



Constructing A Bridge In Manhattan

Introduction

An aerial photograph of New York City, showing the dense urban landscape of Manhattan and the surrounding areas. The Hudson River is visible on the right side, and the city extends to the horizon under a clear blue sky.

- New York is the 11th most crowded city in the entire world.
- If we look at the largest cities with the urban area density new york is at the top 12,093 km² with a huge difference by the followings boston 9,539km² and tokyo 8,231km².
- New York is the most congested 5th city in the world. Drivers in New York spent an average of 117 hours stuck in traffic.
- We as a group realized that it we can solve the traffic problem as building a bridge and opening new transport lines and roads to take the congestion out of manhattan.
- Our bridge will built over the hudson river along side the george washington bridge and will lower the congestion by bringing at least half of the drivers that use the george washington bridge.

Problem statement

- **The New York metropolitan area's transportation system suffers from significant congestion and traffic-related issues due to a scarcity of transit options.**
- **A new Hudson River bridge between Manhattan and New Jersey has been proposed as a solution to these issues.**
- **Careful consideration of environmental impact, traffic flow management, and potential cost-benefit analysis is crucial for the project's successful construction and execution.**
- **These aspects need to be addressed in the planning phase to ensure that the new bridge will effectively alleviate the current transportation issues in the New York metropolitan area.**

Background Information

An aerial photograph of a busy city street intersection. The street is filled with various vehicles, including cars, vans, and several large white box trucks. The scene is captured from a high angle, showing the layout of the roads and the density of traffic. The background is slightly blurred, emphasizing the foreground traffic.

- **Proposed bridge will replace existing tunnels and bridges linking Manhattan and New Jersey**
- **Intended to accommodate a large increase in traffic volume and reduce congestion.**
- **Provides an opportunity to improve the transportation infrastructure of the New York metropolitan area.**
- **Important transit link for efficient movement of goods and people between Manhattan and New Jersey.**
- **The proposed bridge is expected to have a longer lifespan, lower maintenance costs, and higher resiliency to natural disasters compared to the existing infrastructure.**

Need Statement

- **Proposed bridge construction aims to meet the expanding transportation needs of the New York metropolitan area, which is currently facing severe congestion and delays due to increased traffic volume.**
- **The bridge would provide an alternate mode of transportation and help to lessen the area's environmental effects from transportation.**
- **Construction of the bridge would generate new job opportunities for the region and support economic growth.**
- **Overall, the proposed bridge would address the transportation challenges of the area while contributing to its environmental and economic sustainability.**

Objective

- **Conduct a comprehensive study of the environmental impact of the proposed bridge construction project.**
- **Analyze traffic flow management strategies to ensure efficient and safe transportation.**
- **Perform a cost-benefit analysis to determine the economic viability of the project.**
- **Evaluate the potential benefits and limitations of the project and provide recommendations for successful implementation.**
- **Engage with stakeholders and the local community to gather input and address concerns regarding the bridge construction project.**

Technical Approach

- **The survey and data analysts team** - Choose location, study depth, flow, and geology of the river.
- **The design team** - plans the bridge's construction
- **Environmental impact study** - analyze effects on the environment.
- **Required permits** - from local, state, and federal government.
- **begins the construction**

Requirements

- **Permits** - to ensure bridge is safe for the society
- **Funding** - to no have financial problem
- **Environmental impact study** - effect on the environment
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- **Experienced engineers and workers** - well developed and skilled
- **High quality Materials** - Steel, Concrete, cables etc.

Architectural Design

- **Location** - Over Hudson River nearby George Washington Bridge
- **Connects Manhattan and New jersey**
- **Reduce Traffic Congestion** - Since George Washington bridge carries 100 million vehicles annually.
- **Size** - length 1.5 kilometers, height 150 meters, Roadway 60 meters.

Implementation Design


- **Survey and data analysts** - choose the best location by studying the depth and flow.
- **Permits** - to ensure that bridge's doesn't effects environment negatively.
- **Design** - Plans on bridge's design, size, color, shape etc.
- **Funding** - obtaining the budget before Start
- **Construction** - Collaboration of Engineers, designers and workers.

Quality Assurance plan

- **Steel** - Weathering steel
- **Concrete** - HPC concrete
- **Cables** - Semi fan
- **Stone** - Granite



Schedule of project completion

- January 2024 to June 2024 - planning and design
- July 2024 to 2025 - getting tools and supplies
- 2025 to 2027 - Foundation
- 2027 to 2030 - The main construction phrase
- 2030 to 2031 - Finishing 
- 2031 to 2032 - Final inspection and testing
- January 2033 - Opening

Expected Project Results

We expect the results of the project would:

- Ease off traffic along the GWB Bridge
- Reduce some of the neighboring highways such as the FDR
- Have a 15-20% increase on the new bridge

Measures of Success

To determine the success of the new bridge, we need to determine:

- the number of cars using it daily
- If travel will be smooth
- Handle high winds with weight of traffic
- The stress of the bridge

Costs

Requirements	Costs
Civil Engineers	\$120,000 per year
Architectures	\$200,000 per years
Construction employers	\$90'000 per year
Concrete	\$250 million with \$180 per cubic yard
Suspension Cables	\$700 per cable
Steel	\$200 millions with \$0.25 per kg
Stone	\$200 per square feet
Asphalt	\$10 per ft ²
Beams	\$100 per foot

Conclusion

The new bridge provides benefits for:

- Ease congestion on GWB
- Businesses to access new markets
- Easier commute times

However, the high cost would require public funding.

Overcoming the challenges would be the greatest achievement for transportation of New York.

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