Maintenance & Protection of Traffic at Workzone

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***Abstract*— Maintenance and Protection of Traffic (MPT) is the process of maintaining the traffic and protecting the road users from traffic congestion problem and giving them safe and comfortable journey through an active work zone. In India, Traffic movement is haphazardious and that enhances the accident ratio as well as cause delay in construction at workzone place. Therefore it should be done to reduce numerous problems related to traffic and safety at working site. Moreover, proper study on Maintenance and Protection of Traffic (MPT) and its application on site will result in less traffic congestion, safe travel through the work zone and less fuel consumption and decrease in pollution. Maintenance and Protection of Traffic (MPT) at working zone can be achieved by the help of various traffic control devices and by providing proper detours through the work zone. This project is to study various traffic control problems, which can arise when construction is on progress on busy corridors and to suggest possible solutions which can reduce these problems. Main objective of study is to provide safe and comfortable journey and to maintain the traffic congestion problem near the construction site.**

***Index Terms*—Traffic controlling devices, Traffic regulation, Maintenance & Protection of Traffic, Traffic Management, Detour map.**

I. INTRODUCTION

A work zone is an area of a traffic way where construction, maintenance or utility work activities are identified by warning signs/signals and that mark the beginning and end of a construction, maintenance or utility work activities. It extends from first warning sign or flashing lights on a vehicle to the "End of road work" sign or the last traffic control device. In addition, transportation planners should be aware of the safety impact of work zone so that the full impact of building a new road or widening an existing road can be realized. Maintenance and protection of traffic is process of controlling the traffic demand as well as congestion through a work zone and if necessary diverting the traffic to another way considering safety of workers and road users. For conducting this process some traffic control devices and traffic signs are necessary to provide. Also the safety measures must be strictly followed by the users while passing the construction zone. To provide a new lane, information about traffic volume and number of daily road users of that lane has to be calculated and then provide a safe and economical route to reach the proper destination for road users. To provide a workable, safe method or plan for the maintenance and protection of traffic are using criteria set forth in the National manual of uniform traffic control devices, standard specifications and other Department issuances and guidance. By gathering proper traffic data and by providing a proper MPT plan reasonable estimate of traffic control cost can be obtained.

II. ACKNOWLEDGMENT

The completion of this study would have been not possible if not dependent on the steadfast support and encouragement of my parents. They hence paid equal contribution to the study for which I always feel profound gratitude in my heart. I would like to express here the very thanks to my advisor Prof. Birva Joshi who provided me the opportunity to do such a research under her guidance.

III. EQUIPMENT USED IN MPT

Following are some of the equipment used for maintenance and protection of traffic in work zones.

1. Vehicle activated traffic message calming sign (VATCS)
2. Trailer mounted variable message signs
3. The big foot cone
4. Collapsible delineator
5. Stop/slow bats
6. Barrier boards
7. Safety belts
8. Channeling devices
9. Rumble strips
10. Traffic Signs
11. Traffic Lights

Fig.1 Vehicle activated traffic message calming sign

Fig.2 Collapsible delineator

Fig. 3 Trailer mounted variable message signs

Fig.4 The big foot cone

Fig.5 Barrier boards

Fig. 6 Safety belts

Fig. 7 Channeling devices

Fig. 8 Rumble strips

IV. CASE STUDY

In Ahmedabad, Metro construction is working in two phases in which New Wadaj metro station is in North to South alignment as located in the existing metro map as below. The metro rail is come from the Vijay nagar and reaches at New Wadaj and then goes to the Ranip. At New Wadaj, the alignment is slightly turn from Gopi Chawk Ann Kshetra and than approach to Ranip on straight path. The whole alignment from Vijay nagar to New Wadaj to Ranip is elevated.

