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Refurbishing Indiranagar, Bengaluru: A Metro Node-To-Residential Interior Framework for Walkability and the 20-Minute Neighbourhood

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ABSTRACT

The sustainability of urban neighborhoods is influenced not only by the distance to key destinations but also by their accessibility via safe, continuous and comfortable routes. The present paper sets out an accessible planning framework to assess Indiranagar, Bengaluru, as a possible 20-minute neighborhood. Four research objectives are set: (1) understanding the relationships between land use, commercial strips, community amenities, and metro access; (2) developing an approach to quantitatively measuring access by walking and cycling to vital services; (3) identifying street-level obstructions to practical accessibility; and (4) integrating transit, public realm, community amenities, and green-blue-green infrastructure into a Metropolitan Node- to-Residential Interior framework. The manuscript applies a mixed methods approach involving GIS network analyses, land-use and amenity mapping, walkability audits, and – assuming implementation – resident/stakeholder surveys. At this stage, the paper describes the context and analytical framework but does not include results of any network-based accessibility calculations, land use percentages, audit scores, or surveys. Therefore, the main contribution of this paper is the context-specific and testable framework for linking metropolitan-level transit access and neighborhood destinations/public realm quality. Thus, the study does not aim to prove that Indiranagar meets the accessibility criteria of 20 minutes at present. The novelty of the paper consists in developing a testable, neighborhood-specific framework linking metro transportation accessibility with neighborhood destinations, walking, quality of the public realm and ecological infrastructures. The proposed framework serves as an analytical tool for understanding accessibility shortcomings and guiding further actions towards making Indiranagar more accessible.

1. Introduction

The increasing process of urbanization has led to the creation of residential zones being far away from employment zones, commercial zones, education facilities, health care facilities, and recreation facilities. Traditional urban design methods tend to give priority to the mobility from one destination to another rather than the accessibility of destinations within each neighbourhood. Proximity urbanism is one such concept that

focuses on the provision of access to important destinations within an area during walking, cycling, and public transit in a limited amount of time. The 20-minute neighbourhood is one such implementation of proximity urbanism where all important land use facilities are provided in one place to enable living within that area. However, mere proximity is not sufficient to ensure good accessibility because of broken pathways, dangerous crossing points, lack of cycling lanes, and broken network of streets [1]–[6], [12], [13].

The Indiranagar area in Bengaluru can be used as an example to explore connectivity between metropolitan and local levels of transport and accessibility in the neighbourhoods. This place has residential and commercial districts, amenities, as well as access to the metro network, so there are possibilities for the creation of an accessible and sustainable neighbourhood. However, there might be some issues with the connectivity for pedestrians and cyclists, discontinuity in the urban public realm, and the lack of the green infrastructure integration that could limit access to local facilities. Therefore, this research suggests a new framework called the Metro Node-to-Residential Interior including seven components: the metro node, mixed-use commercial spine, public plaza, networks of pedestrians and cyclists, community facilities, green and blue-green networks, as well as the residential interior. The suggested concept implies the metro station as an urban catalyst connecting metropolitan transport networks and activities of the neighbourhood. The research will use spatial analysis and the evaluation of the accessibility and urban functionality to explore the opportunities for increasing the level of local self-sufficiency without the loss of metropolitan connectivity. The expected contribution of the study will be the framework for 20-minute neighbourhood [7], [8], [10], [11], [17], [30].

Generally, in manuscript, should have: 1. Introduction (research background and Literature Review); 2. Methodology; 3. Result; 4. Conclusion; Acknowledgment; References. You may add more if required. The style of the section header as bellow:

2. Literature Review

2.1 Research Background

Indiranagar, located on the eastern part of Bengaluru, is a common example of an urban neighborhood that evolved by means of residential developments, commercial developments, institutional uses, and transport facilities. Over time, this urban area has become an urban neighborhood from being a residential one since it has residential buildings, retail shops, eateries, offices, educational institutions, health care institutions, and recreational facilities. Commercial areas such as 100 Feet Road and 12th Main Road have helped make Indiranagar a vibrant and urban area. Moreover, Indiranagar metro station, belonging to Purple Line of Bangalore Metro, makes Indiranagar connected to job centers and other urban areas of the city. [3], [10]–[12], [30]

Although this method offers numerous advantages, there are certain difficulties that emerge in relation to pedestrian safety, traffic management, parking, footpath connectivity, and the quality of public spaces. Even though there are quite a few facilities located quite nearby, they are accessible only with the help of connected streets, crosswalks, pedestrian infrastructure, and footpaths/cycle paths connectivity. Furthermore, the presence of greenery, trees on streets, and blue/green infrastructure is of paramount importance for improving environmental conditions for pedestrians. This is an example of how proximity and accessibility of urban facilities differ from each other. [5], [6], [13], [28], [29], [14]

The existing body of research on Indiranagar city area is mostly focused on the relationships between transit connectivity, commercialization, land-use change, and neighborhood performance.

