollutants per km driven and per minute occupation of road by vehicles.

This study aims at quantifying – at least to some definable extent – whether excessive, undisciplined & anywhere parking contributes to increase in pollution thru increase in traffic congestion and sub optimal conditions of driving.

We have quantified parking on a few representative road stretches (4-2). These parked vehicles are a major cause of congestion on these and connecting roads, which in turn affects air quality.

In order to quantify the emissions on roads where traffic is affected by parking, we identified 1 road as control (where there is almost no parking but high traffic volumes) and 4 road stretches as test sites. Both the control & test sites were similar in terms of traffic volume, no. of lanes etc but differed in terms of parking on the roads (which was mostly absent in control and substantially present on Test roads). The chosen roads were as follows:

	Names of roads selected	Type	Space occupied by parking in %
1	Dr Annie Besant Rd (Worli)	control	No parking
2	Linking Rd (Bandra)	Test	45
3	E Moses Rd (Worli)		60
4	Mohammed Ali Rd (under JJ F/o)		75
5	N.C.Kelkar Rd (Dadar)		**

*** Within 700 m of this road, there are 4 entry exit lanes with huge both sides parking, which in effect is parking for N.C kelkar road, which is a major shopping area strategically located almost outside Dadar station. Direct parking is also observed to some extent.*

Observations were recorded at an interval of 15 minutes since morning to late evening for full normal dry working days in mid June 2014. On each road observations have been identified for peak congestion period and off peak (lean) period and it was invariably found that emissions are significantly higher during peak periods when the occupation of road by flow of vehicles is higher (i.e. there is very high incidence of stop start driving due to traffic congestion.) The observations were recorded for the following along with the vehicle flow counts:

1. Level of Particulate matter (PM)
2. Levels of Carbon monoxide-CO
3. Decibel levels
4. The number of vehicles passing counted thru a manual counter.

2.3 Data Compilation and Analysis

This work was entrusted to **Environment Policy & Research India (EPRI)**, an organization which specializes in this type of work. We jointly worked out the selection of sample, method of data collection and its interpretation ensuring that the results are reliable and significant.

1. All the samples were collected from 8.00 am to 8.00 pm (12 hours a day)
2. All the air quality parameters were collected at an interval of 15 minutes. Thus four readings per hour were obtained.
3. Vehicle counting was carried out on continuous basis for 12 hours.
4. Collected data was brought to the laboratory and then analyzed using statistical software.
5. Statistical analysis of the data was carried out with the help of Microsoft Office Excel.

Peak period vs non peak period

Following table gives the vehicle count on all the above roads for peak hr peak direction and the lowest no. (Presumably at off peak hr) - Table-1

Road stretch #	Type	Peak hr (PCUs)	Off Peak (PCUs)
Annie Besant Rd. worli	Control (no parking)	3754	3396
N.C. Kelkar rd, Dadar**	Test (high parking)	1586	2035
Linking Rd – Bandra w	Test (high parking)	2839	1907
E. Moses Road-worli to M'laxmi	Test (high parking)	1183	982
Mohd Ali Rd. (under JJ flyover)	Test (high parking)	1158	1036

*** On this road, traffic congestion is so high during peak hours that due to drastic reduction in traffic speeds, the actual thrupt declines as compared to off peak period. On this road, congestion is observed even during some non peak hours.*

Above table shows that the vehicle thruput is higher during the peak hr (with the exception of Dadar where hour wise distribution of vehicles flow is flat. Control road also has a high volume of traffic but it is much smoother than the test roads. Parking on roads is an important (but not the only) element which makes a difference to traffic flows and the emissions.

Also due to choked traffic, the no. of vehicles actually goes down during peak hr. We have observed similar phenomena at BKC, Haji Ali and a few other locations as observed at N.C.Kelkar Road. We expect this will increase at more locations where the traffic completely overwhelms the carrying capacity of the road – needless to say , this is intensified further due to extensive and chaotic parking on both sides of the road ! Typically, on roads where there is some “idle” space on the carriageway during off peak hours gets filled up during the peak hr.

