

October 28, 2024

Corporate Relationship Department, BSE Limited Phiroze Jeejeebhoy Towers Dalal Street, Mumbai 400 001	Listing Department, National Stock Exchange of India Limited Exchange Plaza, C-1 Block G Bandra Kurla Complex, Bandra (E), Mumbai 400 051
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Dear Sir / Madam,

Ref.: Scrip Code: 540526, Symbol: IRBINVIT

Sub.: Valuation Report & Toll Revenue and O&M Cost Projection Report for half year ended September 30, 2024

We are enclosing herewith the Valuation Report dated October 28, 2024, as issued by Valuer, namely M/s. KPMG Valuation Services LLP (Firm Registration No. IBBI/RV-E/06/2020/115) for the half year ended September 30, 2024.

We are also enclosing herewith the Toll Revenue and O & M Cost Projection Report issued by M/s. GMD Consultants, Technical Consultant, for each Project SPV.

The Net Asset Value pursuant to Regulation 10 of SEBI (Infrastructure Investment Trusts) Regulations, 2014 based on the Valuation Report issued by the Valuer is as follows:

Statement of Net Assets at Fair Value as at September 30, 2024

Particulars	Amount in millions
A. Assets	1,43,207.45
B. Liabilities	86,506.34
C. Net Assets	56,701.11
Outstanding units	580.50
NAV at Fair Value Per Unit (INR)	97.68

You are requested to take note of the same.

Thanking you,

Yours faithfully,

**For IRB Infrastructure Private Limited
(Investment Manager to IRB InvIT Fund)**

**Swapna Arya
Company Secretary and Compliance Officer**

Encl.: As above



Valuation Report

October 2024





IRB InvIT Fund

Valuation of IRB InvIT Fund and its SPVs

Valuation Report

—
October 2024





Strictly private and confidential

28 October 2024

IRB InvIT Fund
(IDBI Trusteeship Services Limited acting on behalf of IRB InvIT Fund)

IRB Complex,
Chandivali Farm, Chandivali Village,
Andheri (East), Mumbai 400 072,
India

IRB Infrastructure Private Limited

3rd Floor, IRB Complex,
Chandivali Farm, Chandivali Village,
Andheri (East), Mumbai 400 072,
India

Dear Sir,

Valuation Report (“Valuation Report”)

This is in accordance with the terms of reference set out in our Letter of Engagement dated 27 September 2024 (“LoE”), wherein KPMG Valuation Services LLP (Registered valuer entity under Companies (Registered Valuers and Valuation) Rules, 2017 having IBBI Registration No. IBBI/RV-E/06/2020/115) (hereinafter referred to as the “KPMG ” or “Us” or “We”) has been appointed by IRB InvIT Fund (“the Client”, or “IRB InvIT Fund”, or “the Trust” or “You”) in relation to carrying out Enterprise Valuation of 6 Special Purpose Vehicles (“SPVs”) of IRB InvIT Fund and Equity Valuation of IRB InvIT Fund (jointly referred as “Targets”) as on the agreed date of the valuation in accordance with Regulation 21 of the Securities Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 (“SEBI InvIT Regulations”) where valuation is required to be conducted by a registered valuer (as defined under section 247 of the Companies Act, 2013) and such valuation report (“Report”) is required to be in compliance with the SEBI InvIT Regulations (“Engagement”).

The date for the valuation is 30 September 2024 (“Valuation Date”).

We hereby enclose our Valuation Report dated 28 October 2024. This is our deliverable and sets out KPMG’s conclusions on the valuation of the Targets and has been prepared in accordance with the LoE as of Valuation Date.

The report is based on the information provided to KPMG by the management of the Targets (“Management”). As detailed in the enclosed Valuation Report, the NAV at fair value per unit of IRB InvIT Fund is **INR 97.68 per unit** as on 30 September 2024.

The Valuation Report is confidential to the Client and will be used by the Client only for the purpose, as indicated in this Report, for which we have been appointed.

The results of our valuation analysis and our Report cannot be used or relied by the Client for any other purpose or by any other party for any other purpose whatsoever.

The Valuation Report is issued by us on the express understanding that it shall not be copied, disclosed or circulated or referred to in correspondence or in discussion with any third party or used for any other purpose without KPMG’s prior written consent. We are aware that the Report may have to be shared with certain regulatory authorities in India and stock exchanges in India and therefore Report may enter the public domain and hereby provide our consent to such sharing. It is clarified that reference to this Valuation Report in any document and/ or filing with aforementioned regulatory authorities/ stock exchanges in India, shall not be deemed to be an acceptance by the Valuer of any responsibility or liability to any person/ party other than the Client.

We will not, pursuant to the LoE, perform any management functions for You, nor make any decisions. You are responsible for making management decisions, including accepting responsibility for the results. Additionally, the Clients are responsible for designating a management-level individual or individuals responsible for overseeing the services provided, evaluating the adequacy of the services provided, evaluating any findings or recommendations, establishing and maintaining internal controls, and monitoring ongoing activities.

The Valuation Report does not constitute an offer or invitation to any section of the public to subscribe for or purchase any securities in, or the other business or assets or liabilities of the Targets or Client. This letter forms an integral part of the Valuation Report and should be read in conjunction with the Valuation Report enclosed herein.

The Valuation Report has been prepared by KPMG Valuation Services LLP (IBBI Registration No. IBBI/RV-E/06/2020/115) solely for the purpose as stated above. The Valuation Report forms an integral whole and cannot be split into parts. The outcome of the valuation can only lead to proper conclusions if the Valuation Report as a whole is taken into account.

Yours faithfully

For KPMG Valuation Services LLP

Registered Valuer Entity under Companies (Registered Valuers and Valuation) Rules, 2017
IBBI Registration No. IBBI/RV-E/06/2020/115

Asset Class: Securities or Financial Assets

Amit Jain, Partner

IBBI Registered Valuer No- IBBI/RV/06/2018/10501



Glossary

%	Percentage	IBEF	India Brand Equity Foundation	n.m.	No Meaningful Figure
A	Actual	IDAA	IDAA Infrastructure Limited	NA	Not applicable
Adj.	Adjusted	IMF	International Monetary Fund	NAV	Net Asset Value
B	Budgeted	INR	Indian Rupee	NHAI	National Highway Authority of India
bn	Billion	InvIT	Investment Trust	NWC	Net Working Capital
CAGR	Compounded Annual Growth Rate	IRBJD	IRB Jaipur Deoli Tollway Limited	O&M	Operation and Maintenance
Capex	Capital Expenditure	IRBPA	IRB Pathankot Amritsar Toll road Limited	PAT	Profit After Tax
CoCo	Comparable Companies	IRBTA	IRB Talegaon Amravati Tollway Limited	PBT	Profit Before Tax
COD	Commercial operation date	IRBTC	IRB Tumkur Chitradurga Tollway Limited	PIB	Press Information Bureau
CoTrans	Comparable Transactions	IRB InvIT	IRB Infrastructure Trust	PV	Present Value
Cr	Crore	IRBIDL	IRB Infrastructure Developers Limited	R(f)	Risk free rate of Return
CWIP	Capital Work In Progress	IRBSD	IRB Surat Dahisar Tollway Limited	R(m)	Market rate of Return
BOT	Build, Operate and Transfer	Kd	Cost of Debt	Rf	Risk-free Rate
DCF	Discounted Cash Flow	Ke	Cost of Equity	SEBI	Securities and Exchange Board of India
EBIT	Earnings Before Interest and Tax	Km	Kilometer	SPV	Special Purpose Vehicle
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization	KPMG	KPMG Valuation Services LLP	Valuation Date	30-Sep-24
EV	Enterprise Value	LoE	Letter of Engagement	VK1	VK1 Expressway Limited
FCFF	Free Cash Flows to Firm	Management	Management of IRB InvIT Fund and its 6 SPVs	WACC	Weighted Average Cost Of Capital
FV	Fair Value	MAT	Minimum Alternate Tax	WPI	Wholesale Price Index
FY	Financial Year	mn	Million	y-o-y	Year on year
HAM	Hybrid Annuity Method	MoRTH	The Ministry of Road Transport and Highways	YTD	Year to date
		MVR	M.V.R. Infrastructure and Tollways Limited		

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1.

Executive Summary

Overview

Terms of the Engagement

- We have been appointed by IRB InvIT Fund to undertake Enterprise Valuation of 6 Special Purpose Vehicles of the Trust and Equity Valuation of IRB InvIT Fund in accordance with Regulation 21 of the Securities Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 where valuation is required to be conducted by a registered valuer.
- As per the LoE, the valuation is to be carried out as on 30 September 2024. This report has been prepared by KPMG pursuant to terms of LoE.
- As at 30 September 2024 IRB InvIT Fund assets comprised of the following 6 operational SPVs acquired by the Trust from the Sponsor:
 - IRB Pathankot Amritsar Toll Road Limited ("IRBPA")
 - IRB Jaipur Deoli Tollway Limited ("IRBJD")
 - IRB Talegaon Amravati Tollway Limited ("IRBTA")
 - IRB Tumkur Chitradurga Tollway Limited ("IRBTC")
 - M.V.R. Infrastructure and Tollways Limited ("MVR")
 - VK1 Expressway Limited ("VK1")

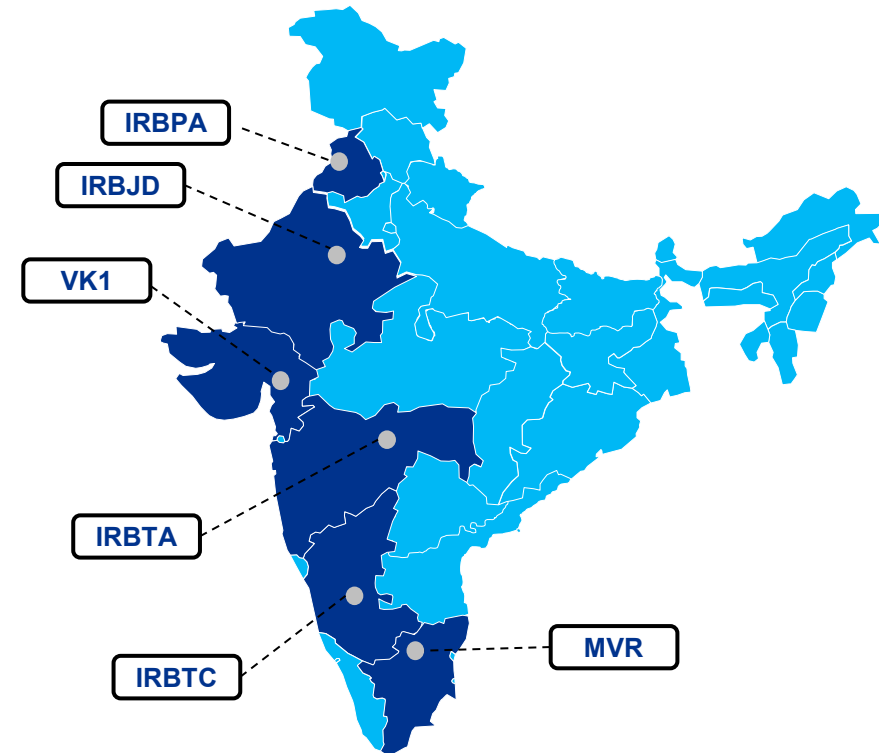
Valuation Approach and Methodology

Approach	Method
Income Approach	Discounted Cash Flow Method (DCF)

Source(s): Management information, KPMG analysis

SPV Overview

The Trust owns, operates and maintain a portfolio of six operational road assets that includes five BOT assets and one HAM asset, in the Indian state(s) of Maharashtra, Gujarat, Rajasthan, Karnataka, Tamil Nadu and Punjab. These roads assets are operated and maintained pursuant to concessions granted by the National Highways Authority of India (NHAI).



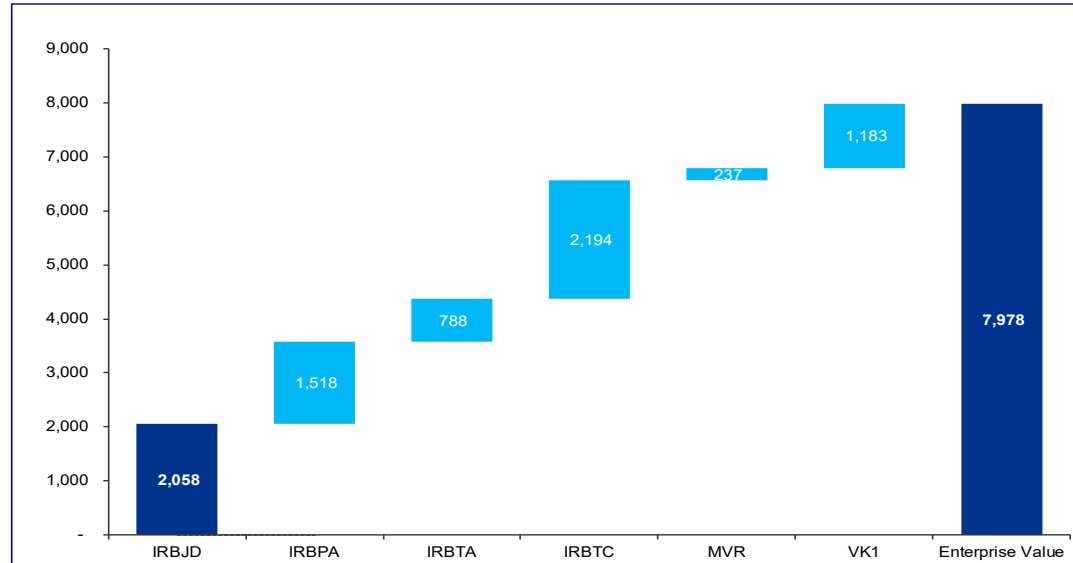
Valuation Conclusion

Valuation Conclusion (INR Crs)

Valuation Conclusion 30 September 2024	INR Crore
IRB Jaipur Deoli Tollway Limited	2,058
IRB Pathankot Amritsar Toll Road Limited	1,518
IRB Talegaon Amravati Tollway Limited	788
IRB Tumkur Chitradurga Tollway Limited	2,194
M.V.R. Infrastructure and Tollways Limited	237
VK1 Expressway Limited	1,183
Enterprise Value of the SPVs	7,978
Cash and cash Equivalents	106
PV of Investment manager fees	(130)
Surplus	154
Capital Creditors	(17)
Debt and Debt like items	(2,421)
Equity value of IRB InvIT Fund	5,670

NAV at fair value per unit as on 30 September 2024	
Equity Value of IRB InvIT Fund (INR Cr)	5,670
Units outstanding (No.)	580,500,000
NAV at fair value per unit (INR)	97.68

Enterprise Value of SPVs



The Enterprise Value of the SPVs is INR 7,978 crores and the 100% Equity Value of the IRB InvIT Fund is INR 5,670 crores as on 30 September 2024.

The NAV at fair value per unit of IRB InvIT Fund as on 30 September 2024 is INR 97.68 per unit.

Note: SPVs are individually referred as “Target”, “Business”, “Company”, “SPV” or the “Asset” Collectively referred as SPVs or Assets

Source(s): Management information, KPMG analysis

2.

IRB InvIT Fund Overview

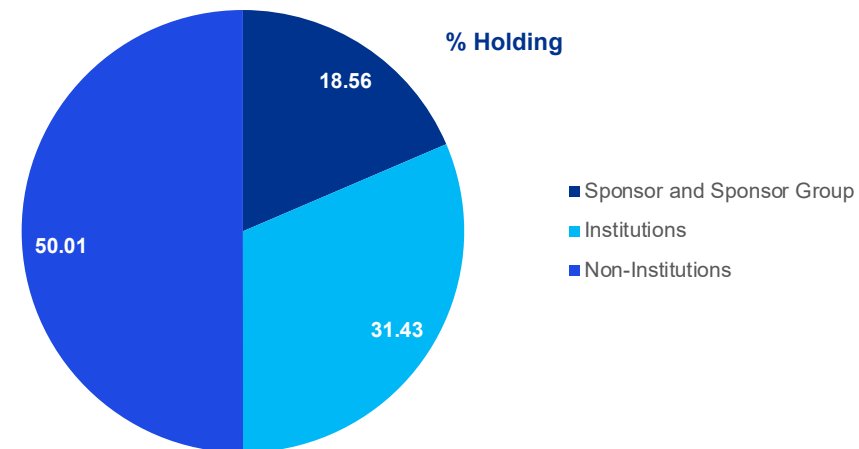
IRB InvIT Fund Overview

IRB InvIT Fund - Overview

- IRB Infrastructure Developers Limited (“IRBIDL” or “Sponsor”) is one of the largest infrastructure development and construction companies in India in the roads and highways sector. It was incorporated on 27 July 1998 and is based in Mumbai, India.
- IRB InvIT Fund (the “Trust”) is a Trust constituted by “The Indenture of Trust” dated October 16, 2015 registered under the Registration Act, 1908 and registered with the Securities and Exchange Board of India as an infrastructure investment trust under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014.
- The Trust is backed by IRB Infrastructure Developers Ltd., as a Sponsor and Project Manager. The Trustee to IRB InvIT is IDBI Trusteeship Services Limited (the Trustee”) and Investment manager for the Trust is IRB Infrastructure Private Limited.
- The Trust has been formed to invest in infrastructure assets primarily being in the road sector in India. All of the Trust’s road projects are implemented and held through Special Purpose Vehicles
- IRB InvIT Fund made an initial offer of 421,568,627 Ordinary Units through public offer at price of INR 102 per Ordinary Unit (the “Offer Price”) in May 2017, and raised INR 4300 cr.
- IRB InvIT Fund was listed in May 2017 with an initial portfolio of six operational Build-Operate-Transfer (BOT) road infrastructure assets. A seventh asset was transferred to the Trust in September 2017. Since then, two assets have been handed back to the National Highways Authority of India following the successful completion of their concession periods, and one Hybrid Annuity Mode (HAM) asset was acquired in October 2022 from the Sponsor.
- The Fund currently manages six operational road assets comprising five BOT assets and one HAM asset.

Source: Management Information, Company filings, Annual Report FY24

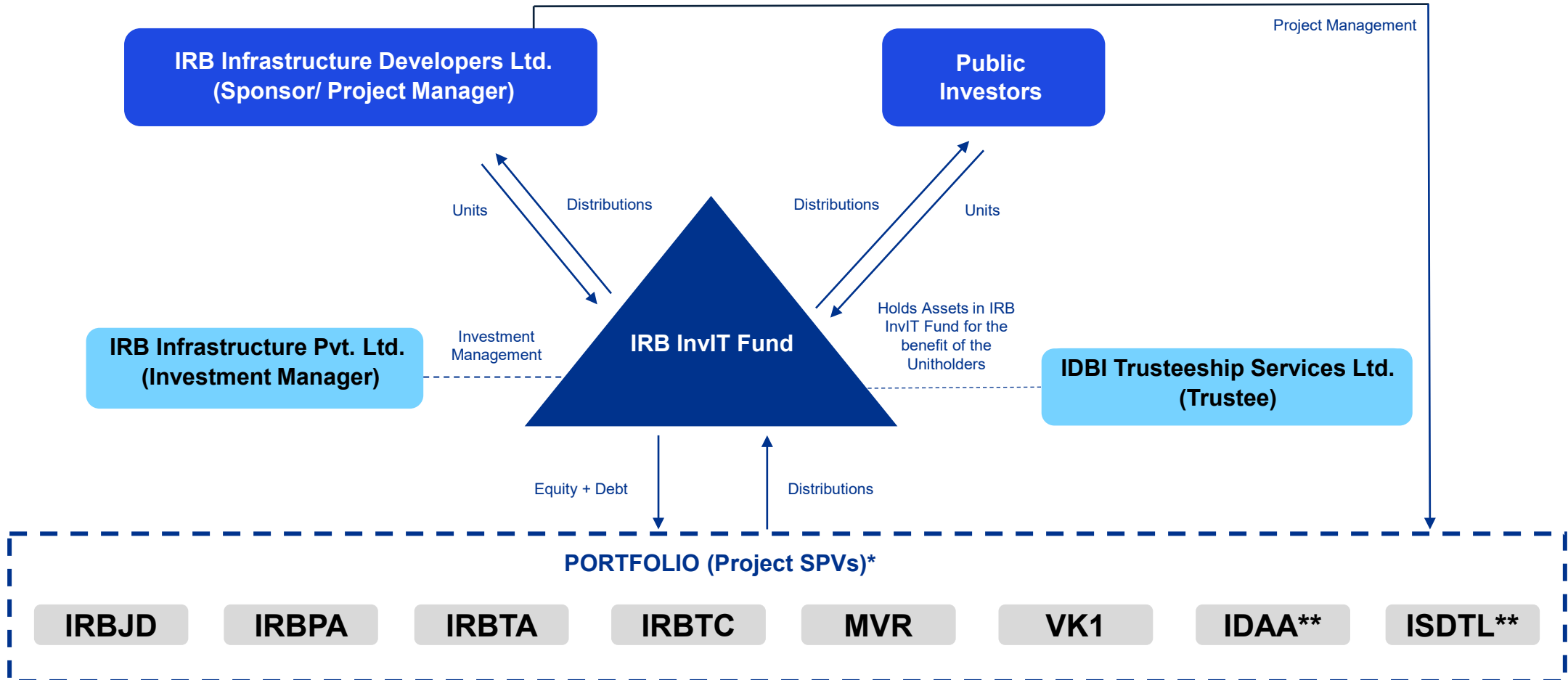
Shareholding Pattern of IRB InvIT Fund as on 30 September 2024



Key related parties of the IRB InvIT

Role	Entity Name
Sponsor	IRB Infrastructure Developers Limited
Investment Manager	IRB Infrastructure Private Limited
Project Manager	IRB Infrastructure Developers Limited
Trustee	IDBI Trusteeship Services Limited

Structure of the IRB InvIT Fund



*100% of project SPV held by the IRB InvIT Fund.

** Concession period for IDAA and ISTDL ended on 31st March, 2022 and 25th May, 2022 respectively. Hence currently they are classified as Non-operational entities

Source(s): IRB InvIT Fund Annual Report, Management



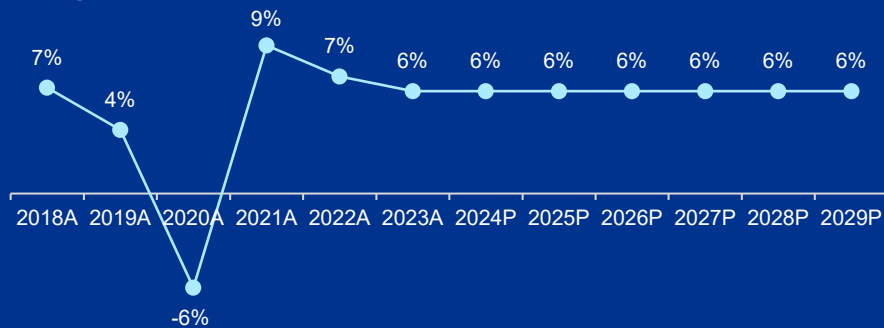
3.

Industry Overview

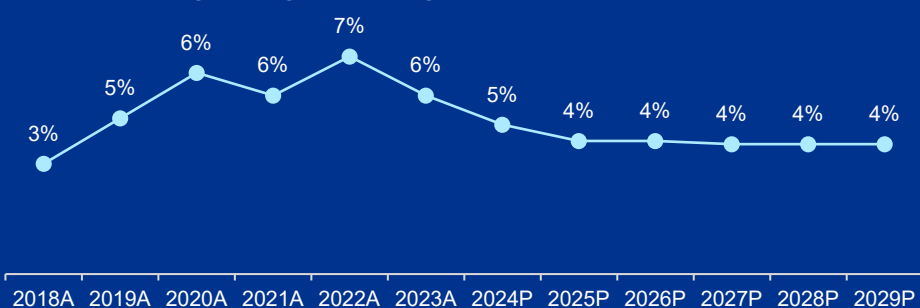
Indian Economy Outlook

Strong economic growth in the first quarter of 2023 helped India overcome the UK to become the fifth-largest economy after it recovered from the COVID-19 pandemic shock. Also, according to IMF economic outlook, India continues to be the fastest-growing economy in the world.

Real GDP growth rate (%)



Annual percentage changes of average consumer prices (%)



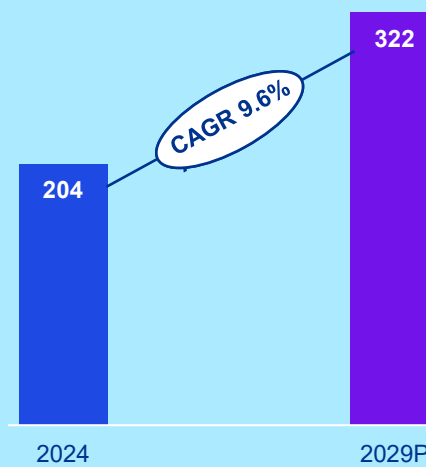
Source(s): International Monetary Fund ("IMF"), India Brand Equity Foundation ("IBEF"), Modor intelligence, EMIS

Infra Sector

Infrastructure is a key enabler in helping India become a USD 26 trillion economy by 2047. The government has announced a strong pipeline of infra projects across sectors.

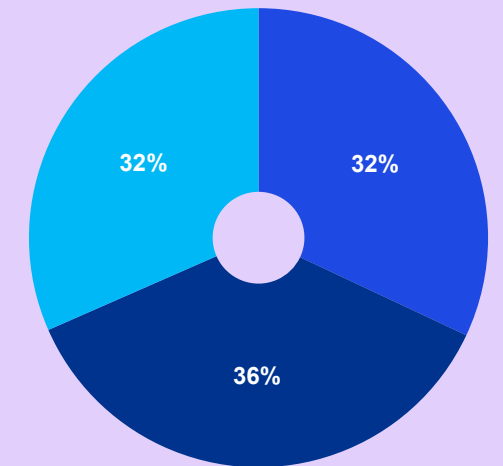
Capital investment outlay for infrastructure is being increased by 33 per cent, which would be 3.3 per cent of GDP and almost three times the outlay in 2019-20.

India Infrastructure market (USD billion)



Construction Industry

Market segmentation of India's Construction industry (2024)



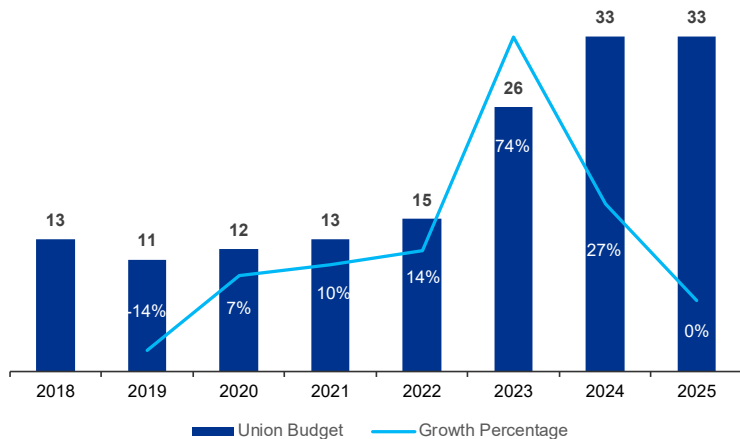
- Infrastructure construction
- Residential construction
- Commercial and special economic zones

Road Transport and Highways

Road Transport and Highways sector

- The Ministry of Road Transport and Highways (“MoRTH”) formulates and administers policies for road transport, national highways and transport research. It is also involved with the construction and maintenance of the National Highways (“NHs”) through the National Highways Authority of India (“NHAI”), and the National Highway and Infrastructure Development Corporation Limited (“NHIDCL”). NHAI is an agency of MoRTH which is also responsible for the toll collection on several highways.
- Under Interim Budget 2024-25, capital investment outlay for infrastructure has been increased by 11.1% to RS 11.1 lakh crore, which is 3.4% of GDP.

Outlay for Roads under the Union Budget (USD billion)

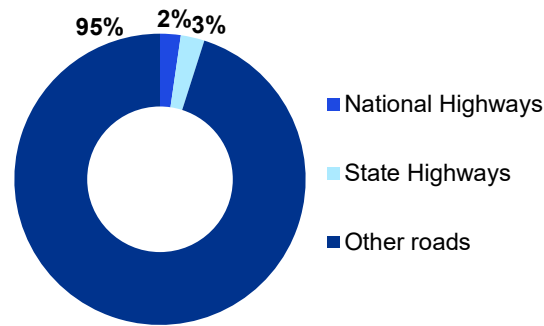


Source(s): MoRTH, IBEF, Invest India

2nd

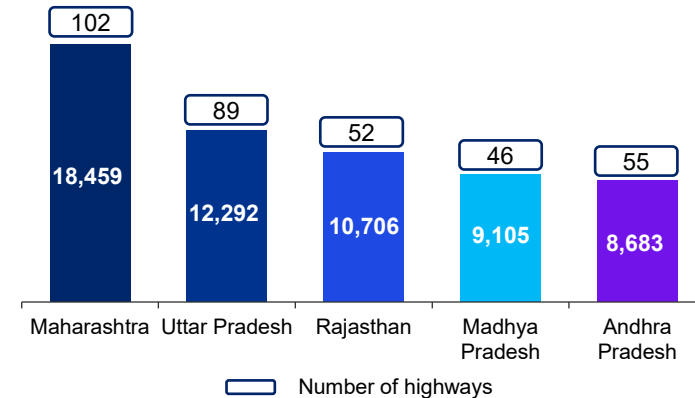
India has the second largest road network in the world of about 67 lakh km. This comprises National Highways, Expressways, State Highways, District Roads, Other District Roads and Village Roads.

Road & Highway – classification breakup



As per the data from Ministry of Road Transport and Highways, National Highways (NHs) make up for about 2.2 per cent (1,46,145 km) of the total road network of India (66,71,083 km).

Top 5 states by length of NHs in India (Km)



National Highways carry over 40 per cent of the total traffic across the length and breadth of the country. Maharashtra has the largest network of National Highways with 18,459 km (12.7%). As per MoRTH, there are 970 highways in India. (State-wise split is as per March 2024)

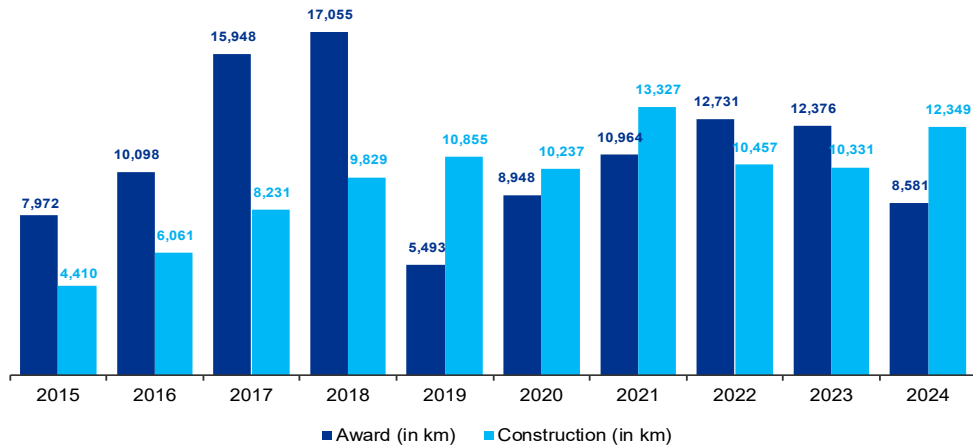
36.2%

The market for roads and highways in India is projected to grow at a CAGR of 36.2 per cent during 2016-2025, on account of growing government initiatives to improve transportation infrastructure in the country.

Key drivers of the sector

Pace of length of highways awarded and constructed (in kms)

The awarding of projects has picked up pace after the sanction of ambitious Bharatmala programme. The Government of India has allocated INR 1.9 lakh crore under the National Infrastructure Pipeline for 2025. The government also aims to construct 23 new national highways by 2025.



CAGR - Length of highways constructed



Estimated toll collection (in INR lakh crore)



Road construction target (in km)



Estimated road constructed per day

Source(s): MoRTH, Press Information Bureau ("PIB"), Money control

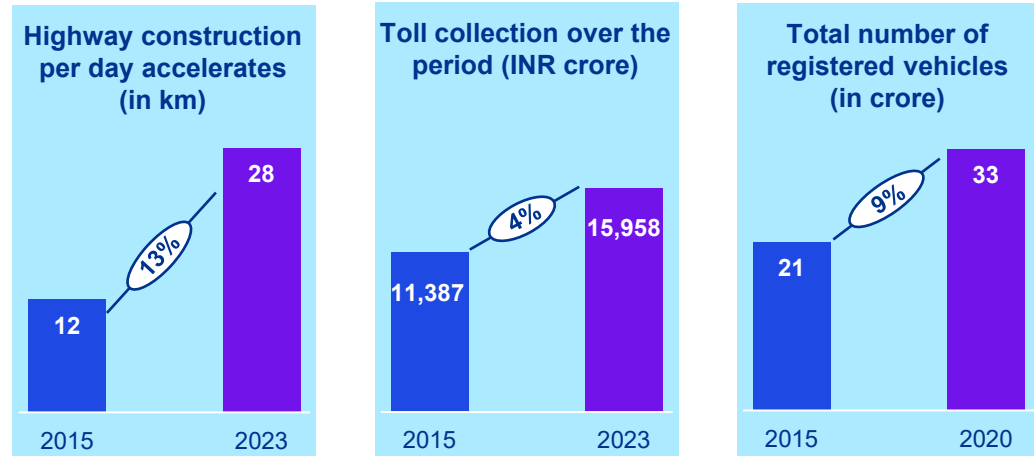
Toll operations efficiency increased due to adoption and growth of FASTag

8.8 Cr

As of 31st March 2024, banks have issued over 8.8 crore FASTags

190 Cr

The average daily collection via FASTag on NH fee plaza is INR 190.6 crore thereby increasing efficiency in toll operations.



2023 data is as of 05 January 2024
○ - CAGR

Government has implemented multiple initiatives in the last 9 years to augment the capacity of the National Highway infrastructure in the country. The pace of National Highways construction has increased consistently between 2014-15 and 2022-23 due to the systematic push through corridor-based National Highway development approach.

Financing in road infrastructure

Financing infrastructure

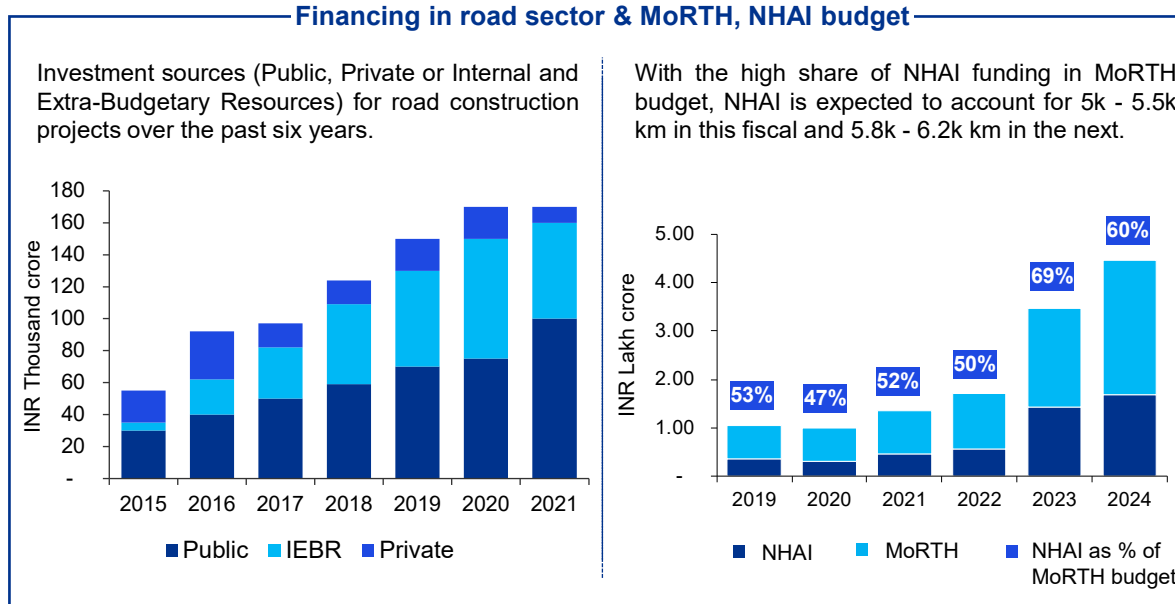
Investment in road infrastructure is long-term and returns are seen several years after construction. Roads and highways are financed through Government and private sources. Funding from Government sources includes budgetary allocations.

Private financing

Under private financing, the private developer builds a road, and in return has the right to collect toll for a specified period of time. The developer is responsible for the maintenance of roads during this period.

Public financing

Funding from government sources includes budgetary allocations, which are financed from taxes, cesses, or dedicated road funds. Publicly funded projects are usually given to contractors under various contract models such as the Engineering Procurement Construction (EPC).



Types of projects awarded by NHA

a. Engineering Procurement & Construction

Under the EPC model, Government pays private players to lay roads. The private player has no role in the road's ownership, toll collection or maintenance.

b. Build Operate Transfer ("BOT")

Private players build, operate and maintain the road for a specified period before transferring the asset back to the Government. The private player arranges all the finances for the project, while collecting toll revenue/annuity fee from the Government.

c. Hybrid Annuity Model ("HAM")

HAM is a hybrid model, a mix of the EPC and BOT (build, operate, transfer) models. HAM combines EPC (40 per cent) and BOT-Annuity (60 per cent). On behalf of the government, NHA releases 40 per cent of the total project cost. The balance 60 per cent is arranged by the developer.



Source(s): PRS Legislative research, IBEF, CRISIL, MoRTH, Invest India

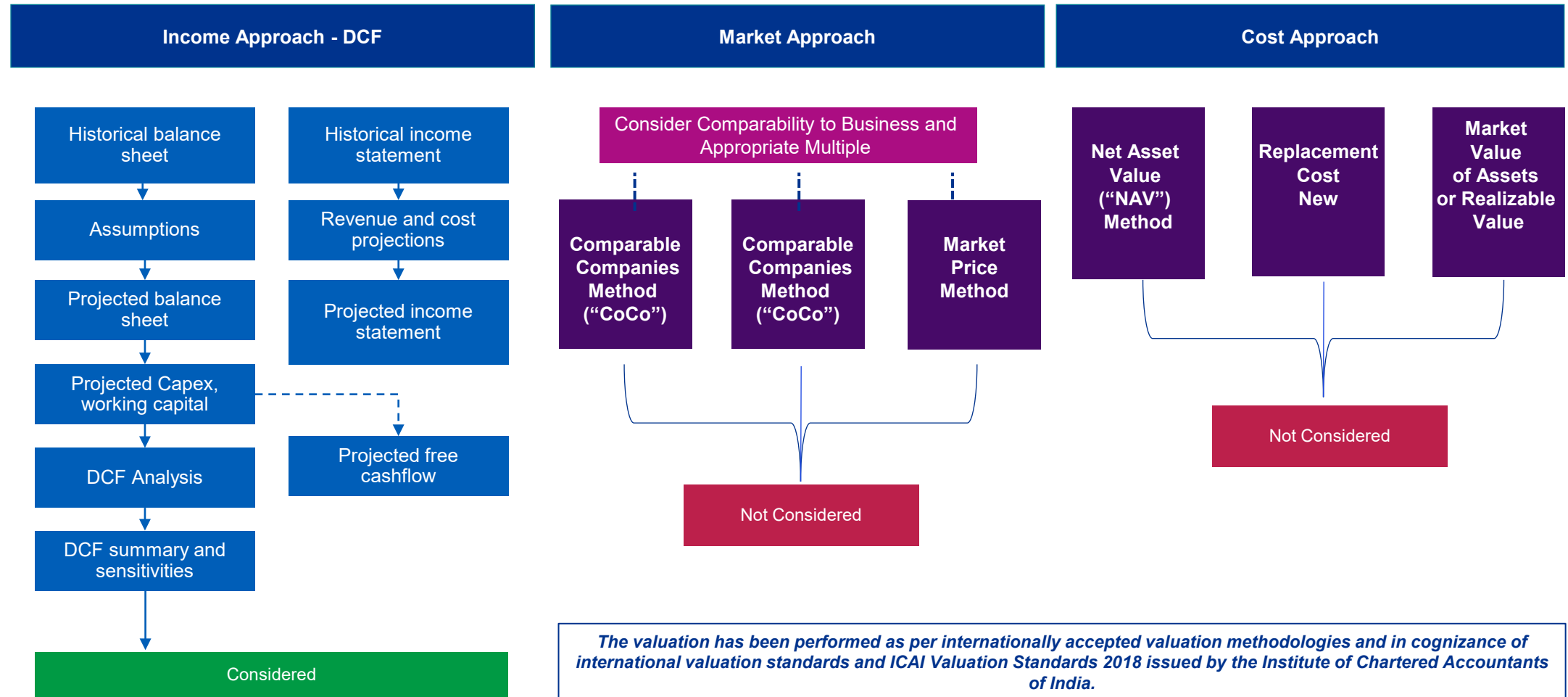
4.

Valuation Methodology and Approach



Valuation Methodology and Approach

Methodology and Approach



Valuation Methodologies - Income Approach



Discounted Cash Flows (“DCF”)

- Under a DCF approach, forecast cash flows are discounted back to the present date, generating a net present value for the cash flow stream of the business. A terminal value at the end of the explicit forecast period is then determined and that value is also discounted back to the valuation date to give an overall value for the business.
- A discounted cash flow methodology typically requires the forecast period to be of such a length to enable the business to achieve a stabilized level of earnings, or to be reflective of an entire operation cycle for more cyclical industries.
- The rate at which the future cash flows are discounted (“the discount rate”) should reflect not only the time value of money, but also the risk associated with the business’ future operations. The discount rate most generally employed is weighted average cost of capital (“WACC”), reflecting an optimal as opposed to actual financing structure.
- In calculating the terminal value, regard must be had to the business’ potential for further growth beyond the explicit forecast period. The “constant growth model”, which applies an expected constant level of growth to the cash flow forecast in the last year of the forecast period and assumes such growth is achieved in perpetuity, is a common method. These results would be cross-checked, however, for reasonability to implied exit multiples.
- Due to the finite life of the concession period of the SPVs, we have not computed a terminal value for the valuation of the SPVs.
- The rate at which future cash flows are discounted should reflect not only the time value of the cash flows but also the risk associated with the business’ future operations. This means that in order for a DCF to produce a sensible valuation figure, the importance of the quality of the underlying cash flow forecasts is fundamental.
- The DCF approach has been applied in the valuation of the SPVs.

Valuation Methodologies - Market Approach



Comparable Companies ("CoCo")

- Under comparable companies method, the value of shares / business of a company is determined based on market multiples of publicly traded comparable companies. Although no two companies are entirely alike, the companies selected as comparable companies should be engaged in the same or a similar line of business as the subject company.
- The appropriate multiple is generally based on the performance of listed companies with similar business models and size.
- The CoCo methodology has not been applied in the valuation of IRB InvIT Fund and SPVs.
- The list of companies in the road segment have mix of assets which are at different stages of operation / development / revenue mix/ leasing period. Therefore, comparable companies' method is not considered.



Comparable Transactions ("CoTrans")

- Under comparable transactions method, the value of shares / business of a company is determined based on market multiples of publicly disclosed transactions in the similar space as that of the subject company. Due to different purposes of investments, transaction rationale and synergy benefits, different control premiums and minority discounts are embedded in the transaction values.
- Multiples are generally based on data from recent transactions in a comparable sector, but with appropriate adjustment after consideration has been given to the specific characteristics of the business being valued.
- The list of transactions in the road segment have mix of assets which are at different stages of operation / development / revenue mix/ leasing period. Therefore, comparable transactions method has not been considered for the valuation of IRB InvIT Fund and SPVs.



Market Price Method

- Under this approach, the value of the business is arrived at considering the market price of the company based on the daily moving averages of the last six-month volume traded weighted average of closing price on the stock exchange where the company's shares are most frequently traded.
- The market price methodology has not been considered in the valuation of SPVs as it is not publicly listed or traded on any stock exchange.

Valuation Methodologies – Cost Approach



Net Asset Value (“NAV”) Method

- Under the net asset value approach, total value is based on the sum of net asset value as recorded on the balance sheet.
- A net asset methodology is most applicable for businesses where the value lies in the underlying assets and not the ongoing operations of the business.
- The net assets methodology has not been considered for the valuation of IRB InvIT Fund and SPVs as the Targets are operational and the financials are made on a going concern basis.



Replacement Cost New

- The replacement cost of a business is the cost of acquiring similar assets employed in the business and/or reaching a similar level of development. A purchaser, faced with a build versus buy scenario, may be prepared to pay significantly over and above this cost to obtain advantages including time saved in developing a similar business, and risk of failure.
- The replacement cost method quantifies the cost and risk to reach the present stage of development.
- This approach is often used for start-up/non-mature technology or biotech businesses.
- Hence, the replacement cost method has not been considered.



Market Value of Assets or Realizable Value

- Under the market value methodology, total value is based on the sum of market value of asset less market value of liabilities plus, the value of intangible assets not recorded on the balance sheet.
- This methodology is most applicable for businesses where the value lies in the underlying assets and not the ongoing operations of the business.
- Hence, the market value method has not been considered.



Procedures adopted

Procedures adopted

We have carried out the Enterprise Valuation of the SPVs, in accordance with valuation standards as specified / applicable as per SEBI InvIT Regulations, to the extent applicable.

In connection with this analysis, we have adopted the following procedures to carry out the valuation analysis:

- Requested and received financial and qualitative information relating to the SPVs.
- Considered the key terms of concession agreements;
- Analysis of the Management Business Plan;
- Considered the Traffic Study Reports from the independent consultant;
- Discussed with the Management on: background of the SPVs– business and fundamental factors that affect its earning-generating capacity and historical and expected financial performance;
- Analysis of the key economic and industry factors which may affect the valuation of the SPVs;
- Analysis of the information available in public domain/ subscribed databases in respect of the comparable companies/ comparable transactions, as considered relevant by us;
- Conducted site visits in September / October 2024 to assess the operating condition of the projects under the SPVs as per the requirements of SEBI (InvIT Regulations) 2014 (as amended);
- Selection of valuation approach and valuation methodology, in accordance with SEBI (InvIT Regulations), as considered appropriate and relevant by us;
- Analysis of other publicly available information, as considered relevant by us; and
- Determination of Enterprise Value of the SPVs and equity value of IRBI InvIT Fund as on the Valuation Date.



WACC Analysis

Discount Rate and Terminal Value

Discount rate

In order to determine the discount rate, we have used the WACC methodology as set out below:

$$\text{WACC} = K_e * (E/(D + E)) + K_d * (1-T) * (D/(D + E))$$

Where:

- K_e = cost of equity
- E = market value of equity
- K_d = cost of debt
- D = market value of debt
- T = corporate taxation rate

Terminal Value

- Due to the finite life of the concession period of the SPVs, we have not computed a terminal value for the valuation of the SPVs.

The cost of equity is derived using the Capital Asset Pricing Model (“CAPM”) as follows:

- K_e = $R_f + \beta * (R_m - R_f) + \alpha$
- Where: R_f = the current return on risk-free assets
- R_m = the expected average return of the market
- $(R_m - R_f)$ = the average risk premium above the risk - free rate that a “market” portfolio of assets is earning
- β = the beta factor, being the measure of the systematic risk of a particular asset relative to the risk of a portfolio of all risky assets
- α = company specific risk factor (alpha)

Summary - WACC

WACC calculation						
Name of SPV	IRBJD	IRBPA	IRBTA	IRBTC	MVR	VK1
Risk free rate of return	6.90%	6.90%	6.90%	6.90%	6.90%	6.90%
Beta	0.75	0.75	0.78	0.75	0.78	1.18
Equity risk premium	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
Alpha	1.00%	3.00%	1.00%	2.00%	0.00%	0.00%
Cost of Equity	13.16%	15.16%	13.39%	14.16%	12.39%	15.16%
Cost of Debt	9.00%	9.00%	9.00%	9.00%	9.00%	8.50%
Tax Rate	25.17%	25.17%	17.47%	25.17%	17.47%	25.17%
After Tax Cost of Debt	6.73%	6.73%	7.43%	6.73%	7.43%	6.36%
Debt to Capital %	50.0%	50.0%	50.0%	50.0%	50.0%	70.0%
Equity to Capital %	50.0%	50.0%	50.0%	50.0%	50.0%	30.0%
Weighted Average Cost of Capital	9.95%	10.95%	10.41%	10.45%	9.91%	9.00%

Source: KPMG analysis, Management Information and S&P Capital IQ

Refer annexure 2 for detailed WACC workings.

Refer subsequent slides for valuation of each SPV based on the discount rates.

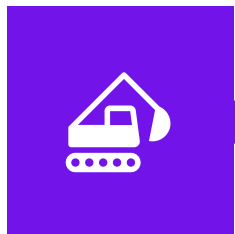
5.

Valuation of Individual SPVs



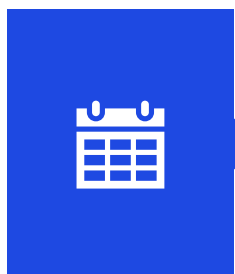
IRB Jaipur Deoli Tollway Limited

Overview



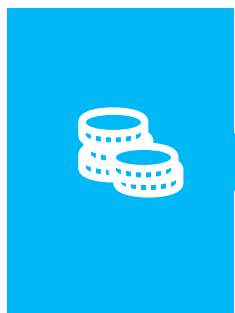
Project details

IRBJD has entered into a concession agreement for four-laning of km 18.7 to km 165.00, Jaipur to Deoli section of NH-12 in the state of Rajasthan on a design, build, finance, operate and transfer (DBFOT) basis. The project stretch is 595 lane kms long with 2 toll plazas. The project is in the state of Rajasthan and passes through districts, viz. Jaipur and Tonk.



Concession period

IRBJD is required to build, operate and transfer the project highway in accordance with the concession agreement for a period of 25 years commencing from the appointed date. This project has been extended by 1,957 days according to article 29 and article 34 of concession agreement for various reasons discussed in the next slide.



Premium / Grant

There is no premium payable to NHAI as per the concession agreement. NHAI provided to IRBJD cash support by way of an outright grant of INR 306 Crores, in accordance with the provisions of the Concession Agreement. The Grant was disbursed to by way of equity support.

Source(s): Management information

Highlights

Particulars	Details
Project location	Jaipur - Deoli
Concessionaire	IRBJD
State	Rajasthan
Tollable length (kms)	146.3
No. of toll plazas	2
Tolling commencement date	May 2014
Concession agreement date	16-Dec-09
Appointed date	14-Jun-10
Completion certificate date	01-Apr-16
Scheduled end date	13-Jun-35
New scheduled end date	21-Oct-40

Shareholding as at 30 September 2024

Particulars	Stake %
IRB InvIT Fund	100%

Key Assumptions

a. Modification in concession period

- As per Clause 29.2 of the concession agreement between NHAI and IRBJD, *“In the event actual average traffic shall have fallen short of the target traffic, then for every 1% shortfall as compared to the target traffic, the concession period shall, subject to payment of concession fee in accordance with this agreement, be increased by 1.5% thereof; provided such increase in concession period shall not in any case exceed 20% of the concession period”*.
- Traffic sampling has been conducted in year 2017, 2018 and 2019. Actual Traffic sampled was 45.25% short than Target Traffic specified in the Concession Agreement. Since the agreement caps the extension to 20%, the maximum allowable extension to concession period was granted, which is 5 years (i.e. 1,826 days). NHAI has approved the extension vide letter dated 18 March 2020.
- Besides the extension mentioned in the agreement, Management represented that the concession period will be increased by further 107 days on account of covid-19 and another 24 days on account of demonetization.
- Accordingly, the Management has confirmed to us to consider revised concession period till 21 October 2040. Thus, the explicit period for the current valuation analysis exercise has been considered from 1 October 2024 to 21 October 2040.

b. Traffic volume

- Traffic volume for the forecast period has been considered based on the traffic report prepared by independent consultant in September 2024.

c. Toll rates

- Annual revision of toll rate for the forecast period shall be in accordance with National Highway Fee (Determination of Rates and Collection) Rules, 2008 and amendment thereto. Additionally, the applicable base rate shall be revised annually on April 1 to reflect the increase in wholesale price index (“WPI”) but such revision shall be restricted to 40% of the increase in WPI on overall basis during the concession period.

- As given in the traffic report, WPI has been projected to grow by 5% initially and stepped down for the future years.

d. Revenue

- Toll revenue has been considered basis the pessimistic scenario from the traffic report prepared by an independent consultant.

e. Periodic maintenance & routine maintenance costs

- Periodic and routine maintenance is based on the agreement with IRB Infrastructure Developers Limited till FY2030. For the forecast period post FY2030, routine and periodic maintenance has been considered based on the technical study conducted by the external professional agency.

f. Depreciation & amortization

- Management has provided the forecast depreciation on assets. Management has forecast depreciation to increase in line with the increase in revenue.

g. Tax

- Management represented that IRBJD is eligible to claim Tax benefit under section 80IA of Income Tax, 1961 from FY2025 to FY2033 and the same has been considered while calculating forecast tax outflows along with any carried forward business loss and unabsorbed depreciation. The SPV will initially pay tax under MAT and gradually shift to the new regime of income tax once its MAT credit is exhausted.

h. Working capital

- The change in WC each year is not material. Therefore, we have only considered the impact of release of working capital at the end of the concession period.

i. Capex

- Since the SPV is already operational, there is no capex to be incurred in the remainder of the concession period.

Source(s): Management information



Discounted Cash Flows (1/2)

Discounted Cash Flow										
	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032	FY2033	
INR crores	6 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months
Revenue	103	213	235	260	284	312	340	374	406	
EBITDA	[A]	96	193	137	154	151	266	304	335	352
EBITDA margin		93%	91%	58%	59%	53%	85%	89%	90%	87%
Depreciation		(20)	(38)	(43)	(47)	(51)	(57)	(62)	(68)	(73)
EBIT		76	155	94	107	100	209	243	268	279
EBIT margin		73%	73%	40%	41%	35%	67%	71%	72%	69%
Less: Tax on EBIT	[B]	-	(17)	(16)	(19)	(17)	(37)	(42)	(47)	(49)
Change in working capital	[C]	-	-	-	-	-	-	-	-	-
Less : Capex	[D]	-	-	-	-	-	-	-	-	-
Free cash flows to the firm E = [A+B+C+D]		96	176	120	135	134	229	262	289	303
Discounting period		0.25	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00
Discount factor	[F]	0.98	0.91	0.83	0.75	0.68	0.62	0.57	0.51	0.47
Present value of cash flows [E*F]		93	160	100	102	91	143	148	149	142

Source(s): Management information, KPMG analysis

Discounted Cash Flows (2/2)

Discounted Cash Flow									
		FY2034	FY2035	FY2036	FY2037	FY2038	FY 2039	FY2040	FY2041
INR crores		12 months	12 months	12 months	12 months	12 months	12 months	12 months	7 months
Revenue		444	484	528	570	618	671	730	439
EBITDA	[A]	283	364	481	521	566	617	673	379
EBITDA margin		64%	75%	91%	91%	92%	92%	92%	86%
Depreciation		(80)	(88)	(95)	(103)	(112)	(121)	(132)	(79)
EBIT		203	277	385	418	455	496	541	300
EBIT margin		46%	57%	73%	73%	74%	74%	74%	68%
Less: Tax on EBIT	[B]	(35)	(48)	(67)	(128)	(143)	(155)	(169)	(95)
Change in working capital	[C]	-	-	-	-	-	-	-	-
Less : Capex	[D]	-	-	-	-	-	-	-	-
Free cash flows to the firm	E = [A+B+C+D]	248	316	413	393	424	462	504	284
Discounting period		9.00	10.00	11.00	12.00	13.00	14.00	15.00	15.78
Discount factor	[F]	0.43	0.39	0.35	0.32	0.29	0.27	0.24	0.22
Present value of cash flows	[E*F]	106	122	146	126	124	122	121	64

Source(s): Management information, KPMG analysis

Valuation conclusion	
INR Crore	
Present value of cash flows	2,058
Present value of release of working capital	(1)
Enterprise Valuation	2,058
WACC	9.95%

Present value of release in working capital represent working capital of negative INR 3 Cr released at the end of the concession period.

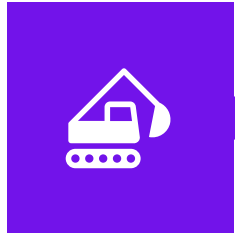
Basis the above and using a WACC of 9.95%, the Enterprise Value of IRBJD, as on 30 September 2024 is INR 2,058 crore.

Please refer to “Summary – WACC” on page 28 for WACC breakup.



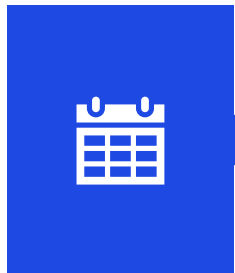
IRB Pathankot Amritsar Toll Road Limited

Overview



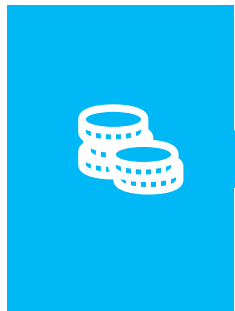
Project details

IRBPA has entered into a concession agreement for four laning for 6.1 kms to 108.5 kms, Pathankot to Amritsar section of NH-15 in the state of Punjab on a design, build, finances, operate and transfer basis. The project stretch is 410 lane kms long with 2 toll plazas. The project is in the state of Punjab and passes through districts of Gurudaspur, Amritsar, Firozpur, Faridkot, Moga, Mukatsar and Bhatinda.



Concession period

IRBPA is required to build, operate and transfer the project highway in accordance with the concession agreement for a period of 20 years commencing from the appointed date. This project has been extended by 2,041 days according to article 29 and article 34 of concession agreement for various reasons discussed in the next slide. Additionally, IRBPA has sought extension of 518 days due to delay in completion of construction of the project. However, the same is under litigation.



Premium / Grant

There is no premium payable to NHAI as per the concession agreement. NHAI provided to IRBPA cash support by way of an outright grant of INR 126.9 Crore, in accordance with the provisions of the Concession Agreement.

Source(s): Management information

Highlights

Particulars	Details
Project location	Pathankot – Amritsar
Concessionaire	IRBPA
State	Punjab
Tollable length (kms)	102.4
No. of toll plazas	2
Tolling commencement date	November 2014
Concession agreement date	16-Nov-09
Appointed date	31-Dec-10
Completion certificate date	27-Nov-14
Scheduled end date	30-Dec-30
New scheduled end date	02-Jan-38

Shareholding as at 30 September 2024

Particulars	Stake %
IRB InvIT Fund	100%

Key Assumptions

a. Modification in concession period

- As per Clause 29.2 of the concession agreement between NHA and IRBPA, *“In the event actual average traffic shall have exceeded the target traffic, then for every 1% excess as compared to the target traffic, the concession period shall, subject to payment of concession fee in accordance with this agreement, be increased by 1.5% thereof, provided such increase in concession period shall not in any case exceed 20% of the concession period”*.
- Traffic sampling has been conducted in year 2018 and 2020. Actual Traffic sampled was 27% short than Target Traffic specified in the Concession Agreement. Since the agreement caps the extension to 20%, the maximum allowable extension to concession period was granted, which is 4 years (i.e. 1,460 days). NHA has approved the extension vide letter dated 5 March 2021.
- Besides the extension mentioned in the agreement, Management presented that the concession period will be increased by 90 days on account of covid-19, 24 days on account of demonetization, and 467 days on account of farmer’s protest.
- Additionally, IRBPA has sought further extension of 518 days due to delay in completion of construction of the project on account of reasons not attributable to IRBPA. However, the matter is under litigation as on Valuation date. Management has considered 518 days of extension in concession period. To account for uncertainty associated with this assumption, We have considered higher Alpha in WACC calculation for IRBPA.
- Accordingly, the Management has confirmed to us to consider revised concession period is till 2 January 2038. Thus, the explicit period for the current valuation analysis exercise has been considered from 1 October 2024 to 2 January 2038.

b. Traffic volume

- Traffic volume for the forecast period has been considered based on the traffic report prepared by an independent consultant in September 2024.

c. Toll rates

- Annual revision of toll rate for the forecast period shall be in accordance with National Highway Fee (Determination of Rates and Collection) Rules, 2008 and amendment thereto.

