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Urban Traffic Congestion and Mobility Challenges in Rapidly Urbanizing Cities: Evidence from the Jogeshwari Vikhroli Link Road, Mumbai

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INTRODUCTION & AIM

- Rapid urbanization in Mumbai places heavy strain on arterial corridors like the Jogeshwari Vikhroli Link Road (JVLR). This mixed-use study area connects major residential, commercial, and institutional zones across an area of approximately 40,160,149 sq.m.
- Aim to evaluate current traffic congestion and mobility bottlenecks to improve transport efficiency, safety, and the overall user experience.

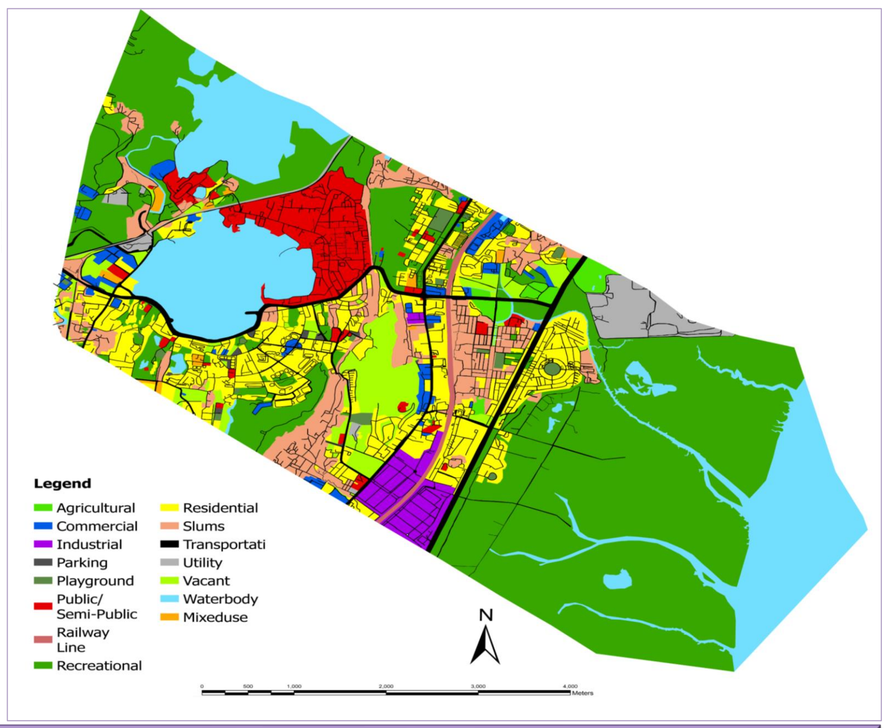


Figure 1: Existing Land Use Map

METHOD

- **Site Selection:**

Created Euclidean distance buffers around Mumbai Suburban local railway stations to specifically identify zones lacking adequate last-mile transit connectivity.

- **Data Collection:**

Conducted manual primary field surveys in the absence of advanced Intelligent Transport Systems (ITS) data, including traffic counts, pedestrian counts, and road inventory assessment.

- **Analysis:**

Calculated Passenger Car Units (PCU), traffic volume, traffic density, and Level of Service (LOS) across critical intersections/sections.

