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# A Predictive Model to Visualise the Change in Built Fabric of a Street

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**ABSTRACT:** A street is a strategic location that is easily accessible from many points, has a well-connected pedestrian path, and is serviced by a variety of transportation options. Physical characteristics utilised for a street environment can be defined by buildings, building designs, locations, landscape components, trees, and street furnishings. Environmental comfort, seating, physical artefacts, sidewalk width, attractiveness and interest in look, and a sense of safety are elements that contribute to a vibrant street. A street's identity and character can be defined by the physical element, activity, and significance of a place, as well as the people who contribute to its comfort, vitality, diversity, trade, and accessibility, all affect how people see it. A certain view and unique buildings and non-building elements makes the street recognizable. The presence of various buildings, landmarks and sidewalks makes the street oriented. This paper aims to develop a predictive model that will predict the change in parameters in the built fabric of the identified project area, which is an ancient street, Ashok Rajpath in Patna, near Patna University Campus, with the introduction of TOD model. The objectives include, to design a visually pleasing and sustainable street using the 5 identified urban design principles and developing a predictive model by studying the current scenario of the identified project area, analysing the street and by applying the urban design principles.

**KEYWORDS:** Predictive Model, Built Fabric, Patna, TOD Policy, urban design principles.

## I. INTRODUCTION

The capital of Bihar State is Patna, which is located 15 kilometres along the convergence of River Ganga. Being entirely landlocked and halfway between the humid West Bengal in the east and the slightly less humid Uttar Pradesh in the west, it is a state that is in transition in terms of climate, economics, and culture. The Ganga, Sone, and Punpun rivers make up its three sides. To the north of Patna, the Gandak River merges with the Ganga River, making it a rare location with four sizable rivers nearby. Patna in the south and Hajipur in the north of Bihar are connected by the 5575-meter-long Mahatma Gandhi Setu bridge over the River. J. P. Setu, also known as the Digha-Sonpur bridge, crosses the Ganga between Patna's Digha Ghat and Sonpur's Pahleja Ghat in Bihar, an Indian state (Town and Country Planning Organization, UD&HD, Bihar Town and Country Planning Organisation Urban Development & Housing Department Patna, n.d.).

People in Patna are connected with the riverfront along Ganga river (Rajak et al., 2023).

### A. Location of Site

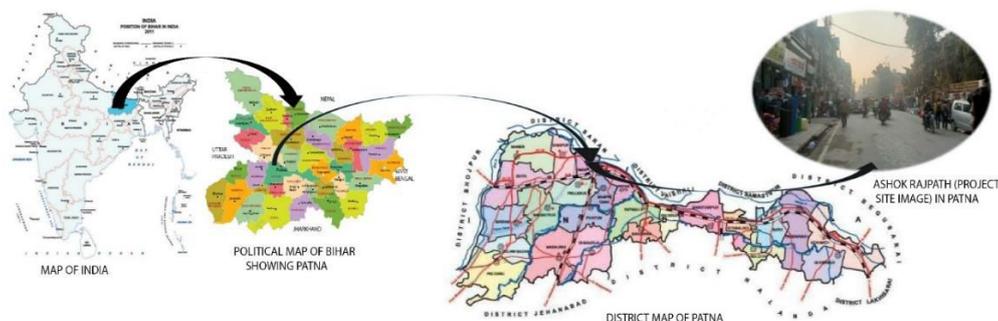


Fig.1. Image showing Location of Site (Source: Author's Compilation)

The site is situated on the Ashok Rajpath road near the Patna University Campus, Patna. The street stretch of the identified research area starts from Golghar till NIT More in Patna. The total length of this street is 2.45 kms. The coordinates are 25.6169° N and 85.1714° E. The area consists of Golghar, which is a historical landmark and also has





Fig. 4. A Few Urban Design Principles Impacting A Street Design (Source: Author’s Compilation).

### 3. How do urban design principles affect the layout of a Street Design?

Imageability is the ability of a location to stand out, be recognised, and be remembered. The ability to visualise a roadway is probably the result of a number of variables working together rather than just one. Landmarks are a component of imageability (THE IMAGE OF THE CITY Kevin Lynch, n.d.).

The term "enclosure" refers to how strongly vertical components like as walls, trees, and other vertical elements clearly define public spaces such as streets (Ewing & Clemente, n.d.).

The term "human scale" is described as "the characteristic of a structure that incorporates structural or architectural components of size and proportions that relate to the human form and/or that exhibit, through its structural or architectural components, the functions of the human contained inside." Medium-sized structures, little areas, and winding streets provide a cosy environment; tall buildings, wide avenues, and vast spaces, on the other hand, generate an expansive atmosphere (Urban Design Glossary, 2004).

