

**PRE FEASIBILITY REPORT  
FOR  
DEVELOPMENT OF  
INTERMODAL TRANSIT HUB ON  
PPP FORMAT AT MYSORE ROAD, BANGALORE  
TO**



**INFRASTRUCTURE DEVELOPMENT DEPARTMENT**

28<sup>th</sup> March, 2012

SUBMITTED BY:



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# 1. Introduction

## 1.1. Background

**Infrastructure Development Department (IDD), Government of Karnataka (GoK)** is the Infrastructure arm of GoK with the primary objective of facilitating development of infrastructure projects across the Karnataka State.

IDD on discussions with project advisors empanelled with the department, including KSIIDC-IL&FS Project Development Company Ltd. (KIPDC) has identified a pipeline of infrastructure projects to be taken up across the State. Further, IDD has proposed to develop Intermodal Transit Hubs (ITH) at various locations across Bengaluru, to be developed on PPP format, having realized the significance of developing infrastructure in the State.

In this regard, pre-feasibility studies for each of the locations across Bengaluru has been proposed at a meeting held on 6th January 2010, under the chairmanship of the Principal secretary-IDD, attended by all the concerned public transportation agencies of Bengaluru. The five locations selected for the pre-feasibility study include Yelahanka, Yeshwanthpur, Peenya, Baiyyappanahalli, Hebbal & **Mysore Road**, Bengaluru.

IDD has appointed KSIIDC-IL&FS project Development Company limited (KIPDC), vide its letter no.: IDD 107 ITS 2009 dated 15-04-2010, to undertake the pre-feasibility study for the **Development of Intermodal Transit Hub (ITH) at Mysore Road** on PPP Format (herewith referred to as the "Project").

The objective of this project is to broadly analyze the Project feasibility / viability for development on Public Private Partnership basis and identify the key issues that need to be resolved to develop the project as well as examine the extent of commercial development that would be required to make the project financially viable. This pre-feasibility report lays emphasis on the feasibility and financial sustainability of the project to be implemented on PPP format.

The Inception report submitted earlier for Mysore road location focused on the conceptual framework and methodology which has been used in preparation of this Pre-feasibility study. This pre-feasibility report lays emphasis on the feasibility and financial sustainability of the project to be implemented on PPP format.

## 1.2. IDD's Objective

IDD's objective towards preparation of the Project pre-feasibility is:

- To explore the possibilities of development of the project identified on PPP basis
- To assess the preliminary project viability for development on PPP basis and the extent of commercial development to be leveraged for addressing the commercial viability of the Project on PPP format.
- To identify the project stakeholders including the project sponsoring department and advice them on taking up the project
- Development & time bound implementation of the project of the government with private sector investment
- Development, operations and maintenance of the project in a planned manner with modern amenities and requisite supporting infrastructure by reputed developers without utilizing government resources of manpower, funds, etc
- To structure a viable and bankable project amenable for PPP and explore project funding through private sector developer
- To expedite project implementation by leveraging private sector efficiency

## 1.3. Role of KSIIDC-IL&FS Project Development Company (KIPDC)

The role of KIPDC while carrying out the Pre-feasibility studies has been to:

- Conduct project pre-feasibility study for development of the proposed project on PPP at the identified locations and include the project concept, need for the project at the location, preliminary market / demand assessment, broad financial feasibility / viability, implementation framework, recommendation of nodal agency for the project at individual locations, role of nodal agency & IDD and way-ahead
- The Pre-feasibility essentially focuses on the viability of the project on PPP with / without State / Central Govt. support, segregation of project components

## 1.4. Approach & Methodology

Activities required to be carried out by KIPDC would include:

- Development of project concept
- Desk study for location(s) analysis, review of statistic / data already available
- Interaction with the head of respective Departments
- Preliminary project structuring and viability assessment

- Summarizing of the Pre-feasibility assessment in the form of a report along with recommendation to KIPDC / IDD
- Preparation of requisite presentations to IDD

As a part of the project documentation, KIPDC would submit the following to IDD:

1. Inception Report
2. Draft Pre-feasibility Report
3. Presentation on Draft Pre-feasibility Report
4. Final Pre-feasibility Report

## 2. Infrastructure in Bengaluru

### 2.1. Overview

Bengaluru, the capital of the Indian state of Karnataka, is located on the Deccan plateau in the south-eastern part of Karnataka. Bengaluru is India's third most populous city and the fifth-most populous urban agglomeration. It is positioned at 12.9°N & 77.56°E and covers an area of 741 sq.km. The majority of the city of Bengaluru lies in the Bengaluru urban district of Karnataka and the surrounding rural areas are a part of the Bengaluru rural district.

Today as a large growing city, Bengaluru is home to many of the most well-recognized colleges and research institutions in India. Bengaluru, known as silicon valley of India for being the nation's leading IT exporter, is also the playground of many Indian as well as multinational information technological (I.T.) and Bio-technological (B.T) companies. Numerous public sector heavy industries, aerospace, telecommunications, and defense organizations are located in the city. A demographically diverse city, Bengaluru is a major economic and cultural hub and the fastest growing major metropolis in India.

Bengaluru has made a niche for itself in the international arena in terms of this growth, and with major players in the IT industry gaining foothold here, Bengaluru has come to be best known within India for being the country's un-official high-tech capital.

The growth of Bengaluru from a town to a metropolis has been a result of five growth events:

- Shifting of state capital from Mysore
- Establishment of the cantonment
- Setting up public sector undertakings / academic institutions
- Development of textile industry, and
- Development of information technology / ITES/ biotech based industries

With an economic growth of 10.3%, Bengaluru is the fastest growing major metropolis in India. Additionally, this city is India's fourth largest fast moving consumer goods (FMCG) market. The city is the third largest hub for high net worth individuals and is

home to over 10,000 dollar millionaires and about 60,000 super-rich people who (US\$ 111,500) respectively. As of 2001, Bengaluru's share of Rs.1, 600 crore (US\$400 million) in Foreign Direct Investment was the fourth highest for an Indian city. With its encouraging policies and favourable environment, the city has attracted investors and has seen a steady increase in FDI inflow in recent years.

### Economic Snapshots

Table -1: Economic Snapshots

<b>Area (Sq Km)</b>	<b>741sq.km.</b>
<b>Population (Census 2001, Million)</b>	5.80
<b>Projected Population (2008, Million)</b>	8.01
<b>Literacy Rate (%)</b>	83%
<b>Per Capita Income (US\$) (2007-08)</b>	1087
<b>Software exports (US\$ Billions)</b>	13.50
<b>Workforce (techies) (in Lakhs)</b>	5.55
<b>International cum Domestic Airport</b>	Bengaluru International Airport, Devanahalli

Source: Data Compilation, KIPDC

Bengaluru has emerged as one of India's fastest growing cities with respect to per capita income and exports as well. The per capita income for the city stood as US\$ 1087 for 2007-08 as against US\$ 942 for Karnataka State. The city has been a frontrunner in the IT/ITES space owing to an appropriate ecosystem for knowledge driven industries including proactive Government, sector-friendly policies and a large pool of skilled manpower.

The headquarters of several public sector undertakings such as Bharat Electronics Limited (BEL), Hindustan Aeronautics Limited (BHEL), Bharat Earth Movers Limited (BEML) and Hindustan Machine Tools (HMT) are located in Bengaluru. In June 1972 the Indian Space Research Organization (ISRO) was established under the Department of Space and headquartered in the city.

The large number of information technology companies located in the city has contributed to about 33% of Indian's RS. 144,214 crore (US\$ 32 billion), IT exports in 2006-07. Bengaluru's IT industry is divided into three main clusters - Software Technology Parks of India (STPI); International Tech Park, Bengaluru (ITPB); and



Electronics City Zone. Infosys and Wipro, India's second and third largest software companies are headquartered in Bengaluru, as are many of the global SEI-CMM Level 5 companies. Bengaluru is considered to be amongst the five largest technology hubs in the world.

In addition to the prominent industry names and fortune 500 companies operating in the city, there are a large number of small and medium size industries that contribute significantly to the economic base of Bengaluru.

The industry turnover and the employment base in various categories of industry are illustrated:

Table -2: Employment Scenario Sector (based on size)

Size	Number	Investment (Rs Million)	Job Opportunities
<b>Small Scale</b>	55,162	16,820	578,000
<b>Medium &amp; Large Scale</b>	546	47,250	224,287
<b>Mega</b>	17	38,080	33,830

Source: JnNURM CDP

Given the above scenario, industrial/commercial employment is obviously the highest, at over 90%, while employment avenues in the rest of the sectors are relatively minor.

Further substantiation is illustrated in the table below:

Table -3: Detailed Employment scenario

Sector	No. of Workers	% of Total
<b>Primary Sector</b>	5,000	0.80%
<b>Manufacturing</b>	245,000	43.36%
<b>Electricity, gas and water supply</b>	8,000	1.40%
<b>Construction</b>	6,000	0.99%
<b>Transport, Storage and Communication</b>	43,000	7.29%
<b>Banking &amp; Insurance</b>	65,000	11.07%
<b>Trade &amp; Business Services</b>	21,000	3.59%
<b>Services</b>	184,000	31.50%
<b>Total</b>	585,000	100.00%

Source: JnNURM CDP

The distribution of economic activities in the city reflects its history, its different stages of development as well as the underlying socio-spatial contexts. Several distinct areas or spatial groups emerge from the geographical distribution of activities of Bengaluru.

The City's software exports growth rate (11%) has dipped and is trailing way behind the rival cities of Tamil Nadu (37%) & Andhra Pradesh (41%). The main reason for Bengaluru's dismal performance may be the poor quality infrastructure. Huge capital investment is required in order to address and improve the conditions of dilapidated roads, Urban Infrastructure, Sewerage & sanitation, plentiful water and power supply.

## 2.2. Transport Infrastructure in the Bengaluru

The newly built Bengaluru International Airport (BIA), which started operations in May 2008, has become the fourth busiest airport in India in terms of passenger traffic. The number of air traffic movements has increased to about 300-315 per day.

Bengaluru has a formidable rail network system and is being connected by rail to most cities in Karnataka, as well as Mumbai, Chennai, Kolkata, Hyderabad, Bhopal, Mysore and other major cities in India. A rapid transit system called Namma Metro is being developed now and is expected to be operational by 2012. Once completed, it will encompass a 42.3 km elevated and underground rail network comprising 41 stations. It is expected to connect central locations in Bengaluru to Devanahalli and Chikballapur regions. Multi Modal Transit Centres (MMTC) has been constructed in Mysore Road, Bengaluru for passengers to make use of the public transport system.

Buses, operated by Bengaluru Metropolitan Transport Corporation (BMTC), are the major means of public transport in the city. BMTC operates Vayu Vajra Airport services buses from city centre to the Airport. Big 10 which are AC buses, and Suvarna & Pushpak which are non AC buses, on city routes. The inter city and interstate buses are operated by Karnataka State Road Transport Corporation (KSRTC) which have 6600 buses and 5700 schedules, connecting Bengaluru with other parts of Karnataka as well as other states. Auto -rickshaws and taxis, which are the intermediate public transport (IPT), are another popular mode of transit in the city.

## 2.3. Initiative in Urban Infrastructure

The growth of urban population in India has been extremely rapid. While the total population in India has grown by about 3.5 times in the last century, its urban population has increased almost 9 times over the same period. According to the 2001 census, India has a population of 1027 million with approximately 28% or 285 million people living in urban areas. The liberalization policies adopted by the Government of India, is expected to increase the share of the urban population to about 40% of total population by the year 2021. It is estimated that by the year 2011, urban areas would contribute about 65 per cent of gross domestic product (GDP). Urban economic activities and higher productivity is contingent upon the availability and quality of infrastructure services such as power, telecom, roads, water supply and mass transportation, coupled with civic infrastructure, such as sanitation and solid waste management.

To ensure sustainable growth, Government of India has initiated the development programs for the urban sector in selected cities through Jawaharlal Nehru Urban Renewal Mission (JNNURM). The aim is to encourage reforms and fast track planned development of identified cities with focus on efficiency in urban infrastructure and service delivery mechanisms, community participation and accountability of ULBs/ Parastatal agencies towards citizens.

The objectives of the JNNURM are to ensure that the following are achieved in the urban sector:

- Focused attention to integrated development of infrastructure services in cities covered under the Mission.
- Establishment of linkages between asset-creation and asset-management through a slew of reforms for long-term project sustainability.
- Ensuring adequate funds to meet the deficiencies in the urban infrastructural serves;
- Planned development of identified cities including per-urban areas, outgrowths and urban corridors leading to dispersed urbanization.
- Scale-up delivery of civic amenities and provisions of utilities with emphasis on universal access to the urban poor.
- Special focus on urban renewal program for the old city areas to reduce congestion.

- Provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply and sanitation, and ensuring delivery of other existing universal services of the Government of education, health and social security.

Bengaluru is one of the fastest growing cities in Asia and one of the most sought after cities in India by people, companies, multinationals and tourists. The massive growth that the city has witnessed in the last decade is a clear indication of this city being developed to be on par with the most modern cities.

A number of infrastructure projects have come up in the city such as roads, highways flyovers etc easing the traffic and making travel a lot easier. While there is still a lot to be done with regard to the projected traffic demand, the Government has indeed been working at a great speed to bring Bengaluru on par with the great cities of the world. Some of the infrastructure initiatives are:

- Railway under bridges at Cantonment, Frazer town, Yeshwantpur and Wheeler towns
- Railway over bridge at Mathikere and Marathalli
- Flyovers along Outer Ring Road
- Peripheral Ring Road
- NICE corridor
- Works done at the Outer Ring Road which has enabled the saving of about 13 kms of extra journey to commuters to reach Mysore road from Magadi road.

## 2.4. Traffic Scenario

Bengaluru city has a population of 5.8 million according to the census statistics for the year 2001, as against the city's earlier population of 2.92 and 4.13 million in 1981 and 1991 respectively. This shows that the population is growing at a rapid pace and has nearly doubled in the last twenty years, and presently the growth rate is around 3.8% annually. The geographical boundaries of the city also are expanding fast, as evident from the census data, which showed the city areas as 386, 446, 531 sq.km. during the years 1981, 1991 and 2001 respectively. With increasing population and reduced available land area the city's population density stood at 7983, 9260 and 10,710 persons/sq.km for the above corresponding period. It is further projected that the

population size of Bengaluru Urban Agglomeration (BUA) will be around 7.8 million in 2011 and 11.0 million in 2021. A large city of this size and rapidly rising population of the above magnitude, demands a whole range of civic services, including in the vital transportation sector.

The present public transport infrastructure of Bengaluru city is largely dependent upon the BMTC operated bus network facility, which is the mainstay for a population size of nearly six million. In Bengaluru, there is a preponderance of private transportation – mainly consisting of two wheelers and three wheelers, besides a good number of four wheelers and light vehicle population. Given this scenario, Bengaluru city is also being promoted as a high profile investment destination by Government, Private industries and Multi-Nationals and the good response thus received, has resulted in a chaotic situation as far as Urban Transport Sector is concerned.

