

# A Suggestive Alternative Route for Avoiding Traffic Congestion During Pune Metro Progressive Construction

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**Abstract:** Most infrastructure schemes in India are not engineering issues but due to management reasons. Failure to implement the overall management strategies affects not just the project time and cost, but also the society and the environment. Construction of major transport schemes such as the Metro Rail Network in the next metro city ranges from 10-15 years. We all know that these initiatives help society by delivering public transit services, but with such a long duration of real road work, we utterly ignore formal management techniques, so that the passengers around us do not have any inconvenience. In this paper we will examine the road and arterial congestion and the results of the execution of the building work to the local society under real site conditions. This study will be assisted by traffic characteristics and standards designed. As a civil engineer's job, recommending such traffic diversion techniques and complying with certain other helpful requirements will therefore help to mitigate the current issue. The Objective of the paper is to discuss the alternate routes of the Pune metro construction sites to avoid traffic congestion and also avoid road accidents.

**Keywords:** Pune Metro, Traffic Jam, Congestion, Accidents, alternative routes

## 1. INTRODUCTION

The Pune district is well linked through road and rail links to the state capital and surrounding headquarters. Express Highways is the road network. State Highways and Main District Routes, National Highways. The cumulative length of the district is 13,642 km of roads. When roads are not sufficiently wide and are ideal for mixed traffic situations between slow and fast-moving cars, road transport can transport an optimum 8000 people per hour per direction (Hirulkar & et. al., 2018). As the traffic rate increases over this level, the average car speed decreases, travel time increases, the air population increases and passengers are put to greater discomfort. The established road-based urban traffic infrastructure in Pune City has already been strained leading to longer travel times, increased air pollution and a rise in road accidents (Sarda & et. al., 2018). The predicted rise in population in the region has contributed to the consolidation and increase of transport infrastructure. Many infrastructure projects are now being initiated in the city. The paper primarily focuses on the suggestions of alternative routes during the construction of Pune Metro rail.

## 2. BACKGROUND

Much study is under way around the world in regards to traffic control and other similar topics. For eg, Yao-Jan Wu (2011) suggested in his literature that congestion is a widespread phenomenon in our everyday lives that costs civilization enormously. Improved understanding of the relationship between freeways and arterial roads could help traffic engineers and researchers enhance the functioning of existing facilities and develop viable road diversion plans to maximize the utilization of existing road capacity within the traffic network (Gov.in, 2017). The consequence of congestion are several costs such as higher fuel usage and loss of time in the traffic of cars. Since new road building is always not a viable option, optimizing the usage of existing road networks is comparatively inexpensive to minimize congestion. There are also similar articles on homogenous congestion types (Pokharkar & et. al., 2019). These are less important in the Indian scenario of the heterogeneous traffic conditions. But such research in India is very unusual, showing how the execution of the construction project will annoy the passengers. There is also an immediate need to dwell on this inconvenience. Below are several Indian studies that can help to promote this research work in one direction or another.

### 2.1. Need for Metro in Pune

Density of vehicles of 753 cars per 1,000 individuals, traffic that doesn't seem to travel along the roads of the city is a typical image. And while the absence of mass transport is the principal cause of the mess, the threadable infrastructure of the city is also a culprit which adds to the troubles of the city's commuters (Indo-Asian News Service, 2019). With an area of 450 square kilometers, Pune is projected to become one of India's largest cities after the planned fusion of 34 villages from the surrounding areas. Pune, Pimpri-Chinchwad and neighboring cantons already had 55 lakhs, and one crore is projected to rise

by 2030. The fusion of 34 villages within the Pune Municipal Corporation (PMC) boundaries is likely to raise the burden on the municipal body, as this would further raise the town's population and the absence of a long-term development plan could escalate the situation (Vidyarthi, 2020).

## 2.2. Traffic Jam Area in Pune

Traffic delays are one of the main issues in most cities such as Pune. As we know, Pune Town is well developed and well-known for its education, and because of major IT industries, many students come from various towns and many young people come for work. Because of this town, it has become more populous. There is more risk of road collisions and traffic congestions due to improper management (Joshi, 2019).