We also notice over the period of time, that the gap between peak and non peak hr is going down. In case of Dadar, there is already full capacity utilization during off peak hours and hence the traffic thruput goes down /slows down during the peak hr as the vehicles are totally in stop start mode. If there is no parking, the flows would certainly be higher and smoother. As we reach the physical capacity of road lanes to carry traffic at a given speed, then the thruput goes down and emissions go up.

Emissions due to Traffic levels

Motor vehicles emit large quantities of carbon dioxide (CO₂), carbon monoxide (CO), Hydro carbons (HC), Nitrogen oxides (NO_x), Particulate Matter (PM), and substances known as mobile source air toxics (MSATs) such as benzene, formaldehyde, acetaldehyde. These substances produce extreme environment hazards.

PM is a widespread air pollutant consisting of a mixture of solid and liquid particles suspended in the air. Commonly used indicators describing PM that are relevant to health refer to the mass concentration of particles with a diameter of less than 10 µm (PM₁₀) and of particles with a diameter of less than 2.5 µm (PM_{2.5}). PM_{2.5}, often called fine PM, also comprises ultrafine particles having a diameter of less than 0.1 µm

Difference in Particulate matter at test and control road stretches – Table -2

Site	Type	Peak hour			Off peak hour		
		1	2.5		1	2.5	10
PM ($\mu\text{g}/\text{m}^3$)							
Annie Besant Road	©	376	482	622	228	227	417
N.C.Kelkar Road	(T)	632	756	929	210	303	377
E.Moses Rd-Worli	(T)	1470	1010	2160	677	829	1360
Linking Rd Bandra	(T)	819	944	1220	196	274	369
Mohammad Ali Rd	(T)	892	974	1961	522	589	658

(The national average standard for PM_{2.5} is 60 $\mu\text{g}/\text{m}^3$ & for PM₁₀ it is 100 $\mu\text{g}/\text{m}^3$)

Observations with regard to particulate matter at all the test roads clearly show that they are higher as compared to control site and much higher than the national average standard for the same, (which is 60 $\mu\text{g}/\text{m}^3$ for PM_{2.5} & for PM₁₀ it is 100 $\mu\text{g}/\text{m}^3$). Also they are much higher in peak hr as compared to off peak hr in a very decisive manner (2 to 3 times!).

The table also shows that the total of all particulate matter for each of the test roads is over 100% higher than the control roads during peak hour (except in case of Mohammad Ali Road, which shows higher PM total during off peak hour)

**Average levels of Carbon monoxide(CO)
at Test & control sites – Table - 3**

Site	Type	Average-PPM	Comparison of Test vs control
		CO	%
Annie Besant Rd, Worli	Control	2.9	
Mohammed Ali Road	Test	22.6	779
N.C.Kelkar Road, Dadar	Test	16.8	579
Linking Road, Bandra	Test	14.5	500
E.Moses Road, Worli	Test	12.0	414

The CPCB-Central Pollution Control Board - national average standard for CO is 3.5 PPM

The CO levels at N.C.Kelkar Road and Linking Road are almost the same. Mohammed Ali road shows the highest CO level. Also on all the test roads, the values are more than 3-4 times higher than the national average standard for CO.

Effects of very slow movement of vehicles due to congestion on emission (excerpts and references)

“Traffic congestion reduces average traffic speed. At low speeds, scientific studies reveal, vehicles burn fuel inefficiently and lead to more pollution level. *For example, a study in the United States found that for the same trip, cars consumed more fuel and polluted more if the traffic was congested, than when traffic flowed freely. At average trip speeds between 20 to 40 km/hr, the cars pollutant emission was twice as much as when the average speed was 55 to 75 km/hr. At average trip speeds between 5 to 20 km/hr, the cars pollutant emissions were 4 to 8 times as much as when the average speed was 55 to 70 km/hr. Fuel efficiencies similarly were much worse with traffic congestion.*(Matthew Barth and Kanok Boriboonsomsin (November 2009)

