

# **Route Rationalization and Feeder Route Planning for Ahmedabad BRTS**

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**Ahmedabad**

# Project Outline

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## ➤ **Study of Existing network**

- BRTS Network
- Low Footfall stations
- Revenue Growth

## ➤ **Planning of routes with better frequencies**

- New Route planning with better frequencies

## ➤ **Feeder Route planning**

- Identification of new feeder routes based on the demand analysis
- Route planning and catchment area
- Network planning
- Depot planning and management

## ➤ **Implementation**

- Strategy to implement

## ➤ **Expected Revenue and alternative sources of revenue**

## ➤ **Expected Outcomes**

# Ahmedabad City

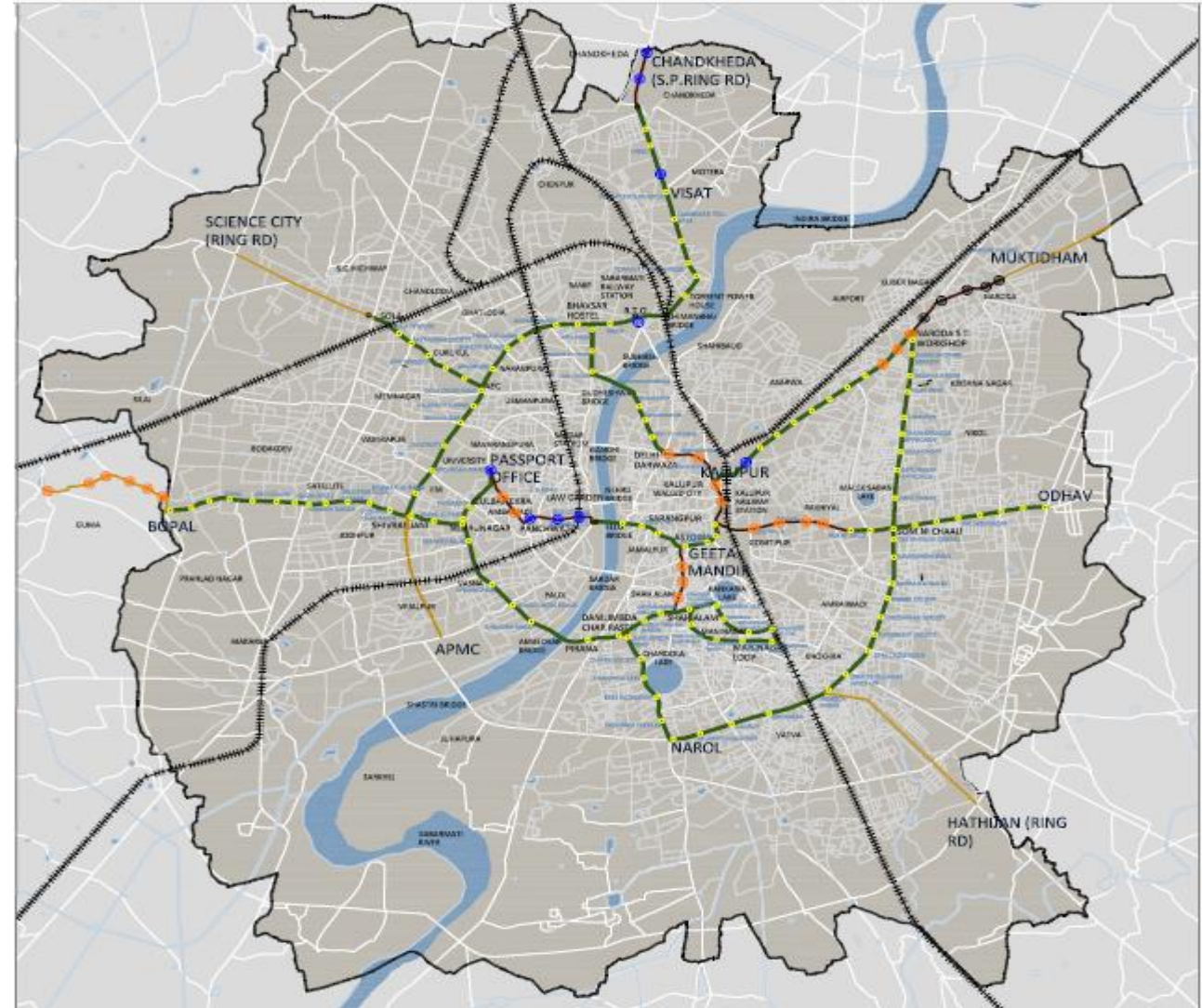
## ➤ Two System for Ahmedabad City

### ➤ AMTS

- Buses on Road - 670. (October, 2019)
- Fleet Utilization – 82%
- Avg. daily Run KMs - 1.28 lacs
- Avg. daily Ridership – 5.57 lacs
- Avg. daily Revenue - Rs. 27.22 Lacs

### ➤ BRTS

- Buses on Road - 236. (October, 2019)
- Fleet Utilization – 93%
- Avg. daily Run KMs - 0.49 lacs
- Avg. daily Ridership – 1.57 lacs
- Avg. daily Revenue - Rs. 19.57 Lacs





# ***BRTS CCC with real time vehicle tracking and CCTV monitoring of stations and corridor***



# Impact of Route Rationalization

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Before Use of Technology (Manual Planning)		After technological Intervention	
Route	All 13 Routes	All 13 Routes	Impact
Scheduled Km per Day	54421.68	49751.68	3670 Km saving on daily basis
Ridership	1.32 lacs	1.57	Increase of 22000 commuters

## Steps Taken:

- Minimized overlapping of routes and rearranged headways
- Restructuring the routes to minimize dead kms (From around 4200 kms to 2050 kms)
- Better frequencies arranged in peak hours

With the approximate Savings of Rs. 60 lacs per month, Ridership has increased by 6.6 lacs per month

