LODHA GROUP PVT. LTD.



TRAFFIC IMPACT ASSESSMENT FOR PALAVA PHASE 2B, KHONI, THANE

MAY 2021

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INDEX

1. INTRODUCTION 1
1.1. Background: 1
1.2. General Scope of Work 1
1.3. Organisation of the report 2
2. DESCRIPTION OF PROPOSED DEVELOPMENT 3
2.1. Proposed Development Details 3
2.2. Road and Rail Connectivity 8
3. TRAFFIC SURVEY AND ANALYSIS OF EXTERNAL ROADS 10
3.1. Introduction 10
3.2. Methodology adopted for the traffic study 10
3.3. Traffic survey location 10
3.4. Traffic surveys 11
3.5. Seasonal Correction Factor 11
3.6. Traffic Volume Survey on Taloja Khoni bypass Road 12
3.7. Traffic Volume Survey on Kalyan Shilphata Road 15
3.8. Traffic Volume Survey on Badlapur Pipeline Road 19
4. TRAFFIC IMPACT ANALYSIS 23
4.1 Introduction 23
4.2 Trip Generation Rates for the Development Type 23
4.3 Modal Split 23
4.4 Hourly Variation of Entry and Exit Trips 24
4.5 Traffic Impact from Proposed Development 24
5. INTERNAL CIRCULATION PLAN AND ANALYSIS 29
5.1. Internal Circulation Plans 29
5.2. Retrieval Time during Emergency 30
5.3. Evacuation Time 31
5.4. Swept Path Analysis 32
6. TRAFFIC MANAGEMENT PLAN 35
6.1. Introduction 35
6.2. Distribution of Traffic on Roads 35
6.3. Summary of traffic condition on Roads after development from the year 2024 43
6.4. Recommendations for Capacity Improvement Measures 47
6.5. Traffic Control 49

6.6. Vehicle parking and turning 50
6.7. Signage Significance 50
6.8. Safety and Sustainability 51
7. CONCLUSION AND RECOMMENDATIONS 52

LIST OF FIGURES

Figure 1-1: Location of Proposed Development 1
Figure 2-1: Layout of the proposed development 4
Figure 2-2: Transport Network and Future upcoming transport Network 9
Figure 3-1: Survey location 11
Figure 3.2: Compositions of Vehicles on Taloja Bypass Road 13
Figure 3.3: Percentage Composition of Traffic on Taloja Bypass Road 13
Figure 3.4: Hourly Variation of Traffic on Taloja Bypass Road 14
Figure 3.5: Compositions of Vehicles on Kalyan Shilphata Road 16
Figure 3.6: Composition of Traffic on Kalyan Shilphata Road 17
Figure 3.7: Hourly Variation of Traffic on Kalyan Shilphata Road 17
Figure 3.8: Compositions of Vehicles on Badlapur Pipeline Road 20
Figure 3.9: Composition of Traffic Badlapur Pipeline Road 20
Figure 3.10: Hourly Variation of Traffic on Badlapur Pipeline Road 21
Figure 5-1: Circulation Plan North MLCP 29
Figure 5-2: Circulation Plan South MLCP 30
Figure 5-3: Circulation Plan Sector 5 MLCP 30
Figure 5-4: Swept Path for Sector-5 MLCP 33
Figure 5-5: Swept Path for North MLCP 33
Figure 5-6: Swept Path for South MLCP 34
Figure 6-1: Zoning of External Trip Distribution 36
Figure 6-2: Concept Proposal on Badlapur Pipeline Road for 3.5km 49
Figure 6-3: Proposed Traffic Control measures 50
Figure 6-4: Vehicle turning and parking standards 50

LIST OF TABLES

Table 2-1: Details of Construction 5
Table 2-2: Parking Details of development.....8
Table 3.1: Traffic Volume Count on Taloja Khoni Bypass road.....12
Table 3.2: Peak Hour Traffic on Approach Road for 17:30 PM - 18:30 PM 14
Table 3.3: Summary of Hourly Traffic (PCUs/Hr.) 15
Table 3.4: Traffic Volume Count on Kalyan Shilphata Road 16
Table 3.5: Summary of Hourly Traffic (PCUs/Hr.) of Kalyan Shilphata Road.....18
Table 3.6: Peak Hour Traffic on Approach Road.....18
Table 3.7: 24 hour Traffic Volume Count on Badlapur Pipeline Road.....19
Table 3.8: Summary of Hourly Traffic (PCUs/Hr.) of Badlapur Pipeline Road 21
Table 3.9: Peak Hour Traffic on Approach Road.....22
Table 4.1: Modal Split for the Proposed Development 23
Table 4.2: Vehicle Occupancy 24
Table 4.3: Percentage Distribution of Daily Entry and Exit Trips.....23
Table 4.4: Adopted PCU Factor.....24
Table 4.5: Calculation of Residential Population from the development 24
Table 4.6: Calculation of Retail Population from the development.....25
Table 4.7: Calculation of School Population from the development 25
Table 4.8: Calculation of Commercial Building Population from the development.....25
Table 4.9: Calculation of Health Care Population from the development 26
Table 4.10: Calculation of Police Station Population from the development 26
Table 4.11: Calculation of Community Centre Population from the development 27
Table 4.12: Calculation of Industrial Building Population from the development.....27
Table 4.13: Calculation of Other Amenities Population from the development 27
Table 4.14: Traffic Generated from Various Developments.....28
Table 5.1: Retrieval Time during Emergency for Residential Parking 31
Table 5.2: Evacuation Time for the development 31
Table 5.3: Different evacuation times for percentage of vehicles parked 32
Table 6.1: Phase-wise Peak hour Traffic distribution from Development 37
Table 6.2: Phase-wise Traffic distribution on Roads.....37
Table 6.3: Peak hour Capacity Analysis for Taloja Khoni Bypass Road.....38

Table 6.4: Peak hour Capacity Analysis for Badlapur Pipeline Road 39

Table 6.5: Peak hour Capacity Analysis for Kalyan-Shilphata Road.....40

Table 6.6: Peak hour Capacity Analysis for Airoli Katai Naka Road 41

Table 6-7: Projected Traffic on Road 43

Table 6-8: Projected Traffic on Road 44

Table 6-9: Projected Traffic on Road 45

Table 6-10: Projected Traffic on Road 47

Table 6-11: Traffic Signage and their significance 51

Abbreviations

IRC – Indian Road Congress

LOS – Level of Service

PCU - Passenger Car Unit

TVC – Traffic Volume Count

MIDC - Maharashtra Industrial Development Corporation

1. INTRODUCTION

1.1. Background:

M/s. Lodha Developers is planning to develop a mixed used residential township at their plot situated at Khoni Village, Thane. The proposed location falls under Kalyan Dombivli Municipal Corporation. The proposed site is located adjacent to Katai Abmernath Pipeline Road. Dombivli is in Thane district of Maharashtra state, India. It is part of Mumbai Metropolitan Region (MMR). The Mumbai Suburban Railway Network offers finest services in the region.

M/s. Aakar Abhinav Consultants Pvt. Ltd. was appointed as a technical consultant for carrying out the traffic study and traffic impact assessment of the project. Accordingly different parameters of the site were studied and a report is made giving recommendations for the development. The following section discusses the scope of the work in detail. Below **Figure 1.1** shows the index map of the residential developments.

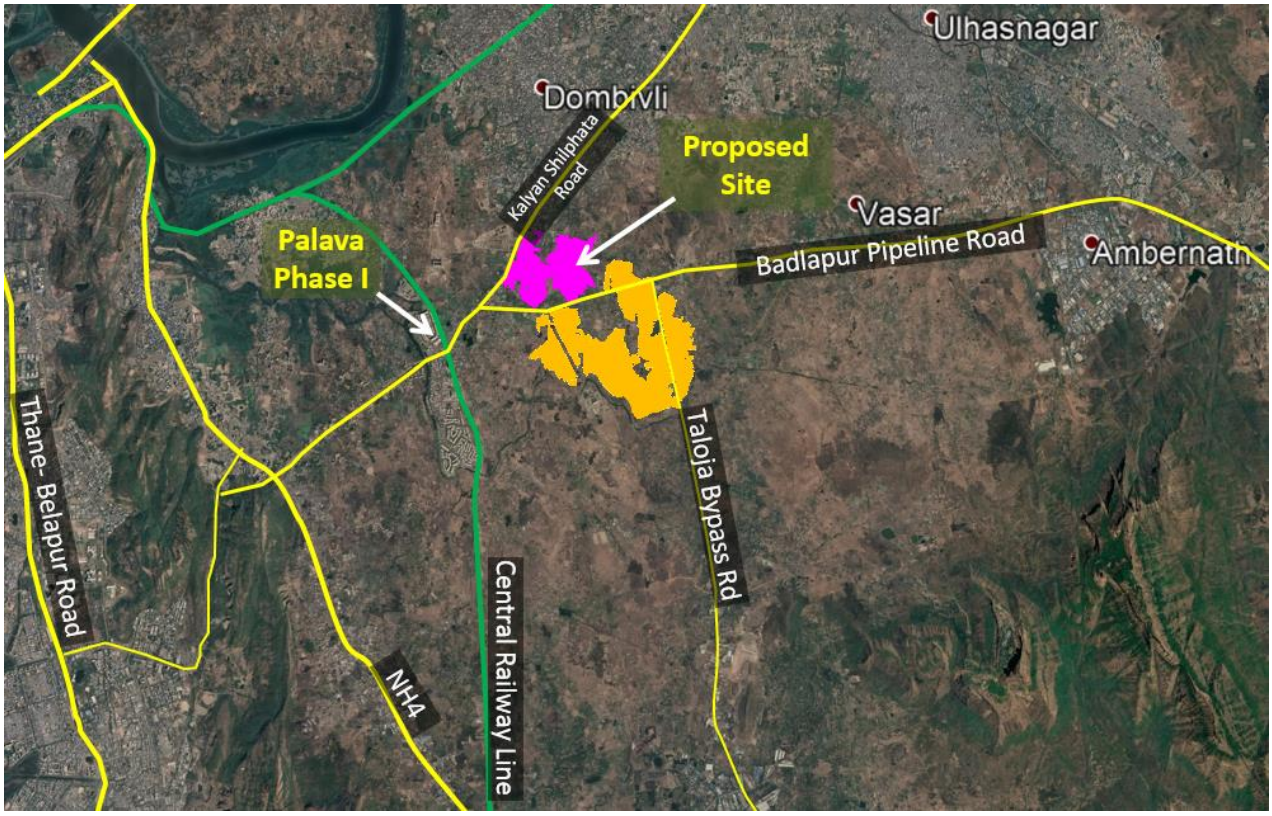


Figure 1-1: Location of Proposed Development

1.2. General Scope of Work

Traffic Study: It shall include a comprehensive study of existing traffic situation, traffic intensity, movement pattern, available infrastructure, right of way, parking demand and

extent of available facility, traffic forecast based on fully developed area and operations of the building occupants.

a. Review the external and internal connectivity aspects so as to appreciate the adequacy of the infrastructure proposed in terms of road lanes, turning radius etc. and if need arises suggest suitable alternatives for the better movement for the project.
b. Future Traffic forecast: In order to quantify the traffic generation from the proposed development, previous data base of similar types of development done all over India to be used. If required, traffic generation surveys to be carried out to find out the traffic generation rate.
c. Traffic Assignment: This involves the pattern in which the generated traffic will be distributed on the surrounding roads
d. Impact of development potential (scenario 5 years down the line)
e. Identify the adequacy of the transport infrastructure for the area and suggest the desired road network for the internal as well as external circulation of the area.
f. Prepare traffic impact assessment report based on the above study.

1.3. Organisation of the report

The report has been organised in seven chapters. In the first chapter the scope of the assignment as envisaged has been described in detail. The second chapter has been devoted to appreciation of the external connectivity for the plot and building characteristics. The major road and rail connectivity, also the major commercial establishments located around the proximity of the plot area have been studied in details. Chapter three briefs the methodology and approach to the projects discuss the surveys to be conducted and its analysis. Chapter four deals with traffic impact from the proposed development and on the external roads near the project site. The internal traffic circulation plan and the analysis of retrieval time, evacuation time and swept path are dealt in chapter five. The sixth chapter concentrates on the management plan and mitigative measures on impact of the traffic generated. The conclusions and recommendations of the assignment have been mentioned in chapter seventh of the report.

2. DESCRIPTION OF PROPOSED DEVELOPMENT

2.1. Proposed Development Details

Lodha Group has appointed Aakar Abhinav Consultants Pvt. Ltd as a Technical consultant for carrying out the traffic study to find the traffic characteristics near the project site. Accordingly different parameters of the site were studied and a report is made giving recommendations for the development. The master plan of the entire development is given in **Figure 2.1** below.

As already mentioned, the proposed development will comprise of mixed land-use predominantly of residential buildings. The proposed project is planned with a complete infrastructure of internal roads, water supply, sewage, and electricity and communication network.

The proposed development will provide residential accommodation to the people and also help in increase in living standards of the local residents. Proposed development has a total built up area of 4242 Acres of which 3015 Acres are residential building units.

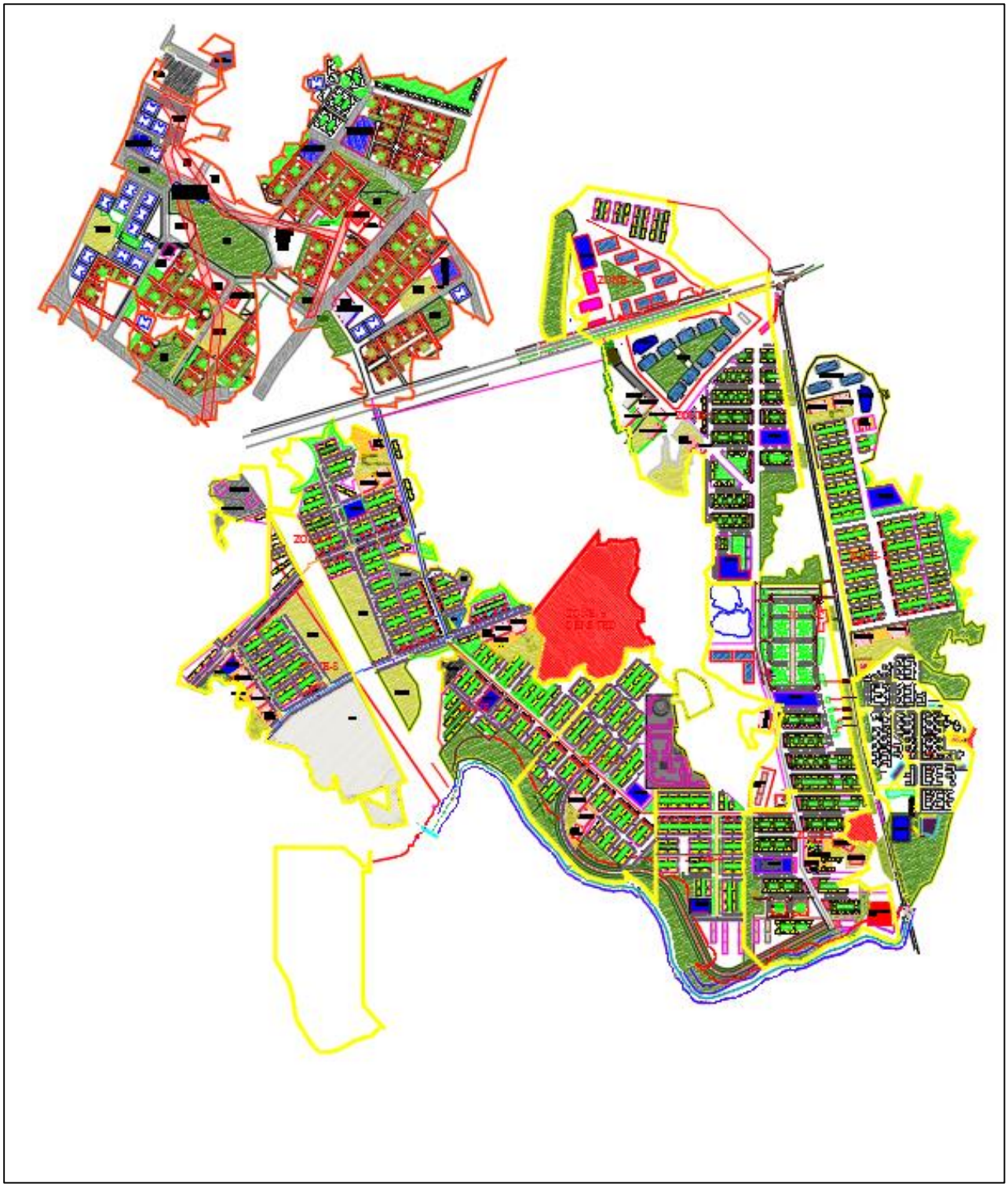


Figure 2-1: Layout of the proposed development

The plot is situated on the side of Badlapur Pipeline Road. The location of the plot is very lucrative for either commercial or residential development in nearby vicinity. The table below shows the details of the construction.