Source(s): Management information

- Additionally, the applicable base rate shall be revised annually on April 1 to reflect the increase in wholesale price index (“WPI”) but such revision shall be restricted to 40% of the increase in WPI on overall basis during the concession period. As given in the traffic report, WPI has been projected to grow by 5% initially and stepped down for the future years.

d. Revenue

- Toll revenue has been considered basis the pessimistic scenario from the traffic report prepared by an independent consultant.

e. Periodic maintenance & routine maintenance costs

- Periodic and routine maintenance is based on the agreement with IRB Infrastructure Developers Limited till FY2030. For the forecast period post FY2030, routine and periodic maintenance has been considered based on the technical study conducted by the external professional agency.

f. Depreciation & amortization

- Forecasted depreciation on assets has been provided by the Management. Management has forecasted depreciation to increase in line with the increase in revenue.

g. Tax

- Management represented that IRBPA is eligible to claim Tax benefit under section 80IA of Income Tax, 1961 from FY2025 to FY2032 and the same has been considered while calculating forecast tax outflows along with any carried forward business loss and unabsorbed depreciation. The SPV will initially pay tax under MAT and gradually shift to the new regime of income tax once its MAT credit is exhausted.

h. Working capital

- The change in WC each year is not material. Therefore, we have only considered the impact of release of working capital at the end of the concession period.

i. Capex

- Since the SPV is already operational, there is no capex to be incurred in the remainder of the concession period.

Discounted Cash Flows (1/2)

Discounted Cash Flow										
		FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032	FY2033
INR crores		6 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months
Revenue		87	178	198	219	240	263	290	321	348
EBITDA	[A]	60	121	161	188	193	182	261	291	317
EBITDA margin		69%	68%	81%	86%	80%	69%	90%	91%	91%
Depreciation		(24)	(47)	(53)	(58)	(64)	(70)	(77)	(85)	(93)
EBIT		36	74	109	130	129	112	184	205	224
EBIT margin		41%	42%	55%	59%	54%	43%	63%	64%	64%
Less: Tax on EBIT	[B]	-	-	-	(18)	(22)	(20)	(32)	(36)	(39)
Change in working capital	[C]	-	-	-	-	-	-	-	-	-
Less : Capex	[D]	-	-	-	-	-	-	-	-	-
Free cash flows to the firm	E = [A+B+C+D]	60	121	161	170	170	163	229	255	278
Discounting period		0.25	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00
Discount factor	[F]	0.97	0.90	0.81	0.73	0.66	0.59	0.54	0.48	0.44
Present value of cash flows	[E*F]	59	110	131	125	112	97	123	123	121

Source(s): Management information KPMG analysis

Discounted Cash Flows (2/2)

Discounted Cash Flow						
		FY2034	FY2035	FY2036	FY2037	FY2038
INR crores		12 months	12 months	12 months	12 months	9 months
Revenue		380	415	455	494	409
EBITDA	[A]	348	382	420	460	373
EBITDA margin		92%	92%	92%	93%	91%
Depreciation		(101)	(110)	(121)	(132)	(109)
EBIT		247	272	299	328	264
EBIT margin		65%	65%	66%	66%	65%
Less: Tax on EBIT	[B]	(43)	(47)	(106)	(116)	(94)
Change in working capital	[C]	-	-	-	-	-
Less : Capex	[D]	-	-	-	-	-
Free cash flows to the firm	E = [A+B+C+D]	305	335	315	344	279
Discounting period		9.00	10.00	11.00	12.00	12.88
Discount factor	[F]	0.39	0.35	0.32	0.29	0.26
Present value of cash flows	[E*F]	120	118	100	99	73

Source(s): Management information, KPMG analysis

Valuation conclusion	
INR Crore	
Present value of cash flows	1,511
Present value of release of working capital	7
Enterprise Valuation	1,518
WACC	10.95%

Present value of release in working capital represent working capital of INR 28 Cr released at the end of the concession period.

Basis the above and using a WACC of 10.95%, the Enterprise Value of IRBPA, as on 30 September 2024 is INR 1,518 crore.

Please refer to “Summary – WACC” on page 28 for WACC breakup.



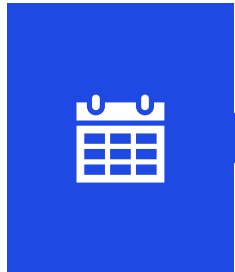
IRB Talegaon Amravati Tollway Limited

Overview



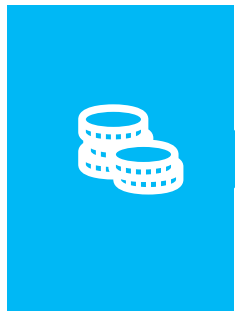
Project details

IRBTA has entered into a concession agreement for four laning for 100 kms to 166.7 kms, Talegaon to Amravati section of NH-6 in the state of Maharashtra on a design, build, finances, operate and transfer (DBFOT) basis. The project stretch is 267 lane kms long with 1 toll plaza. The project is in the state of Maharashtra and passes through cities of Nandgaon Peth, Mozri, Tivsa, and Ramdara.



Concession period

IRBTA is required to build, operate and transfer the project highway in accordance with the concession agreement for a period of 22 years commencing from the appointed date. This project has been extended by 1,733 days according to article 29 and article 34 of concession agreement for various reasons discussed in the next slide.



Premium / Grant

There is no premium payable to NHAI as per the concession agreement. NHAI provided to IRBTA cash support by way of an outright grant of INR 216 Crores, in accordance with the provisions of the Concession Agreement. The Grant was disbursed to by way of equity support.

Source(s): Management information

Highlights

Particulars	Details
Project location	Talegaon – Amravati
Concessionaire	IRBTA
State	Maharashtra
Tollable length (kms)	66.7
No. of toll plazas	1
Tolling commencement date	April 2014
Concession agreement date	18-Nov-09
Appointed date	03-Sep-10
Completion certificate date	25-Jul-18
Scheduled end date	02-Sep-32
New scheduled end date	02-Jun-37

Shareholding as at 30 September 2024

Particulars	Stake %
IRB InvIT Fund	100%

Key Assumptions

a. Modification in concession period

- As per Clause 29.2 of the concession agreement between NHA and IRBTA, *“In the event actual average traffic shall have fallen short of the target traffic, then for every 1% shortfall as compared to the target traffic, the concession period shall, subject to payment of concession fee in accordance with this agreement, be increased by 1.5% thereof; provided such increase in concession period shall not in any case exceed 20% of the concession period”*.
- Traffic sampling has been conducted in year 2019, 2020 and 2021. Actual Traffic sampled was 46% short than Target Traffic specified in the Concession Agreement. Since the agreement caps the extension to 20%, the maximum allowable extension to concession period has been considered, which is 4.4 years (i.e. 1, 606 days). NHA approval on this extension is yet to be received.
- Besides the extension mentioned in the agreement, Management represented that the concession period will be increased by further 103 days on account of covid-19 and another 24 days on account of demonetization.
- Accordingly, the Management has confirmed to us to consider revised concession period till 2 June 2037. Thus, the explicit period for the current valuation analysis exercise has been considered from 1 October 2024 to 2 June 2037.

b. Traffic volume

- Traffic volume for the forecast period has been considered based on the traffic report prepared by an independent consultant in September 2024.

c. Toll rates

- Annual revision of toll rate for the forecast period shall be in accordance with National Highway Fee (Determination of Rates and Collection) Rules, 2008 and amendment thereto. Additionally, the applicable base rate shall be revised annually on April 1 to reflect the increase in wholesale price index (“WPI”) but such revision shall be restricted to 40% of the increase in WPI on overall basis during the concession period. As given in the traffic report, WPI has been projected to grow by 5% initially and stepped down for the future years.

d. Revenue

- Toll revenue has been considered basis the pessimistic scenario from the traffic report prepared by an independent consultant.

e. Periodic maintenance & routine maintenance costs

- Periodic and routine maintenance is based on the agreement with IRB Infrastructure Developers Limited till FY2030. For the forecast period post FY2030, routine and periodic maintenance has been considered based on the technical study conducted by the external professional agency.

f. Depreciation & Amortization

- Forecasted depreciation on assets has been provided by the Management. Management has forecasted depreciation to increase in line with the increase in revenue.

g. Tax

- Management represented that IRBTA is eligible to claim Tax benefit under section 80IA of Income Tax, 1961 from FY2025 to FY2033, the same has been considered while calculating forecast tax outflows along with any carried forward business loss and unabsorbed depreciation. Based on the current forecast, IRBTA is expected to continue to pay tax under MAT regime for the balance of the concession period. .

h. Working capital

- The change in WC each year is not material. Therefore, we have only considered the impact of release of working capital at the end of the concession period.

i. Capex

- Since the SPV is already operational, there is no capex to be incurred in the remainder of the concession period.

Source(s): Management information



Discounted Cash Flows [1/2]

Discounted Cash Flow										
		FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032	FY2033
INR crores		6 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months
Revenue		48	102	112	125	137	152	168	184	203
EBITDA	[A]	41	85	95	73	76	126	141	156	174
EBITDA margin		86%	84%	84%	58%	56%	83%	84%	85%	86%
Depreciation		(12)	(23)	(26)	(28)	(31)	(35)	(38)	(42)	(46)
EBIT		30	62	69	44	45	92	103	114	128
EBIT margin		62%	61%	62%	36%	33%	61%	61%	62%	63%
Less: Tax on EBIT	[B]	-	(10)	(12)	(8)	(8)	(16)	(18)	(20)	(22)
Change in working capital	[C]	-	-	-	-	-	-	-	-	-
Less : Capex	[D]	-	-	-	-	-	-	-	-	-
Free cash flows to the firm	E = [A+B+C+D]	41	75	83	65	69	110	123	136	151
Discounting period		0.25	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00
Discount factor	[F]	0.98	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45
Present value of cash flows	[E*F]	40	68	68	48	46	67	68	68	69

Source(s): Management information, KPMG analysis

Discounted Cash Flows [2/2]

Discounted Cash Flow						
INR crores		FY2034 12 months	FY2035 12 months	FY2036 12 months	FY2037 12 months	FY2038 2 months
Revenue		223	246	270	296	56
EBITDA	[A]	142	156	236	260	18
EBITDA margin		64%	63%	87%	88%	33%
Depreciation		(51)	(56)	(61)	(67)	(13)
EBIT		92	100	175	193	5
EBIT margin		41%	41%	65%	65%	10%
Less: Tax on EBIT	[B]	(16)	(17)	(31)	(34)	(1)
Change in working capital	[C]	-	-	-	-	-
Less : Capex	[D]	-	-	-	-	-
Free cash flows to the firm	E = [A+B+C+D]	126	138	206	226	17
Discounting period		9.00	10.00	11.00	12.00	12.59
Discount factor	[F]	0.41	0.37	0.34	0.30	0.29
Present value of cash flows	[E*F]	52	51	69	69	5

Source(s): Management information, KPMG analysis

Valuation conclusion	
INR Crore	
Present value of cash flows	788
Present value of release of working capital	(0)
Enterprise Valuation	788
WACC	10.41%

Present value of release in working capital represent working capital of negative INR 0.5 Cr released at the end of the concession period.

Basis the above and using a WACC of 10.41%, the Enterprise Value of IRBTA, as on 30 September 2024 is INR 788 crore.

Please refer to “Summary – WACC” on page 28 for WACC breakup.



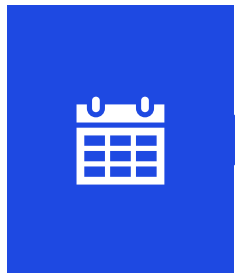
IRB Tumkur Chitradurga Tollway Limited

Overview



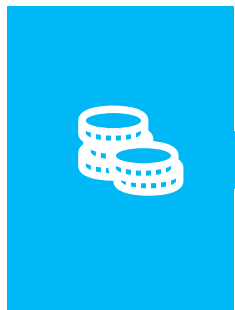
Project details

IRBTC has entered into a concession agreement for six laning for 75 kms to 189 kms, Tumkur to Chitradurga section of NH-4 in the state of Karnataka on a design, build, finances, operate and transfer (DBFOT) basis. The project stretch is 684 lane kms long with 2 toll plazas. The project is in the state of Karnataka and passes through cities of Tumkur, Sira, Hiriya and Chitradurga.



Concession period

IRBTC is required to build, operate and transfer the project highway in accordance with the concession agreement for a period of 26 years commencing from the appointed date. This project has been extended by 2,034 days according to article 29 and article 34 of concession agreement for various reasons discussed in the next slide.



Premium

Concession agreement required IRBTC to pay NHA a premium of INR 140.4 Cr in the 1st year and due in each subsequent year with an 5% increment each year. Subsequently, IRBTC has entered into a supplementary agreement with the NHA dated June 6, 2014, in relation to the deferment of premium payable by IRBTC. This deferment is limited to IRBTC's actual revenue shortfall after meeting the debt obligation and operation expenditure. The deferred portion also carries an interest rate of 2% above the RBI bank rate.

Source(s): Management information

Highlights

Particulars	Details
Project location	Tumkur – Chitradurga
Concessionaire	IRBTC
State	Karnataka
Tollable length (kms)	114.0
No. of toll plazas	2
Tolling commencement date	June 2011
Concession agreement date	16-Aug-10
Appointed date	04-Jun-11
Completion certificate date	04-Jul-14
Scheduled end date	03-Jun-37
New scheduled end date	29-Dec-42

Shareholding as at 30 September 2024

Particulars	Stake %
IRB InvIT Fund	100%

Key Assumptions

a. Modification in concession period

- As per Clause 29.2 of the concession agreement between NHAI and IRBTC, “*In the event actual average traffic shall have fallen short of the target traffic, then for every 1% shortfall as compared to the target traffic, the concession period shall, subject to payment of concession fee in accordance with this agreement, be increased by 1.5% thereof; provided such increase in concession period shall not in any case exceed 20% of the concession period*”.
- Traffic sampling has been conducted in year 2019, 2020 and 2021. Actual Traffic sampled was 25% short than Target Traffic specified in the Concession Agreement. Since the agreement caps the extension to 20%, the maximum allowable extension to concession period has been considered, which is 5.2 years (i.e. 1,899 days). NHAI Approval on this extension is yet to be received.
- Besides the extension mentioned in the agreement, Management represented that the concession period will be increased by further 111 days on account of covid-19 and further 24 days on account of demonetization.
- Accordingly, the Management has confirmed to us to consider revised concession period till 29 December 2042. Thus, the explicit period for the current valuation analysis exercise has been considered from 1 October 2024 to 29 December 2042.

b. Traffic volume

- Traffic volume for the forecast period has been considered based on the traffic report prepared by an independent consultant in September 2024.

c. Toll rates

- *Annual revision of toll rate for the forecast period shall be in accordance with National Highway Fee (Determination of Rates and Collection) Rules, 2008 and amendment thereto. Additionally, the applicable base rate shall be revised annually on April 1 to reflect the increase in wholesale price index (“WPI”) but such revision shall be restricted to 40% of the increase in WPI on overall basis during the concession period. As given in the traffic report, WPI has been projected to grow by 5% initially and stepped down for the future years.*

d. Revenue

- Toll revenue has been considered basis the pessimistic scenario from the traffic report prepared by an independent consultant. Further, IRBTC also collects toll for an additional 13 km stretch. The revenue pertaining to this is transferred to NHAI after deducting 3 per cent as collection charges. Therefore, this additional toll is a pass through cashflow and collection charges are considered other operating income in our analysis.

e. Premium payable

- The premium payable to NHAI is considered and corroborated from the concession agreement as given by the Management.

f. Periodic maintenance & routine maintenance costs

- Periodic and routine maintenance is based on the agreement with IRB Infrastructure Developers Limited till FY2030. For the forecast period post FY2030, routine and periodic maintenance has been considered based on the technical study conducted by the external professional agency.

g. Depreciation & Amortization

- Forecasted depreciation on assets has been provided by the Management. Management has forecasted depreciation to increase in line with the increase in revenue.

h. Tax

- Management represented that IRBTC is eligible to claim tax benefits under section 80IA of Income Tax Act, 1961 from FY2025 to FY2031 and the same has been considered while calculating forecast tax outflows along with any carried forward business loss and unabsorbed depreciation. The SPV will initially pay tax under MAT and gradually shift to the new regime of income tax once its MAT credit is exhausted.

i. Working capital

- The change in WC each year is not material. Therefore, we have only considered the impact of release of working capital at the end of the concession period.

Source(s): Management information



Key Assumptions

j. Capex

- Since the SPV is already operational, there is no capex to be incurred in the remainder of the concession

k. Deferment of Premium

- Due to inadequate cashflows, IRBTC had made an application under Scheme of Deferment Premium issued by Ministry of Road and Transport Highways vide letter No. NH-37012/22/2011-H dated 04 March 2014. The application was granted on 06 June 2014. Accordingly, premium deferment was granted for a period of 10 years starting from FY2015 as per the schedule given in the below table:

Year	Premium payment as originally contracted	Deferment of Premium granted	Revised premium payable under this scheme
INR Crore			
2014-15	162.53	81.45	81.08
2015-16	170.66	67.80	102.86
2016-17	179.19	52.93	126.26
2017-18	188.15	36.20	151.95
2018-19	197.56	59.32	138.24
2019-20	207.43	-	207.43
2020-21	217.81	-	217.81
2021-22	228.70	22.94	205.76
2022-23	240.13	16.29	223.84
2023-24	252.14	68.48	183.66

- As per the terms of the premium deferment approval letter, deferred premium has been allowed to be deferred over concession period at an interest rate at 2% above the Bank Rate.
- As on Valuation Date, Management has represented that IRBTC has INR 684.7 cr outstanding as Deferred premium (including accumulated interest of INR 279.3 cr on the deferred premium).
- Given this understanding, We have relied on Management assumptions to consider payment of deferred premium to the extent of available cashflows and Interest on deferred premium has been considered at 8.75% for the forecast period.

Source(s): Management information



Discounted Cash Flows [1/2]

Discounted Cash Flow										
	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032	FY2033	
INR crores	6 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months
Revenue	209	438	482.86	536	590	650	714	787	867	
EBITDA	[A]	187	426	471	523	576	581	696	768	847
EBITDA margin		89%	97%	98%	98%	98%	89%	97%	98%	98%
Depreciation		(187)	(151)	(167)	(185)	(204)	(224)	(246)	(271)	(299)
EBIT		158	275	304	338	373	356	449	496	548
EBIT margin		76%	63%	63%	63%	63%	55%	63%	63%	63%
Less: Tax on EBIT	[B]	(15)	(37)	(42)	(48)	(55)	(53)	(71)	(83)	(95)
Change in working capital	[C]	-	-	-	-	-	-	-	-	-
Less : Capex	[D]	-	-	-	-	-	-	-	-	-
Premium Payment to NHAI		(139)	(305)	(349)	(401)	(455)	(459)	(580)	(667)	(513)
Free cash flows to the firm F = [A+B+C+D+E]		32	84	80	74	67	68	44	18	238
Discounting period		0.25	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00
Discount factor	[G]	0.98	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45
Present value of cash flows	[F*G]	32	76	65	55	45	42	24	9	108

Source(s): Management information, KPMG analysis

- Premium payment to NHAI presented in the above table is inclusive of Premium payable as per Concession agreement, Deferred premium forecast to be paid during the year and interest on deferred premium to be paid.
- EBITDA calculated in the above table is excluding Premium and interest on Deferred Premium.

Discounted Cash Flows [2/2]

Discounted Cash Flow										
	FY2034	FY2035	FY2036	FY2037	FY2038	FY 2039	FY2040	FY2041	FY2042	FY2043
INR crores	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	9 months
Revenue	951	1,044	1,145	1,250	1,368	1,501	1,645	1,792	1,954	1,593
EBITDA [A]	930	933	1,122	1,225	1,342	1,473	1,616	1,762	1,922	1,568
EBITDA margin	98%	89%	98%	98%	98%	98%	98%	98%	98%	98%
Depreciation	(328)	(360)	(395)	(431)	(817)	(1,102)	(1,164)	(1,225)	(1,292)	(1,021)
EBIT	602	573	727	794	525	371	452	536	630	547
EBIT margin	63%	55%	63%	64%	38%	25%	27%	30%	32%	34%
Less: Tax on EBIT [B]	(105)	(100)	(127)	(139)	(92)	(239)	(268)	(298)	(331)	(274)
Change in working capital [C]	-	-	-	-	-	-	-	-	-	-
Less : Capex [D]	-	-	-	-	-	-	-	-	-	-
Premium Payment to NHAI	(411)	(431)	(453)	(475)	(499)	(524)	(550)	(578)	(607)	(478)
Free cash flows to the firm F = [A+B+C+D+E]	414	402	542	611	751	710	798	886	984	816
Discounting period	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	17.87
Discount factor [G]	0.41	0.37	0.34	0.30	0.27	0.25	0.23	0.20	0.18	0.17
Present value of cash flows [F*G]	169	149	182	185	206	177	180	181	182	138

Source(s): Management information, KPMG analysis

Valuation conclusion	
INR Crore	
Present value of cash flows	2,203
Present value of release of working capital	(9)
Enterprise Valuation	2,194
WACC	10.45%

Present value of release in working capital represent working capital of negative INR 56 Cr released at the end of the concession period.

- Premium payment to NHAI presented in the above table is inclusive of Premium payable as per Concession agreement, Deferred premium forecast to be paid during the year and interest on deferred premium to be paid.
- EBITDA calculated in the above table is excluding Premium and interest on Deferred Premium.

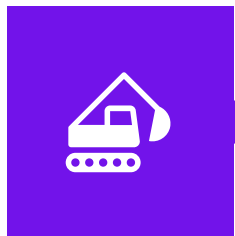
Basis the above and using a WACC of 10.45%, the Enterprise Value of IRBTC, as on 30 September 2024 is INR 2,194 crore.

Please refer to "Summary – WACC" on page 28 for WACC breakup.



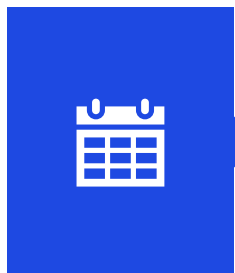
M.V.R. Infrastructure and Tollways Limited

Overview



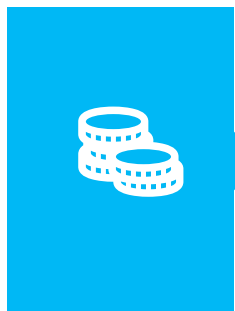
Project details

MVR has entered into a concession agreement for (i) design, construction, development, finance, operation and maintenance of km 207.05 (Salem) to km 248.625 (start of proposed flyover on Namakkal Bypass) and (ii) improvement, operation and maintenance of Km 199.2 (start of Salem Bypass on NH-7) to km 207.050 (Salem) on NH-7 in the State of Tamil Nadu under North-South Corridor (NHDP Phase II) on build, operate and transfer (BOT) basis (iii) improvement, operations and maintenance of MVR Additional Highway



Concession period

MVR is required to build, operate and transfer the project highway in accordance with the concession agreement for a period of 20 years commencing from the appointed date. This project has been extended by 152 days for various reasons discussed in the next slide.



Premium / Grant

MVR is required to provide to NHA cash payment equal to INR 46 Crores at net present value at the rate of 10% in accordance with the provisions of the Concession Agreement. As confirmed by Management 100% of the payment for negative grant of INR 126.3 cr has been made and no premium or grant is to be payable on or after Valuation Date.

Source(s): Management information

Highlights

Particulars	Details
Project location	Salem – Namakkal
Concessionaire	MVR
State	Tamil Nadu
Tollable length (kms)	68.6
No. of toll plazas	1
Tolling commencement date	August 2009
Concession agreement date	16-Feb-06
Appointed date	14-Aug-06
Completion certificate date	06-Aug-09
Scheduled end date	14-Aug-26
New scheduled end date	12-Jan-27

Shareholding as at 30 September 2024

Particulars	Stake %
IRB InvIT Fund	100%

Key Assumptions

a. Modification in concession period

- The concession agreement does not have any provisions regarding the extension or reduction of the concession period.
- Management represented that the concession period will be increased by further 113 days on account of covid-19, 15 days on account of floods in Chennai and 24 days on account of demonetization.
- Accordingly, the Management has confirmed to us to consider revised concession period till 12 January 2027. Thus, the explicit period for the current valuation analysis exercise has been considered from 1 October 2024 to 12 January 2027.

b. Traffic volume

- Traffic volume for the forecast period has been considered based on the traffic report prepared by an independent consultant in September 2024.

c. Toll rates

- Annual revision of toll rate for the forecast period shall be in accordance with Fee Notification. The applicable base rate shall be revised annually on September 1 to reflect the increase in wholesale price index (“WPI”). As given in the traffic report, WPI has been projected to grow by 5% initially and stepped down for the future years.

d. Revenue

- Pursuant to the terms of the Concession Agreement, consequent to MVR being handed over the Additional Highway along with the revised fees notification, MVR is required to pay 80.43% of the additional proportional revenue per year for that year to NHAI for the entire remaining operations period. The additional proportional revenue per year is required to be computed as the MVR Additional Highway length multiplied by the total toll collection of MVR for that accounting year divided by the MVR Project Highway length (including MVR Additional Highway length).
- Toll revenue has been considered basis the pessimistic scenario from the traffic report prepared by an independent consultant net of NHAI share in revenue for additional highway.

e. Periodic maintenance & routine maintenance costs

- Periodic and routine maintenance is based on the agreement with IRB Infrastructure Developers Limited till FY2027.

f. Depreciation & Amortization

- Forecasted depreciation on assets has been provided by the Management. Management has forecasted depreciation to increase in line with the increase in revenue.

g. Tax

- Management represented that MVR is eligible to claim Tax benefit under section 80IA of Income Tax,1961 from FY2025 to FY2027 and the same has been considered while calculating forecast tax outflows along with any carried forward business loss and unabsorbed depreciation. Based on the current forecast, the SPV will pay tax under MAT for the balance of the concession period.

h. Working capital

- The change in WC each year is not material. Therefore, we have only considered the impact of release of working capital at the end of the concession period.

i. Capex

- Since the SPV is already operational, there is no capex to be incurred in the remainder of the concession period.

Source(s): Management information



Discounted Cash Flows [1/1]

Discounted Cash Flow				
		FY2025	FY2026	FY2027
INR crores		6 months	12 months	9 months
Revenue		70	148	125
EBITDA	[A]	55	141	118
EBITDA margin		78%	95%	94%
Depreciation		(15)	(39)	(33)
EBIT		38	102	85
EBIT margin		55%	69%	68%
Less: Tax on EBIT	[B]	(7)	(18)	(15)
Change in working capital	[C]	-	-	-
Less : Capex	[D]	-	-	-
Free cash flows to the firm	E = [A+B+C+D]	48	123	103
Discounting period		0.25	1.00	1.89
Discount factor	[F]	0.98	0.91	0.84
Present value of cash flows	[E*F]	47	112	86

Source(s): Management information, KPMG analysis

Valuation conclusion	
INR Crore	
Present value of cash flows	245
Present value of release of working capital	(8)
Enterprise Valuation	237
WACC	9.91%

Present value of release in working capital represent working capital of negative INR 9 Cr released at the end of the concession period.

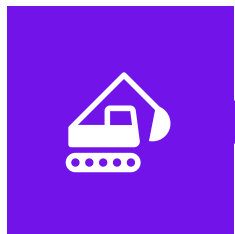
Basis the above and using a WACC of 9.91%, the Enterprise Value of MVR, as on 30 September 2024 is **INR 237 crore.**

Please refer to “Summary – WACC” on page 28 for WACC breakup.



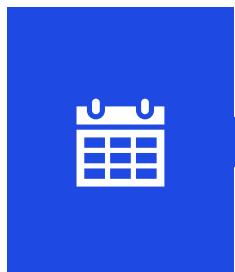
VK1 Expressway Limited

Overview



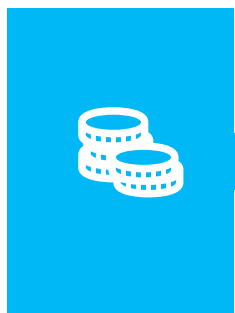
Project details

VK1 has entered into a concession agreement for construction of eight lane Vadodara kim Expressway from km 355 to 378.7, Padara to Vadodara section of NH-8 in the state of Gujarat on a Hybrid Annuity Mode (HAM) basis.



Concession period

VK1 has to construct; operate, maintain, modify, repair or otherwise make improvements to the project highway in accordance with the concession agreement for a construction period of 730 days and operation period of 15 years post completion of construction.



Annuity

40% of the Adjusted Bid Project has been paid in form of equity support during construction. The remaining Adjusted Bid Project Cost shall be payable in 30 bi-annual installments and the 1st annuity was due on 29th September 2022.

Source(s): Management information



Highlights

Particulars	Details
Project location	Padra – Vadodara
Concessionaire	VK1
State	Gujarat
Total length (kms)	208.4 lane kms
No. of lanes	8
Concession agreement date	09-May-18
Completion certificate date	30-Aug-22
Construction Period	730 days
Operational Period	15 years
Annuity Details	30 annuities over 15 years
Bid Project Cost	INR 2,043 Cr
Adjusted Bid Project Cost	INR 2,331 Cr

Shareholding as at 30 September 2024

Particulars	Stake %
IRB InvIT Fund	100%

Key Assumptions

a. Payment of bid project cost

- As per Clause 23 of the concession agreement;
 - a) **40% of the bid project cost** (Also known as “NHAI support”) adjusted for price index multiple shall be due and payable to the Concessionaire in 5 equal instalments of 8% each during the **Construction period on milestone basis**. Construction of the highway has been completed and the COD has been achieved hence, the entire NHAI support has been paid to VK1.
 - b) The balance bid project cost shall be due and payable in 30 biannual instalments from 180th day of COD (“Annuity payments”) during the 15 years of **Operation period**. Each such annuity is a **fixed percentage** of the completion cost remaining to be paid on COD.

b. Revenue

- Revenue forecast for VK1 comprises of Annuity receivable from NHAI, interest on annuity and O&M Support receivable from NHAI.
- As per information provided by the Management, we understand that VK1 has received payments for 4 annuity installments and 5th installment of INR 97cr (including interest) was due on 29 September 2024 has been received in October 2024. Since 5th installment has been received after valuation date, we have separately added value of the annuity in the Enterprise Value of VK1.
- Balance annuity of INR 1,254 cr is forecast to be received over next 12.5 years in 25 bi-annual installments.

c. Interest on Annuity

- Each of the biannual instalments payable above shall be paid along with interest at a rate of applicable bank rate plus 3 %. Thus, interest on annuity has been considered at 9.75 per cent (6.75 per cent MCLR plus 3 per cent).

d. Periodic and routine maintenance payments by Authority

O&M expenses shall be borne by NHAI and a lump sum financial support in the form of biannual payments shall be due and payable by NHAI to VK1. This shall be computed on INR 2.7 Cr. Thus, O&M payments by Authority have been considered accordingly by adjusting for price index multiple of 5 per cent.

e. Periodic maintenance & routine maintenance costs

- Periodic and routine maintenance is based on the agreement with IRB Infrastructure Developers Limited till FY2037.

f. Depreciation & amortisation

- Amortization has been considered based on intangible asset model where the capital cost net of NHAI support is depreciated at 25 per cent over the operational period.

g. Tax

- Management represented that the VK1 has adopted the new tax regime. Thus, tax outflows for the forecast have been calculated based on the new regime of income tax. Carried forward business loss and unabsorbed depreciation if any has been considered while calculating tax outflows.

h. Capex

- Construction of the highway has been completed. Hence, no major capex cost needs to be incurred.

i. Working capital

- The change in WC each year is not material. Therefore, we have only considered the impact of release of working capital at the end of the concession period.

Source: Management Information



Discounted Cash Flows [1/3]

Discounted cash flow										
	FY2025	FY2026	FY2026	FY2027	FY2027	FY2028	FY2028	FY2029	FY2029	
	31-Mar-25	30-Sep-25	31-Mar-26	30-Sep-26	31-Mar-27	30-Sep-27	31-Mar-28	30-Sep-28	31-Mar-29	
INR Crore	6 months	6 months	6 months	6 months	6 months	6 months	6 months	6 months	6 months	6 months
Revenue	98	97	96	96	95	94	94	93	92	
EBITDA	[A]	92	90	89	86	85	87	86	86	86
EBITDA margin (%)		94.3%	92.9%	92.8%	89.9%	89.8%	92.1%	92.1%	93.0%	92.9%
Less: Depreciation		-	-	-	-	-	-	-	-	-
EBIT		92	90	89	86	85	87	86	86	86
EBIT margin (%)		94.3%	92.9%	92.8%	89.9%	89.8%	92.1%	92.1%	93.0%	92.9%
Less: Taxes on EBIT	[B]	-	-	-	-	-	(4)	(4)	(16)	(16)
(Increase)/decrease in net working capital	[C]	-	-	-	-	-	-	-	-	-
Less: Capital expenditure	[D]	-	-	-	-	-	-	-	-	-
Free cash flow to the firm [E] = [A] + [B] + [C] + [D]		92	90	89	86	85	83	83	70	70
Discounting period		0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
Discounting factor	[F]	0.96	0.92	0.88	0.84	0.81	0.77	0.74	0.71	0.68
Present value of cash flows [E] * [F]		88	83	79	72	69	64	61	50	47

Source(s): Management information, KPMG analysis

Discounted Cash Flows [2/3]

Discounted cash flow									
	FY2030	FY2030	FY2031	FY2031	FY2032	FY2032	FY2033	FY2033	FY2034
	30-Sep-29	31-Mar-30	30-Sep-30	31-Mar-31	30-Sep-31	31-Mar-32	30-Sep-32	31-Mar-33	30-Sep-33
INR Crore	6 months	6 months	6 months	6 months	6 months	6 months	6 months	6 months	6 months
Revenue	91	91	90	89	88	87	86	85	84
EBITDA [A]	85	84	83	82	80	79	75	74	75
EBITDA margin (%)	92.6%	92.6%	92.3%	92.2%	90.3%	90.2%	86.5%	86.4%	89.3%
Less: Depreciation	-	-	-	-	-	-	-	-	-
EBIT	85	84	83	82	80	79	75	74	75
EBIT margin (%)	92.6%	92.6%	92.3%	92.2%	90.3%	90.2%	86.5%	86.4%	89.3%
Less: Taxes on EBIT [B]	(17)	(17)	(18)	(18)	(17)	(17)	(17)	(17)	(17)
(Increase)/decrease in net working capital [C]	-	-	-	-	-	-	-	-	-
Less: Capital expenditure [D]	-	-	-	-	-	-	-	-	-
Free cash flow to the firm [E] = [A] + [B] + [C] + [D]	68	67	65	64	62	61	58	57	58
Discounting period	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00
Discounting factor [F]	0.65	0.62	0.60	0.57	0.547	0.524	0.502	0.481	0.460
Present value of cash flows [E] * [F]	44	42	39	37	34	32	29	27	27

Source(s): Management information, KPMG analysis

Discounted Cash Flows [3/3]

Discounted cash flow							
	FY2034 31-Mar-34 6 months	FY2035 30-Sep-34 6 months	FY2035 31-Mar-35 6 months	FY2036 30-Sep-35 6 months	FY2036 31-Mar-36 6 months	FY2037 30-Sep-36 6 months	FY2037 31-Mar-37 6 months
INR Crore							
Revenue	83	81	78	78	79	76	73
EBITDA [A]	74	73	70	70	71	71	68
EBITDA margin (%)	89.1%	90.3%	90.0%	89.7%	89.8%	93.7%	93.4%
Less: Depreciation	-	-	-	-	-	-	-
EBIT	74	73	70	70	71	71	68
EBIT margin (%)	89.1%	90.3%	90.0%	89.7%	89.8%	93.7%	93.4%
Less: Taxes on EBIT [B]	(17)	(17)	(17)	(17)	(17)	(17)	(17)
(Increase)/decrease in net working capital [C]	-	-	-	-	-	-	-
Less: Capital expenditure [D]	-	-	-	-	-	-	-
Free cash flow to the firm [E] = [A] + [B] + [C] + [D]	57	56	53	53	54	54	51
Discounting period	9.50	10.00	10.50	11.00	11.50	12.00	12.50
Discounting factor [F]	0.441	0.422	0.405	0.388	0.371	0.356	0.341
Present value of cash flows [E] * [F]	25	24	22	21	20	19	17

Source(s): Management information, KPMG analysis

Valuation Conclusion	
INR Crore	
Primary value	1,071
Annuity receivable - Sep 24	97
PV of Working Capital	15
Enterprise value	1,183
WACC	9.00%

Present value of release in working capital represent working capital of negative INR 45 Cr released at the end of the concession period.

Since the annuities are paid semi annually, we have considered half yearly cash flows for discounting.

Basis the above and using a WACC of 9.00%, the Enterprise Value of VK1, as on 30 September 2024 is INR 1,183 crore.

Please refer "Summary – WACC" on page 28 for WACC breakup.

6.

Valuation Conclusion

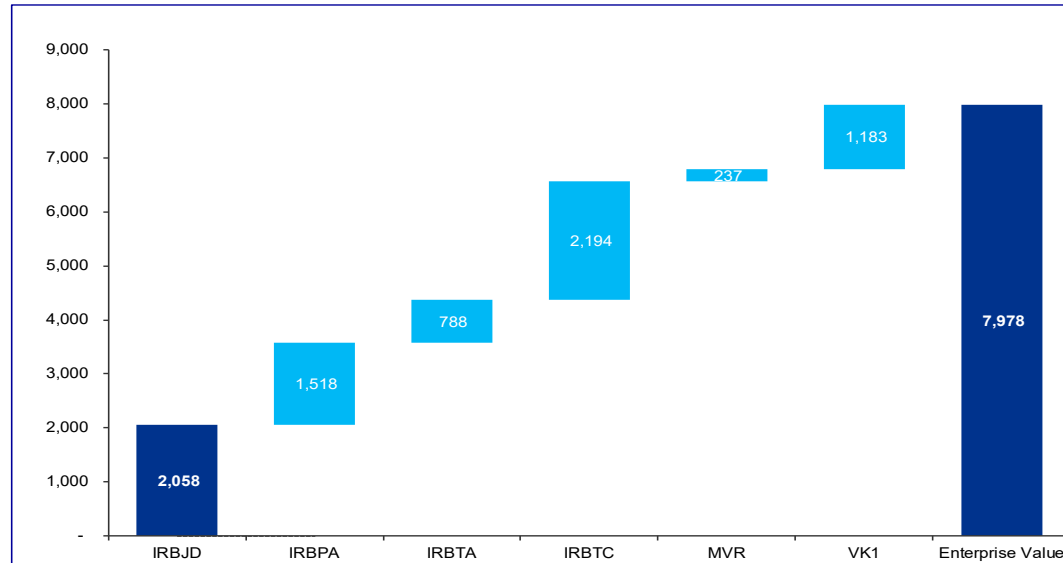
Valuation Conclusion (1/2)

Valuation Conclusion (INR Crs)

Valuation Conclusion 30 September 2024	INR Crore
IRB Jaipur Deoli Tollway Limited	2,058
IRB Pathankot Amritsar Toll Road Limited	1,518
IRB Talegaon Amravati Tollway Limited	788
IRB Tumkur Chitradurga Tollway Limited	2,194
M.V.R. Infrastructure and Tollways Limited	237
VK1 Expressway Limited	1,183
Enterprise Value of the SPVs	7,978
Cash and cash Equivalents	106
PV of Investment manager fees	(130)
Surplus	154
Capital Creditors	(17)
Debt and Debt like items	(2,421)
Equity value of IRB InvIT Fund	5,670

NAV at fair value per unit as on 30 September 2024	
Equity Value of IRB InvIT Fund (INR Cr)	5,670
Units outstanding (No.)	580,500,000
NAV at fair value per unit (INR)	97.68

Enterprise Value of SPVs



The chart above presents the Enterprise Value of the SPVs. Refer subsequent slide for details about the post Enterprise Value adjustments.

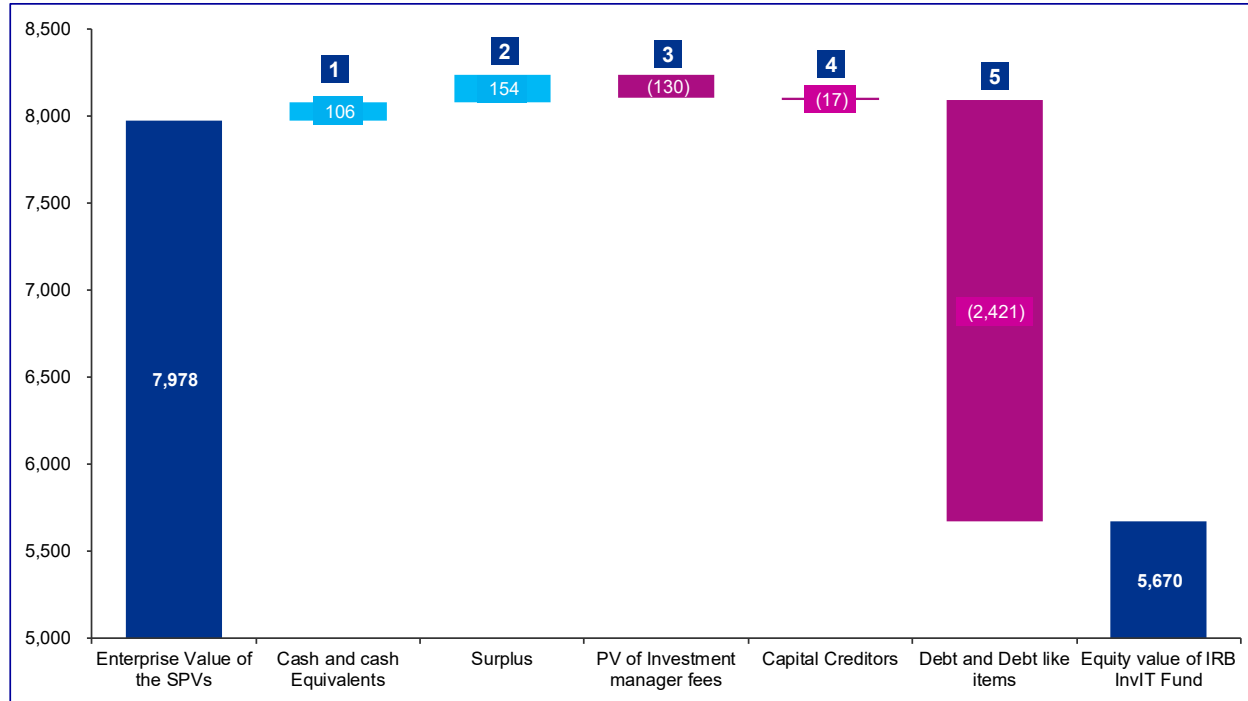
The Enterprise Value of the SPVs is INR 7,978 crores and the 100% Equity Value of the IRB InvIT Fund is INR 5,670 crores as on 30 September 2024.

The NAV at fair value per unit of IRB InvIT Fund as on 30 September 2024 is INR 97.68 per unit.

Source(s): Management information, KPMG analysis

Valuation Conclusion (2/2)

Calculation of Equity Value of IRB InvIT Fund from Enterprise Value of the SPVs



The Enterprise Value of the SPVs is INR 7,978 crores and the 100% Equity Value of the IRB InvIT Fund is INR 5,670 crores as on 30 September 2024.

The NAV at fair value per unit of IRB InvIT Fund as on 30 September 2024 is INR 97.68 per unit.

- 1** Cash and cash equivalents comprise balance and deposits with banks (excluding balance held towards DSRA) as at 30 September 2024.
- 2** Surplus assets primarily comprise of investment in mutual funds of INR 154 Cr.
- 3** Present value of standalone expenses of the IRB InvIT Fund represent the present value of the investment manager fee in the books of IRB InvIT Fund. The expenses have been forecasted assuming 1% of Toll Revenue (net off premium / revenue share) with a floor of INR 10 Crore and a Cap of INR 25 Crore per annum.
- 4** Capital creditors of INR 17 Cr have been considered debt like in nature and adjusted from the Enterprise Value to arrive at the Equity Value of IRB InvIT Fund. Management represented that they do not consider these liabilities as part of the working capital and thus they have not been considered as part of the forecast working capital
- 5** Debt and debt like items primarily represents loan from banks and financial institutions of INR 2,512 Cr as at 30 September 2024. The debt and debt like items has been reduced by INR 91 Cr, which represents the present value of the release of DSRA as at 30 September 2024. The release schedule of the DSRA along with applicable interest earned on the DSRA balance has been provided by the Management.

Source(s): Management information, KPMG analysis



7.

Annexures

Annexure 1: Sources of Information (1/2)

This Report is prepared based on the below sources of information as provided to us by the Management:

The following information provided to KPMG by Management was used in preparation of the Valuation Report:

- Audited financial statements for FY2021, FY2022, FY2023 and FY2024 of all operational SPVs.
- Consolidated and Standalone audited financial statements for FY2022, FY2023 and FY2024 of IRB InvIT Fund.
- Provisional financial statements for the period ended 30 September 2024 for all the SPVs and IRB InvIT Fund (standalone and consolidated).
- Financial projections of SPV's, Investment Manager fee, DSRA requirement from 1 October 2024 till the end of the concession period of the respective SPV's
- Other data for all the SPVs which is as follows –
 - Concession Agreements
 - Premium Deferment agreement for IRBTC
 - Completion Certificates
 - Traffic Reports prepared by GMD consultants
 - Toll Rate Notifications
 - Extract of O&M agreement with IRBIDL
 - Details of brought forward losses and MAT credit (as per Income Tax Act) of the SPVs as at 30 September 2024.
- List of approvals, permits, licenses and litigations for the SPVs as at 30 September 2024.
- NHAI letters for modification of concession period for IRBJD and IRBPA.
- Letter from the SPV to NHAI for modification of concession period in accordance with terms of concession agreement for IRBTC and IRBTA.
- Management has provided project completion cost certificate for VK1.
- Management has provided Traffic consultant reports prepared by GMD Consultants (appointed independently by Client) dated September 2024 for all the SPVs. Management has confirmed that the traffic studies shared are the most recent studies available. Forecast revenue has been considered from the aforesaid traffic study reports for each of the SPVs. We have compared the revenue considered in the forecast model with the revenue forecasted in the traffic study reports and noted that the Management has considered the pessimistic revenue scenario in their forecast.
- Management has informed that O&M for the SPVs projects would be done by IRBIDL based on fixed price contract. O&M payments are fixed for the contract period till FY2030 for IRBJD, IRBPA, IRBTA and IRBTC, FY2027 for MVR and FY2037 for VK1 after which terms of the contract may get renegotiated upon renewal. Management has shared extract of the contract and we have validated forecasted periodic and routine maintenance expense for contract period from the same. For the forecast period post the contract period O&M has been considered based on the technical feasibility study conducted by the external third party. We have gone ahead with Management assumption on O&M cost. Given the technical nature of this study, review of the same is not part of our scope of work.

Annexure 1: Sources of Information (2/2)

- The investment management fees is computed assuming 1% of net Toll Revenue with a floor of INR 10 Crore and a Cap of INR 25 Crore per annum which is in line with agreement between Fund and Investment manager.
- Management represented that due to covid 19 the concession period end dates across all BOT SPVs increased by 90-113 days pursuant to notification no F.18/4/2020-PPD dated 13th May 2020 and Notification no. Covid-19/Roadmap/JS(H)/2020 dated 26th August 2021. Concession period of IRBPA in addition to covid 19 increase, increased by further 467 days due to farmer agitations on its route. Apart from this, concession period is increased by 24 days for all BOT SPVs due to demonetization.
- Management has considered 518 days of extension in concession period for IRBPA due to delay in completion of construction for reasons not attributable to IRBPA. However, the NHA has challenged the extension of 518 days and the matter is still under litigation. Based on this representation from Management, we have considered 518 days of extension in concession period in our analysis. We have considered higher alpha for IRBTC to account for uncertainty associated with extension of concession period.
- Given the nature of the liability, capital creditors of INR 17 Cr outstanding in the books of the SPVs have been considered debt like in nature and adjusted from the Enterprise Value to arrive at the Equity Value of IRB InvIT Fund.
- Besides the above, there may be other information provided by the Management which may not have been perused by us in any detail, if not considered relevant for our defined scope.
- In addition to the above, we have also obtained such other information and explanations from the Management, either verbally or in written form, as were considered relevant for the purpose of the valuation. We had discussions with the key members of the Management;
- The following external sources were used in the preparation of the report:
 - External databases such as Capital IQ, etc.
 - Relevant information made available to us by Management at our request.
 - Publicly available information and secondary information.

Annexure 2: WACC – IRBJD

Risk free rate (Rf)	The nominal risk-free rate is based on our understanding of the analysis of 10 year benchmark government of India securities yield as well analysis of the consensus forecast yield stands at 6.9%.
Equity risk premium	Equity risk premium is estimated based on KPMG's understanding of prevailing market return in India stands at 7%.
Relevered beta	Beta is a measure of the risk of the shares of a company. β is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. We have considered companies involved in the road operating industry and infrastructure investment trusts. Betas are low in this industry due to the stable nature of the road operating industry and low level of cash flow volatility due to the relatively steady usage of roads. We have arrived at a beta of 0.75. Refer to Annexure 3a.
Alpha	The Alpha factor incorporates company specific risk factor to reflect different stages of maturity and levels of uncertainty that are not already reflected in the projected cash flows. Considering the length of remaining concession period, forecast cashflows and discussion with the Management, We have considered an alpha at 1%.
Cost of equity	Based on above parameters cost of equity is calculated as 13.16%.
Cost of debt	As per the Management, the average cost of debt for the SPVs is 9%.
Tax rate	We understand that eventually all the SPVs will transition to the new tax regime once its MAT credit is exhausted, hence we have considered tax rate of 25.17% for the WACC analysis which is the long term tax rate applicable to IRBJD.
Post-tax cost of debt	The average post tax cost of debt is 6.7% for IRBJD.
Debt Equity Ratio	Based on discussion with the Management on target capital structure of the Trust, We have considered a debt-to-equity ratio of 100% i.e. debt to capital of 50% and equity to capital of 50%.
WACC	Based on the optimal capital structure, the weighted average cost of capital is calculated as 9.95%.

Annexure 2: WACC – IRBPA

Risk free rate (Rf)	The nominal risk-free rate is based on our understanding of the analysis of 10 year benchmark government of India securities yield as well analysis of the consensus forecast yield stands at 6.9%.
Equity risk premium	Equity risk premium is estimated based on KPMG's understanding of prevailing market return in India stands at 7%.
Relevered beta	Beta is a measure of the risk of the shares of a company. β is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. We have considered companies involved in the road operating industry and infrastructure investment trusts. Betas are low in this industry due to the stable nature of the road operating industry and low level of cash flow volatility due to the relatively steady usage of roads. We have arrived at a beta of 0.75. Refer to Annexure 3a.
Alpha	The Alpha factor incorporates company specific risk factor to reflect different stages of maturity and levels of uncertainty that are not already reflected in the projected cash flows. Considering the ongoing dispute with NHAI on extension of concession period by 518 days, length of remaining concession period, forecast cashflows and discussion with the Management, We have considered an alpha at 3%.
Cost of equity	Based on above parameters cost of equity is calculated as 15.16%.
Cost of debt	As per the Management, the average cost of debt for the SPVs is 9%.
Tax rate	We understand that eventually all the SPVs will transition to the new tax regime once its MAT credit is exhausted, hence we have considered tax rate of 25.17% for the WACC analysis which is the long term tax rate applicable to IRBPA.
Post-tax cost of debt	The average post tax cost of debt is 6.7% for IRBPA.
Debt Equity Ratio	Based on discussion with the Management on target capital structure of the Trust, We have considered a debt-to-equity ratio of 100% i.e. debt to capital of 50% and equity to capital of 50%.
WACC	Based on the optimal capital structure, the weighted average cost of capital is calculated as 10.95%.

Annexure 2: WACC – IRBTA

Risk free rate (Rf)	The nominal risk-free rate is based on our understanding of the analysis of 10 year benchmark government of India securities yield as well analysis of the consensus forecast yield stands at 6.9%.
Equity risk premium	Equity risk premium is estimated based on KPMG's understanding of prevailing market return in India stands at 7%.
Relevered beta	Beta is a measure of the risk of the shares of a company. β is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. We have considered companies involved in the road operating industry and infrastructure investment trusts. Betas are low in this industry due to the stable nature of the road operating industry and low level of cash flow volatility due to the relatively steady usage of roads. We have arrived at a beta of 0.78. Refer to Annexure 3b.
Alpha	The Alpha factor incorporates company specific risk factor to reflect different stages of maturity and levels of uncertainty that are not already reflected in the projected cash flows. Considering the length of remaining concession period, forecast cashflows and discussion with the Management, We have considered an alpha at 1%.
Cost of equity	Based on above parameters cost of equity is calculated as 13.39%.
Cost of debt	As per the Management, the average cost of debt for the SPVs is 9%.
Tax rate	We understand IRBTA will continue with the old tax regime and pay MAT. Hence, we have considered a tax rate of 17.47%.
Post-tax cost of debt	The average post tax cost of debt is 7.4% for IRBTA.
Debt Equity Ratio	Based on discussion with the Management on target capital structure of the Trust, We have considered a debt-to-equity ratio of 100% i.e. debt to capital of 50% and equity to capital of 50%.
WACC	Based on the optimal capital structure, the weighted average cost of capital is calculated as 10.41%.

Annexure 2: WACC – IRBTC

Risk free rate (Rf)	The nominal risk-free rate is based on our understanding of the analysis of 10 year benchmark government of India securities yield as well analysis of the consensus forecast yield stands at 6.9%.
Equity risk premium	Equity risk premium is estimated based on KPMG's understanding of prevailing market return in India stands at 7%.
Relevered beta	Beta is a measure of the risk of the shares of a company. β is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. We have considered companies involved in the road operating industry and infrastructure investment trusts. Betas are low in this industry due to the stable nature of the road operating industry and low level of cash flow volatility due to the relatively steady usage of roads. We have arrived at a beta of 0.75. Refer to Annexure 3a.
Alpha	The Alpha factor incorporates company specific risk factor to reflect different stages of maturity and levels of uncertainty that are not already reflected in the projected cash flows. Considering the length of remaining concession period, forecast cashflows and discussion with the Management, We have considered an alpha at 2%.
Cost of equity	Based on above parameters cost of equity is calculated as 14.16%.
Cost of debt	As per the Management, the average cost of debt for the SPVs is 9%.
Tax rate	We understand that eventually all the SPVs will transition to the new tax regime once its MAT credit is exhausted, hence we have considered tax rate of 25.17% for the WACC analysis which is the long term tax rate applicable to IRBTC.
Post-tax cost of debt	The average post tax cost of debt is 6.7% for IRBTC.
Debt Equity Ratio	Based on discussion with the Management on target capital structure of the Trust, We have considered a debt-to-equity ratio of 100% i.e. debt to capital of 50% and equity to capital of 50%.
WACC	Based on the optimal capital structure, the weighted average cost of capital is calculated as 10.45%.

Annexure 2: WACC – MVR

Risk free rate (Rf)	The nominal risk-free rate is based on our understanding of the analysis of 10 year benchmark government of India securities yield as well analysis of the consensus forecast yield stands at 6.9%.
Equity risk premium	Equity risk premium is estimated based on KPMG's understanding of prevailing market return in India stands at 7%.
Relevered beta	Beta is a measure of the risk of the shares of a company. β is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. We have considered companies involved in the road operating industry and infrastructure investment trusts. Betas are low in this industry due to the stable nature of the road operating industry and low level of cash flow volatility due to the relatively steady usage of roads. We have arrived at a beta of 0.78. Refer to Annexure 3B.
Alpha	The Alpha factor incorporates company specific risk factor to reflect different stages of maturity and levels of uncertainty that are not already reflected in the projected cash flows. Considering the relatively small length of remaining concession period, forecast cashflows and discussion with the Management, We have not considered any alpha for MVR.
Cost of equity	Based on above parameters cost of equity is calculated as 12.39%.
Cost of debt	As per the Management, the average cost of debt for the SPVs is 9%.
Tax rate	We understand MVR will continue with the old tax regime and pay MAT. Hence, we have considered a tax rate of 17.47%.
Post-tax cost of debt	The average post tax cost of debt is 7.4% for MVR.
Debt Equity Ratio	Based on discussion with the Management on target capital structure of the Trust, We have considered a debt-to-equity ratio of 100% i.e. debt to capital of 50% and equity to capital of 50%.
WACC	Based on the optimal capital structure, the weighted average cost of capital is calculated as 9.91%.

Annexure 2: WACC – VK1

Risk free rate (Rf)	The nominal risk-free rate is based on our understanding of the analysis of 10 year benchmark government of India securities yield as well analysis of the consensus forecast yield stands at 6.9%.
Equity risk premium	Equity risk premium is estimated based on KPMG's understanding of prevailing market return in India stands at 7%.
Relevered beta	Beta is a measure of the risk of the shares of a company. β is the co-variance between the return on sample stock and the return on the market. In order to determine the appropriate beta factor for the Company, consideration must be given either to the market beta of the Company or betas of comparable quoted companies. We have considered companies involved in the road operating industry and infrastructure investment trusts. Betas are low in this industry due to the stable nature of the road operating industry and low level of cash flow volatility due to the relatively steady usage of roads. We have arrived at a beta of 1.18. Refer to Annexure 3c.
Alpha	The Alpha factor incorporates company specific risk factor to reflect different stages of maturity and levels of uncertainty that are not already reflected in the projected cash flows. VK1 is a HAM asset with fixed cash flows in form of annuities. Considering this, we have not considered any Alpha for VK1.
Cost of equity	Based on above parameters cost of equity is calculated as 15.16%.
Cost of debt	As per the Management, the average cost of debt for the SPVs is 8.5%.
Tax rate	We understand that eventually all the SPVs will transition to the new tax regime once its MAT credit is exhausted, hence we have considered tax rate of 25.17% for the WACC analysis which is the long term tax rate applicable to VK1.
Post-tax cost of debt	The average post tax cost of debt is 6.4% for IRBJD.
Debt Equity Ratio	We have considered a debt to equity ratio of 233% i.e. debt to capital of 70% and equity to capital of 30%. This is based on the target capital structure of VK1.
WACC	Based on the optimal capital structure, the weighted average cost of capital is calculated as 9.00%.

Annexure 3a: Beta Computation – IRBJD, IRBPA, IRBTC

Beta computation										
	Market Capitalization	Total Debt excl. Cap Lease	Debt / Equity	Debt / Total Capital	Final Beta 1 Year	Tax Rate	Unlevered Beta	Target's Debt Equity	Target's Tax Rate	Re Levered Beta
IRB Infrastructure Developers Limited	396,786	186,490	47.0%	32.0%	1.47	25.17%	1.09	100.0%	25.17%	1.91
PNC Infratech Limited	124,798	80,165	64.2%	39.1%	1.15	25.17%	0.78	100.0%	25.17%	1.36
Dilip Buildcon Limited	79,189	72,404	91.4%	47.8%	1.48	25.17%	0.88	100.0%	25.17%	1.54
Bharat Road Network Limited	4,310	14,578	338.2%	77.2%	0.74	25.17%	0.21	100.0%	25.17%	0.37
National Highways Infra Trust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
India Infrastructure Trust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
India Grid Trust	108,762	186,972	171.9%	63.2%	0.42	25.17%	0.19	100.0%	25.17%	0.32
Powergrid Infrastructure Investment Trust	84,743	5,692	6.7%	6.3%	0.45	25.17%	0.43	100.0%	25.17%	0.75
IRB InvIT Fund	36,294	25,123	69.2%	40.9%	0.44	25.17%	0.29	100.0%	25.17%	0.50
Bharat Highways InvIT	47,817	11,376	24%	19%	0.40	25.17%	0.34	100.0%	25.17%	0.59
G R Infraprojects Limited	161,816	38,028	24%	19%	1.02	25.17%	0.87	100.0%	25.17%	1.52
Median			64.2%	39.1%	0.74		0.43			0.75

Note:

- (a) Market capitalization of comparable companies has been considered based on 3-month volume weighted average share prices till 30 September 2024.
- (b) Beta has been computed based on 1-year daily average adjusted beta.
- (c) Although, National Highway Infra Trust and India Infrastructure Trust are a part of our comparable companies set, they have been excluded while calculating the beta due to low trading.

Source(s): KPMG analysis based on data sourced from S&P Capital IQ database.

Annexure 3b: Beta Computation – IRBTA, MVR

Beta computation										
	Market Capitalization	Total Debt excl. Cap Lease	Debt / Equity	Debt / Total Capital	Final Beta 1 Year	Tax Rate	Unlevered Beta	Target's Debt Equity	Target's Tax Rate	Re Levered Beta
IRB Infrastructure Developers Limited	396,786	186,490	47.0%	32.0%	1.47	25.17%	1.09	233.3%	25.17%	2.99
PNC Infratech Limited	124,798	80,165	64.2%	39.1%	1.15	25.17%	0.78	233.3%	25.17%	2.14
Dilip Buildcon Limited	79,189	72,404	91.4%	47.8%	1.48	25.17%	0.88	233.3%	25.17%	2.41
Bharat Road Network Limited	4,310	14,578	338.2%	77.2%	0.74	25.17%	0.21	233.3%	25.17%	0.58
National Highways Infra Trust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
India Infrastructure Trust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
India Grid Trust	108,762	186,972	171.9%	63.2%	0.42	25.17%	0.19	233.3%	25.17%	0.51
Powergrid Infrastructure Investment Trust	84,743	5,692	6.7%	6.3%	0.45	25.17%	0.43	233.3%	25.17%	1.18
IRB InvIT Fund	36,294	25,123	69.2%	40.9%	0.44	25.17%	0.29	233.3%	25.17%	0.79
Bharat Highways InvIT	47,817	11,376	24%	19%	0.40	25.17%	0.34	233.3%	25.17%	0.93
G R Infraprojects Limited	161,816	38,028	24%	19%	1.02	25.17%	0.87	233.3%	25.17%	2.38
Median			64.2%	39.1%	0.74		0.43			1.18

Note:

- (a) Market capitalization of comparable companies has been considered based on 3-month volume weighted average share prices till 30 September 2024.
- (b) Beta has been computed based on 1-year daily average adjusted beta.
- (c) Although, National Highway Infra Trust and India Infrastructure Trust are a part of our comparable companies set, they have been excluded while calculating the beta due to low trading.

