

MULTI MODAL TRANSIT HUB

A THESIS

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Architecture degree

By

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DEPARTMENT OF ARCHITECTURE

SCHOOL OF BUILDING AND ENVIRONMENT

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY) Accredited

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NOVEMBER 2021



DEPARTMENT OF ARCHITECTURE

BONAFIDE CERTIFICATE

This is to certify that this Thesis Report is the bonafide work of **R.S Prem Mohan (37210026)** who carried out the Thesis entitled “**Multi Modal Transit Hub**” under our supervision from July 2021 to November 2021.

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DECLARATION

I, **R.S Prem Mohan** hereby declare that the Thesis Report entitled “**Multi Modal Transit Hub**” done by me under the guidance of **Dr.Devyani Gangopadhyay** (Internal Guide), **Ar.Vijendranath.R**(Internal Review Member) and **Ar. Sarath ChandraKanth** (External Guide) Sathyabama Institute of Science and Technology is submitted in partial fulfilment of the requirements for the award of Bachelor of Architecture Degree.

DATE: 06/12/2021



PLACE: Chennai

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **Sathyabama Institute of Science and Technology** for their kind encouragement in doing this Thesis and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. DevyaniGangopadhay**, Dean and Head of theDepartment, School of Building and Environment, Our Design Chair **Dr. Suresh Kuppuswamy**, Thesis Coordinator**Ar.SuryaRajkumar** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Thesis Internal guide **Dr. Devyani Gangopadhyay**, Internal Review member**Ar.Vijendranath.R** and External Guide **Ar. Sarath ChandraKanth** their guidance, suggestions and constant encouragement which paved the way for the successful completion of my Thesis work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Architecture** who were helpful in many ways for the completion of the Thesis.

R.S Prem Mohan

THESIS SYNOPSIS

Transportation has been in evolution ever since the humans have created wheels from the early ages to create the very first airplane. Transportation has been booming along with the rise in the technology and the planning sector. With the rise in the population and the developments happening in metropolitan cities, dependency on the use of private vehicles for transportation increased, as a result of which the roads were congested most of the times and led to many serious environmental issues as well. Multimodal is a concept which integrates two or more means of transport under a single hub or at a certain accessible distance.

Multimodal integration, reduces the dependency of people on private vehicles and promotes public transportation. A properly planned and developed multimodal facility gives a high-quality public transit facilities which is cheap, accessible by all, fast and frequent enough to cover longer distances. It also solves the environmental issues by reducing the emission of carbon gases into the atmosphere by reducing the percentage of use of private vehicles.

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CHAPTER 1 : INTRODUCTION

1.1 INTRODUCTION

Transportation is one of the important sectors in any country which allows the people to access their needs from one place to another. In populous countries like India, transportation plays a very important role. It not only allows the greater spread of people but also allows trade at various locations, hence adds up to the economic development of the country. Transportation conditions in a country determine its overall development. In a growing metropolitan city like Chennai, with developments happening in terms of jobs, educational institutions, industries, housing developments all around, it becomes a basic need for travelling to different parts of the city. Under such demands, one mode of transport cannot suffice/meet the demands of the people. Hence there is a need for one and more modes of transport that has to be integrated with each other in order to make transportation smooth and easy. Public transportation is a group transportation services which carries a group of people from one place to another. It works on fixed established routes, timings and fixed fares as per the routes. Public transport runs in dedicated corridors which are free from traffic. Public transport is considered as one of the most sustainable means of approach as it reduces air pollution and oil consumption by reducing the numbers of private vehicles.

1.2 THE NEED OF MULTI MODAL TRANSIT HUB

In a growing metropolitan city like Chennai, with developments happening in terms of jobs, educational institutions, industries, housing developments all around, it becomes a basic need for travelling to different parts of the city. Under such demands, one mode of transport cannot suffice/meet the demands of the people. Hence there is a need for one and more modes of transport that has to be integrated with each other in order to make transportation smooth and easy. With Chennai rapidly developing in its suburbs and the connectivity under developing stage, the multimodal transit hub serves as a solution for the people to travel from one node to another node. Integration of different modes of transport at one junction is called as the Multi Modal Transit Hub.

1.3 AIM OF THE PROJECT

- 1). To design a Multi Modal transit hub.
- 2). To create an environment in and around the transit hub to bring a community-oriented design incorporating the principles of TOD.

1.4 OBJECTIVE OF THE PROJECT

- 1). To integrate MRTS (Velachery MRTS) & MTC (Vijayanagar Bus Stand) modes of transport.
- 2). Increase in the efficiency of switching between the two modes of transport for the ease of reaching to the different parts of the city.
- 3). Reduce the traffic and pollution caused by promoting the use of public transportation by creating high quality transit services.
- 4). To Make the hub easily accessible to all the categories of people.
- 5). Promote commercial activities around the hub to generate revenues.
- 6). Giving an urban proposal to the community in order to make the facility function more than just a transit.

1.5 METHODOLOGY OF THE PROJECT

- 1). Secondary data collection on Multi Modal Transit Hubs, of on-going projects, policies
- 2). Live & literature case studies to understand the functioning & zoning of transport stations & their integration with other stations.
- 3). Conclusions from the case studies for defining the programme statement for the project.
- 4). Site & SWOT analysis to take major design decisions & referring major design standards & by-laws.
- 5). Integrating MRTS and MTC with proper design of urban plazas, pedestrian pathways, foot over bridges and subways.

1.6 SCOPE OF THE PROJECT

- 1). Proposing a bus terminus in order to facilitate the hub as a Multi Modal Hub.
- 2). Rerouting of the buses on an urban level to make sure proper circulation of the buses inside and outside the site.
- 2). Proposing proper footpaths, pedestrian crossings, walkable streets, safe cycling tracks, spaces for the vendors and hawkers to sell.

1.7 LIMITATIONS OF THE PROJECT

- 1). The project development is confined to just 500m radius from the site to the neighbourhood settlements.
- 2). The existing infrastructure of the MRTS doesn't come in the scope of the design

CHAPTER 2 :CASE STUDIES

2.1 ROTTERDAM CENTRAL STATION – LITERATURE STUDY



Figuer 2.1 : Image of Rotterdam CentralStation

Location: Rotterdam, Netherlands

Architect: Team CS, BenthemCrouwel

Floor Area: 46,000sqm

People foot fall: 110,000 people per day

Completion: 2014

- a) Rotterdam Central railway station is the main railway station of the city Rotterdam in South Holland, Netherlands.
- b) The station receives an average of 110,000 passengers.
- c) A total reconstruction of the station was sanctioned to accommodate more trains and to connect to the other means of transport, and also to cater the need of the increasing people footfall, from 110,000 to 320,000.(2025)

Modes of transport accommodated :

- 1). High speed train - HST
 - 2). Light rail system - Metro rail
 - 3). Rand Stad rail - Tram system
- d) The new station is not only larger, brighter and more orderly than the former, but also has an international feel.
 - e) The station has been located such a way it has entries from two major sides, the north and the south one.
 - f) North side exists the residential n simpler part of the city where as the south side accommodates tall towers, business and commercial buildings in a vast urban context.
 - g) The plaza in front of the station is seamlessly merged to a green esplanade, together they form a 300 meter long continuous, unified public space leading into the heart of Rotterdam.
 - h) Parking for the cars and bicycles have been zoned clubbed in a one region and in order to prevent additional traffic and congestion, thus promoting the pedestrian movement.

- i) The feeder & kiss and ride facilities have been restricted to the western side, to avoid traffic at the front part.
- j) Tram services has been redirected to the eastern side of the terminus.
- k) The urban plaza accommodates subways which connect to the metro.

