

## CHAPTER 0 EXECUTIVE SUMMARY

### 0.1 INTRODUCTION

#### GENERAL

The Project Road is section of SH-4(*In principle declared as NH-163*), which starts at Existing Ch: 14/000 (design CH 14.000) Hyderabad (*from ORR-Appa Junction*) and ends at Existing Ch: 59/500 (Design Ch: 60.533) near Manneguda. The length of the project stretch is 46.533 km. The project stretch passes through shamshabad and Rangareddy Districts and mainly passes through Aziz nagar, Himayat nagar, Moinabad, Appa reddy gudda, Chevella, Indra reddy nagar. This chapter will give a general description of the project, existing features and design proposals to upgrade the facility to Four/Six-lane divided highway.

### 0.2 PROJECT BACKGROUND

The State Government accorded Administrative Sanction for 38 road projects to take up consultancy services for Techno-Economic Feasibility and Transaction Advisory Services by engaging experienced consultants. Out of which, seven State roads are taken up by the State of Telangana.

As per the GoT's strategic vision for the provision, operation and maintenance of infrastructure in the State, it has identified the need to upgrade and operate the high traffic roads in the State through public private partnership arrangements. The Client has the onus of procurement of concessionaires to Design, Finance, Construct, Maintain, operate and Transfer the roads by tapping into central government financing if required.

The 7 roads being considered for Techno-Economic feasibility are as below:

Sl. No	Name of the Road	Awarded Length in km as per original contract Agreement	Modified Length in km as per	Additional Length in km
1	Sanga Reddy – Narsapur – Toopran – Gajwel – Bhongir – Chityal Road ( Km 0/0 on SH-17 to MDR km 43/8)	164	164	-
2	Mahaboobnagar – Nalgonda Road (Km 0/0 to km 163/2).	163.2	163.2	-
3	Hyderabad – Narsapur – Medak Road (Km 16/0 to Km 78/0)	28	62	34
4	Jangaon – Cheryal – Duddeda road (Km 0/0 to Km 46/4)	46.4	46.4	-
5	Jangaon – Suryapet Road (Km 0/0 to Km 84/4)	84.4	84.4	-
6	Suryapet – Mothey – Khammam Road (Km 0/0 to Km 58/3)	58.3	58.3	-
<b>7</b>	<b>Hyderabad – Bijapur Road</b>	<b>36.4</b>	<b>108.7</b>	<b>81.9</b>

Sl. No	Name of the Road	Awarded Length in km as per original contract Agreement	Modified Length in km as per	Additional Length in km
	(Hyderabad – Mannegudda – Pargi – Kodangal – Karnataka Border) (Km 14/0 to Km 132/300)			
	<b>Total</b>	<b>580.7</b>	<b>696.6</b>	<b>115.9</b>

Roads and Buildings Department PPP wing, Government of Telangana has appointed M/s. Feedback Infra Pvt. Ltd. for providing the required consultancy services for PPP Techno-Economic Feasibility Study and Transaction Advisory Services for 7 State Roads in the State of Telangana.

The project road (SH-4) Hyderabad-Moinabad-Chevella-Mannegudda is In-Principle declared as National Highway and named as NH-163. The project is transferred to National Highway Authority of India through tripartite-supplementary agreement dated 28<sup>th</sup> April 2017 between National Authority of India and Roads & Building Department of Telengana and Feedback Infra Pvt. Ltd.

The present Technical Feasibility Report is pertaining to Hyderabad-Moinabad-Chevella-Mannegudda Road.

### 0.3 Scope of the Project

The original scope of work for the Transaction Advisor is divided into these two phases:

**Phase-1: Techno-Economic Feasibility study and Preliminary Engineering Design:** The main objective is to establish the Technical, Economical, and Financial viability of the selected roads and prepare preliminary engineering designs and preliminary project reports for the identified roads. The viability of the project designed as a partially access controlled facility shall be established taking in to account the requirement with regard to rehabilitation, upgrading and improvement based on highway design, pavement design, provision of service roads wherever necessary, type of intersections, underpasses / flyovers / ROB's rehabilitation and widening of existing and / or construction of new bridges and structures, road safety features, quantities of various items of works and cost estimates vis-à-vis the investment and financial return through toll and other revenues.