Transparency is the degree to which people can observe or understand human activity, and more particularly, the degree to which they can observe or understand what is situated outside of a street's or other publicly accessible area (Ewing & Clemente, n.d.).

Complexity can be referred as variety of a location's visuals. The variety of a place's physical environments specifically, the quantity and types of buildings, architectural variation, decoration, landscape features, street furniture, signs, and human activity determines how complex it is (Ewing & Clemente, n.d.).

#### B. MIXED-USE STREETS

Cities use their streets for a variety of purposes, including walking lanes, cars and transportation. These tasks are connected to circulation but separate from it and are just as crucial to the smooth operation of a city on their own as circulation is. The pedestrian areas of city roadways, or sidewalks, perform a variety of other functions in addition to carrying people (J. Jacobs, n.d.). It is more likely that a bustling city street will be secure. Unoccupied city streets are likely unsafe. But how does this work exactly? What determines if a city street is heavily used or avoided? What about busy streets that will periodically go completely empty? (J. Jacobs, n.d.) For a city street to be ready to cope with strangers and make their presence a safety asset, as successful city communities usually do, there are three essential qualities needed: The first requirement is to clearly separate public from private spaces. It is impossible for public and private spaces to converge, as they frequently do in projects or suburbs. Second, there must be eyes on the street, eyes that belong to people who might be referred to as the "natural proprietors" of the street. Buildings on a street must face the street if they are equipped to cope with strangers and guarantee the security of both locals and visitors. They cannot turn a blind eye to it or choose to ignore it. Finally, in order to enhance the number of effective eyes on the street and urge residents of the buildings close to the street to maintain an acceptable number of eyes on the sidewalks, there must be people utilising the sidewalk reasonably continuously. Nobody enjoys watching a deserted street from a window or a porch. Practically nobody behaves in such a way. In their free time, many people like observing street activity (J. Jacobs, n.d.).

#### C. SIMILAR CASE STUDY

Urban designers' top priority is to transform spaces into places in order to enhance the quality of the human experience in metropolitan environments. A new urban design direction that considers a multifaceted approach that enhances feeling of place has been desperately needed. It is necessary to design environments that encourage and involve people in a range of activities. In other words, the task for contemporary urban designers is to transform a variety of spaces into meaningful places. "Placemaking is a general concept as well as a practical tool for enhancing a neighbourhood, city, or area. It could end up being one of the century's most revolutionary concepts (Al-Kodmany, 2013).

"Sidewalk contacts are the small change from which a city's wealth of public life may grow," claimed (J. Jacobs, n.d.). The difficulties of establishing a sense of place with tall buildings tries to pinpoint the structural elements and practical areas of tall buildings that could improve and foster a feeling of place. The base of the tower might be constructed to accommodate people. Socially beneficial socioeconomic pursuits might be used on the ground floors. Tall building

layouts could also improve imageability by establishing a network of landmarks, paths, edges, nodes, and districts (Al-Kodmany, 2013).

The physical aspect of placemaking is the first and is highly influenced by the concreteness of our surroundings. These physical components can enable or prevent orientation and a sense of visible space (*THE IMAGE OF THE CITY* Kevin Lynch, n.d.). In (*THE IMAGE OF THE CITY* Kevin Lynch, n.d.) the five elements Kevin Lynch lists for imageability are paths, edges, districts, nodes, and locations. These five components can be intricately intertwined to produce a stable visual order in the metropolis. Observing the human scale in urban design is essential for fostering a feeling of place, in addition to imageability.

Placemaking suggests four municipal and architectural design elements that could enhance placemaking with tall buildings: Imageability, human scale, social life, and cultural design examples are listed in that order. The first section of the article centres on how tall buildings can enhance a city's imageability. By creating legible and memorable environments, tall buildings will support a feeling of place and enhance the imageability of communities when properly positioned and designed. Second, the article highlights human scale design as a fundamental component for successful places. It looks at tall building problems from the perspective of the entire city, the base of the towers, and the overall architectural and site planning design. The third section of the article examines the socioeconomic elements that improve the social climate and financial health of our cities. In order for tall buildings to add to placemaking, it is crucial to promote accessible socioeconomic activity, according to this argument. The final section of the article looks at using cultural allusions in tall building architecture to aid placemaking. The goal of culturally sensitive design is to produce structures that reflect a particular culture and way of living. The examined dimensions in the suggested model are intended to improve placemaking with tall structures (Al-Kodmany, 2013).

