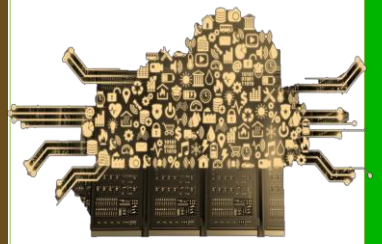
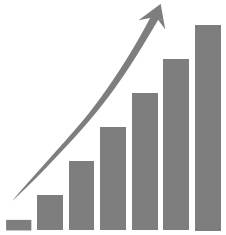
High Capacity Mass Transit Route (HCMTR) Project, Pune

HCMTR Presentation

15 May 2019

Pune Highlights

Cultural capital of Maharashtra with well-established manufacturing, glass sugar, and forging industries that provide employment to more than 4.77 lakh		7th richest city in India with respect to the GDP. The estimated GDP is $69 billion		Known as Queen of the Deccan Plateau & Oxford of East for its world class educational facilities and relative prosperity		The Hinjawadi IT Park (officially called the Rajeev Gandhi IT Park) is a project being started by MIDC to house the IT sector in Pune with an estimated investment of $9.4B
	9th largest metropolis in India and second largest in the state of Maharashtra after Mumbai		Home to the Automotive Research Association of India, Pune is regarded as the Motor City as the automotive sector is prominent in PCMC		Major IT/ITES sector developed in Hadapsar (outskirts of PMC) and Tathawade in PCMC is providing more than 3.5 lakh employment	

Pune Traffic Trends

1. The Pune Municipal Corporation (PMC) and Pimpri-Chinchwad Municipal Corporation (PCMC) have a population of about 60 lakhs spread over an area of 414 sq.km. The population is expected to increase to 92 lakhs by 2038
2. The rapid urbanization in PMC and PCMC has resulted in an increase in the number of motor vehicles. The total trips are expected to increase to 138.74 lakhs from current 82.02 lakhs per day by 2038
3. As of 31st March, 2018, PMC & PCMC have around 51.88 lakhs registered vehicles. Everyday more than 1000 new vehicles are being added
4. The total number of vehicles registered in year 2016-17 in PMC and PCMC are 3,95,684. In this two wheelers are 68.70% and cars are 22.70%
5. The existing road network in the city is operating at its peak saturation level, resulting in frequent traffic jams, prolonged signal delays, increased accidents and forced flow conditions
6. Majority of the intersections on radial roads and important city roads are beyond their capacity and warrants grade separators

Need for HCMTR

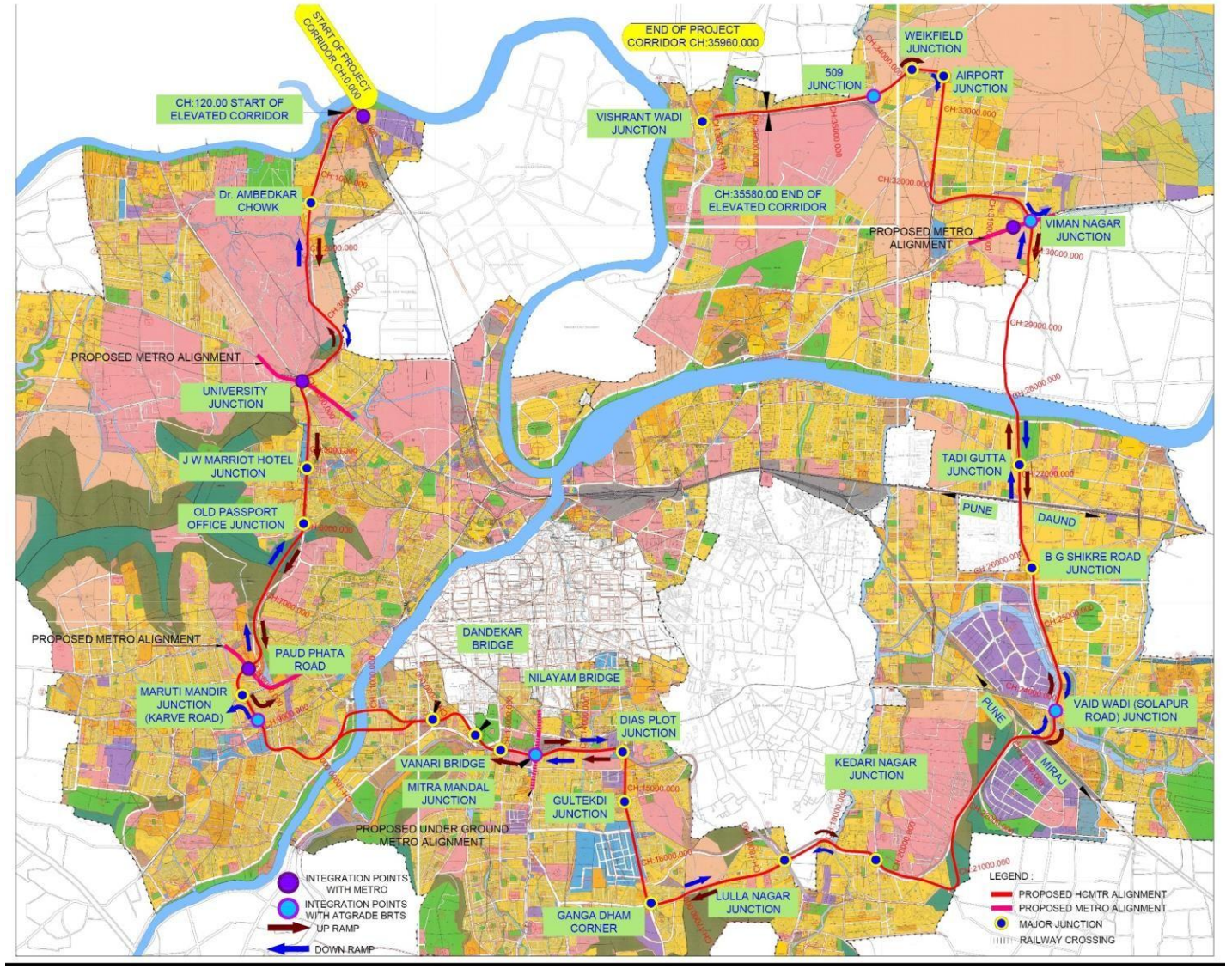
- Pune is currently having only major roads/highways radially passing through the city, connected by the city roads
- The ever increasing vehicular population and urbanization due to rapid developments in IT sector has resulted in huge growth in vehicular traffic
- Average journey speed is around 21 Kmph
- The reduced journey speed along the city roads is resulting in the increased travel time for users
- The existing ROW along the major roads in Pune city are very narrow and surrounded with huge built-up/commercial/ forest/cantonment areas, with limited scope for widening the existing roads