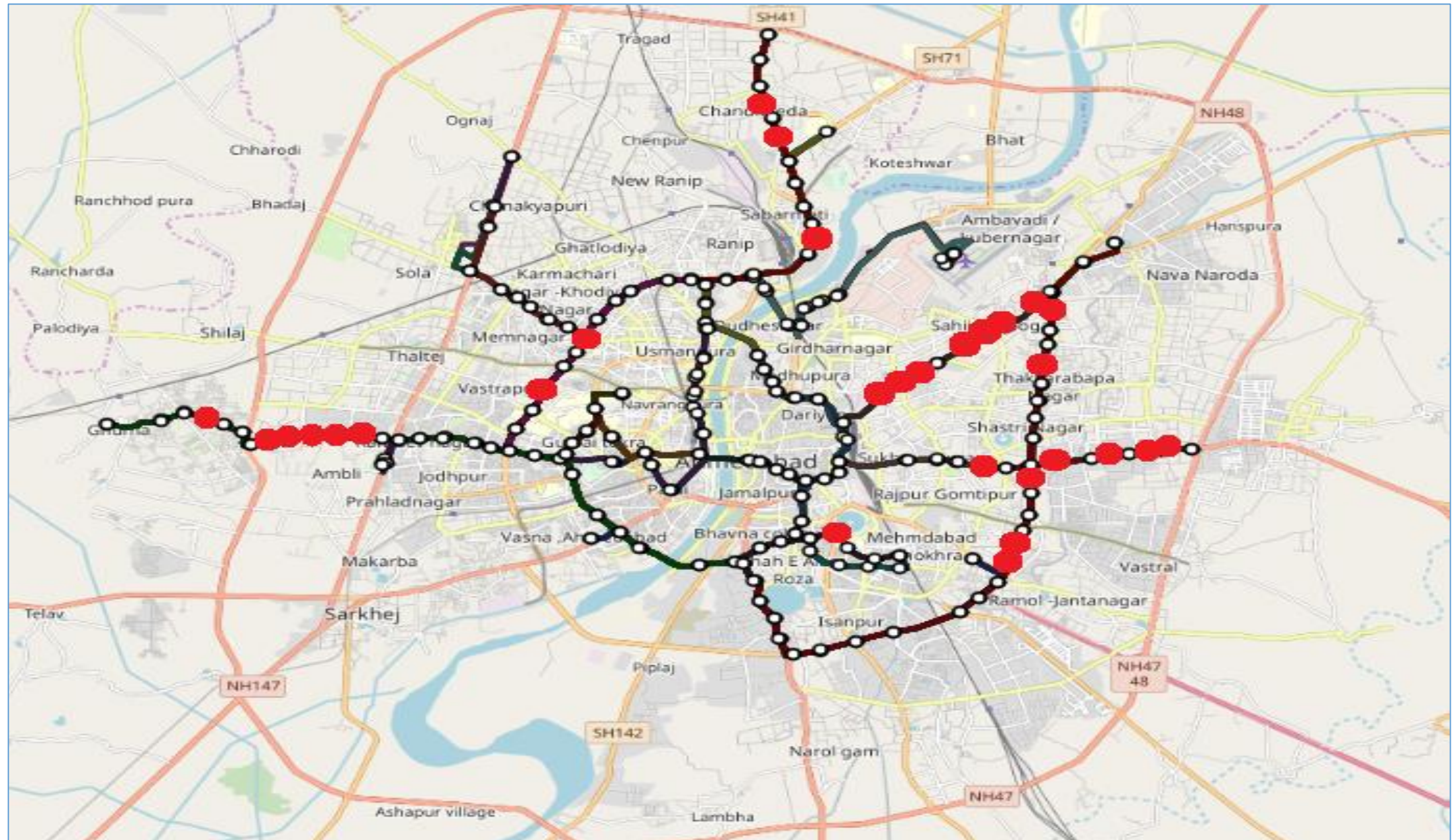
# Challenges

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- Majority of fleet is being replaced by upcoming 300 midi electric buses
  - Current Fleet Size: 255
  - Older buses to be removed: 77
  - Addition of new buses: 100
- Steady ridership growth observed in last 6 months which requires better route planning
- Identification of new feeder routes
- Fare policy for feeder route
- Depot locations are to be finalized
- Electric infrastructure requirement

