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ADVANCING URBAN MOBILITY:

Implementing Inclusive Pedestrian Walkway Infrastructure in Solapur

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Abstract : The paper explores the importance of establishing walkable neighborhoods in Solapur using the inclusive pedestrian infrastructure. It promotes sustainable living by emphasizing pedestrian-friendly design, effective infrastructure, and community involvement. The paper addresses difficulties in core locations such as Navi Peth, Begam Peth, and Tilak Chauk through in-depth analysis, which includes an examination of pedestrian network design principles and elements influencing walkability such as accessibility and infrastructure quality. The use of statistical methods namely behavioural mapping, interviews, and surveys offers useful information into pedestrian preferences and comfort, emphasizing the importance of elements such as shelter and vegetation. To enhance pedestrian infrastructure while maintaining accessibility, realistic ideas are proposed, such as shifting street vendors to ease congestion. The article intends to give practical insights for urban planners and policymakers by combining empirical facts and best practices, with the ultimate goal of creating lively, sustainable, and inclusive pedestrian environments in Solapur.

IndexTerms - **Inclusive pedestrian infrastructure, Sustainable living, Pedestrian-friendly design, Walkability**

I. INTRODUCTION

Streets are the arteries of any city, serving as connectors and vibrant hubs for social interaction, commerce, and recreation. In India the challenge is balancing the need for mobility with the desire for inclusive urban spaces. As private vehicle ownership rises, the pressure to accommodate pedestrians often reduces the space available for communal activities. Public spaces are shared assets where people from all walks of life come together, playing a significant role in shaping the social fabric of a city. Pedestrian streets, in particular, offer opportunities for social interaction, leisure, and commerce. Yet, in the quest to accommodate vehicles, the pedestrian experience has often been neglected, leading to streets that prioritize cars over people. In Indian cities, there is a pressing need to make streets safer and more welcoming for pedestrians. By focusing on pedestrian infrastructure, we can enhance mobility and create vibrant, socially inclusive spaces. This shift aligns with a global movement towards prioritizing pedestrians and non-motorized transport in urban planning. It also supports Sustainable Development Goal 11, which aims to make cities inclusive, safe, resilient, and sustainable. This paper explores the implementation of inclusive pedestrian walkways. By examining existing challenges and proposing solutions, we aim to pave the way for a more walkable, equitable, and interconnected urban landscape. Additionally, we look at successful pedestrian-friendly initiatives from cities around the world and review important international laws on walkability, such as the European Accessibility Act, the Americans with Disabilities Act, and Brazil's Law 10098. In India, new guidelines from the Ministry of Housing and Urban Affairs focus on universal accessibility, aiming to create a barrier-free environment and promote inclusion for Persons with Disabilities (PwDs). By exploring these international and national perspectives, this paper proposes practical solutions for enhancing pedestrian infrastructure in Solapur, contributing to a more walkable, equitable, and vibrant urban landscape.

II. AIM

Enhancing Pedestrian Accessibility and Establishing Inclusive Walkway Infrastructure in Solapur Smart City to foster a safer and more accessible urban environment.

III. OBJECTIVES

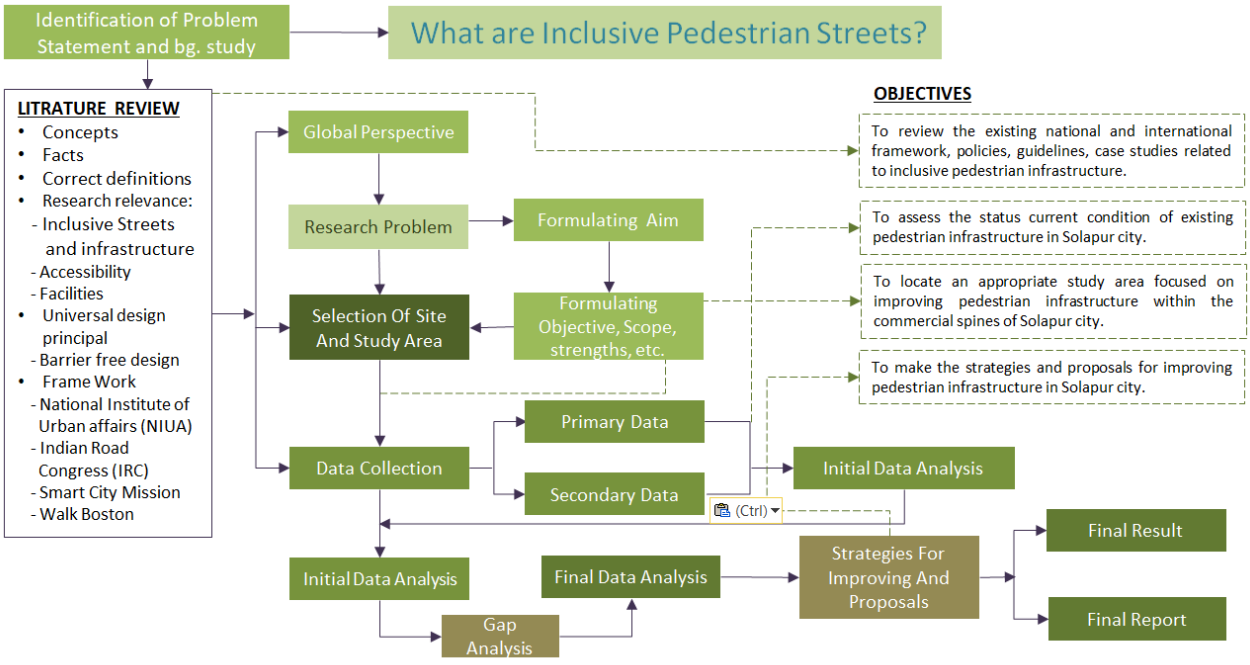
- To review the existing national and international framework, policies, guidelines, case studies related to inclusive pedestrian infrastructure.
- To assess the status current condition of existing pedestrian infrastructure in Solapur city.
- To locate an appropriate study area focused on improving pedestrian infrastructure within the commercial spines of Solapur city.
- To make the strategies and proposals for improving pedestrian infrastructure in Solapur city.

