

BENGALURU COMMUTER RAIL SERVICE

CALL TO ACTION



CAPT. NAVEEN CHANDRA
KHADER BASHA SYED
SANJEEV DYAMANNAVAR
SATHYA SANKARAN

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CiSTUP

Centre for infrastructure, Sustainable Transportation
and Urban Planning

SID Complex, Indian Institute of Science
Bangalore - 560 012, INDIA

Prof. T. G. Sitharam

Chairman

Summary Report on “RECOMMENDATIONS FOR SETTING UP A SPV BANGALORE COMMUTER RAIL AUTHORITY LIMITED” prepared by Praja

by

Prof. T.G. Sitharam, Chairman, CiSTUP, Indian Institute of Science, Bangalore

The report comprehensively covers all the aspects relevant to implementation of Bengaluru Commuter Rail Authority Limited (BCRAL) giving clear deadlines for the tasks to be undertaken by the SPV. This is an excellent idea wherein one can transport a very large number of people (moving people) from the city to the suburbs. It also integrates BCRAL with Bangalore Metro, BMTC, HSRL, Railway stations and Bus stations and provides clear plan of linking of all mass transit systems in Bangalore. The report gives a set of recommendations to set up a Commuter Rail Service to connect the suburbs and nearby towns to the city. This is necessary to take the housing pressure off Bangalore and make suburban cities attractive for settlers and connect them to the city within approximately an hour to commute on the lines of Mumbai local train service. As per the report, the Proposed Routes for the Bangalore Commuter Rail Service are:

Yeswantpur-Yelahanka-Devanahalli-Chickballapur
Benninganahalli-Thanisandra-Yelahanka-Doddaballapur
Yeswantpur-Benninganahalli-Anekal-Hosur
Tumkur/Nelamangala-Yeswantpur-Benninganahalli
Yelahanka- Benninganahalli-Whitefield-Malur-Bangarpet
Yelahanka-Yeswanthpur-City-Kengeri-Ramanagara

The report also highlights the proposal for setting up 35 additional stations and upgrading the present stations along the routes specified for this service to be convenient and popular mode of transport. This service is estimated to serve close to 45 lakh people who live along the existing tracks between Bangalore and these growth centers. About 1/3rd of this population are not served because of lack of stations and consequently move to other modes of transport putting further pressure on roads.

PROPOSAL: (Suggested time limits are indicated within the brackets)

- Setting up of a Special Purpose Vehicle called Bengaluru Commuter Rail Authority Limited with the following stakeholders (3 months)
 - a. Infrastructure Development Department representing Govt of Karnataka
 - b. Railway Vikas Nigam Limited (RVNL) representing Indian Railways
 - c. BMTC for Bus Last Mile Connectivity
 - d. BMRC for Namma Metro integration
- Improve accessibility to the stations by providing feeder services from nearest Major Bus/Metro Transit center 24/7. (3 months)
- BMTC needs to support BCRAL by providing feeder services to all the stops in operational areas. (3 months)
- Upgrade stations to cater to a large number of passengers by providing basic amenities at each station (6 months)
- Optimized routing and consolidation for effective operations. (6 months)
- Installing new signaling systems to enable better management of train traffic. (12 months)
- Construction of new stations on the routes specified. (18 months)
- Doubling/Quadrupling and electrification of all railway tracks to enable uninterrupted commuter rail operations. (18 months)
- Enhancement of transportation hubs identified as Yeswantpur, Yelahanka and Benninganahalli to international standards as they must have seamless interconnectivity with other modes like bus, metro, mono rail, HSRL etc. (24 months)
- Common innovated ticketing system for BMTC, Metro and Commuter Rail Service must be developed for complete integration and utilization of all mass transit systems. (24 months)

T.G. Sitharam

Tel : +91-80-2293 2521, 2346 8207, 2293 2043 Telefax : +91-80-2346 8207

e-mail : chairman@cistup.iisc.ernet.in

Web : http://cistup.iisc.ernet.in

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1. Foreword

Commuter rail, also known as suburban rail, is a type of public transport that is characterized by passenger trains operating on railroad tracks and providing regional service between the city and suburbs. This report about “NammaRailu” comprehensively covers all the aspects relevant to implementation of Bengaluru Commuter Rail Authority Limited (BCRAL) giving clear deadlines for the tasks to be undertaken by the SPV. Commuter rail can draw a large number of commuters - people who travel on a daily basis from cities like Tumkur, Yelahanka, Devanahalli, Hoskote, Whitefield, Hosur, Anekal, Kengeri, Ramanagar, Doddballapur and Chikkaballapura. Commuter rail provides a number of public benefits including reduced highway congestion, pollution and energy dependence and further, they serve lower density areas, and often share right-of-way with intercity or freight trains. They can also operate on existing rights-of-way and thus eliminates the time and significant costs of new infrastructure construction. Trains can operate following a schedule, at speeds of about 50 km/h and some services restricted to peak hours. When compared to rapid transit, commuter rail has lower frequency, following a schedule rather than fixed intervals, and fewer stations spaced further apart.

In the world there are many examples of commuter rail systems. In Japan, commuter rails have extensive network and frequent service, and are heavily used. Many of them are run by private railway companies as envisaged in this report for Bangalore. Other examples in Asia include Seoul Metropolitan Subway which has suburban lines operated by Korail in South Korea, KTM Komuter in Malaysia, and KRL Jabotabek in Jakarta Metropolitan area, Indonesia. Major metropolitan areas in most European countries are usually served by extensive commuter rail systems. Well-known examples are Pendeltåg in Sweden, S-Tog in Denmark, Beovoz in Belgrade, Serbia, S-Bahn in Germany, Switzerland and Austria, RER in France, Linee S in Italy, Cercanías in Spain and HÉV in Budapest, Hungary. Major cities in Australia have commuter rail services in their metropolitan area. New Zealand has two commuter rail systems one in Auckland and the other in Wellington (Tranz Metro). In South America, São Paulo and Buenos Aires has metropolitan rail system and also in Santiago, Chile.

In India, there are commuter rails in some cities such as Mumbai (Mumbai Suburban Railway), Chennai (Chennai Suburban Railway) and also in Hyderabad. MMTS at Hyderabad has done a good job in transporting people from the city centre to HI-TEC city and the Information Technology hub, etc.

Dr. T.G. Sitharam, Ph.D. (Canada)
Professor in Civil Engineering and
Chairman,
Centre for infrastructure and Sustainable
Transportation & Urban Planning (CiSTUP),
Indian Institute of Science (IISc)
Bangalore, 560 012, INDIA

e-mail: sitharam@civil.iisc.ernet.in
<http://civil.iisc.ernet.in/~sitharam>
Tel : (+91)-80-2293 2919 (civil) or 2293
2521 (CiSTUP)
Fax: (+91)-80-2360 0404 (Civil) or 2346
8207 (CiSTUP)



2. Introduction

Decongestion of cities is a burning issue facing the administrators today. With the kind of visibility Bengaluru has in the international arena and the role India is going to play in the world of the future, it is important for both central and state governments to sit up and take notice. Ignoring the long term mass transport needs of the city can backfire on the country. The economy of any city thrives on availability of good quality labor at affordable cost. Expensive housing and increased travel times only put more pressure on productivity of human capital. This may ultimately lead to flight of capital and hurt the economy with cascading effect.

Housing has already become unaffordable in Bengaluru for the lower and middle classes which is going to form a major portion of the workforce of the future. Also, a 76% decline in vegetation cover and 79% decline in water bodies due to the increase in built up space in the urban areas of Bengaluru means, brownfield growth centers at approximately one hours commute from Bengaluru needs to be developed. No amount of connectivity within the city will be successful if that connectivity is not supplemented by mass transit to these growth centers. The key is **frequent, low cost connectivity** which can be achieved by utilizing and enhancing the existing train tracks between Bengaluru and these growth centers. Multiple reports over 27 years including RITES surveys have confirmed this fact.

