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1 INTRODUCTION

The first Bus Rapid Transit System is proposed from Ambedkar Nagar to Delhi Gate. It dissects the city crossing a number of residential and commercial pockets. It also crosses three schools. They are:

- Indian School at Sadiq Nagar,
- Birla Vidya Niketan at Orthonova Junction, and,
- Delhi Public School at Mathura Road.

The main aim is to streamline the school vehicular pattern with the new corridor design.

The study includes the following:

- Study of existing circulation pattern around the school.
- Re-design of the road infrastructure to minimize conflicts and enhance traffic circulation of all modes.



Figure 1: Parking of private vehicles on the main road leading to congestion.

2 INDIAN SCHOOL, SADIQ NAGAR

2.1 ANALYSIS

The school and its surroundings were studied in respect to the traffic scenario and the following observations were made.

2.1.1 SITE ANALYSIS

This school lies at Sadiq Nagar prior to the Moolchand Intersection on the corridor (4.7 KM) while going towards Delhi Gate. A service lane and a side lane on one side with residential pockets and a green area surround it.

2.1.1.1 Existing Circulation

The traffic pattern includes number of different users coming to the school.

There are two kinds of traffic:

1. Commuters on the main carriageway.
2. School traffic
 - School owned buses and vans
 - Staff vehicles (cars and bicycles)
 - Privately owned vehicles.

A large number of privately owned cars occupy most road space.

The private owned cars mainly use the main carriageway for stopping and standing (*Figure 2*), mainly near the school gate with the school buses occupying the space in the service lane (*Figure 3*).

Since bollards block the entry to the side lane, some privately owned vehicles and vans enter it from the rear and park next to the school boundary (*Figure 4*). The service lane is occupied by parking on both the sides by privately owned vehicles (*Figure 5*)

Figure 6 showing a clear picture of the activity happening on both sides of the footpath i.e. the service lane and main carriageway.



Figure 2: Congestion on main carriage way due to privately owned cars.

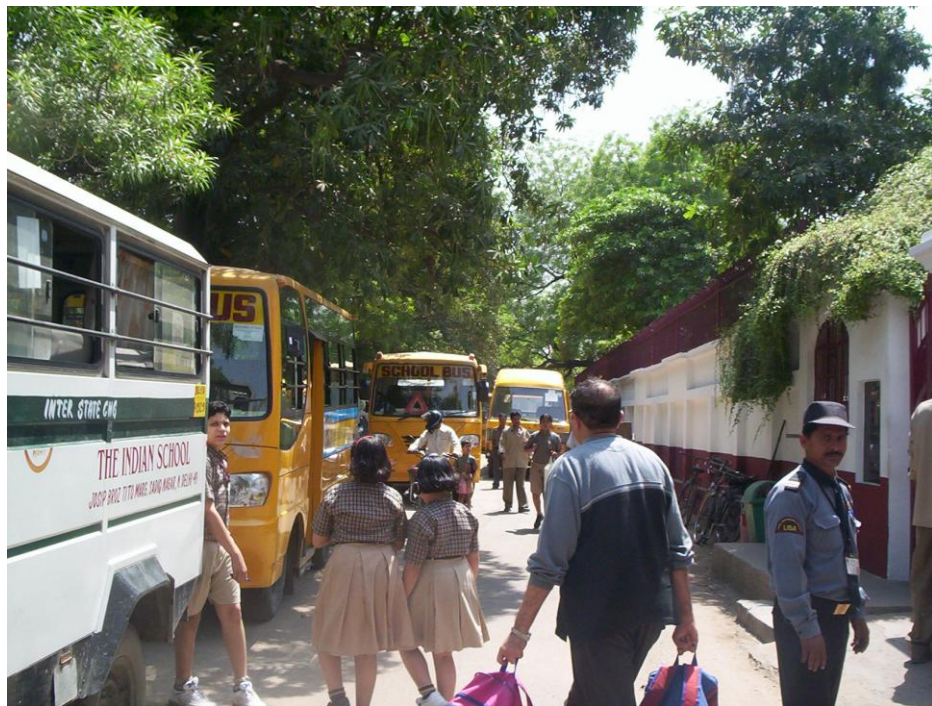


Figure 3: Pick up of school children for buses in front of the main gate in the service lane



Figure 4: Side lane used by privately owned vehicles and vans.



Figure 5: Service lane occupied by vehicles parked on both sides.



Figure 6: Activity on either side of the footpath.

2.1.1.2 Traffic Data

Maximum Number of vehicles parked on the service road and the main carriageway between 1:00 pm – 2:00 pm.

Table 1: Traffic data for Indian school

S.No	Vehicle Type	Vehicle Count
1	Cycle	4
2	Two - wheeler	10
3	Maruti van - shared	16
4	Car	73
5	RTV	5
6	Mini Bus	6
7	Bus	0
8	Auto- 3 wheeler	2
9	Cycle rickshaw (for carrying debris)	1



Figure 7: Existing image from Google Earth showing the site and its vicinity.

