TRAFFIC STUDY REPORT

Of

Proposed Mixed-Use development on Plot Bearing Gut no.61/1/1, Gut No. 61/1/2,3,4 and 61/2/1,2,3 of Village Chitalsar, Manpada, District Thane

Prepared for

M/s. Acme Housing India Pvt. Ltd.

January – 2021

ttec
TRANSPORTATION AND TRAFFIC ENGINEERING CONSULTANTS

Traffic Study of the Proposed Mixed-Use development on Plot Bearing Gut no.61/1/1, Gut No. 61/1/2,3,4, 61/2/1,2,3 of Village Chitalsar, Manpada, District Thane

January 2021

Developer : **M/s. Acme Housing India Pvt. Ltd.**
Building No.10, 5th Floor, Solitaire Corporate Park, Guru Hargovindji Road, Chakala, Andheri (E), Mumbai-400093.

Traffic Consultants: **M/s Transportation and Traffic Engineering Consultants (TTEC)**
F-61, Shagun Arcade,
Opp. HDFC Bank,
Gen. A.K. VaidyaMarg
Malad (E)
Mumbai – 400097
E :ttec.ms@gmail.com
W : www.ttec.co.in
T:+912228407770

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Chapter 1

Introduction

1.0 INTRODUCTION

1.1 Project Background

M/s. Acme Housing India Pvt. Ltd. plans to develop a Mixed-use development at Manpada, Thane. The proposed development comprises of Residential developments comprising of **1862 units** having flat configuration of 2 BHK, 2.5 BHK, 3 BHK and 4 BHK. Moreover, an additional **2448** 1RK units of **MMRDA** and a **commercial** component i.e. shops/gala of total **3420.84 SQM** carpet area are also planned within the proposed development.

The multiple ingress and egress to the proposed mixed-use development is provided through both the roads i.e. Khewra Circle Marg and Existing narrow road to be widened 10m wide as per(Dp) Development Plan to the west of the proposed development.

Recognizing the need for traffic engineering advice **M/s. Acme Housing India Pvt. Ltd.** has appointed ***M/s Transportation and Traffic Engineering Consultants*** to undertake the preparation of traffic study of the proposed development.

This report presents the results and findings of the traffic study.

1.2 Scope of Work

The scope of our work during this study report covers the following aspects related to Traffic study:

- Initial overview and comments on any current master plan layouts and surrounding roads and identification of potential traffic issues and concerns
- Assessment of existing traffic conditions in the vicinity of the site; which includes site surveys and analysis of the surrounding road network
- Future Traffic forecast: Traffic surveys to quantify existing flows and trip rates for this type of development
- Traffic Assignment: This involves the pattern in which the generated traffic will be distributed on the surrounding roads. The outcome of the traffic surveys & the existing and future road connectivity will be the inputs for the traffic assignment.
- Traffic Impact Analysis: Assessment of the impact of the vehicles coming to the proposed development on the surrounding road network in the immediate vicinity of the proposed development
- Assessment of the adequacy of existing road system capacity in the vicinity of the site to take the traffic generated from the proposed development.

- Traffic management measures to mitigate the traffic impact if any impact is significant.
- Ingress/egress points to the development site.
- Advise the team on pick-up, drop-off points, locations and design of pick-up and drop-off points etc.
- Overview of the internal traffic circulation at ground level and at different parking levels: This involves removing/reducing the conflicting vehicular movements at different levels
- Development of traffic management scheme, layout proposals, design of external junctions (if required), signal design (if required) etc.
- Comments on the road widths of the internal roads based on the projected traffic generation.
- Swept path analysis: Checking the turning radius of different vehicles types (i.e. cars.) at critical locations with the help of AUTOTRACK software
- Comments on the ramp system (i.e. circular ramps, straight ramps, the turning radius etc.)
- Review of the parking layouts. Analyzing the areas of concern inside the car parks
- Optimization of car parking bays inside the car park, comments on the aisle
- Preparation of a report on traffic issues and recommendations.

1.3 Structure of this Report

Following this introduction **Chapter 1**, this report is divided into the following chapters;

Chapter 2 Existing Conditions; which describes the existing road network and the prevailing traffic conditions in the vicinity of the development site.

Chapter 3 General Development Layout

Chapter 4 Traffic Generation & Impact Analysis

Chapter 2

Existing Conditions

2.0 EXISTING CONDITIONS

2.1 Existing Development Site Conditions

The proposed development project site location and the surrounding area as per the existing conditions is presented in **Figure 2.1.**

The main roads surrounding the proposed development site are Khewra Circle Marg and Existing narrow road to be widened 10m wide as per Dp. The multiple ingress and egress to the proposed development are provided through both the roads.

As per the existing condition, the area surrounding the proposed development includes some Commercial and Residential developments.

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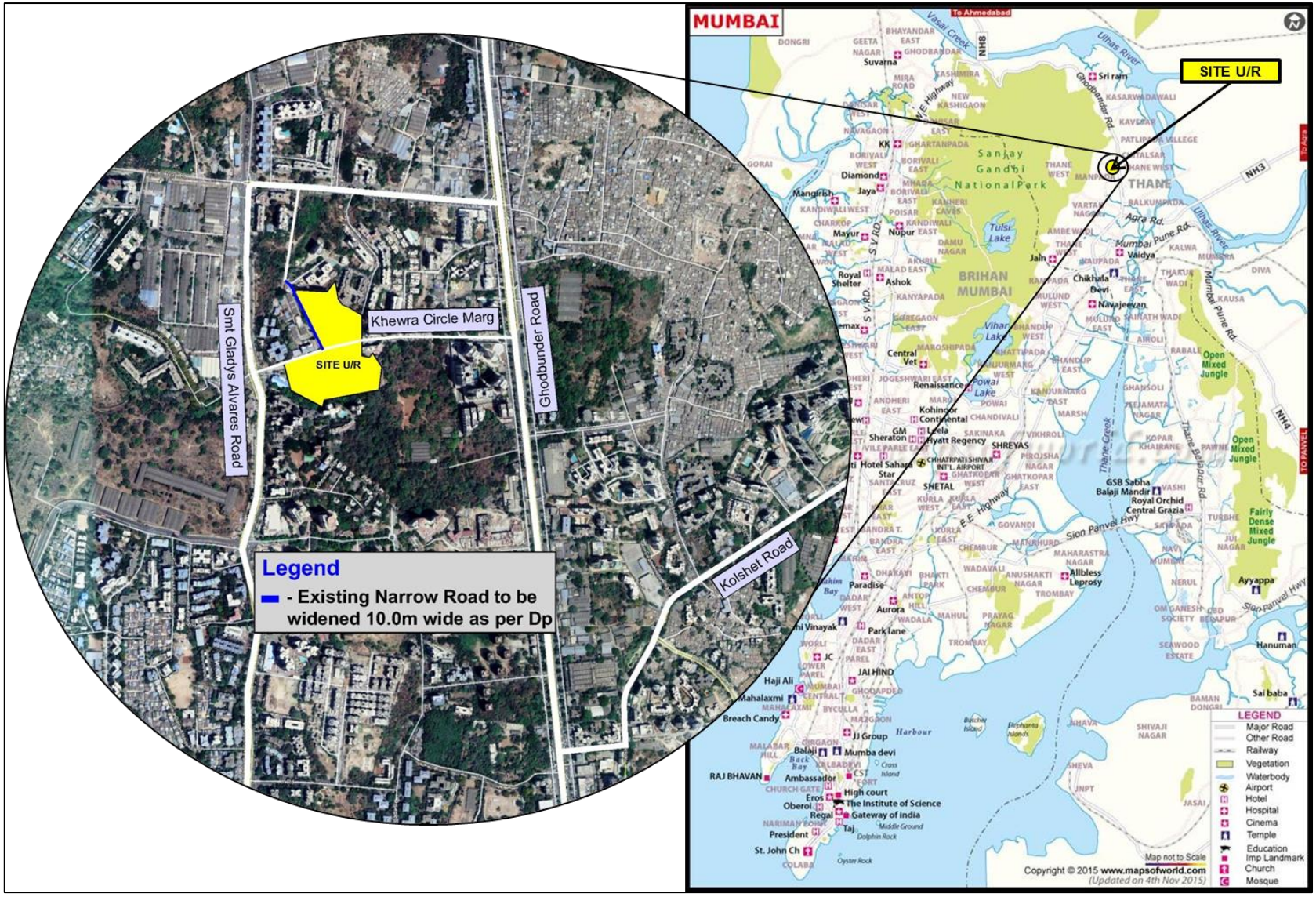


Figure 2.1: Location Map

2.2 Road Network

The important roads in the surrounding area are as follows:

2.2.1 Khewra Circle Marg (near to the proposed development)

It is a 4-lanes, 2-way undivided road in front of the proposed development. The traffic on this road is moderate throughout the day. Multiple Entry's/exit's to the proposed development is provided through this road.

Figure 2.2 shows the existing condition of this road. **Figure 2.3** presents a typical cross section of this road based on the existing conditions.

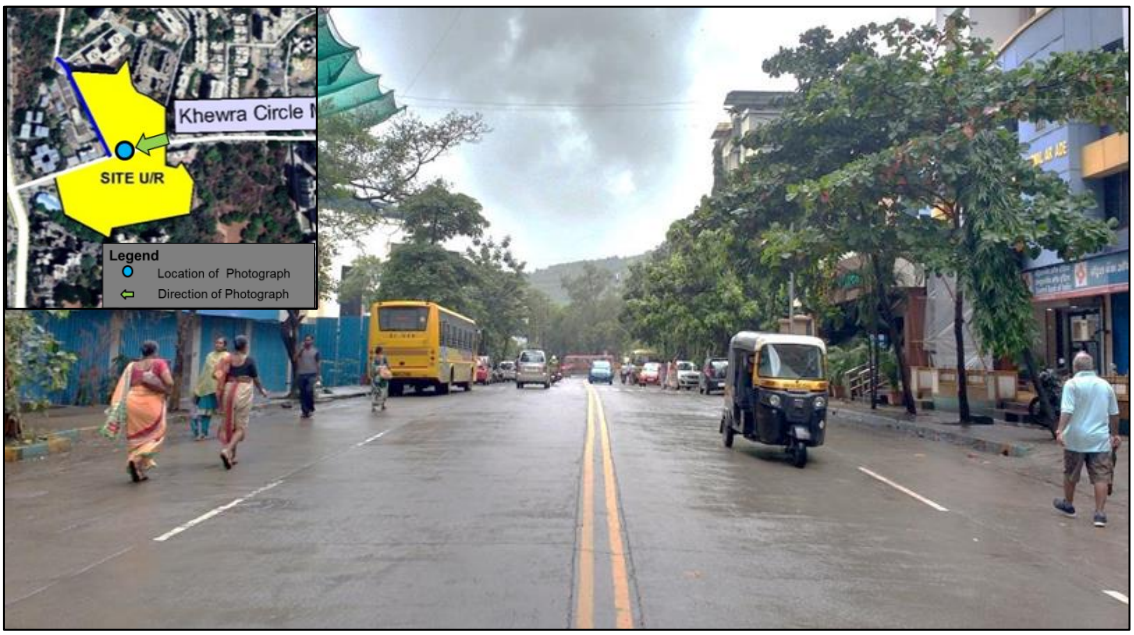


Figure 2.2: Existing conditions of Khewra Circle Marg (near the proposed development)

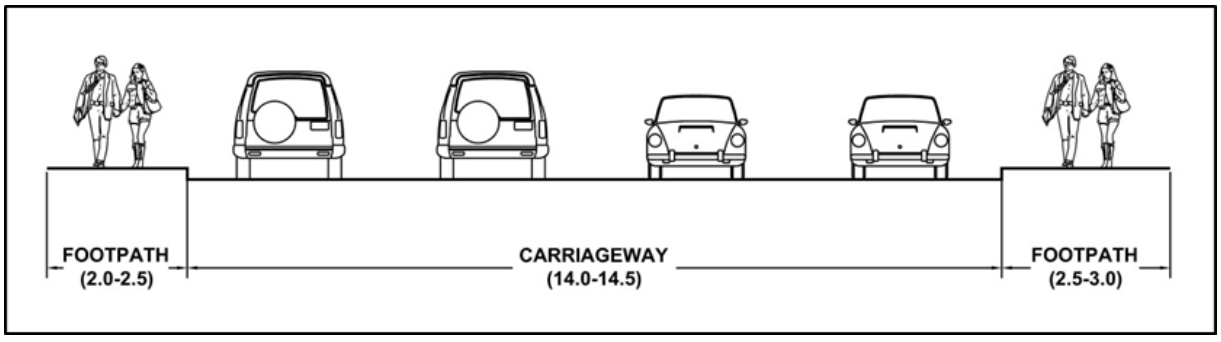


Figure 2.3: Typical Cross-Section of Khewra Circle Marg (near the proposed development)

2.2.2 Existing narrow road to be widened 10m wide as per DP

It is a local road, having a total carriageway width of 4-4.5m near the proposed development.

As per the existing conditions, the traffic on this road is localized with 2-way movement having a less traffic even during peak hours. This road is to be widened 10 m wide as per DP. Multiple Entry's/exit's to the proposed development is provided through this road.

Figure 2.4 shows the existing condition of narrow Road. **Figure 2.5** presents a typical cross section of this road based on the existing conditions.

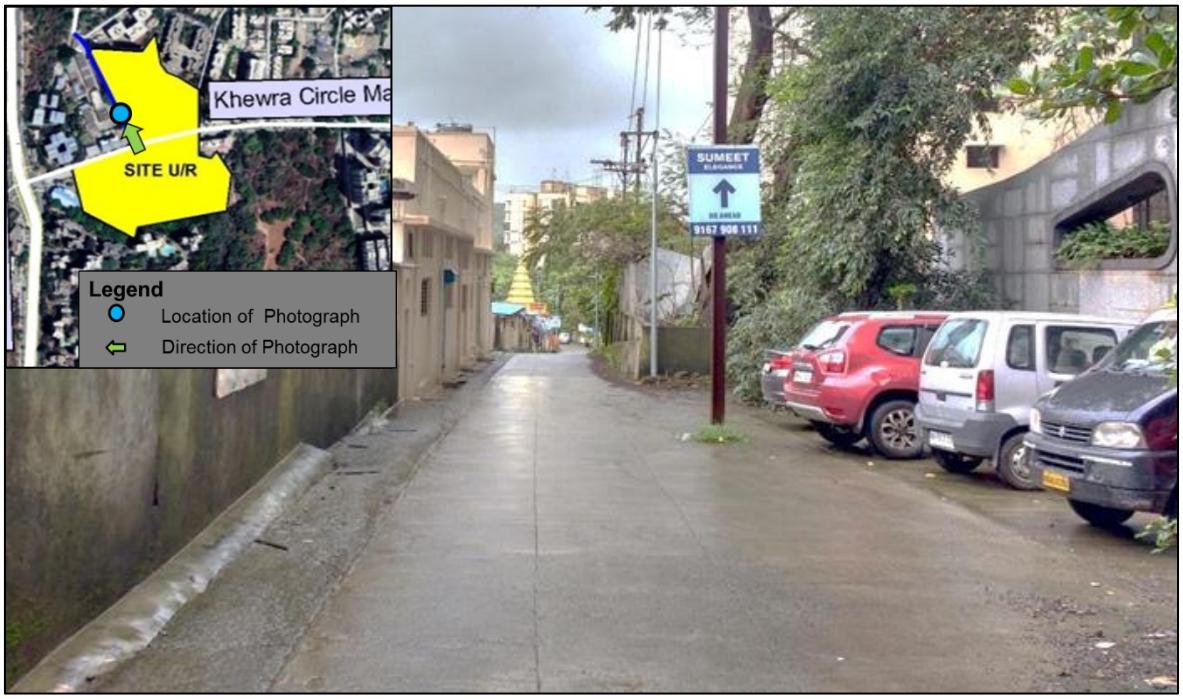


Figure 2.4: Existing conditions of Existing narrow road to be widened 10m wide

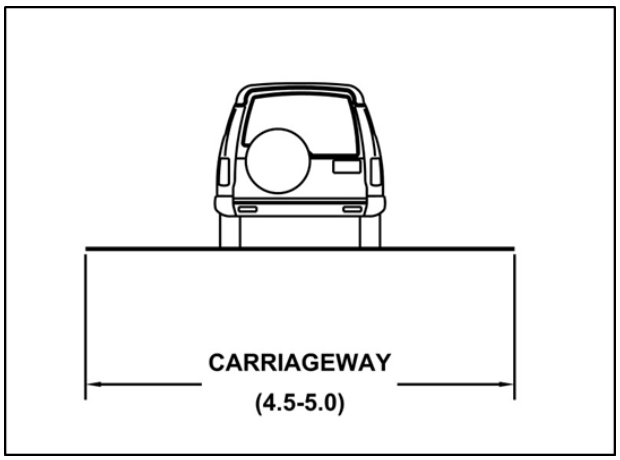


Figure 2.5: Cross-Section of Existing narrow road to be widened 10m wide

2.3 Existing Travel Pattern to entry & exit the site

Figure 2.6 & Figure 2.7 presents the travel pattern to access the proposed development from different directions**. Figure 2.6** presents the travel pattern to enter the proposed development while **Figure 2.7** presents the travel pattern to exit the proposed development.