This Commuter Rail Service for Bengaluru will require the following

1. Setting up a **Special Purpose Vehicle** between representative entities of the Indian Railways and the Government of Karnataka
2. Introduce **new trains** on new routes and **increase the frequency** on all routes
3. **Increase capacity** of tracks and implement state of the art signaling systems
4. Build **new stations** with good quality infrastructure and **improve accessibility** to existing stations with last mile connectivity
5. Create multimodal **hubs and interchanges** to allow people to change to other modes of transport

The benefits of the Commuter Rail Service is multifold

1. With 6 Routes connecting 6 growth centers at a frequency of 24 trains per day per route, 375 kilometers and 50 lakh people can be covered
2. Availability of labor for growth of the already established economic ecosystem
3. Decongestion of the city
4. Increased efficiency in commute times
5. Affordable housing for lower & middle classes
6. Significantly lower capital expenditure on transport infrastructure



3. The Need

Per McKinsey report on India's urbanization to 2030:

- **590 million** people will live in cities, nearly twice the population of US today
- **270 million** people will be the net increase working age population
- **70%** of net new employment will be generated in cities
- **91 million** households will be middle class, up from 22 million today
- **700-900 million sq mtr** of commercial & residential space needs to be built, or a new Chicago every year
- **2.5 billion sq mtrs** of roads will have to be paved, 20 times the capacity created in the past decade
- **7400 kms** of metros & subways will need to be constructed, 20 times the capacity added in the past decade

Bengaluru is a leader in this growth. Per the report, it will have more than 10 million people inhabiting it by 2030, of whom; a majority will be from the middle and lower income group. For them, the urban mobility challenge will only increase as the working population increases and hence, commute will become a major quality of life indicator.

Further, research by Center for Ecological Sciences, IISc, reveals a **76%** decline in vegetation cover and a **79%** decline in water bodies due to the increase in built up space in the urban areas of Bengaluru. This implies that any further significant net addition within the urban area will result in a decline in standard of living.

How Bengaluru builds its infrastructure & manages this growth will determine if it will continue to lead in taking the country forward or it will become a failure leading to urban chaos.

Growth Center paradigm

CTTP 2007 commissioned by KUIFDC/IDD of GoK had this to say regarding Commuter Rail on existing tracks *"With the development of the huge Multiple Economic Activity Areas like Electronic City, I.T. Parks, Industrial & Commercial Areas with consequent job opportunities on the one hand and availability of comparatively cheaper accommodation in surrounding towns like Hosur, Ramanagaram and Tumkur etc. where a large number of working population is likely to live, substantial of commuter movement between these towns and the Metropolis will take place."*



One critical element of this urban operating model of the future is how cities will make and enforce land & space choices. Housing has already become unaffordable in Bengaluru for the lower and middle classes. No city in India has allocated space and zoning for affordable housing. The housing market has a preference to locate close to commercial/urban spaces to increase the premium the houses can fetch. This increases both, the cost & mixed use urban sprawl. Counter magnet cities, with suburban mass transit, is the best and most effective way to focus on affordable housing for middle & lower income groups who will constitute 75% of the future workforce. Nearby suburban towns were often viewed as best options for setting up industries to release growth pressures on the city to absorb new migrants and to relocate some people from the city. It never happened, because a business ecosystem cannot be artificially replaced or relocated. These suburban cities need to be zoned to take the housing pressure off Bengaluru and this can happen only when the option of traveling to Bengaluru quickly and cheaply becomes a reality.

From the McKinsey report one can gather that, for the first time in India's history, Karnataka along with other large south Indian states will have more people in its cities than in its villages. This means that the pressure on cities will increase considerably in the future to avoid urban sprawl and still manage their growth. Increasing the area of Bengaluru and making it Bruhat Bengaluru has put undue pressure on civic bodies and made the area difficult to manage. The alternate model is to enable suburban cities to become more attractive destinations for settlers & connect them via mass transit trains to within an approximate one hour commute distance from Bengaluru.

In the past two decades the state government in co-operation with the central government has attempted a few options to address the urban transportation challenges. Namma Metro, Mono Rail, High Speed Rail to BIAL, rejuvenated BMTC service are all examples. While most of these focus on making commute within Bengaluru city easier, the suburban connect is what will bring dividends in the long run.

Efficiency in operations, more advanced levels of automation in signaling supplemented by close coordination with local authorities in implementing last mile solutions and superior interchange with metro is going to determine the success of the Commuter rail.

The rest of this report will provide recommendations to ensure that the Commuter Rail can be implemented successfully and be counted amongst the best in the world.



4. Commuter Rail Service

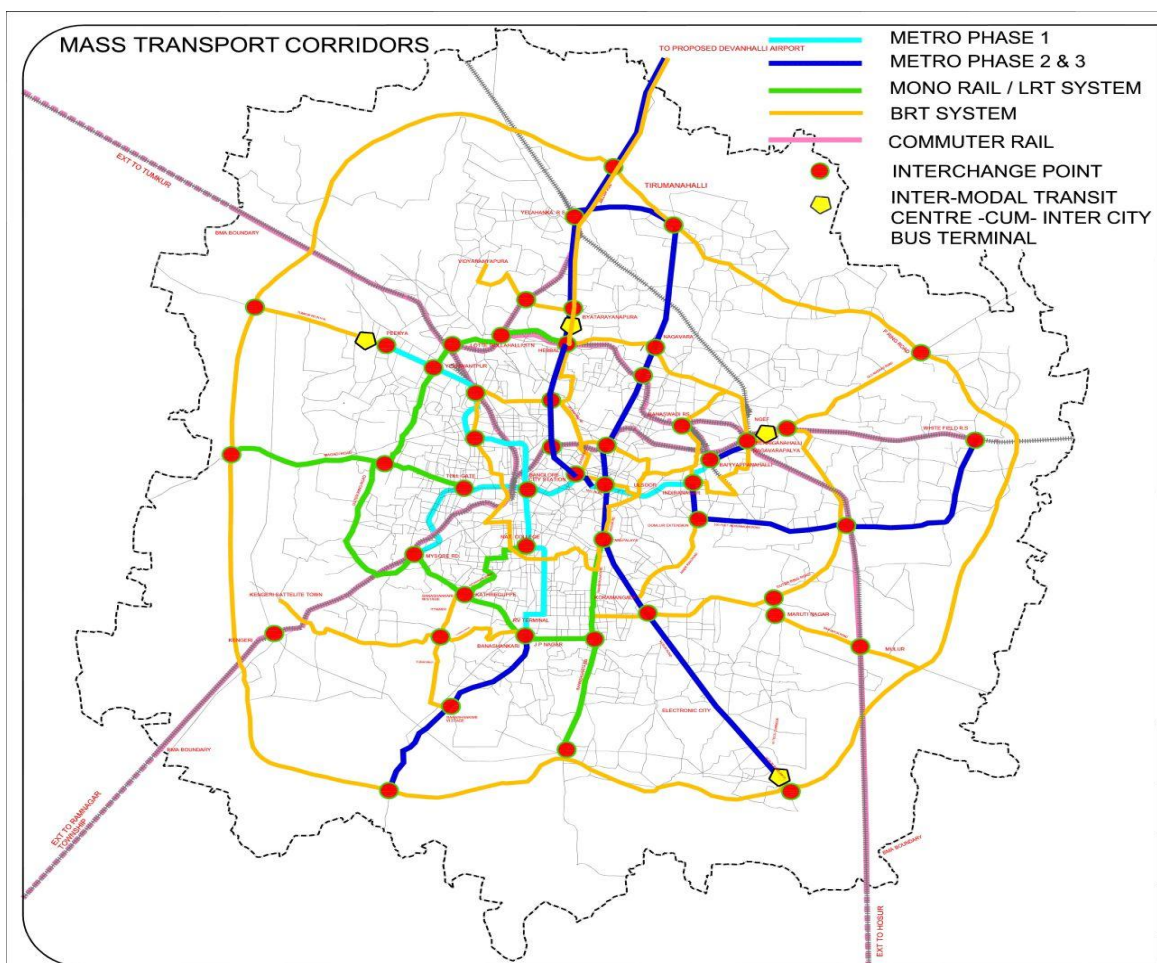
4.1 What is it?

The commuter rail service consists of train services connecting suburban growth centers within an approximate one hour travel distance to Bengaluru with environmental friendly electric trains which are bicycle & disabled friendly, operating on existing tracks, doubled or quadrupled as necessary, for operation at a high frequency of 20 or more trains per day between each origin-destination pair.