A traffic density survey conducted for evaluating the traffic pattern scenario helps in determining the congestion status of the road network. The present vehicular fleet on Bengaluru roads is around 1.8 million vehicles traversing in the city area which would be difficult to survey and hence at those key locations along the corridors, field survey teams carried out traffic census during peak and off peak hours of the day for different categories of vehicular flow in the area. The collected field statistics were analyzed and compared with the congestion index available for the city the derived Congestion Index (CI) indicated far above the limiting value of 1.0. This is evident from some of important road links in the city network which are given in the table below:

Table -4: Traffic pattern in major route links in Bengaluru

Name of the road	Peak Hour service volume	Practical Capacity	Congestion Index
Platform Road	14,375	2,486	5.78
Seshadri Road	10,105	3,813	2.65
Race Course Road	7,375	1,371	5.38
Subedar Chatram Road	5,934	2,057	2.88
J.C. Road	11,813	4,971	2.30
Dickenson Road	5,511	1,971	2.80
Airport Road	7,767	2,900	2.68

The traffic pattern surveys along the proposed corridors brought out clearly the composition of vehicle population plying on the city roads. From the survey data, it was evident that the two wheeler population almost always exceeded 50% at most survey points, while the three wheelers were typically around 20%, which together accounted for over 70% of the total vehicle population and the rest accounted for by cars and HMTVs. These findings have helped to confirm the total inadequacy of the present public transport system operating in the city.

At all major roads in Bengaluru the traffic has increased many folds especially, Mysore Road where the number of commuters has increased as people travel to places such as Mandya, Srirangapatna, Ooty and even Kerala through this road. Apart from this and to meet the genuine needs of a rapid, efficient and convenient mode of city transport, there is a growing trend to use personalized vehicles in Bengaluru with attendant problems of high road congestions, large fuel consumption, heavy air pollution levels, besides growing number of accidents on the road.

To address the traffic problems in and around Bengaluru region singularly and collectively, and in order to bring in considerable relief to the travelling public, the Government of Karnataka has desired to introduce a Metro rail system; Mono Rail System, HSRL and Commuter rail etc for the future benefit of the city's commuting population across the city.

## 3. The Concept: Intermodal Transit Hubs

### 3.1. Background

The Government of Karnataka (GoK) has been very proactive and has brought in a number of new initiatives for growth and development of the State. The efforts being taken up for the city of Bengaluru is particularly commendable. Bengaluru city was originally developed as a Garden City and has now transformed into an industrial and software hub. Most of the development has happened on the outskirts of the city and has caused an urban sprawl around, to some extent lop sided towards south and east.

However, rapid growth in development, economic activity, and in turns population in Bengaluru, brought to the fore increasing traffic and transportation problems due to the gap between demand and supply of transport system. For Bengaluru, the modal shift in favor of mass transport system is not only poor but declining. As a result, there is tremendous increase in the use of personalized vehicles. To further aggravate the situation, the carrying capacity of the roads has not kept pace with the growth and hence leading to congestion, increased air pollution and accidents. The use of personalized vehicles should be regulated through Low cost Transportation systems and management techniques. An **Intermodal Transit system** is the need of the hour for a city like Bengaluru. It is a network that links all of the city's public transport services together.

In an Intermodal Transit system, the urban transport system should complement and not compete with the other services/ components of the systems. Mere introducing of new modes of public transport system will not do the trick, unless a good connectivity is not established between the various modes of transport. As per the opinion of experts in the Urban Transportation systems, poor modal connectivity is a significant barrier to intermodalism just as in freight transport, leading to commuters opting out of public transport system. Too often, the bus station is 1 km away from the commuter rail station, or the transit line stops at the airport, but too far away to walk to the terminals.

- Addressing the above issue of poor modal connectivity, Intermodal surface public transport stations represent a rapidly evolving and developing concept.
- In an Inter modal Transport system, the different modes of transport such as Buses, Trains, intermediate transport networks like auto rickshaws, private

vehicles, etc. are linked to enable commuters to travel within the city in the least possible time and at lower costs.

- The Intermodal transit hub will be developed as a publicly owned and operated central transit passenger transfer facility which services rail, bus, shuttle, taxis, bicyclists and pedestrians. Apart from this complimentary land uses such as offices, restaurants, commercial & retail sales and service, bus line terminals, bus line yards and repair facilities and taxicab facilities may be provided to make the project viable.
- The development of the Transit centre becomes a destination by itself as the future Central Business District “CBD”.

Thus, on a whole Intermodalism is an important feature of today’s transportation systems worldwide. In recent years, there has been an increasing emphasis placed on the development of intermodal transport centres as tools with which to improve urban mobility. Specifically this activity is highly critical in the developing countries, where a majority of residents use transit and where an effective system of transfer centers could improve intra-urban mobility and give low-income residents better access to economic opportunities. The facility may be complemented with a commuter lifestyle space where utilities like offices, restaurants, commercial & retail sales and services are offered to the commuters.

### 3.2. Intermodal Transit hub – the Concept

An intermodal facility can be defined as a place where interface occurs between transportation systems. In a passenger terminal, people enter the facility by one mode of access (e.g. by car, by bus or rail, etc.) and leave by another. The term “**Intermodal Transit Hub (ITH)**” is generally applied to a terminal that serves multiple transit operators and/or modes, such as combined bus and rail systems such as Metro and HSRL services along with the intermediate public transport network. The figure below depicts a Multi/inter modal corridor in an urban regional centre:



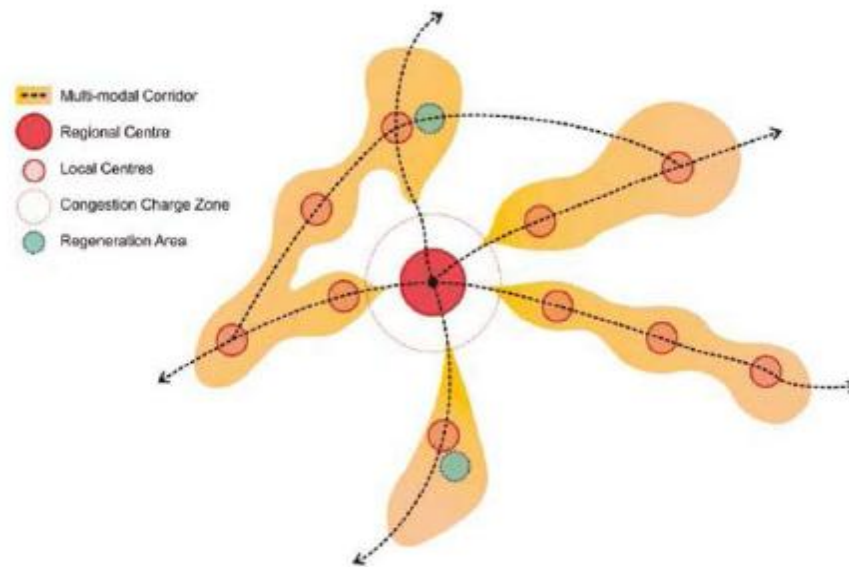


Figure 3:1: Intermodal Transit hub - *the Concept*

Intermodal Transit hubs are a particularly strategic consideration in the present scenario of traffic growth and congestion in roads in Bengaluru. An Intermodal Transit Facility gathers many modes of transportation together and is strategically located so that the commuter has different transit alternatives to reach the destination. It describes an approach to planning, building and operating the transportation system, emphasizes optimal utilization of transportation resources and connections between modes. One of the objectives of an Intermodal transit hub is to minimize the cost and inconvenience of changing transit systems by a commuter.

The intermodal hub is a major transportation centre generally characterized by a large footprint, many thousands of users, multiple modes of transportation and serving large portion of the city area, regional center, park-and-ride activity, transfer between bus and possibly other modes and includes a building that functions as a transit centre. A well designed ITH should fit within the fabric of the entire transport system of the region.

### 3.3. Need & benefits of Intermodal Transit Hub

An Intermodal Transit Facility gathers many modes of transportation together and is strategically located so that the commuter has different transit alternatives to reach the destination. It describes an approach to planning, building, and operating the transportation system, emphasizes optimal utilization of transportation resources and connections between modes. One of the objectives of an Intermodal transit hub is to

minimize the cost and inconvenience of changing transit systems by a commuter. The benefits derived from effective intermodal co-ordination:

- Lowering transportation costs by allowing each mode to be used for the portion of the trip for which it is best suited
- Increasing economic productivity and efficiency, thereby enhancing the Nation's global competitiveness;
- Reducing the burden on overstressed infrastructure components by shifting use to infrastructure with excess capacity
- Generating higher returns from public and private infrastructure investments
- Improving mobility for the elderly, disabled, isolated, and economically Disadvantaged
- Reducing energy consumption and contributing to improved air quality and environmental conditions.
- It introduces Single ticket travel which in turn enables easy movement from one mode to another.
- Reducing Land take for road operations and common amenities & maximizing opportunities for shared facilities and synergies
- Minimizing potential phasing impacts by reducing the number of components that need to be accommodated and avoiding duplication of facilities.

### 3.4. Intermodal Transit Hubs (ITH) on PPP

ITH facilities are expensive and require massive mobilization of resources for investments that have long gestation periods. Urban transport also has an inherent imbalance as it involves carriage of high volume of traffic during peak hours whereas during rest of the day, it is underutilized. This affects the economic viability of the system adversely.

The development of the project can be envisaged on Public Private Partnership basis wherein the private sector player shall develop, operate and manage the facility for a predetermined time period. Commercial viability being the key to the success of any PPP project, the viability of Intermodal Transit Hubs in the urban sector can be ascertained with the following as main streams of Revenue:

- Revenues from the commercial space and other facilities provided at the ITH

- Levy of user charges to transport service providers including Government inter and intra state services, private/ Omni buses, taxis, Autos etc
- Levy of Parking fee for buses and other vehicles using the proposed parking facilities
- User charges for other miscellaneous services like day/ night parking, vehicle repair/service facilities, etc for buses, cars etc
- Revenue from advertising (at the intermodal hub premises, on parking fee tickets, interior walls, parking spaces and subway etc)

The Project could be implemented on a PPP model by selecting a developer through a transparent open bidding process who would be responsible for the design, development, finance, construction, marketing, sub-lease and maintenance of the common area and facilities of the property.

The subject site for the construction of Intermodal Transit Hub can be leased out for a pre agreed number of years to the successful bidder by Government for an agreed upfront lease premium, an annual license fee and /or on any other feasible option derived as per detailed studies.

## 4. Proposed Project

### 4.1. Project Area - Mysore Road (SH-17)

Mysore Road located at the south-west part of the Bengaluru city and is one among the five radial roads. This road connects the Outer ring road, Nice road and other major roads of the city, it is one of the most busiest roads in the region. Mysore road is also the State Highway (SH-17), and hence most of the interstate/intercity vehicles commute on this road. This road serves both the inter-city and intra-city passengers.

At the primary catchment area, the maximum users of this road are from Kempapura Agrahara, Vijaynagar, Herohalli, Banashankari and also by the passengers commuting from Kengeri.

This part of the city is a knowledge hub with many education centers and is well known in India and abroad like NLSIU, the Law school at Nagarbhavi, Bangalore University area, R.V. Engineering College, Medical College etc. The area also has many small scale industries and with Mutation corridor, new industries in near future are proposed as per the Master plan 2015. The area is a part of the Bruhat Bengaluru Mahanagar Palike having a population of 5,03,864 covers the area of 13584.5 Ha. The population of individual wards as per 2001 census is as shown in the table below.

The secondary Catchment area would be covering the whole of the western area beyond the outer ring road, for the passengers who would be travelling towards Mysore, from NH-4 to NH-209 as shown in the figure below:

Table 4-1: Primary Catchment Area Popln.

Wards	Population(2002)	Area (ha)	Gross density (persons/ha)	Net density (persons/ha)
Kengeri	134242	12617.2	11	153
Herohalli	206263	5810	35	299
Vijaynagar	228956	1000.2	228	544
Banashankari	460726	1851	249	487
Kempapura agrahara	380649	876	435	1074

Source: Bengaluru Master plan 2015

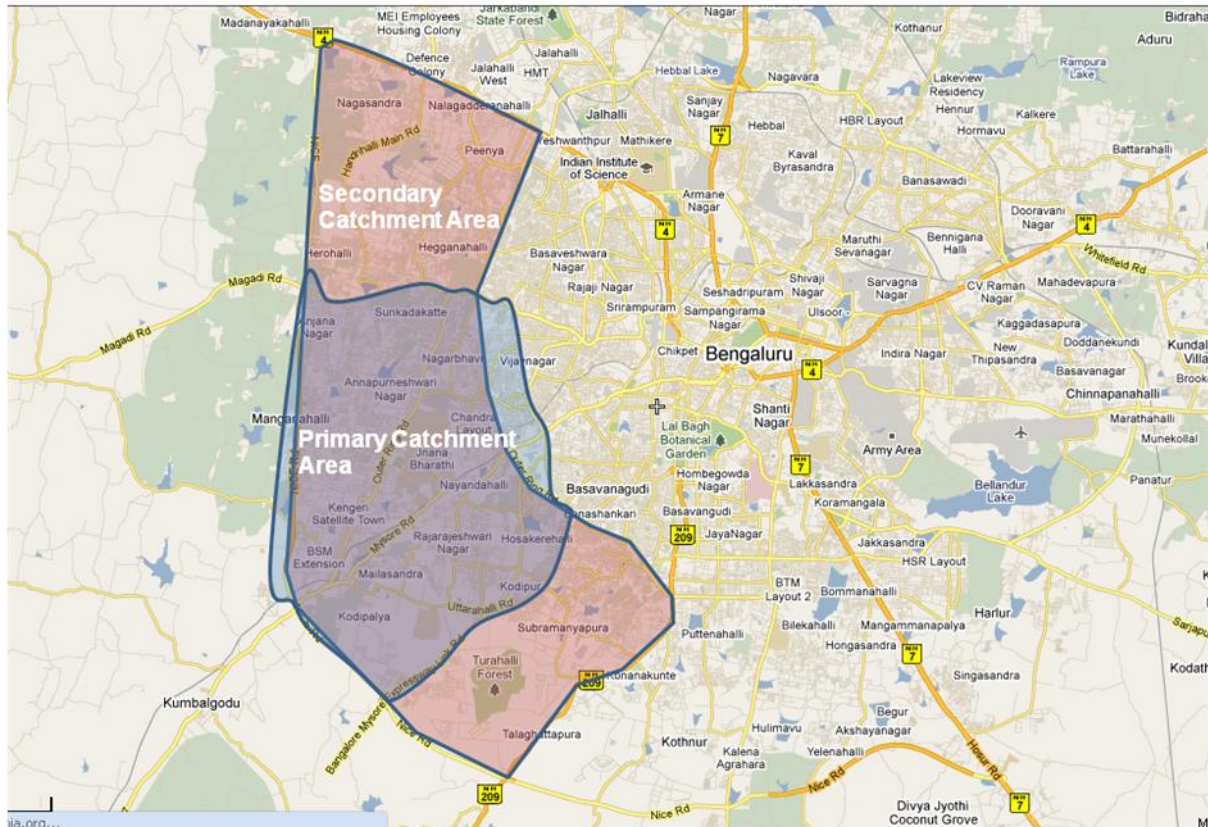


Figure 4:1: Primary & Secondary Catchment area delineation

**Kempapura Agrahara** had a population of 3,80,649 in 2002, covering an area of 8.77 sq.kms is located in the South-West of the city of Bengaluru, India. It is surrounded by KR Market and the Majestic area to the North; Vijaynagar to the North-west; and Hoskerekhalli Layout, extensions of Banashankari at the Southwest. The gross density is about 435 persons/ha which is more than twice the maximum BMP ratio of 200 persons/ha. The existing net density of 1074 persons/ha is thrice that of the net density of BMP which is 352 persons/ha.

