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Planning of New Route of Pune Metro Rail

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Abstract: ***With the development of rapid urbanization, the urban expansion and traffic jams are the serious problem of city development. Metro railway plays an important role in urban public transport, which helps to ease traffic congestion. The organization should aim not only at satisfying the customer but also focus on the delighting them. Implementation of metro rail projects paves way to the construction activities and in this process long term construction work zones are inevitable. Long term work zones on urban roads lead to many problems such as reduction in capacity , increase the travel time delays, queue length, fuel consumption, number of forced merges, and roadway accidents which lead to unaccounted economic losses. Urban transport system Evaluation of modern transportation framework of Metro Rail facility proposed in Pune city is the primary aim of this study***

Keywords: Planning of proposed stations, Traffic volume count, Origin and Destination survey (Interview of Workers and Workplace), Capital cost Estimates

I. INTRODUCTION

Work Zone is defined as an area of a highway in which maintenance and construction operations are taking place that impinge on the number of lanes available to traffic or affect the operational characteristics of traffic flowing through the area. Due to the rapid growth of urban population and increasing vehicle count supplemented by increased use of private vehicles, congestion on urban roads has increased tremendously. In a developing country like India augmentation of road infrastructure and development of mass rapid rail systems are projected as the solution to address this problem. Indian Roads Congress has suggested guidelines on safety in road construction work zone and Highway capacity manual (2000) provides capacity of short term and long term construction work zones, but the nature and construction activities related to a construction of a metro rail project differ much from a road project and consequently the effects of work zones due a metro rail construction project is different than highway projects and thus it becomes necessary to study and quantify the impact of mass rapid transit system construction work zones on traffic environment which will further help in estimating the economic loss due to metro rail construction work zone.

Pune is well known as the Queen of Deccan due to its scenic beauty and rich natural Resources. Besides, it is famous for its religious and historical places. Pune city is known in the world map because of its educational, research and development institutions. The District also has an importance as an important military base. Pune is the most industrialized district in western Maharashtra and a famous IT hub in the country. Pune Exemplifies an indigenous Marathi culture and ethos, in which education, arts & crafts and Theaters are given due prominence. Pune is the cultural capital of Maharashtra. It is the Birth place of the poet-saint Tukaram. It is the home of great freedom fighters like Bal Gangadhar Tilak, Agarkar and Gopal Krishna Gokhale. Jayant Narlikar, the famous Contemporary scientist is from Pune.

The district is bound by Ahmadnagar district on the north-east, Solapur district on the south-east, Satara district on south, Raigad district on the west and Thane district on the north-west.

Pune city is known in the world map because of its educational, research etc. Also The District has an importance as an important military base and most industrialised district in western Maharashtra and a famous IT Hub in The Country. It is also known as Queen of Deccan. In India there are currently 13 operational rapid transit systems in 18 cities. As March 2019, India has 638.91 km's of operational Metro Lines and 496 stations. Further 500 plus kilometre of lines are under construction. All the metro rail line projects composed of mainly standard gauge out of that only Kolkata metro and Delhi metro used broad gauge. The first rapid system in India is the Kolkata Metro which started operations in 1984 and the newest metro opened is Nagpur metro on 8th March 2019.

II. OBJECTIVES OF THE PRESENT STUDY

To planning of new route of metro rail in Pune city

A. To analysis and determine the traffic congestion of city using traffic volume count method.
B. To determine the capital cost estimate of new metro rail route in Pune city.

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III.DETAILS OF PROPOSED STATIONS

Name of station	Alignment	Distance from dead end (KM)	Distance between Station to station(KM)
Wakad chouk	Elevated	0.00	0.00
Kaspate wasti	Elevated	3.1	3.10
Jagtap Dairy	Elevated	4.1	1.00
Kokane Chouk	Elevated	4.9	0.8
Govind Yashada Chouk	Elevated	6.2	1.3
Kate Patil Chouk	Elevated	6.5	0.3
Kalpataru Society	Elevated	8.2	1..7
(Nashik Phata chouk)	Elevated	10.00	1.8

IV.TRAFFIC VOLUME COUNT

The most important traffic characteristic to be collected from the field includes sped, travel time, flow and density. Some cases, spacing and headway are directly measured. In addition, the occupancy, i.e. percentage of time a point on the road is occupied by vehicles is also of interest.