The **average trip speed** on many Indian city roads, especially in metros, is **less than 20 km/hr; a 10 km trip can take 30 minutes or more. At such speeds, vehicles in India emit air pollutants 4 to 8 times more than they would with less traffic congestions**, Indian vehicles also consume a lot more fuel per trip (leading to *even more emissions!*) than they would *if the traffic congestion was less*. Emissions of particles and heavy metals increase over time because the growth of the fleet and mileage outpaces the efforts to curb emissions (R. Kumari, A.K. Attr 2008). “

Noise Related Health Issues -

Besides the adverse effects of the air pollution, elevated levels of noise have become an inseparable part of our roads. Noise pollution is a significant environmental problem in cities like Mumbai, and is a serious health hazard in terms of:

1. hearing impairment,
2. hypertension,
3. ischemic heart disease,
4. annoyance,
5. sleep disturbance
6. Changes in the immune system

Noise Level in decibels (dB) – Table-4

Site	Type	Noise level-dB		PCUs	
		peak	off peak	peak	off peak
Annie Besant Rd, Worli	Control	80-85	75-80	3754	3396
N.C.Kelkar Road, Dadar	Test	90-95	70-75	1586	2035
Linking Road, Bandra	Test	90-95	65-70	2839	1907
E.Moses Road, Worli	Test	95-100	65-70	1183	982
Mohammed Ali Road	Test	95-100	70-75	1158	1036

The table shows high decibel levels on Mohammad Ali Road as well as N.C. Kelkar Rd - at peak hour- as compared to the control road implying the impact of traffic congestion. On the other hand, at off peak hours, there isn't any distinct difference between the noise levels at the control or test sites, as the flow of traffic is relatively smooth and use of horn is less - An observation that makes sense. Since honking, though futile (on congested jam packed road!) greatly contributes to noise pollution.

Conclusion and way forward

Finally, comparison of the findings at the test and control road sites as well as peak and off peak hrs shows that traffic congestion, slow moving vehicles and unmanaged pedestrian movement due in a substantial manner on account of poor quality of footpaths **and last but not the least chaotic, unregulated& free parking** contribute in a decisive manner to a substantial increase in PM & CO emissions and an increase in decibel levels.

Our choice of roads with and without parking also clearly implies that undisciplined parking which occupies at least one lane (out of 2- 3 lanes) is a major contributor to the increased congestion, leading to slow as well as stop-start driving leading, in turn, to *materially increased emissions*. Together with other adverse impacts mentioned elsewhere in the report, these findings must be taken into consideration in transport planning to contribute to keeping the traffic movement in a free flowing manner thereby regulating emissions.

Regulation of parking can be a good and effective starting point towards this goal. It is one of the quick wins, which is also revenue positive. If there is a lack of enough reasons for taking step which is somewhat unpleasant to a few thousand motorists in a city of 13 million, a great increase in pollution can certainly be one more powerful reason.

Measurement of air quality - photographs

5-1

E Moses Road – Worli Naka



E Moses Road – Worli Naka



6 Recommendations for sustainable parking policies & practices 2014-16

6-1 To improve parking practices:

We need to conduct parking census on all roads and streets in each ward (during day and night). This should identify road width and estimation of traffic volume and whether there is high commuter traffic.

Based on the actual observation of parking volumes together with available road widths and footpath widths, we should choose, at first, very obvious high volume locations and mark where parking (under payment) is permitted (in white boxes) and where parking (such as at and within certain distance from bus stops, turning and in front of schools/high volume locations) should attract double fine (yellow boxes.) The marking should clearly indicate whether parking should be parallel or in 90 /60 degrees.