The Indian school lies on the Joseph Broz Tito with CPWD Quarters on one side and a lush green park at rear; as shown in *Figure 7*.

Figure 8 depicts the existing traffic scenario. The traffic after crossing the Siri Fort junction enter into the service lane after the petrol pump; most of them stopping in front of the school gate on the main carriageway occupying 2 or more lanes. Since the school buses are standing on the service lane, small numbers of cars enter the service lane. The school buses exit from the service lane to enter the main carriageway. At the same point i.e 'A', cars enter to and exit from the service lane.

- TRAFFIC ON MAIN CARRIAGEWAY
- PRIVATELY OWNED CARS
- SCHOOL BUSES

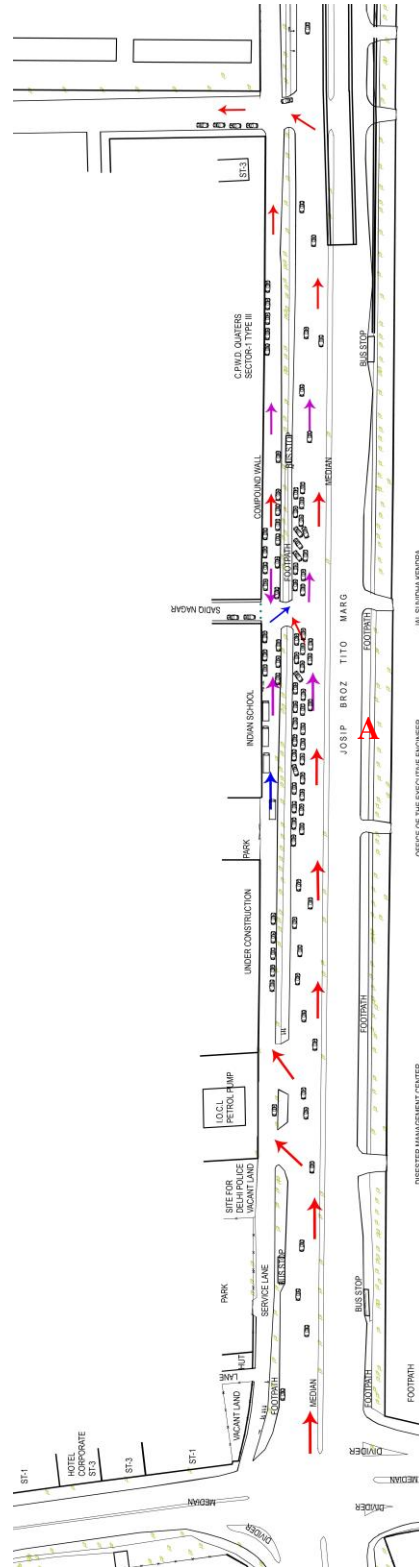


Figure 8: Existing Traffic scenario

2.1.2 PROBLEM ANALYSIS

2.1.2.1 Circulation

1. The existing plans have been studied and the following problems have been identified:
 - i. Privately owned vehicles occupy more than two lanes in the main carriageway.
 - ii. Privately owned vehicles are parked closer to the gate of the school.
 - iii. Discharge of students into their respective carriers with lack of space for walking.
 - iv. Conflict at entry and exit point onto the main carriageway.

2.2 PROPOSAL

The main aim is to relieve the main carriageway from any hindrances to a smooth flow of traffic. Moving vehicles should use the main carriageway in the proposed design. All the other vehicles should use the service lane.

2.2.1 GUIDING PRINCIPLES

1. Boarding and Alighting should be undertaken in the service lane. Service lane to be used for parking also.
2. Making the service lane one-way and minimizing conflict.
3. Side lanes to be used by school buses.

2.2.2 Proposed Circulation

1. Use of service lanes by privately owned cars.
2. Side lanes to be used by school buses creating one-way movement.
 - i. Parking
 1. The service lane on the corridor can hold up to 80 privately owned vehicles, relieving the road.
 2. About 13 buses (small RTVs) can be parked on to the side lane.