The Railways vision 2020 plan had this to say about railways vision for suburban rail *"Partnerships with State and City Authorities will be established to augment the infrastructure and manage suburban services under a single management. Both suburban and long-distance trains must also look smart and colorful, reflecting our belief in and commitment to 'Change for a better tomorrow'".*

CTTP

Bengaluru's CTTP proposed commuter rails along critical routes. It's now time to start implementing it in full.





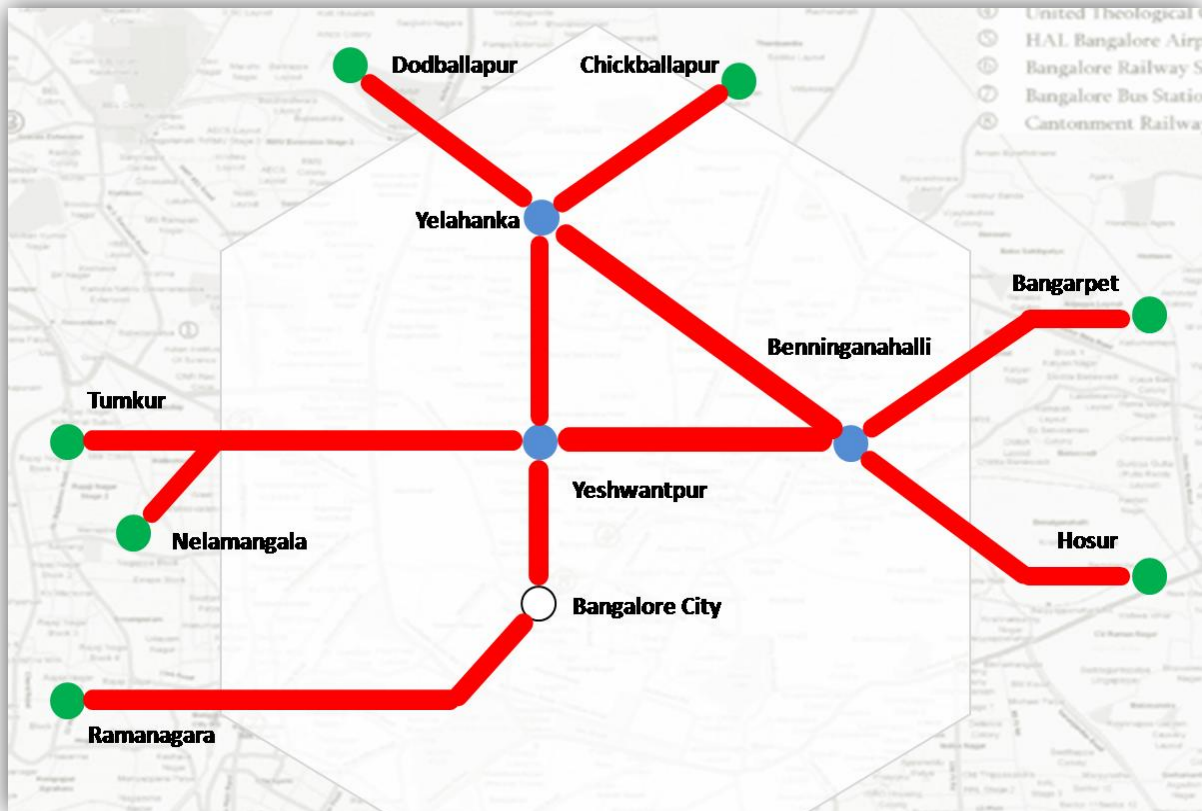
The journey of Bengaluru Commuter rail

- 1983 – Southern Railway team recommends 3 commuter rail lines and a 58-km ring railway over a 25-year period.
- 1988 – RITES transport study report, reiterated improvements to commuter rail lines.
- 1993 – State established committee to look into mass rapid transit recommended the same circular railway put forward by Southern Railways in 1983.
- 1998 – RITES does survey for Local Trains funded by World Bank.
- 2003 – RITES completes survey for Local Trains for State Govt.
- 2007 – RITES completes survey for commuter rail as part of CTPP 2007, recommending an extensive commuter rail network for Bengaluru and nearby towns.
- JAN 2008 – IDD agrees to fund for two Rakes DEMU services.
- NOV 2009 – BMLTA assigns work to IDD to study Commuter Rail services connecting all peripheral stations.
- 14 DEC 2009 – SWR finally agrees to start few Local Trains to Anekal/Devanahalli, Kengeri as per the BMLTA meeting.
- DEC 2009 – MoS Shri K H Muniyappa makes press briefing that State Govt is not yet decided on Local Trains / Commuter Rail Services.
- 2 JAN 2010 – MoS Shri K H Muniyappa makes announcement about commencement of local trains between Yeshwanthpur to Anekal and Devanahalli .
- FEB 2010 – Bengaluru South MP Shri H N Ananth Kumar request the MoS Railways to take up the Local Train facility similar to Mumbai.
- 3 MAR 2010 – CM of Karnataka Shri Yeddyurappa writes letter to Railway Minister to sanction the Local Train Project with 50% project cost to be contributed by State Govt.

Despite various studies over 27 years, Bengaluru is still waiting for a full fledged commuter rail service to serve its citizens whilst other similar, large cities have already been operating such services for a long time.



4.2 Growth centers



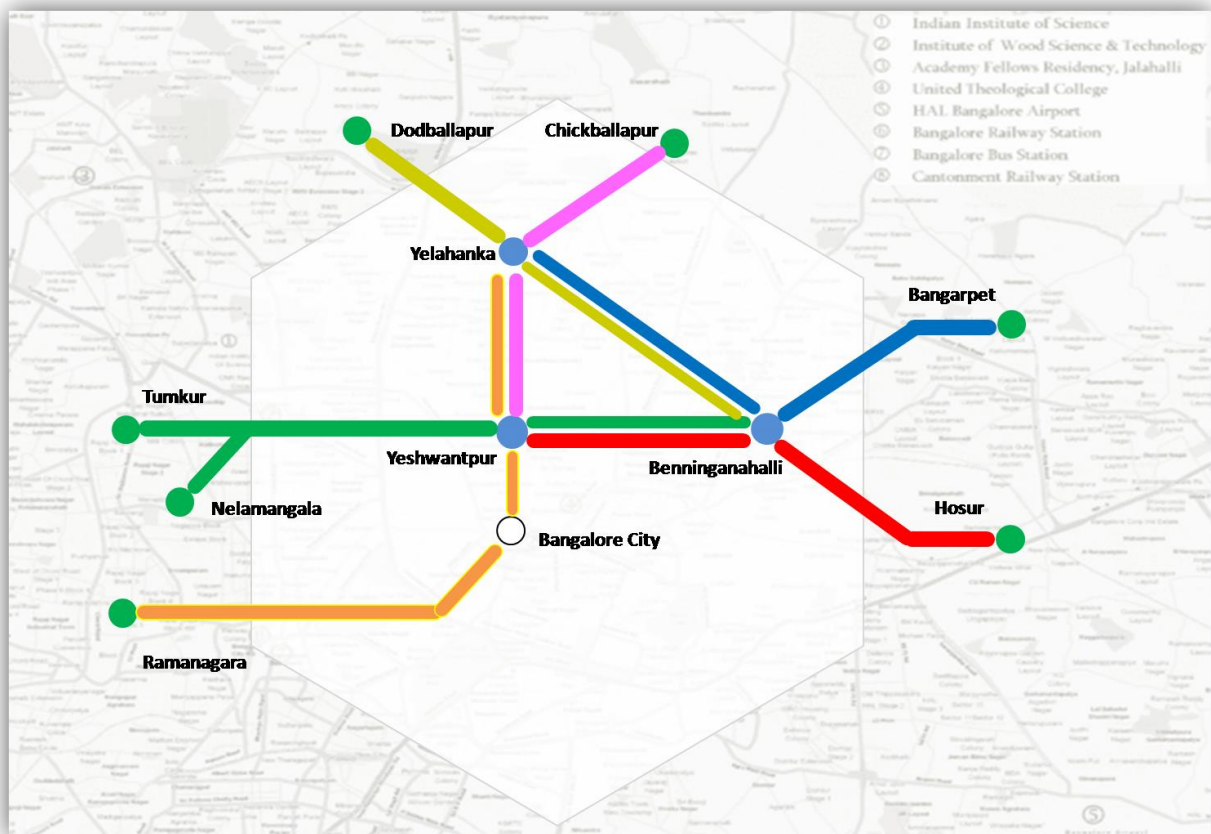
The growth centers indicated as green dots on the map are the towns which will be connected by the Commuter Rail. These growth centers are significant because they are currently not very heavily populated despite their close proximity to Bengaluru. They have sufficient headroom for growth and are approximately within one hours traveling distance from Bengaluru. The catchment areas in between also have potential to grow with rail connections.