This area has a high concentration of worker population and is largely under-equipped with respect to infrastructure facilities. The area is heavily built-up and only about 10.9% of the land area is vacant within the planning district.

The availability of employment opportunities and economical rental housing, which are important aspects of the existing neighborhoods; attract people to settle in this area. About 17% of the area is occupied by large industries including KAVIKA, Binny Mills, Minerva Mills and BHEL. Almost 40% of the district is put to residential uses.

The Vrishabhavathi River runs through this area in the form of an open drain and separates it from the surrounding areas both physically and socio-economically. The

predominant land use of Kempapura Agrahara is residential, which covers 40.5% of the area. Industrial use cover 17.3% and vacant space is 10.9% as per the existing land use, 2004. A third of the area's water demand is met by BWSSB; the rest through tapping of ground water. The industrial units largely depend on ground water. The Primary Urban Roads, Mysore Road (SH-17) and Magadi Road, are important connectors at the city level. Although the road network enables connectivity, the narrow road widths and the poor road conditions inhibit smooth circulation. The existing areas are well connected and equipped with public transport and necessary infrastructure. The southern Railway line (Mysore bound) passing through this area plays a significant role in dividing the planning district into two. The KSRTC public bus node is a major traffic generator in this area.

**Vijaynagar** is mainly residential area with pockets of mixed use towards the North, and a large extent of vacant land towards the south, the Vijayanagar located within the BMP area, is bound by Herohalli towards the East and Kengeri towards the South-west. Towards the North-East, the Bengaluru-Mysore railway line segregates Vijayanagar from Kempapura Agrahara. Part of the Bangalore University is located within this ward towards the south-west. The northern edge of this ward is defined by the Bangalore to Mysore railway line. The Sports Authority of India is located within the University premises. The area is generally well served by neighborhood level urban amenities for health, education and active and passive recreation.

**Herohalli**, lies along the western periphery of Bengaluru. A portion of this ward is been considered within the catchment area till the State Highway Magadi Road (SH-17E).

**Banashankari** is characterized by a variety of residential buildings, is strengthened further with the exception of Basavanagudi and Sankarapuram areas where residential transformation is encouraged. This ward is located within the BMP area, and is defined by KR Road and Kanakapura Road (NH209) to the east and Mysore road (SH-17) to the west. The outer ring road cuts through the southern part of the planning district. Since Mysore road is the part of this ward, portion of this ward inevitably falls into the catchment area.

**Kengeri**, a green hinterland of Bengaluru, covers an area of 12617.2 Ha has only 886.3 Ha dedicated for residential purposes. This ward, which is located in the south-west part of the city, includes a major economic corridor of Mysore Road and is threatened by



disorganization. Its many vacant layouts are expected to serve the future housing needs of the city. This ward is broadly defined by green agricultural areas on the west; Magadi Road on the North; and Kannakapura road and southern ring road on the East;

The area supports different kinds of traffic which:

- Serves the educational institution of the Bangalore university;
- Caters to commuters going to and fro to the city for occupational purposes;
- Connects Mysore, Chamraj nagar, Mandya, Srirangapatna, Madikeri, Ooty and other major destinations in Kerala
- Serves the rural population in traversing to the city (market, health facilities).

#### 4.2. Proposed Project - ITH

Intermodal Transit Hubs (ITH) is proposed to be implemented on PPP basis across many locations in Bengaluru and accordingly an ITH has been planned to be developed on a site along Mysore Road. The site identified for the proposed project is along the Mysore road (state highway SH-17) and has the main road facing it. Just opposite to the site is the plot owned by BMRCL where the construction works for the new Metro Station is in progress. Adjacent to the site, was the BESCO Power house of 66KV High Tension Power Line, which is being shifted to another area close to the proposed project site for ITH.

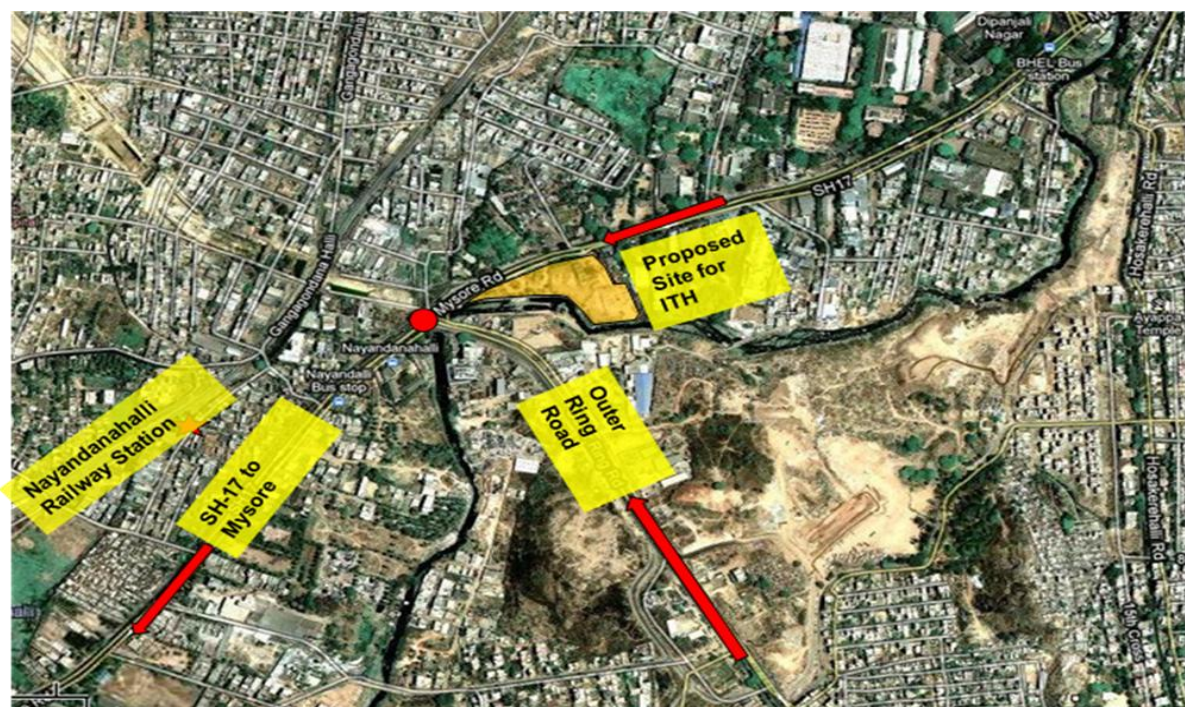


Figure 4.2: Areal view of the site with major landmarks

### 4.3. Location & Site Assessment

**Approach to the site:** The site does not have a regular shape and has an area of approx. 5 acres. The site is located close to the junction of Mysore Road and Outer Ring Road and is adjacent to the State Highway-17 with many inter-city and intra-city vehicles travelling through these routes. The subject site has been identified at a very important and strategic location.

**On-site features:** The site for the project is a plain terrain with a portion of it owned by BMRCL & BESCOM.



*BESCOM Construction on Project Site*

**Off-site features:** Vijaynagar is on the northern side of the site. The main junction Mysore road – Outer ring road is adjacent to the plot. To the west is Kengeri and apart from this Nayandahalli Railway station is in close proximity to the site (approx. 1 km). On the opposite side of the Mysore road, in front of the site area, is the Metro Station under construction.



*Metro Station construction in front of the project sight*



Applicable Development controls for the Project:

**Table 5: Development Control Regulations as applicable to the Project Site**

<b>Land Use for the Site</b>	The permitted Land Use is Industrial (Main). This needs to be changed to <b>Traffic &amp; Transportation (T &amp; T)</b> .
<b>Area of the Site</b>	<b>5 acres</b>
<b>Permitted Ground Coverage</b>	<b>45% (to be proposed as per T &amp; T land use)</b>
<b>FAR</b>	4 (Since Metro station is in close proximity of the site)
<b>Parking</b>	As per applicable rules
<b>Height Restriction</b>	The Proposed facilities such as Bus Terminal, Metro and Monorail are one on top of the other and require enough height separation.
<b>Setbacks (all around setbacks)</b>	As per applicable zoning regulations: Above 30 mts - 11 mts Above 40 mts - 13 mts Above 50 mts - 16 mts
When Multi Level Car Parking (MLCP) is proposed on a plot as independent activity, there shall not be any limitation of FAR or height of building subject on condition that it satisfies fire restrictions where ever applicable.	

#### 4.4. Transportation Environment in the area

- The entire area in proximity to the subject site, comes under Bruhat Bengaluru Mahanagara Palike (BBMP) jurisdiction.
- Bengaluru Metropolitan Transport Corporation (BMTC), which is the agency that operates the public transport bus service in Bengaluru, has a vast network of buses within this catchment area.
- Similarly, Karnataka state road transport corporation (KSRTC) operates intra-state buses across the state.
- KSRTC runs inter-state buses going towards Mysore, Tirupathi, Pune, Chennai, Thrissur, Coimbatore, Ernakulam, etc
- BMTC & KSRTC buses ply through the Mysore road area.
- The site is very close to the major junction of ORR and SH-17 intersection.
- Nayanadahalli Railway station is one of the major stations in this area and is at a distance of less than 1 Km from the project site.

*Details of BMTC buses plying in this area via Mysore road have been provided in the Inception report.*

Outer Ring Road is one of the concentric ring roads proposed by the BDA to connect the various neighborhoods of the Bengaluru without entering the core city region.

#### 4.5. Tentative Components of Intermodal Transit Hub at Mysore Road

The development of an Intermodal Transit Hub would include the following project components:

##### 4.5.1. Integrated Bus Terminal

An Integrated Bus Terminal would serve as a common facility to:

- Govt. owned inter-state / inter-city buses, i.e.; KSRTC, and other state transport buses, etc.
- Private bus operators (inter-state / inter-city)
- Local city buses i.e. BMTC etc.

The Bus Terminal shall be a transit terminal and there shall be a repair shop / depot (mini) at the ground floor. The Bus terminal expected in this site is expected to provide support services to the Mysore road satellite Bus terminus which is approx. 2 kms away from the site.

The components of the bus terminal shall include:

<b>Bus Station Facilities</b>
Bus Bays - Intercity And Inter- City Buses
Bus Parking Area (For Each Operator)
Mini Repair Shop For Buses
Driver Retiring Rooms/Cafeteria
Administrative Offices (For Each Operator), Security Cabins,
<b>Passenger Facilities</b>
Ticketing Counters/Information Kiosks/Enquiry
Passenger Concourse Area
Retiring/Waiting Rooms/Cloak Rooms
<b>Other Facilities</b>
Restaurants/Coffee Shops/Fast Food Outlets
Commercial Outlets- Book Stores, Medical Shops, Etc
ATMs, Internet Cafes/ Business Centers, Stalls, Etc

A mini repair shop / depot can be included mainly for the buses plying on longer routes on user charge basis. This shall include:

- Small workshop shed
- Washing platforms

- Crew rooms
- Office area for BMTC/KSRTC

#### 4.5.2. State of the art Metro station

A state of the art Metro Station, taking in to consideration the future development and expansion plans, is envisaged to be an integrated part of the project. Parking facilities also need to be provided for the facilities mentioned above. The Metro station facility is expected to be coming up just opposite the site for the Project.

<b>Metro Station Facility</b>
Ticket Counters/Reservation Counters (Bus & Rail)/Information Kiosks
Waiting Lounge/Cloak Rooms
Restaurants/Coffee Shops/Fast Food Centers
Commercial Outlets-Book Stores, Medical Shops, Souvenir Shops Etc
Access For Disables Persons
Foot Over Bridges connecting the Bus terminal at the proposed ITH facility

#### 4.5.3. Mono Rail station

The main purpose of the Monorail is to serve as a feeder for Metro, hence the components required for the station are as mentioned below. The Mono rail route is still under finalization and is expected to be along the junction of ORR and Mysore road. Hence, the Mono rail station may be envisaged at that location (which approx 400 mts away from the subject site).

<b>Monorail Facilities</b>
Ticket Counters/Reservation Counters (Bus & Rail)/Information Kiosks
Waiting Lounge/Cloak Rooms
Pre-Paid Porter Counters
Restaurants/Coffee Shops/Fast Food Centers
Commercial Outlets-Book Stores, Medical Shops, Souvenir Shops Etc
Access For Disables Persons
Barrier Free Access For Disabled Passengers I.e. escalators/Elevators
Foot Over Bridges connecting ITH and the Mono rail station that may be envisaged at the junction.

#### 4.5.4. Intermediate public transport (IPTs) system

Most of the passengers use intermediate public transport such as auto-rickshaws and taxis over short distances. Moreover, the Railway Station and the Mono rail station (expected in future) may require connectivity to the ITH & Metro facility which shall be facilitated by feeder buses and the IPTs. Hence appropriate space need to be provided for this mode of transport within ITH facility.

#### 4.5.5. Commercial development – commercial/institutional/office

The project has being envisaged in a prime area, where developments is expected to happen over the years and hence commercial development of the available FSI has been proposed, that would provide supplementary services to the passengers travelling by rail as well as road. The following are possible development that commands a potential demand at the project.

<b>The commercial development – commercial/institutional/office</b>
Ticket reservation counters by private operators
Tourism counters
Food & beverage outlets
Shopping center, Retail hyper mart
Visitor parking facilities
Office space/area for it, IT'S, BPO, institutions etc.

#### 4.5.6. Traffic & Transit Management centers (TTMC)

TTMC'S are planned to have multi-level parking lot, public utilities like mini-shopping centers and food courts. These centers in addition to providing park & ride facilities are also proposed to act as hubs for mini-buses planned by BMTC to transport the commuters from every major residential area to the nearest TTMC, so that commuters can board a bus of their choice. The TTMC is already operational at Kengeri and is approx. 6 kms from the subject site.

*All these components in and around the region fall under the gamut of Intermodal Transit Hub (ITH) at Mysore road.*

## 5. Infrastructure Planning

### 5.1. On Site

The proposed intermodal transit hub (ITH) is to be planned and designed as an iconic/landmark building with contemporary innovative design subject to clearance from BMRCL authorities and fulfillment of other applicable norms/ laws/ rules such as set-backs, distance between buildings, etc. Appropriate connectivity may be necessary with rest of the components of ITH.

The ITH shall be required to comprise of a state-of-art bus terminal, Mono-rail, Metro station (Mysore Road), TTMC & MLP. The bus terminal is proposed to be in the ground floor and shall connect all the networks in the catchment area and beyond. It shall also serve as pick up station for buses plying on longer routes i.e. to Mysore, Ooty, Ernakulam etc. At the above floors, Commercial area / office space is proposed. Multi level Car Parking may be provided to cater to balance ECS, after the Basement area has been exhausted for parking. Suitable connectivity in the form of Foot over Bridges / Skywalks is a high point in this project as this would be required to complete the essence of Intermodal Transit Hub.

