

Architecture Department

College of Architecture and Design



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Initiating a smart Transportation system in Jeddah



Aida Nayer

Manal Wael Al-Dweik

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Content

- **Overview**
- **Project Definition**
- **Project Goals and Objectives**
- **Concept & Philosophy**



Overview:

Jeddah is a busy city, where road networks and expansion are under continuous development.

Public commuting is a key issue for many social categories needs to commute within reliable transportation system that enhances quality of life, in addition to potential hybrid technologies can improve policy efficiency from users' interest point,



Why ?

Investigation adopted in a comparative technique, between important congestive allocations nodes in Jeddah analysis in order to test public preferences between commercial or entertainment areas as a start for system initiation.

The discussion demonstrates potential of integrating smart transportation systems within sectors of the city; reference is made to city capacity and traffic densities and major flows of commuting within the heart of the old city.



Projects' Definition:

A tram, usually known 'street car', 'trolley car' or 'trolley', is a car which runs on fixed rails and is designed to travel on streets, sharing road space with other traffic and pedestrians.

Tramway is a rapid transit system inside the city regularly stops to load or unload passengers.



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Statement of research

Today, Old Jeddah is subject to all sorts of rapid development pressure, represented in the negative impact of vehicular traffic and corresponding disruption of the fabric of the city; speculative real estate trends linked with vehicular accessibility which introduce new land-use within the historical urban fabric; the new standards of services, facilities and sanitation which are neither adapted nor integrated to the historic fabric.



Smart Cities Mission

- The objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of ‘Smart’ Solutions.
- The focus is on sustainable and inclusive development and the idea is to look compact areas, create a replicable model which will act like a light house to other aspiring cities.
- The Smart Cities Mission of the Government is a bold, new initiative. It is meant to set examples that can be replicated both within and outside the Smart City, catalyzing the creation of similar Smart Cities in various regions and parts of the country.



PLANNED MUNICIPALITIES NETWORK (METRO)

- As a result of sustained national economic development over several decades, most of the towns and cities in Saudi Arabia became developed the scale and rates of growth which have been experienced, particularly since the early 1970s (A. Daghistani, 1993).
- The 'boom' period of 1974-1983 saw the rapid physical development of the city, which was not always in accordance with the newly established planning policies.



