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Designing a Modern Bus Terminal: A Case Study of Nowdapara Bus Terminal, Rajshahi

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Abstract

The transportation system is an inherent element of the normal function of a community. Transportation is crucial to the functioning of society. But in our country, no bus terminal has good facilities along with proper management. So, the research is conducted to design an aesthetic bus terminal that will ensure safety purpose along with maximum facilities and provide proper traffic management through environmental sustainability for developing this research in Rajshahi we have selected Nowdapara Bus Terminal as our study area for its huge vacant space and good connectivity with the city. The study used a questionnaire survey to learn about people's perceptions and the amenities they would want to have, and it included design proposals that took into account two primary topics, such as facilities and environmentally sustainable landscape design for the bus station. This research is beneficial for safeguarding the area's natural resources and striking a balance between environmental sustainability and aesthetic appeal.

Keywords: Maximize Facilities, Landscaping, Environmental sustainability, Traffic management

1 Introduction

The operation of civilization depends heavily on transportation. Bus service increases the effectiveness of transit operations and encourages more people to commute by bus. (Yi Luo, 2014) Enhancing bus service performance will encourage people to use public transportation instead of private vehicles, and shorten travel times. (Golan Ben-Dor, 2018) The positioning of the transportation infrastructure plays a significant part in this development to become the center of the development nodes (Khosyatillah Hakima, 2016) These are the locations where a large number of people congregate for transportation to complete their journey these nodes are the hubs of passenger activity, (Sandeep Gandhi, 2015). Bus terminals serve several purposes; hence a well-designed bus terminal must be able to. (Jianhua Lyu, 2019)

In Bangladesh, the bus terminals are not well-designed. The lack of integration of public transportation was caused by the absence of proper bus services (Xian, 2006) It needs proper management and a good design. The new bus terminal can offer passengers enough essential amenities, providing a relaxing and convenient trip. (Bismi M Buhari, 2020) The effectiveness of the urban transportation system is significantly impacted by where bus terminals are located. (Mohammad Hossein Zamanian, 2019) So, this study aimed to design an aesthetic bus terminal that ensures safety and facilities for the passengers and ensures environmental sustainability with proper traffic management.

2 literature Review:

2.1 Case Study 1: Landscape Design of the Urban Bus Station Based on the Urban Characteristics and Ecological Environment of Smart City, China

The paper discusses the importance of bus stations as the city's primary transportation center, focusing on their efficiency, cost, and impact on passengers. It explores geometric components, material quality, and space dimensions, aiming for green, environment-friendly, and sustainable development in urban bus station design. (Li, 2020)

2.2 Case Study 2: Design of Bus Station Based on Sustainable Development and Humanization Design Principles-Take Two Design Plans for Example

The study reveals that the bus station doesn't fully adhere to humanization design principles, with small stop signs, limited public seating, and inadequate ceilings. It also lacks accessibility for children, elderly people, and parents. The design demonstration promotes sustainable development by using solar panels and integrating social networking tools, information advice, and daily amenities.

2.3 Case Study 3: The Sylhet Central Bus Terminal in the city's Kadamtali area is likely to introduce a modern bus terminal to reduce people's suffering. The terminal is a great example of modern architecture. The modern, brick-red, six-story bus terminal complex has a number of amenities with the capacity to hold large passengers in its waiting lounges at once. In order to maintain clear pathways for the vehicles, the bus departure and arrival systems were created to resemble airports with various gates. provided many segments for specified facilities. The two buildings are connected through the corridor Meetings and events for vehicle owners and drivers are held in the terminal's back. Additionally, a green zone was established there. Red roof sheets are used for the structure of the bus terminal. (Islam, 2022) This bus terminal is designed to reduce a passenger's confusion and disorientation so that he can move quickly to his destination after arriving at the terminal.

3. Methodology:

The methodology of this study described the overall working procedure of this project. From this section, one can easily read out the methods and processes that are used in this work. We took the Nowdapara Bus Terminal as our study area. It has a huge space for bus parking, counter, bus wash, workshop, and so on. Only inter-city buses have been parked here. Bus terminals have various characteristics such as connectivity, interface, buffer, etc. They also have design qualities such as form, texture, shape, etc.