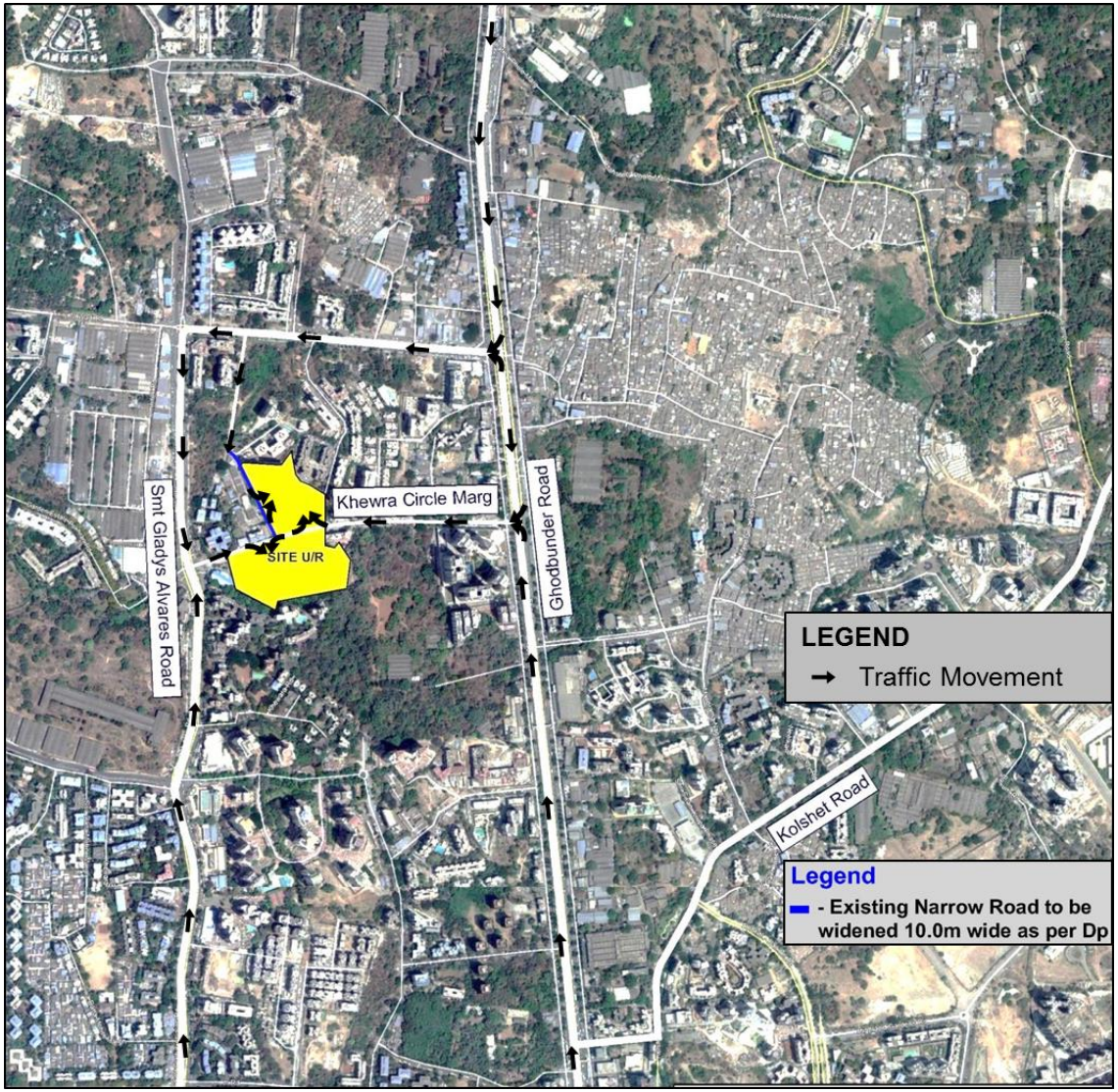


Figure 2.6: Existing Travel pattern to access the proposed development

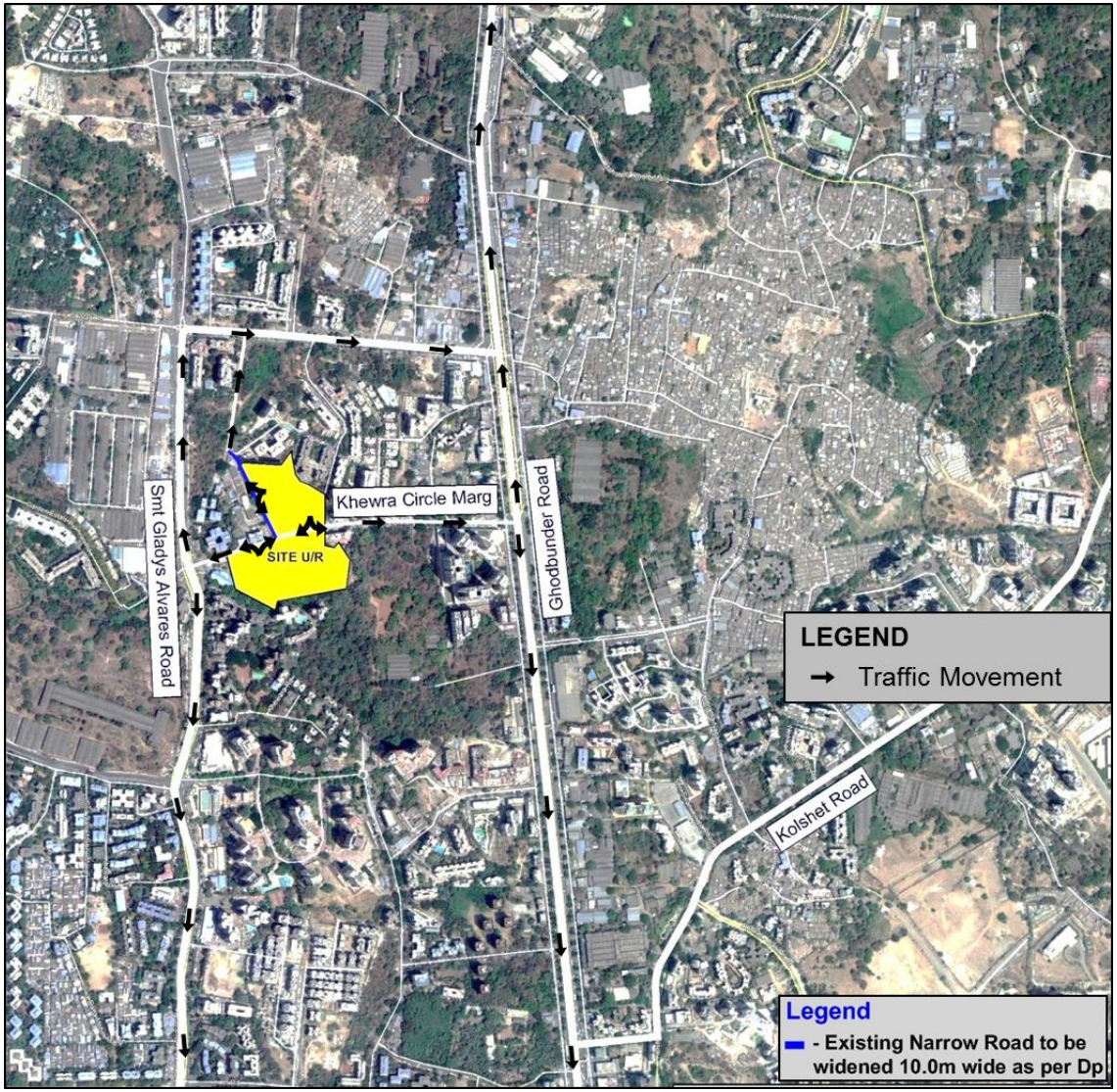


Figure 2.7: Existing Travel pattern to exit the proposed development

2.4 Connectivity to the Public Transport

The proposed site is located around 8 Km from **Thane Railway Station** and 750m from proposed Manpada metro station and 1.3km from Tiku Ji Ni Wadi Metro station.

Figure 2.8 shows the connectivity of proposed development to public transport.

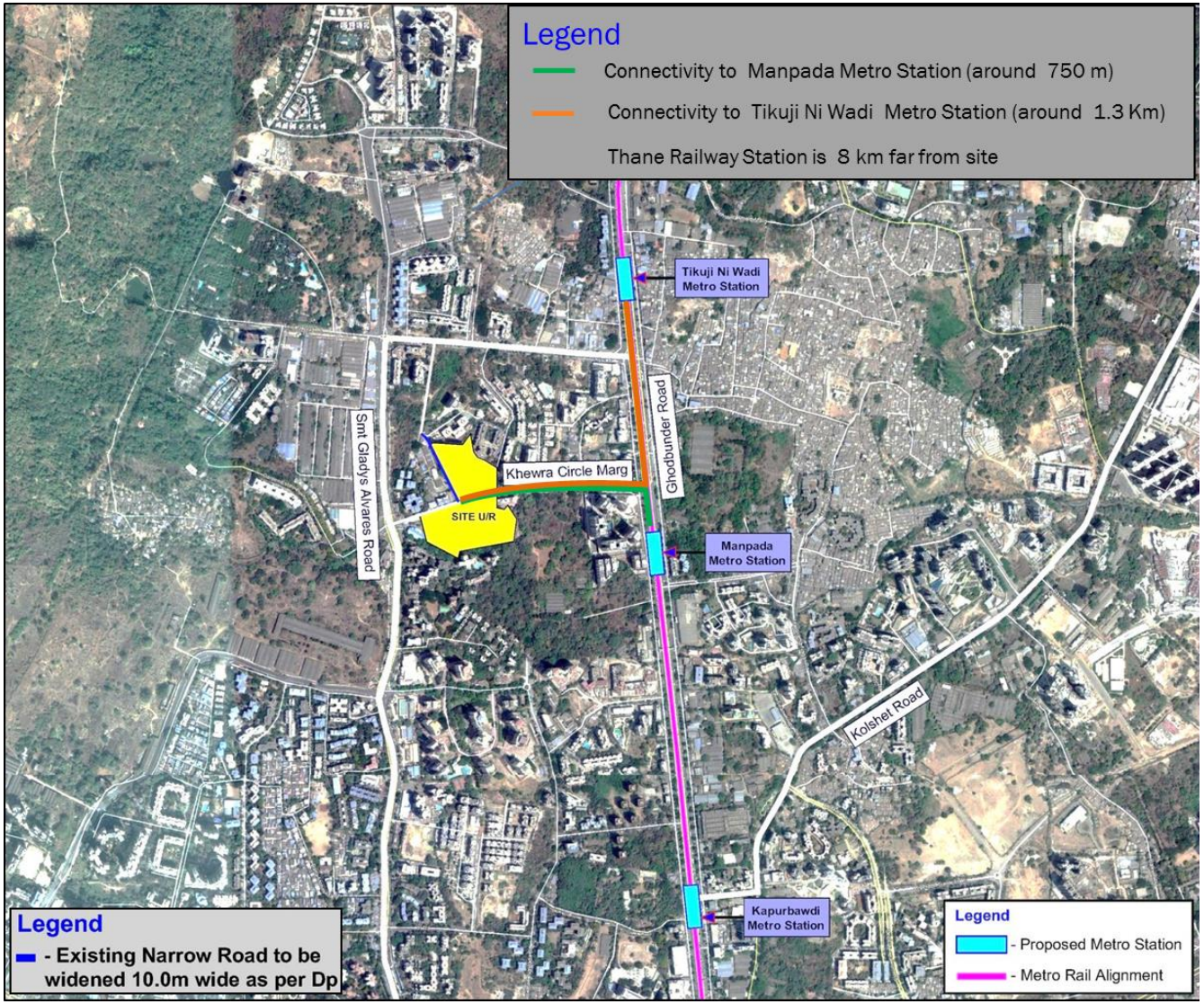


Figure 2.8: Connectivity of Proposed Development to the Public Transport

2.5 Existing Traffic Conditions

In order to quantify the traffic conditions and also to understand the impact of the proposed development traffic, following traffic surveys were carried out:

- ✓ Road Inventory Surveys
- ✓ Reconnaissance Survey
- ✓ Photographic Survey
- ✓ Weekday Classified turning movement traffic volume count on 3-arm junction (i.e. existing narrow road to be widened 10m wide X Khewra Circle Marg) near the proposed development. The survey was carried out for 13 hours (i.e. 8:00 AM to 9:00 PM) dated 07/08/2018.

The location of the traffic surveys is shown in **Figure 2.9.**



Figure 2.9: Location of Traffic Surveys

2.6 Turning Movement Traffic Volume Count Survey

A week day turning movement traffic volume count survey was conducted on 3-Arm junction (i.e. Existing narrow road to be widened 10m wide X Khewra Circle Marg) for 13 hours (i.e. from 8:00 A.M. to 9:00 P.M.). The survey was conducted to find out the existing traffic flow and thus to understand the residual capacity of the surrounding roads. This will help us to know whether these roads can carry the additional traffic generated from the proposed development. The outcome of the turning movement traffic volume count analysis is presented as follows:

2.6.1 Total Junction Inflow Traffic Volume at the 3-Arm Intersection (Existing narrow road to be widened 10m wide X Khewra Circle Marg)

The Khewra circle marg near the proposed redevelopment is a 4-lanes two way undivided road as per the existing conditions whereas the Existing narrow road to be widened 10m wide is single lanes two way road. **Figure 2.10** shows the analysis of the total traffic inflow at the 3-Arm intersection of (Existing narrow road to be widened 10m wide X Khewra Circle Marg). The results of the traffic surveys and analysis show that the peak hour traffic inflow of the Morning peak occurs from **12:00 A.M to 01:00 P.M** The total traffic inflow to the junction is **709 PCU/ Hr.** and Evening peak occurs from **6:00 P.M to 7:00 P.M**. The total traffic inflow to the junction during Evening peak hour is **884 PCU/ Hr**. The vehicular composition is 24% Cars, 4% Taxis, 34% Auto-rickshaws, 34% MTW, 1% Bus, 1% Mini-Bus, 2% LCV and 0% HCV

2.6.2 Arm 1: Existing narrow road to be widened 10m wide

Figure 2.11 shows the analysis of mid-block classified traffic volume count of Existing narrow road to be widened 10m wide. The results of the traffic surveys and analysis show that the peak hour of the day occurs from **09:00 P.M to 10:00 P.M**. The traffic during peak hour is **191 PCU/ Hr.**

2.6.3 Arm 2: Khewra Circle Marg (Towards Ghodbandar Road)

Figure 2.12 shows the analysis of mid-block classified traffic volume count of Khewra Circle Marg (Towards Ghodbandar Road). The results of the traffic surveys and analysis show that the peak hour of the day occurs from **06:00 A.M to 07:00 P.M**. The traffic during peak hour is **817 PCU/ Hr** in both the directions.

2.6.4 Arm 3: Khewra Circle Marg (Towards S.G Alvares Road)

Figure 2.13 shows the analysis of mid-block classified traffic volume count of Khewra Circle Marg (Towards S.G Alvares Road). The results of the traffic surveys and analysis show that

the peak hour of the day occurs from **06:00 A.M to 07:00 P.M.** The traffic during peak hour is **864 PCU/ Hr** in both the directions.

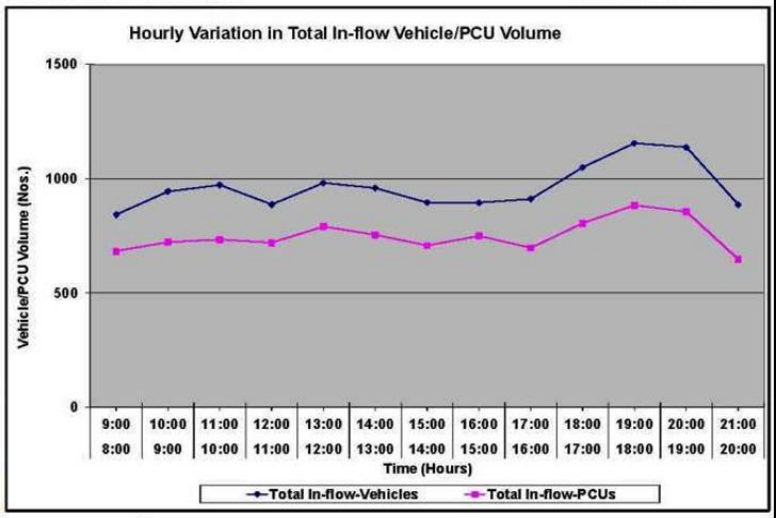
Figure 2.14 & Figure 2.15 presents the existing morning and evening peak hour directional traffic flow respectively.

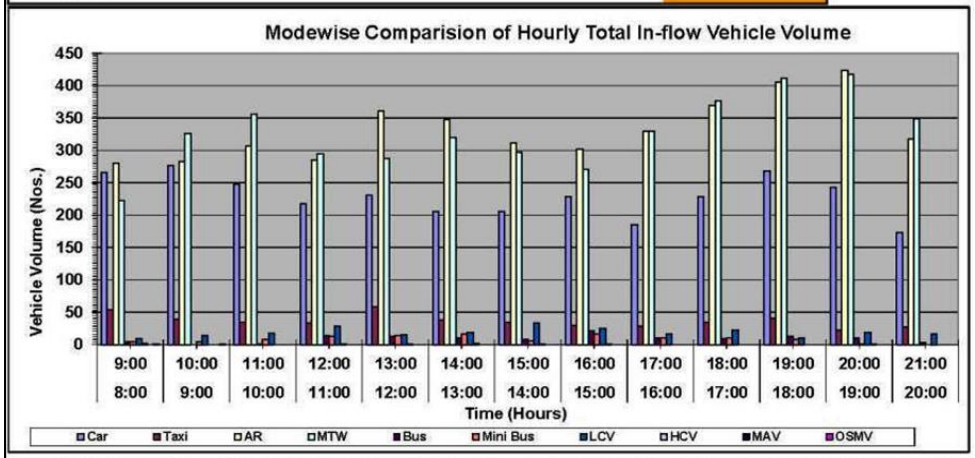
Location:3 Arm Intersection Near ACME OZONE — 3 Arm Intersection Classified Vehicle Volume Analysis — Date:07-08-2018

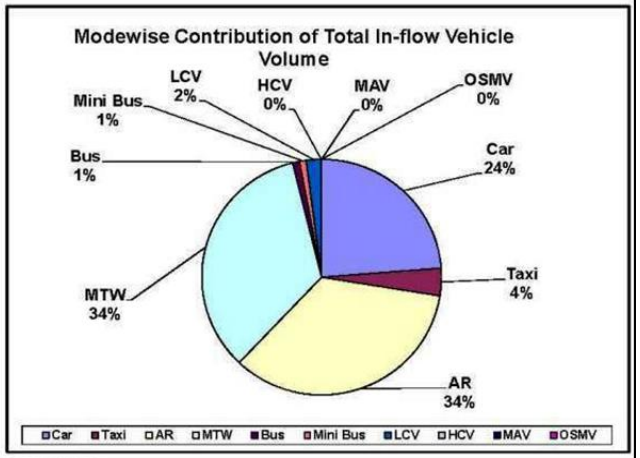
TOTAL CLASSIFIED IN-FLOW VOLUME

Time From	Time To	Car	Taxi	AR	MTW	Bus	Mini Bus	LCV	HCV	MAV	OSMV	Hourly Vehicles	Hourly PCU
PCU Factor		1	1	0.75	0.5	3	1.5	1.5	3	4.5	3		
8:00	9:00	266	54	280	222	4	5	9	2	0	1	843	683
9:00	10:00	277	39	282	326	0	5	14	0	0	1	944	722
10:00	11:00	248	34	307	356	1	8	18	0	0	0	972	733
11:00	12:00	217	33	285	295	14	13	29	1	0	0	887	720
12:00	**13:00**	**231**	**58**	**361**	**288**	**13**	**14**	**15**	**1**	**0**	**0**	**981**	**790**
13:00	14:00	205	38	348	320	10	17	19	2	0	0	959	754
14:00	15:00	205	34	311	297	8	6	33	1	0	0	895	707
15:00	16:00	228	30	302	271	21	17	25	1	0	0	895	749
16:00	17:00	185	29	330	330	10	10	17	0	0	0	911	697
17:00	18:00	228	35	369	376	9	10	23	0	0	0	1050	805
18:00	**19:00**	**268**	**40**	**405**	**411**	**13**	**8**	**10**	**0**	**0**	**0**	**1155**	**884**
19:00	20:00	243	23	423	417	10	1	19	1	0	0	1137	855
20:00	21:00	173	27	317	349	3	0	17	0	0	0	886	647
Total		2974	474	4320	4258	116	114	248	9	0	2	12515	9746

Peak Period	Veh/hour	PCU/hour
Morning Peak	981	790
Evening Peak	1155	884







AR-Autorickshaw, MTW-Motorised Two Wheeler, L/HCV-Light/Heavy Commercial Vehicle, MAV-Multi Axle Vehicle,OSMV-Other Slow Moving Vehicle

DRG.NO.

REVISION

NO. DATE. SUBJECT DESCRITION

KEY PLAN

M/s Transportation and Traffic Engineering Consultants (TTEC) F-61, Shagun Arcade, Opp. HDFC Bank, Gen. A.K. Vaidya Marg Malad (E) Mumbai - 400097,
E : ttec.ms@gmail.com
W : www.ttec.co.in
T : +91 2228407769
: +91 2240109571

PROJECT :-
Acme Ozone Project

OWNER :-
M/s. Acme Housing India Pvt. Ltd.

