

# Reinterpreting Kolkata's heritage: A system-cybernetic approach for the resurgence of tram as an eco-friendly mode of transport.

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## ABSTRACT

*Tramways are regarded as one of the most profitable of all Light Rail Transit systems originated in early nineteenth century in Wales. These help in contributing smart growth patterns by promoting economic stewardship and increasing ridership besides boasting of a clean, green, no-residue medium of transport. Design wise, tramcars are comfortable and user-friendly having a low height boarding platform. India being under colonial rule experienced tram system as early as 1873 with Kolkata being the first city. The once flourishing network has been gradually reduced to a meagre existential formality being hampered with the uncontrolled expansion of the urban core and emergence of faster systems like the metro. With most developed cities around the world opting for trams as an alternative, Kolkata has backtracked gradually pushing the once flourishing system towards 'extinction'.*

*This paper aims to identify tram as a system along with its various subsystems for having a comprehensive apprehension of how environmental psychology can be effectively incorporated to identify the arguments and advocate strategies to reinterpret the user perception by various principles of environmental appraisal on two routes selected from survey to provide a consolidated scheme for the resurgence of tram system in the city of joy.*

**Keywords:** Environmental appraisal, LRT system, System-cybernetic approach, Urban mobility.

## 1. INTRODUCTION

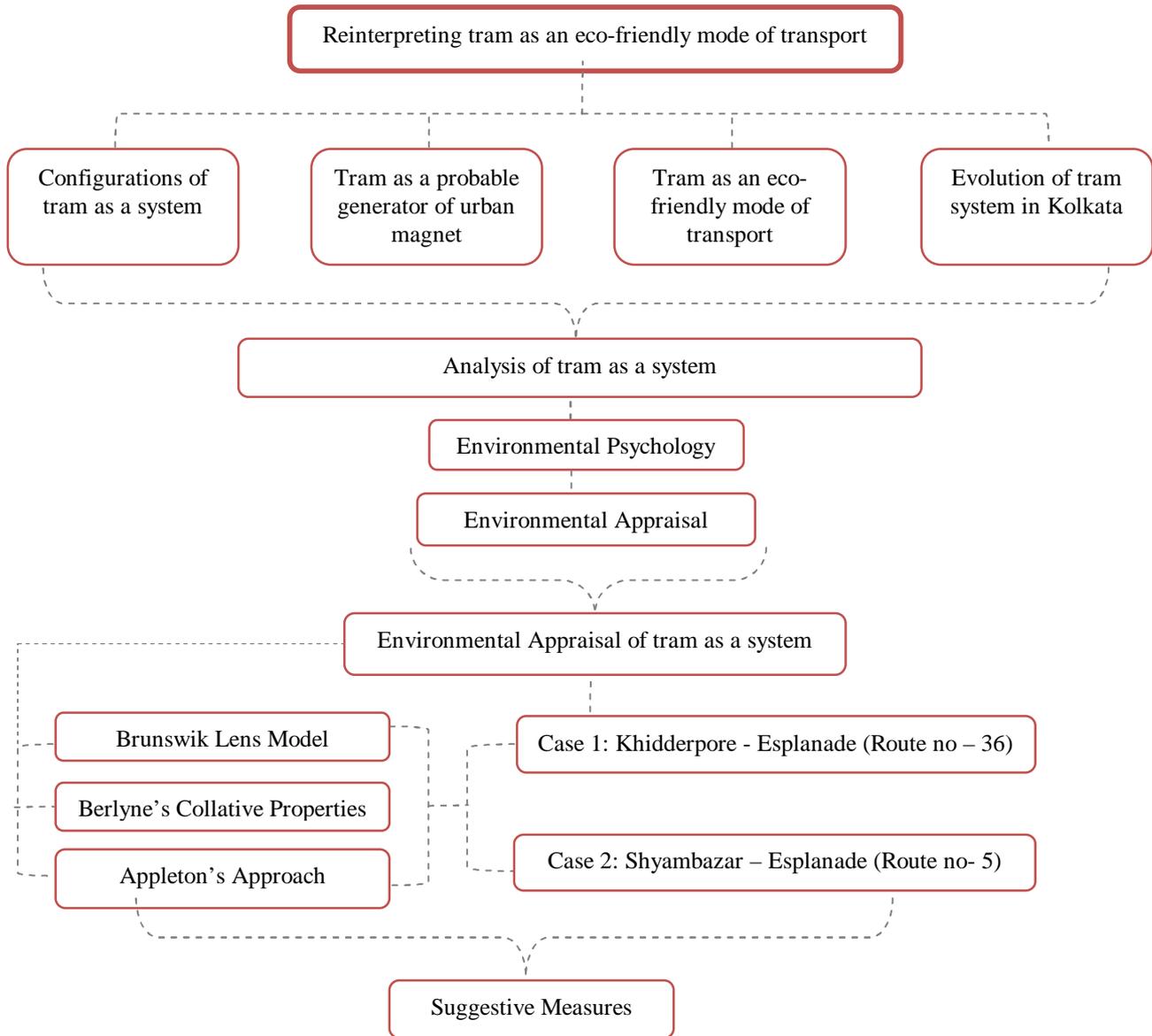
A system as defined by [1] is a group of interacting or interrelated entities that form a unified whole. A system is delineated by its spatial and temporal boundaries, surrounded and influenced by its environment, described by its structure and purpose and expressed in its functioning.