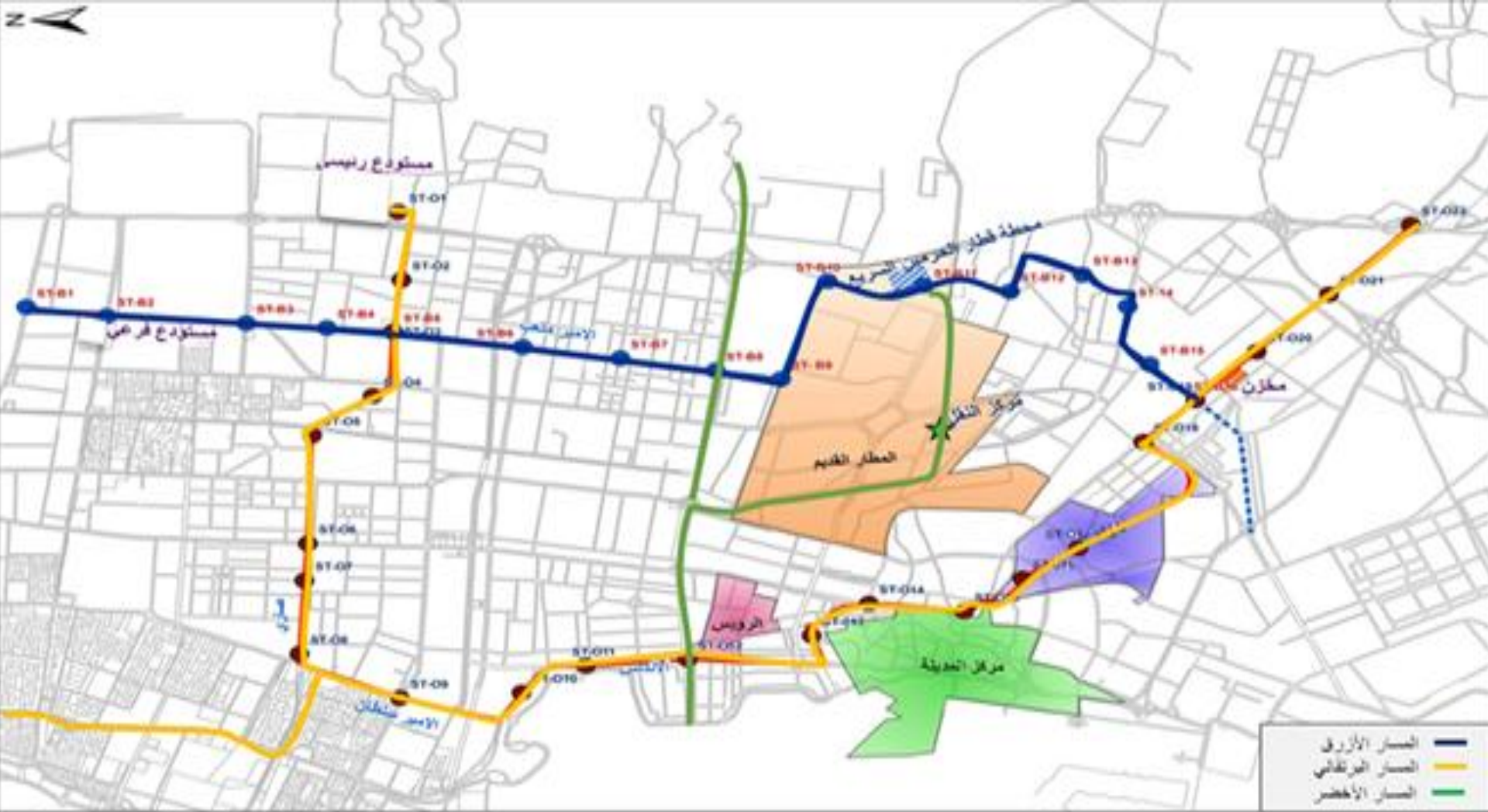
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Analysis of two major aspects of Jeddah original Master

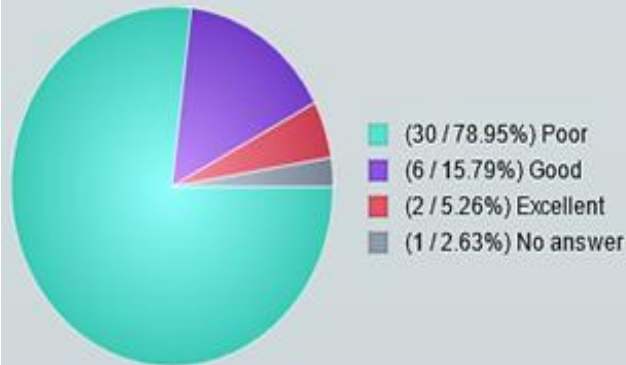
- Plan's policies, in an attempt to discover some of the factors which have contributed to the unsuccessful and successful implementation of planning policies in the city.
- These case studies included the policies for retail development, Jeddah Corniche development, desalination unit, sharm abhour expansion, road network.
- At this early stage transportation system was not yet considered as a community requirement since the services were mostly considering the pelegrinage route frrom and to the two holy cities via Jeddah airport.