6-2 Criteria for on road parking based on road widths, character and volume of traffic:

1. Allow enough space for 1+1 clear lane carriageway where the traffic volume is less than 200 PCUs in a peak hr peak direction/road-lane(excl parking lanes.) we must also have a minimum 2 m (preferably 3 m depending upon current and potential volume of pedestrians) footpath on either side of the carriageway . It means that even a lane where we allow one side parking must have a gross width of 14.5 m width (2m footpath each on both side, 3 lanes of 3.5 m each carriageway footpath totaling 14.5 m).
2. If the volume is not more than 600 pcus/hr and if the gross width is 18 m , we can allow both side parking – but needless to say, at a price equal to 85% of utilization to be discovered by trial and error. This should be the basic guideline but can be little liberal for first two years when exception can be made for deviations upto 10% width available.
3. As the car parking in a parallel form requires about 2.5 m space while the lane width is 3.5 m and effective lane width in many cases is about 2.75 m and hence 10% concession should be acceptable especially if there is a dead end. But in such lanes, we should allow residents parking reservations
4. On arterial roads, which have larger widths but also have higher volume per lane (i.e. beyond 300 pcus per day) we need to restrict parking. We should have 2 criteria for:
 - Side lanes which are perpendicular to arterials/major 4 lane roads
 - Arterials as well as 2+2 lane road

We believe that current estimated parking is above 250,000 vehicles during the day. The night parking will not be much less. But a full census will determine the precise extent. We can then decide which lanes/alleys can be left out from parking regime. We expect that to begin with we should aim at 50,000 spaces in lots of minimum 20 spaces per lot. At a few places, we can experiment with two level mechanized parking (with due consideration of need, ease of entry/exit and due consideration for urban look and area characteristic. It should be used frugally and prudently (and attract additional fee to cover the cost of mechanized structure.

- All the boxes where parking is permitted(and on payment basis) should be serially numbered in a systematic manner which can form a dbase and the same numbering system should be used for awarding service provider contracts, for estimating and accounting of fees, gradation of class and estimating the use level periodically.

6-3 Parking guidelines for commuter arteries during morning /evening to improve bus movement

We should allow no parking on major N-S arteries such as Ambedkar road, S.V.road, Annie Besant Road, as well as E-W arteries such as JVLR and SCLR - **during phpd**. This can facilitate high frequency, higher speed thrupt of corridor line bus service during peak morning/evening hours @ 1 bus /min or even more. The justification of no parking on the kerb of these roads should be governed by the no of buses per hour and parking and bus operation should be closely linked, which it is not at the moment, in other words, the people should be informed that banning of parking is directly related to superior bus service. This also means that in practice there is an option between parking (@ high enough prices) & buses which are frequent, predictable and speedy inasmuch as the buses won't take more time than the individual cars. Eg. Ambedkar Road, a major artery between Sion and CST with several flyovers, should have no parking on the left side in the morning and on the right side in the evening to mitigate the possible shock to the people who are used to park their cars routinely throughout the day. In the side lanes, to this and all other arteries, we should provide paid parking on one side (change the sides on odd and even dates). We can consider providing limited parking under the flyovers, in a restricted and designed manner, all of this should be attracting a tariff of Rs.30-40/hr. We can consider higher rate for the main arteries and lower rate for the lanes & even lower rates for vertical parking provided by 33(24). To take a concrete example of Ambedkar Road, as well as Tulsi Pipe Road, the tariff could be Rs.40/hr on the main artery only on the permitted side, Rs.30/hr for the side lanes, and Rs.20/hr, inside the towers covered under 33(24). This approach can be adopted for major east west links such as JVLR as well as SCLR. This calls for a detailed and specific study of how this can be possible and supported thru special supervision and communications program.

6-4 Guidelines for transit oriented development, multi storied private/public parking

For buildings within 500 m of railway/metro stations, or major bus terminals especially for bus priority and BRTS we should have TOD guidelines, whereby, we should allow a very small parking maximum, a famous egg shaped building London, the tallest, more than 50 floors, allows only 45 car parking spaces whereas we have for every flat of 700 sq.f extra FSI worth, 400 sq.ft (given free to the builder) but he adds this price to the sale price of the flat (bundling of price). On top of it under sec 33(24) as mentioned above a builder is allowed 400 sq ft as a buildable area (for residence or commercial) worth several lakhs, but the damage does not stop here.This extra buildable area for residential or commercial purposes leads to further children parking spaces, which in the end means 1 flat becoming 1 & a half flat & we have 4 parking spaces, and typically this dev takes place in highly compact, & expensive, prime areas where the road space outside such towers, will not be able to manage this excessively generated traffic.