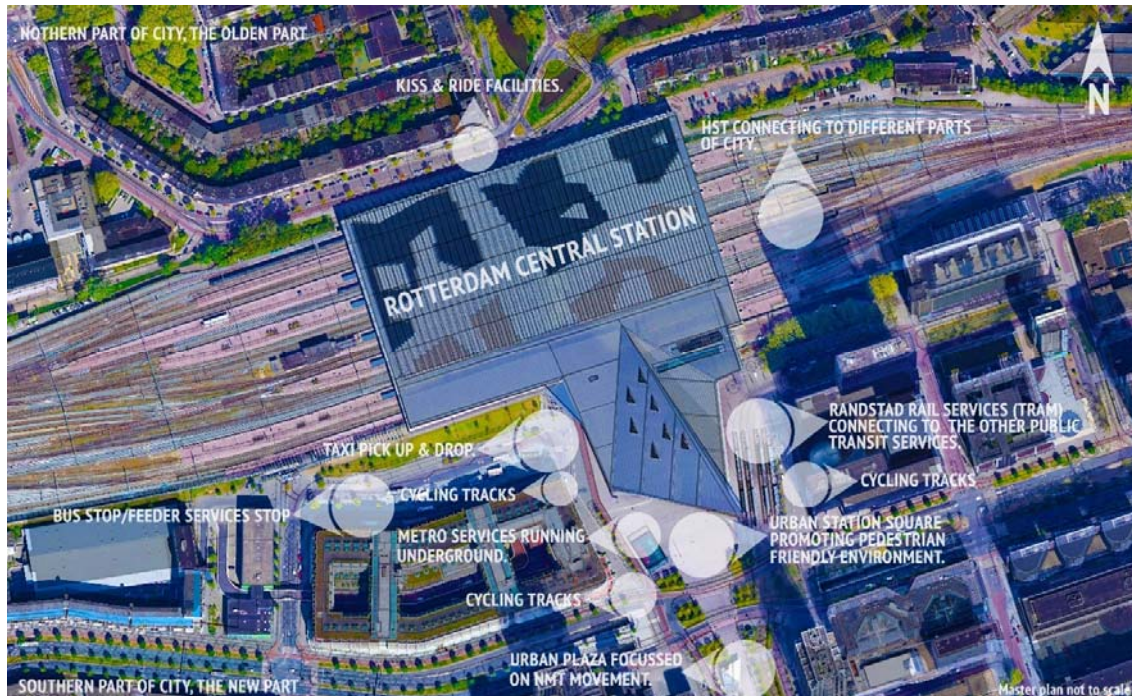


Figure 2.2 : Figure showing the planning details of Rotterdam Central

- l) The routing through the station is logical; travelers are guided by a direct view of the trains and by the daylight that penetrates to the traveler's passage via the voids that extend through the transparent roof platform and down to the stairs.
- m) Because of its transparency the widened traveler's passage, lined with commercial functions, forms a natural part of the station.
- n) Escalators, lifts and stairs lead up to the new platforms, which feature inviting and comfortable platform furniture. On the west side of the station there is a footbridge over the tracks for travelers in transit. This footbridge also functions as an escape route in the event of an emergency.
- o) It includes commercial spaces, a lounge, restaurants, offices, parking for cars and bicycles. In the spacious concourse the passenger service functions are conveniently arranged. There is travel information, an information point, the Dutch Railways (NS) travelers' shop, ticket vending machines and commercial functions.

- p) Waiting areas in the hall and the passage are linked to the passenger flows, with areas both for browsing and quick shopping.

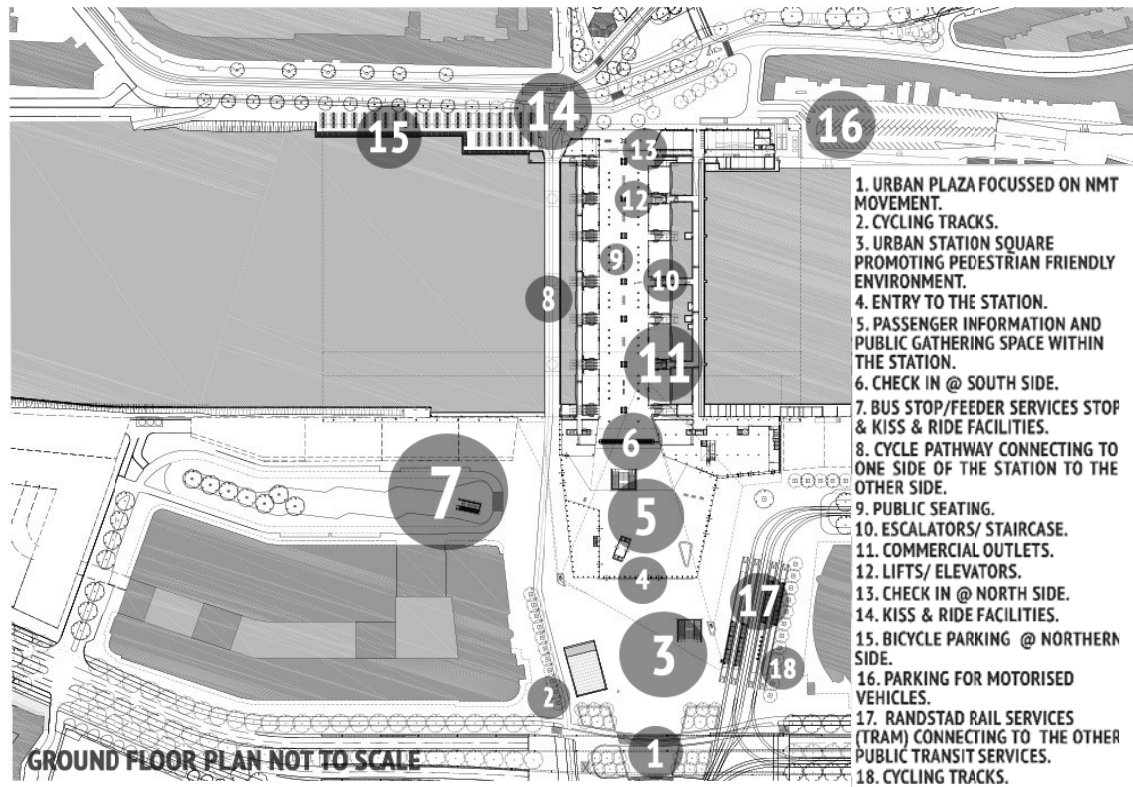


Figure 2.3 : Ground floor plan of the Railway Station.

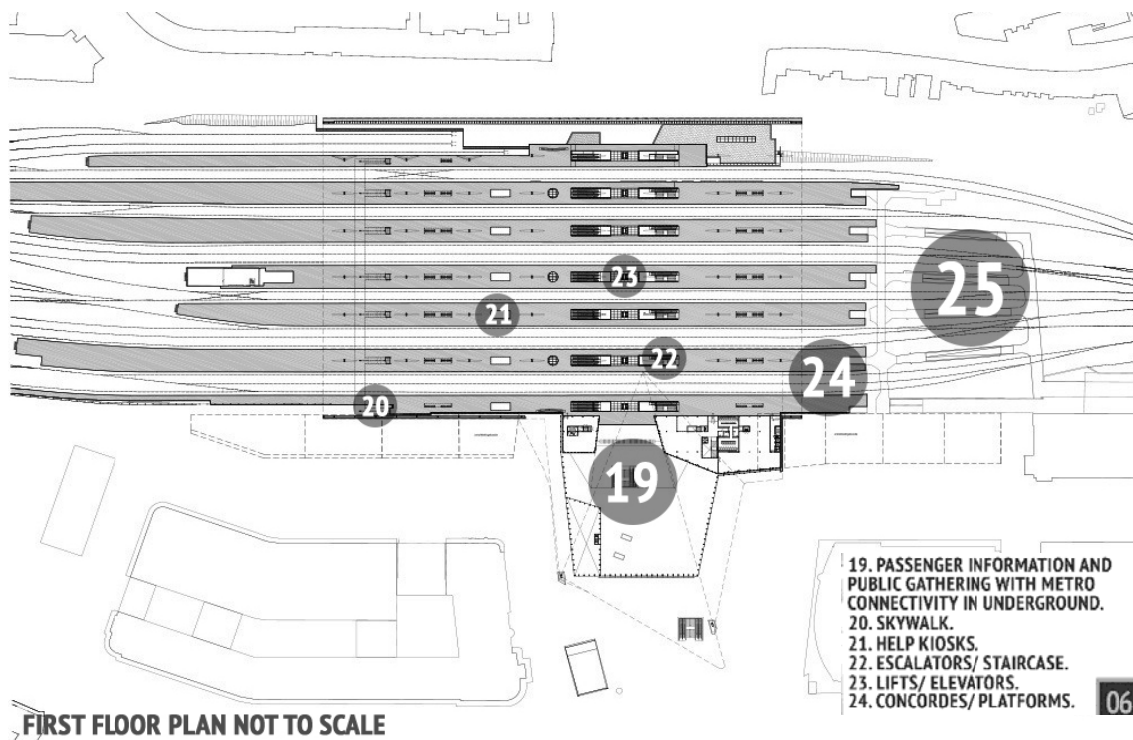


Figure 2.4 : First Floor Plan of the Railway Station.