Imageability is the macro-scale analysis considers how tall buildings affect the surrounding area's general visual appeal. Tall buildings are perceived by viewers as being a part of the metropolis. Imageability is a key idea in urban planning that aids in understanding how tall structures fit visually into the city in this context. A physical object's imageability is described by Kevin Lynch as "the quality that gives it a high probability of evoking a strong image in any given observer." It is that particular shape, colour, or arrangement that makes it easier to create strong, well-organized, vivid mental pictures of the surroundings. It can also be referred to as legibility (*THE IMAGE OF THE CITY* Kevin Lynch, n.d.). According to (*THE IMAGE OF THE CITY* Kevin Lynch, n.d.), imageability is made up of five components: nodes, edges, districts, routes, and landmarks. The article is applicable in the parts that follow Lynch's elements of imageability to tall buildings. Landmarks are readily recognisable point-references that are defined physical objects, such as buildings or mountains. Tall structures stand out in a city's skyline due to their distinctive height and obvious visibility at a distance; some even approach landmark status. The routes along which the observer frequently, sporadically, or possibly moves are referred to as paths (*THE IMAGE OF THE CITY* Kevin Lynch, n.d.). Edges are the boundaries between two stages can be thought of as discontinuities in continuity because they are linear. They could be man-made structures like railways or they could be created naturally, like shorelines, forests, and mountains. Districts are medium-sized to large areas of the city that the observer encounters and are distinguishable by having some defining or common characteristics. Numerous factors could support a district's imageability if it has tall structures. Nodes are defined as "points, the strategic spots in a city into which an observer can enter and which are the intense foci to and from which he is travelling." (*THE IMAGE OF THE CITY* Kevin Lynch, n.d.). A striking node could be made by several towering structures grouped together. Including a grounding point inside the node is a crucial element that improves a node's imageability. It might be the focal point, like a sculpture or pond. A significant tall building with a distinctive height and design could honour the node in the event of a node with tall buildings. Human Scale is the micro-scale analysis considers tall building-related human scale problems. According to Protagoras, a pre-Socratic Greek scholar, humanity is the standard for everything (Ali & Al-Kodmany, 2012), (Riley, 2003). For users to feel comfortable and for the built environment to evoke a feeling of place, human scale must be taken into consideration during design. Tall structures automatically violate human scale because they are built on a grand scale (Beedle, 2007). Creating a feeling of place in large cities with a cluster of tall buildings is difficult. They are prone to display "giantism," as described (A. Jacobs & Appleyard, 1987). Massive tall building developments make people feel insignificant, tiny, and out of place. However, there are ways to lessen the oppressive vertical scale by using the right perceptual cues, such as the architecture of the tower base, shaft, landscaping, atriums, plazas, and sculptures. (Ludwig Mies van der Rohe, n.d.) proposed using transparency in the tower base as a more straightforward visual treatment that invites the viewer to peer through it. The bottom floor's transparency makes it possible for onlookers to see through it, creating an inviting and permeable entrance (Al-Kodmany, 2013).

Restoring human size environments may be made possible by careful landscaping. While larger signs purposefully draw the focus of pedestrians, smaller street signs are positioned so that they can be seen by them. Streetlight posts are positioned among the trees, and about halfway up the light poles, banners are hung to display words for onlookers. Again, this detracts from the impression that pedestrians are going through a massively large building by placing the flags and flagpoles that fly outside the office buildings at about the first and second stories of buildings. Simple landscaping features, like tree canopies and streetscape elements, like awnings, effectively mitigate the human-scale issue of tall buildings by fostering a pedestrian-friendly micro-environment (Al-Kodmany, 2013).

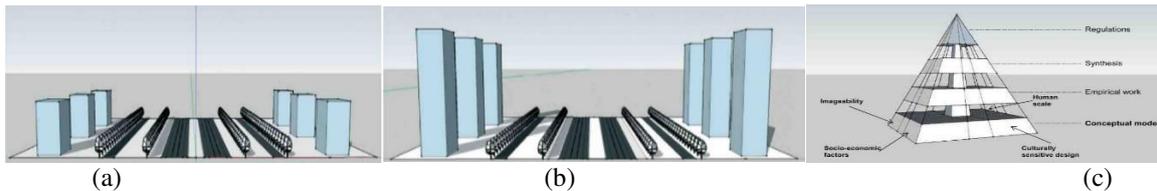


Fig. 5. (a) There is no feeling of enclosure due to the ratio of building height to street width (Al-Kodmany, 2013), (b) A feeling of enclosure is created due to a more appropriate ratio between building height and street width (Al-Kodmany, 2013), (c) Towards creating rules for placemaking (Al-Kodmany, 2013).