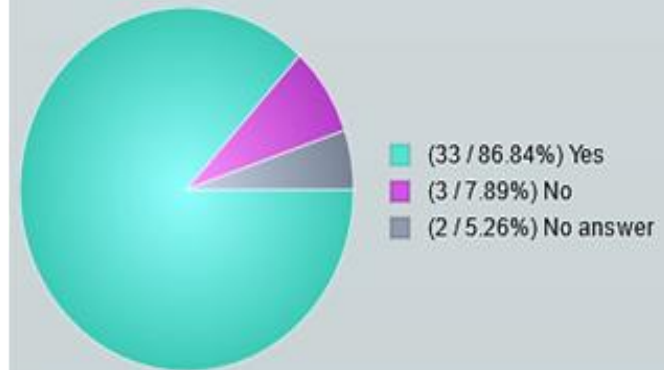


Planned municipalities network (METRO)

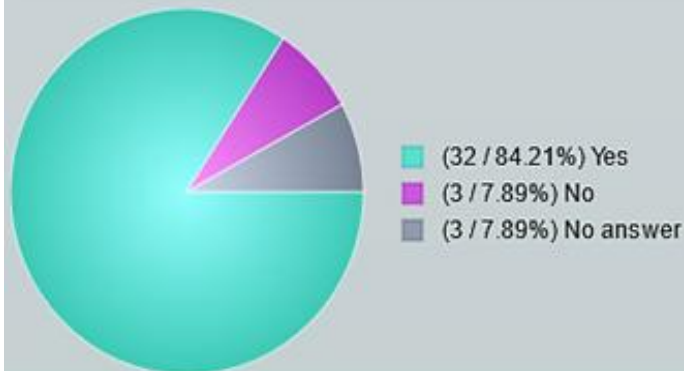
4. How would you rate public transportation system in Jeddah city?



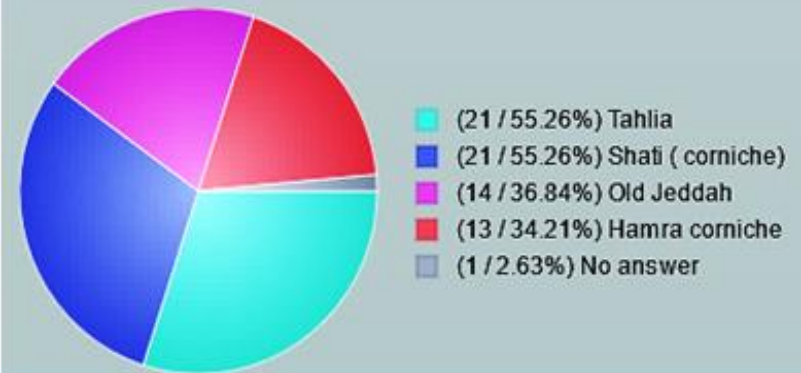
5. Is this project helps to facilitate the transport routes in Jeddah?



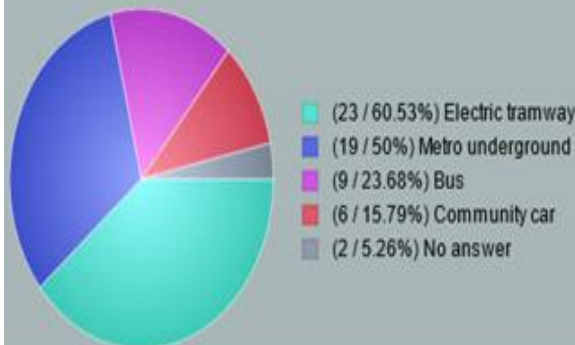
6. Would this project help reducing congestion on the streets?



15. Where prefer the terminal site?



13. Which public transportation system would you find most appropriate in Jeddah?



Community requirement

According to a survey done recently as part of capstone preparation thesis (Manal, 2016), typical identified requirements were aligned with smart cities initial founding as a sample of initial public requirements in figure 2.

Smart transportation system (ITS):

- makes transport more efficient, faster, easier and reliable.
- The focus is on smart solutions to integrate passenger and freight flows across transport modes and provide sustainable solutions to infrastructure bottlenecks affecting roads, railways.
- encompasses a broad range of wireless and wireline communications-based information and electronics technologies, such as Systems that collect real-time traffic data and transmit information.
- When integrated into the transportation system's infrastructure, and in cars themselves, these technologies relieve congestion, improve safety and enhance productivity.