The scope of the project is to establish the Technical, economical and financial viability of the project and prepare Techno-Economic Feasibility Study and Preliminary Engineering Design Report for rehabilitation and upgrading of the existing 7 State roads to 2-lane with paved shoulders/ 4-lane with central median/ divided carriage way configuration in a sound technical and most economical manner, taking into consideration the environment and social aspects of the area.

The transaction advisory services role will be for procurement of construction agency. This must enable the GOT to determine:

- Full road life costs;
- Affordability limits;
- Risks and their costs and

- **Optimal value-for-money methods of delivery.**

**Phase 2: Procurement:** On the basis of the feasibility study, a solution is decided on, and if the Client requires it, the Transaction advisor will be required to provide the necessary Technical, Legal and Financial advisory support for the procurement of private parties. This must be in compliance with all relevant National and State regulation policies, and will include training of staff of the Client on contract administration / management.

- To prepare bid documents for tendering purposes suitable to meet requirements of international standards;
- Preparation of Bid documents on the viability of the project to suit for various types of construction and
- Advisory services in finalization of contract and providing services in sanction of VGF from Government of India etc.

Further as per revised scope conveyed vide letter no. NHAI/Tech/Hyd-man/TS/2017/96557 dated 15.03.2017. The following documents are required to be prepared as per rearrangement of payment schedules within contract price:

<i>Stage I&amp;II</i>	<i>Signing of Agreement and Mobilization of Techno Economic Feasibility Report.</i>
<i>Stage III</i>	<i>Preparation of revised Technical Feasibility Report as per prevailing NHAI Guidelines.</i>
<i>Stage IV</i>	<i>Preparation of Technical Schedules and Bid Documents.</i>
<i>Stage V</i>	<i>Preparation of Land Plan Schedules Preparation of 3(a) and 3 (A) notifications Preparation of 3 (D) notifications including FBMs and Sub-Division plan etc. along with any other LA documents as per requirements of NHAI/CALA, peg marking at site and Utility Relocation.</i>

The present report forms a part of Phase – III (Revised Technical Feasibility Report).

#### **0.4 PROJECT DESCRIPTION**

The Project stretch starts at Existing km 14.000 Hyderabad (Outer Ring Road) and ends at Existing km 59.500 before Mannegudda town. The total existing Length of the project stretch is 45.50 km. The project stretch passes through shamshabad and Rangareddy Districts and mainly passes through Aziz nagar, Himayat nagar, Moinabad, Appa reddy gudda, Chevella, Indra reddy nagar. . Many Schools, Religious Structures are situated along the project road.

The existing project road is a predominantly 2-lane carriageway with average width of 7m and 4-Lane exists from Ch 14/000 to Ch 21/000 with median width of 0.5m and at Moinabad and Chevella towns. The existing pavement is predominantly flexible pavement throughout the stretch. The existing pavement for the entire project stretch is flexible pavement. The condition of the pavement varies from Good to Poor. Earthen Shoulder is existing throughout the stretch varies from 1.0 to 2.0m. Pavement condition of the earthen shoulders is fair to poor. Many substandard horizontal curves and vertical curves exist along the alignment. Among these, some curves are observed to have insufficient sight distance. Heavy vehicular traffic movement is leading to traffic congestion and mishaps. Due to the narrow roads the congestion will hinder free flow of vehicular traffic. To

overcome these problems, it is essential to have bypass at Moinabad town and Chevella town. Mrugavani National Park exists on right side of the project road from Km 15/000 to Km 17/000. Project road traverses through Reserve Forest locations and the total length of forest area along the project road is about 6.17 km.

## **0.5 SOCIO-ECONOMIC PROFILE**

Social indicators are a set of indicators that measure progress of the project influence area towards the policy objectives. Demographic Indicators are a scientific measure of human population dynamics. Economic indicators allow analysis of past economic performance and predictions of future performance.