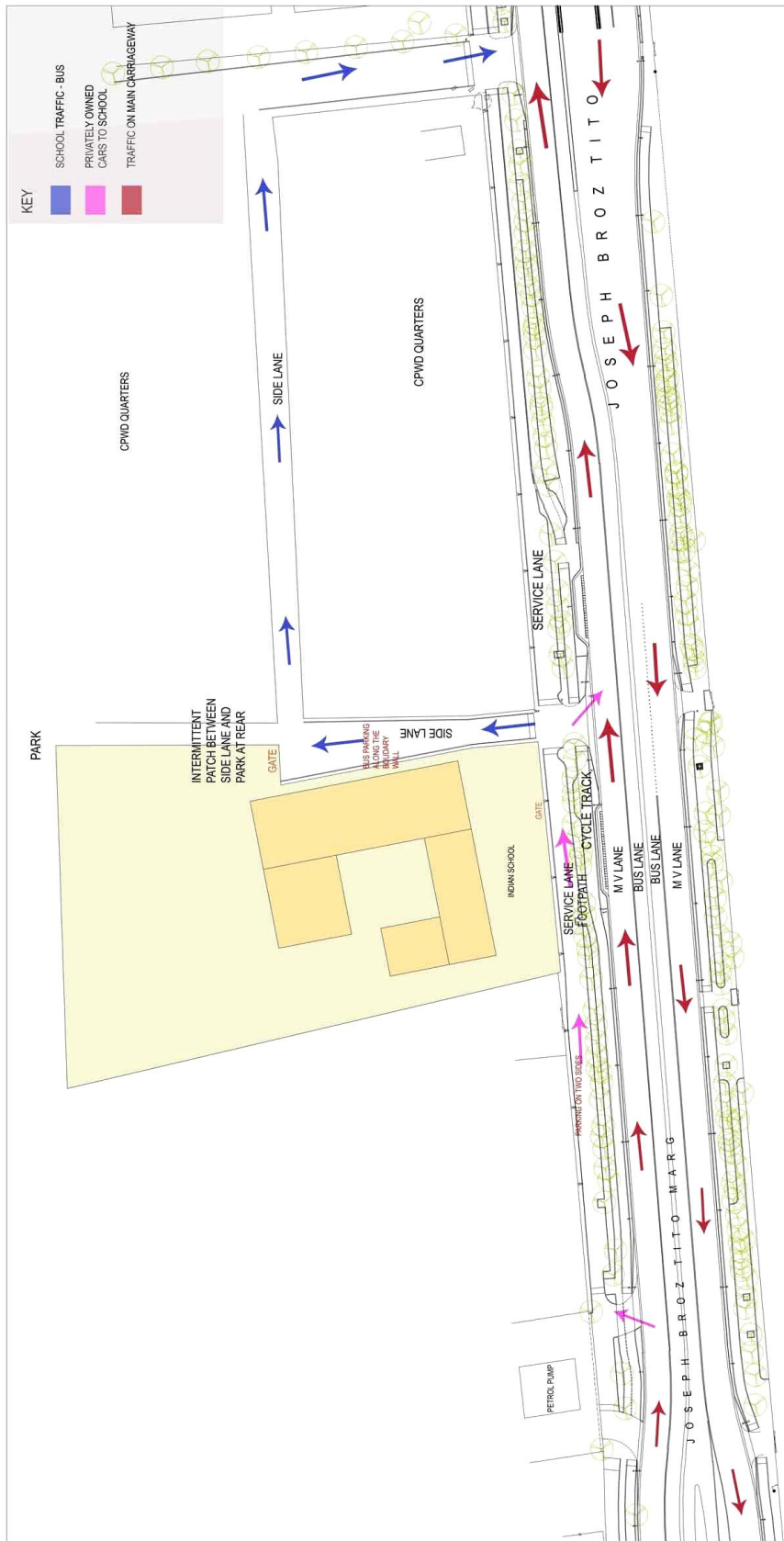


Figure 9: Proposed Circulation Plan segregating the traffic as per use.

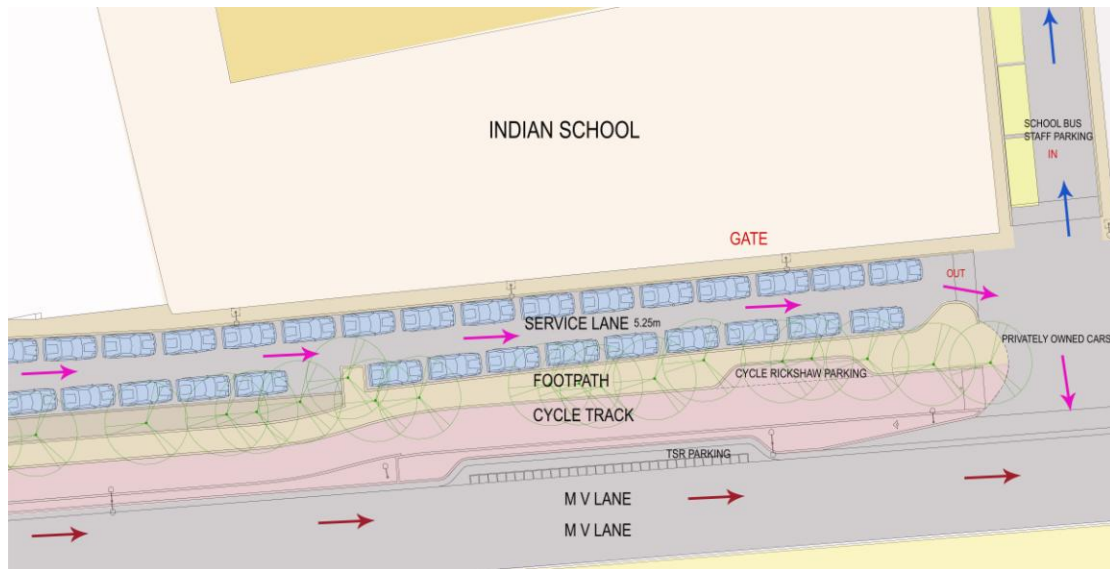


Figure 10: Detail of segregation of traffic with parking on service lane for privately owned cars