Proposed HCMTR

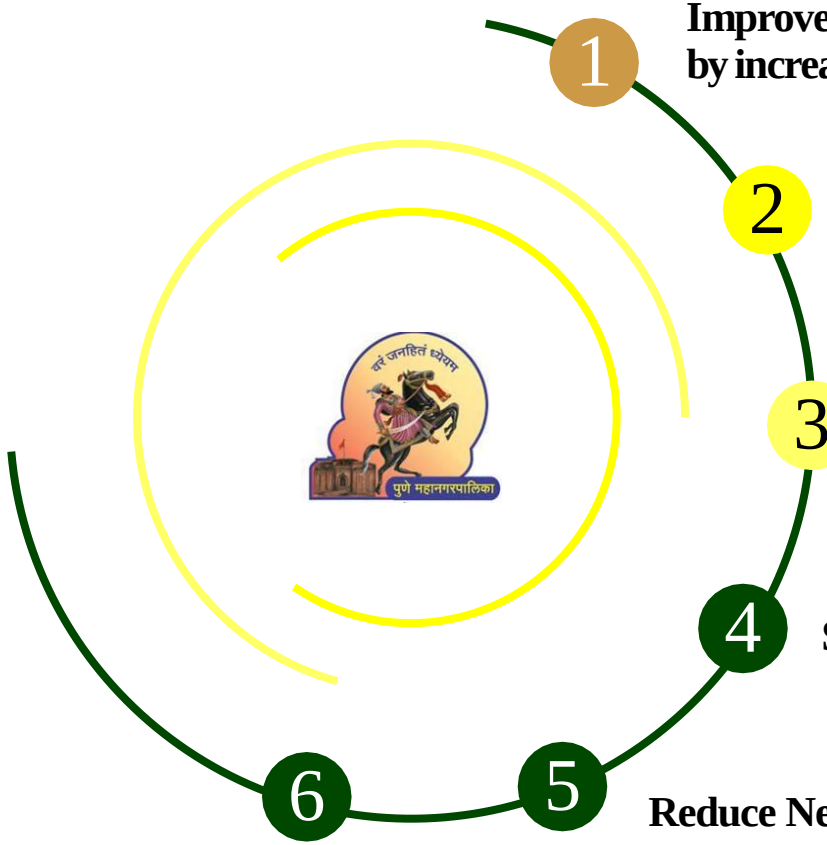
35.96 Km elevated **six** lane corridor passing over **34** junctions.

2 dedicated lanes for BRTS with 26 stations

4 lanes for private vehicles (4 wheelers) with **17** up-ramps and **16** down ramps



Objectives of HCMTR



1. **Improve the Public Transportation System;**
   Improve Safety and Level of Service for Private Traffic, both Local and Through Traffic by increasing the mobility
2. **To meet the future travel demand and to Reduce the traffic congestion on existing roads**
3. **Facilitate Continuous and Uninterrupted Traffic Movements for Through Traffic**
4. **Savings in Travel Time and Reduction in Vehicle Operating Costs**
5. **Reduce Negative Impact on Environment and Social Issues**
6. **Reduction in Pollution Levels**

Salient Features

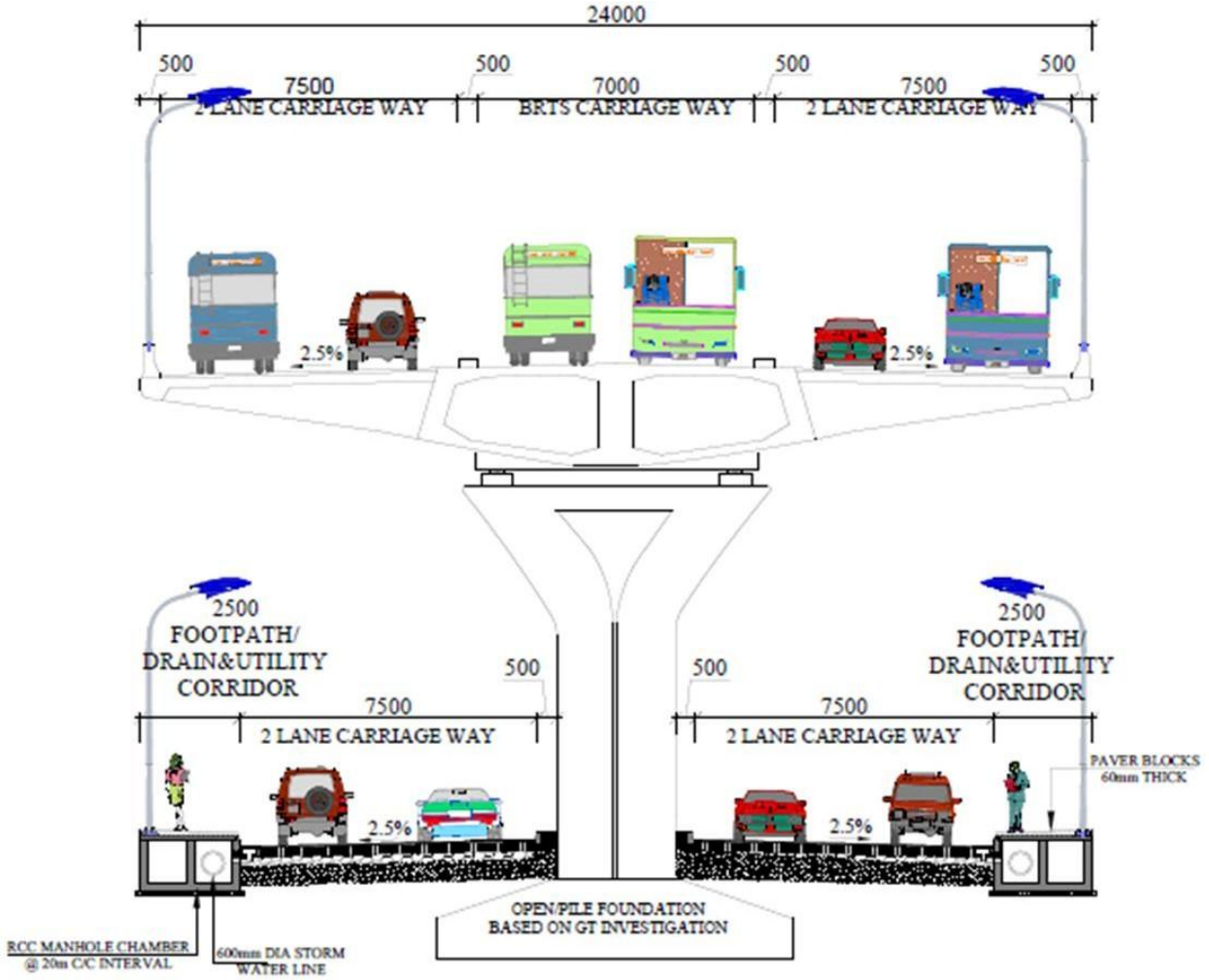
DESCRIPTION OF ITEM	DETAILS
Total Project Length	35.96 Km (with Split carriageway of 11m in each direction for a length of 1.2 km)
Structure Type	Elevated Corridor
Access to Corridor	17 Up & 16 Down Ramps Provided at Major Radial Roads – 33 Nos.
Project ROW	24m (minimum)
Lane Configuration	Total 6 lanes with 2 dedicated BRTS Lanes and remaining 4 for Private Vehicles
No. of BRTS Stations	26 Nos.
Access to BRTS	Elevated BRTS Stations can be accessed by Staircases and Escalator provided at the At-grade median/footpath locations
Laybyes	2 locations (Pune University hostel and SRPF land)
Design Speed	Main Carriageway 50 Kmph and Ramps 25 Kmph
Maximum super elevation	4%
Traffic Demand on BRTS lanes of Elevated Corridor	The projected demand for horizon years of 2021, 2031 and 2041 for BRTS is estimated as: ■ 125343 Passengers/Day & 2625 PPHPD in 2021. *PPHPD- Passengers per hour per direction ■ 296045 Passengers/Day & 6537 PPHPD in 2031. ■ 566829 Passengers/Day & 12711 PPHPD in 2041.
Traffic Demand on Elevated Corridor	The projected demand for horizon year 2041 for Elevated Corridor is estimated as: ■ Passenger traffic 50514 PCU/day & Goods traffic 10485 PCU during night in HS-1. ■ Passenger traffic 36905 PCU/day & Goods traffic 18963 PCU during night in HS-2. ■ Passenger traffic 48016 PCU/day & Goods traffic 4841 PCU during night in HS-3.