Growth Center	Distance from BLR	Population	Catchment
Hosur	40 Kms	1.5 Lakhs	Anekal, Jigani, Electronic city
Ramanagara	50 Kms	1 Lakh	Kengeri, Bidadi
Tumkur	70 Kms	3 Lakhs	Nelamangala, Peenya, Jalahalli, Hessarghatta, Dobbsspet
Chickballapur	70 Kms	0.7 Lakhs	Devanahalli, BIA, ITIR, DBP, aviation hub
Dodballapur	40 Kms	0.9 Lakh	Yelahanka, Dodballapur Indl Area
Bangarpet	70 Kms	1.5 Lakh	Malur, KIADB

* All figures are approximate and taken from publically available sources



4.3 Routes



The Commuter Rail routes described below, if implemented at a frequency of 20 trains per day for each route, can support lakhs of commuters per day. By adding rakes and using double decked carriages capacities can be scaled up many times this number.

Route	Distance (Kms)
Yeswantpur - Yelahanka - Devanahalli – Chickballapur	60
Benninganahalli - Thanisandra - Yelahanka – Doddballapur	37
Yeswantpur - Benninganahalli - Anekal – Hosur	66
Tumkur/Nelamangala - Yeswantpur – Benninganahalli	83
Yelahanka - Benninganahalli - Whitefield - Malur – Bangarpet	80
Yelahanka - Yeswantpur - City - Kengeri – Ramanagara	50
Total route length (Kms)	376



4.4 Segments

This section provides a description of the population covered by the existing network of tracks and the potential that lies unutilized.

An estimated 45 lakh people live along the existing tracks between Bengaluru and these growth centers. About 1/3rd of this population are not served because of lack of stations and last mile within local areas. These 33% consequently move to other modes like private transport to fulfill their commuting needs, putting further pressure on roads.

4.4.1 SEGMENT COVERAGE

SEGMENT	Total catchment population in Lakhs (2001)	Not covered by local station
YESWANTPUR TO BENNINGANAHALLI	6.7	37.10%
BENNINGANAHALLI TO HOSUR	5.6	12.60%
BENNINGANAHALLI TO YELAHANKA	1.8	56.90%
YESHWANTPUR TO YELAHANKA	2.3	70.00%
YELAHANKA TO DODBALLAPUR	2.1	38.20%
YELAHANKA TO CHICKBALLAPUR	2.8	28.90%
YESHWANTPUR TO TUMKUR	10.7	20.97%
YESHWANTPUR TO RAMANAGARA	9.6	10.96%
BENNINGANAHALLI TO BANGARPET	4.0	16.00%
	45.5	32.40%

4.4.2 STATIONS BY SEGMENT

It is obvious that the inventory of existing stations needs to be supplemented with many additional stations for commuter rail to be a convenient and popular mode of transport. For each segment, an attempt has been made to identify localities where there is need for new stations to cover the one-third population that remains unserved. The data has been collated from publicly available information on the internet and also relies on 2001 census figures to determine the areas for new stations. However, it does not accurately pin-point exact locations for stations for which, a detailed study will be necessary. Where possible, some locations have been suggested that might facilitate interchange between public transport modes and make access to stations easier for users. The tables below list the stations (both existing and new) for each segment.



Yeswantpur - Benniganahalli Stations

Stations	Distance
Yeshwantpur	0.0km
Gokula Extension	4.1km
Lottegolahalli	1.4km
RMV Extn (D Rajagopal Rd)	1.6km
Hebbal	1.3km
Guddadahalli	1.1km
Kanakanagar	1.3km
Nagavara Main rd	1.4km
Kadugondhalli	1.1km
Banaswadi	1.3km
Kamanahalli Rd (IOC Flyover)	1.0km
Kasturinagar (near SAIL)	1.5km
Benniganahalli	1.2km
TOTAL	18.3km

Existing Stations Proposed Stations

* Distances are approximate

Yelahanka - Chickballapur Stations

Stations	Distance
Yelahanka Jn	0.0km
Kenchanhalli East	2.2km
MVIT /Ganganahalli	4.1km
Bettahalsoor	2.1km
Doddajala	4.3km
NH-7 /BIAL trumpet Interchange	3.7km
Devanahalli	7.1km
Avatihalli	6.8km
Venkatgirikote	3.0km
Nandi Hills	6.5km
Chikkballapur south (SJCIT)	2.8km
Chikballapur	3.6km
TOTAL	46.2km

Yelahanka - Doddaballapur Stations

Stations	Distance
Yelahanka Jn	0.0km
Kenchanhalli West	2.2km
Naganahalli	1.6km
Rajankunte	5.0km
Doddaballapur Ind Area (middle)	8.3km
Doddaballapur	3.2km
TOTAL	20.3km

Benniganahalli - Hosur Stations

Stations	Distance
Benniganahalli	0.0km
Kaggadasapura (near Railway Cross)	2.1km
Karthik Nagar (east of ORR)	2.6km
Varthur Rd (Marathalli bridge)	1.8km
Bellandur Rd	2.5km
Karmalarama	3.3km
Sarjapur Rd (just past level crossing)	1.1km
Heelalige	10.9km
Anekal road	10.5km
Hosur	13.4km
TOTAL	48.2km

Benniganahalli - Yelahanka Stations

Stations	Distance
Benniganahalli	0.0km
Channasandra	2.2km
Horamavu (near main rd)	1.8km
Hennur	1.8km
Bagalur rd cross	1.8km
Thanisandra	2.1km
Jakkur East	3.0km
Nehru Nagar (NH-7 Jn)	2.0km
Yelahanka Jn	1.4km
TOTAL	16.1km



Existing Stations Proposed Stations

* Distances are approximate

Yeswantpur - Tumkur	
Stations	Distance
Yeshwantpur	0.0km
HMT	3.2km
Jalahalli West (Near Jalahalli Main Rd)	1.8km
Chikkabanavara	2.9km
Soldevanahalli	2.9km
Golhalli	9.9km
Bhairanayakanahalli	6.6km
Dodbele	4.4km
Muddalingahalli	6.9km
Nidvanda	4.4km
Dobbspet	1.0km
Hirehalli	8.5km
Kyatsandra	6.1km
Vijaynagar (Siddaganga)	2.8km
Tumkur	2.6km
TOTAL	64.0km

Yeswantpur - Yelahanka	
Stations	Distance
Yeshwantpur	0.0km
Gokula Extension	4.1km
Lottegollahalli	1.4km
Kodigehalli	1.6km
Jakkur West (Allalasandra main rd)	1.6km
Yelahanka south (NH7 /Level crossing)	1.7km
Yelahanka Jn	2.0km
TOTAL	12.4km

Benniganahalli - Bangarpet	
Stations	Distance
Benniganahalli	0.0km
KR Puram	1.6km
Hoodi (Main rd cross)	4.7km
Sadarmangal (Kodigehalli rd cross)	2.0km
Whitefied	2.6km
Devangothi	7.8km
Malur	12.2km
Byatrayanahalli	8.8km
Tyakal	6.0km
Maralahalli	5.8km
Bangarpet Jn	6.2km
TOTAL	57.7km

Yeswantpur - Ramnagaram	
Stations	Distance
Yeshwantpur	0.0km
Subramanyanagar (Milk colony)	1.7km
Malleswaram	2.7km
City	2.7km
Binnypet (Bus stand)	2.3km
Chord Road	2.2km
Nayandahalli	2.9km
Jnana Bharati (BU)	1.4km
Rajarajeshwari nagar (RVCE)	2.3km
Kengeri	1.2km
NICE Rd (Southwest)	1.8km
Kumbalgodu (Rajarajeswari Denti /Engg)	4.1km
Hampapura (WonderLa)	3.2km
Hejjala	1.9km
Bidadi	6.4km
Ketohalli	8.3km
Ramnagaram	6.5km
TOTAL	49.9km



5. Proposition

PHASE 1

5.1 Setup of SPV

3 months

In 2007, the Rail India Technical and Economic Society (RITES), a Government of India enterprise, released a Comprehensive Traffic and Transportation Plan (CTTP) for Bengaluru. The report states *"Major developments have been proposed in the suburban towns of Bengaluru by BMRDA in the Bengaluru Metropolitan Region. This is likely to increase interaction between Bengaluru and these suburban towns. There will be need to provide commuter rail services to these towns from Bengaluru"*. It also says that the commuter rail system should be extended up to BMRDA's new townships and beyond to act as sub-urban services. Multiple reports have reinforced this fact and the CTTP has been accepted for planning purposes. Thus, GoK & IDD are in favor of a Commuter rail system for Bengaluru.