DRG.TITLE :-
Total Inflow near the proposed development

REVISION	DATE:-		
FILE :-	DETAIL BY: PS	CHECKED BY: MS	APPROVED BY:

SIGNATURE & SEAL OF TRAFFIC CONSULTANT :-

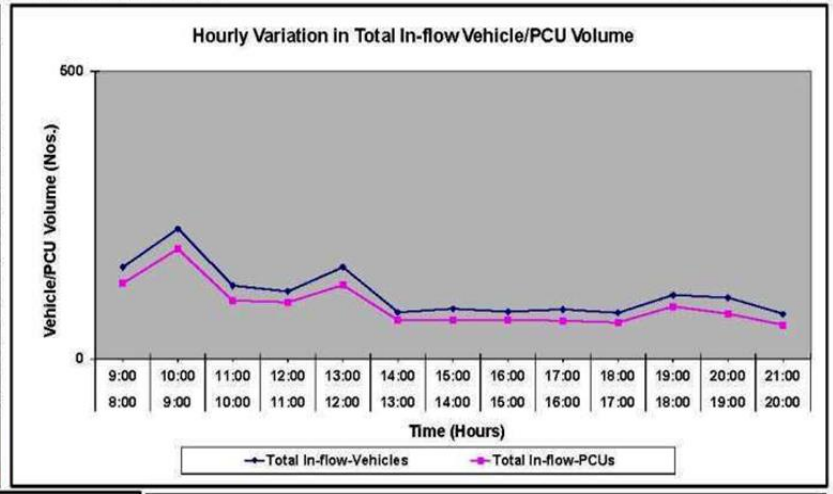
Figure 2.10: Total Inflow at the 3-Arm Intersection (Existing narrow road to be widened 10m wide X Khewra Circle Marg)

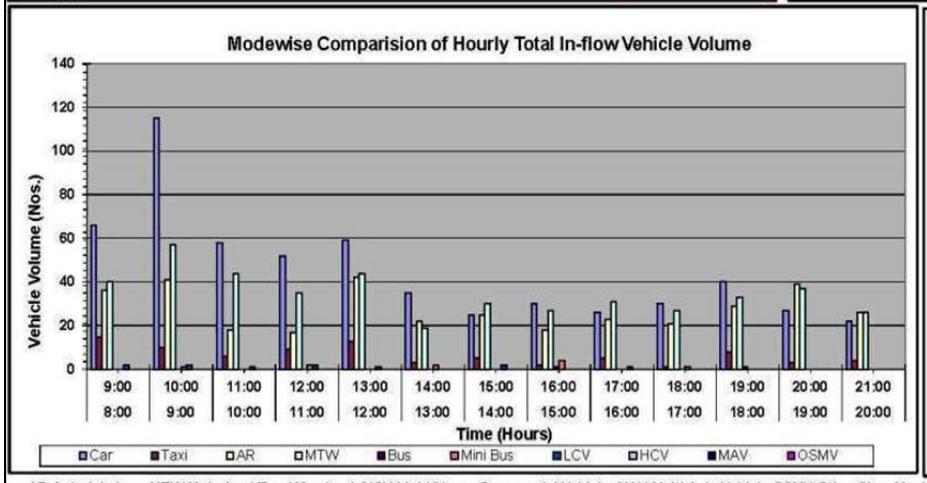
Location: 3 Arm Intersection Near ACME OZONE — Arm 1 - Mid Block Traffic Volume Count — Date:07-08-2018

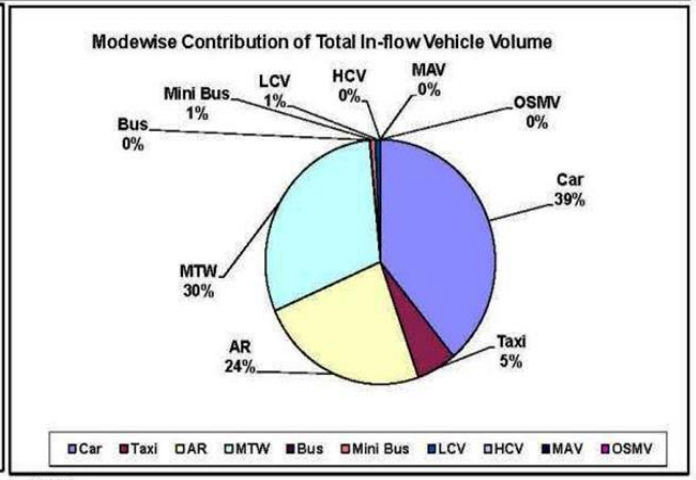
TOTAL CLASSIFIED IN-FLOW VOLUME

Time From	Time To	Car	Taxi	AR	MTW	Bus	Mini Bu	LCV	HCV	MAV	OSMV	Hourly Vehicles	Hourly PCU
PCU Factor		1	1	0.75	0.5	3	1.5	1.5	3	4.5	3		
8:00	9:00	66	15	36	40	0	0	2	0	0	0	159	131
9:00	10:00	115	10	41	57	0	1	2	0	0	0	226	191
10:00	11:00	58	6	18	44	0	0	1	0	0	0	127	101
11:00	12:00	52	9	17	35	0	2	2	0	0	0	117	98
12:00	13:00	59	13	42	44	0	0	1	0	0	0	159	128
13:00	14:00	35	3	22	19	0	2	0	0	0	0	81	67
14:00	15:00	25	5	25	30	0	0	2	0	0	0	87	67
15:00	16:00	30	2	18	27	1	4	0	0	0	0	82	68
16:00	17:00	26	5	23	31	0	0	1	0	0	0	86	66
17:00	18:00	30	1	21	27	0	1	0	0	0	0	80	63
18:00	19:00	40	8	29	33	1	0	0	0	0	0	111	91
19:00	20:00	27	3	39	37	0	0	0	0	0	0	106	78
20:00	21:00	22	4	26	26	0	0	0	0	0	0	78	59
Total		585	84	357	450	2	10	11	0	0	0	1499	1208

Peak Period	Veh/hour	PCU/hour
Morning Peak	226	191
Evening Peak	111	91







AR-Autorickshaw, MTW-Motorised Two Wheeler, L/HCV-Light/Heavy Commercial Vehicle, MAV-Multi Axle Vehicle,OSMV-Other Slow Moving Vehicle

DRG.NO.

REVISION

NO. DATE. SUBJECT DESCRITION

KEY PLAN

M/s Transportation and Traffic Engineering Consultants (TTEC) F-61, Shagun Arcade, Opp. HDFC Bank, Gen. A.K. Vaidya Marg Malad (E) Mumbai - 400097,
E : ttec.ms@gmail.com
W : www.ttec.co.in
T : +91 2228407769
: +91 2240109571

PROJECT :- Acme Ozone Project

OWNER :- M/s. Acme Housing India Pvt. Ltd.

DRG.TITLE :- Midblock Traffic volume count at Arm 1

REVISION	DATE:-		
FILE :-	DETAIL BY: PS	CHECKED BY: MS	APPROVED BY:

SIGNATURE & SEAL OF TRAFFIC CONSULTANT :-

Figure 2.11: Midblock Traffic Volume Count at Arm 1_ Existing narrow road to be widened 10m wide

Location-3 Arm Intersection Near ACME OZONE

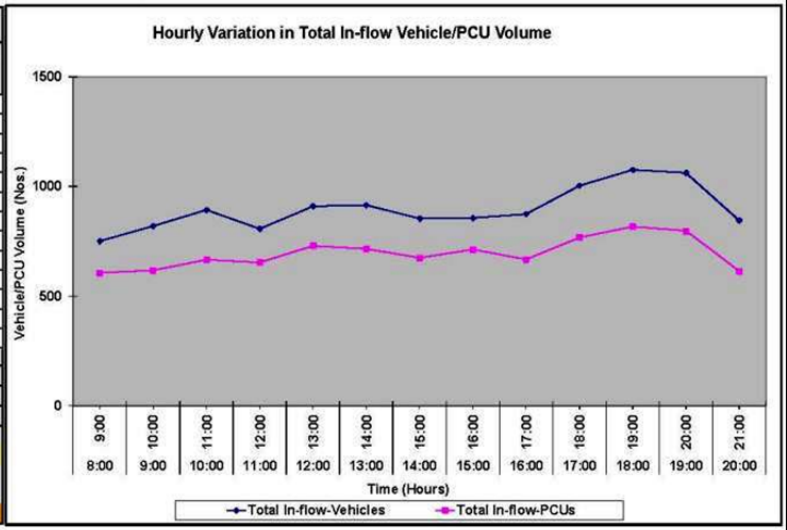
Arm-2 Mid-Block Vehicle Volume Analysis

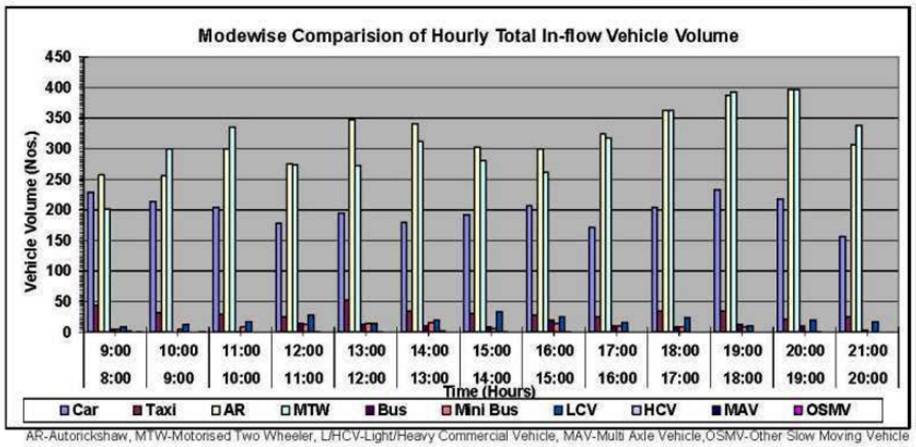
Date-07/08/2018

TOTAL CLASSIFIED IN-FLOW VOLUME

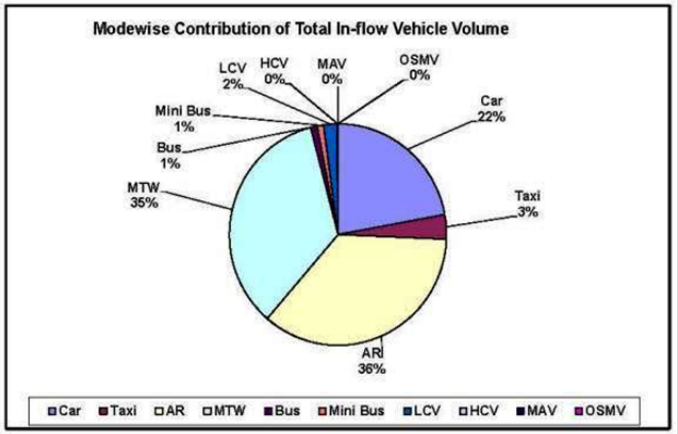
Time From	Time To	Car	Taxi	AR	MTW	Bus	Mini Bus	LCV	HCV	MAV	OSMV	Hourly Vehicles	Hourly PCU
PCU Factor		1	1	0.75	0.5	3	1.5	1.5	3	4.5	3		
8:00	9:00	228	44	257	201	4	5	8	2	0	1	750	606
9:00	10:00	214	32	256	300	0	4	12	0	0	1	819	617
10:00	11:00	204	29	299	335	1	8	17	0	0	0	893	666
11:00	12:00	178	25	275	273	14	13	28	1	0	0	807	653
12:00	13:00	195	52	348	272	13	14	14	1	0	0	909	729
13:00	14:00	179	35	341	312	10	16	19	2	0	0	914	715
14:00	15:00	191	31	303	280	8	6	33	1	0	0	853	675
15:00	16:00	207	28	299	262	20	14	25	1	0	0	856	712
16:00	17:00	171	25	324	318	10	10	16	0	0	0	874	667
17:00	18:00	204	34	362	362	9	9	23	0	0	0	1003	767
18:00	19:00	232	34	387	392	12	8	10	0	0	0	1075	817
19:00	20:00	218	21	396	396	10	1	19	1	0	0	1062	797
20:00	21:00	156	25	306	338	3	0	17	0	0	0	845	614
Total		2577	415	4153	4041	114	108	241	9	0	2	11660	9035

Peak Period	Veh/hour	PCU/hour
Morning Peak	914	729
Evening Peak	1075	817





AR-Autorickshaw, MTW-Motorised Two Wheeler, L/HCV-Light/Heavy Commercial Vehicle, MAV-Multi Axle Vehicle,OSMV-Other Slow Moving Vehicle



DRG.NO.

REVISION

NO. DATE. SUBJECT DESCRITION

KEY PLAN

M/s Transportation and Traffic Engineering Consultants (TTEC) F-61, Shagun Arcade, Opp. HDFC Bank, Gen. A.K. Vaidya Marg Malad (E) Mumbai - 400097,
E : ttec.ms@gmail.com
W : www.ttec.co.in
T : +91 222407769
: +91 2240109571

PROJECT :-
Acme Ozone Project

OWNER :-
M/s. Acme Housing India Pvt. Ltd.

DRG.TITLE :-
Midblock **Traffic volume count at Arm 2**

REVISION	DATE:-		
FILE :-	DETAIL BY: PS	CHECKED BY: MS	APPROVED BY:

SIGNATURE & SEAL OF TRAFFIC CONSULTANT :-

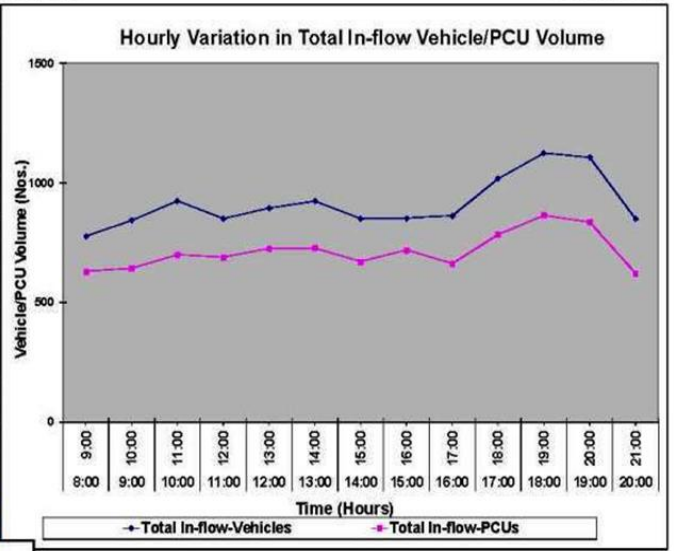
Figure 2.12: Midblock Traffic Volume Count at Arm 2_ Khewra Circle Marg (Towards Ghodbandar Road)

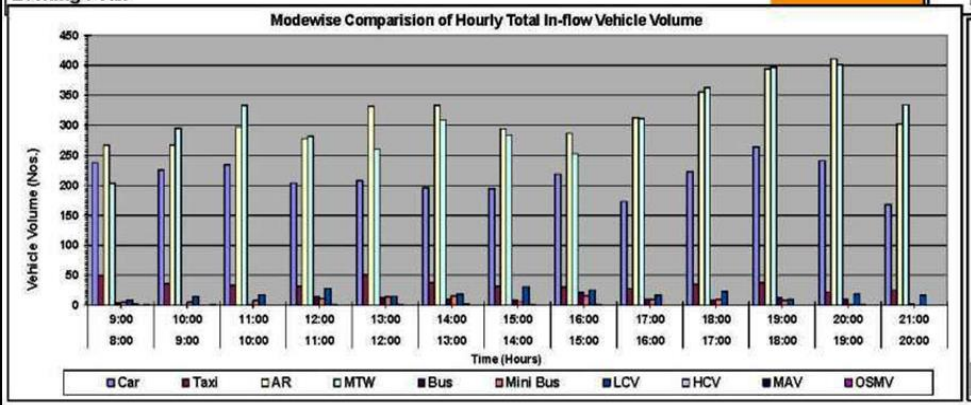
Location-3 Arm Intersection Near ACME OZONE — Arm-3 Mid-Block Classified Vehicle Volume Analysis — Date-07/08/2018

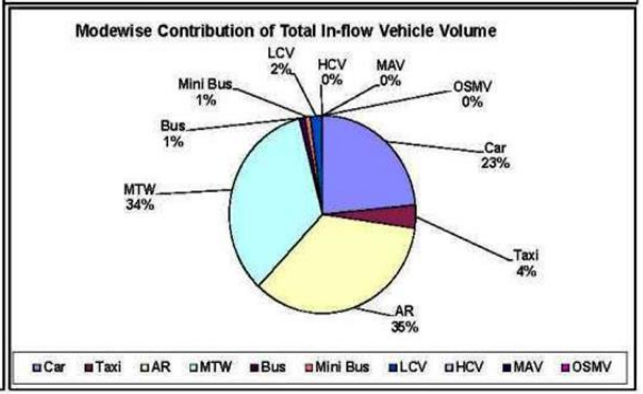
TOTAL CLASSIFIED IN-FLOW VOLUME

Time From	Time To	Car	Taxi	AR	MTW	Bus	Mini Bus	LCV	HCV	MAV	OSMV	Hourly Vehicles	Hourly PCU
PCU Factor		1	1	0.75	0.5	3	1.5	1.5	3	4.5	3		
8:00	9:00	238	49	267	203	4	5	8	2	0	1	777	630
9:00	10:00	225	36	267	295	0	5	14	0	0	1	843	642
10:00	11:00	234	33	297	333	1	8	18	0	0	0	924	700
11:00	12:00	204	32	278	282	14	11	28	1	0	0	850	689
12:00	13:00	208	51	332	260	13	14	15	1	0	0	894	725
13:00	14:00	196	38	333	309	10	16	19	2	0	0	923	727
14:00	15:00	194	32	294	284	8	6	31	1	0	0	850	671
15:00	16:00	219	30	287	253	21	16	25	1	0	0	852	719
16:00	17:00	173	28	313	311	10	10	17	0	0	0	862	662
17:00	18:00	222	35	355	363	9	10	23	0	0	0	1017	783
18:00	19:00	264	38	394	397	13	8	10	0	0	0	1124	864
19:00	20:00	241	22	411	401	10	1	19	1	0	0	1106	835
20:00	21:00	168	25	302	334	3	0	17	0	0	0	849	621
Total		2786	449	4130	4025	116	110	244	9	0	2	11871	9268

Peak Period	Veh/hour	PCU/hour
Morning Peak	924	725
Evening Peak	1124	864







AR-Autorickshaw, MTW-Motorised Two Wheeler, L/HCV-Light/Heavy Commercial Vehicle, MAV-Multi Axle Vehicle,OSMV-Other Slow Moving Vehicle

DRG.NO.

REVISION

NO. DATE. SUBJECT

DESCRITION

KEY PLAN

M/s Transportation and Traffic Engineering Consultants (TTEC) F-61, Shagun Arcade, Opp. HDFC Bank, Gen. A.K. Vaidya Marg Malad (E) Mumbai - 400097.
E : ttec.ms@gmail.com
W : www.ttec.co.in
T : +91 2228407769
: +91 2240109571

PROJECT :-
Acme Ozone Project

OWNER :-
M/s. Acme Housing India Pvt. Ltd.

