IRB Infrastructure private limited
(A subsidiary of
IRB INFRASTRUCTURE DEVELOPERS LTD)

Registered Office :
IRB Complex, Chandivali Farm, Chandivali Village, Andheri (E), Mumbai-400 072
Tel: 91-22-6640 4299 • Fax: 91-22-6640 4274 • e-mail: info@irbfl.co.in • www.irbfl.co.in
CIN :U28920MH1997PTC112628

November 14, 2022

Corporate Relationship Department, BSE Limited Phiroze Jeejeebhoy Towers Dalal Street, Mumbai- 400001	Listing Department, National Stock Exchange of India Limited Exchange Plaza, C-1 Block G Bandra Kurla Complex, Bandra (E), Mumbai

Dear Sir/Madam,

Ref: Scrip Code: 540526, Symbol: IRBINVIT

Sub: Report for the half year ended September 30, 2022

Pursuant to Regulation 23 of SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended, please find attached Report of IRB InvIT Fund for the half year ended September 30, 2022.

Kindly take the same on your record.

Thanking you,

Yours faithfully,

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

Vinod Kumar Menon

Digitally signed by Vinod Kumar Menon
DN: c=IN, o=Personal, 2.5.4.20=a25290b407a614729b1cf32d80f9aae7a4063141c61a93a4ff0156fd4c0931ec, postalCode=421201, st=Maharashtra, serialNumber=1530b06178e02ec85e221c167d140848b170ac38b06c8057360fe25521 85582d, cn=Vinod Kumar Menon
Date: 2022.11.14 17:34:18 +05'30'

Vinod Kumar Menon
CEO & Whole-lime Director

Encl: As above

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(A subsidiary of
IRB INFRASTRUCTURE DEVELOPERS LTD)

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CIN :U28920MH1997PTC112628

Report for the half year ended September 30, 2022

To,
The Unitholders,
IRB InvIT Fund

We, IRB Infrastructure Private Limited, Investment Manager of IRB InvIT Fund (the Trust) hereby submit the Report for the half year ended September 30, 2022 to the Unitholders of the Trust together with Financial Statements and Valuation Report for the half year ended September 30, 2022.

1) Investment Manager's brief report of activities of the Trust and summary of the unaudited consolidated financial statements for the period of the Trust.

The Trust has been settled by IRB Infrastructure Developers Limited (the "Sponsor") pursuant to the Indenture of Trust in Mumbai, India, as an irrevocable trust in accordance with the Trusts Act. The Trust has been registered with SEBI as an Infrastructure Investment Trust under Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 (the InvIT Regulations) (Registration Number: IN/InvIT/15-16/0001). The object and purpose of the Trust is to carry on the activity of an Infrastructure Investment Trust under the InvIT Regulations, to raise resources in accordance with the InvIT Regulations, and to make investments in accordance with its investment strategy.

The Trust owns, operates and maintains a portfolio of five toll-road assets in the Indian states of Maharashtra, Rajasthan, Karnataka, Tamil Nadu and Punjab. These toll roads are operated and maintained pursuant to concessions granted by the NHAI. The Trust is listed on both the Stock exchanges i.e. National Stock Exchange of India Limited and BSE Limited since May 18, 2017.

IDAA Infrastructure Limited and IRB Surat Dahisar Tollway Limited, Project SPVs of the Trust, have successfully completed the respective Concession Periods on March 31, 2022 and May 25, 2022 and handed over the Project Highways including Project Assets to National Highways Authority of India (NHAI) in accordance with the terms of the Concession Agreement.

The Summary of financial information on Standalone and Consolidated Financial Statement of the Trust are annexed herewith as

2) Brief details of all the assets of the Trust, project-wise

Project wise brief details of all the assets of the Trust are annexed herewith as

3) Details of revenue during the period, project-wise from the underlying projects

Details of Project wise revenue from the underlying assets are annexed herewith as

4) Details regarding the monies lent by the InvIT to the holding company or the special purpose vehicle in which it has investment

Details regarding the monies lent by the InvIT to the holding company or the special purpose vehicle in which it has investment is annexed herewith as

5) Brief summary of the valuation as per full valuation report as at the end of the period