The ITH is intended to facilitate transportation via the mode that enables travel in the least possible time and permitting easy shift to another mode when necessary. Hence, it is mandatory to provide easy connectivity among bus terminal, and the other transit components such as mono-rail & metro. All related internal and external services i.e. internal sanitary and plumbing, internal electrical services and installation along with electric substation; fire detection, fire alarm and fire fighting services; air-conditioning services whenever necessary; communication system and services; air-conditioning services whenever necessary; communication system and services; elevators/ escalators should be provided whenever necessary to enable easy access for disabled passengers.

Apart from the bus movement in the ground floor, easy and separate circulation should also be provided for private vehicles, intermediate public transport such auto-rickshaws, taxis, etc. adequate parking area shall also be provided for various components within the project site. The parking norms as applicable for traffic and transport facilities shall be valid for the site.

### Area Requirement for various components with ITH

#### Bus terminal

The bus terminal facility shall include:

Sl.No.	Sub-Component	Area Required (In Sq.Ft.)
1	Enquiry Office & Ticketing Counters	4000
2	Tourist Information Centers, And Admin Office, Security Cabins, Office Area For Operators/ Transport Depts.	4500
3	Passengers Concourse Area	25,000
4	Waiting Halls (Gents & Ladies)	6,000
5	Repair Shop Area - Shed, Washing Platform, Crew Rooms, Generator Room, Tool & Store Room	18,000
6	Passenger Amenities - Commercial Area/ Space With Bus Terminal, Toilets, Cloak Rooms - 1/2 <sup>nd</sup> of The Bus Terminal Area In A Mezzanine Floor	31,000
7	Total Area Required For Bus Terminal Along With Repair Area	90,000 (Approx.)
8	Boarding Bays (Demand Assessment Provided Below)	40
9	Idle Parking	23

#### Demand assessment for boarding bays in bus terminal

The number of boarding bays for bus terminal has been calculated based on the total bus schedules trips that service on the routes in and around the catchment area. The routes and the bus schedules have been highlighted in the previously submitted Inception report. BMTC & KSRTC are the agencies that operate public transport bus services on these routes. With the help of the secondary data, the total no. of scheduled trips done by both BMTC & KSRTC at present per day is 3168.

The assumptions considered are:

- The bus trips growth rate assumed for BMTC is 4% and for KSRTC is 2%  
The BMTC bus trips in the region are expected to increase about 4 times to 8751 after 30 yrs & KSRTC bus trips to about 2 times to 851 after 30 years. The growth rate has been taken, comparing the catchment area growth rate with the rest of Bengaluru.
- The time to board a bus - 5 min

- The time to alight a bus – 3 min
- Bus terminal shall operate for approx. 16 hrs. This is in keeping with the running time of Mysore Road Metro station & the proposed Mono – rail station timings.
- The number of boarding buses, a bus bay can handle is 192, where as the number of alighting buses is 320
- Of the total estimated no. of bus trips (9602), 50% i.e. 4801 is for boarding and the remaining 50% for alighting.
- From the above, the total number of boarding bays is 25 and alighting bays is 15.  
Hence total number of bus bays is 25+15 = 40

The area required per bus bay is minimum 76 sq.mt. as per urban development plans formulation & implementation (UDPFI) guidelines. Hence the area required for 40 bus bays is 32,710.4 sq.ft.

The area required per idle bus bays is 145 sq.mt. as per UDPFI guidelines. Hence the area required for 23 idle bus bays is approx. 35,570 sq.ft.

#### Metro Station

The Mysore Road Metro station is under construction and is expected to be completed by near future. However, the details of the various sub components within the station are not available and hence not provided in this report.

#### Mono-Rail Station

The area requirement for various sub components within Mono-Rail station has been provided below. The facility is expected at a distance of approx. 400 mts away from the site at the junction of Mysore Road and Outer Ring Road.

Sl.No.	Sub-Component	Area Required (In Sq.Ft.)
1	Enquiry Office & Ticketing Counters, Check In Counters	15000
2	Tourist Information Centers, Admin Office, Security Cabins, Office Area For Metro Dept.	5000
3	Waiting Halls (Gents & Ladies)	6000
4	Platform Area	113000
5	Passenger Amenities – Commercial Area/ Space such As Shopping Arcade, ATMs, Kiosks, Refreshment Stalls, Cloak Rooms – 30% Of Total Platform Area	22600
6	Total Area Required For Mono (Since 2 Platforms Are Required)	160000 (Approx.)

Multi level parking

Passengers normally use transit modes other than buses and trains, such as cars, two-wheelers and intermediate public transports like taxis and autos. So it is necessary to provide a facility that ensures easy circulation and parking of these vehicles.

The norms for parking requirements in a traffic & transport land use area are 1 ECS per 100 sq.mt. of built up area which requires a parking facility for approx. 370 ECS. Thus the parking is provided at the basement and one of the above floors and hence the proper slope for the car passing facility should be provided without any conflict in circulation and without blocking the other passengers travelling by other public transport modes.

Commercial development – commercial/institutional/office area

It is necessary to optimize the level of commercial development to be allowed so as to ensure financial viability for the project. The various sub-components within this facility are:

Sl.No	Sub-Component
1	Commercial Complex Area – Shops, Grocery Stores, Restaurants, Food Courts, Super/ Hyper Markets,
2	Institutional Area – Educational Institutions, Colleges, Tutorials, R & D Labs And Test Centers
3	Office Area – IT, ITES, BPO, Consulting & Business Offices, Financial Institutions

The preliminary Concept Plan for the ITH project at Mysore Road has been shown below:



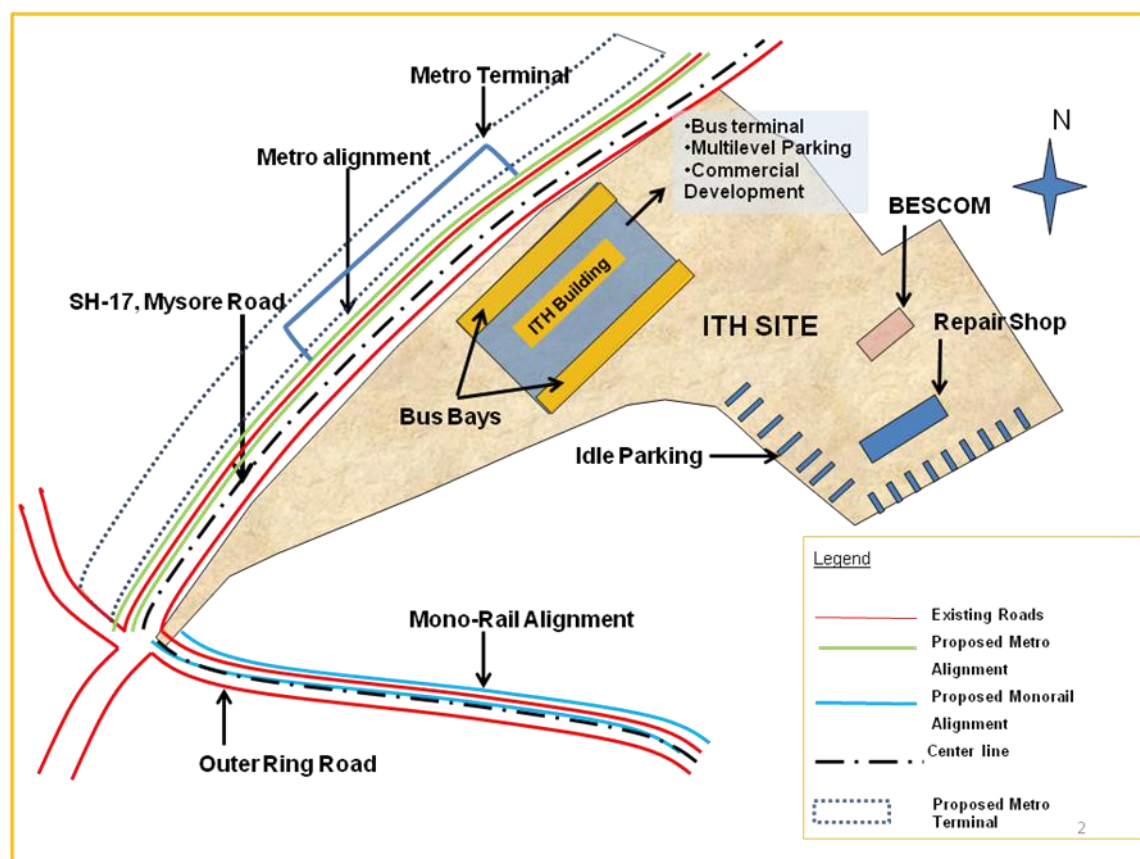


Figure 5:1: Project Site with major components

As, the suitable private sector developer, has not been decided yet, for the construction of ITH, the Government should take up this decision at the earliest possible due to its demand and also since the area has a potential to grow in near future. The developer shall construct a bus terminal that includes all facilities for passengers, apart from boarding bays, repair shop, multi level parking etc. The developer shall also construct Commercial Development just enough to make project viable.

## 5.2. Off Site

The site is adjacent to Mysore Road which is close to the Outer ring road, an important road providing major connectivity and hence reducing the traffic congestion within city limits. The Entry/ exit for users of the project facility shall be planned keeping this in mind, without causing any conflict to the traffic circulation of the region. Connectivity should be provided to the Nayandahalli railway station from the site by Buses/ IPT Vehicles.

## 5.3. Entry & Exit Points

The entry/exit for private and intermediate public transport (IPT) vehicles movement shall be required to be separated from that of buses. The 'drive - way' concept shall be

adopted wherein the private vehicle/taxis carrying the passengers enters the project site through a drive way which leads to the passenger concourse of the bus terminal or to entrance of the Metro/ Mono station. The private vehicles then move out of the drive way which is adjacent to the parking facility. The parking facility for the private vehicles and taxis shall be near to the entry/exit of the drive ways. A foot over bridge / subway may be provided at the parking facility so that passenger circulation does not conflict with the bus and other vehicles movement.

#### 5.4. Traffic Circulation

The Traffic circulation of the region needs huge improvement as it has been reeling under mismanagement and poor traffic planning. The external traffic circulation requires proper management considering the future growth prospects of the region. Vehicles entering the project site, coming from the city and vehicles leaving the site towards the Mysore & vice-versa require proper and easy access to the main road without causing any traffic disorder. Similarly in the case of traffic coming from outer ring road to the site also needs to be addressed. Traffic circulation within the site is illustrated in the figure given below.

BDA infrastructure development plans of constructing flyover at Mysore Road - ORR junction and road-widening work on the 141-km state highway has been progressing at a fast pace, with the project slated for completion ahead of schedule. And the road, designed to take vehicles at 100 kmph, will reduce travel time between Bengaluru and Mysore to a mere 90 minutes.

Three options have been examined for proper administration of traffic in the region.

##### External traffic circulation – option -1

###### Option 1(a)

Since the road widening from 2 lanes to 6 lanes & a double flyover has been proposed by the Government, the opportunity can be utilized by using the “Magic box” for what it is called or a pre-cast structure for entry and exit at the project sight, for vehicles coming from both the directions, as shown in the figure below. The vehicles which enter the project site can use this box. Service lanes too are proposed for easy movement of the vehicles.

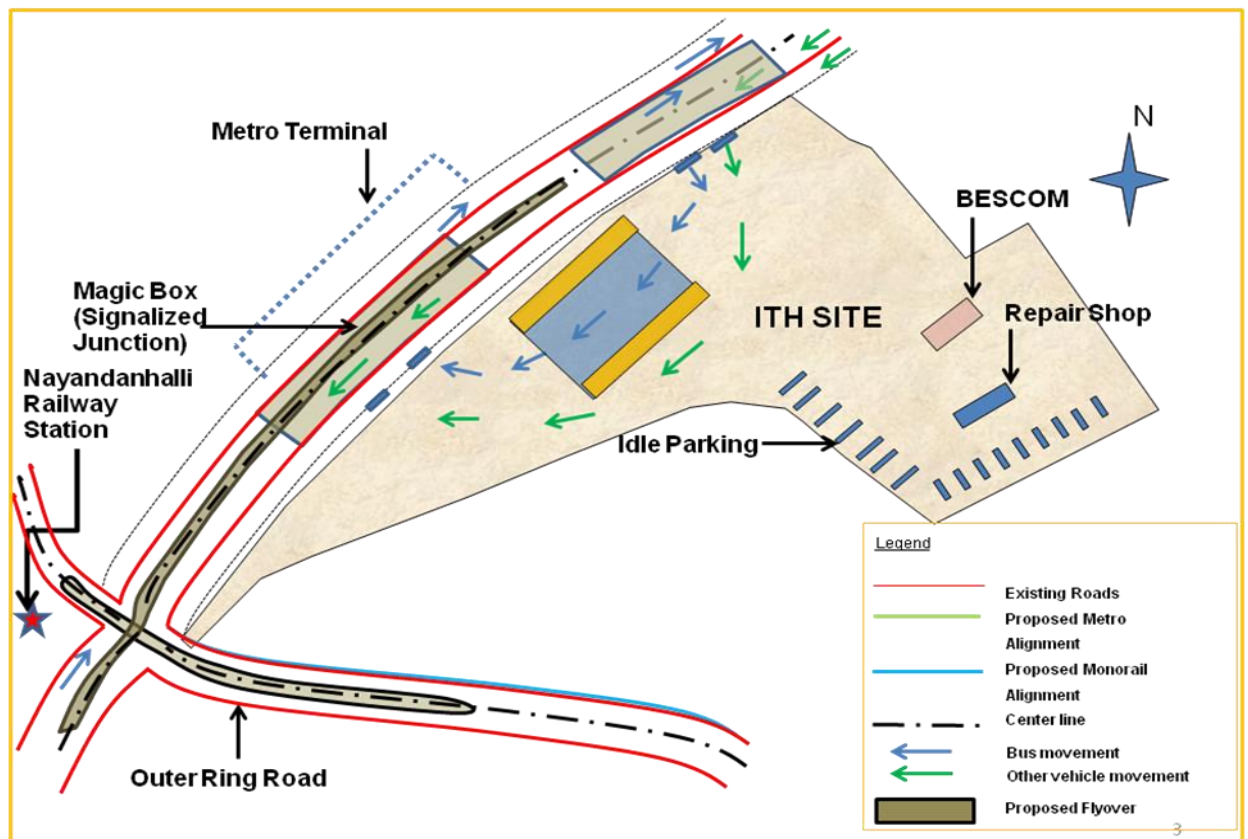


Figure 5:2: External Traffic Circulation with magic box – Option 1(a)

Advantage of this option:

- Vehicle congestion can be avoided.
- Easy access for all vehicles to the entry/exit
- No hindrance or obstruction to be caused to the construction of flyover/metro/mono.
- No land acquisition issues.

Disadvantages of this option:

- The cost of Construction of 'Magic Box' in this location is a costly affair as it may not be technically feasible.

#### Option -1(b)

Further in addition to option 1(a), Skywalks are proposed in option 1(b), for the easy movement of the passengers. The skywalks connect almost all transit modes Bus, Metro & Mono. Metro Station & ITH have a separate connectivity since the Metro alignment is on other side of the project site. Similarly, the Mono-rail station is adjacent to the site, at the junction and requires another skywalk facility. Nayandahalli railway station is a km away and hence can be connected by feeder bus services. The skywalk shall be provided

with all the facilities in it, like elevators, for the disabled persons, luggage movement, etc & some food stalls.