### III. SITE ANALYSIS



Fig.6. Land-Use Plan of Project Site on the Ashok Rajpath Road (Source: Author’s Compilation).

The location Ashok Rajpath is a commercial street that has institutional land use on one side (to the north) and mixed land use on the other (South). The building typology consists of commercial shops on the ground floors and residential on the upper floors, which are often referred to as mixed-use buildings. The entire area is developed in a grid-iron pattern. It is a brownfield project. In the project area, there are a few lesser open areas with a limited amount of greenery (Srivastava et al., n.d.). On this route, the use of heavy commercial vehicles is prohibited during the day. Temporarily, traffic lanes were converted from footpaths to improve the movement of vehicles. Asphalt roadways are replaced with concrete ones. The road is categorised as being in poor shape by visual inspection (Kumari et al., 2023).

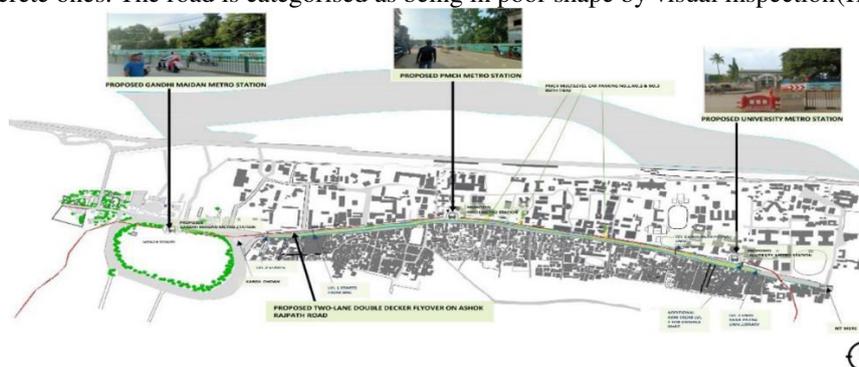


Fig.7. Site Plan of Project Site along-with Proposed Double-decker Flyover and 3 Proposed Underground Metro Stations on the Ashok Rajpath Road (Source: Author’s Compilation).

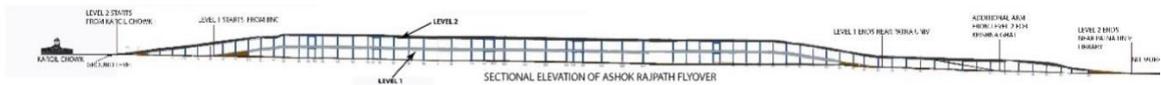


Fig.8. Sectional Elevation of the Proposed Double-decker Flyover on the Ashok Rajpath Road (Source: Author’s Compilation).



Fig.9 Photograph of the Proposed Double-decker Flyover on the Ashok Rajpath Road (Source: Author’s Compilation).



Fig.10 Photographs of the 3-D Views of Proposed Double-decker Flyover on the Ashok Rajpath Road(Kush, n.d.).

Table 1 Details of Ashok Rajpath Two Lane Double Decker Flyover(Source:Kush, n.d.)

|                             |  |
|-----------------------------|--|
| Name of Project             | Construction of Elevated Corridor from Kargil Chowk, Gandhi Maidan to Science College via PMCH, Ashok Raj Path, Patna, Bihar (2-Lane Double Decker)  |
| District/Head               | Patna  |
| Description of Project      | (i) Type of Structure-RCC/PSC / Steel Composite,<br>(ii) Length of elevated corridor-2.2 km, Length of Tier-1 is 1.5 km and Tier-2 is 2.2 km<br>(iii) Carriage way-2 x 2-lane Double Decker (Tier-1 two lanes + Tier-2 two lane) |
| Administrative Approval     | Rs.422.00 Crore {RCD, Lt No.-5566 (S) dated-24.09.2020}  |
| Agreement Amount            | Rs.324.0049 Crore (Agreement no.-16/2021-22).  |
| Date of Start               | 15.01.2022   |
| Schedule Date of Completion | 14.01.2025   |
| Contractor                  | Gawar Construction Limited, DSS- 378, Sector: 16-17, Hisar 125 005 (Haryana)   |
| Progress Physical           | Remarks  |

| Foundati on | Sub-Structu re | Super-Structure | Approach | Expendit ure (Rs. in Cr.) | Work in Progress |
|-------------|----------------|-----------------|----------|---------------------------|------------------|
| 20%         | 15%            | 15%             | -        | 5.40                      |                  |
|             |                |                 |          |                           |                  |