Project's Goal:

- The improvement of quality and efficiency of transport operations.
- The contribution in absorbing of an important part of congestion and environmental and safety problems on roads
- Tourist guide in Jeddah
- Low cost, Time saving.



Project's Objectives:

This project has environmental, economic and social objectives:

1. Environmental Objectives:

- Reducing the dependency of using petroleum for private cars.
- Reducing the air pollution and energy consumption.

2. Economic Objectives

- Public transportation is affordable and not expensive on the individuals
- Helps economic growth



Project's Objectives:

3. Social Objectives

- Women, children and the elderly will find a safe transportation system that takes them to schools, offices, or entertainment places.
- It will positively impact people studying and working in remote areas, this system will provide them a safe and efficient mean of transportation.
- The station public areas will help people to gather and socially interact.



Thematic Approach

- Main case studies
- Thematic Case Studies
- Program Proposed
- Site selection
- Conclusion



Main case study (1)

Rotterdam Central Station



Location	Rotterdam, Netherlands
completed	2013
Gross floor area:	46,000 sqm (495,140 sqf)
passengers	110,000 a day
Parking	750 cars.
Bicycles	5,200 bicycle.

❖ Rotterdam Central Station is one of the most important transport hubs in The Netherlands.

❖ Design

- The grand entrance on the city side is clearly the gateway to the high-rise urban center.
- The hall made of glass and wood. The roof of the hall, fully clad with stainless steel.
- The garden in front of the station.

The Program

Train

Tram

Bus

Subway



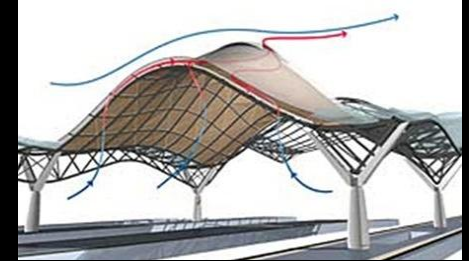
Main case study (2)

Southern Cross railway station



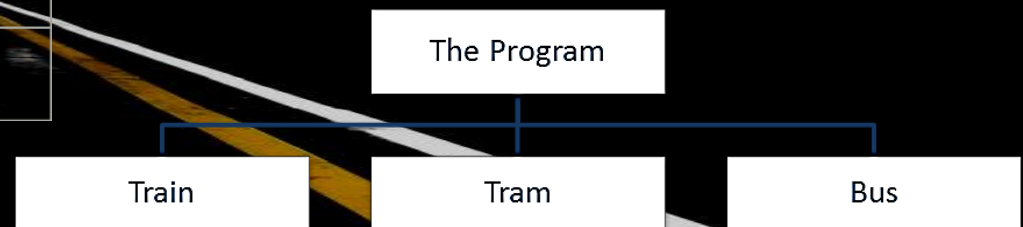
Location	Spencer Street, Melbourne Australia
Status	Premium station
Opened	17 January 1859
passengers	100,000 a day
Tracks	22
Platforms	16

❖ is a major railway station in Docklands, Melbourne.



❖ Design

uses a novel roof shape to expel diesel fumes from the trains below. The roof shape was designed to do several things including help exhaust diesel fumes from the train station below, protect occupants from the weather, connect old and new areas of the city, and provide a central civic destination for the city.



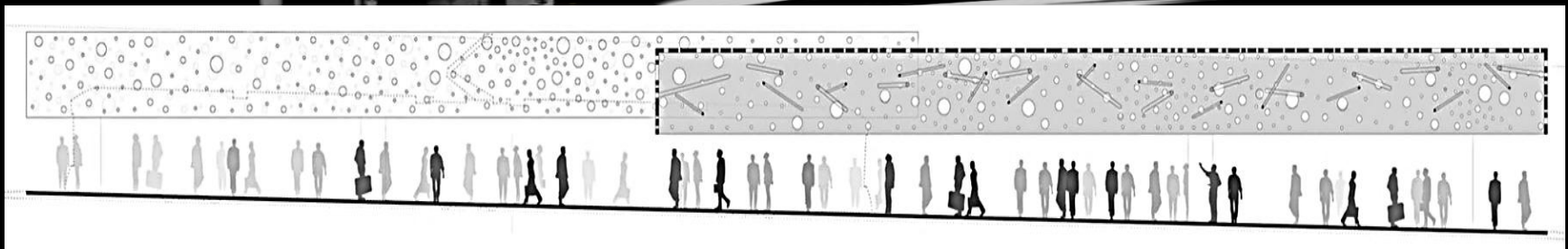
Thematic Case Study (1)