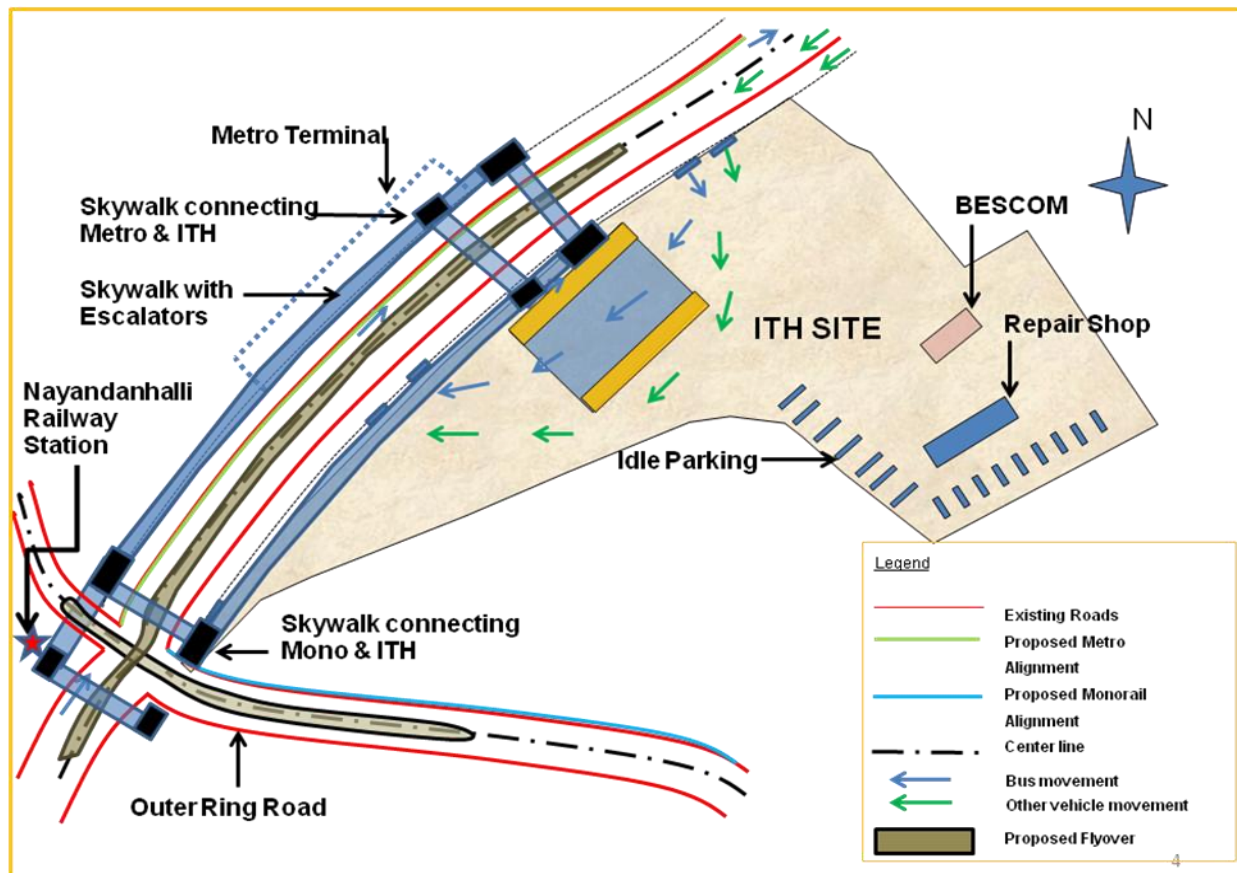


Figure 5:3: External Traffic Circulation – Option 1(b)

Skywalk needs to be designed keeping in mind the proposed double flyover. Considering all the facts mentioned above, it is recommended that flyover should be designed keeping in mind the requirements of Foot over Bridge.

Advantages of this option:

- Vehicle congestion can be avoided.
- Easy passage for the passengers without any interruption
- Saves time
- With the help of foot over bridge / elevators the passengers with luggage can reach the Mono / Metro stations without any extra expense.

Disadvantages of this option:

- Flyover extension construction may increase the costs.
- Land acquisition might be a problem at Nayandahalli.

### External traffic circulation – option -2

Option -2: The two entrances and two exits should be used for the project. One entrance & exit is the connectivity provided by underpasses and the other entrance & exit at-grade. All vehicles (Bus/ Private/ IPT) shall service through the underpass. Two entrance and exits need to be constructed near the road side for the easy access of the site and easy traffic flow for all kind of vehicles. Land acquisition being a major problem this option is not suitable for the project.

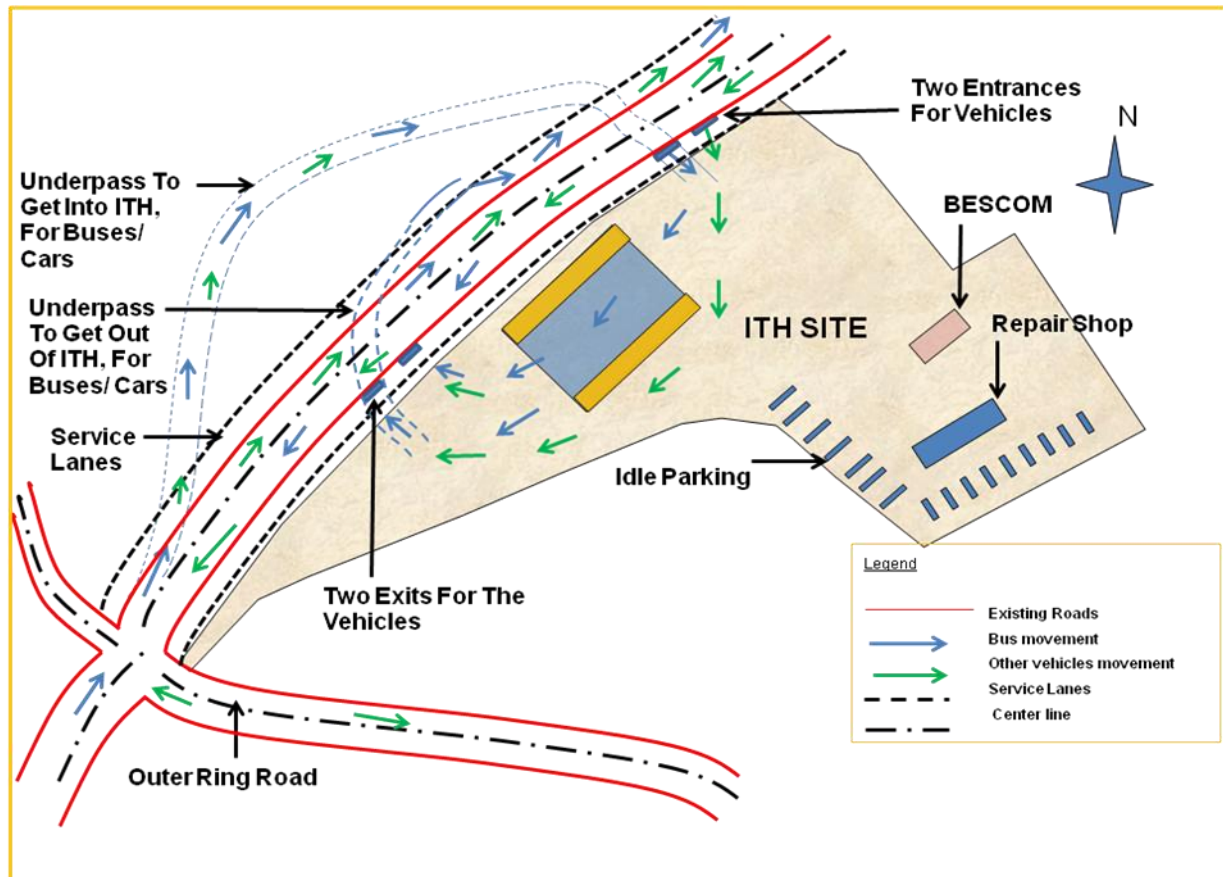


Figure 5:4: External Traffic Circulation – Option 2

Advantage of this option:

- Vehicle congestion may be avoided.
- Easy access for all vehicles to the entry/exit
- No hindrance or obstruction to be caused to the construction of flyover/metro station / mono station.

Disadvantages of this option:

- Construction of the underpass in this location is a costly affair as the road being the State Highway and the busiest route; might not be technically feasible either.



- Acquisition of extra land may be necessary for the project on the other side of the Mysore road for vehicles to move easily which will make it difficult to implement.

The option 1(a) & (b) can be considered in phases as they are viable by all means with option 1(a) being considered in first phase and option 1(b) in second phase.

Besides this, single ticketing concept would bring added value to the project and should be used for better management of traffic. Single ticketing system will see travellers being transported seamlessly and with much ease around the region. Using an electronic card, commuters will be able to use all modes of public transport, including trains, buses and mini-buses, taxis, etc, which ply in the locality. Introduction of the single ticket system - would help to reduce public travel costs and attract existing car users to use public transport.

## 6. Critical Issues

Critical issues have been identified as part of the pre-feasibility study. These issues raised would be required to be addressed by the stakeholders prior to commencement of project development. The critical issues are:

### 6.1. Land Acquisition

In order to undertake the envisaged development land acquisition/ transfer from the private parties may be necessary. Apart from this, a portion of land is owned by BESCOM; N.O.C. is required in case of high rise buildings as per the City Development Master Plan (2007-2015) guidelines and hence needs to be confirmed.

### 6.2. Change of Land Use

Proposed site comes under Industrial (Main) as per CDP 2015. Thus, process of change in Land use pattern from Industrial (Main) to Traffic & Transportation land use has to be initiated. The development controls as per the proposed Land use has been provided earlier in this report.

### 6.3. Location & Connectivity

The entry/exit for the project site can only be along the Mysore Road at the Northern side of the plot where access to all users i.e. buses, private vehicles, intermediate public transport such as taxis, etc, need to be provided. This is the only side having a road adjacent to the site; on the west, the site is narrow and so very little land is available for the entry/exit. Behind the plot, the river which has turned to a drain is flowing and on the east there are the private lands.

The road facing the subject site is a State Highway (Mysore road) and has a narrow width. This part of the city has been witnessing heavy traffic during peak hours on a daily basis and apart from this with the above mentioned developments (ITH) envisaged in the region, heavy clogging of buses and other modes using the facility can be expected, once the project is set up. In order to avoid congestion of vehicles at the entry/exit, suitable traffic circulation measures have to be initiated.

To provide easy circulation and avoid clogging of vehicles at the site entrance, widening of the road may be a necessity.

The issue of interlinking the site with the nearby existing facilities like Railway station, upcoming Mono rail Station, Metro Station & TTMC should be addressed very meticulously. The connectivity to the Metro / Mono stations can be addressed to an extent by setting up of Foot over bridges / skywalks at appropriate locations. However, coverage of ITH may be restricted as the Railway station at Mysore road is some distance away from the site and hence connectivity would have to be provided viz. feeder buses between the ITH and the station.



*SH-17, Mysore Road in front of the site*



*Road In front of Metro Station site*

#### **6.4. Capital Intensive**

The envisaged project components for the project is expected to be capital intensive while the ITH & other ancillary facilities such as the car parking, Foot over Bridges / Skywalks are not expected to be major revenue generators for the developer. It is only the Commercial development that shall be a major revenue generator. Hence, it needs to be ensured that the risk - return tradeoff has been met.



## 7. Project Financials

### 7.1. General

The preliminary financial analysis for an Intermodal Transit Hub (ITH) has been carried out based on the assumptions arrived from preliminary market assessment carried out at Mysore Road.

The ITH is proposed to be developed with the state of art facility which integrates the Bus terminal, metro, mono-rail stations, TTMCs and the Satellite Bus Terminus with linkages and connectivity to the State highway-17/ Outer Ring Road / Major Roads.

The Railway Station at Nayandahalli is hardly 1 km away from the site for the proposed facility and so may be connected via feeder buses. For the preliminary calculation of capital cost and operational cost, the development of the entire facility has been considered except the metro and mono station. This includes:

- Bus terminal with bus bays for transit operations and passenger amenities
- A mini repair shops for buses and idle parking bays. A small service shop is only expected here as buses requiring major repairs can utilize a much larger facility at Mysore road satellite Bus Terminus which is hardly 2 -3 kms away.
- Adequate parking for intermediate public transport and private vehicles
- Adequate circulation areas and landscaping
- Commercial development - commercial/ institutional / office area
- Basement parking, Utilities at basement
- Foot over Bridges / Skywalks connecting Mono / metro stations and passenger amenities within this facility.

The broad financial viability of the project is assessed with respect to key parameters such as project internal rate of return (IRR), Net present value (NPV) and return on investment (ROI). The discount rate considered for the project is 12.50% which is the opportunity cost of capital.

The viability analysis includes the identification of revenue and expenditure streams. Revenues will be the user fees from private bus operators, parking fees, advertisement charges, rentals from commercial activities, while the expenditure would be primarily on account of capital and O& M costs.

For the preliminary calculation of capital costs and operation costs Metro / Mono has not been considered. However, Foot over Bridges / Skywalks expenditure has to be considered, as it is necessary for easy access to commuters between different modes, without causing any circulation issues for vehicles within and outside the site, and hence helps in avoiding traffic clogging. The Foot over Bridge is considered from the subject site to Metro station which shall be approx. 30 mts. and from the site to Mono station which will be approx. 400 mts (*since the Mono station is expected at the Junction of Mysore road and Outer Ring Road*). Hence, Foot over Bridge / Skywalks of approx. 430 mts have been considered for Capex & Opex of the project. Escalators have not been considered for the Project, however Elevators (with a capacity of 15- 20 persons) have been considered - 3 Nos.

## 7.2. Assumptions in capital and operation & maintenance cost

Following set of assumptions are considered for the financial assessment of the Inter modal transit hub at Mysore road that includes general assumptions and specifications.

### *Preliminary cost estimation*

The preliminary cost estimates are based on the preliminary market survey carried out for identified cities. The base project cost is calculated considering the cost of construction for each component - bus terminal, metro Station, mono-rail station, land development cost & basement cost etc. The total project cost includes the base project cost, preemptive & preoperative expenses (4% of base project cost), project development expenses (1% of base project cost), escalations & contingencies (4% of base project cost) and interest during construction (interest @ 11.5%). The following table shows the breakup of cost for an integrated intermodal transit hub at Mysore road. (For details refer Annexure - I)

### Summary of project costs

Table 7-**Error! No text of specified style in document.**-1: Summary of Project Costs (*Tentative*)

Description	Capital Cost (In Rs. Crore)
Components	
Land Development Cost - For 5 Acres Of Land	1.2
Bus Terminal Facilities	

No. Of Boarding Bays – 40	
No. Of Idle Bays – 23	
Construction Cost Of Bus Terminal & Repair Shop – Rs 1200 Per Sq.Ft.	7.50
Foot over Bridges (approx. 30 mts to Metro; 400 mts to Mono station)	
Construction Cost of Foot over Bridges	11.00
Passenger Amenities – Commercials Within Bus Terminal	5.00
Multi level Car Parking – 260 Cars On Traffic & Transport Land Use; Cost @ Rs 1450 Per sq.ft. <i>This excludes parking within the Basement.</i>	14.25
Cost Of Commercial Development – Rs 1700 Per Sq.Ft.	56.65
Cost For Basement Construction. This includes parking for remaining cars (108 = 368 – 260) & Utilities for the Commercial development – Rs 1450 per sq.ft.	15.30
Total Base Project Cost	111.00 (approx.)
Preemptive & Pre Operative Expenses (4% Of Base Project)	4.5
Project Development Expenses(1% Of Base Project)	1.1
Escalations & Contingencies(4% Of Base Project)	4.5
Interest During Construction (Interest @ 11.5%)	11.45
Total Project Cost For Inter Modal Transit Hub At Mysore Road	132.50 (approx.)