Variation of volume counts can be further sub-divided into daily, weekly and seasonal variation. For studying the daily variation, the flow in each hour has been expressed as percentage of daily flow. Weekdays, Saturdays and Sundays usually show different patterns. That's why comparing day with day is much more useful. Peak Hour Volume is very important factor in the design of roads and control of traffic, and is usually 2 - 2.5 times the average hourly volume. Apart from this there is one additional feature of this variation: two dominant peaks (morning and evening peak), especially in urban areas. The most important point measurement is the vehicle volume count. Data can be collected manually or automatically.

There are various stops in Pune city on Hinjewadi to Bhosari. On this corridor, Kaspate wasti and Kalpataru society are where traffic congestion is noted to be the highest during peak hours. It is important that the introduction of metro is first justified at these locations. Thus traffic volume count for peak hour peak direction traffic (PHPDT) was done at these locations (that is Kaspate Wasti and Kalpataru Society) on this route. Traffic count was done at peak hours in the morning 8.30 AM to 11.00 AM as well as in the evening from 5.00 PM to 7.00PM for both the directions. Counting periods vary from short counts at spot points to continuous counts at permanent stations. Hourly counts are generally significant in all engineering design, while daily and annual traffic is important in economic calculations, road system classification and investment programs.

Table 01--vehicular break up of PHPDT at Kaspate Wasti

Vehicle type	Percentage (%)
Cars/four wheelers	29.59
Two-wheelers	55.14
Auto/three wheelers	9.54
Buses	3.62
Cycles	0.77
Others	1.33
Total	100

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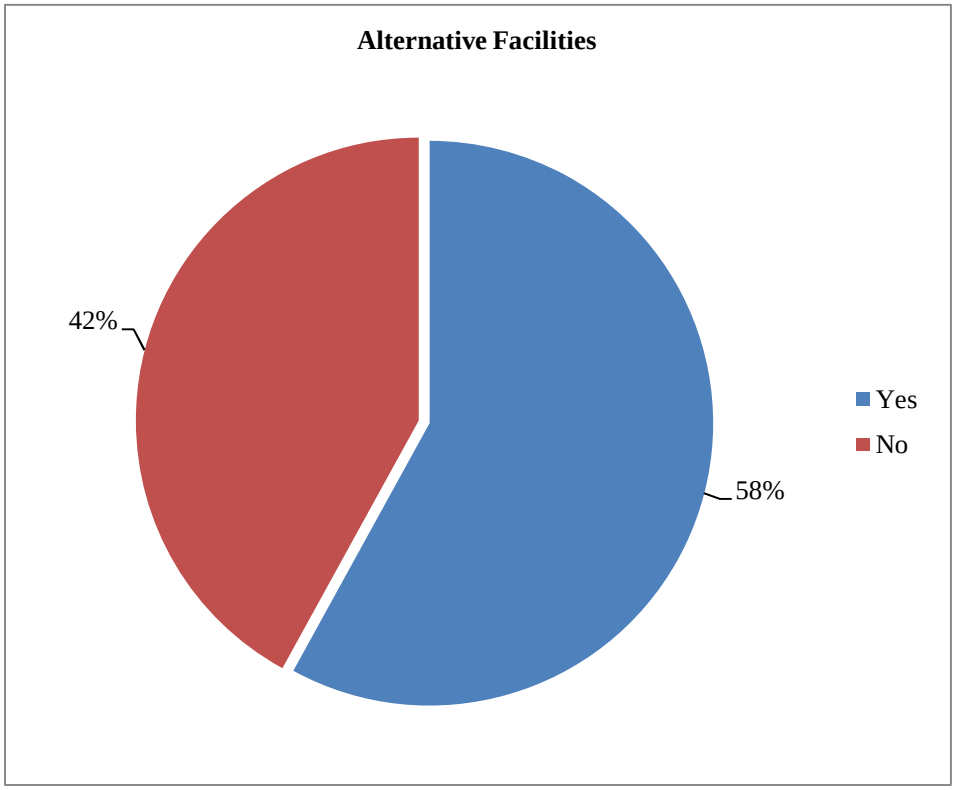
Table 02-vehicular break up of PHPDT at Kalpataru Society