DRG.TITLE :-
Midblock Traffic volume count at Arm 3

REVISION	DATE:-		
FILE :-	DETAIL BY: PS	CHECKED BY: MS	APPROVED BY:

SIGNATURE & SEAL OF TRAFFIC CONSULTANT :-

Figure 2.13: Midblock Traffic Volume Count at Arm 3_ Khewra Circle Marg (Towards S.G Alvares Road)

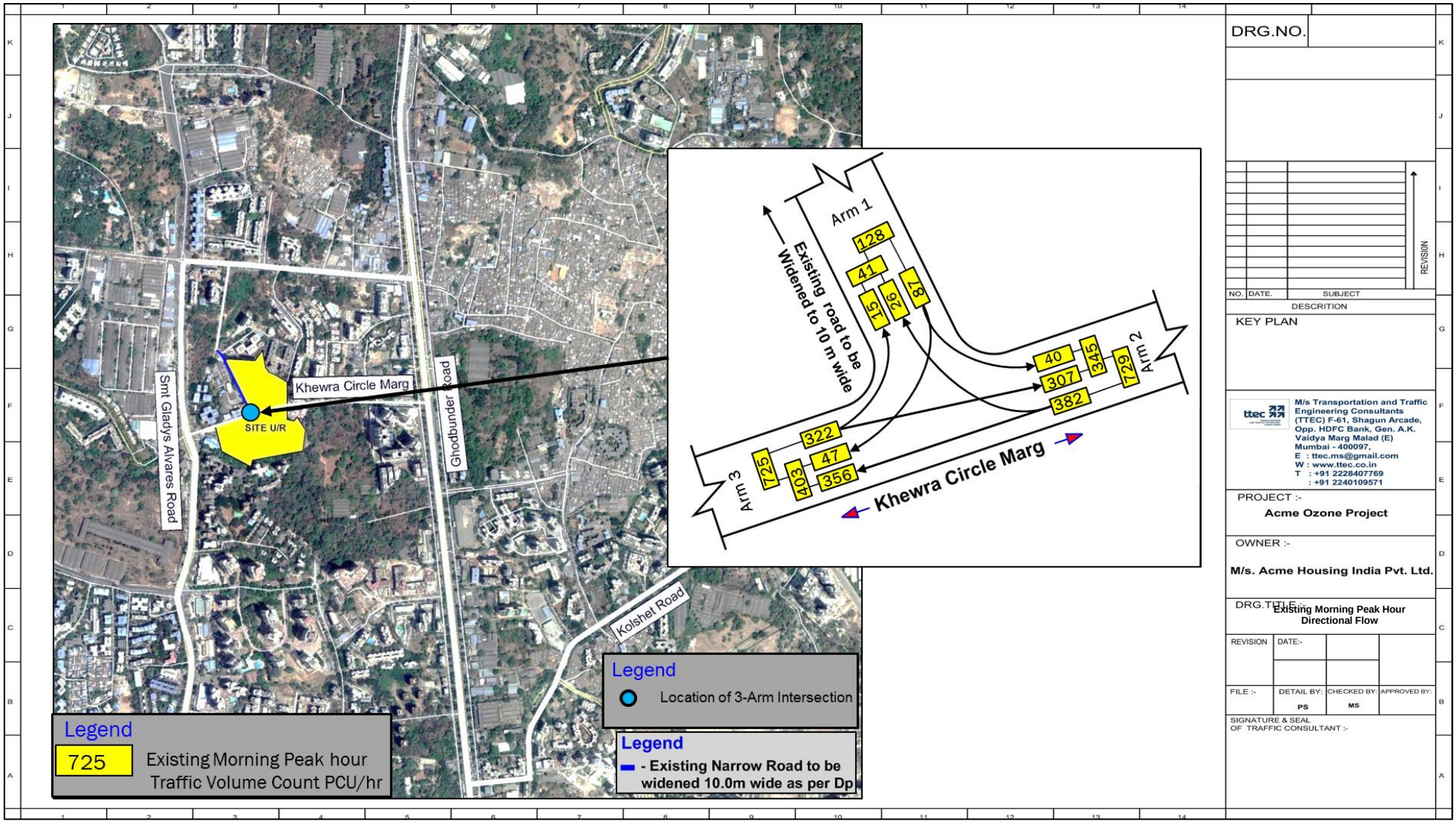


Figure 2.14: Existing Morning Peak Hour Directional Flow (Pcu/hr)

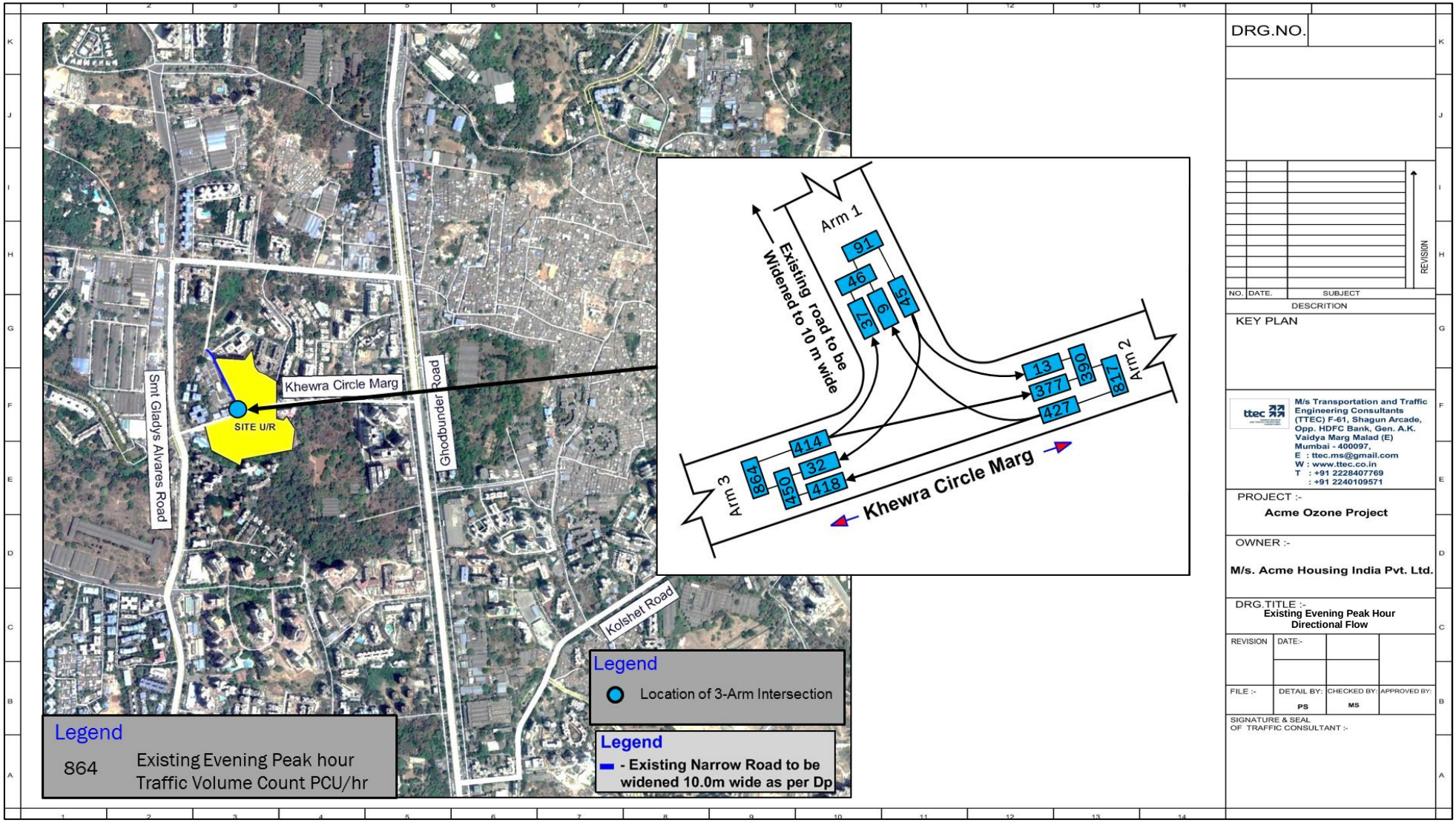


Figure 2.15: Existing Evening Peak Hour Directional Flow (Pcu/hr)

Chapter 3

General Development Layouts

3.0 GENERAL DEVELOPMENT LAYOUT

3.1 Background

M/s. Acme Housing India Pvt. Ltd. plans to develop a Mixed-use development at Manpada, Thane. The proposed development comprises of Residential developments comprising of **1862 units** having flat configuration of 2 BHK, 2.5 BHK, 3 BHK and 4 BHK. Moreover, an additional **2448** 1RK units of **MMRDA** and a **commercial** component i.e. shops/gala of total **3420.84 SQM** carpet area are also planned within the proposed development.

3.2 Development Layout

The multiple ingress and egress to the proposed mixed-use development is provided through both the roads i.e. Khewra Circle Marg and Existing narrow road to the west of the proposed development (to be widened 10m wide as per Development Plan).

- Total number of parking provided to the proposed development of plot A is **2286** car parking bays and plot B is **397**car parking bays.

3.3 Development Schedule

The parking statement of the proposed development of Plot A and Plot B is shown in **Table 3.1 and Table 3.2.**

Table 3.1: Parking Statement of Proposed Development - Plot A

Parking Statement A+B+C+D+G+H																				
TYPE OF PARKING BAYS	Basement level				Ground level				1st level				2nd level				STILT level			
	95.40 level				100.00 level				105.20 level				108.40 level				111.6 level			
Puzzle		x	1	0	434	x	1	434		x	1	0								
		x	1	0		x	1	0		x	1	0								
Tandom Parking		x	2	0	9	x	2	18	40	x	2	80	36	x	2	72	22	x	2	44
Tandom Puzzle					31	x	1	31												
Pit Stack Prking		x	2	0									67	x	2	134				
3lvl Stack Parking		x	3	0	38	x	3	114												
1+1 Stack Parking		x	2	0	141	x	2	282	21	x	2	42	0	x	2	0	50	x	2	100
Single Parking Big		x	1	0	0	x	1	0	149	x	1	149	147	x	1	147		x	1	0
Single Parking Small		x	1	0	1	x	1	1	49	x	1	49	56	x	1	56	28	x	1	28
For Approval		x	1	0		x	1	0		x	1	0		x	1	0		x	1	0
TOTAL	0			0	654			880	259			320	306			409	100			172

Parking Statement E + F																								
TYPE PF PARKING BAYS	Basement level 2				Basement level 1				Ground level				1st level				2nd level				STILT level			
Puzzle		x	1			x	1		79	x	1	79	0	x	1	0								
Extra In Pit Puzzle		x	1	0		x	1	0	0	x	1	0		x	1	0								
3 / 4 Level Puzzle									25	x	1	25												
2 Stack in Pit + 1 Parking																								
1 Parking																								
Tandom Parking	11	x	2	22	9	x	2	18	2	x	2	4	18	x	2	36	18	x	2	36		x	2	0
3lvl Stack Parking		x	3	0	0	x	3	0	13	x	3	39												
1+1 Stack Parking		x	2	0		x	2	0	1	x	2	2	0	x	2	0	0	x	2	0		x	2	0
Single Parking Big	42	x	1	42	41	x	1	41	4	x	1	4	14	x	1	14	25	x	1	25				
Single Parking Small	32	x	1	32	41	x	1	41	2	x	1	2	12	x	1	12	31	x	1	31		x	1	0
For Approval		x	1	0		x	1	0		x	1	0		x	1	0		x	1	0		x	1	0
TOTAL	85			96	91			100	126			155	44			62	74			92	0			0

GRAND TOTAL	BASEMNET LEVEL 1 & 2 = 196	GROUND LEVEL = 1035	1ST LEVEL = 382	2ND LEVEL = 501	STILT LEVEL = 172	TOTAL = 2286

Table 3.2: Parking Statement of Proposed Development - Plot B

Parking Statement	
Floor	Car Parking
Ground Floor	151
Podium P1	111
Podium P2	103
Stilt Floor	32
Total	397

Figure 3.1 presents the Ground Floor Plan (Entry/Exit) of plot A. **Figure 3.2** and **Figure 3.2(a) shows** the Basement B1 & B2 Level plan of plot A. **Figure 3.3, Figure 3.4** and **Figure 3.5** present the parking layouts of Podium P1, Podium P2 and Stilt level of plot A respectively.

Figure 3.6 Presents the Podium P1 Floor Plan (Entry/Exit) of Plot B. **Figure 3.7 to Figure 3.9** present the parking layouts of Ground level, Podium P2 and Stilt Level of plot B respectively.