Systems theory is an interdisciplinary theory about the nature of complex systems in nature, society, and science, and is a framework by which one can investigate and/or describe any group of objects that work together to produce some result [2]. It is multi-disciplinary in nature having taken ideas from various fields like architecture, geography, engineering along with the ethos of life and social wellbeing [3]. A system can be further subdivided into its constituent elements each having the capability to be analyzed as an individual entity. These components form the subsystem which when collectively grouped together identifies itself as a system. Furthermore, a system can be controlled (cybernetic in nature) and uncontrolled. In a controlled system, information is discerned and the variations are realized in feedback to the information. These variations are the detector, selector and effector functions of the system. Detector plays the role of mutually exchanging information between systems. The selector is characterized by the procedures that the system uses to determine judgements, and the effector is the mode through which systems exchange information.

The primary question that arises is how can we incorporate environmental psychology to understand and analyze the existing arguments related to resurgence of trams as an eco-friendly mode of transport. Based on the analysis further strategies shall be formed to elucidate the matter. It must be kept in mind that tram here has been considered as a system and the surrounding built environment acts as the setting.

## 2. METHODOLOGY

The whole perspective of this paper caters to a system-cybernetic approach for analyzing the arguments. A flowchart illustrated below clearly denotes the workflow stating the different cybernetic models involved in the study.



**Figure 1**Flow diagram indicating the research methodology (Source: Author)

## 3. ANALYSIS

Trams are considered as a fairly simple system of transport. It consists of two coaches with head coach in front housing the engine and driver running along a track embedded in the street. Before the introduction of electric trams, they were usually driven by horse, steam and gas. Electricity in trams was first operational in 1880 in Sestroretsk near Saint Petersburg, Russia. The trams which use electric power are fed by the pantograph sliding on an overhead line. The line on which trams operate are known as tramways. They usually share the street with other users like pedestrians, motorized and non-motorized vehicles unless they have a grade separated right of way. This encourages a conflux of activities thereby enriching the perception of a place making it inviting and attractive for people. Referring to Heinz vonFoerster's "order from noise" principle in 1960, trams have emerged as a cohesive system in the urban chaos

thereby justifying the principle that addition of noise makes it more likely for a system to evolve to a stable state.

**Table 1:** Margin specifications

SL. NO	PARAMETERS	DESCRIPTION
1	Detector (D)	Tramcar, Electric lines, Urban streets, Diversified network routes, Operating body.
2	Selector (S)	Alternate mode of transport, Operational costs, Simple and stable configuration.
3	Effector (E)	Pedestrians, Vehicular traffic, Passengers, Driver, Conductor, CTC staff, Shared streets, Stakeholders.

### 3.1 Configurations of tram as a system

Introduced as an experimental transport module in the urban setting, trams have survived the test of times. Gradually as the experiment proved successful, trams have undergone a transition from less stable to a more stable configuration. As we know evolution is asymmetrical in nature and cannot occur without instability, the case is no different for trams. Having seen so many developments over the years from being driven by horses to electric power, the system according to the principle of selective retention has retained the stable configurations while eliminating the unstable ones. Thus, it is safe to say that trams are more of a generalized “continuous” system having a high rate of probability of transition under variable circumstances to achieve stability which is a factor of time.