Vehicle type	Percentage (%)
Cars	30.72
Two-wheelers	52.58
Auto/three wheelers	9.23
Buses	5.74
Cycles	0.33
Others	1.7
Total	100

V. ORIGIN AND DESTINATION SURVEY (INTERVIEW OF WORKERS AND WORKPLACE)

Public surveys were conducted at the various locations on East-West Corridor where traffic data was also calculated. As many as 100 people were interviewed with basic questions to know their travel characteristics. On compiling all the responses a general trend of public opinion was formed.

If metro is the only alternative for improving transport facilities in the city (%).

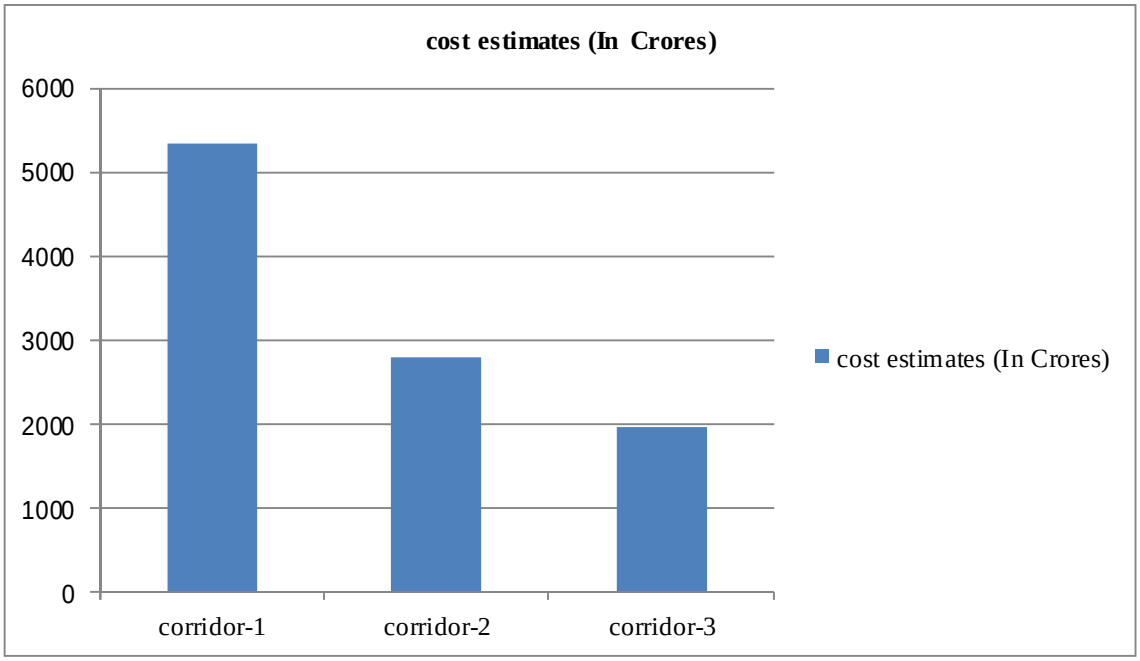


VI. CAPITAL COST ESTIMATES

A. The overall capital cost for PCMC-Swargate corridor, at November 2015 price level, works out to 5333 Cr. Excluding taxes and duties, but including general charges and design charges @5% on all items except land and 3 % contingencies on all items.