IV. LIMITATIONS

- Securing suitable land for pedestrian walkways may be challenging in densely populated urban areas, necessitating creative solutions or negotiations with landowners.
- Ensuring the long-term sustainability of walkways requires ongoing maintenance, which can be costly and logistically challenging.

V. METHODOLOGY

The first phase in this study is to identify the difficulties and requirements unique to the city, which will define the research area's goals, objectives, scope, and constraints. To do this, a comprehensive literature study of global and Indian scenarios is undertaken, complemented by pertinent case studies. Parameters are chosen based on the insights acquired from the literature study, and both primary and secondary data are collected. The acquired data is then evaluated using suitable tools and techniques, allowing for a thorough analysis of the highlighted difficulties and needs in the context of the research.

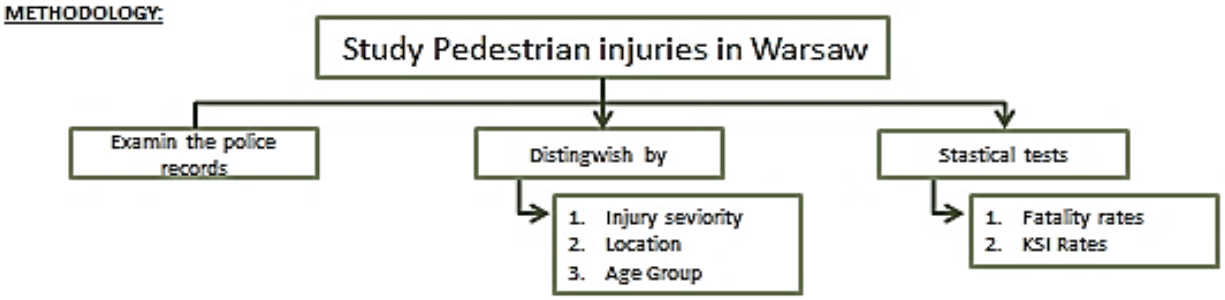


VI. LITERATURE REVIEW

6.1 Paper I: Pedestrian Safety at Traffic Signals in Warsaw

Authors: Piotr Olszewski, Hdwd Vlĕvnd, Anna Lholĕvnd

Journal: Transportation Research Procedia, 2016
This study examines pedestrian safety at signalized crossings in Warsaw, Poland. Despite improvements in traffic safety, pedestrian fatalities remain high, making up 60% of traffic deaths. Analyzing police records from 2010 to 2014, it was found that many accidents occur at signalized crossings due to pedestrians and drivers disobeying signals. Recommendations include better road design, stricter law enforcement, and speed reduction measures.



6.2 Paper II: Safe Access to Pedestrian Infrastructure in Almaty, Kazakhstan

Authors: Zhaina Tolegen, Usama Konbr, Sangul Karzhaubayeva, Gaukhar Sadvokasova, Ainash Nauryzbayeva, Dina Amandykova

Journal: Civil Engineering and Architecture, 2016

This study evaluates pedestrian infrastructure in Almaty, Kazakhstan, amid a growing population. The study categorizes infrastructure into large (e.g., supermarkets, schools) and small (e.g., small shops, medical centers) and uses the Pedestrian Comfort Level approach. Findings highlight both positive aspects like bike lanes and negative aspects like blocked walkways and lack of ramps. Recommendations focus on improving sidewalks, resolving parking issues, and enhancing lighting.

6.3 Paper III: Sustainable Pedestrian Infrastructure in Colombo, Sri Lanka

Authors: Sashinika Thilini, Coorey Shaleeni

Journal: ResearchGate, 2016

This study assesses walkability in Colombo, focusing on pathways in key parks. Emphasizing qualitative factors such as comfort and sociability, the study finds that many improvement projects fail due to ignoring local needs. It suggests a comprehensive approach that integrates qualitative and physical design elements to enhance walkability.

6.4 Paper IV: Walkability and Tourism in Kuala Lumpur, Malaysia

Authors: Norsidah Ujang, Zulkifli Muslim

Journal: Athens Journal of Tourism, 2019

This study explores the walkability of tourist areas in Kuala Lumpur and its impact on tourist satisfaction. Despite recognizing the city's walkability, tourists often face issues like poor pavement conditions and safety concerns. The study stresses the need for infrastructure upgrades, better pavement, vegetation for comfort, and enhanced safety measures to improve the tourist experience.