The vision 2020 plan of Indian Railways states *"In the suburban segment, the main challenges are the creation of adequate capacity, segregation of commuter lines from long-distance lines and expansion of services to ensure comfort of commuters. Partnership with state authorities will be necessary for development of suburban rail systems. Railways may also aim at integrating the metro-rail and sub-urban rail-systems under a single management in partnership with the respective state/city authorities."* It is thus clear that Indian Railways recognize that states will need to partner with IR to build and operate suburban commuter rail systems in the future.

As per Rail Vikas Nigam Ltd, the features of Joint Venture SPV model of investment in Railway projects with Indian Railways are as hereunder:

- It envisages participation of the stakeholders and beneficiaries besides national level infrastructure funding institutions in the development and creation of rail infrastructure through appropriate concessions.
- Financial participation can be through equity participation in the SPV. An SPV can be a joint venture with Railways and majority/minority partner or a pure private company.
- Revenue from operations are generated by SPV through revenue apportionment.
- Concession period will normally be for 33 years extendable with mutual agreement.
- Railway land, as available, required for the project will be made available on lease/license.



- Tariff freedom as per provision of Railways' Act, 1989.
- Commercial utilization of railway land, commercial publicity rights as permissible under the law and public policy will be permitted with profit sharing.
- Initial project development will be done by Indian railways to establish project cost, land acquisition, other project component requirements, and project viability.
- Land acquisition will be done by the Indian railways for partnership projects.
- Project construction will be decided by the SPV (done by RVNL as per the model shareholders agreement).
- In case of gauge conversion and doubling projects, maintenance of the project line will be done by IR.
- Maintenance of a green field project can be decided by the SPV.
- Operations will normally be done by IR with its own rolling stock. Use of dedicated non-IR rolling stock permitted.

The above points establish the parameters in which both, the state authorities and the Indian Railways, can cooperate for Commuter rail.

It is highly recommended that the Suburban Commuter Rail be run under a SPV called Bengaluru Commuter Rail Authority Ltd. (BCRAL), which will consist at a bare minimum the following stake holders

1. IDD representing GoK and the citizens as majority partners
2. RVNL representing Indian Railways
3. BMTC for bus last mile connectivity
4. BMRC for Namma Metro integration

It is important BCRAL be setup immediately and made operational before further steps can be taken.



Operations & Maintenance Option

While the model agreement describes O&M to be handled by IR in the project, similar to Boston and Stockholm, two of the many cities in US & Europe that have outsourced O&M to private parties, BCRAI could explore contracting the O&M to a private party who can oversee the following:

- Management of the entire commuter rail workforce.
- Maintenance & upgrade of rolling stock, facility, stations, track, signal and communications equipment.
- Operation of trains and the majority of the dispatching.
- All customer service and revenue collection.

Since ticket pricing is expected to be on the basis of the railways act, determination of fares could be retained with the SPV. The O&M contract could be a fixed bid reverse auction for a specific duration and incentives defined on exceeding performance targets. The performance targets could include punctuality, cleanliness of stations & rolling stock, customer satisfaction surveys and revenue collections.

OTHER LOCAL TRAIN SERVICES IN INDIA

HYDERABAD

The Multi-Modal Transport System (MMTS) is a successful model in this city. Flagged off on Aug 9, 2003, it currently runs 84 services a day, covering 27 stations and connecting Secunderabad, Falaknuma and Lingampally over the existing railway network. Around 90,000 to 100,000 commuters use MMTS every day. There are first class, general class and special ladies compartments. The State and Center have contributed 50% each for project cost.

MUMBAI

The suburban railway system in the island city is one of the most complex, densely loaded and intensively utilized in the world. It has the highest passenger density in the world with 6.5 million commuters commuting every day. Mumbai suburban railway system which has spread over 319 route kms is run using Electric Multiple Units.

The Mumbai Railway Vikas Corporation Ltd (MRVC Ltd), a public sector unit of the Government of India under the Ministry of Railways, was incorporated under the (Indian) Companies Act, 1956 on July 12, 1999, with an equity capital of Rs 25 crores to implement the rail component of an integrated rail-cum-road urban transport project, called Mumbai Urban Transport Project. The cost of the rail component of the project is to be shared equally by Ministry of Railways and Government of Maharashtra.



KOLKATA

Kolkata and its neighboring districts have an extensive suburban railway system. The suburban railway services in Kolkata are operated by Eastern Railway and South Eastern Railway. The Kolkata Metro Railway operates the underground Metro services in the city as well. There is a separate Circular Railway corridor in the city also operated by ER. Most of the trains are EMUs stretching into the districts of North 24 Paraganas, South 24 Paraganas, Nadia, Howrah, Hooghly, Bardhaman, Purba Medinipur and Paschim Medinipur.

CHENNAI

Chennai suburban railways have 286 km true suburban and 610.5 km MEMU service. 80,000 to 1,00,000 passengers travel in Chennai suburban railway everyday which uses EMU's operating on Alternating Current drawn from overhead cables. The State and Center have contributed 50% each for project cost.

DELHI

Delhi Suburban Railway services are a commuter rail service operated by Northern Railway zone of the Indian railways for the National Capital Region. These services are mostly run using EMU and MEMU rakes. This also includes passenger trains and DMU services up to Rewari in Haryana, which is also considered part of the National capital region. Delhi Ring Railway is part of the Delhi Suburban Railway services. The Ring Railway is a circular rail network in Delhi.



5.2 Enhance accessibility to stations

3 months



The railway vision plan 2020 says this on stations *"However, the stations are inadequately designed and equipped to handle such large multitudes of passengers. They do not provide easy access or comfortable experience prior to boarding or after disembarkation from trains. Street-level access is generally restricted to one or two end-platforms (except at*

terminal type of station layouts). Inter-platform connectivity is through foot over-bridges which are often inadequate, apart from being passenger-unfriendly"

Station Accessibility

- Feeder Service from the nearest Major Bus/Rail/Metro Transit Center - 24/7.
- Preferential Access Point for Public Transport Drop Off/Pick up – Bus, Taxis, Cabs, Auto.
- Preferential Parking Spaces for Environment Friendly Vehicles like Bicycles.
- General Security 24/7 around stations and access roads.
- Walkways and Ramps to access points across tracks and outside stations which are disabled friendly.
- Clear signboards providing directions to parking and to public transport.



Additionally, ROB's & RUB's need to be built along all lines to enable smooth access and uninterrupted service.



5.3 Last mile connectivity to stations

3 months

All over the world, the trend in public transport system has been to integrate all modes of PT systems. It is a well acknowledged fact that India has been building transportation infrastructure in isolation. The planning of these is rarely done with all transport stakeholders together and hence multimodal integration is found wanting during implementation. This consequently leads to underutilization and wastage.

Most suburban services in India are underperforming due to lack of last mile connectivity and poor interconnectivity with other modes of transport to allow for seamless changeovers.

In order to make Commuter Rail useful and viable, it has to have tight integration with city's PT systems. Integration with other PT systems provides

the commuter with point to point connectivity right from the town outside Bengaluru to the specific location in the city.



The Integration could range from Commuter Rail station at the same physical location to Commuter Rail station being a short walking distance to other PT transit stations.

Coaches having facilities to carry cycles will go a long way in helping promote green last mile options. It also benefits the

economically weaker sections to save on the total cost of commuting.