Please refer Valuation Report issued by Mr. S Sundararaman, Valuer for the half year ended September 30, 2022, annexed herewith as

6) Any information or report pertaining to the specific sector or sub-sector that may be relevant for an investor to invest in units of the Trust

The Toll Revenue and O&M Cost Projection Report issued by M/s. GMD Consultants, Technical Consultant, for each Project SPV is annexed herewith as

7) Details of changes during the period pertaining to:

a) Addition and divestment of assets including the identity of the buyers or sellers, purchase or sale prices and brief details of valuation for such transactions

During the period, the Trust has received the non-binding offer from Sponsor for acquisition of Vadodara-Kim HAM project. Subsequently, the Investment Manager has appointed the intermediaries for evaluation of this asset. Post completion of the independent valuation for the asset and the due diligence process, the unitholders approval has been taken for (a) the acquisition of 100% of the equity share capital of VK1 Expressway Private Limited ("**VK1**") by the Trust from IRB Infrastructure Developers Limited (i.e., the Sponsor and the Project Manager of the Trust) and the provision of a shareholder loan to VK1 the proceeds of which shall be utilized by VK1 for the repayment, in full, of the shareholder loan provided to VK1 by the Sponsor, for an aggregate purchase consideration of Rs. 342 crores to be paid in cash on the terms and conditions as may be agreed among the parties; and (b) the appointment of the Sponsor as the project manager in relation to VK1 to undertake O&M works for an aggregate consideration of Rs. 224 crores, on such terms and conditions as may be mutually agreed among the parties to the proposed transaction.

The trust has not divested any of its Assets.

b) Valuation of assets and NAV (as per the full valuation reports)

Statement of Net Assets at Fair Value as at September 30, 2022

Particulars	Amt in Lakhs
A. Assets	7,01,167.97
B. Liabilities	1,17,773.89
C. Net Assets	5,83,394.08
Outstanding units	5,805.50
NAV at Fair Value (Per Unit)	**100.49**

c) Borrowings or repayment of borrowings (standalone and consolidated)

Details of Borrowings or repayment of borrowings on standalone and consolidated are annexed herewith as .

d) Credit rating

CARE Ratings Limited has reaffirmed "CARE AAA" to the Trust's long term bank facilities with a stable outlook.

India Ratings and Research (Ind-Ra) has affirmed the Trust's long term senior debt rating at "IND AAA" with stable outlook.

e) Sponsor, Investment Manager, Trustee, valuer, directors of the Trustee or Investment Manager or sponsor, etc.

Details of the Investment Manager

IRB Infrastructure Private Limited is the Investment Manager (IM) of the Trust, and has been designated as such pursuant to the Investment Management Agreement dated March 3, 2016. The Investment Manager is responsible for making investment decisions with respect to the underlying assets or projects of the Trust (Project SPVs), including any further investment or divestment of its assets, in accordance with Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended (the InvIT Regulations) and the Investment Management Agreement.

The details of the Investment Manager are as follows:

Details of the Investment Manager

a) **Name:** IRB Infrastructure Private Limited (CIN : U28920MH1997PTC112628);

b) **Registered Office:** IRB Complex, Chandivali Farm, Chandivali Village, Andheri (E), Mumbai - 400 072;

c) **Correspondence Address:** IRB Complex, Chandivali Farm, Chandivali Village, Andheri (E), Mumbai - 400 072;

d) **Telephone Number:** +91 22 6640 4299;

e) **Fax:** +91 22 6640 4274; and

f) **Website:** www.irbfl.co.in

g) **E-mail:** info@irbfl.co.in

i) Details of the Contact Person of the Investment Manager

a) **Name:** Ms. Swapna Vengurlekar, Compliance Officer;

b) **Telephone Number:**+91 22 6640 4299; and

c) **Email:** swapna.vengurlekar@irbfl.co.in

ii) Past Experience of the Investment Manager

The Company has adequate net worth, experience, resources and personnel in the development of infrastructure and to perform functions of the Investment Manager. The Board of the Investment Manager comprises of majority of the Independent Directors having extensive experience in Infrastructure Sector and Project financing.

iii)

a) Mr. Rajinder Pal Singh (DIN : 02943155)