Fig. 9 Map Of Metro Rail in Ahmedabad, Gujarat

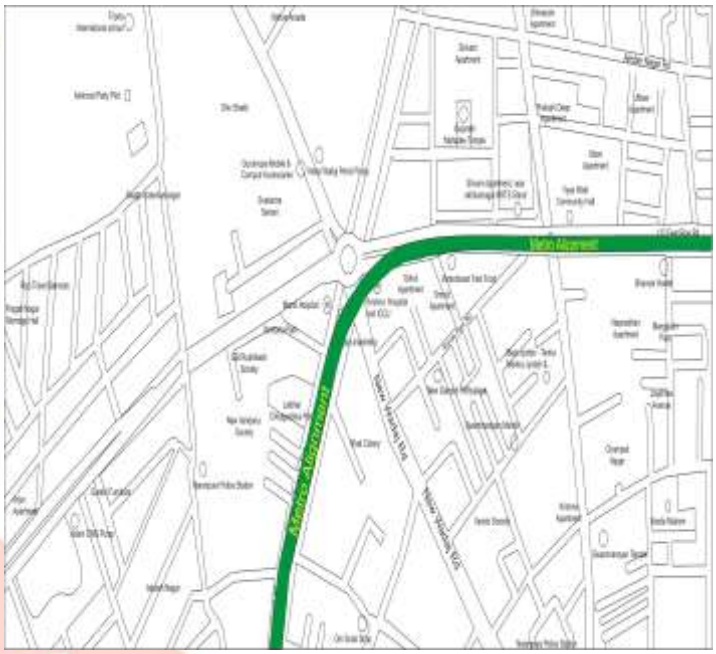
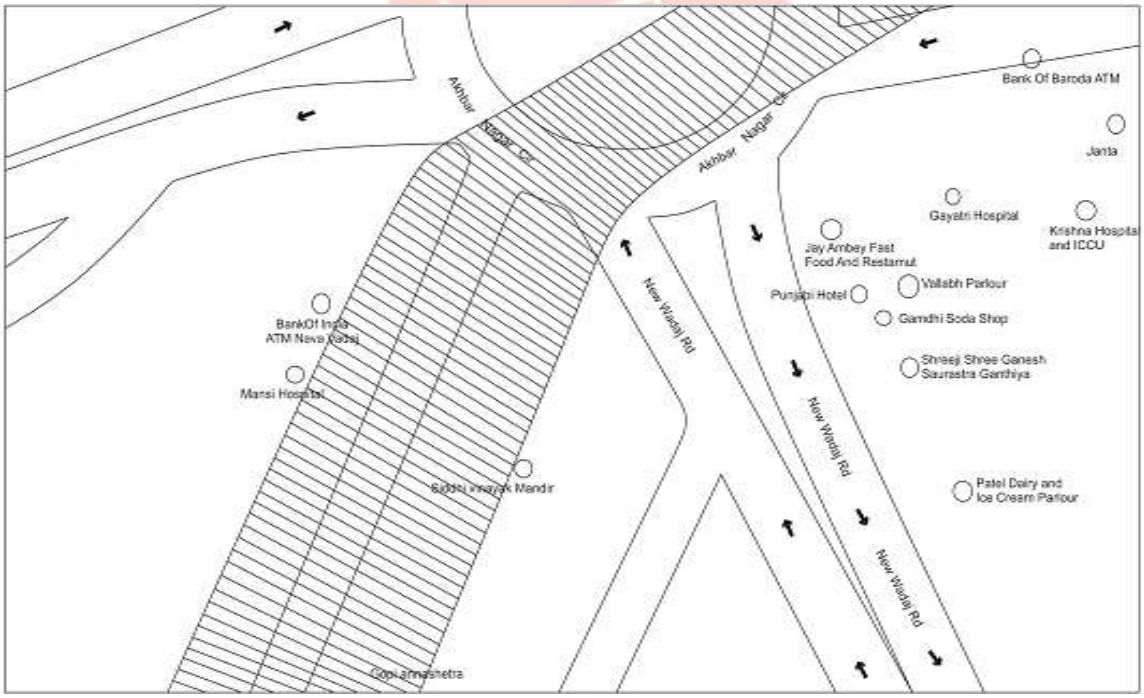


Fig. 10 Map of New Wadaj, Ahmedabad, Gujarat

Workzone

During the construction of metro rail at New Wadaj Circle, it covers several area for construction of elevated track. It will cover at least one lane i.e.12 ft space from each end of work zone width. Below the hatched portion in map identifies the



area of work zone at New Wadaj circle.