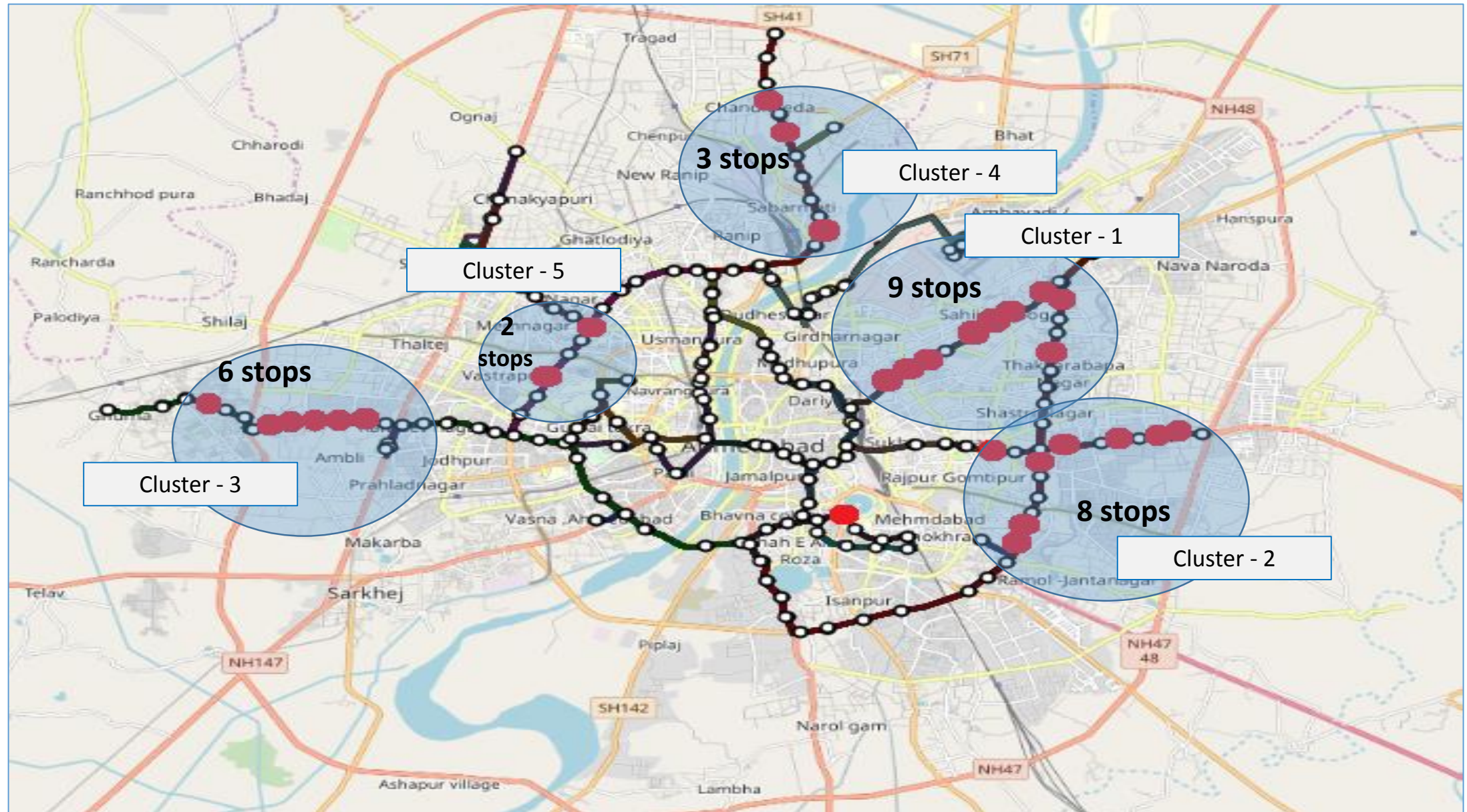


## Low Footfall Stations (Three Months Data – Boarding of 100 to 250 passengers per day)



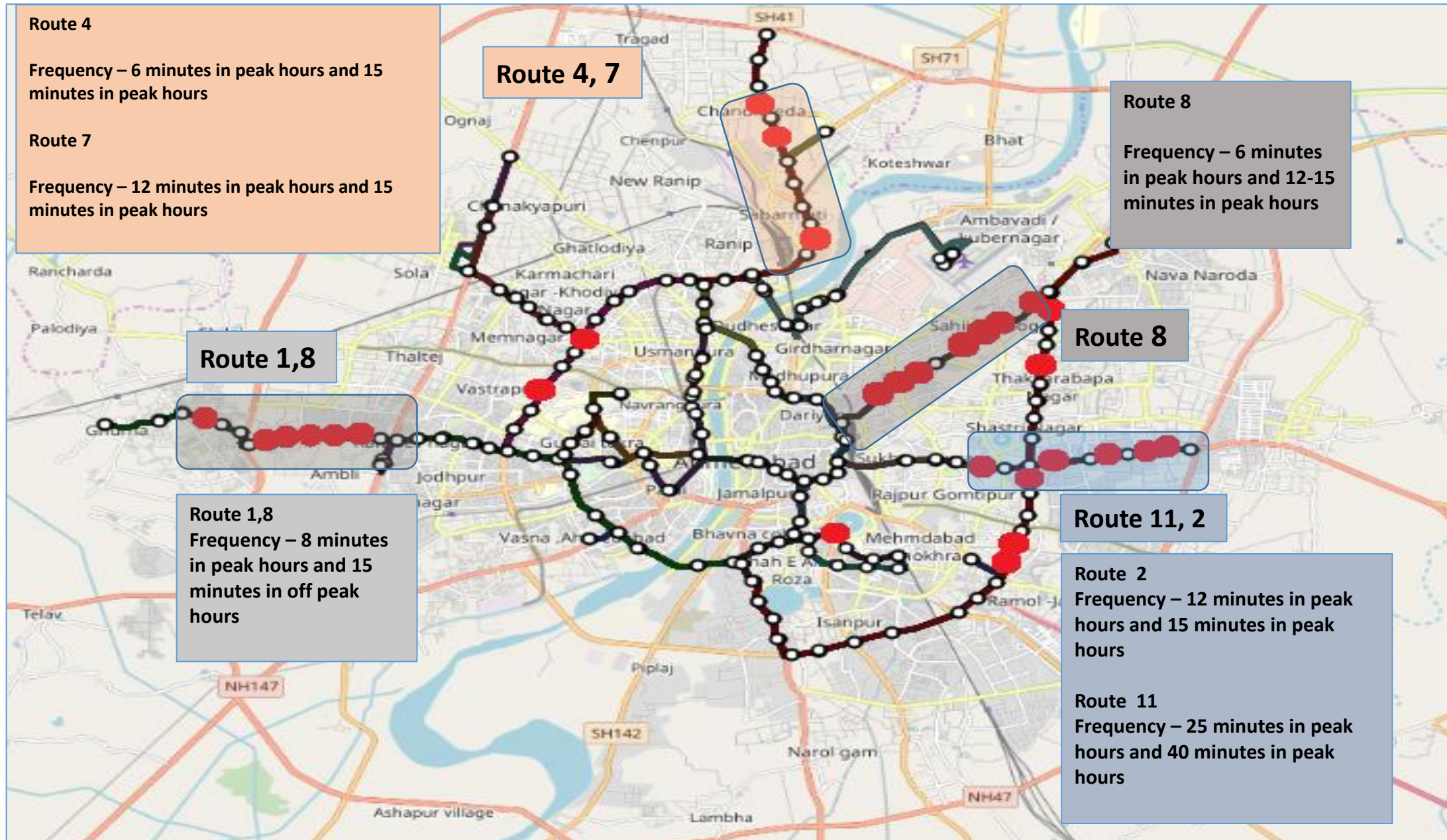


# Low Footfall Stations



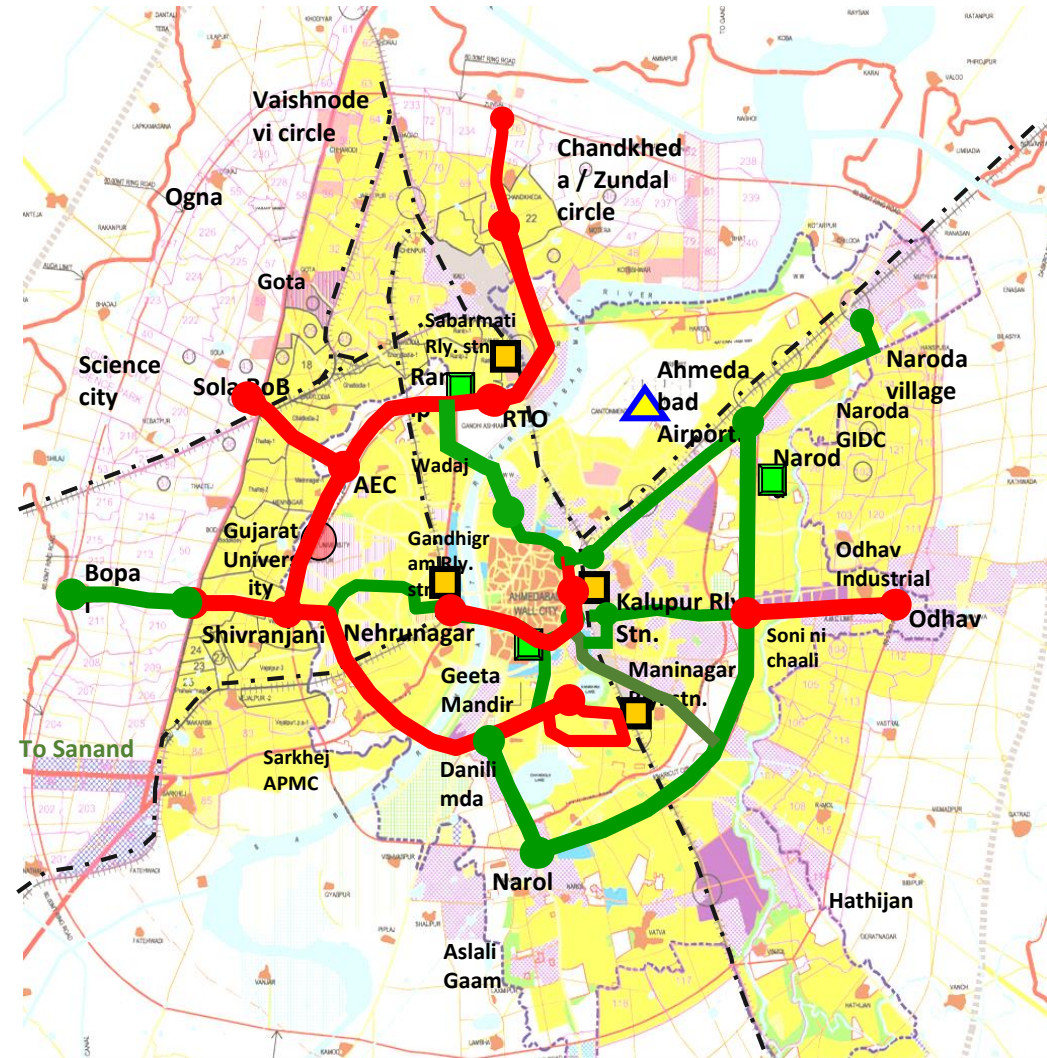


## Low Footfall Stations

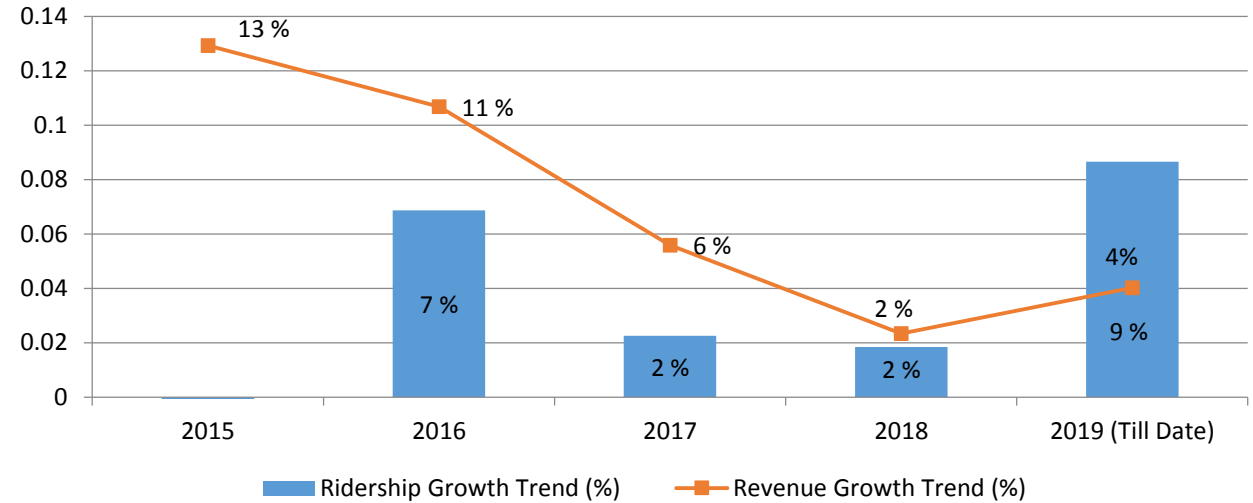




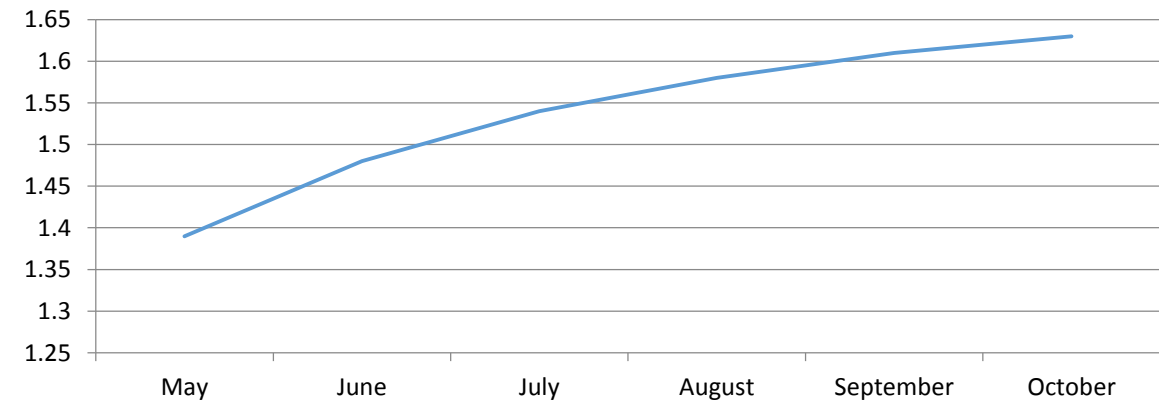