Figure 9 shows the segregation of traffic circulation minimizing conflict. The traffic on the main carriageway is free moving traffic. The privately owned cars use the service lane (one-way). Two-side parking is provided. The vehicles enter at the petrol pump and exit from the lane after the school gate to merge into the main traffic. The school buses enter and park in the side lane and exit from the rear lane, between the quarters, and then merge into the main carriageway.

Figure 10 shows detail of segregation of traffic with parking on service lane for privately owned cars

3 BIRLA VIDYA NIKETAN at Sadiq Nagar

3.1 ANALYSIS

The school and its surroundings were studied in respect to the traffic scenario and the following observations were made

3.1.1 SITE ANALYSIS

This school lies at Pushpa Vihar at Orthonova Intersection (1.2 KM) on the corridor while going towards Delhi Gate. A service lane at the front and a major road with a side lane forms the three sides of this school.

The school has a junior and a senior block with five gates utilizing the roads surrounding the school; primarily four gates are used.

Gate 3 and Gate 4 are on the service lane. Gate 3 and Gate 4 are on the side major road and Gate 5 comes on the third road primarily used by junior block.

3.1.1.1 Existing Circulation Plan

The traffic pattern includes number of different users coming to the school.

There are two kinds of traffic:

1. Commuters on the main carriageway.
2. School traffic
 - School owned buses and vans
 - Staff vehicles (cars and bicycles)
 - Privately owned vehicles.

The school children get down at a distance from the school gate (*Figure 11*), and, the main carriageway is blocked by privately owned cars (*Figure 12*). Most of the service lane is consumed by parking cars and school buses as shown in *Figure 13*. The school children sprawl out onto the service lane (*Figure 14*).



Figure 11. School children get down at the junction away from the school gate and walk.



Figure 12. Main carriageway is blocked by private cars (3 rows) in front of the school gate.



Figure 13: Service is lane is used for parking school buses and private and staff cars.



Figure 14: School students sprawl out at the school gate into the service lane.

3.1.1.2 Traffic Data

Maximum Number of vehicles parked on the service road and the main carriageway between 1:00 pm – 2:00 pm.

Table 2: Traffic data for Birla Vidya Niketan

S.No	Vehicle Type	Vehicle Count
1	Cycle	3
2	Two - wheeler	74
3	Maruti van +Jeep (shared)	18+11
4	Car – Private Owned	156
5	RTV	3
6	Mini Bus	2
7	Bus	60
8	Auto- 3 wheeler	5



Figure 15: Location of Birla Vidya Niketan and its vicinity.

The school at Orthonova Junction with residential premises at the rear; as shown in *Figure 15*.

Figure 16 depicts the existing traffic scenario. The school premises end at the Orthonova junction, with three sides surrounded by roads and one side adjoining others' property. Staff cars and school buses use the service lane to park. Since the school buses are standing on the service lane, small numbers of cars enter the service lane. Most of the private cars are stopping in front of the school on the main carriageway, occupying 2 or more lanes. The school also uses the side lane for boarding school children.