Table 2-1: Details of Construction

S.No.	Type Of Bldgs.	No. Of Floor	Const /Bldgs. (Sq.m)	No. Of Flats Per Bldg.	No of Bldgs.	Const area Total (sqmt)	No. Of Flats
RESIDENTIAL							
ZONE 1							
1	A1	G+17	6868.82	106	29	199195.8	3074
2	A2	G+17	5830.07	70	19	110771.3	1330
3	B1	G+17	8938.07	108	17	151947.2	1836
4	B2	G+17	7571.41	70	12	90856.92	840
5	B3	G+17	8796.69	108	17	149543.7	1836
6	ASPI	G+20	16188.06	84	1	16188.06	84
7	ASPI (NEAR S. MLCP)	G+20	16188.06	84	3	48564.18	252
ZONE 2							
8	A1	G+17	6868.82	106	6	41212.92	636
9	A2	G+17	5830.07	70	4	23320.28	280
10	C1	G+17	5636.47	108	5	28182.35	540
11	C2	G+17	5605.83	72	6	33634.98	432
12	B1.1	G+17	9132.38	108	11	100456.2	1188
13	B2.1	G+17	7407.21	72	1	7407.21	72
14	B2.1A	G+17	7448.51	72	2	14897.02	144
15	B3.1	G+17	8670.08	108	3	26010.24	324
16	B4	G+17	7923.39	72	2	15846.78	144
17	B5	G+17	9145.33	72	2	18290.66	144
18	B6	G+17	8818.43	72	1	8818.43	72
19	B7	G+17	8357.84	108	1	8357.84	108
20	E1LF	G+12	9147.796	135	2	18295.59	270
21	E2LF	G+12	7521.346	120	1	7521.346	120
22	E3LF	G+12	9065.942	135	1	9065.942	135
23	E4LF	G+12	9234.3	135	12	110811.6	1620
24	E4MLF	G+12	9234.473	135	7	64641.31	945
25	E5LF	G+12	5890.015	75	5	29450.08	375
26	B6LF	G+12	5899.396	60	3	17698.19	180
27	C2LF	G+12	4777.373	60	1	4777.373	60
28	ASPI	G+21	12497.88	88	4	49991.52	352
ZONE 3							
29	A1	G+17	6868.82	108	6	41212.92	648
30	A2	G+17	5830.07	72	4	23320.28	288
31	C1	G+17	5636.47	108	36	202912.9	3888
32	C2	G+17	5605.83	72	27	151357.4	1944
33	B1.2	G+17	8703.05	108	1	8703.05	108
34	B3.2	G+17	6670.46	108	1	6670.46	108
35	B6	G+17	8818.43	72	4	35273.72	288
36	F1	G+12	6477.45	143	4	25909.8	572
37	F2	G+12	5418	117	4	21672	468
38	ASPI	G+20	16188.06	84	7	113316.4	588
ZONE 4							

S.No.	Type Of Bldgs.	No. Of Floor	Const /Bldgs. (Sq.m)	No. Of Flats Per Bldg.	No of Bldgs.	Const area Total (sqmt)	No. Of Flats
39	E1	G+19	9183.936	120	6	55103.62	720
40	E2	G+19	12096.19	144	55	665290.5	7920
41	ASPI	G+20	16188.06	84	8	129504.5	672
ZONE 5							
42	E1	G+19	9183.936	120	1	9183.936	120
43	E2	G+19	12096.19	160	92	1112850	14720
ZONE 7							
44	VI-A	G+12	7328.38	117	1	7328.38	117
45	VI-B	G+12	8080.29	143	1	8080.29	143
46	VI-C	G+12	6835.4	117	1	6835.4	117
47	VI-E	G+12	7914.49	143	1	7914.49	143
48	VI-F	G+12	6854.61	117	1	6854.61	117
49	VI-G	G+12	8417.76	143	1	8417.76	143
50	VI-H	G+12	6685.21	117	1	6685.21	117
51	VI-I	G+12	7917.06	143	1	7917.06	143
52	VI-J	G+12	9422.15	52	1	9422.15	52
ZONE 8							
53	E1	G+19	9183.936	120	8	73471.49	960
54	E2	G+19	12096.19	160	40	483847.6	6400
ZONE 9							
55	E1	G+23	10618.93	144	19	201759.6	2736
56	E2	G+23	13980.33	192	76	1062505	14592
ZONE 10							
57	E2	G+23	13980.33	192	20	279606.7	3840
ZONE 11							
58	E2	G+19	10212.05	128	56	571874.7	7168
ZONE 12							
59	E2	G+26	17232.83	216	112	1930077	24192
PREMIER LAND 2B							
60	E4	G+26	16621.74	243	135	2243935	32805
61	E5	G+26	10602.03	135	38	402877.1	5130
62	SERENITY	G+27	15906.39	112	10	159063.9	1120
63	LQH E	G+13	8523.254	154	4	34093.02	616
64	LQH J	G+13	10146.98	56	4	40587.94	224
65	LQH I	G+13	8525.515	154	3	25576.55	462
66	LQH H	G+13	7199.446	126	3	21598.34	378
67	LQH G	G+13	9065.215	154	3	27195.65	462
68	LQH F	G+13	7381.877	126	3	22145.63	378
70	TOTAL for CASA buildings				977	11657707	153000
SOCIAL HOUSING COMPONENT							
71	JA-A	G+12	5769.01	130	8	46152.08	1040
72	JA-B	G+12	7041.55	143	8	56332.4	1144
73	JA-C	G+12	7016.59	143	4	28066.36	572
74	JA-D	G+12	5788.09	117	3	17364.27	351

S.No.	Type Of Bldgs.	No. Of Floor	Const /Bldgs. (Sq.m)	No. Of Flats Per Bldg.	No of Bldgs.	Const area Total (sqmt)	No. Of Flats
75	JA-E	G+12	7016.59	143	3	21049.77	429
76	JA-F	G+12	3868.93	78	4	15475.72	312
77	JA-G	G+12	7768.1	182	6	46608.6	1092
78	JA-H	G+12	8933.73	195	5	44668.65	975
79	JA-I	G+12	7941.04	169	4	31764.16	676
80	OR-A	G+12	5798.04	130	1	5798.04	130
81	OR-B	G+12	7443.27	143	1	7443.27	143
82	OR-C	G+12	7443.27	143	1	7443.27	143
83	OR-D	G+12	6208.92	117	3	18626.76	351
84	OR-E	G+12	7443.27	143	3	22329.81	429
85	OR-F	G+12	5798.04	130	3	17394.12	390
86	OR-G	G+12	7688.58	182	4	30754.32	728
87	OR-H	G+12	9928.71	221	4	39714.84	884
88	OR-I	G+12	8659.58	169	4	34638.32	676
89	OR-J	G+12	8956.83	195	1	8956.83	195
90	OR-K	G+12	8956.83	195	1	8956.83	195
91	OR-L	G+12	8660.46	208	1	8660.46	208
92	OR-M	G+12	8070.62	247	1	8070.62	247
93	OR-N	G+12	6455.02	182	2	12910.04	364
94	OR-O	G+12	4977.12	143	1	4977.12	143
95	TOTAL EWS.				76	544156.7	11817
96	TOTAL RESIDENTIAL				1053	12201864	164817
97	OFFICE BUILDINGS	G+16			39	2643511	
98	SCHOOLS	G+5			20	218089.3	
99	MEDICAL	G+4			3	36777.78	
100	COMMUNITY MARKET				1	2150	
101	TOWN HALL	G+2			1	50660.83	
102	FIRE BRIGADE				1	2439.206	
103	CREMATION				1	1200	
104	BUS TRANSPORT				1	3350	
105	POLICE STATION				1	2655.877	
106	ELECTRIC SUBSTATION					0	
107	CLUBS	G+1			9	19558	
108	RETAILS				62	75734.29	
109	RELIGIOUS STRUCTURES (PRAYER HALL, TEMPLES & GURUDWARA				8	2400	
110	INDUSTRIAL BLDGS				3	11081.85	
111	POST OFFICE				1	1120	
112	TELEPHONE EXCHANGE				1	1120	
113	MLCP				19	1876426	
114	ON ROAD PARKING						
115	AMENITY (AM1) SPORTS BLDG				2	18349.04	

Details of parking provided are given in the **Table 2.2** below:

Table 2-2: Parking Details of development

Development Type	Land Parcel	Number of Parking
Residential	Zone 2a Residential	53414
	Zone 2a Residential Social Housing	5909
	Zone 2b Residential	21348
Commercial	Zone 2a Commercial	15430
	Zone 2b Commercial	6281
	Commercial zone in Premier Land	6281

2.2. Road and Rail Connectivity

The proposed land under consideration has good external connectivity. However the connectivity has also certain constraints for the development. The present and future connectivity has been appreciated in the following paragraphs.

2.2.1. Present External Connectivity

The location map of the area has been presented in the above section. From the location map one can see that the land parcel considered for development is bounded by major roads on three sides. On north bound Badlapur Pipeline road which is a 4 lane divided road. On west bound Kalyan Shilphata Road. On the southern side of the development Taloja Khoni bypass Road passes through which connects Badlapur Pipeline Road. Hedutane Bus Stand is about 3 km and Hira Nagar Bus Stand is about 2.5 km from the site location. Kalyan railway station and Dombivli railway station is the nearest Central Line sub-urban railway station which is about 10 km from the proposed development.

The proposed development will be well accessible to Hedutane metro station, which is on proposed metro line 12. Also other stations like Kolegaon station and Nilje Gaon station proposed on metro line 12 (Kalyan-Dombivli-Taloja) will be within 3 km distance from the proposed development. Below **Figure 2.2** shows the present and future road, rail, and metro connectivity near the proposed development.

Multi-Modal Corridor (MMC) with Metro line: MSRDC has proposed a 60 m wide spine road connecting proposed Virar to Alibaug multi-modal corridor towards north along with provision of metro line. The passes along the south parcels through zone 8 and 9.

Airoli Katai Naka Alignment

The 13.6km Airoli Katai Naka alignment starts from proposed Multi-Modal Corridor at Katai Naka Junction passes along Shilphata and Parsik hill (tunnel section) to and ends at Airoli on Mulund-Airoli Bridge.

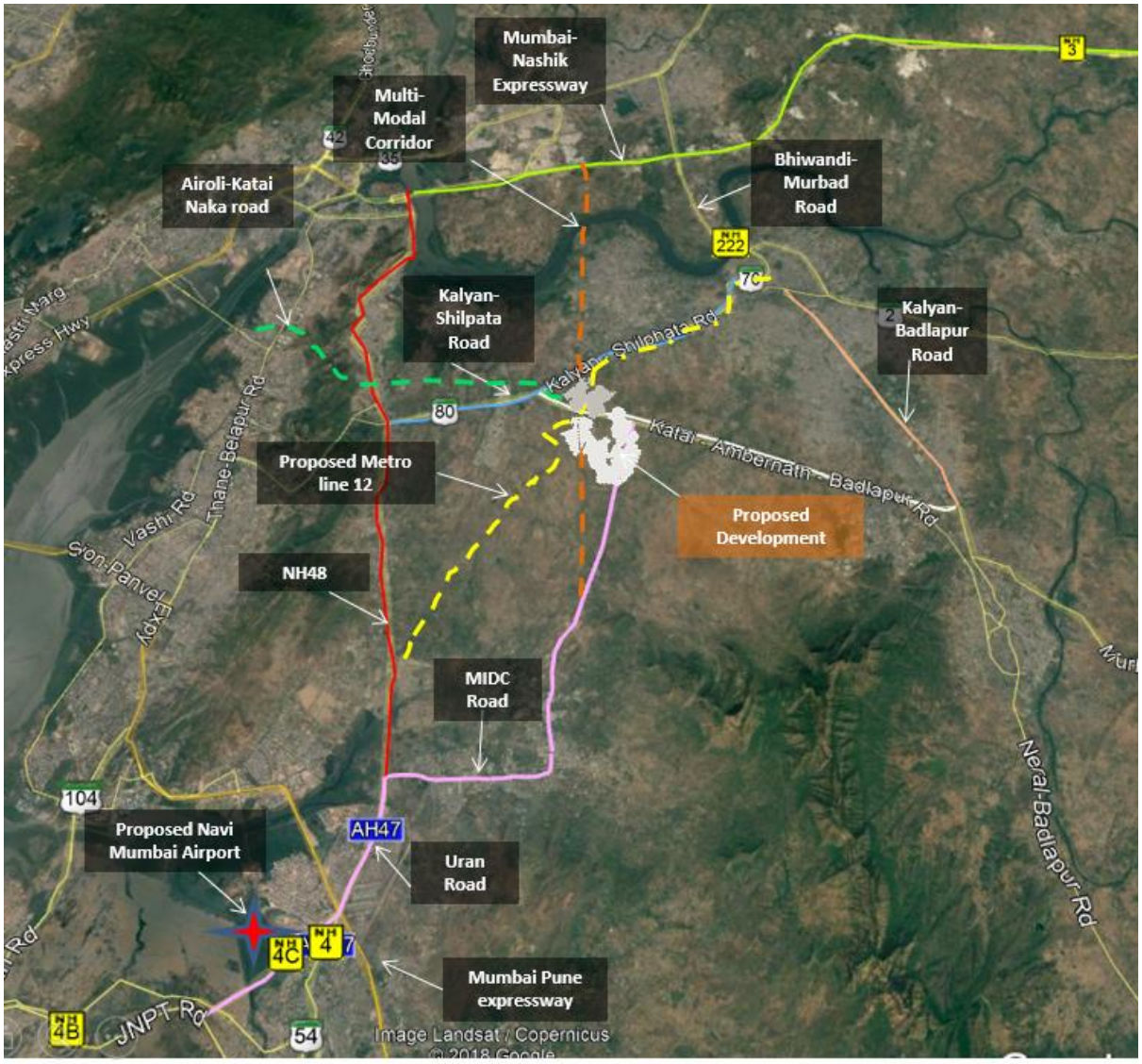


Figure 2-2: Transport Network and Future upcoming transport Network

3. TRAFFIC SURVEY AND ANALYSIS OF EXTERNAL ROADS

3.1. Introduction

In order to arrive at the present traffic demand and appreciate the travel characteristics of the road users as well as the residents in this area, field studies were organised. The observations from the field studies have been presented in this chapter.

3.2. Methodology adopted for the traffic study

To assess the impact on the external road network the current traffic characteristics need to be assessed. Since from the field visit major connecting road to the proposed site was identified. Traffic volume count survey for 24 hours on a week day was conducted at a mid-section on Taloja-Khoni Bypass Road, Badlapur Pipeline Road and Kalyan Shilphata Road. On the basis of these parameters, the traffic on proposed roads is estimated and projected for future. The traffic expected to be generated by the proposed development and traffic from other developments in the nearby influence area was then added to the existing traffic on various connecting roads to see what the situation on road will be after the proposed development is complete on site.

3.3. Traffic survey location

Figure below shows the survey location near the proposed development. As already mentioned, traffic volume count survey was carried out at a mid-section near the proposed development. The survey was carried out to take count of both upstream as well as downstream traffic for 24 hours during day time. The appreciation of trip generation rates as well as modal split was undertaken on the basis of previous studies done in the recent past two to three years.

The survey location with respect to the site has been shown in the **Figure 3.1** below.

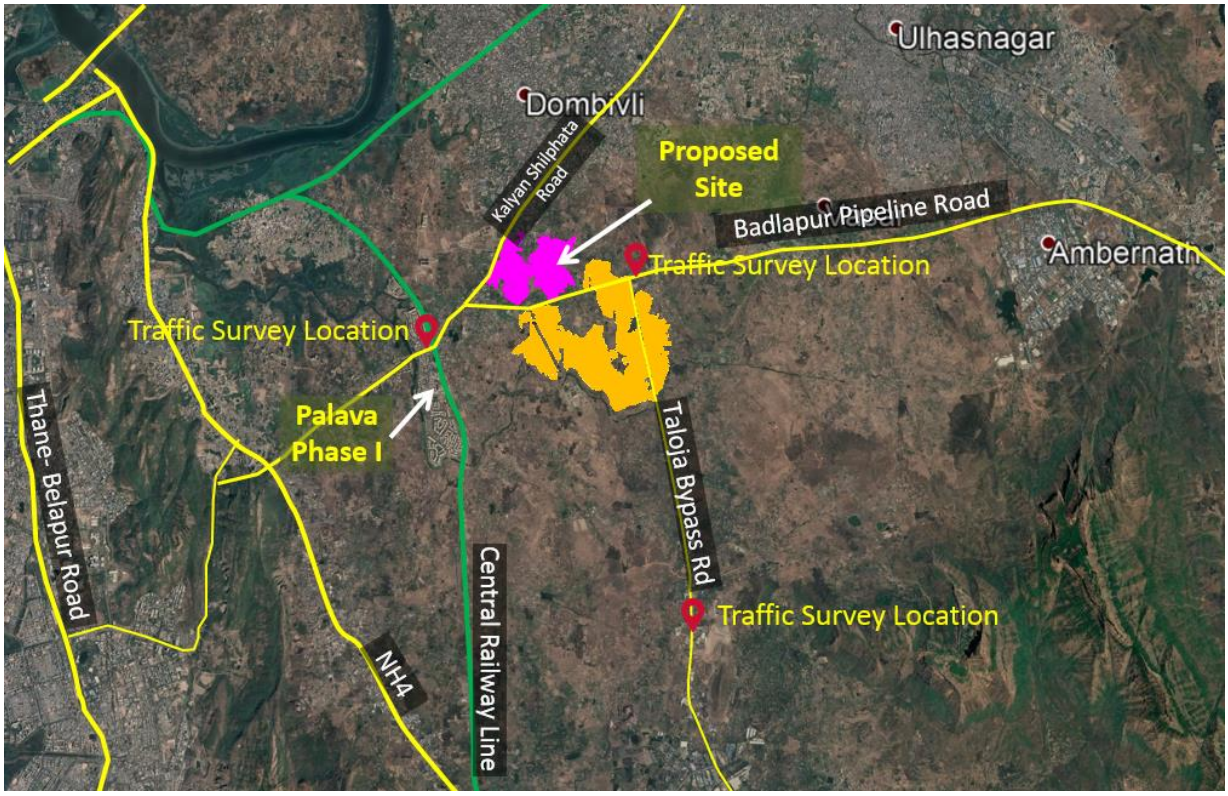


Figure 3-1: Survey location

3.4. Traffic surveys

The traffic survey formats are designed on the basis of objectives of the study and the data to be collected during the survey. Special teams consisting of Traffic survey supervisors and enumerators were constituted to carry out the surveys. The activity included:

- Training of enumerators
- Constitution of survey teams
- Carrying out of surveys

Classified Traffic Volume Survey was carried out manually and counts were recorded at 15 minutes interval. The vehicle classifications as suggested in TOR/IRC Codes were followed. All results have been presented in tabular and graphical forms. The data collected was computerized in MS-EXCEL software.