Figure 2.5 : Northern Side Entrance Façade.



Figure 2.6 : Southern Side Entrance Façade.



Figure 2.7 : The Plaza space in front of the Station



Figure 2.8 : The Plaza esplanade with NMT.



Figure 2.9 : The interiors of the railway station.



Figure 2.10 : The Concorde.



Figure 2.11 : The Concorde and commercial outlets.



Figure 2.12 : The escalators/stairs leading to the Metro Underground.



Figure 2.13 : The Grand Entry on the station.



Figure 2.14 : The tram ways near by the railway station.

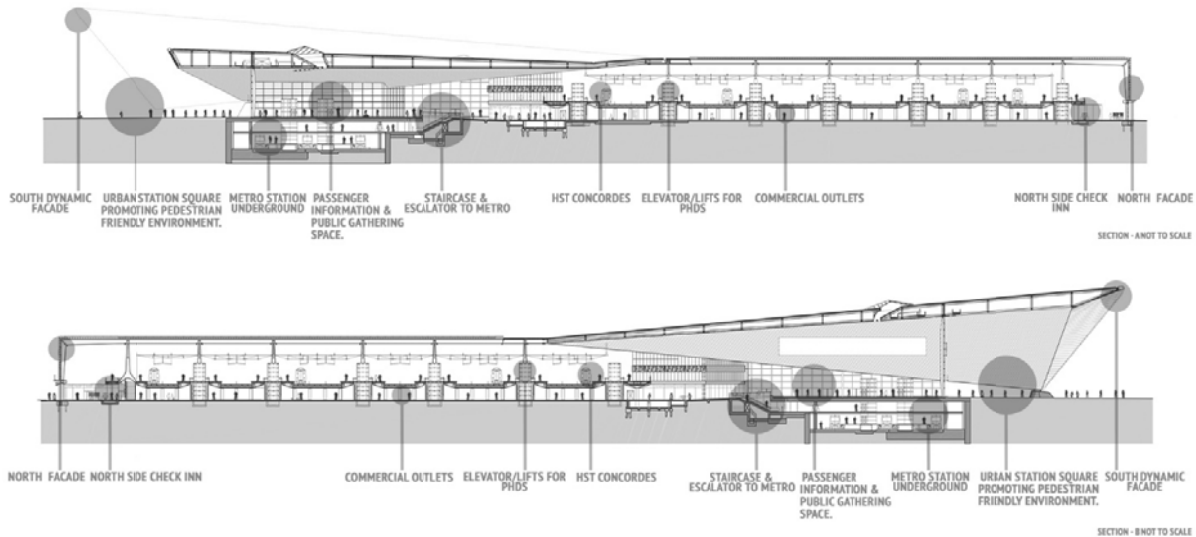


Figure 2.15 : Figure showing the sectional drawings of the railway station.

- q) The platform roof of the terminal is transparent which allows natural light to flush into the Concorde of the terminal, in return reducing the dependency on artificial sheets.
- r) The bright high hall that is at the center side, allows the passenger to have a clear and seamless look of the entire station with the trains waiting at the platforms for the passengers to board in.
- s) This transparency solves the way finding problems of the hub. The wood finish on the inside of the hall creates a warm and welcoming ambience, inviting the visitors.
- t) The brightly lit commercial outlets on the passage to the Concorde allows the passengers to get through the commercial areas attracting them towards it.

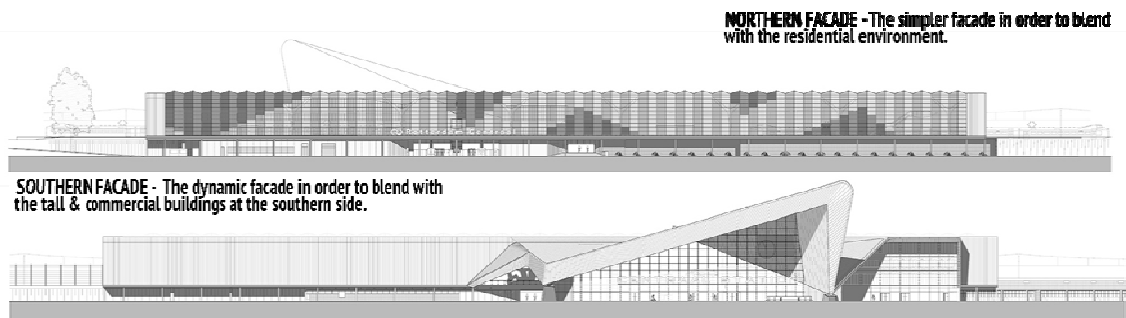


Figure 2.16 : Image depicting the elevations of the two facades.

- u) Users of a transit hub varies widely, it includes:-
 - 1). Travelers (People traversing from one place to another)
 - 2). Visitors. (People visiting the hub for other purposes)
 - 3). Administration People (Official people working at the hub)
 - 4). Drivers. (Person who drives/controls the vehicles)

- 5). Cleaners. (Person who maintains the hub).
 - 6). Securities. (Security guards and people who looks on safe guarding the hub).
- v) Further more the users can be broadly classified on the basis of the purpose of the use :-
- a). Employee Passengers.
 - b). Local passengers.
 - c). Student Passengers.
 - d). Business Passengers.
 - e). First time Passengers.
 - f). Explorer Passengers.
- w) Circulation patterns plays a very important role in the planning of a transit hub. It involves on a macro and the micro scale. Circulation majorly are of two types :-

a). Vehicular Circulation:-

Vehicular circulation diagram in the figure above shows how the vehicular movement has been controlled and directed around the station terminus to control the traffic flow and promote pedestrian friendly environment.

b). User Circulation:-

User Circulation allows us to understand the way the people flow happens inside the terminus. Peoples flow is determined by the type of the people using it, their preferred mode of transport and the footfall at the peak hours. Here the majority of the people come from the southern side which reflects in the planning with a welcoming large hall.