**Figure 2** Tram as a system under different settings (Source: Author)

### 3.2 Tram as a probable generator of urban magnet

In the realm of transportation, tramways act as a possible generator of urban magnet triggering an urban transformation within the city precincts. The introduction of trams has brought about significant impact on the present transit system by unlocking potentials for city development. Tram corridors running within the urban fabric helps in connecting functional zones creating a dynamic network. Owing to the pedestrian scale, trams are able to harmoniously blend into the natural setting. They are also credited for imbuing a sense of place through the experience it provides to the users. Tramways does not require heavy infrastructure for its operation hence, can pass through roads of different hierarchy. This perpetually provides tourist and locals the ease of accessing attractive places. A tram ride is starkly different from other modes of transport as it is based more on perception than just an origin-destination service. Since the trams ply at such speed, riders are able to connect seamlessly with the built environment giving the brain ample time to form images. Hence, every journey leave behind several memories in the form of mental maps which invariably contributes in wayfinding.

### 3.3 Tram as an eco-friendly mode of transport

Pollution is regarded as a burning issue in the twenty first century. Dwindling natural resources has resulted in people opting for alternative solutions that safeguard our environment. Of all means of transport plying within the city,

tramways serve as a mobility solution that helps reduce pollution, traffic congestion and offers a stable configuration. This electrically driven pollution-free mechanism having a high carrying capacity is one of the most favoured option. The problem of urban transport can be resolved to a great extent with extensive use of trams. Much of the dependency on non-renewable resources is eliminated since trams operate on renewable sources lowering the carbon footprint. Besides conserving, trams can be accredited for generating economic benefits in mutual connection to its commuters. This system enhances the natural setting in coherence with the whole without altering the impression of our built environment.

### 3.4 Evolution of tram system in Kolkata

Currently running under the administrative control of Transport Department, Government of West Bengal, The Kolkata Tram System has an interesting chronology of development.

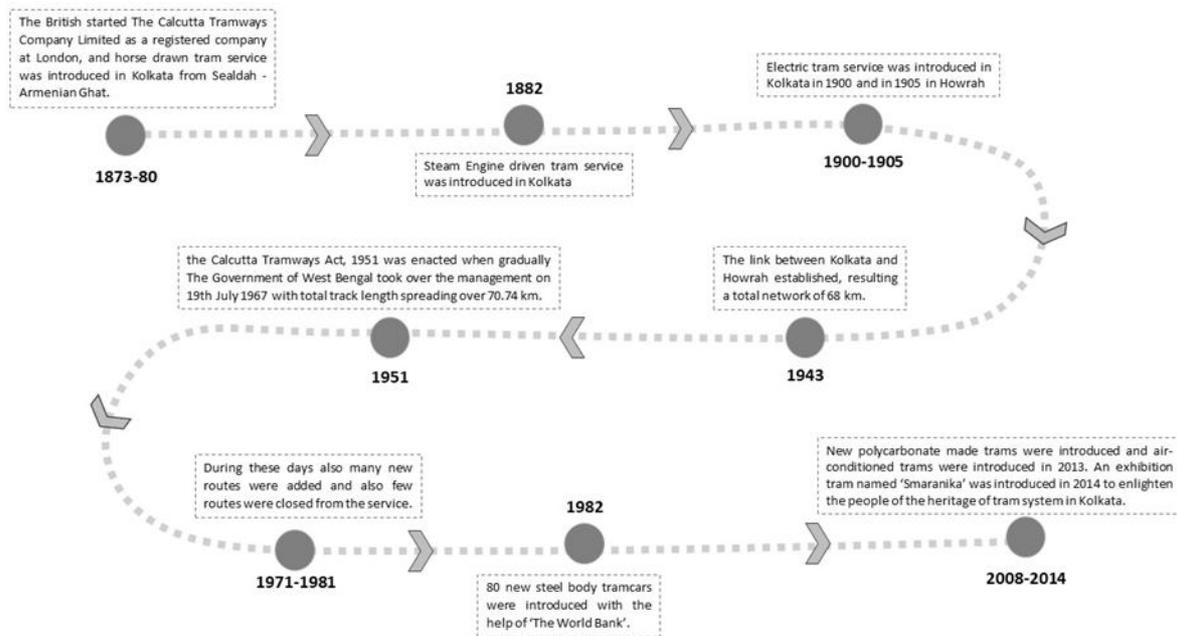


Figure 3 Chronology of trams in Kolkata (Source: Author)

## 4. DISCUSSION

### 4.1 Environmental Psychology

Environmental psychology plays an important role on the development of an individual's unique behaviour, perception and appraisal of his environment. This observation is a result of both his personal experience and the nature of the environmental influences of that environment. Environmental psychology gives a better understanding of the psychological affects that the physical environment has on its users. Environmental psychology finds special relevance while dealing with cognition science. It helps to find the bridge between human behaviour and perception to advocate strategies for remediation[4]. Thus, this helps the planners and designers to build a better physical environment according to the user's behaviour and perception.