3.5. Seasonal Correction Factor

The survey was conducted manually on a week day in the month of April 2021. As Covid-19 pandemic is prevailing the traffic on the road was also affected by this. It is observed that the vehicular share is less than compared to a normal day traffic scenario i.e. 'without Covid-19' scenario. So from the previous traffic studies at various locations and comparison with the

present traffic volumes on the roads, a seasonal correction factor of 20% of the total PCUs is assumed for further calculations.

As part of the data collection it was decided to undertake the traffic volume count surveys so as to get the present peak hour demand on the nearby roads. The appreciation of trip generation rates as well as modal split was undertaken on the basis of previous studies undertaken in the recent past two to three years. Below section discusses the mid-section traffic volume count conducted at 3 locations.

3.6. Traffic Volume Survey on Taloja Khoni bypass Road

Table 3.1: Traffic Volume Count on Taloja Khoni Bypass road

Type of Vehicles	Vehicles / day	PCUs/day
Car/Vans/Jeeps	6470	6470
Taxi	153	153
Mini Buses	177	266
BEST/Govt. Bus	198	594
Private Bus	215	646
Auto Rickshaw	522	392
Two Wheelers	6028	3014
Goods Auto	126	95
Mini LCV's	761	1141
LCV's	1299	1948
2 - Axle Trucks	1202	3605
3 - Axle Trucks	883	2650
MAV/Containers	1030	4636
Others	22	99
Total	**19086**	**25707**

i. Composition of Commercial and Passenger Vehicular Traffic

The analysis of composition of traffic on Taloja Bypass Road shows that the commercial vehicles traffic is about 72% of total traffic and the percentage of passenger vehicles traffic is at 28% of total traffic. Below **Figure 3.2** shows the percentage share of Commercial and Passenger vehicles

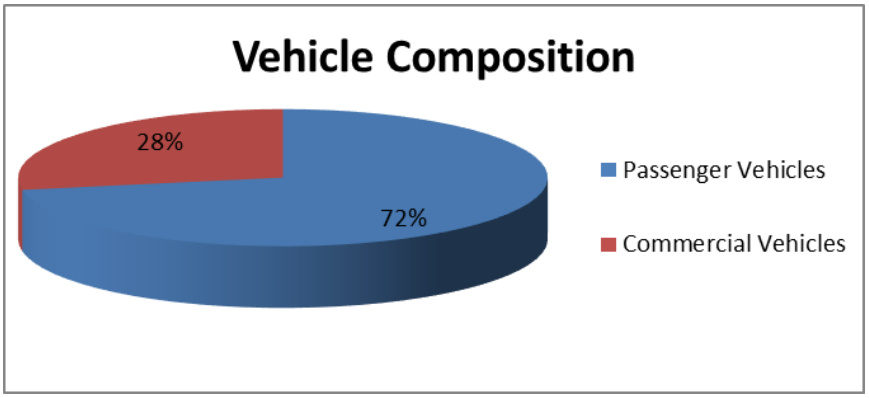


Figure 3.2: Compositions of Vehicles on Taloja Bypass Road

On Taloja Bypass Road, the percentage of Cars and Two Wheelers in total traffic volume is 34% & 32% respectively. The percentage composition of Trucks and MAV is around 11% & 5% respectively. Below **Figure 3.3** shows the composition of vehicular share.

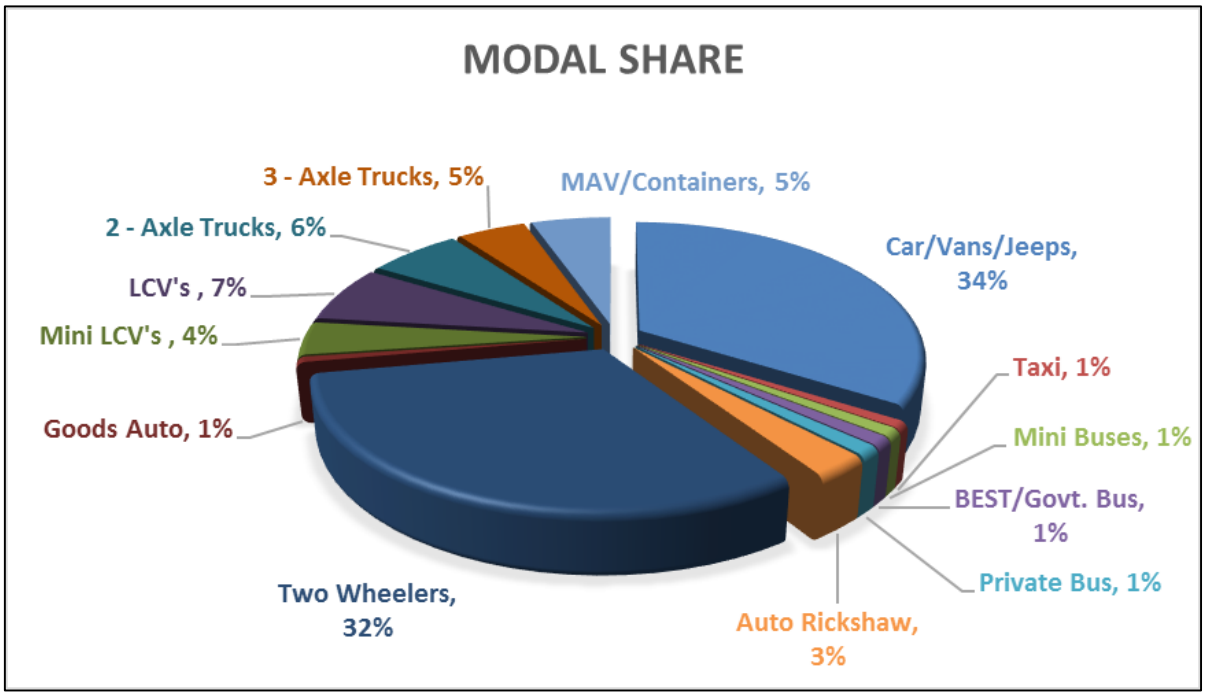


Figure 3.3: Percentage Composition of Traffic on Taloja Bypass Road

ii. Hourly Variation of Traffic

Figure 3.4 below presents the even hourly variation of traffic. As can be seen from the graph, there is tidal variation in traffic. The peak hour traffic of **1714 PCUs/hr** is observed between 17:30 to 18:30 hrs.

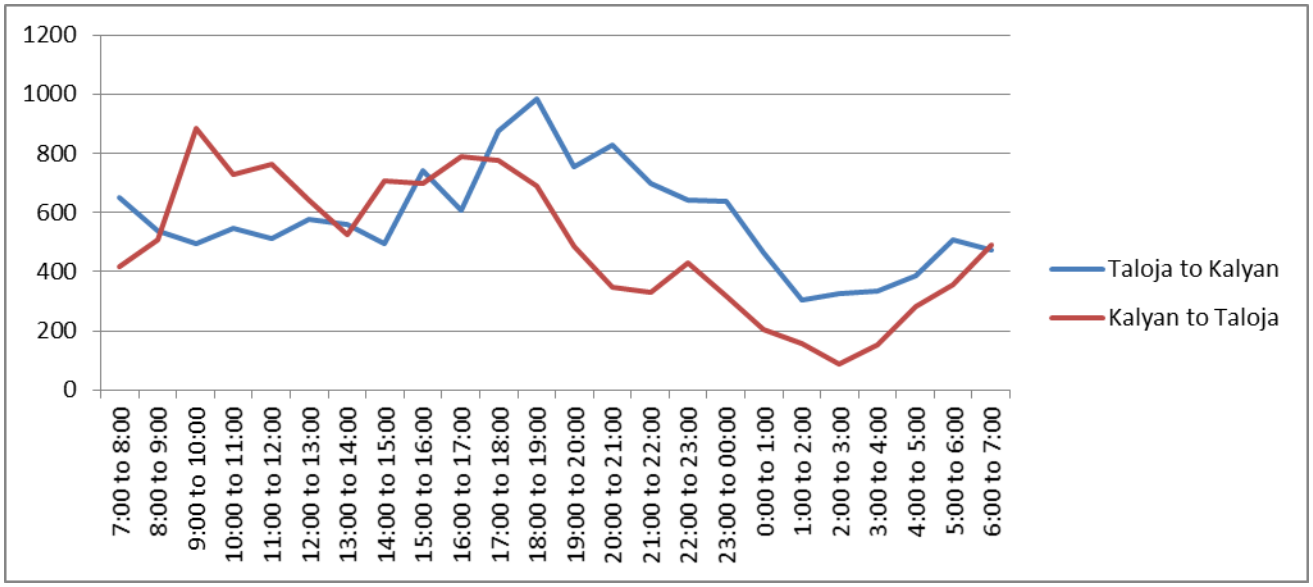


Figure 3.4: Hourly Variation of Traffic on Taloja Bypass Road

The Peak Hour Percentage (defined as the ratio between the numbers of vehicles counted during the peak hour in terms of PCU per hour to the total vehicles counted in a day) is 7%..

Taloja Bypass Road is 2 lane two-way Arterial Road with paved shoulder. The capacity of this road as per latest Indo HCM is 2800 PCUs/hr.

The peak hour traffic observed on Taloja Bypass Road near Narhen is shown in below **Table 3.2.**

Table 3.2: Peak Hour Traffic on Approach Road for 17:30 PM - 18:30 PM

Type of Vehicles	PCUs/Hr.
Car/Vans/Jeeps	594
Taxi	29
Mini Buses	28
BEST/Govt. Bus	28
Private Bus	80
Auto Rickshaw	33
Two Wheelers	296
Goods Auto	9
Mini LCV's	68
LCV's	127
2 - Axle Trucks	142
3 - Axle Trucks	94
MAV/Containers	172
Others	16
Total Vehicles per hr.	1576
Total PCUs/Hr.	1714
Capacity of Road	2800
Present V/C Ratio	**0.61**

The present Volume to Capacity Ratio (V/C Ratio) is **0.61**.

The hourly variation of traffic in terms of PCUs/hr was as follows:

Table 3.3: Summary of Hourly Traffic (PCUs/Hr.)

Time Interval	Total Traffic in Terms of PCUs/hr		
	Taloja to Kalyan (PCUs/hr.)	Kalyan to Taloja (PCUs/hr.)	Both way (PCUs/hr.)
7:00 to 8:00	649	417	1066
8:00 to 9:00	539	509	1048
9:00 to 10:00	**496**	**883**	**1380**
10:00 to 11:00	547	728	1275
11:00 to 12:00	512	764	1276
12:00 to 13:00	576	644	1220
13:00 to 14:00	560	525	1085
14:00 to 15:00	493	708	1201
15:00 to 16:00	741	698	1439
16:00 to 17:00	607	788	1395
17:00 to 18:00	876	777	1653
18:00 to 19:00	**983**	**690**	**1673**
19:00 to 20:00	754	488	1242
20:00 to 21:00	826	348	1174
21:00 to 22:00	699	329	1028
22:00 to 23:00	643	431	1074
23:00 to 00:00	638	317	955
0:00 to 1:00	462	204	667
1:00 to 2:00	305	155	460
2:00 to 3:00	326	88	414
3:00 to 4:00	335	155	489
4:00 to 5:00	386	282	667
5:00 to 6:00	507	356	863
6:00 to 7:00	473	492	964
Total	**13933**	**11775**	**25707**

3.7. Traffic Volume Survey on Kalyan Shilphata Road

The location selected for the traffic volume count surveys was at Thane Bhiwandi Road on both sides of the road in front of the site for proposed development.

The traffic volume count surveys were undertaken for one day for 24 hours at this location. Table below presents the summary of traffic volume count at Kalyan Shilphata Road.

Table 3.4: Traffic Volume Count on Kalyan Shilphata Road

Type of Vehicles	Vehicles / day	PCUs/day
Car/Vans/Jeeps	34891	34891
Taxi	903	903
Mini Buses	406	609
BEST/Govt. Bus	831	2492
Private Bus	828	2483
Auto Rickshaw	9978	7484
Two Wheelers	35702	17851
Goods Auto	903	677
Mini LCV	2691	2691
LCV's	1672	2508
2 Axle Trucks	918	2754
3 Axle Trucks	384	1726
MAV/Trailers/Containers	164	738
Others	22	101
Total	**90293**	**77908**

i. Composition of Commercial and Passenger Traffic

The analysis of composition of traffic on Kalyan-Shilphata Road shows that the passenger vehicles traffic is about 93% of total traffic and the share of commercial vehicles traffic is at 7% of total traffic.

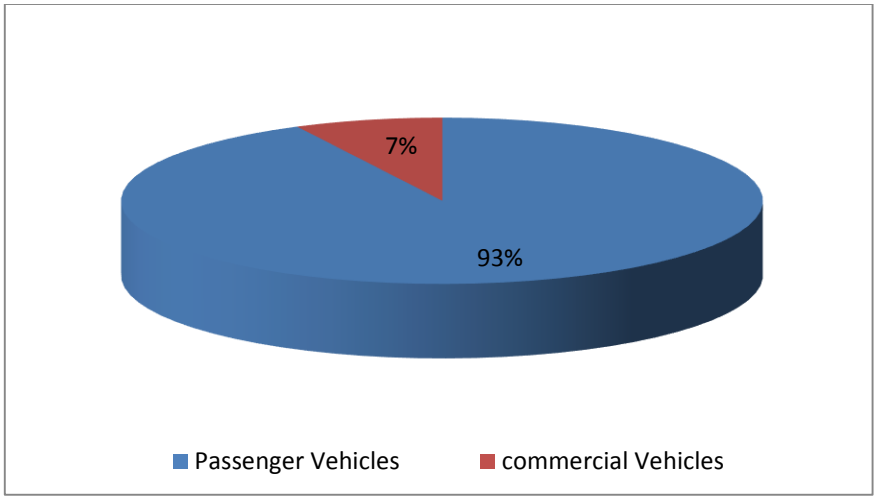


Figure 3.5: Compositions of Vehicles on Kalyan Shilphata Road

On Kalyan-Shilphata Road, the percentage of two wheelers in the total traffic volume is 40% which is the highest followed by share of car which is 21%. Share of auto rickshaws is 11% and that of taxi, mini buses and buses is about 1 %. The share of commercial vehicles is very low (about 7%) and mainly comprises mini LCV's, LCV's and 2-axle trucks its share is 2%

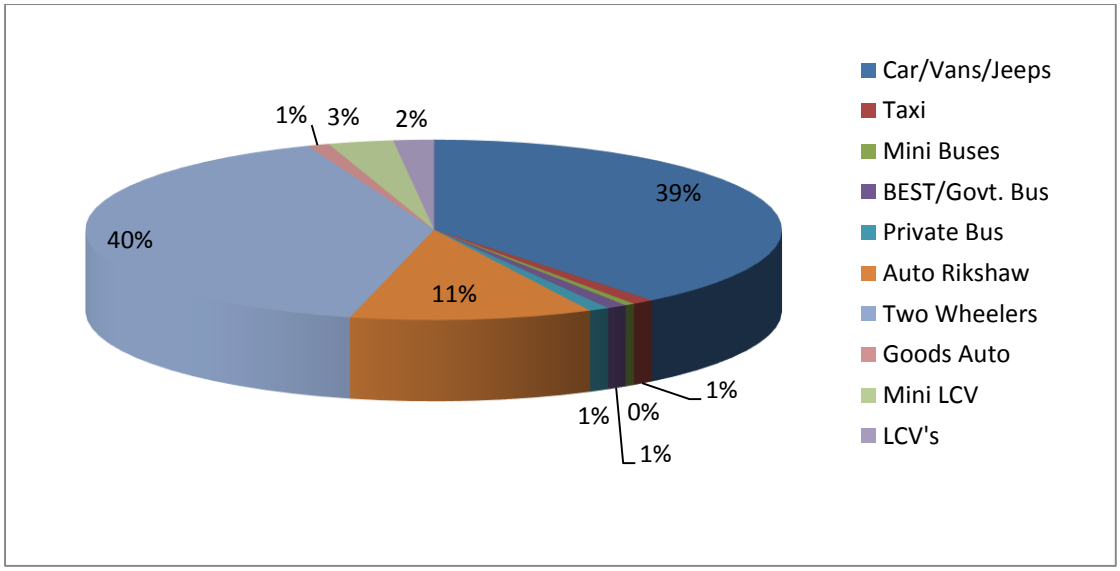


Figure 3.6: Composition of Traffic on Kalyan Shilphata Road

ii. Hourly Variation of Traffic

Figure below presents the hourly variation of traffic. As can be seen from the graph, there is tidal variation in traffic. The peak hour traffic of 5552 PCUs/hr (bothways) is observed between 18:00 to 19:00 hrs.