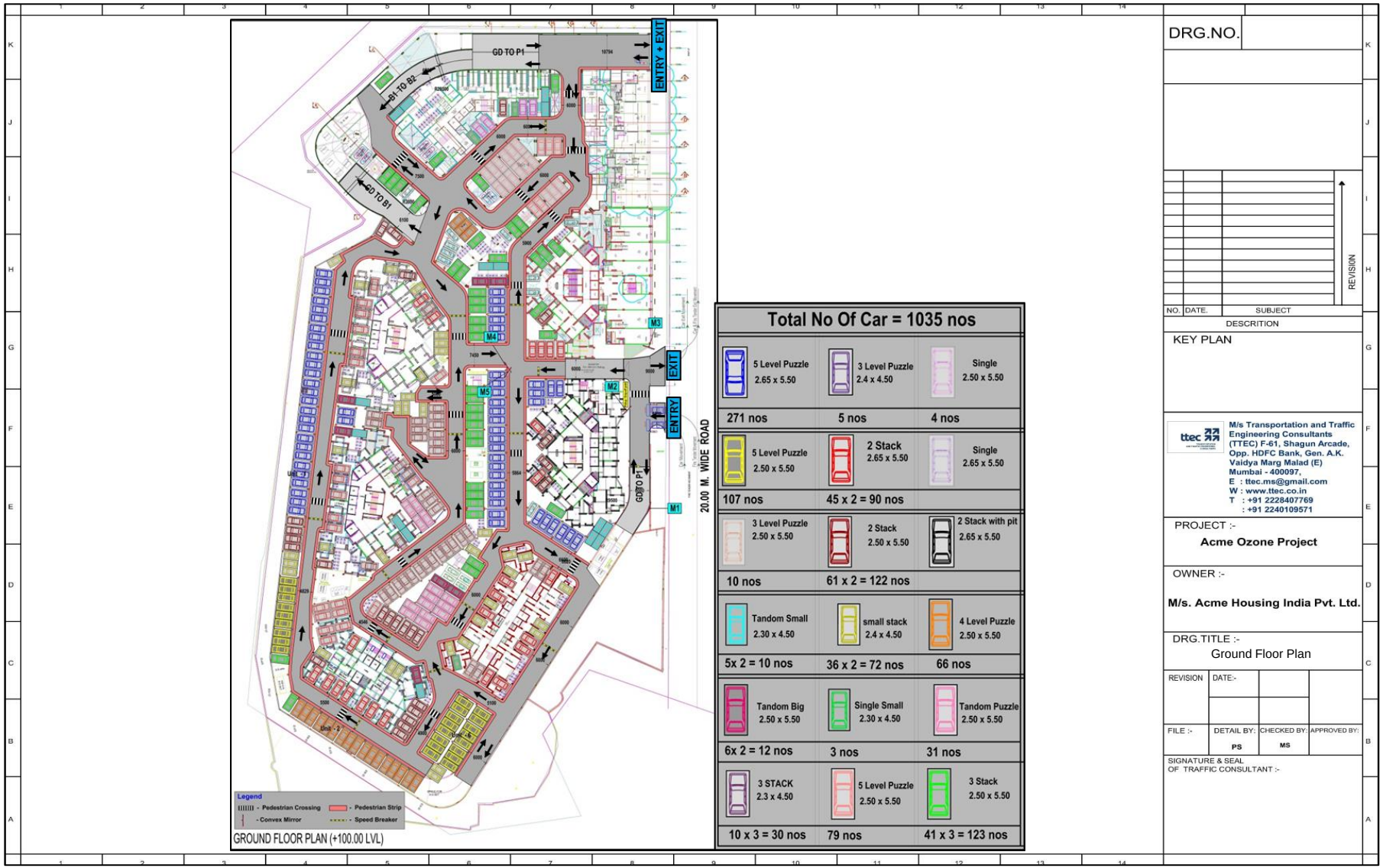


Figure 3.1: Ground Floor Plan (Entry/Exit) of plot A

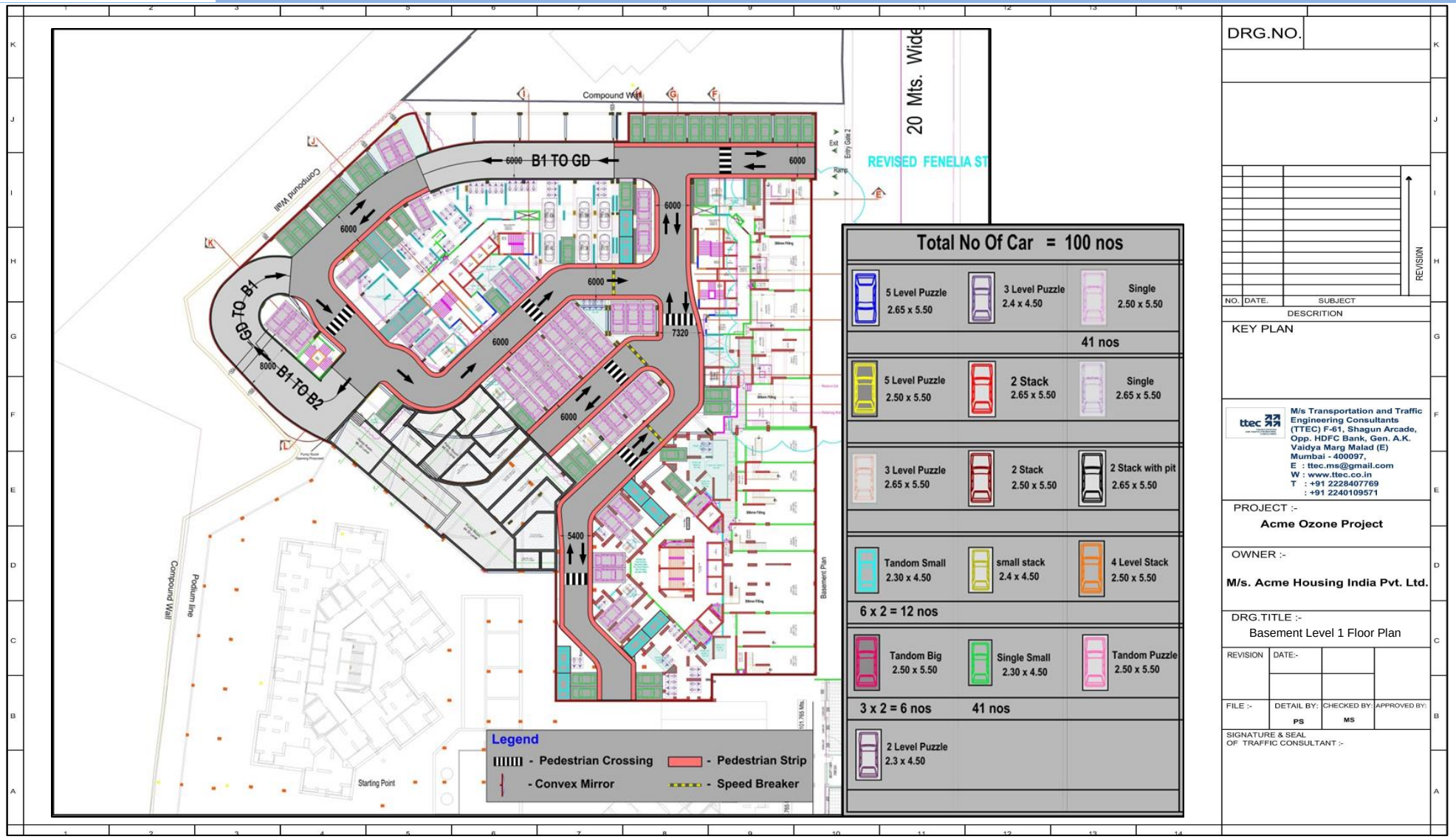


Figure 3.2: Basement B1 Floor Plan of Plot A

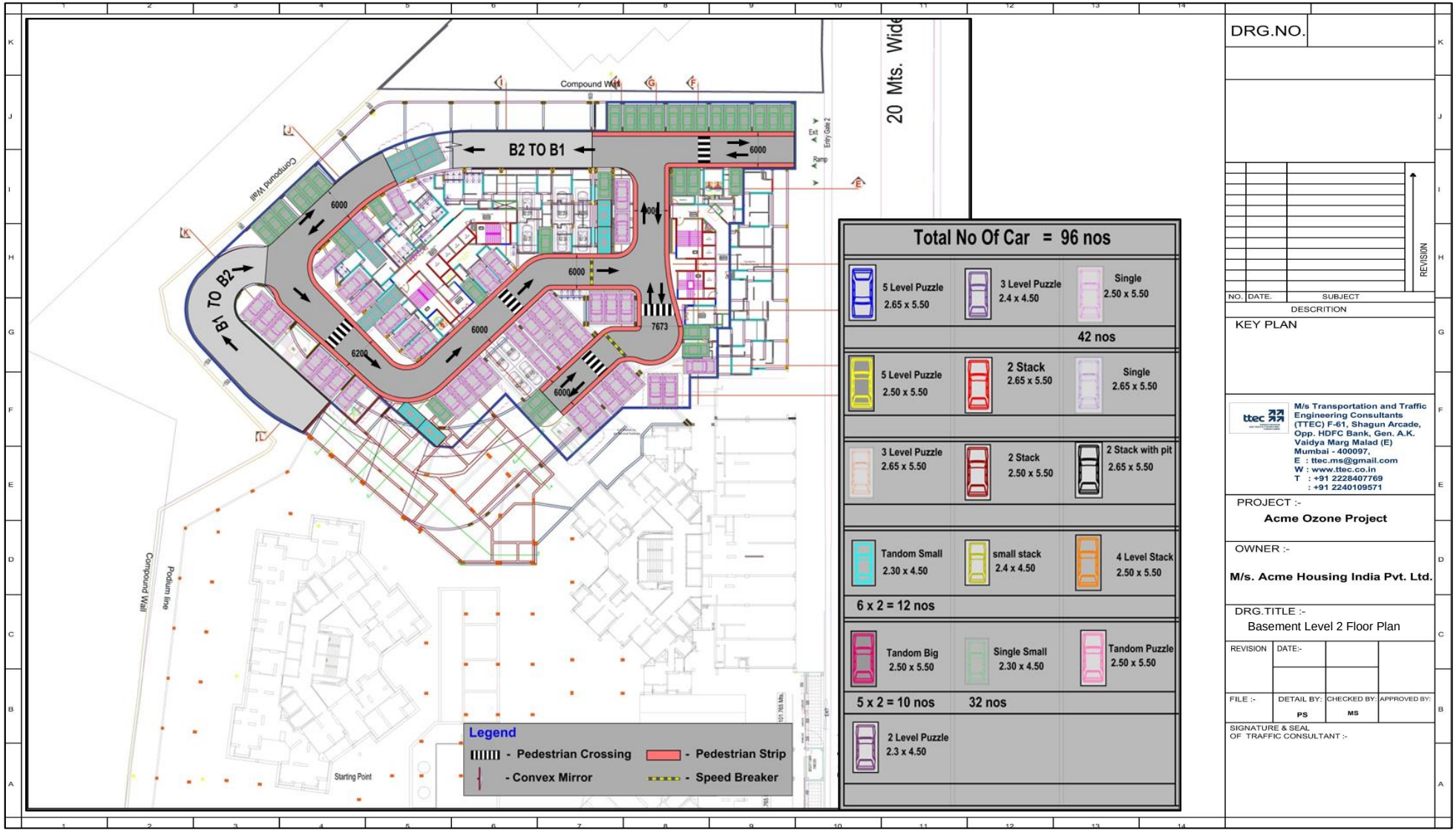


Figure 3.2(a): Basement B2 Floor Plan of Plot A

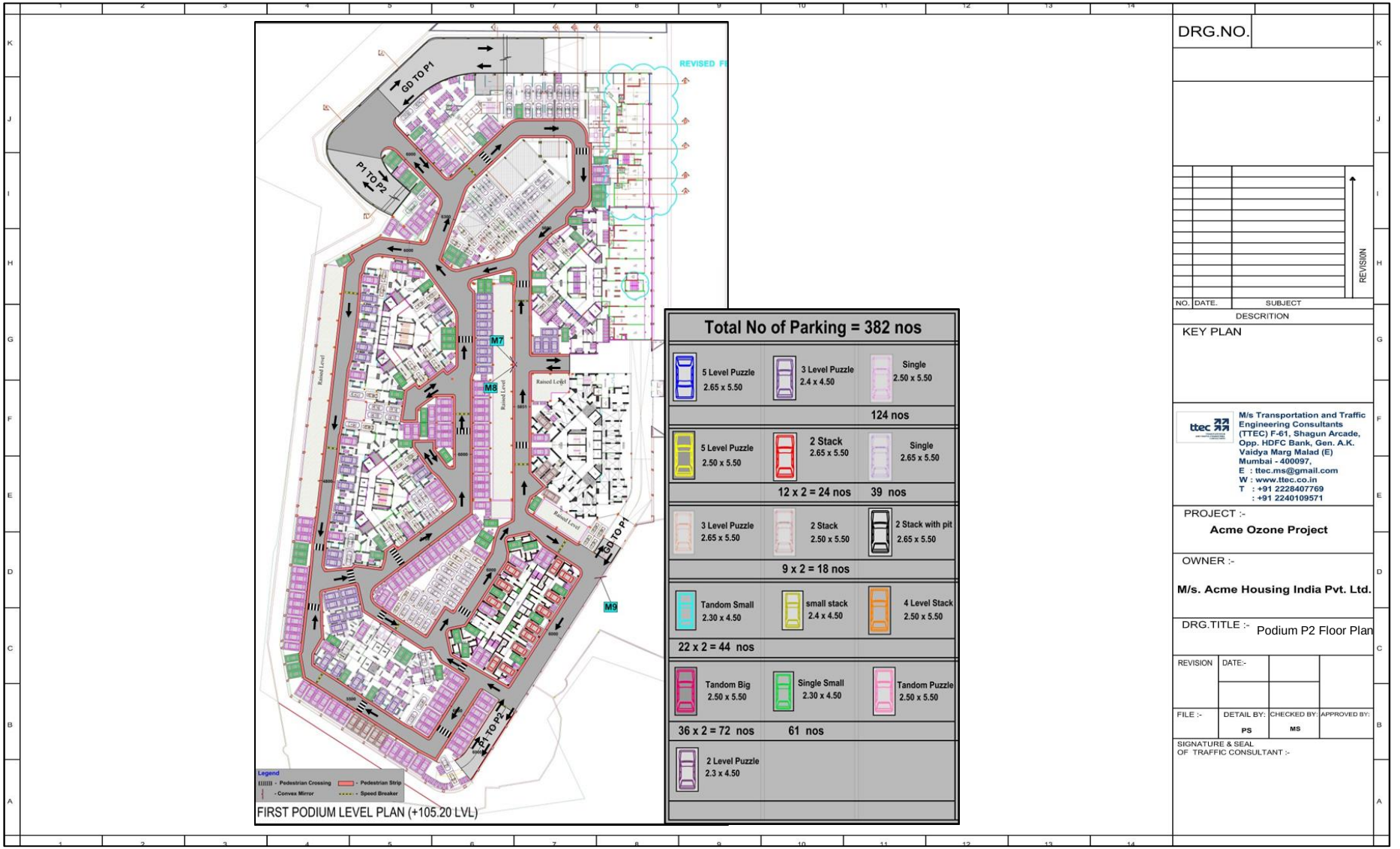


Figure 3.3: Podium P1 Floor Plan of Plot A

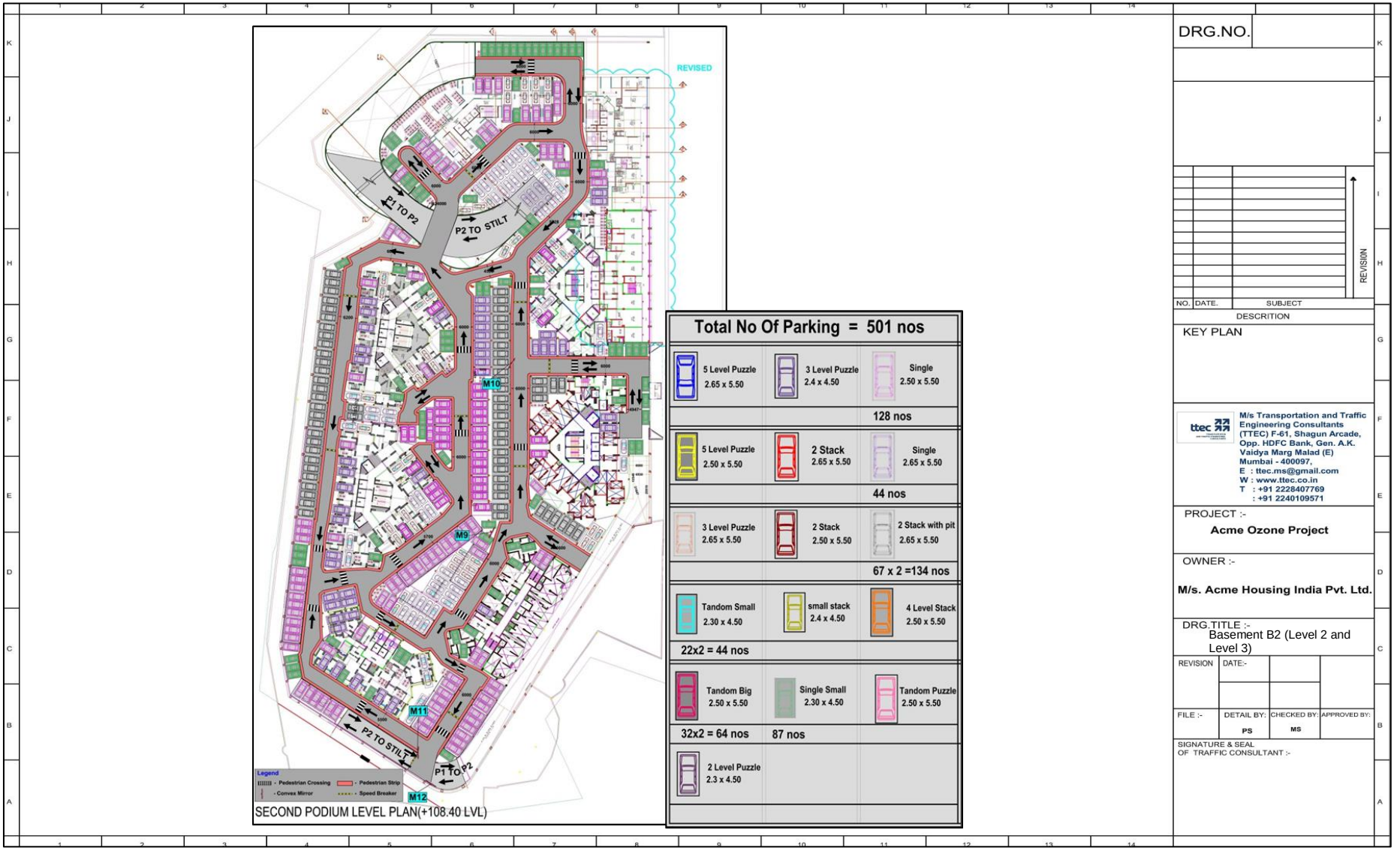


Figure 3.4: Podium P2 Floor Plan of Plot A



Figure 3.5: Stilt Level Floor Plan of Plot A

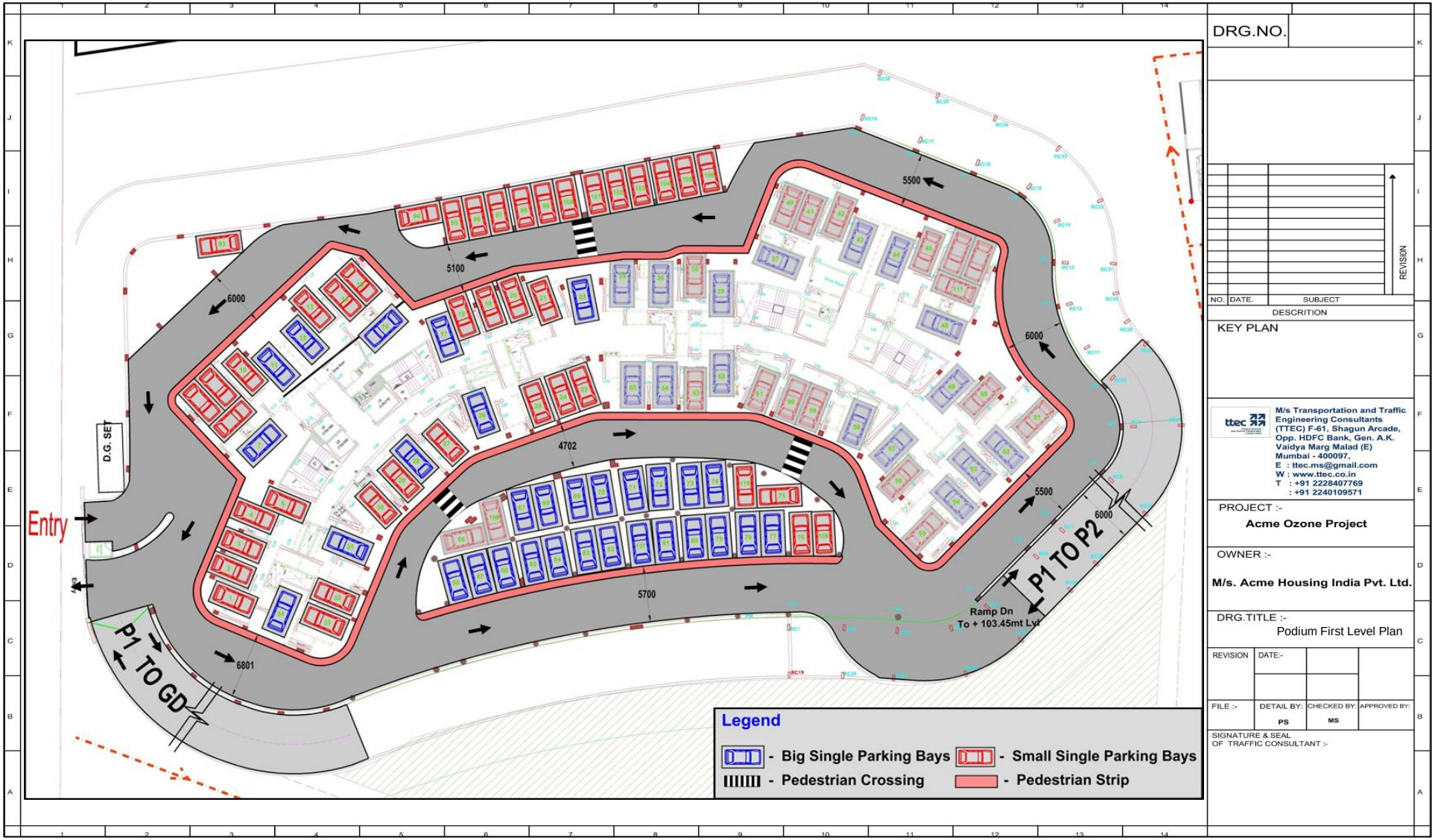


Figure 3.6: Podium P1 Floor Plan (Entry/Exit) of Plot B

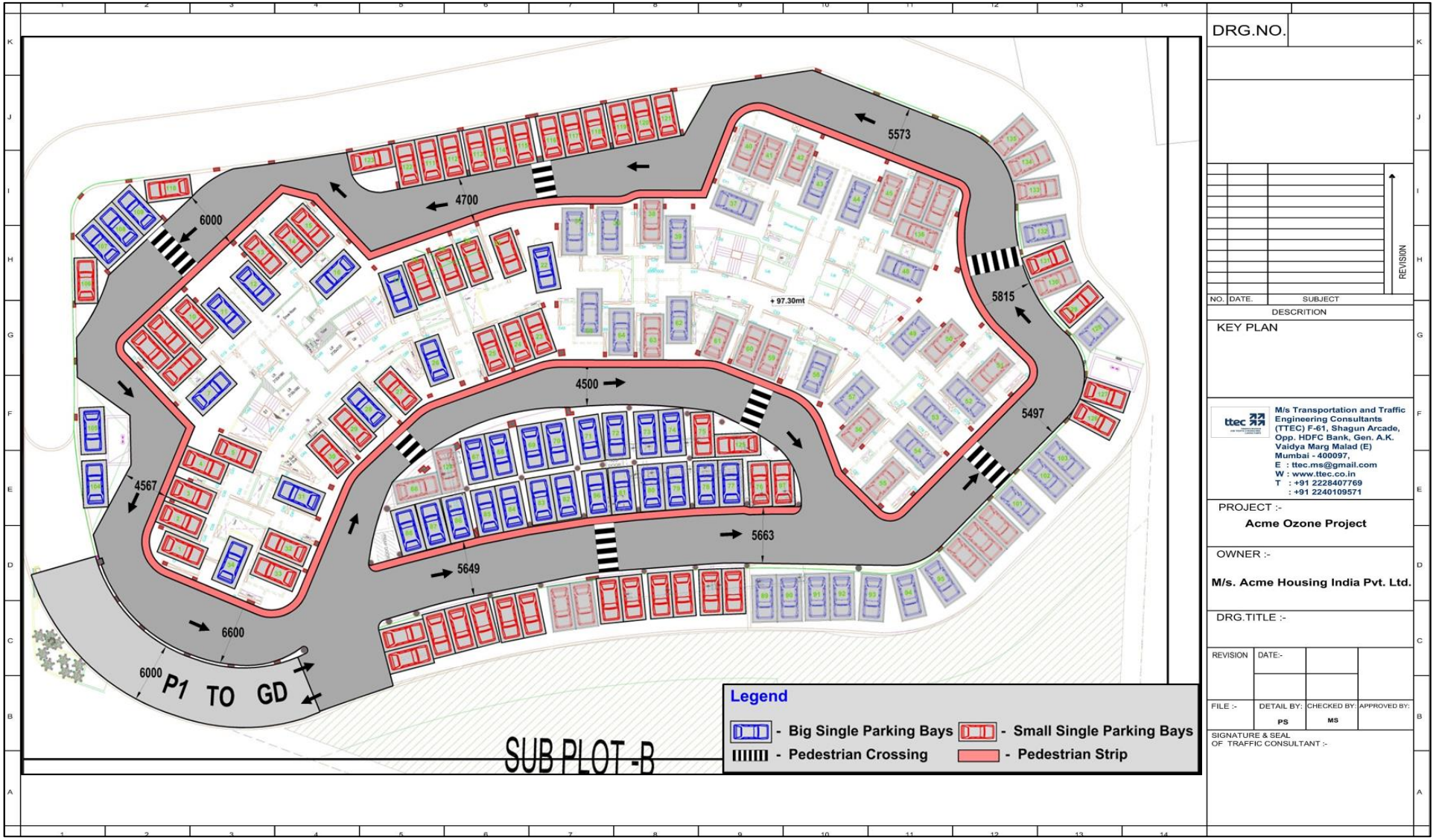


Figure 3.7: Ground Floor Plan of Plot B

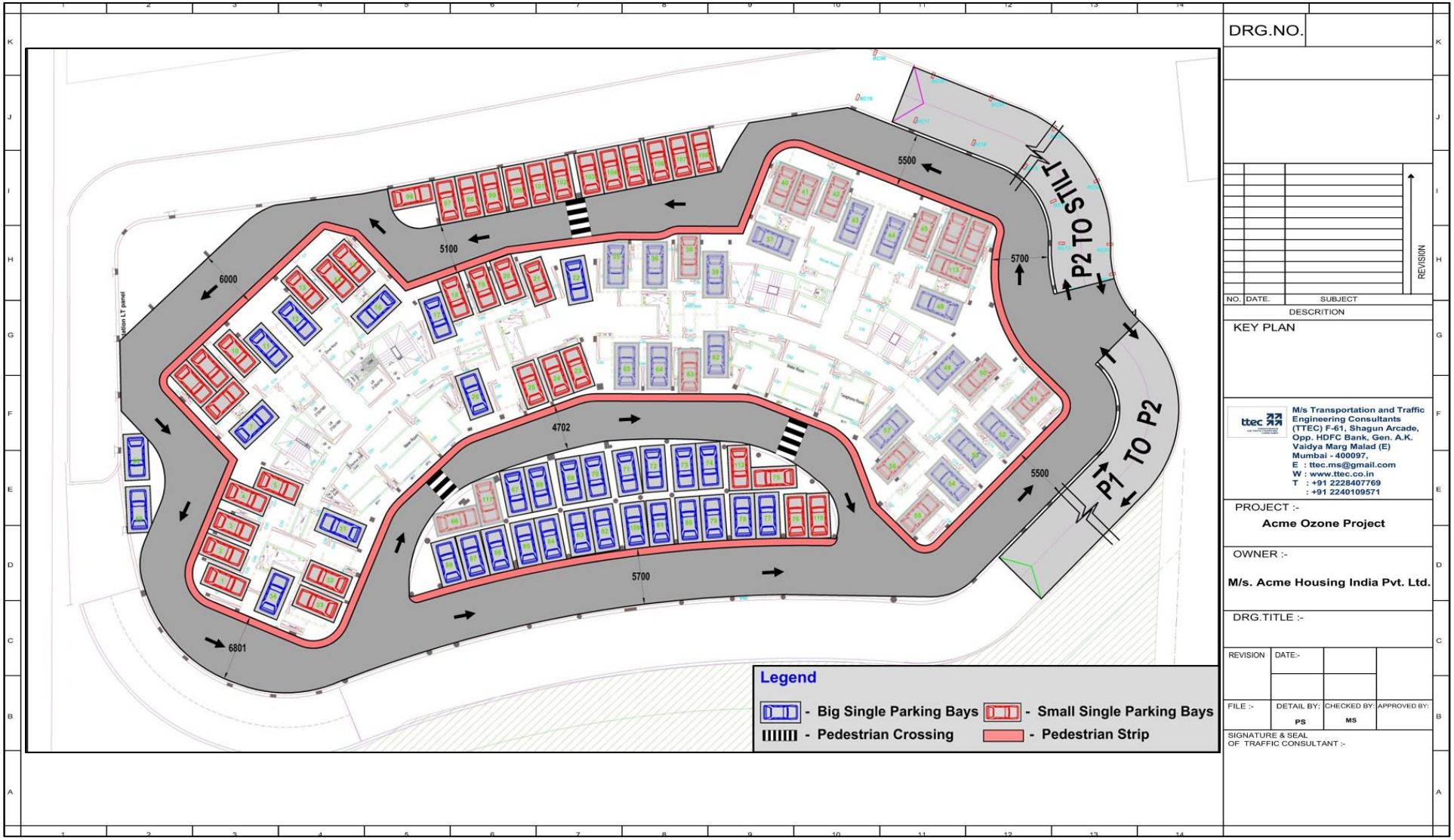


Figure 3.8: Podium P2 Floor Plan of Plot B

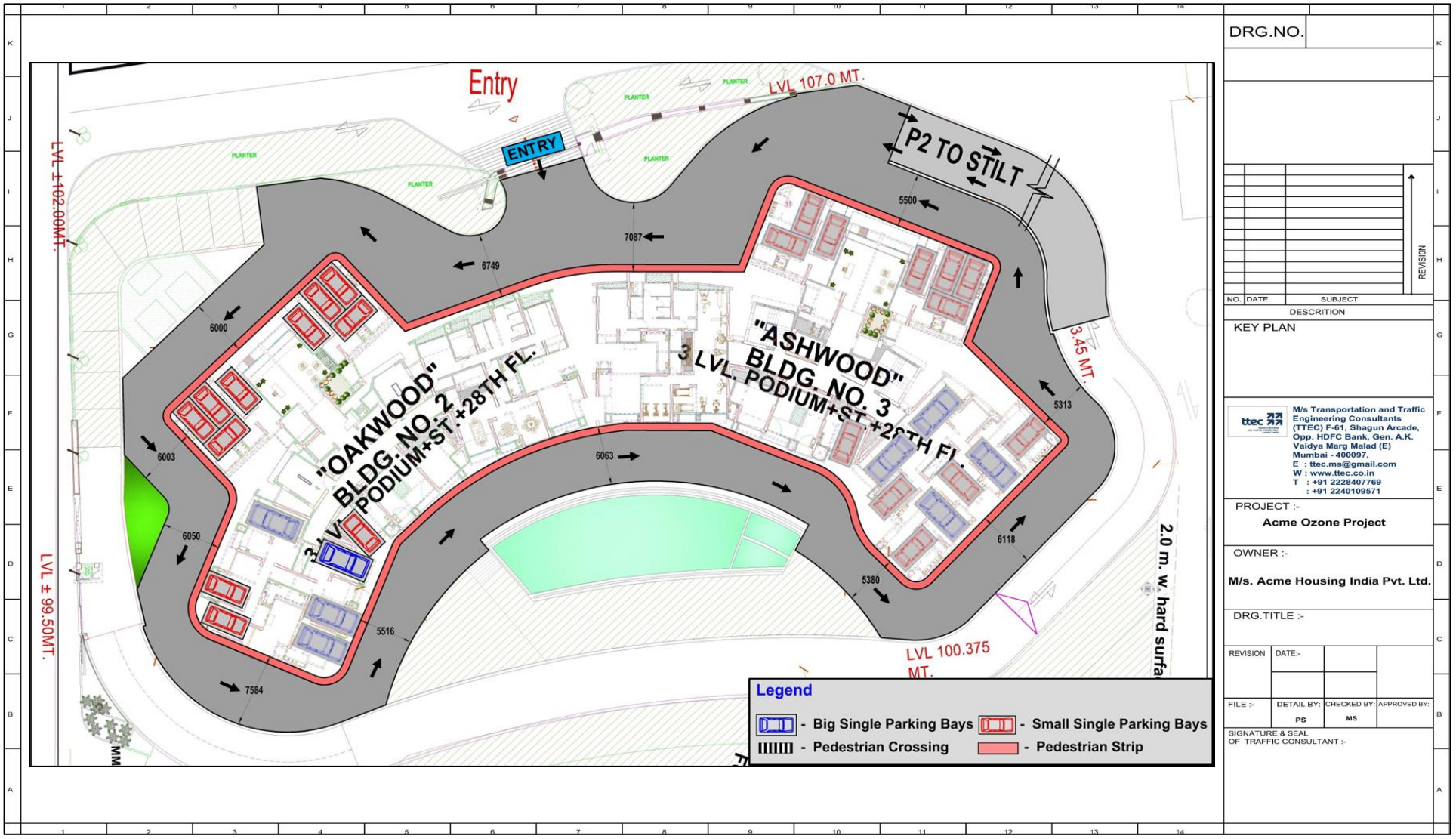


Figure 3.9: Stilt Level Floor Plan of Plot B

3.4 Evacuation Analysis

Evacuation Analysis (Plot A)

Evacuation time is the time taken during emergency to evacuate entire parking lot.

There is one entry gate, one exit gate and one entry + exit gates to the entire Plot A. The widths of the gates are **9m**, **12m** and **10.7m** respectively.

There are two no. of 2-way ramps which serves all the podium levels. The basement is served by two no. of 1-way ramps.

During emergency evacuation all gates will operate as exit gate only. Therefore, during emergency evacuation at least **10 lanes** of exit will be available for emergency evacuation.

The rate of exit per vehicle/lane from the exit point to the external road is assumed as 8 seconds on an average (i.e. assuming the capacity of exit lane as 450 PCU/hr./lane). This is assuming maximum obstruction to the vehicles joining the queue of exiting vehicles.

In case of mechanized parking, the first 10 cars will take some time to reach the exit point. However, after the first 10 cars, there will be queue of vehicles exiting out simultaneously.

Note: In case of mechanized parking, the cars at the ground level will exit out like conventional parking. However, the movement of cars from the other parking levels of the Mechanized parking particularly to the Ground level and the movement of cars from Ground level of the Mechanized parking to the exit point will happen simultaneously.

During emergency evacuation, the evacuation of all Podium levels and Stilt level will happen simultaneously (i.e. Stilt to Podium P2, Podium P2 to P1, Podium P1 to ground level and so on). However, this is the worst scenario in terms of obstruction by one vehicle to other.

The nearest parking bays at Ground level are some 13m, 31.61m and 45m from the Gate 1, Gate 2 and Gate 3 respectively. This distance will be covered in 5, 11, and 16 seconds (assuming speed of 10Kmph) respectively. Assuming some reaction time, the first ten vehicles will take around 2.5-3.0 minutes to evacuate. After these 10 cars, there will be ten lanes of vehicles exiting out simultaneously.