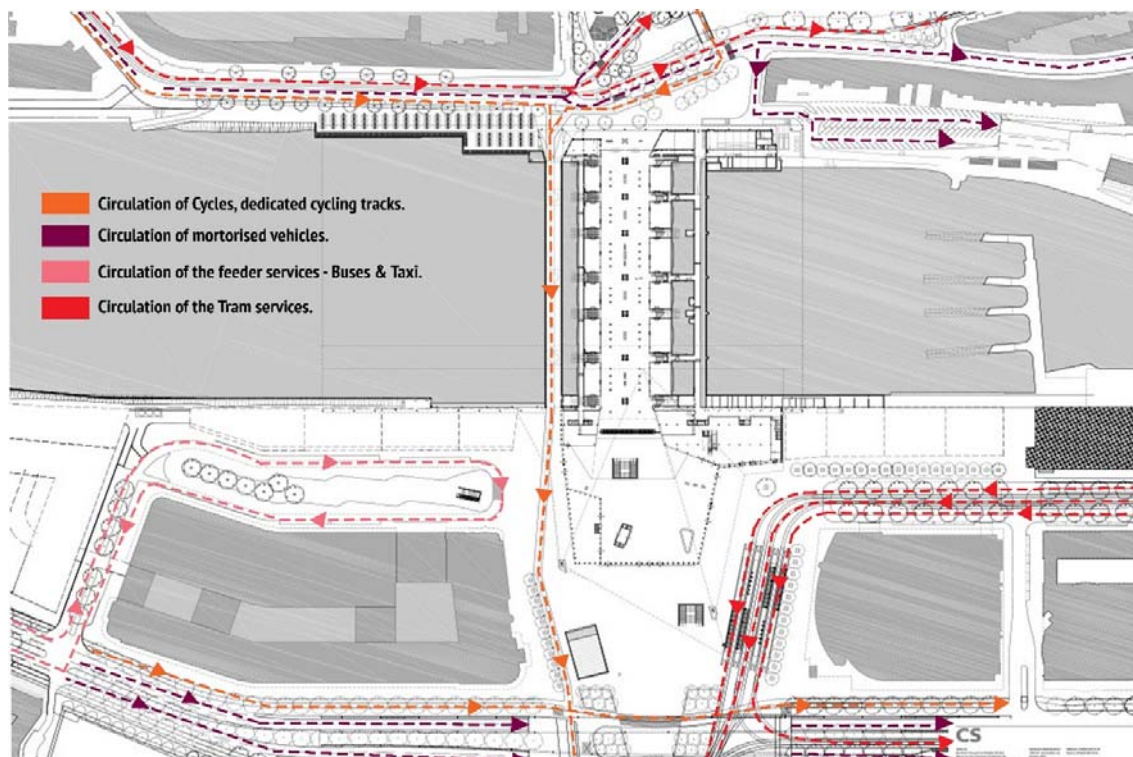


Figure 2.17 : Vehicular Movement around the Railway Station

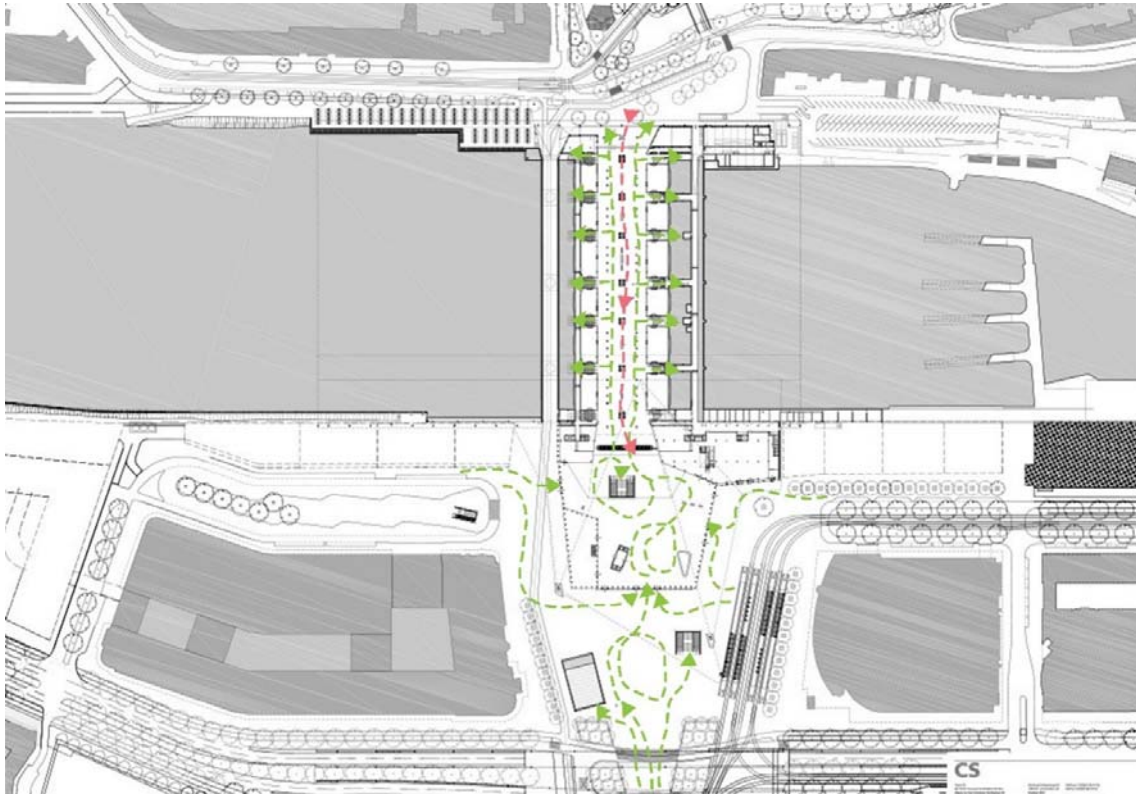


Figure 2.18 :Pedestrian movement around the Railway Station

2.1.1 Inferences derived from the Case Study

- a) Basic planning and integration between the different modes of transport was inferred.
- b) Important Urban spaces like the plazas, the esplanades, the footpaths, the cycle tracks, waiting plazas, bus stops, feeder services etc linking with the existing transit hub to function as a node for the community.
- c) Integration of proper designed plazas, footpaths, subways, foot over bridges, parking for two and four wheelers, promoting non-motorized transport, public toilets, pick up and drop off zones, spaces and opportunities for commercial activities in the multimodal facility.
- d) Implementation and following of all the possible Transit Oriented Development principles was done in order to create a high-quality transit.

2.2 CHENNAI CENTRAL SQUARE – LIVE CASE STUDY



Figure 2.19 : Aerial shot of the Central

- a) Chennai central metro Station accommodates two corridors of metro rails.
- b) The proposal included the development of surroundings which includes, MRTS station, sub urban station, the central station, the bus stand & including the other means & modes of private transportation.
- c) Hence as a whole the multimodal integration.

- 1) **Chennai Central Railway station** :- One of the major landmarks in Chennai and is also known as one of the most important hubs in India. Its connectivity to the other transportation hubs nearby makes it one of the most busiest hubs in the city.
- 2) **Chennai Suburban Railway Station** :- Situated next to the central station. It is an office building as well as serves as a terminus for the Chennai suburban trains. which connects to the suburbs of the city.
- 3) **Chennai Park & Park town station** :- Situated opposite to the central station. Its main purpose is to serve the Chennai MRTS. Trains run from Chennai beach to southern parts of the city, Tambaram as well as to the eastern corridors, Velachery and so on.
- 4) **Chennai central metro station** :- An underground metro station which serves both the lines of the Chennai metro. Line 1 connects from Wimco Nagar to the Airport and the Line 2 connects to St. Thomas mt.



Figure 2.20 : Chennai Suburban Station



Figure 2.21 : Chennai Park Station



Figure 2.22 : Chennai Central Metro



Figure 2.23 : Chennai Central top view showing the Planning and the Multi Modal Integration.

2.2.1 Inferences and Understanding from the Case Study

- a) The circulation of the vehicles was majority on the main GWT road and the other sub arterial roads, i.e., the wall street, moor market street.
- b) Private vehicles, hired vehicles that reach the central and the suburbs are directed through the moor market street and are directed to the parking lots and auto stands.
- c) Passengers/General Public accessibility is made throughfare with the use of subways, lifts and escalators.
- d) The Central square connects and receives the public through its various entry and exit points through its dense subway connectivity.
- e) Connections between the modes is possible through subways, urban squares, elevators and escalators.
- f) The walkways are connected, but could see the interception of vehicles with it.
- g) Does not promote Non-Motorized Transport.
- h) Located at the busiest locations of the city and is a predominant rich mix of commercial, & residential hubs.

CHAPTER 3 :URBAN SITE ANALYSIS

3.1 METHODOLOGY OF THE SITE ANALYSIS

a) Land use Mapping :

- o This Study was conducted to understand the land use patterns and the settlements that had happened around the MRTS over the years since its development.
- o The study was conducted by walking down the streets with a map of 500M radius and marking the area with 6major categories that are :
 - 1). Residential
 - 2). Commercial
 - 3). Institutional
 - 4). Mixed Use
 - 5). Marsh Land &
 - 6). Waterbodies
- o Velachery's distinctive land use, fascinates about the evolution of the place. Its Distinctive location had brought a varied land use in the entire region ranging from commercial to residential to industrial to institutional as well.
- o On talking and getting to know about the stories from the locals, a basic understanding of how the development had happened from the days of the construction of the MRTS.
- o The Land use history in the Plate 3.1 talks about the development of the area along with the development and working of the MRTS, in short, a developing Transit Oriented community.

b) Road Networks, Nodes & Land Marks Mapping

- o This study was done to understand the road networks and the important nodes around the 500M radius of the site.
- o Proper study and understanding of road networks were done through the study of maps, frequent site visits and traversing around the site through walks and vehicle rides.
- o Observation of nodes during the different time zones of the week days and week ends was done to understand the functioning and the characteristics of these zones.