Source(s): KPMG analysis based on data sourced from S&P Capital IQ database.

Annexure 3c: Beta Computation – VK1

Beta computation										
	Market Capitalization	Total Debt excl. Cap Lease	Debt / Equity	Debt / Total Capital	Final Beta 1 Year	Tax Rate	Unlevered Beta	Target's Debt Equity	Target's Tax Rate	Re Levered Beta
IRB Infrastructure Developers Limited	396,786	186,490	47.0%	32.0%	1.47	25.17%	1.09	233.3%	25.17%	2.99
PNC Infratech Limited	124,798	80,165	64.2%	39.1%	1.15	25.17%	0.78	233.3%	25.17%	2.14
Dilip Buildcon Limited	79,189	72,404	91.4%	47.8%	1.48	25.17%	0.88	233.3%	25.17%	2.41
Bharat Road Network Limited	4,310	14,578	338.2%	77.2%	0.74	25.17%	0.21	233.3%	25.17%	0.58
National Highways Infra Trust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
India Infrastructure Trust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
India Grid Trust	108,762	186,972	171.9%	63.2%	0.42	25.17%	0.19	233.3%	25.17%	0.51
Powergrid Infrastructure Investment Trust	84,743	5,692	6.7%	6.3%	0.45	25.17%	0.43	233.3%	25.17%	1.18
IRB InvIT Fund	36,294	25,123	69.2%	40.9%	0.44	25.17%	0.29	233.3%	25.17%	0.79
Bharat Highways InvIT	47,817	11,376	24%	19%	0.40	25.17%	0.34	233.3%	25.17%	0.93
G R Infraprojects Limited	161,816	38,028	24%	19%	1.02	25.17%	0.87	233.3%	25.17%	2.38
Median			64.2%	39.1%	0.74		0.43			1.18

Note:

- (a) Market capitalization of comparable companies has been considered based on 3-month volume weighted average share prices till 30 September 2024.
- (b) Beta has been computed based on 1-year daily average adjusted beta.
- (c) Although, National Highway Infra Trust and India Infrastructure Trust are a part of our comparable companies set, they have been excluded while calculating the beta due to low trading.

Source(s): KPMG analysis based on data sourced from S&P Capital IQ database.

Annexure 4: Investment Management Expenses

Present value of Investment Management expenses pertaining to InvIT										
	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032	FY2033	FY2034
INR crores	6 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months
IM Expenses	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	13.1	15.9
IM Expenses (including GST)	5.9	11.8	11.8	11.8	11.8	11.8	11.8	11.8	15.5	18.7
Discounting period	0.25	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
Discount factor	0.98	0.91	0.83	0.75	0.69	0.62	0.57	0.52	0.47	0.43
Present value of cash flows	5.8	10.7	9.8	8.9	8.1	7.4	6.7	6.1	7.3	8.0

Present value of Investment Management expenses pertaining to InvIT										
	FY2035	FY2036	FY2037	FY2038	FY 2039	FY2040	FY2041	FY2042	FY2043	
INR crores	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months	12 months
IM Expenses	17.6	19.4	21.3	19.5	16.5	18.3	16.5	13.5	11.2	
IM Expenses (including GST)	20.7	22.9	25.2	23.0	19.4	21.5	19.5	15.9	13.2	
Discounting period	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	
Discount factor	0.39	0.35	0.32	0.29	0.27	0.24	0.22	0.20	0.18	
Present value of cash flows	8.1	8.1	8.1	6.7	5.2	5.2	4.3	3.2	2.4	

Valuation conclusion

INR Crore

Present value of cash flows **130**

WACC

9.95%

Source(s): Management Information, KPMG Analysis

The investment management fees is computed assuming 1% of net Toll Revenue with a floor of INR 10 Crore and a Cap of INR 25 Crore which is in line with agreement between Fund and Investment manager. We have relied on Management representation for the same.

We have considered the median WACC of the SPVs for discounting Investment Management Expenses.

Annexure 5: Other disclosures as required under SEBI InvIT Regulations

The following disclosures are as at 30 September 2024 for the SPVs

1. **Valuation of the project in the previous 3 years:** Refer annexure 5a for the aforementioned information.
2. **List of one-time sanctions/approvals which are obtained or pending/ List of up to date/overdue periodic clearances:** Refer annexure 5b for the aforementioned information.
3. **Estimates of already carried as well as proposed major repairs and improvements along with estimated time of completion:** Refer annexure 5c for the aforementioned information.
4. **Purchase price of the project by the InvIT:** Refer annexure 5d for the aforementioned information.
5. **On-going and closed material litigations including tax disputes in relation to the assets, if any:** Refer annexure 5e for the aforementioned information.
6. **Statement of assets:** Refer annexure 5f for the aforementioned information.
7. **Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:** Management represented that there are no revenue pendencies including local authority taxes and compounding charges with respect to the 6 SPVs.
8. **Vulnerability to natural or induced hazards that may not have been covered in town planning/ building control:** Management represented that there are no such natural or induced hazards which have been not considered in town planning/building control with respect to the 6 SPVs.
9. **Latest pictures of the SPVs:** Refer annexure 5g for the aforementioned information
10. **Date of site inspection:** During the month of September/ October 2024.
11. **In term of the SEBI InvIT Regulations, we hereby confirm that:**
 - We are competent to undertake the valuation.
 - We are independent and have prepared this Report on fair and unbiased basis.
 - The Valuation has been performed as per internationally accepted valuation methodologies and in cognizance of international valuation standards and ICAI Valuation Standards 2018 issued by the Institute of Chartered Accountants of India.
 - KPMG is not affiliated to the Client in any manner whatsoever. Further KPMG does not have a prospective interest in the Targets which is the subject of this Valuation and KPMG's fee is not contingent on an action or event resulting from the analysis, opinions or conclusions in the Valuation.

Caveat to disclosures

KPMG has not independently verified the documents related to disclosures mentioned in the annexures and have relied on Management representation for the same.

Source(s): Management information, KPMG analysis

Annexure 5a: Valuation of the projects in the previous 3 years

Valuation Summary						
INR Crore						
Name of the SPV	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-24
IRB Jaipur Deoli Tollway Limited	1,799	1,848	1,856	1,893	1,939	1,949
IRB Pathankot Amritsar Toll Road Limited	1,634	1,714	1,619	1,687	1,611	1,590
IRB Talegaon Amravati Toll Road Limited	1,109	1,028	996	937	841	791
IRB Tumkur Chitradurga Tollway Limited	2,097	2,102	2,156	2,364	2,176	2,078
MVR Infrastructure and Tollways Limited	408	415	385	351	327	295
VK1 Expressway Limited	NA	NA	NA	1,375	1,300	1,267

Source(s): Valuation Report dated 30 April 2024

Valuation for prior 3 years was conducted by a different valuer.

Annexure 5b: One-time sanctions and approvals and overdue periodic clearances

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
IRB Jaipur Deoli Tollway Limited			
1	Labour License under Contract Labour (Regulation and Abolition) Act, 1970 and Contract Labour (Regulation and Abolition) Contract Rules, 1971		
i	Labour License No.JP-46(153)/2013-RLC,dated 03-Oct-13	Regional Labour Commissioner (Central), Jaipur	Valid up to 02-Oct-24 (Renewal is in under process)
2	Provisional permission for energization of Installation (DG set/Captive power) under Rule 63 & 47 A of Indian Electricity Rules, 1956		
i	Barkheda-Chandlai Toll Plaza	Sr.Electrical Inspector, Jaipur	Valid up to 31-Mar-26
ii	Sonwa Toll Plaza	Sr.Electrical Inspector, Jaipur	Valid up to 31-Mar-26
3	WIM System		
i	Inspection certificate for Barkheda -Chandlai Toll Plaza	Weigh and Measure Department, Jaipur	Stamping Certificate renewed upto 11-Dec-24.
ii	Inspection certificate for Sonwa Toll Plaza	Weigh and Measure Department, Tonk	Stamping Certificate renewed upto 05-Dec-24
4	Static Weigh Bridge		
i	Inspection Certificate for Static Weight Bridge at Barkheda-Chandlai Toll Plaza	Weigh and Measure Department, Jaipur	1. Stamping of WBE 44 - Renewed upto 07-Jan-25 2. Stamping Certificate for WBE 47 (Tonk Side) Renewed upto 07-Jan-25
ii	Inspection Certificate for Static Weight Bridge at Sonwa Toll Plaza	Weigh and Measure Department, Tonk	Stamping of WBE 45 (Jaipur Side) & WBE 46 (Tonk Side): Valid up to 29-Nov-24

Source(s): Management information

Annexure 5b: One-time sanctions and approvals and overdue periodic clearances

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
IRB Pathankot Amritsar Toll Road Limited			
1	Labour License for Contract Labours 46 (L-112)/2013/ALK dated 23.07.2024	Office of the Assist. Labour Commissioner, Jalandhar	1-Sep-25
2	Inspection Certificate, WIM at Ladpalwan Toll Plaza (5 Nos.) and Receipt No. 240373180, LCR No.-37202173165, VC S no. 91202403712208	Controller Legal Metrology, Punjab, Pathankot	18-Jun-25
3	Inspection Certificate, WIM at Ladpalwan Toll Plaza (5 Nos.) and Receipt No. 240373180, LMUR No.37202173165, VC S no. 91202403712209	Controller Legal Metrology, Punjab, Pathankot	18-Jun-25
4	Inspection Certificate, Static Weigh Bridge at Ladpalwan Toll Plaza PTK & ASR Side LMUR No. 37202071327, VC S. no. 9120220377647 and Fee Receipt No. 220377624	Controller Legal Metrology, Punjab, Pathankot	27-Nov-24
5	Inspection Certificate, WIM at Waryam Nangal Toll (9 Nos.) LCR No. 25202358066, VC S no.91202402569877 Fee Receipt 240254709	Controller Legal Metrology, Punjab, Amritsar	7-Aug-25
6	Inspection Certificate, WIM at Waryam Nangal Toll (1 Nos.) LMUR No. 25202358066, VC S no.91202302563126 Fee Receipt 230251547	Controller Legal Metrology, Punjab, Amritsar	21-Mar-25
7	Inspection Certificate, Static Weigh Bridge at Waryam Nangal Toll Plaza PTK & ASR Side LMUR No. 26202062518, VC S. no. 91202202622728 and Fee Receipt No. 220262999	Controller Legal Metrology, Punjab, Amritsar	10-Oct-24

Source(s): Management information



Annexure 5b: One-time sanctions and approvals and overdue periodic clearances

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status	Remarks
IRB Talegaon Amravati Tollway Limited				
1	Principle employer registration - No. (Labour License No.ALCN/46(L)/158/2010-CL, dated 26-Nov-10)	Office the Regional Labour, Nagpur	Valid up to 20-Dec-24	-
2	License for Building & Other Construction activities No. (ALCN/42 (R)/150/2010/BOCW, dated 21-Dec-10)	Office the Regional Labour, Nagpur	Valid up to 02-Sep-32	-
3	Inspection Certificate for WIM installed at Nandagaon Toll Plaza	Inspector, Legal Metrology, Amravati	Valid upto 23-Jun-23	Letter issued to Office of the Inspector of legal metrology Amravati Division 2 - communicating that WIM and SWB are under maintainace and therefore stamping will not be carried out until fuctionality is restored.
4	Inspection Certificate for Static Weigh Bridge at Nandagaon Toll Plaza (Amravati Side)	Inspector, Legal Metrology, Amravati	Valid upto 26-Jan-24	
5	Inspection Certificate for Static Weigh Bridge at Nandagaon Toll Plaza (Nagpur Side)	Inspector, Legal Metrology, Amravati	Valid upto 26-Jan-24	

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
M.V.R. Infrastructure and Tollways Limited			
1	Licence No. CLRA/ALCCHENNAI/2020/L-116/ under the Contract Labour (Regulation and Abolition) Act, 1971, dated 03.08.2021	Regional Labour Commissioner (Central), Chennai	Valid up to 03-Aug-25
2	Certificate for registration of DG Sets (40KVA and 125KVA no. 03/2012-13)	Government of Tamil Nadu, Electrical Inspector, Salem	Life time validity

Source(s): Management information

Annexure 5b: One-time sanctions and approvals and overdue periodic clearances

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
IRB Tumkur Chitradurga Tollway Limited			
1	Labour License for Contract Labours Licence no. 46(97)2011.B3 /2011 dated 28.02.2024	Office of the Assist. Labour Commissioner, Bangalore	30-Mar-25
2	Labour License for Contract Labours Licence no. 33/2011-AH dated 26.02.2024	Office of the Assist. Labour Commissioner, Hubli	5-Apr-25
3	Inspection Certificate, Iron hexagon weight at Guilalu Toll Plaza and Receipt No. 2401113119, LCR No.-AC11046 SI no. 91202401112308	Controller Legal Metrology, Karnataka	29-Jul-26
4	Inspection Certificate, Iron hexagon weight at karjeevanahally Toll Plaza and Receipt No. 2403516207, LCR No.-AC51251 SI no. 91202403521106	Controller Legal Metrology, Karnataka	15-Aug-26
5	Inspection Certificate, WIM Lane 2 and 9 at Guilalu Toll Plaza and Receipt No. 2401112786, LCR No.- AC024202315918 SI no. 91202401112002	Controller Legal Metrology, Karnataka	19-Mar-25
6	Inspection Certificate, WIM at Lane 1 and 7at Guilalu Toll Plaza and Receipt No. 2401112678, LCR No.- AC024202315918 SI no. 91202401111901	Controller Legal Metrology, Karnataka	26-Feb-25
7	Inspection Certificate, WIM at Lane 3 and 8 at Guilalu Toll Plaza and Receipt No. 2401112835, LCR No.- AC024202315918 SI no. 91202401112046	Controller Legal Metrology, Karnataka	17-Apr-25

Source(s): Management information

Annexure 5b: One-time sanctions and approvals and overdue periodic clearances

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
8	Inspection Certificate, WIM at Lane 4 and 10 at Guilalu Toll Plaza and Receipt No. 2401112851, LCR No.-AC024202315918 SI no. 91202401112061	Controller Legal Metrology, Karnataka	5-May-25
9	Inspection Certificate, WIM at Lane 5 and 6 at Guilalu Toll Plaza and Receipt No. 2401113180, LCR No.-AC11046 SI no. 91202401112365	Controller Legal Metrology, Karnataka	26-Sep-25
10	Inspection Certificate, WIM at Lane 11 and 12 at Guilalu Toll Plaza and Receipt No. 2401113180, LCR No.-AC11046 SI no. 91202401112365	Controller Legal Metrology, Karnataka	27-Aug-25
11	Inspection Certificate, Static weigh bridge towards Chitradurga at Guilalu Toll Plaza and Receipt No. 2401112834, LCR No.-AC11046 SI no. 91202401112045	Controller Legal Metrology, Karnataka	17-Apr-25
12	Inspection Certificate, Static weigh bridge towards Tumkur at Guilalu Toll Plaza and Receipt No. 2301112371, LCR No.-AC11046 SI no. 91202301111608	Controller Legal Metrology, Karnataka	3-Dec-24
13	Inspection Certificate, WIM at Lane 2 and 9 at Karjevvanahally Toll Plaza and Receipt No. 2403515264, LCR No.-AC51251 SI no. 91202403519109	Controller Legal Metrology, Karnataka	27-Feb-25
14	Inspection Certificate, WIM at Lane 8 and 3 at Karjevvanahally Toll Plaza and Receipt No. 2403515368, LCR No.-AC51251 SI no. 91202403519370	Controller Legal Metrology, Karnataka	22-Mar-25

Source(s): Management information



Annexure 5b: One-time sanctions and approvals and overdue periodic clearances

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
15	Inspection Certificate, WIM at Lane 1 and 7 at Karjeevanahally Toll Plaza and Receipt No. 2403515699, LCR No.-AC51251 SI no. 91202403519609	Controller Legal Metrology, Karnataka	28-Apr-25
16	Inspection Certificate, WIM at Lane 4 and 10 at Karjevvanahally Toll Plaza and Receipt No. 2403515644, LCR No.-AC51251 SI no. 91202403519893	Controller Legal Metrology, Karnataka	9-May-25
17	Inspection Certificate, WIM at Lane 5,6,11 and 12 at Karjevvanahally Toll Plaza and Receipt No. 2403516206, LCR No.-AC51251 SI no. 91202403521105	Controller Legal Metrology, Karnataka	15-Aug-25
18	Inspection Certificate, Static weighbridge towards Bangalore at Karjevvanahally Toll Plaza and Receipt No. 2403515369, LCR No.-AC51251 SI no. 91202403519371	Controller Legal Metrology, Karnataka	22-Mar-25
19	Inspection Certificate, Static weighbridge towards Chitradurga at Karjeevanahally Toll Plaza and Receipt No. 2303514740, LCR No.-AC51251 SI no. 91202403518174	Controller Legal Metrology, Karnataka	14-Dec-24

Source(s): Management information



Annexure 5b: One-time sanctions and approvals and overdue periodic clearances

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status	Remarks
VK1 Expressway limited				
1	Clearing of Pollution Control Board	Gujarat Pollution control board	06-Dec-17 to 30-Sep-24	Not Required in O&M Phase
2	Labour License	Ministry of Labour & Employment	19-Dec-24	
3	Permission of Village Panchayat and Pollution control board for installation of crushers	Gujarat Pollution control board, Vadodara	18-Apr-19 to 25-Mar-26	Not Required in O&M Phase

Source(s): Management information



Annexure 5c: Estimates of already carried as well as proposed major repairs and improvements

Estimates of already carried out as well as proposed major repairs and improvements												
INR Crore												
Name of the SPV	FY 2020	FY 2021	FY 2022	FY 2023	FY2024	FY2025	FY2026	FY2027	FY 2028	FY 2029	FY 2030	FY 2031
IRB Jaipur Deoli Tollway Limited	32	32	-	-	-	-	-	78	84	110	23	-
IRB Pathankot Amritsar Toll Road Limited	27	31	22	-	-	32	29	8	-	15	47	-
IRB Talegaon Amravati Toll Road Limited	3	0	23	24	-	-	-	-	34	42	5	-
IRB Tumkur Chitradurga Tollway Limited	19	-	-	-	-	44	-	-	-	-	55	-
MVR Infrastructure and Tollways Limited	5	-	-	-	10	10	-	-	-	-	-	-

Estimates of already carried out as well as proposed major repairs and improvements												
INR Crore												
Name of the SPV	FY2032	FY2033	FY2034	FY2035	FY 2036	FY 2037	FY 2038	FY 2039	FY2040	FY2041	FY2042	FY2043
IRB Jaipur Deoli Tollway Limited	-	13	118	75	-	-	-	-	-	-	-	-
IRB Pathankot Amritsar Toll Road Limited	-	-	-	-	-	-	-	-	-	-	-	-
IRB Talegaon Amravati Toll Road Limited	-	-	49	58	-	-	-	-	-	-	-	-
IRB Tumkur Chitradurga Tollway Limited	-	-	-	89	-	-	-	-	-	-	-	-
MVR Infrastructure and Tollways Limited	-	-	-	-	-	-	-	-	-	-	-	-

Source(s): Management information



Annexure 5d: Purchase price of the SPVs by the InvIT

Purchase price of the SPVs		
Name of the SPV	Acquisition Value (INR Crore)	% Stake in SPV
IRB Jaipur Deoli Tollway Limited	1,484.7	100%
IRB Pathankot Amritsar Toll Road Limited	1,485.7	100%
IRB Talegaon Amravati Toll Road Limited	657.6	100%
IRB Tumkur Chitradurga Tollway Limited	1,329.0	100%
MVR Infrastructure and Tollways Limited	340.0	100%
VK1 Expressway Limited	1,325.4	100%

The table above presents the acquisition value of the SPVs by the trust and % stake held by the trust in each SPV.

Source(s): Management information



Annexure 5e: Pending litigations - IRBJD

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
1	Criminal Litigation	NA	<p>Background of the case: Pradeep Sogani, Shankar Lal Sharma and certain others (collectively the “Complainants”) have lodged 10 first information reports against Virendra Mahiskar, Managing Director, IRB Infrastructure Developers Limited, Vivek Chouhan (the project manager and the authorised signatory of the Sponsor) and certain others (collectively the “Accused”) with the Chaksu Police Station. The aforesaid first information reports were lodged on the alleged ground that there was delay in the release of payments on the part of the Accused towards the purchase of various materials from the Complainants.</p> <p>Current Status: No offence have been found to be committed by the Accused. Hence, they are acquitted from all the cases. This matter is closed.</p>	Not quantified
2	Civil Litigation (Writ Petition)	Rajasthan High Court	<p>Background of the case: Jagannath University (the “Petitioner”) had filed a writ petition before the Rajasthan High Court against the project manager of IRBJD and certain others (the “Respondent”) seeking that the Respondents be directed to issue monthly pass to the buses/ vehicles of the Petitioner for the toll fee of Rs. 215 per month as per the notification dated 8 April 2013 and any other appropriate relief in favour of the Petitioner which the court deems fit. The said relief has been sought on the alleged grounds that the Respondents had previously issued a monthly pass of a higher denomination without taking into consideration the non-commercial nature of the vehicles of the Petitioner, which was in violation of Clause 3 of the notification dated 8 April 2013. Further, the Petitioner has also filed a stay application before the Rajasthan High Court seeking that during the pendency of the writ petition, the Respondents be directed to permit the vehicles of the Petitioner on the toll fee of Rs. 215 per month. The project manager of IRBJD has filed its reply denying the averments made by the Petitioner</p> <p>Current Status: The matter is currently pending.</p>	Not quantified
3	Direct Tax Matters	CIT (A)	<p>Background of the case: IRBJD has received order u/s 143(3) r.w.s 147 of Income Tax Act, 1961 (“ITA 1961”) dated 30 Dec 2019 for A Y 2012-13. The matter pertains to addition on account of interest under section 56 of ITA 1961 under Income from other sources. Assessing Officer has also levied Interest u/s 244A and 234D of ITA 1961 and has initiated penalty proceedings u/s.271(1)(c) of ITA 1961. However, IRBJD does not accept the views, findings and contentions of the Assessing Officer and has filed an appeal against the order on 27 Jan 2020. Commissioner of Income-tax (Appeals) was passed in favor of the Company. Department has filed an Appeal with ITAT. The ITAT passed an order in favor of the Company. Department has filed an appeal with Hon'ble High Court.</p> <p>Current Status: The matter is currently pending.</p>	27.2

Source(s): Management information

Annexure 5e: Pending litigations - IRBTA

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
1	Public Interest Litigation (PIL)	Bombay High Court Aurangabad bench	<p>Background of the case: The Petitioners have filed a PIL against NHA & Ors. raising allegations regarding the quality of various roads in Maharashtra. The petitioners have alleged that the quality of roads from Nagpur to Dhule is not in good condition and there are pot holes on the road. The concessionaire is only responsible for the patch of road between Talegaon to Amravati and not for the larger stretch referred by the petitioner. There are no pot holes on the highway and the quality of the road is good and is maintained as per the concession agreement.</p> <p>Current Status: The matter is pending.</p>	Not quantified

Source(s): Management information



Annexure 5e: Pending litigations – VK1

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
1	Arbitration Tribunal	Arbitration Tribunal	<p>Background of the case: The Concessionaire submitted its claim under Article 29.2 of the Concession Agreement on the basis of claim submitted by the Project manager for compensation of additional cost/losses on account of the delay in completion of construction due to reasons attributable to the NHAI, damages under Article 4.2 and compensation under Article 35.1 on account of Change in Law along with interest as per Article 41.4. Since there was no response from NHAI, the Concessionaire crystallised dispute under Article 38. Further, the conciliation failed and the arbitration was invoked as per Article 38.3 of the Concession Agreement.</p> <p>Current Status: The Claimant filed Statement of Claim for a consolidated amount of Rs. 448.33 Crore. The arbitration proceedings are in progress and the matter is pending.</p>	4,483.3

Source(s): Management information



Annexure 5e: Pending litigations – IRBTC

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
1	Civil Litigation	Delhi High Court	<p>Background of the case: Due to a dispute on the deferred premium calculation of the previous years between the IRBTC and the NHA, the concessionaire has filed an appeal with the Honorable High Court of Delhi for resolution against the NHA's demand of advance premium of Rs. 169.8 Mn in aggregate and interest on it. As per the interim order of the Division Bench of Honorable High Court, withdrawals from Escrow Account are not permitted till final order in the matter.</p> <p>Current Status: The Section 37 matters were disposed off on 26.04.2022 with directions that interim relief in terms of order dated 19.12.2019 will continue to operate and also directed Arbitral Tribunal to conduct a hearing on 10.05.2022. Subsequently, the Arbitral Tribunal was constituted and the Learned Tribunal by its order dated 14.07.2022 directed NHA to withdraw Rs. 97.8 Crore as an interim measure and then by interim order dated 09.08.2022 further directed NHA to withdraw Rs 453.9 Crore and Concessionaire to withdraw Rs 193 Crore. The embargo on the operation of Escrow was also lifted. Arbitration proceedings are in progress.</p> <p>NHA filed Section 37 against interim AT order dated 09.08.2022. The matter is pending</p>	949.8 + interest

Source(s): Management information



Annexure 5e: Pending litigations – MVR

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
1	Civil Litigation	Madras High Court	<p>Background of the case: Certain colleges in Salem (the “Petitioners”) have filed 25 writ petitions before the High Court of Madras, against MVR and others (collectively the “Respondents”) alleging the legality of act of collecting entry fee at increased rates from college buses. The Petitioners have sought the directions against Respondents to collect entry fee at toll plaza for educational institution vehicles at par with that of school buses. An order was passed by the High Court of Madras, which took into consideration various petitions filed against MVR regarding the above mentioned issue and held that the discounted rates were only applicable to school buses carrying school students and not to college buses. However, the High Court of Madras passed an order granting an interim stay and ordered MVR to collect entry fee from the college buses of the Petitioners at par with the rates applicable to school buses. The matter is currently pending.</p> <p>Current Status: The writ petitions filed by 7 educations are disposed by the high court till date. The rest of the petitions are pending.</p>	Not quantified
2	Arbitration with NHAI	Arbitration Tribunal	<p>Background of the case: NHAI had initiated arbitration proceedings against MVR before the Arbitration Tribunal Consisting of Dr. Arijit Pasayat (Presiding Arbitrator) Mr. S. S. Agarwal and Mr. Navin Kumar for its claim to the tune of Rs. 126.1 Mn (towards non construction of second carriageway of a Flyover at km 188.850) and Rs. 77.70 Mn (towards provision of safety barriers in missing location on the Project Highway). The proceedings are in progress.</p> <p>Current Status: The matter is pending.</p>	203.8

Source(s): Management information



Annexure 5e: Pending litigations – MVR

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
3	Arbitration with NHAI	Arbitration Tribunal	<p>Background of the case: MVR initiated arbitration proceedings against NHAI before the Arbitration Tribunal Consisting of Dr. Arijit Pasayat (Presiding Arbitrator) Mr. S. S. Agarwal and Mr. Navin Kumar for its claim to the tune of Rs. 51.4 Mn (towards positive Change of scope for construction of additional arm of flyover) and Rs. 2.6 Mn (negative Change of Scope on account of deletion of 19 hume pipe culverts). The conciliation meeting between NHAI and MVR meeting was concluded. As NHAI did not respond on the matter, MVR invoked Arbitration proceedings against NHAI. MVR had submitted its statement of claims against NHAI. As per direction of the Court, NHAI deposited Rs 5.39 Crore in the registry of the Delhi High Court on August 22, 2023. The matter is pending.</p> <p>In th meantime NHAI challenged the Award under Section 34 which was dismissed by the Hon'ble Delhi High Court. Subsequently, NHAI appealed against the Section 34 judgment under Section 37 in the Delhi High Court which was also dismissed but with a liberty granted to NHAI to file a review petition against the Section 34 judgment. The matter is pending.</p> <p>Current Status: The Hon'ble Arbitral Tribunal has pronounced the Award in favour of MVR on 17/02/2022 and NHAI was directed to pay Rs 4,89,71,505/- . In terms of the Award, MVR requested NHAI for payment of the awarded amount along with interest @ 8% pa from the date of Award i.e. from 17.02.2022. Subsequently, MVR has filed execution application in the Hon'ble Delhi High Court and directed NHAI to deposit the amount in the registry. As per direction of the Court, MVR withdrew Rs 5.39 Crore from the Court's registry upon submission of the indemnity bond. The matter is pending.</p>	48.9 + interest @ 8% pa wef 17.02.2022

Source(s): Management information



Annexure 5e: Pending litigations – IRBPA

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
1	Civil Litigation	NA	<p>Background of the case: IRBPA has initiated arbitration proceedings against NHAI before Arbitration Tribunal consisting of Mr. Ajit Prakash Shah (Presiding Arbitrator), Mr. S S. Agarwal & Mr. Navin Kumar. The claim is for sum of Rs. 2522.5 Mn and extension in concession period by 518 days. IRBPA had submitted its claim on account of losses and requested NHAI for appointment of other Arbitrator. NHAI had refused the request for appointment of arbitrator. As per the provisions of Concession Agreement, IRBPA requested Indian road congress to appoint arbitrator on behalf of NHAI. Subsequently, on NHAI had appointed Mr Navin Kumar as the Arbitrator.</p> <p>Current Status: The Hon'ble Arbitral Tribunal pronounced unanimous Award on July 13, 2021 in favour of IPATRL and granted, i) extension in Concession Period by 518 days; ii) compensation of Rs. 252.251 Cr along with 9% interest w.e.f. November 27, 2014 till the date of realisation; and iii) cost of arbitration of Rs. 1.58 Crores. Further, the Hon'ble Tribunal passed an order on July 27, 2021 incorporating the factual corrections in the Award in response to IPATRL's application under Section 33 of the Arbitration and Conciliation Act 1996. IPATRL submitted a demand to NHAI requesting for implementation of the terms of the said Award. However, NHAI challenged Award in the Delhi High Court and filed a petition under section 34 under Arbitration and Conciliation Act 1996 on November 26, 2021 which was dismissed by the Court on March 8, 2022. IPATRL has served a legal notice for execution of the Award on March 30, 2022. IPATRL had filed application for execution of Section 34 order dated March 8, 2022 in the Delhi High Court. The Court vide its order dated May 20, 2022 had directed NHAI to release 75% of the arbitral amount awarded in terms of the decision of the Cabinet Committee and the SOP within 2 weeks. Pursuant to the Order dated May 20, 2022, IPATRL complied with the SOP of NHAI and submitted a BG of Rs. 317.3 crores on May 24, 2022 towards release of 75% of Payout Amount. Subsequently, NHAI released net amount of Rs. 310.91 crores after statutory deductions.</p> <p>In the meantime, on May 10, 2022, NHAI filed appeal under Section 37 challenging the Delhi High Court (Section 34) order dated March 8, 2022. Subsequently, the Delhi High Court by its order dated July 03, 2023 set aside the Award and Section 34 order. IPATRL had to re-deposit the Arbitral amount of Rs. 317.3 crores with NHAI and the BG submitted has been withdrawn. IPATRL filed Special Leave Petition (SLP) in the Supreme Court challenging the Section 37 order of the Delhi High Court. The Supreme Court admitted the SLP and the matter is pending.</p>	2522.5 + interest @ 9% wef 27.11.2014

Source(s): Management information



Annexure 5e: Pending litigations – IRBPA

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
2	Criminal Litigation	HIGH COURT OF PUNJAB AND HARYANA	<p>Background of the case: The Concessionaire had constructed the toll plaza building on the land acquired and handed to the concessionaire by NHAI. Irrigation Distributary was shifted along the boundary of Ladpalwan Toll building. SDO, Irrigation department requested the concessionaire that water is not flowing smoothly in the shifted irrigation distributary and needs to be constructed as per approved drawings. NHAI submitted necessary documents to the irrigation department. Irrigation department did not approve the drawings and been continuously writing to concessionaire and NHAI for disturbed flow of water through Irrigation distributary. Irrigation Department imposed case on employees of Concessionaire with the help of adjacent farmers in the court of Divisional Officer, Gurdaspur for non-smooth flow of water in Irrigation Distributary, who imposed Rs. 20,000/- as penalty on the concessionaire. Hence, writ petition is filed praying to quash the order passed by Divisional Officer, Gurdaspur by which the personal liability of the petitioners has been fixed under Northern India Canal and Drainage Act 1873, etc.</p> <p>Current Status: The matter is pending.</p>	Rs. 20,000/-+
3	Regulatory Action (ESIC)	NA	<p>Background of the case: Employees' State Insurance Corporation, sub-regional office Marol ("ESIC") issued a notice to IRBPA demanding payment of Rs. 0.08 Mn towards pending employers contributions and employees' contributions required to be paid by IRBPA, in its capacity as the principal employer, under Section 40 read with Section 39 of the Employees' State Insurance Act, 1948. Further, ESIC has also directed IRBPA to show cause as to why the assessment of an amount of Rs. 5.83 Mn towards contributions payable in respect of the employees should not be recovered from IRBPA. IRBPA has replied to the aforementioned notice.</p> <p>Current Status: No further communication has been received in this regard.</p>	5.8

Source(s): Management information



Annexure 5e: Pending litigations – IRBPA

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
4	Civil Litigation	High Court	<p>Background of the case: In the month of September 2020, Government of India passed three new Farm bills in the Parliament. This drew flak among some group of farmers in the state of Haryana who forcefully stopped the operation of the toll plazas in Haryana. IRBPA had notified this event as the Force Majeure under Indirect Political Event and submitted its claim for the period i.e. 01.10.2020 to 15.12.2021 (Farmer's strike/ protest I) amounting to Rs. 121 crores and consequent extension to Concession Period by 441 days in terms of Clause 34.7.2 (b) and 34.6.2 (b) of the Concession Agreement respectively. Since there was no response received from NHA, IRBPA crystallised this matter as the dispute and subsequently invoked arbitration as per Clause 44.3 of the Concession Agreement. Thereafter, during 17.11.2023 to 25.11.2022 and 15.12.2022 to 15.01.2023 (Farmer's strike/ protest II), the toll collection was affected due to Farmer's agitation against the State Govt. IRBPA filed claim for extension of Concession Period by 32.28 days and compensation of Force Majeure cost of Rs 7.19 Crore.</p> <p>Current Status: NHA released partial amount of Rs. 36.03 Crore on 25.08.2022 and approved extension of Concession Period by 436 days. However, IRBPA has requested NHA to resume conciliation through CCIE for resolution of the dispute with respect to the balance dues and extension in Concession Period. Till then Arbitration is kept in abeyance and both the above referred claims of IRBPA were taken up with CCIE for conciliation but the conciliation failed. Subsequently, IRBPA reinvoked the arbitration on 16.02.2023. IRBPA filed a consolidated claim towards Farmer's protest I & II amounting to Rs. 111.62 Cr (Rs 92.44 Cr + interest of Rs 19.18 Cr upto 31.03.2023) & execution of Supplementary Agreement for extension of Concession Period by 473.28 days (i.e. 441 days [approved is 436 days] +32.28 days). The Arbitral Award was pronounced on 17.02.2024, the Tribunal awarded Rs. 28.54 Crore as the compensation (as on 17.02.2024) along with interest @ 10.5% per annum till realisation of payment and allowed extension fo Concession Period by 472 days. NHA filed section 34 challenging the Award. Concessionaire has also filed section 34 to the extent of reimbursement of Force Majeure Costs towards Interest payment on Debt. The matter is pending.</p>	1116.2 + interest & extension of 473.28 days

Source(s): Management information



Annexure 5e: Pending litigations – IRBSD

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
1	Civil Litigation	Bombay High Court	<p>Background of the case: 1. Mr. Vasantrai Harilal Gohil and Mr. Vijay Vasantrai Gohil (the “Plaintiffs”) have filed a special civil suit before the Court of the Civil Judge (Senior Division) at Vasai, against the Sponsor, certain directors of the Sponsor and IRB Surat Dahisar Tollway Pvt. Ltd. The Plaintiffs have alleged that on 05 Jan 2011, certain employees of the Sponsor acted violently and forcefully with them when they could not provide a money change at the toll plaza at Khanivade, Taluka Vasai. The Plaintiffs have alleged that they were chased, threatened and beaten by the employees of the Sponsor which resulted in serious injuries. The Plaintiffs have sought a direction that the Sponsor and its directors be directed to pay the medical expenses of Rs. 0.5 million incurred by the Plaintiffs along with damages of Rs. 50 Mn with interest. The Plaintiffs have also sought a direction from the court requiring the Sponsor and the directors to disclose on oath, their respective movable and immovable property and to record charge of Rs. 50.5 Mn over such property until the decretal amount is paid. The Plaintiffs have filed an application for adding IRBSD as a necessary party in the suit. The IRBSD, its directors and employees have filed their reply in the matter. The Civil Judge (Senior Division) at Vasai has vide its Judgement dated 09 July 2019 directed the respondents jointly and severally to pay Rs. 0.5 Mn with interest at the rate of 9% p.a. to the Plaintiffs.</p> <p>Current Status: IRBSD has filed writ petition in Bombay High Court challenging the Judgement of the Vasai Court dated 09 July 2019. The matter is pending.</p>	Rs. 50 lakhs plus interest
2	Public Interest Litigation (PIL)	Bombay High Court	<p>Background of the case: Jimmy Gonsalves and another (the “Petitioners”) have filed a public interest litigation before the High Court of Bombay against the MoRTH, NHAI, IRBSD and Ideal Road Builders Private Limited and certain others (the “Respondents”). The Petitioners have inter alia alleged that commuters are facing hardship and inconvenience due to traffic at Varsova Creek bridge and that IRBSD has denied its duty to build a new bridge on Varsova Creek, and have sought inter alia, that MoRTH be directed to take steps for the construction of a third bridge on Varsova Creek and that all vehicles travelling from Khaniwade toll on NH-8 and Ghodbunder Road toll on the state highway be exempt from toll till the completion of said new bridge. IRBSD and Ideal Road Builders Private Limited are yet to file their respective replies in this matter.</p> <p>Current Status: The matter is currently pending.</p>	Not quantified

Source(s): Management information



Annexure 5e: Pending litigations – IDAA

Sr. No	Matter	Pending Before	Particulars	Amount Involved (INR Million)
1	Indirect Tax Matters		There is one indirect tax proceeding pending against IDAA, which involves an aggregate amount of Rs. 9.37 Mn.	9.4

Source(s): Management information



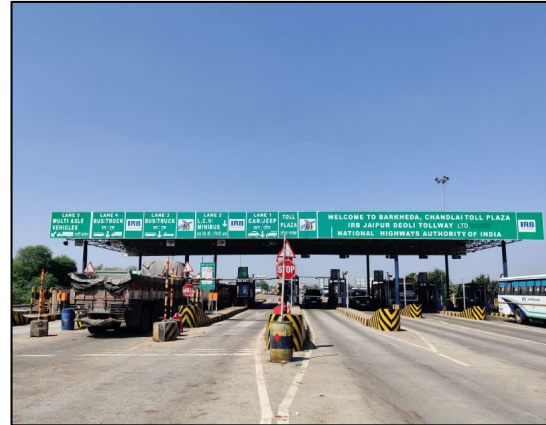
Annexure 5f: Statement of assets as at 30 September 2024

Statement of assets					
INR Crore					
Name of the SPV	Net tangible assets (A)	Intangible assets (B)	Other non current assets (C)	Total Non current assets (A+B+C)	Current assets
IRB Jaipur Deoli Tollway Limited	0	1,285	0	1,285	6
IRB Pathankot Amritsar Toll Road Limited	0	1,165	-	1,165	472
IRB Talegaon Amravati Toll Road Limited	0	537	-	537	5
IRB Tumkur Chitradurga Tollway Limited	0	6,941	0	6,942	41
MVR Infrastructure and Tollways Limited	1	107	-	108	51
VK1 Expressway Limited	-	-	1,121	1,121	296

Source(s): Management information, Provisional Financial Statements



Annexure 5g: Site pictures - IRBJD



Source(s): Site visits conducted in September/October 2024.

Annexure 5g: Site pictures - IRBPA

वाहन की श्रेणी / Vehicle Type	एक लाने की यात्रा / Single Journey	24 घण्टे के लिए वापसी यात्रा / Valid for 24 hrs. Return Journey	मासिक लाने का मासिक पास / Monthly Pass
कार / Car	135	200	4465
ट्रक / Truck	205	310	6870
बस / Bus	420	630	13980
ट्रैक्टर / Tractor	635	955	21210
ट्रैलर / Trailer	825	1235	27490



Source(s): Site visits conducted in September/October 2024.

Annexure 5g: Site pictures - IRBTA

National Highways Authority of India User Fee to be Recovered from Users		
Type of Vehicle	Single Journey (₹)	Return Pass (₹) One Time to & Fro within 24hrs
Car/Passenger Van/Jeep or Light Motor Vehicle	120/- /-	185/- /-
Light Commercial Vehicle (LCV)/Light Goods Vehicle or Minibus	190/- /-	285/- /-
Truck and Bus	395/- /-	590/- /-
Earth Moving Equipment, Heavy Construction Machinery or Multi Axle Vehicle (3 to 6 Axle)	605/- /-	910/- /-
Oversized Vehicles (Seven or More Axle)	765/- /-	1150/- /-



Source(s): Site visits conducted in September/October 2024.

Annexure 5g: Site pictures - IRBTC



KARJEEVNAHALI TOLL PLAZA (KM 104 + 530) NH - 48 (OLD NH - 4)
 ಕರ್ಜೀವನಾಹಳ್ಳಿ ಟಾಲ್ ಪ್ಲಾಜಾ (ಕಿ.ಮೀ. 104 + 530) ನಂ. 48 (ಫೋರ್ಮರ್ ನಂ. ಕೂಲ್ಯಾ. 04)

Category Of Vehicle ವಾಹನದ ವರ್ಗ	Single journey Only FASTag (Rs) ಅಥವಾ ಮಾತ್ರ ಫಾಸ್ಟಾಗ (ರೂ.)	Without FASTag Backdated / Insufficient Balance / Cash pay ಬ್ಯಾಕಡೇಟ್ / ಅನುಪುರಕ ಸಂಪನ್ಮೂಲ / ಕಾಶ ಪೇಯಿಮೆಂಟ್	Monthly Pass Only FASTag (Rs) ಮಾತ್ರ ಫಾಸ್ಟಾಗ (ರೂ.)
Car / Jeep / Van / LMV ಕಾರ್ / ಜೀಪ್ / ವ್ಯಾನ್ / ಲೈಟ್ ಮೋಟಾರ್ ವಾಹನ	105	210	3455
LCV / LGV / Mini Bus ಲೈಟ್ ಕಾರ್ / ಮಿಡಿಯಂ ಕಾರ್ / ಸಣ್ಣ ಬಸ್	165	330	5580
Bus / Truk (2 Axles) ಬಸ್ / ಟ್ರಕ್ (2 ಅಕ್ಷಗಳು)	355	710	11695
HCM / EME / MAV (3-6 Axles) ಹೈವೆಜ್ಡ್ ಕಾರ್ / ಮಿಡಿಯಂ ಕಾರ್ / ಮಲ್ಟಿ-ಅಕ್ಷದ ಬಸ್	550	1100	18340
Oversized Vehicles (>7 Axles) ಅತಿ ದೊಡ್ಡ ವಾಹನಗಳು (7 ಅಕ್ಷಗಳಿಗಿಂತ ಹೆಚ್ಚು)	670	1340	22325

Note: Monthly Pass @ Rs. 340/- (Only FASTag) For Local Non Commerical Vehicle Within 20 Km Radius
 ಸೂಚನೆ: ಮಾತ್ರ ಫಾಸ್ಟಾಗ ಮಾತ್ರವೇ ಅನ್ವಯಿಸುತ್ತದೆ. ಒಳಗಡೆ 20 ಕಿ.ಮೀ. ವ್ಯಾಪ್ತಿಯಲ್ಲಿ 2024-2025 ರಲ್ಲಿ ಮಾತ್ರವೇ ರೂ. 340/- (ಫಾಸ್ಟಾಗ ಮಾತ್ರ) ಅನ್ವಯಿಸುತ್ತದೆ.



NATIONAL HIGHWAYS AUTHORITY OF INDIA
 ರಾಜ್ಯ ಹೆಚ್ಚುವರಿ ಹೆಚ್ಚುವರಿ ಸರ್ಕಾರ
 IRB TUMKUR CHITRADURGA TOLLWAY LTD
 ಕೆ.ಆರ್.ಪೇಟೆ, ಹಂಪನಹಳ್ಳಿ - ಚಿತ್ರದುರ್ಗ, ಕರ್ನಾಟಕ
 GUILALU TOLL PLAZA (KM 172 + 770 + NH - 48) (OLD NH - 4)

Toll fee for Stretch Sira- Chitradurga - From km 132.000 to km. 189.000 of NH - 48
 ಟಾಲ್ ಫೀ ಸಿರಾ-ಚಿತ್ರದುರ್ಗ - ಕಿ.ಮೀ. 132.000 ರಿಂದ ಕಿ.ಮೀ. 189.000 ನಂ. 48
 User Fee effective Period - FROM 01-04-2024 To 31-03-2025
 ಉಪಯೋಗ ಫೀ ಪರಿಧಿ - 01-04-2024 ರಿಂದ 31-03-2025 ವರೆಗೆ

Category Of Vehicle ವಾಹನದ ವರ್ಗ	Single journey Only FASTag (Rs) ಅಥವಾ ಮಾತ್ರ ಫಾಸ್ಟಾಗ (ರೂ.)	Without FASTag Backdated / Insufficient Balance / Cash pay ಬ್ಯಾಕಡೇಟ್ / ಅನುಪುರಕ ಸಂಪನ್ಮೂಲ / ಕಾಶ ಪೇಯಿಮೆಂಟ್	Monthly Pass Only FASTag (Rs) ಮಾತ್ರ ಫಾಸ್ಟಾಗ (ರೂ.)
Car / Jeep / Van / LMV ಕಾರ್ / ಜೀಪ್ / ವ್ಯಾನ್ / ಲೈಟ್ ಮೋಟಾರ್ ವಾಹನ	85	170	2785
LCV / LGV / Mini Bus ಲೈಟ್ ಕಾರ್ / ಮಿಡಿಯಂ ಕಾರ್ / ಸಣ್ಣ ಬಸ್	135	270	4500
Bus / Truk (2 Axles) ಬಸ್ / ಟ್ರಕ್ (2 ಅಕ್ಷಗಳು)	285	570	9430
HCM / EME / MAV (3-6 Axles) ಹೈವೆಜ್ಡ್ ಕಾರ್ / ಮಿಡಿಯಂ ಕಾರ್ / ಮಲ್ಟಿ-ಅಕ್ಷದ ಬಸ್	445	890	14790
Oversized Vehicles (>7 Axles) ಅತಿ ದೊಡ್ಡ ವಾಹನಗಳು (7 ಅಕ್ಷಗಳಿಗಿಂತ ಹೆಚ್ಚು)	540	1080	18005

Note: Monthly Pass @ Rs. 340/- (Only FASTag) For Local Non Commerical Vehicle Within 20 Km Radius
 ಸೂಚನೆ: ಮಾತ್ರ ಫಾಸ್ಟಾಗ ಮಾತ್ರವೇ ಅನ್ವಯಿಸುತ್ತದೆ. ಒಳಗಡೆ 20 ಕಿ.ಮೀ. ವ್ಯಾಪ್ತಿಯಲ್ಲಿ 2024-2025 ರಲ್ಲಿ ಮಾತ್ರವೇ ರೂ. 340/- (ಫಾಸ್ಟಾಗ ಮಾತ್ರ) ಅನ್ವಯಿಸುತ್ತದೆ.

Source(s): Site visits conducted in September/October 2024.

Annexure 5g: Site pictures - MVR

NATIONAL HIGHWAYS AUTHORITY OF INDIA TOLL RATES			
VEHICLE	SINGLE JOURNEY ONLY FASTAG	MULTIPLE JOURNEY 24HRS ONLY ON FASTAG	MONTHLY PASS ONLY ON FASTAG
CAR/JEEP	95	145	2915
L.C.V	170	255	5105
BUS/TRUCK	340	510	10205
MULTI AXLE VEHICLE	545	820	16405



Source(s): Site visits conducted in September/October 2024.

Annexure 5g: Site pictures – VK1



Source(s): Site visits conducted in September/October 2024.

8.

Scope & Limitations

Scope & Limitations (1/3)

Terms of Engagement

- KPMG Valuation Services LLP (“KPMG” or “we”) has been appointed by IRB InvIT Fund (“IRB InvIT Fund”, “Trust” or “Client” or “you”) in relation to carrying out Enterprise Valuation of 6 Special Purpose Vehicles (“SPVs” or “Trust Assets”) of IRB InvIT Fund and Equity Valuation of IRB InvIT Fund (jointly referred as “Targets”) as on the agreed date of the valuation in accordance with Regulation 21 of the Securities Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 where valuation is required to be conducted by a registered valuer (as defined under section 247 of the Companies Act, 2013) and such valuation report (“Report”) is required to be in compliance with the SEBI InvIT Regulations (“Engagement” or “Valuation”).
- The terms of the Engagement are set out in our letter of engagement dated 27 September 2024 (“LoE”). This letter of engagement is preceded by signed undertaking dated 13 June 2024 (“Undertaking letter”) provided by us. As agreed, Undertaking letter shall be read in conjunction and shall form part of the aforesaid letter of engagement.
- The date of Valuation is 30 September 2024 (“Valuation Date”).
- This Report sets out KPMG’s conclusions on the Valuation and has been prepared in accordance with LoE. Our Report is confidential to the Client and will be used by the Client only for purposes mentioned in the LoE. The Report will be issued by us on the express understanding that it shall not be copied, disclosed or circulated or referred to in correspondence or discussion with any third party. This Report is confidential to the Client and it is given on the express understanding that it is not communicated, in whole or in part, to any third party without KPMG’s prior written consent. Neither the Report nor its content may be used for any other purpose without prior written consent of KPMG. This Report has a limited scope as specified in it. KPMG will not accept any responsibilities to any other party to whom the Report may be shown or who may acquire a copy of the Report.
- We are not responsible to any other person/ party for any decision of such person/ party based on this Report. Any person/ party intending to provide finance/ invest in the shares/ businesses of the Targets/ their holding companies/ subsidiaries/ group companies, if any, shall do so after seeking their own professional advice and after carrying out their own due diligence procedures to ensure that they are making an informed decision. If any person/ party (other than the Client) chooses to place reliance upon any matters included in the report, they shall do so at their own risk and without recourse to the Valuer. It is hereby notified that usage, reproduction, distribution, circulation, copying or otherwise quoting of this Report or any part thereof, except for the purpose as set out earlier in this report, without our prior written consent, is not permitted, unless there is a statutory or a regulatory requirement to do so.
- We are aware that the Report may have to be shared with certain regulatory authorities in India and stock exchanges in India and therefore Report may enter the public domain and hereby provide our consent to such sharing subject to the following:
 - You shall indemnify and hold us harmless against any loss that may be incurred by us arising out of or relating to sharing of the Report with regulatory authorities in India or stock exchanges in India, or the Report entering the public domain as mentioned herein, as also against all costs, charges and expenses (including legal expenses) suffered or incurred by us on account of the aforesaid. In this clause “us” shall include all Firm Persons and “you” shall include Other Beneficiaries (as these terms have been defined in the LoE).
 - Such Report shall be disclosed in full and strictly in such forms as KPMG has provided to the Client without any deviation.
 - KPMG shall not be liable to any person or party for any reason and under any circumstances.
 - The readers of the Report shall not bring any claim against KPMG for matters arising out of or consequent upon disclosure of the Report.
 - The Report shall be issued with all the disclaimers as provided by KPMG at the time of issuance of the Report.

Scope & Limitations (2/3)

Disclosure of Interest/Conflict

- KPMG is not affiliated to the Client in any manner whatsoever. Further, KPMG does not have a prospective interest in the business which is the subject of this engagement.
- KPMG's fee is not contingent on an action or event resulting from the analyses, opinions or conclusions in this Report.
- You are aware that KPMG is already providing/has provided valuation services to IRB Infrastructure Trust and IRBIDL. Notwithstanding the aforesaid past/ongoing relationship with you, we do not perceive any conflict in undertaking this engagement.

Basis of Value

- The report has been prepared on the basis of "Fair Value" as at Valuation Date. The generally accepted definition of "Fair Value" is the value as applied between a hypothetical willing vendor and a hypothetical willing prudent buyer in an open market and with access to all relevant information.

Premise of Value

- The report has adopted "Going Concern Value" as the premise of value in the given circumstances. The generally accepted definition of Going concern value is the value of a business enterprise that is expected to continue to operate in the future.
- The valuation has been performed as per internationally accepted valuation methodologies and in cognizance of international valuation standards and ICAI Valuation Standards 2018 issued by the Institute of Chartered Accountants of India.

Scope and Limitations

- This Report is based on the information provided by the Client and has been confirmed by the Client. KPMG have not independently verified or checked the accuracy or timeliness of the same. KPMG have indicated within this Report the sources of the information presented and have satisfied ourselves, so far as possible, that the information presented is consistent with other information which is made available to us in the course of our work in accordance with the terms of this engagement letter. KPMG have not, however, sought to establish the reliability of the sources by reference to other evidence, except as may be specifically agreed in writing between us.
- KPMG has read, analyzed and discussed the financial information and underlying management assumptions pertaining to the Targets as provided by the Management of the Client ("Management"). This information has been solely relied upon by KPMG for the Valuation.
- We have based our analysis on the audited financial statements of the SPVs for the years ended 31 March 2021 to 31 March 2024 and provisional financial statements of the SPVs for the period from 01 April 2024 to 30 September 2024. Additionally, our analysis is based on the business plan of the SPVs for the period from 1 October 2024 to the end of the concession periods of respective SPVs as provided by the Management ("Management Business Plan") and key underlying assumptions. Any changes in the assumptions or methodology used to consolidate the financial statements may significantly impact our analysis and therefore the Valuation.
- KPMG has read and analyzed but have not commented on the appropriateness of or independently verified the Management Business Plan and underlying data and assumptions and accordingly provided no opinion on the same. If there were any omissions, inaccuracies or misrepresentations of the information provided by the Management, this may have a material effect on our findings and therefore the Valuation.
- The realization of the projections in the Management Business Plan will be dependent on the continuing validity of assumptions on which it is based. Our analysis therefore will not and cannot be directed to providing any assurance about the achievability of the future plans. Since the projections relate to the future, actual results are likely to be different from the projected results because events and circumstances do not occur as expected and the differences may be material.

Scope & Limitations (3/3)

- This Report makes reference to 'KPMG analysis'. This indicates only that we have (where specified) undertaken certain analytical activities on the underlying data to arrive at the information presented.
- Our work did not constitute an audit of the financial statements and accordingly, we do not express any opinion on the truth and fairness of the financial position as indicated in this Report. Our work did not constitute a validation of the financial statements of the Targets, and accordingly, we do not express any opinion on the same.
- We have carried out the Valuation based on Management Business Plan received. Our scope of work does not include any commercial / legal / technical due diligence or carrying out any environmental / technical feasibility analysis or comparison of Management Business Plan with approved budgets / annual operating plans of the Targets. We have relied on Management's representation on such considerations and any changes in the same may significantly impact our analysis and therefore the Valuation.
- Wherever applicable, we have relied upon the legal opinion document / affidavit copies provided by Management in relation to the current status of the projects. We have not carried out / sought any independent legal opinion, nor have we verified the accuracy of the legal opinion shared. Any discrepancy in the same may significantly impact our analysis and therefore the Valuation.
- Our opinion is based on prevailing market, economic, and other conditions at the Valuation Date. It should be appreciated that these conditions can change over relatively short periods of time, not only as a result of internal factors, but because of external factors, which could impact the value, either positively or negatively.
- For our analysis, we have relied on published and secondary sources of data, whether or not made available by the Client. We have not independently verified the accuracy or timeliness of the same.
- Neither KPMG nor any of its affiliates worldwide are responsible for updating this Report because of events or transactions occurring subsequent to the date of this Report. Any updates or second opinions in this Report cannot be sought by the Management from external agencies including global offices of KPMG without the prior written permission of KPMG.
- KPMG has not considered any finding made by other external agencies in carrying out the Valuation analysis other than the one mentioned herein.
- For the purpose of the Valuation, our scope does not include valuation or legal due diligence of current assets and liabilities and as represented by the Management, the same has been considered at their respective book value.
- For the purpose of this engagement and Report, we have made no investigation of, and assume no responsibility for the title to, or liabilities against the Targets. Our conclusion of value assumes that the title to the assets and liabilities of the Targets reflected in the financial statements as on Valuation Date is intact as at the date of this Report.
- Any discrepancies in any table/ annexure between the total and the sums of the amounts listed are due to rounding-off.
- The Report should be read in the light of these limitations, and we caution that had these matters been within the scope of our review, our conclusions may have changed, and that change could be material.
- The information presented in this Report does not reflect the outcome of any due diligence procedures. The reader is cautioned that the outcome of due diligence process could change the information herein and our Valuation, and that change could be material.
- This Report forms an integral whole and cannot be split in parts. The outcome of the Valuation can only lead to proper conclusions if the Report as a whole is taken into account.

Management representation

- This Report is prepared on the basis of the sources of information listed in Annexure 1. KPMG has relied upon written representation provided by the Management that the information contained in the Report is materially accurate and complete, fair in its manner of portrayal and therefore forms a reliable basis for the Valuation.



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The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavor to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

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JAIPUR TO DEOLI SECTION OF NH-12

(KM 18.700 To 165.00)

IN THE STATE OF RAJASTHAN



OCTOBER 2024



TOLL REVENUE AND O&M COST PROJECTION REPORT (FINAL)



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ABBREVIATIONS

AADT	- Annual Average Daily Traffic	NHAI	- National Highways Authority of India
BOT	- Build Operate Transfer	NHDP	- National Highways Development Project
CAGR	- Compound Annual Growth Rate	NSDP	- Net State Domestic Product
CTV	- Classified traffic volume	O&M	- Operation & Maintenance
DBFOT	- Design, Build, Finance, Operate & Transfer	PCDP	- Per Capita Domestic Product
EME	- Earth Moving Equipment	PCI	- Per Capita Income
GDP	- Gross Domestic Product	PCU	- Passenger Car Unit
GSDP	- Gross State Domestic Product	PSC	- Pre-stressed Concrete
HCM	- Heavy Construction Machinery	RCC	- Reinforced cement concrete
HCV	- Heavy Commercial Vehicle	RHS	- Right Hand Side
HTMS	- Highway Traffic Management System	SH	- State Highway
IRC	- Indian Road Congress	TP	- Toll Plaza
IRR	- Internal Rate of Return	WPI	- Wholesale Price Index
LCV	- Light Commercial Vehicle	SIR	- Special Investment Region
LHS	- Left Hand Side	c.	- Circa
LGV	- Light Goods Vehicle	ROB	- Railway Over Bridge
MAV	- Multi Axle Vehicle	MDR	- Major District Road
MORTH	- Ministry of Road Transport and Highways	ODR	- Other District Road
NH	- National Highway	CA	- Concession Agreement
PCC	- Plain Cement Concrete	RMT	- Running Meter
CR	- Coarse Rubble		

CHAPTER 1

INTRODUCTION

1.1 Background

The Government of India through National Highway Authority of India (NHAI) embarked upon a program to enhance the traffic capacity and safety for efficient transportation of goods as well as passenger traffic on National Highway Sections under NHDP Phase V. Under Phase V NHAI has planned to convert 6,500 km of existing 4-lane National Highways into 6-lane National Highway. Sections envisaged under 6-laning comprise the Golden Quadrilateral section (5,700 km) and some other sections which are 800 km in length.

The project under consideration, Jaipur - Deoli section of NH-12 from Km 18.700 to km 165.000 is one such road project NHAI intended to implement on a BOT basis in the DBFOT format. *M/s IRB Jaipur Deoli Tollway Ltd.* (Concessionaire) has been awarded the Project for concession period of 25 years starting from 14th June 2010 to 13th June 2035. The Project has been commissioned and is currently in the operation / maintenance phase.

1.2 Objective of the Study

M/s IRB INVIT FUND has engaged *GMD Consultants* to assess the future traffic and toll potential of the project along with related operation & maintenance expenditure involved.

This report named as “*Toll Revenue and O&M Cost Projection Report*” mainly focuses on traffic and O&M aspects of the project. Other parameters like competing road, area developments etc. have been considered from a traffic development point of view.