There are 3 Proposed Underground Metro Stations which will be coming under Corridor - II which is from Patna Railway Station to New ISBT, as Corridor - I is from Danapur to KheminiChak. Corridor -I is having Underground Metro Stations which are Gandhi Maidan, PMCH, University Metro stations. The distance from Gandhi Maidan to PMCH is 1.22 Kms and PMCH to University is 1.25 Kms. The Design Speed is 85 Kmph and the Scheduled Speed is 35 Kmph. The Physical Progress is 4.20 %. The 14.45 km long Patna Railway stop - Patliputra ISBT Corridor (Corridor-II) of the Patna Metro will include the PMCH stop. There will be four entry and exit gates at the PMCH metro stop, two of which will be inside the PMCH campus and the other two will be on the Ashok Rajpath on the other side of the street. Additionally, a 30-meter-long subway will be built to provide accessto the entrance and exit gates on either side. With a length of 225 meters, the PMCH metro station will partly enter PMCH's campus and partially enter Anjuman Islamia Hall's campus(Faryal Rumi, 2021).

IV. ANALYSIS OF THE URBAN DESIGN PRINCIPLES UPON SITE

A. IMAGEABILITY ANALYSIS UPON SITE

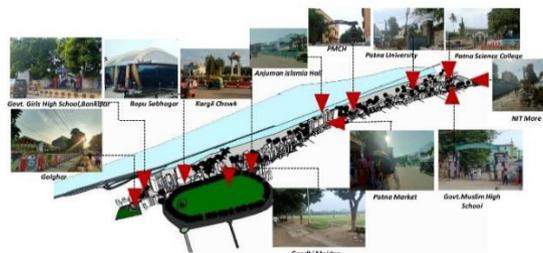


Fig.11 Image shows various landmarks, Imageability Analysis on various locations on Site (Source: Author’s Compilation).

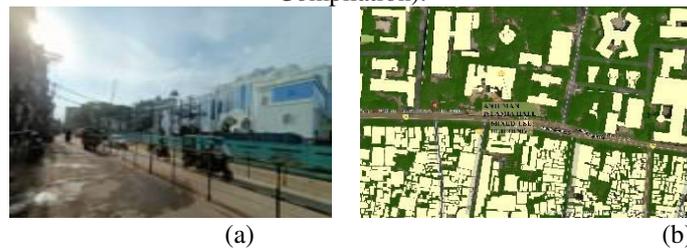


Fig.12(a)Picture of a location Anjuman Islamia Hall on the Ashok Rajpathroad (Source: Author’s Compilation), (b) Satellite image of a location Anjuman Islamia Hall and surrounding areas on the Ashok Rajpathroad (Source: GIS Image by Author).

Imageability analysis on location Anjuman Islamia Hall Before and After Coming of Two-Lane Double-decker Flyover on Ashok Rajpath road.

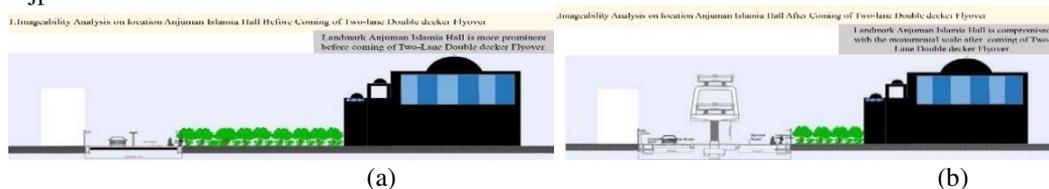


Fig.13(a) Image of a location on the Ashok Rajpath road showing that landmark Anjuman Islamia Hall is more prominent before coming of Two-Lane Double-decker flyover(Source: Author’s Compilation),(b)Image of a location on the Ashok Rajpath road showing that landmark Anjuman Islamia Hall is compromised after coming of Two-Lane Double-decker flyover.

**B. ENCLOSURE ANALYSIS UPON SITE**

The connection between a building's height and floor area, as well as how they interact with the environment, other buildings, and roads. The structure envelope, site coverage, and solar orientation are also included. By generating a sense of openness or enclosure, dimension and mass have an impact on the amenity of streets, spaces, and other structures. Height to distance ratios for enclosures range from 1:1 for a full enclosure, 1:2 for a minimum enclosure, 1:3 for threshold of enclosure and 1:4 for loss of enclosure. Due to shadowing from nearby structures and trees, areas with lower sky view factor values cool more rapidly at night and gradually warm up during the day (Kush, n.d.).



Fig.14 Enclosure Analysis on various locations on Site (Source: Author's Compilation).