### 7.3. Revenue streams

The revenues for the proposed ITH project shall be generated from bus terminal and commercials within it, Parking facilities, advertisements within all sub components including Foot over Bridges / Skywalks, & Commercial Development.

The ITH is proposed to be structured on development and management rights model with user fees, parking fees, advertising charges and commercial rental rights. The main

source of revenue generation shall be from Commercial development. (For details refer Annexure - I)

#### 7.3.1. Revenue from bus terminal operations – income from user fees

One of the major revenues for Bus Terminal apart from the lease rentals of stalls / retail shops within it, is the User fees or Adda fees charged from the Buses. All buses except those of public buses shall pay user fees before leaving the bus terminal. This user fees shall be revised at regular intervals. Apart from this, buses parking during the day and night shall pay idle parking charges.

#### 7.3.2. Revenue from lease of commercials within bus terminal

The Developer / Operator shall have the right to lease the shops at the Bus Terminal for specific end uses. The end uses of the shops / retail stalls / kiosks shall be compliant to the requirements of the various modes of transport within the ITH facility.

Sufficient enhancement in scale and scope of this commercial space would fetch higher rentals for the private sector party. Indicative acceptable end uses (or ancillary land uses) have been detailed in the notification no. UDD 93 MNJ 2008 and zoning regulation of Master plan 2015 of Bangalore development authority.

#### 7.3.3. Revenue from parking of private & intermediate transport vehicles

The parking fees to be charged from various categories of vehicles and its periodic increase should be fixed. For instance, car should be charged Rs. 10/- and two wheelers should be charged Rs. 5/-.

#### 7.3.4. Advertisement rights at the bus terminal, Commercial development & Foot Over Bridge

Income from advertising charges has massive potential considering the large foot fall of commuters in the bus terminal and Commercial development (Retail / Office), provided it is tapped properly.

Hoardings on the Foot over Bridges are allowable, apart from Bus Terminal & Commercials. For the Financial analysis of this Project, Hoardings over the Foot Over Bridges and inside it, too have been considered. The private sector party, however shall have the right to locate hoardings as per applicable rules, regulations standards, etc.

#### 7.3.5. Revenue from Commercial development

The private sector party shall have the flexibility to charge any rentals from the commercial/ institutional/ office areas leased to third party. The facilities that may be permissible under this category are been detailed in the notification no. UDD 93 MNJ 2008 and the zoning regulations of Master Plan of Bangalore Development Authority.

#### 7.4. Key financial indicators

The Project returns of the ITH at Mysore Road have been calculated considering the typical investment and facilities at the location. The revenue streams are assumed as per the market conditions and the lease period considered for the project, for calculation of returns, is 30 years. A block financial assessment for the development of ITH on PPP format at Mysore road is provided in **Annexure I**.

The following table throws light on the financing pattern and expected returns for the project using both the approaches:

Table 7-2: Financial Analysis

<b>Financing</b>		
<b>Lease Period</b>	Years	30
<b>Debt: Equity Ratio</b>	Ratio	1.0
<b>Loan Period</b>	Years	9
<b>Interest Rate</b>	%P.A.	11.5
<b>Expected Returns</b>		
<b>Total Cost Of Project (Excl Land) (Rs Cr)</b>		132.50
<b>Return On Investment (ROI) (In %)</b>		35%
<b>Project IRR (Post Tax)</b>		17.40%
<b>Equity IRR</b>		19.00%

For the purpose of financial analysis for this Project, we have performed a Sensitivity Analysis. The table below shall explain the financial status for each change in the variable. The variables considered are – *Change in Construction costs, Change in O & M costs and Change in Revenue incurred.*

Table 7-3: Sensitivity Analysis

Variable Investment Criteria	Increase in Construction Costs (@ 10%)	Increase in O & M Costs (@ 15%)	Decrease in Revenue (@ 10%)	Effect of all variables together
Project IRR	16.19%	17.18%	15.81%	14.36%
Equity IRR	17.30%	18.58%	16.84%	15.02%
NPV for the Project (in Rs Lakhs)	3,767.45	4,426.69	3,075.69	1,862.35

From the above table it may be inferred that, when there is a change in all the variables under consideration, the Project IRR is 14.36%, Equity IRR 15.02% and NPV for the Project is Rs 1862.35 lakhs.

The assumptions considered for the model are block cost estimates for the capital outlay and returns have been worked out using a conservative approach taking in to account the current market scenario. However, the viability of the project could be further enhanced by optimizing the product mix from a detailed project development study. Internal rate of return (IRR) and Net Present Value (NPV) represent the project's broad financial viability on PPP format. *(For details refer Annexure - I)*

## 7.5. Commercial viability as per location – Mysore road

The Project viability is based on the revenues generated from subleasing of the Commercial Developments, Parking Charges & hoardings rentals. All of these are dependent on the developments happening now and in future around the proposed location. The Investment criteria analysis (IRRs, NPVs) have been derived considering the prevailing lease rental rates, parking rates and advertising charges in Mysore road, catchment area. The private sector party developing the ITH project may operate or transfer operating rights of ITH to respective departments after construction. The developer can operate, maintain, and sublease the commercial development built up area at prevailing market rates.

For viability of the project, approx. 3,33,234 sq.ft. of Commercial development i.e. commercial/ institutional/ office area should be allowed.

At Mysore road, the railway station is 1 km away from the site for the proposed facility and connectivity to the site can be provided through the use of feeder buses,

intermediate public transport like taxis or a skywalk with elevators for convenient movement of the luggage. This avoids the need to provide a rail station at the facility, thus reducing the capital investment to be incurred by the developer. The internal connectivity for different modes of transport and the commercial development can be done through stairs and elevators at appropriate locations within ITH facility as these components are one above the other.

## 8. Assessment of Risks

### 8.1. Risk Allocation and Mitigation

Appropriate risk mitigation structures have to be evolved for the Project. Various risks associated with the Project and broad mitigation structure is explained below:

#### 8.1.1. Traffic Revenue Risk

This risk is a major component of risk matrix which can be alleviated only through meticulous traffic studies and accurate projections. Apart from this, it is essential from perspective, to ensure proper collection of user charges from private bus operators, to inculcate some discipline.

The traffic revenues for the project would also depend on the following:

1. The private / Government operated buses must be directed, to provide services at the ITH, Mysore Road, through enforcement by the Local bodies.
2. Existence & suitable positioning of Mono Station at the junction close to the ITH.
3. Provide Feeder bus services to Nayandahalli Railway station / TTMC, Vijaynagar / Mysore road satellite Bus Terminus.
4. Provide appropriate parking and circulation for private and intermediate public transport vehicles (like taxis, auto-rickshaws)

#### 8.1.2. Construction Risk

This risk may be a Design Risk, Cost Overrun and/or Time Over run.

Design Risk:

The Design risk of the facility shall be with the private sector developer, as this brings in the project better scope for innovation leading to efficiency in cost and services. The Developer shall be solely responsible for any defects and/or deficiency in the design and shall rectify the same at his/ her own cost.

Cost Overrun:

It is the responsibility of the Private Sector Developer to manage the implementation of the Project cost effectively. Termination payments, specified in the Agreement, linked to Total Project Cost which shall be lowest of (i) Total Project Cost as per financing



documents, (ii) actual capital cost as certified by auditor (iii) project cost defined by Client in the agreement.

Time Over run:

To avoid this risk – Time Over run, the Construction period should remain fixed. Effective clauses should be provided in the Agreement, which shall be signed between the Client and the Developer. Timely clearances and handing over of site for the project should be ensured.

#### 8.1.3. Demand Risk

This risk arises from the project if there is no established demand for the Project. In this case, a Pre-feasibility has been carried out to assess the viability based on the demand for the revenue generating components for the project. It is however envisaged that the demand for revenue generating facilities at the proposed ITH would increment over years and on commencement of operations of the ITH. Apart from this, the Developer shall be given the freedom to design the facility in order to improve the optimum utilization, provided no obstruction is caused to development of minimum development obligations for the ITH.

#### 8.1.4. Commercial Risk/ Revenue Risk

Commercial Risk arises from the demand and expected competition for the project apart from the effective utilization of space and management of facilities. Risks would be transferred to the Developer, with the involvement of Private Sector in marketing, O & M and attractive incentive structures linked with Project success. The Developer also has the right to decide the lease rental tariff for the commercial development and other applicable charges / fees for the project components under the ITH facility. It is however envisaged that the demand for commercial facilities at the proposed ITH would increase over years and on commencement of operations of the ITH and the Metro station close by.

#### 8.1.5. Operational Risk

This risk is with the Developer, as it should operate and maintain the facility for an agreed lease period. Effective clauses addressing the above should be incorporated in the Agreement. Increase in the O & M costs, except in cases due to change in Specification & Standards and Change in Law, shall be borne by Developer. The operational rights may be transferred, by the Developer, to another party subject to approval from Client.

### 8.1.6. Debt servicing Risks

An appropriate debt–equity mix and proactive managerial strategies in financial restructuring are the only ways to mitigate this Risk. The lenders for the project may be given appropriate rights like project revenue security, which can help in mitigating Debt servicing risk. The lenders would also require assignment and substitution rights so that the concession / lease can be transferred to another party in the event of failure of the Developer to operate the project successfully.

### 8.1.7. Political Risk

This risk needs to be mitigated by effective legal documentation & insurance and essential Government involvement for successful implementation of the project.

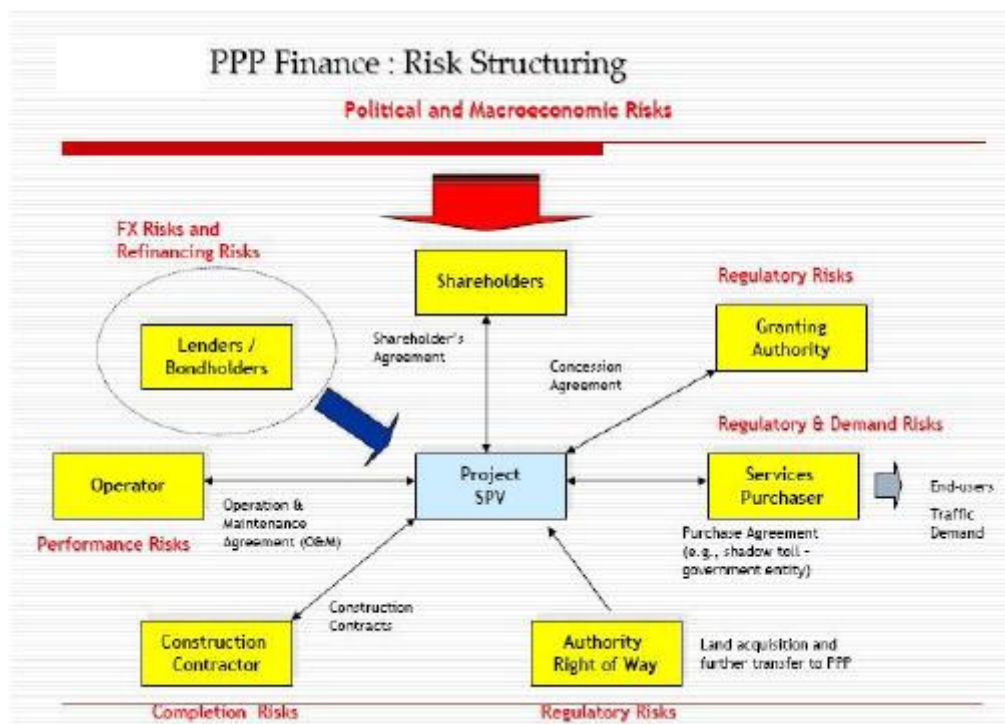


Figure 8:1: Risk Structuring

## 9. Requirement of Legal & Regulatory Framework

Constant reform of policies and regulations by Government has become a necessity, especially, in sectors where development has been happening through private investment. This is because, Private sector parties require attractive incentives and policies in place in order for them to develop project in an environment conducive to their needs and aspirations.

Regulatory agencies and issues pertaining to regulations have come to prominence after the privatization of infrastructure sector. Thus, any design of a regulatory framework is a complex undertaking that involves the balancing of many influences / elements which include regulatory goals and resources, social institutions and sector characteristics.

The proposed ITH necessitates a robust legal and regulatory framework, the following are the requirements:

- Land Acquisition at Mysore Road

To ensure sustainable and orderly growth, the Bangalore Development Authority (BDA) plans, regulates, controls, monitors and facilitates urban development in Bangalore Metropolitan Area. All necessary land approvals need to be obtained from BDA.

At present the portion of site belongs to BMRCL and hence the necessary approvals for construction of facility, internal & external services like water supply etc, off-site infrastructure planning (say, widening of roads for traffic circulation) may require concurrence from BDA / Bruhat Bangalore Mahanagara Palike (BBMP) / other concerned authorities.

*The developer should follow the Karnataka town & country planning act, 1961 and other applicable acts in matters concerning the site and the project facility.*

- Wide range of activities like those that are executed directly by Government, activities that are executed under PPP mode and activities acquiescent to VGF and so on.

The Infrastructure Development Department (IDD) is the nodal agency for coordination, development and implementation of infrastructure projects mainly

on PPP format. It also facilitates for obtaining clearance and approvals on PPP route.

ITH facility (project under consideration) falls under the gambit of transportation & logistics sector, which would be governed by the Infrastructure policy of GoK - 2007. This policy puts in place a fair and transparent policy framework to facilitate the development of infrastructure projects in the state. It is envisaged that incentives and financial support contemplated under this policy are applicable:

- For infrastructure projects where, in the opinion of the Government, the project is public project set up for common use, where such infrastructure would otherwise not be created;
- Only for bridging the viability gap for infrastructure projects on a PPP
- Responsibility of preparation of the master plan, infrastructure planning, financing, implementation, integration, management, operations, licensing and overall administration of the project.

For this, the developer shall need to take the concurrence of the relevant development authorities of the state Government such as BDA, BBMP, etc. for appropriate approvals and clearances. For assistance and necessary support appropriate and effective clauses in the Agreement may be incorporated.

- The success of the ITH would depend on the Implementation of traffic regulations levied by the local administration towards restricted entry of buses to the region and directing the same to the proposed ITH. Implementation of no parking zones, traffic regulations, entry / exit limiting restrictions, levy of penalty for off-street parking of buses, cars intermediate public transport, etc are necessary as applicable.
- The liabilities of the developer of the ITH Project should be necessary and customary for the entire authorization / lease period of the project. The scope of the insurance policy shall not be reduced without the permission of the client.