- o Important landmarks and distinctive features for the 500M radius of the site was studied to understand the role it played and its contribution on an urban context.

c) Activity and Issue Mapping

- o The main purpose and the reason for this study was to identify, document and analyze the activities happening around the site.
- o Each nodewas observed carefully and the activities were noticed and documented.
- o Each activity happening on the site happened in the different timings of a day. Certain activities happened only during the weekends on the site and was also documented and analyzed.
- o Issue that was already present on the site was understood and documented and after detailed analysis, solutions were given to overcome the issues.
- o Certain activities that happened on the site led to certain issues like traffic jam at peak hours, congestion and many more.

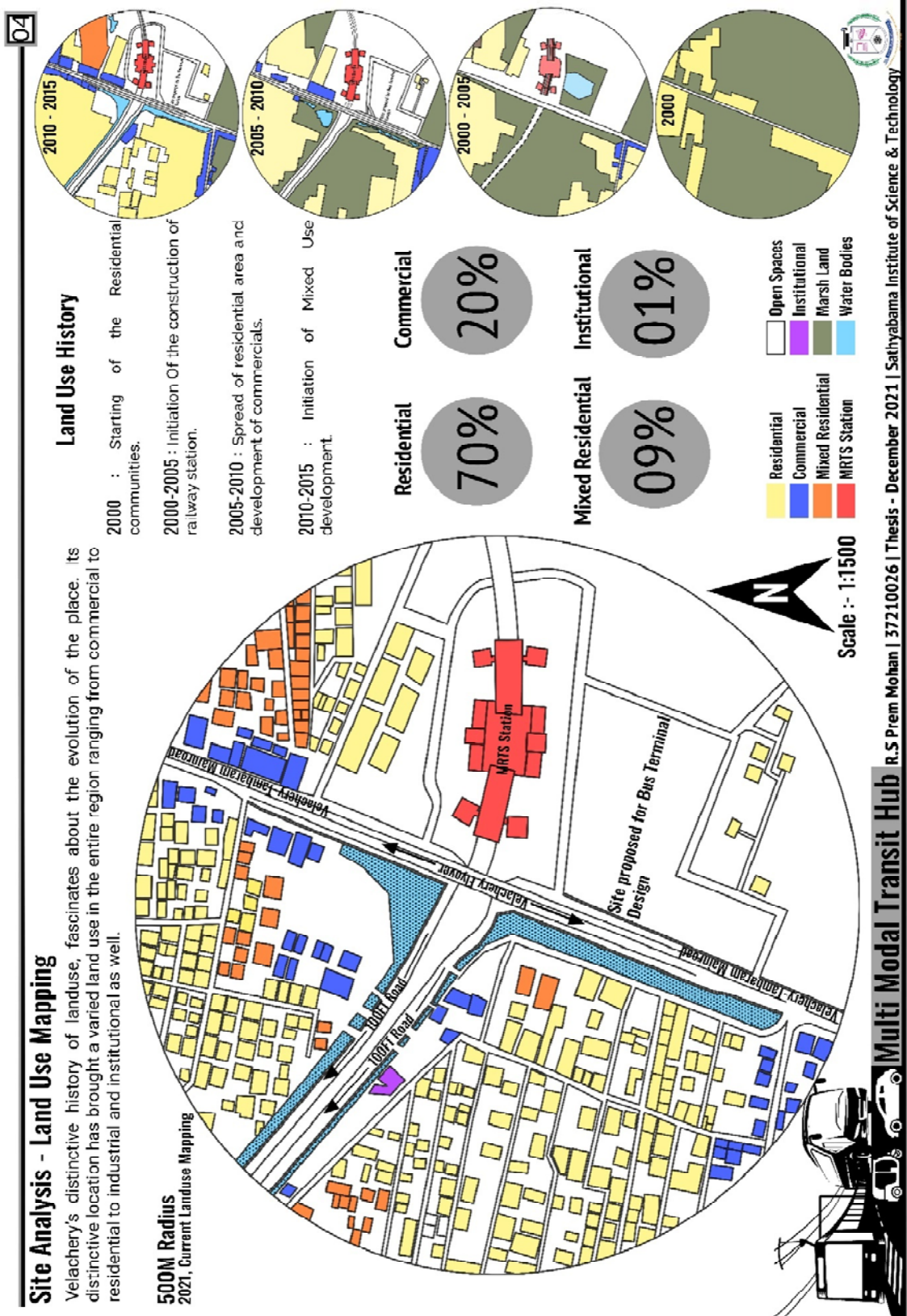
d) Traffic Analysis

- o Traffic analysis study was done to understand the traffic patterns on the site.
- o The study was conducted in 3 different time zones and two different categories of days, i.e., the week days and the week ends.
- o The Morning time zone (9:00 AM – 12:00PM), Afternoon time zone (01:00PM – 04:00PM) and in the Evening time zone (06:00PM – 09:00PM).
- o Each time zone in each category of day was carefully observed and noticed and is put in an understanding format beneath in plate 3.4.
- o Traffic congestion was noticed during the peak hours (i.e. during the morning and the evening time zones) of the weekdays more than the weekends.
- o Proper study and analysis was carried to give required solutions for the need which is explained below in the later part of the report.

e) Bus routes and Circulation

- o This study was done to understand the bus routes happening in and around the site.
- o This study was done by viewing the bus routes map and spending considerable amount of time on site to note and observe the present movement of the buses.
- o On meeting and discussing with the MTC bus officials and understanding the routes and circulation of buses around the site.

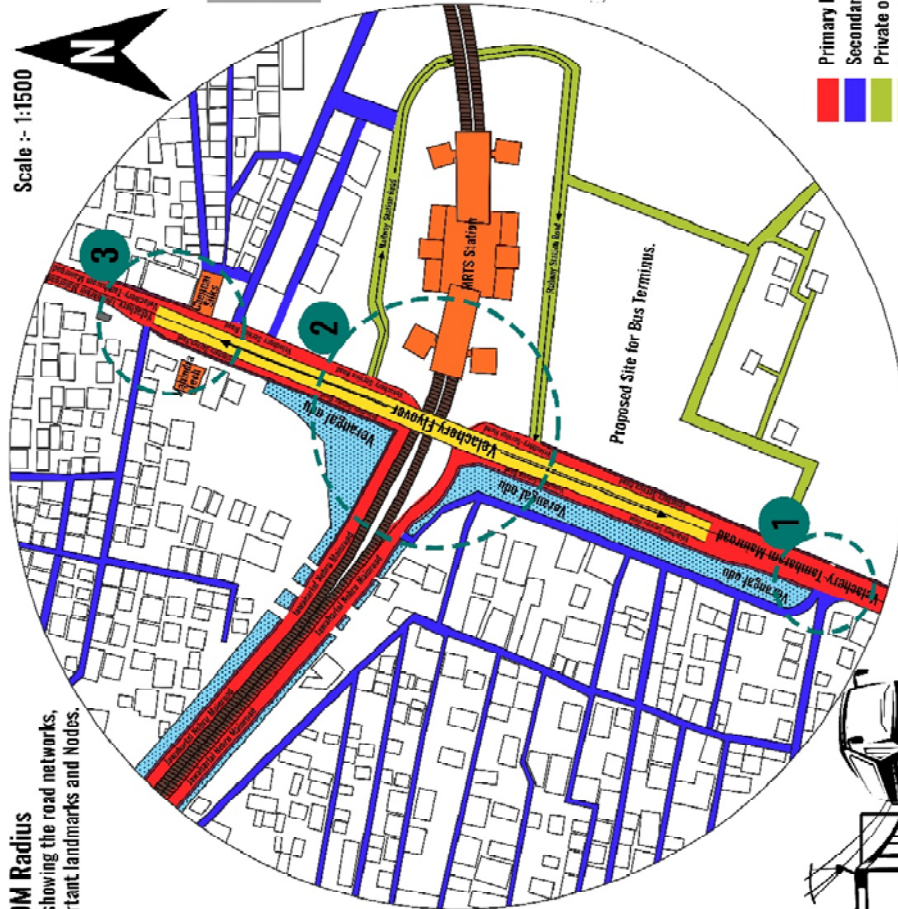
3.2 LAND USE MAPPING



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Mapping of the roads (its types), pathways, nodes, junctions and other important landmarks were done around the site for a radius of 500 meters to understand the road width, the minimum design speed and issues at the nodes/junctions.