In this context, a study conducted by the World Resources Institute has shown that there was considerable commercialization near Indiranagar Metro Station during 2004-2018 [11]

However, the relationships between metropolitan transit system and neighborhood needs are vital components of urban planning. In this connection, this study investigates the possibility of using 20-minute neighborhood model as an instrument for establishing the connections between transit nodes, commercial corridors, public spaces, community facilities, active transport system and residential areas. The goal of the study is to design a new model of spatial planning which does not require private motorized transport [1], [4], [10], [17], [27]

2.2 Statement of Problem

The area of Indiranagar, Bengaluru, has managed to develop itself into a mixed-use neighborhood due to the availability of metro connectivity, commercial strips, residential zones, and all other required amenities. The increase in commercial activity, traffic volume, parking problems, fragmentation of footpaths, unsafe pedestrian crossings, and lack of any cycle tracks create challenges for creating a user-friendly and comfortable neighborhood. Though all kinds of necessary amenities are present nearby, proximity alone is not sufficient to ensure their easy, safe, and equitable access to all residents of that area. Fragmented integration of public spaces, community amenities, footpaths, and greens makes it even more difficult for using active means of transport, social interaction, and environmental comfort. Transit connection in its current format would not help in solving the problems of the neighborhood without integrating itself with the land use pattern, public realm, and requirements of the community. Therefore, the problem is mainly about the lack of integration between the transit infrastructure and local destinations/areas. [3], [4], [10], [12], [13], [30]

2.3 Research gap and novelty

Proximity-based planning, Transit Oriented Development (TOD), and walkability research identify the need for mixed land use, transit, street design, and public space. These threads of research are generally considered as distinct planning problems. For a mature neighborhood which is transit accessible, such as Indiranagar, the key issue is not simply about having access to amenities within a certain distance, but about whether they can be reached within a practical time frame through the existing streets network. The suggested contribution from the manuscript is a bringing together of the above-mentioned aspects within the Metro Node-Residential Interior framework. This is a theoretical contribution at this point in time, which is not yet a validated empirical model. It would require network-based travel time calculations, amenity mapping, street audit, and if done, user evidence. [1], [3], [4], [6], [10], [12], [15], [16]

2.4 Objective

The objective is to design a comprehensive spatial planning tool that can be used to evaluate and enhance the sustainable, accessible, and socially-inclusive potential of Indiranagar as a 20-minute neighbourhood, through connections between metro access, mixed use land development, walkable and cyclable streets, public spaces, community facilities, and blue-green infrastructure. The study makes a clear differentiation between geographical and physical proximity and highlights the evidence needed to establish the same. [1], [2], [10], [17], [27], [30]

2.5 Research questions and objectives

The research is structured according to four research objectives. The research questions operationalise the objectives and must be answered based on measurable data in the Results chapter.

Objective 1: Identify the spatial structure of the study area, its residential areas, commercial nodes, community facilities, street network, and metro access. RQ1: How do all those factors affect the spatial configuration of Indiranagar and its ability to form a 20-minute neighbourhood?

Objective 2: Measure walkability and cycleability for education, health care, retail and recreational destinations using the routable street network and a maximum travel time threshold. RQ2: What proportion of origin points can access each of those categories within 20 minutes, and where are the deficiencies?

Objective 3: Analyse the street level factors affecting walking and cycling, such as footpath connectivity, crossing points, obstacles, exposure to traffic, shading, and cycle facilities. RQ3: What barriers are found, where they are located, and how do they influence the accessibility by means of analysis of the street network?

Objective 4: Formulate an integrative framework that relates the transit, commercial street, public space, active mobility, community infrastructure, and the green/blue-green network from the metro node to the residential interior. RQ4: How could the metro node and commercial corridors be integrated with local destinations for active mobility? RQ5: How could public space and environmental sustainability networks contribute to comfort and inclusiveness? RQ6: What would the spatial intervention and indicators of such an integrative framework be?