6.5 Paper V: Making Siliguri a Walkable City

Authors: Dibyendu Bikash Bhattacharyyaa, Soumen Mitra

Journal: 13th COTA International Conference of Transportation Professionals, 2013

This study focuses on improving walkability in Siliguri, West Bengal, which faces challenges like traffic congestion and safety risks due to rapid urbanization. The study advocates for creating pedestrian pathways, improving connections with other transportation modes, and ensuring safety to promote walking as a sustainable transport option.

VII. INTRODUCTION TO SOLAPUR, MAHARASHTRA

Solapur, in Maharashtra near the Karnataka border, is a key transport hub known for Solapuri Chadars and beedis. It has a rich history and industrial growth in power looms and cotton mills. The city hosts the Nandidhwaj yatra and the Ajoba Ganpati temple. With a diverse population of Marathi, Kannada, and Telugu speakers, Solapur is managed by the Solapur Municipal Corporation. It spans 178.57 square kilometers, divided into 51 wards and eight zones. The population was 951,000 in 2011, projected to reach 1,351,000. Connected by National Highway 9 to Pune, Mumbai, and Hyderabad,

Solapur's road and rail links ensure easy travel to nearby states. The city focuses on sustainable growth amid modern challenges.

VIII. TYPES OF DATA COLLECTION

- Primary data collection

A. Surveys and Questionnaires: Surveys and questionnaires are widely used to collect data from a large number of participants. They can be conducted in person, over the phone, via email, or online. Researchers design questions based on their research objectives and distribute them to respondents.

B. Interviews: Interviews involve direct interaction between the researcher and the participant(s). They can be structured, semi-structured, or unstructured, depending on the level of flexibility needed in obtaining information. Interviews allow for in-depth exploration of topics and can provide rich qualitative data.

C. Observations: Observation involves systematically watching and recording behaviours, events, or processes as they occur in their natural settings. Researchers may use structured observation protocols or simply record their observations in field notes. Observation can be particularly useful in studying behaviours that may be difficult to capture through other methods.

- Secondary data collection

Researchers may also utilize existing datasets collected by other researchers or organizations. Secondary data analysis involves reanalyzing data that were originally collected for a different purpose. This approach can be cost-effective and efficient, allowing researchers to explore new research questions or validate findings.

A. Literature review: A literature review is an analytical synthesis and assessment of previous research on a given subject from a variety of sources, including books, dissertations, academic papers, and conference proceedings.

B. Case Studies: Case studies involve in-depth examination of a single individual, group, organization, or phenomenon. Researchers collect data from multiple sources, such as interviews, observations, and documents, to provide a comprehensive understanding of the case.

C. Document Analysis: Researchers may analyse various types of documents, such as official records, texts, policies, or historical artefacts, to gather data relevant to their research questions. Document analysis can provide insights into past events, societal trends, or organizational practices.

Adopted tools and techniques

1. Virtual survey
2. Interviews (local and expert)
3. Physical surveying and mapping
4. Observations

5. Structured questionnaire
6. Literature review
7. Document study

Observations to be made

1. Surface Quality
2. Width and Clearance
3. Obstacles and Clutter
4. Crosswalks and Intersections
5. Lighting
6. Accessibility Features:
7. User Experience:
8. Public Art and Amenities
9. Cultural significance
10. Safety and Security
11. Visibility
12. Surveillance
13. Environmental Factors
14. Accessibility Maintenance

IX. SAMPLE SIZE

Confidence level	95%
Margin of Error	10%
Population proportion	50%
Population size	13,00,000

Cochran's sample size formula

$$n_0 = \frac{z^2 \cdot p \cdot (1 - p)}{e^2}$$

p: the population size
e: the margin of error
z: the z-value, extracted from a z-table

SAMPLE SIZE: 97

Hence the ideal sample size of the study must be 97 or more, and the study must have a confidence level of 95% about the real result must be +/- 10% of surveyed value.

X. PRIMARY DATA ANALYSIS

Problem sites have been identified and graded based on data and public feedback. Major issues include zebra crossings without proper markings or curb ramps, sidewalks with obstacles that impede accessibility, and intersections lacking or having poorly maintained curb ramps. Open drains near roadways pose serious safety hazards, and underpasses and footbridges often lack accessibility for people with disabilities (PWDs). The absence of functional traffic signals and poorly maintained bus stops worsens these problems. These findings highlight the need for comprehensive measures to remove accessibility barriers and prioritize PWDs in public infrastructure planning and management.

XI. PEDESTRIAN AND MOTOR VEHICLE PATH TRACKING

By monitoring the routes used by pedestrians and two- and three-wheeler operators, we can determine the best routes for marking the research area. Examining these activity patterns provides insights into how foot traffic and vehicle flow through the area. Urban planners and researchers can identify key interaction points and potential congestion sites by understanding the paths that different types of vehicles and pedestrians frequently travel. This data-driven approach helps create optimal routes that prioritize accessibility, efficiency, and safety for all users. It ensures that the study area accurately reflects the dynamics of urban movement, aiding decision-making processes to improve urban mobility and infrastructure. By superimposing maps of pedestrian, two-wheeler, and three- and four-wheeler activities, we can pinpoint locations where traffic merges, potentially causing jams or safety issues. This integrated method allows urban planners and policymakers to develop targeted solutions to enhance pedestrian safety, streamline traffic flow, and improve overall urban functionality, ensuring interventions meet the specific needs and challenges identified in the research area.