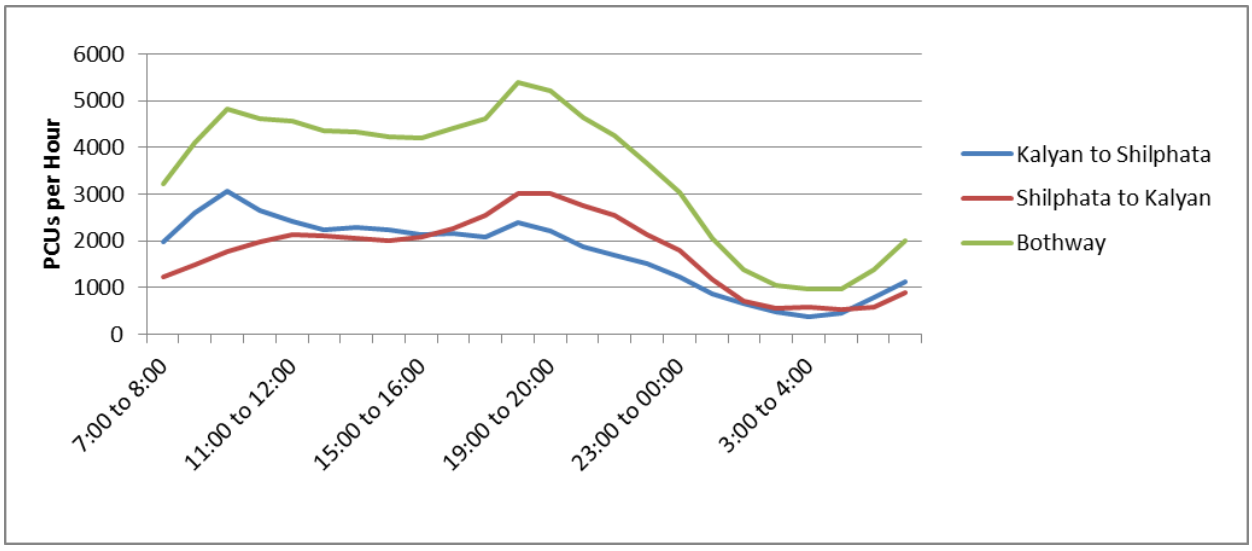


Figure 3.7: Hourly Variation of Traffic on Kalyan Shilphata Road

The hourly variation of traffic in terms of PCUs/hr was as follows:

Table 3.5: Summary of Hourly Traffic (PCUs/Hr.) of Kalyan Shilphata Road

Time Interval	Kalyan to Shilphata	Shilphata to Kalyan	Both way
7:00 to 8:00	1975	1235	3210
8:00 to 9:00	2595	1496	4091
9:00 to 10:00	3065	1768	4833
10:00 to 11:00	2643	1978	4621
11:00 to 12:00	2430	2144	4574
12:00 to 13:00	2248	2107	4355
13:00 to 14:00	2278	2050	4329
14:00 to 15:00	2233	1993	4226
15:00 to 16:00	2125	2076	4201
16:00 to 17:00	2155	2256	4411
17:00 to 18:00	2081	2539	4620
18:00 to 19:00	2381	3013	5394
19:00 to 20:00	2215	3003	5218
20:00 to 21:00	1885	2762	4646
21:00 to 22:00	1701	2559	4261
22:00 to 23:00	1511	2141	3653
23:00 to 00:00	1232	1795	3028
0:00 to 1:00	869	1176	2045
1:00 to 2:00	656	719	1375
2:00 to 3:00	475	567	1043
3:00 to 4:00	379	580	959
4:00 to 5:00	448	524	972
5:00 to 6:00	798	590	1388
6:00 to 7:00	1127	883	2010

The Peak Hour traffic (defined as the ratio between the numbers of vehicles counted during the peak hour in terms of PCU per hour to the total vehicles counted in a day) is 6%. The peak hour traffic observed on Kalyan Shilphata Road was as follows:

Table 3.6: Peak Hour Traffic on Approach Road

Type of Vehicles	Vehicles /Hr	PCUs/Hr
Car/Vans/Jeeps	2420	2420
Taxi	52	52
Mini Buses	30	45
BEST/Govt. Bus	39	118
Private Bus	76	228
Auto Rickshaw	738	554
Two Wheelers	2920	1460

Goods Auto	52	39
Mini LCV	170	170
LCV's	91	136
2 Axle Trucks	32	95
3 Axle Trucks	14	61
MAV/Trailers/Containers	2	7
Others	2	9
Total	**6638**	**5394**

Kalyan Shilphata Road is 6-lane divided - two way arterial road. The capacity of this road as per Indo-HCM 2017 is 8400 PCUs/hr. Hence the present Volume to Capacity Ratio (V/C Ratio) is 0.64.

3.8. Traffic Volume Survey on Badlapur Pipeline Road

The third location were traffic survey was conducted is on Badlapur Pipeline Road on both sides of the road near the proposed site.

The traffic volume count surveys were undertaken for one day for 24 hours at this location. **Table 3.7** below presents the summary of traffic volume count at Badlapur Pipeline Road.

Table 3.7: 24 hour Traffic Volume Count on Badlapur Pipeline Road

Type of Vehicles	Vehicles / day	PCUs/day
Car/Vans/Jeeps	13803	13803
Auto Rickshaw	1543	1157
Two Wheeler	14853	7426
Cycle	44	132
Mini Bus	64	96
Bus	241	723
Goods Auto (3 wheeler)	531	398
Mini LCV	1570	1570
LCV	1511	2266
Truck	2323	6970
MAV	421	1894
Tractor	1	2
Animal Cart	1	7
Other	0	0
Total	**36905**	**36444**

i. Composition of Commercial and Passenger Traffic

The analysis of composition of traffic on Badlapur Pipeline Road shows that the passenger vehicles traffic is about 83% of total traffic and the share of commercial vehicles traffic is at 17% of total traffic.

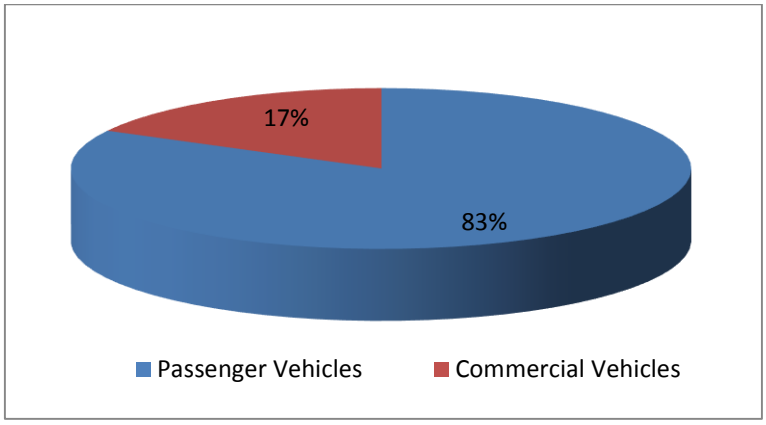


Figure 3.8: Compositions of Vehicles on Badlapur Pipeline Road

On Badlapur Pipeline Road, the percentage share of two wheelers is 40%, cars is 37%, autorickshaw and buses share is about 1% each. The share of commercial vehicles is low (about 17%) and mainly comprises mini LCV's, and MAV containers with percentage share of 4% and 1% respectively. The vehicle composition is shown in the **Figure 3.9** below.

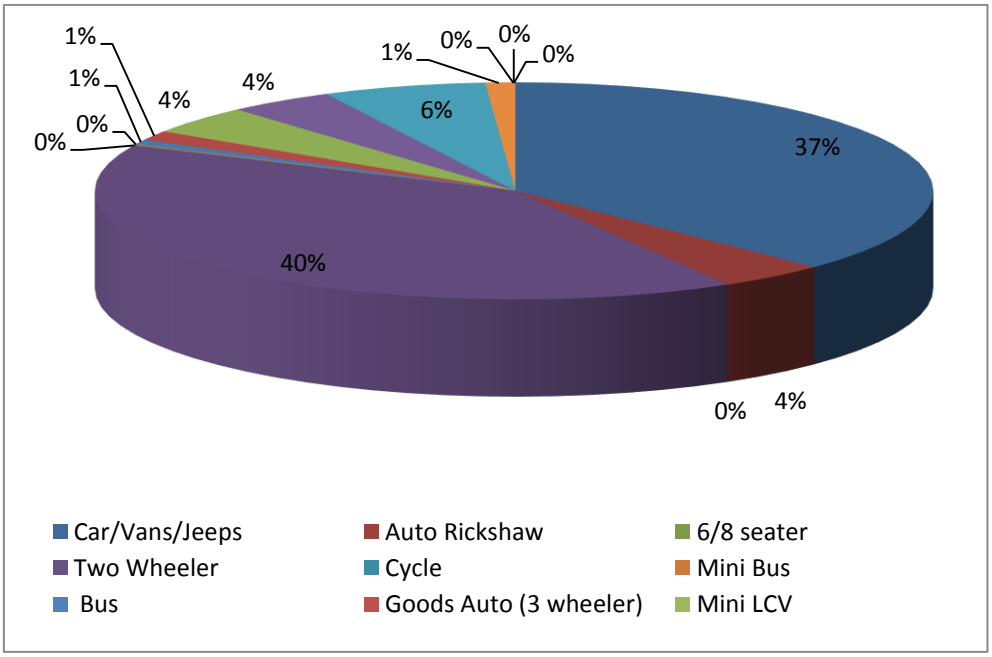


Figure 3.9: Composition of Traffic Badlapur Pipeline Road

ii. Hourly Variation of Traffic:

Figure 3.10 below presents the hourly variation of traffic. As can be seen from the graph, there is tidal variation in traffic. The peak hour traffic of 2270 PCUs/hr (both ways) is observed between 18:00 to 19:00 hrs.

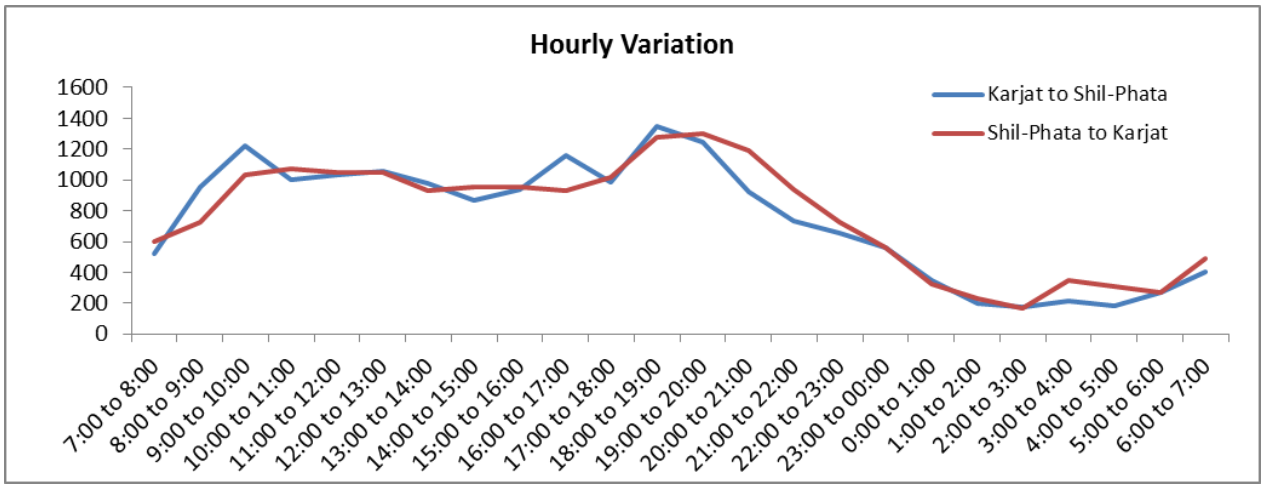


Figure 3.10: Hourly Variation of Traffic on Badlapur Pipeline Road

The hourly variation of traffic in terms of PCUs/hr was as follows:

Table 3.8: Summary of Hourly Traffic (PCUs/Hr.) of Badlapur Pipeline Road

Time Interval	Karjat to Shil-Phata	Shil-Phata to Karjat	Both way (PCUs/hr.)
7:00 to 8:00	522	600	1122
8:00 to 9:00	952	729	1681
9:00 to 10:00	1219	1034	2253
10:00 to 11:00	1000	1069	2069
11:00 to 12:00	1029	1051	2080
12:00 to 13:00	1057	1048	2105
13:00 to 14:00	979	931	1910
14:00 to 15:00	866	955	1822
15:00 to 16:00	942	953	1895
16:00 to 17:00	1162	931	2093
17:00 to 18:00	985	1021	2006
18:00 to 19:00	1351	1281	2632
19:00 to 20:00	1248	1303	2552
20:00 to 21:00	922	1194	2117
21:00 to 22:00	734	942	1676
22:00 to 23:00	652	728	1380
23:00 to 00:00	563	558	1122
0:00 to 1:00	350	322	672

1:00 to 2:00	200	228	427
2:00 to 3:00	176	170	346
3:00 to 4:00	211	347	558
4:00 to 5:00	186	307	493
5:00 to 6:00	272	268	540
6:00 to 7:00	403	493	896
Total	17980	18464	36444

The Peak Hour traffic (defined as the ratio between the numbers of vehicles counted during the peak hour in terms of PCU per hour to the total vehicles counted in a day) is 7%. The peak hour traffic observed on Badlapur Pipeline Road was as follows:

Table 3.9: Peak Hour Traffic on Approach Road

Type of Vehicles	Vehicles /Hr	PCUs/Hr
Car/Vans/Jeeps	1164	1164
Auto Rickshaw	132	99
Two Wheeler	1211	606
Cycle	3	10
Mini Bus	7	10
Bus	19	56
Goods Auto (3 wheeler)	30	23
Mini LCV	88	88
LCV	80	120
Truck	138	414
MAV	9	42
Tractor	0	0
Animal Cart	0	0
Other	0	0
Total	**2882**	**2632**

Badlapur Pipeline Road is 4-lane road. The capacity of this road as per Indo-HCM 2017 is 5400 PCUs/hr. Hence the present Volume to Capacity Ratio (V/C Ratio) is 0.49.

4. TRAFFIC IMPACT ANALYSIS

4.1 Introduction

In order to arrive at the traffic demand on various external links approaching the proposed land parcel for the development, the built up area or number of units, the type of development envisaged etc. was studied and on the basis of the same the traffic on various links has been arrived at. The trip generation rates were derived based on number of building units in the proposed residential complex.

4.2 Trip Generation Rates for the Development Type

On the basis of previous traffic studies, various assumptions are made for the proposed project to arrive at the population generated and attracted for various building type. Below sections discusses the assumptions made.

4.3 Modal Split

The modal split will analyse the mode used by the population for their day to day trips. The modal split recommended by various studies was studied in detail. As the modal split will change with respect to the availability of public transport facilities and the road network around the proposed land parcel, the most relevant area for the comparison was studied.

On the basis of observed modal split from previous studies, the consultants have recommended following modal split for the proposed land parcel. The occupancy rates as observed from the survey can be considered for arriving at the number of vehicles.

Table below presents the modal split and vehicular occupancy adopted for the present study.

Table 4.1: Modal Split for the Proposed Development

Type of Vehicles	Industrial Building	Residential Building	Commercial Building	School	Police	Health Care	Other Amenities	Community Centre
Car	18%	25%	22%	7%	26%	29%	25%	**20%**
Taxi	3%	12%	8%	2%	5%	18%	10%	10%
Auto Rickshaw	5%	8%	8%	8%	12%	15%	10%	10%
Two Wheelers	22%	30%	30%	12%	40%	15%	30%	30%
Bus	5%	8%	8%	1%	5%	5%	5%	10%

Shuttle Bus	18%	10%	22%	52%	0%	12%	0%	
Walk	5%	7%	2%	8%	12%	6%	20%	20%
Cycle	4%			10%				
Trucks	15%							
Trailer	5%							
Total	100%	100%	100%	100%	100%	100%	100%	100%

The occupancy rates as observed from the survey were considered for arriving at the number of vehicles.