## 10. Project structuring & implementation framework

### 10.1. Background

The ITH is proposed to be developed on Public Private Partnership (PPP) format. Infrastructure projects on a PPP platform have been as an avenue to optimize development and implementation in the long run. PPP provides an attractive alternative to bring private investment as well as efficiency gains in the provision of services.

Intermodal Transit Hub project at Mysore Road is highly capital intensive and the region is expected to develop greatly due to setting up of this facility. The major project components like Bus Terminal, Multi level parking, hoardings, etc, require huge investments but do not generate great revenues. The only major component for revenue generation is Commercial Development facility. However, this is greatly depended on the demand/ market required for such facility in the region considering the fact that all the developments happening in and around the catchment area is expected to make it a major hub in future only. This is a risk in itself for the developer and may create difficulties for achieving financial closure. Hence it is absolutely necessary to structure the project in order to make it financially viable.

When properly structured and made bankable, the project creates a balance between the requirements of the Government and the public for service provision with high quality standards and thus attract private investments. The project involves components of diverse nature via: Rail & Road infrastructure, real estate development to improve the feasibility of the project, etc. This results in various permutations and combinations before narrowing down to a single and most suitable option in PPP framework. This however, is a tentative Project structure and would require further in-depth analysis based on detailed viability / feasibility study for the project.

### 10.2. Implementation through Public-Private-Partnership (PPP)

Successful development and implementation of the ITH at catchment area would require diligent planning, extensive project development with proper implementation strategy. Technically, development and implementation of the project would draw expertise from transport sector. It is pertinent to mention that implementation of this project has unique

and distinctive requirements, not comparable to similar ventures in production and service sectors. It is also pertinent to say that due to limited resources of the local bodies and also in order to achieve higher performance efficiency both in construction and operation, it is imperative that the project needs to be implemented through active private sector participation under an appropriate PPP model.

### 10.3. Project structuring

Project may be proposed to be implemented on Public-Private-Partnership (PPP) format under Design, Finance, Build, Operate and Transfer (DFBOT) basis.

In the option proposed, Private Developer / Private Sector Player (PSP) shall finance, design, engineer, construct, market, operate, maintain and manage the project during the Authorization/ Lease period and transfer the project to the client at the end of the Authorization / lease period. The project is proposed to be structured as under:

- The project is structured for capital investment to be brought in by the selected private sector player and since the portion of land belongs to the BMRCL.
- Scope of the work for the PSP / Developer:
  - Selected private sector player does Designing including planning,
  - Detailed designing and Engineering of facilities based on Concept
  - Construction, marketing, operating, maintaining and managing (utilities, facilities, equipments etc) the project during the authorization period
  - Obtaining all clearances / approvals from the concerned Govt. Department, handling legal issues etc

The Project is proposed to be developed by:

- Utilizing the complete ground coverage.
- Developing the Bus terminal (Interstate/ Intrastate), Public amenities, basic infrastructure & utilities and parking.
- Developing min repair shops (*which shall support similar larger facility at the Satellite Bus terminal*) which includes a workshop shed, washing platform, office, staff quarters, etc,
- Developing Commercial development.
- Developing the Foot over bridges/ Skywalks wherever necessary to connect the Bus Terminal with the Metro / Mono Station.

The table below summaries the above structuring Option suggested for the Project:

Table 10-1: Tentative Project Structure summarized

	<b>Option</b>
<b>Land</b>	Subject Site For The ITH Project is The Entire 5 Acres.
<b>Land For Project Components</b>	All Components Envisaged For The ITH Project To Be Developed In The Subject Site.
<b>Land Assigned To; &amp; Project Development To Be Carried Out By;</b>	BMRCL, to whom the land is allotted, shall select a Developer for the Implementation of the Project through a transparent Bidding process. KIPDC/IDD can suggest the Project sponsor on adoption of other project components in order for successful implementation of ITH.

## 11. Operating Framework

### 11.1. Implementation Structure

The development of Intermodal Transit Hub (ITH) at Mysore road needs to be extensively reviewed for its operational efficiency and technical & financial viability. In the proposed PPP structure for implementation, the roles & responsibilities to be performed by the respective parties i.e. the Project Sponsor and selected Developer has been identified as below:

#### 11.1.1. Role of Project Sponsor

The role of the Project Sponsor would include:

1. Identification and acquisition of land for the Project
2. Grant of lease hold rights of the project site to the developer
3. Co-ordination with Railways / Metro / Mono departments and seeking requisite clearances from the concerned departments regarding the site.
4. Providing collection of User charges (for Bus Terminal) rights to the developer
5. Providing collection of parking fees rights to developers
6. Providing collection of rentals for Hoardings at the commercial, bus terminal and foot over bridge / skywalk facilities
7. Permit collection of rentals from commercial development at tariff rates as decided by developer
8. Standardization of performance standards & specifications

#### 11.1.2. Role of Developer

The role of the Developer would include but not limited to:

1. Design, finance, construct, operate, maintain and manage the facilities including supporting ancillary infrastructure conforming to the building byelaws and regulations
2. Meet the requirements laid down by the Competent Authorities and obtain all necessary clearances
3. Operate & maintain the Commercial development facility in order to recoup the investment incurred
4. Collect user charges/ fees / rentals from the components of the project facility.



### 11.1.3. Civil and Structural Requirements

The building shall be designed in accordance with the latest Indian Standard Codes and shall be designed to resist wind and seismic forces. RCC Structures shall be designed as per IS 456: 2000. Steel Structures shall be designed in accordance with the provision of IS 800-1984. Structural steel shall conform to IS 2062. Tubular section shall conform to IS 4923.

- Architectural design norms as per NBC (National Building Code – 2005)
- Structural Design norms as per NBC and BIS (Bureau of Indian Standards)

### 11.1.4. Fire Fighting Facilities

The developer shall provide the required firefighting equipment and facilities conforming to relevant standards and the applicable rules and regulations. Fire safety measures as recommended in applicable codes (Indian as well as international) shall be implemented. Specifically, the fire fighting system shall be adequate to control petroleum fires.

Construct the Parking Facilities' structure with non-combustible material without a specified fire resistance. In addition, those portions of the facility used for the transport and / or storage shall have a finish of non-absorbent, non-combustible material.

## 11.2. Maintenance and Performance Standard

### 11.2.1. General

During the period of operation, the Developer would be required to maintain all the Facilities in accordance with performance standards and maintenance requirements, as mentioned below:

- Perform maintenance on a routine and periodic basis. Identify potential problems early within the context of the planned maintenance system so that corrective action may be planned and completed in a timely manner.
- Establish a maintenance list for planned operation and maintenance. Follow an orderly program so that maximum operational efficiency is attained.

The system shall be required to be designed such, that maintenance personnel has access to all facilities, machinery and electrical and electronic components in a safe manner.

The Developer shall perform routine and periodic maintenance activities for the project infrastructure via, civil, mechanical and electrical works and equipment, furniture for meeting the specified performance standards.

## 12. Keys to Success

### 12.1. Key stakeholders

The key stakeholders identified for the development of Intermodal Transit Hub in Mysore Road are:

- **Project Sponsor** - Transport Department / BMRCL
- **Nodal Department** - Infrastructure Development Department (IDD)
- **Facilitating Department** - Infrastructure Development Department
- Bengaluru Metropolitan Transport Corporation (BMTC)
- Karnataka State Road Transport Corporation (KSRTC)
- Bruhat Bengaluru Mahanagara Palike (BBMP)
- Traffic Police of Bengaluru
- Southern Railways
- National Highway Authority of India (NHAI)
- State Public Works Department- (Roads Division)
- City Town Planning Department
- Revenue Department
- City Corporations
- Other agencies as deemed necessary

For the successful implementation of the project, the BMRCL, IDD along with the Project Advisors, the Urban Development Department and the Transport Department would require to convene a joint meeting of their respective heads where the project concept and structure may be discussed and taken up for implementation.

The project sponsor along with the Project Advisors will be required to take the lead in coordinating with the individual agencies involved for identification of locations and for seeking the requisite clearances.

### 12.2. Essential issues to be addressed

The following have been identified to be key issues for the success in developing of ITH and effective utilization of the same

- Coordination with project sponsor and/ or IDD to decide on the Option to be followed for the project.

- Coordination with the Railway Authorities for connectivity to the proposed ITH i.e. from Nayadanhalli railway station.
- Coordination with Mono-Rail agency for provision of Mono-rail station close to the proposed site at the junction.
- Coordination with National & State Highway Authorities to sort out connectivity issues for intermodal transfer and provide for improvement roads, if necessary. Apart from this, appropriate clearances may be necessary for the construction of Foot over Bridges / Skywalks along and across the roads for connectivity between the different facilities.
- Coordination with the concerned depts. and others concerned for land acquisition to provide for widening of the Mysore Road.
- Coordination with State Road Transport Corporations & Private Bus Operators Associations for the entry of buses to the ITH
- Traffic Authorities to be roped for Traffic Management for ingress & egress routes to the ITH
- Stringent provisions by way of fine and other penal actions need to be provided to restrict entry to the cities.
- A graded parking/entry fee / User fee structure should be evolved as a measure of demand management at the ITH for Buses, Mini Buses, Taxis, Autos, Cars etc
- Joint inspections of locations and reviews with key stakeholders

### 12.3. Role of Project Sponsor

The Project Sponsor shall be responsible to give right to use land free of encumbrance to the Developer for developing the Project components. The land required for creating the Project Facilities would be required to be given on Development and Management Rights to the Developer over the Authorization Period in terms of the Authorization Agreement supported by Development and Management Agreement (DMA). The Project Sponsor will also require facilitating availability of infrastructural support / services and ensuring effective coordination between all Government departments to provide timely approval and clearances. Government support/ facilitation would be required in the following:

- Ensuring availability of requisite land & infrastructural support/ services, viz. power supply, improving existing roads, development of connectivity

- Providing all clearances and approvals for execution of commercial facility at ITH, installing supportive facilities and other commercial components for development and operation
- Issue of necessary regulations for re-directing buses to the ITH

#### 12.4. Clearances and Sanctions

The following clearances and sanctions for the proposed project from various agencies would be required

- Bengaluru Metro for the approval of location of the Metro Station facilities
- National and State Highway Authorities for efficient connectivity to the location and seamless integration for Intermodal transfer
- Concerned Municipal Authority /City Corporations
- Urban Development Authority
- Revenue Department in case of acquisition required in the location
- Traffic Police Department
- State Electricity Board
- Water Supply & Sewerage Board
- Other agency as deemed necessary

## 13. Way Ahead

### 13.1. Implementation Plan

As per the pre-feasibility analysis, the ITH project at Mysore Road is viable for development on PPP format. However, it needs to be emphasized that the critical issues of traffic circulation, Change of Land Use, widening of roads, approvals from National / State Highway Authority need to be obtained for construction of Foot over Bridges / Skywalks across the road, and provisions necessary to avoid vehicle clogging need to be resolved on a priority basis for the project development to proceed effectively.

In case the proposed option is to be followed, the project with all its components envisaged may be suggested to BMRCL for adoption and eventually for selection of preferred bidder.

It is proposed to take up the development of ITH at Mysore Road suitably addressing the viability by other sources of project funding as well as additional commercial components.

A presentation on the draft Pre-feasibility Report was made to the stakeholders, wherein it was decided that BMRCL would be developing the proposed facilities on their own.

## Case Study Inferences

### Gateway Multi modal Transportation Centre

The Gateway Multi modal Transportation center is a rail and bus station in downtown St.Louis, Missouri. It was inaugurated in 2008 and is operational 24 hours a day.



- The station serves Amtrak, St. Louis Metro Link, Metro Bus regional buses, Greyhound cross-country buses and taxis.
- The station was built at a cost of \$31.4 million.
- The Station has ancillary facilities such as sundry stores and food court which was opened in December 2008
- The Gateway Station serves as a terminal hub for the following:
  - Amtrak Rail – Trains to and from Chicago, Kansas City, Missouri, San Antonio, Los Angeles
  - Metro Link – Metro train from Lambert – St. Louis International Airport
  - Metro Bus, Mega Bus, – Serves many routes within and around the region of Gateway Station.
  - Taxis, Rental Cars

### Miami Central Station

The Miami Central Station (MCS) is an Inter modal facility located on a 27 acre plot. This facility is designed to accommodate various transportation connections.



- This is built around the existing tri-rail tracks at its Airport Station.
- The MCS will offer centralized transfer between Tri-rail, Metrorail and Amtrak rail service.
- Intra city bus services area also being provided here and space for private vehicle parking.



- There is an elevated pedestrian walkway spanning across the rail tracks from the public esplanade into the Miami International Airport.
- This would be also a Station on the proposed Florida High Speed Rail.
- The total Cost of the facility is expected to be \$ 1.7 billion.
- Expected to serve 1, 50000 commuters and travelers each day.

### Millbrae Station

Millbrae Station (also known as Millbrae Intermodal Terminal) is an at-grade Bay Area Rapid Transit (BART) and Caltrain station located in suburban Millbrae, California, in northern San Mateo County



- Millbrae Station is the largest Intermodal terminal in the United States west in terms of station facilities and acreage
- Consists of three at-grade main tracks for BART and two for Caltrain.
- A regional bus transit hub with multiple bus bays served by several SamTrans lines.
- Approx. 3,000 parking spaces, including a five-story parking garage and surrounding surface parking.

### Salt Lake City Inter modal Hub

This is a multi modal transportation hub located in Salt Lake City, Utah. Amtrak, the national regional rail system provides one train daily in each direction on the California Zephyr line, with service to Emeryville, California, to the west and Chicago, Illinois, to the east.



- Hub through a TRAX, light rail system, on the University Line serves the University of Utah campus to the east.
- Have Access to the Sandy/Salt Lake Line, with service to Sandy to the south.
- Greyhound Lines, a national bus company, also services the station with several departures to points all across the United States, Canada and Mexico.
- Providing services of Amtrak, Greyhound lines, U Car Share.
- The Passenger traffic for the year 2009 was 31,319

## ANNEXURE - I

Total Area requirements for various components			
Ground Floor	Bus Terminal area (including Workshop) + Commercial		
Mezzanine floor	Commercial (within Bus Terminal)		
One of the above floors	Multi level car parking		
1st Floor, 2nd, 3rd and above floors	Commercials + Office		
Area		5	acres
		217800.00	in sq.ft.
Ground Coverage		45%	
Allowable Building Foot print/ground coverage		98010.00	in sq.ft.
Open Area		119790.00	in sq.ft.
FAR		4	
Total Covered area		871200	in sq.ft.
Basement		174240.00	
Total Construction required for Bus Terminal area		62794.00	in sq.ft.
Total Construction required for Metro Station		0.00	in sq.ft.
Total Construction required for Monorail Station		0.00	in sq.ft.
Commercial Area		31397.00	in sq.ft.
Use of Foot print area		98010.00	
Bus Terminal area (Ground floor) + Repair shop for buses		62794.00	in sq.ft.
Commercial - retail		35216.00	in sq.ft.
Use of Open area		119790.00	
Roads, pavement, Drive ways, circulation - % of Open area	35%	41926.50	in sq.ft.