Environmental psychology deals with five areas of interest, which are:

1. Environmental perception
2. Environmental appraisal
3. Spatial cognition
4. Sensory stimulation
5. User control, constraints and crowding

### 4.2 Environmental Appraisal

Environmental appraisal refers to an individual's personal impressions of an environment [5]. The reaction of the users or the people to the surrounding environment is based on how the person feels within the setting or on emotional

response making the environmental appraisals obscure. Individual differences or psychological factors influence the appraisal approach in the judgement of the beauty of the environment.

Environmental appraisal involves measurement of preference and basically revolves around two questions–

1. What do we like?
2. How do we measure preference?

(But where do these preferences come from and which one, we prefer?)

Not everyone applies the same set of rules to assess preference. For the development of an individual's preference both environmental and personal factors act as influential magnets but environmental appraisal specifically focusses more on the individual's personal factor to assess how they develop their unique impression of their environment. People respond in a complex manner to their environment or to their setting. A number of cues are needed to understand the responses made by an individual to the setting or how he or she perceives his or her environment. These responses might vary according to different situations or environments. One theory or concept cannot provide a comprehensive explanation as to how an individual respond to a specific environment. Number of theories and concepts are therefore necessary to better understand an individual's experience and perception towards environmental appraisal.

### 4.3 Environmental Appraisal of Tram as a System

Tramways in Kolkata form a complex network within the city core. Preference of the users within the system varies according to location and affordances. Choices of users influences their preferences. In the quest to find the two contrasting yet operational routes in different external setting preferred by users, a survey was conducted (Annexure – 1) that highlighted two routes namely Khidderpore – Esplanade and Shyambazar – Esplanade. While one route represented high prospect, the other depicted untapped potentiality. This paper aims to understand tram as a system through the theories and concepts of environmental appraisal analogous the aforesaid routes for a futuristic resurgence in terms of their user experience.



**Figure 4** Changing urban pattern across route 36: Khidderpore - Esplanade (Source: Author)



**Figure 5** Changing urban pattern across route 5: Shyambazar - Esplanade (Source: Author)

#### 4.3.1 Brunswik Lens Model

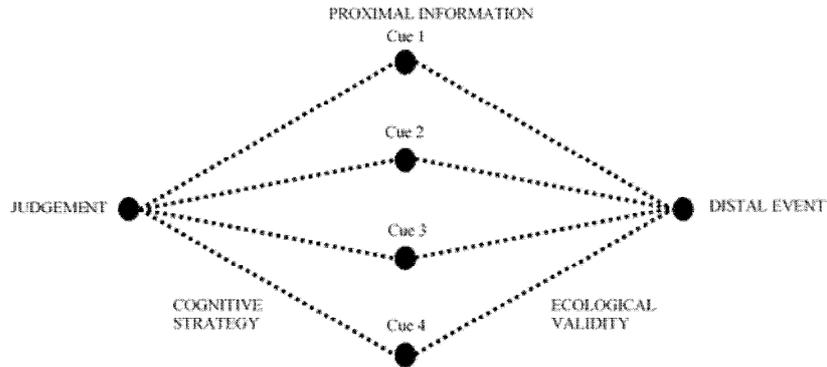
The primary idea of Egon Brunswik was that both the perceiver and the environment are important for the environmental perception and appraisal. He emphasizes that the perceiver acts as a predominant force for the development of the perception. Extracting useful images of the environment is considered as the principal role of the perceiver so as to understand the setting or the environment in a better way.

Brunswik's concept of the lens model has been known as being an influential approach to the understanding of environmental perception, including how individuals differ in learning based on the environmental information they receive within their setting. This theory establishes that environmental stimuli becomes focused and perceived through individual perceptual efforts [5]. He states that a number of cues are provided by the environment but only a few of the

cues given in the setting or the environment are useful to the perceiver. To perform effectively in a setting or an environment, the perceiver plays an important role in selecting the most important cues. This selection or attention that these cues get over the rest, depends upon the significance of the cues in the given setting or the environment for the user.