Table 4.2: Vehicle Occupancy

Type of Vehicles	Industrial Building	Residential Building	Commercial Building	School	Police	Health Care	Other Amenities	Community Centre
Car	1.2	1.2	1.1	1.2	2.1	1.8	2.1	2.2
Taxi	2.5	2.5	1.3	1.2	1.8	2.1	1.8	2.5
Auto Rickshaw	1.1	1.1	1.2	2.7	1.5	1.5	1.5	1.8
Two Wheelers	1	1	1	1.0	1.2	1.2	1.2	1.2
Bus	8	3	8	10.0	2	3	2	3.0
Shuttle Bus	35	15	35	35	-	25	-	
Walk	1	1	1	1.0	1.0	1.0	1.0	1.0
Cycle	1	1	1	1.1	1.0	1.0	1.0	
Trucks	2							
Trailer	2							

4.4 Hourly Variation of Entry and Exit Trips

From the benchmark studies, percentage distribution of trips in 24 hours of the day was observed and the same percentage distribution was adopted for the present study. The details of the percentage distribution of entry and exit trips are as follows:

Table 4.3: Percentage Distribution of Daily Entry and Exit Trips

Time Interval	Residential		Commercial		School		Industrial		Shops		Hospital		Police Station		Post Office and Telephone		Amenities		Religious	
	Entry %	Exit %	Entry %	Exit %	Entry %	Exit %	Entry %	Exit %	Entry %	Exit %	Entry %	Exit %	Entry %	Exit %	Entry %	Exit %	Entry %	Exit %	Entry %	Exit %
7:00 to 8:00	0%	12%	1.7%	2.4%	30%		6%	3%	1%		10%		5%		5%		1%	0%	15%	15%
8:00 to 9:00	2%	13%	4.7%	1.0%	30%		6%	7%	2%		10%		10%	10%	10%	10%	2%	0%	5%	5%
9:00 to 10:00	4%	15%	11.3%	0.6%	20%		9%	2%	2%		5%		10%	10%	10%	10%	5%	4%	2%	
10:00 to 11:00	6%	10%	20.4%	1.3%			11%	1%	2%				15%	15%	20%	25%	4%	5%	1%	
11:00 to 12:00	6%	7%	16.6%	1.0%			4%	3%	4%				10%	10%	20%	20%	5%	3%		
12:00 to 13:00	5%	5%	12.8%	1.3%	20%	30%	3%	3%	5%		10%						5%	3%		
13:00 to 14:00	2%	1%	6.0%	2.3%		30%	6%	5%	5%	4%			5%	5%	15%	15%	8%	8%		
14:00 to 15:00	1%	2%	3.7%	1.3%		20%	4%	5%	5%	6%							8%	8%		
15:00 to 16:00	2%	2%	2.2%	2.0%			4%	8%	7%	7%		10%	5%	5%	10%	10%	7%	7%	1%	
16:00 to 17:00	5%	5%	2.1%	4.0%			2%	5%	7%	8%	20%	10%	5%	5%	10%	10%	7%	7%	2%	
17:00 to 18:00	5%	5%	1.3%	5.9%		20%	4%	8%	10%	9%	30%	25%	5%	5%	0%	0%	8%	6%	15%	15%
18:00 to 19:00	8%	5%	1.7%	10.6%			2%	12%	15%	10%	10%	30%	10%	10%	0%	0%	10%	8%	15%	15%
19:00 to 20:00	14%	4%	1.2%	12.1%			2%	9%	16%	12%		10%	5%	5%	0%	0%	12%	12%	12%	15%
20:00 to 21:00	15%	3%	1.8%	19.7%			3%	4%	12%	16%		5%	5%	5%	0%	0%	12%	10%	3%	5%
21:00 to 22:00	12%	2%	2.1%	12.5%			4%	3%	5%	18%			5%	5%	0%	0%	4%	8%		
22:00 to 23:00	6%	2%	2.6%	7.6%			5%	3%	1%	10%	5%		5%	5%	0%	0%	1%	7%		
23:00 to 00:00	5%	2%	1.8%	5.6%			3%	3%				10%		5%		0%		3%		
0:00 to 1:00	2%		1.2%	3.0%			3%	2%										1%		
1:00 to 2:00	1%		0.9%	1.0%			2%	1%												
2:00 to 3:00			0.5%	0.6%			2%	1%												
3:00 to 4:00			1.3%	1.6%			2%	1%												
4:00 to 5:00			0.3%	1.3%			3%	2%											2%	
5:00 to 6:00			0.5%	0.6%			4%	3%											12%	15%
6:00 to 7:00		5%	1.5%	0.6%			6%	4%	1%								1%		15%	15%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

4.5 Traffic Impact from Proposed Development

The traffic on any road is characterised as mixed traffic condition, resulting in complex interaction between various kinds of vehicles. To cater to this, IRC has recommended for converting different types of traffic in to a common unit of "Passenger Car Unit, (PCU)". Each vehicle type is converted into equivalent PCUs based on their interference value. IRC has recommended the conversion factors as shown in table below.

Table 4.4: Adopted PCU Factor

Type of Vehicles	PCU Factor
Car/Van Jeep	1
Mini Bus	1.5
Bus	3
Auto Rickshaw	0.75
Two Wheelers	0.5

On the basis of Modal Split, Vehicles Occupancy Ratio, hourly variation of Traffic and PCU factors, the traffic impact from all the parcels of the developments in terms of PCU/Day was derived. The below section discusses the same.

i. Trip Generation from Residential Buildings

The trips from the residential buildings were calculated by considering the number of persons in each family. Below table provides the details of the calculation for arriving at the total population.

Table 4.5: Calculation of Residential Population from the development

Residential	
Total number of flats	164817
Weighted Average Persons in a Flat	3.5
Total population from plot	581896
Persons making trip/day	494612
Total External trips made	247306

From the previous baselines studies it is found that from each flat approx. 85-90% of the people makes an external trip. It also assumed that 40% of the trips are made internally within the mixed used development.

ii. Traffic Impact from Retails

The trips from Retail buildings were calculated based on trips for every 100 sqmt of Built-up area. Below table provides the details of the calculation for arriving at the total population.

Table 4.6: Calculation of Retail Population from the development

Malls/Retails	
Built-up area in sqmt	37200
Carpet area in sqmt	27900
Trips/day/100sqm	35
Trips/day	9765
External Trips	5859

It assumed that 40% of the trips are made internally within the mixed used development.

iii. Traffic Impact from Schools

The trips from school buildings were calculated based on trips for every 100 sqmt of Built-up area. Below table provides the details of the calculation for arriving at the total population.

Table 4.7: Calculation of School Population from the development

School	
Built-up area in sqmt	195300
Carpet area in sqmt	146475
Trips/day/100sqm	30
Trips/day	43942
External Trips	26365

It assumed that 60% of the trips are made internally within the mixed used development.

iv. Traffic Impact from Commercial Buildings

The trips from Commercial buildings were calculated based on trips for every 10 sqmt of Built-up area. Below table provides the details of the calculation for arriving at the total population.

Table 4.8: Calculation of Commercial Building Population from the development

Commercial Building	
Built-up area in sqmt	1909651
Carpet area in sqmt	1432238
Trips/day/10sqm	1
Trips/day	143224
External trips to office	85934

It assumed that 40% of the trips are made internally within the mixed used development.

v. Traffic Impact from Health Care

The trips from Health care were calculated based on trips for every 100 sqmt of Built-up area. Below table provides the details of the calculation for arriving at the total population.

Table 4.9: Calculation of Health Care Population from the development

Health Care/Hospital	
Built-up area in sqmt	24900
Carpet area in sqmt	18675
Trips/day/100sqm	20
Trips/day	3735
External trips	2241

It assumed that 40% of the trips are made internally within the mixed used development.

vi. Traffic Impact from Police Station

The trips from Police Station were calculated based on trips for every 100 sqmt of Built-up area. Below table provides the details of the calculation for arriving at the total population.

Table 4.10: Calculation of Police Station Population from the development

Police Station	
Built-up area in sqmt	2500
Carpet area in sqmt	1875
Trips/day/100 sqm	20
Trips/day	375
External trips	300

It assumed that 20% of the trips are made internally within the mixed used development.

vii. Traffic Impact from Community Centre

The trips from Community Centre were calculated based on trips for every 100 sqmt of Built-up area. Below table provides the details of the calculation for arriving at the total population.

Table 4.11: Calculation of Community Centre Population from the development

Community Centre	
Built-up area in sqmt	2400
Carpet area in sqmt	1800
Trips/day/100 sqm	70
Trips/day	1260
External trips	378

It assumed that 70% of the trips are made internally within the mixed used development.

viii. Traffic Impact from Industrial Building

The trips from Industrial Building were calculated based on trips for every 100 sqmt of Built-up area. Below table provides the details of the calculation for arriving at the total population.

Table 4.12: Calculation of Industrial Building Population from the development

Industrial	
Built-up area in sqmt	9180
Carpet area in sqmt	6885
Trips/day/100 sqm	40
Trips/day	2754
External trips	1928

It assumed that 30% of the trips are made internally within the mixed used development.

ix. Traffic Impact from Other Amenities

The trips from Other Amenities were calculated based on trips for every 100 sqmt of Built-up area. Below table provides the details of the calculation for arriving at the total population.

Table 4.13: Calculation of Other Amenities Population from the development

Other Amenities	
Built-up area in sqmt	62690
Carpet area in sqmt	47018
Trips/day/100 sqm	30
Trips/day	14105
External trips	7053

It assumed that 50% of the trips are made internally within the mixed used development.

Table 4.14: Traffic Generated from Various Developments

Time (hrs)	Residential	Commercial	School	Retail	Police	Community Centre	Health Care	Industrial	Other Amenities	Total
7:00 to 8:00	15254	1765	1465	770	7	45	97	121	30	19554
8:00 to 9:00	19068	2408	1465	770	27	15	97	176	60	24086
9:00 to 10:00	**24153**	**5004**	**977**	**513**	**27**	**3**	**49**	**148**	**270**	**31143**
10:00 to 11:00	20339	9141	0	0	41	2	0	173	270	29965
11:00 to 12:00	16525	7401	0	0	27	0	0	97	240	24290
12:00 to 13:00	12712	5952	2442	1283	0	0	97	80	240	22806
13:00 to 14:00	3814	3501	1465	770	14	0	0	146	479	10189
14:00 to 15:00	3814	2126	977	513	0	0	0	119	479	8028
15:00 to 16:00	5085	1741	0	0	14	2	97	159	419	7517
16:00 to 17:00	12712	2576	0	0	14	3	292	96	419	16112
17:00 to 18:00	15254	3446	977	513	14	45	535	167	419	21371
18:00 to 19:00	19068	5598	0	0	27	45	389	192	539	25858
19:00 to 20:00	20339	5607	0	0	14	41	97	154	719	26971
20:00 to 21:00	**20339**	**8246**	**0**	**0**	**14**	**12**	**49**	**92**	**659**	**29410**
21:00 to 22:00	16525	6183	0	0	14	0	0	94	359	23176
22:00 to 23:00	10170	4339	0	0	14	0	49	115	240	14925
23:00 to 00:00	8898	3150	0	0	7	0	97	87	90	12329
0:00 to 1:00	2542	496	0	0	0	0	0	58	0	3096
1:00 to 2:00	1271	377	0	0	0	0	0	38	0	1686
2:00 to 3:00	0	0	0	0	0	0	0	40	0	40
3:00 to 4:00	0	0	0	0	0	0	0	47	0	47
4:00 to 5:00	0	0	0	0	0	0	0	70	0	70
5:00 to 6:00	0	0	0	0	0	0	0	93	0	93
6:00 to 7:00	6356	269	0	0	0	23	0	131	0	6778

5. INTERNAL CIRCULATION PLAN AND ANALYSIS

5.1. Internal Circulation Plans

The following are the circulation plans developed for the traffic movement inside the MLCP levels. Also few external parking is also provided. Following are the traffic circulation recommendations:

- Two way circulations are recommended inside podium and basement driveways with driveway of min 6 metre wide.
- The ramps inside the parking levels are 6 meters wide.
- Two way circulations are provided on the ramps for changing the levels inside the parking levels.
- The turning radius of min. 4.5m is provided for the ramps and inside the parking level.

The internal circulation plans of the parking levels are as shown in the **Figure 5.1** – **Figure 5.3** below.

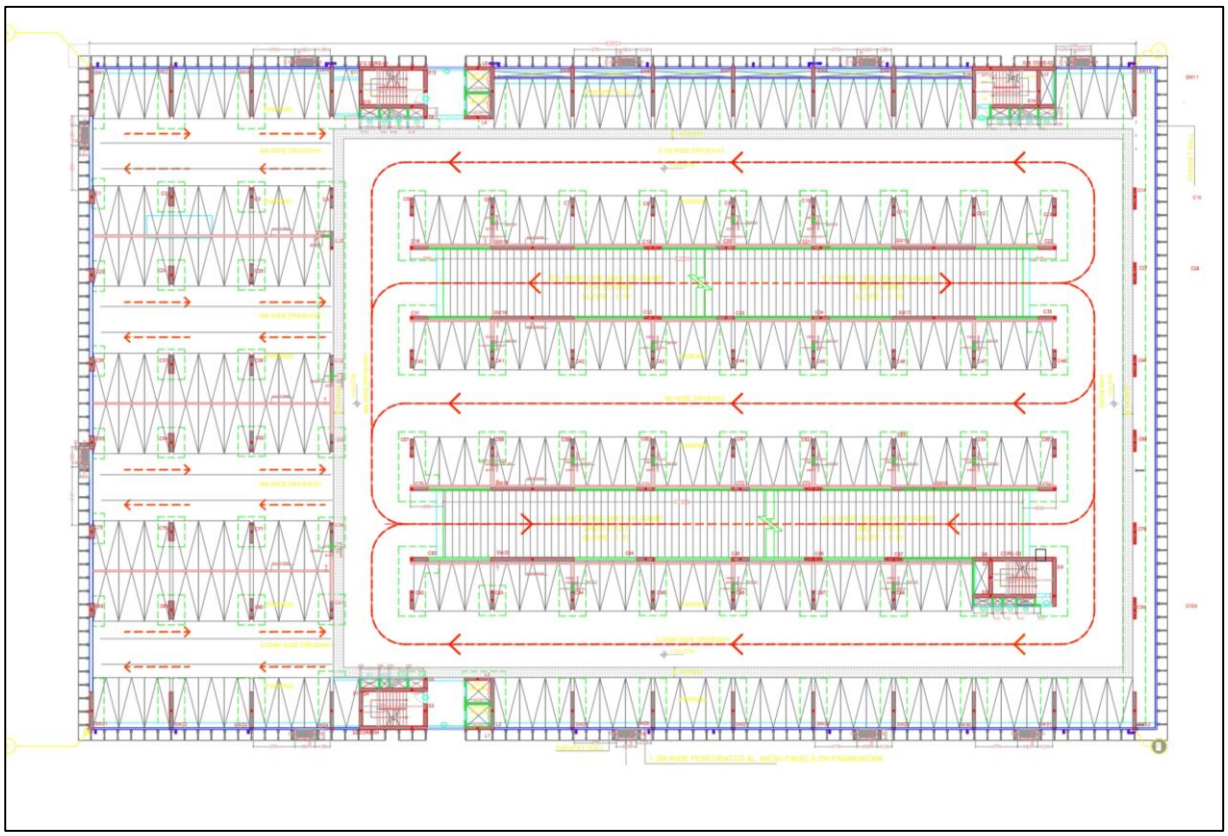


Figure 5-1: Circulation Plan North MLCP

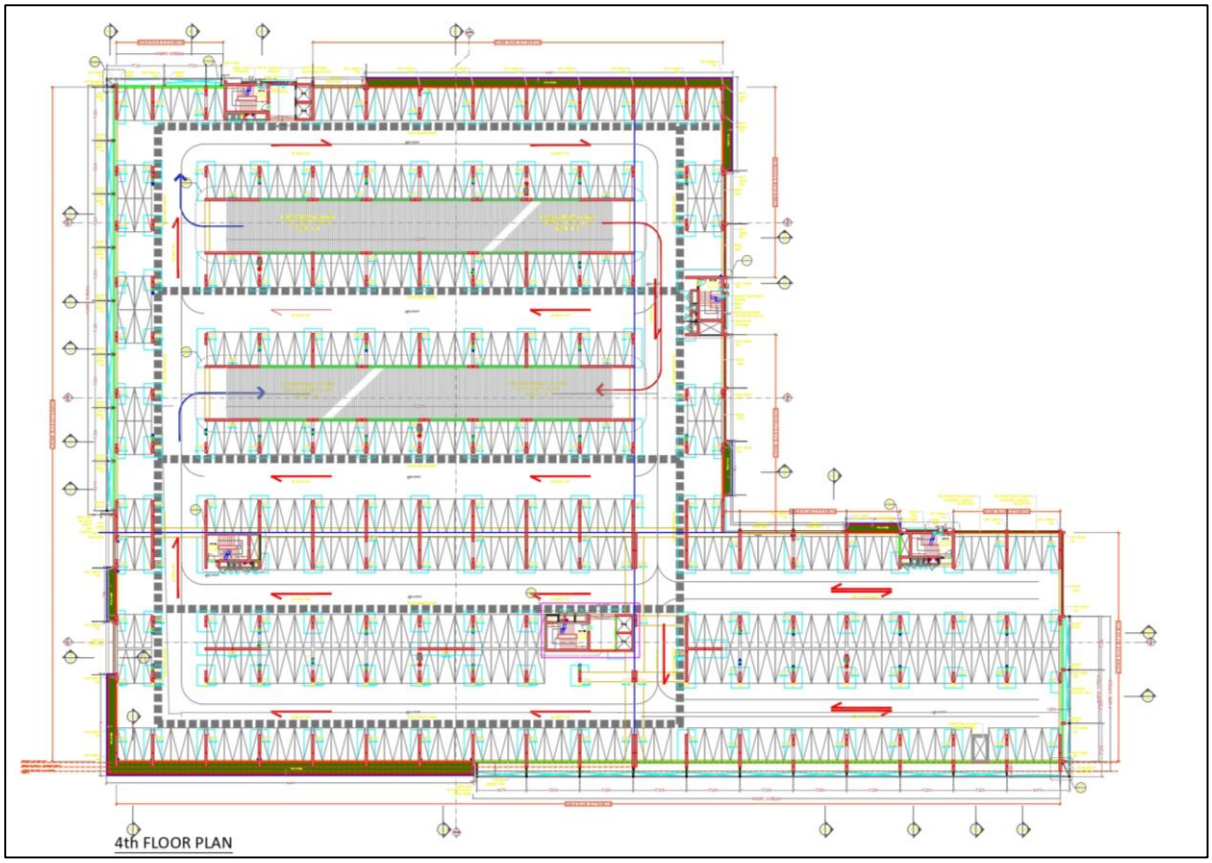


Figure 5-2: Circulation Plan South MLCP

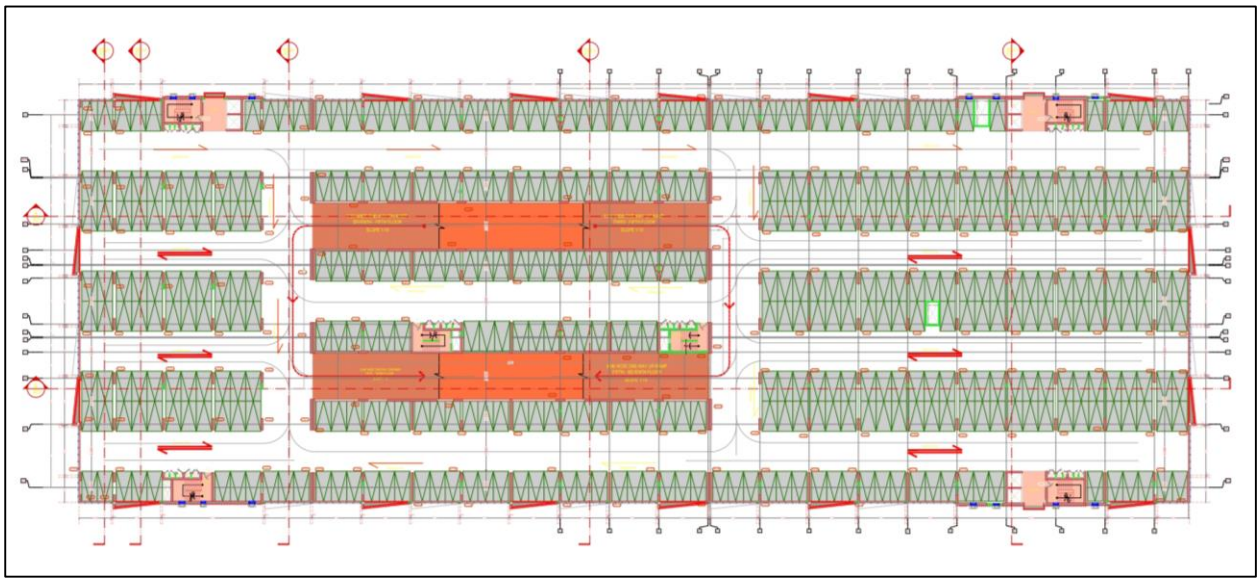


Figure 5-3: Circulation Plan Sector 5 MLCP

5.2. Retrieval Time during Emergency

The maximum retrieval time is the time required for a vehicle parked at the farthest parking slot to reach to the exit gate of the residential complex during emergency. The movement and travel time of similar parking slot was studied and average speed of vehicles during the

parking operation was determined. Retrieval time analysis was carried out for North MLCP, South MLCP and Sector 5 MLCP.