# Ridership Growth



## Ridership & Revenue Growth Trend



## Avg. Ridership (in Lacs) per day



Ridership Growth is steady since past 6 months due to various initiatives of Government which needs better planning of existing frequencies

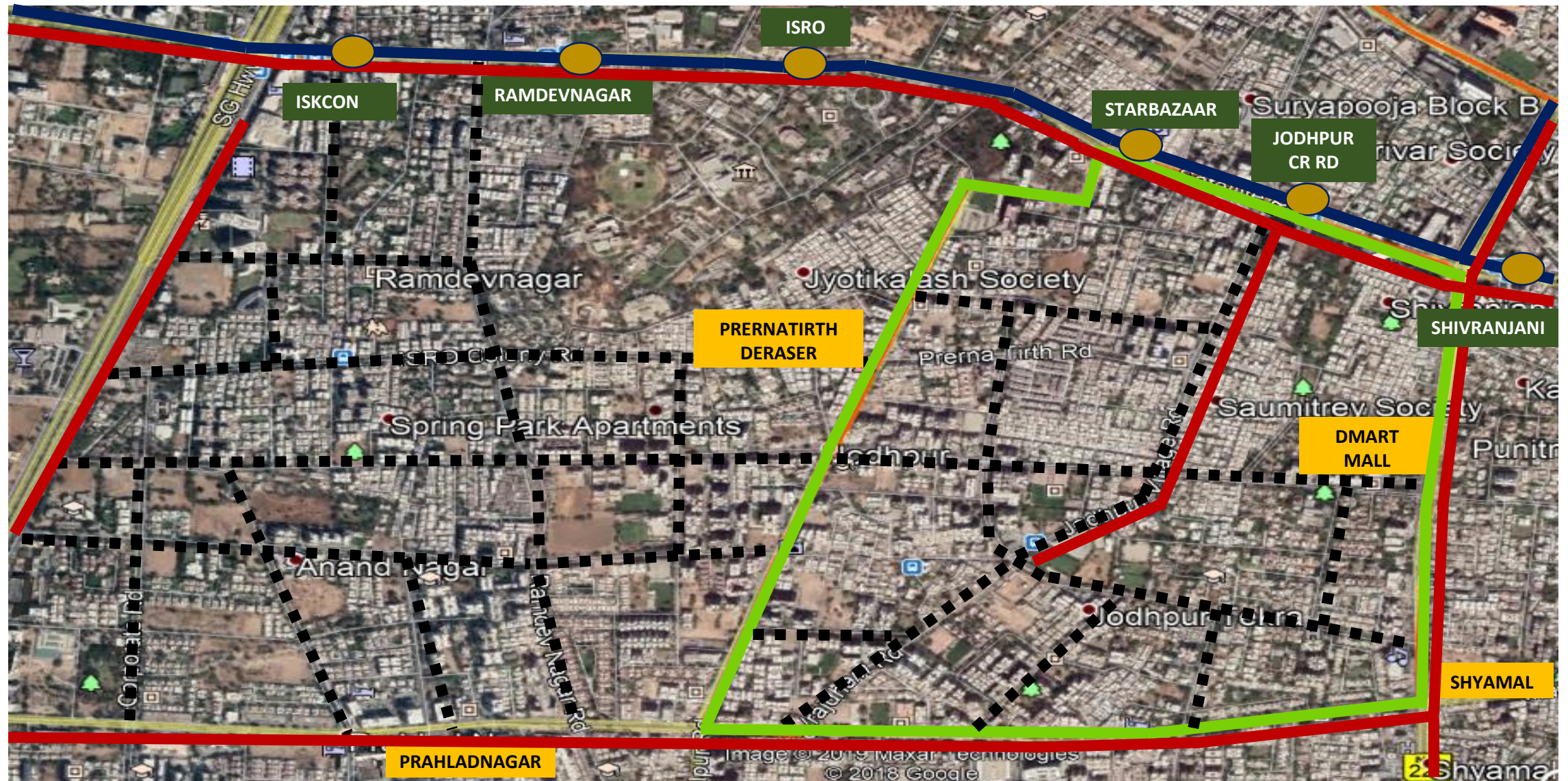
# Requirement of Additional Buses in Existing BRTS Routes