Reduction in Vehicle Emissions

YEAR	HYDRO CARBON (HC)	CARBON MONOXIDE (CO)	NITROUS OXIDE (NO)	SULPHUR DIOXIDE (SO_2)	CARBON DIOXIDE (CO_2)	PARTICULATES (PAR)	LEAD (PB)
2021	52%	54%	43%	46%	52%	49%	58%
2031	46%	49%	8%	10%	33%	23%	51%
2041	35%	36%	(-) 55%	(-) 58%	(-) 5%	(-) 26%	32%

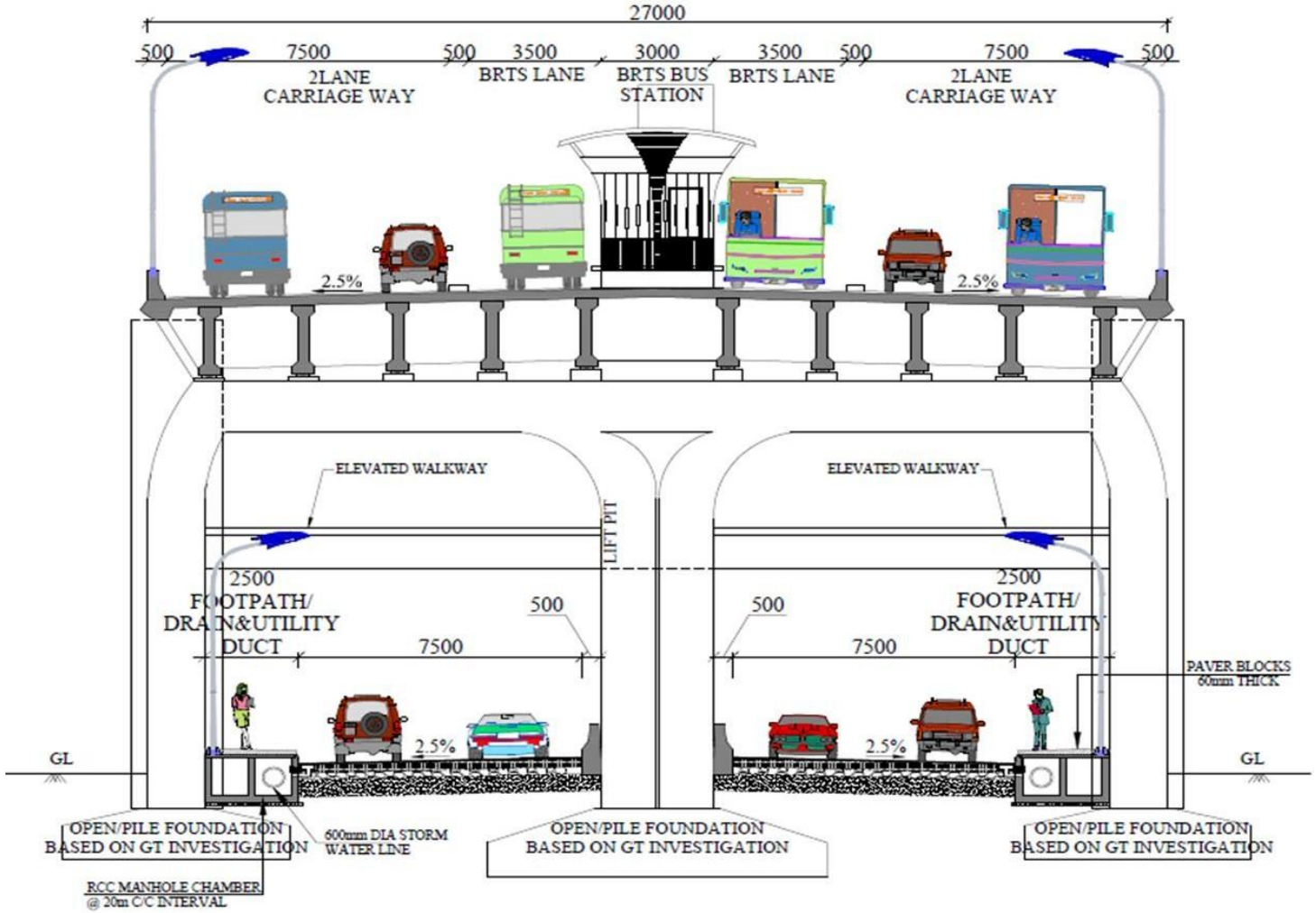
Note:
Reduction in emissions is observed for all pollutants till 2031. After that there is increase in pollution level with respect to Nitrous Oxide, Sulphur Dioxide and Particulates, which may be possible to control with technological development