5. RQ5: Public Space and Environmental Sustainability How can the connections between public spaces, community facilities, and green/blue-green networks be made in order to enhance social interactions, comfort, and environmental sustainability? [18] – [25].

6. RQ6: Integrated Spatial Planning Framework How can the Metro Node–to–Residential Interior framework includes transit, mixed-used development, active mobility, public space, community infrastructure, and ecological networks in order to make Indiranagar a more socially inclusive and sustainable 20-minute neighbourhood? [1], [4], [10], [15], [30]

2.6 Previous Studies

In this research, the neighborhood of Indiranagar of Bengaluru city will be analyzed with respect to whether the neighbourhood can become 20-minute neighbourhood or not by analyzing the correlation between land use, public transport, active mobility, public spaces and community facilities. In this research, the accessibility of education, health care, retailing and recreational facilities through the means of walking and cycling routes will be analyzed. This research will focus on analyzing the current spatial configuration, metro linkages, commercial areas, pedestrian network and green-blue network of the neighborhood in order to find out barriers that affect the liveability of the neighborhood. GIS spatial analysis, field surveys and land use analysis will be used in order to analyze the correlation between proximity and accessibility. [1], [3], [4], [10], [11], [12], [15]

2.7 Theoretical concepts

The 20-minute neighborhood in Indiranagar, Bengaluru is based on the principles of urban imageability and legibility suggested by Kevin Lynch as well as the principles of modern urban design such as accessibility, connectivity, mixed uses, and sustainability. The elements of paths, edges, districts, nodes, and landmarks can be considered helpful for the analysis of the spatial arrangement and the everyday life of the neighborhood. The term path is used to describe the walking and cycling route between the residential neighborhoods and commercial streets, metro stations, and other facilities of the neighborhood. The edges are major roads or other physical boundaries which influence mobility and connectivity within the neighborhood. District is a clearly defined residential or commercial area with its own function. The node is generally some kind of center of movement within the neighborhood, which might be Indiranagar metro station or another important location. Landmarks are those elements which are helping to develop the identity of the neighborhood. In this way, their application in relation to Indiranagar can help to assess the impact of spatial legibility, functional integration, and links between active mobility routes on the ability [5], [7], [8], [18], [19], [21]

3. Methodology

This research employs a mixed methods and geographically oriented approach for exploring the possibilities that Indiranagar, Bengaluru, has of becoming a 20-minute neighbourhood. The methodology includes spatial analysis, assessment of the land use, accessibility map creation and qualitative analysis of the existing walking infrastructure. The focus of this research lies on the connection between metropolitan transit integration and access to essential services and community facilities at the neighbourhood level. The research consists of five phases: study area identification, spatial data gathering, GIS analysis, fieldwork and developing the framework of Metro Node–to–Residential Interior

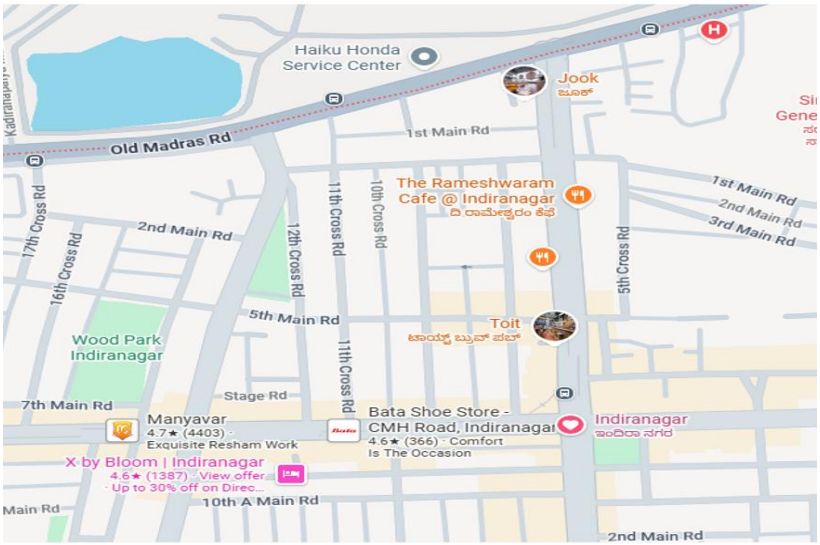


Fig. 1. Location map of the study area for Indiranagar, Bengaluru

The map should show the study boundary, Indiranagar Metro Station, primary roads, residential zones, commercial zones, and other important places. The current manuscript does not provide any information about the study boundary, scale, north direction arrow, legend, data source, and geographic extent of the map provided.