B. The overall capital cost for Vanaz-Ramvadi corridor, at November 2015 price level, works out to 2794 Cr. Excluding taxes and duties, but including general charges and design charges @5% on all items except land and 3 % contingencies on all items.

C. The overall capital cost for Wakad chouk-Nashik Phata (Bhosari) corridor, at November 2015 price level, works out to 1952 Cr. Excluding taxes and duties, but including general charges and design charges @5% on all items except land and 3 % contingencies on all items.



VII. CONCLUSION

A. The population of Pune according to Census of India 2011 is 55.13 lakhs with just 17.50% growth in the past decade.

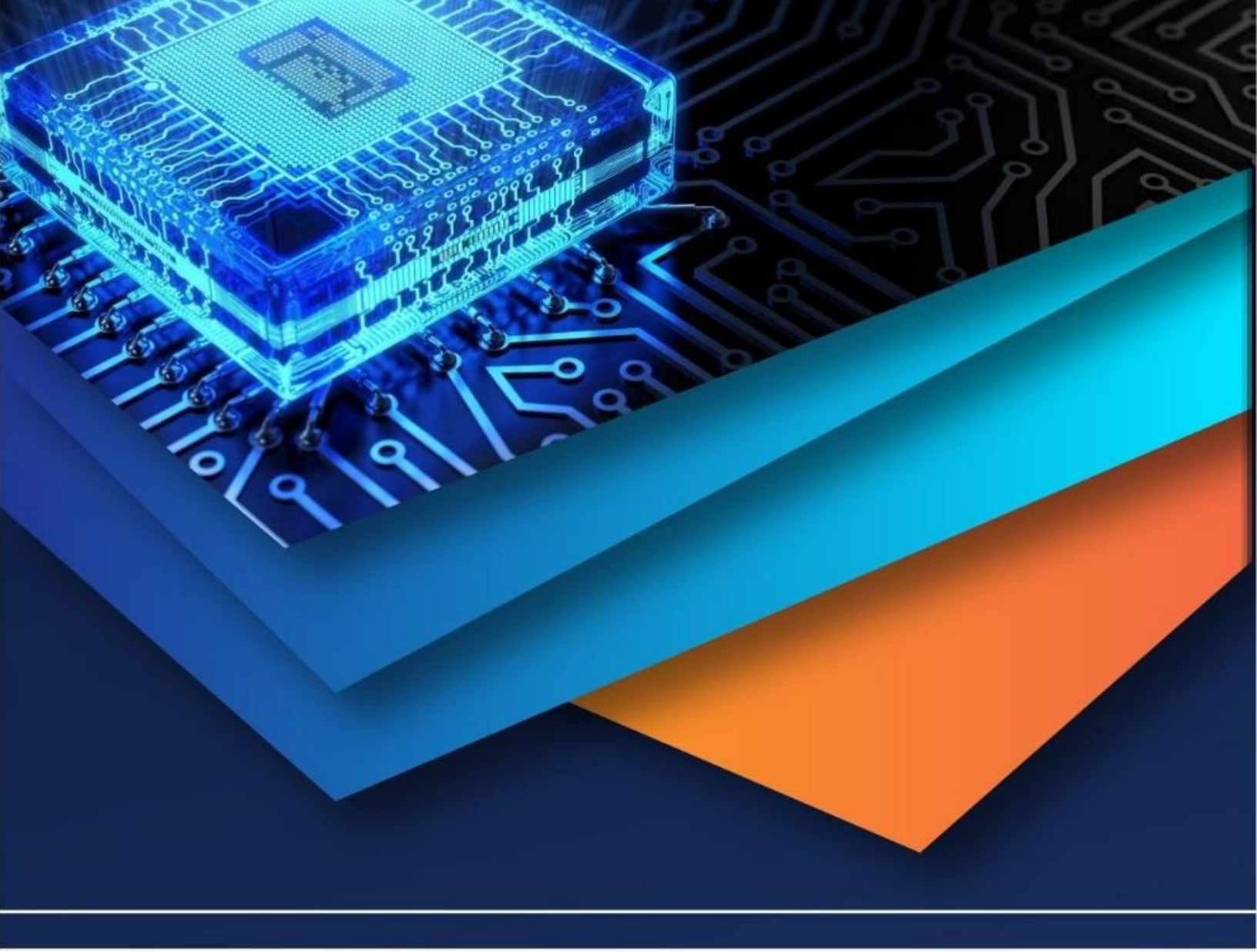
B. At present the population of the city is 64.10 lakhs. Considering the same growth rate of the previous decade, the projected population for the year 2021 will be nearly 67 lakhs.