Typical Cross Section of Elevated Corridor



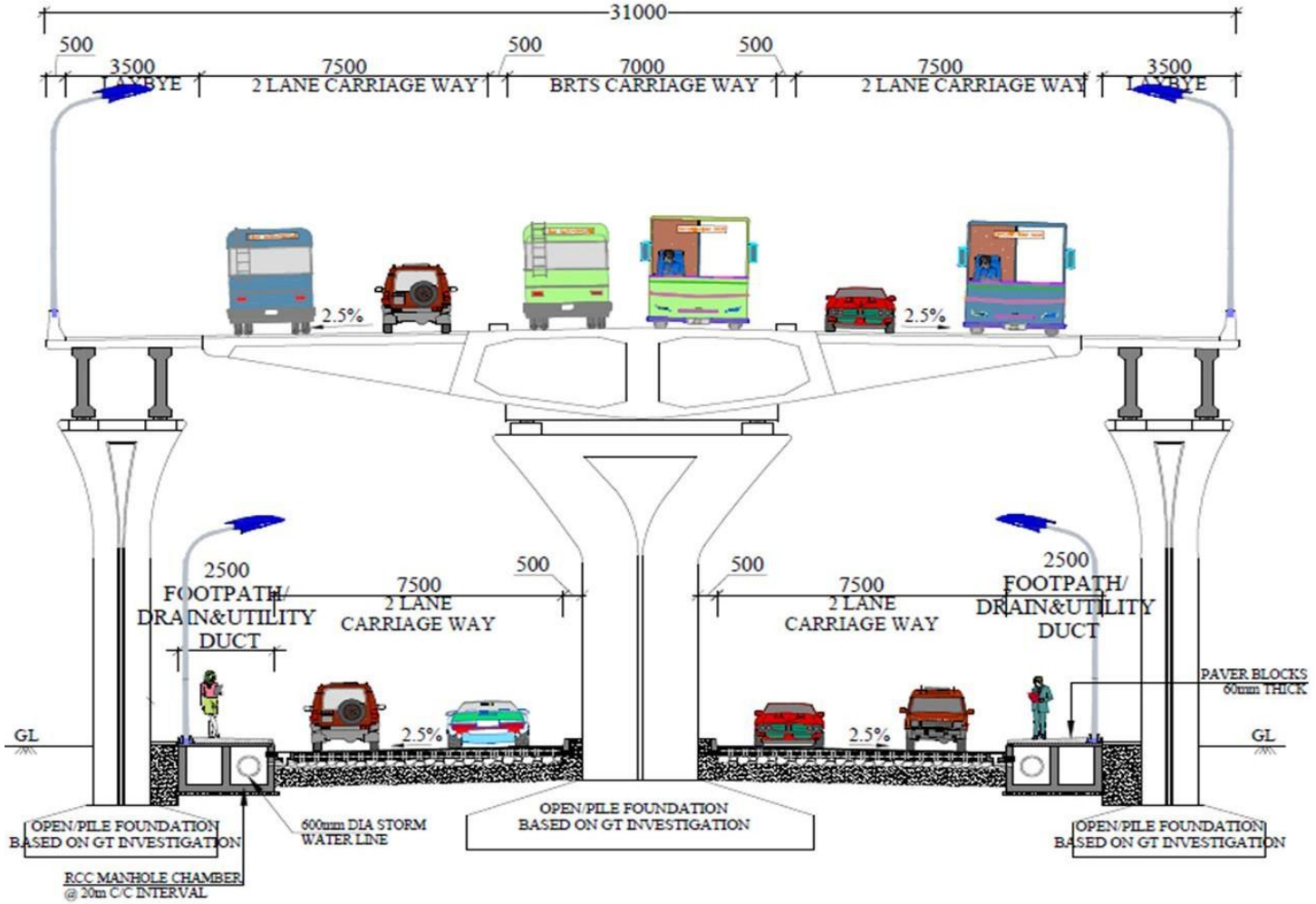
TCS for 4 lane HCMTR Corridor with 2 lane BRTS at Centre

Typical Cross Section of Elevated Corridor



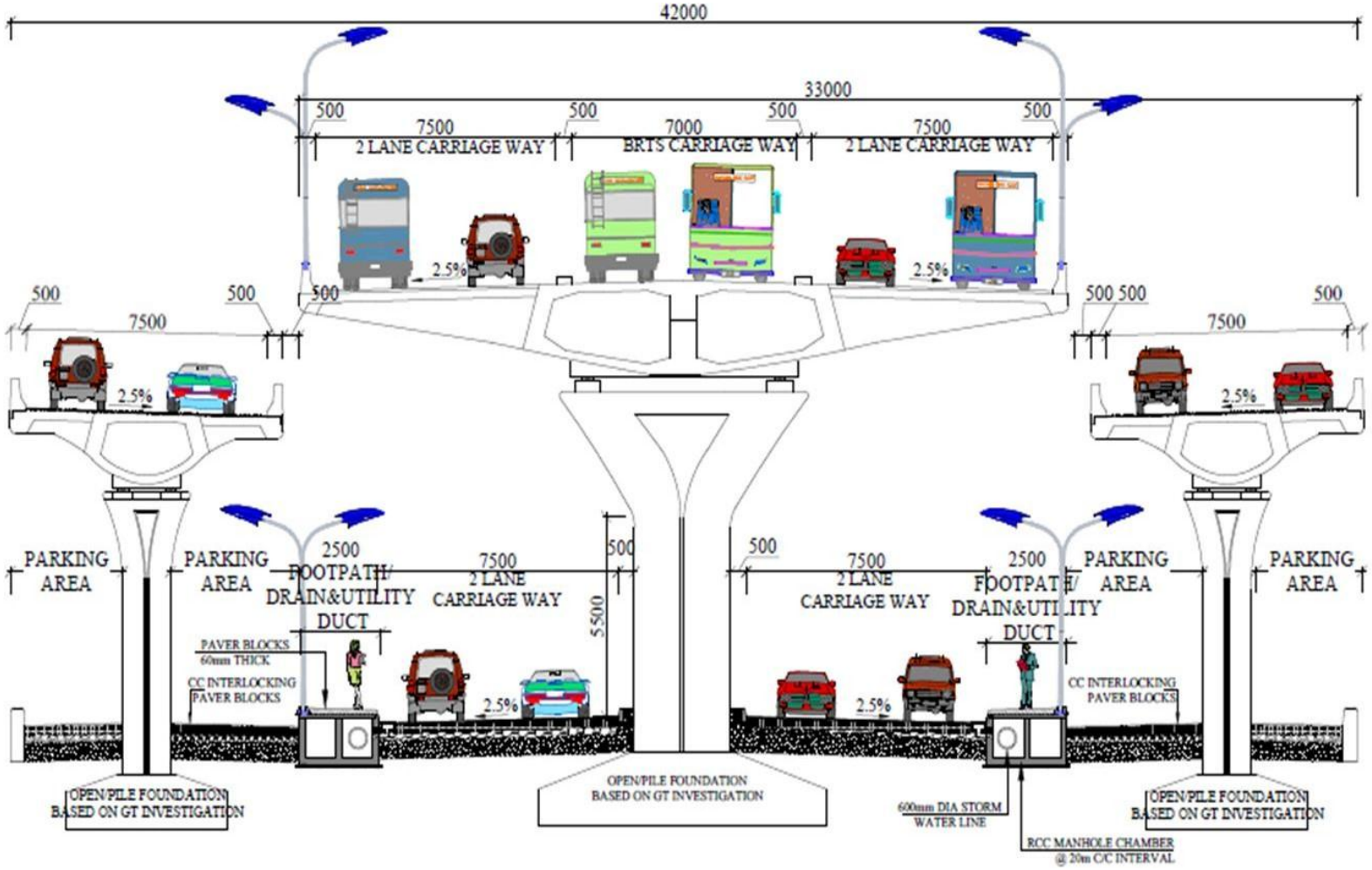
TCS for 4 lane HCMTR Corridor with 2 lane BRTS and BRTS Station at Centre