Fig 2. Sri Raghavendra Swami Mutt, Indiranagar, Bengaluru.

This photograph is an example of a community/religious place of interest and how such places could contribute to neighborhood identity and activities. It is merely contextual evidence and does not prove accessibility or usage of the place.



Fig. 3. Residential units in Indiranagar, Benngaluru



Fig. 4. Paramahansa Yogananda road, Indiranagar, Bengaluru



Fig. 5. Streets of Indiranagar, Bengaluru

3.1 Existing Frameworks

Some of the existing frameworks concerning the formation of a 20-minute neighborhood in Indiranagar (fig 1) are as follows: 15 Minute City framework, which concentrates on the proximity of the place to the amenity; Transit-Oriented Development (TOD), which takes into account the relation between transport and development; and Neighbourhood Unit framework, which deals with the positioning of daily amenities in the context of residential neighborhoods. 'Image of the city' framework by Kevin Lynch offers spatial legibility with the help of five elements viz., path, edge, district, node and landmark. 3Ds/5Ds framework considers density, diversity, design, access to destination and distance to the transit. [1], [3], [9], [10], [17], [30]

Indiranagar is a mature urban neighbourhood situated towards the eastern side of Bengaluru consisting of residential neighbourhood, commercial roads, institutional structures, recreational spaces, and public transportation. The configuration of the urban neighbourhood suggests that the process of transformation of a mainly residential neighbourhood into an active mixed-use neighbourhood. Major commercial roads such as 100 Feet Road and 12th Main Road include commercial units, temples (fig 2), restaurants, offices, and other service centers while the inner roads consist of residential houses and local facilities. The Indiranagar Metro Station of Purple Line of Bengaluru Metro links the neighbourhood with key places in the Bengaluru city. Growing commercial activities, traffic problems, lack of parking facilities, broken footpaths, and conflict between pedestrians and vehicles have made the neighbourhood unlivable. Regarding the 20-minute

neighbourhood, the neighbourhood can be designed with basic facilities, active transportation, public spaces, and green spaces. [6], [10], [11], [18], [19], [28], [29]

3.2 Characteristics of land use in Indiranagar, Bengaluru

The area under study is characterized by diversified urban land use with residential, commercial, institutional, recreational and transport purposes. Residential land use includes independent houses, apartments and redeveloped buildings and provides the primary place of residence for the neighborhood inhabitants. Commercial activities are provided by retail shops, restaurants, cafes, offices, and service establishments, which are concentrated mostly on major corridors – 100 Feet Road and 12th Main Road. Institutional land use includes educational establishments, medical care centers and other services that meet daily needs of residents. Recreational use of land includes parks, playgrounds and open spaces. Transportation facilities include the Indiranagar Metro Station of the Purple Line, roads, streets and others that link the neighborhood with metropolitan area. From the point of view of the 20-minute neighborhood, this diversified land use gives much room for high local accessibility and less dependence on cars. Nevertheless, the concentration of commercial activities on major roads, poor pedestrian infrastructure, traffic congestion, and poor connections of residential areas with other amenities can reduce accessibility. Consequently, incorporating mixed use developments, walkways/cycleways, facilities, and green spaces is necessary for ensuring livability, sustainability, and social inclusivity in neighborhoods. [3], [4], [10], [12], [13], [15]

3.3 Connectivity of Indiranagar in Bengaluru in terms of Transport Facilities

Indiranagar is well-connected to various other locations within the city of Bengaluru through metro rail, road, bus, and intermediate mode of transportation. Indiranagar Metro station located on the Namma Metro's Purple Line provides connectivity to the significant destinations across the city. BMTC Bus Service provides assistance for establishing connectivity with other residential, commercial, and industrial areas. Important roads like the 100 feet Road and Old Madras Road provide connectivity in terms of movement both at local and metropolitan levels. Auto-rickshaws, cabs, and app-based transport facilities also provide connectivity. However, traffic pollution, parking problem, nonexistence of continuous footpath, and lack of cycle path can pose some challenges to pedestrians. [2], [10], [27], [30]

3.4 Reasoning for selection of Indiranagar

Fig 5. Street scene in Indiranagar, Bengaluru. The image aims at showing the street scenario relevant to walkability and accessibility of the neighbourhood. Identify the exact location, date, author/source, and the specific street conditions which have been analyzed.