Fig. 11 Workzone at Study Area

V. STEPS INVOLVED IN MAINTENANCE & PROTECTION OF TRAFFIC

To regulate the traffic flow from workzone, following steps should be followed:

- Public notice
- Partial road closure
- Complete road closure
- Detour maps

Public Notice

When the construction is running over the road, the surrounding area near the site should have been closed. So the detour route should be provided for the users. So to inform the new existing route, an announcement to road users is mandatory. The announcement can be done by following ways:

- Radio with actual Traffic Information
- Internet
- Print Media
- Traffic Signaling
- Construction site information
- Traffic guidance and Information System
- Parking Guidance System
- Video Text

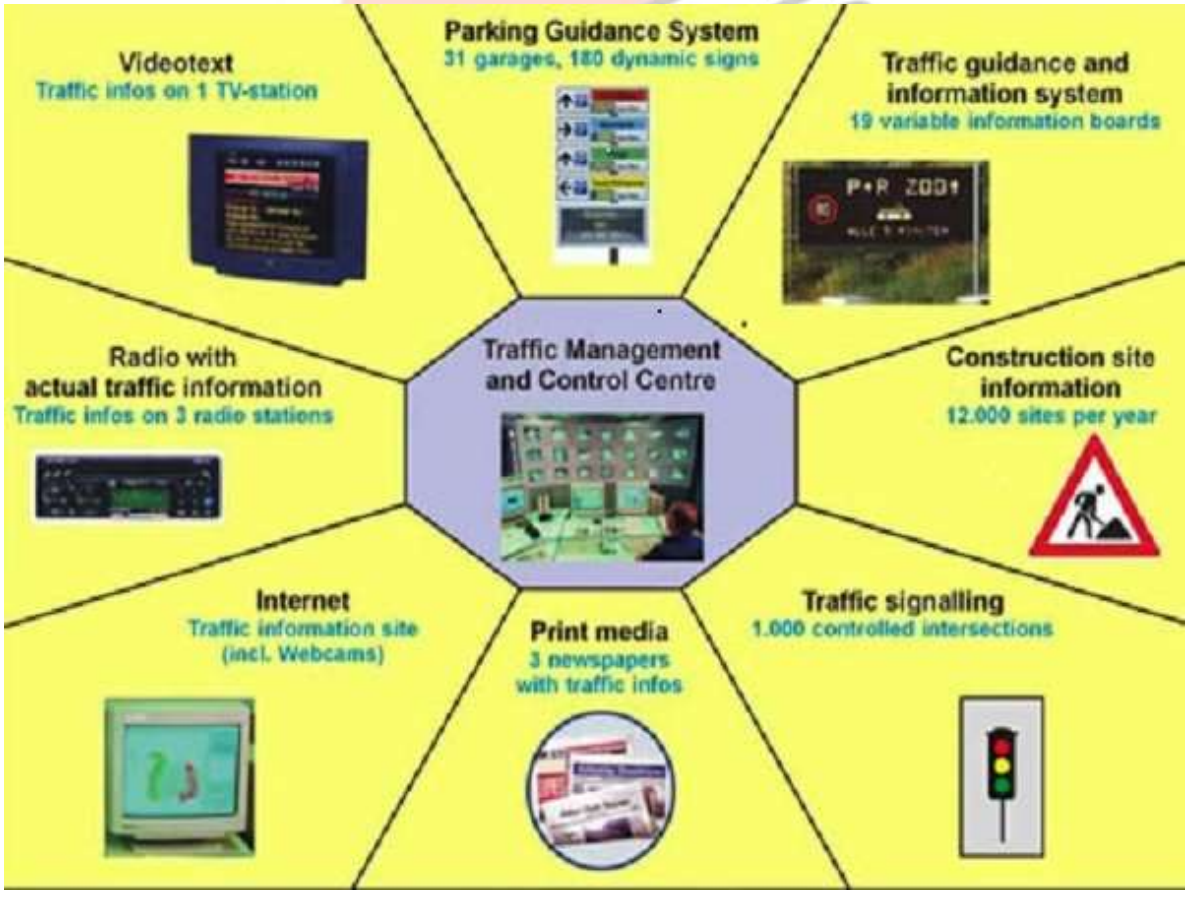


Fig. 12 Methods of Announcement

For this research work Radio, Print Media & Video Text Method is used and further detailing to do so is explained below:

- **Radio With Actual Traffic Information**

Generally Radio is available in all mobile. Today generation is using mobile regularly. If we announce the news of lane closer and detour plan by radio. It is the best way to traffic control and manage the traffic.

- **Print Media**

An announcement can also be done by noticing a detour map in newspapers and it is a best way for announcement of road closing in the town or city. This announcement will make sure users to travel with new detour map.