A list of Socio – Economic Indicators considered in the preparation of the Socio – Economic Profile is given below:

- Population
- Male / Female Ratio
- Health
- Household
- Literacy
- Poverty
- Employment
- Gross Domestic Product (GDP)
- Net State Domestic Product (NSDP)
- Per Capita Income
- Agriculture & Irrigation
- Industry
- Transportation

## **0.6 TRAFFIC SURVEYS, ANALYSES AND FORECAST**

### **0.6.1 Traffic Surveys and Analyses**

Various traffic surveys and analysis have been carried out for addressing the objectives and issues pertaining to widening and strengthening of the project stretch. The surveys conducted include 7-day volume count, Turning movement survey, origin & destination survey, speed and delay survey, pedestrian count survey, willingness to pay survey etc. The study aims at obtaining the existing traffic and travel characteristics on the project corridor and forecasting the same for the project horizon year considering various constituent streams and various scenarios. The results of this analysis will form inputs for developing capacity augmentation proposals, designing the pavement, design of intersections, decisions regarding grade separators, pedestrian facilities, designing the toll plaza, wayside amenities, planning the tolling strategy and carrying out economic and financial analysis.

The project stretch, which is having a length of 47.000 km, is divided into three homogeneous road sections on the basis of traffic generation and dispersal nodes located along the project road. The important dispersal / generation location identified along the project road include:

- Outer ring road at km 14.000 is the starting point of project stretch.
- Moinabad at km 23.600 is a major settlement and having four lane from ORR.

- Chevella at km 41.400 is the minor settlement, diversion point for Farooq Nagar.
- Manneguda at km 60.000 is the major settlement, diversion point for Vikarabad and end point of project stretch.

Considering the above mentioned traffic generation/diversion point, the project stretch is divided into three homogeneous section for the purpose of analysis and presentation of traffic and travel characteristics. Table 0.1 gives the details of the homogeneous section defined for the study.

#### Homogeneous traffic section

Section No.	Starting		Ending		Length
	Existing km	Place	Existing km	Place	
I	Km 14.000	ORR	Km 23.600	Moinabad	9.600
II	km 23.600	Near Moinabad	km 41.400	Chevella	17.800
III	km 41.400	Chevella	km 60.200	Manneguda	18.800

The average daily traffic (ADT) has been converted to average annual daily traffic (AADT) using seasonal correction factors. The AADT is the input for various analyses like traffic forecast, capacity augmentation, pavement design, economic and financial analysis etc. Table below gives the ADT and AADT plying on the project road.

#### Summary of ADT & AADT at count locations

Sl. No.	Location	ADT		AADT	
		Nos.	PCUs	Nos.	PCUs
1	km 32.000	8053	10352	8053	10352
2	km 57.300	10282	14811	10282	14811

#### 0.6.2 Traffic Forecast

Traffic demand plays the most important factor in deciding the type of facility (infrastructure) to be provided. This in turn determines likely costs to develop and benefits arising out of the improvement. A highway project of this nature calls for significant investment. Prediction of traffic demand becomes an important task and has to be carried out accurately. For the design of pavement, plan for future maintenance programme as well as capacity augmentation and for economic & financial evaluation, it is necessary to have realistic estimation of the size of traffic in the Concession period of 20 years.

Traffic forecasting is made by determining the past trend of traffic flow and by the use of economic models developed to co-relate past vehicle registration data with economic indices such as per capital income (PCI), net state domestic product (NSDP) and gross domestic product (GDP). By using the elasticity values obtained from the economic models and the likely rate of growth of indicators, the mode wise growth rates are obtained. Applying these growth rates, future traffic volume is estimated.

The traffic estimated for future years are given in the Table below.

#### Projected sectional traffic (AADT) in PCUs

Section	2015	2020	2025	2030	2035	2040	2045
I	10355	14470	19212	24238	29058	34895	41969
II	10355	14470	19212	24238	29058	34895	41969
III	14811	20361	26691	33349	39715	47391	56662

Projected sectional AADT was compared with design service volume. The design service volume for project road is considered at the end of LOS B and LOS C and capacity augmentation is suggested for road section, which carry traffic volume more than design service volume.