1.2.1 Scope of Services

The broad scope of work covered in the assignment is as follows:

- a) Analysis of Traffic Growth
- b) Toll Rate Growth
- c) Revenue Forecasting
- d) Operation and Maintenance Cost Projections

The Concessionaire has provided basic historical traffic data and other project details on the basis of which the above analysis has been carried out, after applying our judgment to the traffic estimates.

“Toll Revenue and O&M Cost Projection Report” was submitted in March 2017. In this report traffic data of year 2015-16 was used as base traffic. The report was updated based on traffic data of year 2017-18 and submitted in April 2018. The report was further updated with traffic Data of the period from April 2018 to September 2018 and was submitted in October 2018. A revised report was submitted with updated traffic for the years 2018-19 in April 2019. The report was further updated with yearly traffic data for 2019-20 in May 2020. With traffic data from April 2020 to March 2021 report was updated, report was further updated with yearly traffic data from April 2021 to March 2022, April 2022 to March 2023, April 2023 to March 2024 and now concessionaire has provided traffic data from April 2024 to September 2024, report is updated with this 6-month traffic data.

CHAPTER 2

TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Surveys

In the course of our work, we have collected the required information for project corridor to understand the general traffic and travel characteristics of the corridor.

The following traffic data has been collected for project:

- Classified traffic volume counts at the two toll plaza locations on Jaipur-Deoli section of NH-12 for base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and Six-Monthly traffic data from April 2024 to September 2024.
- Local Component of traffic
- Component of Return Journey
- Component of Monthly Pass Journey

The main objective of the traffic data analysis is to:

- Determine the existing traffic movement characteristics of project.
- Establish base year traffic.
- Identification of travel patterns and modal split of project traffic
- Deriving growth factors for traffic forecasting
- Estimation of corridor traffic including traffic diversion if any
- Preparation of revenue model and projection of revenue as per toll policy for various scenarios

The project can be divided into two homogenous sections from a traffic point of view.

These sections can be:

1. Jaipur to Tonk
2. Tonk to Deoli

Traffic of both sections is represented by toll plaza in each section. Table below lists provides details of locations from where traffic details have been collected:

Table 2-1 : Traffic Data Details

SR. NO	LOCATION	CTV	Single Journey Traffic	Return Pass Traffic	Monthly Pass Traffic	Local Traffic
1	Km 30.500 Toll Plaza	AADT for Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016
		AADT for year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017
		AADT for year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018
		AADT for year 2018-2019	For year 2018-2019	For year 2018-2019	For year 2018-2019	For year 2018-2019
		AADT for year 2019-2020	For year 2019-2020	For year 2019-2020	For year 2019-2020	For year 2019-2020
		AADT for year 2020-2021	For year 2020-2021	For year 2020-2021	For year 2020-2021	For year 2020-2021
		AADT for year 2021-2022	For year 2021-2022	For year 2021-2022	For year 2021-2022	For year 2021-2022
		AADT for year 2022-2023	For year 2022-2023	For year 2022-2023	For year 2022-2023	For year 2022-2023
		AADT for year 2023-2024	For year 2023-2024	For year 2023-2024	For year 2023-2024	For year 2023-2024
		Six Monthly Data from April 24 to September 24	For April 23 to Sept 24	For April 23 to Sept 24	For April 23 to Sept 24	For April 23 to Sept 24
2	Km 105.000 Toll Plaza	AADT for Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016
		AADT for year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017
		AADT for year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018
		AADT for year 2018-2019	For year 2018-2019	For year 2018-2019	For year 2018-2019	For year 2018-2019

SR. NO	LOCATION	CTV	Single Journey Traffic	Return Pass Traffic	Monthly Pass Traffic	Local Traffic
		AADT for year 2019-2020	For year 2019-2020	For year 2019-2020	For year 2019-2020	For year 2019-2020
		AADT for year 2020-2021	For year 2020-2021	For year 2020-2021	For year 2020-2021	For year 2020-2021
		AADT for year 2021-2022	For year 2021-2022	For year 2021-2022	For year 2021-2022	For year 2021-2022
		AADT for year 2022-2023	For year 2022-2023	For year 2022-2023	For year 2022-2023	For year 2022-2023
		AADT for year 2023-2024	For year 2023-2024	For year 2023-2024	For year 2023-2024	For year 2023-2024
		Six Monthly Data from April 24 to September 24	For April 23 to Sept 24	For April 23 to Sept 24	For April 23 to Sept 24	For April 23 to Sept 24

The locations of each of the traffic surveys are illustrated in Figure 2-1.

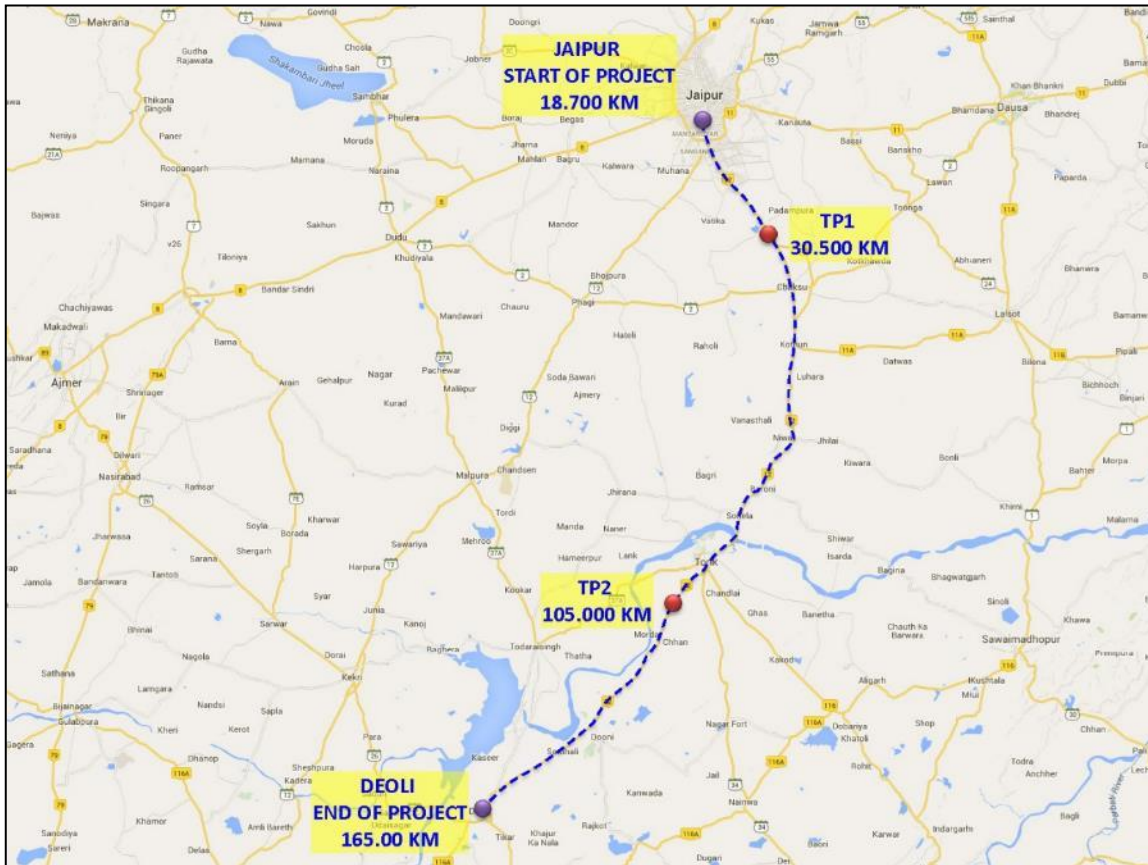


Figure 2-1: Toll Plaza Locations

2.2 Classified Traffic Volume Count

The objective of conducting a Classified Traffic Volume Count is to understand the traffic flow pattern including modal split on a roadway. The Classified Traffic Volume Count survey has been provided by concessionaire of project highway from actual traffic data gathered at toll plaza locations based on monthly data shared with NHAI. These locations are indicated in **Figure 2-1** and listed in **Table 2-1**.

The vehicles can broadly be classified into fast moving / motorized and slow moving / non-motorized vehicles, which can be further classified into specific categories of vehicles. The groupings of vehicles are further segregated to capture the tollable vehicle categories specifically and toll exempted vehicles are counted separately. The detailed vehicle classification system as per IRC: 64-1990 is given in the table below.

Table 2-2 : Vehicle Classification System

Vehicle Type	
Auto Rickshaw	
Passenger Car	Car, Jeep, Taxi & Van (Old /new technology)

Vehicle Type	
Bus	Minibus
	Standard Bus
Truck	Light Goods Vehicle (LCV)
	2 – Axle Truck
	3 Axle Truck (HCV)
	Multi Axle Truck (4-6 Axle)
	Oversized Vehicles (7 or more axles)
Other Vehicles	Agriculture Tractor, Tractor & Trailer

Source - IRC: 64 – 1990

However, since the project highway is currently under toll operation, the data collected corresponds to the category of tollable vehicles. Following are the type of vehicles as per concession agreement:

- Car / Jeep / van
- Minibus /LCV
- Truck / Bus
- Multi Axle
- Oversize Vehicle

2.3 Traffic Characteristic

Toll revenue of the project highway does not solely depend on traffic volume. There are certain characteristics of traffic which have significant potential to affect toll revenue. Components of local traffic, component of passenger and commercial traffic, portion of return journey traffic, portion of monthly pass traffic are some such characteristics of traffic. These will be discussed in subsequent sections of this report.

2.3.1 Traffic Data

Project concessionaire has provided Traffic data for base years 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and from April 2024 to September 2024.

Since the traffic data available for this update is for Six months, from April 2024 to September 2024, it may not represent the whole year traffic. Hence a seasonality

factor for balance part of year has been applied to average traffic of current four months to arrive at Annual Average Daily Traffic of base year 2024-25. Same corrected traffic is used for future projections and revenue calculations. The following table shows historical traffic on project stretch and derived Annual Average Daily Traffic (AADT) for year 2024-25.

Table 2-3 : Traffic Data at Toll Plaza @ Km 30.500

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2018-19	Annual Average Daily Traffic (Nos.) FY 2019-20	Annual Average Daily Traffic (Nos.) FY 2020-21	Annual Average Daily Traffic (Nos.) FY 2021-22	Annual Average Daily Traffic (Nos.) FY 2022-23	Annual Average Daily Traffic (Nos.) FY 2023-24	Annual Average Daily Traffic (Nos.) FY 2024-25
1	Car	8428	8860	9044	7684	8808	8880	9725
2	Minibus / LCV	1506	1370	1056	377	553	665	753
3	Truck / Bus	1109	1278	996	1178	1314	1266	1363
4	Multi Axle	1453	1402	1390	1616	2207	2362	2214
5	Oversized Vehicles	60	50	28	5	7	4	1
	Total	12556	12960	12515	10860	12889	13176	14056

Similar traffic data for toll plaza at km 105.000 is given as under

Table 2-4 : Traffic Data at Toll Plaza @ Km 105.000

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2018-19	Annual Average Daily Traffic (Nos.) FY 2019-20	Annual Average Daily Traffic (Nos.) – FY 2020-21	Annual Average Daily Traffic (Nos.) FY 2021-22	Annual Average Daily Traffic (Nos.) FY 2022-23	Annual Average Daily Traffic (Nos.) FY 2023-24	Annual Average Daily Traffic (Nos.) FY 2024-25
1	Car	3276	3446	3736	3612	3918	4557	4667
2	Minibus/ LCV	780	661	573	235	363	497	545
3	Truck/Bus	691	778	767	913	914	1243	1453
4	Multi Axle	1315	1248	1556	2031	2203	2529	2797
5	Oversized Vehicles	25	19	18	6	9	7	3
	Total	6087	6151	6650	6798	7407	8832	9465

2.4 Data Analysis

2.4.1 Analysis of Traffic Volume Count

Understanding the character of existing traffic forms the basis of traffic forecast. The various vehicle types having different sizes and characteristics can be converted into a single unit called Passenger Car Unit (PCU). Passenger Car equivalents for various vehicles are adopted based on recommendations of Indian Road Congress prescribed in “IRC-64-1990: Guidelines for Capacity of Roads in Rural areas”. The adopted passenger car unit values (PCU) are presented in **Table 2-5**.

Table 2-5 : PCU Factors Adopted for Study

Vehicle Type	PCUs
Car	1.0
Minibus	1.5
Standard Bus	3.0
LCV/LGV	1.5
2 Axle Truck	3.0
3 – 6 Axle Truck	4.5
MAV	4.5
Auto Rickshaw	1.0
Van/Tempo	1.0
Agriculture Tractor with Trailer	4.5
Agriculture Tractor without Trailer	1.5

Source: IRC: 64-1990

Traffic volume at each toll plaza was converted to PCU and same is presented as under.

Table 2-6 : Traffic in PCU at both sections

Toll Plaza Location	Period	PCU	PCU Index
30.500	FY 2015-16	26809	2.17
	FY 2016-17	28629	2.07
	FY 2017-18	26323	1.98
	FY 2018-19	20823	1.66
	FY 2019-20	21283	1.64

Toll Plaza Location	Period	PCU	PCU Index
	FY 2020-21	19998	1.60
	FY 2021-22	19077	1.76
	FY 2022-23	23541	1.83
	FY 2023-24	24321	1.85
	FY 2024-25	24900	1.77
105.000	FY 2015-16	15963	2.29
	FY 2016-17	13747	2.25
	FY 2017-18	14917	2.30
	FY 2018-19	12549	2.06
	FY 2019-20	12472	2.03
	FY 2020-21	13979	2.10
	FY 2021-22	15871	2.33
	FY 2022-23	17158	2.32
	FY 2023-24	20443	2.31
	FY 2024-25	22444	2.37

It can be observed from above that project traffic has a PCU index ranging from 1.5 to 2.4.

which indicates a good mix of commercial and passenger traffic.

2.4.2 Components of Traffic

As discussed previously, components of traffic volume play an important role in determining project revenue. A larger component of commercial traffic with higher axle configuration adds to project revenue positively. Similarly, a larger component of local traffic affects the project revenue potential negatively.

For the purpose of analysis, the recent yearly traffic numbers for the year 2023-24 have been considered as the base numbers.

It is observed that car traffic forms 69% of total traffic at toll plaza location 30.5 while multi axle vehicles are 16% of total traffic. 10% of traffic is Truck /Bus while

LCV traffic forms the balance 5%. Overall, about 31% of traffic is commercial in nature.

At toll plaza location 105.0 car traffic forms 49% of total traffic at toll plaza while multi axle and LCV are 30% and 6%. Truck/ Bus volume is 15% of the total traffic. Overall, about 51% of traffic is commercial in nature which is higher as compared to toll plaza location 30.5.

Another important bifurcation of traffic is components of traffic with respect to various type of toll ticketing like

1. Single Journey
2. Return Journey
3. Overweight Vehicles (Concessionaire provided special tariff for this category)
4. Monthly Pass (Local and General)

The following table provides numbers of vehicles falling in each of the above categories on base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20 2020-21, 2021-22 ,2022-23, 2023-24 and April 2024 to September 2024.

Table 2-7 : Journey Type Bifurcation of Traffic at KM 30.500

Sr. No	Type	Traffic Volume (Nos.) FY 2018-19	Traffic Volume (Nos.) FY 2019-20	Traffic Volume (Nos.) FY 2020-21	Traffic Volume (Nos.) for FY 2021-22	Traffic Volume (Nos.) for FY 2022-23	Traffic Volume (Nos.) for FY 2023-24	Traffic Volume (Nos.) for FY 2024-25
1	Single Journey	4395	5113	6409	4900	5273	5325	5740
2	Return Journey	5372	5188	3676	5858	7502	7736	8194
3	Overweight vehicles	314	2	0	0	0	0	0
4	Monthly Pass	2475	2657	2430	102	114	115	122

A significant part of the traffic at KM 30.500 is return journey (58%) followed by single journey (41%) and monthly passes which share 1% of the total traffic volume. Overweight vehicle shares have reduced to almost nil.

Similarly, traffic numbers for the type of journey at KM 105.000 are given in the following table.

Table 2-8 : Journey Type Bifurcation of Traffic at KM 105.000

Sr. No	Type	Traffic Volume (Nos.) FY 2018-19	Traffic Volume (Nos.) FY 2019-20	Traffic Volume (Nos.) FY 2020-21	Traffic Volume (Nos.) for FY 2021-22	Traffic Volume (Nos.) for FY 2022-23	Traffic Volume (Nos.) for FY 2023-24	Traffic Volume (Nos.) for FY 2024-25
1	Single Journey	2999	3379	4475	3950	4082	5791	6296
2	Return Journey	2036	1978	1634	2816	3300	3018	3146
3	Overweight vehicles	252	6	0	0	0	0	0
4	Monthly Pass	800	788	541	32	25	23	23

Here single journey (67%) forms the highest portion of traffic followed by return journey (33%) and monthly pass journey (0%). It can be observed as 105.000 is predominantly a rural part, monthly passes and return journey components have reduced as compared to location 30.500. Components of overweight vehicles remain the same though.

2.5 Secondary Data Collection

There are several other factors which have substantial impact on traffic pattern and growth on any project corridor. The following are some of such important factors.

- Industrial development around project corridor and its catchment
- Educational infrastructure along project corridor
- Demographic pattern
- Urban area development
- Tourism potential
- Upcoming major infrastructural or Industrial projects
- Special Industry in project corridor
- Overall trends of economic growth local as well as national / regional

Hence in addition to traffic details on the project site, secondary data was also collected from the various sources. Typical secondary data includes the following:

1. Vehicle registration data of regional and national level.
2. Economic Data
 - a) GDP
 - b) NSDP
 - c) Population Growth

- d) Per Capita Income growth
- e) Industrial Growth
- f) Special Industry Potential
- g) Regional and National development vision / plan
- h) Any other relevant data

CHAPTER 3

GROWTH OF TRAFFIC ON PROJECT HIGHWAY

3.1 Introduction

Traffic growth is a function of the interplay of a number of contributory factors such as National economy, Government policy, socio-economic conditions of the people, and changes in land uses along the project corridor precincts etc. As these factors have a number of uncertainties associated with them, forecasts of traffic are dependent on the forecasts of factors such as population, gross domestic product (GDP), vehicle ownership, per capita income (PCI), agricultural output, fuel consumption etc. Future patterns of change in these factors can be estimated with only a reasonable degree of accuracy and hence the resultant traffic forecast levels may not be precise.

Traffic growth forecast for project corridor Jaipur – Deoli section of NH-12 has been done taking above factors into consideration. “**IRC: 108-2015-Guidelines for Traffic Prediction on Rural Highways**” is established best practice and has been used for traffic growth forecast.

3.2 Trend Analysis

One of the methods of estimation of future rate of traffic growth is to assume the same rate of growth as experienced in the past. However, it may be noted that major influencing factors which reflect Economic conditions such as GDP, agricultural output, industrial output, national policies etc. are susceptible to change over a longer period of time and necessary adjustments need to be made to past trends to account for these changes.

Thus, we have considered the Elasticity model of growth projection which is one of the most widely acceptable methods for traffic forecast and is recommended in **IRC: 108-2015-Guidelines for Traffic Prediction on Rural Highways**.

In this method past trends of any vehicular data are paired with an economic indicator and a regression analysis is done to yield the economic model of growth. Growth of vehicle traffic varies for different types of vehicles. It is a proven fact that growth patterns for passenger and goods vehicles are different. Traffic growth on any highway typically depends on a number of economic parameters. The most important and direct parameters are given as under

- Per Capita Income
- Net State Domestic Product (NSDP)
- Population

It is observed that the ownership of a car is more closely related to affordability hence per capita is the index which closely fits with growth of car traffic among other criteria. In similar fashion, the following pairs of vehicle type and independent variable can be established for elasticity modeling of growth.

- Car / Jeep – Par Capita Income
- Bus / Minibus – Population
- Trucks / Heavy / Goods Vehicle – NSDP

Time series data of vehicle (both passenger and goods) Registered in state of Rajasthan is used as the base data for analysis of growth.

3.3 Estimation of Traffic Demand Elasticity

The elasticity of traffic demand is defined as the rate at which traffic intensity varies due to change in the corresponding indicator selected. Hence, in order to estimate the elasticity of traffic demand, it is necessary to establish the relationship between the growth in number of given categories of vehicle with one of the economic variables considered, such as NSDP, per capita income and population growth. Latest available data for vehicle registration, per capita income, NSDP and population is used in analysis.

As per IRC: 108-2015 the model for estimating elasticity index for the project corridor is of the following form and is as given below:

$$\text{Log}(P) = k \times \text{Log}(EI) + A$$

Where,

P = Number of Vehicles (Mode wise)

EI = Economic Indicator

A = Regression constant

k = Elasticity coefficient (Regression coefficient)

The elasticity for cars and bus (passenger vehicles) is calculated based on the Population and Per Capita Domestic Product (PCDP) and the elasticity for trucks is calculated based on the Net State Domestic Product (NSDP).

The following tables and graphs depict regression and elasticity of growth model.

Table 3-1 : Per Capita Income Vs Car

Year	PCI	Car	Log PCI	Log Car	PCI Growth	Average Growth
2004	18565	397290	4.27	5.60		
2005	19445	417701	4.29	5.62	5%	
2006	21342	467675	4.33	5.67	10%	
2007	21922	524723	4.34	5.72	3%	
2008	23356	585161	4.37	5.77	7%	
2009	24304	659616	4.39	5.82	4%	
2010	27502	748295	4.44	5.87	13%	
2011	29612	845909	4.47	5.93	8%	
2012	30839	947598	4.49	5.98	4%	
2013	31386	1053406	4.50	6.02	2%	
2014	33186	1171267	4.52	6.07	6%	6.0%

Regression analysis of same is given in figure below.

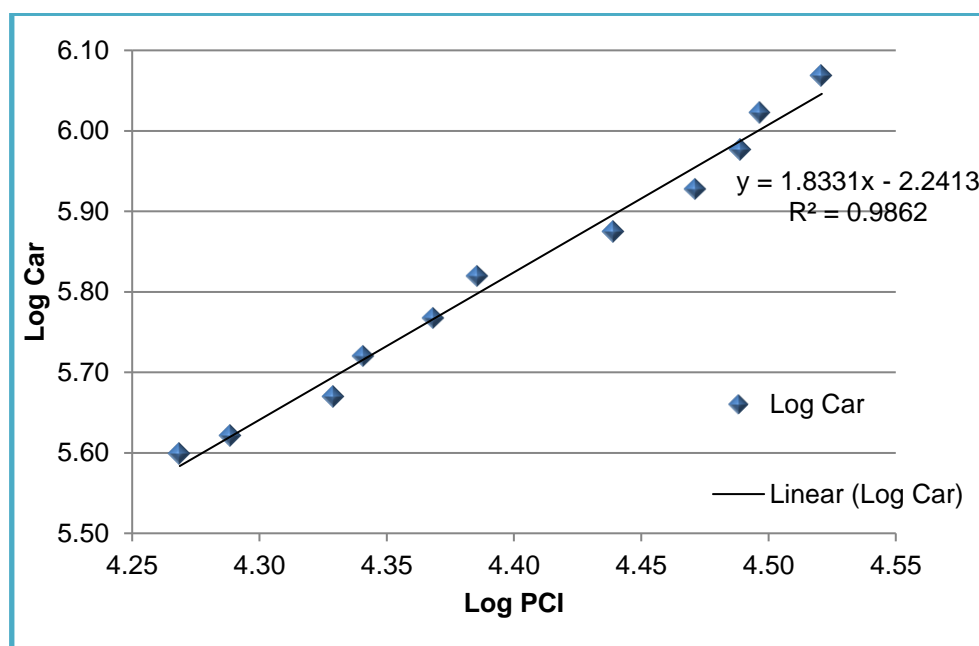
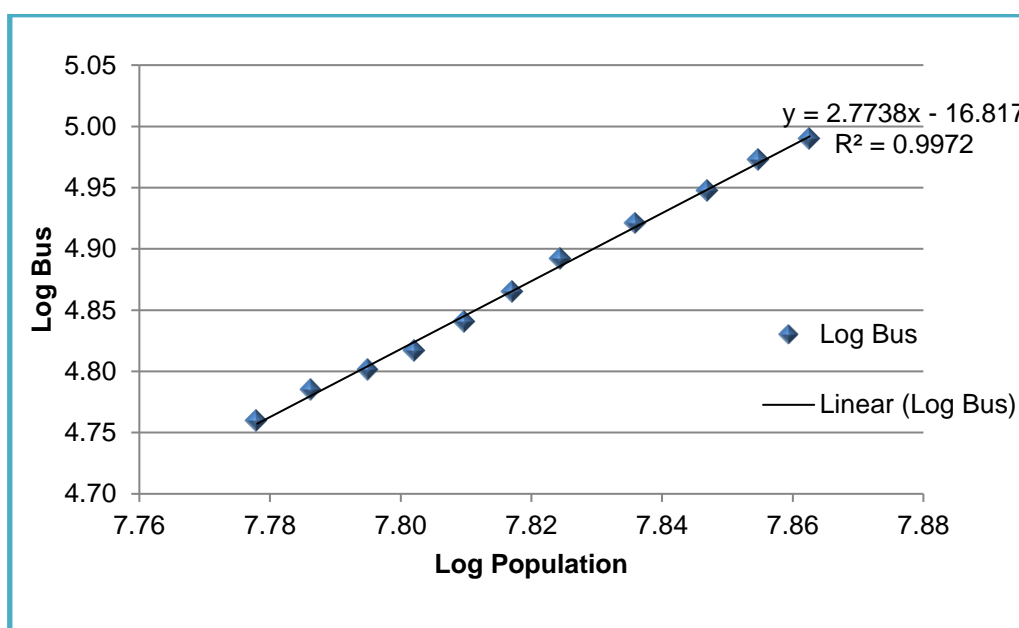
**Figure 3-1: Regression and Elasticity PCI vs. Car-Extrapolation**

Table 3-2 : Population Vs Bus

Year	Population	Buses	Log Pop	Log Bus	Pop Growth	Average Growth
2004	59984000	57542	7.78	4.76		
2005	61136000	60979	7.79	4.79	2%	
2006	62377000	63320	7.80	4.80	2%	
2007	63407000	65605	7.80	4.82	2%	
2008	64533000	69298	7.81	4.84	2%	
2009	65650000	73257	7.82	4.86	2%	
2010	66750000	77980	7.82	4.89	2%	
2011	68548437	83345	7.84	4.92	3%	
2012	70314000	88616	7.85	4.95	3%	
2013	71584000	93892	7.85	4.97	2%	
2014	72877000	97650	7.86	4.99	2%	1.97%

Regression analysis of same is given in figure below.

**Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation**

The elasticity of goods traffic has been worked out by regression analysis with NSDP. The following table represents the data and details.

Table 3-3 : Goods Traffic Vs NSDP

Year	NSDP	Trucks	Log NDSP	Log Truck	NSDP Growth	Average Growth (5 Year)
2004	112636000	186431	8.05	5.27		
2005	120202000	206381	8.08	5.31	7%	
2006	134350000	232007	8.13	5.37	12%	
2007	140471000	252109	8.15	5.40	5%	
2008	152284000	266048	8.18	5.42	8%	
2009	161159000	289925	8.21	5.46	6%	
2010	185366000	323273	8.27	5.51	15%	
2011	202749000	362028	8.31	5.56	9%	
2012	214391000	401983	8.33	5.60	6%	
2013	224632000	434379	8.35	5.64	5%	
2014	237530000	472365	8.38	5.67	6%	7.43%

The following figure depicts regression analysis and extrapolation.

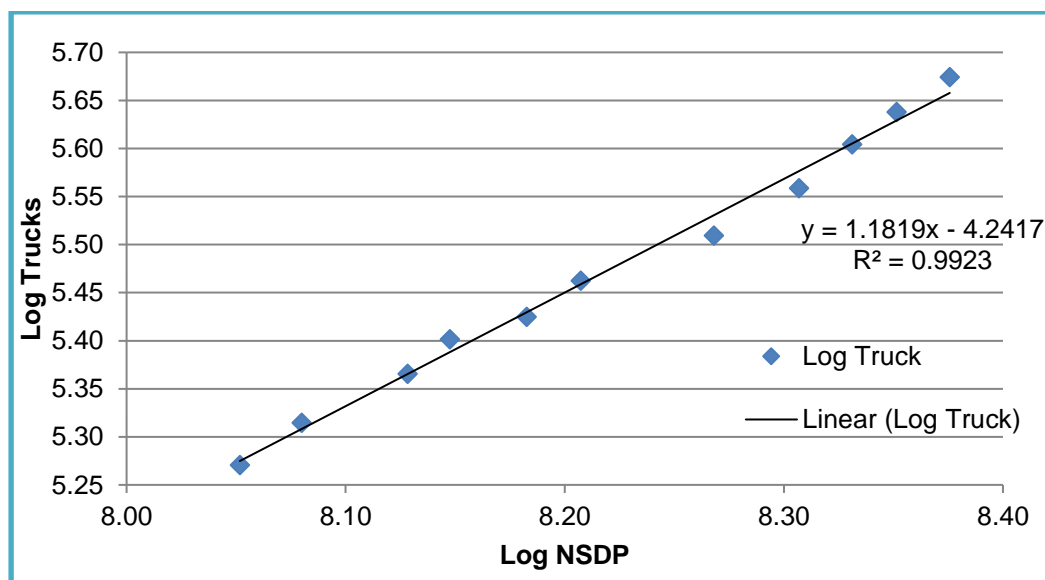


Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation.

Using the regression analysis above, we have arrived at the elasticity of traffic demand for each class of vehicle to a given change in relevant economic indicators. Average traffic growth of a vehicle class is multiplied by the corresponding elasticity coefficient to arrive at traffic growth. R^2 is a statistical measure of how close the data are to the fitted regression line. It varies from 0 to 1. The higher the value of R^2 more representative is the regression model of data.

The results of these analyses for the good fit as reflected by R^2 values are presented in the Table below.

Table 3-4 : Summary Regression Analysis

State	Vehicle Category	Independent Variable	Regression Equation	R Square	Elasticity Coefficient (y)	Average Growth	Growth Elastic Model
Rajasthan	Car/Jeep	PCI	$y = 1.8331x - 2.2413$	$R^2 = 0.9862$	1.8331	6.03%	11.05%
	Bus	Population	$y = 2.7738x - 16.8173$	$R^2 = 0.9972$	2.7738	1.97%	5.46%
	Truck	NSDP	$y = 1.1819x - 4.2417$	$R^2 = 0.9923$	1.1819	7.43%	8.78%

Economic model for predicting growth is good tool, however other local, regional, national factors should also be considered before finalizing growth factors. Considering factors such as proposed developments and other influencing economic factors, moderated growth should be considered. These factors are discussed in subsequent sections.

3.4 Analysis of Historic Traffic Data

Historic traffic data forms useful information for any highway project. It provides useful information for establishing past trends of growth. Project stretch of Jaipur to Deoli has recently been commissioned and tolling only commenced in 2013-14. Only 3-4 years of traffic data is available with project concessionaire. The following factors also have added to inconsistency in traffic volume on project during previous years.

- a) Demonetization in November 2016
- b) Ban on mining in Rajasthan
- c) Covid-19 Impact from Feb-20 onwards by successive waves

It is assumed that as the project is now completed after adding the balance length, the impact of demonetization is diminishing, and mining ban has also been lifted in area. This had impacted the traffic growth adversely.

3.5 Other Factors Influencing Growth

There are many factors which have an impact on traffic growth. As discussed previously these factors can be economic, social, educational, and industrial.

Potentiality of such factors for project highway is discussed as under.

ECONOMY

After witnessing a slowdown during 2011-12, the economy recovered in 2013-14, and a high growth rate of GDP was recorded in up to 2018-19. Pandemic of COVID-19 impacted all economies of world including India. Following figure show trend of GDP growth in India.

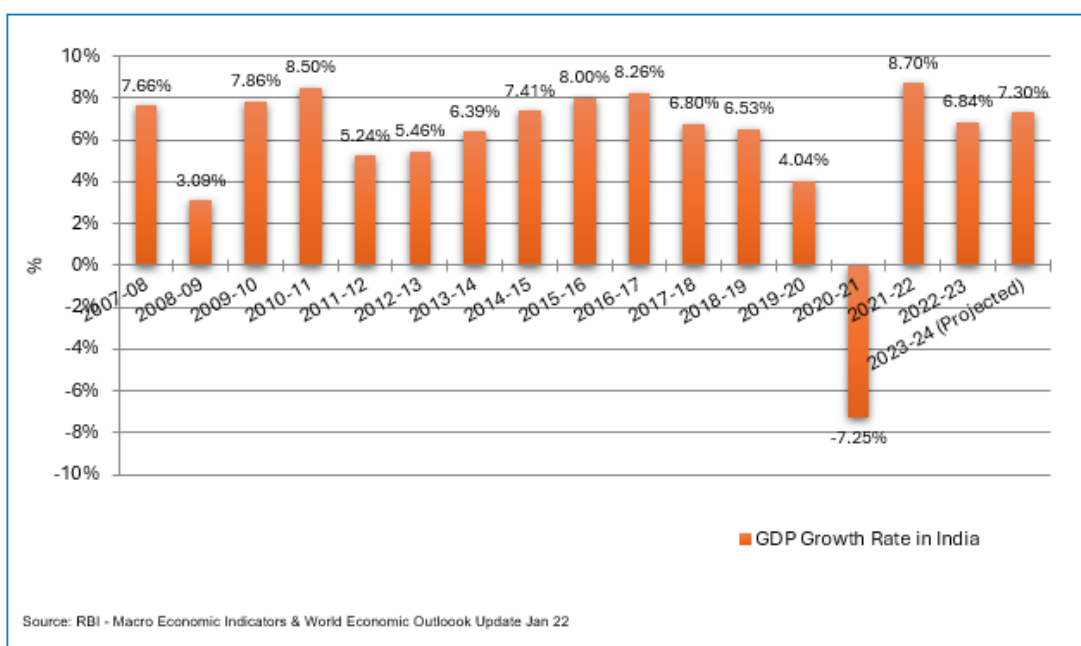


Figure 3-4 : Growth of GDP in India

FY 2017-18 recorded a growth of 6.7% which had a slight impact of GST and demonetization. Indian economy appears on recovery path with estimated growth of 6.8% in FY 2018-19. The government took major policy decisions including tax infrastructure reforming, banking sector improvement and ease of doing business.

Major economies of world collapsed due to pandemic COVID-19 including India. Indian economy is also registered negative growth in financial year 2020-21. After that Indian economy recovered handsomely and registered a growth of about 9% in Year 2021-22.

3.6 Recommended Growth Rates of Traffic

Based on the above analysis and after giving due consideration to the entire listed factors, the following overall growth rates are recommended for each category of vehicle as below. The rate of growth is moderate in light of overall regional trends. Growth of multi-Axle is kept slightly higher as trend of technological advances in logistic industry favors multi-axle over 2/3 axle carriage. It is also expected that as the economy moves from developing to developed, the rate of growth diminishes. Same growth rate is not sustainable for long.

Temporary disruptions caused by implementation of Goods and Service Tax (GST) and demonetization have dissipated, and growth of economy has significantly improved since then. The curb on mining activity in the area due to the ban on quarrying had affected traffic on this project.

Growth rates are recommended for three scenarios for sensitivity analysis namely **Optimistic**, **Pessimistic** and **Most Likely** with a positive and negative variation 0.5% from Most Likely case.

Table 3-5 : Recommended Growth Rates Optimistic

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Car	8.69%	7.54%	6.46%	5.45%	4.50%
Minibus /LCV	5.67%	5.23%	4.52%	3.59%	2.70%
Truck / Bus	6.81%	5.97%	5.19%	4.47%	3.81%
Multi Axle	5.76%	5.06%	4.41%	3.81%	3.26%
Oversized Vehicles	5.76%	5.06%	4.41%	3.81%	3.26%

Table 3-6 : Recommended Growth Rates Pessimistic

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Car	7.69%	6.54%	5.46%	4.45%	3.50%
Minibus /LCV	4.67%	4.23%	3.52%	2.59%	1.70%

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Truck / Bus	5.81%	4.97%	4.19%	3.47%	2.81%
Multi Axle	4.76%	4.06%	3.41%	2.81%	2.26%
Oversized Vehicles	4.76%	4.06%	3.41%	2.81%	2.26%

Table 3-7 : Recommended Growth Rates Most Likely

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Car	8.19%	7.04%	5.96%	4.95%	4.00%
Minibus /LCV	5.17%	4.73%	4.02%	3.09%	2.20%
Truck / Bus	6.31%	5.47%	4.69%	3.97%	3.31%
Multi Axle	5.26%	4.56%	3.91%	3.31%	2.76%
Oversized Vehicles	5.26%	4.56%	3.91%	3.31%	2.76%

CHAPTER 4

TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in the previous section of the report are used to arrive at traffic projections for future years. Toll plaza wise futuristic traffic projection is given in tables below.

These projections have been done for the following three cases of growth.

1. Optimistic Scenario
2. Pessimistic Scenario
3. Most Likely Scenario

Table 4-1 : Total Tollable Traffic @ Toll Plaza 1- Chainage 30.500 KM
(Optimistic Growth Scenario)

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	10458	793	1444	2326	1	15022	26451
2026-27	11247	834	1530	2443	1	16055	28086
2027-28	12095	877	1622	2566	1	17161	29828
2028-29	13007	922	1718	2696	1	18344	31681
2029-30	13988	970	1820	2832	1	19611	33652
2030-31	14891	1013	1915	2957	1	20777	35467
2031-32	15853	1058	2014	3088	1	22014	37383
2032-33	16878	1105	2118	3224	1	23326	39402
2033-34	17968	1155	2229	3366	1	24719	41539
2034-35	19128	1207	2345	3514	1	26195	43791
2035-36	20171	1250	2449	3648	1	27519	45814
2036-37	21269	1295	2559	3787	1	28911	47935
2037-38	22427	1341	2673	3931	1	30373	50152
2038-39	23649	1389	2792	4080	1	31911	52473
2039-40	24937	1439	2917	4236	1	33530	54913
2040-41	26061	1478	3028	4374	1	34942	57050

Table 4-2 : Total Tollable Traffic @ Toll Plaza 2- Chainage 105.000 KM
(Optimistic Growth Scenario)

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	5019	573	1539	2938	3	10072	23730
2026-27	5397	603	1631	3087	3	10721	25100
2027-28	5804	634	1728	3243	3	11412	26546
2028-29	6241	668	1831	3407	3	12150	28081
2029-30	6712	703	1940	3580	3	12938	29710

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2030-31	7145	735	2041	3738	3	13662	31205
2031-32	7606	769	2147	3902	3	14427	32773
2032-33	8097	804	2258	4074	3	15236	34424
2033-34	8620	840	2375	4254	3	16092	36162
2034-35	9177	878	2498	4441	3	16997	37986
2035-36	9676	909	2609	4610	3	17807	39625
2036-37	10203	941	2726	4786	3	18659	41343
2037-38	10759	975	2847	4968	3	19552	43132
2038-39	11345	1010	2975	5157	3	20490	45005
2039-40	11963	1046	3107	5353	3	21472	46955
2040-41	12502	1074	3225	5527	3	22331	48673

**Table 4-3 : Total Tollable Traffic @ Toll Plaza 1- Chainage 30.500 KM
(Pessimistic Growth Scenario)**

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	10361	785	1430	2304	1	14881	26201
2026-27	11039	818	1501	2397	1	15756	27560
2027-28	11762	852	1576	2495	1	16686	29000
2028-29	12531	888	1654	2597	1	17671	30516
2029-30	13350	925	1736	2702	1	18714	32109
2030-31	14079	957	1809	2794	1	19640	33519
2031-32	14848	991	1885	2890	1	20615	34999
2032-33	15659	1026	1964	2988	1	21638	36541
2033-34	16514	1062	2046	3090	1	22713	38155
2034-35	17416	1099	2131	3195	1	23842	39840
2035-36	18190	1127	2205	3285	1	24808	41283

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2036-37	18999	1157	2282	3377	1	25816	42782
2037-38	19844	1187	2361	3471	1	26864	44332
2038-39	20726	1217	2443	3569	1	27956	45946
2039-40	21648	1249	2528	3669	1	29095	47621
2040-41	22407	1270	2599	3752	1	30029	48998

**Table 4-4 : Total Tollable Traffic@ Toll Plaza 2- Chainage 105.000 KM
(Pessimistic Growth Scenario)**

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	4972	568	1525	2911	3	9979	23512
2026-27	5297	592	1600	3028	3	10520	24625
2027-28	5644	618	1679	3152	3	11096	25806
2028-29	6014	644	1763	3280	3	11704	27043
2029-30	6408	671	1850	3413	3	12345	28337
2030-31	6758	695	1928	3529	3	12913	29479
2031-32	7127	720	2009	3649	3	13508	30668
2032-33	7516	746	2093	3774	3	14132	31911
2033-34	7926	772	2180	3902	3	14783	33197
2034-35	8358	799	2272	4035	3	15467	34544
2035-36	8730	820	2351	4148	3	16052	35693
2036-37	9118	842	2433	4264	3	16660	36882
2037-38	9524	864	2517	4384	3	17292	38113
2038-39	9948	887	2604	4508	3	17950	39390
2039-40	10390	910	2695	4635	3	18633	40711
2040-41	10754	926	2770	4740	3	19193	41797

Table 4-5 : Total Tollable Traffic @ Toll Plaza 1- Chainage 30.500 KM
(Most Likely Growth Scenario)

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	10409	788	1437	2315	1	14950	26324
2026-27	11142	825	1516	2420	1	15904	27822
2027-28	11927	864	1599	2530	1	16921	29410
2028-29	12767	905	1686	2645	1	18004	31090
2029-30	13666	948	1779	2766	1	19160	32877
2030-31	14480	986	1862	2873	1	20202	34478
2031-32	15343	1025	1948	2985	1	21302	36162
2032-33	16257	1066	2040	3102	1	22466	37940
2033-34	17226	1109	2136	3223	1	23695	39806
2034-35	18253	1153	2237	3350	1	24994	41773
2035-36	19156	1188	2326	3462	1	26133	43500
2036-37	20104	1225	2419	3577	1	27326	45300
2037-38	21099	1262	2515	3696	1	28573	47174
2038-39	22143	1301	2614	3818	1	29877	49122
2039-40	23238	1340	2718	3945	1	31242	51159
2040-41	24168	1370	2808	4054	1	32401	52895

Table 4-6 : Total Tollable Traffic @ Toll Plaza 2- Chainage 105.000 KM
(Most Likely Growth Scenario)

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	4996	571	1532	2924	3	10026	23620
2026-27	5348	598	1616	3057	3	10622	24863
2027-28	5724	626	1705	3197	3	11255	26178
2028-29	6127	656	1798	3343	3	11927	27562

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2029-30	6558	687	1896	3496	3	12640	29022
2030-31	6948	714	1985	3632	3	13282	30332
2031-32	7362	743	2078	3774	3	13960	31707
2032-33	7801	773	2175	3921	3	14673	33144
2033-34	8266	804	2278	4074	3	15425	34653
2034-35	8758	836	2385	4233	3	16215	36229
2035-36	9191	862	2480	4373	3	16909	37616
2036-37	9646	889	2578	4517	3	17633	39054
2037-38	10123	916	2681	4667	3	18390	40555
2038-39	10624	944	2787	4821	3	19179	42109
2039-40	11150	974	2897	4981	3	20005	43730
2040-41	11597	996	2993	5118	3	20707	45115

4.2 Modification in Concession Period

As per Article 29 of the concession agreement, if actual traffic on the project falls short or exceeds Target Traffic on project highway on defined date, concession period shall be modified subject to calculation stipulated therein. For Jaipur - Deoli project, the Target Date and Target Traffic are defined as under:

Target Date - 1st October 2018

Target Traffic - 30344 in PCU

It was observed that as per traffic projections, traffic volume fell short of target traffic and concession period is expected to extend by about 5 years.

Due to the suspension in toll in the year FY17 because of demonetization for a period of 24 days, the Concessionaire would be entitled to an extension of an additional 24 days.

Traffic was severely impacted on the project highway during the initial lockdown period. NHAI has declared a policy of providing extension of concession to make up

for revenue loss during lockdown. It is expected that extensions will be provided to project concession period on this account as well.

Accordingly, traffic and revenue projections have been worked out up to year 2040-41.

CHAPTER 5

FORECAST OF TOLL REVENUE

5.1 General

This chapter presents the tolling rate calculations, categories and toll revenue of the project.

5.2 Discount Categories

As per the Toll Notification (Schedule R) the following discounts have been considered:

1. Monthly Pass: For frequent users a monthly pass is issued for 50 trips per month. The discount factor works out to 33.33% for 50 journeys. Similarly, there is a pass for 100 trips per month as well, with a discount factor of 33.33% for 100 journeys.
2. Daily Pass (for Return Trip): A 75% discount will be offered on the return trip.
3. Single Journey: Full single journey toll would be charged to this category of vehicles who are infrequent travelers or whose frequency does not yield any discount from the above categories.
4. Local Car / Jeep / Van to be charged at Rs 150 per month (2007)

Building of inflation and escalation of rate on the basis of WPI are done as per toll notification (Schedule R) as given under

The formula for determining the applicable rate of fee shall be as follows:-

$$\text{Applicable rate of fee} = \text{base rate} + \text{base rate} \times \left\{ \frac{\text{WPI A} - \text{WPI B}}{\text{WPI B}} \right\} \times 0.4$$

Factor of inflation / growth has been incorporated as per Schedule R. WPI are available up to 2021-22. A moderate growth in Wholesale Price Index (WPI) has been assumed after that. Following graph provides projection of rate of inflation (WPI) in India. Data has been taken from Office of Economic Advisor web site

(www.eaindustry.nic.in). WPI for years 2017-18 and 2018-2019 is worked back by applying a correlation factor for 2004-05 series as 2017-18 and 2018-2019 data is available in 2011-12 series only. Ratio of WPI for year 2016-17 for both series is used for conversion of WPI in 2004-05 series.

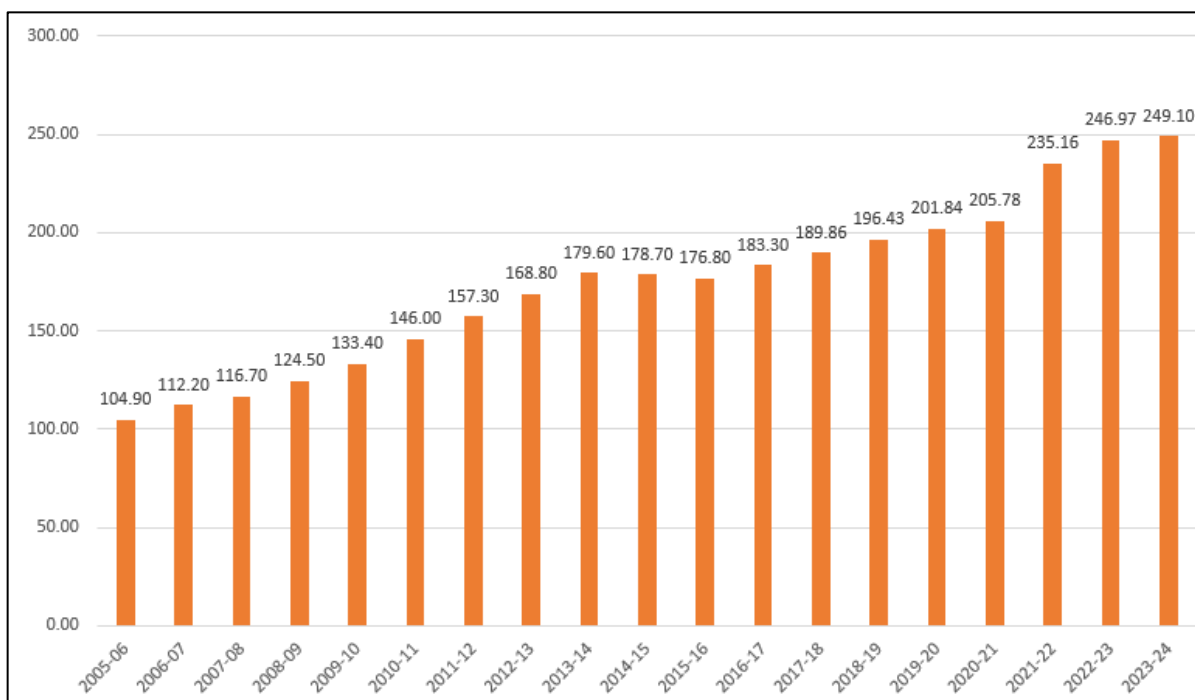


Figure 5-1 : Historical Rate of WPI Inflation in India

Except for the negative growth of WPI in the year 2015-16 average inflation in WPI from the year 2005-2024 is 4.98%. For Future year initially it is takes 5% and suitably stepped down for future year.

It has been observed that the project corridor witness's high percentage of overweight vehicles. In response to same, Concessionaire has further declared special rates for overweight vehicles which are applicable on project corridor.

These overweight categories and rate on base year (2015-16) are given as under

Table 5-1 : Overweight Traffic Rate

Category	Rate (Rs)
LCV (Single Journey of Ten Times)	1300
LCV (Single Journey of Two Times)	260

Category	Rate (Rs)
Truck/ Bus (Single Journey of Ten Times)	2700
Truck/ Bus (Single Journey of Two Times)	540
Multi Axle Vehicle (Single Journey of Ten Times)	4150
Multi Axle Vehicle (Single Journey of Two Times)	830

Normal escalation in the basis of WPI would be applicable to these rates as well.

In addition to above concessive has also declared special rates for overweight return journey as under

Table 5-2 : Special Overweight Return Pass

Category	Rate (Rs.)
Minibus /LCV	170
Truck/Bus	210
Multi Axle	205

These rates would be escalated at normal inflation rate.

5.3 Estimation of Toll Rates

As per the applicable MORTH notification and Schedule R of contract agreement, the following Base rate of fee for the categories mentioned in the table stands true in the National Highways Fee Rules, 2008.

Table 5-3 : Base Toll Rates 2007 - 08

Type of Vehicle	Base Rate of Fee / Km (in Rs.)
Car, Jeep, Van or Light Motor Vehicle	0.65
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.05

Type of Vehicle	Base Rate of Fee / Km (in Rs.)
Bus or Truck (2 Axle)	2.2
Three Axle commercial vehicles	2.4
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (4-6 axles)	3.45
Oversized Vehicle (seven or more axles)	4.2

There are a number of bypasses and structures in each package. Equivalent length for structures is added to tollable length at each toll plaza. Bypasses cost more than Rs. 10 Cr. are to be charged 1.5 times the normal fee. This has been incorporated in rates. The following table provides details of tollable lengths at each toll plaza.

Table 5-4 : Tollable Length Jaipur – Deoli section of NH -12

Toll Plaza Chainage	Length (km)	Bypass Cost (Cr)	Equivalent Structure length (km)	Tollable highway + structure length (km)
30.500	59.164	64.5 (Chaksu Bypass)	-	59.194
105.000	66.500	-	-	66.50

Additional rate for bypass having cost more than 10 Cr has been added as per schedule -R in toll rates for toll plaza at 30.50 km.

Other than this there is no structure or bypass which qualifies for additional toll rate at any toll plaza.

Toll rates are calculated as per guidelines provided in schedule R (rounded to nearest Rs. five) for the concession period and are given below. Since applicable length of highway length is equal for both plazas, applicable toll rates are also same

Thus, worked out rates for various categories of vehicle and discounts are given as under;

Table 5-5 : Toll Rates for Single Journey @ Km 30.500

Year	Car	LCV	Truck / Bus	Multi Axle	Oversized Vehicles
2024-25	120	190	395	610	765
2025-26	125	200	415	645	805
2026-27	135	210	435	675	845
2027-28	140	220	460	710	885
2028-29	145	230	480	745	930
2029-30	155	245	505	780	975
2030-31	160	255	530	815	1020
2031-32	170	265	555	855	1070
2032-33	175	280	580	900	1120
2033-34	185	295	610	940	1175
2034-35	195	310	640	985	1230
2035-36	205	325	670	1035	1290
2036-37	215	340	700	1085	1355
2037-38	225	355	735	1140	1420
2038-39	235	375	770	1195	1490
2039-40	245	390	810	1255	1565
2040-41	260	410	850	1315	1640

Table 5-6 : Toll Rates for Return Journey @ Km 30.500

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2024-25	180	285	595	920	1145
2025-26	190	300	625	965	1205
2026-27	200	315	655	1015	1265
2027-28	210	330	690	1065	1330
2028-29	220	350	720	1115	1395
2029-30	230	365	755	1170	1460
2030-31	240	385	790	1225	1530
2031-32	255	400	830	1285	1605
2032-33	265	420	870	1345	1680
2033-34	280	440	910	1410	1765
2034-35	290	460	955	1480	1850
2035-36	305	485	1005	1550	1940
2036-37	320	510	1050	1630	2035
2037-38	335	535	1105	1710	2130
2038-39	355	560	1160	1790	2235
2039-40	370	585	1215	1880	2345
2040-41	390	615	1275	1975	2465

Table 5-7 : Toll Rates for Overweight Ticket @ Km 30.500

Year	LCV (Single Journey of Ten Times)	LCV (Single Journey of Two Times)	Truck/ Bus (Single Journey of Ten Times)	Truck/ Bus (Single Journey of Two Times)	Multi Axle Vehicle (Single Journey of Ten Times)	Multi Axle Vehicle (Single Journey of Two Times)
2024-25	1900	380	3950	790	6100	1220
2025-26	2000	400	4150	830	6450	1290
2026-27	2100	420	4350	870	6750	1350
2027-28	2200	440	4600	920	7100	1420
2028-29	2300	460	4800	960	7450	1490
2029-30	2450	490	5050	1010	7800	1560
2030-31	2550	510	5300	1060	8150	1630
2031-32	2650	530	5550	1110	8550	1710
2032-33	2800	560	5800	1160	9000	1800
2033-34	2950	590	6100	1220	9400	1880
2034-35	3100	620	6400	1280	9850	1970
2035-36	3250	650	6700	1340	10350	2070
2036-37	3400	680	7000	1400	10850	2170
2037-38	3550	710	7350	1470	11400	2280
2038-39	3750	750	7700	1540	11950	2390
2039-40	3900	780	8100	1620	12550	2510
2040-41	4100	820	8500	1700	13150	2630

Table 5-8 : Toll Rates for Overweight Return Ticket (RPPU) @Km 30.500

Year	Minibus /LCV	Truck/ Bus	Multi Axle
2024-25	305	420	460
2025-26	320	440	485
2026-27	335	460	510
2027-28	350	485	535
2028-29	365	505	560
2029-30	380	530	585
2030-31	395	555	610
2031-32	415	580	635
2032-33	435	605	665
2033-34	455	630	695
2034-35	475	660	725
2035-36	495	690	760
2036-37	515	720	795
2037-38	540	750	830
2038-39	565	785	865
2039-40	590	820	905
2040-41	615	855	945

Table 5-9 : Toll Rates for Monthly Pass Local @ Km 30.500

Year	Car (Non-Commercial Vehicles)	Car SPL (10 to 20 Km)	LCV / Minibus SPL	LCV / Minibus (10 to 20 Km)
2024-25	340	1815	3060	4015
2025-26	355	1905	3215	4215

Year	Car (Non-Commercial Vehicles)	Car SPL (10 to 20 Km)	LCV / Minibus SPL	LCV / Minibus (10 to 20 Km)
2026-27	375	2000	3375	4425
2027-28	390	2100	3545	4645
2028-29	410	2195	3705	4855
2029-30	430	2295	3870	5075
2030-31	450	2400	4045	5305
2031-32	475	2510	4225	5545
2032-33	495	2625	4415	5795
2033-34	520	2745	4615	6055
2034-35	545	2870	4825	6325
2035-36	570	3000	5040	6610
2036-37	600	3135	5265	6905
2037-38	630	3275	5500	7215
2038-39	660	3420	5750	7540
2039-40	695	3575	6010	7880
2040-41	725	3735	6280	8235

Table 5-10 : Toll Rates for Monthly Pass @ Km 30.500

Year	Car	Minibus /LCV	Truck/ Bus	Multi Axle	Oversized Vehicle	Truck/Bus - 100 Trips
2024-25	4025	6370	13190	20415	25490	26380
2025-26	4230	6695	13855	21445	26770	27710
2026-27	4440	7030	14555	22530	28125	29110
2027-28	4665	7390	15295	23675	29555	30590
2028-29	4890	7740	16025	24805	30965	32050

Year	Car	Minibus /LCV	Truck/ Bus	Multi Axle	Oversized Vehicle	Truck/Bus - 100 Trips
2029-30	5125	8110	16790	25990	32450	33585
2030-31	5370	8500	17600	27240	34005	35195
2031-32	5630	8910	18445	28550	35645	36890
2032-33	5900	9340	19335	29930	37365	38670
2033-34	6185	9795	20270	31375	39170	40540
2034-35	6485	10270	21255	32900	41070	42510
2035-36	6800	10770	22290	34500	43070	44575
2036-37	7135	11295	23375	36180	45170	46750
2037-38	7485	11845	24520	37955	47385	49040
2038-39	7850	12425	25725	39815	49710	51445
2039-40	8235	13040	26990	41775	52155	53980
2040-41	8645	13680	28320	43835	54730	56645

Table 5-11 : Toll Rates for Single Journey @ Km 105.000

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles
2024-25	105	165	350	545	665
2025-26	110	175	365	575	700
2026-27	115	185	385	605	735
2027-28	120	195	405	635	770
2028-29	125	200	425	665	810
2029-30	130	210	445	695	845
2030-31	135	220	465	730	890
2031-32	145	235	485	765	930
2032-33	150	245	510	800	975

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles
2033-34	160	255	535	840	1025
2034-35	165	270	560	880	1070
2035-36	175	280	590	925	1125
2036-37	180	295	620	970	1180
2037-38	190	310	650	1015	1235
2038-39	200	325	680	1065	1300
2039-40	210	340	715	1120	1360
2040-41	220	355	750	1175	1430

Table 5-12 : Toll Rates for Return Journey @ Km 105.000

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles
2024-25	155	250	525	820	1000
2025-26	160	260	550	860	1050
2026-27	170	275	575	905	1100
2027-28	180	290	605	950	1155
2028-29	190	305	635	995	1215
2029-30	195	320	665	1045	1270
2030-31	205	335	700	1095	1330
2031-32	215	350	730	1145	1395
2032-33	225	365	765	1200	1465
2033-34	235	385	805	1260	1535
2034-35	250	400	840	1320	1610
2035-36	260	420	885	1385	1685
2036-37	275	440	925	1455	1770

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles
2037-38	285	465	970	1525	1855
2038-39	300	485	1020	1600	1945
2039-40	315	510	1070	1675	2040
2040-41	330	535	1125	1760	2145

Table 5-13 : Toll Rates for Overweight Tickets @ Km 105.000

Year	LCV (Single Journey of Ten Times)	LCV (Single Journey of Two Times)	Truck/ Bus (Single Journey of Ten Times)	Truck/ Bus (Single Journey of Two Times)	Multi Axle Vehicle (Single Journey of Ten Times)	Multi Axle Vehicle (Single Journey of Two Times)
2024-25	1650	330	3500	700	5450	1090
2025-26	1750	350	3650	730	5750	1150
2026-27	1850	370	3850	770	6050	1210
2027-28	1950	390	4050	810	6350	1270
2028-29	2000	400	4250	850	6650	1330
2029-30	2100	420	4450	890	6950	1390
2030-31	2200	440	4650	930	7300	1460
2031-32	2350	470	4850	970	7650	1530
2032-33	2450	490	5100	1020	8000	1600
2033-34	2550	510	5350	1070	8400	1680
2034-35	2700	540	5600	1120	8800	1760
2035-36	2800	560	5900	1180	9250	1850
2036-37	2950	590	6200	1240	9700	1940
2037-38	3100	620	6500	1300	10150	2030
2038-39	3250	650	6800	1360	10650	2130
2039-40	3400	680	7150	1430	11200	2240
2040-41	3550	710	7500	1500	11750	2350

Table 5-14 : Toll Rates for Overweight Return Pass (RPPU) @ Km 105.00

Year	Minibus /LCV	Truck/ Bus	Multi Axle
2024-25	265	380	395
2025-26	280	400	415
2026-27	295	420	435
2027-28	310	440	455
2028-29	325	460	475
2029-30	340	480	495
2030-31	355	500	515
2031-32	370	525	540
2032-33	385	550	565
2033-34	400	575	590
2034-35	420	600	615
2035-36	440	625	645
2036-37	460	655	675
2037-38	480	685	705
2038-39	500	715	735
2039-40	525	745	770
2040-41	550	780	805

Table 5-15 : Toll Rates for Local Monthly Pass @ Km 105.000

Year	Car (Non-Commercial Vehicles)	Car SPL (10 to 20 Km)	LCV / Minibus SPL	LCV / Minibus (10 to 20 Km)
2024-25	340	1805	2965	7990
2025-26	355	1895	3115	8390

Year	Car (Non-Commercial Vehicles)	Car SPL (10 to 20 Km)	LCV / Minibus SPL	LCV / Minibus (10 to 20 Km)
2026-27	375	1990	3270	8810
2027-28	390	2090	3435	9250
2028-29	410	2185	3590	9665
2029-30	430	2285	3750	10100
2030-31	450	2390	3920	10555
2031-32	475	2500	4095	11030
2032-33	495	2615	4280	11525
2033-34	520	2735	4475	12045
2034-35	545	2860	4675	12585
2035-36	570	2990	4885	13150
2036-37	600	3125	5105	13740
2037-38	630	3265	5335	14360
2038-39	660	3410	5575	15005
2039-40	695	3565	5825	15680
2040-41	725	3725	6085	16385

Table 5-16 : Toll Rates for Monthly Pass @ Km 105.000

Year	Car	Minibus /LCV	Truck/ Bus	Multi Axle	Oversized Vehicle	Truck/Bus - 100 Trips
2024-25	3430	5545	11615	18220	22180	23235
2025-26	3605	5825	12200	19135	23295	24405
2026-27	3790	6120	12820	20105	24475	25640
2027-28	3980	6430	13470	21125	25715	26940
2028-29	4170	6735	14115	22135	26945	28230
2029-30	4370	7060	14790	23195	28235	29580

Year	Car	Minibus /LCV	Truck/ Bus	Multi Axle	Oversized Vehicle	Truck/Bus - 100 Trips
2030-31	4580	7400	15500	24305	29590	31000
2031-32	4800	7755	16245	25475	31015	32490
2032-33	5030	8130	17030	26705	32510	34060
2033-34	5275	8520	17855	28000	34085	35710
2034-35	5530	8935	18720	29355	35740	37440
2035-36	5800	9370	19630	30785	37475	39260
2036-37	6085	9825	20590	32285	39305	41180
2037-38	6380	10305	21595	33865	41230	43195
2038-39	6695	10815	22655	35530	43255	45310
2039-40	7025	11345	23770	37280	45380	47545
2040-41	7370	11905	24945	39120	47620	49890

5.4 Toll Revenue

As indicated earlier, toll revenue on the Project Road has been calculated under in all three scenarios. The estimates of toll revenue under *Optimistic*, *Pessimistic* and *Most Likely* growth scenarios are presented in the following section.