- **Video Media**

Some other new technique developed on the way of providing the traffic news to the road user. Video media is the new techniques. In this media using LCD (Liquid crystal diode) detour route can display on it. This LCD is provided at top of the building and in there LCD traffic news is generally updated at regular interval. So that the road users can get update plan that the work zone is continue ahead of that. So that they will take left or right or using proper detour plan to reach their destination and there detour plan in that LCD.

Partial Road Closer Method

Less restrictive (and not self enforcing) partial road closure which prohibit traffic in one direction only, and forced turn channelization which are partial road closure which require traffic to make a right turn onto an intersecting street.

Fig. 13 Partially Closed Road

Complete Road Closer Method

Many people do not consider road closure to be traffic calming measures at all because they redirect traffic to other routes. It is true that road closure are far more extreme measures than speed hums and chokers which still allow through traffic to use the roads on which they are installed.

The difficulties associated with road closure are far greater than less restrictive measures, not least because of the controversy which they cause. None the less there are places that lend themselves to road closure and I think it is appropriate to keep the possibility of road closure in the traffic calming “arsenal”.

The best place to consider road closure is at intersection to prohibit entering and exiting traffic. One problem that has to be faced with road closure is the need to create a turning area for vehicles. If a public road is closed at some point other than an intersection, turning area will be needed from two directions.

We are using the complete road closure at our location so that it is necessary to provide detour map for reducing traffic consumption and diverting the traffic to another way considering safety of workers and road users and also reduce accident ratio.

Fig. 14 Complete Road Closer Method

Detour:

A roundabout or circuitous way or course, especially one used temporarily when the main route is closed. An alternative route for use by traffic when the usual road is temporarily closed. The definition of a detour is a route that is different from the ordinary, often used when the direct route cannot be used.

Detour report and notice of detour approval:

A Detour Report and a Notice of Detour Approval will be required for all projects that require the temporary detouring of a roadway for construction.

The Notice of Detour Approval shall state:

- The project number and brief project description of the project.
- Statement that the roadway will be closed for construction and the length of time the roadway is expected to be closed.
- A description of the detour route to be used.
- Statement informing the public that a map is available for review at the appropriate Office of the Department of Transportation.
- Statement giving the public a point of contact to discuss the detour.

Signboard Used for Detour Maps According to IRC: SP: 55-2014

1. This sign board I is to indicate the road works Progresses ahead and sign is installed in the advance warning area. This sign should be used away from some distance from the Actual work zone. Size of this instructive sign varies with different design speed of Respective road ways. The size for different design speeds are shown in below table.

Fig. 15 Sign board I

2. Sign board II is indicate that road ahead has been closed as part of temporary traffic management plan. Size of this instructive sign varies with different design speed of Respective road ways. The size for different design speeds are shown in below table.

Fig. 16 Sign board II

3. Sign board III is to inform to take a detour at the location where the sign is placed. This sign is used for tuning at right hand Side. Size of this instructive Sign varies with different design speed of respective road ways. The size for different design speeds are shown in below table.

Fig. 17 Sign Board III

4. Sign Board IV to inform to take a detour at the location where the sign is placed. This sign is used for turning at left hand side. Size of this instructive sign varies with different design speed of Respective road ways. The size for different design speeds are shown in below table.

Fig. 18 Sign Board IV

5. Sign Board V is to inform of end of detour. Size of this instructive Sign varies With different speed of Respective road ways. The size for different design speeds are shown in below table.

Fig. 19 Sign Board V

Sign Board	Up to 50kmph		51 to 65kmph	
	English (in mm)	Hindi (in mm)	English (in mm)	Hindi (in mm)
Sign Board I	402×424	445× 424	536×565	593× 565
Sign Board II	585× 465	425× 465	795× 619	566× 619
Sign Board III	161× 539	161× 539	1282× 719	1282× 719
Sign Board IV	538× 439	808× 424	717× 586	1078× 565
Sign Board V	548× 327	476× 327	731× 436	633× 436

VI. DETOUR MAPS

Detour: 1 Towards Ranip via Swaminarayan Madir - Vyashwadi Circle (right turn traffic)