It is reminded that the lane adequacies shown are based on present and future traffic and guidelines proposed in codes mentioned in Section 2.3. The IRC SP: 84 – 2014 and IRC SP: 73 – 2015 proposes 2-lane with paved shoulder for roads where traffic is less than 10000 PCUs (at the time of bidding) and 2-lane with paved shoulder where traffic exceeds 18000 PCUs. If traffic is between 10000 and 40000 PCUs, the Government may take decision whether to go for stage construction.

Table below shows the year up to which LoS B and LoS C will serve and when the facility is falling to next LoS, for most likely scenario.

**Years to which LoS B and LoS C will serve**

LoS Section	LoS B			LoS C		
	I	II	III	I	II	III
IL	-	-	-	-	-	-
2L + ES	2020	2020	2015	2026	2026	2020
2L + PS	2023	2023	2018	2031	2031	2023
4L + ES	2040	2040	2031	Beyond 2045	Beyond 2045	2042
4L + PS	2043	2043	2035			Beyond 2045
6 Lane	Beyond 2045	Beyond 2045	Beyond 2045			

In the table, the last year up to which the facilities of Intermediate lane, 2-lane and 4-lane will continue to be in LoS B is shown. For example, consider homogeneous section III. The existing 2 lane facility will serve in LoS B till 2015. The 4-lane facility should be ready by end of 2015, for the road section to continue in same LoS. The four lane facility will serve in LoS B up to 2035 and it will fall in LoS C after 2035 onwards. That indicates, for the facility to continue in LoS B, its capacity should be augmented (6 laning) by end of 2035.

## 0.7 DESIGN STANDARDS AND SPECIFICATIONS

The design standards adopted are in conformity to IRC SP 84-2014 Standards for National/State Highways, 4/6 lane configuration, both with respect to highway works, Bridges, other cross drainage works, etc.

## 0.8 DESIGN PROPOSALS

### Proposed Alignment

After carrying out the field investigation, reconnaissance survey of the existing alignment, consultant has made the proposal of the Project alignment.

The existing 2/4 lane highway will be widened to 4/6 lane with 12m median and paved shoulder configuration Widening proposal has been prepared based on availability of additional land / existing ROW, Horizontal geometrics, study of existing bridges and considering Road Safety parameters.

### Pavement Design

Pavement is the most significant component of a road and therefore its performance must be ensured to support the projected traffic loading throughout the design period. Its cost represents a major proportion of the total construction cost.

The project road comprises of three homogeneous sections based on the traffic, CBR and existing Pavement composition. The design inputs considered for pavement design have been summarized:

#### Design Inputs for Flexible pavement Design

DESCRIPTION	Section I - from ORR to Start of Chevella Bypass (From Ch. 14+000 to Ch. 38+800)	Section II Start of Chevella Bypass to Manneguda (From Ch.38+800 to Ch.60+533)
Design life of BT layers (in years)	15	15
MSA for BT Layers	19	16
Lane Distribution factor	0.75	0.75
Directional Distribution	0.5	0.5
CBR	10%	10%

The design as per the IRC: 37 –2012, Base and Sub base is designed for 15 years design life and no stage construction is adopted.

#### Proposed Flexible Pavement Composition

DESCRIPTION	Section I - from ORR to Start of Chevella Bypass (From Ch. 14+000 to Ch. 38+800)	Section II Start of Chevella Bypass to Manneguda (From Ch.38+800 to Ch.60+533)
Bituminous Concrete	40	40
Dense Bituminous Macadam	80	70
Wet Mix Macadam	250	250
Granular Sub Base	200	200
<b>Total</b>	<b>570</b>	<b>560</b>

Sub-grade of 500 mm thickness of CBR value not less 10% and Sub-base material of CBR not less than 30% shall be used.

#### Strengthening of the Existing Pavement

Rehabilitation of the existing pavement may be required for one or more of the following reasons:

- Inadequate riding quality
- High pavement distress
- Reduced coefficient of friction between tyre and pavement, affecting safety.
- Unacceptable high overall-road- user costs
- Inadequate structural capacity to cater for project loading
- Submergence of existing road

#### Overlay Design

Overlay design of pavement is designed as per IRC: 81-1997 for a design life of 10 years.