Indiranagar of Bengaluru is chosen as the case study since it is a matured, mixed-use, and transit-oriented urban neighbourhood that has enough scope for the application of the 20-minute neighbourhood approach. The existence of residential areas(fig 5), commercial streets, educational institutions, healthcare facilities, recreation areas, and Indiranagar metro station make a proper ground to analyze the local accessibility. It is the combined feature of metropolitan connections and neighbourhood-level activities that allow evaluating how well the locals are able to access their basic necessities through walking and cycling. However, traffic, parking issues, lack of pedestrian infrastructure, and fragmentation of public spaces make problems for liveability of the neighbourhood. Thus, it can be considered a relevant case for creating an integrated spatial planning framework of transit, land use, active transportation, public spaces, and ecological infrastructure. [1], [4], [10], [11], [30]

3.5. Conceptual Framework

Land use • Metro connectivity • Street network • Community facilities • Public space • Residential pattern - [3], [4], [10], [12]

METRO NODE–TO–RESIDENTIAL INTERIOR

1. Metro Node

Transit access and interchange - [10], [27], [30]

2. Mixed-Use Commercial Spine

Retail, services, and employment - [3], [10], [17], [21]

3. Public Plaza

Social interaction and public life - [18], [19], [20], [21]

4. Pedestrian and Cycling Network

Connectivity, safety, and accessibility - [5], [6], [13], [28], [29]
5. Community Facilities
Education, health care and recreation - [9], [17], [19], [20]
6. Green / Blue-Green Network
Shade, ecology, and climate resilience - [22]–[25]
7. Residential Interior
Local living and neighbourhood identity - [7]–[9], [20]

4. Expected Outcomes

Outcomes proposed for evaluation—rather than outcomes which have been proven via the current draft—are increased accessibility within 20 minutes, better walkability, fewer private car trips required, improved public space inclusion, reinforced local identity, and enhanced environmental comfort. Measurement indicators and baseline figures should be provided prior to claiming an outcome. **Figure 6**. Schematic framework architecture

EXISTING CONDITIONS → EVIDENCE BASE → DIAGNOSIS → PROPOSED INTERVENTIONS → EVALUATION

Land use, metro, streets, amenities, public space, residential form

↓ GIS inventory and travel time analysis and walking audit

Accessibility deficiencies, disconnected routes, unsafe crossing points, absence of shade/connections to public space

↓

Metro node ↔ mixed-use commercial spine ↔ public space ↔ pedestrian/cycling network ↔ community facilities ↔ green and blue-green connections ↔ residential interior

↓

Evaluation criteria: destinations accessible within 20 minutes, land use mix, route continuity, crossing safety, minimum pedestrian width, cycling network continuity, access to public space, shade/green connections.

5. Delimiting the study area

The area under study is Indiranagar in east Bengaluru. Specifically, the emphasis will be on the connection between the Indiranagar Metro Station, 100 Feet Road, 12th Main Road and the residential neighbourhoods that surround them.

The boundary of the study area has to be delimited through the definition of a well-defined geographical extent. This will encompass the residential zones, commercial zones, metro station, and other key facilities within the area.5.3 Data collection.

Table 1
The study uses primary and secondary data to examine the spatial structure and accessibility of Indiranagar.

Data category	Information required	Proposed source or method
Land use	Residential, commercial, institutional, recreational and mixed-use areas	Satellite imagery, land-use maps and field verification
Transport infrastructure	Metro station, roads, street hierarchy and public transport access	Bengaluru Metro records, road maps and field observation
Community amenities	Schools, healthcare facilities, retail, parks and recreational spaces	GIS mapping, online spatial datasets and field survey
Pedestrian infrastructure	Footpaths, crossings, obstructions and pedestrian connections	Primary field survey and photographic documentation
Cycling infrastructure	Cycle lanes, cycle routes and road-sharing conditions	Field observation and infrastructure mapping
Green-blue infrastructure	Street trees, parks, open spaces, drains and water-related features	Satellite imagery, GIS mapping and field verification