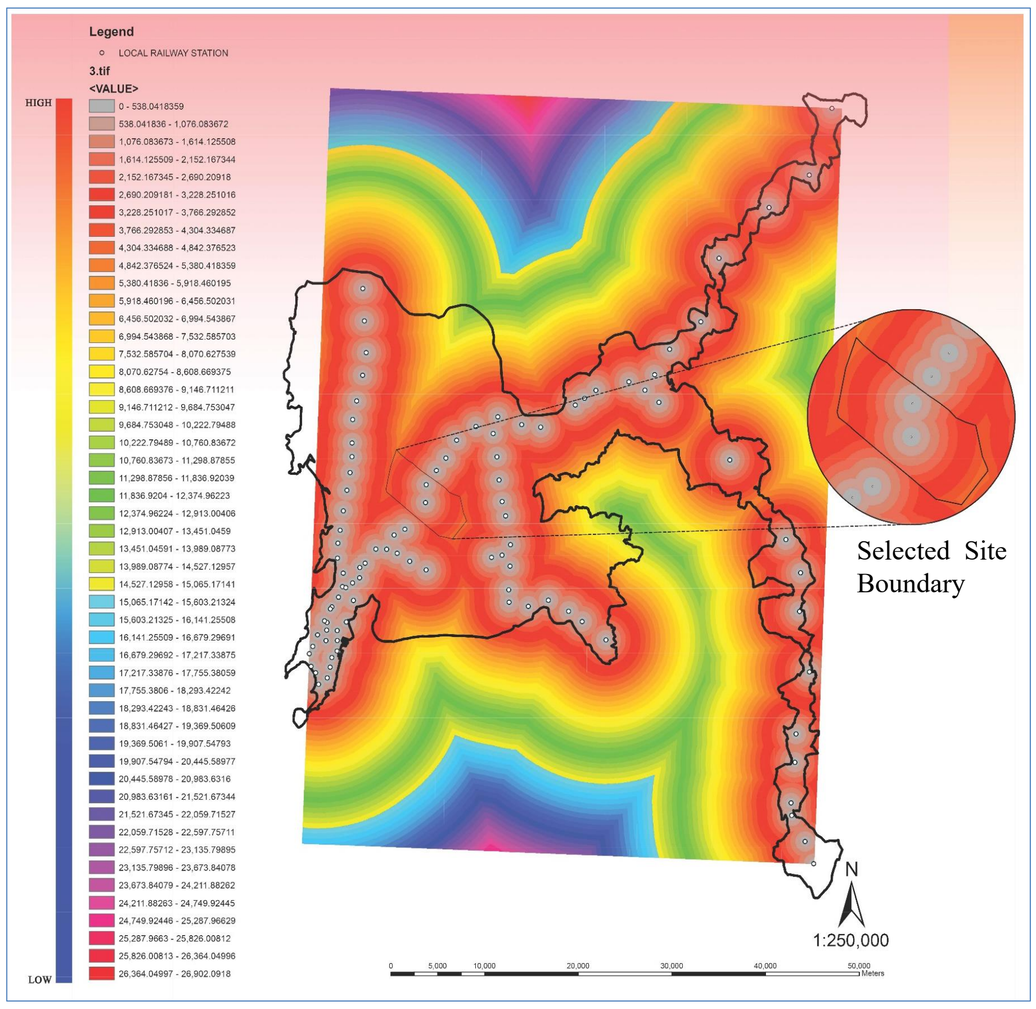


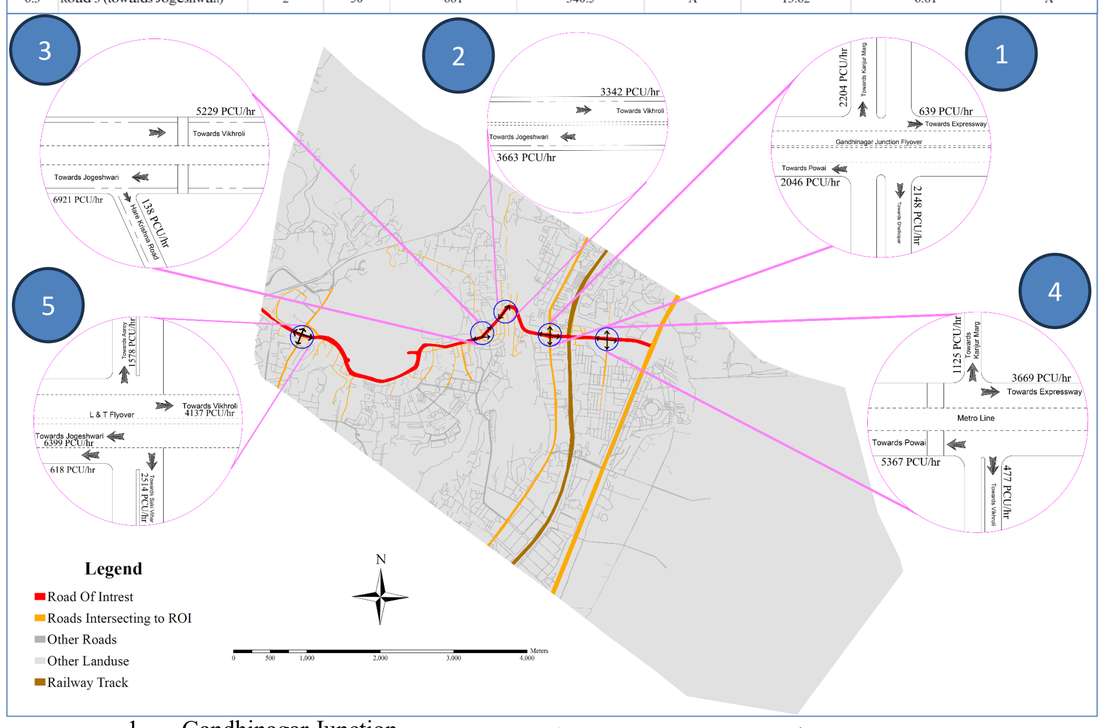
Figure 2. Site Selection Buffer

RESULTS & DISCUSSION

- Out of 18 analyzed road stretches, 5 currently operate below the acceptable Indian average Level of Service C. These include the L&T Flyover (Road 1), specific sections of Gandhinagar Junction (towards Kanjur and Ghatkopar), IIT Main Gate Road and Tagore Nagar Junction (towards Powai), all of which belong to LOS D or E.
- The IIT Main Gate (Road 2) experiences extreme congestion, recording a peak traffic flow of 2,307 PCU/hour/lane, resulting in an undesirable LOS E.
- Conversely, stable to free-flowing conditions (LOS A and B) were observed on specific links, including the Expressway-bound road at Gandhinagar Junction, Saki Vihar Road, and the Kanjur Marg/Vikhroli-bound roads at Tagore Nagar Junction.
- Road inventory surveys at nodes like Gandhinagar Junction and the L&T Flyover reveal a systemic lack of pedestrian crossings, continuous medians, and green buffers.

Level Of Services								
S.No.	Road Name/No.	No. of lanes	Speed (v) (km/hour)	Total Traffic Volume (Q) (PCU/hour)	Lanewise Traffic Volume PCU/hour/lane)	LOS w.r.t. Traffic Volume	Traffic Density (k) (PCU/KM) k = Q/v	Lanewise Traffic Density (PCU/KM/lane)	LOS w.r.t. Traffic Density
1	GANDHINAGAR JUNCTION								
1.1	Road 1 (towards Powai)	2	70	2046	1023	B	29.23	14.62	C
1.2	Road 2 (towards Kanjur)	2	50	2205	1102.5	B	44.1	22.05	D
1.3	Road 3 (towards Expressway)	2	70	639	319.5	A	9.13	4.57	A
1.4	Road 4 (towards Ghatkopar)	2	50	2148	1074	B	42.96	21.48	D
2	IIT MARKET ROAD								