#### Overlay Design for homogenous section

Sl.	Chainage(Km)	Characteristic Deflection	MSA	BM	Overlay	Design Thickness
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No	From	To	(mm)		(mm)	(mm)	BC (mm)	DBM (mm)
1	14.000	40.400	1.2	12	86.4	64.80	40	50
2	40.400	61.817	1.35	10	102.5	76.87	40	50

### Bridges and Structures

The project stretch consists of 103 Culverts, 13 Vehicular under pass (VUP), 6 LVUP 2 CUP's proposed in the project road.

There are 111 culverts in the project road. Out of 111 culverts, 24 culverts are in poor condition that has been proposed as reconstruction, 54 new culverts are proposed due to bypass/realignment 29 new pipe culverts proposed at minor junction & 4 new pipe culverts are proposed at major junctions.

### Cross Section Type along the Project Corridor

The Project Highway shall be constructed to four/six lane configuration for the Project length. Typical cross sections required to be developed in different segments of the project highway are given below.

Sl. No.	Deign Chainage (km)		Length (m)	TCS Type	Remarks
	From	To			
1	14+000	18+500	4500	2	Mrugavani National Park (RHS)
2	18+500	19+600	1100	2A	No widening section
3	19+600	20+500	900	3	
4	20+500	21+770	1270	2A	4 lane with service road in Urban section
5	21+770	22+670	900	3A	Moinabad Bypass -VUP with service road
6	22+670	24+573	1903	1	
7	24+573	26+420	1847	3A	
8	26+420	27+580	1160	1A	Moniabad Bypass
9	27+580	28+380	800	3A	LHS widening
10	28+380	28+570	190	1A	
11	28+570	28+970	400	1D	LHS widening
12	28+970	29+570	600	1A	Reconstruction
13	29+570	30+330	760	1B	LHS widening
14	30+330	31+230	900	3	
15	31+230	32+900	1670	2B	4 lane with service road in Rural section
16	32+900	35+450	2550	3	
17	35+450	36+270	820	1B	LHS widening
18	36+270	38+200	1930	2B	4 lane with service road in Rural section
19	38+200	39+700	1500	3A	
20	39+700	40+670	970	1	Chevella Bypass
21	40+670	41+470	800	3A	Chevella Bypass

Sl. No.	Deign Chainage (km)		Length (m)	TCS Type	Remarks
	From	To			
22	41+470	44+170	2700	1	Chevella Bypass
23	44+170	45+070	900	3A	Chevella Bypass
24	45+070	46+300	1230	1	
25	46+300	47+270	970	3	
26	47+270	47+870	600	1A	LHS widening
27	47+870	48+070	200	1D	Reconstruction
28	48+070	48+420	350	1B	RHS widening
29	48+420	48+570	150	1D	Reconstruction
30	48+570	49+170	600	1B	RHS widening
31	49+170	49+770	600	1D	Reconstruction
32	49+770	50+370	600	3	
33	50+370	52+220	1850	1B	RHS widening
34	52+220	52+620	400	1C	In builtup
35	52+620	52+870	250	1B	RHS widening
36	52+870	53+077	207	1B	RHS widening
37	53+077	53+677	600	3	
38	53+677	53+970	293	1	curve improvement
39	53+970	55+320	1350	1B	RHS widening
40	55+320	56+270	950	3	
41	56+270	57+630	1360	1B	Khandlapalli Reserve Forest-RHS widening
42	57+630	58+430	800	3	
43	58+430	60+220	1790	1B	Khandlapalli Reserve Forest-RHS widening
44	60+220	60+533	313	1D	Concentric- at End to match existing alignment
<b>Total Length (Km)</b>			<b>46.533</b>		

#### Realignments / Curve Improvements:

The Following are the Curve Improvements and realignment proposed for the project road:

Sl. No	Existing Chainage (km)		Design Chainage (km)		Design Length (km)	Remarks
	From	To	From	To		
1	19+490	20+300	19+500	20+225	725	Realignment
2	27+850	28+275	28+000	28+400	400	curve improvement
3	28+500	28+865	28+615	29+000	385	
4	30+875	31+300	31+025	31+460	435	
5	31+700	33+050	31+860	33+175	1315	
6	45+550	45+800	46+575	46+820	245	
7	48+210	48+780	49+250	49+800	550	
8	52+635	53+000	53+685	53+995	310	
9	57+230	57+370	58+230	58+380	150	

**Bypasses:** The project stretch passes through heavy built-up areas of Moinabad and Chevella.

Therefore bypasses are proposed for Moinabad and Chevella town.