The farthest parking location of the vehicles was derived from the drawing and the total length of travel from that farthest location to the ramp and then to the ground level and to the exit gate of the residential complex was calculated from the drawing. Retrieval time for parking provision was calculated. The arrival rate of vehicles coming to the gate was determined on the basis of number of parking slots available. The retrieval time calculations have been shown in the **Table 5.1** below.

Table 5.1: Retrieval Time during Emergency for Residential Parking

Particulars	Sector-5 MLCP	South MLCP	North MLCP
Total Length from Level-14 to Ground	2451.6	2783.4	2116.1
Distance from the ramp to exit gate (M)	174	159.38	100.14
Total Distance of Travel (M)	2625.6	2942.8	2216.3
Average Speed of Car in Parking Lot (Km/hr)	12	12	12
Travel time in Minutes	13.1	14.7	11.1

5.3. Evacuation Time

Evacuation time is the time required to evacuate all the vehicles. Parking is provided on podiums levels and also few external ground parking. The dimensions, distance to parking slots and speed of car etc. were considered for the analysis. As seen in the layout all the lanes are considered for the purpose of evacuation. The calculation of time required for evacuating cars from the complex is shown in the following **Table 5.2**.

Table 5.2: Evacuation Time for the development

MLCP-18	
Total No. of Parked vehicles	4866
Avg Speed of Vehicle at the gate	12
Length of vehicle	5.0
Length of veh + gap between two vehr (M)	8.00
Time required for one veh to exit from gate in sec	2.4
Initial Lag Time (Min)	2.00
Time required for all vehicles to exit (min)	**21.5**

Below **Table 5.3** shows the different evacuation times depending on the various percentages of vehicles parked in the plots.

Table 5.3: Different evacuation times for percentage of vehicles parked

% of Total veh parked	Exit of No. of veh	Total time required for exit of cars (min)
Number of exit Lanes		8
Initial Lag Time (Min)		2
10%	487	3.9
20%	973	5.9
30%	1460	7.8
40%	1946	9.8
50%	2433	11.7
60%	2920	13.7
70%	3406	15.6
80%	3893	17.6
90%	4379	19.5
100%	4866	21.5

5.4. Swept Path Analysis

Swept Path Analysis is the calculation and analysis of the movement and path of different parts of a vehicle when that vehicle is undertaking a turning manoeuvre. At a basic level this includes calculating the path taken by each wheel during the turn and also calculating the space needed by the vehicle body during the turn. The swept path analysis for car movement inside the parking was examined at all the turning locations inside the parking area and found to be in order. Below figures shows the swept path analysis for the typical floor plans of the MLCPs.

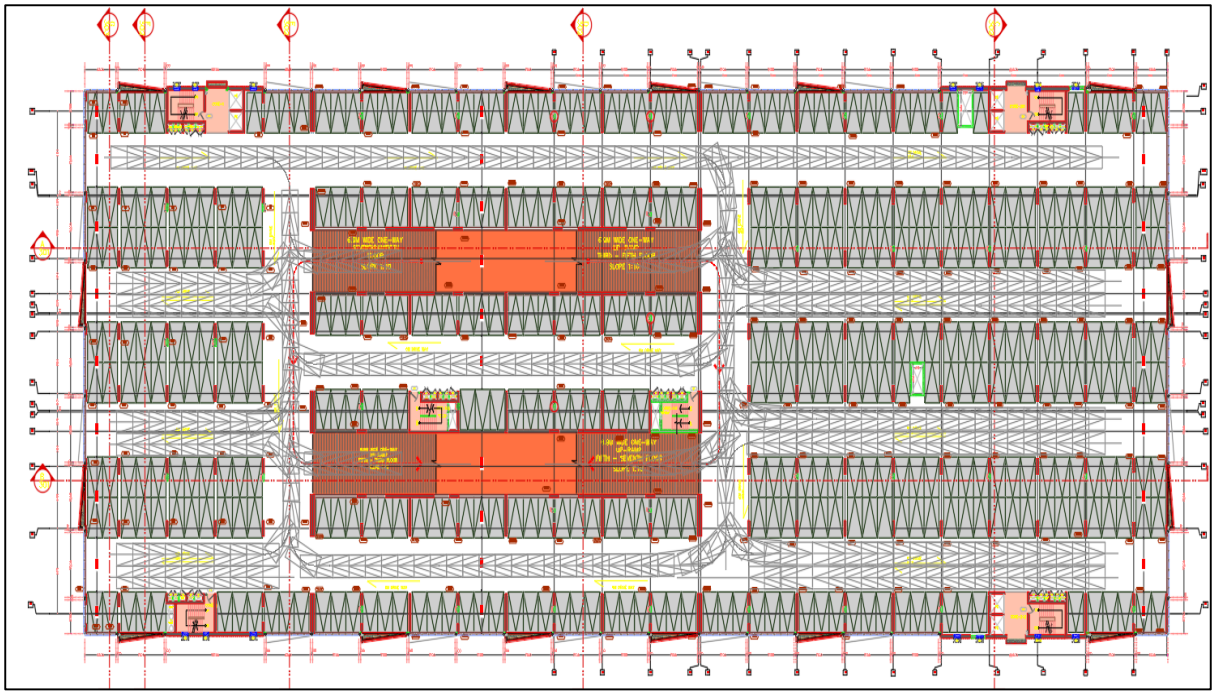


Figure 5-4: Swept Path for Sector-5 MLCP

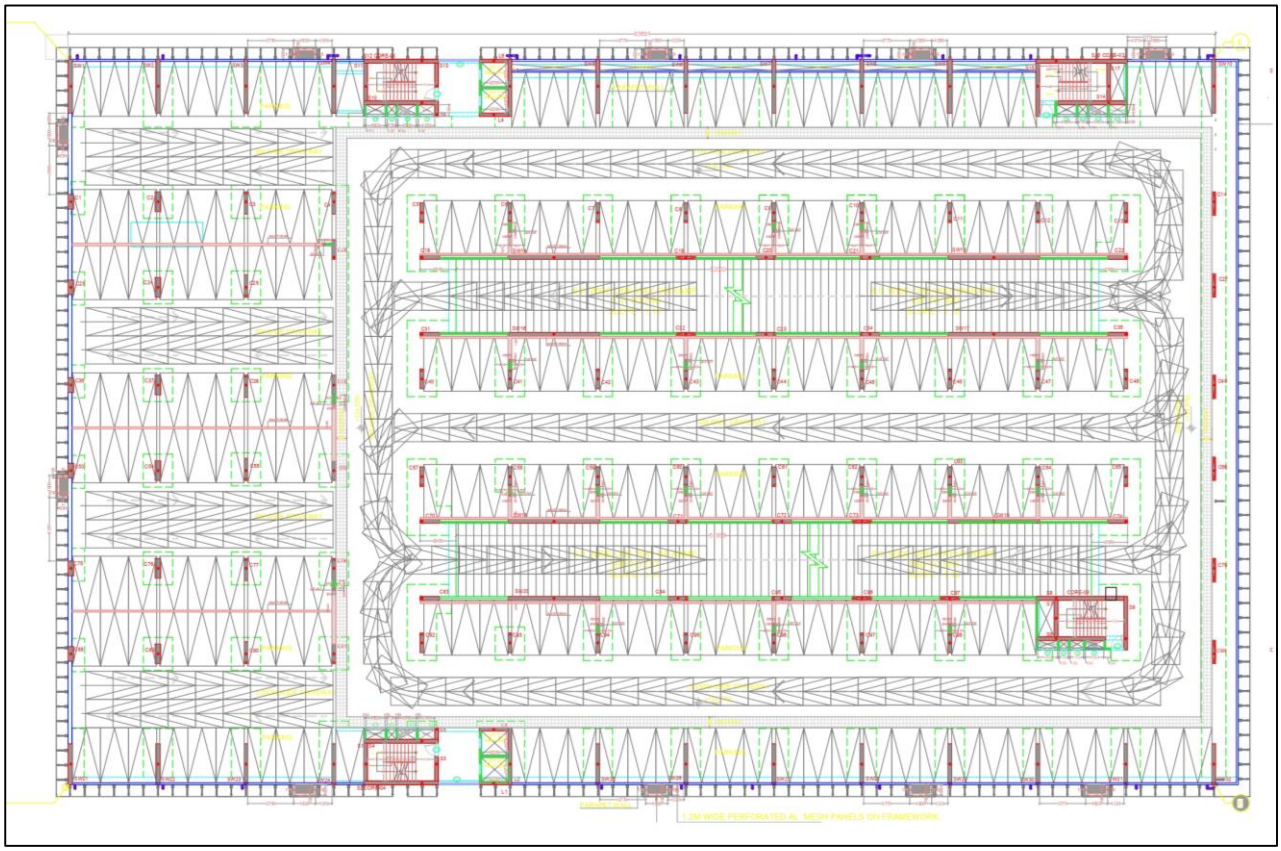


Figure 5-5: Swept Path for North MLCP

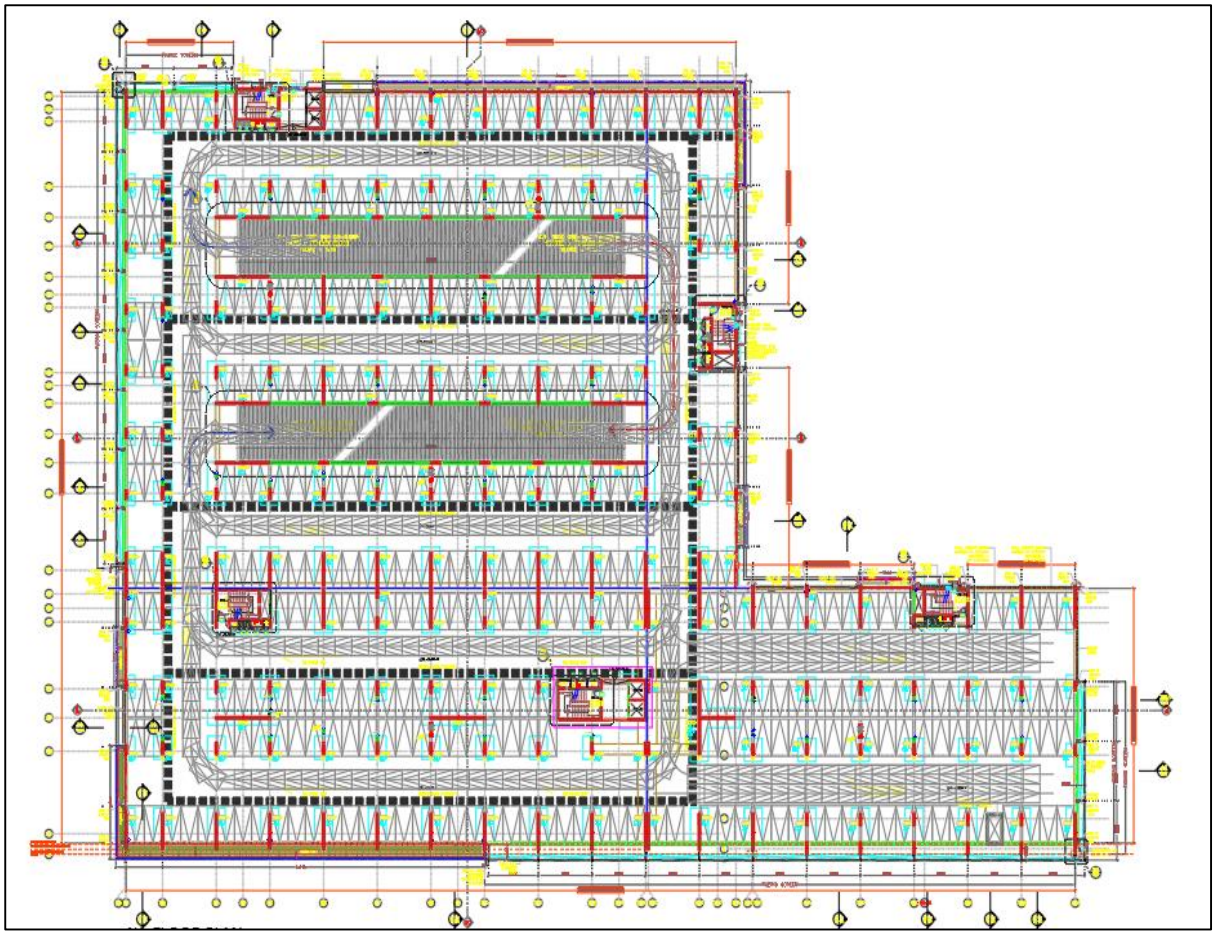


Figure 5-6: Swept Path for South MLCP

6. TRAFFIC MANAGEMENT PLAN

6.1. Introduction

A traffic management plan chart have been prepared year wised based the traffic projections from existing proposed developments. The plan chart is based on the generated trips that would impact on the nearby roads. The various augmentation necessary based on the traffic scenario is also proposed.

6.2. Distribution of Traffic on Roads

The calculated traffic from the developments would impact the external abutting roads near the plot. This impact need to be analysed based on the probable route choice of the vehicle users on to the external roads. The major abutting roads near to the plots are Thaloja-Khoni Road, Badlapur Pipeline Road, Kalyan Shilphata Road and upcoming Airoli-Katai Naka Road. Traffic from the development would fall on these roads based on their work location, mode choice, convenience, and route choice. Since the present development is of mixed use a proportion of traffic would have trips within the developments. This percentage share provided in chapter three. Below section provides the regional distribution of external traffic based on the road networks. For this the consultant had a thorough study of the upcoming projects, Kalyan growth centre Development Plan, etc. and the commercial regions were identified. These regions based on the road network connectivity were classified into four zones. They are:

a) North Zone – Kalyan
b) West Zone – Mumbai/ Airoli
c) South Zone – Navi Mumbai/ Panvel
d) East Zone – Ambernath/Badlapur

Below figure shows the demarcation of zones in the map.