Public realm	Plazas, public spaces, seating, shade and pedestrian activity	Site observation and photographic documentation
User perceptions	Perceived accessibility, safety, comfort and service requirements	Proposed resident and stakeholder questionnaires

The study uses primary and secondary data to examine the spatial structure and accessibility of Indiranagar. Secondary data needs to be sourced from the appropriate government departments, Bengaluru Metro data, municipal and urban planning literature, open source spatial data and scientific literature. The primary data needs to be collected through site visits, auditing of the pedestrian infrastructure, photography and surveys if carried out.

6. Methodological limitations

The accuracy of the accessibility analysis will depend on the comprehensiveness and validity of the street-network, land-use and amenity datasets. Footpath and cycling facility data could be inadequate, and field validation might be necessary. The estimated travel time may not be the same as the actual travel time due to factors such as the pedestrian speed, traffic, crossing time, obstruction of the route and individual mobility needs. In addition, the recommended framework is a neighbourhood planning framework and does not determine if all individuals have access to all services within 20 minutes.

7. Research design approach

STAGE 1: Research Base

Research question • Purpose and objectives • Literature review • Research gap

STAGE 2: Area of study and data collection

Land use • Transport connectivity • Services • Public spaces • Field surveys • Users survey

STAGE 3A: Quantitative study

GIS Mapping, network accessibility within 20 minutes journey time, services accessibility, connectivity analysis and land use analysis.

STAGE 3B: Qualitative study

Walkability assessment, pedestrian safety, public space quality, user experience and stakeholder interview.

STAGE 4: Synthesis and evaluation

Comparison between the spatial accessibility with real conditions of the streets and the experience of the users to determine the accessibility gaps.

STAGE 5: Planning approach

Metro Node ➔ Commercial spine ➔ Public Plaza ➔ Active Mobility Network ➔ Community Facilities ➔ Green/Blue green Network ➔ Interior residential

8. Result and Analysis

The spatial evaluation of Indiranagar, Bengaluru, aims at exploring the connection between land use pattern, metro connectivity, accessibility and pedestrian infrastructure under the proposed concept of 20 minute neighbourhood. The study mainly concentrates on understanding the interconnection between Indiranagar Metro Station, major commercial strips, social amenities, pedestrian paths and residential spaces. In light of the current study context and analytical approach, this result section highlights the spatial findings that need to be empirically verified.

8.1 Land use pattern and neighbourhood structure

Indiranagar shows a mixed character in terms of urbanism, where residential zones, business premises, institutional zones, medical facilities and recreation grounds can be seen. The development of Indiranagar into a mixed-use urban neighbourhood is seen clearly in 100 Feet Road and 12th Main Road. The commercial zones have retail shops, restaurants and business offices.

The presence of residential zones amidst commercial and institutional zones suggests the possibility of decreasing distances to destinations. But whether or not the destinations are accessible within a 20-minute walk or cycle route is yet to be verified using GIS-based land use and network analysis.

8.2 Metropolitan connectivity and transit-oriented development

Indiranagar Metro Station, Purple Line, connects the neighbourhood to other significant locations in the city of Bengaluru. The metro station acts as a critical link for the commuters in accessing the area.

The connection between the metro station and the commercial areas in its vicinity indicates the importance of public transportation in transforming the neighbourhood. However, there is no guarantee that metropolitan connectivity will automatically ensure easy access to nearby destinations. The ease of connection from the metro station to other destinations like commercial zones and even interior residences of the neighbourhood becomes critical here.

8.3 Pedestrian accessibility and street-network conditions

Pedestrian accessibility plays a significant role in assessing the capacity of Indiranagar to function as a 20-minute neighborhood. Although there are many facilities available inside the neighborhood, its accessibility depends on the availability of continuous footpaths, safe pedestrian crossings, and streets suitable for walking and cycling. The possible challenges could be discontinuous footpaths, conflicts between pedestrians and vehicles, roadside parking, traffic congestion, and inadequate facilities for cyclists. These aspects could have an impact on convenience, even if the destinations are located closer to the neighborhood. Thus, there is a need for conducting a thorough audit and analysis of networks using GIS.