BMTC Connection

BMTC needs to support Commuter Rail by providing feeder services to all the Commuter Rail stops/stations in the BMTC operational area. The feeder service at bare minimum should connect Commuter Rail stations to the nearest BMTC transit center. BMTC's footprint being large, this should be an easy proposition. All it may need is some changes in the route or it could be an exclusive feeder loop connecting the station to the nearest transit center.



5.4 Upgrade stations and trains

6 months



The Railways Vision plan has this to say on suburban stations *"Many of the railway stations located in major metropolitan cities individually handle more passengers than the combined numbers handled by all airports of the country put together. However, the stations are inadequately designed and equipped to handle such large multitudes of passengers. They do not provide easy access or comfortable experience prior to boarding or after disembarkation from trains"*.

It is imperative that stations & rolling stock are upgraded to provide comfortable traveling experience. Common branding of stations & trains with appropriate signage enables common facilities to be offered at good quality under a single roof. Comfortable trains and stations are already being built in other suburban services like Mumbai & Hyderabad. A similar effort needs to be undertaken by the SPV for Bengaluru Commuter Rail Service.

Common branding also requires the current SWR services to destinations in the commuter rail target areas to be rolled into the ambit of commuter rail. SWR trains to destinations like Bangarpet, Hosur and nearby towns can become Commuter rail services thus enabling common ticketing schemes and timetable sharing. This inorganic acquisition of existing services will help scale Commuter Rail services faster.



Information Systems



- Electronic Information Displays - Announcing Arrivals/Departures
- Electronic / Manual Information Counter - Information on nearest transit centers, Business Centers, Hotels/Restaurants etc nearby

Basic Commuter Amenities

Basic commuter facilities are essential for the success of commuter rail & for high ridership levels. Listed below are basic amenities that are necessary at commuter train stations:

- Train Travel Information/Planning Kiosks
- Customer Service - Telephone/Manned
- Clean and Hygienically maintained Restrooms
- Internet Hot-Spots
- Charging outlets for mobile devices
- First Aid Counter
- ATM / Postal Vending Kiosks
- Help for Physically Handicapped, Senior Citizens, Women with small children



Bulk Goods Transportation Facilities

The towns located around Bengaluru city are the growth centers and Commuter Rail is their smart life line for their regular commute, business trips, goods transport from and to their towns. Commuter Rail can facilitate goods transportation by having rakes for carrying bulk goods and products. A good example is Mumbai's local service, where each train has a special bogey exclusively for carrying bulk goods.



5.5 Optimized routing and consolidation

6 months

One of the key elements to make commuter rail a success, would be its ability to blend with other rapid interstate and slow passenger services. Close scrutiny reveals that some of the existing services could be brought under the ambit of commuter rail to avoid duplicate services and also to provide for optimal utilization of these services under a common umbrella as they serve the same catchment areas for the same purpose. Bringing these trains under the commuter rail authority would enable the authority to co-ordinate and plan last mile connections and other interchanges. A consolidation exercise in addition to improvement in areas where delays can be minimized by careful choice of tracks & platforms is needed.

The following 14 pairs of trains can effectively be rolled into the commuter rail umbrella as soon as the SPV gets started.

S/no	Train No	From Station	Dep	To Station	Arr.	Type of Train	Remarks
1	526SW	Bangalore City	7:00	Marikuppam	9:35	Passenger	Only 16 Kms extra & 5 more stations exists
2	530SW	Bangalore City	10:00	Bangarapet	12:05	Passenger	Pair for 529SW, wasting 20 minutes at Bangalore city
3	511SW	Bangalore City	12:20	Marikuppam	15:15	Passenger	Pair for 512SW, wasting 100 minutes at Bangalore city
4	532SW	Bangalore City	14:45	Bangarapet	16:25	Passenger	Pair for 531SW, wasting 15 minutes at Bangalore city
5	503SW	Bangalore Cantt.	15:00	Bangarapet	17:05	Passenger	
6	524SW	Bangalore City	18:05	Marikuppam	20:35	Passenger	Pair for 525SW, wasting 15 minutes at Bangalore city
7	6522	Bangalore City	19:35	Bangarapet	21:10	Express	
8	523SW	Marikuppam	6:20	Bangalore City	9:15	Passenger	Starting
9	529SW	Bangarapet	7:30	Bangalore City	9:30	Passenger	Starting
10	512SW	Marikuppam	8:00	Bangalore City	10:30	Passenger	Starting
11	502SW	Bangarapet	11:00	Bangalore Cantt.	13:00	Passenger	
12	531SW	Bangarapet	12:40	Bangalore City	14:25	Passenger	Pair for 530SW, wasting 30 minutes at Bangarapet Jn
13	525SW	Marikuppam	14:00	Bangalore City	17:00	Passenger	
14	6521	Bangarapet	21:40	Bangalore City	23:25	Express	Pair for 6522, wasting 20 minutes at Bangarapet Jn
15	551SW	Bangalore City	8:40	Chikballapur	10:50	Passenger	
16	595SW	Bangalore City	18:00	Chikballapur	19:55	Passenger	
17	596SW	Chikballapur	7:55	Bangalore City	9:45	Passenger	
18	552SW	Chikballapur	15:55	Bangalore City	18:00	Passenger	
19	YH-1	Yesvanthpur	6:20	Hosur	7:55	Passenger	
20	YH-2	Yesvanthpur	15:35	Hosur	17:05	Passenger	
21	YD-1	Yesvanthpur	10:40	Devanahalli	11:45	Passenger	
22	HY-1	Hosur	8:10	Yesvanthpur	9:50	Passenger	
23	HY-2	Hosur	17:45	Yesvanthpur	19:20	Passenger	
24	DY-1	Devanahalli	13:15	Yesvanthpur	14:35	Passenger	
25	221SW	Bangalore City	9:20	Tumkur	11:05	Passenger	
26	225SW	Bangalore City	13:35	Tumkur	15:25	Passenger	
27	226SW	Tumkur	15:50	Bangalore City	17:40	Passenger	
28	222SW	Tumkur	11:25	Bangalore City	13:15	Passenger	



5.6 New services & increased frequency

8 months

The economy of Bengaluru ranges from IT industries in Electronic city to Textile units in Doddballapur to Manufacturing in Tumkur, Bidadi & Kolar, all working in shifts. There is a need for commute during late hours for most of these workers. So an ideal commuter rail service has to start early at 5AM and run late night till 11PM. This means trains need to run for 18 hours a day with peak hours spread out in between.

The frequency of commuter rails hence needs to be one train every 30 minutes during peak hours and every hour during non peak hours. Assuming peak hour as 6 hours, split in the morning & evening, we would ideally need to have 24 services running in a day on each route. The peak hour services can consist of a few fast trains with limited stops to supplement the regular services.

Thus, the frequency needs to be increased to have at least 8 trains during peak hours on all routes immediately on commencement of services. This needs to gradually increase to up to 24 trains a day on each route as the necessary infrastructure is implemented. The frequency will be a key determinant of how people choose to use the service. A high frequency service will encourage people to reside in more distant places since they will have the means to travel to their destinations easily, regardless of the time of day.