5.5 Toll Revenue at all toll plazas under Scenarios

Toll Revenue estimates under most likely scenario at each of the toll plaza starting from the year 2024-25 are shown in tables below.

Table 5-17 : Toll Revenue Optimistic Scenario

(Rs. Crores)

Year	Toll at Plaza 30.500	Toll at Plaza 105.000	Total
2024-25	101.55	91.48	193.03
2025-26	113.26	101.50	214.76
2026-27	126.73	112.86	239.60
2027-28	141.39	125.62	267.01
2028-29	156.43	138.67	295.10
2029-30	174.62	153.00	327.62

Year	Toll at Plaza 30.500	Toll at Plaza 105.000	Total
2030-31	191.88	168.35	360.23
2031-32	213.55	186.04	399.59
2032-33	234.04	203.61	437.66
2033-34	259.13	224.67	483.80
2034-35	285.80	246.80	532.60
2035-36	314.70	271.19	585.89
2036-37	344.17	295.35	639.52
2037-38	377.41	322.45	699.86
2038-39	414.39	352.93	767.33
2039-40	454.84	387.67	842.51
2040-41	495.80	420.19	915.99

Table 5-18 : Toll Revenue Pessimistic Scenario
(Rs. Crores)

Year	Toll at Plaza 30.500	Toll at Plaza 105.000	Total
2024-25	101.55	91.48	193.03
2025-26	112.18	100.56	212.74
2026-27	124.32	110.76	235.08
2027-28	137.41	122.11	259.52
2028-29	150.59	133.52	284.11
2029-30	166.50	145.86	312.37
2030-31	181.23	158.94	340.17
2031-32	199.83	174.00	373.84
2032-33	217.02	188.62	405.64
2033-34	237.99	206.07	444.06
2034-35	259.95	224.29	484.24

Year	Toll at Plaza 30.500	Toll at Plaza 105.000	Total
2035-36	283.51	244.10	527.60
2036-37	307.07	263.25	570.32
2037-38	333.51	284.71	618.22
2038-39	362.76	308.63	671.39
2039-40	394.31	335.84	730.15
2040-41	425.68	360.50	786.18

Table 5-19 : Toll Revenue Most Likely Scenario

(Rs. Crores)

Year	Toll at Plaza 30.500	Toll at Plaza 105.000	Total
2024-25	101.55	91.48	193.03
2025-26	112.72	101.04	213.76
2026-27	125.53	111.81	237.34
2027-28	139.43	123.84	263.27
2028-29	153.51	136.05	289.56
2029-30	170.57	149.37	319.93
2030-31	186.47	163.57	350.04
2031-32	206.51	179.91	386.42
2032-33	225.33	195.93	421.26
2033-34	248.26	215.16	463.41
2034-35	272.55	235.31	507.86
2035-36	298.77	257.35	556.12
2036-37	325.20	278.90	604.10
2037-38	354.91	303.04	657.95

Year	Toll at Plaza 30.500	Toll at Plaza 105.000	Total
2038-39	387.84	330.07	717.91
2039-40	423.61	360.87	784.48
2040-41	459.51	389.22	848.74

CHAPTER 6

OPERATION AND MAINTENANCE

6.1 Operation & Maintenance

The following are project parameters which would contribute towards the cost of operation and maintenance.

The future cost of operation and maintenance is estimated on a guess basis. Keeping all above factors in view, the following can be basis of working out cost of operation and maintenance for project corridor from Jaipur to Deoli on NH-12 in state of Rajasthan.

- i) **Annual Regular Maintenance** – Covering pothole repair, shoulder and slope repair, drain cleaning, median maintenance, Crash barrier, toll plaza maintenance, Toll collection, other services like medical help and rescue operations etc.
- j) **Periodic Maintenance** – This will be done on a periodic basis, say every 5 years. It will consist of overlaying of wearing course and painting and marking. Some pavement strengthening is also anticipated in a few sections. This operation and its cost are spread over three years.

Concessionaire has recently updated the program of maintenance of project road. Same has been reviewed and year-wise cost of O&M from year 2023-2024 is given in table below.

Table 6-1 : O&M Cost

Year	Annual maintenance (Rs. Cr)	Thermoplastic painting (Rs. Cr)	Renewal Coat with BC (Rs. Cr.)	Special Repair of pavement	Structure maintenance. (Rs. Cr)	Electric System		Total Expenditure (Rs. Crores)	Remarks
						Annual	Periodic		
2024-25	12.70			0.80	0.07	0.04		19.14	Regular O & M
2025-26	12.95			0.80	0.07	0.04		20.47	Regular O & M
2026-27	13.21	1.72	23.37	27.28	0.07	0.04		101.89	Renewal of Wearing course + Pavement repair
2027-28	13.47	1.47	20.03	32.10	0.07	0.04		109.42	Renewal of Wearing course + Pavement repair
2028-29	13.74	1.72	23.37	43.33	0.07	0.04		140.70	Renewal of Wearing course + Pavement repair
2029-30	14.43			12.84	0.07	0.04		49.16	Regular O & M
2030-31	15.15			4.81	0.07	0.04		37.85	Regular O & M
2031-32	15.91			4.81	0.07	0.04		41.24	Regular O & M
2032-33	16.23	0.49		10.43	0.07	0.04		56.66	Renewal of Wearing course + Pavement repair
2033-34	16.55	1.47	20.03	40.12	0.07	0.04		170.87	Renewal of Wearing course + Pavement repair
2034-35	16.88	1.72	23.37	12.84	0.07	0.04		125.86	Renewal of Wearing course
2035-36	16.88			3.21	0.07	0.04		48.61	Regular O & M

Year	Annual maintenance	Thermoplastic painting	Renewal Coat with	Special Repair of	Structure maintenance.	Electric System		Total Expenditure	Remarks
2036-37	16.88			3.21	0.07	0.04		51.04	Regular O & M
2037-38	16.88			3.21	0.07	0.04		53.59	Regular O & M
2038-39	16.88			3.21	0.07	0.04		56.27	Regular O & M
2039-40	16.88	1.72		1.60	0.07	0.04		59.41	Regular O & M
2040-41	5.06			0.32	0.07	0.04		16.86	Regular O & M

CHAPTER 7

CONCLUSION & RECOMMENDATIONS

7.1 Conclusion & Recommendations

Project stretch of Jaipur to Deoli section of NH-12 in state of Rajasthan from km 18.700 to km 165.000 is currently a four-lane road. The road is in sound condition and serves reasonably good levels of traffic volume. The project corridor falls in the influence zone of fast upcoming metro city Jaipur. There are many upcoming projects in the area which have the potential to boost economic growth of the area and add value to the development of the region. All these developments have potential to give a positive impact to traffic flow on the project. As estimated in this study report, project traffic revenue is expected to grow at a rate of 6-8% per annum.

The following can be considered as major outcome of study.

- a) There is a good amount of tollable traffic running on the project.
- b) Project corridor has potential to witness traffic growth @ 6-8% annually in near future due to various development in area and overall growth of the economy.
- c) Project corridor does not have risk of traffic leakage due to lack of competing roads of comparable quality.

The project infrastructure is in good condition and its maintenance cost is also reasonable.

Based on the above it can be considered a stable healthy project from the traffic and revenue point of view.

CHAPTER 8

PROJECT ILLUSTRATIONS

8.1 Project Illustrations

Current condition OF Project has been depicted in the following photographs.



Figure 8-1 : Chaksu Junction



Figure 8-2 : General Condition



Figure 8-3 : General Condition



Figure 8-4 : Toll at Barkheda



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PATHANKOT TO AMRITSAR SECTION OF NH-15
(KM 6.082 TO 108.502)
IN THE STATE OF PUNJAB



OCTOBER 2024



**TOLL REVENUE AND O&M COST
PROJECTION REPORT
(FINAL)**



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OCTOBER 2024

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ABBREVIATIONS

AADT	- Annual Average Daily Traffic	NHAI	- National Highways Authority of India
BOT	- Build Operate Transfer	NHDP	- National Highways Development Project
CAGR	- Compound Annual Growth Rate	NSDP	- Net State Domestic Product
CTV	- Classified traffic volume	O&M	- Operation & Maintenance
DBFOT	- Design, Build, Finance, Operate & Transfer	PCDP	- Per Capita Domestic Product
EME	- Earth Moving Equipment	PCI	- Per Capita Income
GDP	- Gross Domestic Product	PCU	- Passenger Car Unit
GSDP	- Gross State Domestic Product	PSC	- Pre-stressed Concrete
HCM	- Heavy Construction Machinery	RCC	- Reinforced cement concrete
HCV	- Heavy Commercial Vehicle	RHS	- Right Hand Side
HTMS	- Highway Traffic Management System	SH	- State Highway
IRC	- Indian Road Congress	TP	- Toll Plaza
IRR	- Internal Rate of Return	WPI	- Wholesale Price Index
LCV	- Light Commercial Vehicle	NH	- National Highway
LHS	- Left Hand Side		
LGV	- Light Goods Vehicle		
MAV	- Multi Axle Vehicle		
MORTH	- Ministry of Road Transport and Highways		

CHAPTER 1

INTRODUCTION

1.1 Background

The Government of India through National Highway Authority of India (NHAI) embarked upon a program to enhance the traffic capacity and safety for efficient transportation of goods as well as passenger traffic on National Highway Sections under NHDP Phase III.

The project under consideration, **Pathankot- Amritsar** section of NH 15 from km 6.082 to km 108.502 is one such road project NHAI intended to implement on a BOT basis in the DBFOT format. M/s IPATRL (Concessionaire) has been awarded the Project for concession period of 20 years starting from December 31, 2010. The Project has been commissioned and is currently in the operation / maintenance phase.

The Pathankot - Amritsar NH 15 Project comprises the section of NH 15 from km 6.082 to km 108.502. IPATRL was entrusted to expand a 102.42 Km section of NH 15 between Pathankot and Amritsar in Punjab from two lanes to four lanes on a DBFOT basis. The project received a completion certificate on November 27, 2014, and IPATRL commenced tolling for a project length of 102.42 Km on that date. Subsequently, the project received a final completion certificate on August 17, 2017.

1.2 Objective of the Study

M/s IRB INVIT FUND has engaged *GMD Consultants* to assess the future traffic and toll potential of the project along with related operation & maintenance expenditure involved.

This report named as “**Toll Revenue and O&M Cost Projection Report**” mainly focuses on traffic and O&M aspects of the project. Other parameters like competing road, area developments etc. have been considered from a traffic development point of view.

1.2.1 Scope of Services

The broad scope of work covered in the assignment is as follows.

- a) Analysis of Traffic Growth
- b) Toll Rate Growth
- c) Revenue Forecasting
- d) Operation and Maintenance Cost Projections

The Concessionaire has provided basic traffic data and other project details on the basis of which the above analysis has been carried out.

“Toll Revenue and O&M Cost Projection Report” was submitted in August 2017. In this report traffic data of year 2016-17 was used as base traffic. The report was updated with traffic data of 2017-18 and same was submitted in April 2018. The report was further updated with traffic Data of the period from April 2018 to September 2019 and was submitted in October 2018. A revised report was submitted with updated traffic for the years 2018-19 in April 2019. The report was further updated with yearly traffic data for 2019-20 in May 2020. Toll collection is affected on project stretch due to ongoing Farmer’s agitation in state. Toll collection is suspended at both toll plazas from early October 2020. Traffic data from April 2020 to October 2020, April 2022 to March 2023, April-2023 to March -2024 was available, this report was updated taking this latest traffic data into consideration. Hence the data from April-2024 to September -2024 can be considered as base traffic for future projections. Projections have been updated on the basis of this new data.

CHAPTER 2

TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Survey

In the course of our work, we have collected the required information for project corridor to understand the general traffic and travel characteristics of the corridor.

Toll operation on the project was suspended due to farmer's agitation. Toll operation is resumed from December 2021 and only nine-month data is available for that period which is also affected due to Covid-19 Third wave. Classified traffic volume counts at the toll plaza locations on Pathankot-Amritsar section for base year 2022-23, 2023-24 and now Six-Monthly traffic data from April 2024 to September 2024.

The following traffic data has been collected for the project.

Classified traffic volume counts at the two toll plaza locations on Pathankot Amritsar section of NH-15 for base year 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23 2023-24 and now Six-Monthly traffic data from April 2024 to September 2024.

- Local Component of traffic
- Component of Return Journey
- Component of Monthly Pass Journey

The main objective of the traffic data analysis is to:

- Determine the existing traffic movement characteristics of project.
- Establish base year traffic.
- Identification of travel patterns and modal split of project traffic
- Deriving growth factors for traffic forecasting
- Estimation of corridor traffic including traffic diversion if any
- Preparation of revenue model and projection of revenue as per toll policy for various scenarios

The project can be divided into two homogenous sections from a traffic point of view.

These sections can be.

1. Pathankot to Gurdaspur
2. Gurdaspur to Amritsar

Traffic of both sections is represented by toll plaza in each section. The table below provides details of locations from where traffic details have been collected.

Table 2-1 : Traffic Data Details

SR. NO	LOCATION	CTV	Single Journey Traffic	Return Pass Traffic	Monthly Pass Traffic	Local Traffic
1	Km 16.00 Toll Plaza	AADT for Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017
		AADT for Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018
		AADT for Year 2018-2019	For Year 2018-2019	For Year 2018-2019	For Year 2018-2019	For Year 2018-2019
		AADT for Year 2019-2020	For Year 2019-2020	For Year 2019-2020	For Year 2019-2020	For Year 2019-2020
		AADT for Year 2020-2021 (up to Oct-20)	For Year 2020-2021 (up to Oct-20)	For Year 2020-2021 (up to Oct-20)	For Year 2020-2021 (up to Oct-20)	For Year 2020-2021 (up to Oct-20)

SR. NO	LOCATION	CTV	Single Journey Traffic	Return Pass Traffic	Monthly Pass Traffic	Local Traffic
		AADT for Year 2022-2023	For Year 2022-2023	For Year 2022-2023	For Year 2022-2023	For Year 2022-2023
		AADT for Year 2023-2024	For Year 2023-2024	For Year 2023-2024	For Year 2023-2024	For Year 2023-2024
		Six Monthly Data from April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24
2	Km 88.50 Toll Plaza	AADT for Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017
		AADT for Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018
		AADT for Year 2018-2019	For Year 2018-2019	For Year 2018-2019	For Year 2018-2019	For Year 2018-2019
		AADT for Year 2019-2020	For Year 2019-2020	For Year 2019-2020	For Year 2019-2020	For Year 2019-2020
		AADT for Year 2020-2021 (up to Oct-20) *	For Year 2020-2021 (up to Oct-20)	For Year 2020-2021 (up to Oct-20)	For Year 2020-2021 (up to Oct-20)	For Year 2020-2021 (up to Oct-20)
		AADT for Year 2022-2023	For Year 2022-2023	For Year 2022-2023	For Year 2022-2023	For Year 2022-2023

SR. NO	LOCATION	CTV	Single Journey Traffic	Return Pass Traffic	Monthly Pass Traffic	Local Traffic
		2022-2023				
		AADT for Year 2023-2024	For Year 2023-2024	For Year 2023-2024	For Year 2023-2024	For Year 2023-2024
		Six Monthly Data from April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24

The locations of each of the traffic surveys are illustrated in Figure below.



Figure 2-1: Toll Plaza Locations

2.2 Classified Traffic Volume Count

The objective of conducting a Classified Traffic Volume Count is to understand the traffic flow pattern including modal split on a roadway. The Classified Traffic Volume Count survey has been provided by concessionaire of project highway from actual traffic data gathered at toll plaza locations based on monthly data shared with NHAI. These locations are indicated in the figure and table given above.

The vehicles can broadly be classified into fast moving / motorized and slow moving / non-motorized vehicles, which can be further classified into specific categories of vehicles. The groupings of vehicles are further segregated to capture the toll able vehicle categories specifically and toll exempted vehicles are counted separately. The detailed vehicle classification system as per IRC: 64-1990 is given below.

Table 2-2 : Vehicle Classification System

Vehicle Type	
Auto Rickshaw	
Passenger Car	Car, Jeep, Taxi & Van (Old / new technology)
Bus	Minibus
	Standard Bus
Truck	Light Goods Vehicle (LCV)
	2 – Axle Truck
	3 Axle Truck (HCV)
	Multi Axle Truck (4-6 Axle)
	Oversized Vehicles (7 or more axles)
Other Vehicles	Agriculture Tractor, Tractor & Trailer

Source - IRC: 64 – 1990

However, since the project highway is currently under toll operation, the data collected corresponds to the category of toll able vehicles. The following are the types of vehicles as per concession agreement.

- Car / Jeep / van
- Minibus /LCV
- Truck / Bus
- Multi Axle
- Oversize Vehicle

2.3 Traffic Characteristic

Toll revenue of the project highway does not solely depend on traffic volume. There are certain characteristics of traffic which have significant potential to affect toll revenue. Components of local traffic, component of passenger and commercial traffic, portion of return journey traffic, portion of monthly pass traffic are some such characteristics of traffic. These will be discussed in subsequent sections of this report.

2.3.1 Traffic Data

Project concessionaire has provided Traffic data for base years 2016-17, 2017-18, 2018-19, 2019-20, April 2020 to October-2020, 2022-23, 2023-24 and April 2024 to September 2024.

Since the traffic data available for this update is for Six months, from April 2024 to September 2024, it may not represent the whole year traffic. Hence a seasonality factor for balance part of year has been applied to average traffic of current four months to arrive at Annual Average Daily Traffic of base year 2024-25. Same corrected traffic is used for future projections and revenue calculations. The following table shows historical traffic on project stretch and derived Annual Average Daily Traffic (AADT) for year 2024-25.

Table 2-3 : Traffic Data at Toll Plaza @ Km 16.00

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) 2016-17	Annual Average Daily Traffic (Nos.) 2017-18	Annual Average Daily Traffic (Nos.) 2018-19	Annual Average Daily Traffic (Nos.) 2019-20	Annual Average Daily Traffic (Nos.) 2020-21 (up to Oct-20) *	Annual Average Daily Traffic (Nos.) 2022-23	Annual Average Daily Traffic (Nos.) 2023-24	Annual Average Daily Traffic (Nos.) 2024-25
1	Car	8094	8916	9220	9402	5404	5888	5808	6092
2	Minibus / LCV	999	992	881	804	660	383	2	0
3	Truck / Bus	1470	1343	1109	1063	738	1087	965	985
4	Multi Axle	2940	2979	2450	2113	2013	2134	2441	2419
5	Oversized Vehicles	604	22	17	32	16	10	6	6
	Total	14107	14252	13677	13414	8831	9502	9222	9496

Similar traffic data for toll plaza at km 88.50 is given as under

Table 2-4 : Traffic Data at Toll Plaza @ Km 88.50

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) 2016-17	Annual Average Daily Traffic (Nos.) 2017-18	Annual Average Daily Traffic (Nos.) 2018-19	Annual Average Daily Traffic (Nos.) 2019-20	Annual Average Daily Traffic (Nos.) 2020-21 (up to Oct-20)	Annual Average Daily Traffic (Nos.) 2022-23	Annual Average Daily Traffic (Nos.) 2023-24	Annual Average Daily Traffic (Nos.) 2024-25
1	Car	10428	11238	11271	11633	6284	8064	7714	8742
2	Minibus/ LCV	578	598	574	587	496	248	189	211
3	Truck/Bus	840	849	841	845	395	892	954	1055
4	Multi Axle	688	939	1177	1239	1181	1498	1458	1646
5	Oversized	479	26	8	15	62	8	4	12

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) 2016-17	Annual Average Daily Traffic (Nos.) 2017-18	Annual Average Daily Traffic (Nos.) 2018-19	Annual Average Daily Traffic (Nos.) 2019-20	Annual Average Daily Traffic (Nos.) 2020-21 (up to Oct-20)	Annual Average Daily Traffic (Nos.) 2022-23	Annual Average Daily Traffic (Nos.) 2023-24	Annual Average Daily Traffic (Nos.) 2024-25
	Vehicles								
	Total	13013	13649	13870	14319	8418	10710	10318	11666

2.4 Data Analysis

2.4.1 Analysis of Traffic Volume Count

Understanding the character of existing traffic forms the basis of futuristic traffic forecast. The various vehicle types having different sizes and characteristics can be converted into a single unit called Passenger Car Unit (PCU). Passenger Car equivalents for various vehicles are adopted based on recommendations of Indian Road Congress prescribed in “IRC-64-1990: Guidelines for Capacity of Roads in Rural areas”. The adopted passenger car unit values (PCU) are presented in the table given below.

Table 2-5 : PCU Factors Adopted for Study

Vehicle Type	PCUs
Car	1.0
Minibus	1.5
Standard Bus	3.0
LCV/LGV	1.5
2 Axle Truck	3.0
3 – 6 Axle Truck	4.5
MAV	4.5
Auto Rickshaw	1.0

Vehicle Type	PCUs
Van/Tempo	1.0
Agriculture Tractor with Trailer	4.5
Agriculture Tractor without Trailer	1.5

Source: IRC: 64-1990

Traffic volume at each toll plaza was converted to PCU and same is presented as under

Table 2-6 : Traffic in PCU at both sections

Year	Toll Plaza Location (Km)	Traffic No	PCU	PCU Index
FY2016-17	16.00	14107	29951	2.12
	88.50	13013	19067	1.47
FY2017-18	16.00	14249	27926	1.96
	88.50	13642	18999	1.39
FY 2018-19	16.00	13677	24969	1.83
	88.50	13870	19986	1.44
FY 2019-20	16.00	13414	23449	1.75
	88.50	14319	20691	1.45
FY 2020-21 (up to Oct-20)	16.00	17739	8831	2.01
	88.50	13808	8418	1.64
FY 2022-23	16.00	9502	19371	2.04
	88.50	10710	17888	1.67
FY 2023-24	16.00	9222	18578	2.01
	88.50	10318	17438	1.69

Year	Toll Plaza Location (Km)	Traffic No	PCU	PCU Index
FY 2024-25	16.00	9496	18770	1.98
	88.50	11666	19685	1.69

It can be observed from above that project traffic has a PCU index ranging between 1.4 to 2.0 which indicates a good mix of passenger and commercial traffic on the project corridor.

2.4.2 Components of Traffic

As discussed previously, components of traffic volume play an important role in determining project revenue. A larger component of commercial traffic with higher axle configuration adds to project revenue positively. Similarly, a larger component of local traffic affects the project revenue potential negatively.

It is observed that car traffic forms 64% of total traffic at toll plaza location Km 16.00 while multi axle vehicles are 20% of total traffic. 8% of traffic is Truck /Bus while LCV traffic forms the balance 3%. Overall, about 36% of traffic is commercial in nature.

At toll plaza location Km 88.50 car traffic forms 75% of total traffic at toll plaza while multi axle and truck / bus are 14% and 4%. LCV volume is 2% of the total traffic. Overall, about 25% of traffic is commercial in nature which is lower as compared to toll plaza location Km 16.00.

Another important bifurcation of traffic is components of traffic with respect to various type of toll ticketing like

1. Single Journey
2. Return Journey
3. Overweight Vehicles (Concessionaire provided special tariff for this category)
4. Monthly Pass (Local and General)

The following table provides numbers of vehicles falling in each of above category in various years.

Table 2-7 : Journey Type Bifurcation of Traffic at KM 16.00

Sr. No	Type	Traffic Volume (Nos.) 2016-17	Traffic Volume (Nos.) 2017-18	Traffic Volume (Nos.) 2018-19	Traffic Volume (Nos.) 2019-20	Traffic Volume (Nos.) 2020-21 (up to Oct-21)	Traffic Volume (Nos.) 2022-23	Traffic Volume (Nos.) 2023-24	Traffic Volume (Nos.) 2024-25
1	Single Journey	4255	4785	4574	4407	3786	4674	4313	4407
2	Return Journey	5364	4648	4322	4236	1924	4676	4770	4930
3	Monthly Pass	4488	4820	4781	4771	3121	152	139	159

A significant part of the traffic at KM 16.00 is monthly and return journey which is 2% and 52% respectively. Single journey component is 46%. This indicated the presence of dedicated urban traffic in the corridor.

Similarly, traffic numbers for type of journey at KM 88.50 is return and monthly journey 56% and 1% respectively. Single journey component is 43%.

Table 2-8 : Journey Type Bifurcation of Traffic at KM 88.50

Sr. No	Type	Traffic Volume (Nos.) 2016-17	Traffic Volume (Nos.) 2017-18	Traffic Volume (Nos.) 2018-19	Traffic Volume (Nos.) 2019-20	Traffic Volume (Nos.) 2020-21 (up to Oct-20)	Traffic Volume (Nos.) 2022-23	Traffic Volume (Nos.) 2023-24	Traffic Volume (Nos.) 2024-25
1	Single Journey	2656	2858	3177	3616	3406	5021	4458	5038
2	Return Journey	5352	5434	5620	5736	2332	5542	5740	6484
3	Monthly Pass	5005	5360	5073	4967	2680	149	120	136

Now traffic data for the period April 2024 to September 2024 is for journey type bifurcation.

2.5 Secondary data collection

There are several other factors which have substantial impact on traffic pattern and growth on any project corridor. The following are some of such important factors.

- Industrial development around project corridor and its catchment

- Educational infrastructure along project corridor
- Demographic pattern
- Urban area development
- Tourism potential
- Upcoming major infrastructural or Industrial projects
- Special Industry in project corridor
- Overall trends of economic growth local as well as national / regional

Hence in addition to traffic details on the project site, secondary data was also collected from the various sources. Typical secondary data includes the following:

1. Vehicle registration data of regional and national level.
2. Economic Data
 - a) GDP
 - b) NSDP
 - c) Population Growth
 - d) Per Capita Income growth
 - e) Industrial Growth
 - f) Special Industry Potential
 - g) Regional and National development vision / plan
 - h) Any other relevant data

CHAPTER 3

GROWTH OF TRAFFIC ON PROJECT HIGHWAY

3.1 Introduction

Traffic growth is a function of the interplay of a number of contributory factors such as National economy, Government policy, socio-economic conditions of the people, and changes in land uses along the project corridor precincts etc. As these factors have a number of uncertainties associated with them, forecasts of traffic are dependent on the forecasts of factors such as population, gross domestic product (GDP), vehicle ownership, per capita income (PCI), agricultural output, fuel consumption etc. Future patterns of change in these factors can be estimated with only a reasonable degree of accuracy and hence the resultant traffic forecast levels may not be precise.

Traffic growth forecast for project corridor Pathankot- Amritsar section of NH-15 has been done taking the above factors in to consideration. Established best practices and standard guidelines such as “**IRC: 108-2015-Guidelines for Traffic Forecast on Highways**” have been used for traffic growth forecast.

3.2 Trend Analysis

One of the methods of estimation of future rate of traffic growth is to assume the same rate of growth as experienced in the past. However, it may be noted that major influencing factors which reflect Economic conditions such as GDP, agricultural output, industrial output, national policies etc. are susceptible to change over a longer period of time and necessary adjustments need to be made to past trends to account for these changes.

Thus, we have considered the Elasticity model of growth projection which is one of the most widely acceptable methods for traffic forecast and is recommended in **IRC: 108-2015-Guidelines for Traffic Forecast on Highways**. Since the entire project alignment falls in Punjab State and has very little contribution from other states in terms of traffic, all developmental parameters pertaining to traffic growth are considered for Punjab State only.

In this method, past trends of any vehicular data are paired with an economic

indicator and a regression analysis is done to yield the economic model of growth. Growth of vehicle traffic varies for different types of vehicles. It is a proven fact that growth patterns for passenger and goods vehicles are different. Traffic growth on any highway typically depends on a number of economic parameters. The most important and direct parameters are given as under:

- Per Capita Income
- Net State Domestic Product (NSDP)
- Population

It is observed that the ownership of a car is more closely related to affordability hence per capita is the index which closely fits with growth of car traffic among other criteria. In similar fashion, the following pairs of vehicle type and independent variable can be established for elasticity modeling of growth.

- Car / Jeep – Par Capita Income
- Bus / Minibus – Population
- Trucks / Heavy / Goods Vehicle – NSDP

Time series data of vehicles (both passenger and goods) Registered in the state of Punjab is used as the base data for analysis of growth.

3.3 Estimation of Traffic Demand Elasticity

The elasticity of traffic demand is defined as the rate at which traffic intensity varies due to change in the corresponding indicator selected. Hence, in order to estimate the elasticity of traffic demand, it is necessary to establish the relationship between the growth in number of given categories of vehicle with one of the economic variables considered, such as NSDP, per capita income and population growth.

As per IRC: 108-2015 the model for estimating elasticity index for the project corridor is of the following form and is as given below:

$$\text{Log } (P) = k \times \text{Log } (EI) + A$$

Where,

P = Number of Vehicles (Mode wise)

EI = Economic Indicator

A = Regression constant

k = Elasticity coefficient (Regression coefficient)

The elasticity for cars and bus (passenger vehicles) is calculated based on the Population and Per Capita Domestic Product (PCDP) and the elasticity for trucks is calculated based on the Net State Domestic Product (NSDP).

The following tables and graphs depict regression and elasticity of growth model.

Table 3-1: Per Capita Income Vs Car

Year	PCI	Car	Log PCI	Log Car	PCI Growth	Average Growth
2004-05	33103	337345	4.52	5.53		
2005-06	34096	376954	4.53	5.58	3%	
2006-07	37087	414612	4.57	5.62	9%	
2007-08	39567	456521	4.60	5.66	7%	
2008-09	41003	496658	4.61	5.70	4%	
2009-10	42831	538862	4.63	5.73	4%	
2010-11	44783	609469	4.65	5.78	5%	
2011-12	46422	680076	4.67	5.83	4%	
2012-13	48496	774611	4.69	5.89	4%	
2013-14	49411	869565	4.69	5.94	2%	
2014-15	51517	960734	4.71	5.98	4%	4.5%

Regression analysis of same is given in figure below.

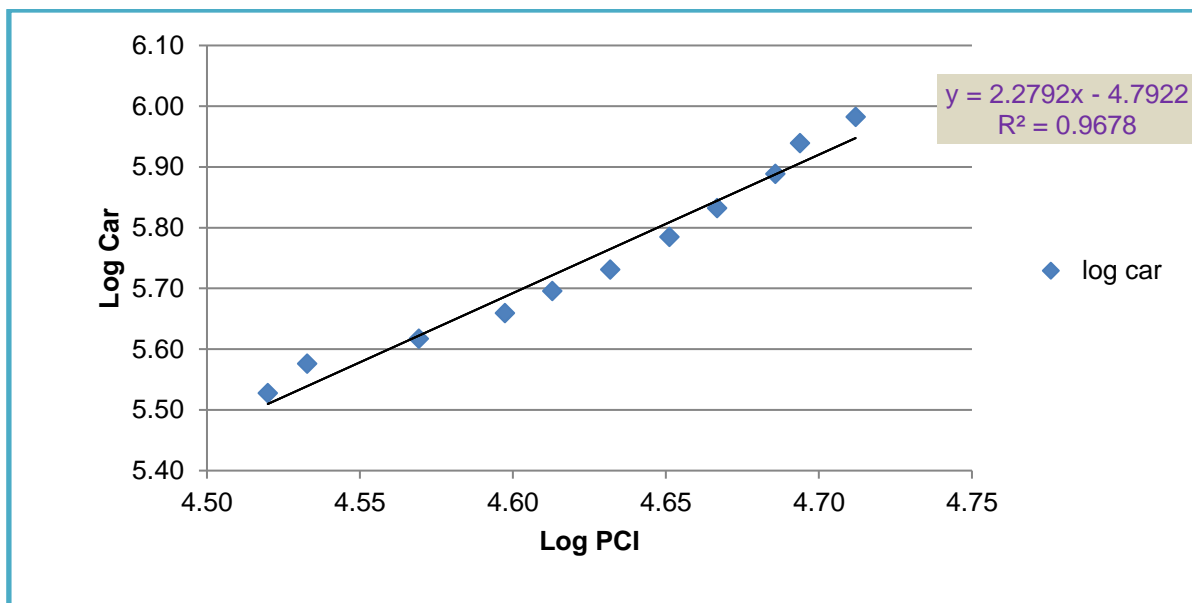


Figure 3-1: Regression and Elasticity PCI vs. Car-Extrapolation

Table 3-2 : Population Vs Bus

Year	Population	Buses	Log Pop	Log Bus	Pop Growth	Average Growth
2004-05	26012183	19855	7.42	4.30		
2005-06	26492788	21136	7.42	4.33	2%	
2006-07	26982983	22373	7.43	4.35	2%	
2007-08	27482038	24457	7.44	4.39	2%	
2008-09	27989725	25682	7.45	4.41	2%	
2009-10	28506747	27146	7.45	4.43	2%	
2010-11	29034180	28653	7.46	4.46	2%	
2011-12	29571111	30160	7.47	4.48	2%	
2012-13	29795907	33475	7.47	4.52	1%	
2013-14	35222450	35864	7.55	4.55	18%	
2014-15	35579780	40545	7.55	4.61	1%	3.29%

Regression analysis of same is given in figure below.

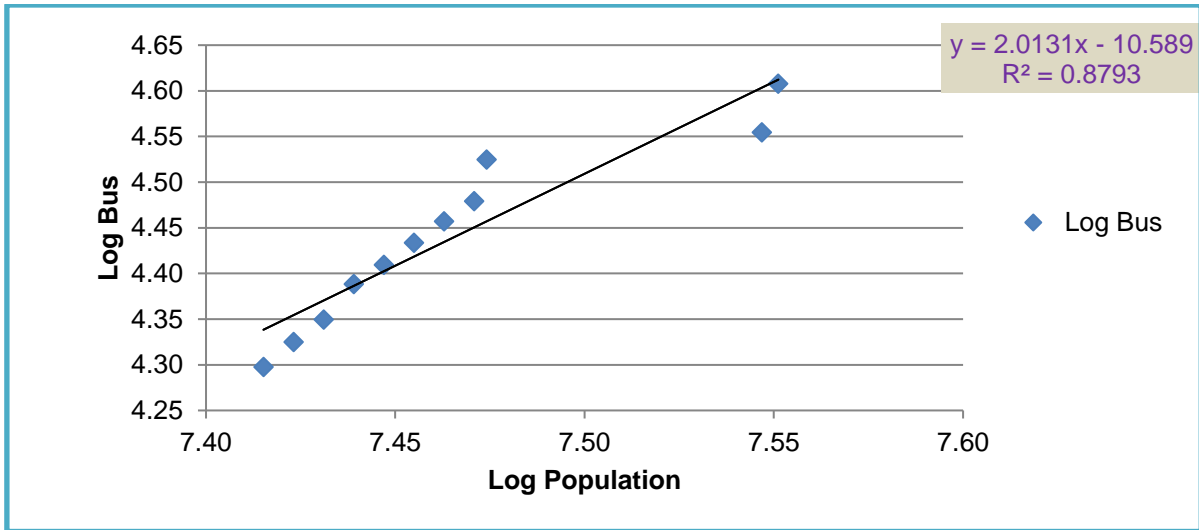


Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

The elasticity of goods traffic has been worked out by regression analysis with NSDP. The following table represents the data and details.

Table 3-3 : Goods Traffic Vs NSDP

Year	NSDP	Trucks	Log NSDP	Log Truck	NSDP Growth	Average Growth (5 Year)
2004-05	8610813	119183	6.94	5.08		
2005-06	9032981	128201	6.96	5.11	5%	
2006-07	10007179	140380	7.00	5.15	11%	
2007-08	10873818	150720	7.04	5.18	9%	
2008-09	11476627	160113	7.06	5.20	6%	
2009-10	12209725	170519	7.09	5.23	6%	
2010-11	13002377	186725	7.11	5.27	6%	
2011-12	13727501	202930	7.14	5.31	6%	
2012-13	14449823	216238	7.16	5.33	5%	
2013-14	17403765	233211	7.24	5.37	20%	
2014-15	18329810	251035	7.26	5.40	5%	7.96%

The following figure depicts regression analysis and extrapolation.

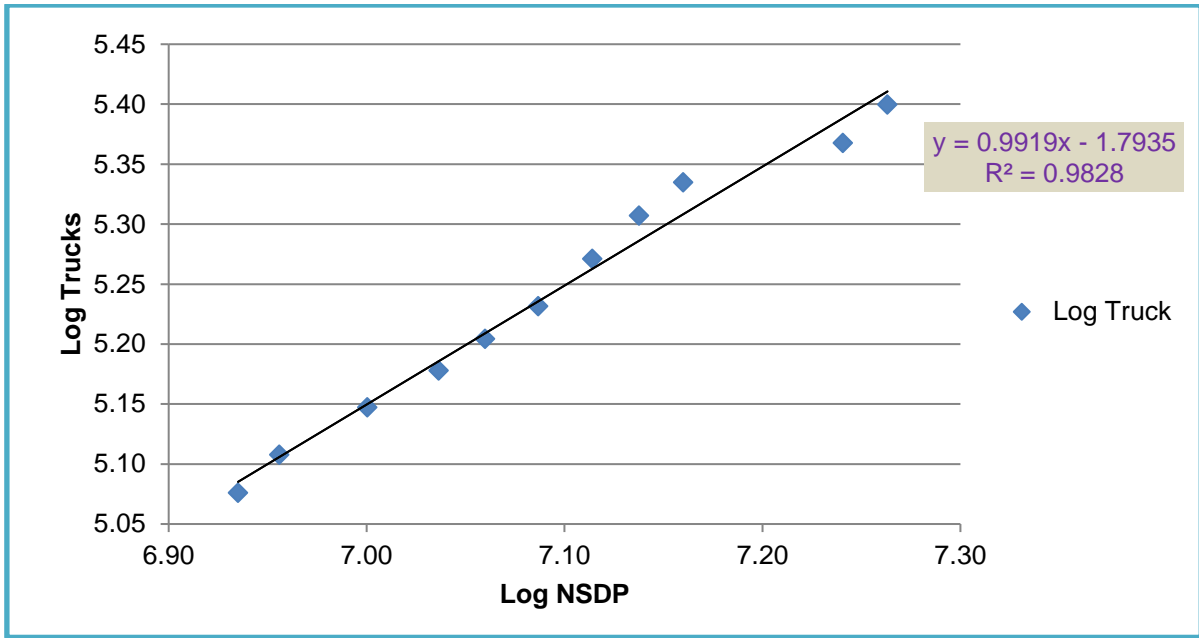


Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation.

Using the regression analysis above, we have arrived at the elasticity of traffic demand for each class of vehicle to a given change in relevant economic indicators. Average traffic growth of a vehicle class is multiplied by the corresponding elasticity coefficient to arrive at traffic growth.

The results of these analyses for the good fit as reflected by R^2 values are presented in the Table below.

Table 3-4 : Summary Regression Analysis

State	Vehicle Category	Independent Variable	Regression Equation	R Square	Elasticity Coefficient (y)	Average IV Growth (5yrs)	Growth Elastic Model	Remarks
Punjab	Car/Jeep	PCI	$y = 2.2792x - 4.7922$	$R^2 = 0.9678$	2.2792	4.54%	10.34%	Good Regression
	Bus	Population	$y = 2.0131x - 10.5894$	$R^2 = 0.8793$	2.0131	3.29%	6.63%	Good Regression
	Truck	NSDP	$y = 0.9919x - 1.7935$	$R^2 = 0.9828$	0.9919	7.96%	7.90%	Good Regression

The economic model for predicting growth is a good tool, however other local, regional, and national factors should also be considered before finalizing growth factors. Considering factors such as Existing developments and other influencing economic factors, moderated growth should be considered. These factors are discussed in subsequent sections.

3.4 Analysis of Historic Traffic Data

Historic traffic data forms useful information for any highway project. It provides useful information for establishing past trends of growth. Project stretch of Pathankot to Amritsar has recently been commissioned and tolling commenced in 2014. Only a few years of traffic data are available, which is not sufficient to establish any credible trend. Moreover, due to the ban on mining in the area commercial traffic is temporarily affected. Lockdown for Corona Virus pandemic (COVID-19) disrupted project traffic in March 2020. Traffic for the period from April 2020 to September 2020 is impacted due to COVID-19 lockdown and from October-20 onwards toll collection was suspended on project which is recently resumed in December 2021. Hence the same cannot be considered for historical growth.

Hence traffic growth on the project corridor has been taken from the economic model.

3.5 Other Factors Influencing Growth

There are many factors which have an impact on traffic growth. As discussed previously these factors can be economic, social, educational, and industrial.

Potentiality of such factors for project highway is discussed as under.

ECONOMY

After witnessing a slowdown during 2011-12, the economy recovered in 2013-14, and a high growth rate of GDP was recorded in up to 2018-19. Pandemic of COVID-19 impacted all economies of world including India. Following figure show trend of GDP growth in India.

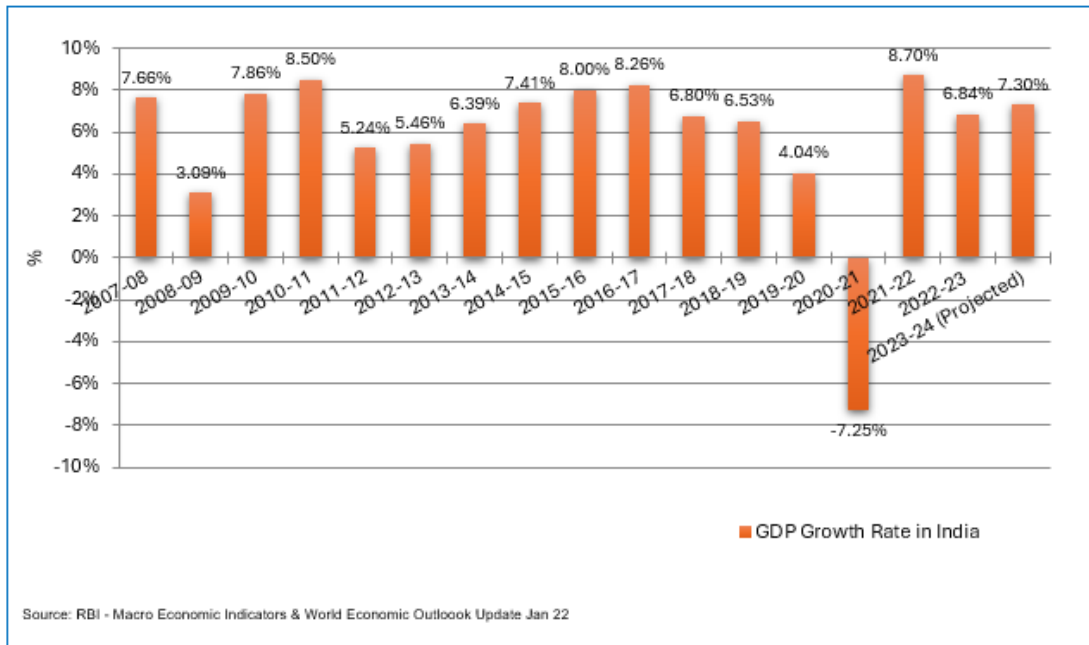


Figure 3-4 : Growth of GDP in India

FY 2017-18 recorded a growth of 6.7% which had a slight impact of GST and demonetization. Indian economy appears on recovery path with estimated growth of 6.8% in FY 2018-19. The government took major policy decisions including tax infrastructure reforming, banking sector improvement and ease of doing business.

Major economies of world collapsed due to pandemic COVID-19 including India. Indian economy is also registered negative growth in financial year 2020-21. After that Indian economy recovered handsomely and registered a growth of about 9% in Year 2021-22. This was partly due to low base of year 2020-21 as well.

Honorable Prime Minister has announced a major relief package of Rs. 20 lakh crores which is about 10% of GDP. This is aimed at turning this major crisis of COVID-19 into an opportunity by providing major impetus to industrial production to the limit of becoming a self-reliant economy. With major thrust of this package being on **Make -In- India** it is expected that industry in India would grow at rapid pace and recover handsomely in post COVID-19 scenario. The World Economic Outlook update also has predicted a growth rate of about 7.5 % in the next year 2022-23.

3.6 Recommended Growth Rates of Traffic

Based on the above analysis and after giving due consideration to the entire listed factors, the following overall growth rates are recommended for each category of vehicle as below. Growth rates are recommended for three scenarios for sensitivity analysis namely Optimistic, Pessimistic and Most Likely with a positive and negative variation 0.5% and -1.0% from Most Likely case respectively. While working out future growth projections both historical and economic model growths are considered.

The rate of growth is moderate in light of overall regional trends. Growth of multi-Axle is kept slightly higher as the trend of technological advances in the logistics industry favors multi-axle over 2/3 axle carriage. It is also expected that as the economy moves from developing to developed, the rate of growth diminishes. Same growth rate is not sustainable for long. It is an established practice to step down future growth rates at intervals of 5 years.

The rate of growth is moderate in light of overall regional trends. Growth of multi-Axle is kept slightly higher as the trend of technological advances in the logistics industry favors multi-axle over 2/3 axle carriage. It is also expected that as the economy moves from developing to developed, the rate of growth diminishes. Same growth rate is not sustainable for long. It is an established practice to step down future growth rates at intervals of 5 years.

Table 3-5 : Recommended Growth Rates Optimistic

Year/ Vehicle Type	2025-27	2027-32	2032-37	2037-42
Car/Jeep/Van	7.84%	6.84%	5.84%	5.34%
LCV	6.40%	5.40%	4.40%	4.15%
Truck/Bus	5.13%	4.13%	3.13%	2.88%
Multi Axle (> 2 axle)	7.40%	6.40%	5.40%	5.15%

Table 3-6 : Recommended Growth Rates Pessimistic

Year/ Vehicle Type	2025-27	2027-32	2032-37	2037-42
Car/Jeep/Van	6.34%	5.34%	4.34%	3.84%
LCV	4.90%	3.90%	2.90%	2.65%
Truck/Bus	3.63%	2.63%	1.63%	1.38%
Multi Axle (> 2 axle)	5.90%	4.90%	3.90%	3.65%

Table 3-7 : Recommended Growth Rates Most Likely

Year/ Vehicle Type	2025-27	2027-32	2032-37	2037-42
Car/Jeep/Van	7.34%	6.34%	5.34%	4.84%
LCV	5.90%	4.90%	3.90%	3.65%
Truck/Bus	4.63%	3.63%	2.63%	2.38%
Multi Axle (> 2 axle)	6.90%	5.90%	4.90%	4.65%

CHAPTER 4

TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in the previous section of the report are used to arrive at traffic projections for future years. Toll plaza wise futuristic traffic projection is given in tables below.

These projections have been done for the following three cases of growth.

1. Optimistic Scenario
2. Pessimistic Scenario
3. Most Likely Scenario

**Table 4-1 : Total Tollable Traffic @ Toll Plaza 1- Chainage 16.000 KM
(Optimistic Growth Scenario)**

Year	Car	Minibus/ LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	6569	302	1253	2070	0	10194	20096
2026-27	7083	321	1318	2223	0	10945	21522
2027-28	7568	338	1373	2365	0	11644	22837
2028-29	8086	356	1430	2516	0	12388	24232
2029-30	8639	375	1489	2677	0	13180	25715
2030-31	9230	395	1551	2848	0	14024	27292
2031-32	9861	417	1615	3030	0	14923	28967
2032-33	10436	435	1666	3194	0	15731	30460
2033-34	11046	454	1717	3367	0	16584	32030
2034-35	11691	474	1772	3548	0	17485	33684
2035-36	12373	494	1827	3739	0	18433	35421
2036-37	13095	516	1884	3941	0	19436	37256
2037-38	13795	538	1939	4144	0	20416	39067

**Table 4-2 : Total Tollable Traffic @ Toll Plaza 2- Chainage 88.50 KM
(Optimistic Growth Scenario)**

Year	Car	Minibus/ LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	9553	228	1127	1792	13	12713	21399
2026-27	10302	243	1185	1925	14	13669	22947
2027-28	11007	257	1233	2049	15	14561	24380
2028-29	11759	271	1285	2179	16	15510	25898
2029-30	12563	286	1338	2318	17	16522	27514
2030-31	13422	302	1393	2467	18	17602	29237
2031-32	14340	319	1450	2625	19	18753	31067
2032-33	15177	333	1495	2767	20	19792	32703
2033-34	16062	348	1542	2916	21	20889	34427
2034-35	16999	364	1589	3074	22	22048	36244
2035-36	17991	380	1637	3240	23	23271	38156
2036-37	19041	397	1689	3415	24	24566	40179
2037-38	20058	414	1737	3591	25	25825	42162

Similarly, traffic projections for Pessimistic scenario are given below.

**Table 4-3 : Total Tollable Traffic @ Toll Plaza 1- Chainage 16.000 KM
(Pessimistic Growth Scenario)**

Year	Car	Minibus/ LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	6478	298	1235	2042	0	10053	19819
2026-27	6890	313	1280	2162	0	10645	20929
2027-28	7258	325	1314	2268	0	11165	21894
2028-29	7646	338	1349	2379	0	11712	22906
2029-30	8055	351	1384	2496	0	12286	23966
2030-31	8485	364	1421	2618	0	12888	25075
2031-32	8939	378	1458	2746	0	13521	26237
2032-33	9327	389	1481	2853	0	14050	27192
2033-34	9732	400	1504	2964	0	14600	28182
2034-35	10155	411	1528	3080	0	15174	29216
2035-36	10597	422	1552	3200	0	15771	30286
2036-37	11057	435	1577	3325	0	16394	31403
2037-38	11482	446	1599	3447	0	16974	32460

Table 4-4 : Total Tollable Traffic @ Toll Plaza 2- Chainage 88.50 KM
(Pessimistic Growth Scenario)

Year	Car	Minibus/ LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	9296	221	1093	1743	13	12366	20809
2026-27	9885	231	1133	1846	14	13109	22001
2027-28	10413	239	1162	1937	15	13766	23042
2028-29	10969	247	1191	2031	16	14454	24124
2029-30	11555	257	1221	2131	17	15181	25270
2030-31	12172	267	1252	2235	18	15944	26467
2031-32	12822	277	1285	2345	19	16748	27731
2032-33	13378	285	1306	2436	20	17425	28776
2033-34	13959	293	1327	2530	21	18130	29859
2034-35	14565	301	1348	2628	22	18864	30986
2035-36	15198	309	1370	2731	23	19631	32165
2036-37	15858	317	1392	2837	24	20428	33384
2037-38	16467	325	1410	2940	25	21167	34527

Similarly, traffic projections for Most Likely are given below.

Table 4-5 : Total Tollable Traffic @ Toll Plaza 1- Chainage 16.000 KM
(Most Likely Growth Scenario)

Year	Car	Minibus/ LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	6538	301	1247	2061	0	10147	20005
2026-27	7017	319	1305	2203	0	10844	21324
2027-28	7462	334	1353	2333	0	11482	22521
2028-29	7934	350	1402	2471	0	12157	23785
2029-30	8437	367	1453	2616	0	12873	25119
2030-31	8972	385	1505	2770	0	13632	26530
2031-32	9542	404	1560	2933	0	14439	28027
2032-33	10051	420	1601	3077	0	15149	29331
2033-34	10588	436	1643	3227	0	15894	30693
2034-35	11153	453	1686	3385	0	16677	32123
2035-36	11748	471	1731	3551	0	17501	33627
2036-37	12375	489	1776	3725	0	18365	35199
2037-38	12975	507	1818	3898	0	19198	36731

Table 4-6 : Total Tollable Traffic @ Toll Plaza 2- Chainage 88.500 KM
(Most Likely Growth Scenario)

Year	Car	Minibus/ LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2025-26	9466	225	1113	1775	13	12592	21189
2026-27	10161	238	1164	1897	14	13474	22610
2027-28	10805	249	1206	2009	15	14284	23905
2028-29	11489	261	1249	2128	16	15143	25276
2029-30	12217	273	1295	2253	17	16055	26727
2030-31	12992	286	1342	2386	18	17024	28265
2031-32	13816	299	1390	2527	19	18051	29892
2032-33	14553	310	1426	2651	20	18960	31316
2033-34	15330	322	1464	2781	21	19918	32814
2034-35	16147	334	1503	2917	22	20923	34383
2035-36	17008	347	1543	3060	23	21981	36031
2036-37	17916	360	1583	3209	24	23092	37754
2037-38	18783	373	1621	3358	25	24160	39429

4.2 Modification in Concession Period

As per Article 29 of the concession agreement, if actual traffic on the project falls short or exceeds Target Traffic on project highway on defined date, concession period shall be modified subject to calculation stipulated therein. For Pathankot-Amritsar project, the Target Date and Target Traffic are defined as below.

Target Date - 1st January 2019

Target Traffic - 34498 in PCU.

It was observed that as per traffic projections, traffic volume falls short of target traffic in all scenarios. This warrants for extension of the concession period. Extension of the concession period is worked out as per the provisions of concession agreement. The following table provides details of modification in concession agreement.

Scenario	Average Traffic in PCUs of Month Dec-2019 Jan-2019	Expected reduction/shortening in Concession Period
Actual	23110	4 years

Further, due to the suspension of toll in the year FY17 for a period of 24 days, the Concessionaire would be entitled to an extension of an additional 24 days.

Traffic was severely impacted on the project highway during the initial lockdown period. NHAI has declared a policy of providing extension of concession to make up for revenue loss during lockdown. It is expected extension would be provided to project concession period on this account as well.

Concessionaire had initiated arbitration proceedings against National Highways Authority of India (“NHAI”) before the Hon’ble Arbitration Tribunal for extension of the Concession Period by 518 days and compensation for delay in completion of construction of the project on account of the reasons not attributable to Concessionaire.

A petition filed by NHAI challenging the Arbitral Award has been dismissed by the Honorable Delhi High Court & the Arbitral Award has been upheld. As a result, the extension of the Concession period by 518 days would accrue to concession period. The matter is currently pending before the Hon'ble Supreme Court.

Thus, a total of about 6 years would be added to the original concession period. Projection of revenue and traffic has been done accordingly.

Due to farmers’ protest in the state of Punjab and Haryana, toll operations were suspended from October 2020 to December 2021. As per the provisions of the Concession agreement, the Concessionaire is eligible for extension of concession period by 441 days.

Due to farmers’ protest in the state of Punjab, toll operations were temporarily suspended from December 16, 2022, to January 15, 2023. As per the provisions of the Concession agreement, the Concessionaire is eligible for extension of concession period by 31 days.

CHAPTER 5

FORECAST OF TOLL REVENUE

5.1 General

This chapter presents the tolling rate calculations, categories and toll revenue of the project.

5.2 Discount Categories

As per the Toll Notification (Schedule R) the following discounts have been considered:

1. Monthly Pass: For frequent user's monthly pass is issued for 50 trips per month. The applicable discounted rate is 2/3 times the normal rate. Concessionaire has also issued an additional monthly pass for 60 trips at 2/3 times the normal rate.
2. Daily Pass (for Return Trip): A 75% discount will be offered on the return trip.
3. Single Journey: Full single journey toll would be charged to this category of vehicles who are infrequent travelers or whose frequency does not yield any discount from the above categories.
4. Local Car / Jeep / Van to be charged at Rs 150 per month (2007)

Building of inflation and escalation of rate on the basis of WPI are done as per toll notification (Schedule R) as given under

The formula for determining the applicable rate of fee shall be as follows:-

$$\text{Applicable rate of fee} = \text{base rate} + \text{base rate} \times \left\{ \frac{\text{WPI A} - \text{WPI B}}{\text{WPI B}} \right\} \times 0.4$$

Factor of inflation / growth has been incorporated as per Schedule R. WPI are available up to 2021-22. A moderate growth in Wholesale Price Index (WPI) has

been assumed after that. Following graph provides projection of rate of inflation (WPI) in India. Data has been taken from Office of Economic Advisor web site (www.eaindustry.nic.in). WPI for years 2017-18 and 2018-2019 is worked back by applying a correlation factor for 2004-05 series as 2017-18 and 2018-2019 data is available in 2011-12 series only. Ratio of WPI for year 2016-17 for both series is used for conversion of WPI in 2004-05 series.

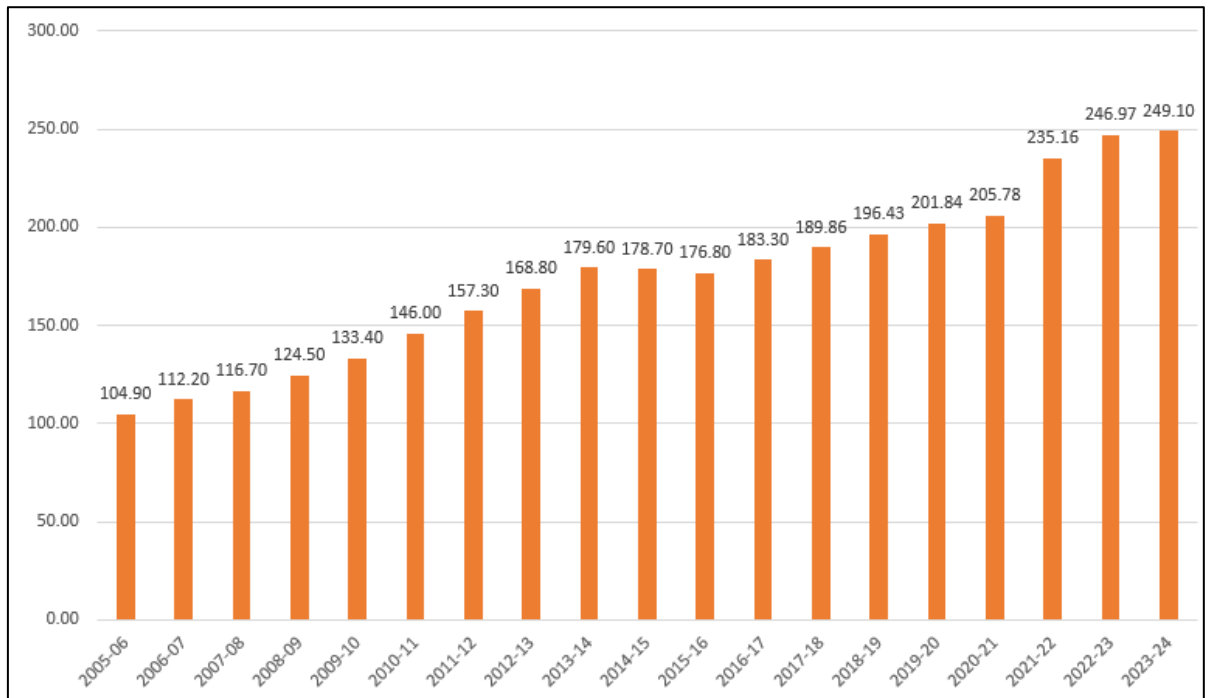


Figure 5-1 : Historical Rate of WPI Inflation in India

Except for the negative growth of WPI in the year 2015-16 average inflation in WPI from the year 2005-2024 is 4.98%. A WPI growth of 5% has been considered for future rate estimates.

5.3 Estimation of Toll Rates

As per the applicable MORTH notification and Schedule R of contract agreement, the following Base rate of fee for the categories mentioned in the table stands true in the National Highways Fee Rules, 2008.