There are **2286** car parking bays provided at Ground level, two basement levels, two podium levels and Stilt level. Assuming 80% as peak hour occupancy, the number of cars exiting out from car parking will be **1829**.

The total time taken to evacuate the complete car park will be **1605 seconds/ 27 minutes** [i.e. 180 + (1829-10)*8/10)].

Evacuation Analysis (Plot B)

Evacuation time is the time taken during emergency to evacuate entire parking lot.

One entry gate and one exit gate is provided at podium level P1 while one entry/exit gate is provided at stilt level provided through 20 m wide Access Road.

There is a 2-way ramp which serves all the podium levels. During emergency evacuation all ramps will operate as exit ramps only.

During emergency evacuation all gates will operate as exit gate only. Therefore, during emergency evacuation at least 5 lanes of exit will be available for emergency evacuation.

The rate of exit per vehicle/lane from the exit point to the external road is assumed as 8 seconds on an average (i.e. assuming the capacity of exit lane as 450 PCU/hr./lane). This is assuming maximum obstruction to the vehicles joining the queue of exiting vehicles.

During emergency evacuation, the evacuation of all Podium levels, and Stilt level will happen simultaneously (i.e. ground to podium 1, Podium P2 to P1, and so on). However, this is the worst scenario in terms of obstruction by one vehicle to other.

The nearest parking bay at Podium level is around 11.5m from the gate. The nearest parking bay at Stilt level is around 26m from the gate. This distance will be covered in 4 & 9 seconds (assuming speed of 10Kmph) respectively. Assuming some reaction time, the first five vehicles will take around 2.0-2.5 minutes to evacuate. After these 5 cars, there will be five lanes of vehicles exiting out simultaneously.

There are **397** car parking bays provided at two podium levels, Ground and Stilt levels. Assuming 80% as peak hour occupancy, the number of cars exiting out from car parking will be 318. The total time taken to evacuate the complete car park will be **501 seconds/9 minutes** [i.e. 150+ (318-5)*8/5)].

Figure 3.10 to **Figure 3.15** presents the evacuation plan at different levels of Plot A while **Figure 3.16** to **Figure 3.19** shows the evacuation plan at different levels of Plot B.



Figure 3.10: Evacuation Analysis Ground Floor Plan (Plot A)

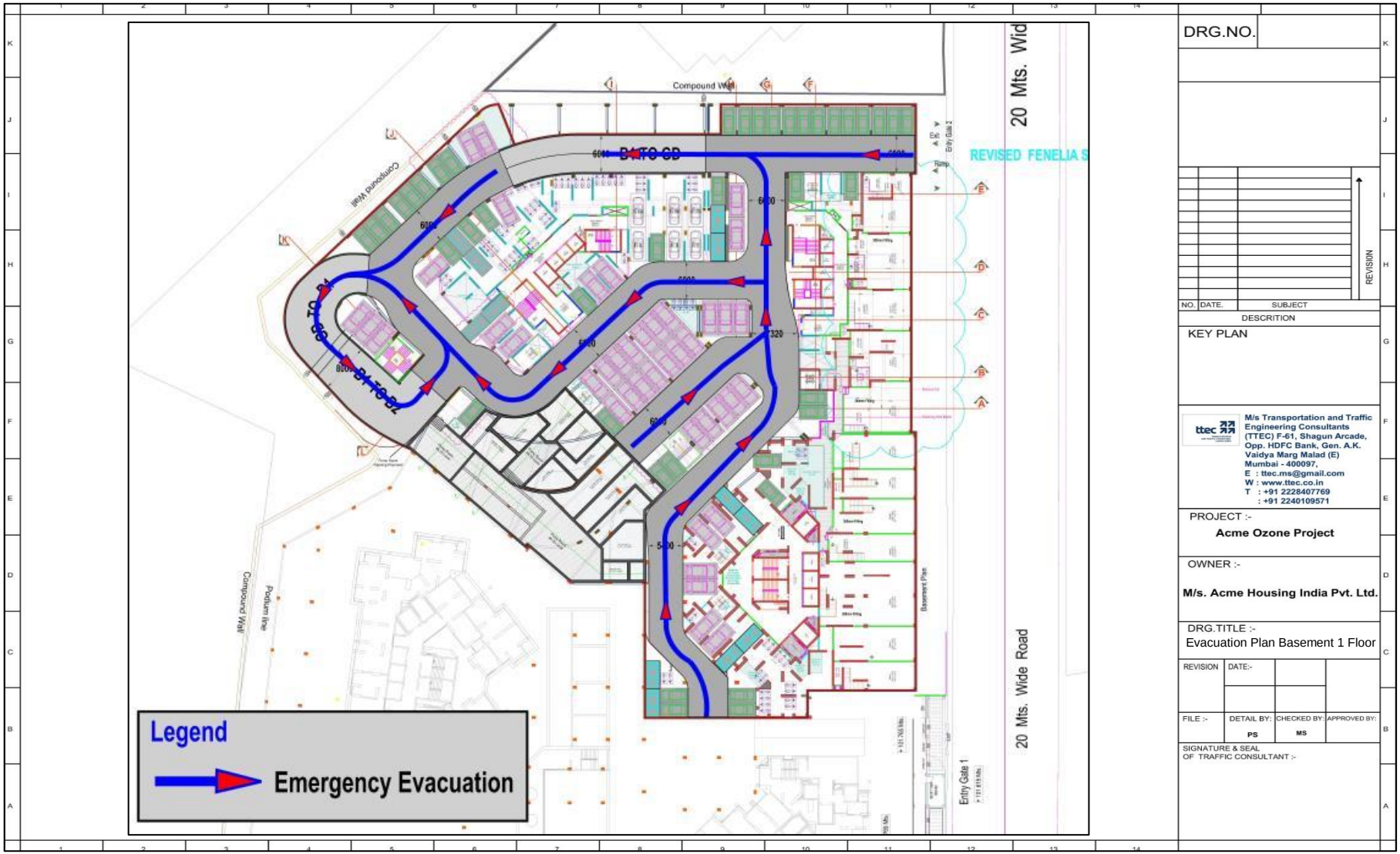


Figure 3.11: Evacuation Analysis Basement B1 Floor (Plot A)

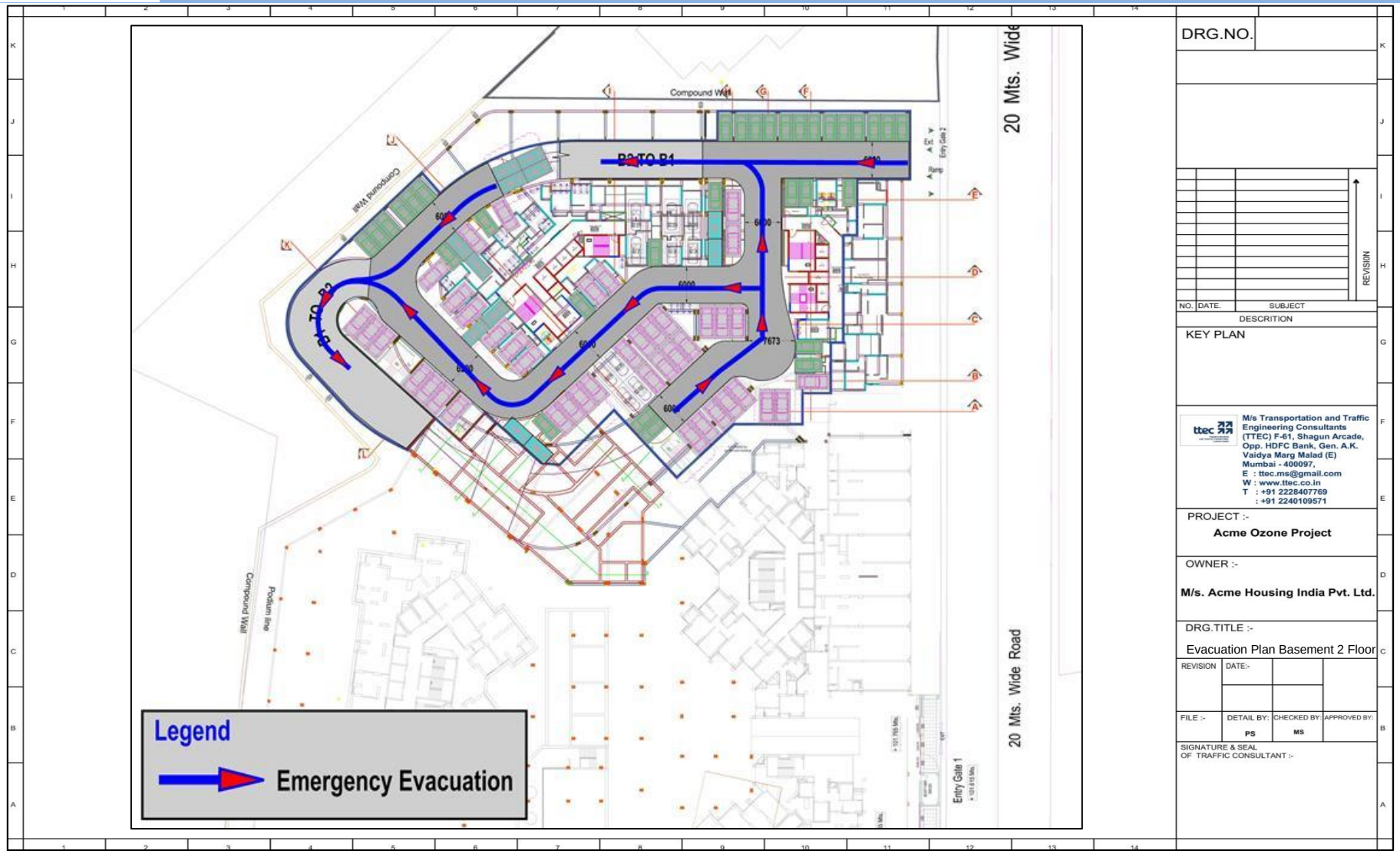


Figure 3.12: Evacuation Analysis Basement B2 Floor (Plot A)

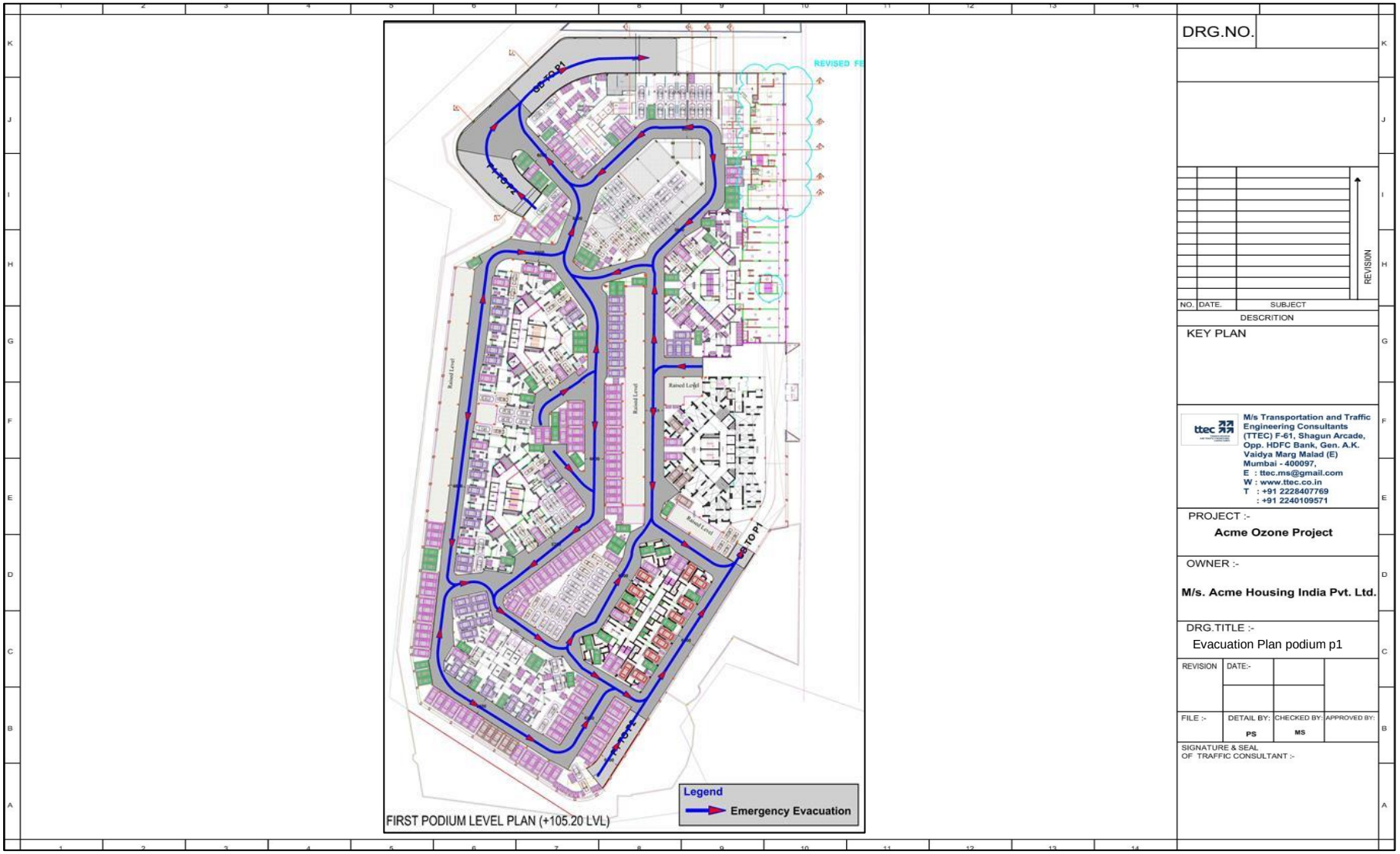


Figure 3.13: Evacuation Analysis Podium P1 Floor (Plot A)