Fig.15 (a) Picture of a location Golghar, Patna (Source: Author's Compilation), (b) Satellite image of a location Golghar, Patna and the surrounding areas (Source: GIS Image by Author).



Fig.16 Image of a location Golghar, Patna showing Enclosure Analysis (Enclosure ratio=1:1) (Source: Author's Compilation).



Fig.17 (a) Picture of a location Bankipur Post Office (India Post Office) (Source: Author's Compilation), (b) Satellite image of a location Bankipur Post Office (India Post Office), Patna (Source: GIS Image by Author).

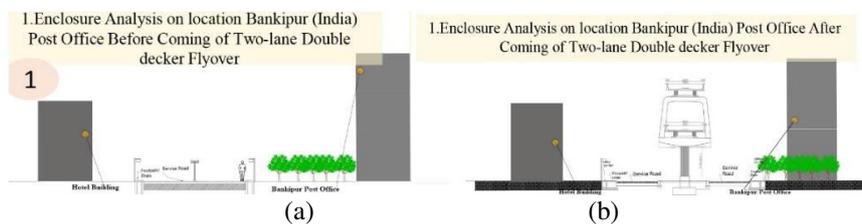


Fig.18 (a) Image of a location Bankipur Post Office (India Post Office) on the Ashok Rajpath road showing Enclosure Analysis before coming of Two-Lane Double-decker flyover (Source: Author's Compilation), (b) Image of a location Bankipur Post Office (India Post Office) on the Ashok Rajpath road showing Enclosure Analysis (Enclosure Ratio= 27/17=1.5, Full Enclosure) after coming of Two-Lane Double-decker flyover (Source: Author's Compilation).



Fig.19(a) Picture of a location Anjuman Islamia Hall (Source: Author’s Compilation), (b) Satellite image of a location Anjuman Islamia Hall on the Ashok Rajpath road(Source:GIS Image by Author).

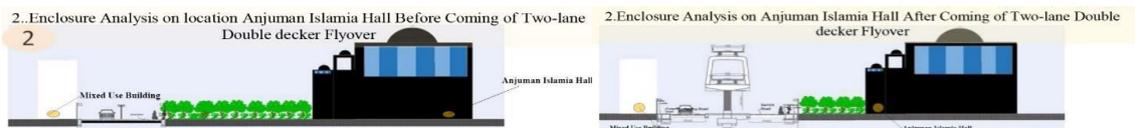


Fig.20 (a) Image of a location Anjuman Islamia Hall on the Ashok Rajpath road showing Enclosure Analysis before coming of Two-Lane Double-decker flyover (Source:Author’s Compilation), (b) Image of a location Anjuman Islamia Hall on the Ashok Rajpath road showing Enclosure Analysis (Enclosure Ratio= $27/16.6=1.6$ , Full Enclosure) after coming of Two-Lane Double-decker flyover (Source: Author’s Compilation).

C. HUMAN SCALE ANALYSIS UPON SITE

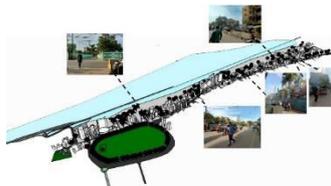


Fig.21 Human Scale Analysis on various locations on Site (Source: Author’s Compilation).



Fig.22(a) Image showing the human activities in front of Anjuman Islamia Hall (Source:Author’s Compilation), (b) Satellite image of a location Anjuman Islamia Hall on the Ashok Rajpath road and surrounding areas (Source:GIS Image by Author).

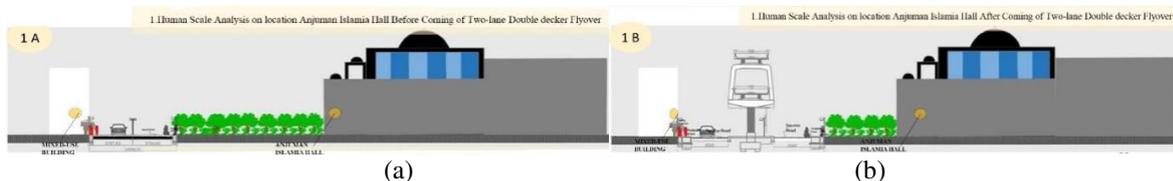


Fig.23 (a) Image showing Human Scale Analysis on a location Anjuman Islamia Hall Before Coming of Two-lane Double decker Flyover (Source: Author’s Compilation), (b) Image showing Human Scale Analysis on a location Anjuman Islamia Hall After Coming of Two-lane Double decker Flyover (Source: Author’s Compilation).