PEDESTRIAN ACTIVITIES 2 WHEELER ACTIVITIES 3/4 WHEELER ACTIVITIES

XII. Level of Service

The above-discussed comprehensive strategy has allowed us to determine the Level of Service (LOS) for the designated roadways. Through an examination of the intersections between pedestrian, two-wheeler, and three- and four-wheeler traffic, we may evaluate how well these roads handle various forms of vehicular movement. By giving important information about potential hotspots for congestion and inefficiency, this assessment helps urban planners set priorities and maximize the functionality of the road system as a whole.

BEGAM PETH

Time	Saturday	Sunday	Tuesday	Wednesday	Friday
	20-Jan	21-Jan	23-Jan	24-Jan	26-Jan
6am	7/min	15/min	9/min	3/min	18/min
8am	20/min	27/min	30/min	31/min	40/min
10am	32/min	32/min	27/min	31/min	43/min
12pm	35/min	21/min	26/min	21/min	24/min
2pm	55/min	45/min	46/min	32/min	17/min
4pm	34/min	75/min	52/min	35/min	19/min
6pm	63/min	74/min	54/min	47/min	37/min
8pm	43/min	60/min	40/min	23/min	43/min
10pm	28/min	32/min	17/min	14/min	23/min
12am	3/min	15/min	2/min	6/min	2/min

- According to the number of pedestrians at peak hours per min per meter:

(63+75+52+47+43)/5 = 56 ped/min/m

- According to that, the current LOS is E. To maintain LOS C we need:
- Effective width of present walkway:
  = total width – shy away distance
  = 1.2 m – (0.5+0.9+0.4) m
  = 1.2m – 1.8m
  = - 0.6m
- Assuming the higher limit of LOS C: 30 ped/min/m
- Now for the effective width that we require is = 56/30 = 1.87 m
- We can round that up to 2.0m
- Now we already have an existing trail of 1.2 m but the effective width is -0.6 hence we need to add 1.4m of clear walkway on both

NAVI PETH					
Time	Saturday	Sunday	Tuesday	Wednesday	Friday
	20-Jan	21-Jan	23-Jan	24-Jan	26-Jan
6am	8/min	3/min	9/min	12/min	16/min
8am	22/min	17/min	26/min	27/min	35/min
10am	30/min	15/min	33/min	38/min	48/min
12pm	35/min	20/min	31/min	21/min	11/min
2pm	48/min	66/min	45/min	56/min	23/min
4pm	28/min	45/min	56/min	28/min	54/min
6pm	55/min	68/min	57/min	71/min	63/min
8pm	35/min	53/min	43/min	47/min	50/min
10pm	21/min	47/min	32/min	21/min	27/min
12am	15/min	7/min	2/min	6/min	1/min

- According to the number of pedestrians at peak hours per min per meter:
  (55+68+57+71+63)/5 = 62.8 ped/min/m

- According to that, the current LOS is E.
  To maintain LOS C we need:

1. Effective width of present walkway:
   = total width – shy away distance
   = 0 m – (0.4+0.5) m
   = 0 m – 0.9 m
   = - 0.9 m

- Assuming the higher limit of LOS C: 30 ped/min/m
- Now for the effective width that we require is = 62.8/30 = 2.09 m
- We can round that up to 2.1m
- Now we do not have an existing trail. But the effective width is -0.9 hence we need to add 2.1 m of clear walkway on both sides.

MADHLA MARUTI/BHANDE GALLI					
Time	Saturday	Sunday	Tuesday	Wednesday	Friday
	20-Jan	21-Jan	23-Jan	24-Jan	26-Jan
6am	5/min	2/min	8/min	4/min	23/min
8am	18/min	14/min	19/min	20/min	39/min
10am	29/min	26/min	35/min	40/min	46/min
12pm	42/min	25/min	29/min	25/min	14/min
2pm	52/min	43/min	30/min	34/min	27/min
4pm	31/min	70/min	59/min	33/min	52/min
6pm	60/min	73/min	62/min	54/min	68/min
8pm	40/min	57/min	47/min	36/min	55/min
10pm	28/min	41/min	16/min	14/min	21/min
12am	2/min	11/min	4/min	3/min	3/min

- According to the number of pedestrians at peak hours per min per meter:
  (60+73+62+54+68)/5 = 63.4 ped/min/m

- According to that, the current LOS is E.
  To maintain LOS C we need:
  - Effective width of present walkway:
    = total width – shy away distance
    = 0 – (0.4 + 0.5 + 0.8)= - 1.7 m
- Assuming the higher limit of LOS C: 30 ped/min/m
- Now for the effective width that we require is = 63.4/30 = 2.1 m
- Now we do not have an existing trail. But the effective width is -1.7 hence we need to add at least 2.1 m of clear walkway on both sides.

XIII. FINAL DATA ANALYSIS

- **Traffic volume demand**

The quantity of vehicle traffic that uses a specific route or transportation network in a given length of time is referred to as traffic volume demand. It is a crucial statistic for understanding the capacity requirements of roads and infrastructure in transportation engineering and planning. Demand for traffic volume might change depending on the day of the week, the time of day, and special occasions. Transportation planners can effectively satisfy the demands of road users and guarantee smooth traffic flow by evaluating traffic volume demand data to influence choices on public transit services, capacity expansions, road design, and traffic management techniques.