Mr. Rajinder Pal Singh, aged 70 years, is a Non-Executive Director and Chairman of the Board of Investment Manager. He holds a master's degree in mathematics from Advanced Centre for Pure Mathematics, Punjab University, Chandigarh. He taught pure mathematics & statistics to graduate classes, before he joined the

Indian Administrative Service. He has wide experience in regulatory areas of finance, industry, urban development and infrastructure. He worked both as Commissioner of Hyderabad Municipal Corporation & Vice Chairman of Hyderabad Urban Development Authority. He was also the Managing Director of Andhra Pradesh Industrial Development Corporation and Commissioner of Taxation in Andhra Pradesh. He was posted to Punjab & Sind Bank as its Chairman from March, 2005 to September, 2009. He retired as Secretary to Government of India in the Department of Industrial Policy & Promotions and post retirement was appointed by the Government of India as Chairman of National Highways Authority of India (NHAI). At present, he is a Director of Maruti Suzuki India Limited, Nirlon Limited and Macrotech Developers Limited.

b) Mr. Sunil Tandon (DIN: 00874257)

Mr. Sunil Tandon, aged 65 years, is an Independent Director of the Investment Manager. He is a former IAS officer with a master's degree in Business Administration (specialisation in Financial Management & Strategy) from the Strathclyde Business School, UK. He has over 42 years in the private sector and in the government; experience spans the entire spectrum from implementation of policy to policy formulation and conceiving and grounding of large infrastructure projects. He held positions of CEO and MD of various large corporates such as SKIL Group, Pipavav Port, Pipavav Rail, GMR Infrastructure, Capital Partners, 50 HZ India Private Limited, etc. He held senior positions in state and central governments and specialises in setting up ("concept to completion") large infrastructure projects (Ports, Defence Shipyards, Airports, Railways, Expressways, Special Economic Zones), project management and finance, joint ventures, mergers and acquisitions, public administration, public private partnership and advising corporates and state governments on risk mitigation strategies for large projects. He has worked with and advised State Governments of Madhya Pradesh, Chhattisgarh, Tamil Nadu, Andhra Pradesh, Gujarat, Rajasthan and Orissa, on large infrastructure projects and Public Private Partnerships. He also served as Nodal officer in the Ministry of Finance, Government of India for various projects financed by various foreign government agencies and organizations and worked with various foreign governments. He was former Chairman of several Infrastructure Committees of Trade bodies such as CII, Assocham and FICCI. He served as Secretary to the Union Minister of State for Finance and Deputy Secretary/Director in the Ministry of Finance.

c) Mr. Vinod Kumar Menon (DIN: 03075345)

Mr. Vinod Kumar Menon, aged 56 years, is a Whole Time Director & Chief Executive Officer of the Investment Manager. He holds a Bachelor of Technology degree in Civil Engineering. He has experience of 35 years in the fields of infrastructure development and management. Previously, he was the president (business development) of the Sponsor. He currently serves as the vice-president of the National Highway Builder Federation - a non-profit organisation.

d) Mr. Nikesh Jain (DIN: 06837475)

Mr. Nikesh Jain, aged 46 years, is an Independent Director of the Investment Manager. He is a fellow member of the Institute of Chartered Accountants of India and partner of JMR Associates LLP (since 2012). He is the Senior Partner of JMR Associates LLP and is in charge of assurance & advisory practice. He has experience of over twenty years in the field of Statutory Audits, Internal Audit, and also diversified experience in Valuations of shares, Initial Public Offer, Consolidation of mid-size Companies, Due Diligence, Valuation of Business, Merger, Acquisition, International and Domestic Taxation, FEMA & RBI Compliances, NBFC, Goods and Service Tax and Accounting System Monitoring Assignments. Earlier, he worked with many renowned Chartered Accountant Firms.

iv)

a) Mr. Vinod Kumar Menon

For details in relation to Mr. Vinod Kumar Menon, see "- *Brief Profiles of the* ".

b) Mr. Rushabh Gandhi

Mr. Rushabh Rakesh Gandhi, aged 32 years, is a qualified Chartered Accountant (ICAI) and also holds a degree in Law. Previously, he served as the CFO of the Sponsor. He has been associated with IRB Group for more than 10 years. He has experience in Accounts, Audit, Finance, Taxation and business reorganisation. He has also been actively participating in the fund raising activities of IRB Group in last 8 years.