Due to the fact that many places in the city and Pimpri-Chinchwad face a traffic jam scenario, the development of Pune metro is underway (Sarda & et. al., 2018). Given this condition, the city government indicated that Maha Metro officials should make suggestions to boost the traffic. In emergencies, residents have encountered delays several times due to traffic jams in the hospital and town hospital caused by the metro. The physicians and the hospital staff also come late because traffic authorities do not have specific instructions on laws and routes.



*Image 1: Pune traffic jam (Source- punemirror.indiatimes.com)*

## 2.3. Motivation for the Paper

Traffic Congestion during Metro Construction is the primary motivation for this project. Several areas in Pune city are facing traffic congestion due to metro construction in the Phase 1 of Pimpri –Chinchwad area. Pune Municipal Corporation is being stressed on taking measures to control the traffic in those areas which is not being addressed as such yet (Pune Mirror, 2019).

Congestion triggered by continuing metro work impacts our operation and we reach the destination late, citing medical professionals of numerous urban hospitals and ambulance authorities. The Pune Metro and Municipality have agreed to redirect from Harris Bridge to MM Chowk (near Daopli Flyover) and Nashik Phata to Kharalwadi where the central lane extending to Mumbai will be blocked (IndianExpress, n.d.). Traffic is carried on highways and thus more traffic on small roads. The BRTS lanes are available for two wheels (Rangarajan, 2010). The central lane to Nashik Phata from MM Chowk and the service road are supposed to use 2 wheels (TNN, 2017).

## 2.4. Accidents During Metro Construction

Few accidents occurred during the construction of Metro in Pune and 5 Dead in an accident occurred during the construction of metro when a 120-ton rig fell down on the road (TNN, 2017).