Table 5-1 : Base Toll Rates 2007 - 08

Type of Vehicle	Base Rate of Fee / Km (in Rs.)
Car, Jeep, Van or Light Motor Vehicle	0.65
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.05
Bus or Truck (2 Axle)	2.2
Three Axle commercial vehicles	2.4
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (4-6 axles)	3.45
Oversized Vehicle (seven or more axles)	4.2

There are a number of bypasses and structures in each package. Equivalent length for structures is added to tollable length at each toll plaza. Bypasses cost more than Rs. 50 Cr. are to be charged as per fee notification which provides incremental rate over basic rate for Rs. 15 Cr cost of bypass. The following table provides details of Bypasses having cost more than Rs. 50 Cr.

Additional rates for bypass having cost more than Rs. 50 Cr has been added as per schedule -R in toll rates for both toll plazas. Lengths of bypasses are deducted to arrive at effective length of road for each toll plaza for normal toll rates. Effective length excluding length of bypasses thus works out to Km 31.310 and Km 36.97 for Toll Plaza at Km 16.00 and Km 88.50 respectively.

Toll rates are calculated as per guidelines provided in schedule R (rounded to nearest Rs. five) for the concession period and are given below. Since applicable length of highway length is equal for both plazas, applicable toll rates are also same

Thus, worked out rates for various categories of vehicle and discounts are given as under.

Table 5-2 : Toll Rates for Single Journey @Km 16.00

Year	Car	Minibus	LCV	Truck	Bus	Multi axle	Oversized Vehicles
2024-25	135	205	205	420	420	635	825
2025-26	140	215	215	440	440	670	865
2026-27	150	230	230	465	465	700	910
2027-28	155	240	240	485	485	740	955
2028-29	165	250	250	510	510	775	1005
2029-30	170	265	265	535	535	815	1055
2030-31	180	280	280	565	565	855	1110
2031-32	190	290	290	595	595	900	1170
2032-33	200	305	305	625	625	950	1230
2033-34	210	325	325	660	660	1000	1295
2034-35	220	340	340	690	690	1050	1360
2035-36	235	360	360	730	730	1105	1430
2036-37	245	375	375	765	765	1165	1510
2037-38	260	395	395	805	805	1225	1590

Table 5-3 : Toll Rates for Return Journey@ Km 16.000

Year	Car	Minibus	LCV	Truck	Bus	Multi axle	Oversized Vehicles
2024-25	200	310	310	630	630	955	1235
2025-26	210	325	325	660	660	1005	1300
2026-27	220	340	340	695	695	1055	1365
2027-28	235	360	360	730	730	1105	1435
2028-29	245	375	375	765	765	1165	1510
2029-30	255	395	395	805	805	1225	1585
2030-31	270	415	415	845	845	1285	1665
2031-32	285	440	440	890	890	1350	1750
2032-33	300	460	460	935	935	1420	1845
2033-34	315	485	485	985	985	1495	1940
2034-35	330	510	510	1040	1040	1575	2040
2035-36	350	535	535	1090	1090	1660	2150
2036-37	365	565	565	1150	1150	1745	2260
2037-38	385	595	595	1210	1210	1840	2380

Table 5-4 : Toll Rates for Local Monthly Ticket @ Km 16.000

Year	Car
2024-25	340
2025-26	355
2026-27	375
2027-28	390
2028-29	410

Year	Car
2029-30	435
2030-31	455
2031-32	480
2032-33	505
2033-34	530
2034-35	560
2035-36	590
2036-37	620
2037-38	650

Table 5-5 : Toll Rates for Monthly Pass Local (50 Trips) @Km 16.000

Year	Car/Jeep/Van	LCV	Truck	Bus	3 - Axle	Multi Axle
2024-25	4465	6870	13980	13980	21210	27490
2025-26	4690	7220	14685	14685	22280	28875
2026-27	4925	7585	15425	15425	23405	30335
2027-28	5175	7970	16210	16210	24595	31875
2028-29	5440	8375	17040	17040	25850	33500
2029-30	5720	8805	17910	17910	27175	35215
2030-31	6015	9255	18830	18830	28570	37030
2031-32	6325	9735	19805	19805	30045	38940
2032-33	6650	10240	20830	20830	31605	40960
2033-34	7000	10775	21920	21920	33255	43095
2034-35	7365	11340	23065	23065	34995	45355
2035-36	7750	11935	24275	24275	36835	47735
2036-37	8160	12565	25560	25560	38780	50260
2037-38	8595	13230	26915	26915	40835	52925

Table 5-6 : Toll Rates for Single Journey @ Km 88.500

Year	Car	Minibus	LCV	Truck	Bus	Multi axle	Oversized Vehicles
2024-25	115	180	180	365	365	560	715
2025-26	120	190	190	385	385	590	750
2026-27	125	195	195	405	405	620	790
2027-28	135	210	210	425	425	650	830
2028-29	140	220	220	445	445	680	870
2029-30	150	230	230	470	470	715	915
2030-31	155	240	240	495	495	755	965
2031-32	165	255	255	520	520	795	1015
2032-33	170	265	265	545	545	835	1065
2033-34	180	280	280	575	575	875	1120
2034-35	190	295	295	605	605	925	1180
2035-36	200	310	310	635	635	970	1245

Year	Car	Minibus	LCV	Truck	Bus	Multi axle	Oversized Vehicles
2036-37	210	325	325	670	670	1025	1310
2037-38	220	345	345	705	705	1075	1380

Table 5-7 : Toll Rates for Return Journey @ Km 88.500

Year	Car	Minibus	LCV	Truck	Bus	Multi axle	Oversized Vehicles
2024-25	175	270	270	550	550	840	1075
2025-26	180	280	280	575	575	880	1130
2026-27	190	295	295	605	605	925	1185
2027-28	200	310	310	635	635	975	1245
2028-29	210	325	325	670	670	1025	1310
2029-30	220	345	345	705	705	1075	1375
2030-31	235	360	360	740	740	1130	1445
2031-32	245	380	380	780	780	1190	1520
2032-33	255	400	400	820	820	1250	1600
2033-34	270	420	420	860	860	1315	1685
2034-35	285	445	445	905	905	1385	1770
2035-36	300	465	465	955	955	1460	1865
2036-37	315	490	490	1005	1005	1535	1965
2037-38	335	515	515	1060	1060	1615	2065

Table 5-8 : Toll Rates for Local Monthly Ticket @ Km 88.500

Year	Car
2024-25	340
2025-26	355
2026-27	375
2027-28	390
2028-29	410
2029-30	435
2030-31	455
2031-32	480
2032-33	505
2033-34	530
2034-35	560
2035-36	590
2036-37	620
2037-38	650

Table 5-9 : Toll Rates for Monthly Pass Local (50 Trips) @ Km 88.50

Year	Car/Jeep/Van	LCV	Truck	Bus	3 - Axle	Multi Axle
2024-25	3840	5965	12210	12210	18655	23865
2025-26	4030	6265	12825	12825	19595	25065
2026-27	4235	6585	13475	13475	20585	26335
2027-28	4450	6920	14155	14155	21635	27670
2028-29	4675	7270	14880	14880	22735	29080
2029-30	4915	7645	15640	15640	23900	30570
2030-31	5170	8035	16445	16445	25130	32145
2031-32	5435	8450	17295	17295	26430	33805
2032-33	5720	8890	18195	18195	27800	35555
2033-34	6015	9355	19140	19140	29250	37410
2034-35	6330	9840	20145	20145	30780	39370
2035-36	6665	10360	21200	21200	32395	41440
2036-37	7015	10905	22320	22320	34110	43625
2037-38	7390	11485	23505	23505	35915	45940

5.4 Toll Revenue

As indicated earlier, toll revenue on the Project Road has been calculated under in all three scenarios. The estimates of toll revenue under *Optimistic*, *Pessimistic* and *Most Likely*.

5.5 Toll Revenue at all toll plazas under Scenarios

Toll Revenue estimates under most likely scenario at each of the toll plaza up to 2037-38 starting from the year 2024-25 are shown in tables below.

Table 5-10 : Toll Revenue Pessimistic Scenario (Crores)

Year	Toll at Plaza 16.00	Toll at Plaza 88.50	Total
2024-25	88.49	72.57	161.07
2025-26	98.07	80.22	178.29
2026-27	108.99	89.08	198.06
2027-28	120.33	98.67	218.99

Year	Toll at Plaza 16.00	Toll at Plaza 88.50	Total
2028-29	131.83	107.90	239.73
2029-30	144.34	119.15	263.49
2030-31	159.02	131.40	290.43
2031-32	175.57	145.28	320.86
2032-33	191.12	156.90	348.02
2033-34	208.46	171.37	379.83
2034-35	226.88	187.74	414.61
2035-36	249.27	205.30	454.57
2036-37	270.43	223.74	494.17
2037-38	294.76	243.63	538.39

**Table 5-11 : Toll Revenue Optimistic Scenario
(Rs. Crores)**

Year	Toll at Plaza 16.00	Toll at Plaza 88.50	Total
2024-25	88.49	72.57	161.07
2025-26	99.49	81.36	180.85
2026-27	112.11	91.68	203.78
2027-28	125.59	102.99	228.58
2028-29	139.55	114.27	253.82
2029-30	154.96	128.02	282.98
2030-31	173.21	143.18	316.38
2031-32	193.97	160.60	354.58
2032-33	214.25	176.00	390.25
2033-34	237.11	195.08	432.19

Year	Toll at Plaza 16.00	Toll at Plaza 88.50	Total
2034-35	261.79	216.79	478.58
2035-36	291.80	240.51	532.31
2036-37	321.17	265.83	586.99
2037-38	355.18	293.73	648.91

Table 5-12 : Toll Revenue Most Likely Scenario
(Rs. Crores)

Year	Toll at Plaza 16.00	Toll at Plaza 88.50	Total
2024-25	88.49	72.57	161.07
2025-26	99.03	80.95	179.98
2026-27	111.08	90.75	201.83
2027-28	123.79	101.50	225.29
2028-29	136.93	112.08	249.01
2029-30	151.32	124.97	276.29
2030-31	168.34	139.09	307.43
2031-32	187.64	155.25	342.89
2032-33	206.26	169.41	375.67
2033-34	227.11	186.90	414.00
2034-35	249.53	206.77	456.30
2035-36	276.80	228.37	505.17
2036-37	303.19	251.25	554.44
2037-38	333.59	276.39	609.98

CHAPTER 6

OPERATION & MAINTENANCE COST

6.1 General

The following are project parameters which would contribute towards the cost of operation and maintenance.

The future cost of operation and maintenance is estimated on a guess basis. Keeping all above factors in view, following can be basis of working out cost of operation and maintenance for project corridor from Pathankot to Amritsar on NH-15 in state of Punjab.

- i) **Annual Regular Maintenance** – Covering pothole repair, shoulder and slope repair, drain cleaning, median maintenance, Crash barrier, toll plaza maintenance, Toll collection, other services like medical help and rescue operations etc.
- j) **Periodic Maintenance** – This will be done on a periodic basis, say every 5 years. It will consist of overlaying of wearing course and painting and marking. Some pavement strengthening is also anticipated in a few sections. This operation and its cost are spread over more than one years.

Concessionaire has recently updated the program of maintenance of project road. Same has been reviewed and year-wise cost of O&M from year 2023-24 is given in table below.

Table 6-1 : Year wise Details of Operation & Maintenance Cost

Year	Annual maintenance (Rs. Cr)	Thermoplastic painting (Rs. Cr)	Renewal Coat with BC (Rs. Cr.)	Special Repair of pavement	Structure maintenance (Rs. Cr)	Electric System	Total Expenditure (Rs. Crores)	Remarks
						Annual		
2024-25	19.12	1.18	16.64	7.21	0.06	0.94	60.50	Periodic Repair
2025-26	19.12	1.18	16.64	5.04	0.06	0.94	60.48	Periodic Repair
2026-27	19.12			5.76	0.06	0.94	38.24	Periodic Repair
2027-28	19.12				0.06	0.94	31.21	Regular O & M
2028-29	19.12			10.09	0.06	0.94	49.20	Periodic Repair
2029-30	19.12	2.03	28.52		0.06	0.94	86.65	Periodic Repair
2030-31	16.25				0.06	0.94	30.39	Regular O & M
2031-32	16.25				0.06	0.94	31.30	Regular O & M
2032-33	16.25				0.06	0.94	32.24	Regular O & M
2033-34	16.25				0.06	0.94	33.21	Regular O & M
2034-35	16.25				0.06	0.94	34.20	Regular O & M

CHAPTER 7

CONCLUSION & RECOMMENDATIONS

7.1 Conclusion & Recommendations

Project stretch of Pathankot to Amritsar section of NH-15 in state of Punjab from km 6.082 to km 108.502 is currently a four-lane road. The road is in sound condition and serves reasonably good levels of traffic volume. The project corridor falls in the influence zone of fast upcoming metro city Amritsar. There are many upcoming projects in the area which have the potential to boost economic growth of the area and add value to the development of the region. All these developments have potential to give a positive impact to traffic flow on the project. As estimated in this study report, project traffic is expected to grow at rate of 6-8% per annum in post COVID-19 scenario.

The following can be considered as major outcome of study.

- a) There is a good amount of toll able traffic running on the project.
- b) Project corridor has potential to witness good traffic growth annually in near future due to various development in area and overall growth of the economy once tolling is resumed on project stretch.
- c) Project corridor does not have risk of traffic leakage due to lack of competing roads of comparable quality.
- d) Project infrastructure is in good condition and its maintenance cost is also reasonable.

Based on the above it can be considered a stable healthy project from the traffic and revenue point of view.

CHAPTER 8

PROJECT ILLUSTRATIONS

8.1 General

Project current condition has been depicted in the following photographs.



Figure 8-1 : General Condition



Figure 8-2 : General Condition



Figure 8-3 : General Condition



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TALEGAON TO AMRAVATI SECTION OF NH-6 (KM 100.000 To KM 166.725) IN THE STATE OF MAHARASHTRA



TOLL REVENUE AND O&M COST PROJECTION REPORT (FINAL)

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OCTOBER 2024



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ABBREVIATIONS

AADT	- Annual Average Daily Traffic	NHAI	- National Highways Authority of India
BOT	- Build Operate Transfer	NHDP	- National Highways Development Project
CAGR	- Compound Annual Growth Rate	NSDP	- Net State Domestic Product
CTV	- Classified traffic volume	O&M	- Operation & Maintenance
DBFOT	- Design, Build, Finance, Operate & Transfer	PCDP	- Per Capita Domestic Product
EME	- Earth Moving Equipment	PCI	- Per Capita Income
GDP	- Gross Domestic Product	PCU	- Passenger Car Unit
GSDP	- Gross State Domestic Product	PSC	- Pre-stressed Concrete
HCM	- Heavy Construction Machinery	RCC	- Reinforced cement concrete
HCV	- Heavy Commercial Vehicle	RHS	- Right Hand Side
HTMS	- Highway Traffic Management System	SH	- State Highway
IRC	- Indian Road Congress	TP	- Toll Plaza
IRR	- Internal Rate of Return	WPI	- Wholesale Price Index
LCV	- Light Commercial Vehicle	SIR	- Special Investment Region
LHS	- Left Hand Side	c.	- Circa
LGV	- Light Goods Vehicle	ROB	- Railway Over Bridge
MAV	- Multi Axle Vehicle	MDR	- Major District Road
MORTH	- Ministry of Road Transport and Highways	ODR	- Other District Road
NH	- National Highway	CA	- Concession Agreement
PCC	- Plain Cement Concrete	RMT	- Running Meter
CR	- Coarse Rubble		

CHAPTER 1

INTRODUCTION

1.1 Background

The Government of India through National Highway Authority of India (NHAI) embarked upon a program to enhance the traffic capacity and safety for efficient transportation of goods as well as passenger traffic on National Highway Sections under NHDP Phase V. Under Phase V NHAI has planned to convert 6,500 km of existing 4-lane National Highways into 6-lane National Highway. Sections envisaged under 6-laning comprise the Golden Quadrilateral section (5,700 km) and some other sections which are 800 km in length.

The project under consideration, Talegaon - Amravati section of NH-6 from Km 100.000 to km 166.725 is one such road project NHAI intended to implement on a BOT basis in the DBFOT format. *M/s IRB Talegaon - Amravati Tollway Ltd.* (Concessionaire) has been awarded the Project for concession period of 22 years starting from 3rd September 2010 to 2nd September 2032. The Project has been commissioned and is currently in the operation / maintenance phase.

1.2 Objective of the Study

M/s IRB INVIT FUND has engaged GMD Consultants to assess the future traffic and toll potential of the project along with related operation & maintenance expenditure involved.

This report named as “*Toll Revenue and O&M Cost Projection Report*” mainly focuses on traffic and O&M aspects of the project. Other parameters like competing road, area developments etc. have been considered from a traffic development point of view.

1.2.1 Scope of Services

The broad scope of work covered in the assignment is as follows.

- a) Analysis of Traffic Growth
- b) Toll Rate Growth
- c) Revenue Forecasting
- d) Operation and Maintenance Cost Projections

The Concessionaire has provided basic historical traffic data and other project details on the basis of which the above analysis has been carried out, after applying our judgment on the traffic estimates.

“Toll Revenue and O&M Cost Projection Report” was submitted in March 2017. In this report traffic data of year 2015-16 was used as base traffic. The report was updated with traffic data for the year 2016-17 and report was submitted in October 2017. The report was further updated with traffic data of 2017-18 and same was submitted in April 2018. The report was further updated with traffic Data of the period from April 2018 to September 2018 and was submitted in October 2018. A revised report was submitted with updated traffic for the years 2018-19 in April 2019. The report was further updated with yearly traffic data of 2019-20 in May 2020. With traffic data from April 2020 to March 2021 report was updated report was further updated with yearly traffic data from April 2021 to March 2022, April 2022 to March 2023, April 2023 to March 2024 and now concessionaire has provided traffic data from April 2024 to September 2024 this report is updated with this annual traffic data into consideration.

CHAPTER 2

TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Surveys

In the course of our work, we have collected the required information for project corridor to understand the general traffic and travel characteristics of the corridor.

The following traffic data has been collected for the project.

- Classified traffic volume counts at toll plaza locations on Amravati - Talegaon section of NH-6 for base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and Six-Monthly traffic data from April 2024 to September 2024.
- Local Component of traffic
- Component of Return Journey
- Component of Monthly Pass Journey

The main objective of the traffic data analysis is to:

- Determine the existing traffic movement characteristics of project.
- Establish base year traffic.
- Identification of travel patterns and modal split of project traffic
- Deriving growth factors for traffic forecasting
- Estimation of corridor traffic including traffic diversion if any
- Preparation of revenue model and projection of revenue as per toll policy for various scenarios

Table 2-1 below lists provides details of locations from where traffic details have been collected.

Table 2-1 : Traffic Data Details

SR. NO	LOCATION	CTV	Single Journey Traffic	Return Journey Traffic	Monthly Pass Traffic	Local Traffic
1	Km 142.800 Toll Plaza	AADT for Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016
		AADT for year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017
		AADT for year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018
		AADT for Year 2018-2019	For Year 2018-2019	For Year 2018-2019	For Year 2018-19	For Year 2018-19
		AADT for Year 2019-2020	For Year 2019-2020	For Year 2019-2020	For Year 2019-2020	For Year 2019-2020
		AADT for year 2020-2021	For Year 2020-2021	For Year 2020-2021	For Year 2020-2021	For Year 2020-2021
		AADT for year 2021-2022	For year 2021-2022	For year 2021-2022	For year 2021-2022	For year 2021-2022
		AADT for year 2022-2023	For year 2022-2023	For year 2022-2023	For year 2022-2023	For year 2022-2023
		AADT for year 2023-2024	For year 2023-2024	For year 2023-2024	For year 2023-2024	For year 2023-2024
		Six Monthly Data from	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24

SR. NO	LOCATION	CTV	Single Journey Traffic	Return Journey Traffic	Monthly Pass Traffic	Local Traffic
		April 24 to Sept 24				

The locations of each of the traffic surveys are illustrated in the following Figure.

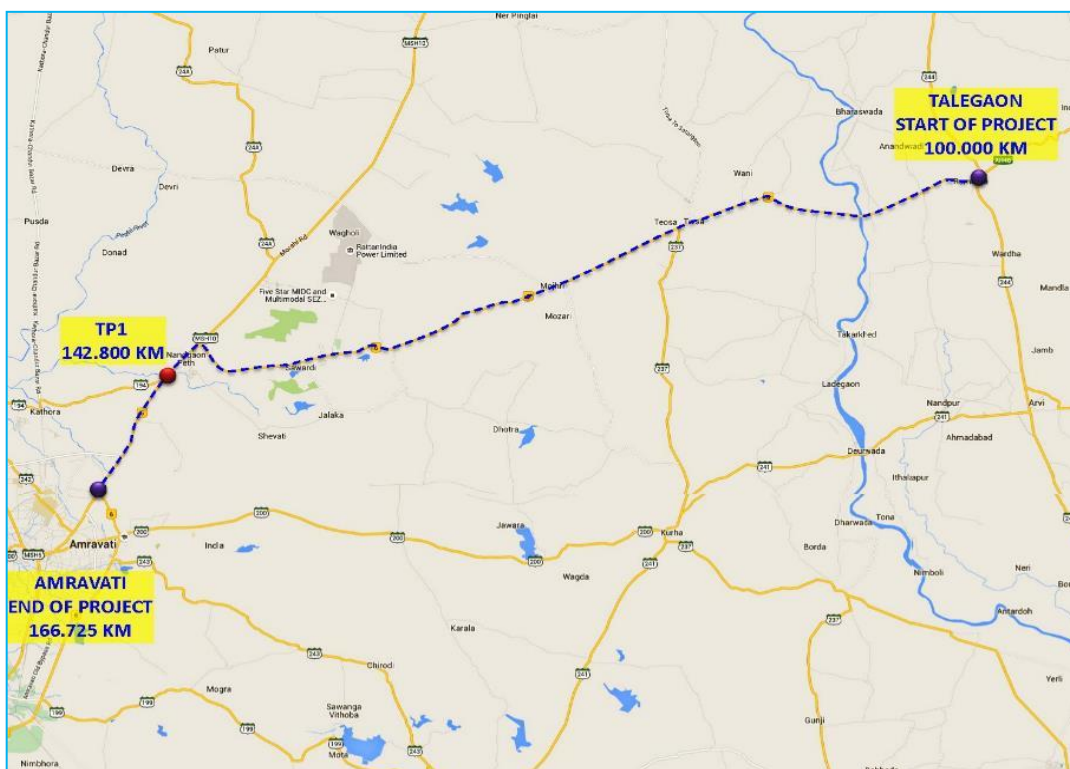


Figure 2-1: Toll Plaza Location

2.2 Classified Traffic Volume Count

The objective of conducting a Classified Traffic Volume Count is to understand the traffic flow pattern including modal split on a roadway. The Classified Traffic Volume Count survey has been provided by concessionaire of project highway from actual traffic data gathered at toll plaza locations based on monthly data shared with NHAI. These locations are indicated in **Figure 2-1** and listed in **Table 2-1**.

The vehicles can broadly be classified into fast moving / motorized and slow moving / non-motorized vehicles, which can be further classified into specific categories of vehicles. The groupings of vehicles are further segregated to capture the tollable vehicle categories specifically and toll exempted vehicles are counted separately. The detailed vehicle classification system as per IRC: 64-1990 is given in

Table 2-2.

Table 2-2 : Vehicle Classification System

Vehicle Type	
Auto Rickshaw	
Passenger Car	Car, Jeep, Taxi & Van (Old / new technology)
Bus	Minibus
	Standard Bus
Truck	Light Goods Vehicle (LCV)
	2 – Axle Truck
	3 Axle Truck (HCV)
	Multi Axle Truck (4-6 Axle)
	Oversized Vehicles (7 or more axles)
Other Vehicles	Agriculture Tractor, Tractor & Trailer

Source - IRC: 64 – 1990

However, since the project highway is currently under toll operation, the data collected corresponds to category of tollable vehicles. The following are the types of vehicles as per concession agreement.

- Car / Jeep / van
- Minibus /LCV
- Truck / Bus
- Multi Axle
- Oversize Vehicle

2.3 Traffic Characteristic

Toll revenue of the project highway does not solely depend on total traffic volume. There are certain characteristics of traffic which have significant potential to affect toll revenue. Components of local traffic, component of passenger and commercial traffic, portion of return journey traffic, portion of monthly pass traffic are some such characteristics of traffic. These will be discussed in subsequent sections of this report.

2.3.1 Traffic Data

The Concessionaire has provided Traffic data for base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and from April 2024 to September 2024.

Since the traffic data available for this update is for Six months, from April 2024 to September 2024, it may not represent the whole year traffic. Hence a seasonality factor for balance part of year has been applied to average traffic of current four months to arrive at Annual Average Daily Traffic of base year 2024-25. Same corrected traffic is used for future projections and revenue calculations. The following table shows historical traffic on project stretch and derived Annual Average Daily Traffic (AADT) for year 2024-25.

Table 2-3 : Traffic Data at Toll Plaza at Km 142.800

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) - FY 2018-19	Annual Average Daily Traffic (Nos.) – FY 2019-20	Annual Average Daily Traffic (Nos.) – FY 2020-21	Annual Average Daily Traffic (Nos.) – FY 2021-22	Annual Average Daily Traffic (Nos.) – FY 2022-23	Annual Average Daily Traffic (Nos.) – FY 2023-24	Annual Average Daily Traffic (Nos.) – FY 2024-25
1	Car	6738	7407	7090	5937	6173	6230	6879
2	Minibus/ LCV	1511	1408	1217	620	547	454	443
3	Truck/Bus	1421	1623	1374	1340	1661	1558	1614
4	Multi Axle	2285	2173	2297	2327	2239	1979	2037
5	Oversized Vehicles	2	4	4	7	9	9	2
	Total	11957	12616	11981	10231	10629	10230	10975

2.4 Data Analysis

2.4.1 Analysis of Traffic Volume Count

Understanding the character of existing traffic forms the basis of traffic forecast. The various vehicle types having different sizes and characteristics can be converted into a single unit called Passenger Car Unit (PCU). Passenger Car equivalents for various vehicles are adopted based on recommendations of Indian Road Congress prescribed in “IRC-64-1990: Guidelines for Capacity of Roads in Rural areas”. The adopted passenger car unit values (PCU) are presented in

Table 2-4.

Table 2-4 : PCU Factors Adopted for Study

Vehicle Type	PCUs
Car	1.0
Minibus	1.5
Standard Bus	3.0
LCV/LGV	1.5
2 Axle Truck	3.0
3 – 6 Axle Truck	4.5
MAV	4.5
Auto Rickshaw	1.0
Van/Tempo	1.0
Agriculture Tractor with Trailer	4.5
Agriculture Tractor without Trailer	1.5

Source: IRC: 64-1990

Traffic volume at each toll plaza was converted to PCU and same is presented as under

Table 2-5 : Traffic in PCU at Project Stretch

Period	Toll Plaza Location	Traffic No	PCU	PCU Index
FY 2015-16	142.800 (Nandgaon Peth)	9340	18547	1.99
FY 2016-17	142.800 (Nandgaon Peth)	10452	20590	1.97

Period	Toll Plaza Location	Traffic No	PCU	PCU Index
FY 2017-18	142.800 (Nandgaon Peth)	11312	22582	2.00
FY 2018-19	142.800 (Nandgaon Peth)	11957	23558	1.97
FY 2019-20	142.800 (Nandgaon Peth)	12616	24187	1.92
FY 2020-21	142.800 (Nandgaon Peth)	11981	23389	1.95
FY 2021-22	142.800 (Nandgaon Peth)	10231	21390	2.09
FY 2022-23	142.800 (Nandgaon Peth)	10629	22092	2.08
FY 2023-24	142.800 (Nandgaon Peth)	10230	20530	2.01
FY 2024-25	142.800 (Nandgaon Peth)	10975	21561	1.96

It can be observed from above that project traffic has PCU index close to 2.0 which indicates balance mix of commercial, goods traffic and passenger traffic. It can be appreciated that the character of traffic is consistent on stretch.

2.4.2 Components of Traffic

As discussed previously, components of traffic volume play an important role in determining project revenue. A larger component of commercial traffic with higher axle configuration adds to project revenue positively. Similarly, a larger component of local traffic affects the project revenue potential negatively.

For the purpose of analysis, the recent traffic numbers for the period April 2023 to March 2024 have been considered as the base numbers.

It is observed that car traffic forms 63% of total traffic at toll plaza location 142.800 where multi axle commercial vehicles comprise 18% of total traffic. Overall, about 27% of traffic is commercial in nature.

Another important bifurcation of traffic is components of traffic with respect various type of toll ticketing like

1. Single Journey
2. Return Journey
3. Monthly Pass (Local and General)

The following table provides numbers of vehicles falling in each of the above categories. on base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22 ,2022-23, 2023-24 and from April 2024 to September 2024 as under for toll plaza –

Table 2-6 : Journey Type Bifurcation of Traffic at KM 142.800

Sr. No	Type	Traffic Volume (Nos.) FY 2018-19	Traffic Volume (Nos.) FY 2019-20	Traffic Volume (Nos.) FY 2020-21	Traffic Volume (Nos.) for FY 2021-22	Traffic Volume (Nos.) for FY 2022-23	Traffic Volume (Nos.) for FY 2023-24	Traffic Volume (Nos.) for FY 2024-25
1	Single Journey	5285	5513	6647	5828	5594	5054	5314
2	Return Journey	3514	3341	1906	4274	4906	5042	5534
3	Monthly Pass	3158	3761	3428	129	129	134	127

A significant part of the traffic at KM 142.800 is single journey 48% followed by return journey 51% and monthly passes which share 1% of the total traffic volume.

2.5 Secondary Data Collection

There are several other factors which have substantial impact on traffic pattern and growth on any project corridor. The following are some of such important factors.

- Industrial development around project corridor and its catchment
- Educational infrastructure along project corridor
- Demographic pattern
- Urban area development
- Tourism potential
- Upcoming major infrastructural or Industrial projects
- Special Industry in project corridor

- Overall trends of economic growth local as well as national / regional

Hence in addition to traffic details on the project site, secondary data was also collected from the various sources. Typical secondary data includes the following:

1. Vehicle registration data of regional and national level.
2. Economic Data
 - a) GDP
 - b) NSDP
 - c) Population Growth
 - d) Per Capita Income growth
 - e) Industrial Growth
 - f) Special Industry Potential
 - g) Regional and National development vision / plan
 - h) Any other relevant data
3. Competing road network.

We have collected and utilized such underlying data in the study to estimate the growth and risk factors for traffic along the project corridor. The same was presented in previous report and there is no significant update on this

CHAPTER 3

GROWTH OF TRAFFIC ON PROJECT HIGHWAY

3.1 Introduction

Traffic growth is a function of the interplay of a number of contributory factors such as National economy, Government policy, socio-economic conditions of the people, and changes in land uses along the project corridor precincts etc. As these factors have a number of uncertainties associated with them, forecasts of traffic are dependent on the projections of other factors such as population, gross domestic product (GDP), vehicle ownership, per capita income (PCI), agricultural output, fuel consumption etc. Future patterns of change in these factors can be estimated with only a reasonable degree of accuracy and hence the resultant traffic forecast levels may not be precise.

Traffic growth forecast for project corridor Bharuch - Surat section of NH-8 has been done taking the above factors into consideration. “**IRC: 108-2015-Guidelines for Traffic Prediction on Rural Highways**” is established best practice and has been used for traffic growth forecast.

3.2 Trend Analysis

One of the methods of estimation of future rate of traffic growth is to assume the same rate of growth as experienced in the past. However, it may be noted that major influencing factors which reflect Economic conditions such as GDP, agricultural output, industrial output, national policies etc. are susceptible to change over a longer period of time and necessary adjustments need to be made to past trends to account for these changes.

Thus, we have considered the Elasticity model of growth projection which is one of the most widely acceptable methods for traffic forecast and is recommended in **IRC: 108-2015-Guidelines for Traffic Prediction on Rural Highways**.

In this method past trends of any vehicular data are paired with an economic indicator and a regression analysis is done to yield the economic model of growth. Growth of vehicle traffic varies for different type of vehicle. It is a proven fact that growth patterns for passenger and goods vehicles are different. Traffic growth on any highway typically depends on a number of economic parameters. The most important and direct parameters are given as under

- Per Capita Income

- Net State Domestic Product (NSDP)
- Population

It is observed that the ownership of a car is more closely related to affordability hence per capita is the index which closely fits with growth of car traffic among other criteria. In similar fashion, the following pairs of vehicle type and independent variable can be established for elasticity modeling of growth.

- Car / Jeep – Per Capita Income
- Bus / Minibus – Population
- Trucks / Heavy / Goods Vehicle – NSDP

Time series data of vehicles (both passenger and goods) Registered in state of Maharashtra is used as the base data for analysis of growth.

3.3 Estimation of Traffic Demand Elasticity

The elasticity of traffic demand is defined as the rate at which traffic intensity varies due to change in the corresponding indicator selected. Hence, in order to estimate the elasticity of traffic demand, it is necessary to establish the relationship between the growth in number of given categories of vehicle with one of the economic variables considered, such as NSDP, per capita income and population growth. Latest available data for vehicle registration, per capita income, NSDP and population is used in analysis.

As per IRC: 108-2015 the model for estimating elasticity index for the project corridor is of the following form and is as given below:

$$\text{Log}(P) = k \times \text{Log}(EI) + A$$

Where,

P = Number of Vehicles (Mode wise)

EI = Economic Indicator

A = Regression constant

k = Elasticity coefficient (Regression coefficient)

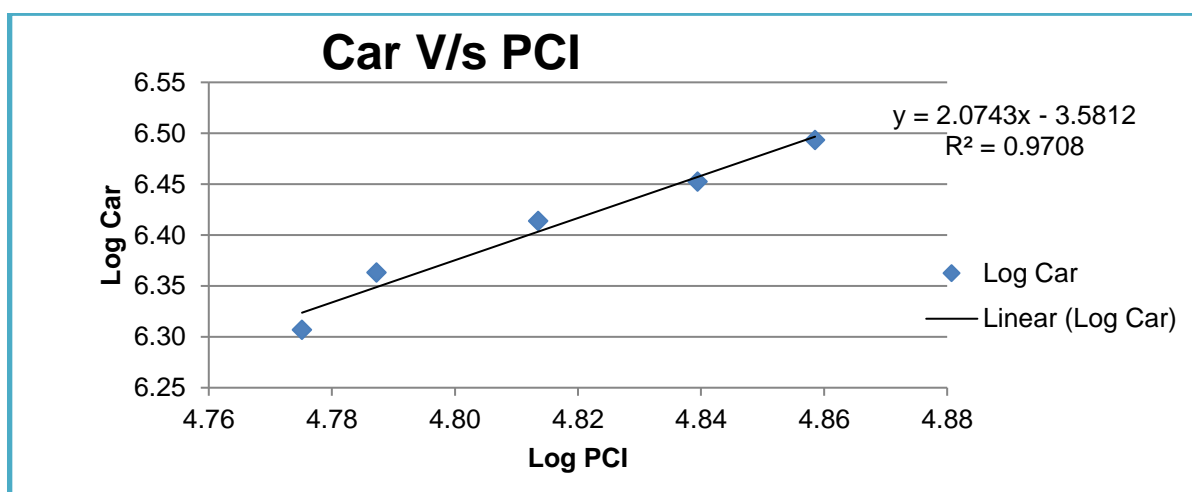
The elasticity for cars and bus (passenger vehicles) is calculated based on the Population and Per Capita Domestic Product (PCDP) and the elasticity for trucks is calculated based on the Net State Domestic Product (NSDP).

The following tables and graphs depict regression and elasticity of growth model.

Table 3-1 : Per Capita Income Vs Car

Year	PCI	Car	Log PCI	Log Car	PCI Growth	Average Growth
2011	59587	2027080	4.78	6.31		
2012	61276	2307841	4.79	6.36	3%	
2013	65095	2592565	4.81	6.41	6%	
2014	69097	2834847	4.84	6.45	6%	
2015	72200	3113773	4.86	6.49	4%	4.9%

Regression analysis of same is given in figure below.

**Figure 3-1: Regression and Elasticity PCI vs. Car–Extrapolation****Table 3-2 : Population Vs Bus**

Year	Population	Buses	Log Pop	Log Bus	Pop Growth	Average Growth
2011	112374333	89861	8.05	4.95		
2012	113807248	100097	8.06	5.00	1%	
2013	115229410	110121	8.06	5.04	1%	
2014	116640546	120886	8.07	5.08	1%	
2015	118040394	120750	8.07	5.08	1%	1.24%

Regression analysis of same is given in figure below.

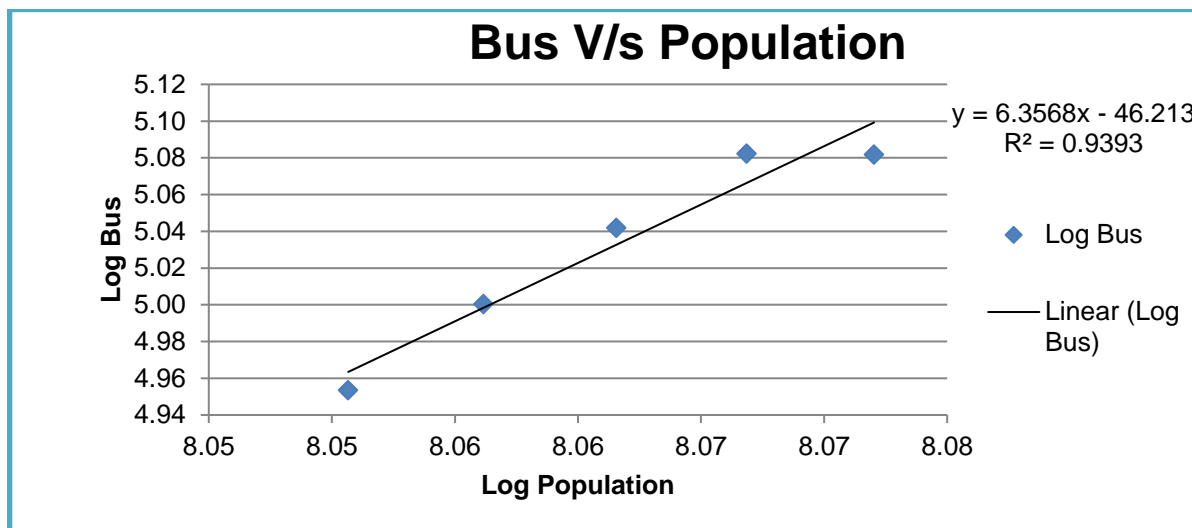


Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

The elasticity of goods traffic has been worked out by regression analysis with NSDP. The following table represents the data and details.

Table 3-3 : Goods Traffic Vs NSDP

Year	NSDP	Trucks	Log NSDP	Log Truck	NSDP Growth	Average Growth
2011	66762536	973788	7.82	5.99		
2012	69590440	1067825	7.84	6.03	4%	
2013	74913695	1142091	7.87	6.06	8%	
2014	80559286	1273256	7.91	6.10	8%	
2015	85245134	1360214	7.93	6.13	6%	6.31%

The following figure depicts regression analysis and extrapolation.

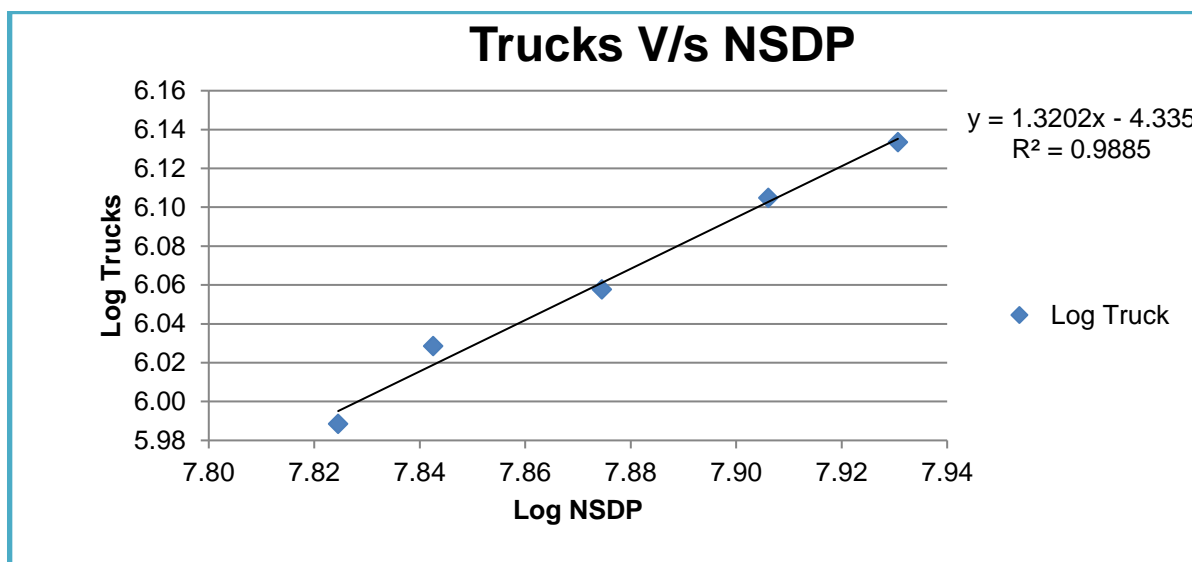


Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation.

Using the regression analysis above, we have arrived at the elasticity of traffic demand for each class of vehicle to a given change in relevant economic indicators. Average traffic growth of a vehicle class is multiplied by the corresponding elasticity coefficient to arrive at traffic growth. R^2 is a statistical measure of how close the data are to the fitted regression line. It varies from 0 to 1. The higher the value of R^2 more representative is the regression model of data.

The results of these analyses for the good fit as reflected by R^2 values are presented in the Table below.

Table 3-4 : Summary Regression Analysis

State	Vehicle Category	Independent Variable	Regression Equation	R Square	Elasticity Coefficient (y)	Average Growth	Growth Elastic Model
Maharashtra	Car/Jeep	PCI	$y = 2.0743x - 3.5812$	$R^2 = 0.9708$	2.0743	4.93%	11.08%
	Bus	Population	$y = 6.3568x - 46.2131$	$R^2 = 0.9393$	6.3568	1.24%	6.82%
	Truck	NSDP	$y = 1.3202x - 4.335$	$R^2 = 0.9885$	1.3202	6.31%	7.57%

While the economic model for predicting growth is a good tool, other local, regional, national factors such as proposed developments etc. should also be considered before finalizing growth factors. These factors are discussed in subsequent sections.

3.4 Analysis of Historic Traffic Data

Historic traffic data forms useful information for any highway project. It provides useful information for establishing past trends of growth. Project stretch of Talegaon to Amravati has recently been commissioned and tolling commenced in 2013. Stable traffic data from the year 2015-16 is only available for stretch which is not enough to establish any growth pattern for future. The following table presents details of historic traffic on project road.

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2018-19	Annual Average Daily Traffic (Nos.) FY 2019-20	Annual Average Daily Traffic (Nos.) FY 2020-21	Annual Average Daily Traffic (Nos.) FY 2021-22	Annual Average Daily Traffic (Nos.) FY 2022-23	Annual Average Daily Traffic (Nos.) FY 2023-24	Annual Average Daily Traffic (Nos.) FY 2023-24
1	Car	6738	7407	7090	5937	6173	6230	6879
2	LCV/Minibus	1511	1408	1217	620	547	454	443
3	Bus/Truck	1421	1623	1374	1340	1661	1558	1614
4	Mav	2285	2173	2297	2327	2239	1979	2037
5	OSV	2	4	4	7	9	9	2
	Total	11957	12616	11981	10231	10629	10230	10975

3.5 Other Factors Influencing Growth

There are many factors which have an impact on traffic growth. As discussed previously these factors can be economic, social, educational, and industrial.

Potentiality of such factors for project highway is discussed as under.

ECONOMY

After witnessing a slowdown during 2011-12, the economy recovered in 2013-14, and a high growth rate of GDP was recorded in up to 2018-19. Pandemic of COVID-19 impacted all economies of world including India. Following figure show trend of GDP growth in India.

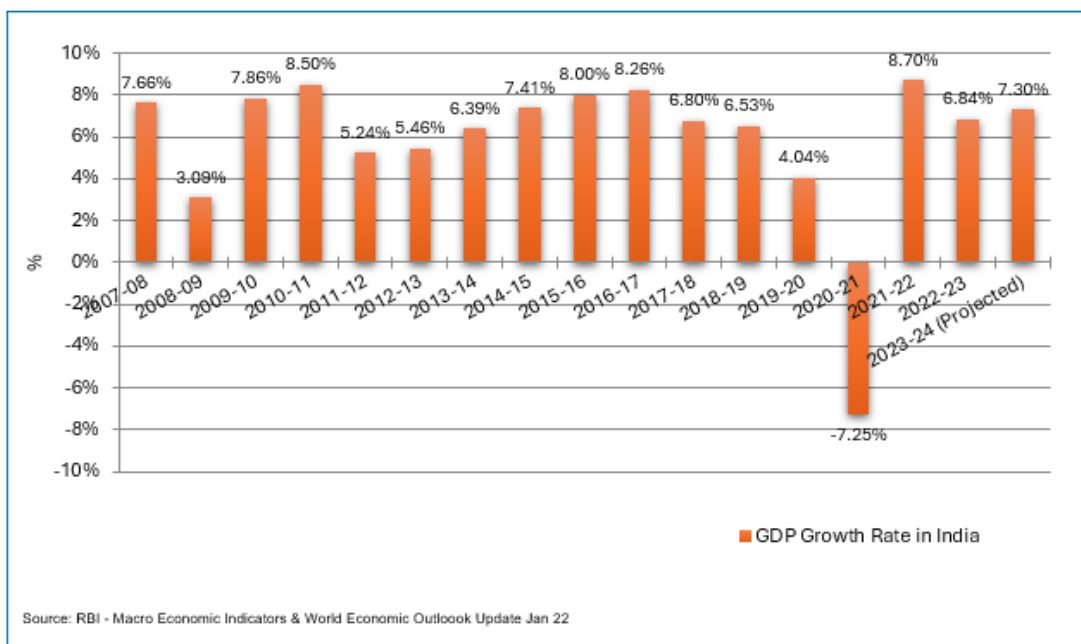


Figure 3-4 : Growth of GDP in India

FY 2017-18 recorded a growth of 6.7% which had a slight impact of GST and demonetization. Indian economy appears on recovery path with estimated growth of 6.8% in FY 2018-19. The government took major policy decisions including tax infrastructure reforming, banking sector improvement and ease of doing business.

Major economies of world collapsed due to pandemic COVID-19 including India. Indian economy is also registered negative growth in financial year 2020-21. After that Indian economy recovered handsomely and registered a growth of about 9% in Year 2021-22. This was partly due to low base of year 2020-21 as well.

3.6 Recommended Growth Rates of Traffic

Based on the above analysis and after giving due consideration to the entire listed factors, the following overall growth rates are recommended for each category of vehicle as below. The rate of growth is moderate in light of overall regional trends. Growth of multi-Axle is kept slightly higher as trend of technological advances in logistic industry favors multi-axle over 2/3 axle carriage. It is also expected that as the economy moves from developing to developed, the rate of growth diminishes. Same growth rate is not sustainable for long. It is an established practice to step down future growth rates at suitable interval of years.

Temporary disruptions caused by implementation of Goods and Service Tax (GST) and demonetization have dissipated, and growth of economy has significantly improved since then. Hence corridor can expect to have expected growth.

Growth rates are recommended for three scenarios for sensitivity analysis namely **Optimistic**, **Pessimistic** and **Most Likely** with a positive and negative variation 0.5% from Most Likely case.

Table 3-5 : Recommended Growth Rates Optimistic

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Car	6.53%	6.11%	5.64%	5.22%	4.51%
Minibus /LCV	5.43%	5.06%	4.75%	4.46%	4.22%
Truck / Bus	6.42%	5.84%	5.53%	4.96%	4.40%
Multi Axle	6.78%	6.17%	5.84%	5.24%	4.65%
Oversized Vehicles	6.42%	5.84%	5.53%	4.96%	4.40%

Table 3-6 : Recommended Growth Rates Pessimistic

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Car	6.03%	5.61%	5.14%	4.72%	4.01%
Minibus /LCV	4.93%	4.56%	4.25%	3.96%	3.72%
Truck / Bus	5.92%	5.34%	5.03%	4.46%	3.90%
Multi Axle	6.28%	5.67%	5.34%	4.74%	4.15%
Oversized Vehicles	5.92%	5.34%	5.03%	4.46%	3.90%

Table 3-7 : Recommended Growth Rates Most Likely

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Car	6.28%	5.86%	5.39%	4.97%	4.26%
Minibus /LCV	5.18%	4.81%	4.50%	4.21%	3.97%
Truck / Bus	6.17%	5.59%	5.28%	4.71%	4.15%

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Multi Axle	6.53%	5.92%	5.59%	4.99%	4.40%
Oversized Vehicles	6.17%	5.59%	5.28%	4.71%	4.15%

CHAPTER 4

TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in the previous section of the report are used to arrive at traffic projections for future years. Toll plaza wise futuristic traffic projection is given in tables below.

These projections have been done for the following three cases of growth.

1. Optimistic Scenario
2. Pessimistic Scenario
3. Most Likely Scenario

Table 4-1 : Total Tollable Traffic @ Toll Plaza 1- Chainage 142.800 KM
(Optimistic Growth Scenario)

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU (Including Non-Paid Traffic)
2025-26	7300	465	1708	2156	2	11631	22833
2026-27	7747	488	1808	2282	2	12327	24181
2027-28	8220	513	1913	2415	2	13063	25605
2028-29	8722	539	2024	2556	2	13843	27114
2029-30	9255	566	2142	2705	2	14670	28712
2030-31	9776	593	2260	2854	2	15485	30298
2031-32	10328	622	2384	3012	2	16348	31976
2032-33	10909	651	2516	3179	2	17257	33748
2033-34	11524	682	2655	3355	2	18218	35619
2034-35	12173	714	2802	3541	2	19232	37594
2035-36	12809	746	2941	3717	2	20215	39487
2036-37	13477	779	3087	3901	2	21246	41470
2037-38	14181	813	3240	4095	2	22331	43557

**Table 4-2 : Total Tollable Traffic @ Toll Plaza 1- Chainage 142.800 KM
(Pessimistic Growth Scenario)**

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU (Including Non-Paid Traffic)
2025-26	7265	463	1700	2146	2	11576	22726
2026-27	7672	484	1790	2260	2	12208	23947
2027-28	8102	506	1886	2380	2	12876	25238
2028-29	8557	529	1987	2507	2	13582	26602
2029-30	9037	553	2093	2641	2	14326	28039
2030-31	9501	576	2198	2774	2	15051	29451
2031-32	9990	601	2309	2914	2	15816	30941
2032-33	10503	626	2425	3061	2	16617	32501
2033-34	11042	653	2547	3215	2	17459	34139
2034-35	11610	680	2675	3377	2	18344	35861
2035-36	12158	707	2794	3528	2	19189	37486
2036-37	12732	734	2918	3686	2	20072	39183
2037-38	13333	763	3048	3851	2	20997	40960

**Table 4-3 : Total Tollable Traffic @ Toll Plaza 1- Chainage 142.800 KM
(Most Likely Growth Scenario)**

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU (Including Non-Paid Traffic)
2025-26	7282	464	1704	2150	2	11602	22774
2026-27	7708	486	1800	2270	2	12266	24061
2027-28	8160	509	1900	2397	2	12968	25419
2028-29	8638	534	2006	2531	2	13711	26856
2029-30	9144	559	2119	2672	2	14496	28373

Year	Car	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU (Including Non-Paid Traffic)
2030-31	9637	584	2230	2813	2	15266	29871
2031-32	10156	611	2348	2961	2	16078	31450
2032-33	10704	638	2472	3117	2	16933	33113
2033-34	11280	667	2602	3281	2	17832	34860
2034-35	11888	697	2739	3454	2	18780	36703
2035-36	12479	726	2868	3617	2	19692	38458
2036-37	13100	757	3003	3787	2	20649	40295
2037-38	13751	789	3144	3965	2	21651	42218

4.2 Modification in Concession Period

As per Article 29 of the concession agreement, if actual traffic on the project falls short or exceeds Target Traffic on project highway on defined date, concession period shall be modified subject to calculation stipulated therein. For Talegaon - Amravati project, the Target Date and Target Traffic are defined as under:

Target Date - 1st April 2020

Target Traffic - 41052 in PCU

It was observed that as per traffic projections, traffic volume falls short of target traffic in all scenarios. This warrants an extension of the envisaged concession period. Based on the above traffic estimate probable extension of concession period is worked out as per article 29 of concession agreement which is summarized as under –

Scenario	Projected Traffic in PCUs (average of traffic on target date, one year before target date and one year after target date)	Expected extension in Concession Period
All	24187	4.4 years

Due to the suspension in toll in the year FY17 because of demonetization for a period of 24 days, the Concessionaire would be entitled to an extension of an additional 24 days. Traffic was severely impacted on the project highway during the initial lockdown

period. NHAI has declared a policy of providing extension of concession to make up for revenue loss during lockdown. It is expected that an extension would be provided to the project concession period on this account also.

Hence, traffic and toll revenue projections have been worked out for additional 5 years beyond original concession period.

CHAPTER 5

FORECAST OF TOLL REVENUE

5.1 General

This chapter presents the tolling rate calculations, categories and toll revenue of the project.

5.2 Discount Categories

As per the Toll Notification (Schedule R) the following discounts have been considered:

1. Monthly Pass: For frequent users, monthly pass is issued for 50 trips per month. The discount factor works out to 33.33% for 50 journeys.
2. Daily Pass (for Return Trip): A 75% discount will be offered on the return trip.
3. Single Journey: Full single journey toll would be charged to this category of vehicles who are infrequent travelers or whose frequency does not yield any discount from the above categories.
4. Local Car / Jeep / Van to be charged at Rs 150 per month (2007)
5. Additionally, Concessionaire has introduced monthly rates for local commercial vehicles also.

Building of inflation and escalation of rate on the basis of WPI are done as per toll notification (Schedule R) as given under

The formula for determining the applicable rate of fee shall be as follows:-

$$\text{Applicable rate of fee} = \text{base rate} + \text{base rate} \times \left\{ \frac{\text{WPI A} - \text{WPI B}}{\text{WPI B}} \right\} \times 0.4$$

Factor of inflation / growth has been incorporated as per Schedule R. WPI are available up to 2021-22. A moderate growth in Wholesale Price Index (WPI) has been assumed after that. Following graph provides projection of rate of inflation (WPI) in India. Data has been taken from Office of Economic Advisor web site (www.eaindustry.nic.in). WPI for years 2017-18 and 2018-2019 is worked back by applying a correlation factor

for 2004-05 series as 2017-18 and 2018-2019 data is available in 2011-12 series only. Ratio of WPI for year 2016-17 for both series is used for conversion of WPI in 2004-05 series.

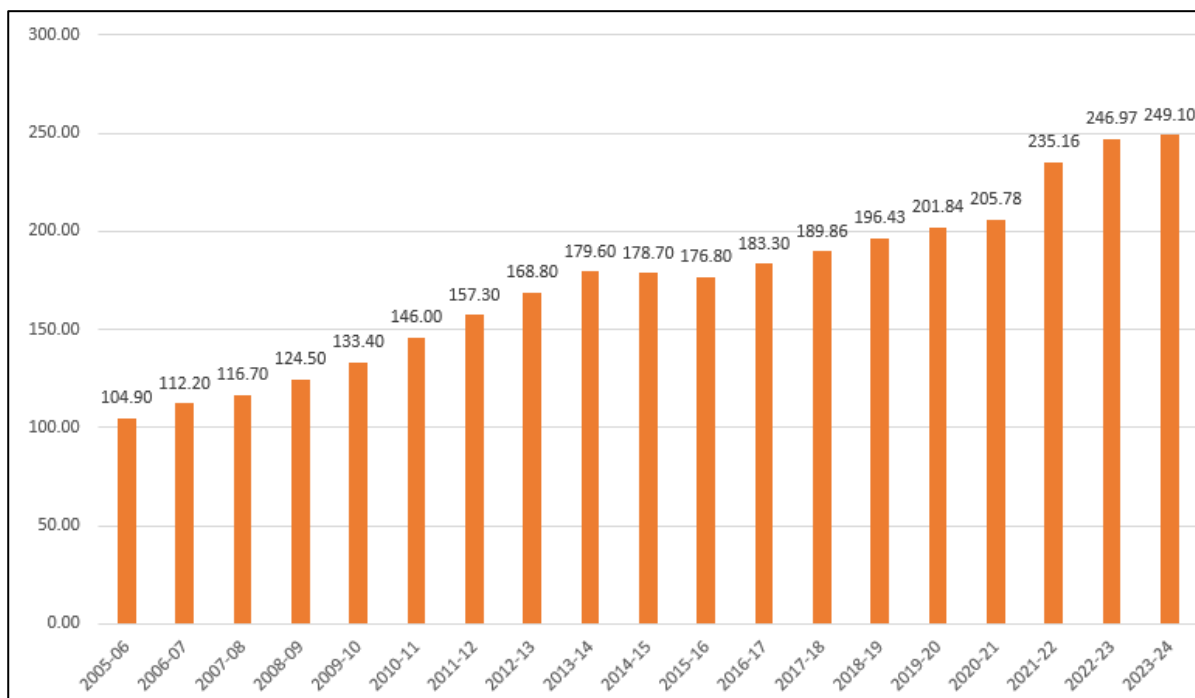


Figure 5-1 : Historical Rate of WPI Inflation in India

Except for the negative growth of WPI in the year 2015-16 average inflation in WPI from the year 2005-2024 is 4.98%. For future years initially it is considered @ 5% and suitably stepped down for future years.

5.3 Estimation of Toll Rates

As per the applicable MORTH notification and Schedule R of contract agreement, the following Base rate of fee for the categories mentioned in the table stands true in the National Highways Fee Rules, 2008.

Table 5-1 : Base Toll Rates 2007 - 08

Type of Vehicle	Base Rate of Fee / Km (in Rs.)
Car, Jeep, Van or Light Motor Vehicle	0.65
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.05
Bus or Truck (2 Axle)	2.2

Type of Vehicle	Base Rate of Fee / Km (in Rs.)
Three Axle commercial vehicles	2.4
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (4-6 axles)	3.45
Oversized Vehicle (seven or more axles)	4.2

Factor of inflation / growth has been incorporated as per Schedule R. WPI are available up to 2023-24.

Amravati bypass qualifies for adding to toll rate since its cost is more than 10 Cr. There is no structure in a project which qualifies for addition in toll rates.

Table 5-2 : Additional Rate for Amravati Bypass

Total Cost of Bypass	95.09 Cr	Length	17.43 km
Type of Vehicle	Base Rate for 15 Cr	Addition for every 5 Cr over 15 Cr	Rate 2007-08
Car/Jeep/Van	5.00	1.00	22
LCV	7.50	1.50	33
Bus	15.00	3.00	66
2-axle	15.00	3.00	66
3 - Axle	22.00	4.50	98.5
Multi Axle	30.00	6.00	132

The above table provides for rates applicable for accounting for bypass in toll rates. This has been incorporated in toll rates at Toll Plaza at Km 142.800 at Nandgaon Peth.

Other than this there is no structure or bypass which qualifies for additional toll rate at any toll plaza.

Toll rates are calculated as per guidelines provided in schedule R (rounded to nearest Rs. five) for the concession period and are given below.

Thus, worked out rates for various categories of vehicle and discounts are given as under.

Table 5-3 : Toll Rates for Single Journey @ KM 142.800

Year	Car	LCV	Truck / Bus	Multi Axle	Oversized Vehicles
2024-25	120	190	395	605	765
2025-26	130	200	415	635	805
2026-27	135	210	435	670	845
2027-28	140	220	455	705	885
2028-29	150	230	480	735	930
2029-30	155	245	500	770	975
2030-31	165	255	525	810	1020
2031-32	170	265	550	845	1070
2032-33	180	280	575	890	1120
2033-34	185	295	605	930	1175
2034-35	195	310	635	975	1235
2035-36	205	325	665	1025	1295
2036-37	215	340	700	1075	1355
2037-38	225	355	730	1125	1420

Table 5-4 : Toll Rates for Return Journey @ KM 142.800

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2024-25	185	285	590	910	1150
2025-26	190	300	620	955	1205
2026-27	200	315	650	1005	1265
2027-28	210	335	685	1055	1330
2028-29	220	350	715	1105	1395
2029-30	235	365	750	1155	1460
2030-31	245	385	790	1215	1530
2031-32	255	400	825	1270	1605
2032-33	270	420	865	1335	1680
2033-34	280	440	905	1395	1765
2034-35	295	460	950	1465	1850
2035-36	310	485	1000	1535	1940
2036-37	325	510	1045	1610	2035
2037-38	340	535	1100	1690	2135

Table 5-5 : Toll Rates for Monthly Pass @ KM 142.800

Year	Car - LP	LCV - LC	Truck/Bus - LC	Car	Minibus /LCV	Truck/Bus	Multi Axle	Oversized Vehicle
2024-25	340	2095	3930	4065	6375	13120	20200	25500
2025-26	355	2200	4125	4270	6695	13780	21220	26785
2026-27	375	2310	4330	4485	7035	14480	22290	28140
2027-28	390	2425	4545	4715	7390	15215	23425	29570
2028-29	410	2535	4750	4940	7745	15940	24540	30980

Year	Car - LP	LCV - LC	Truck/Bus - LC	Car	Minibus /LCV	Truck/Bus	Multi Axle	Oversized Vehicle
2029-30	430	2650	4965	5175	8115	16705	25720	32465
2030-31	450	2770	5190	5425	8505	17505	26950	34025
2031-32	475	2895	5425	5685	8915	18350	28250	35660
2032-33	495	3025	5670	5960	9345	19235	29610	37380
2033-34	520	3160	5925	6245	9800	20165	31045	39190
2034-35	545	3300	6190	6550	10275	21145	32550	41090
2035-36	570	3450	6470	6870	10775	22175	34135	43090
2036-37	600	3605	6760	7205	11300	23255	35800	45195
2037-38	630	3765	7065	7555	11850	24390	37555	47405

* LP- Local Passenger, LC – Local Commercial

5.4 Toll Revenue

As indicated earlier, toll revenue on the Project Road has been calculated under in all three scenarios. The estimates of toll revenue under *Optimistic*, *Pessimistic* and *Most Likely* growth scenarios are presented in the following section.