c) Ms. Swapna Vengurlekar

Ms. Swapna Vengurlekar, aged 31 years, has been designated as the Company Secretary and Compliance Officer by the Investment Manager with respect to the Trust. She joined the Sponsor Group in May 2015. She has done B. Com and LL.B. from Mumbai University. She is an associate member of the Institute of Company Secretaries of India. She has more than ten years of experience in the field of Corporate Affairs and Compliances of Company Law and Securities Law. Prior joining to Sponsor Group, she was associated with M/s. Makarand M. Joshi & Co., Practising Company Secretary and SKP Crossborder Consulting Private Limited.

v) Details of the Holding or the Proposed Holding by the Investment Manager and its Directors in the Trust

As on September 30, 2022, as per the disclosures received from the Directors of Investment Manager, Mr. Vinod Kumar Menon, Whole-time Director and Chief Executive Officer holds 30,000 units of the Trust.

vi) Summary of the Standalone Financial Statements of the Investment Manager

The Investment Manager has no subsidiaries. For a summary of the financial statements of the Investment Manager, as derived from the standalone financial statements of the Investment Manager, prepared in accordance with Ind AS and the Companies Act, 2013 as of and for the financial year ended March 31, 2022, please refer website of Investment Manager i.e. www.irbfl.co.in

During the period, there was no change in the Board of Directors of the Investment Manager.

vii) Codes / Policies

In order to adhere to the good governance practices for the Trust, the Investment Manager has adopted the following policies in relation to the Trust:

Distribution Policy

The Investment Manager has adopted the Distribution Policy as disclosed in Final Offer Document to ensure proper, accurate and timely distribution for the Trust. The Distributable Income of the Trust is calculated in accordance with the Distribution

Policy, the InvIT Regulations and any circular, notification or guidance issued thereunder.

Code of Internal Procedures and Conduct for Regulating, Monitoring and

The Investment Manager has adopted the UPSI Policy (as a part of PIT) to ensure that the Trust complies with applicable law, including the SEBI InvIT Regulations or such other laws, regulations, rules or guidelines prohibiting insider trading and governing disclosure of material, unpublished price sensitive information.

Policy in relation to Related Party Transactions

To ensure proper approval, supervision and reporting of the transactions between the Trust and its Related Parties, the Board of Directors of the Investment Manager has adopted the Policy in relation to Related Party Transactions as disclosed in Final Offer Document, to regulate the transactions between the Trust and its Related Parties.

Representatives on the Board of Directors of each Project SPVs

The Investment Manager, in consultation with the Trustee, has appointed the majority of the board of directors of Project SPVs. Further, the Investment Manager ensures that in every meeting, including annual general meeting of Project SPVs, the voting of the Trust is exercised.

viii) Functions, Duties and Responsibilities of the Investment Manager

The functions, duties and responsibilities of the Investment Manager are in accordance with the Investment Management Agreement and the InvIT Regulations. The Board of the Investment Manager comprises of majority of the Independent Directors having extensive experience in Infrastructure Sector and Project financing. The business operations of the Investment Manager are managed by a team of professionals with experience in the road infrastructure sector.

Details of the Sponsor and the Project Manager

IRB Infrastructure Developers Limited is the Sponsor of the Trust. The Sponsor is one of the largest infrastructure development and construction companies in India. The Sponsor has been listed on the Indian Stock Exchanges since 2008.

As of September 30, 2022, the Sponsor's portfolio comprises of 22 highway projects, including 17 Build-Operate-Transfer (BOT), 1 Toll-Operate-Transfer (TOT) and 4 Hybrid Annuity Model (HAM) projects and 1 Airport project located at Sindhudurg District of Maharashtra. The BOT segment includes ten projects under IRB Infrastructure Trust with O&M contracts and five projects under O&M contracts as a project manager for the IRB InvIT Fund. The Sponsor also has the largest TOT – Mumbai-Pune Expressway – to its credit. Altogether, it has ~20% share of the GQ Highway Network under various stages. Over the years, the Company has developed rich in-house expertise in both its EPC and O&M verticals.