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BEGAM PETH

DAY	TIME	PUC	PED.	CYCLES	2W	3/4 W	6/8W
Monday	8:00-8:10am	14.4	20	12	15	3	1
Monday	2:00-2:10pm	17.8	22	10	22	7	0
Monday	6:00-6:10pm	23	18	15	35	6	0
Monday	8:00-8:10pm	28	25	9	43	9	0
Thursday	8:00-8:10am	10	27	8	11	4	0
Thursday	2:00-2:10pm	17.8	28	11	24	6	0
Thursday	6:00-6:10pm	22	21	10	30	8	0
Thursday	8:00-8:10pm	26	26	7	39	9	0
Sunday	8:00-8:10am	15.2	23	14	16	3	1
Sunday	2:00-2:10pm	23	24	13	36	6	0
Sunday	6:00-6:10pm	26.6	19	11	41	8	0
Sunday	8:00-8:10pm	29.8	30	8	48	9	0

TILAK CHAUK

DAY	TIME	PUC	PED.	CYCLES	2W	3/4 W	6/8W
Monday	8:00-8:10am	27	24	16	32	11	0
Monday	2:00-2:10pm	26.8	29	14	35	10	0
Monday	6:00-6:10pm	28	21	19	38	9	0
Monday	8:00-8:10pm	26.6	25	13	30	12	0
Thursday	8:00-8:10am	26	26	12	34	10	0
Thursday	2:00-2:10pm	30.2	36	15	38	9	1
Thursday	6:00-6:10pm	27.2	22	14	26	11	1
Thursday	8:00-8:10pm	28	27	11	32	13	0
Sunday	8:00-8:10am	29.2	25	16	40	7	1
Sunday	2:00-2:10pm	25.8	30	15	42	6	0
Sunday	6:00-6:10pm	26.8	23	13	38	9	0
Sunday	8:00-8:10pm	28.4	29	10	41	10	0

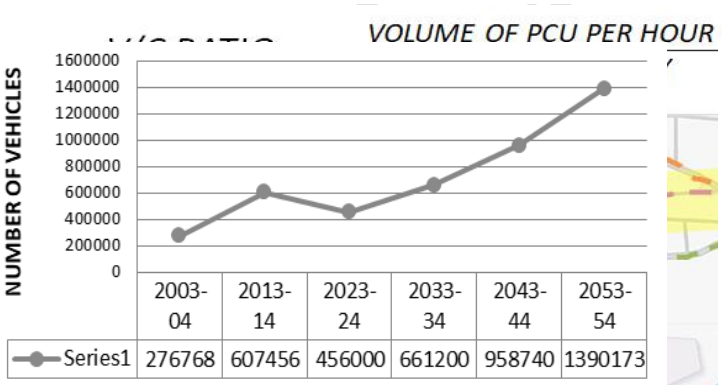
KAUNTAM CHAUK

DAY	TIME	PUC	PED.	CYCLES	2W	3/4 W	6/8W
Monday	8:00-8:10am	13.2	24	6	20	1	1
Monday	2:00-2:10pm	18.4	29	13	32	3	0
Monday	6:00-6:10pm	21.8	21	19	35	4	0
Monday	8:00-8:10pm	23	25	14	38	5	0
Thursday	8:00-8:10am	9	26	2	14	3	0
Thursday	2:00-2:10pm	18.8	31	12	31	1	1
Thursday	6:00-6:10pm	23.8	22	15	37	6	0
Thursday	8:00-8:10pm	28.6	27	14	42	9	0
Sunday	8:00-8:10am	19.6	25	11	21	9	0
Sunday	2:00-2:10pm	29.8	30	14	40	11	0
Sunday	6:00-6:10pm	34.8	23	13	43	15	0
Sunday	8:00-8:10pm	35.4	29	10	51	13	0

NAVI PETH (Node A to Node B)

DAY	TIME	PCU	PED	CYCLES	2W	3W	4 W	6W
Monday	8:00-8:05am	46.7	28	20	25	15	6	1
Monday	2:00-2:05pm	42.4	32	10	28	17	4	0
Monday	6:00-6:05pm	61.9	35	23	41	21	7	0
Monday	8:00-8:05pm	50.5	32	17	33	16	8	0
Thursday	8:00-8:05am	32.6	32	16	18	11	4	0
Thursday	2:00-2:05pm	38.1	20	9	21	14	5	1
Thursday	6:00-6:05pm	57.9	37	18	45	16	9	0
Thursday	8:00-8:05pm	48.4	31	15	34	17	5	0
Sunday	8:00-8:05am	49.8	27	20	42	9	10	0
Sunday	2:00-2:05pm	57.9	14	12	45	18	9	0
Sunday	6:00-6:05pm	64.2	42	17	40	22	11	0
Sunday	8:00-8:05pm	65.9	39	14	43	24	10	0

XIV. Data projection



Source: Author, transport.maharastra.gov.in/statistical data

- Considering a **45% growth rate**, in successive decades we can predict the vehicle registration data for Solapur city.

PCU on Thursday at peak hours: 57.9 x 12 = 694.8PCU/hr.
PCU on Sunday at peak hours: 65.9 x 12 = 790.8 PCU/hr.

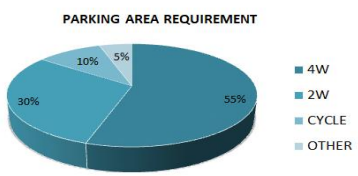
The mean volume of PCU/hour = 742.8 PCU/hour.