5.5 Toll Revenue at all toll plazas under Scenarios

Toll Revenue estimates under most likely scenario at each of the toll plaza up to 2037-38 (End of Concession Period+ 5 Years) starting from the year 2024-25 are shown in tables below.

Table 5-6 : Toll Revenue Optimistic Scenario
(Rs. Crores)

Year	Toll at Plaza 142.800	Total
2024-25	91.67	91.67
2025-26	102.01	102.01
2026-27	113.49	113.49
2027-28	126.45	126.45
2028-29	140.07	140.07
2029-30	155.48	155.48
2030-31	172.58	172.58
2031-32	190.24	190.24
2032-33	210.90	210.90
2033-34	232.10	232.10
2034-35	257.24	257.24
2035-36	284.66	284.66
2036-37	312.66	312.66
2037-38	343.75	343.75

Table 5-7 : Toll Revenue Pessimistic Scenario
(Rs. Crores)

Year	Toll at Plaza 142.800	Total
2024-25	91.67	91.67
2025-26	101.52	101.52
2026-27	112.40	112.40
2027-28	124.65	124.65
2028-29	137.41	137.41
2029-30	151.86	151.86
2030-31	167.81	167.81
2031-32	184.14	184.14
2032-33	203.20	203.20
2033-34	222.52	222.52
2034-35	245.52	245.52
2035-36	270.37	270.37
2036-37	295.54	295.54
2037-38	323.39	323.39

Table 5-8 : Toll Revenue Most Likely Scenario
(Rs. Crores)

Year	Toll at Plaza 142.800	Total
2024-25	91.67	91.67
2025-26	101.72	101.72
2026-27	112.93	112.93
2027-28	125.53	125.53

Year	Toll at Plaza 142.800	Total
2028-29	138.74	138.74
2029-30	153.64	153.64
2030-31	170.15	170.15
2031-32	187.13	187.13
2032-33	206.96	206.96
2033-34	227.22	227.22
2034-35	251.21	251.21
2035-36	277.31	277.31
2036-37	303.86	303.86
2037-38	333.28	333.28

CHAPTER 6

OPERATION & MAINTENANCE

6.1 Operation & Maintenance

The operation and maintenance cost of a project depends on a number of factors like quality of construction, response of maintenance team to early damage, local climate (rain etc.).

The future cost of operation and maintenance is estimated on a guess basis. Keeping all above factors in view, the following can be basis of working out cost of operation and maintenance for project corridor from Talegaon to Amravati on NH-6 in state of Maharashtra.

- a) **Annual Regular Maintenance** – Covering pothole repair, shoulder and slope repair, drain cleaning, median maintenance, Crash barrier, toll plaza maintenance, Toll collection, other services like medical help and rescue operations etc.
- b) **Periodic Maintenance** – This will be done on a periodic basis, say every 5 years. It will consist of overlaying of wearing course and painting and marking. Some pavement strengthening is also anticipated in a few sections. This operation and its cost are spread over three years.

Concessionaire has recently updated the program of maintenance of project road. Same has been reviewed and year-wise cost of O&M from year FY 2022-23 is given in table below.

Table 6-1 : O&M Cost

Year	Annual maintenance (Rs. Cr)	Thermoplastic painting (Rs. Cr)	Renewal Coat with BC (Rs. Cr.)	Special Repair of pavement	Structure maintenance. (Rs. Cr)	Electric System		Total Expenditure (Rs. Crores)	Remarks
						Annual	Periodic		
2024-25	12.45				0.02	0.59		17.49	Regular O & M
2025-26	12.45				0.02	0.59		18.37	Regular O & M
2026-27	12.45				0.02	0.59		19.29	Regular O & M
2027-28	12.45	1.47	16.36	4.58	0.02	0.59		55.01	Renewal of Wearing course + Pavement repair
2028-29	12.45	1.47	16.36	7.64	0.02	0.59		62.74	Renewal of Wearing course + Pavement repair
2029-30	12.45			2.29	0.02	0.59		26.25	Regular O & M
2030-31	12.45			2.29	0.02	0.59		27.56	Regular O & M
2031-32	12.45			2.29	0.02	0.59		28.94	Regular O & M
2032-33	12.45			2.29	0.02	0.59		30.38	Regular O & M

Year	Annual maintenance (Rs. Cr)	Thermoplastic painting (Rs. Cr)	Renewal Coat with BC (Rs. Cr.)	Special Repair of pavement	Structure maintenance. (Rs. Cr)	Electric System		Total Expenditure (Rs. Crores)	Remarks
						Annual	Periodic		
2033-34	12.45	1.47	16.36	9.16	0.02	0.59		83.25	Renewal of Wearing course + Pavement repair
2034-35	12.45	1.47	16.36	12.22	0.02	0.59		94.08	Renewal of Wearing course + Pavement repair
2035-36	12.45			2.29	0.02	0.59		35.17	Regular O & M
2036-37	12.45			2.29	0.02	0.59		36.93	Regular O & M

CHAPTER 7

CONCLUSION & RECOMMENDATIONS

7.1 Conclusion & Recommendations

Project stretch of Talegaon to Amravati section of NH-6 in state of Maharashtra from km 100.000 to km 166.725 is currently a four-lane road. The road is in sound condition and serves to stable traffic volumes. Project corridor is part of major east west connectivity National highway NH-6. There are many upcoming projects in the area which will boost economic growth of the area and add value to the development of the region. All these developments have potential to give a positive impact to traffic flow on the project. The following can be considered as major outcome of study.

- a) There is a good amount of tollable traffic running on the project.
- b) Project corridor has potential to witness traffic growth @ 6-8% annually post COVID-19 impact in the near future, further moderated by 1-2% in the longer term due to various development in area and overall development of economy.

The project infrastructure is in good condition and its maintenance cost is also reasonable.

Based on the above it can be considered a stable healthy project from the traffic and revenue point of view.

CHAPTER 8

PROJECT ILLUSTRATIONS

8.1 General

Project current condition has been depicted in the following photographs.



Figure 8-1 : General Condition



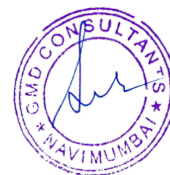
Figure 8-2 : Toll Plaza



Figure 8-3 : General Condition



Figure 8-4 : General Condition



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TUMKUR TO CHITRADURGA (KM 75.000 TO KM 189.000) SECTION OF NH-4 IN THE STATE OF KARNATAKA



TOLL REVENUE AND O&M COST PROJECTION REPORT (FINAL)



OCTOBER 2024



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Adding Value

**TUMKUR TO CHITRADURGA
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SECTION OF NH-4 IN THE STATE OF KARNATAKA**

**TOLL REVENUE AND O&M
COST PROJECTION REPORT
(FINAL)**

OCTOBER 2024



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ABBREVIATIONS

AADT	- Annual Average Daily Traffic	NHAI	- National Highways Authority of India
BOT	- Build Operate Transfer	NHDP	- National Highways Development Project
CAGR	- Compound Annual Growth Rate	NSDP	- Net State Domestic Product
CTV	- Classified traffic volume	O&M	- Operation & Maintenance
DBFOT	- Design, Build, Finance, Operate & Transfer	PCDP	- Per Capita Domestic Product
EME	- Earth Moving Equipment	PCI	- Per Capita Income
GDP	- Gross Domestic Product	PCU	- Passenger Car Unit
GSDP	- Gross State Domestic Product	PSC	- Pre-stressed Concrete
HCM	- Heavy Construction Machinery	RCC	- Reinforced cement concrete
HCV	- Heavy Commercial Vehicle	RHS	- Right Hand Side
HTMS	- Highway Traffic Management System	SH	- State Highway
IRC	- Indian Road Congress	TP	- Toll Plaza
IRR	- Internal Rate of Return	WPI	- Wholesale Price Index
LCV	- Light Commercial Vehicle	SIR	- Special Investment Region
LHS	- Left Hand Side	c.	- Circa
LGV	- Light Goods Vehicle	ROB	- Railway Over Bridge
MAV	- Multi Axle Vehicle	MDR	- Major District Road
MORTH	- Ministry of Road Transport and Highways	ODR	- Other District Road
NH	- National Highway	CA	- Concession Agreement
PCC	- Plain Cement Concrete	RMT	- Running Meter
CR	- Coarse Rubble		

CHAPTER 1

INTRODUCTION

1.1 Background

The Government of India through National Highway Authority of India (NHAI) embarked upon a program to enhance the traffic capacity and safety for efficient transportation of goods as well as passenger traffic on National Highway Sections under NHDP Phase V. Under Phase V NHAI has planned to convert 6,500 km of existing 4-lane National Highways into 6-lane National Highway. Sections envisaged under 6-laning comprise the Golden Quadrilateral section (5,700 km) and some other sections which are 800 km in length.

The project under consideration, Tumkur - Chitradurga Section of NH-4 is one such road project NHAI intended to implement on a BOT basis in the DBFOT format. M/s *IRB Tumkur Chitradurga Tollway Ltd.* (Concessionaire) has been awarded the Project for concession period of 26 years starting from June 4th, 2011, to June 3rd, 2037. The Project has been commissioned and is currently in the operation / maintenance phase.

1.2 Objective of the Study

M/s IRB INVIT FUND has engaged GMD Consultants to assess the future traffic and toll potential of the project along with related operation & maintenance expenditure involved.

This report named as “*Toll Revenue and O&M Cost Projection Report*” mainly focuses on traffic and O&M aspects of the project. Other parameters like competing road, area developments etc. have been considered from a traffic development point of view.

1.2.1 Scope of Services

The broad scope of work covered in the assignment is as follows.

- a) Analysis of Traffic Growth
- b) Toll Rate Growth
- c) Revenue Forecasting
- d) Operation and Maintenance Cost Projections

The Concessionaire has provided basic historical traffic data and other project details on the basis of which the above analysis has been carried out, after applying our judgment to the traffic estimates.

“Toll Revenue and O&M Cost Projection Report” was submitted in March 2017. In this report traffic data of year 2015-16 was used as base traffic. The report was updated with traffic data for the year 2016-17 and the report was submitted in October 2017. The report was further updated with traffic data of 2017-18 and same was submitted in April 2018. The report was further updated with traffic Data of the period from April 2018 to September 2018 and was submitted in October 2018. A revised report was submitted with updated traffic for the years 2018-19 in April 2019. With traffic data from April 2020 to March 2021 report was updated report was further updated with yearly traffic data from April 2021 to March 2022, April 2022 to March 2023, April 2023 to March 2024 and now concessionaire has provided traffic data from April 2024 to September 2024 report is updated taking this latest traffic data into consideration.

CHAPTER 2

TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Surveys

In the course of our work, we have collected the required information for project corridor to understand the general traffic and travel characteristics of the corridor.

The following traffic data has been collected for the project.

- Classified traffic volume counts at the two toll plaza locations on Tumkur-Chitradurga section of NH-4 for base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and Six-Monthly traffic data from April 2024 to September 2024.
- Local Component of traffic
- Component of Return Journey
- Component of Monthly Pass Journey

The main objective of the traffic data analysis is to:

- Determine the existing traffic movement characteristics of project.
- Establish base year traffic.
- Identification of travel patterns and modal split of project traffic
- Deriving growth factors for traffic forecasting
- Estimation of corridor traffic including traffic diversion if any
- Preparation of revenue model and projection of revenue as per toll policy for various scenarios

The project can be divided into two homogenous sections from a traffic point of view.

These sections can be.

1. Chitradurga to Sira
2. Sira to Tumkur

Traffic of both sections is represented by toll plaza in each section.

Table 2-1 below lists provides details of locations from where traffic details have been collected.

Table 2-1 : Traffic Survey Locations

Sr. No.	Location	CTV	Single Journey Traffic	Return Journey Traffic	Monthly Pass Traffic	Local Traffic
1	Km 172.770 Toll Plaza (Guilalu)	AADT for Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016
		AADT for year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017
		AADT for year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018
		AADT for year 2018-19	For year 2018-19	For year 2018-19	For year 2018-19	For year 2018-19
		AADT for year 2019-20	For year 2019-20	For year 2019-20	For year 2019-20	For year 2019-20
		AADT for year 2020-21	For year 2020-21	For year 2020-21	For year 2020-21	For year 2020-21
		AADT for Year 2021-22	For Year 2021-22	For Year 2021-22	For Year 2021-22	For Year 2021-22
		AADT for Year 2022-23	For Year 2022-23	For Year 2022-23	For Year 2022-23	For Year 2022-23
		AADT for Year 2023-24	For Year 2023-24	For Year 2023-24	For Year 2023-24	For Year 2023-24
		Six Monthly Data from April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24
2	Km 104.530 Toll Plaza (Karjeevanhalli)	AADT for Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016
		AADT for year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017
		AADT for year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018
		AADT for year 2018-19	For year 2018-19	For year 2018-19	For year 2018-19	For year 2018-19

Sr. No.	Location	CTV	Single Journey Traffic	Return Journey Traffic	Monthly Pass Traffic	Local Traffic
		AADT for year 2019-20	For year 2019-20	For year 2019-20	For year 2019-20	For year 2019-20
		AADT for year 2020-21	For year 2020-21	For year 2020-21	For year 2020-21	For year 2020-21
		AADT for Year 2021-22	For Year 2021-22	For Year 2021-22	For Year 2021-22	For Year 2021-22
		AADT for Year 2022-23	For Year 2022-23	For Year 2022-23	For Year 2022-23	For Year 2022-23
		AADT for Year 2023-24	For Year 2023-24	For Year 2023-24	For Year 2023-24	For Year 2023-24
		Six Monthly Data from April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24

The locations of each of the traffic surveys are illustrated in Figure 2-1.

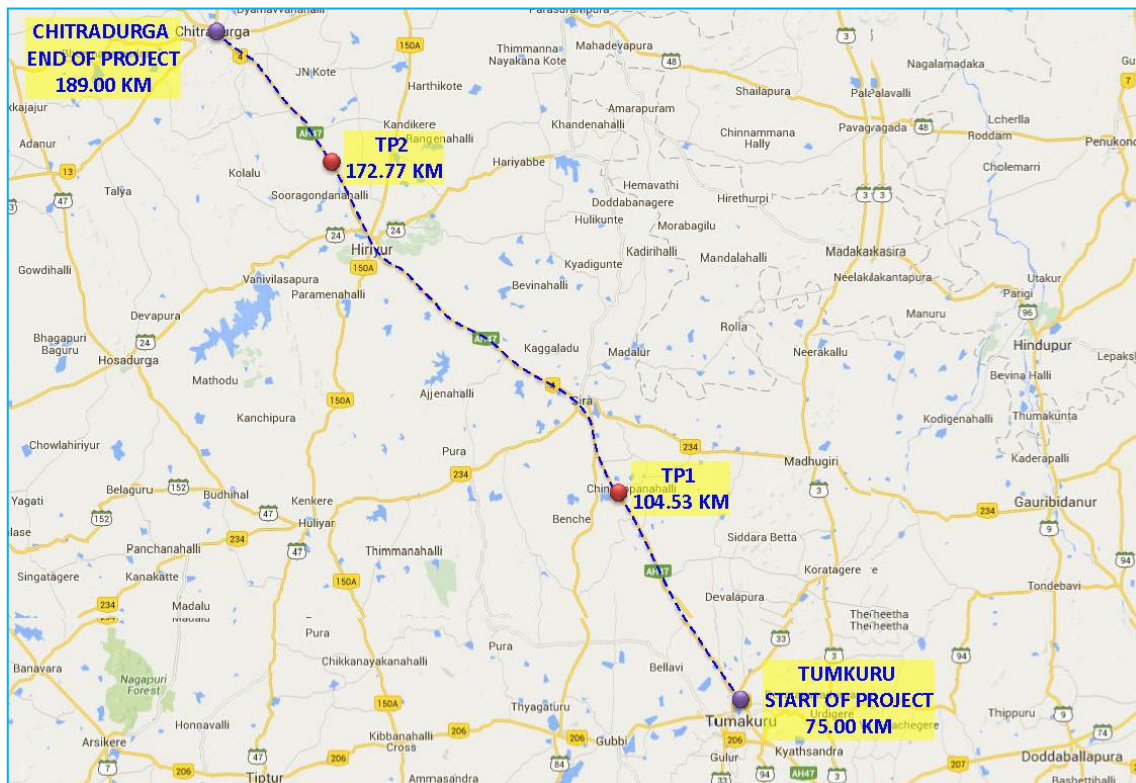


Figure 2-1: Traffic Survey Locations

2.2 Classified Traffic Volume Count

The objective of conducting a Classified Traffic Volume Count is to understand the traffic flow pattern including modal split on a roadway. The Classified Traffic Volume Count survey has been provided by concessionaire of project highway from actual traffic data gathered at toll plaza locations based on monthly data shared with NHAI. These locations were indicated in *Figure 2-1* and listed in *Table 2-1*.

The vehicles can broadly be classified into fast moving / motorized and slow moving / non-motorized vehicles, which can be further classified into specific categories of vehicles. The groupings of vehicles are further segregated to capture the tollable vehicle categories specifically and toll exempted vehicles are counted separately. The detailed vehicle classification system as per IRC: 64-1990 is given in *Table 2-2*.

Table 2-2 : Vehicle Classification System

Vehicle Type	
Auto Rickshaw	
Passenger Car	Car, Jeep, Taxi & Van (Old / new technology)
Bus	Minibus
	Standard Bus
Truck	Light Goods Vehicle (LCV)
	2 – Axle Truck
	3 Axle Truck (HCV)
	Multi Axle Truck (4-6 Axle)
	Oversized Vehicles (7 or more axles)
Other Vehicles	Agriculture Tractor, Tractor & Trailer

Source - IRC: 64 – 1990

However, since the project highway is currently under toll operation, the data collected corresponds to the category of tollable vehicles. The following are the types of vehicles as per the Concession Agreement.

- Car / Jeep / Van
- LCV
- Truck / Bus
- HCM/ EME/ MAV

2.3 Traffic Characteristic

Toll revenue of the project highway does not solely depend on traffic volume. There are certain characteristics of traffic which have significant potential to affect toll revenue. Components of local traffic, component of passenger and commercial traffic, portion of return journey traffic, portion of monthly pass traffic are some such characteristics of traffic. These will be discussed in subsequent sections of this report.

2.3.1 Traffic Data

The Concessionaire has provided Traffic data for base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and from April 2024 to September 2024.

Since the traffic data available for this update is for Six months, from April 2024 to September 2024, it may not represent the whole year traffic. Hence a seasonality factor for balance part of year has been applied to average traffic of current four months to arrive at Annual Average Daily Traffic of base year 2024-25. Same corrected traffic is used for future projections and revenue calculations. The following table shows historical traffic on project stretch and derived Annual Average Daily Traffic (AADT) for year 2024-25.

Table 2-3 : Traffic Data at Toll Plaza at Km 172.770

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2018-19	Annual Average Daily Traffic (Nos.) FY 2019-20	Annual Average Daily Traffic (Nos.) FY 2020-21	Annual Average Daily Traffic (Nos.) FY 2021-22	Annual Average Daily Traffic (Nos.) FY 2022-23	Annual Average Daily Traffic (Nos.) FY 2023-24	Annual Average Daily Traffic (Nos.) FY 2024-25
1	Car	5244	5560	7633	11046	12943	13427	14293
2	LCV	2918	2752	2652	2006	2079	2206	2319
3	Truck/Bus	3157	3167	2631	3423	4395	5015	5559
4	HCM /EME/ MAV	5748	5033	4968	5831	6359	6293	6612
5	Oversized Vehicles	31	37	14	15	25	331	127
	Total	17099	16548	17898	22322	25801	27272	28910

Similar traffic data for toll plaza at Km 104.530 is given as under

Table 2-4 : Traffic Data at Toll Plaza at Km 104.530

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2018-19	Annual Average Daily Traffic (Nos.) FY 2019-20	Annual Average Daily Traffic (Nos.) FY 2020-21	Annual Average Daily Traffic (Nos.) FY 2021-22	Annual Average Daily Traffic (Nos.) FY 2022-23	Annual Average Daily Traffic (Nos.) FY 2023-24	Annual Average Daily Traffic (Nos.) FY 2024-25
1	Car	6855	7664	10224	8597	10272	11069	11958
2	LCV	3401	3237	3103	1803	1916	2030	2154
3	Truck/Bus	3888	3896	3133	3005	3912	4429	4860
4	HCM /EME/ MAV	6656	5833	5617	5305	5811	5774	6113
5	Oversized Vehicles	35	45	18	15	31	227	98
	Total	20834	20675	22094	18725	21942	23528	25183

2.4 Data Analysis

2.4.1 Analysis of Traffic Volume Count

Understanding the character of existing traffic forms the basis of traffic forecast. The various vehicle types having different sizes and characteristics can be converted into a single unit called Passenger Car Unit (PCU). Passenger Car equivalents for various vehicles are adopted based on recommendations of Indian Road Congress prescribed in “IRC-64-1990: Guidelines for Capacity of Roads in Rural areas”. The adopted passenger car unit values (PCU) are presented in **Table 2-5**.

Table 2-5 : PCU Factors Adopted for Study

Vehicle Type	PCUs
Car	1.0
Minibus	1.5
Standard Bus	3.0
LCV/LGV	1.5
2 Axle Truck	3.0
3 – 6 Axle Truck	4.5
MAV	4.5

Vehicle Type	PCUs
Auto Rickshaw	1.0
Van/Tempo	1.0
Agriculture Tractor with Trailer	4.5
Agriculture Tractor without Trailer	1.5

Source: IRC: 64-1990

Traffic volume at each toll plaza was converted to PCU and same is presented as under.

Table 2-6 : Traffic in PCU at both Toll Plazas

Toll Plaza Location	Period	Traffic No	PCU	PCU Index
172.770	FY 2015-16	14885	40661	2.73
	FY 2016-17	15460	41587	2.69
	FY 2017-18	16451	43474	2.64
	FY 2018-19	17099	45099	2.64
	FY 2019-20	16548	42002	2.54
	FY 2020-21	17898	41923	2.34
	FY 2021-22	22322	50632	2.27
	FY 2022-23	25801	57974	2.25
	FY 2023-24	27272	61590	2.26
	FY 2024-25	28910	64774	2.24
104.530	FY 2015-16	17678	48037	2.72
	FY 2016-17	18782	49471	2.63
	FY 2017-18	19826	51585	2.60
	FY 2018-19	20834	53728	2.58
	FY 2019-20	20675	50659	2.45
	FY 2020-21	22094	49634	2.25
	FY 2021-22	18725	44256	2.36
	FY 2022-23	21942	51171	2.33
	FY 2023-24	23528	54404	2.31
	FY 2024-25	25183	57718	2.29

It can be observed from the above that project traffic has a PCU index near 2.5 which indicates a good mix of commercial and passenger traffic.

2.4.2 Components of Traffic

As discussed previously, components of traffic volume play an important role in determining project revenue. A Larger component of commercial traffic with higher axle configuration adds to project revenue positively. Similarly, a larger component of local traffic affects the project revenue potential negatively.

For the purpose of analysis, the recent traffic numbers for the period April 2024 to September 2024 have been considered as the base numbers.

It is observed that at Toll KM 172.770 Car traffic forms 50% of total traffic while HCM / EME / MAV comprises 24% of total traffic. Overall, about 50% of traffic is commercial in nature, and at Toll KM 104.530 Car traffic forms 48% of total traffic while HCM / EME / MAV comprises 24% of total traffic. Overall, about 52% of traffic is commercial in nature.

Another important bifurcation of traffic is components of traffic with respect to various types of toll ticketing.

1. Single Journey
2. Return Journey
3. Local Single Journey (Concessionaire provided special tariff for this category)
4. Monthly Pass Journey

The following table provides numbers of vehicles falling in each of the above categories.

Table 2-7 : Journey Type Bifurcation of Traffic at KM 172.770

Sr. No	Type	Traffic Volume (Nos.) for FY 2018-19	Traffic Volume (Nos.) for FY 2019-20	Traffic Volume (Nos.) for FY 2020-21	Traffic Volume (Nos.) for FY 2021-22	Traffic Volume (Nos.) for FY 2022-23	Traffic Volume (Nos.) for FY 2023-24	Traffic Volume (Nos.) for FY 2024-25
1	Single Journey	13370	12845	14512	15558	18017	18741	19689
2	Return Journey	3332	3356	3074	6724	7740	8488	9192
3	Local Single Journey	185	128	150	18	22	23	16
4	Monthly Pass	212	219	162	22	22	20	13

A significant part of the traffic at KM 172.770 is single journey (68%) followed by return journey (32%) with a very low component of local single journey and monthly pass traffic.

Similarly, traffic numbers for type of journey at KM 104.530 are given in following table.

Table 2-8 : Journey Type Bifurcation of Traffic at KM 104.530

Sr. No	Type	Traffic Volume (Nos.) for FY 2018-19	Traffic Volume (Nos.) for FY 2019-20	Traffic Volume (Nos.) for FY 2020-21	Traffic Volume (Nos.) for FY 2021-22	Traffic Volume (Nos.) for FY 2022-23	Traffic Volume (Nos.) for FY 2023-24	Traffic Volume (Nos.) for FY 2024-25
1	Single Journey	15053	14807	16990	13821	16220	17209	18257
2	Return Journey	4820	4910	4456	4782	5632	6242	6870
3	Local Single Journey	387	385	316	65	73	64	49
4	Monthly Pass	574	573	332	57	15	13	7

A significant part of the traffic at KM 104.530 is single journey (73%) followed by return journey (27%) with a very low component of local single journey and monthly pass traffic.

Here too it was observed that single journey is the most dominant component of traffic consistent across entire length of the project highway.

2.5 Secondary Data Collection

There are several other factors which have substantial impact on traffic pattern and growth on any project corridor. The following are some of such important factors.

- Industrial development around project corridor and its catchment
- Educational infrastructure along project corridor
- Demographic pattern
- Urban area development
- Tourism potential
- Upcoming major infrastructural or Industrial projects
- Special Industry in project corridor
- Overall trends of economic growth local as well as national / regional

Hence in addition to traffic details on the project site, secondary data was also collected from the various sources. Typical secondary data includes the following:

1. Vehicle registration data of regional and national level.
2. Economic Data
 - a) GDP
 - b) NSDP

- c) Population Growth
- d) Per Capita Income growth
- e) Industrial Growth
- f) Special Industry Potential
- g) Regional and National development vision / plan
- h) Any other relevant data

CHAPTER 3

GROWTH OF TRAFFIC ON PROJECT HIGHWAY

3.1 Introduction

Traffic growth is a function of the interplay of a number of contributory factors such as National economy, Government policy, socio-economic conditions of the people, and changes in land uses along the project corridor precincts etc. As these factors have a number of uncertainties associated with them, forecasts of traffic are dependent on the forecasts of factors such as population, gross domestic product (GDP), vehicle ownership, per capita income (PCI), agricultural output, fuel consumption etc. Future patterns of change in these factors can be estimated with only a reasonable degree of accuracy and hence the resultant traffic forecast levels may not be precise.

Traffic growth forecast for project corridor viz. Tumkur – Chitradurga section of NH-4 has been done after taking the above factors into consideration. “**IRC: 108-2015-Guidelines for Traffic Prediction on Rural Highways**” is established best practice and has been used for traffic growth forecast.

3.2 Trend Analysis

One of the methods of estimation of future rate of traffic growth is to assume the same rate of growth as experienced in the past. However, it may be noted that major influencing factors which reflect Economic conditions such as GDP, agricultural output, industrial output, national policies etc. are susceptible to change over a longer period of time and necessary adjustments need to be made to past trends to account for these changes.

Elasticity model of growth projection is one of the most widely acceptable methods for traffic forecast. The same is recommended in **IRC: 108-2015-Guidelines for Traffic Prediction on Rural Highways**.

In this method past trends of any vehicular data are paired with an economic indicator and a regression analysis is done to yield the economic model of growth. Growth of vehicle traffic varies for different types of vehicles. It is a proven fact that growth patterns for passenger and goods vehicles are different. Traffic growth on any highway typically depends on a number of economic parameters. The most important and direct parameters are given as under

- Per Capita Income

- Net State Domestic Product (NSDP)
- Population

It is observed that the ownership of a car is more closely related to affordability hence per capita is the index which closely fits with growth of car traffic among other criteria. In similar fashion, the following pairs of vehicle type and independent variable can be established for elasticity modeling of growth.

- Car / Jeep – Par Capita Income
- Bus / Minibus – Population
- Trucks / Heavy / Goods Vehicle – NSDP

Time series data of vehicles (both passenger and goods) Registered in state of Karnataka is used as the base data for analysis of growth.

3.3 Estimation of Traffic Demand Elasticity

The elasticity of traffic demand is defined as the rate at which traffic intensity varies due to change in the corresponding indicator selected. Hence, in order to estimate the elasticity of traffic demand, it is necessary to establish the relationship between the growth in number of given categories of vehicle with one of the economic variables considered, such as NSDP, per capita income and population growth. Latest available data for vehicle registration, per capita income, NSDP and population is used in analysis.

As per IRC: 108-2015 the model for estimating elasticity index for the project corridor is of the following form and is as given below:

$$\text{Log}(P) = k \times \text{Log}(EI) + A$$

Where,

$$P = \text{Number of Vehicles (Mode wise)}$$

$$EI = \text{Economic Indicator}$$

$$A = \text{Regression constant}$$

$$k = \text{Elasticity coefficient (Regression coefficient)}$$

The elasticity for cars and buses (passenger vehicles) is calculated based on the Population and Per Capita Domestic Product (PCDP) respectively and the elasticity for trucks is calculated based on the Net State Domestic Product (NSDP).

The following tables and graphs depict regression and elasticity of growth model.

Table 3-1 : Per Capita Income Vs Car

Year	PCI	Car	Log PCI	Log Car	PCI Growth	Average Growth
2011	40699	1131201	4.61	6.05		
2012	41492	1269430	4.62	6.10	2%	
2013	43266	1420767	4.64	6.15	4%	
2014	46012	1572521	4.66	6.20	6%	
2015	48907	1741831	4.69	6.24	6%	4.7%

Regression analysis PCI Vs Car data is presented in the figure below.

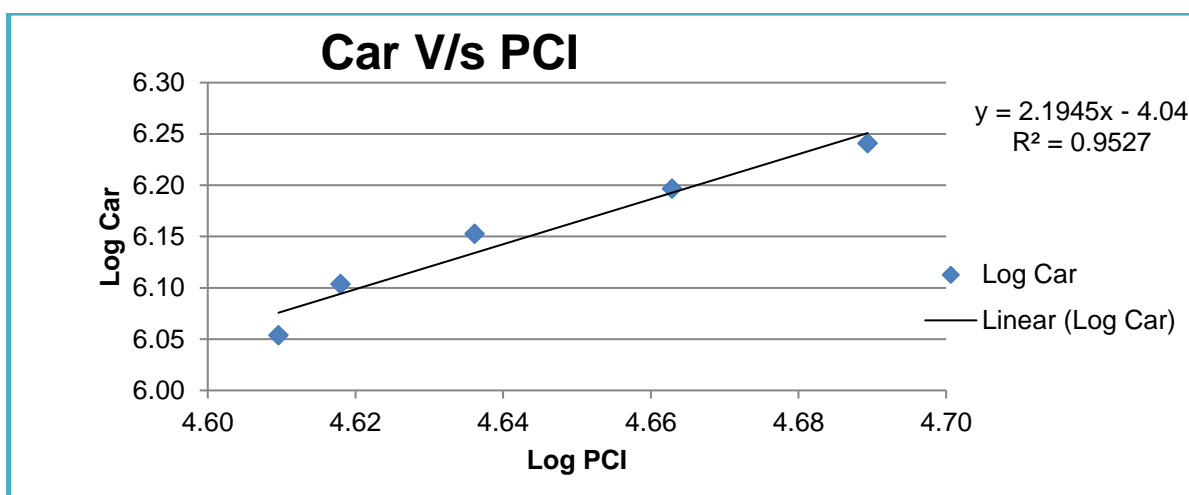


Figure 3-1: Regression and Elasticity PCI vs. Car–Extrapolation

Table 3-2 : Population Vs Bus

Year	Population	Buses	Log Pop	Log Bus	Pop Growth	Average Growth
2011	61095297	58012	7.79	4.76		
2012	62058777	62501	7.79	4.80	2%	
2013	63017877	69718	7.80	4.84	2%	
2014	63972322	75529	7.81	4.88	2%	
2015	64921845	80911	7.81	4.91	1%	1.53%

Regression analysis of population Vs. Bus Traffic is presented in figure below.

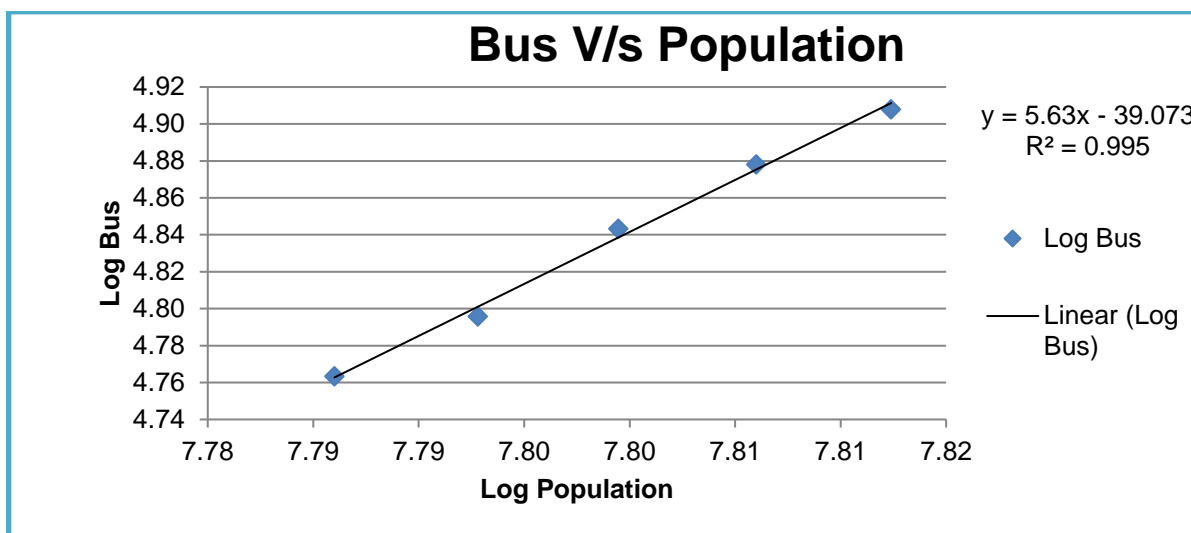


Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

Elasticity of goods traffic demand has been worked out by regression analysis with NSDP. The following table represents the data and details.

Table 3-3 : Goods Traffic Vs NSDP

Year	NSDP	Trucks	Log NSDP	Log Truck	NSDP Growth	Average Growth
2011	24081677	415491	7.38	5.62		
2012	24804028	454582	7.39	5.66	3%	
2013	26125013	506340	7.42	5.70	5%	
2014	28056052	555255	7.45	5.74	7%	
2015	30107076	606352	7.48	5.78	7%	5.76%

The following figure depicts regression analysis and extrapolation of NSDP vs. goods traffic.

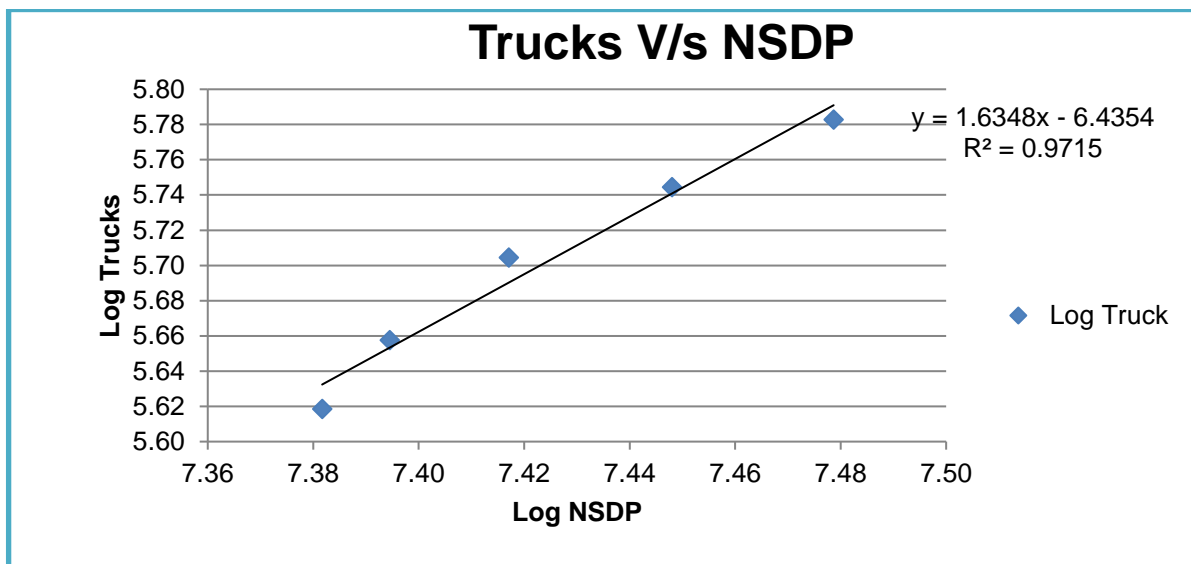


Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation.

Using the regression analysis above, we have arrived at the elasticity of traffic demand for each class of vehicle to a given change in relevant economic indicators. Average traffic growth of a vehicle class is multiplied by the corresponding elasticity coefficient to arrive at traffic growth. R^2 is statistical measure of how close the data are to the fitted regression line. It varies from 0 to 1. The higher the value of R^2 more representative is the regression model of data.

The results of these analyses for the good fit as reflected by R^2 values are presented in the Table below.

Table 3-4 : Summary Regression Analysis

State	Vehicle Category	Independent Variable	Regression Equation	R Square	Elasticity Coefficient	Average Growth	Growth Elastic Model
Karnataka	Car/Jeep	PCI	$y = 2.1945x - 4.04$	$R^2 = 0.9527$	2.1945	4.72%	10.35%
	Bus	Population	$y = 5.63x - 39.0727$	$R^2 = 0.995$	5.6300	1.53%	8.62%
	Truck	NSDP	$y = 1.6348x - 6.4354$	$R^2 = 0.9715$	1.6348	5.76%	9.41%

While the economic model for predicting growth is a good tool, other local, regional, national factors such as proposed developments etc. should also be considered before finalizing growth factors. These factors are discussed in subsequent sections.

3.4 Analysis of Historic Traffic Data

Traffic growth on a particular section of the highway depends on a number of factors. Some of these are local and some have regional or national context. Regional or national economic development has a marked impact on traffic growth. Still, historical traffic volume data at the project highway provides a meaningful insight into traffic development on the corridor.

Recently there has been tremendous up-gradation in the logistics industry in terms of processes, technology and mode of transportation. Improvement in road networks has opened the way for larger freight vehicles to be used for transportation of goods. This has added substantial value to logistical operations all across the country. It has been observed that the volume of the typical 2 Axle truck has reduced and multi axle trucks or larger size have come in their place. This phenomenon is observed at project highway under study as well.

The following historical traffic data have been used for our analysis.

- a) Traffic Numbers provided in Contract document pertaining to year 2008.
- b) Traffic Numbers provided in Report of Lea Associates pertaining to year 2010.
- c) Traffic Numbers provided in by concessionaire pertaining to year 2016 to year upto March 2024

Traffic numbers pertaining to tollable category of contract have been compared.

The following tables provide historical traffic numbers at both toll plaza locations i.e., at Km 104.530 (Near Sira) and Km 172.770 (Near Chitradurga)

Table 3-5 : Historical Traffic Volume at Sira

Location	Year										
	2007-08	2009-10	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
At Sira											
Car	2571	3061	6203	6577	6855	7664	10224	8597	10272	11069	11958
LCV	493	1462	2581	2999	3401	3237	3103	1803	1916	2030	2154
Truck/Bus	9211	4386	3727	3743	3888	3896	3133	3005	3912	4429	4860
HCM/EME/MAV	524	5498	6140	6464	6656	5833	5617	5305	5811	5774	6113
Oversized Vehicles	0	0	130	43	35	45	18	15	31	227	98
Total	12799	14407	18782	19826	20834	20675	22094	18725	21942	23528	25183

Location	Year										
	2007-08	2009-10	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
At Chitradurga											
Car	1664	2356	4803	5261	5244	5560	7633	11046	12943	13427	14293
LCV	385	1475	2237	2514	2918	2752	2652	2006	2079	2206	2319
Truck/Bus	7907	9628	2976	3066	3157	3167	2631	3423	4395	5015	5559
HCM /EME/MAV	524	564	5365	5563	5748	5033	4968	5831	6359	6293	6612
Oversized Vehicles	0	0	80	46	31	37	14	15	25	331	127
Total	10480	14023	15460	16451	17099	16548	17898	22322	25801	27272	28910

Table 3-6 : Historical Traffic Volume at Chitradurga

3.5 Other Factors Influencing Growth

There are many factors which have an impact on traffic growth. As discussed previously these factors can be economic, social, educational, and industrial.

Potentiality of such factors for project highway is discussed as under.

Economy

After witnessing a slowdown during 2011-12, the economy recovered in 2013-14, and a high growth rate of GDP was recorded in up to 2018-19. Pandemic of COVID-19 impacted all economies of world including India. Following figure show trend of GDP growth in India.

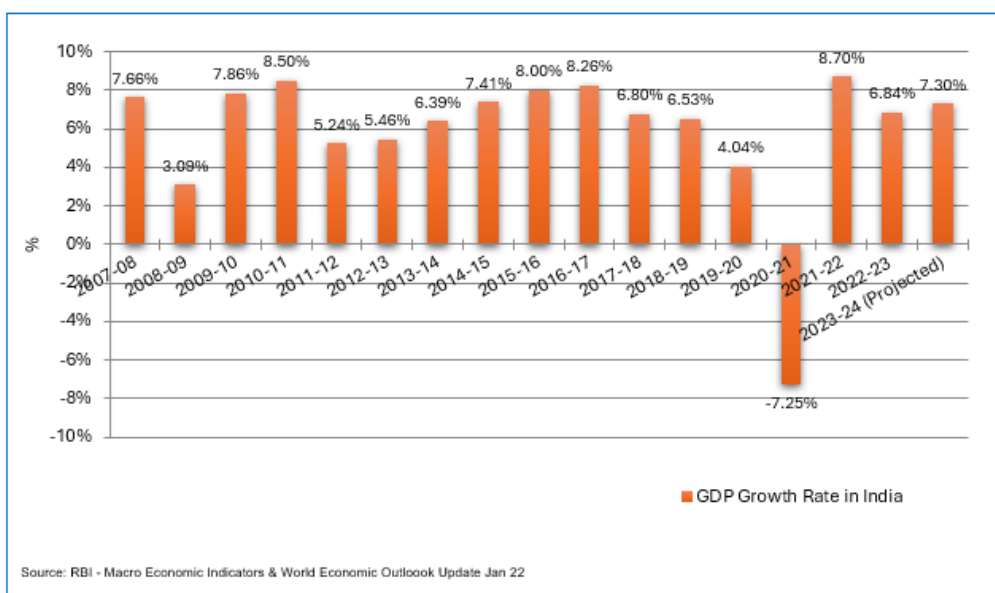


Figure 3-4 : Growth of GDP in India

FY 2017-18 recorded a growth of 6.7% which had a slight impact of GST and demonetization. Indian economy appears on recovery path with estimated growth of 6.8% in FY 2018-19. The government took major policy decisions including tax infrastructure reforming, banking sector improvement and ease of doing business.

Major economies of world collapsed due to pandemic COVID-19 including India. Indian economy is also registered negative growth in financial year 2020-21. After that Indian economy recovered handsomely and registered a growth of about 9% in Year 2021-22.

3.6 Recommended Growth Rates of Traffic

The rate of growth is moderate in light of overall regional trends. Growth of multi-Axle is kept slightly higher as trend of technological advances in logistic industry favors multi-axle over 2/3 axle carriage. It is also expected that as the economy moves from developing to developed, the rate of growth diminishes. Same growth rate is not sustainable for long. It is an established practice to step down future growth rates at suitable intervals of the year.

Temporary disruptions caused by implementation of Goods and Service Tax (GST) and demonetization have dissipated, and growth of economy has significantly improved since then. Hence corridor can expect to have expected growth.

Growth rates are recommended for three scenarios for sensitivity analysis namely **Optimistic**, **Pessimistic** and **Most Likely** with a positive and negative variation 0.5% from Most Likely case.

Based on the above analysis and after giving due consideration to the entire listed factors, the following overall growth rates are recommended for each category of vehicle as below.

Table 3-7 : Recommended Growth Rates in an Optimistic Scenario

Year/ Vehicle Type	2025-30	2030-35	2035-40	2040-45
Car	5.66%	5.21%	4.61%	3.94%
LCV	6.05%	5.59%	5.16%	4.80%

Year/ Vehicle Type	2025-30	2030-35	2035-40	2040-45
Truck / Bus	5.26%	4.85%	4.44%	4.04%
HCM /EME/ MAV	6.03%	5.55%	5.09%	4.63%
Oversized Vehicles	6.61%	6.08%	5.57%	5.06%

Table 3-8 : Recommended Growth Rates in a Pessimistic Scenario

Year/ Vehicle Type	2025-30	2030-35	2035-40	2040-45
Car	5.16%	4.71%	4.11%	3.44%
LCV	5.55%	5.09%	4.66%	4.30%
Truck / Bus	4.76%	4.35%	3.94%	3.54%
HCM /EME/ MAV	5.53%	5.05%	4.59%	4.13%
Oversized Vehicles	6.11%	5.58%	5.07%	4.56%

Table 3-9 : Recommended Growth Rates in a Most Likely Scenario

Year/ Vehicle Type	2025-30	2030-35	2035-40	2040-45
Car	5.41%	4.96%	4.36%	3.69%
LCV	5.80%	5.34%	4.91%	4.55%
Truck / Bus	5.01%	4.60%	4.19%	3.79%
HCM /EME/ MAV	5.78%	5.30%	4.84%	4.38%
Oversized Vehicles	6.36%	5.83%	5.32%	4.81%

CHAPTER 4

TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in the previous section of the Report are used to arrive at traffic projections for future years. Traffic projections at the respective toll plazas are presented in the tables below.

These projections have been done for following three growth scenarios:

1. Optimistic Scenario
2. Pessimistic Scenario
3. Most Likely Scenario

**Table 4-1 : Total Tollable Traffic @ Toll Plaza 1- Chainage 172.770 KM
(Optimistic Growth Scenario)**

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles	Total No.	Total PCU
2025-26	15102	2459	5852	7010	135	30558	68499
2026-27	15957	2607	6160	7432	143	32299	72435
2027-28	16861	2765	6484	7880	152	34142	76605
2028-29	17816	2932	6826	8355	161	36090	81014
2029-30	18825	3109	7185	8859	171	38149	85679
2030-31	19806	3282	7533	9351	180	40152	90218
2031-32	20837	3465	7898	9870	190	42260	94999
2032-33	21922	3659	8281	10418	201	44481	100039
2033-34	23064	3864	8682	10997	212	46819	105347
2034-35	24264	4080	9102	11608	224	49278	110934
2035-36	25383	4290	9506	12198	235	51612	116285
2036-37	26554	4511	9928	12818	247	54058	121897
2037-38	27779	4744	10368	13470	260	56621	127784
2038-39	29060	4989	10828	14156	273	59306	133958
2039-40	30400	5246	11309	14876	287	62118	140430
2040-41	31597	5498	11766	15564	300	64725	146530
2041-42	32840	5762	12241	16284	314	67441	152897
2042-43	34132	6039	12736	17037	329	70273	159546

**Table 4-2 : Total Tollable Traffic @ Toll Plaza 2- Chainage 104.530 KM
(Optimistic Growth Scenario)**

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles	Total No.	Total PCU
2025-26	12635	2285	5115	6481	104	26620	61040
2026-27	13350	2423	5383	6871	110	28137	64548
2027-28	14105	2569	5666	7285	117	29742	68266
2028-29	14903	2725	5964	7724	124	31440	72199
2029-30	15746	2890	6278	8189	131	33234	76355
2030-31	16565	3052	6582	8643	138	34980	80404
2031-32	17426	3223	6901	9122	146	36818	84670
2032-33	18334	3403	7236	9629	154	38756	89170
2033-34	19289	3593	7586	10164	163	40795	93908
2034-35	20293	3794	7954	10728	172	42941	98896
2035-36	21229	3990	8307	11274	181	44981	103683
2036-37	22208	4196	8676	11847	190	47117	108697
2037-38	23232	4412	9062	12450	200	49356	113961
2038-39	24303	4640	9464	13083	210	51700	119474
2039-40	25423	4879	9884	13749	221	54156	125259
2040-41	26423	5113	10283	14385	231	56435	130714
2041-42	27462	5358	10698	15051	242	58811	136412
2042-43	28542	5616	11131	15747	253	61289	142359

Table 4-3 : Total Tollable Traffic @ Toll Plaza 1- Chainage 172.770 KM
(Pessimistic Growth Scenario)

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles	Total No.	Total PCU
2025-26	15031	2448	5824	6978	134	30415	68179
2026-27	15807	2584	6101	7363	141	31996	71754
2027-28	16624	2727	6392	7770	149	33662	75526
2028-29	17482	2878	6697	8199	157	35413	79492
2029-30	18385	3037	7016	8652	166	37256	83670
2030-31	19251	3192	7321	9089	174	39027	87686
2031-32	20157	3354	7639	9548	183	40881	91895
2032-33	21106	3524	7971	10030	192	42823	96304
2033-34	22099	3703	8317	10537	202	44858	100930
2034-35	23140	3891	8679	11070	212	46992	105783
2035-36	24092	4072	9021	11577	222	48984	110359
2036-37	25082	4262	9377	12108	232	51061	115136
2037-38	26114	4460	9747	12664	243	53228	120127
2038-39	27188	4668	10131	13245	254	55486	125329
2039-40	28306	4885	10530	13852	266	57839	130755
2040-41	29279	5095	10903	14424	277	59978	135785
2041-42	30285	5314	11290	15019	288	62196	141008
2042-43	31326	5542	11689	15639	300	64496	146432

Table 4-4 : Total Tollable Traffic @ Toll Plaza 2- Chainage 104.530 KM
(Pessimistic Growth Scenario)

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles	Total No.	Total PCU
2025-26	12574	2273	5091	6451	103	26492	60750
2026-27	13223	2399	5333	6807	109	27871	63943
2027-28	13905	2532	5587	7183	115	29322	67305
2028-29	14622	2673	5853	7580	121	30849	70845
2029-30	15376	2821	6131	7999	128	32455	74572
2030-31	16099	2964	6398	8403	134	33998	78156
2031-32	16857	3115	6676	8828	141	35617	81918
2032-33	17650	3273	6966	9274	148	37311	85857
2033-34	18481	3440	7269	9743	155	39088	89989
2034-35	19350	3615	7585	10236	163	40949	94323
2035-36	20146	3783	7884	10706	170	42689	98415
2036-37	20974	3959	8195	11197	178	44503	102685
2037-38	21836	4144	8518	11710	186	46394	107138
2038-39	22734	4337	8853	12247	195	48366	111788
2039-40	23669	4539	9202	12808	204	50422	116638
2040-41	24482	4734	9528	13337	212	52293	121138
2041-42	25323	4938	9865	13887	221	54234	125811
2042-43	26193	5150	10215	14460	230	56248	130668

Table 4-5 : Total Tollable Traffic @ Toll Plaza 1- Chainage 172.770 KM
(Most Likely Growth Scenario)

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles	Total No.	Total PCU
2025-26	15067	2453	5838	6994	134	30486	68337
2026-27	15882	2595	6131	7398	142	32148	72098
2027-28	16742	2746	6438	7826	150	33902	76067
2028-29	17648	2905	6760	8278	159	35750	80252
2029-30	18603	3074	7098	8757	168	37700	84671
2030-31	19526	3239	7424	9222	177	39588	88952
2031-32	20494	3412	7766	9711	186	41569	93447
2032-33	21510	3595	8123	10226	196	43650	98171
2033-34	22577	3787	8496	10768	206	45834	103129
2034-35	23696	3989	8887	11339	217	48128	108343
2035-36	24729	4184	9260	11888	227	50288	113303
2036-37	25808	4389	9649	12463	238	52547	118493
2037-38	26933	4605	10053	13066	250	54907	123922
2038-39	28107	4831	10474	13698	262	57372	129596
2039-40	29333	5068	10912	14361	275	59949	135533
2040-41	30415	5298	11326	14989	287	62315	141082
2041-42	31537	5539	11756	15645	300	64777	146866
2042-43	32699	5791	12202	16330	313	67335	152885

Table 4-6 : Total Tollable Traffic @ Toll Plaza 2- Chainage 104.530 KM
(Most Likely Growth Scenario)

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles	Total No.	Total PCU
2025-26	12606	2279	5104	6466	104	26559	60902
2026-27	13288	2411	5359	6840	110	28008	64257
2027-28	14007	2551	5627	7236	116	29537	67799
2028-29	14765	2699	5908	7654	123	31149	71534
2029-30	15564	2855	6204	8096	130	32849	75476
2030-31	16336	3007	6489	8525	137	34494	79293
2031-32	17145	3168	6787	8977	144	36221	83303
2032-33	17994	3338	7099	9453	152	38036	87521
2033-34	18886	3516	7426	9954	160	39942	91951
2034-35	19822	3703	7768	10481	168	41942	96601
2035-36	20686	3885	8093	10988	176	43828	101031
2036-37	21589	4076	8432	11520	185	45802	105672
2037-38	22531	4276	8785	12077	194	47863	110520
2038-39	23514	4486	9153	12661	203	50017	115590
2039-40	24539	4706	9537	13273	213	52268	120896
2040-41	25444	4920	9899	13854	222	54339	125863
2041-42	26382	5144	10275	14460	232	56493	131037
2042-43	27354	5378	10664	15093	242	58731	136421

4.2 Modification of Concession Period

As per Article 29 of the concession agreement, if actual traffic on the project falls short or exceeds Target Traffic on project highway on defined date, concession period shall be modified subject to calculation stipulated therein. For Tumkur-Chitradurga project, the Target Date and Target Traffic are defined as under:

Target Date - 1st April 2020

Target Traffic - 54558 in PCU

It was observed that as per traffic projections, traffic volume falls short of Target Traffic in all scenarios. This warrants for extension of the concession period as per provisions of concession agreement which is summarized as under -

Scenario	Projected Traffic in PCUs (average of traffic on target date, one year before target date and one year after target date)	Expected extension in Concession Period
All	46331	5.20

As per above, traffic and toll revenue have been considered assuming extension of 5.2 years in the concession period. The said extension is subject to approval from NHAI.

Due to the suspension of toll in the year FY-17 because of demonetization for a period of 24 days, the Concessionaire would be entitled to an extension of an additional 24 days.

Traffic was severely impacted on the project highway during the initial lockdown period. NHAI has declared a policy of providing extension of concession to make up for revenue loss during lockdown. It is expected that extension will be provided to the project concession period on this account also.

CHAPTER 5

FORECAST OF TOLL REVENUE

5.1 General

This chapter presents the tolling rate calculations, categories and toll revenue of the project.

5.2 Discount Categories

As per the Toll Notification (Schedule R) the following discounts have been considered:

1. Monthly Pass: For frequent users a monthly pass is issued for 50 trips per month. The discount factor works out to 33.33% for 50 journeys.
2. Daily Pass (for Return Trip): A 25% discount will be offered for a return pass.
3. Single Journey: Full single journey toll would be charged to this category of vehicles who are infrequent travelers.
4. Local Car / Jeep / Van to be charged at Rs 150 per month (2007)

The inflation and escalation of toll rate on the basis of WPI has been built up as per toll notification (Schedule R) as given under

The formula for determining the applicable rate of fee shall be as follows:-

$$\text{Applicable rate of fee} = \text{base rate} + \text{base rate} \times \left\{ \frac{\text{WPI A} - \text{WPI B}}{\text{WPI B}} \right\} \times 0.4$$

Concessionaire has further declared special discount rates which are applicable on project corridor.

These categories and rate on base year (2015-16) are given as under

Table 5-1 : Special Local Monthly Rate

Category	Monthly Rate
Car (Local 2)	370.00
Car (Local 3)	615.00
LCV (Local 1)	615.00
LCV (Local 2)	1,850.00
Truck/Bus (Local 1)	3085.00
Truck/Bus (Local 2)	5185.00

Normal escalation in the basis of WPI would be applicable to these rates as well.

In addition to above Concessionaire has also declared special rates for single local journey as under

Table 5-2 : Special Local Single Journey Rate

Category	Rate
Car	30.00
LCV	40.00
Truck/Bus	70.00
HCM /EME/ MAV	95.00

Factor of inflation / growth has been incorporated as per Schedule R. WPI are available up to 2021-22. A moderate growth in Wholesale Price Index (WPI) has been assumed after that. Following graph provides projection of rate of inflation (WPI) in India. Data has been taken from Office of Economic Advisor web site (www.eaindustry.nic.in). WPI for years 2017-18 and 2018-2019 is worked back by applying a correlation factor for 2004-05 series as 2017-18 and 2018-2019 data is available in 2011-12 series only. Ratio of WPI for year 2016-17 for both series is used for conversion of WPI in 2004-05 series.

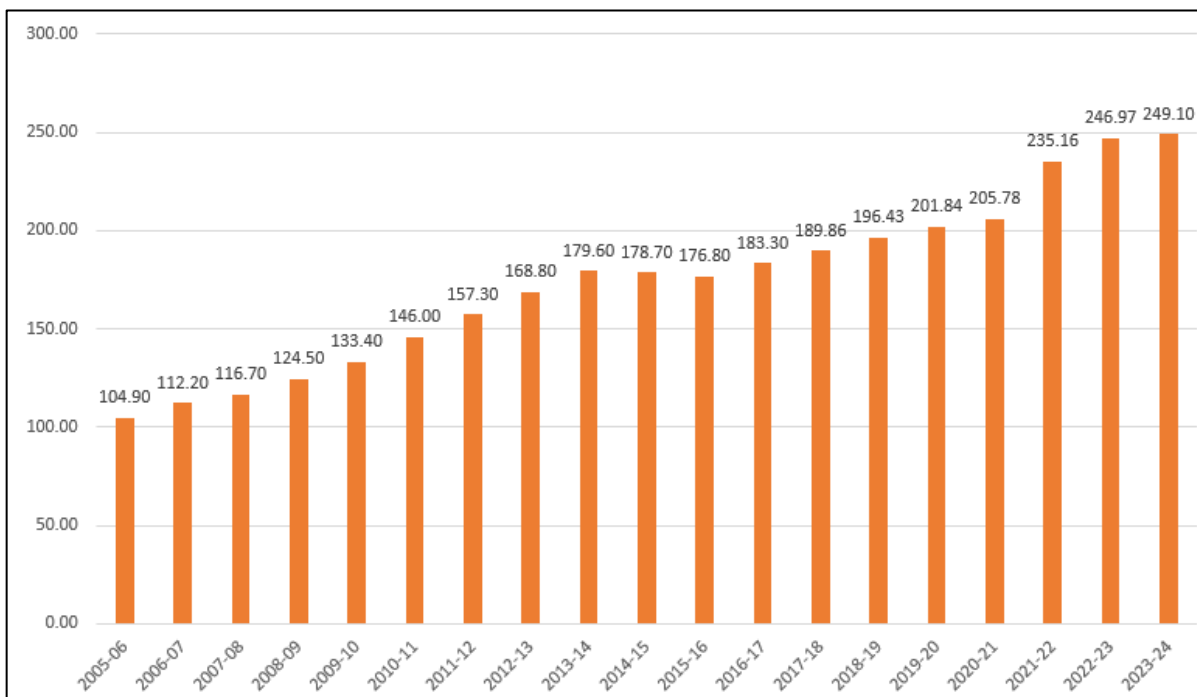


Figure 5-1 : Historical Rate of WPI Inflation in India

Except for the negative growth of WPI in the year 2015-16 average inflation in WPI from the year 2005-2024 is 4.98%. For future years initially it takes 5% and suitably stepped down for future years.