	Route - 1	Route -2	Route -3	Route - 4	Route - 5	Route - 6	Route -7	Route - 8	Route - 9	Route - 101	Route - 201	Route - 11	Route - 12	Route – 14
Route Name	(Maninagar – Ghuma Gam)	(Bhadaj Circle – SP Ring Rd)	(Maninagar – RTO Circle)	(LD Engg College – DCIS Circle)	(Vasna – Naroda Gam)	(Narol – Naroda ST Wrshp)	(Narol – DCIS Circle)	(Iskcon – Naroda Gam)	(Maninagar – Gota Cross Road)	(RTO Circle – Circular )	(RTO Circle – Anti Circular )	(LD Engg College – SP Ring Rd)	(CTM Cr Rd – RTO Circle)	(Vasna – Kalupur – Naroda Gam)
Avg Route Distance	21 km	25 km	19 km	20 km	23 km	14 km	27 km	23 km	25 km	27 km	27 km	15 km	23 km	17.7 km
Existing Buses	27	22	24	25	16	6	16	23	19	9	9	10	20	10
Avg Existing Frequency	10 minutes	12 minutes	10 minutes	9 minutes	12 minutes	25 minutes	15 minutes	10 minutes	12 minutes	15 minutes	15 minutes	15 minutes	11 minutes	14 minutes
Avg Existing Km per Bus	210 km	220 km	220 km	210 km	240 km	225 km	220 km	200 km	215 km	250	250	210 Km	230 km	220 km
Proposed no of Buses	39	33	31	30	33	22	33	38	33	22	22	20	34	23
Avg Proposed Frequency	7 minutes	8 minutes	7 minutes	7 minutes	8 minutes	8 minutes	7 minutes	7 minutes	8 minutes	8 minutes	8 minutes	8 minutes	8 minutes	8 minutes
Avg Proposed Km per Bus	200 km	200 km	200 km	200 km	200 km	200 km	210 km	200 km	210 km	200 km	200 km	200 km	200 km	200 km
Requirement of additional Buses	12	11	7	5	17	16	17	15	14	13	13	10	14	13

Total **177** additional Buses are required to be operated along with the existing schedule of **236** Buses which will make a total of **413** Buses



# Feeder – 1 (Circular Route) (Shivranjani – Shyamal – Anand Nagar – Prernatirth – Startbazaar – Jodhpur – Shivranjani)



● BRTS Existing Bus Stop    ■ BRTS Existing Corridor    ■ Proposed Feeder    ■ Internal Roads    ■ AMTS Routes



# Feeder – 1 (Circular Route) (Shivranjani – Shyamal – Anand Nagar – Prernatirth – Start bazaar – Jodhpur – Shivranjani)

Factors	Data	Remarks
Route Length	5 km	Circular route length
Area covered	1.53 Square Km	Total area will be catered by the service
Journey Time	20 Minutes	One complete circular journey time
Trip Cycle	15 + 5 (Buffer Time) = 20 Minutes	One trip cycle time
Number of Buses	4	Number of Buses required
Peak Hour Headway	5 - 6 Minutes	Headway will be around 5 to 6 minutes throughout the day
Trips	192 Circular Trips (48 trips per Bus (1 <sup>st</sup> Shift = 24 Trips, 2 <sup>nd</sup> Shift = 24 Trips))	Total 192 trips can be performed through out the day
Total Km	960 KMs	Commercial KMs would be around 720
Bus Capacity (Passengers trips) (55) (Seating + Standee)	6,336	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	52,800	Fixing 5 INR for the Journey
Expense (45 INR per km)	43,200	At 45 INR per km





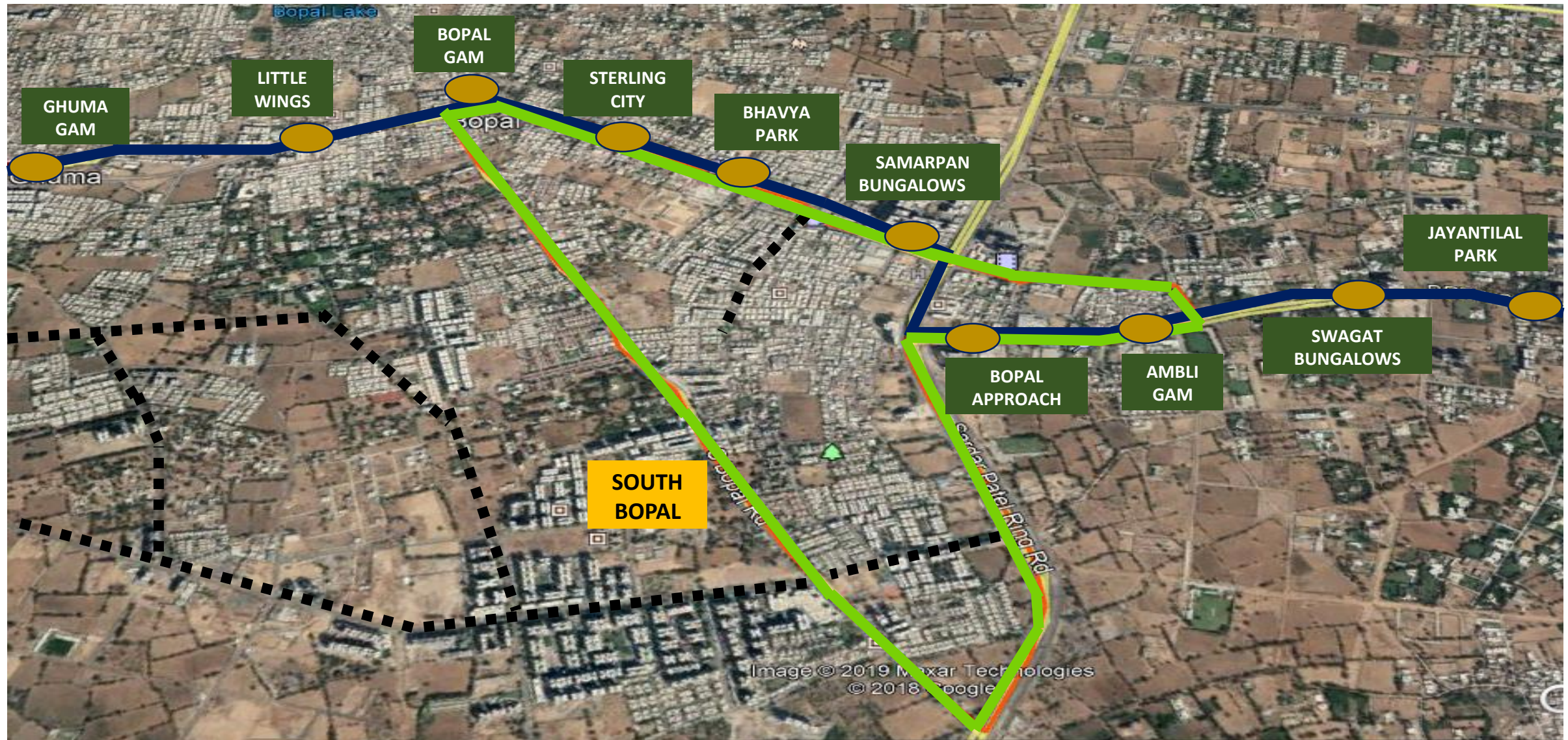


# Feeder – 2 (Anti - Circular Route) (Starbazaar – Prernatirth – Prahladnagar – Karnavati Club – ISKCON – ISRO - Starbazaar )

Factors	Data	Remarks
Route Length	7 km	Circular route length
Area covered	1.48 Square Km	Total area will be catered by the service
Journey Time	25 Minutes	One complete circular journey time
Trip Cycle	20 + 5 (Buffer Time) = 25 Minutes	One trip cycle time
Number of Buses	5	Number of Buses required.
Peak Hour Headway	5 - 6 Minutes	Headway will be around 5 to 6 minutes throughout the day
Trips	152 Circular Trips (38 trips per Bus)	Total 152 trips can be performed throughout the day
Total Km	1064 KMs	Commercial KMs would be around 1064
Bus Capacity (Passengers trips) (55 Seating + Standee)	5,016	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	41,800	Fixing 5 INR for the Journey
Expense (45 INR per km)	47,880	Assuming 45 INR per km for Payment