During the period, Mr. Carlos Ricardo Ugarte Cruz Coke ceased to be the Director of the Sponsor w.e.f. August 5, 2022, Mr. Ravindra Dhariwal was appointed as an Additional Independent Director of the Sponsor w.e.f. August 5, 2022 and Mr. Virendra Mhaiskar was re-appointed as Managing Director of the Sponsor for a period of 5 years w.e.f. September 7, 2022, except this there was no change in the Board of Directors of the Sponsor.

For more details about the Sponsor, please refer website www.irb.co.in

Details of the Trustee

The Sponsor has settled the Trust pursuant to the Indenture of Trust dated October 16, 2015, as amended on February 17, 2017, and appointed IDBI Trusteeship Services Limited (the Trustee) in accordance with the provisions of the InvIT Regulations.

The Trustee is registered with the SEBI as a debenture trustee under the Debenture Trustees Regulations, having the SEBI registration number of IND000000460. The Trustee's SEBI registration certificate is valid unless it is suspended or cancelled by the SEBI.

As per confirmation received from the Trustee, there is no change in their details. The Board of Directors of the Trustee as on September 30, 2022 is as follows:

Sr. No.	Name	Designation	DIN
1.	Ms. Padma Betai	Managing Director and CEO	00937921
2.	Mr. J. Samuel Joseph	Chairman	02262530
3.	Mr. Pradeep Kumar Jain	Director	07829987
4.	Ms. Madhuri J. Kulkarni	Director	07787126
5.	Ms. Jayashree Vijay Ranade	Director	09320683

Details of the Valuer

During the period under review, the Investment Manager and Unitholders of the Trust has approved the appointment of Mr. S. Sundaraman ("Registered Valuer"), bearing IBB registration number IBBI/RV/06/2018/10238 and Baker Tilly DHC Business Private Limited as the valuers of the IRB InvIT Fund and all its Project SPVs for the financial year 2022-2023.

As per confirmation received from the Valuer, the details of the Valuer are as follows:

Mr. S Sundararaman
Registered Valuer
IBBI Registration Number - IBBI/RV/06/2018/10238
Address: 5B, "A" Block, 5th Floor, Mena Kampala Arcade, New #18 & 20,
Thiagaraya Road, T. Nagar, Chennai – 600 017

f) Clauses in trust deed, investment management agreement or any other agreement entered into pertaining to activities of the Trust

During the period, there is no change in Clauses of Trust Deed, Investment Management Agreement or any other agreement entered into pertaining to activities of the Trust since listing of Units of the Trust.

g) Any regulatory changes that has impacted or may impact cash flows of the underlying projects

There are no other material regulatory changes that had impacted or may impact cash flows of the underlying projects.

h) Change in material contracts or any new risk in performance of any contract pertaining to the Trust

During the period, there is no change in material contracts or any new risk in performance of any contract pertaining to the Trust.

i) Any legal proceedings which may have significant bearing on the activities or revenues or cash flows of the Trust

Manager, Project Manager(s), or any of their associates and the Trustee if any, as at the end of the period".

j) Any other material change during the period

During the period, there are no material changes except as disclosed in this Report.

8) Revenue of the Trust for the last 5 years, project-wise

Project wise revenue of the Trust is annexed herewith as

9) Update on development of under-construction projects, if any

The Trust has not invested in under-construction projects.

10) Details of outstanding borrowings and deferred payments of the Trust including any credit rating(s), debt maturity profile, gearing ratios of the Trust on a consolidated and standalone basis as at the end of the period

Details of outstanding borrowings and deferred payments of the Trust including any credit rating(s), debt maturity profile, gearing ratios of the Trust on a consolidated and standalone basis as at the end of the period are annexed herewith as

11) The total operating expenses of the Trust along with detailed break-up, including all fees and charges paid to the Investment Manager and any other parties, if any during the period

The total operating expenses of the Trust along with detailed break-up, including all fees and charges paid to the Investment Manager and any other parties, if any during the period are annexed herewith as

12) Past performance of the Trust with respect to unit price, distributions made and yield for the last 5 years, as applicable