Map showing the road networks, important landmarks and Nodes.



1). Velachery Tambaram road (30M, two lane road) - Primary Road.

- 2). Jawaharlal Nehru road/100ft. road (18M, two lane road) - Primary Road.
- 3). Velachery flyover (25M, two lane road).
- 4). Subramaniam road, Anna Indira Gandhi road - Secondary roads.

Type of roads	Design Speed	Road Width
Primary Roads	30-75	25-40M
Secondary Roads	35-55	20-15M
Private/Site Roads	40-50	05-10M

Velachery MRTS station.
Major transit option for the locality.

Velachery Flyover.
Adds up to the skyline of the region.

Velachery Vijaynagar Bus
Stand.
Second most transit
option for the locality.

Chennai Silks, Grand square Mall, Mahindra Tech.

Primary Roads
Secondary Roads
Private or Site Roads
Bridges/Flyover

- Pedestrian Pathway
- Local Landmarks
- Rail Tracks
- Waterbody

NODE 3 : @ Kaiveli Jn.

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3.4ACTIVITY AND ISSUE MAPPING

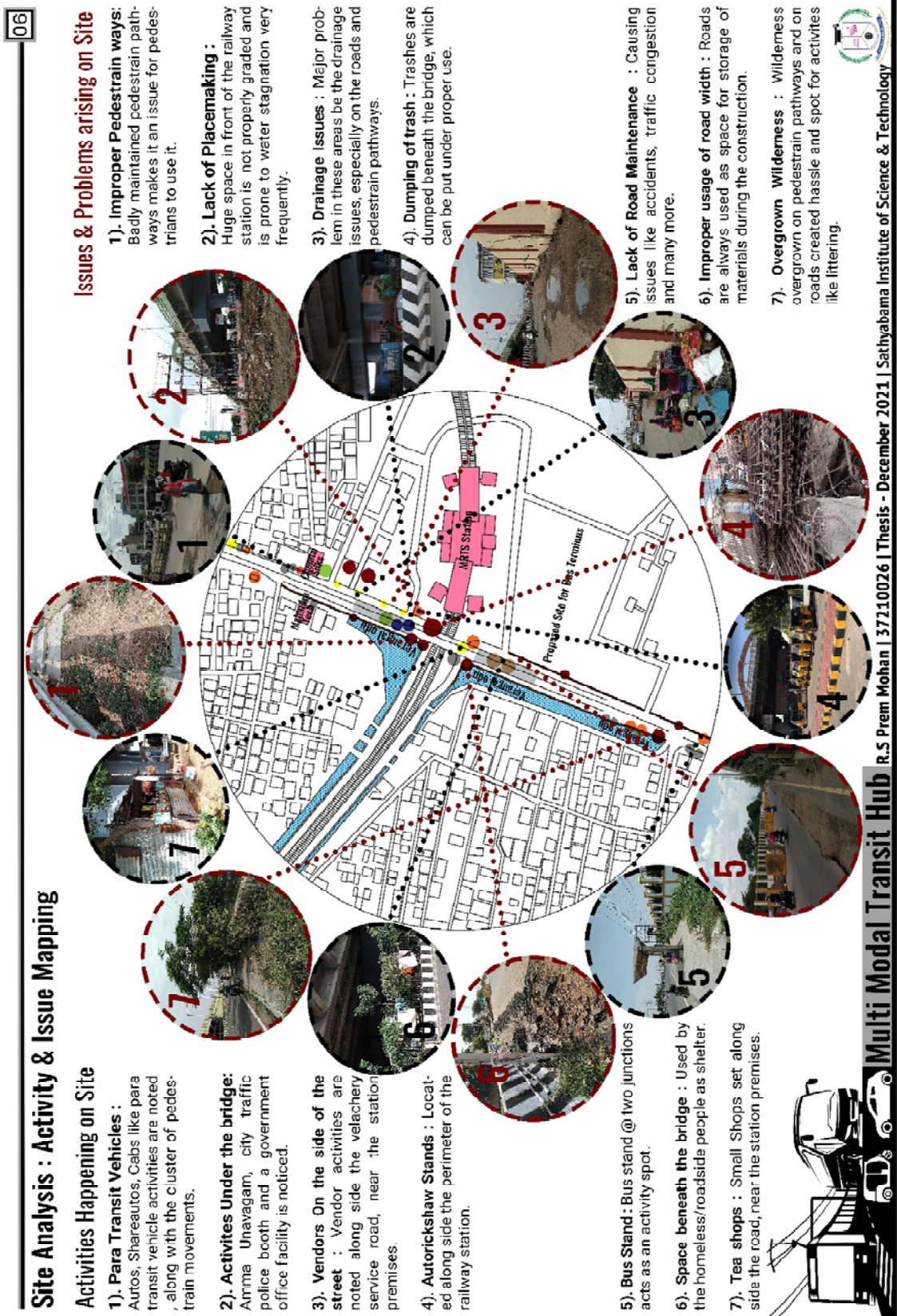
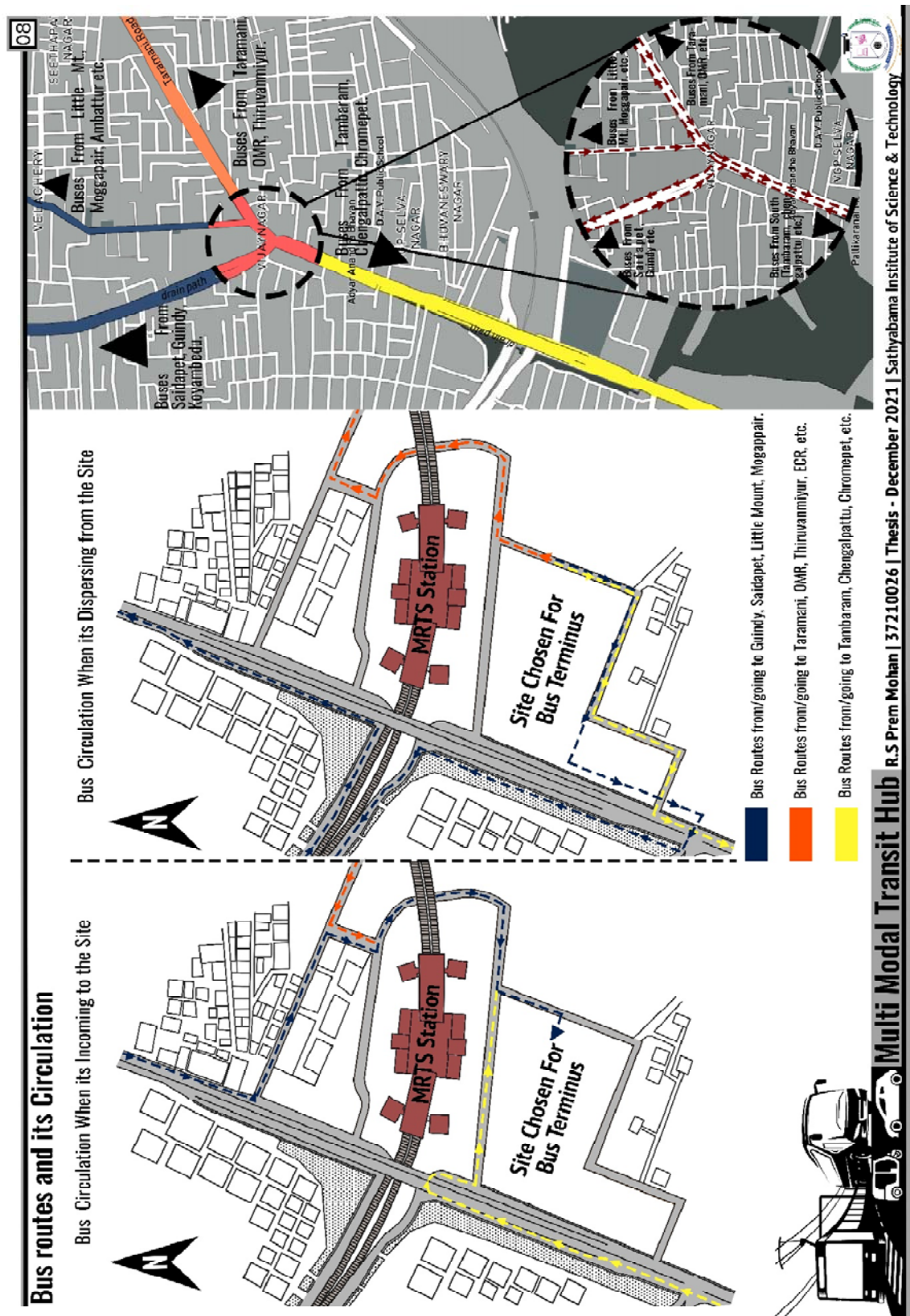