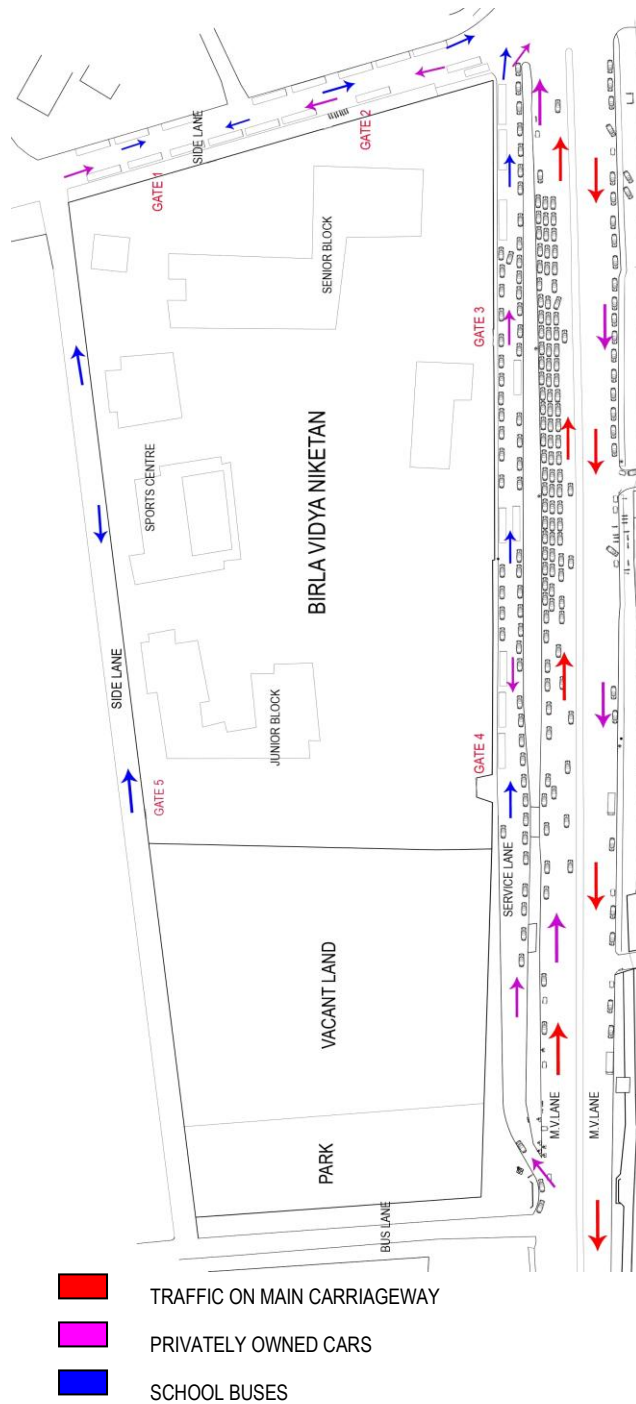


Figure 16 – Existing Traffic Scenario

3.2 PROBLEM ANALYSIS

3.2.1 Circulation

1. The existing plans have been studied and the following problems have been identified:
 - i. Privately owned vehicles occupy more than two lanes in the main carriageway.
 - ii. Discharge of students into their respective carriers with lack of space for walking.
 - iii. School buses occupy all sides of road space with little space for private cars on service lane.
 - iv. Staff cars parked in the service lane.

3.3 PROPOSAL

The main aim is to relieve the main carriageway from any obstacles to a smooth flow of traffic. Moving vehicles should use the main carriageway in the proposed design. All the other vehicles should use the service lane or the side lanes.

3.3.1 GUIDING PRINCIPLES

1. Boarding and Alighting should be undertaken in the loop created for buses and for private cars in the service lane. Service lane to be used for parking also.
2. Making the service lane one-way and minimizing conflict.
3. Side lanes to be used by school buses.

3.3.2 Proposed Circulation

1. Use of service lanes by privately owned cars.
2. Side lanes to be used by school buses creating one-way movement.

i. Parking

1. The service lane on the corridor can hold up to 50 privately owned vehicles, relieving the road.
2. A certain amount of parking should be created within the school premises for its staff.
3. About 65 buses need to be parked. By creating a one-way loop for bus movement, and access by three gates, the target can be achieved.



Figure 17: Proposed Circulation plan.

Figure 17 shows the segregation of traffic circulation minimizes conflict. The traffic on the main carriageway is free moving traffic. The privately owned cars use the service lane (one-way). Two-side parking is provided. The school buses enter and park in the side lane and exit from the other way after crossing a one-way loop, and then merge into the main carriageway.

4 DELHI PUBLIC SHOOOL at Mathura Road

4.1 ANALYSIS

The school and its surroundings were studied in respect to the traffic scenario and the following observations were made

4.1.1 SITE ANALYSIS

This school lies at Mathura Road on the corridor at 9.5 KM while coming from Delhi Gate.

There are two gates on the corridor primarily used for the entry and exit of school buses. A third gate is located on the road adjoining the corridor along the flyover. The timings for the junior block are 12:30 pm and the senior block is up to 1:40 pm.

4.1.1.1 Existing Circulation Plan

The traffic pattern includes number of different users coming to the school.

There are two kinds of traffic:

1. Commuters on the main carriageway.
2. School traffic
 - School owned buses and vans
 - Staff vehicles (cars and bicycles)
 - Privately owned vehicles.

Most of the private pick-up vehicles park outside the school gate, occupying most of the carriageway of the adjoining road (*Figure 18*). A restricted movement of the traffic can be witnessed (*Figure 19*).

Figure 20 shows the queue of cars due to lack of space in front of the gate. Exit of school buses from the school premises onto the corridor (*Figure 21*). The parking occupies two lanes of the main carriageway (*Figure 22*). The school buses are all parked within the school premises (*Figure 23*).



Figure 18. Private Pick up vehicles in front of Gate no. 2.



Figure 19: Restricted movement of moving traffic.



Figure 20: Queue of vehicles from Gate 2 to Gate 4



Figure 21: School buses exit from the school premises



Figure 22: Parking occupying two lanes of the carriageway.