Brunswik said that there are two levels of guesses –

1. Relationship between the external world and the proximal cues.
2. Relationship between cues and the judgement.



**Figure 6**Flow diagram of Brunswik lens model

**Table 1:** Analysis of Brunswik’s two level of guesses at Khidderpore – Esplanade route

LOCATION	CUES	
	Relationship between the external world and the proximal cues	Relationship between cues and the judgement with respect to Tram
Khidderpore depot – Khidderpore market	<ul style="list-style-type: none"> <li>–Densely packed on both sides of Karl Marx Sarani</li> <li>–Hawkers in front of the retail shops creates visual barrier</li> <li>–Fancy market is a hub of second hand accessories</li> <li>–Reminiscent of typical crowded street markets in the city drawing large crowds</li> <li>–Presence of multiple places for prayers</li> <li>–Built bear the same character with old tarnished structures</li> </ul>	A vibrant place with similar built character
Khidderpore market – Race course	<ul style="list-style-type: none"> <li>–Khidderpore iron bridge built over TollyNala is grade separated</li> <li>–Presence of high-rise buildings</li> <li>–A gradual shift in the urban landscape from built to open</li> <li>–The Royal Calcutta Turf Club with its historic green setting</li> </ul>	Pleasant view with increase in open spaces
Race course – Mayo Road	<ul style="list-style-type: none"> <li>–Vast outstretched green lands</li> <li>–Thick growth of large trees on both sides of Khidderpore Road and Dufferin Road</li> <li>–Important structures like Victoria Memorial, Fort William, Tata Centre, The 42 and landmarks like Vidyasagar Setu, Vijay Smarak can be seen through this stretch</li> <li>–Location of sporting clubs and practice grounds all around Maidan area</li> <li>–Fast speed and free flowing traffic accounts for a smooth ride</li> </ul>	Skyline seen here depicts the image of the city
Mayo road – Esplanade depot	<ul style="list-style-type: none"> <li>–View of the Shahid Minar, LIC Building serves as a landmark for wayfinding</li> <li>–Shift in the urban setting from the green fields to a commercially vibrant area</li> <li>–Access to the heart of the city</li> <li>–Wholesale market mainly for sporting goods</li> </ul>	Amalgamation of different zones with the Central Business District

	-Connectivity to the various bus terminus	
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**Table 2:** Analysis of Brunswik’s two level of guesses at Shyambazar – Esplanade route

LOCATION	CUES	
	Relationship between the external world and the proximal cues	Relationship between cues and the judgement with respect to Trams
<b>Shyambazar depot – Hatibagan</b>	<ul style="list-style-type: none"> <li>- Tightly packed urban fabric on both sides of Bidhan Sarani</li> <li>- Chaotic hawkers encroaching the pedestrian pathways</li> <li>- Availability of wide range of home and fashion products</li> <li>- Congested street with two-way traffic</li> <li>- Movie halls reflect old persona of the place</li> <li>- Huge crowd of commuters and shoppers during evening</li> </ul>	Dynamic character flooded with lights and people
<b>Hatibagan – Hedua park</b>	<ul style="list-style-type: none"> <li>- Presence of numerous noteworthy educational institutes like Bethune and Scottish etc.</li> <li>- Large square at Hedua with facilities like yoga, swimming, recreation having limited access</li> <li>- Crowded with students during school hours slow moving traffic</li> <li>- Mixed use development with residential and retail shops</li> </ul>	High prospect zone for young age group
<b>Hedua park – ThanthaniaKalibari</b>	<ul style="list-style-type: none"> <li>- The renovated house of Swami Vivekananda is of historic importance</li> <li>- Aryan Kanya school and Vidyasagar College located facing the road</li> <li>- Large gathering at Kalibari to offer prayers</li> <li>- Presence of old residential buildings reflecting the rich architecture of the place</li> </ul>	Prominent old Kolkata built character
<b>Thanthaniakalibari –College street</b>	<ul style="list-style-type: none"> <li>- Old commercial establishments on both sides</li> <li>- The incomplete and under-utilized Barnaparichay Mall</li> <li>- Chaotic surroundings with vendors, shoppers, commuters and busy traffic traversing each other</li> <li>- Busy College Street node slowing down traffic</li> </ul>	Commercially viable zone acting as an urban magnet
<b>College street – Calcutta Medical college</b>	<ul style="list-style-type: none"> <li>- Premier institutes like Presidency, Calcutta University and Calcutta Medical College</li> <li>- Presence of one of world largest on-street book markets on College Street</li> <li>- College Square serves as an important gathering place</li> <li>- Traffic rules regulated to avoid chaos during peak time</li> <li>- Slow speed of tram with frequent stops</li> </ul>	Wide range of activities catering to a large user group
<b>Calcutta Medical college –Hind inox</b>	<ul style="list-style-type: none"> <li>- Retail shops for medical purposes, sanitary fittings and hardware in abundance</li> <li>- Roadside eateries always buzzing with people</li> <li>- Hind Inox multiplex is an important recreation facility</li> <li>- Oldest wholesale market of gold jewellery, milk and dairy products</li> </ul>	Specific user group of buyers and sellers accessing the markets
<b>Hind inox – Esplanade depot</b>	<ul style="list-style-type: none"> <li>- Wellington Square centre for activities like gym, sports and political gatherings</li> <li>- Change in route towards Esplanade via Lenin Sarani</li> <li>- Electronics market at Chandni Chowk always crowded</li> <li>- Loreto School is the only institution in the otherwise commercially dominant area</li> </ul>	Mixed economy with changing built pattern