Sl. No	Existing Chainage		Design Chainage		Design Length (km)	Remarks
	From	To	From	To		
1	22+000	26+120	21+950	26+300	4.35	Moinabad Bypass
2	38+650	44+115	38+700	45+200	6.50	Chevella Bypass

**Protected Areas:**

Mrugavani National Park (MNP), a notified protected area [Dt. July, 21 1998 under section 35(4) of Wildlife (P) Act, 1972] is located adjacent to the road on right hand side. As per the recommendation of sub-committee on Guidelines for roads in protected areas [In pursuance to the decision taken by Standing Committee of National Board for wildlife in its 28<sup>th</sup> meeting held on 20<sup>th</sup> March 2013], *NO WIDENING IS PROPOSED.*

**Forest Locations:**

The project road traverses 4.784 km and 1.395 km through Mudimiyal RF and Kandlapally RF respectively.

**At grade intersections:**

(A) **Major Intersections:** There are 4 major junctions proposed along the project road.

Sl. No.	Design Chainage in Km		Type of Major Junction	Remarks
	Design	Existing	Junction	
1	22200	-	3-legged	Moinabad Bypass Start
2	26050	-	3-legged	Moinabad Bypass End
3	39100	-	3-legged	Chevella Bypass Start
4	44600	-	3-legged	Chevella Bypass End

(B) **Minor Intersections:** There are 29 minor junctions proposed along the project road.

Sl. No.	Chainage in Km		Type of Minor Junction	Category of Road	Towards	
	Design	Existing			LHS	RHS
1	14+200	14+212	3-legged	ORR service road	-	Narsing to appa service road
2	15+200	15+200	3-legged	City road	Aziz nagar	-
3	17+220	17+270	3-legged	City road	Aziz nagar	Gandhipet
4	18+450	18+525	3-legged	City road	Bakar ram	-
5	19+880	19+970	3-legged	City road	Enkepally	-
6	20+080	20+215	3-legged	City road	-	Himayath nagar
7	21+900	22+000	3-legged	City road	Murthuzaguda	-
8	25+000	-	4-legged	City road	Surangal	Moinabad
9	27+245	27+145	3-legged	Village Road	Kanaka mamidi road	-
10	28+000	27890	3-legged	Village Road	Kanaka mamidi road	-

Sl. No.	Chainage in Km		Type of Minor Junction	Category of Road	Towards	
	Design	Existing			LHS	RHS
11	30+790	30+670	3-legged	Village Road	Anjanpally	–
12	31+330	31+225	3-legged	Village Road	–	Appareddy guda
13	32+150	32+040	3-legged	Village Road	Tollkatta	–
14	33+330	33+275	3-legged	Village Road	–	Mudimyal
15	36+580	36+500	3-legged	Village Road	Palgutta	
16	37+800	37+760	3-legged	Village Road		Malkapur
17	38+700	38+770	3-legged	Village Road	Chevella	
18	41+100	-	4-legged	Village Road	Shahabad	Chevella
19	45+100	-	3-legged	Village Road	Chevella	
20	46+620	45+665	4-legged	Village Road	–	Sjhn college of engineering
21	46+720	45+770			Dameriguda	–
22	50+080	49+135	4-legged	Village Road	Bastepur	Mirjaguda
23	52+300	51+300	3-legged	Village Road	Khanapur	–
24	52+660	51+560	3-legged	Village Road	Cross road	
25	53+350	52+440	3-legged	Village Road	Khanapur	–
26	53+400	52+455	3-legged	Village Road	–	Kisthapur
27	55+840	54+900	4-legged	Village Road	Angadi chitampally	Antharam
28	58+000	57+035	3-legged	Village Road	Kandlapally	–
29	59+850	58+945	3-legged	Village Road	–	Gangupalle