D. TRANSPARENCY ANALYSIS UPON SITE



Fig.24. Transparency Analysis on various locations on Site (Source: Author’s Compilation).



Fig.25 (a) Image showing the the buildings in Shutter infront of Patna University Central Library (Source: Author’s Compilation), (b) Satellite image of a location Patna University Central Library & adjacent areas (Source: GIS Image by Author).

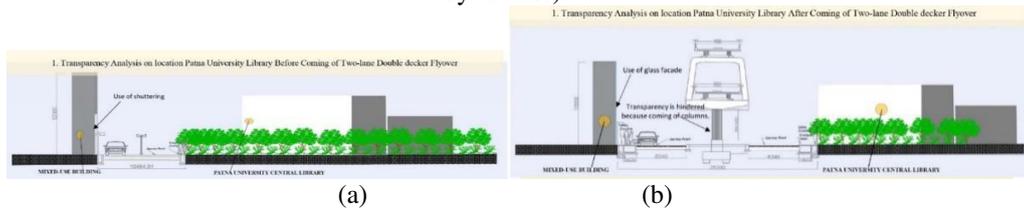


Fig.26(a) Image showing Transparency Analysis on location Patna University Library Before Coming of Two-lane Double-decker Flyover (Source: Author’s Compilation), (b)Image showing Transparency Analysis on location Patna University Library After Coming of Two-lane Double-decker Flyover (Source: Author’s Compilation).

E. COMPLEXITY ANALYSIS UPON SITE



Fig.27 Complexity Analysis on various locations on Site (Source: Author’s Compilation).



Fig.28 (a) Image showing the street vendors infront of Patna University, (b)Satellite image of a location Site Plan of Patna University and surrounding areas (Source:GIS Image by Author).

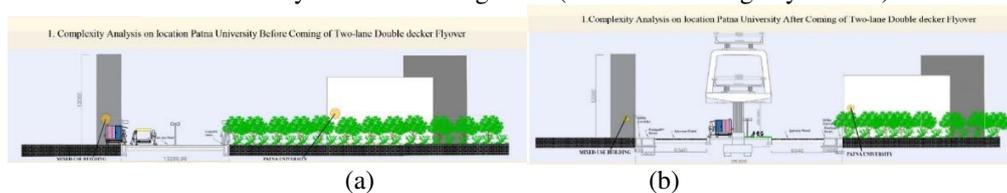


Fig.29(a) Image showing Complexity Analysis on location Patna University Before Coming of Two-lane Double-decker Flyover (Source: Author’s Compilation), (b)Image showing Complexity Analysis on location Patna University After Coming of Two-lane Double-decker Flyover (Source: Author’s Compilation).



Flyovers not only assist in reducing traffic congestion, but they also provide pedestrians with a useful street by converting the under-flyover spaces into lovely gardens with sit-outs and children's play areas. Additionally, since commuters sometimes use these areas as a rest area and can store their own private two- and four-wheel vehicles in designated parking spaces, areas for street vendors and hawkers' spaces must be designed. The settlers should be given good treatment, and some areas should be planned with them in mind (Srivastava et al., n.d.-b).

**IV. TABLE OF ANALYSIS OF URBAN DESIGN PRINCIPLES IMPLEMENTED UPON SITE.**

| Urban Design Principles | Analysis on Site before coming of Flyover (Ground Situation)   | Predictive Analysis on Site after coming of Flyover   |
|-------------------------|--|---|
| 1. Enclosure            | Full Enclosure can be seen on Golghar, Bankipur Post Office and Anjuman Islamia Hall locations.  | Loss of enclosure, loss of sky-view factor, Trees are cut, loss of shaded pathways because of coming of flyover.  |
| 2. Human Scale          | Human scale was there due to street lights, street vendors, interconnected built form.   | Human Scale is lost, greenery is lost. Human Scale is converted into concrete monumental scale by coming of flyover on the street.                        |
| 3. Transparency         | Visual Transparency are of two types: 1. Within Street, 2. With Buildings. Transparency within street is hindered because of coming of columns. Shops and buildings transparency remain same.  | For Newer Construction, more transparency is required by using Glass, open façade glass. New Boundary walls to be built on the site demolishing old ones. |
| 4. Imageability         | Imageability can be seen on both the stretch of street, since it's a mixed Landuse. 1. Left Side: All types of a) Brass Utensils shops, b) Book Stores, c) Medical Stores, d) Household items. 2. Right Side: Public and Institutional Buildings, which are essential Landmarks. | Earlier trees were there but now they are cut down. Transformation of green spaces into concretization.   |
| 5. Complexity           | Complexity can be seen by street vendors, shops, modes of transport used. Footpath was earlier encroached by street vendors.   | Use of under-flyover spaces-Garden spaces, vegetation, playground spaces, vendors, markets.   |

**V. PREDICTIVE MODEL**

For developing a Predictive Model, a futuristic projection of the expansion and advancement of the street of Ashok Rajpath can be seen through figures. The impact of a double-decker flyover can be seen on the street as it creates a monumental scale, the building height will change, changing the skyline of the project area. As a result, also by coming of transit-oriented policy regulations, the F.A.R. of plots will alter, which will affect building height and plot size.