Typical Cross Section of Elevated Corridor



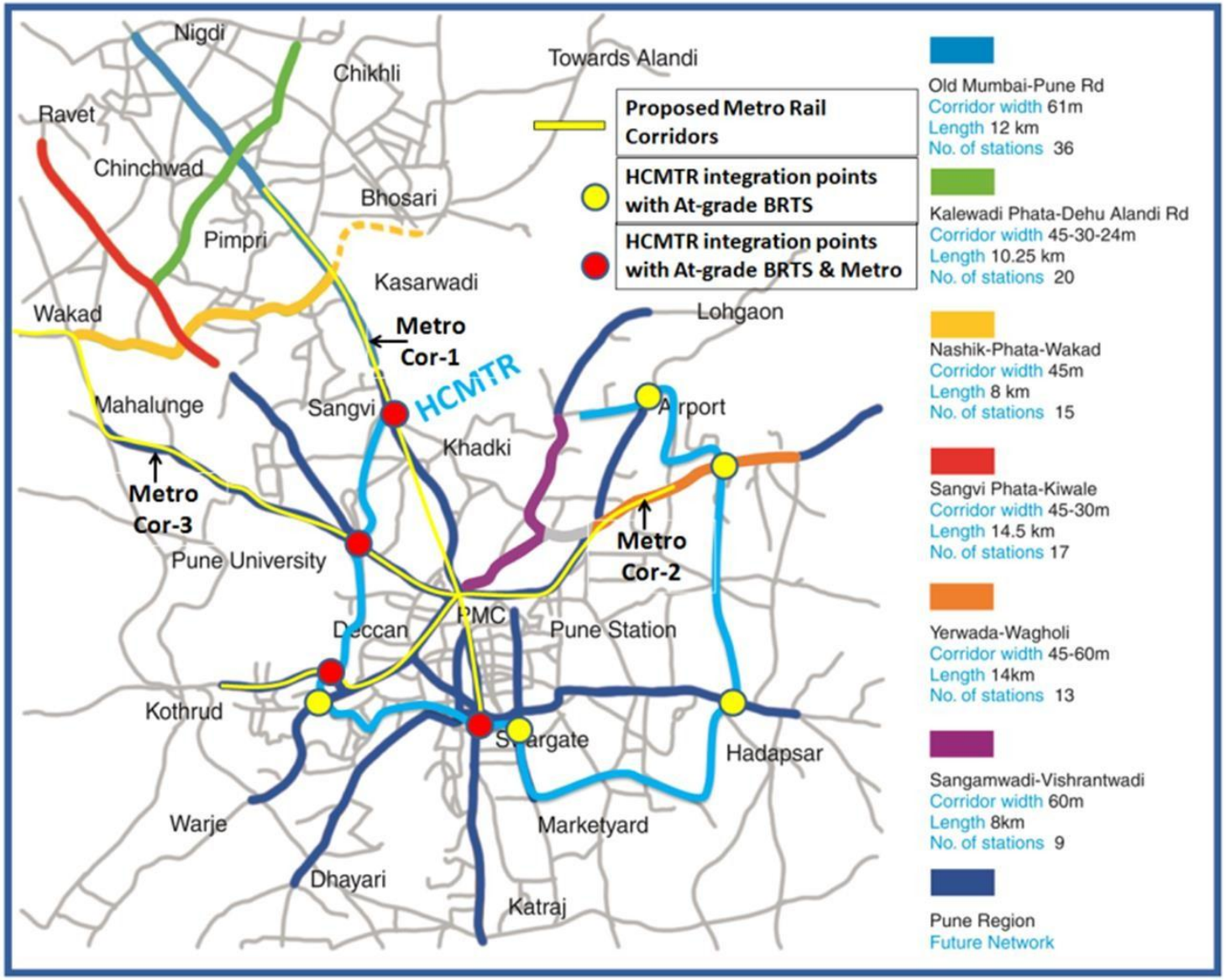
TCS for 4 lane HCMTR Corridor with 2 lane BRTS at Centre and Laybye

Typical Cross Section of Elevated Corridor



TCS for 4 lane HCMTR Corridor with 2 lane BRTS and BRTS Station at Centre and Up & Down ramps adjacent to main corridor

Integration of HCMTR with Other Infra Projects for Mobility



Land Usage

NO.	LAND USE	LENGTH (KM)
1	HCMTR along Existing Roads	17.80
2	HCMTR along Nalas, Canal and River Crossing	5.28
3	HCMTR Through Forest Land/Open Land, Green fields and Railway Line	5.34
4	HCMTR through Built-up area, Slums and Vacant Land	7.55
Total Length (Km)		**35.95**

*Note: estimated private land acquisition compensation is around Rs._ Crore. PMC proposes to pay the land acquisition compensation through TDR and reservation credit bonds
PMC proposes to obtain permits on the lands belonging to govt.
Detailed land acquisition survey is in progress

Construction Package Description

Details of Construction Package - III -Sub package

NO.	CONSTRUCTION PACKAGE – III (EASTERN HCMTR) SUB – PACKAGES	MODE OF DEVELOPMENT	SUB- PACKAGES NUMBERING	DESIGN CHAINAGE		LENGTH (KM)
				FROM (KM)	TO (KM)	
1	From Lula nagar Junction to Sholapur Road Junction	PPP	Package- III A	18.4	23.8	5.40
2	From Sholapur Road Junction to Samrat Ashok Road/Ahmednagar road	PPP	Package- III B	23.8	30.4	6.60
3	From Samrat Ashok Road/Ahmednagar road to Vishrantwadi	EPC	Package- III C	30.4	35.96	5.56
Total						17.56

Traffic Demand on HCMTR for Horizon Year 2041

Most likely scenario

CATEGORY / YEAR	HS-1	HS-2	HS-3
	HCMTR CORRIDOR (PCU/DAY)		
Car/Jeep/Van -White Board	32,956	23,916	26,374
Car/Jeep/Van -Yellow Board	13,933	10,325	19,667
Mini Bus/Maxi Cab	1,076	1,611	1,572
Bus	2,549	1,053	403
Total Private Vehicle Trips	**50,514**	**36,905**	**48,016**
LCV	1,907	5,400	636
Truck 2 Axle	2,884	3,362	513
Truck 3 Axle	2,022	4,833	1,060
Trucks 4 to 6 Axle	3,576	5,368	2,632
MAV / HCM / EMV	96	0	0
Total Goods Trips	10,485	18,963	4,841
Total Trips in PCU/Day	60,999	55,868	52,857
Maximum Section Traffic	60,999	PCU/Day	
Peak Hour Factor, k	0.1		
Peak Hour Section Traffic	6,099 PCU/Hr	4 Lanes are required	

The horizon year Private vehicle traffic demand for the HCMTR corridor during 2041 is estimated as 60,999 PCU/Day. 4 lanes are adequate to cater to the Private vehicles traffic movement for the horizon years

Traffic Demand on HCMTR for Horizon Year 2041

Most likely scenario

DESCRIPTION / YEAR	2021	2031	2041
Peak hour ridership (Passengers)	12,534	29,605	56,683
Maximum Sectional Loading (PPHPD)	2,625	6,537	12,711
Daily Ridership (Passengers)	12,5343	29,6045	56,6829