8.4 Public spaces and green-blue infrastructure

Public spaces, street trees, parks and other forms of green infrastructure are important factors that make for good environment within the neighbourhoods and comfortable walking conditions. Their incorporation into pedestrian and cycling pathways is beneficial for better connectivity of public spaces and for promoting active transportation. The existing correlation between the green space, commercial roads and residential districts in Indiranagar allows developing green-blue networks. But first, the distribution, connectivity and accessibility of such elements should be analysed.

8.5 Integrated Metro Node-to-Residential Interior Framework

This proposed framework includes seven interrelated components: metro node, mixed commercial spine, public plaza, pedestrian and cycle routes, community amenities, green-blue-green network and residential interior. The components form the spatial link between the connectivity of metropolitan transportation system and daily activities of the neighborhoods.

The framework proposes that the metro station shall not serve only as a transport hub but act as an urban catalyst that is linked to commerce, public space and the adjacent residential communities. The integration of the above components forms the planning framework that would assist in determining the improvements in neighborhood accessibility and walkability.

9. Discussion

The initial evaluation of Indiranagar underscores the necessity of combining metropolitan connectivity with the concept of neighbourhood-level accessibility in meeting the goals of the 20-minute neighbourhood. The Indiranagar Metro Station, the mixed-use developments, and commercial streets, like 100 Feet Road and 12th Main Road, serve as a solid basis for proximity-based urban development. At the same time, the accessibility problem arises due to the poor condition of pedestrian infrastructure, connectivity of streets, safety of crossings, and provision of cycling facilities. The study also underlines that the sustainability of a neighbourhood is not limited by only one criterion of land use and transport connectivity but also includes public places, street trees, and green-blue infrastructure as a means of improving pedestrian comfort and environmental qualities. As a result, accessibility needs to be interpreted as a set of spatial proximity, network connectivity, and quality of the public realm. The Metro Node-to-Residential Interior planning strategy represents the approach that combines the development of transit infrastructure, commercial activities, community facilities, active mobility, and ecological networks. Thus, its implementation will allow identifying spatial gaps and implementing improvements at the neighbourhood scale. Nevertheless, the effectiveness of the framework should be tested using GIS-based analysis of travel

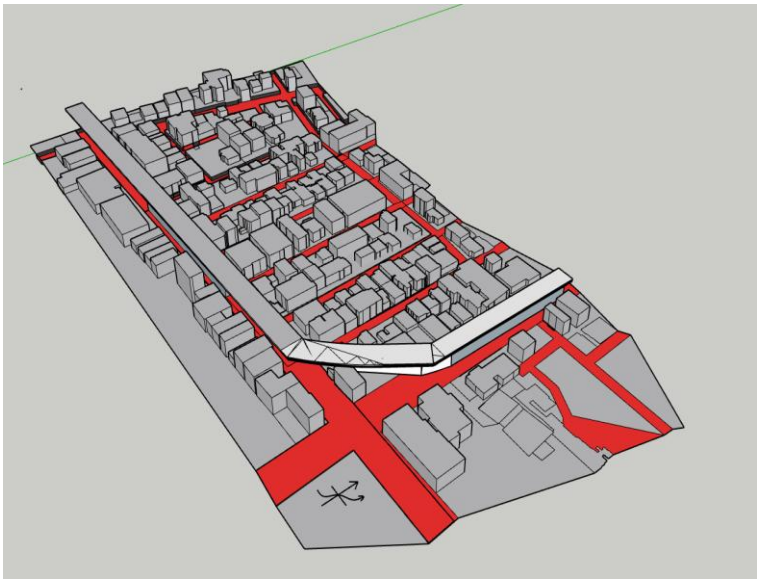


Fig. 6. Dimensional view of Indiranagar, Bengaluru showing different heights of the building existing

10. Conclusions

The 20-Minute Neighbourhood principle presents a viable basis for achieving accessibility, livability, and sustainability in the case study neighbourhood of Indiranagar, Bengaluru. While the neighbourhood boasts of a mixed-use composition, metro connectivity, and various urban amenities, the success of the neighbourhood rests on constant connectivity of pedestrian paths, provision of secure cycle lanes, accessible open spaces, and availability of all basic services evenly distributed throughout the neighbourhood. The combination of the metro node, the commercial strip, public plazas, community facilities, and the green-blue network will help in improving the connectivity of the neighbourhood and minimizing dependency on the automobile. [1], [2], [10], [18], [22]–[30]

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