Figure 23: The buses are parked in the school premises.

4.1.2 Traffic Data

Maximum Number of vehicles parked on the service road and the main carriageway between 12:00 pm – 2:00 pm.

Table3: Traffic Data for Delhi Public School

S.No	Vehicle Type	Vehicle Count
1	Cycle	3
2	Two - wheeler	5
3	Maruti van - shared	30
4	Car – Private Owned	121
5	Staff Cars	60
5	RTV (parked in school)	2
6	Mini Bus (parked in school)	1
7	Bus	64(24 + 38)
8	Auto- 3 wheeler	8
9	Cycle rickshaw	4



Figure 24: Location of DPS Mathura Road

The school is located at Mathura Road with residential premises at its side; as shown in *Figure 24*.

Figure 25 depicts the existing traffic scenario. The school premises is surrounded by two roads, one is the main arterial road and the other is a side road separating the premises with the Sundernagar area. The school buses use the gate next to the side road to enter and the gate on the corridor to exit from the school compound. Most of the private cars stop in front of the third gate occupying more than two lanes of the carriageway, with the queue of vehicles going up to the exit gate of the buses

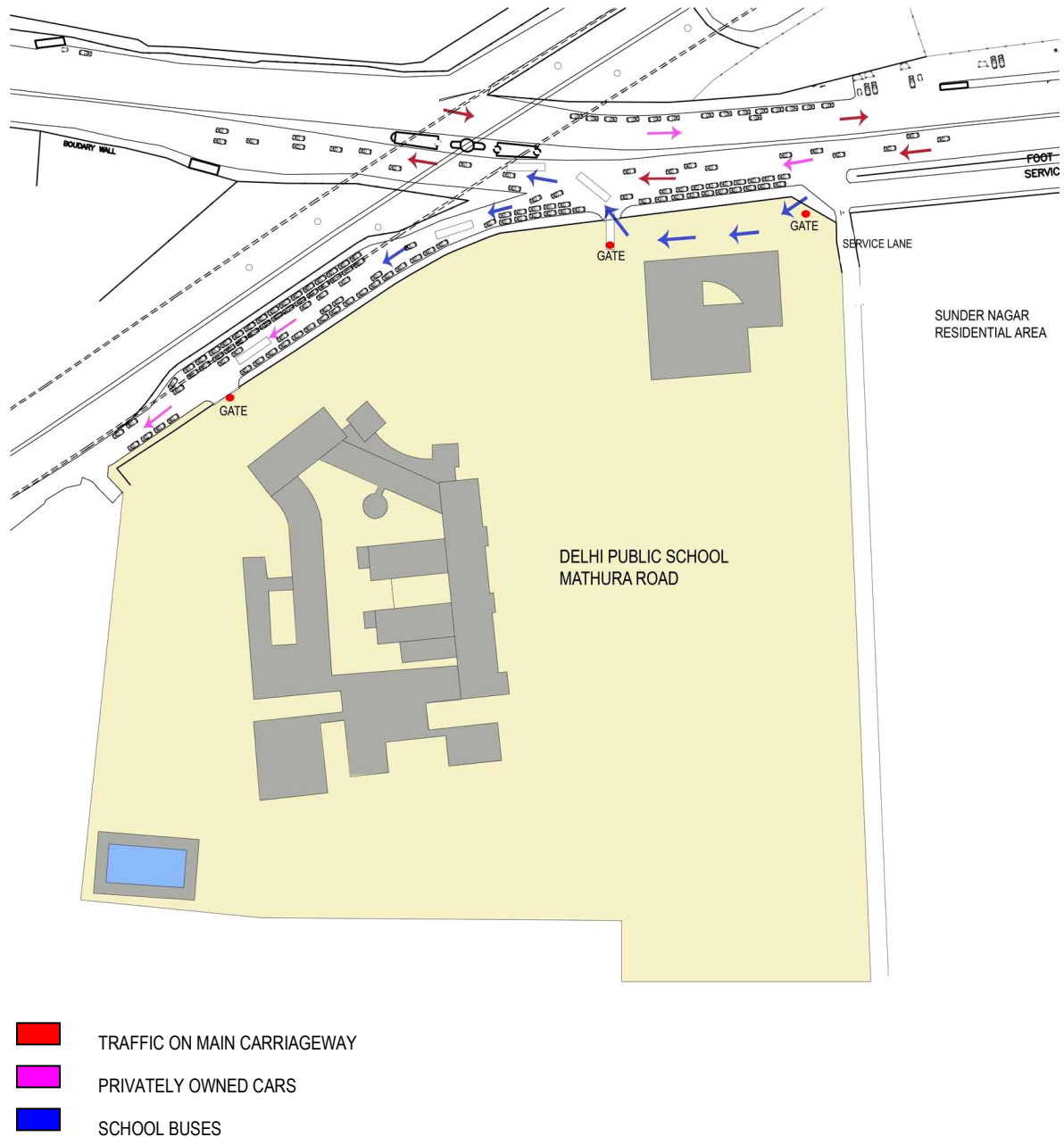


Figure 25: Existing Traffic Scenario

4.2 PROBLEM ANALYSIS

4.2.1 Circulation

1. The existing plans have been studied and the following problems have been identified:
 - i. Privately owned vehicles occupy more than two lanes in the carriageway adjoining the corridor.
 - ii. Queuing takes place, as a result, there is parking of pick up vehicles on the corridor.
 - iii. The exit of school buses takes place from the gate at the corridor.
 - iv. There is a conflict at the exit point of the buses with the main carriageway traffic.