Source: Author, IRC, Transportation planning

- When the registered vehicle count in 23-24 is 456,000 and the parking demand exceeds above 150 spots, we need to plan for future parking demands.
- Considering a 45% growth in footfall for PCU for the CBD area, we can project further data;

1. Present parking demand = **228 PCU**
2. Present provision = **45 PCU**
3. Hence, we need to provide **185 PCU** parking spots
4. Now in the next decade the growing number of vehicles can be managed by increasing the parking spots by **45%**
5. Hence, by 2033, we need to provide 265 PCU parking or 5307sq m of parking area.
6. Similarly by 2043, 385 (7688sq m) and 2053, 558 (11,160sq m).

- TOTAL PARKING: 895.13 SQ. M. (45 PCU)
- TOTAL PARKING FOR 4W: 558 SQ. M. (28 4W.)
- TOTAL PARKING FOR 2W: 282.6 SQ. M. (94 2W.)



XV. Parking Data

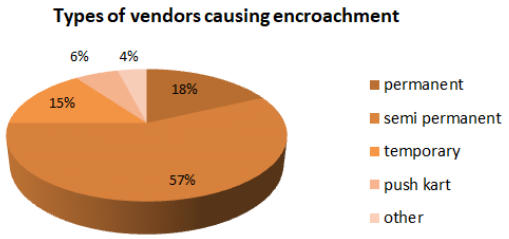
As we know, stated above;

- The mean PCU at peak hour is 707.43
- But 3W and 6W represent public and commercial modes of transportation and usually tend to leave after dropping off the passenger or goods respectively.
- Hence, we can eliminate probability of parking spots for them.
- Now the PCU at peak hour that will be consuming parking spots should be: 228 PCU.
- At present condition we are catering to about 45 PCU.
- The gap of around 175 PCU needs to be catered at present scenario.

XVI. VENDOR DATA

- Vendors are the essence of a shopping street in India.
- They give the street its value.
- But when their number exceeds, the space becomes suffocating and hence lose it value eventually.
- When street vendors start occupying the road and the walkway, the level of service starts to degrade.
- This phenomenon is known as Encroachment.

- There are about 67 to 75 street vendors that encroach the street.



- Allotment of a designated space for these small business owners can not only finish encroachment but also can be beneficial to maintain the soul of the street.

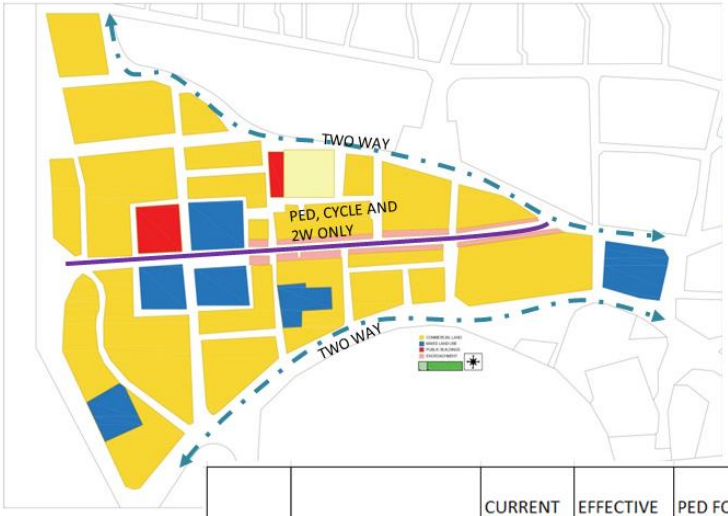
XVII. RECOMMENDATIONS FOR INCLUSIVE PEDESTRIAN INFRASTRUCTURE

- Implement universal design principles.
- Ensure wide sidewalks free of obstacles.
- Install curb ramps at intersections.
- Provide accessible crosswalks with audible signals.
- Make pedestrian signals accessible.
- Maintain adequate and glare-free lighting.
- Include public seating and rest areas.

Recommendations for improving street quality

The information gathered makes it abundantly evident that changes are required to improve the street's condition. The absence of green areas should be addressed by adding features like flower boxes, green walls, and trees for the benefit of pedestrians, according to recommendations for quality enhancement. It is recommended to activate street nodes to promote social contact and to designate activities to improve legibility. To encourage social interaction, there must to be a wider range of activities available along the street. Enhancing pavement materials and pedestrian amenities, together with improving building and landscape facades, can all contribute to improving the street's visual appeal and promoting pedestrian use. Improved lighting is one example of a safety precaution that should be put in place to guarantee security, especially at night. Prioritizing comfort above other factors such as street furniture,

decorative elements, safety, and vegetation should be based on the requirements of people. All things considered, the street can be successfully redesigned to accommodate user demands and activities, making it a pedestrian-friendly area.