# Feeder – 3 (Circular Route) (Ambli Gam – Bopal Gam – South Bopal – Samarpan Bungalows – Ambli Gam)



● BRTS Existing Bus Stop    — BRTS Existing Corridor    — Proposed Feeder    - - - - Internal Roads

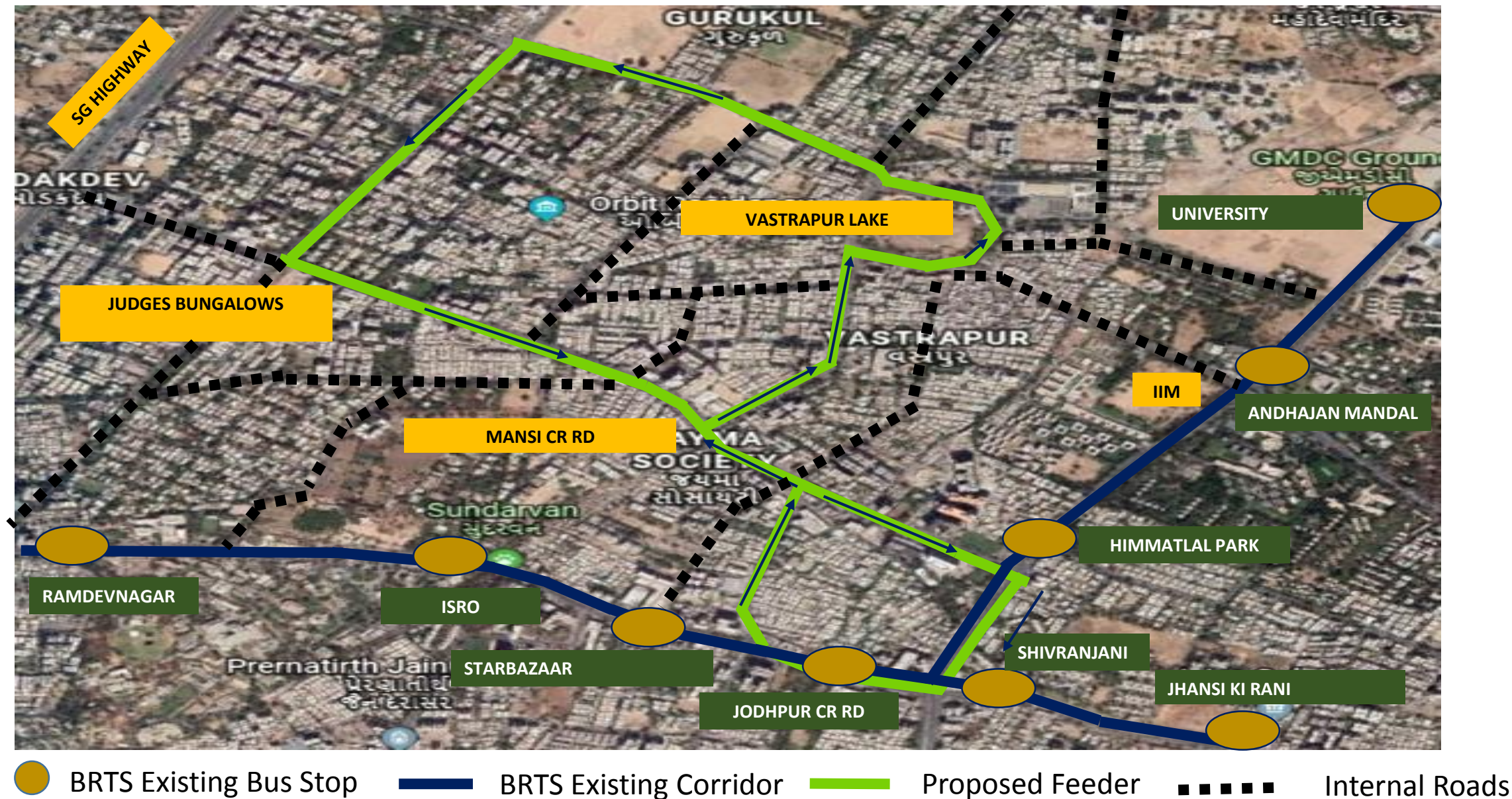


## Feeder – 3 (Circular Route) (Ambli Gam – Bopal Gam – South Bopal – Samarpan Bungalows – Ambli Gam)

Factors	Data	Remarks
Route Length	7 km	Circular route length
Area covered	1.6 Square Km	Total area will be catered by the service
Journey Time	25 Minutes	One complete circular journey time
Trip Cycle	20 + 5 (Buffer Time) = 25 Minutes	One trip cycle time
Number of Buses	4	Number of Buses required.
Peak Hour Headway	6-7 Minutes	Headway will be around 6 to 7 minutes throughout the day
Trips	152 Circular Trips (38 trips per Bus)	Total 152 trips can be performed throughout the day
Total Km	1064 KMs	Commercial KMs would be around 1064
Bus Capacity (Passengers trips) (55 Seating + Standee)	5,016	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	41,800	Fixing 5 INR for the Journey
Expense (45 INR per km)	47,880	Assuming 45 INR per km for Payment



Feeder – 4 (Circular Route) (Shivranjani – Jodhpur Cr Rd – Mansi Circle – Judges Bungalows – Vastrapur Lake – Mansi Circle – Himmatlal Park – Shivranjani)



## Feeder – 4 (Circular Route) (Shivranjani – Jodhpur Cr Rd – Mansi Circle – Judges Bungalows – Vastrapur Lake – Mansi Circle – Himmatlal Park – Shivranjani)

Factors	Data	Remarks
Route Length	6.8 km	Circular route length
Area covered	0.73 Square Km	Total area will be catered by the service
Journey Time	35 Minutes	One complete circular journey time
Trip Cycle	27 + 8 (Buffer Time) = 35 Minutes	One trip cycle time
Number of Buses	7	Number of Buses required.
Peak Hour Headway	5-6 Minutes	Headway will be around 5 to 6 minutes throughout the day
Trips	182 Circular Trips (26 trips per Bus)	Total 182 trips can be performed throughout the day
Total Km	1237 KMs	Commercial KMs would be around 1237
Bus Capacity (Passengers trips) (55 Seating + Standee)	6,006	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	50,050	Fixing 5 INR for the Journey
Expense (45 INR per km)	55,692	Assuming 45 INR per km for Payment



# Feeder – 5 (Nehrunagar – Ambawadi – Central Mall - Panchvati – Law Garden – Parimal Garden – Mahalaxmi Cr Rd – Paldi Cr Rd)