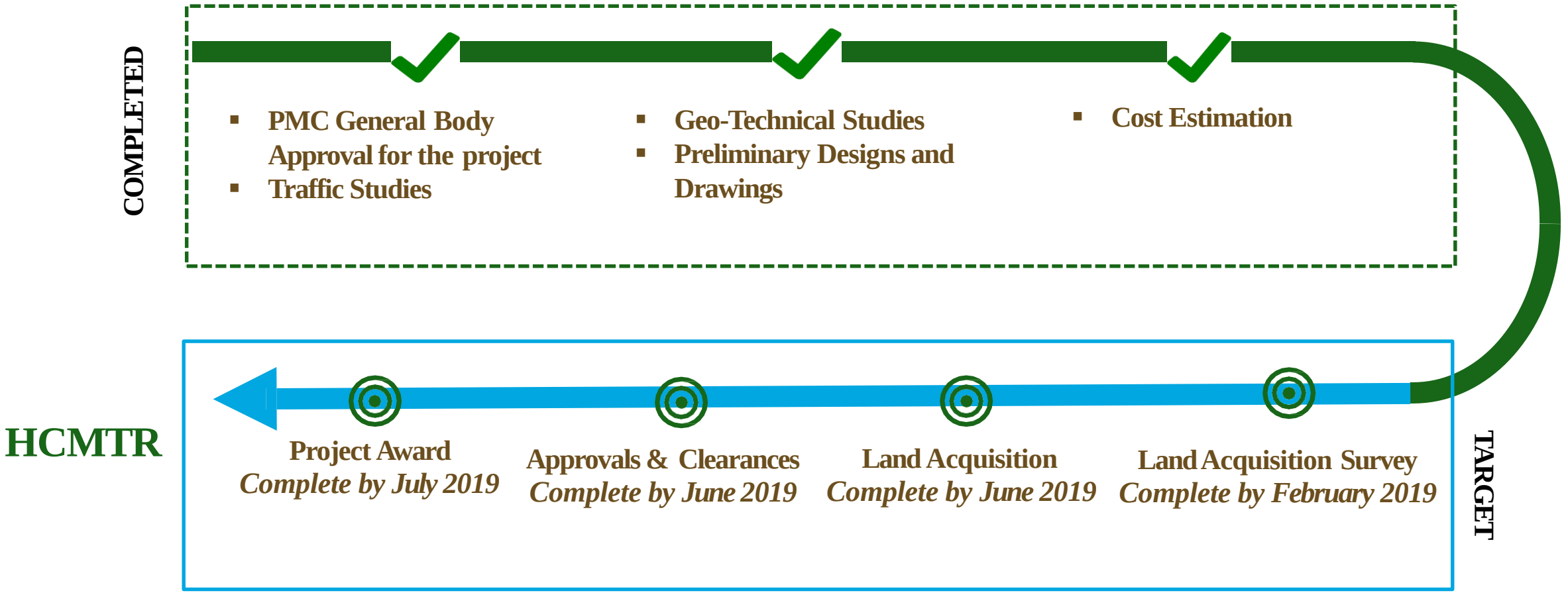
HAM Model- Key Assumptions

Particulars	Amount in Rs. Crore	%
Estimated Total Project Cost	5,291	
Means of Finance		
Construction Support from PMC/State	2,116	40%
Equity	952	18%
Debt	2,222	42%

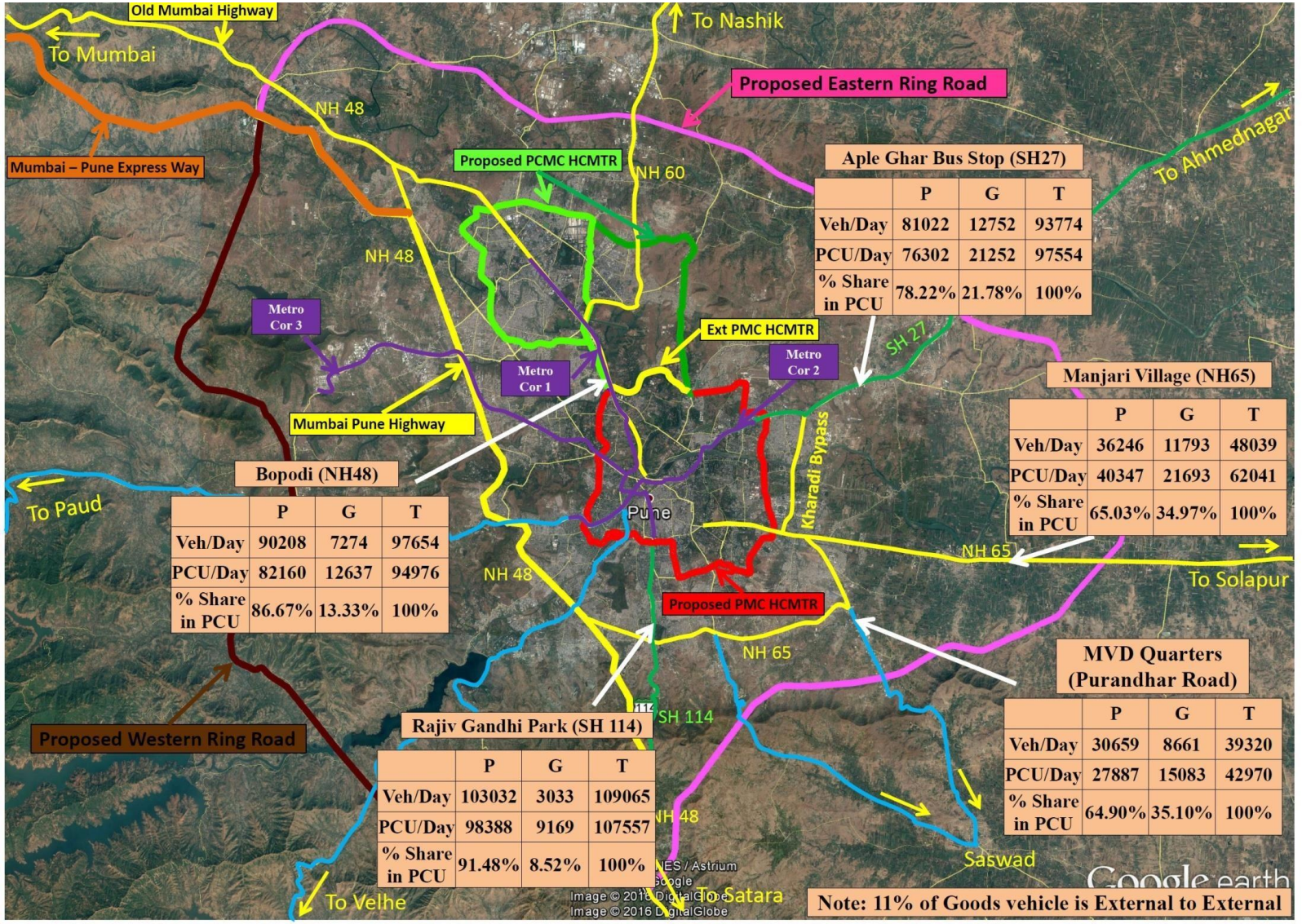
Assumptions

- ✓ HAM Model as per MORTH
- ✓ 40% of Bid Project Cost is payable during Construction Period
- ✓ Balance 60% is payable as Semi Annuities during 15 years of Operations period
- ✓ Debt Equity Ratio 70: 30
- ✓ Cost of Debt 14.25% (HUDCO Lending Rate)
- ✓ Target Project IRR (Cost of Debt Plus 1%):15.25%
- ✓ PMC will target to recover Annuity and O&M payments during 15 years of operations

Immediate Targets



Traffic Volumes on NH/SH



Aple Ghar Bus Stop (SH27)

	P	G	T
Veh/Day	81022	12752	93774
PCU/Day	76302	21252	97554
% Share in PCU	78.22%	21.78%	100%

Manjari Village (NH65)

	P	G	T
Veh/Day	36246	11793	48039
PCU/Day	40347	21693	62041
% Share in PCU	65.03%	34.97%	100%

Bopodi (NH48)

	P	G	T
Veh/Day	90208	7274	97654
PCU/Day	82160	12637	94976
% Share in PCU	86.67%	13.33%	100%

MVD Quarters (Purandhar Road)