**4.3.2 Berlyne’s Collative Properties**

Daniel Berlyne stated that a few collative properties of the environment inspire the perceiver to compare the settings or the cues, to look into it deeply and investigate further. He was interested in motivation and believed that peoplesometimes get influenced by simple curiosity. The collative properties defined by Berlyne affected or inspired

arousaland the central idea was that there was a “sweet spot” for arousal. In an urban context, anything which is too high or too low is less preferred. If the changes are made in a moderate level, it is more preferable.

The collative properties are –

- COMPLEXITY – much detail; number of components that frame the setting or the environment.
- INCONGRUITY – the belief or judgement that something is out of place.
- COHERENCE– overall order of a scene or gradual change.
- NOVELTY – unusualness of appearance.

Berlyne thus believed that the aesthetic judgement of an environment made by the perceiver is influenced by these collative properties and that it also increases the desire to explore.

**Table 3:** Analysis of Berylne’s collative properties at Khidderpore – Esplanade route

LOCATION	CUES				ANALYSIS
	COMPLEXITY	INCONGRUITY	COHERENCE	NOVELTY	
<b>Khidderpore depot – Khidderpore market</b>	YES	NO	NO	NO	<ul style="list-style-type: none"> <li>- Complicated zone with lots of different activities from morning till evening</li> <li>- Buildings are typical and does not appear to be out of place</li> <li>- The setting does not show change in the urban character</li> <li>- Similar in appearance with markets predominating</li> </ul>
<b>Khidderpore market –Race course</b>	NO	YES	YES	YES	<ul style="list-style-type: none"> <li>- Area is not complex with vividly distinct activities near Hastings and Race Course</li> <li>- The high-rise buildings near Hastings seem out of place in contrast to the rest of the area</li> <li>- A gradual shift in urban character upon crossing the Khidderpore Loha bridge</li> <li>- The tall buildings do seem unusual alongside the green</li> </ul>
<b>Race course – Mayo Road</b>	NO	NO	YES	NO	<ul style="list-style-type: none"> <li>- Minimal details along Race Course and Maidan with mostly recreational activities</li> <li>- Every elements merge with the setting to give a seamless experience</li> <li>- No change in urban character offering an order to the scene</li> <li>- Nothing bizarre in the appearance with vast expanse of open green fields</li> </ul>
<b>Mayo road – Esplanade depot</b>	YES	YES	NO	YES	<ul style="list-style-type: none"> <li>- The clusters of shops at Maidan Market and no management at Esplanade bus terminus makes for a complex setting</li> <li>- Encroachment of hawkers near Shahid Minar and improper management at the Esplanade bus terminus seem out of place</li> <li>- The change in urban character after Mayo Road and Dufferin Road roundabout is sudden and disturbs the overall order of the urban setting</li> <li>- The dense accumulation of built structures near Shahid Minar</li> </ul>

					with Esplanade bus terminus and Maidan Market seem unusual as compared to the journey through Maidan
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**Table 4:** Analysis of Berylne’s collative properties at Shyambazar – Esplanade route

LOCATION	CUES				ANALYSIS
	COMPLEXITY	INCONGRUITY	COHERENCE	NOVELTY	
Shyambazar depot – Hatibagan	YES	YES	NO	NO	<ul style="list-style-type: none"> <li>– Area presents a complex scene bustling with hawkers, retail shops on both sides of Bidhan Sarani along with movie halls</li> <li>– Modern buildings like Fusion, Fashion at Big Bazar, Citimart gives an impression that these structures do not fit contextually</li> <li>– No transition in the overall arrangement with similar kind of commercial activities on both sides of Hatibagan</li> <li>– Typical appearance of built structures with no surprising elements</li> </ul>
Hatibagan – Hedua park	NO	NO	YES	NO	<ul style="list-style-type: none"> <li>– Area presents a simplistic scene with developments parallel to Bidhan Sarani</li> <li>– Square at Hedua Park and the built forms of Bethune, Scottish are old yet rich in details and merges well with the surroundings</li> <li>– A change in the setting from dense commercial developments near Hatibagan to an institutional zone near Hedua bestow an order to the setting</li> <li>– No such unconventional forms in the setting that evokes a feeling of confusion</li> </ul>
Hedua park – ThanthaniaKalibari	YES	NO	NO	NO	<ul style="list-style-type: none"> <li>– Development is complex with religious, institutional, residential buildings all in one scene</li> <li>– The residential buildings near ThanthaniaKalibari have minute details prevalent in the old houses of Kolkata seem to blend aptly with the setting</li> <li>– An orderly system having no shift in the developmental pattern with the tram operating through the middle</li> <li>– Similar kind of setting on both sides exhibiting traditional forms</li> </ul>