4.3 PROPOSAL

The main aim is to relieve the main carriageway from any obstacles to a smooth flow of traffic. Moving vehicles should use the main carriageway in the proposed design. All the other vehicles should use the service lane or the side lanes.

4.3.1 GUIDING PRINCIPLES

1. Easy movement of school buses minimizing conflict.
2. Provision for parking.

4.3.2 Proposed Circulation

1. Use of space under the flyover for parking.
2. Use of service lane in front of the sundernagar residential area to park private owned vehicles.
3. School buses slip into the service lane to enter the school premises.

i . Parking

1. The service lane can be used to park pick up vehicles (20 vehicles)
2. Space under the flyover could be widened to provide parking. The existing space is widened by about 8m to accommodate about 50 cars below.
3. One moving lane of 3.0m is provided.
4. Both side parallel parking to provide about 20 cars.
5. Staff cars can be parked in the school premises.

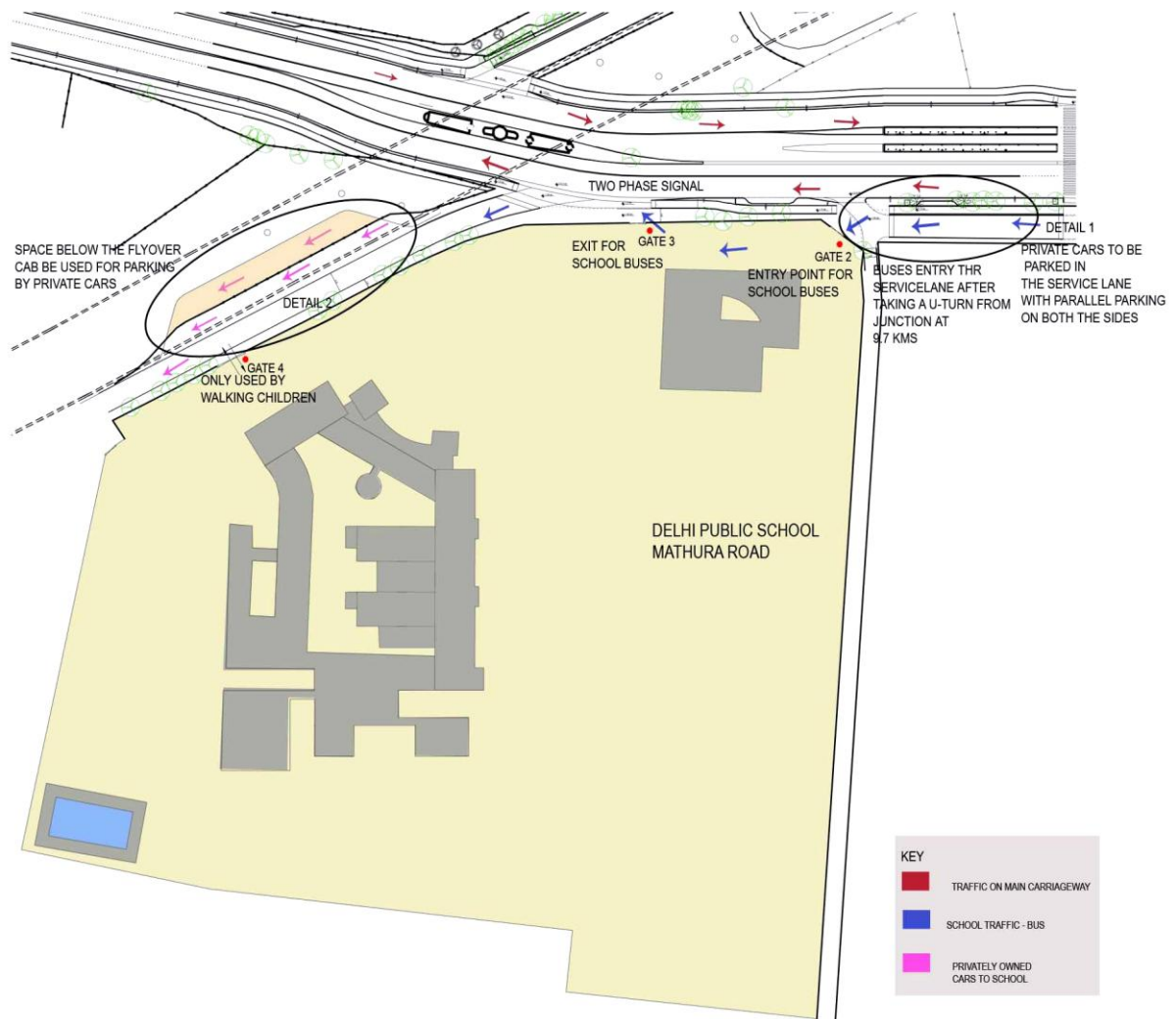


Figure 26: Proposed Circulation plan.