We have collected qualitative and quantitative data and created the draft design for improving the existing conditions of the study area. The draft proposal has been made according to the demands of the passengers and the people. A 2D study area model has been prepared using software (Autocad). Designed 3D through SketchUp software. A complete scenario has been made by using blender software that gives the actual natural view and is easy to visualize. After completing these steps, finally, we finally proposed a modern bus terminal in Rajshahi City.

3.1 Study Area Profile:

Nawdapara Bus Terminal is located at Aamchattar, Rajshahi. It is 4 km away from the Vodra bus stand & 5 km away from Seroil bus stand.

4 Results and Discussion:

We have considered the desires of the drivers and the passengers mainly.

Passengers Response:

Existing Facilities	Desired Amenities
Cleanliness (Lowest)	Trees
Sitting arrangement (Lowest)	Lighting
Comfortable (Lowest)	Good frontage
Entrance and Exit (Moderate)	Water features
Facilities of women and children (Lowest)	Seating
Facilities for disable (Lowest)	Open and Parking Space
Visually pleasant (Lowest)	Separate walkways

Table: Existing Facilities and Desired amenities Source: Author's Survey,2022

Drivers Response:

Objects	Amenities
Improving transportation efficiency	<ul style="list-style-type: none"> Distance between Entrance and Exit Special lane
Desired technical specifications	<ul style="list-style-type: none"> Bus placement Bus turnaround requirements Parking spaces
Traffic Regulations	<ul style="list-style-type: none"> Should be maintained Should be conscious about rules and regulation
Available traffic signs	<ul style="list-style-type: none"> Bus stop sign Guidepost
Separate cycle track	Should be given inside the entire bus stand
Parking space	Separate parking space for different operators and routes

Table: Existing Facilities and Desired Amenities Source: Author’s Survey,2022

5 Design Proposal

5.1 Proposed 2D and 3D Design

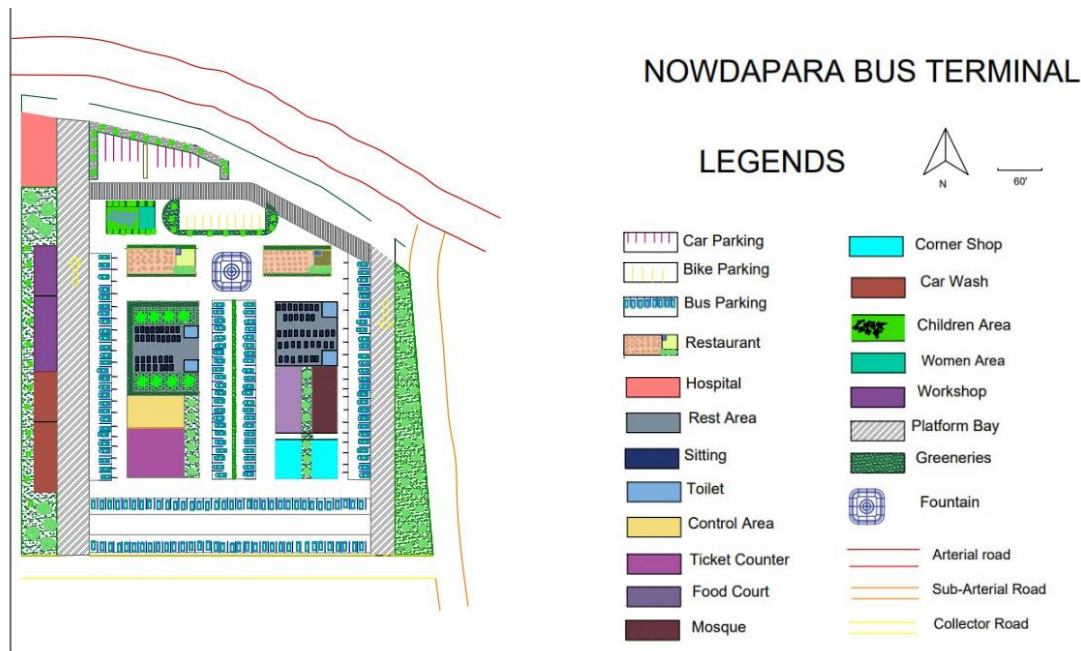




Figure: 2D and 3D design of the study area

5.2. Description of the Proposed Design:

For design purposes, we have divided the total area into four zones. Where zone 1 contains a Restaurant, Food court, mosque, and rest area. In Zone 2 there is Car parking, Bike parking, Bus parking, a Children's area, Fountain. This zone also gives a kind of refreshment and recreation for the passengers. Where consists of Zone 3: Rest area, Restaurant, Ticket counter, control room, and Shops. The last one zone 4 includes some of the existing features like a Workshop, washing center, and Hospital we have segregated it into individual zones