Tram stop

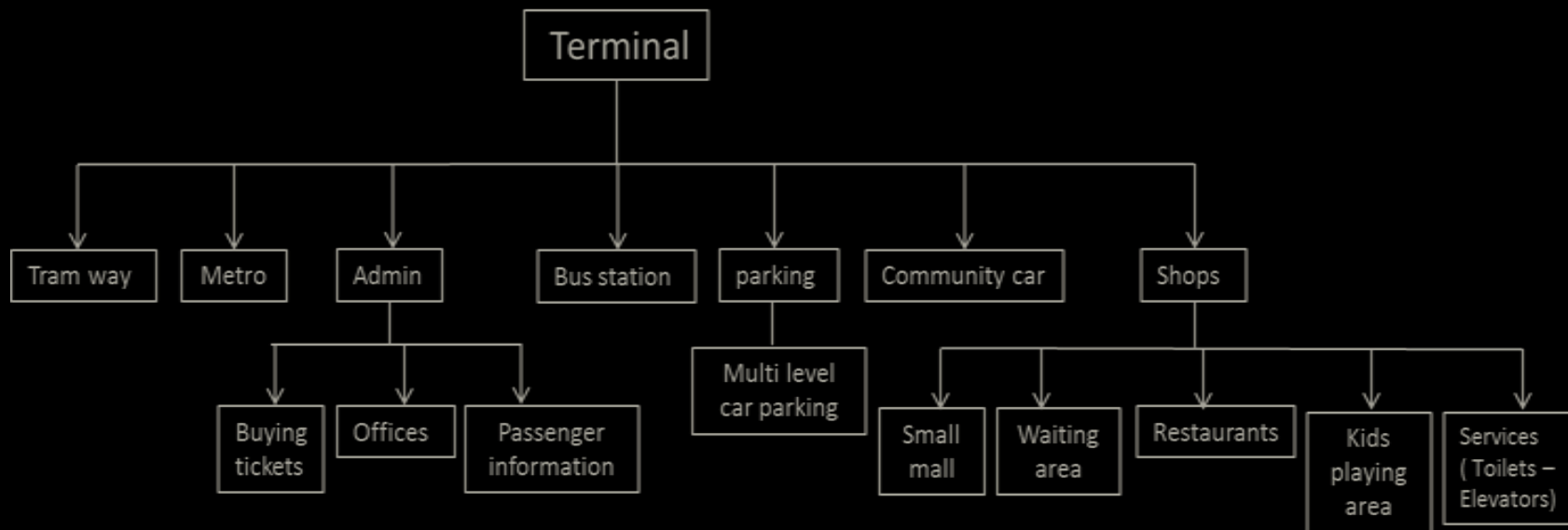


- ❖ Two hollow boxes, create a floating emptiness slightly above the travelers' heads in a scale closer to the Tram than to the street furniture.
- ❖ At night, they become two powerful lamps that light up the platforms directly. The benches are related to the paths, allowing the passengers to wait in contact with vegetation, lighting the route softly.