Figure 26 shows the segregation of traffic circulation minimizes conflict. The traffic on the main carriageway is free moving traffic. The privately owned cars use the service lane (one-way) in front of sundernagar residential area. Two-side parking is provided. The school buses can take a U-turn from the junction at 9.7 Km to get into the service lane where from they can enter the school premises to park. A two-phase signal is provided for school buses when they exit from the school compound. The rest of the private pick-up vehicles can be parked below the flyover to minimize conflict with the moving traffic.

Figure 27 shows the detail layout of the proposed parallel parking in the service lane in front of the sundernagar residential area. Parking capacity is provided for 20 private cars.

Figure 28 shows the detail layout of the space under the flyover, widened for provision of parking. The existing space is widened by about 8m to accommodate about 50 cars below. The other cars can be parked on both sides with a 3.0m moving

lane at the center of the carriageway. Also, traffic calming measures to be provided with for easy and safe pedestrian infrastructure.

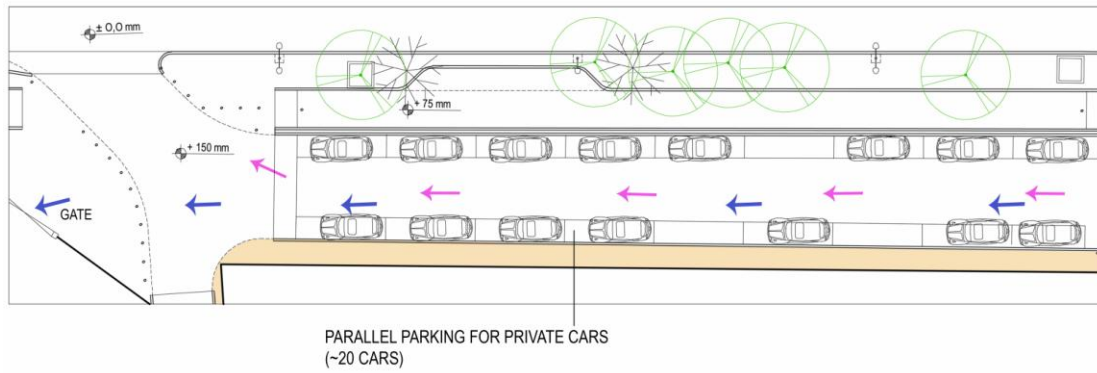


Figure 27: Detail 1

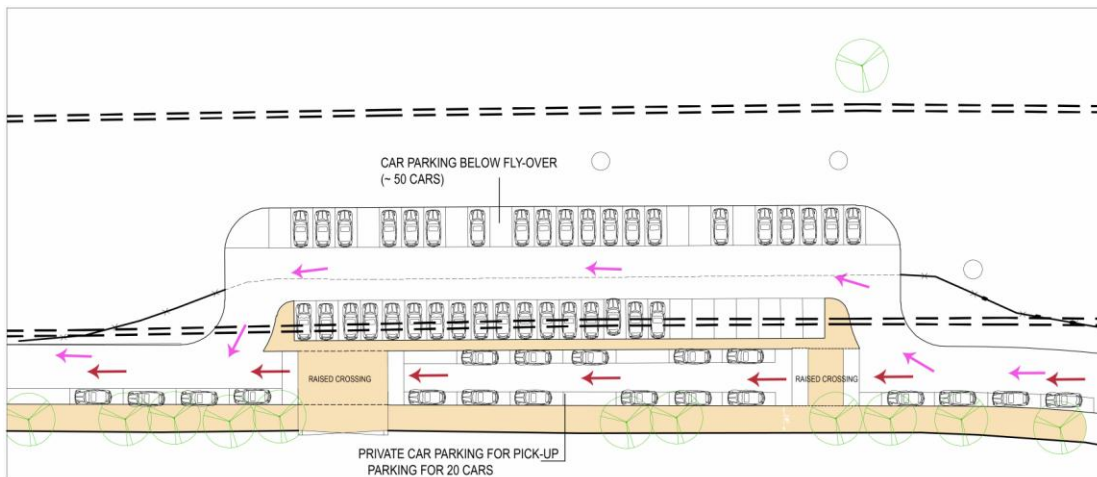


Figure 28 : Detail 2