Plate 3.3 :The Activity and Issue mapping for 500M radius around the site

80

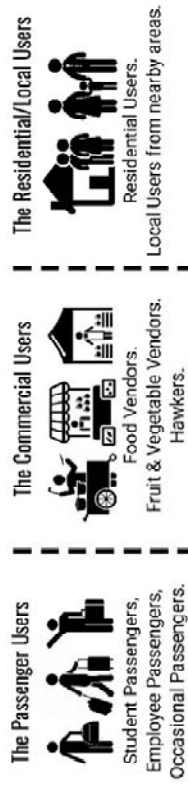


3.6 BUS ROUTES AND ITS CIRCULATION



User Analysis and the Design Requirements derived.

Types of the User Groups Considered for the User Survey.



User Requirements and Needs Derived from the User Survey



Multi Modal Transit Hub

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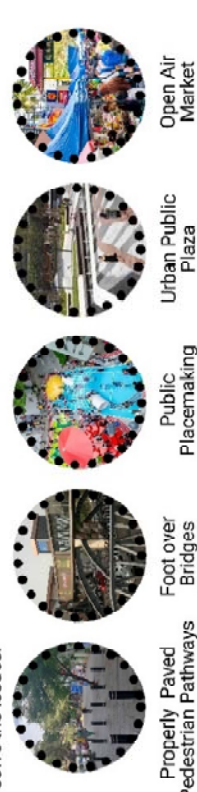
3.7 USER ANALYSIS AND THE DESIGN REQUIREMENTS

09

Design Requirements/Programme Brief Analysed from the study.

Requirements derived from the Issues of previous study.

On the basis of the study on Land use mapping, Traffic congestion and intensity mapping, Activity and Issue mapping & Bus circulation mapping, some of the Urban elements and design proposals related to it were necessary to be added in the Design Requirements to solve the issues.



Final Design Requirements List formulated from the Survey & Analysis.

BUS TERMINAL DESIGN			URBAN SPACES TO BE PROPOSED FOR THE COMMUNITY		
S.NO	SPACES	AREA REQUIRED	S.NO	SPACES	AREA REQUIRED
1	Parking and Drop off points	-	63	Open-air public spaces for people to sit and relax (open space)	2000sqm
2	Food vendors, Fruit & Vegetable Vendors, Hawkers	1000sqm	64	Open-air public spaces for people to sit and relax (open space)	2000sqm
3	Administrative / Office	500sqm	65	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.1	Food Vendors / Hawkers	1000sqm	66	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.2	Administrative / Office	500sqm	67	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.3	Food Vendors / Hawkers	1000sqm	68	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.4	Administrative / Office	500sqm	69	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.5	Food Vendors / Hawkers	1000sqm	70	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.6	Administrative / Office	500sqm	71	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.7	Food Vendors / Hawkers	1000sqm	72	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.8	Administrative / Office	500sqm	73	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.9	Food Vendors / Hawkers	1000sqm	74	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.10	Administrative / Office	500sqm	75	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.11	Food Vendors / Hawkers	1000sqm	76	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.12	Administrative / Office	500sqm	77	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.13	Food Vendors / Hawkers	1000sqm	78	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.14	Administrative / Office	500sqm	79	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.15	Food Vendors / Hawkers	1000sqm	80	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.16	Administrative / Office	500sqm	81	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.17	Food Vendors / Hawkers	1000sqm	82	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.18	Administrative / Office	500sqm	83	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.19	Food Vendors / Hawkers	1000sqm	84	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.20	Administrative / Office	500sqm	85	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.21	Food Vendors / Hawkers	1000sqm	86	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.22	Administrative / Office	500sqm	87	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.23	Food Vendors / Hawkers	1000sqm	88	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.24	Administrative / Office	500sqm	89	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.25	Food Vendors / Hawkers	1000sqm	90	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.26	Administrative / Office	500sqm	91	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.27	Food Vendors / Hawkers	1000sqm	92	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.28	Administrative / Office	500sqm	93	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.29	Food Vendors / Hawkers	1000sqm	94	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.30	Administrative / Office	500sqm	95	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.31	Food Vendors / Hawkers	1000sqm	96	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.32	Administrative / Office	500sqm	97	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.33	Food Vendors / Hawkers	1000sqm	98	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.34	Administrative / Office	500sqm	99	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.35	Food Vendors / Hawkers	1000sqm	100	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.36	Administrative / Office	500sqm	101	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.37	Food Vendors / Hawkers	1000sqm	102	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.38	Administrative / Office	500sqm	103	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.39	Food Vendors / Hawkers	1000sqm	104	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.40	Administrative / Office	500sqm	105	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.41	Food Vendors / Hawkers	1000sqm	106	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.42	Administrative / Office	500sqm	107	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.43	Food Vendors / Hawkers	1000sqm	108	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.44	Administrative / Office	500sqm	109	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.45	Food Vendors / Hawkers	1000sqm	110	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.46	Administrative / Office	500sqm	111	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.47	Food Vendors / Hawkers	1000sqm	112	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.48	Administrative / Office	500sqm	113	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.49	Food Vendors / Hawkers	1000sqm	114	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.50	Administrative / Office	500sqm	115	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.51	Food Vendors / Hawkers	1000sqm	116	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.52	Administrative / Office	500sqm	117	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.53	Food Vendors / Hawkers	1000sqm	118	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.54	Administrative / Office	500sqm	119	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.55	Food Vendors / Hawkers	1000sqm	120	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.56	Administrative / Office	500sqm	121	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.57	Food Vendors / Hawkers	1000sqm	122	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.58	Administrative / Office	500sqm	123	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.59	Food Vendors / Hawkers	1000sqm	124	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.60	Administrative / Office	500sqm	125	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.61	Food Vendors / Hawkers	1000sqm	126	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.62	Administrative / Office	500sqm	127	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.63	Food Vendors / Hawkers	1000sqm	128	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.64	Administrative / Office	500sqm	129	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.65	Food Vendors / Hawkers	1000sqm	130	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.66	Administrative / Office	500sqm	131	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.67	Food Vendors / Hawkers	1000sqm	132	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.68	Administrative / Office	500sqm	133	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.69	Food Vendors / Hawkers	1000sqm	134	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.70	Administrative / Office	500sqm	135	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.71	Food Vendors / Hawkers	1000sqm	136	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.72	Administrative / Office	500sqm	137	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.73	Food Vendors / Hawkers	1000sqm	138	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.74	Administrative / Office	500sqm	139	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.75	Food Vendors / Hawkers	1000sqm	140	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.76	Administrative / Office	500sqm	141	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.77	Food Vendors / Hawkers	1000sqm	142	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.78	Administrative / Office	500sqm	143	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.79	Food Vendors / Hawkers	1000sqm	144	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.80	Administrative / Office	500sqm	145	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.81	Food Vendors / Hawkers	1000sqm	146	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.82	Administrative / Office	500sqm	147	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.83	Food Vendors / Hawkers	1000sqm	148	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.84	Administrative / Office	500sqm	149	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.85	Food Vendors / Hawkers	1000sqm	150	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.86	Administrative / Office	500sqm	151	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.87	Food Vendors / Hawkers	1000sqm	152	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.88	Administrative / Office	500sqm	153	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.89	Food Vendors / Hawkers	1000sqm	154	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.90	Administrative / Office	500sqm	155	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.91	Food Vendors / Hawkers	1000sqm	156	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.92	Administrative / Office	500sqm	157	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.93	Food Vendors / Hawkers	1000sqm	158	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.94	Administrative / Office	500sqm	159	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.95	Food Vendors / Hawkers	1000sqm	160	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.96	Administrative / Office	500sqm	161	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.97	Food Vendors / Hawkers	1000sqm	162	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.98	Administrative / Office	500sqm	163	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.99	Food Vendors / Hawkers	1000sqm	164	Open-air public spaces for people to sit and relax (open space)	2000sqm
3.100	Administrative / Office	500sqm	165	Open-air public spaces for people to sit and relax (open space)	2000sqm