PHASE 2

5.7 New Signaling system

12 months

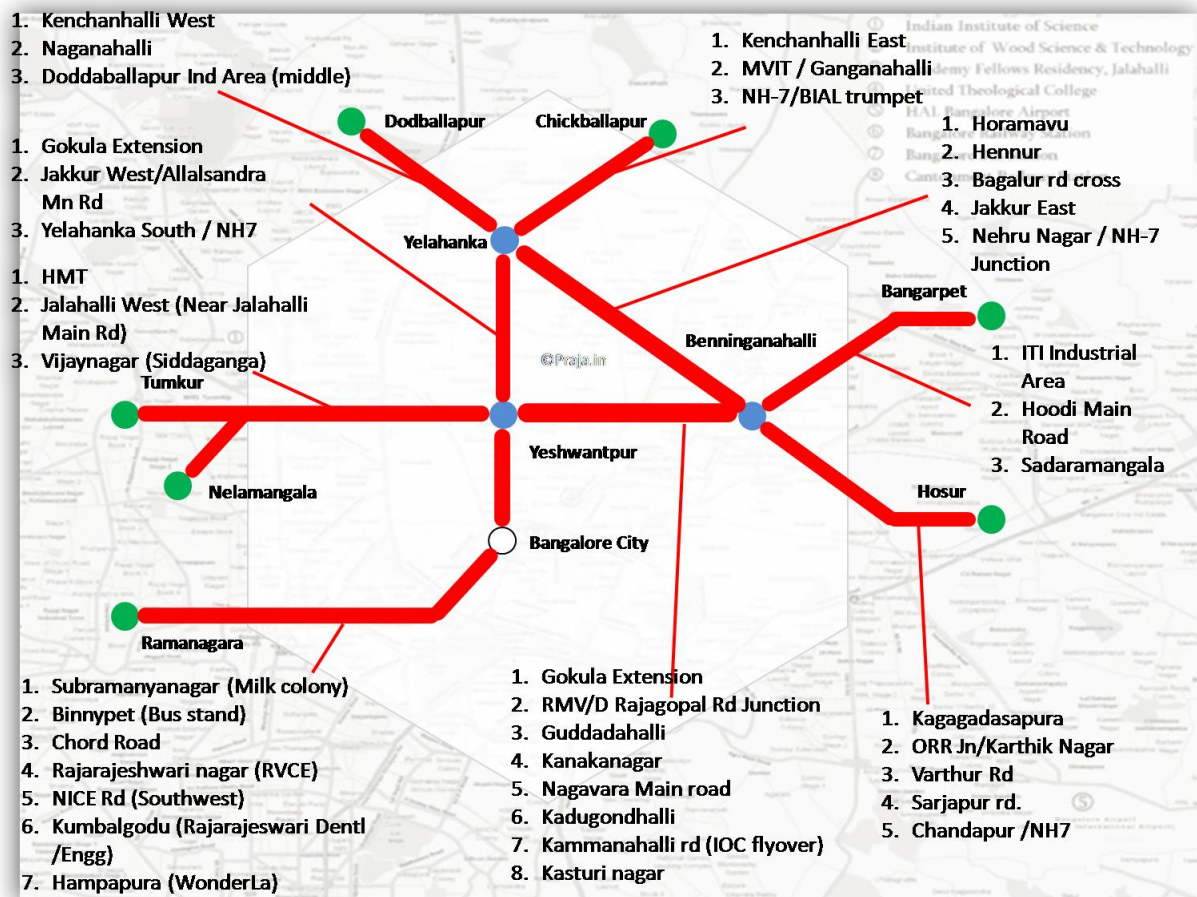
Indian railways prefer the block lengths to be 4 to 8 kms under normal circumstances. Railways need to reduce the block sizes on the commuter rail routes to increase track capacity. Increasing the number of stations is bound to create smaller block sizes. In cases where distances between stations are higher it is important that the commuter rail authority create Intermediate block sections to improve track utilization. Smaller blocks would mean more signals and coordination at each block. To ensure manual systems do not become a hurdle, negating the efficiencies gained in reducing the block sizes, the Commuter Rail authority needs to go in for Automated Block Signaling system for the tracks in scope. A more advanced Moving Block System can be considered to manage the block sizes dynamically and enable better management of train traffic.



5.8 New identified stations on all routes

18 months

As seen in section 3, Close to 33% of areas remain uncovered due to lack of stations. New stations are required to provide complete coverage. While the new stations that need to be created are listed in section 3 appropriate to each segment, the sketch below provides a consolidated listing of the same.



5.9 Doubling/Quadrupling & Electrification

18 months

73% of the tracks proposed in the commuter rail routes need Electrification.

49% of the total proposed length is single track. This needs doubling on urgent priority to enable bandwidth to run uninterrupted commuter rail operations.

Doubling of tracks is essential to increase frequency and provide uninterrupted flow to the commuter rail service. In fact, once frequency reaches a certain threshold quadrupling of tracks may be required.

The following table provides the status of doubling & electrification.

Electrification is essential to run EMU's and run other state of the art engines.



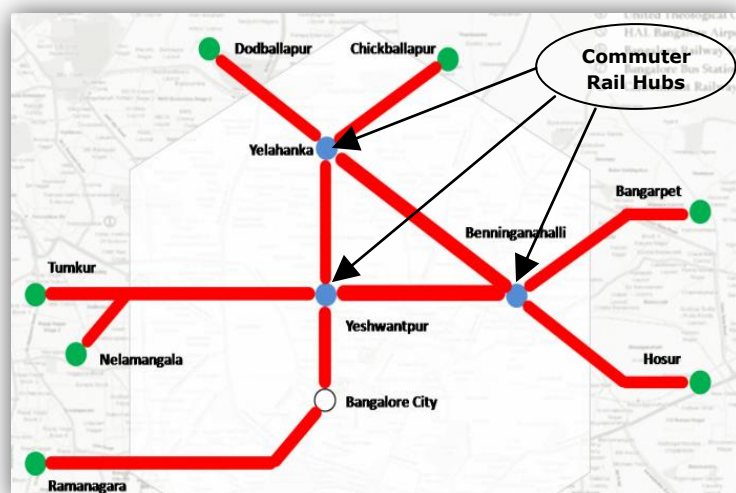
Segment	Distance in Kms	Doubling Needed?	Electrification Needed?	Status / Remarks
Yelahanka to Yesavnthpur	12.45	Yes	Done	Railway Budget Sanctioned, DPR is ready, Tenders to be called for doubling.
Yelahanka to K R Puram	15.80	Yes	Done	Railway Budget Sanctioned, DPR is ready, Tenders to be called for doubling.
Yelahanka to Chikballapur	46.05	Yes	Yes	
Yelahanka to Dodballapur	20.72	Yes	Yes	
Yesavnthpur to Banaswadi	14.76	Yes	Done	
Banaswadi to Hosur	51.36	Yes	Yes	
Banswadi to Baiyyappanahalli	4.47	Yes	Done	
Yesvanthpur to Soldevanhalli	10.78	No	Yes	
Soladevanhalli to Nelamngala & upto NH-4	8.00 / 10.00	Yes	Yes	
Soladevanhalli to Tumkur	53.22	No	Yes	
Kengeri to Ramanagaram	32.43	No	Yes	As part of Bangalore to Mysore Doubling & Electrification, this stretch electrification will be taken up.
Kengeri to Yesvantpur	19.00	No	Done	
Baiyyappanahalli to Bangarpet	60.00	No	Done	

As is clear from the table, doubling & quadrupling of tracks for a distance of 43 Kms (segments Yelahanka-Yeshwanthpur, Yelahanka-KRPuram and Yeswanthpur-Banaswadi) is very critical for operation of commuter rail.

5.10 Enhance Hubs

24 months

The commuter rail hubs indicated in blue spots in the figure will form important interchanges for changing directions from one commuter train to the other. It will have multiple platforms and inter connectivity with other modes of transport like bus, metro, mono, HSRL etc. These hubs need to be enhanced to international standards to enable seamless connectivity between multiple modes.





Yeshwantpur - Commuter Rail West Hub

Yeshwantpur is an important junction at the north-west end of the city for Commuter Rail. This station is being enhanced to become a multimodal interchange to allow for metro and bus interchanges. The commuter rail needs to use this as a hub and provide appropriate facilities.

Benninganahalli - Commuter Rail East Hub

Old Madras Road (SV road) is a key traffic corridor in the east that connects NH4 towards Kolar, Whitefield road towards ITPL, EPIP and other industrial areas. It also connects the eastern stretch of the busy outer ring road. This makes it imperative for Commuter Rail to make a stop at this location. There are two options in this regard. One is to build a station at Benninganahalli and the other is to use Byappanahalli.

The option of building a multi level station at Benninganahalli is attractive as it can be made a dedicated commuter rail hub station. The upper level will serve the Yeshwantpur-Hosur route and the lower perpendicular station will serve the City-Bangarpet section.

The other option is to route the Commuter trains coming from Yeshwantpur past the byappanahalli goods yard towards Byappanahalli station. This allows the commuter trains to use the facilities and interchanges being built at Byappanahalli. The drawbacks of this option are:

- Trains from Yelahanka towards Bangarpet will have to bypass Byappanahalli and stop at Krishnarajapuram instead.
- Since Byappanahalli also serves intercity trains to the city currently, the available bandwidth needs to be managed so that it doesn't interfere with the operation of frequent commuter trains.