Thanthaniakalibari – College street	YES	NO	YES	YES	<ul style="list-style-type: none"> <li>– Convoluted context with wholesale market, retail shops, street vendors and public gathered together</li> <li>– Most of the built forms have retained similar character for years hence nothing seems unfamiliar</li> <li>– A gradual shift from mixed use development near ThanthaniaKalibari to a more commercially assertive zone near College Street junction</li> <li>– The shabby appearance of the Barnaparichay Mall reveals a contrasting image</li> </ul>
College street – Calcutta Medical college	NO	NO	YES	NO	<ul style="list-style-type: none"> <li>– Although the pattern seems complex with book stalls on pathways and the College Street becoming narrower, there is order in chaos</li> <li>– The built structures near College Square bear a harmonious relationship with the setting</li> <li>– The scene shows a progressive deviation from commercial to institutional area</li> <li>– Area symbolic of city’s heritage with no peculiarity in the outward aspect of the surroundings</li> </ul>
Calcutta Medical college – Hind inox	YES	YES	NO	YES	<ul style="list-style-type: none"> <li>– Crowded place with on-street parking and markets near Bowbazar area reinforces the complexity of the system</li> <li>– The modern structures do not look befitting to the area that bears a traditional style</li> <li>– Not much change in the urban character with markets being at the forefront</li> <li>– Few tall buildings like Tanishq, Goenka college, White Towers seem unsuitable when compared to the narrow Nirmal Chandra Street</li> </ul>
Hind inox – Esplanade depot	YES	YES	NO	YES	<ul style="list-style-type: none"> <li>– Goods vendor, hawkers, porters, parked vehicles at Lenin Sarani all account for a perplexing system</li> <li>– Few residential houses near Wellington Square and Loreto School on Lenin Sarani does not conform to the setting</li> <li>– No subtle change of character with continuity of the commercial area till the destination</li> <li>– Temporary stalls at Chandni Chowk when compared to the rest of the commercial area seem uncommon considering they have been there for years now</li> </ul>

**4.3.3 Appleton’s Approach**

Humans have the tendency to prefer locations or settings which have high prospect or high refuge. Areas with high prospect are those environments where the users feel refreshed or energized or can feel a change of behaviour in himself. And the settings with high refuge are those where a user feels safe and comfortable. These approaches treat the environment and the user as two different entities. The physical aspects or characteristics of a setting like its form and shape and personal properties influences the assessment.

**Table 5:** Assessment of cues through Appleton’s approach at Khidderpore – Esplanade

ENVIRONMENT	USERS GROUPS	USER PREFERENCES	LOCATION	CUES	TYPE OF BEHAVIOUR
Leisure	Tourist	Seeing places of interest Enjoying the lush green grounds Accessing the bus terminus	Hastings, Victoria Memorial, Race course, Maidan, Shahid Minar	Soothing environment with plenty of greenery and places for tourist attraction	Pleasing experience for riders. Trams play at faster speed compared to any other area in the city
	Locals	Spending a day with family Going for sports practice Enjoying the serene setting	Victoria Memorial, Maidan		
Work	Office goers	Connecting the CBD	Esplanade, BBD Bagh	Access to CBD and bus terminus	Modal split
	Business	Transportation of goods	Fancy Market, Khidderpore market, Maidan market	Overcrowded with commercial activities.	Difficulty in boarding. Slow speed due to traffic
	Vendors	Accessing the nearby market			

This route is one of the oldest routes which is still prevalent and running. As a major part of it traverses through the green lungs of the city along with connecting important places for tourist attraction, this route is an important one. Connecting other areas to the CBD is another important feature of this highly efficacious route. Thus, it can be safely concluded that this route has high prospect and high refuge.