Location	Valencia, Spain
Project Start	September 2005
Area	5.09 sqm
Project Year	2007



Design Program :



Space program

Number of passengers

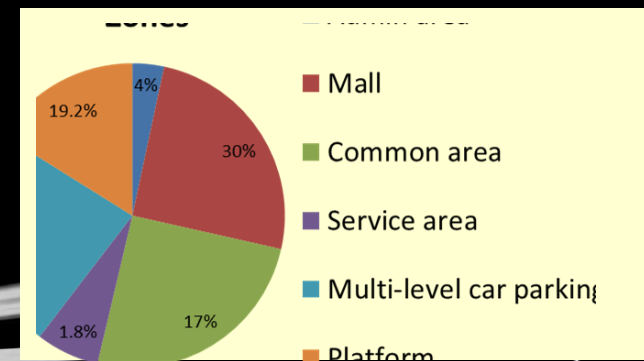
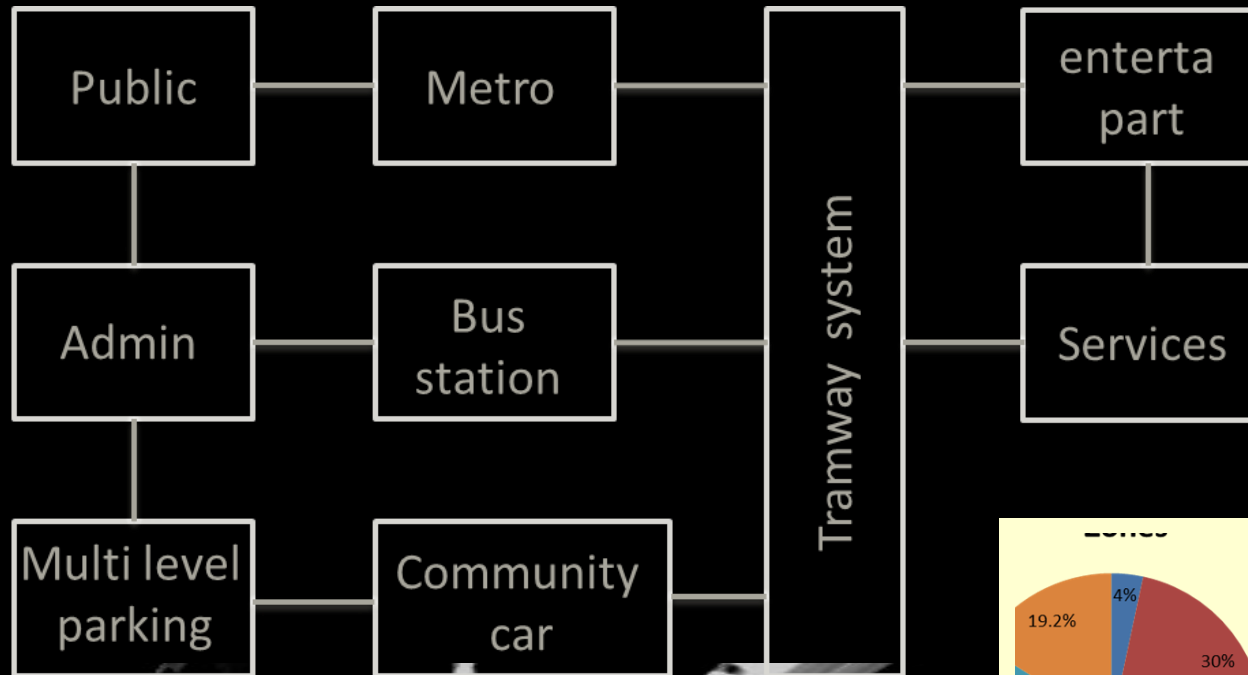
	Hour (6:00 – 24:00)	Day	Month	Year
Number of passengers	4,722 passengers	85,000 passengers	2,550,000 passengers	31,025,000 passengers