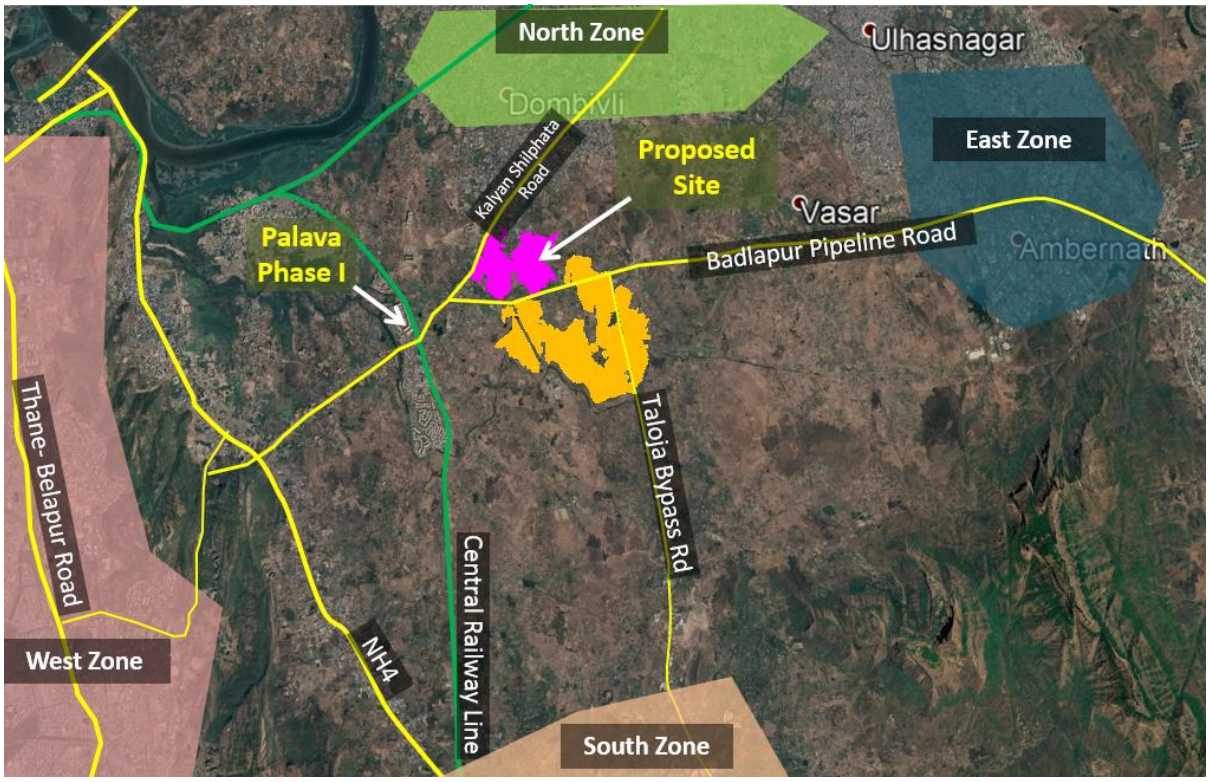


Figure 6-1: Zoning of External Trip Distribution

Based on zoning of personnel's business destinations, the route choice were identified and assigned. These were calculated based on the phase-wise development of the entire master plan. This was then added year-wise on to the external road traffic. The volume to capacity ratio for the peak hour traffic was calculated to arrive at the Level of Service with which the roads will operate. The phase-wise distribution of traffic from the development for the peak hour is provided in T**able 6.1** below. **Table 6.2** provides the year-wise traffic distribution on roads. **Table 6.3 – 6.7** provides the yearly growth of traffic for the peak hour and its volume to capacity ratios. Also the level of service for each year is calculated based on the Indo-HCM 2017 standards.

Table 6.1: Phase-wise Peak hour Traffic distribution from Development

	Development Type	Peak Hour Traffic	phase 1	phase 2	phase 3	phase 4	phase 5	phase 6	phase 7	phase 8	phase 9	phase 10	Total
			2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Traffic from development	Residential	24153	10.1%	13.6%	13.6%	7.7%	8.4%	6.1%	10.4%	11.8%	10.4%	7.8%	100.0%
	commercial	5004				33%	34%	33%	0%				100.0%
	School	977			50%		50%						100.0%
	Retail	513											
	Police	27								100%			100.0%
	Community Centre	3			100%								100.0%
	Health Care	49	100%										100.0%
	Industrial	148							50%		50%		100.0%
	Other Amenities	270				25%		25%		25%		25%	100.0%
	Phase-wise Traffic		2478	3287	3777	3587	4224	3191	2596	2951	2580	1959	

Table 6.2: Phase-wise Traffic distribution on Roads

	2025-2028 % distribution	From 2028 % distribution		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Traffic distribution on Road	33%	22%	Taloja Bypass Road	818	1085	1246	789	929	702	571	649	568	431
	22%	17%	Badlapur Road	545	723	831	610	718	542	441	502	439	333
	45%	26%	Kalyan Shilphata Road	1115	1479	1700	933	1098	830	675	767	671	509
	-	35%	Airoli Katai Naka	-	-	-	1255	1478	1117	908	1033	903	686

Table 6.3: Peak hour Capacity Analysis for Taloja Khoni Bypass Road

Year	Traffic on Road	Development Traffic	Total Traffic	Capacity of road	Volume to Capacity Ratio	LOS of the road	Action Plans
2021	1380		1380	2800	0.49	C	Existing Traffic
2022	1428		1428	2800	0.51	C	
2023	1478		1478	2800	0.53	C	
2024	1530		1530	8400	0.18	B	Road widening to 6-lane as per DP Plan
2025	1584	818	2401	8400	0.29	B	Phase 1 Development Traffic expected on road
2026	2473	1085	3558	8400	0.42	B	Phase 2 Development Traffic expected on road
2027	3665	1246	4911	8400	0.58	C	Phase 3 Development Traffic expected on road
2028	5058	789	5848	8400	0.70	C	Phase 4 Development Traffic expected on road, Airoli Katai Naka Road connectivity fully gets operational-expects 15% Traffic diverts on to it
2029	5146	929	6075	8400	0.72	C	Phase 5 Development Traffic expected on road
2030	5528	702	6230	8400	0.74	C	Phase 6 Development Traffic expected on road, Metro line 12 start operation-expects 12% reduction in traffic
2031	6386	571	6957	8400	0.83	D	Phase 7 Development Traffic expected on road
2032	7131	649	7780	8400	0.93	E	Phase 8 Development Traffic expected on road
2033	7975	568	8543	8400	1.02	F	Phase 9 Development Traffic expected on road
2034	8756	431	9187	8400	1.09	F	Phase 10 Development Traffic expected on road
2035	9417		9417	8400	1.12	F	
2036	7251		7251	8400	0.86	E	Expects MMC Road Network gets operational-25% both passenger and commercial traffic diverts
2037	7396		7396	8400	0.88	E	
2038	7544		7544	8400	0.90	E	
2039	7695		7695	8400	0.92	E	
2040	7849		7849	8400	0.93	E	
2041	7966		7966	8400	0.95	E	
2042	8086		8086	8400	0.96	E	

Year	Traffic on Road	Development Traffic	Total Traffic	Capacity of road	Volume to Capacity Ratio	LOS of the road	Action Plans
2043	8207		8207	8400	0.98	E	
2044	8330		8330	8400	0.99	E	
2045	8455		8455	8400	1.01	F	Traffic Augmentation Required

Table 6.4: Peak hour Capacity Analysis for Badlapur Pipeline Road

Year	Traffic on Road	Development Traffic	Total Traffic	Capacity of road	Volume to Capacity Ratio	LOS of the road	Action Plans
2021	2253		2253	5400	0.42	B	Existing Traffic
2022	2332		2332	5400	0.43	B	
2023	2414		2414	5400	0.45	B	
2024	2498		2498	5400	0.46	C	
2025	2585	545	3131	5400	0.58	C	Phase 1 Development Traffic expected on road
2026	3225	723	3948	5400	0.73	C	Phase 2 Development Traffic expected on road
2027	4066	831	4897	5400	0.91	E	Phase 3 Development Traffic expected on road
2028	5044	610	5654	8400	0.67	C	Phase 4 Development Traffic expected on road, Airoli Katai Naka Road connectivity fully gets operational-expects 15% Traffic diverts on to it. Road widening to 6-lane is recommended
2029	4975	718	5693	8400	0.68	C	Phase 5 Development Traffic expected on road
2030	5181	542	5723	8400	0.68	C	Phase 6 Development Traffic expected on road, Metro line 12 start operation-expects 12% reduction in traffic
2031	5866	441	6308	8400	0.75	D	Phase 7 Development Traffic expected on road
2032	6465	502	6967	8400	0.83	D	Phase 8 Development Traffic expected on road
2033	7141	439	7580	8400	0.90	E	Phase 9 Development Traffic expected on road
2034	7769	333	8102	8400	0.96	E	Phase 10 Development Traffic expected on road
2035	8305		8305	8400	0.99	E	
2036	6395		6395	8400	0.76	D	Expects MMC Road Network gets operational-25% both passenger and commercial traffic diverts

Year	Traffic on Road	Development Traffic	Total Traffic	Capacity of road	Volume to Capacity Ratio	LOS of the road	Action Plans
2037	6523		6523	8400	0.78	D	
2038	6653		6653	8400	0.79	D	
2039	6786		6786	8400	0.81	D	
2040	6922		6922	8400	0.82	D	
2041	7026		7026	8400	0.84	D	
2042	7131		7131	8400	0.85	D	
2043	7238		7238	8400	0.86	E	Traffic Augmentation Required
2044	7347		7347	8400	0.87	E	
2045	7457		7457	8400	0.89	E	

Table 6.5: Peak hour Capacity Analysis for Kalyan-Shilphata Road

Year	Traffic on Road	Development Traffic	Total Traffic	Capacity of road	Volume to Capacity Ratio	LOS of the road	Action Plans
2021	4833		4833	8400	0.58	C	Existing Traffic
2022	5002		5002	8400	0.60	C	
2023	5177		5177	8400	0.62	C	
2024	5358		5358	8400	0.64	C	
2025	5546	1115	6661	8400	0.79	D	Phase 1 Development Traffic expected on road
2026	6861	1479	8340	8400	0.99	E	Phase 2 Development Traffic expected on road
2027	8590	1700	10289	8400	1.22	F	Phase 3 Development Traffic expected on road
2028	6482	933	7415	8400	0.88	E	Phase 4 Development Traffic expected on road, Airoli Katai Naka Road connectivity fully gets operational-expects 40% Traffic diverts on to it from Kalyan Shiphata Road
2029	6525	1098	7623	8400	0.91	E	Phase 5 Development Traffic expected on road
2030	6556	830	7386	8400	0.88	E	Phase 6 Development Traffic expected on road, Metro line 12 start operation-expects 17% reduction in traffic

Year	Traffic on Road	Development Traffic	Total Traffic	Capacity of road	Volume to Capacity Ratio	LOS of the road	Action Plans
2031	6315	675	6990	8400	0.83	D	Phase 7 Development Traffic expected on road
2032	7164	767	7932	8400	0.94	E	Phase 8 Development Traffic expected on road
2033	8130	671	8801	8400	1.05	F	Phase 9 Development Traffic expected on road
2034	9021	509	9530	8400	1.13	F	Phase 10 Development Traffic expected on road
2035	9769		9769	8400	1.16	F	
2036	7522		7522	8400	0.90	E	Expects MMC Road Network gets operational-25% both passenger and commercial traffic diverts
2037	7672		7672	8400	0.91	E	
2038	7826		7826	8400	0.93	E	
2039	7982		7982	8400	0.95	E	
2040	8142		8142	8400	0.97	E	
2041	8264		8264	8400	0.98	E	
2042	8388		8388	8400	1.00	E	
2043	8514		8514	8400	1.01	F	LOS drops to F, Traffic Augmentation Required
2044	8641		8641	8400	1.03	F	
2045	8771		8771	8400	1.04	F	

Table 6.6: Peak hour Capacity Analysis for Airoli Katai Naka Road

Year	Traffic on Road	Development Traffic	Total Traffic	Capacity of road	Volume to Capacity Ratio	LOS of the road	Action Plans
2021							Existing Traffic
2022							
2023							
2024							
2025							
2026							

Year	Traffic on Road	Development Traffic	Total Traffic	Capacity of road	Volume to Capacity Ratio	LOS of the road	Action Plans
2027							
2028	2750	1255	4005	8400	0.48	C	Phase 4 Development Traffic expected to divert to Airoli Katai Naka Road
2029	3445	1478	4923	8400	0.59	C	Phase 5 Development Traffic expected on road
2030	4234	1117	5351	8400	0.64	C	Phase 6 Development Traffic expected on road, Metro line 12 start operation-expects 17% reduction in traffic
2031	5484	908	6393	8400	0.76	D	Phase 7 Development Traffic expected on road
2032	6553	1033	7586	8400	0.90	E	Phase 8 Development Traffic expected on road
2033	7775	903	8678	8400	1.03	F	Phase 9 Development Traffic expected on road
2034	8895	686	9581	8400	1.14	F	Phase 10 Development Traffic expected on road
2035	9820		9820	8400	1.17	F	
2036	7562		7562	8400	0.90	E	Expects MMC Road Network gets operational-25% both passenger and commercial traffic diverts
2037	7713		7713	8400	0.92	E	
2038	7867		7867	8400	0.94	E	LOS drops to F, Traffic Augmentation Required
2039	8025		8025	8400	0.96	E	
2040	8185		8185	8400	0.97	E	
2041	8308		8308	8400	0.99	E	
2042	8432		8432	8400	1.00	F	
2043	8559		8559	8400	1.02	F	
2044	8687		8687	8400	1.03	F	
2045	8818		8818	8400	1.05	F	

6.3. Summary of traffic condition on Roads after development from the year 2024

i. On Taloja Bypass Road

The present peak hour vehicular volume for Taloja Bypass road is 1380 PCU in peak hour. The present LOS of the road is **C.** It has be learnt from the Development Plan that the present 2-Lane road is to be widened to 6-lane divided two way road and by 2024 it expected to get completed. As per the latest Indo-HCM 2017 the capacity of 6-alne road is 8400 PCUs/hr. Thus LOS increases to B. The first phase of development is expected to be complete by 2025 and the LOS of the road remains at B. By 2028 it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS remains in C. By 2030 it is expected that metro Line 12 would be completed and mode shift would impact passenger traffic from the present road. Traffic augmentation may be required to improve the efficiency of the road like capacity improvement, intersection signalisation, etc. for the later years by 2045 when LOS drops to F.

The traffic on the Road was projected for future year till 2045. Also the V/C ratio analysis was calculated incorporating the traffic from the development after projecting the values for future as shown in the **Table 6.7** below.

Table 6-7: Projected Traffic on Road

Year	Peak hour traffic PCUs/hr)	V/C Ratio for Taloja Bypass Road	LoS for Taloja Bypass Road	Remark
2021	1380	0.51	C	Base Scenario
2026	3558	0.42	B	Scenario2026
2031	6957	0.83	D	Scenario2031
2036	7251	0.86	E	Scenario2036
2041	7966	0.95	E	Scenario2041

- Base Scenario - The present road is 2-lane both way with paved shoulders and the LOS is C. As per DP plan the existing road gets widened to 6-lane divided carriageway. LOS B is thus achieved. The proposed development would start impacting on the roads by 2024 and LOS remains at B.

- Scenario2026 – By 2026 the development traffic will impact on the road, but since the road is getting widened the LOS remains within B.

- Scenario2031 – By 2028 it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS remains in C. By 2030 metro Line 12 will be fully operational and mode shift would impact passenger traffic from the present road. Still the LOS drops to D.

- Scenario2036 – LOS drops to E, Traffic circulation and management measures to be adopted.

ii. On Badlapur Pipeline Road

The present peak hour vehicular volume for Badlapur Pipeline Road is 2253 PCU. The present LOS of the road is **B**. The first phase of development is expected to be complete by 2025 and the LOS of the road drops to C. By 2028 it is recommended that the road gets widened to 6-lane. As per the latest Indo-HCM 2017 the capacity of 6-alne road is 8400 PCUs/hr. Thus LOS increases to C. By 2028 it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment. By 2030 it is expected that metro Line 12 would be completed and mode shift would impact passenger traffic from the present road and LOS remains in C. Traffic augmentation may be required to improve the efficiency of the road like capacity improvement, intersection signalisation, etc. for the later years by 2043 when LOS drops to E.

The traffic on the Road was projected for future year till 2045. Also the V/C ratio analysis was calculated incorporating the traffic from the development after projecting the values for future as shown in the **Table 6.8** below.

Table 6-8: Projected Traffic on Road

Year	Peak hour traffic PCUs/hr)	V/C Ratio for Taloja Bypass Road	LOS for Badlapur Pipeline Road	Remark
2021	2253	0.42	B	Base Scenario
2026	3948	0.73	C	Scenario2026
2031	6308	0.75	D	Scenario2031
2036	6395	0.76	D	Scenario2036
2041	7026	0.84	D	Scenario2041

- Base Scenario - The present road is 4-lane both way with paved shoulders and the LOS is B.
- Scenario2026 – By 2025 the development traffic will impact on the road, and LOS drops to C.
- Scenario2031 – By 2028 it is By 2028 it is recommended that the road gets widened to 6-lane and also it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS remains in C. By 2030 metro Line 12 will be fully operational and mode shift would impact passenger traffic from the present road. Still the LOS drops to D.
- Scenario2036 – LOS remains in D.
- Scenario2041 – LOS drops to E, Traffic circulation and management measures to be adopted.

iii. On Kalyan Shilphata Road

The present vehicular volume for Kalyan Shilphata Road is 4833 PCU in peak hour. The present LOS of the road is **C**. The first phase of development is expected to be complete by 2025 and the LOS of the road drops to C. By 2027 LOS drops to F, but by 2028 it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS increases to E. By 2030 it is expected that metro Line 12 would be completed and mode shift would impact passenger traffic from the present road and LOS increases to D. Traffic augmentation may be required to improve the efficiency of the road like capacity improvement, intersection signalisation, etc. for the later years by 2043 when LOS drops to F.

The traffic on the Road was projected for future year till 2045. Also the V/C ratio analysis was calculated incorporating the traffic from the development after projecting the values for future as shown in the **Table 6.9** below.