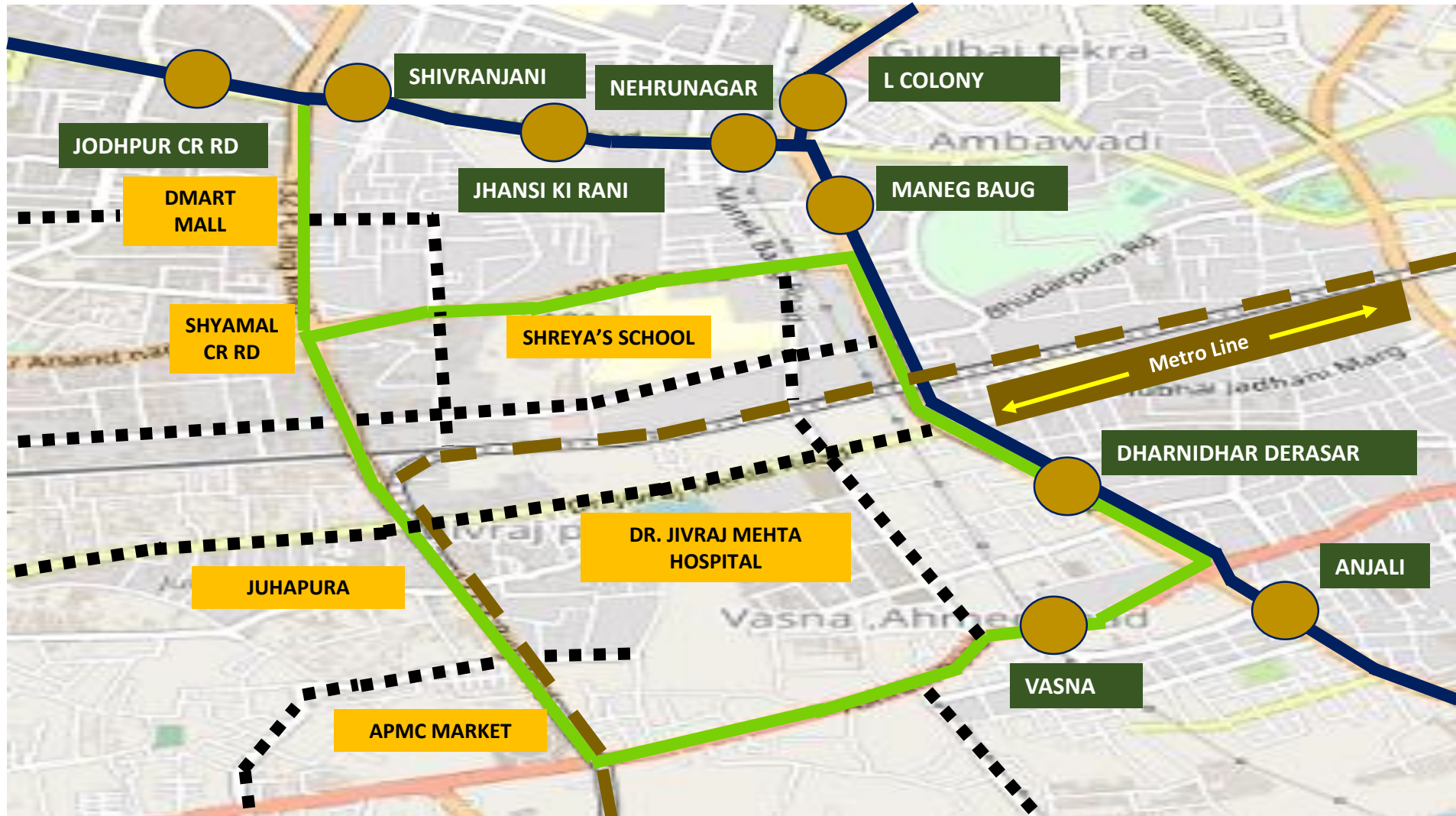
● BRTS Existing Bus Stop    — BRTS Existing Corridor    — Proposed Feeder    - - - - Internal Roads



## Feeder – 5 (Nehrunagar – Ambawadi – Central Mall - Panchvati – Law Garden – Parimal Garden – Mahalaxmi Cr Rd – Paldi Cr Rd)

Factors	Data	Remarks
Route Length	4.3 km	Route length
Journey Time	25 Minutes	One complete journey time
Trip Cycle	17 + 8 (Buffer Time) = 25 Minutes	One trip cycle time
Number of Buses	10	Number of Buses required.
Peak Hour Headway	5 Minutes	Headway will be around 5 to 6 minutes throughout the day
Trips	380 Trips (38 trips per Bus)	Total trips can be performed through out the day
Total Km	1,634 KMs	Commercial KMs would be around 1634 km
Bus Capacity (Passengers trips) (55 Seating + Standee)	12,540	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	1,04,500	Fixing 5 INR for the Journey
Expense (45 INR per km)	73,530	Assuming 45 INR per km for Payment

# Feeder – 6 (Shivranjani – Shyamal – Rajivnagar – APMC – Vasna – Dharnidhar Derasar – Manegbaug – Shyamal - Shivranjani)



● BRTS Existing Bus Stop    — BRTS Existing Corridor    — Proposed Feeder    - - - - Internal Roads



## Feeder – 6 (Shivranjani – Shyamal – Rajivnagar – APMC – Vasna – Dharnidhar Derasar – Manegbaug – Shyamal - Shivranjani)

Factors	Data	Remarks
Route Length	9.3 km	Route length
Journey Time	Minutes	One complete circular journey time
Trip Cycle	38 + 7 (Buffer Time) = 45 Minutes	One trip cycle time
Number of Buses	9	Number of Buses required.
Peak Hour Headway	5 Minutes	Headway will be around 5 to 6 minutes throughout the day
Trips	198 Trips (22 trips per Bus)	Total 198 Circular trips can be performed through out the day
Total Km	1842 KMs	Commercial KMs would be around 1842
Bus Capacity (Passengers trips) (55 Seating + Standee)	6,534	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	54,450	Fixing 5 INR for the Journey
Expense (45 INR per km)	82,863	Assuming 45 INR per km for Payment

# Feeder – 7 (R.T.O Circle – Sabarmati Ashram – Juna Vadaj - Usmanpura – Vijay Char Rasta – Commerce six roads – Xavier’s College – LD Engg College)





# Feeder – 7 (R.T.O Circle – Sabarmati Ashram – Juna Vadaj - Usmanpura – Vijay Char Rasta – Commerce six roads – Xavier’s College – LD Engg College)

Factors	Data	Remarks
Route Length	8 km	Route length
Journey Time	40 Minutes	One complete journey time
Trip Cycle	32 + 7 (Buffer Time) = 40 Minutes	One trip cycle time
Number of Buses	16	Number of Buses required.
Peak Hour Headway	5 Minutes	Headway will be around 5 to 6 minutes throughout the day
Trips	384 Trips (24 trips per Bus)	Total 384 trips can be performed throughout the day
Total Km	3072 KMs	Commercial KMs would be around 1536
Bus Capacity (Passengers trips) (55 Seating + Standee)	12,672	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	1,05,600	Fixing 5 INR for the Journey
Expense (45 INR per km)	1,38,240	Assuming 45 INR per km for Payment