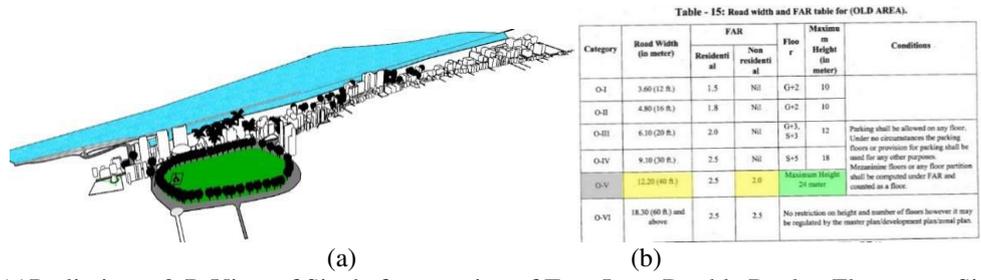


Fig.30 (a) Preliminary 3-D View of Site before coming of Two-Lane Double Decker Flyover on Site (Source: Author’s Compilation), (b) Table for Floor Area Ratio (F.A.R.) for buildings shall be decided on the basis of the road width on which the plot/site abuts (before coming of double-decker flyover on Ashok Rajpath road) (Source: (Bihar Building Bye-Laws 2014, Urban Development & Housing Department, Government of Bihar, n.d.)) Before coming of Two-lane Double Decker Flyover, the road width was 12.20 metres (minimum), so F.A.R was 2.0 for the area, maximum floor height was 24 metres (Table 30(b)).

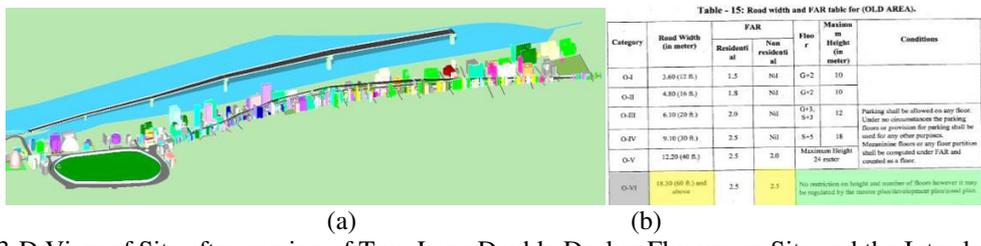


Fig.31 (a) 3-D View of Site after coming of Two-Lane Double Decker Flyover on Site and the Introduction of TOD Policy (Source: Author’s Compilation), (b) Table for Floor Area Ratio (F.A.R.) for buildings shall be decided on the basis of the road width on which the plot/site abuts (before coming of double-decker flyover on Ashok Rajpath road) (Source: (Bihar Building Bye-Laws 2014, Urban Development & Housing Department, Government of Bihar, n.d.))

After coming of Two-lane Double Decker Flyover, the road width is increased, trees were cut-down, new boundary walls to be built for Patna University Campus and Science college the new road width is increased to 18.30 metres and above, so new F.A.R is 2.5 for the area, maximum floor height has no restrictions (Table 31(b)), (Predicted 2 more floors in the Model (Fig.31(a)).

VI. CONCLUSION

Since the whole area, Ashok Rajpath is a brownfield development so new developments can’t take place, due to this, the only change after coming of double-decker flyover can be seen in the structural (civil changes) and some changes in the architectural character like treatment of building facades and thus heights of the buildings and plot size will change due to change in F.A.R.

Also, the movement of vehicles because of 3 tiers will be segregated, NMT and other vehicles will move on the ground floor and heavy automobiles on the tier I and tier II. There will be more space for vendors and for this under flyover spaces can be utilized. Because of road widening, more utility for pedestrian and vehicular movement will be seen. Three multistorey parking buildings are proposed near PMCH, diminishing the option for on-site parking, along footpaths. Also, connectivity to Loknaya Ganga path via Krishna Ghat creates a new urban image to this location thus visualising the change in built fabric of this street using a Predictive Model and hence applying urban design principles.

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