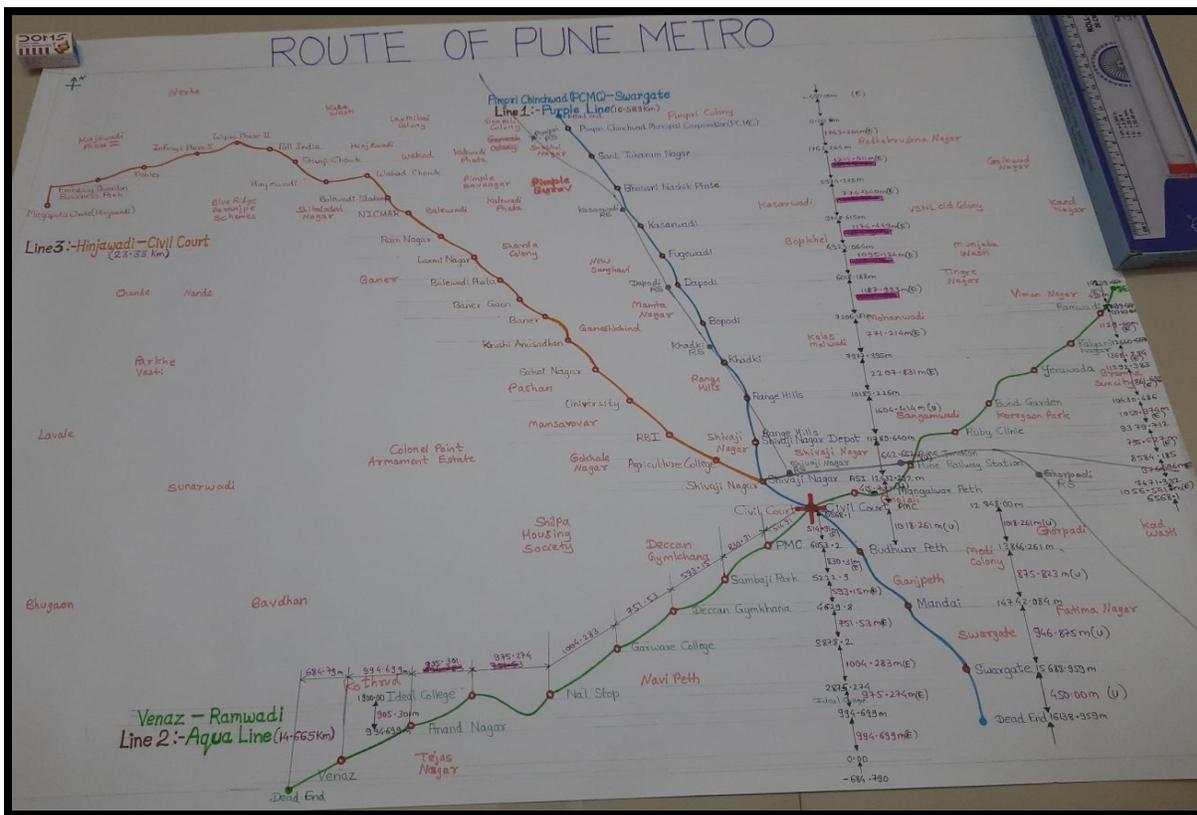
### 3. DISCUSSION

Pune is the second largest city in the Maharashtra Indian state after Mumbai, with a projected population of 7.4 million in India by 2020. Pune is well connected by Indian and State highways to other cities. NH48 is connected between Bangalore and Mumbai, NH 65 is connected to Hyderabad and NH60 to Nashik. SH27 link Ahmednagar to Pune. Established in 2002, the Mumbai Pune Expressway is the first Indian six-lane high-speed highway. With the growing population contributing to an increase in automobile and factory traffic, particulate emissions in certain parts of the city increased 10-fold. Pune Metro is the under-construction metro-based rapid transit system that includes Pune Central and the Pimpri and Chinchwad districts. The table provides the metro line information.

**Table 1:** Pune Metro Lineup Source: (DMRC, 2014)

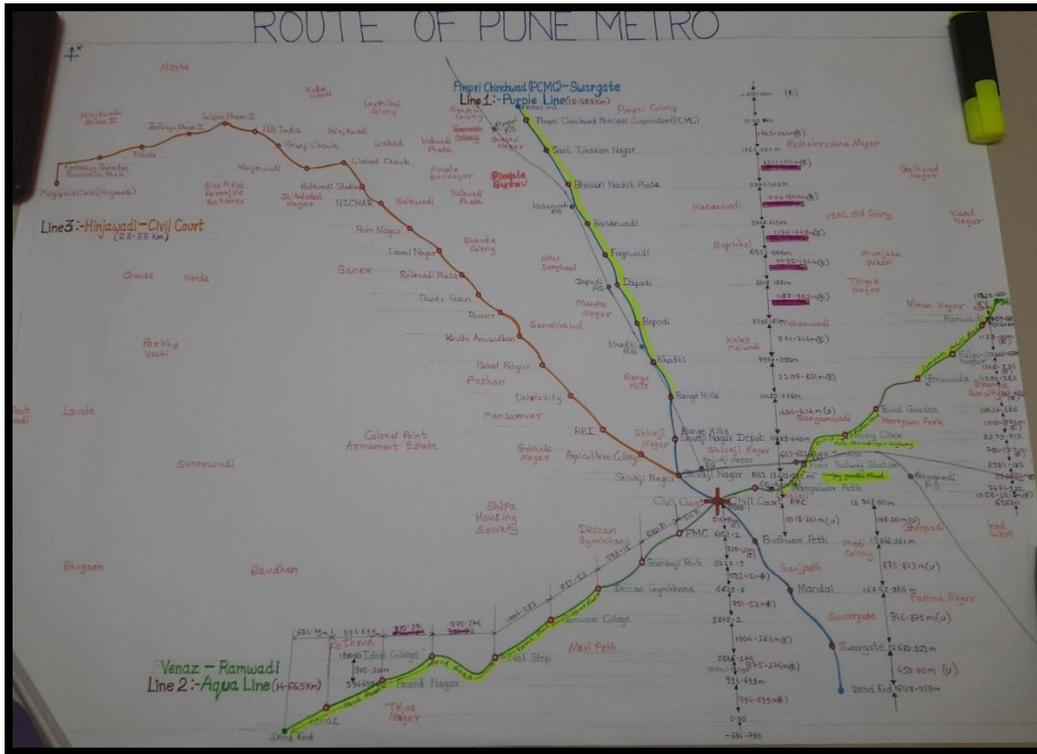
| Description                             | Underground | Elevated (KM) | Total (KM)   |
|---|-------------|---------------|--------------|
| Corridor-1<br>PCMC - SWARGATE           | 5.019       | 11.57         | 16.589       |
| Corridor-2<br>VANAZ-RAMVADI             | NIL         | 14.665        | 14.665       |
| Corridor-3 HINJAWADI - CIVIL COURT PUNE | NIL         | 23.33         | 23.33        |
|   |             | <b>TOTAL</b>  | <b>54.58</b> |