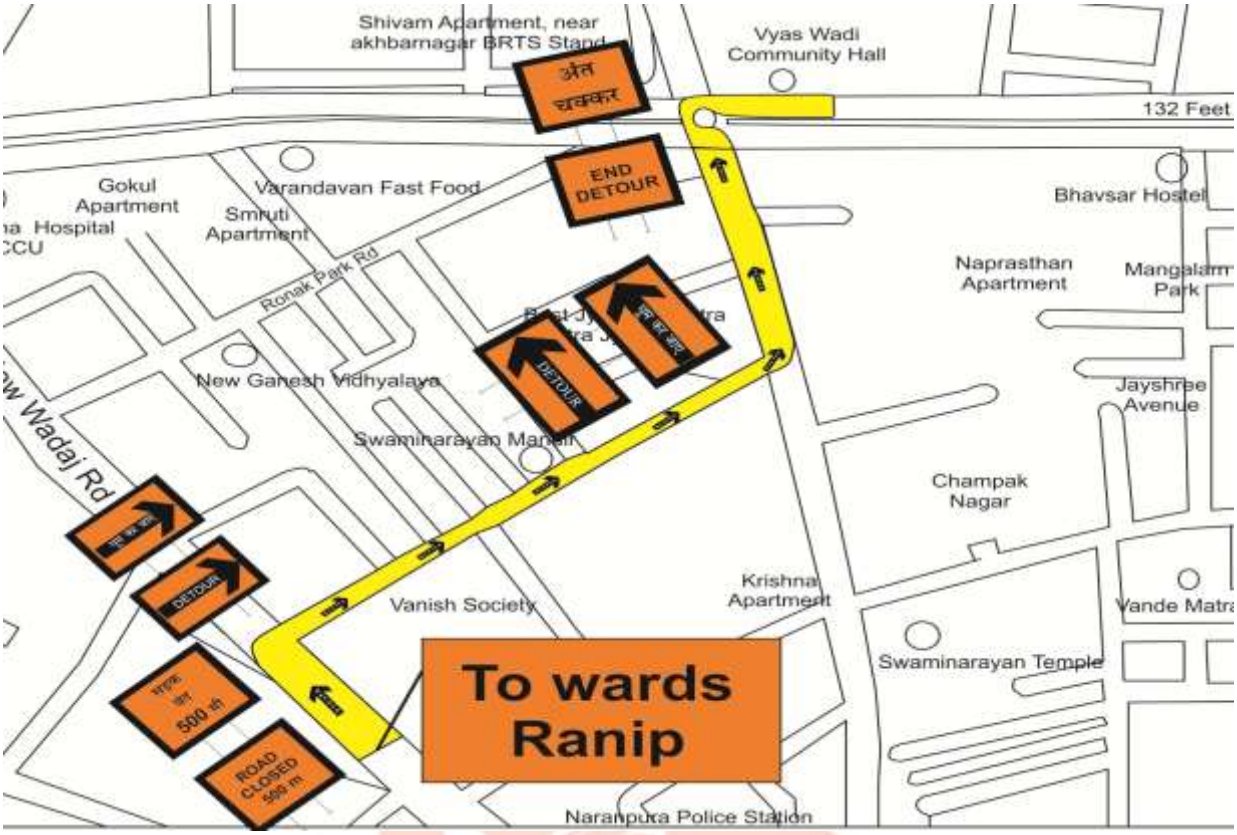


Fig. 20 Detour 1

This figure shows the detour map from New Wadaj road to vyaswadi community circle hall. It start from New Wadaj and then turn right at 500m from vanish society after that turn left at Krishna apartment to reach vyaswadi community hall and finally road users reach there 132ft road towards Ranip.