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Details programs

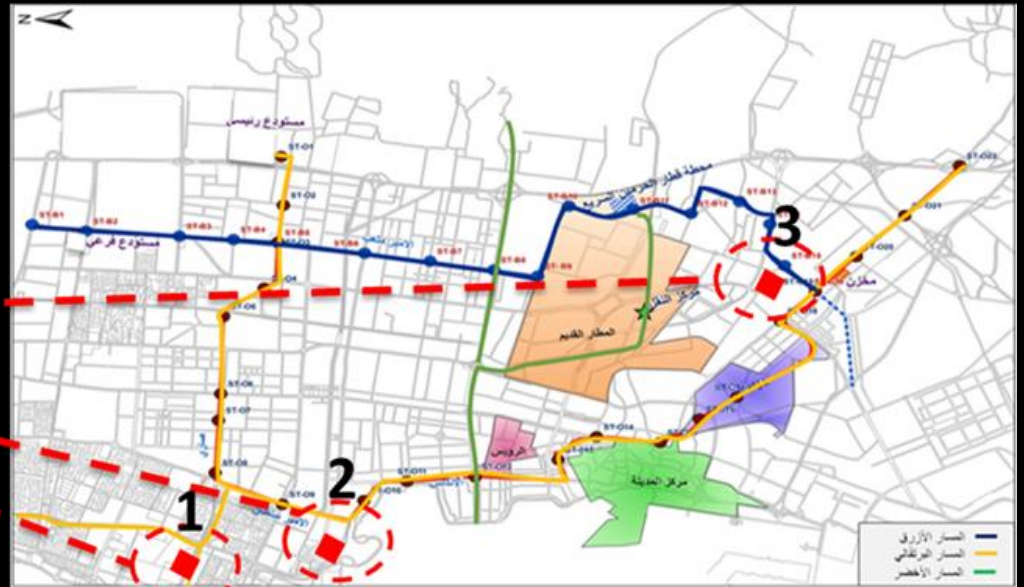
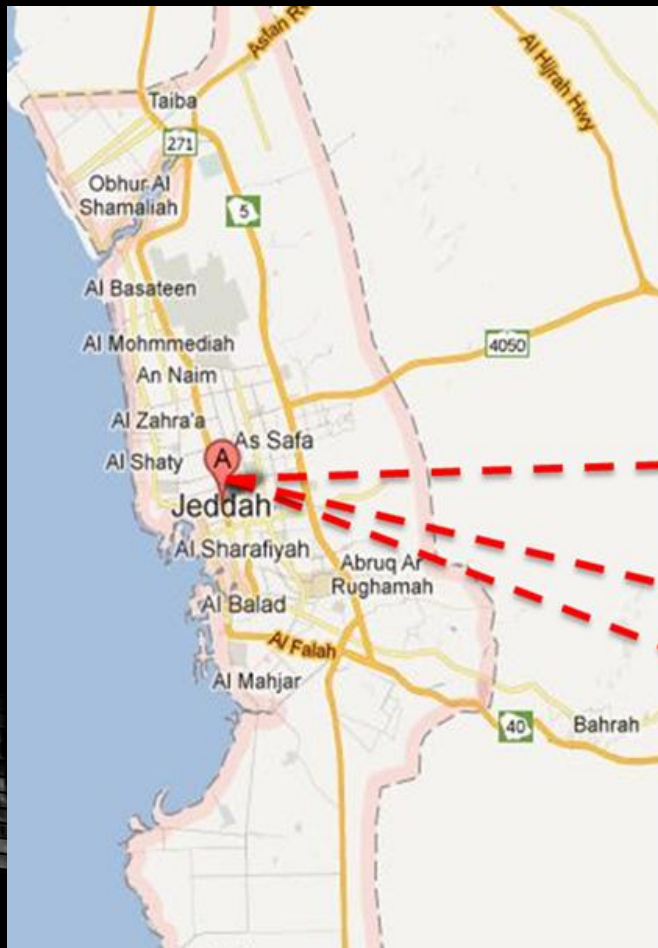


Site allocation

- **Sites Functional purposes**
- **Site Proposals and Evaluation**
- **Site Analysis**



Sites location:



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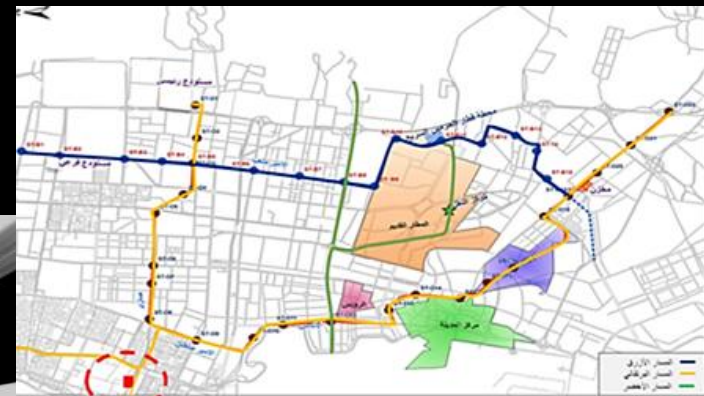
First Proposal

The site is located Shati (Corniche) Sari Street / Corniche



□ Area :30,000 sqm
150 X 200

— Metro network



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Second Proposal

The site is located Tahliah / King Abdullah Road



□ Area :30,000 sqm

150 X 200

— Metro network



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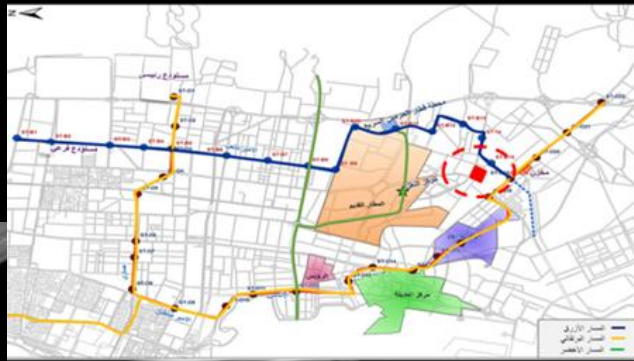
Third Proposal

The site is located Old Jeddah King Khaled / old Makkah



□ Area :30,000 sqm
150 X 200

— — Metro network



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Site Evaluation

Criteria	Site (1) Shati (Corniche)	Site (2) Tahliah	Site(3) Old Jeddah
Access / Traffic (WF=3)	12	15	10
shape/Proportional (WF=2)	8	10	6
Topography (WF=1)	4	5	4
Future Development (WF=3)	15	12	15
Surrounding (WF=2)	8	10	6
Views (WF=2)	10	10	6
Visibility (WF=2)	6	8	6
Total	63	70	53

The site of Al Tahliah got the highest score.

Site Analysis

site size: 200 x 150 equal to 30.000 square meter



Accessibility



The site is very accessible due to its location. The location has two intersections with main streets.

— Main Road

- - Secondary Road

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Surrounding



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CLIMATE CHART



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Zoning



Conclusion

After considering the previous case studies, studying and analyzing the pros and cons of each of them, the result is the following criteria:

- The site should be highly accessible for everybody.
- Providing parking spaces depends on the scale of the project.
- The circulation of the public areas should be clear and easy to understand and navigate.
Statement of research
- facilities might be added like mall, cafes and Restaurants.



Conclusion:

- tram system connecting with the proposed metro line by a common point and design its terminal (station)
- Secure and facilitate the movement of residents, tourists and visitors in the city of Jeddah. and guiding them to the most important monuments to visit safely and fast. and giving women's greater freedom of movement safely on their own.
- Potential of integrating smart transportation systems within sectors of the city; reference is made to city capacity and traffic densities and major flows of commuting within the heart of the city.



Vision of 2030

There are many factors of Saudi vision 2030 that support and motivate the Initiating a smart transportation system in Jeddah city (Tram System)

- The high quality of Applying a smart transit system
- New transportation system encourages for having special attractions that support all the possible factors and paths that will lead to this level of quality
- With this new Tram System, using the electrical power will save oil investments and that's will be the strongest factor that will support initiating a smart transportation system in Jeddah city (Tram System)



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THANK YOU



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