## Feeder – 8 ( Narol Circle – Narol Gam – New Maninagar – Lambha Gam – Lambha lake)



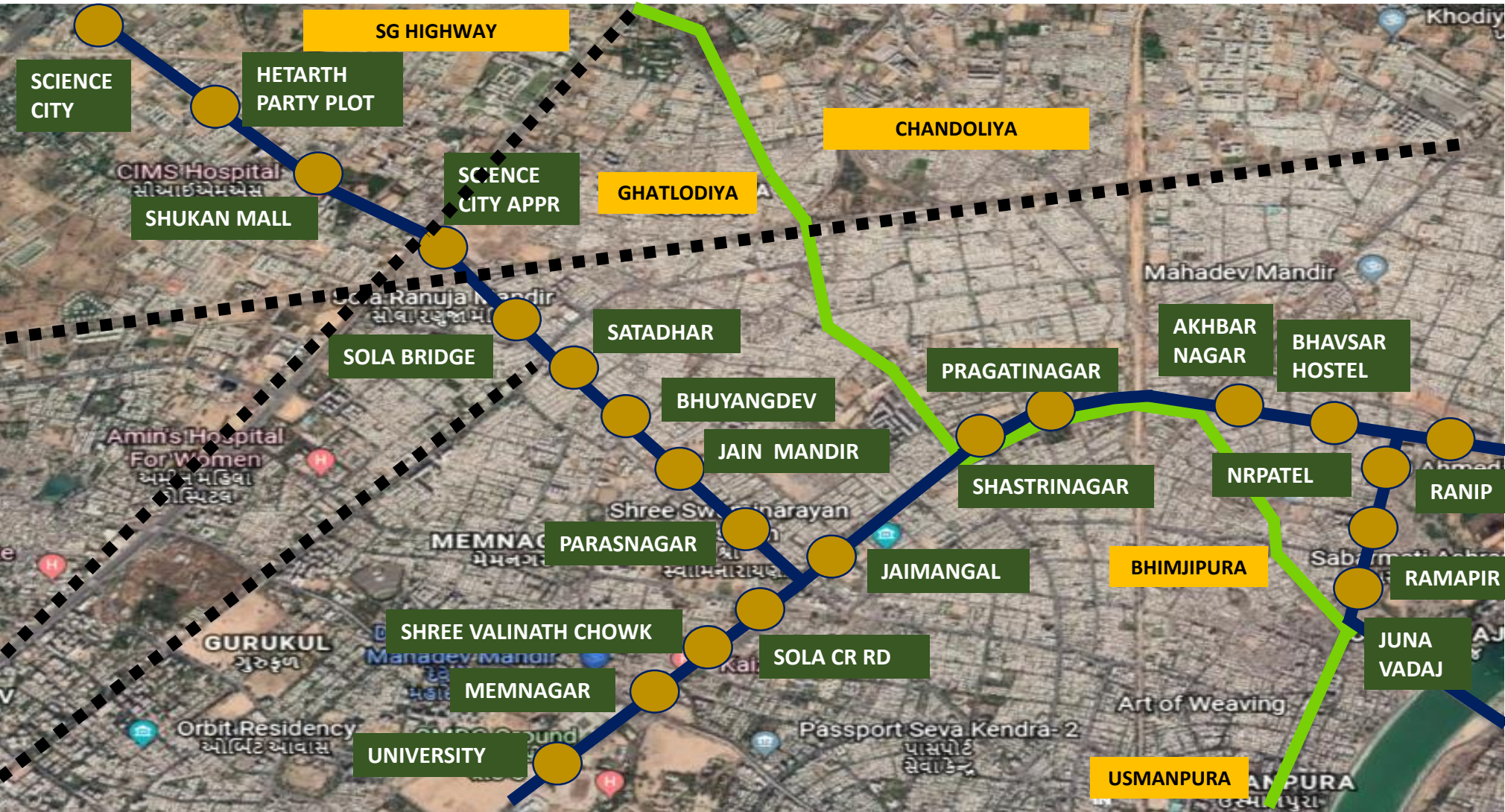
- BRTS Existing Bus Stop    — BRTS Existing Corridor    — Proposed Feeder    - - - - Internal Roads



## Feeder – 8 ( Narol Circle – Narol Gam – New Maninagar – Lambha Gam – Lambha lake)

Factors	Data	Remarks
Route Length	5 km	Route length
Journey Time	15 Minutes	One complete journey time
Trip Cycle	15 + 5 (Buffer Time) = 20 Minutes	One trip cycle time
Number of Buses	7	Number of Buses required.
Peak Hour Headway	8 Minutes	Headway will be around 8 minutes throughout the day
Trips	280 Trips ( 40 trips per Bus)	Total 280 trips can be performed throughout the day
Total Km	1400 KMs	Commercial KMs would be around 1400
Bus Capacity (Passengers trips) (55 Seating + Standee)	9,240	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	77,000	Fixing 5 INR for the Journey
Expense (45 INR per km)	63,000	Assuming 45 INR per km for Payment

Feeder – 9 (Usmanpura – Juna vadaj – Bhimjipura – Akhbarnagar – Pragatinagar – Ghatlodiya – Chandoliya – Sola Civil Hospital)



● BRTS Existing Bus Stop    — BRTS Existing Corridor    — Proposed Feeder    - - - Major Roads



## Feeder – 9 (Usmanpura – Juna vadaj – Bhimjipura – Akhbarnagar – Pragatinagar – Ghatlodiya – Chandoliya – Sola Civil Hospital)

Factors	Data	Remarks
Route Length	7.7 km	Route length
Journey Time	30 Minutes	One complete journey time
Trip Cycle	30 + 5 (Buffer Time) = 35 Minutes	One trip cycle time
Number of Buses	10	Number of Buses required.
Headway	8 Minutes	Headway will be around 8 minutes throughout the day
Trips	250 Trips ( 25 trips per Bus)	Total 250 trips can be performed throughout the day
Total Km	1,925 KMs	Commercial KMs would be around 1925
Bus Capacity (Passengers trips) (55 Seating + Standee)	8,250	Assuming the buses are running at 60% load factor
Total Revenue (5 INR per ticket)	68,750	Fixing 5 INR for the Journey
Expense (45 INR per km)	86,625	Assuming 45 INR per km for Payment

## Summary of Planning of 300 BRTS New Buses

	Addition of Buses in Existing Routes	Buses for New Feeder Routes	Buses require after Scrapping of old Buses	Total
No of Routes	14	9	14	23 (to be operated including feeder routes)
Buses operated in Existing Schedule	236	-	50 (Buses to be scrapped by 2021)	-
Proposed no of Buses (Additional)	177	72	51	300
Total Buses to be operated	413	72	-	<b>485 (Total Fleet will be 528)</b>



## Requirement of New Depots

### • Existing Depot Capacity

- Ranip – 65 Buses
- Naranpura – 50 Buses
- Chandkheda – 50 Buses
- Chandola – 75 buses
- Odhav – 60 Buses
- Total Capacity - 300

### • New Capacity Requirement

- Gulbai Tekra – 75 buses
- Bopal – 100 Buses
- CTM – 75 buses

# Revenue Projections

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- **Fare Box Revenue - Rs. 5/- should be the fixed fare for feeder routes to increase footfall**
- **Revenue Advertisement rights**
  - **Advertisement rights on PIS system for entire network – Expected revenue of Rs. 2 crores per annum**
- **New Sources of Revenue**
  - **Leasing out OFC network at expected revenue of Rs. 5 cr per annum**



# Implementation Strategy

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- **Fixed Fare**
- **Using existing IT infrastructure of Handheld Ticketing**
- **Using existing depots and infrastructure to start feeder routes**
- **Communication to the citizens prior to launch**

# Expected Outcomes

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- **With load factor of 0.6,**
  - **Around 71000 new passengers will be added**
  - **Expected Revenue – Rs. 3,58,050 for feeder routes**
  - **Expected Expenditure – Rs. 7,16,000 for feeder routes**
- **Overall increase in ridership – Target would be 2.75 lacs passengers per day in one year time after successful implementation of these routes.**
- **Gap funding requirement will be minimized due to CM bus Subsidy.**



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**Thank You**