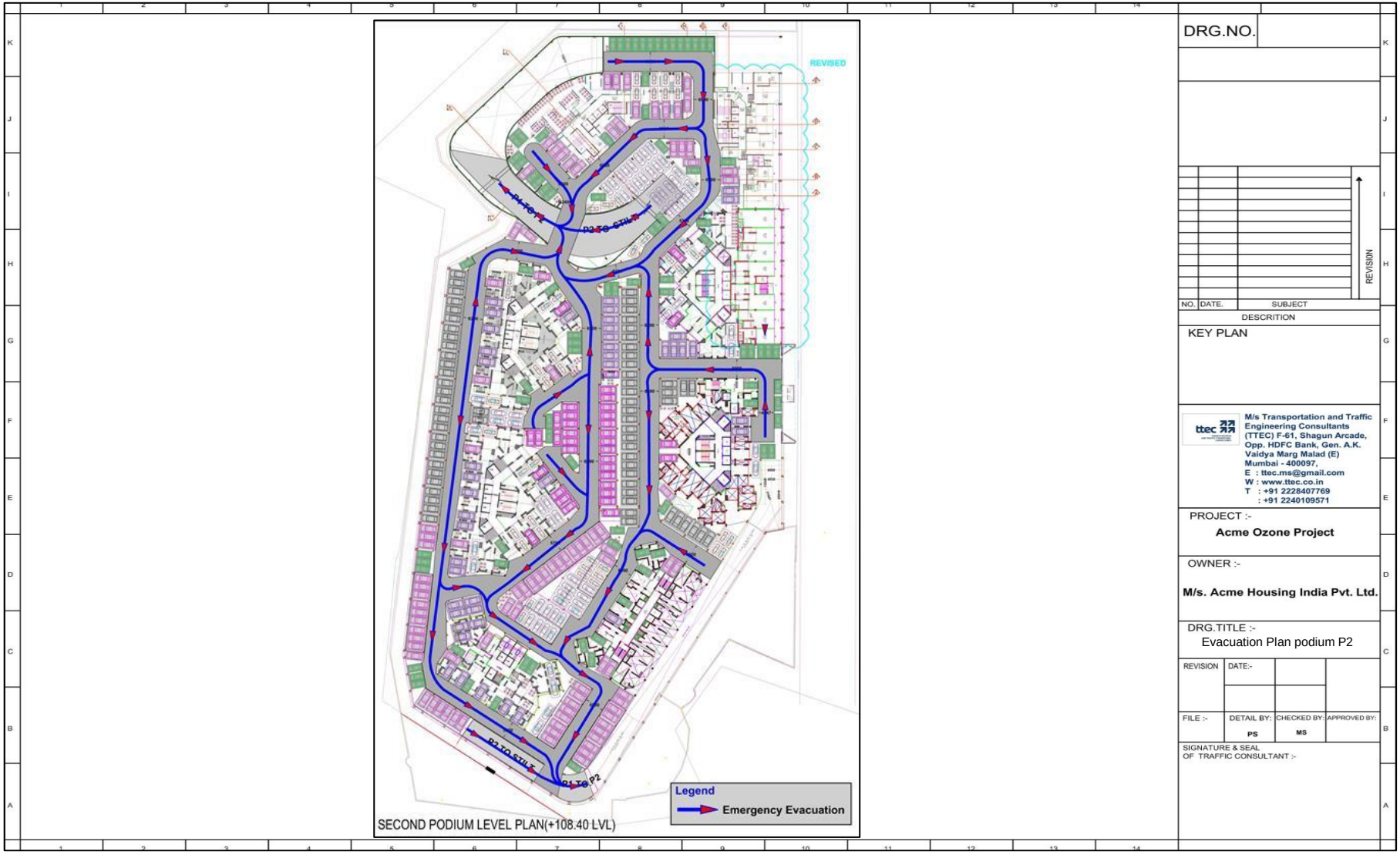


Figure 3.14: Evacuation Analysis Podium P2 Floor (Plot A)



Figure 3.15: Evacuation Analysis Stilt Floor (Plot A)

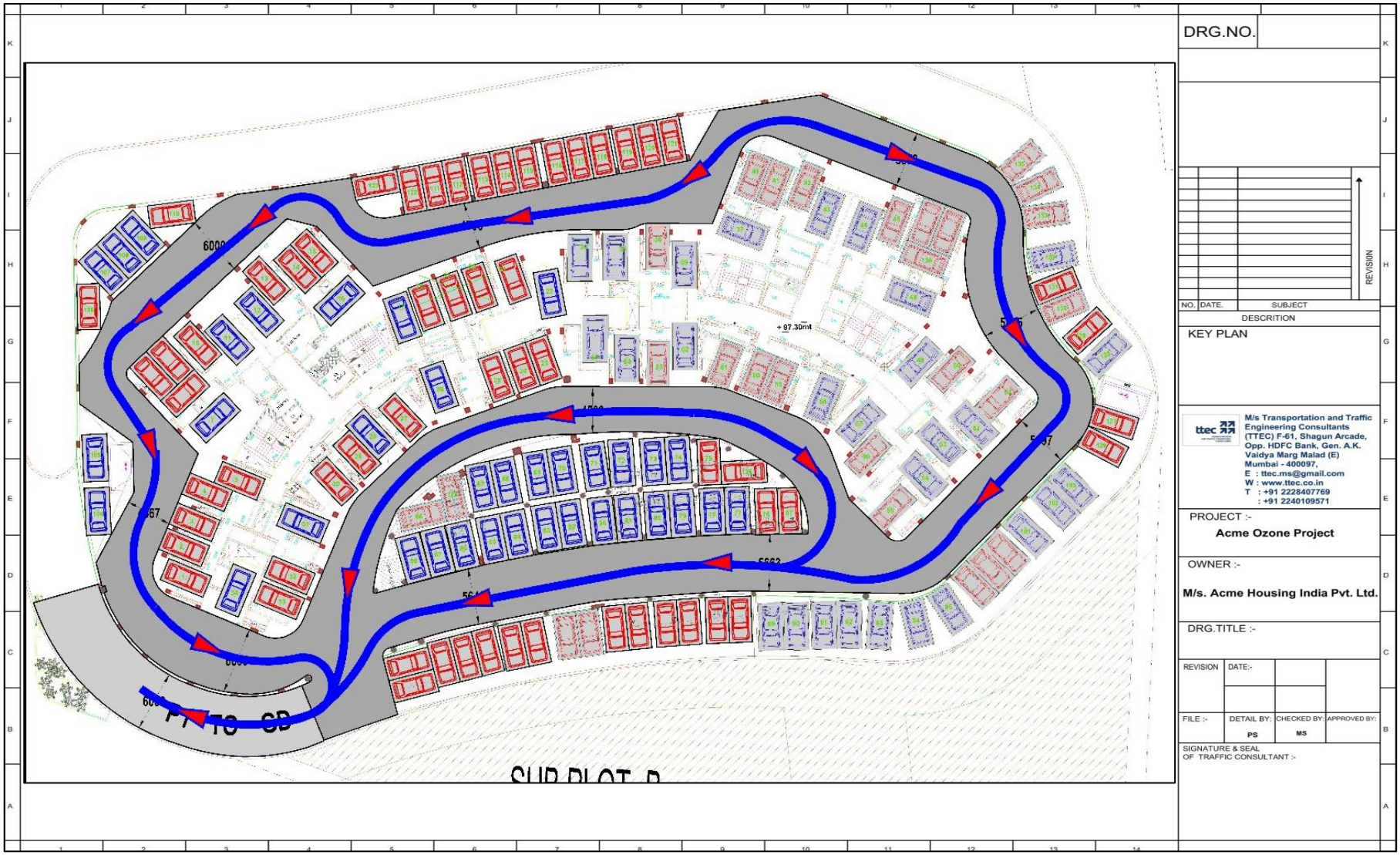


Figure 3.16: Evacuation Analysis Ground Floor Plan (Plot B)

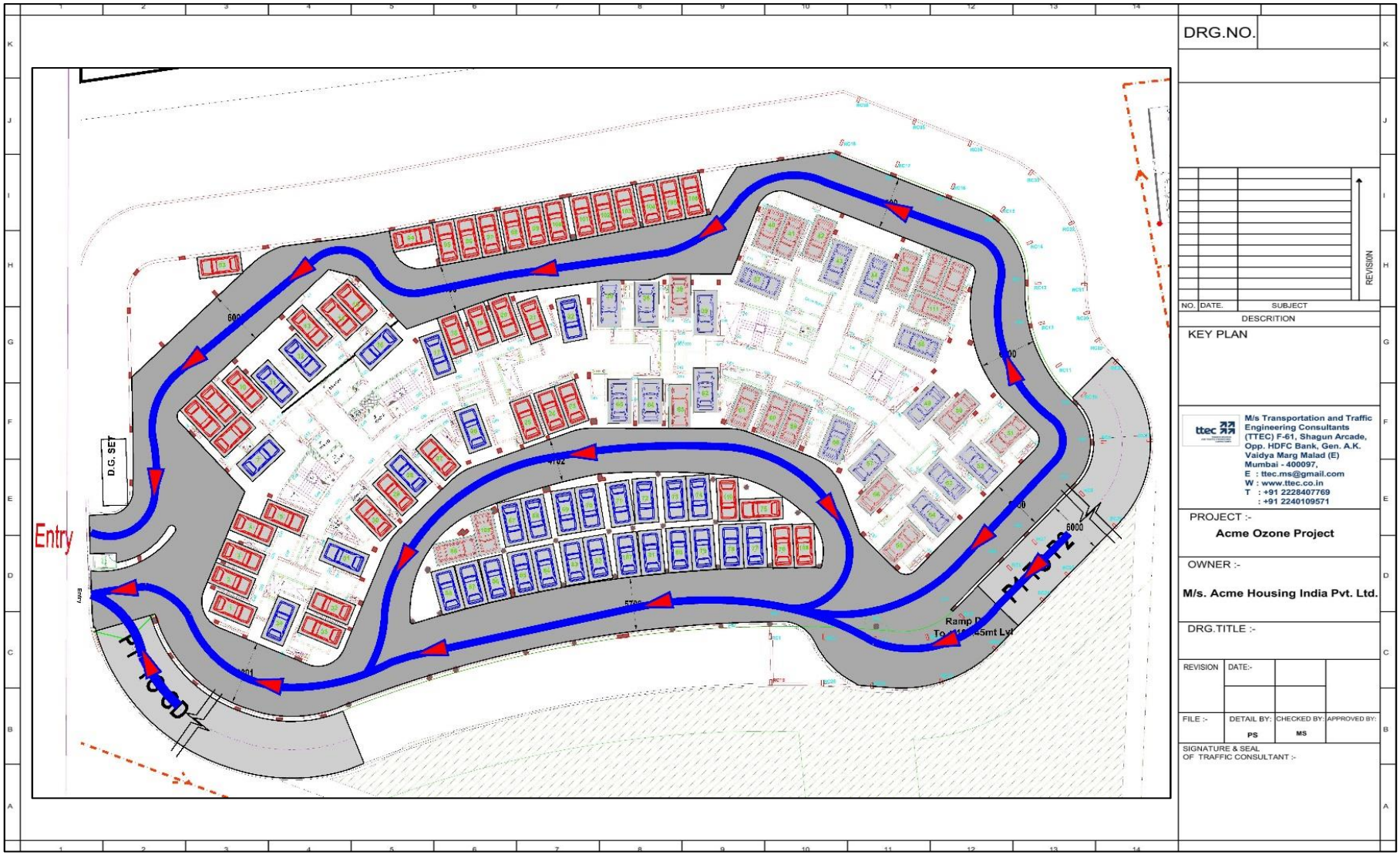


Figure 3.17: Evacuation Analysis Podium P1 Floor (Plot B)

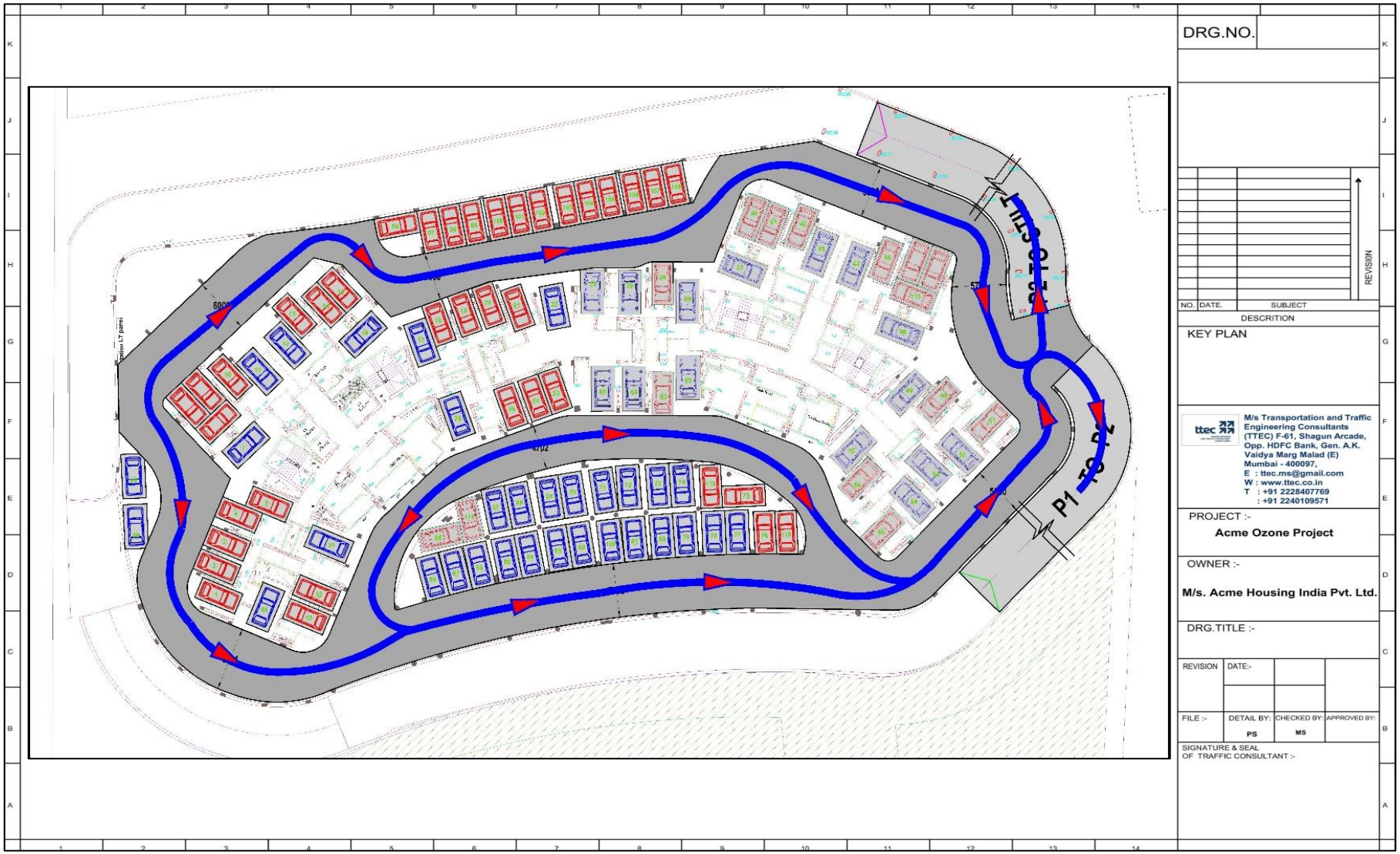


Figure 3.18: Evacuation Analysis Podium P2 Floor (Plot B)

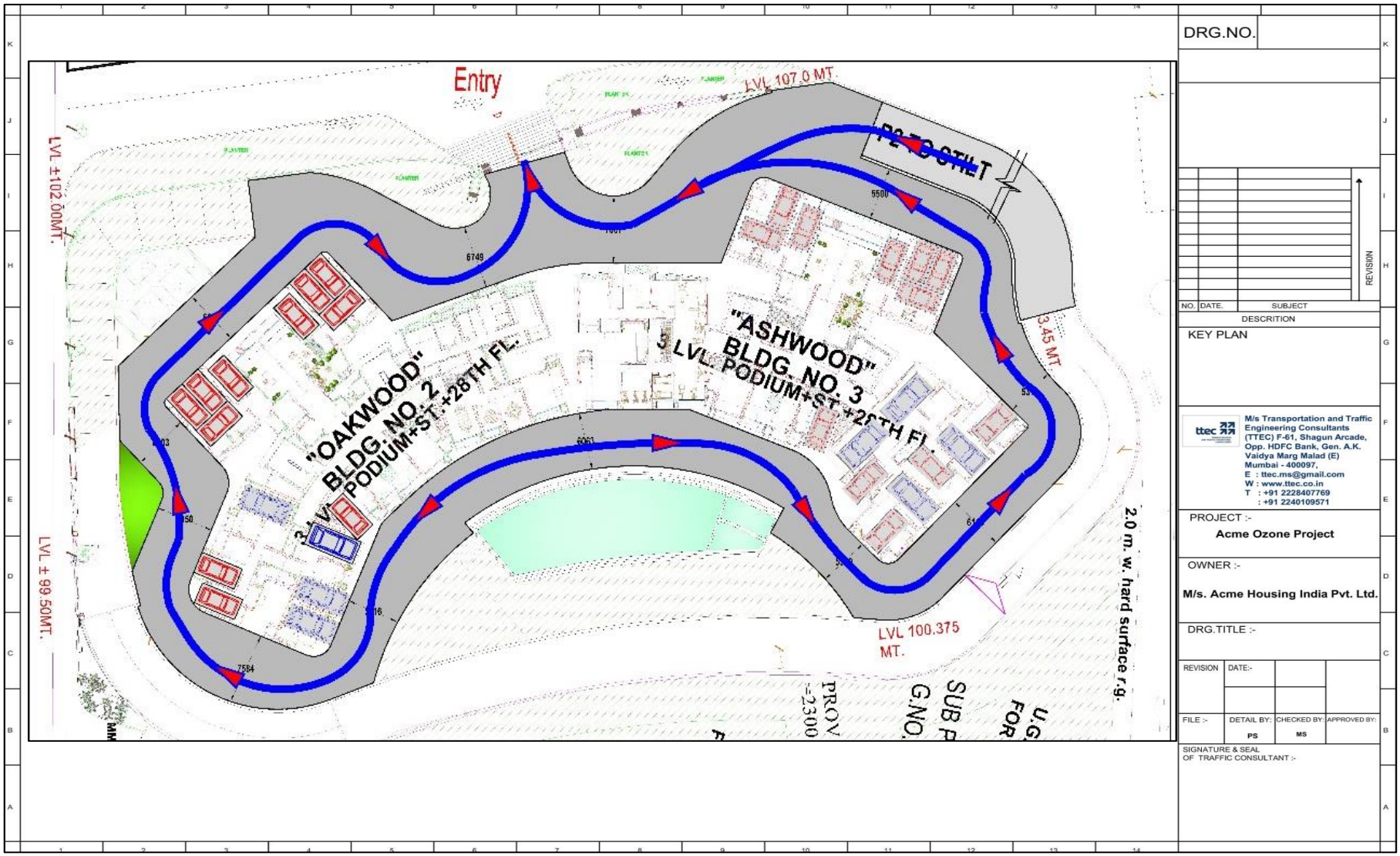


Figure 3.19: Evacuation Analysis Stilt Floor (Plot B)

Chapter 4

Traffic Generation & Impact Analysis

4.0 TRAFFIC GENRATION AND IMPACT ANALYSIS

4.1 Trip Generation Estimating Procedure

The process of estimating future traffic levels generated from the proposed Benchmark involves the identification of suitable trip generation/attraction rates obtained from the previous surveys and applying these to the proposed development.

Assumptions are then made regarding the likely external road routing(s) of this traffic to the development recognizing the final entry/exit arrangements. The net future development site traffic is then superimposed onto the existing traffic to provide an estimate of the future traffic conditions on the external roads serving the development.

4.2 Traffic Generation

Trip generation rates are different for each type of property use. Traffic generation vary depending on the size and behavior of the property.

The trip generation rates used to determine the expected traffic coming to the proposed development is taken from previously surveyed properties.

The process of developing valid trip generation rates involves surveying the number of vehicles entering and exiting the property throughout the day. In addition, the traffic generation surveys also take into account the traffic that is parked on the road in the immediate vicinity of the development. This is then divided by the number flats within the property or area of the surveyed property to give you the existing vehicle trip rate per hour.

To estimate the expected traffic generation to the property, these rates are then multiplied against the total number of flats within the proposed development or the area of the proposed development.

The Trip Generation Rates used for similar types of Residential properties in Thane are shown in **Table 4.1**. The traffic generation/attraction surveys in Thane reveals that Residential developments are normally low traffic generators.