Table 6-9: Projected Traffic on Road

Year	Peak hour traffic PCUs/hr)	V/C Ratio for Taloja Bypass Road	LoS for Kalyan Shilphata Road	Remark
2021	4833	0.58	C	Base Scenario
2026	8340	0.99	E	Scenario2026
2031	6990	0.83	D	Scenario2031

2036	7522	0.90	E	Scenario2036
2041	8264	0.98	E	Scenario2041

- Base Scenario - The present road is a 6-lane road with LOS C.
- Scenario2026 – By 2025 the development traffic will impact on the road, the LOS drops to D.
- Scenario2031 – By 2027 LOS drops to F, but by 2028 it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS increases to E. By 2030 it is expected that metro Line 12 would be completed and mode shift would impact passenger traffic from the present road and LOS increases to D.
- Scenario2036 – LOS drops to E, Traffic circulation and management measures to be adopted.
- Scenario2041 – By 2043 LOS drops to F, Traffic Augmentation Required.

iv. On Airoli Katai Naka Road

The 13km Airoli Katai Naka Road is under construction and is expected to be completed by 2028. It is 6-lane divided road. As per the latest Indo-HCM 2017 the capacity of 6-alne road is 8400 PCUs/hr. The base year traffic is estimated to be 3667 PCUs for the peak hour. The first phase of development is expected to be complete by 2024 and the LOS of the road remains at B. By 2028 it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS remains in C. By 2030 it is expected that metro Line 12 would be completed and mode shift would impact passenger traffic from the present road. Traffic augmentation may be required to improve the efficiency of the road like capacity improvement, intersection signalisation, etc. for the later years by 2045 when LOS drops to F.

The traffic on the Road was projected for future year till 2045. Also the V/C ratio analysis was calculated incorporating the traffic from the development after projecting the values for future as shown in the **Table 6.10** below.

Table 6-10: Projected Traffic on Road

Year	Peak hour traffic PCUs/hr)	V/C Ratio for Taloja Bypass Road	LoS for Airoli Katai Naka Road	Remark
2021	-	-	-	Base Scenario
2026	-	-	-	Scenario2026
2031	6393	0.76	D	Scenario2031
2036	7562	0.90	E	Scenario2036
2041	8308	0.99	E	Scenario2041

- Base Scenario and Scenario2026- The Road is under construction and is expected to be completed by 2028. The base year LOS of the road will be C.
- Scenario2031 –By 2030 metro Line 12 will be fully operational and mode shift would impact passenger traffic from the present road and LOS remain in C.
- Scenario2036 – LOS drops to E, Traffic circulation and management measures to be adopted.
- Scenario2041 – By 2042 LOS drops to F, Traffic Augmentation Required.

6.4. Recommendations for Capacity Improvement Measures

The Badlapur Pipeline Road is the major abutting road which presently exists and will be the primary connecting road for the development traffic. The Airoli Katai Naka Alignment terminates at the Kalyan Shilphata Junction. It is recommended to extend the elevated corridor till the Taloja Bypass Road Junction for a length of 3.5km. The details of the proposals are provided below.

- Continuous Elevated Corridor of approximately 3.5Km connecting the proposed Multi Modal corridor interchange network and ending 350m ahead of Taloja junction.
- Even if the MMC is not implemented, Airoli Katai Naka is under implementation and there will be need for an interchange at this location, In view of this it is likely that MMRDA will go for an elevated corridor in the future years to come.
- Three numbers of up ramps and down ramps with length 300m are proposed to access the flyover.
- Proposals are prepared to improve Taloja Junction and intermediate junctions.

The proposal at major junction on 3.5km Pipeline Road is provided below.

- **Junction 1**
    - up and down ramp with length 300m are proposed to access the flyover
- **Junction 2**
    - up and down ramp with length 300m are proposed to access the flyover
    - It is proposed to have 500m (250m either side) two-way underpass for straight traffic from Palava sector 2 to the proposed DP Road.

Loops of 30m radius are proposed as shown connecting the flyover. This will ease the right turning traffic from phase 2 junction to enter the flyover without crossing the junction at ground and vice versa.

Loops of interchange for left turning traffic is proposed to have 300m length

- **Junction 3**

It is proposed to have 500m (250m both side) two-way underpass for straight traffic from Taloja Bypass Phata to the proposed DP road as shown.

Loops of 30m radius are proposed as shown connecting the flyover. This ease the right turning traffic from Taloja junction to enter the flyover without crossing the junction at ground and vice versa.

Loops of interchange for left turning traffic is proposed to have 300m length.

The concept Plan proposal is provided in below figure.

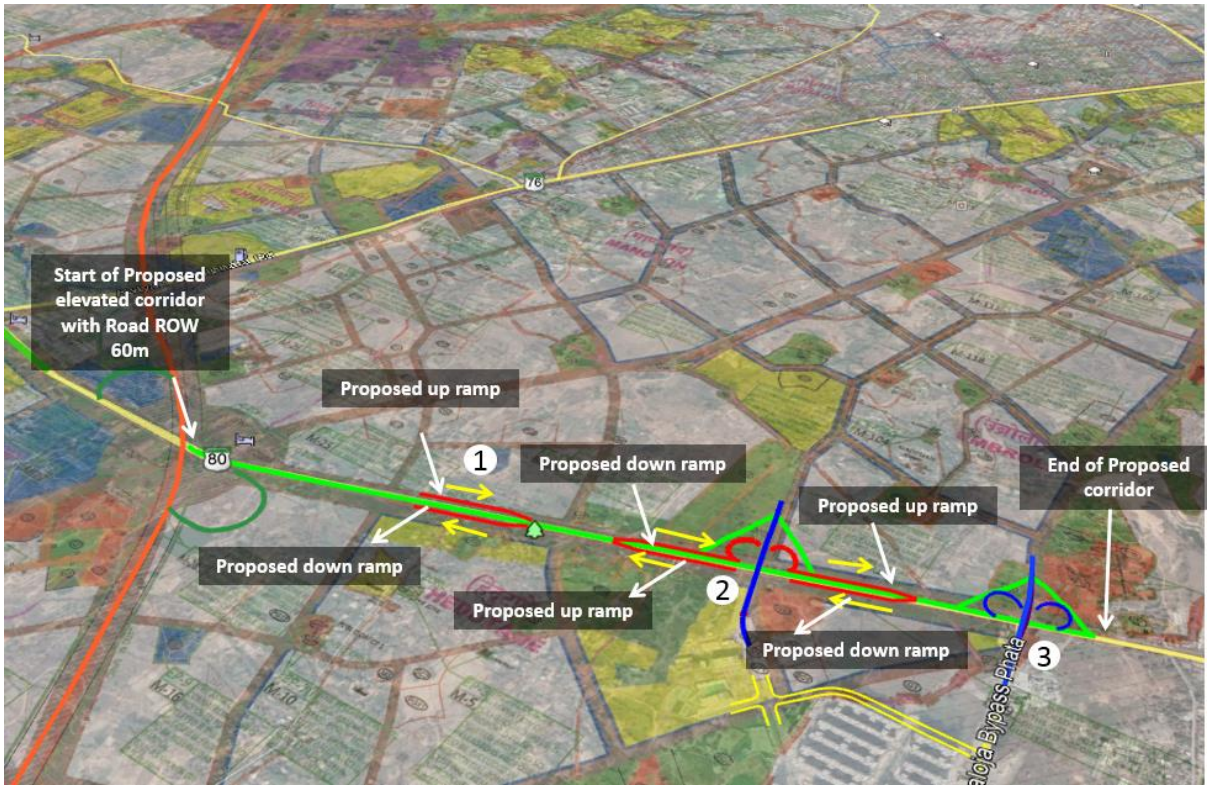


Figure 6-2: Concept Proposal on Badlapur Pipeline Road for 3.5km

6.5. Traffic Control

Speeding inside the complex and parking levels, blind turns rash driving can lead to serious or fatal accidents. To avoid these accidents it is necessary to provide proper traffic control measures inside the complex. Pedestrians are the most vulnerable victims in any accidents. To regulate the traffic inside the complex a comprehensive traffic movement signage plan has to be prepared which includes pedestrian walk, pedestrian crossing, speed limit signage, stop and go signage, speed breaker etc.

Direction arrow and exit arrows are required inside the complex to provide proper directions to the drivers and to avoid confusion while driving on the driveways. A signage plan is to be prepared along with proper location. Apart from signage boards, rumble strips are preferred inside the complex to check speeding. It is proposed to provide convex mirrors at corners for better view of upcoming vehicles.

		
20 kmph Speed Limit Sign	**Rumble Strips**	**Convex mirrors**

Figure 6-3: Proposed Traffic Control measures

6.6. Vehicle parking and turning

- Minimum kerb to kerb turning radius of the cars near the parking space is kept 3 m.
- All car parking size at both basements and podium is of size 2.5mx5m and 2.3mx4.5m.
- Minimum 4.5m driveway (one-way) is proposed on parking area.
- Minimum Ramp width shall be 6m.

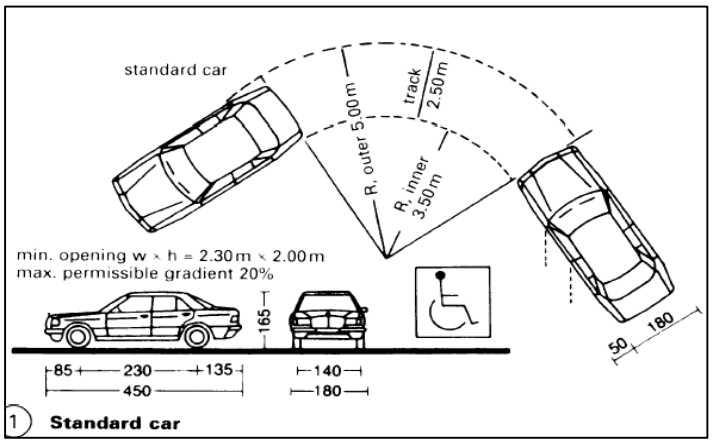


Figure 6-4: Vehicle turning and parking standards

6.7. Signage Significance

Signage has to be provided in such a way that the driver will get complete information about the driveway ahead. These signages will help driver to manoeuvre vehicle inside the complex easily and will assist driver. All signage proposed will be clearly understood. Reflective or illuminated signage is suggested for proper visibility. Signage is placed in appropriate locations so that people have time to see and understand the signs and take appropriate action. Following are the signages to be provided for all the parking floors.

Table 6-11: Traffic Signage and their significance

SI No.	Signage	Significance
1	To Parking	To guide drivers towards parking area
2	Stop and Go	To denote stop and go movement of vehicles near turning
3	Speed Limit	To denote a specific speed limit inside the complex
4	Pedestrian Crossing	To guide pedestrians towards pedestrian crossing for crossing the road.
5	Rumble Strips	To check speeding on road
6	Convex mirror	To provide better view of upcoming vehicles

6.8. Safety and Sustainability

Safety of pedestrians and drivers is one of the most important factors at any provision. Vehicles moving inside the complex should be restricted to a certain speed limit. For restricting speed of the vehicles, vertical delineators are suggested in the form of rumble strips. Also speed limit signage is suggested at specific locations inside the complex to regulate the traffic within permissible vehicle speed limit.

7. CONCLUSION AND RECOMMENDATIONS

1. The total built-up area of construction is 4242 Acres of which 3015 Acres are residential building units.

2. The summary of parking statement is provided below for each of the development.

Development Type	Land Parcel	Number of Parking
Residential	Zone 2a Residential	53414
	Zone 2a Residential Social Housing	5909
	Zone 2b Residential	21348
Commercial	Zone 2a Commercial	15430
	Zone 2b Commercial	6281
	Commercial zone in Premier Land	6281

3. External mid-section traffic count were conducted for 24 hours to understand the traffic characteristics of the roads and peak hour volume. The morning and evening peak hour traffic of the roads are provided below:

Peak Hour traffic on Taloja bypass Road:

Morning Peak Hour Traffic 9AM - 10AM- 1380 PCUs/hr
Evening Peak Hour Traffic 6PM – 7PM – 1673 PCUs/hr

Peak Hour traffic on Badlapur Pipeline Road:

Morning Peak Hour Traffic 9AM - 10AM- 2253 PCUs/hr
Evening Peak Hour Traffic 6PM – 7PM – 2632 PCUs/hr

Peak Hour traffic on Kalyan-Shilphata Road:

Morning Peak Hour Traffic 9AM - 10AM- 4833 PCUs/hr
Evening Peak Hour Traffic 6PM – 7PM – 5394 PCUs/hr

4. The traffic from various building type was calculated based the population it would serve. This was calculated from the hourly variation of their trips, modal split of vehicles people would travel, occupancy in each vehicles etc. The peak hour impact from the development is summarized below.

Time (hrs)	Residential	Commercial	School	Retail	Police	Community Centre	Health Care	Industrial	Other Amenities	Total
9:00 to 10:00	24153	5004	977	513	27	3	49	148	270	31143
20:00 to 21:00	20339	8246	0	0	14	12	49	92	659	29410

5. Internal Traffic Circulation is studied in detail and the findings are as follows:

a. Internal circulation is designed in such a way that the manoeuvring of vehicle is easy. All the parts of the development are accessible internally in the case of emergency, for ex. fire breakdowns, medical emergencies etc.

b. In order to attain safety of the pedestrians, maximum speed limit is proposed as 20 kmph.

c. The retrieval time for the residential MLCP for Sector-5 MLCP is 13.1 min, for South MLCP is 14.7 min, for North MLCP is 11.1 min.

d. The Evacuation time obtained for all vehicles to exit from the MLCP-18 is 21.5 min.

6. Recommendation for Traffic Management

Summary of Management Plan for various roads

a. Taloja Bypass Road

Projected Traffic on Road

Year	Peak hour traffic PCUs/hr)	V/C Ratio for Taloja Bypass Road	LOS for Taloja Bypass Road	Remark
2021	1380	0.51	C	Base Scenario
2026	3558	0.42	B	Scenario2026
2031	6957	0.83	D	Scenario2031
2036	7251	0.86	E	Scenario2036
2041	7966	0.95	E	Scenario2041

- Base Scenario - The present road is 2-lane both way with paved shoulders and the LOS is C. As per DP plan the existing road gets widened to 6-lane divided carriageway. LOS B is thus achieved. The proposed development would start impacting on the roads by 2024 and LOS remains at B.

- Scenario2026 – By 2026 the development traffic will impact on the road, but since the road is getting widened the LOS remains within B.

- Scenario2031 – By 2028 it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS remains in C. By 2030 metro Line 12 will be fully operational and mode shift would impact passenger traffic from the present road. Still the LOS drops to D.
- Scenario2036 – LOS drops to E, Traffic circulation and management measures to be adopted.

b. On Kalyan Shilphata Road

Projected Traffic on Road

Year	Peak hour traffic PCUs/hr)	V/C Ratio for Taloja Bypass Road	LOS for Badlapur Pipeline Road	Remark
2021	2253	0.42	B	Base Scenario
2026	3948	0.73	C	Scenario2026
2031	6308	0.75	D	Scenario2031
2036	6395	0.76	D	Scenario2036
2041	7026	0.84	D	Scenario2041

- Base Scenario - The present road is 4-lane both way with paved shoulders and the LOS is B.
- Scenario2026 – By 2025 the development traffic will impact on the road, and LOS drops to C.
- Scenario2031 – By 2028 it is By 2028 it is recommended that the road gets widened to 6-lane and also it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS remains in C. By 2030 metro Line 12 will be fully operational and mode shift would impact passenger traffic from the present road. Still the LOS drops to D.
- Scenario2036 – LOS remains in D.
- Scenario2041 – LOS drops to E, Traffic circulation and management measures to be adopted.

c. On Kalyan Shilphata Road

Projected Traffic on Road

Year	Peak hour traffic PCUs/hr)	V/C Ratio for Taloja Bypass Road	LoS for Kalyan Shilphata Road	Remark
2021	4833	0.58	C	Base Scenario
2026	8340	0.99	E	Scenario2026
2031	6990	0.83	D	Scenario2031
2036	7522	0.90	E	Scenario2036
2041	8264	0.98	E	Scenario2041

- Base Scenario - The present road is a 6-lane road with LOS C.
- Scenario2026 – By 2025 the development traffic will impact on the road, the LOS drops to D.
- Scenario2031 – By 2027 LOS drops to F, but by 2028 it is expected that Airoli Katai Naka Road get operational and traffic would divert to the new alignment and LOS increases to E. By 2030 it is expected that metro Line 12 would be completed and mode shift would impact passenger traffic from the present road and LOS increases to D.
- Scenario2036 – LOS drops to E, Traffic circulation and management measures to be adopted.
- Scenario2041 – By 2043 LOS drops to F, Traffic Augmentation Required.

d. On Airoli Katai Naka Road

Projected Traffic on Road

Year	Peak hour traffic PCUs/hr)	V/C Ratio for Taloja Bypass Road	LoS for Airoli Katai Naka Road	Remark
2021	-	-	-	Base Scenario
2026	-	-	-	Scenario2026
2031	6393	0.76	D	Scenario2031
2036	7562	0.90	E	Scenario2036
2041	8308	0.99	E	Scenario2041

- Base Scenario and Scenario2026- The Road is under construction and is expected to be completed by 2028. The base year LOS of the road will be C.
- Scenario2031 –By 2030 metro Line 12 will be fully operational and mode shift would impact passenger traffic from the present road and LOS remain in C.
- Scenario2036 – LOS drops to E, Traffic circulation and management measures to be adopted.
- Scenario2041 – By 2042 LOS drops to F, Traffic Augmentation Required

7. Recommendation for Capacity Improvement

- Illegal parking and Encroachment on nearby road should be removed to maintain the capacity of the through road.
- Continuous Elevated Corridor of approximately 3.5Km connecting the proposed Multi Modal corridor interchange network or upcoming Airoli Katai Naka Road and ending 350m ahead of Taloja junction.
- Three numbers of up ramps and down ramps with length 300m are proposed to access the flyover.
- Grade-separated Proposals to decongest Taloja Bypass Junction and intermediate junctions.