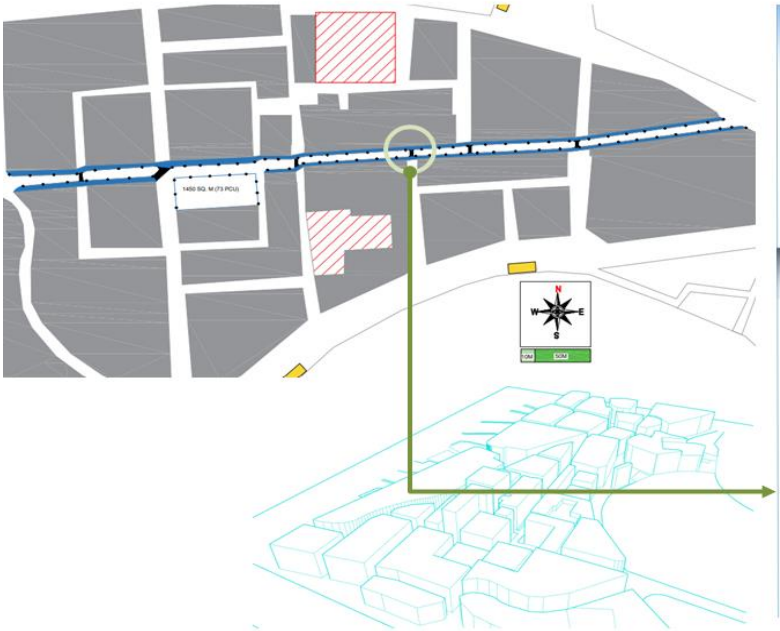
- To cater the problems of navipeth, we can need to implement the NMV zone policy with the exception of 2W.
- Hence we can divert the 3W and above vehicles to the alternative roads.
- This can ensure a safe and sustainable pedestrian environment.
- Reduce the speed limit of 2W upto 20kmph so that the unnecessary traffic can be avoided.

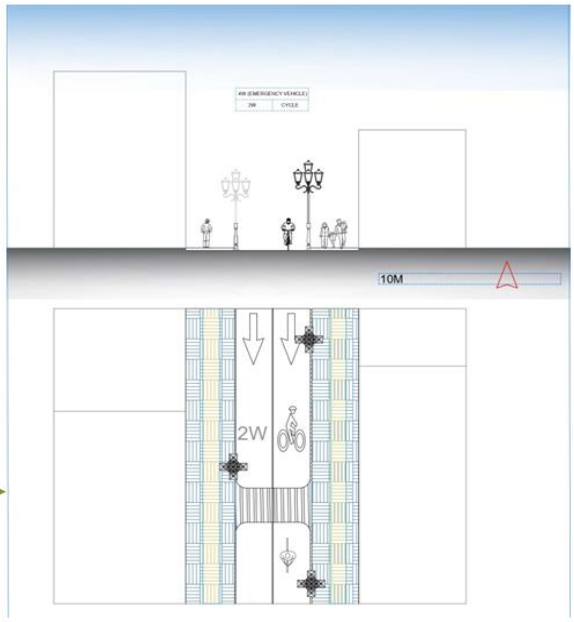
SR. NO.	NAME OF ROADS	CURRENT ROW	EFFECTIVE ROW	PED FOOTFALL AT PEAK HOUR/MIN	PCU FOOTFALL AT PEAK HOUR/MIN	V/C RATIO	CURRENT LOS	RANK (MOST PROBLAMATIC)
1	NAVI PETH LINK	9M	6.5M	7.6	6.9	1.05	LOS F	1
2	LINK 1	12M	10.2M	7.2	12.76	0.82	LOS D	2
3	LINK 2	24M	20M	5.8	15.13	0.76	LOS D	3

Source: Author, IRC, Transportation planning

XVIII. PROPOSALS

- Proposal I: Re-routing the 4w/motor vehicle traffic to promote walkability and NMV infrastructure (cycle lanes, emergency vehicle only zone).

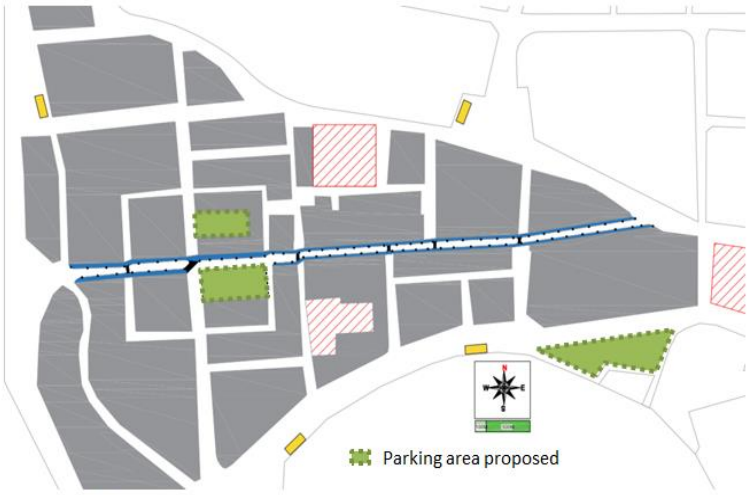




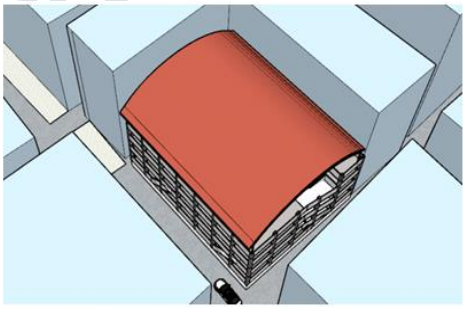
- Proposal II: Minimize Pedestrian Accidents and Inclusive Streets