Hence it is important that we should have total restriction of 1 car for every 2 flats or corresponding commercial space. & that too, at the full price of fsi, to the municipality, which should be credited to

the transport fund. In such areas, we should have clearly smaller flats, which cannot be combined. Now instead of current 4 parking spaces per flat we will have 1 parking place for every 2 flats, thus, if we have smaller flats we will have several residences, which can be provided at affordable prices to people belonging to middle and lower middle classes, who can use public transport and can afford the price of Rs.5000-7000/ sq. ft for a flat within the range of 300-500, meaning a maximum of 35 lakhs, this can be a high quality but small flat ideal for a small, young and upwardly mobile family. And we need to attract them, to improve the competitiveness of the city.

In the non TOD areas also parking can be permitted at the rate of 1 car per flat or corresponding commercial places but for which there should be no extra fsi. Further, out of the open or unbuilt area in housing complexes or housing societies, parking should not be allowed for more than 1/3rd of it, which will allow, 2/3rd area for children to play and some green area as a common free public space, and parking needs to be considered as a private use of public space. This will automatically put restriction on people to own the cars. This will also encourage more users for pooled cars/taxis, autos and walking or using bicycles. Such transparent pro people and pro city regulation of parking will definitely encourage city administration people to follow directions in the short and long term.

6-5 Parking policy for buses, trucks as well taxis and autos

There are no specifically provided parking spaces for trucks and buses. They are mostly parked for free. Water tankers, inter city, private buses (1000) and school buses (2500) are parked in large number all over. Mumbai has the largest population of autos and taxis in the world at 110,000 and 55000 respectively. In addition, there are more than 10,000 fleet taxis and private taxis. Further, there are 2500 school buses, and almost an equal number of private buses. They are all parked on roads in the night and also during day for several hours.

We should consider specific zones where the trucks can have longer parking (such as Vadala truck terminal) we need at least 2 more terminals – one each for traffic from Ahmedabad and Nashik. At these terminals night parking at a small fee upto Rs. 25/night)should be provided. But not more than one night !

Taxi /auto parking is a complex issue and should be dealt with separately . There should be taxi/auto stands in all parts of city, well marked on ground and on a board and specifically serving share auto/taxi. We should consider parking of taxis and autos at regular parking lots if the space is available and they are willing to pay upto 1/3 tariff for cars.



6-6 Parking under flyovers

Under more than 30 flyovers, a large no. of buses, trucks, taxis, autos and cars are parked. Many of these seem to be parked for several days. Some are virtually abandoned and several new vehicles which were confiscated due to nonpayment of installments have been rotting under these flyovers.



Contradictory statements emanate from various authorities about whether the parking should be permitted under the flyovers. But no *definitive action is seen in any organized way at all*. We believe that the space under all these flyovers is very valuable and its abuse must be stopped. We cannot take a view that no parking should be allowed as it will then shift to the curbside of the highway or service lanes and this will create more problems. It is possible to restrict parking for upto days only and there should be high enough fee – just the same as elsewhere in the area and few spaces within the overall designed land scape and other uses such as right traffic lanes, police chowkies and under some flyovers even some play area for children (depending upon the location and ambience !)

7 Policy reforms

Instead of linking electricity with bus operation, it is useful to link parking with bus operation. The city should have a comprehensive parking authority with a head but a common board along with bus operation . Both are independent and important strategic business units. Parking authority should take care of parking offences and fines. It should share common dbase of car ownership with RTO and traffic police.

To regulate in a restrictive manner with substantially higher fees is not an easy thing. At the same time, it cant be wished away or postponed conveniently. It needs a support from the highest level of political and administrative leadership and needs a strong educative and communications campaign. There should be simultaneous and substantial improvement in bus service as well as auto and taxi sharing , encouragement for car pooling etc. Unless we take well planned comprehensive approach , piece meal reforms will not work. But parking is at the core of basic and next generation reforms . Auto and taxies will benefit and so will be the buses and this needs to be explained and gain their active support and cooperation .