	P	G	T
Veh/Day	30659	8661	39320
PCU/Day	27887	15083	42970
% Share in PCU	64.90%	35.10%	100%

Rajiv Gandhi Park (SH 114)

	P	G	T
Veh/Day	103032	3033	109065
PCU/Day	98388	9169	107557
% Share in PCU	91.48%	8.52%	100%

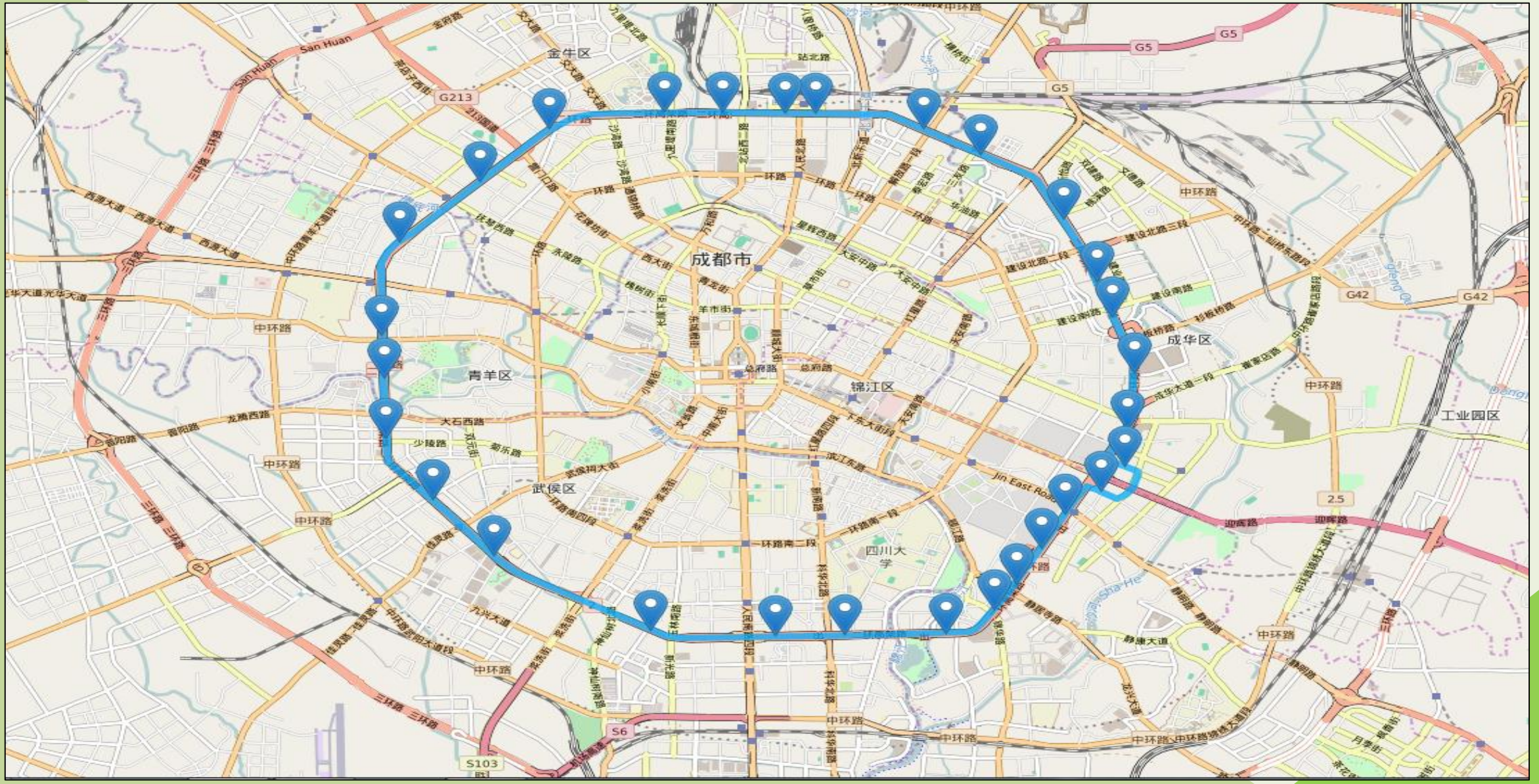
PPP Models for Road Projects- Key features

	FOR CONSTRUCTION			POST CONSTRUCTION	
MODEL	**HAM**	**BOT(Annuity)**	**BOT (Toll)**	**TOT**	**OMT**
FULL FORM	• Hybrid Annuity Model	• Built Operate Transfer (Annuity)	• Built Operate Transfer (Toll)	• Toll Operate Transfer	• Operate Maintain Transfer
RESPONSIBILITIES	• Construction • O&M	• Construction • O&M	• Construction • O&M • Toll Collection	• Improvement in facilities • Toll Collection • O&M	• Improvement in facilities • Toll Collection • O&M
BID PARAMETER	Project Cost	Annuity	Premium /Grant	Upfront Premium	Revenue Share
INDICATIVE CONCESSION PERIOD	Construction Period Plus 15 years	15 to 20 years	15 to 20 years	30 years	8 years
FOCUSED CAPABILITIES	Construction & Financing	Construction & Financing	Construction & Financing	Financing	O&M
REASONS FOR FAILURE	• This is relatively new Model and Model failures not yet reported • Current financial market conditions are challenging for many developers for arranging Debt and Equity	• No protection against cost over run • No Protection against increase in O&M and Interest Cost	• No protection against cost over run • Inadequate Protection against Traffic Risk	• This is relatively new Model and Model failures not yet reported • Large Project size, technology is adequate to monitor Toll pilferage	• Small Project size, technology not adequate to monitor Toll pilferage • NHAI prefers TOT model