Detour: 2 Towards Akhbarnagar underpass via Vandnapark

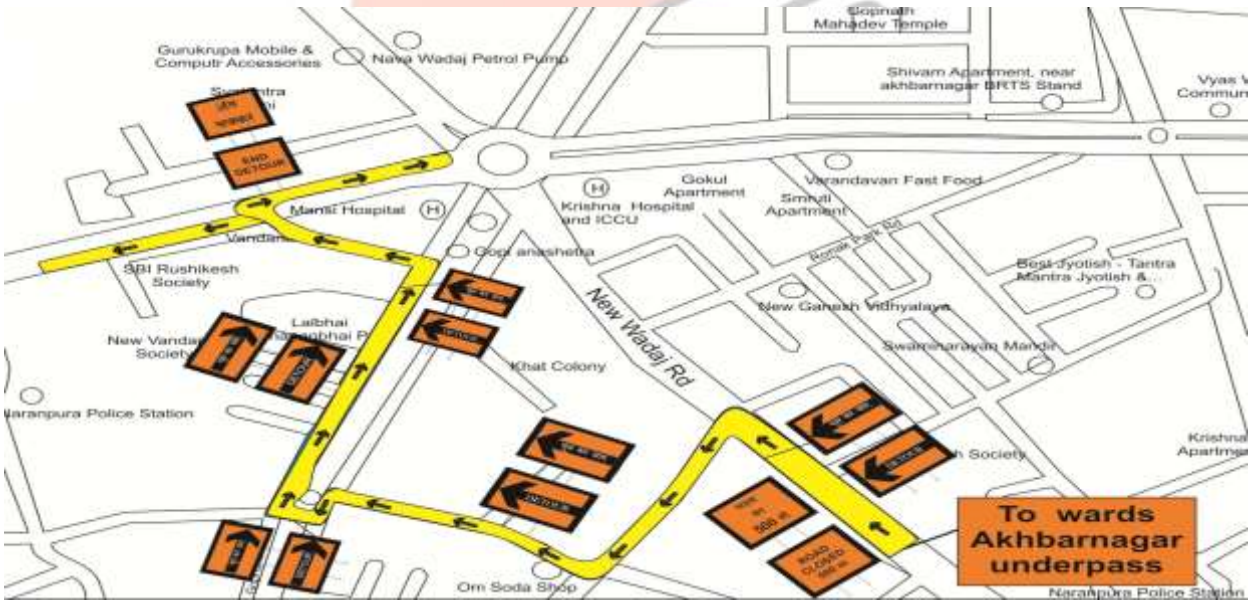


Fig. 21 Detour 2

This figure shows the detour map from New Wadaj road to akhbarnagar underpass. It start from New Wadaj road then turn left from 500m ahead of New Wadaj road and then turn right from om soda shop after that take U- Turn from gopi chowk road to reach gopi chowk annakshatra and then take left from vandana park to reach akhbarnagar underpass.