5.3.1 Zone 1: Restaurant, Food court, Rest area, Mosque.

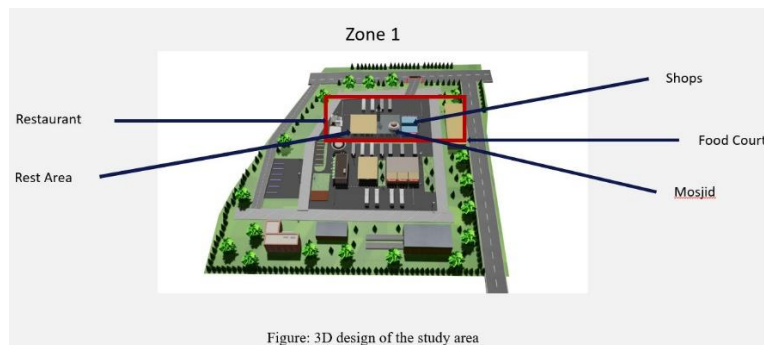
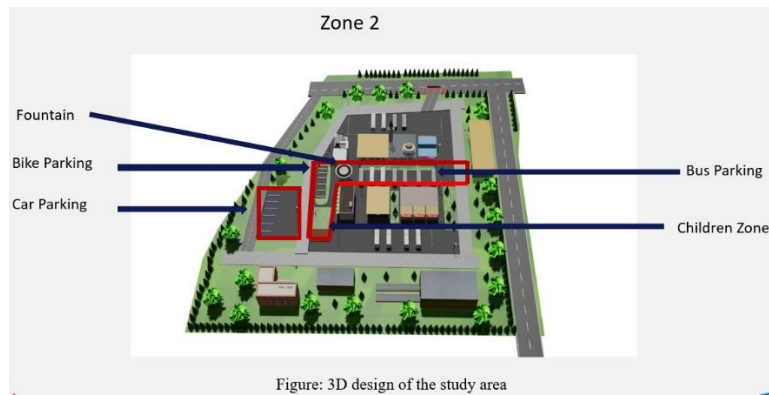


Figure: 3D design of the study area

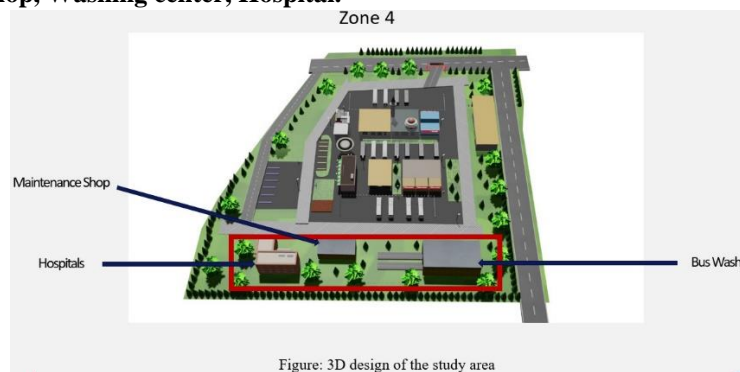
5.3.2 Zone 2: Car parking, Bike parking, Bus parking, Children area, Fountain.



5.3.3 Zone 3: Rest area, Restaurant, Ticket counter, control room, Shops.



5.3.4 Zone 4: Work shop, Washing center, Hospital.



First objective designing aesthetic bus terminal that ensures safety and facilities for the passengers which is fulfilled by zone 1, zone 3 and zone 4. Second objective to ensure environmental sustainability with proper traffic management which is fulfilled by zone 2

6: Conclusion

Bangladesh's bus terminals are poorly designed and lack proper facilities. This study proposes a modern bus terminal in Rajshahi City, emphasizing passenger and driver satisfaction and proper traffic management. The proposed layout design will lead to a sustainable environment, minimizing pollution and noise. Noise-reducing trees like Thuja Giant, Pine, and Fir will act as noise barriers and minimize air pollution. The terminal will provide maximum facilities and safety, while traffic regulations and management will be considered sustainably way forward of the study..

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