#### Toll Plaza:

Toll Plaza shall be provided at the following location:

Location	Location of Toll Plaza (Km)		Minimum Number of Toll Lanes	
	Existing Chainage	Design Chainage	Entry	Exit
Near Angadichittimpalle	53+630	54+600	6+2+1	6+2+1

#### Rest Areas (Wayside Amenities):

Wayside Amenities shall be provided at locations as given below:

Sl. no	Existing Chainage (Km)	Design Chainage (Km)	Location Name	Area(Ha)
1	44+660	45+680	Near Appa reddy guda	2.0

#### Truck lay-by:

The truck lay-by shall be provided at below given location.

Sl. No.	Existing km	Design Chainage	Side
1	19+760	19+800	Both

**Bus bays and Passenger Shelters:**

Bus bays and bus shelters shall be provided in accordance with section 12.5of Manual.

There are 33nos of bus byes proposed along the project road. The bus bays and bus shelters are proposed at the following locations:

Sl. No.	Design Chainage in Km	Bus Bay / Bus shelter
1	15+950	Bus Shelter on RHS
2	17+300	Bus Shelter on RHS
3	17+300	Bus Shelter on LHS
4	17+500	Bus Shelter on RHS
5	18+500	Bus Shelter on LHS
6	18+500	Bus Shelter on RHS
7	19+900	Bus bay on LHS
8	19+800	Bus bay on RHS
9	26+700	Bus Shelter on RHS
10	30+700	Bus Shelter on LHS
11	30+800	Bus Shelter onRHS
12	32+100	Bus Shelter on LHS
13	32+200	Bus Shelter on RHS
14	33+200	Bus Shelter on RHS
15	33+300	Bus Shelter on LHS
16	36+500	Bus Shelter on RHS
17	36+600	Bus Shelter on LHS
18	38+000	Bus Shelter on LHS
19	38+100	Bus Shelter on RHS
20	42+150	Bus bay on LHS
21	42+250	Bus bay on RHS
22	46+650	Bus Shelter on RHS
23	46+800	Bus Shelter on LHS
24	51+100	Bus Shelter on RHS
25	51+200	Bus Shelter on LHS
26	52+550	Bus Shelter on RHS
27	52+650	Bus Shelter on LHS
28	53+370	Bus Shelter on RHS
29	53+470	Bus Shelter on LHS
30	55+750	Bus Shelter on RHS
31	55+900	Bus Shelter on LHS
32	57+900	Bus Shelter on RHS
33	58+050	Bus Shelter on LHS

## 0.9 PRELIMINARY COST ESTIMATES

The consultants have framed the indicative project cost for 4/6 lane with paved shoulder configuration including cost of roads, structures, environmental and social safeguards proposed based on MoRT&H standard data book and schedule of rates (2016-2017) evolved for Telangana State together with market rate for the inputs.

The indicative estimated cost of project road comprises of

- (a) Civil works at Rs. 738.63 crores.
- (b) Total Project Cost is Rs.1077.32 crores.

## 0.10 Financial analysis:

Financial Analysis was carried for the following two options .i.e 1)BOT (Toll) 2).Hybrid Annuity Summary of Results are shown below:

Description	BOT (TOLL)	BOT (Hybrid Annuity)
Concession Period	25 Years	17.5years
Operation Period	22.5years	15 years
Toll Collection Rights	Concessionaire	Authority
Grant/Annuity/Construction support, annuity & O&M	40%	Construction Support – 364.83Cr
		Annuity – 329.40Cr
		Interest – 667.62 Cr
		O&M Payments – 1038.47 Cr
Equity IRR	8.31%( not viable under(BOT)	21.36%
Project IRR	4.9%(less then WACC)	5.76% (Greater then WACC)
Authority Capital requirement during the Construction	NA	364.35 Cr as construction support
Approx. Capital requirement by authority for each year post construction	NA	2035.49 cr. (Annuity, Interest & O & M)