Based on the above exercise, we should develop basic tender document which should ensure that each parcel of sites should cover a minimum of 50 ecs and a maximum of 200 ecs. We can determine basis of min estimated occupancy of 60% out of 10 hours /day for working days (in case of shopping areas as well as purely residential areas concept of working days and hours should be changed in line with the use pattern. For example, the residential area should focus more on monthly/quarterly /annual permits for nights (and optionally) days etc.

7-1 Management of Parking and Reforms

As suggested by M V Asia we should establish Mumbai Municipal Parking Authority which should set up the organization , prepare budget (it will be highly revenue positive by the year end), choose the sites and service providers. Work out the pricing (incl “price discovery”) and supervise management, honesty efficiency observance of rules by those who park and by the service providers. As we will demonstrate in the subsequent parts of the report, the revenues from parking can by increased by 30-40 times of the current level and hence spending upto 10% of the revenue in efficient management and systems is highly desirable.

Need for systems approach using meters, cards and accounting

We have to standardize procedures, metering system, parking card (or even better transport card which can be used for tolls, parking and fines as well as use of trains and buses and possibly even taxies and autos in the long run.) These cards can be either prepaid or credit cards and meters should be able to read the entry time, exit time and fee which can be debited in a cashless option. Use of such cards should be attractive offering 10% discount over the cash pmt basis. This will improve honest and proper accounting. The money centrally collected thru such system can be credited to each service

provider without hitch or delay and that should improve overall efficiency and honesty. It is not difficult to design such system – to begin with parking.

This systems approach with a strong focus on governing is a must. Needless to say, when the tariff is going to be high , it is possible that system can be designed in the matching efficiency , neatness and honesty which should enable people to make a logical decision and enable smart and efficient policing . No spillover beyond the borders should be tolerated. There should be very visible numbering, boards, meters, uniforms etc. With proper dbase support and electronic tendering , we can choose good service providers in a transparent manner . This can be first tried thru a pilot and then extended all over the city. An orderly parking of vehicles can be an important step towards a world class city and give people a sense of pride and encourage the proper usage of the system.

Parking tariff should not be telescopic. We should discourage long term parking. Typically, daily rates for parking must be much higher than the average fare for AC buses These should encourage switch from bringing a car to office and keep it parked for 8 hours or more. Higher tariff will encourage car pooling. In fact, part of the revenue from

How Fair Parking Fees can contribute to modal shift within overall policy

In fact, part of parking revenue can be used to subsidize high quality/frequency AC bus service of high frequency for commuters. This can be a powerful impetus to modal shift. It is possible that such intelligent and comprehensive pricing strategy can achieve modal shift of 10 to 20% and this can contribute substantially to reduce congestion and its associated negative effects.

Like all other services, we can achieve "**price discovery**" thru experimentation. We believe it is better to begin with Rs.20/30/40 for low/medium/high volume/demand areas rather than very high price to begin with which may create a shock effect. What is more important is to increase the coverage of most roads in the city, and then to discover the price after proper marking and supervision. This will create highly improved ambience on the roads and can clearly make it possible for BEST to provide much better services. We can then demand a much higher level of discipline from the auto/taxi trade and can take action against errant auto/taxi operators. This can also improve the visibility and usage of share autos and taxis and car pooling for which a variety of incentives can be provided such as allowing cars that practice pooling to get advertizing on their doors, which can reduce the cost of operations of car.

This can be increased once it is successful, proper pricing can be established to prevent spill over, and the ownership of cars can be restricted to those who have an assured parking space, which has been so successfully implemented in Tokyo. For this, it is important that area night parking should get established and become a part of dbase for city space.

MOUD has already set up service level bench mark wherein a city can qualify for A grade, if it achieves 50% of cars parked to be under pay & park and the parking fee in high volume areas to be at least twice that in residential area.

This authority can also take care of compliance and fining. This integration can improve the effectiveness. The effectiveness of this part can be enhanced by use of Dbase of number plates.

RFID, prepaid cards and possibly software for handheld cameras etc. Integration of management of parking, compliance, fining should all aim at optimizing revenue and discipline together.