C. But according to DPR the projected population is considered to be 68.99 lakhs at 2021 year which seems highly unlikely, as there are no indicators of such a phenomenal growth

D. Total cost require for corridors 1 and 2 is 8127 Cr. As compared to proposed new line for 1952 cr.

REFERENCES

[1] George Yannis, “Estimating the Adequacy of a Metro Network”, 10.1061/ (ASCE) UP.1943-5444.0000114. © 2012 American Society of Civil Engineers.
[2] Kassiani T simplokoukou, “A feasibility study approach for underground railways - a case study: Line 4 of Athens metro”, Global Journal of Engineering Education Volume 14, Number 1, 2012.
[3] Alex Dampier, “A Study of the Feasibility and Potential Implementation of Metro-Based Freight Transportation in Newcastle upon Tyne”, springer Published online 19 August 2015.
[4] Gabriele Bano, “Dimensionality reduction in feasibility analysis by latent variable modelling”, July 1-5, 2018, San Diego, California, USA © 2018 Elsevier.
[5] Chao Liu, “How to Increase Rail Ridership in Maryland: Direct Ridership Models for Policy Guidance”, 10.1061/ (ASCE) UP.1943-5444.0000340. © 2016 American Society of Civil Engineers
[6] Ashwin Mahalingam, “Investigating the Role of Lean Practices in Enabling BIM Adoption: Evidence from Two Indian Cases”, 10.1061/ (ASCE) CO.1943-7862 .0000982. © 2015 American Society of Civil Engineers
[7] S. Khasnabis, “Mechanisms for Transportation Infrastructure Investment in Developing Countries” 10.1061, ASCE, 0733-9488, 2010
[8] S. P. Sekar, “Impact of Rail Transit on Land Use and Development: Case Study of Suburban Rail in Chennai”, 10.1061/ (ASCE) UP.1943-5444.0000375.©2016 American Society of Civil Engineers.
[9] Song Poyang, “Analysis of energy consumption reduction in metro systems using rolling stop-skipping patterns”, Available online 26 November 2018 0360-8352/ © 2018 Elsevier.
[10] Sudin bag, “Kolkata metro railway and customer satisfaction: an empirical study”, international journal of multidisciplinary research vol.2 issue 3, march 2012, ISSN 2231 5780.
[11] Mukti Advani, “Evaluation of public transport systems: case study of Delhi Metro”, proceeding in start-2005 conference held at IIT Kharagpur, India
[12] Ravi Bhutani, “Impact of metro rail construction work zone on traffic environment”, 11th Transportation Planning and Implementation Methodologies for Developing Countries, TPMDC 10-12 December 2014, 2014, Mumbai, India
[13] Mahdi Khosravi, “Management and planning under complexities of metro construction”, 8th Nordic Conference on Construction Economics and Organization, Science Direct, 2015.
[14] Juanjuan zhao, “Estimation of passenger route choice pattern using smart card data for complex metro systems” IEEE transactions on intelligent transportation systems, vol. 18, no. 4, April 2017.
[15] Luiz E. Brandão. “Government Supports in Public–Private Partnership Contracts: Metro Line 4 of the São Paulo Subway System”, 2012 American Society of Civil Engineers.



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