**Table 6:** Assessment of cues through Appleton’s approach at Shyambazar – Esplanade

ENVIRONMENT	USERS GROUPS	USER PREFERENCES	LOCATION	CUES	TYPE OF BEHAVIOUR
Leisure	Locals	Accessing places for recreation	Darpan cinema, Minar cinema, Mitra movie hall, Star Theatre & Hind Inox	Presence of old school movie halls parallel to the route	Easy accessibility as they are located on the road itself
			Hedua Park, College square, Wellington Square	Only dedicated green space (park) in the entire route	Gathering place for a mixed group of people

			Ramakrishna Mission Swami Vivekananda's Ancestral House and Cultural Centre, famous houses on Bidhan Sarani	Typical old built fabric with intricate architectural details of North – Kolkata on both sides of the street	Feeling of nostalgia and pride on passing through the area
Work	Office goers	Going to hospital for work Reaching their respective Govt & Pvt offices	Calcutta Medical College and Hospital, Esplanade	Disorganized yet highly activated area giving direct access to desired destination	Often preferred having good connectivity for short trips at cheap price
	Patients & family	Reaching hospital for treatment	Calcutta Medical College & Hospital		
	Business	Reaching their respective shops	Sreemani bazar, College street market, Hatibagan market, Dharmatala market	Congested at places with a spillover of commercial activities near the road	Not preferred due to slow speed during peak hours adding to the chaos
	Vendors	Accessing the nearby market			
Academic	School students & guardians	To-and-fro from school	Arya Kanya, Town school, Scottish church school, Hindu, Hare, Loreto day school (Dharmatala)	Located in close proximity to the institutional premises with frequent stoppages	High demand during peak hours and most preferred option by students
	College goers	Going to colleges	Scottish church, Bethune college, Vidyasagar college, Presidency University, Calcutta University, Medical College		
	Coaching class	Going to professional centres	Hedua Park College street		

This route is credited for being prevalent and operational as it connects the major institutional areas with entertainment facilities impacting ridership. Relatively high frequency during peak hours but narrow lanes accounts for high prospect low refuge zones in some places and low refuge high prospect zones in others.

**Conclusion**

Observations and analysis from both routes reiterate on the need for small interventions bringing about substantial impact. Public awareness and their active participation are a must if we are to reinforce holistic solutions. From Brunswik’s lens model we see users perceive the significant cues. Hence fine-tuning the unfavorable cues to increase user preference include, not only realigning the tram lines at major public gathering spaces with platforms for passengers to embark and disembark towards the side of the road, but also devise dedicated tram bays wherever road width is sufficient to maintain speed.

It is imperative to list solutions corresponding to the ideas of Berylne, who highlights four properties of environment for users to draw inspiration based on external cues. Overhead wires strewn around hampers the visual appropriateness. Tram services are often overwhelmed by technical faults and natural mishaps. To counteract this dilemma the initiation of battery driven trams may be looked at, considering Kolkata is reluctant for E-Mobility as a futuristic solution. Introduction of daily tram schedule and GPS system linked with software applications for commuters to easily locate trams nearby. This smart LRT system can be implemented in phases to salvage the existing and closed system along with expansion of services to new areas like Rajarhat - New Town as last mile connectivity to the upcoming metro corridor.

Appleton talks about interpreting areas with prospect and refuge. Modification to the external environment help in transforming sectors into zones with prospect and refuge. In order to redefine the user perception and experience of tram riders, few long routes such as Shyambazar – Gariahat (via College Street, Wellington crossing, Park Circus) and Bidhannagar – Park Circus (via Manicktala, Sealdah, Wellington crossing) can be used for accessing strategic points. Heritage tram routes like the one in Gothenburg (Sweden) is aimed at tourists giving them a scenic ride besides enabling them to be a part of the city’s history. Taking a leaf out of their book, a dedicated tram route from Esplanade to Hastings running in a loop on weekends and holidays can be formulated where tourists can enjoy the natural setting

with a view of the iconic structures that define the image of the city. Refurbished historic tram coaches comprising of modern amenities can be used as a reflection of the city's rich history and culture.

Solutions maybe multi-faceted having varied implications but should bear one common goal of bringing this eco-friendly mode of transport back to the streets with a sense of pride and belonging, that it has and will always continue to be a part of Kolkata's heritage.

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## **ACKNOWLEDGEMENTS**

We would like to acknowledge the West Bengal Transport Company (previously CTC) for extending their support and helping us with the required information and also the Calcutta Tram Users Association (CTUA) which is a group of enthusiastic tram users and workers who are making every last ditch efforts possible to save and revive this heritage system.

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