Particulars	**BSE (Rs.)**	**NSE (Rs.)**
Unit price quoted on the exchange at the beginning (Closing price of April 1, 2022)	52.78	52.73
Unit price quoted on the exchange at the end (Closing price of September 30, 2022)	59.72	59.65
highest unit price (September 16, 2022)	60.70	-
highest unit price (September 9, 2022)	-	60.50

lowest unit price (May 16, 2022)	52.00	51.90

Yield Details:

Particulars	FY22	FY21	FY20	FY19	FY18
Yield (%) based on average rate	17%	21%	22%	16%	11%

13) Unit price quoted on the exchange at the beginning and end of the period, the highest and lowest unit price and the average daily volume traded during the period

MONTHLY HIGHEST AND LOWEST UNIT PRICE

Month	**BSE**		**NSE**	
	High (Rs.)	**Low (Rs.)**	**High (Rs.)**	**Low (Rs.)**
April, 2022	56.96	52.60	56.70	52.50
May, 2022	56.65	52.00	56.84	51.90
June, 2022	57.98	53.10	55.70	53.70
July, 2022	57.48	55.02	57.95	54.80
August, 2022	57.90	54.02	56.95	54.01
September, 2022	60.70	54.10	60.50	56.05

AVERAGE DAILY VOLUME TRADED

Month	**Average daily volume**	
	BSE	**NSE**
April, 2022	47,706	4,36,864
May, 2022	5,70,778	9,20,480
June, 2022	21,915	1,97,864
July, 2022	33,175	2,36,758
August, 2022	44,002	5,27,472
September, 2022	38,070	3,08,742

14) Details of all related party transactions during the period, value of which exceeds five per cent of value of the Trust assets

Details of all related party transactions and related party balances are provided in financial press release annexed herewith as .

15) Details of issue and buyback of units during the period, if any

During the Period, the Trust has not issued any additional Units.

16) Brief details of material and price sensitive information

During the period, the Trust, from time to time, has been providing details of material and price sensitive information to the stock exchanges in accordance with InvIT Regulations.

17) Brief details of material litigations and regulatory actions, which are pending, against the Trust, sponsor(s), Investment Manager, Project Manager(s), or any of their associates and the Trustee if any, as at the end of the period

Brief details of material litigations and regulatory actions, which are pending, against the Trust, sponsor(s), Investment Manager, Project Manager(s), or any of their associates and the Trustee if any, as at the end of the period are provided as .

18) Risk factors

Risk factors are annexed herewith as .

19) Information of the contact person of the Trust

Ms. Swapna Vengurlekar
Compliance Officer
Address: IRB Complex, Chandivali Farm, Chandivali Village,
Andheri (East), Mumbai – 400 072
Tel: +91 22 6640 4299
Fax: +91 22 6640 4274
E-mail: swapna.vengurlekar@irbfl.co.in

IRB INVIT FUND
By Order of the Board IRB Infrastructure Private Limited
(as the Investment Manager to IRB InvIT Fund)

Vinod Kumar Menon

Digitally signed by Vinod Kumar Menon
DN: c=IN, o=Personal, 2.5.4.20=a25290b407a614729b1cf32d80f9aae7a4063141c61a93a4ff0156fd4c0931ec, postalCode=421201, st=Maharashtra, serialNumber=1530b06178e02ec85e221c167d1408648b170ac38b06c80573606fe255218558 2d, cn=Vinod Kumar Menon
Date: 2022.11.14 17:41:19 +05'30'

Vinod Kumar Menon
Whole Time Director and Chief Executive Officer of the Investment Manager
Encl.: As above

6. Based on our review conducted as above and upon consideration of review reports of other auditors, nothing has come to our attention that causes us to believe that the accompanying Statement, prepared in accordance with the recognition and measurement principles laid down in the applicable Indian Accounting Standards (Ind AS) as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015 as amended and other recognised accounting practices and policies has not disclosed the information required to be disclosed in terms of Regulation 23 of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 as amended, read with the SEBI Circular, including the manner in which it is to be disclosed, or that it contains any material misstatement.