Detour: 3 Towards New wadaj road from underpass via Vyas wadi circle

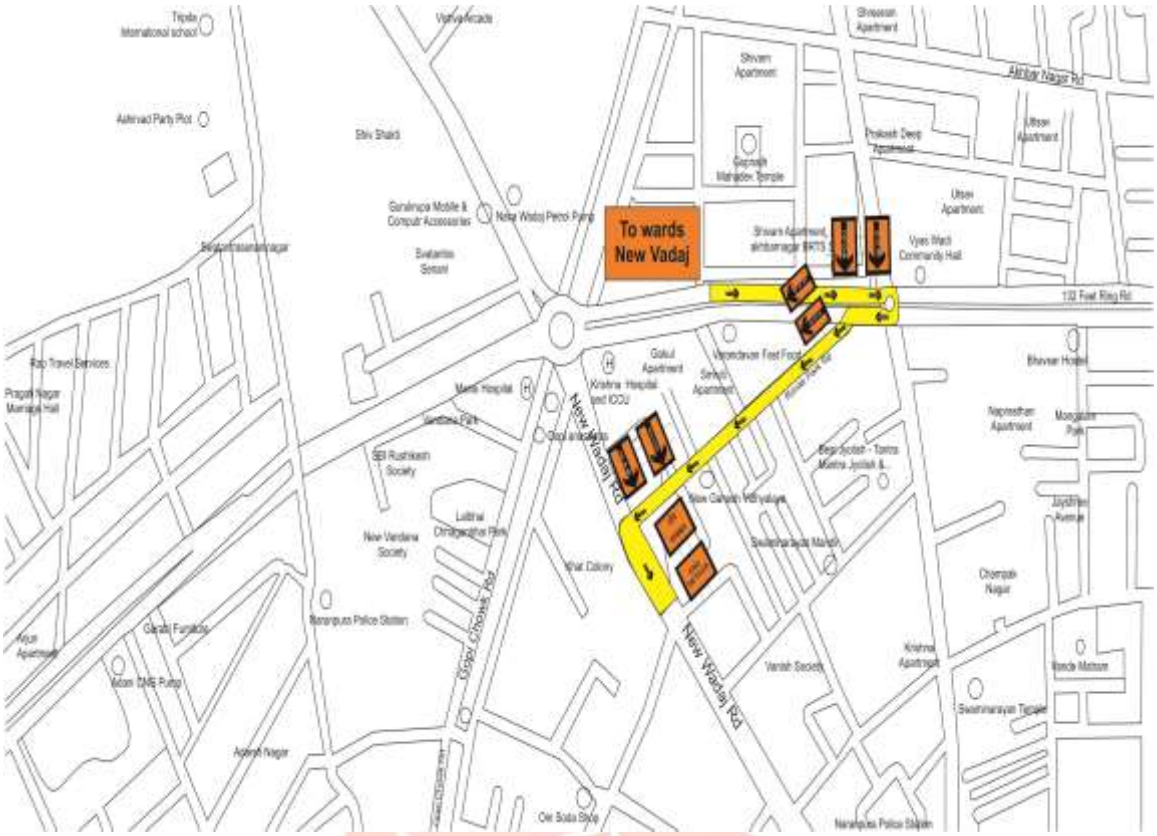


Fig. 22 Detour 3

This figure shows the detour map from akhbarnagar underpass to New wadaj road. It start from 132ft ring road and take U-turn from vyaswadi community hall toward ronak park road and finally take left turn to reach the New Wadaj road.

Detour: 4 Towrds Nirnaynagar underpass via Vyas wadi circle

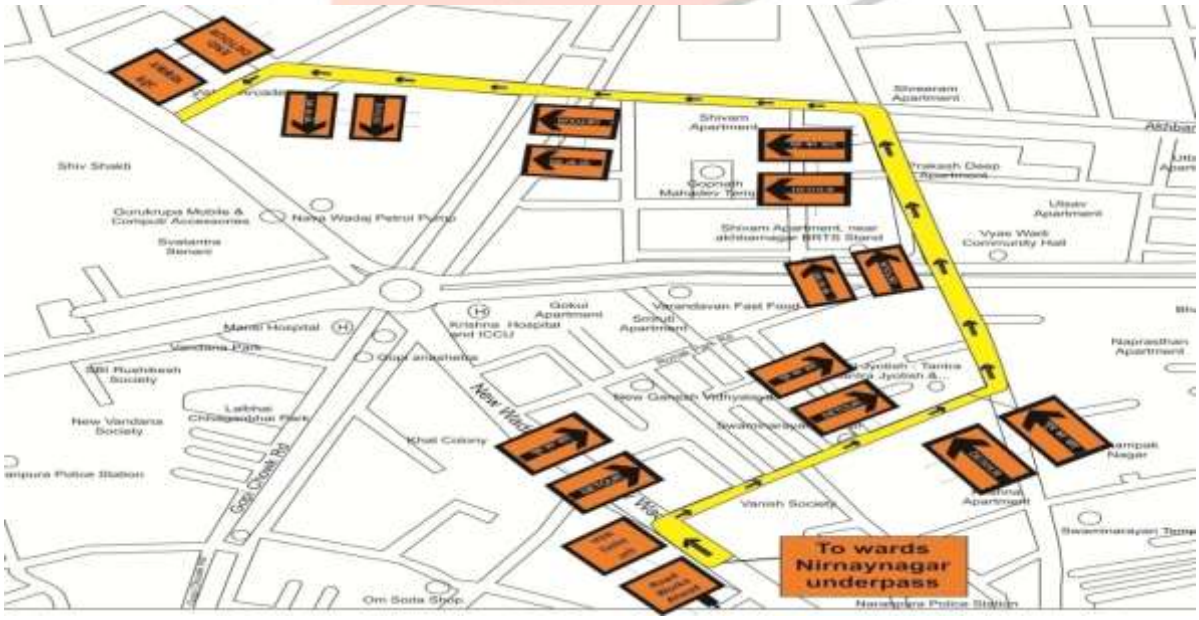


Fig. 23 Detour 4

This figure shows the detour map from New Wadaj road to nirnaynagar underpass. It similar to detour 1 to reach vyaswadi community hall after that go straight from vyaswadi community hall and take left turn from shreenath apartment and reach nirnaynagar circle and take right turn from circle to reach nirnaynagar underpass.

VII. CONCLUSION

The implementation of proper MPT at a working site which may channelize the traffic consumption and reduce fuel cost of vehicles also reduce accident ratio and provide safety to the road user and worker at site. although it might increase the travel time and travel distance for road users.

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