Service road for Entry / Exit of Buses at the front of the site	8%	9583.20	in sq.ft.
Boarding Bays		32710.40	in sq.ft.
Idle Parking		23	No.s
Parking facilities for private vehicles (Picking & Alighting) total no. reqd. for BT		58	ECSs
Parking facilities for private vehicles (Picking & Alighting) - area reqd. in the basement		21843	in sq.ft.
Basement - Total area (70%)		174240	in sq.ft.
Basement - Utilities		65000	in sq.ft.
Actual Parking required in Basement (BT + Property Development)		108	
Area reqd for Basement parking		40673	in sq.ft.
Parking facilities for private vehicles (Picking & Alighting) in the open area No.s		0	ECSs
Parking facilities for private vehicles (Picking & Alighting) - area reqd. in the open		0.00	in sq.ft.
Use of Total Covered area		871200.00	
Bus Terminal Station + Work Shop + Metro Station + Monorail Pick up station		94191.00	in sq.ft.
Unused area		777009.00	in sq.ft.

Total Area requirements for Commercial Development		
Total Build up area	871200	sq.ft.
Area used by BT	94191.00	sq.ft.
Area available for Property development =	777009.00	sq.ft.
But allowable PD shall be only 45% of the 5 acres i.e. =	392040.00	sq.ft.
one floor for car parking	98010	sq.ft.
Area available for Property development after deducting one floor =	392040.00	sq.ft.
Reqd PD for Financial Viability =	333234.00	sq.ft.
Percentage of total allowable PD =	85.0%	
Parking facilities for private vehicles (Picking & Alighting)	310	ECS
Parking facilities for private vehicles (Picking & Alighting) - area reqd.	116746.00	in sq.ft.
Multi level parking - 1 floor area available	260	No.
no. of Floors of the MLP	1	No.

Use of Total Covered area inclusive of Ground floor portion of Commercial (35216 sq.ft.)	333234.00	in sq.ft.
A floor for parking	98010.00	in sq.ft.
Area available for Property development including one floor for parking=	431244.00	sq.ft.
Unused area	443775.00	in sq.ft.

Costing Estimation				
		Cost/unit	Total cost	
Land Development Cost		100	119.79	Rs lakhs
Cost of Construction of Bus Terminal + Work shop		1200	753.53	Rs lakhs
Cost of Construction of Metro station		1200	0.00	Rs lakhs
Cost of Construction of FOB		0	1101.22	Rs lakhs
Cost of Commercial Development within the proposed facilities		1600	502.35	Rs lakhs
Construction of Multi level parking		1450	1421.15	Rs lakhs
Cost of Property Development		1700	5664.98	Rs lakhs
Cost of Basement		1450	1532.26	Rs lakhs
<b>Total - Base Cost</b>			<b>11095.27</b>	<b>Rs lakhs</b>
			11095.27	
Premptive & Pre Operative expenses	4.0%	of Const cost	443.81	Rs lakhs
Project Development Expenses	1.0%	of Const cost	110.95	Rs lakhs
Escalations & Contingencies	4.0%	of Const cost	443.81	Rs lakhs
VGF				
<b>Total - Project Cost</b>			<b>12093.84</b>	<b>Rs lakhs</b>

Financing					
Interest During Construction (IDC)	1141.55	lakhs			
Total Landed Project Cost	12093.84	lakhs	Total Project Cost + IDC		13235.40
Construction Phasing					
	1s year	2nd year	3rd year		

	41%	41%	27%	
<b>Total cost phasing</b>	4963.27	4963.27	3308.85	
<b>Financed By</b>		1s year	2nd year	3rd year
<b>Debt</b>	50%	0.00	3308.85	3308.85
<b>Equity</b>	50%	4963.27	1654.42	0.00

Revenue																			
Escalations		15%	every three years																
						35%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Commercials within Bus Terminal		sq.ft	Rs/ sq.ft./ month		1	2	3	4	5	6	7	8	9	10	15	20	30		
		GF	66613.00	60	479.61		479.61	479.61	479.61	551.56	551.56	551.56	634.29	634.29	634.29	838.85	1109.38	1687.22	
Total income from commercial within BT					0.00	167.86	359.71	479.61	551.56	551.56	551.56	634.29	634.29	634.29	838.85	1109.38	1687.22		
						35%	75%	95%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Commercials within Property Development (PD)		sq.ft	Rs/ sq.ft./ month		1	2	3	4	5	6	7	8	9	10	15	20	30		
		All floors	266621.00	55	1759.70		1759.70	1759.70	1759.70	2023.65	2023.65	2023.65	2327.20	2327.20	2327.20	3077.72	4070.29	6190.40	
Total income from commercial within PD					0.00	615.89	1319.77	1671.71	2023.65	2023.65	2023.65	2327.20	2327.20	2327.20	3077.72	4070.29	6190.40		
						35%	75%	95%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Car Parking					1	2	3	4	5	6	7	8	9	10	15	20	30		
Average Parking rate per vehicle	6.29																		
Covers per parkin lot per day	3.5																		
No. of Days	365																		
Total parking lots	700																		
Revision of rates	15.00%	every three years																	
						56.21	56.21	56.21	64.64	64.64	64.64	74.34	74.34	74.34	98.31	130.02	197.74		
Total Income from Parking						19.67	42.16	53.40	64.64	64.64	64.64	74.34	74.34	74.34	98.31	130.02	197.74		



	Rate per vehicle	No.s	Vehicle type															
	10	180	Car (ECS)															
	5	520	Two wheeler															
		6.29																
			No. fo Hoardings	Sq.ft. / Hoarding	Total sq.ft.		30%	60%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Advertising</b>						1	2	3	4	5	6	7	8	9	10	15	20	30
	Rate per Sq. ft.		250															
	Total Number of Hoardings - Categaory 1		6	600	3600													
	Total Number of Hoardings - Categaory 2		10	200	2000													
					168.00	0.00	168.00	168.00	168.00	193.20	193.20	193.20	222.18	222.18	222.18	293.83	388.59	591.00
<b>Income from Hoardings</b>							<b>50.40</b>	<b>100.80</b>	<b>151.20</b>	<b>193.20</b>	<b>193.20</b>	<b>193.20</b>	<b>222.18</b>	<b>222.18</b>	<b>222.18</b>	<b>293.83</b>	<b>388.59</b>	<b>591.00</b>
				Revenu e per sq.ft. unit per month	Area of the Unit (Sq.ft)													
	Advertisements Hoardings			225	6456	0%	30%	60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Advertisements inside the Skywalk			90	648	0%	30%	60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Escalation					1	1	1	1	1.15	1.15	1.15	1.3225	1.3225	1.3225	1.749006	2.313061	3.517876292
<b>Income from MFOB Adv.</b>						<b>0.00</b>	<b>54.39</b>	<b>108.79</b>	<b>181.31</b>	<b>208.51</b>	<b>208.51</b>	<b>208.51</b>	<b>239.78</b>	<b>239.78</b>	<b>239.78</b>	<b>317.11</b>	<b>419.38</b>	<b>637.83</b>

							0.00											
<b>Total Revenue</b>							<b>908.23</b>	<b>1931.23</b>	<b>2537.24</b>	<b>3041.56</b>	<b>3041.56</b>	<b>3041.56</b>	<b>3497.79</b>	<b>3497.79</b>	<b>3497.79</b>	<b>4625.83</b>	<b>6117.66</b>	<b>9304.19</b>

<b>Expenses</b>																	
<b>for ITH</b>		<b>Escalation</b>	<b>3%</b>	<b>every yr</b>													
					1	2	3	4	5	6	7	8	9	10	15	20	30
	Manpower		15	Nos.													
	Average Salary per month		7500														
	Total Salary per yr		13.5			13.50	13.91	14.32	14.75	15.19	15.65	16.12	16.60	17.10	19.83	22.98	30.89
	Power & Fuel per year		9.6			9.60	9.89	10.18	10.49	10.80	11.13	11.46	11.81	12.16	14.10	16.34	21.96
<b>Total expenses for ITH</b>					<b>0</b>	<b>9.24</b>	<b>19.03</b>	<b>24.51</b>	<b>25.24</b>	<b>26.00</b>	<b>26.78</b>	<b>27.58</b>	<b>28.41</b>	<b>29.26</b>	<b>33.92</b>	<b>39.33</b>	<b>52.85</b>

<b>FOR PD</b>																	
		<b>Escalation</b>	<b>3.00%</b>														
					1	2	3	4	5	6	7	8	9	10	15	20	30
	Staff		28	No.s													
	Average Salary per month		7500		<b>Construction Period</b>												
	Total Salary per yr		25.2			25.2	25.956	26.73	27.54	28.36	29.21	30.09	30.99	31.92	37.01	42.90	57.66
	Electricity per year	4.00%		<b>% of Commercial revenue</b>		31.35	67.18	86.05	103.01	103.01	103.01	118.46	118.46	118.46	156.66	207.19	315.10
	Telephone per year	1.50%				11.76	25.19	32.27	38.63	38.63	38.63	44.42	44.42	44.42	58.75	77.69	118.16
	General Admin per yr	1.00%				7.84	16.79	21.51	25.75	25.75	25.75	29.61	29.61	29.61	39.17	51.80	78.78
	Maintenance exp per yr	1.20%				9.41	20.15	25.82	30.90	30.90	30.90	35.54	35.54	35.54	47.00	62.16	94.53
	Miscell. exp per yr	0.50%				3.92	8.40	10.76	12.88	12.88	12.88	14.81	14.81	14.81	19.58	25.90	39.39

Total Expenses for PD						89.47	163.67	203.14	238.70	239.53	240.38	272.93	273.84	274.76	358.17	467.63	703.62	
						14.527%	12.402%	12.152%	11.796%	11.837%	11.879%	11.728%	11.767%	11.807%	11.637%	11.489%	11.366%	
Opex for MFOB						1	2	3	4	5	6	7	8	9	10	15	20	30
		Power costs of Escalators				0	0	0	0	0	0	0	0	0	0	0	0	0
		Power costs of Lifts				6.3072	6.3072	6.3072	6.3072	6.3072	6.3072	6.3072	6.3072	6.3072	6.3072	6.3072	6.3072	6.3072
		Power costs for lighting, Manpower, AMC, etc				79.8064	79.8064	79.8064	79.8064	79.8064	79.8064	79.8064	79.8064	79.8064	79.8064	79.8064	79.8064	79.8064
		Sub total				86.1136	86.1136	86.1136	86.1136	86.1136	86.1136	86.1136	86.1136	86.1136	86.1136	86.1136	86.1136	86.1136
		Escalation				1	1	1	1.05	1.05	1.05	1.1025	1.1025	1.1025	1.215506	1.340096	1.551328216	
		<b>Total</b>				<b>34.45</b>	<b>68.89</b>	<b>86.11</b>	<b>90.42</b>	<b>90.42</b>	<b>90.42</b>	<b>94.94</b>	<b>94.94</b>	<b>94.94</b>	<b>104.67</b>	<b>115.40</b>	<b>133.59</b>	
Total Expenses						1	2	3	4	5	6	7	8	9	10	15	20	30
						<b>133.15</b>	<b>251.60</b>	<b>313.76</b>	<b>354.37</b>	<b>355.95</b>	<b>357.58</b>	<b>395.46</b>	<b>397.19</b>	<b>398.97</b>	<b>496.76</b>	<b>622.36</b>	<b>890.06</b>	

P & L Statement													
	1	2	3	4	5	6	7	8	9	10	15	20	30
<b>Revenues</b>	0.00	908.23	1931.23	2537.24	3041.56	3041.56	3041.56	3497.79	3497.79	3497.79	4625.83	6117.66	9304.19
<b>O&amp;M Expenses</b>	0.00	133.15	251.60	313.76	354.37	355.95	357.58	395.46	397.19	398.97	496.76	622.36	890.06
<b>Annual Concession fee -</b>	0.00	0.00	0.00	25.00	25.00	25.00	28.00	28.00	28.00	31.36	35.12	44.06	61.90
<b>Annual Revenue Share - % of Revenue</b>													
<b>Fee - Max. of the above two options</b>	0.00	0.00	0.00	25.00	25.00	25.00	28.00	28.00	28.00	31.36	35.12	44.06	61.90

Capital expenses	-	-	-										
	4963.27	4963.27	3308.85										
PBIDT		775.07	1679.63	2198.47	2662.19	2660.61	2655.98	3074.34	3072.61	3067.46	4093.94	5451.24	8352.23
Interest	0.00	380.52	761.04	719.07	620.51	509.98	386.06	247.11	91.31	0.00	0.00	0.00	0.00
PBDT		775.07	918.59	1479.40	2041.69	2150.63	2269.92	2827.23	2981.30	3067.46	4093.94	5451.24	8352.23
Depreciation		1275.96	1040.18	858.36	717.33	607.21	520.55	451.75	396.59	268.96	199.07	148.87	79.16
PBT/Operating Profit	0.00	-500.88	-121.59	621.04	1324.36	1543.42	1749.37	2375.48	2584.70	2798.50	3894.87	5302.37	8273.07
Loss brought forward		-	-	-	-	-	-	-	-				
Income Tax (33.66%) or MAT (11.33%)	0.00	0.00	0.00	209.04	445.78	519.51	588.84	799.59	870.01	941.98	1311.01	1784.78	2784.72
PAT	0.00	-500.88	-121.59	412.00	878.58	1023.90	1160.53	1575.89	1714.69	1856.53	2583.86	3517.59	5488.35

## Cash Flow Statement

	1	2	3	4	5	6	7	8	9	10	15	20	30
Cash Flow From Operations less tax		775.07	1679.63	1989.43	2216.41	2141.09	2067.14	2274.75	2202.59	2125.49	2782.93	3666.46	5567.52
Interest on Loan			761.04	719.07	620.51	509.98	386.06	247.11	91.31	0.00	0.00	0.00	0.00
Tax			0.00	209.04	445.78	519.51	588.84	799.59	870.01	941.98	1311.01	1784.78	2784.72
Cash flow after tax & Interest			918.59	1270.36	1595.91	1631.11	1681.08	2027.64	2111.29	2125.49	2782.93	3666.46	5567.52
Capital repayments			0.00	812.88	911.45	1021.97	1145.90	1284.85	1440.65	0.00	0.00	0.00	0.00
(Project Cash Flows)	-4963.27	-4188.20	-1629.22	1964.43	2191.41	2116.09	2039.14	2246.75	2174.59	2094.13	2747.81	3622.40	5505.62

<b>Equity Cash Flows</b>	-4963.27	-879.35	918.59	457.47	684.46	609.14	535.18	742.79	670.64	2125.49	2782.93	3666.46	5567.52
<b>Cumulative</b>	<b>-4963.27</b>	<b>-9151.47</b>	<b>-10780.70</b>	<b>-8816.26</b>	<b>-6624.85</b>	<b>-4508.76</b>	<b>-2469.62</b>	<b>-222.87</b>	<b>1951.73</b>	<b>4045.86</b>	<b>16746.89</b>	<b>32548.79</b>	<b>77594.89</b>
<b>Project IRR (Post Tax)</b>													
<b>17.47%</b>													
<b>Equity IRR</b>													
<b>18.95%</b>													
<b>NPV of the Project</b>													
<b>4,703.73      Rs lacs</b>													
<b>PV of payments</b>													
<b>173.35      Rs Lacs</b>													
<b>Gross Revenue for Govt. during the 30 yr period</b>													
<b>11.08      crores</b>													
<b>Gross Cash Flows for the Project during the 30 yr period</b>													
<b>775.95      crores</b>													