2.1	Road 1 (towards Jogeshwari)	3	70	3663	1221	B	52.33	17.44	C
2.2	Road 2 (towards Vikhroli)	3	70	3342	1114	B	47.74	15.91	C
3	IIT MAIN GATE ROAD								
3.1	Road 1 (towards Vikhroli)	3	70	5229	1743	C	74.7	24.9	D
3.2	Road 2 (towards Jogeshwari)	3	70	6921	2307	E	98.87	32.96	E
3.3	Road 3 (Hare Krishna Road)	2	30	138	69	A	4.6	2.3	A
4	TAGORE NAGAR JUNCTION								
4.1	Road 1 (towards Kanjur)	3	40	1125	375	A	28.13	9.38	B
4.2	Road 2 (towards Expressway)	4	70	3669	917.25	B	52.41	13.1	B
4.3	Road 3 (towards Powai)	4	70	5367	1341.75	C	76.67	19.17	D
4.4	Road 1 (towards Kanjur)	2	40	477	238.5	A	11.93	5.97	A
5	L & T FLYOVER								
5.1	Road 1 (towards Jogeshwari)	3	70	6399	2133	D	91.41	30.47	E
5.2	Road 2 (towards Vikhroli)	3	70	4137	1379	B	59.1	19.7	C
6	SAKI VIHAR ROAD								
6.1	Road 1 (towards Saki Vihar)	3	50	2514	838	A	50.28	16.76	C
6.2	Road 2 (towards Aarey)	3	50	1578	526	A	31.56	10.52	B
6.3	Road 3 (towards Jogeshwari)	2	50	681	340.5	A	13.62	6.81	A

Table 1. Level of Service (LOS) and Traffic Density Assessment



1. Gandhinagar Junction
2. IIT Market Road
3. IIT Main Gate Road
4. Tagore Nagar Junction
5. L&T Flyover and Saki-Vihar Road

Figure 3. Peak Traffic Volume and PCU Analysis

CONCLUSION

- This study evaluated traffic volume and traffic density data to determine the Level of Service (LOS).
- Out of the 18 analyzed road stretches, 13 meet or exceed the acceptable Indian average LOS C, while 5 operate below it.
- Recommended right-of-way widening, improved pedestrian crossings, and street hardware installations.

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