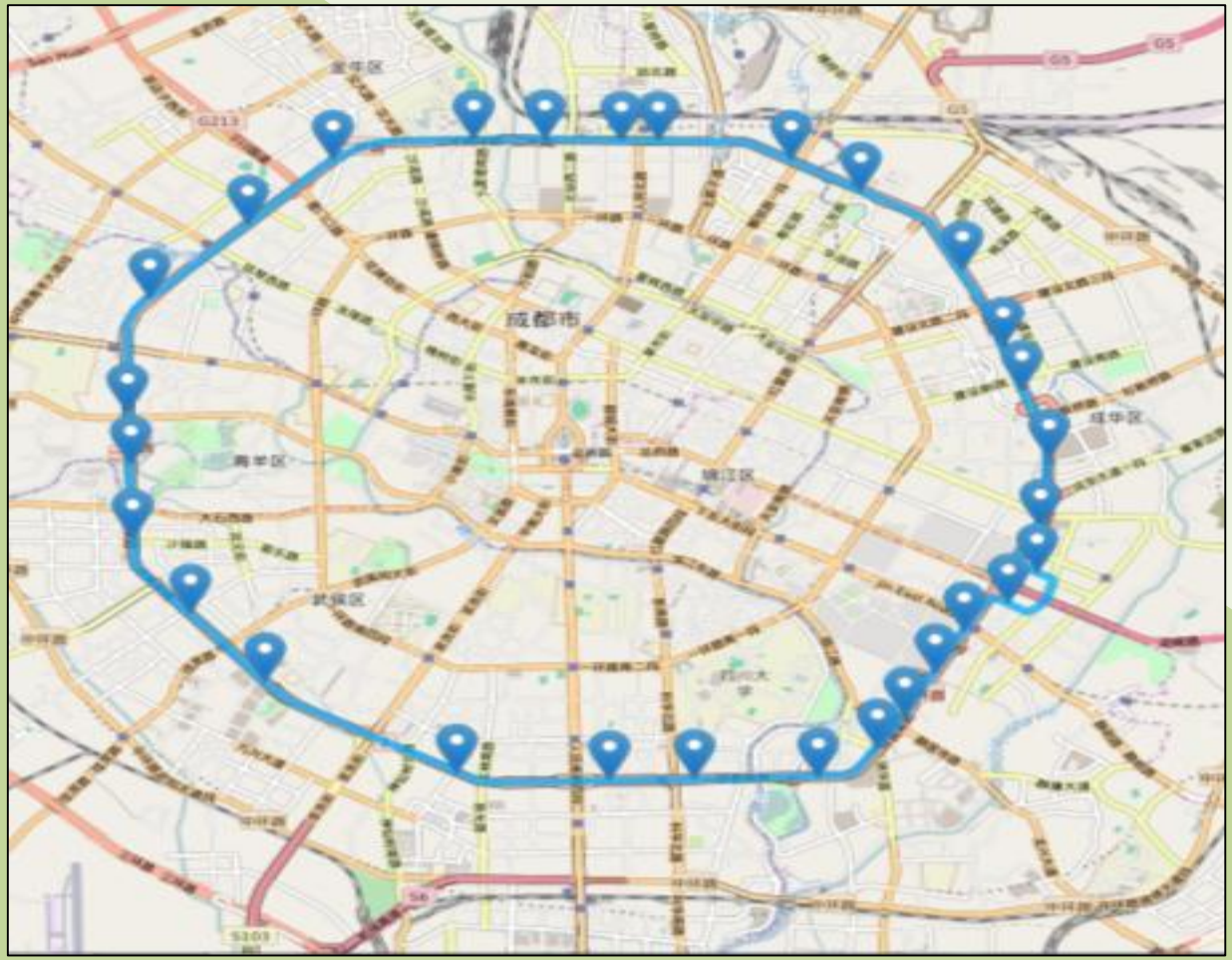
PPP Models for Road Projects- Risk Matrix

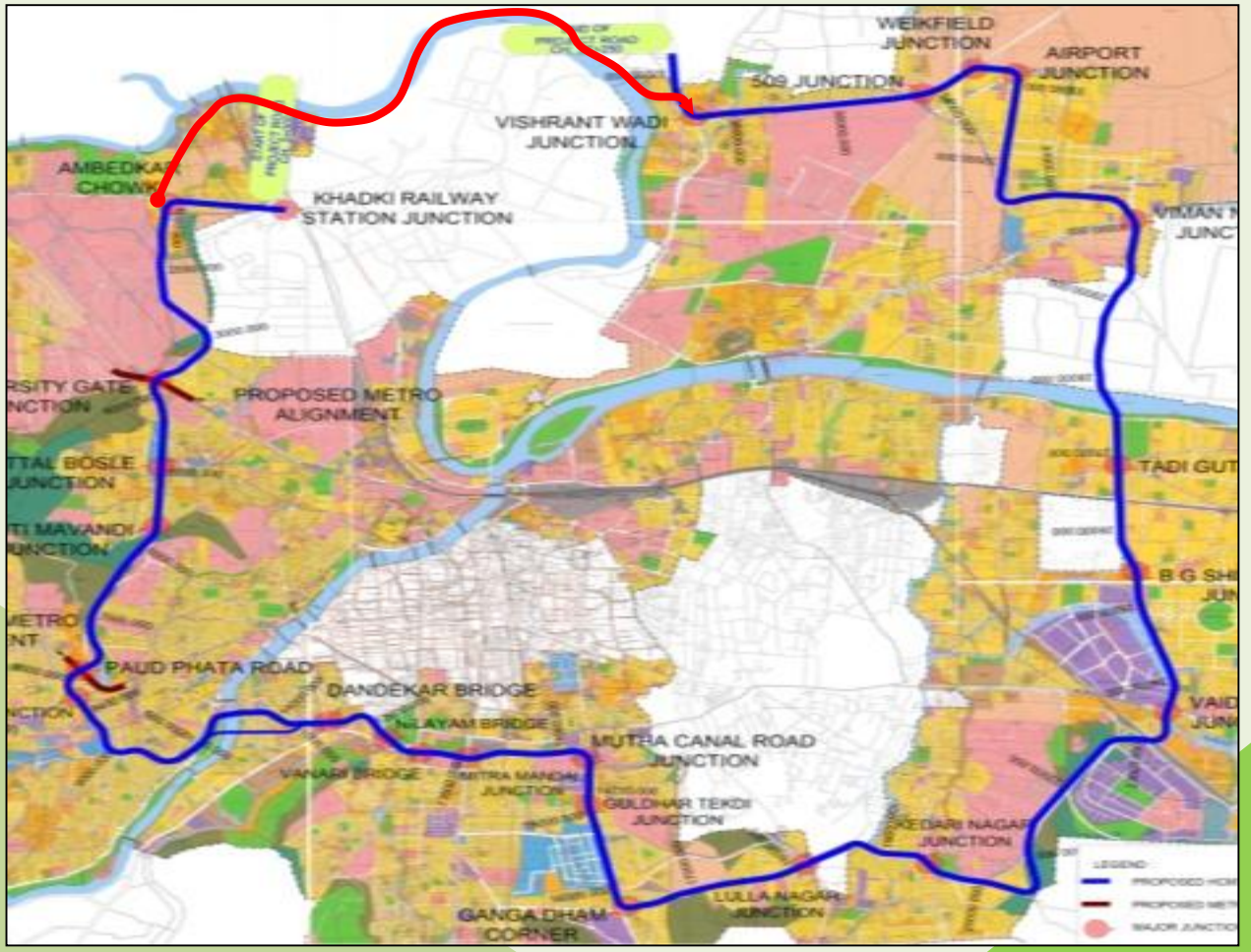
	FOR CONSTRUCTION			POST CONSTRUCTION	
MODEL	**HAM**	**BOT(Annuity)**	**BOT (Toll)**	**TOT**	**OMT**
CONSTRUCTION RISK	Medium Risk	High Risk	High Risk	Low Risk	Low Risk
TRAFFIC RISK	No Risk	No Risk	High Risk	High Risk	High Risk
LAND ACQUISITION	Medium Risk	High Risk	High Risk	No Risk	No Risk
RIGHT OF WAY					
LEGAL CLEARANCES	Medium Risk	High Risk	High Risk	No Risk	No Risk
TOLL PILFERAGE	No Risk	No Risk	Low Risk	Low Risk	Low Risk
INTEREST RATE RISK	Medium Risk	High Risk	High Risk	High Risk	Low Risk

Chengdu (China) Elevated BRT



Similarity Between Chengdu (China) Elevated BRT and Pune HCMTR





Off Board Ticketing System

Inside view of the BRTS Stations

View of Elevated BRT at Down Ramp locations

View of Elevated BRT – Access to Stations

Bird’s Eye View of Elevated BRT in Chengdu, China

Thank you