Plate 3.6 :Design Requirements framed from the

3.8 INFERENCES & KEY POINTS DERIVED FROM THE URBAN SITE ANALYSIS

a) Land Use Mapping :

- o More open spaces were found in the locality that was not used properly and wisely.
- o No green spaces/recreational spaces that could be spotted in the locality for public use.
- o On taking up the residential people survey, the inputs given by them was a need of a green space where they could take their children out and spend some time in the evenings and at the weekends.
- o Unused space around the railway station limits can be used to give a public space proposal.
- o Providing Office spaces in the locality in order to bring in the diversity in the land use and enriching the TOD.

b) Road Networks, Nodes, & Landmarks Mapping :

- o Creating a proper network of foot paths with good maintenance, Well-lit during the night time and shaded with trees during the day, with proper width for required pedestrian flow.
- o Road crossing at the Node 3 (Madipakkam-Velachery junction) and at the Velachery -Tambaram high road is a huge task, proposal of a subway for the public/ introducing a speed table in order to reduce the traffic speed and promote safe crossings.

c) Activities and Issue Mapping :

- o Supporting the on-site activities like the vendors on the streets, tea shops, under bridge activities etc.
- o Issues like water logging, improper roads, improper grading, leading to sewage and storm water drainage problems, hence an environmental issue.
- o Proper Paved foot paths, Street furniture (Where ever necessary) near the Amma Unavagam.
- o Walkable streets with controlled wilderness (overgrown trees) to prevent littering and removal of waste clutter beneath the bridge to solve the environmental issue.

- o Development of bus stand near the MRTS to make it a multi modal facility as the already present Vijayanagar bus stand lacks infrastructure and many other facilities. Also reduces the passenger's difficulty in shifting between the modes of transport.

d) Traffic Analysis and Mapping :

- o Solving the congestion issues at peak hours in the nodes will be the main goal.
- o Dedicated market space/commercial space for road side vendors and tea shops must be given in order to free up the occupied space on the road (especially at the turning) and ease up the traffic flow.
- o Dedicated parking lots to solve the roadside parking which acts a main congestion factor.
- o Auto stands, Bus stands & Bus bays, pick up and drop off point for Para transit vehicles is necessary to remove minor traffic clusters at times.

e) Bus Circulation and Routing:

- o The study is to understand the movement of the buses around the site.
- o This study is essential to design the Bus terminus and cater the needs of the already existing bus terminus without any hindrance after relocation.
- o To study how the site reacts when a relocation of a bus terminus happens in an urban context, and how it effects the movement of the existing traffic.
- o Getting to understand the Bus routes that connects with the bus terminal, in order to reroute the buses incoming and dispersing from the site as per the traffic patterns and site condition.
- o Fixing up proper entry and exit of the buses into the site, so that the buses doesn't conflict with the needs it is meant to cater and to the existing traffic.

CHAPTER 4 :THE DESIGN

The major strength of the design lies in the overall planning of the urban area selected for 500M radius from the MRTS. The main aim of the design was to satisfy the different user groups this design is going to serve. The detailed study of the site i.e., the “The Urban Site Analysis” that was seen detailly in Chapter 3, provided a strong base in determining the requirements and the need for the design.

Site Zoning and Networking

- a) This would be the important part and portion of the design as all the analysis and study done in the before portions comes to a form and shape over this section of the design.
- b) The zoning and network mapping zones the spaces that are framed for the design as per the needs on the basis of the existing patterns of traffic, people flow, activities happening, existing issues on site and inflow and outflow of the buses surrounding the site.
- c) The zoning was done in such a way that it could solve the existing issues and problems in the site as well as fulfill the needs and the demands of the public.
- d) The entire site region selected for the multimodal development (i.e., the MRTS region) was divided into two regions, the northern side (pre dominantly residential side) and the southern side (the bus terminal side).

Master Plan – Northern Side (Residential Portion)



Figure 4.1 : Conceptual sketches of open air market and open gallery

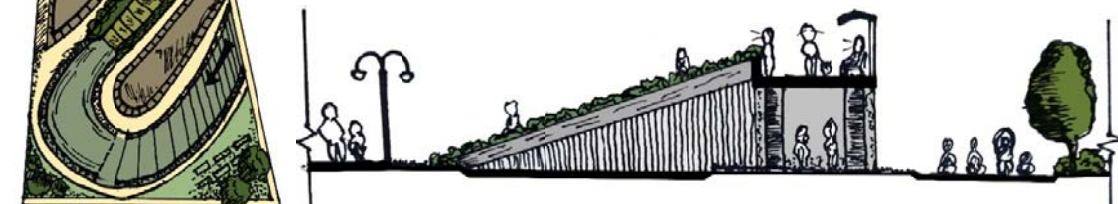


Figure 4.2 : Image depicting conceptual sketches in plan and in section respectively of how the northern plaza will be designed.

- a) After detailed analysis and survey taken on the site from the local and the neighboring community people, it was understood that the people in the locality lacked for self-indulging activities, recreational activities and the local road side vendors expected for an opportunity to speed up their small business.
- b) Hence the northern stretch of the site was divided into three zones
 - o Public Visibility Zone
 - o MRTS Zone
 - o Residential Zone
- d) The spaces that covered in the public visibility zone were predominantly the ones that involved the public activity that is the open-air market, promotional events, carnival spaces at the weekends, OAT for performance activities and the gallery spaces
- e) The spaces that covered in the MRTS Zone were the spaces that involved the users who commute frequently with the MRTS. It includes coworking spaces and gallery spaces.
- f) The last zone namely the residential zone was for the neighboring residential area of the community it involved spaces that encourage the neighboring community to use it at any point of time during a day. It includes futsal ground for teenagers, kids play ground with provided furniture's for the same, informal spaces for informal and leisure activities and a space for multipurpose activities that can be utilized for week end classes and interactive - fun sessions.

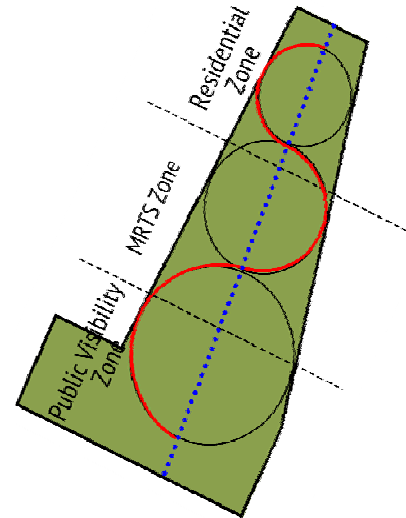


Figure 4.3 : Image depicting the conceptual zoning of the northern side urban plaza

Master Plan – Southern Side (Bus Terminal proposal)

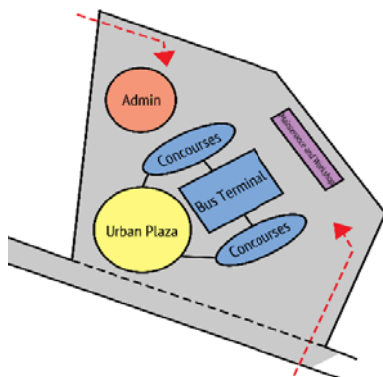


Figure 4.4 : Figure depicting the basic zoning of the bus terminus.

- a) The bus terminus region was designed with integrated urban plaza which houses activities for hawkers, food vendors and an open-air market that could provide opportunities for the smaller vendors to grow their business and also ease the public using the terminal with their services. It also functions as relaxing spot with landscape and site furnitures with proper toilets

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[illegible]

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4.4 BUS TERMINAL VIEWS



Plate4.4 :The Views of Bus Terminal

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4.6 URBAN PLAZA VIEWS



Plate 4.6 : Views of the Urban Plaza

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