7-2 Need to sell the parking Policy in a persuasive manner

It is not at all easy to obtain a “buy in” from wider public to the sensible parking policy as many people will find it difficult that they cant park anywhere that they are used to it. Further, paying for parking and that too much more than they “feel” right (since they believe that it is the duty of a govt agency to provide parking either free or at reasonable (i.e. negligible) prices ! It is important to communicate effectively and over a period of time . There is a need to achieve some consensus on this issue amongst various political parties and govt officials , media and opinion leaders.

8 What Good Parking Policy Can Achieve in and for Mumbai (2014-2017)

A good parking policy means at least half of all vehicles (mostly and to begin with, but not restricted to private cars) are under pay n park sites equipped with boxes and meters, boards and attendants and proper price structure in a range of a min of Rs. 20 and maximum upto Rs. 60/80 depending upon the size of car, location, time of the day and day of the week . It should be variable and not constant all across! With modern technology, meters can be programmed. At current low tariff, we can't afford to have good metering and use of prepaid cards and good IT supported supervision. It will also mean that in many areas, night area parking is done in an organized and paid basis. The third part is that on the commuter arteries , buses get a free lane to drive during peak hours peak direction – supported by marking of the lanes showing the timings when the bus lane will operate at the kerb (with substantial compliance!)

This is possible if we have strong communications campaign explaining to motorists why a parking policy which restricts/regulates parking and which involves higher fees and fines is in the interest not only the city and its citizen in general but also to those who badly need to use the car. This campaign should also emphasize how such regulation of parking will enable the BEST to run more frequent buses in a smoother and faster manner. It will also provide funds and focus on footpaths, walking and biking possibilities and facilities in a functional manner. This will encourage car pooling and some shift to buses. This will reduce congestion and clutter visibly on roads and those who will park within the limited & paid parking areas , will be able to driving smoother and faster. It is a win - win situation for all!

We believe that a robust parking policy will lead to migration of about 15% traffic from cars to other cars (car pooling and taxi pooling) and another 15% to buses where the capacity exists within the buses (it is also possible to bring out more buses to meet this increased demand. This migration will also take place from taxies and autos too! With a reduction of 30% of cars during peak hr peak direction can mean *all the remaining vehicles will save fuel (upto 10%) and time to the extent of 20%. Further, this will reduce the anxiety and tension and increase the sense of well being. More people will find walking on improved footpaths to bus stops a more pleasant occurrence.*

If we reduce free parking of 300,000 vehicles to 50,000 vehicles, and increase low fee paid but unmarked and organized parking to marked, restricted and properly priced parking to a level of 100,000 spaces, it can make a significant difference to the behavior of car users . For this purpose, it is necessary that the market “discovers” the right price – which could be even higher than the initially proposed. Yes, this will have one negative effect and that is on the purchase of new cars! We cant treat this as a city or people negative !

Parking fees will contribute in excess of a net amount of Rs. 400 cr A substantial part of this money , if paid for improvement in footpaths and bike paths , it will be a great fillip to this utterly neglected but very important area. This will contribute to a change inmindset. This is much more important than the revenue. This will creat possibilities for serious walking , biking, car/taxi sharing and using buses – not

just for relaxation but for business and commuting. And this will have a double effect of reducing the congestion and pollution as well as improving health of the citizen. It will usher a virtuous cycle. This can lead even to relocation of offices and workplaces within residential areas which can actually reduce the commuting . But we cannot do most of these unless we take a clear stand and act on parking reforms .

This level of parking management should contribute to an increase in bus usage (thru higher speeds and shorter turnaround time) by migration from cars and taxies (but even some from trains to avoid the crowd) This should be quite substantial but not possible to quantify yet. Same is the case with the savings in fuel by all modes. But suffice it to say that it will be very visible and should start a virtuous cycle in the entire commuting and transportation.

This will be a decisive step towards making Mumbai a sustainable city and a real and substantial progress towards becoming a world class city ! Parking regulation and a radical improvement in the quality and range of bus service as well as improvement in the availability of individual as well as shared taxies/autos will mark a great shift towards sustainable mobility for all in Mumbai !