Table 4.1: Residential Trip Generation Rates

Peak Hour	Vehicle Trips (PCU's/Apartment/hr)		
	Entry	Exit	Total
AM PEAK	0.21	0.20	0.41
PM PEAK	0.18	0.16	0.34

4.3 Traffic Generation and Impact Analysis

The estimated traffic generated/attracted from the proposed residential redevelopment is outlined below in **Table 4.2** respectively**.**

Table 4.2: Estimated Traffic Generation of the Proposed Residential Redevelopment

Peak Hour	Entry	Exit	Total
AM PEAK	762	740	**1502**
PM PEAK	667	583	**1250**

We anticipate that the peak hour traffic generation from the proposed Residential redevelopment will be around **1500-1550 PCUs** per hour. In addition, **35-40 PCU's** per hour will be generated from commercial component of the proposed redevelopment

The projected morning and evening peak hour directional traffic flows on the surrounding road is presented in **Figure 4.1 and Figure 4.2.**

A line of comparison of the congestion index **(V/C ratio)** is drawn between the existing traffic conditions and the projected traffic conditions (when the proposed redevelopment will be in place). **Figure 4.3** to **Figure 4.4** shows the traffic impact analysis/congestion indices for roads surrounding proposed redevelopment for different years. The same is shown in **Table 4.3.**The operating condition of the road in terms of V/C as per **IRC 106-1990** shows in **Table 4.4.**

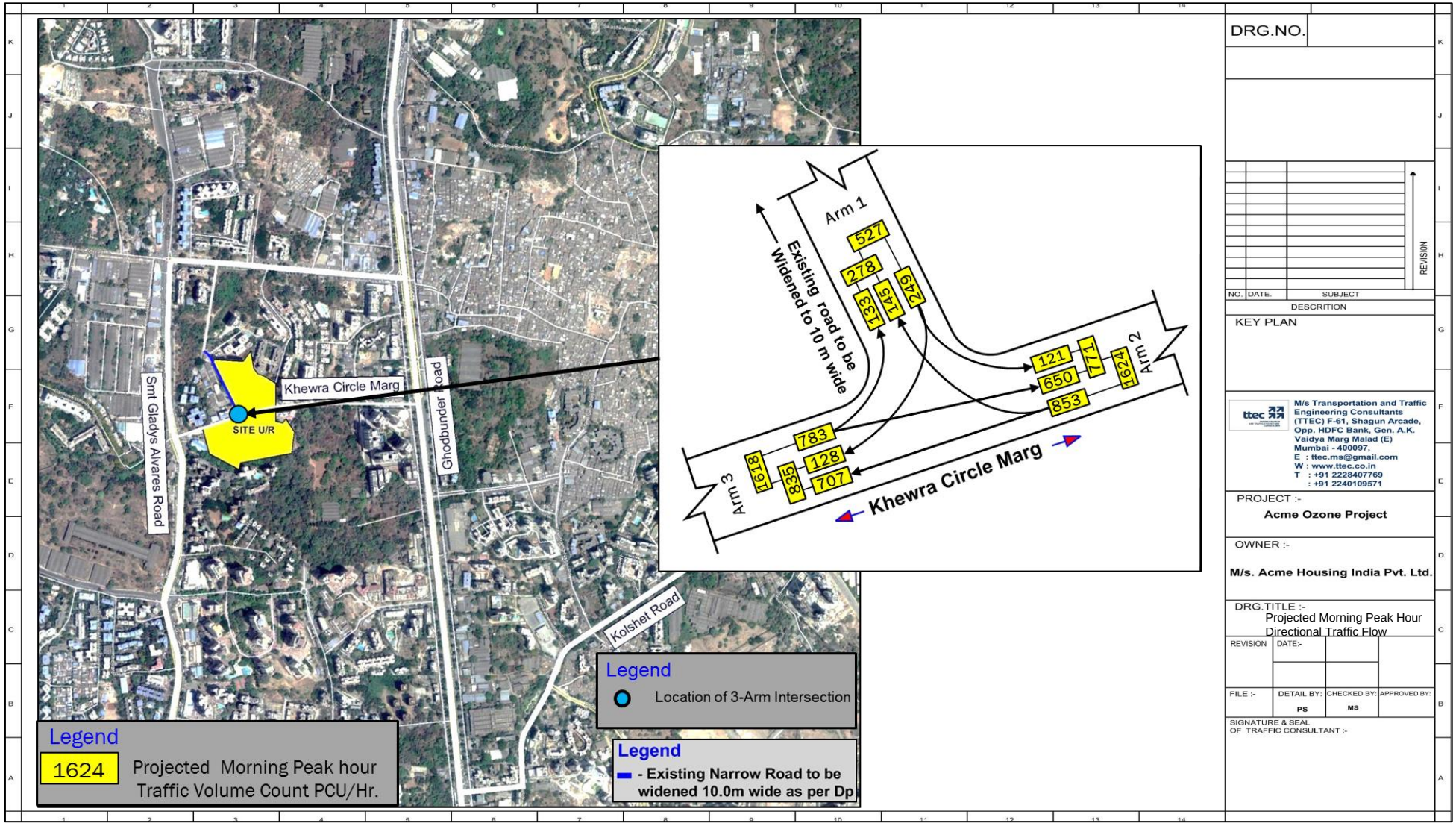


Figure 4.1: Projected Morning Peak Hour Directional Traffic Flow of Surrounding Roads

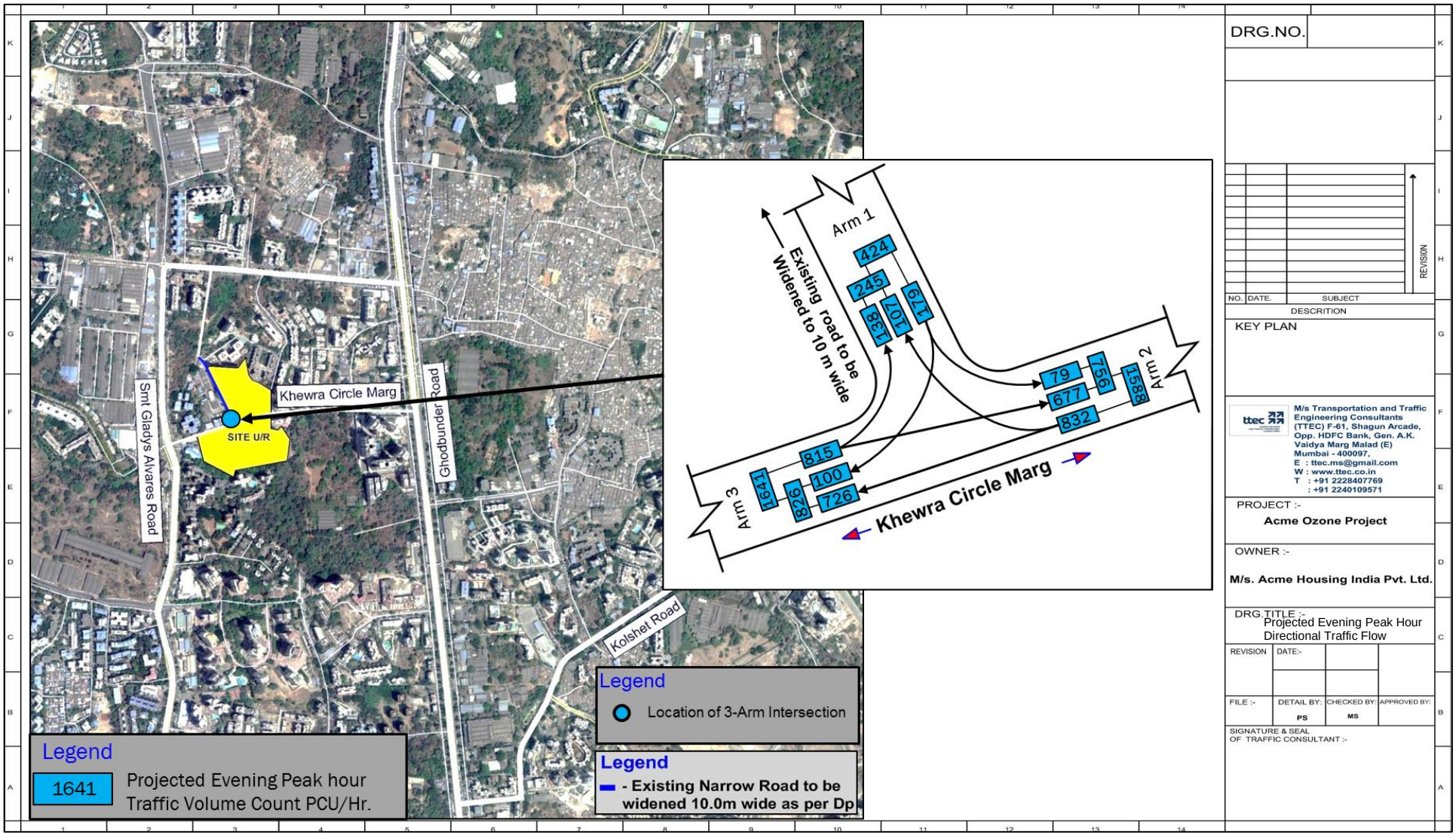


Figure 4.2: Projected Evening Peak Hour Directional Traffic Flow of Surrounding Roads

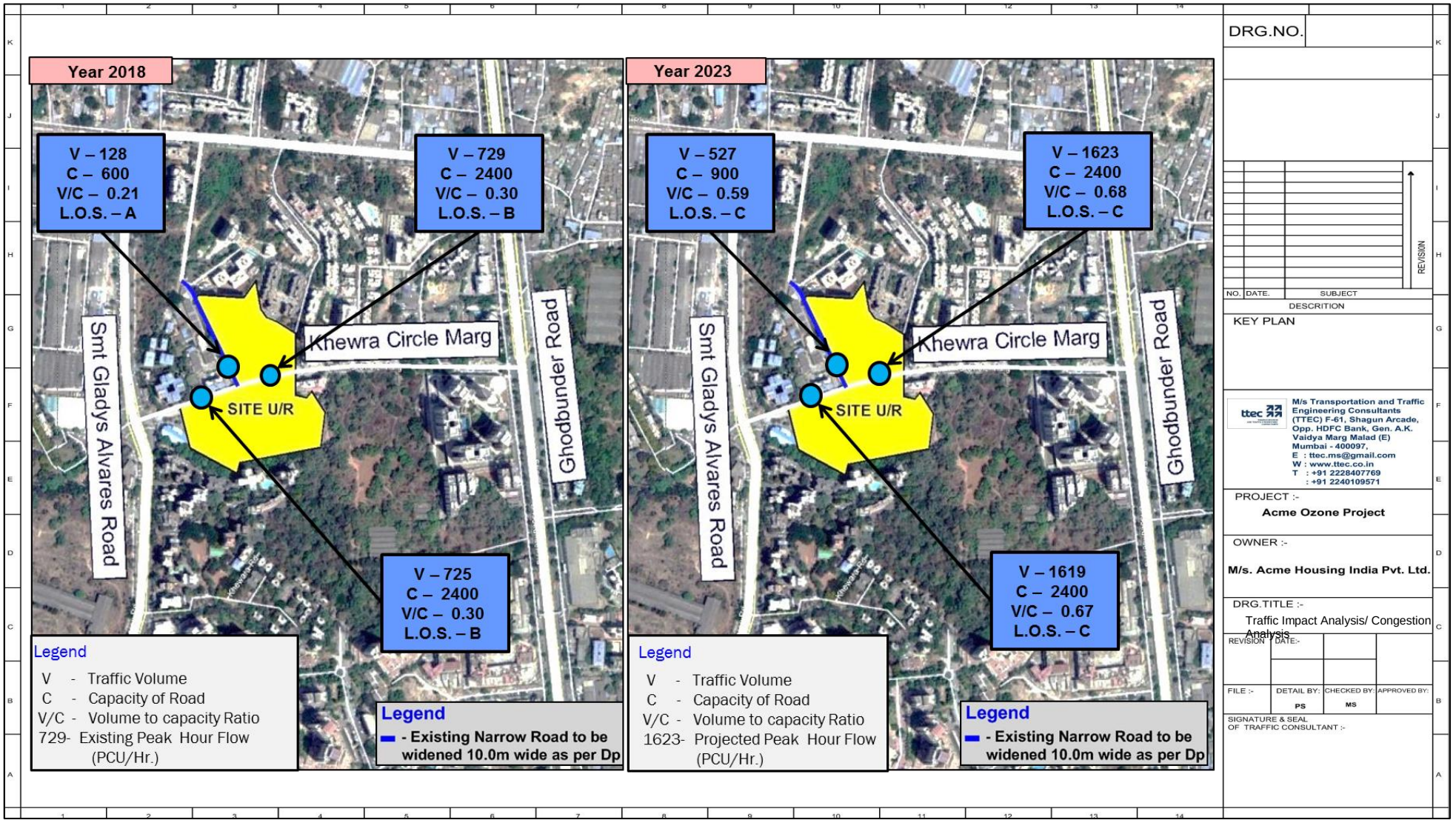


Figure 4.3: Traffic Impact Analysis/ Congestion Analysis for Existing & Projected Conditions (Year 2018 & Year 2023)

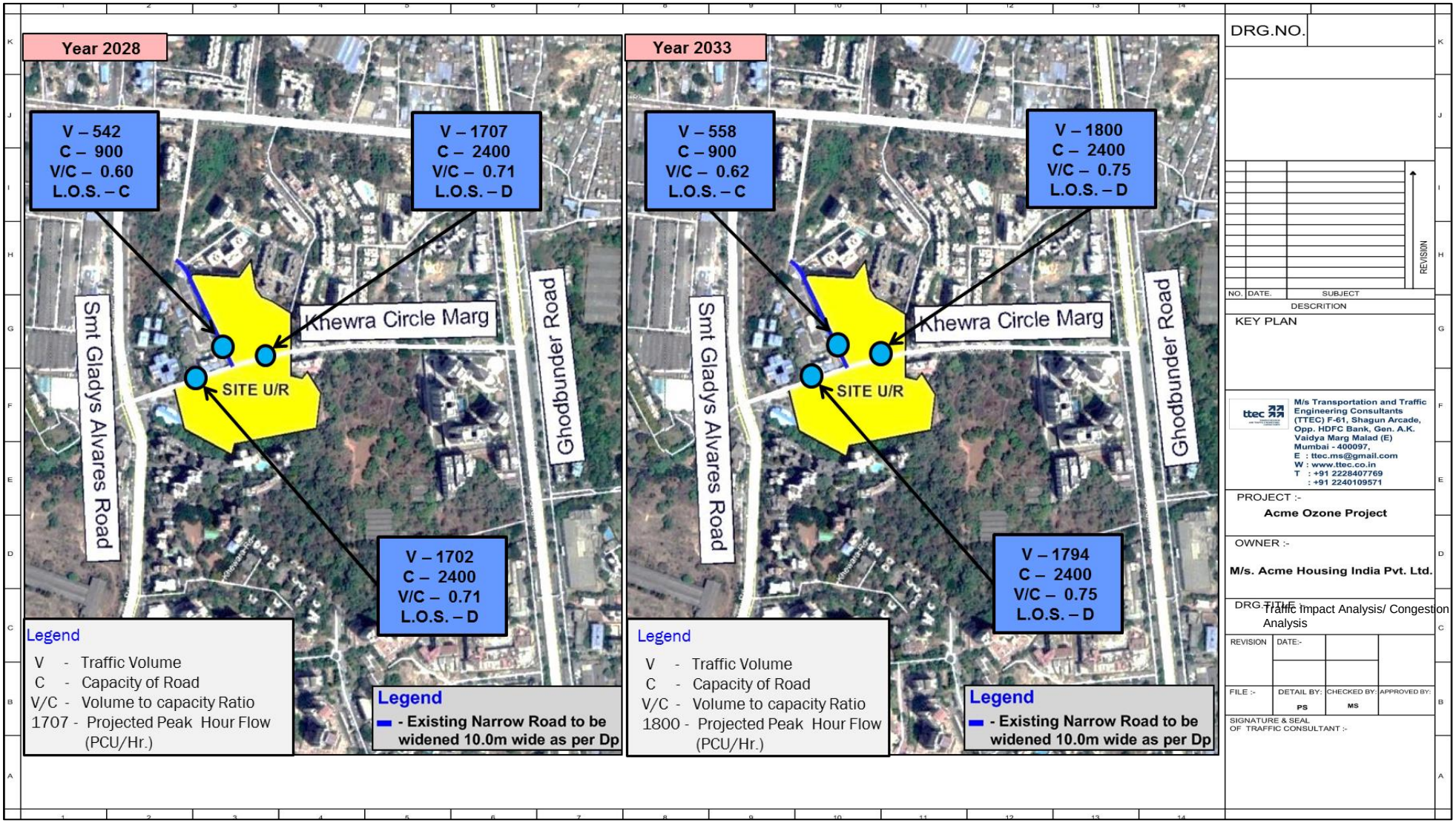


Figure 4.4: Traffic Impact Analysis/ Congestion Analysis for Projected Conditions (Year 2028 & Year 2033)

Table 4.4: Comparison of Congestion Indices (V/C Ratio)

Road Name	Traffic Scenario	Volume (PCU's/Hr.)	Capacity (PCU's/Hr.)	V/C Ratio (Congestion Index)	Level of Service (LOS)
Arm 1 Existing Narrow Road to be widened 10m wide as Per Dp Map	Existing Traffic Conditions	128	600	0.21	A
	Projected Traffic Conditions (Year 2023)	527	900	0.59	C
	Projected Traffic Conditions (Year 2028)	542		0.60	C
	Projected Traffic Conditions (Year 2033)	558		0.62	C
Arm 2 Khewra Circle Road(Towards Ghodbandar Road)	Existing Traffic Conditions	729	2400	0.30	B
	Projected Traffic Conditions (Year 2023)	1623		0.68	C
	Projected Traffic Conditions (Year 2028)	1707		0.71	D
	Projected Traffic Conditions (Year 2033)	1800		0.75	D
Arm 3 Khewra Circle Road(Towards S.G Alvares Road)	Existing Traffic Conditions	725	2400	0.30	B
	Projected Traffic Conditions (Year 2023)	1619		0.67	C
	Projected Traffic Conditions (Year 2028)	1702		0.71	D
	Projected Traffic Conditions (Year 2033)	1794		0.75	D

Operating condition of roads in terms of V/C ratio are presented in **Table 4.5**

Table 4.5: Operating Condition of Road in terms of V/C as per Indian Roads Congress (IRC) - 106-1990

Level of Service	General Operating Conditions	Range of V/C
A	Free flow (traffic flows at or above speed limit and motorists have complete mobility between lanes)	<0.30
B	Reasonable flow (slightly more congested, with some maneuverability)	0.3 – 0.47
C	Stable flow (more congested than B, loads close to capacity)	0.48 – 0.68
D	Approaching unstable flow (speeds are somewhat reduced, example: busy corridor during middle of a weekday, or a functional urban highway during rush hour)	0.70 – 0.88
E	Unstable flow (flow becomes irregular, speed varies widely and rarely reaches speed limit)	0.88 – 1.00
F	Forced or breakdown flow (a constant traffic jam)	> 1.00

4.5 Mitigating Measures

Project Proponent/Developer

Proper traffic control measures should be provided by the project proponent to regulate the flow of traffic/to streamline the traffic flow

- Adequate traffic signs should be provided to notify the flats owners.
- Entries and Exits are segregated for efficient traffic evacuation
- Speed humps/Speed Breakers should be provided for traffic calming and restricting the internal vehicular speed to 10km/hr.
- Pedestrian facilities are provided like pedestrian strip and pedestrian crossing
- Traffic wardens should be assigned to regulate the traffic flow during peak hours

Future Proponent

- The roads in the near vicinity of the proposed development should be constructed as per the Development Plan proposal. This will help in better distribution of traffic and will improve the level of service of the surrounding roads

4.6 Conclusion

The proposed development site is well connected to the surrounding area. The entry exit to the proposed development is provided through Khewra Circle Marg and Existing narrow road to be widened 10m wide as per DP remarks. Separate entry and exit gate will help in better traffic distribution.

The result of the traffic surveys and analysis shows that the traffic on the surrounding roads is normal to moderate. Moreover, the traffic is more localized traffic and less through traffic.

The traffic generation from the proposed development is around **1500-1550 PCUs** and in addition, **35-40 PCU's** per hour will be generated from commercial component of the proposed redevelopment during peak hours which is distributed on the surrounding road network. The result of the traffic impact analysis shows that the two roads have residual capacity to take the additional traffic that will be generated from the proposed development.