- Proposal III: Improving Public Mode of Transportation

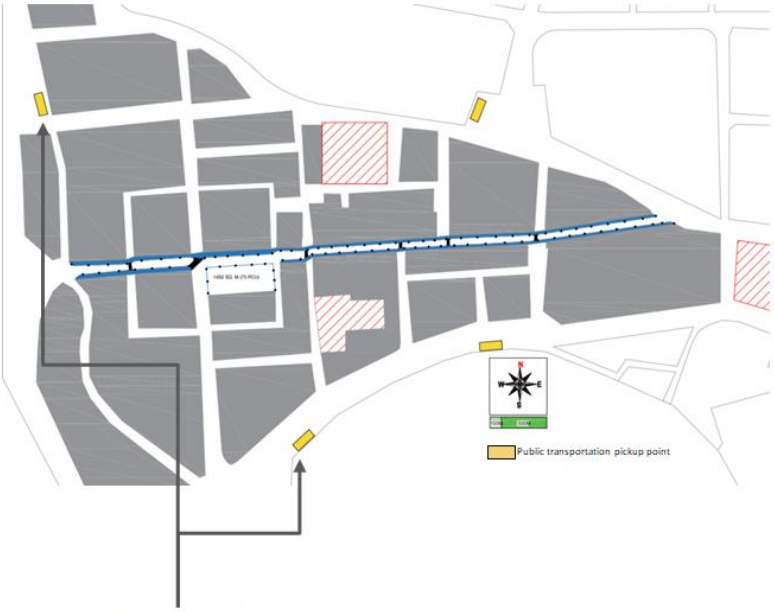
- Increasing the capacity of parking spaces can be achieved through multi level parking.
- Parking provision near the study area on vacant land.
- Marked parking space for optimum use of available resources.
- Removal of encroachment on parking area.



Source: Author, Taming India's on-street parking, Institute of Town Planners, India,



- Proposal IV: Increasing the Capacity of Parking Spaces

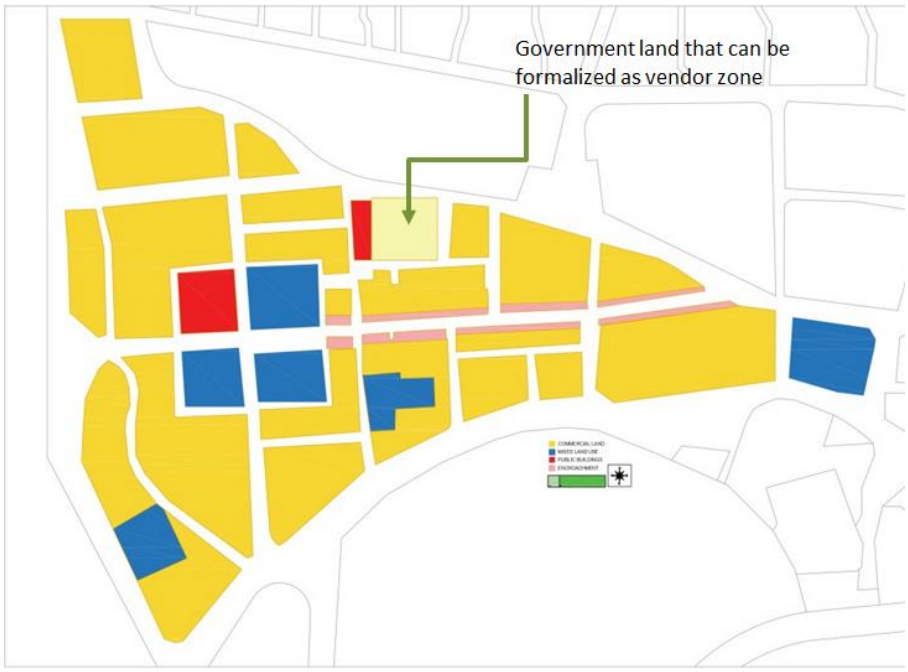


New Public transportation pickup point near the entry of the Business district

- Ensuring many pick up locations of public transportation can motivate people to choose public transportation over private vehicles.
- Provision of bus stops/Rickshaw stop at >400m distance so that it falls in the walkable zone.
- To repair and maintain the existing bus stops and ensure the frequency of city bus.
- To relocate the bus stop to areas with higher pedestrian footfall.

- Proposal V: Dedicated Vendor Market Area to Reduce Encroachment

- To reduce encroachment in study area, establishing a dedicated vendor market area with proper infrastructure and amenities can provide vendors with a formalized space to conduct their businesses.
- Implementing clear regulations and enforcing them effectively can help maintain order and prevent encroachment into pedestrian walkways or public spaces, ensuring a more organized and conducive environment for both vendors and residents.



XIX. Conclusion

This study emphasizes the critical need to integrate accessible services and universal design features in the pedestrian infrastructure of Navi Peth, Solapur City. The findings highlight how current pedestrian spaces are limited due to increasing demand, underscoring the necessity for enhancements to make these areas more usable and comfortable for everyone, regardless of age, gender, or physical capabilities.

By examining Indian standards for pedestrian infrastructure and accessible roads, planners and designers can develop a fact-based understanding of the elements that improve user performance and enjoyment. This research identifies the gaps and needs in accessible roadways and pedestrian areas, offering evidence-based recommendations for enhancing mobility infrastructure.

In light of Solapur City's growing population, it is crucial to plan for truly inclusive public spaces and to incorporate amenities for people with disabilities. Pedestrian streets like those in Navi Peth are vital urban areas that attract tourists and enhance the social lives of locals. For these streets to be successful, factors such as green spaces, accessibility, safety, and comfort must be considered.

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