Yelahanka - Commuter Rail North Hub

With trains from Yeswantpur towards Chickballapur & from Byappanahalli towards Dodballapur converging here, Yelahanka is well positioned to be the North Hub for Commuter Rail. It serves major industrial regions of ITIR, DBP, BIA & Dodballapur. With a stop planned for HSRL, this station needs to be developed into a multifunctional hub and taken up on the lines of Yeswantpur & Byappanahalli.



5.11 Complete integration

24 months

The commuter rail complements the metro and other forms of city transport. If the commuter rail is seamlessly integrated with other modes of transport, it can feed the Metro /Mono /BMTC with a good number of commuters from the suburbs who can then reach the interior parts of the city with these systems.

This integration will include facilities like disabled friendly ramps, walkways, travelators, escalators and subways directly to those terminals so that uninterrupted access between different modes is available.

Metro Connection

Fortunately, Namma Metro intersects the IR routes at many places in the city. Commuter Rail needs to be integrated with Namma Metro at these locations, i.e provide easy interchange facilities. Some of the locations that can provide easy transit include: Yeshwantpur, Benninganahalli, Kengeri & Whitefield.

HSRL Connection

Exclusive connectivity to the new airport via high speed rail when it becomes operational will also provide the opportunity for Commuter Rail to integrate with HSRL, thereby providing commuters from the nearby towns another PT connection to reach the new airport and vice versa. Interchanges with HSRL need to be provided at both, Yelahanka and Hebbal.

Fare Tickets / Smart Cards

The Railways vision plan also mentions *"Distribution channels for railway tickets would be constantly innovated so that obtaining a railway ticket is completely hassle-free. PRS/UTS terminals, e-ticket services, tickets through post offices, ATMs, petrol pumps and smart-card based tickets for unreserved travel would be expanded to improve access. New and emerging technologies will be harnessed towards this end"*



- Fare Tickets/Smart Cards Vending Kiosks (Self Service)
- Fare Tickets/Smart Cards Vending Counters (Manned)

Common ticketing system between Commuter Rail Service, Metro & BMTC must be developed.



6. Highlights

35 new proposed stations

160 is the possible number of services per day on all routes suggested for optimum efficiency

376 Kilometers is the approximate distance covered by the proposed routes

1,50,000 is the carrying capacity per day with current train sizes to start with, which can be increased by adding rake capacity

45,00,000 is the number of people in the catchment areas covered by the current SWR tracks

33% is the percentage of the population in the catchment areas who need access to a local station

2010 is the year for Commuter Rail in Bengaluru

SPV is the way to go for rolling out commuter services with all stakeholders being a part of this entity working together to make this a success



7. Glossary

ABS	Automated Block Signaling
BBMP	Bruhat Bengaluru Mahanagara Palike
BCRAL	Bengaluru Commuter Rail Authority Limited
BIA	Bengaluru International Airport
BMLTA	Bengaluru Metropolitan Land Transport Authority
BMRC	Bengaluru Metro Rail Corporation
BMRDA	Bengaluru Metropolitan Region Development Authority
BMTC	Bengaluru Metropolitan Transport Corporation
CTTP	Comprehensive Traffic and Transport Plan
DBP	Devanahalli Business Park
DEMU	Diesel Electric Multiple Unit
EMU	Electric Multiple Unit
EPIP	Export Promotion Industrial Park
GoK	Government of Karnataka
HSRL	High Speed Rail Link
IDD	Infrastructure Development Department
IR	Indian Railways
ITIR	Information Technology Investment Region
ITPL	Information Technology park Ltd
KIADB	Karnataka Industrial Areas Development Board
KUIFDC	Karnataka Urban Infrastructure Development Corporation
MEMU	Mainline Electric Multiple Unit
MTS	Multi Modal Transport System
MRVC	Mumbai Rail Vikas Corporation
O&M	Operations & Maintenance
ORR	Outer Ring Road
PT	Public Transport
RITES	Rail India Technical and Economic Society
ROB	Road Over Bridge
RUB	Road Under Bridge
RVNL	Rail Vikas Nigam Ltd
SPV	Special Purpose Vehicle
SWR	South Western Railway



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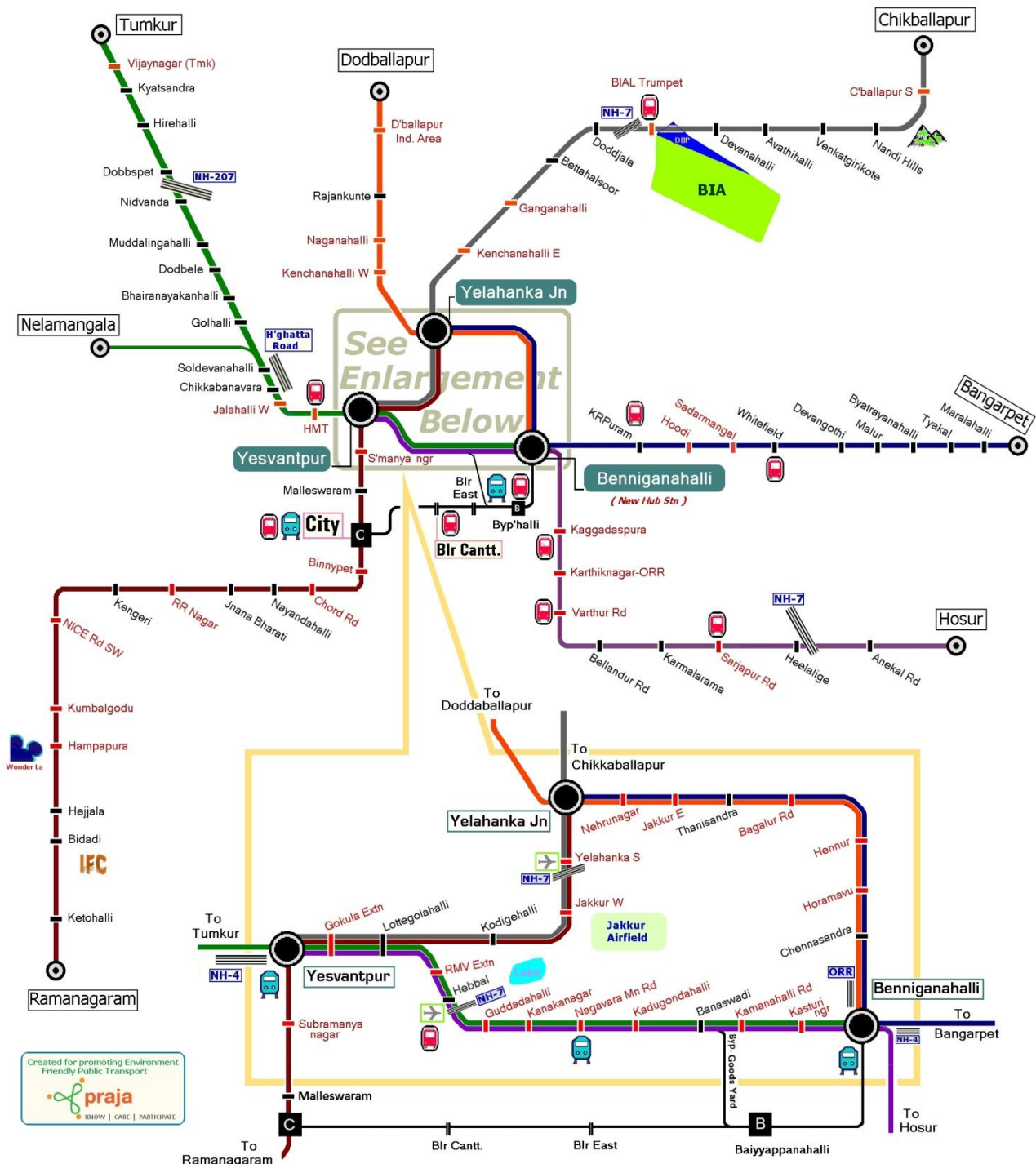
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9. Network Map

Bengaluru Commuter Rail Network



Legend

	Commuter Rail Hub Station		Intermediate (Existing) Station		Interchange to Metro Train
	Inter-City Train Terminals		Proposed / New Station		Interchange to Bus
	Commuter Train Terminal Stn		Important Highway / Road Crossing		Interchange to Airport Hi-speed Train

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