5.3 Estimation of Toll Rates

As per the applicable MORTH notification and Schedule R of contract agreement, the following Base rate of fee for the categories mentioned in the table stands true in the National Highways Fee Rules, 2008.

Table 5-3 : Base Toll Rates 2007 - 08

Type of Vehicle	Base Rate of Fee / Km (In Rs.)
Car, Jeep, Van or Light Motor Vehicle	0.65
Light Commercial Vehicle, Light Goods Vehicle or Minibus	1.05
Bus or Truck (2 Axle)	2.2
Three Axle commercial vehicles	2.4
Heavy Construction Machinery (HCM) or Earth Moving Equipment (EME) or Multi Axle Vehicle (MAV) (4-6 axles)	3.45

Type of Vehicle	Base Rate of Fee / Km (In Rs.)
Oversized Vehicle (seven or more axles)	4.2

Factor of inflation / growth has been incorporated as per Schedule R. WPI are available up to 108-19. A moderate growth in Wholesale Price Index (WPI) has been assumed after that as discussed above.

Table 5-4 : Tollable Length PKG-I

Toll Plaza Chainage	Length (Km)	Tollable Highway + Structure length (Km)
172.770	57.00	57.00
104.530	57.00	70.680

Toll rates are calculated as per guidelines provided in schedule R (rounded to nearest Rs. five) for the concession period and are given below. Since applicable length of highway length is equal for both plazas, applicable toll rates are also same

Thus, worked out rates for various categories of vehicle and discounts are given as under

Table 5-5 : Toll Rates for Single Journey @ 172.770 & @104.530

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2024-25	85	135	285	445	540
2025-26	90	140	295	465	565
2026-27	90	150	310	490	595
2027-28	95	155	330	515	625
2028-29	100	165	345	540	655
2029-30	105	170	360	565	690
2030-31	110	180	380	590	720
2031-32	115	190	395	620	755

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2032-33	125	200	415	650	790
2033-34	130	210	435	680	830
2034-35	135	220	455	715	870
2035-36	140	230	480	750	915
2036-37	150	240	500	785	955
2037-38	155	250	525	825	1005
2038-39	165	265	550	865	1055
2039-40	170	275	580	910	1105
2040-41	180	290	610	955	1160
2041-42	190	305	640	1000	1215
2042-43	200	320	670	1050	1280

Table 5-6 : Toll Rates for Return Journey @ 172.770 & @104.530

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2024-25	125	205	425	665	810
2025-26	130	215	445	700	850
2026-27	140	225	470	735	895
2027-28	145	235	490	770	940
2028-29	150	245	515	810	985
2029-30	160	260	540	845	1030
2030-31	165	270	565	890	1080
2031-32	175	285	595	930	1135
2032-33	185	295	620	975	1190
2033-34	195	310	650	1025	1245
2034-35	200	325	685	1070	1305

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2035-36	210	340	715	1125	1370
2036-37	220	360	750	1180	1435
2037-38	235	375	790	1235	1505
2038-39	245	395	830	1300	1580
2039-40	255	415	870	1360	1660
2040-41	270	435	910	1430	1740
2041-42	285	455	955	1500	1825
2042-43	295	480	1005	1575	1915

Table 5-7 : Toll Rates for Local Single Journey @ 172.770 & @104.530

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV
2024-25	70	80	140	285
2025-26	75	85	145	300
2026-27	80	90	150	315
2027-28	85	95	160	330
2028-29	90	100	165	345
2029-30	95	105	170	360
2030-31	100	110	180	375
2031-32	105	115	190	390
2032-33	110	120	200	410
2033-34	115	125	210	430
2034-35	120	130	220	450
2035-36	125	135	230	470

Year	Car	LCV	Truck / Bus	HCM /EME/ MAV
2036-37	130	140	240	490
2037-38	135	145	250	510
2038-39	140	150	260	535
2039-40	145	155	270	560
2040-41	150	160	280	585
2041-42	155	165	295	610
2042-43	160	170	310	635

Table 5-8 : Toll Rates for Monthly Pass@ 172.770 & @104.530

Year	Car (Regular)	Car (Local 1)	Car (Local 2)	Car (Local 3)	LCV (Regular)	LCV (Local 1)	LCV (Local 2)	Truck/Bus (Regular)	Truck/Bus ((Local 1)	Truck/Bus (Local 2)	HCM /EME/ MAV	Oversized Vehicles	Truck / Bus (60 Trips)	Truck / Bus (80Trips)
2024-25	2785	340	675	1075	4500	4010	3060	9430	5110	8390	14790	18005	11270	15090
2025-26	2925	355	705	1125	4730	4210	3215	9905	5365	8810	15535	18915	11840	15850
2026-27	3075	375	740	1185	4965	4420	3375	10410	5635	9250	16320	19870	12440	16650
2027-28	3230	390	780	1245	5220	4645	3545	10935	5915	9715	17150	20880	13075	17500
2028-29	3385	410	815	1300	5470	4850	3705	11460	6180	10150	17970	21875	13700	18335
2029-30	3550	430	850	1355	5730	5070	3870	12005	6460	10610	18830	22925	14360	19210
2030-31	3720	450	890	1420	6005	5300	4045	12585	6750	11085	19735	24025	15050	20135
2031-32	3895	475	930	1480	6295	5535	4225	13190	7055	11585	20685	25180	15775	21105
2032-33	4085	495	970	1550	6600	5785	4415	13825	7370	12105	21680	26395	16540	22120
2033-34	4285	520	1015	1620	6920	6045	4615	14495	7705	12650	22730	27670	17345	23190
2034-35	4490	545	1060	1690	7255	6320	4820	15200	8050	13220	23835	29015	18185	24315
2035-36	4710	570	1105	1770	7605	6605	5040	15935	8410	13815	24995	30425	19075	25500
2036-37	4940	600	1155	1845	7980	6900	5265	16715	8790	14435	26210	31910	20010	26745
2037-38	5180	630	1210	1930	8370	7210	5500	17535	9185	15085	27495	33470	20990	28055
2038-39	5435	660	1265	2015	8780	7535	5750	18395	9600	15765	28845	35115	22020	29430
2039-40	5700	695	1320	2110	9210	7875	6010	19300	10030	16475	30265	36845	23110	30880
2040-41	5985	725	1380	2205	9665	8230	6280	20250	10480	17215	31760	38660	24250	32400
2041-42	6280	765	1440	2300	10145	8600	6560	21255	10955	17990	33330	40575	25455	34005
2042-43	6590	800	1505	2405	10645	8985	6855	22310	11445	18800	34985	42590	26720	35695

5.4 Toll Revenue

As indicated earlier, toll revenue on the Project Road has been calculated under in all three scenarios. The estimates of toll revenue under *Optimistic*, *Pessimistic* and *Most Likely* growth scenarios are presented in the following section.

5.5 Toll Revenue at all toll plazas under Scenarios

Starting from the year 2024-25 are shown in the tables below.

Table 5-9 : Toll Revenue Optimistic Scenario
(Rs. Crores)

Year	Toll Plaza at 177.2	Toll Plaza at 104.53	Total
2024-25	207.83	189.90	397.72
2025-26	229.82	209.89	439.72
2026-27	254.69	232.72	487.42
2027-28	283.86	259.57	543.43
2028-29	314.06	287.17	601.24
2029-30	347.90	317.95	665.85
2030-31	383.51	350.56	734.06
2031-32	424.95	388.47	813.41
2032-33	470.32	429.88	900.20
2033-34	518.52	473.92	992.43
2034-35	571.88	522.75	1094.63
2035-36	629.93	576.09	1206.02
2036-37	691.42	632.08	1323.49
2037-38	760.41	695.21	1455.63
2038-39	838.10	766.18	1604.29
2039-40	922.99	844.18	1767.17
2040-41	1010.17	924.02	1934.19
2041-42	1106.50	1012.07	2118.58
2042-43	1212.01	1108.48	2320.48

Table 5-10 : Toll Revenue Pessimistic Scenario
(Rs. Crores)

Year	Toll Plaza at 177.2	Toll Plaza at 104.53	Total
2024-25	207.83	189.90	397.72
2025-26	228.77	208.89	437.66
2026-27	252.30	230.55	482.86
2027-28	279.90	255.94	535.84
2028-29	308.19	281.80	589.99
2029-30	339.77	310.52	650.29
2030-31	372.78	340.76	713.54
2031-32	411.11	375.85	786.95

Year	Toll Plaza at 177.2	Toll Plaza at 104.53	Total
2032-33	452.84	413.89	866.73
2033-34	496.89	454.10	950.99
2034-35	545.39	498.52	1043.91
2035-36	597.88	546.73	1144.61
2036-37	653.11	596.96	1250.07
2037-38	714.83	653.42	1368.25
2038-39	784.11	716.74	1500.85
2039-40	859.44	785.94	1645.38
2040-41	936.09	856.14	1792.23
2041-42	1020.41	933.28	1953.69
2042-43	1112.38	1017.31	2129.69

**Table 5-11 : Toll Revenue Most Likely Scenario
(Rs. Crores)**

Year	Toll Plaza at 177.2	Toll Plaza at 104.53	Total
2024-25	207.83	189.90	397.72
2025-26	229.29	209.41	438.70
2026-27	253.48	231.67	485.15
2027-28	281.85	257.77	539.62
2028-29	311.12	284.52	595.64
2029-30	343.79	314.27	658.06
2030-31	378.11	345.70	723.81
2031-32	417.97	382.17	800.14
2032-33	461.52	421.94	883.46
2033-34	507.57	464.07	971.64
2034-35	558.43	510.67	1069.10
2035-36	613.65	561.42	1175.07
2036-37	671.97	614.52	1286.49
2037-38	737.25	674.25	1411.51
2038-39	810.60	741.33	1551.93
2039-40	890.57	814.86	1705.44
2040-41	972.35	889.78	1862.13
2041-42	1062.56	972.24	2034.80
2042-43	1161.08	1062.28	2223.36

CHAPTER 6

OPERATION & MAINTENANCE

6.1 Operation & Maintenance

The following are project parameters which would contribute towards the cost of operation and maintenance.

The future cost of operation and maintenance is estimated on engineering judgment and experience basis. Keeping all above factors in view, the following can be basis of working out cost of operation and maintenance for project corridor from Tumkur to Chitradurga on NH-4 in state of Karnataka.

- a) **Annual Regular Maintenance** – Covering pothole repair, shoulder and slope repair, drain cleaning, median maintenance, Crash barrier, toll plaza maintenance, Toll collection, other services like medical help and rescue operations etc.
- b) **Periodic Maintenance** – This will be done on a periodic basis, say every 5 years. It will consist of overlaying of wearing course and painting and marking. Some pavement strengthening is also anticipated in a few sections. This operation and its cost are spread over three years. But since the project is commissioned and running traffic for last many years, periodic maintenance shall be as per condition of pavement and other infrastructure. Input from concessionaires have been taken in this regard.

Concessionaire has recently updated the program of maintenance of project road. Same has been reviewed and year-wise cost of O&M from year 2022-23 is given in table below.

Table 6-1 : O&M COST

Year	Annual Maintenance (Rs. Cr)	Thermoplastic Painting (Rs. Cr)	Renewal Coat with BC (Rs. Cr.)	Special Repair of pavement	Structure maintenance. (Rs. Cr)	Electric System		Total Expenditure (Rs. Crores)	Remarks
						Annual	Periodic		
2025-26	8.56				0.01	0.04		12.10	Regular O & M
2026-27	8.56				0.01	0.04		12.70	Regular O & M
2027-28	8.56				0.01	0.04		13.34	Regular O & M
2028-29	8.56				0.01	0.04		14.01	Regular O & M
2029-30	8.56	0.98	13.74	19.91	0.01	0.04		73.94	Renewal of Wearing course + Pavement repair
2030-31	8.56			1.81	0.01	0.04		18.69	Regular O & M
2031-32	8.56			1.81	0.01	0.04		19.63	Regular O & M
2032-33	8.56			1.81	0.01	0.04		20.61	Regular O & M
2033-34	8.56			1.81	0.01	0.04		21.64	Regular O & M
2034-35	8.56	1.72	13.74	28.96	0.01	0.04		115.74	Renewal of Wearing course + Pavement repair
2035-36	8.56			1.81	0.01	0.04		23.86	Regular O & M
2036-37	8.56			2.17	0.01	0.04		25.92	Regular O & M
2037-38	2.57				0.01	0.04		6.60	Regular O & M

CHAPTER 7

CONCLUSION & RECOMMENDATIONS

7.1 Conclusion & Recommendations

Project stretch of Tumkur to Chitradurga section of NH-4 in state of Karnataka from km 75.000 to km 189.000 is currently Six lane road. The road is in sound condition and serves to good traffic volume. As Indian economy is poised to grow at 7%+ post COVID-19, project corridor is expected to pick up same trend in terms of traffic flow. All these developments have potential to give a positive impact to traffic flow on the project. Following can considered as major outcome of study:

- a) There is a good amount of tollable traffic running on the project.
- b) Project corridor has potential to witness good traffic growth annually in near future in post COVID-19 scenario due to various development in area and overall development of economy.
- c) Project corridor has committed traffic as long route traffic and does not have risk of traffic leakage due lack of competing road of comparable quality.

The project infrastructure is in good condition and its maintenance cost is also reasonable.

Based on the above it can be considered a stable healthy project from the traffic and revenue point of view.

CHAPTER 8

PROJECT ILLUSTRATIONS

8.1 General

Project current condition has been depicted in the following photographs.



Figure 8-1 : General Condition of project road



Figure 8-2 : General Condition of project road.



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OMALAUUR TO NAMAKKAL (KM 180.00 TO KM 248.625)
SECTION OF NH-7 IN THE STATE OF TAMIL NADU.

OCTOBER 2024



**TOLL REVENUE AND O&M COST
PROJECTION REPORT
(FINAL)**



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ABBREVIATIONS

AADT	- Annual Average Daily Traffic	NHAI	- National Highways Authority of India
BOT	- Build Operate Transfer	NHDP	- National Highways Development Project
CAGR	- Compound Annual Growth Rate	NSDP	- Net State Domestic Product
CTV	- Classified traffic volume	O&M	- Operation & Maintenance
DBFOT	- Design, Build, Finance, Operate & Transfer	PCDP	- Per Capita Domestic Product
EME	- Earth Moving Equipment	PCI	- Per Capita Income
GDP	- Gross Domestic Product	PCU	- Passenger Car Unit
GSDP	- Gross State Domestic Product	PSC	- Pre-stressed Concrete
HCM	- Heavy Construction Machinery	RCC	- Reinforced cement concrete
HCV	- Heavy Commercial Vehicle	RHS	- Right Hand Side
HTMS	- Highway Traffic Management System	SH	- State Highway
IRC	- Indian Road Congress	TP	- Toll Plaza
IRR	- Internal Rate of Return	WPI	- Wholesale Price Index
LCV	- Light Commercial Vehicle	SIR	- Special Investment Region
LHS	- Left Hand Side	c.	- Circa
LGV	- Light Goods Vehicle	ROB	- Railway Over Bridge
MAV	- Multi Axle Vehicle	MDR	- Major District Road
MORTH	- Ministry of Road Transport and Highways	ODR	- Other District Road
NH	- National Highway	CA	- Concession Agreement
PCC	- Plain Cement Concrete	RMT	- Running Meter
CR	- Coarse Rubble		

CHAPTER 1

INTRODUCTION

1.1 Background

The Government of India through National Highway Authority of India (NHAI) embarked upon a program to enhance the traffic capacity and safety for efficient transportation of goods as well as passenger traffic on National Highway Sections under NHDP Phase V. Under Phase V NHAI has planned to convert 6,500 km of existing 4-lane National Highways into 6-lane National Highway. Sections envisaged under 6-laning comprise the Golden Quadrilateral section (5,700 km) and some other sections which are 800 km in length.

The project under consideration, Omalur - Namakkal section of NH-7 from Km 180.000 to km 248.625 is one such road project NHAI intended to implement on a BOT basis in the DBFOT format. Project has concession period of 20 years. Project achieved COD on 6th August-2009. The Project has been commissioned and is currently in the operation / maintenance phase. Project under consideration is a combination of construction and maintenance packages as given under

Maintenance package – From Km 180.000 to Km 207.500

Construction & Maintenance Package – From Km 207.500 to Km 248.625

1.2 Objective of the Study

M/s IRB INVIT FUND has engaged GMD Consultants to assess the future traffic and toll potential of the project along with related operation & maintenance expenditure involved.

This report named as “*Toll Revenue and O&M Cost Projection Report*” mainly focuses on traffic and O&M aspects of the project. Other parameters like competing road, area developments etc. have been considered from a traffic development point of view.

1.2.1 Scope of Services

The broad scope of work covered in the assignment is as follows.

- a) Analysis of Traffic Growth
- b) Toll Rate Growth
- c) Revenue Forecasting
- d) Operation and Maintenance Cost Projections

The Concessionaire has provided basic historical traffic data and other project details on the basis of which the above analysis has been carried out, after applying our judgement on the traffic estimates.

“Toll Revenue and O&M Cost Projection Report” was submitted in March 2017. In this report traffic data of year 2015-16 was used as base traffic. The report was updated with traffic data for the year 2016-17 and the report was submitted in October 2017. The report was further updated with traffic data of 2017-18 and same was submitted in April 2018. The report was further updated with traffic Data of the period from April 2018 to September 2018 and was submitted in October 2018. The report was further updated with yearly traffic data for 2019-20 in May 2020. With traffic data from April 2020 to March 2021 report was updated, report was further updated with yearly traffic data from April 2021 to March 2022, April 2022 to March 2023, April 2023 to March 2024 and now concessionaire has provided traffic data from April 2024 to September 2024, report is updated taking this latest traffic data into consideration.

CHAPTER 2

TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Surveys

In the course of our work, we have collected the required information for the project corridor to understand the general traffic and travel characteristics on the corridor.

The following traffic data has been collected for the project.

- Classified traffic volume counts at toll plaza location on Omalur - Namakkal section of NH-7 for base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and Six-Monthly traffic data from April 2024 to September 2024.
- Local Component of traffic
- Component of Return Journey
- Component of Monthly Pass Journey

The main objective of the traffic data analysis is to:

- Determine the existing traffic movement characteristics of project.
- Establish base year traffic.
- Identification of travel patterns and modal split of project traffic
- Deriving growth factors for traffic forecasting
- Estimation of corridor traffic including traffic diversion if any
- Preparation of revenue model and projection of revenue as per toll policy for various scenarios

Project can be divided into the following homogenous sections from traffic point of view.

These sections can be.

- Omalur to Salem
- Salem to Rasipuram
- Rasipuram to Namakkal

Table 2-1 below lists provides details of locations from where traffic details have been collected.

Table 2-1 : Traffic Data Details

SR. NO	LOCATION	CTV	Single Journey Traffic	Multiple Journey	Monthly Pass	Local Traffic
1	Km 191.800 Toll Plaza	AADT for Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016	For Year 2015-2016
		AADT for year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017	For Year 2016-2017
		AADT for year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018	For Year 2017-2018
		AADT for Year 2018-19	For Year 2018-19	For Year 2018-19	For Year 2018-19	For Year 2018-19
		AADT for Year 2019-20	For Year 2019-20	For Year 2019-20	For Year 2019-20	For Year 2019-20
		AADT for Year 2020-21	For Year 2020-21	For Year 2020-21	For Year 2020-21	For Year 2020-21
		AADT for Year 2021-22	For Year 2021-22	For Year 2021-22	For Year 2021-22	For Year 2021-22
		AADT for Year 2022-23	For Year 2022-23	For Year 2022-23	For Year 2022-23	For Year 2022-23
		AADT for Year 2023-24	For Year 2023-24	For Year 2023-24	For Year 2023-24	For Year 2023-24
		Six Monthly Data from April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24	For April 24 to Sept 24

The locations of each of the traffic surveys are illustrated in Figure 2-1.

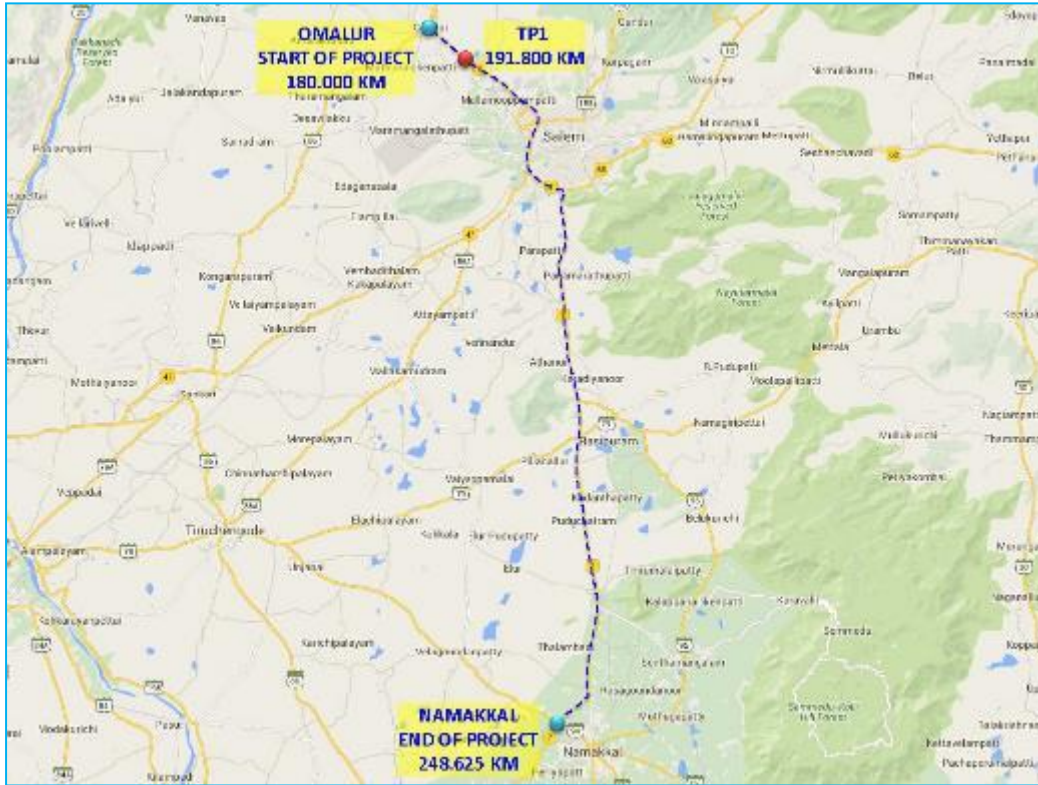


Figure 2-1: Toll Plaza Locations

2.2 Classified Traffic Volume Count

The objective of conducting a Classified Traffic Volume Count is to understand the traffic flow pattern including modal split on a roadway. The Classified Traffic Volume Count survey has been provided by concessionaire of project highway from actual traffic data gathered at toll plaza locations based on monthly data shared with NHAI. These locations are indicated in Figure 2-1 and listed in Table 2-1.

The vehicles can broadly be classified into fast moving / motorized and slow moving / non-motorized vehicles, which can be further classified into specific categories of vehicles. The groupings of vehicles are further segregated to capture the tollable vehicle categories specifically and toll exempted vehicles are counted separately. The detailed vehicle classification system as per IRC: 64-1990 is given in **Table 2-2**.

Table 2-2 : Vehicle Classification System

Vehicle Type	
	Auto Rickshaw
Passenger Car	Car, Jeep, Taxi & Van (Old / new technology)
Bus	Minibus

Vehicle Type	
	Standard Bus
Truck	Light Goods Vehicle (LCV)
	2 – Axle Truck
	3 Axle Truck (HCV)
	Multi Axle Truck (4-6 Axle)
	Oversized Vehicles (7 or more axles)
Other Vehicles	Agriculture Tractor, Tractor & Trailer

Source - IRC: 64 – 1990

However, since the project highway is currently under toll operation, the data collected corresponds to the category of tollable vehicles. The following are the types of vehicles as per concession agreement.

- Car / Jeep / Van
- LCV
- Truck / Bus
- Multi Axle

2.3 Traffic Characteristic

Toll revenue of project highway does not solely depend on traffic volume. There are certain characteristics of traffic which have substantial potential to affect toll collection. Component of local traffic, component of passenger and commercial traffic, portion of return journey traffic, % of monthly pass traffic are some of such characteristics of traffic. These will be discussed in subsequent sections of the report.

2.3.1 Traffic Data

Project concessionaire has provided Traffic data for base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and from April 2024 to September 2024.

Since the traffic data available for this update is for Six months, from April 2024 to September 2024, it may not represent the whole year traffic. Hence a seasonality factor for balance part of year has been applied to average traffic of current four months to arrive at Annual Average Daily Traffic of base year 2024-25. Same corrected traffic is used for future projections and revenue calculations. The following table shows

historical traffic on project stretch and derived Annual Average Daily Traffic (AADT) for year 2024-25.

Table 2-3 : Traffic Data at Toll Plaza at Km 191.800

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) – FY 2018-19	Annual Average Daily Traffic (Nos.) – FY 2019-20	Annual Average Daily Traffic (Nos.) – FY 2020-21	Annual Average Daily Traffic (Nos.) – FY 2021-22	Annual Average Daily Traffic (Nos.) – FY 2022-23	Annual Average Daily Traffic (Nos.) – FY 2023-24	Annual Average Daily Traffic (Nos.) – FY 2024-25
1	Car	12645	13352	12618	14831	18389	19694	21315
2	LCV	4672	4632	4290	2748	2856	2671	2776
3	Truck/Bus	3199	3446	2666	3075	3796	4319	3859
4	Multi Axle	2952	2873	3017	3350	3765	4057	4150
	Total	23468	24304	22591	24004	28806	30741	32100

2.4 Data Analysis

2.4.1 Analysis of Traffic Volume Count

Understanding the character of existing traffic forms the basis of traffic forecast. The various vehicle types having different sizes and characteristics can be converted into a single unit called Passenger Car Unit (PCU). Passenger Car equivalents for various vehicles are adopted based on recommendations of Indian Road Congress prescribed in “IRC-64-1990: Guidelines for Capacity of Roads in Rural areas”. The adopted passenger car unit values (PCU) are presented in Table 2-4

Table 2-4 : PCU Factors Adopted for Study

Vehicle Type	PCUs
Car	1.0
Minibus	1.5
Standard Bus	3.0
LCV/LGV	1.5
2 Axle Truck	3.0
3 – 6 Axle Truck	4.5
MAV	4.5
Auto Rickshaw	1.0

Vehicle Type	PCUs
Van/Tempo	1.0
Agriculture Tractor with Trailer	4.5
Agriculture Tractor without Trailer	1.5

Source: IRC: 64-1990

Traffic volume at each toll plaza was converted to PCU and same is presented as under

Table 2-5 : Traffic in PCU at Project Stretch

Year	Toll Plaza Location	Traffic No.	PCU	PCU Index
FY 2015-16	191.800	19447	36164	1.86
FY 2016-17	191.800	20589	38355	1.86
FY 2017-18	191.800	21977	39232	1.78
FY 2018-19	191.800	23468	42534	1.81
FY 2019-20	191.800	24304	43569	1.79
FY 2020-21	191.800	22591	40626	1.80
FY 2021-22	191.800	24004	43254	1.80
FY 2022-23	191.800	28806	51004	1.77
FY 2023-24	191.800	30741	54914	1.79
FY 2024-25	191.800	32000	55732	1.74

It can be observed from above that project traffic has PCU index near 2 which is a fair indicator of good mix being split between commercial and urban traffic.

2.4.2 Components of Traffic

As discussed previously, components of traffic volume play an important role in determining project revenue. A larger component of commercial traffic with higher axle configuration adds to project revenue positively. Similarly, a larger component of local traffic affects the project revenue potential negatively.

For the purpose of analysis, the recent traffic numbers of for period from April 2023 to September 2023 have been considered as the base numbers.

It is observed that car traffic forms 66% of total traffic at toll plaza location Km 191.800 LCV and bus / truck share 9% and 12% respectively. Multi axle consists of 13% of total traffic. Overall, about 34% of traffic is commercial in nature. A higher percentage of urban traffic is due to the project corridor passing through the city of Salem which is a fast-upcoming urban C category town.

Another important bifurcation of traffic is components of traffic with respect to various type of toll ticketing like

1. Single Journey
2. Multi Journey
3. Monthly Pass (Local and General)

The following table provides numbers of vehicles falling in each of the above categories on base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and from April 2024 to September 2024.

Table 2-6 : Journey Type Bifurcation of Traffic at KM 191.800

Sr. No	Type	Traffic Volume (Nos.) For FY 2018-19	Traffic Volume (Nos.) For FY 2019-20	Traffic Volume (Nos.) For FY 2020-21	Traffic Volume (Nos.) For FY 2021-22	Traffic Volume (Nos.) For FY 2022-23	Traffic Volume (Nos.) For FY 2023-24	Traffic Volume (Nos.) For FY 2024-25
1	Single Journey	16311	16931	16626	16244	19856	20766	22063
2	Return Journey	5210	5280	4492	7196	8280	9200	9952
3	Monthly Pass	1947	2093	1473	564	670	775	85

The single journey component in total traffic numbers is as high as 69% while the return journey component is 31%. The monthly pass share is as low as 0%. As the project corridor serves as primary link for traffic between Madurai and Bangalore the component of single journey ticket is much higher. Moreover, the toll structure of the

project is based on old toll policy and there are special rates for local single journey traffic. This makes the option of a monthly pass less attractive.

2.5 Secondary Data Collection

There are several other factors which have substantial impact on traffic pattern and growth on any project corridor. The following are some of such important factors.

- Industrial development around project corridor and its catchment
- Educational infrastructure along project corridor
- Demographic pattern
- Urban area development
- Tourism potential
- Upcoming major infrastructural or industrial projects
- Special industry in project corridor
- Overall trends of economic growth local as well as national / regional

Hence in addition to traffic details on the project site, secondary data was also collected from the various sources. Typical secondary data includes the following:

1. Vehicle registration data of regional and national level.
2. Economic Data
 - a) GDP
 - b) NSDP
 - c) Population Growth
 - d) Per Capita Income growth
 - e) Industrial Growth
 - f) Special Industry Potential
 - g) Regional and National development vision / plan
 - h) Any other relevant data
3. Competing road network.

We have collected and utilized such underlying data in the study to estimate the growth and risk factors for traffic along the project corridor.

CHAPTER 3

GROWTH OF TRAFFIC ON PROJECT HIGHWAY

3.1 Introduction

Traffic growth is a function of the interplay of a number of contributory factors such as National economy, Government policy, socio-economic conditions of the people, and changes in land uses along the project corridor precincts etc. As these factors have a number of uncertainties associated with them, forecasts of traffic are dependent on the forecasts of factors such as population, gross domestic product (GDP), vehicle ownership, per capita income (PCI), agricultural output, fuel consumption etc. Future patterns of change in these factors can be estimated with only a reasonable degree of accuracy and hence the resultant traffic forecast levels may not be precise.

Traffic growth forecast for project corridor Omalur - Namakkal section of NH-7 has been carried out taking the above factors into consideration. “**IRC: 108-2015-Guidelines for Traffic Prediction on Rural Highways**” is established best practice and has been used for traffic growth forecast.

3.2 Trend Analysis

One of the methods of estimation of future rate of traffic growth is to assume the same rate of growth as experienced in the past. However, it may be noted that major influencing factors which reflect Economic conditions such as GDP, agricultural output, industrial output, national policies etc. are susceptible to change over a longer period of time and necessary adjustments need to be made to past trends to account for these changes.

Thus, we have considered the Elasticity model of growth projection which is one of the most widely acceptable methods for traffic forecast and is recommended in **IRC: 108-2015-Guidelines for Traffic Prediction on Rural Highways**.

In this method past trends of any vehicular data are paired with an economic indicator and a regression analysis is done to yield the economic model of growth. Growth of vehicular traffic varies for different types of vehicles. It is a proven fact that growth patterns for passenger and goods vehicles are different. Traffic growth on any highway typically depends on a number of economic parameters. The most important and direct parameters are given as under

- Per Capita Income

- Net State Domestic Product (NSDP)
- Population

It is observed that the ownership of a car is more closely related to affordability hence per capita is the index which closely fits with growth of car traffic among other criteria. In similar fashion, the following pairs of vehicle type and independent variable can be established for elasticity modeling of growth.

- Car / Jeep – Per Capita Income
- Bus / Minibus – Population
- Trucks / Heavy / Goods Vehicle – NSDP
- Time series data of vehicle (both passenger and goods) Registered in the state of Tamil Nadu is used as the base data for analysis of growth.

3.3 Estimation of Traffic Demand Elasticity

The elasticity of traffic demand is defined as the rate at which traffic intensity varies due to change in the corresponding indicator selected. Hence, in order to estimate the elasticity of traffic demand, it is necessary to establish the relationship between the growth in number of given categories of vehicle with one of the economic variables considered, such as NSDP, per capita income and population growth. Latest available data for vehicle registration, per capita income, NSDP and population is used in analysis.

As per IRC: 108-2015 the model for estimating elasticity index for the project corridor is of the following form and is as given below:

$$\text{Log}(P) = k \times \text{Log}(EI) + A$$

Where,

P = Number of Vehicles (Mode wise)

EI = Economic Indicator

A = Regression constant

k = Elasticity coefficient (Regression coefficient)

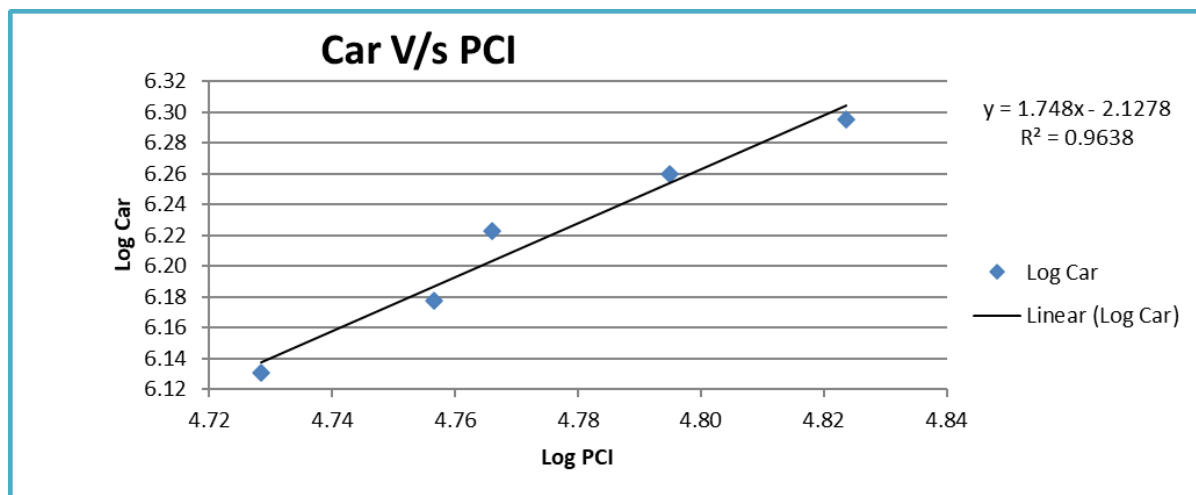
The elasticity for cars and buses (passenger vehicles) is calculated based on Population and Per Capita Domestic Product (PCDP) and the elasticity for trucks is calculated based on the Net State Domestic Product (NSDP).

The following tables and graphs depict regression and elasticity of growth model.

Table 3-1 : Per Capita Income Vs Car

Year	PCI	Car	Log PCI	Log Car	PCI Growth	Average Growth
2011	53507	1350722	4.73	6.13		
2012	57093	1504735	4.76	6.18	7%	
2013	58360	1668913	4.77	6.22	2%	
2014	62361	1818284	4.79	6.26	7%	
2015	66635	1972354	4.82	6.29	7%	5.7%

Regression analysis of same is given in figure below.

**Figure 3-1: Regression and Elasticity PCI vs. Car–Extrapolation****Table 3-2 : Population Vs Bus**

Year	Population	Buses	Log Pop	Log Bus	Pop Growth	Average Growth
2011	72147030	134887	7.86	5.13		
2012	73447335	144251	7.87	5.16	2%	
2013	74744601	156470	7.87	5.19	2%	
2014	76038376	165176	7.88	5.22	2%	
2015	77328222	171581	7.89	5.23	2%	1.75%

Regression analysis of same is given in figure below.

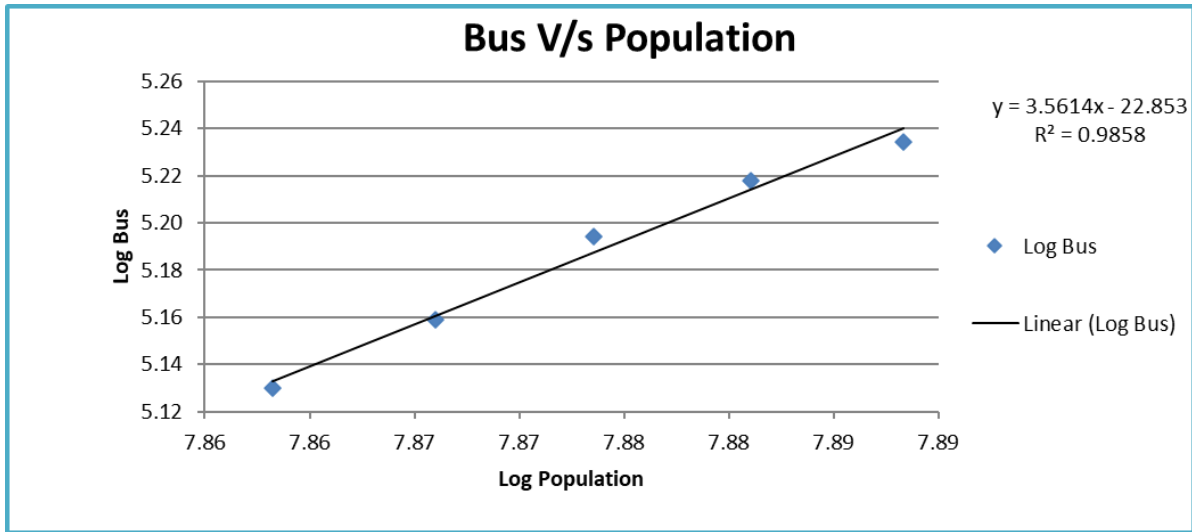


Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

The elasticity of goods traffic has been worked out by regression analysis with NSDP. The following table represents the data and details.

Table 3-3 : Goods Traffic Vs NSDP

Year	NSDP	Trucks	Log NSDP	Log Truck	NSDP Growth	Average Growth (Year)
2011	35996050	744663	7.56	5.87		
2012	38650813	821108	7.59	5.91	7%	
2013	39747091	896985	7.60	5.95	3%	
2014	42718219	924082	7.63	5.97	7%	
2015	45898663	946232	7.66	5.98	7%	6.28%

The following figure depicts regression analysis and extrapolation.

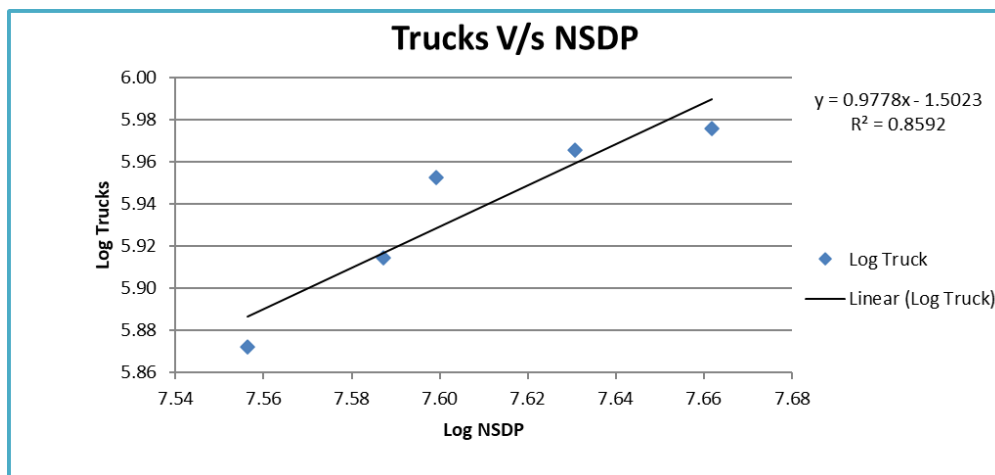


Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation.

Using the regression analysis above, we have arrived at the elasticity of traffic demand for each class of vehicle to a given change in relevant economic indicators. Average traffic growth of a vehicle class is multiplied by the corresponding elasticity coefficient to arrive at traffic growth. R^2 is a statistical measure of how close the data are to the fitted regression line. It varies from 0 to 1. The higher the value of R^2 more representative is the regression model of data.

The results of these analyses for the good fit as reflected by R^2 values are presented in the Table below.

Table 3-4 : Summary Regression Analysis

State	Vehicle Category	Independent Variable	Regression Equation	R Square	Elasticity Coefficient (y)	Average IV Growth (5yrs)	Growth Elastic Model	Remarks
Tamil Nadu	Car/Jeep	PCI	$y = 1.748x - 2.1278$	$R^2 = 0.9638$	1.7480	5.66%	9.89%	Good Regression
	Bus	Population	$y = 3.5614x - 22.8532$	$R^2 = 0.9858$	3.5614	1.75%	6.23%	Good Regression
	Truck	NSDP	$y = 0.9778x - 1.5023$	$R^2 = 0.8592$	0.9778	6.28%	6.14%	Good Regression

While the economic model for predicting growth is a good tool, other local, regional, national factors such as proposed developments etc. should also be considered before finalizing growth factors. These factors are discussed in subsequent sections.

3.4 Analysis of Historic Traffic Data

Historic traffic data forms useful information for any highway project. It provides useful information for establishing past trends of growth. Project stretch of Omalur to Namakkal has been commissioned and it has been under tolled operation since 2009.

Table 3-5 : Historical Traffic at Project Stretch

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2018-19	Annual Average Daily Traffic (Nos.) FY 2019-20	Annual Average Daily Traffic (Nos.) FY 2020-21	Annual Average Daily Traffic (Nos.) FY 2021-22	Annual Average Daily Traffic (Nos.) FY 2022-23	Annual Average Daily Traffic (Nos.) FY 2023-24	Annual Average Daily Traffic (Nos.) FY 2024-25
1	Car	12645	13352	12618	14831	18389	19694	21315
2	LCV	4672	4632	4290	2748	2856	2671	2776
3	Truck/Bus	3199	3446	2666	3075	3796	4319	3859
4	Multi	2952	2873	3017	3350	3765	4057	4150

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2018-19	Annual Average Daily Traffic (Nos.) FY 2019-20	Annual Average Daily Traffic (Nos.) FY 2020-21	Annual Average Daily Traffic (Nos.) FY 2021-22	Annual Average Daily Traffic (Nos.) FY 2022-23	Annual Average Daily Traffic (Nos.) FY 2023-24	Annual Average Daily Traffic (Nos.) FY 2024-25
	Axle							
	Total	23468	24304	22591	24004	28806	30741	32100

3.5 Other Factors Influencing Growth

There are many factors which have an impact on traffic growth. As discussed previously these factors can be economic, social, educational, and industrial.

Potentiality of such factors for project highway is discussed as under.

ECONOMY

After witnessing a slowdown during 2011-12, the economy recovered in 2013-14, and a high growth rate of GDP was recorded in up to 2018-19. Pandemic of COVID-19 impacted all economies of world including India. Following figure show trend of GDP growth in India.

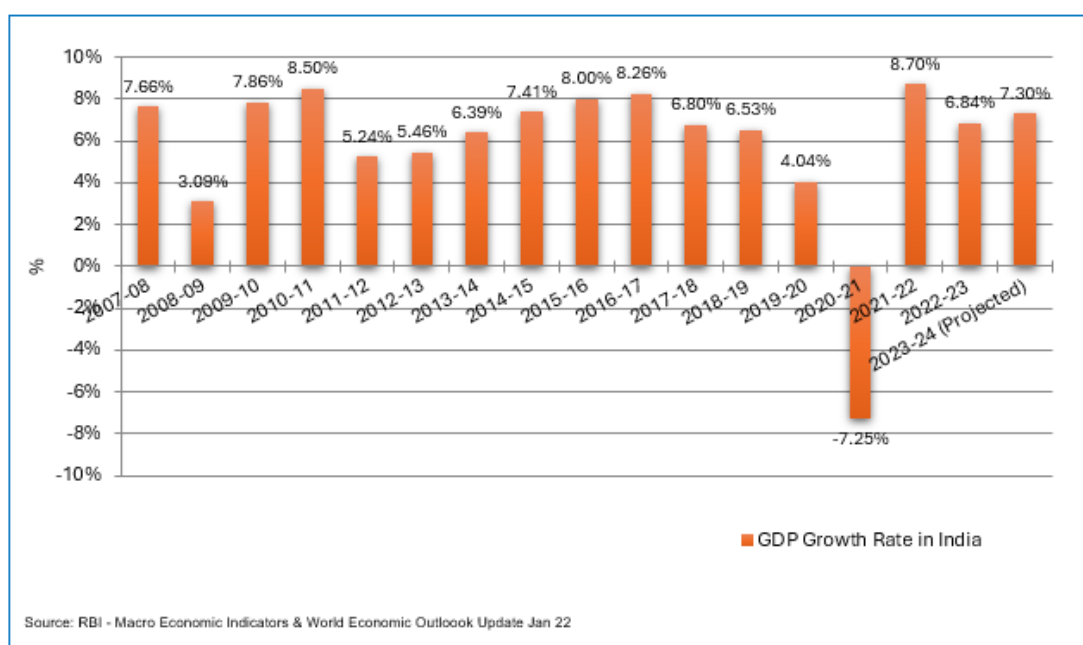


Figure 3-4 : Growth of GDP in India

FY 2017-18 recorded a growth of 6.7% which had a slight impact of GST and demonetization. Indian economy appears on recovery path with estimated growth of 6.8% in FY 2018-19. The government took major policy decisions including tax infrastructure reforming, banking sector improvement and ease of doing business.

Major economies of world collapsed due to pandemic COVID-19 including India. Indian economy is also registered negative growth in financial year 2020-21. After that Indian economy recovered handsomely and registered a growth of about 9% in Year 2021-22.

3.6 Recommended Growth Rates of Traffic

Based on the above analysis and after giving due consideration to the entire listed factors, the following overall growth rates are recommended for each category of vehicle as below. The rate of growth is moderate in light of overall regional trends. Growth of multi-Axle is kept slightly higher as trend of technological advances in logistic industry favors multi-axle over 2/3 axle carriage. It is also expected that as the economy moves from developing to developed, the rate of growth diminishes. Same growth rate is not sustainable for long. It is established practice to step down future growth rates at suitable intervals of years.

Temporary disruptions caused by implementation of Goods and Service Tax (GST) and demonetization have dissipated, and growth of economy has significantly improved since then. Hence the corridor can have the expected growth.

Growth rates are recommended for three scenarios for sensitivity analysis namely **Optimistic**, **Pessimistic** and **Most Likely** with a positive and negative variation 0.25% from Most Likely case.

Table 3-6 : Recommended Growth Rates Optimistic

Year/ Vehicle Type	2025-2026	2026-2031	2031-2036	2036-2041	2041-2046
Car	4.58%	4.24%	3.87%	3.36%	2.81%
Minibus /LCV	3.09%	2.88%	2.72%	2.65%	2.53%
Truck / Bus	3.86%	3.52%	3.19%	2.86%	2.53%
Multi Axle	3.86%	3.52%	3.19%	2.86%	2.53%

Table 3-7 : Recommended Growth Rates Pessimistic

Year/ Vehicle Type	2025- 2026	2026- 2031	2031- 2036	2036- 2041	2041- 2046
Car	4.08%	3.74%	3.37%	2.86%	2.31%
Minibus /LCV	2.59%	2.38%	2.22%	2.15%	2.03%
Truck / Bus	3.36%	3.02%	2.69%	2.36%	2.03%
Multi Axle	3.36%	3.02%	2.69%	2.36%	2.03%

Table 3-8 : Recommended Growth Rates Most Likely

Year/ Vehicle Type	2025- 2026	2026- 2031	2031- 2036	2036- 2041	2041- 2046
Car	4.33%	3.99%	3.62%	3.11%	2.56%
Minibus /LCV	2.84%	2.63%	2.47%	2.40%	2.28%
Truck / Bus	3.61%	3.27%	2.94%	2.61%	2.28%
Multi Axle	3.61%	3.27%	2.94%	2.61%	2.28%

CHAPTER 4

TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in the previous section of the report are used to arrive at traffic projections for future years. Toll plaza wise futuristic traffic projection is given in tables below.

These projections have been done for the following three cases of growth.

1. Optimistic Scenario
2. Pessimistic Scenario
3. Most Likely Scenario

Table 4-1 : Total Tollable Traffic @ Toll Plaza 1- Chainage 191.800 KM
(Optimistic Growth Scenario)

Year	Car	LCV	Truck/ Bus	Multi axle	Total No.	Total PCU (Including Non-Paid Traffic)
2025-26	22219	2856	3995	4296	33366	57820
2026-27	23161	2937	4136	4447	34681	59986

Table 4-2 : Total Tollable Traffic @ Toll Plaza 1- Chainage 191.800 KM
(Pessimistic Growth Scenario)

Year	Car	LCV	Truck/ Bus	Multi axle	Total No.	Total PCU (Including Non- Paid Traffic)
2025-26	22112	2842	3976	4275	33205	57541
2026-27	22938	2910	4096	4405	34349	59414

Table 4-3 : Total Tollable Traffic @ Toll Plaza 1- Chainage 191.800 KM*(Most Likely Growth Scenario)*

Year	Car	LCV	Truck/ Bus	Multi axle	Total No.	Total PCU (Including Non- Paid Traffic)
2025-26	22165	2849	3986	4286	33286	57684
2026-27	23049	2924	4118	4426	34517	59706

4.2 Extension of Concession Period

15 days of extension in concession period has been approved by NHAI due to floods in Chennai in December 2015. Due to the suspension in toll in the year FY17 because of demonetization for a period of 24 days, the Concessionaire would be entitled to an extension of an additional 24 days. Traffic was severely impacted on the project highway during the initial lockdown period. NHAI has declared a policy of providing extension of concession to make up for revenue loss during lockdown. It is expected that an extension would be provided to project concession period on this account as well.

CHAPTER 5

FORECAST OF TOLL REVENUE

5.1 General

This chapter presents the tolling rate calculations, categories and toll revenue of the project.

5.2 Discount Categories

Fee schedule of agreement of Omalur – Namakkal section of NH-7 is based on old toll policy. As per the Toll Notification (Schedule R) the following discounts have been considered:

1. Monthly Pass: For frequent user's monthly pass would be issued at fee 30 times the single journey fee. There are other local monthly passes for cars /Jeep/ Van category I and II and school bus @ Rs.150, Rs.300 and Rs.1000 respectively.
2. Multiple Journeys (for Return Trip): Will be charged at 1.5-time single journey.
3. Single Journey: Full single journey toll would be charged to this category of vehicles who are infrequent travelers or whose frequency does not yield any discount from the above categories.
4. There are several categories of local discounts.
 - a) Local Bus / truck and LCV (within 20 km) will be charged @ Rs. 25 and 15 respectively. The rate will be constant throughout the concession period.

Building of inflation and escalation of rate on the basis of WPI are done as per toll notification (Schedule R) as given under

$$\text{Base Fee} \times \frac{\text{WPI-B}}{\text{WPI-A}} \times \text{length of the said section.}$$

Where

- WPI-A = is the Wholesale Price Index of June, 1997 (131.4).
- WPI-B = is the Average Wholesale Price Index for the year ending March, 31st preceding the fee revision date.

5.3 Estimation of Toll Rates

As per the applicable MORTH notification and Schedule R of contract agreement, the following Base rate of fee for the categories mentioned in the table stands true in the National Highways Fee Rules applicable for contract.

Table 5-1 : Base Toll Rates June 1997

Type of Vehicle	Base Rate of Fee / Km (in Rs.)
Car, Jeep, Van or Jeep	0.40
Light Commercial Vehicle, (LCV)	0.70
Bus or Truck (2 Axle)	1.40
MAV (> 2 axle)	2.25

Factor of inflation / growth has been incorporated as per Schedule R. WPI are available up to 2021-22. A moderate growth in Wholesale Price Index (WPI) has been assumed after that. Following graph provides projection of rate of inflation (WPI) in India. Data has been taken from Office of Economic Advisor web site (www.eaindustry.nic.in). WPI for years 2017-18 and 2018-2019 is worked back by applying a correlation factor for 2004-05 series as 2017-18 and 2018-2019 data is available in 2011-12 series only. Ratio of WPI for year 2016-17 for both series is used for conversion of WPI in 2004-05 series.

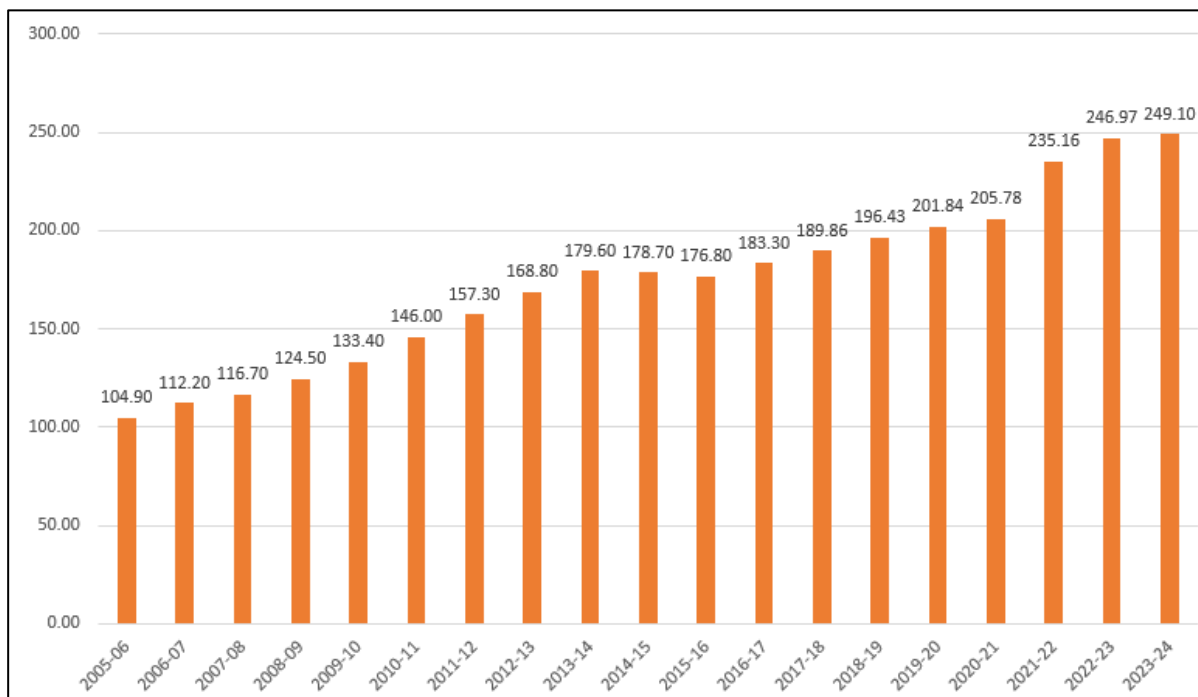


Figure 5-1 : Historical Rate of WPI Inflation in India

Except for the negative growth of WPI in the year 2015-16 average inflation in WPI from the year 2005-2024 is 4.98%. For future years initially it takes 5% and suitably stepped down for future years.

Toll rates are calculated as per guidelines provided in schedule R (rounded to nearest Rs. five) for the concession period and are given below.

Thus, worked out rates for various categories of vehicle and discounts are given as under

Table 5-2 : Toll Rates for Single Journey @191.800

Year	Car/Jeep/Van	LCV	Truck/Bus	Multi Axle (> 2 axle)	Car - LCO	LCV - LTO	Truck/Bus - LTO
2024-25	95	170	340	545	15	15	25
2025-26	100	180	355	575	15	15	25
2026-27	105	185	375	600	15	15	25

Table 5-3 : Toll Rates for Multiple Journeys @ 191.800

Year	Car	Minibus /LCV	Truck/ Bus	Multi Axle
2024-25	145	255	510	820
2025-26	155	265	535	860
2026-27	160	280	560	900

Table 5-4 : Toll Rates for Monthly Pass @191.800

Year	Car/ Jeep/ Van	LCV	Truck/ Bus	Multi Axle (> 2 axle)	Car - LT1	Car - LT2	School Bus
2024-25	2910	5090	10180	16360	150	300	1000
2025-26	3055	5345	10690	17180	150	300	1000
2026-27	3205	5610	11225	18040	150	300	1000

5.4 Toll Revenue

As indicated earlier, toll revenue on the Project Road has been calculated under in all three scenarios. The estimates of toll revenue under *Optimistic*, *Pessimistic* and *Most Likely* growth scenarios are presented in the following section.

5.5 Toll Revenue at all toll plazas under Scenarios

Toll Revenue estimates under most likely scenario at each of the toll plaza up to 2026-27 (End of Concession Period) starting from the year 2024-25 are shown in tables below.

Table 5-5 : Toll Revenue Optimistic Scenario*(Rs. Crores)*

Year	Toll Plaza 191.800	Total
2024-25	178.13	178.13
2025-26	191.59	191.59
2026-27	207.54	207.54

Table 5-6 : Toll Revenue Pessimistic Scenario**(Rs. Crores)**

Year	Toll Plaza 191.800	Total
2024-25	178.13	178.13
2025-26	190.65	190.65
2026-27	205.52	205.52

Table 5-7 : Toll Revenue Most Likely Scenario**(Rs. Crores)**

Year	Toll Plaza 191.800	Total
2024-25	178.13	178.13
2025-26	191.11	191.11
2026-27	206.54	206.54

CHAPTER 6

OPERATION & MAINTENANCE

6.1 Operation & Maintenance

The following are project parameters which would contribute towards the cost of operation and maintenance.

The future cost of operation and maintenance is estimated on engineering judgment and experience basis. Keeping all above factors in view, following can be basis of working out cost of operation and maintenance for project corridor from Omallur to Salem on NH-44 in state of Tamil Nadu.

- b) **Annual Regular Maintenance** – Covering pothole repair, shoulder and slope repair, drain cleaning, median maintenance, Crash barrier, toll plaza maintenance, Toll collection, other services like medical help and rescue operations etc.
- c) **Periodic Maintenance** – This will be done on a periodic basis, say every 5 years. It will consist of overlaying of wearing course and painting and marking. Some pavement strengthening is also anticipated in a few sections. This operation and its cost are spread over three years.

Concessionaire has recently updated the program of maintenance of project road. Same has been reviewed and year-wise cost of O&M from year 2023-24 is given in table below.

Table 6-1 : O&M COST

Year	Annual maintenance (Rs. Cr)	Thermoplastic painting (Rs. Cr)	Renewal Coat with BC (Rs. Cr.)	Special Repair of pavement	Structure maintenance. (Rs. Cr)	Electric System	Total Expenditure (Rs. Crores)	Remarks
						Annual		
2024-25	5.13	1.51	6.08	5.71	0.14	0.23	25.20	Renewal of Wearing course + Pavement repair
2025-26	5.13				0.14	0.23	7.75	Regular O & M
2026-27	5.13				0.14	0.23	8.13	Regular O & M

CHAPTER 7

CONCLUSION & RECOMMENDATIONS

7.1 Conclusion & Recommendations

Project stretch of Omalur to Namakkal section of NH-7 in state of Tamil Nadu from km 180.000 to km 248.625 is presently a four-lane road. The road is in sound condition and serves healthy traffic volumes. The project corridor is a part of critical North – South connectivity via national highway NH-7. Bangalore has already emerged as the IT capital of country and the project stretch falls in its catchment. There are many upcoming projects in the area which are proposed to boost economic growth of the area and add value to the development of the region. All the developments considered in the Report have the potential to have a positive impact on the traffic flow on the project. The following can be considered as major outcome of study.

- a) There is a healthy volume of tollable traffic running on the project.
- b) Project corridor has the potential to witness good traffic growth annually in the post COVID-19 scenario due to various developments in area and overall development of economy.
- c) Project corridor does not have risk of traffic leakage due to lack of competing roads of comparable quality.

The project infrastructure is in good condition and its maintenance cost is also reasonable.

Based on the above it can be considered a stable healthy project from the traffic and revenue point of view.

CHAPTER 8

PROJECT ILLUSTRATIONS

8.1 General

Project current condition has been depicted in the following photographs.



Figure 8-1 : General Project Condition



Figure 8-2 : Toll Plaza



Figure 8-3 General Project Condition



Figure 8-4 General Project Condition



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