The system included 3 lines with a total length of 54.58 km. As all the metro lines cover major areas of Pune and Pimpri and Chinchwad and lined to highway create massive traffic congestion on road.



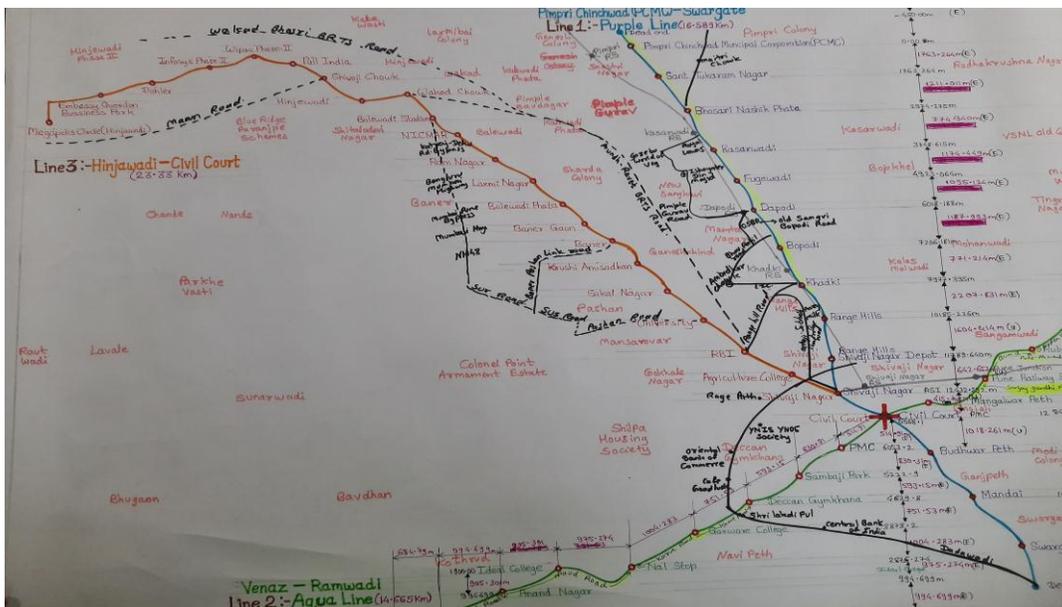
**Map1:** Pune Metro Route. Map Ref: Google maps

The map above explains the route map of entire Pune metro covering the locations Line 1, 2 and 3 at the same time.



**Map2:** Pune Metro Route along Existing Road Highlighted in Yellow (Drawing ref.-maps.google.com)

The above map explains the road line along the metro line marked in highlights. All the highlights area is expected to have high traffic congestion and are highly prone to accidents with respect to both constructions related and other wise. The map highlights line 2 is more along the road the metro.



**Map3:** Alternate route arrangement for daily commute (Drawing ref.-maps.google.com)

The map above shows alternate routes drawn and marked in Black. Though Line 2 runs along the road and metro there are fewer alternate routes with respect to infrastructure conditions. There are some alternate routes that can be used in Line 2 and there are several in Line 1 & Line 3.

#### 4. CONCLUSION

In three stages, Line 1 (L1), Line 2 (L2) and Line 3(L3) the Pune Metro project is executed on three busy traffic corridors. The L3 is the longest upcoming line with nearly 25 stations. Although the L2 is all elevated, the L1 is partially underground, and the tunneling work lasts for the next few months. The tunnel boring machines imported from China are about 6 km long and boring underground. The active construction site is resulting traffic jams and construction accidents in the process of development. The suggested alternate routes are expected to help in reduced major traffic congestion and eventually result in a smaller number of people being affected by any construction accidents if may happen.

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