For Suresh Surana & Associates LLP
Chartered Accountants
Firm's Reg. No.121750W / W-100010

RAMESH GUPTA

Digitally signed by RAMESH GUPTA
DN: c=IN, o=Personal, title=3234, pseudonym=133015767920058959k8V5TgRa3pBbJ, 2.5.4.20=cee46451fba2b5775c0a4217839f08e5a3248dd2204fe0be04a132cad63997b8, postalCode=400101, st=Maharashtra, serialNumber=58850e070d0e07728cfeae5722c26b267511a51661a740bf3955d17900be0b41, cn=RAMESH GUPTA
Date: 2022.10.17 14:20:21 +05'30'

SURESH SURANA & ASSOCIATES LLP
Chartered Accountants
MUMBAI

(Ramesh Gupta)
Partner
Membership No.: 102306
UDIN: 22102306AZYTJV9674
Place: Mumbai
Dated: 17 October 2022

Registered Office: IRB Complex, Chandivali Farm, Chandivali Village, Andheri (E), Mumbai – 400 072, Maharashtra, India.
Tel: 022 6640 4299, **Fax:** 022 6640 4274,
E-mail: info@irbinvit.co.in; **Website:** www.irbinvit.co.in
SEBI Registration Number: IN/InvIT/15-16/0001;

IRB InvIT Fund

(An irrevocable trust set up under the Indian Trusts Act, 1882, and registered as an Infrastructure Investment trust with the Securities and Exchange Board of India)

(Rs. in lakhs, unless otherwise stated)

Unaudited Consolidated Interim Financial Results for the half year ended September 30, 2022

Sr. No.	Particulars	Six months ended September 30, 2022	Six months ended September 30, 2021	Six months ended March 31, 2022	For the year ended March 31, 2022
		(Unaudited)	(Unaudited)	(Audited – Refer note 3)	(Audited)
I.	**Incomes and gains**				
	Revenue from operations	91,376.76	65,991.31	73,165.31	1,39,156.62
	Interest	23.37	240.72	150.60	391.32
	Profit on sale of investments/assets	289.64	104.46	129.12	233.58
	Other income *	400.35	117.42	135.41	252.83
	Total Income and gains	**92,090.12**	**66,453.91**	**73,580.44**	**1,40,034.35**
II.	**Expenses and losses**				
	Operation expenses (refer note 9)	45,028.59	3,473.46	2,425.50	5,898.96
	Project management fees **(Refer note c)	3,218.00	6,337.50	6,731.50	13,069.00
	Valuation expenses	22.06	11.12	10.94	22.06
	Annual Listing Fees	39.75	30.49	30.32	60.81
	Trustee Fees	14.75	14.75	14.75	29.50
	Audit fees	18.17	24.71	20.58	45.29
	Insurance & security expenses	22.28	38.28	37.40	75.68
	Employee benefits expenses	895.38	1,313.34	1,280.80	2,594.14
	Investment management fees (refer note b)	590.00	590.00	688.15	1,278.15
	Depreciation on property, plant and equipment	0.36	0.53	0.51	1.04
	Amortisation of intangible assets	16,605.66	28,467.96	39,603.75	68,071.71
	Finance costs (Interest)	6,868.48	6,862.34	6,745.74	13,608.08
	Finance costs (Others)	298.82	201.67	374.62	576.29
	Repairs and maintenance	-	-	0.82	0.82
	Legal and professional fees	478.50	78.78	632.73	711.51
	Other expenses ***	50.48	109.20	283.01	392.21
	Total Expenses and losses	**74,151.28**	**47,554.13**	**58,881.12**	**1,06,435.25**
III.	**Profit for the period before income tax (I) - (II)**	**17,938.84**	**18,899.78**	**14,699.32**	**33,599.10**
IV.	Tax expenses (current tax and deferred tax)/ reversal	303.17	824.07	2,509.04	3,333.11
V.	**Profit for the period after income tax (III) - (IV)**	**17,635.67**	**18,075.71**	**12,190.28**	**30,265.99**
VI.	**Other comprehensive income not to be reclassified to profit or loss in subsequent periods:**	(4.28)	-	10.01	10.01
VII.	**Total Comprehensive Income (V) + (VI)**	**17,631.39**	**18,075.71**	**12,200.29**	**30,276.00**

* Other income includes change in fair value and other non-operating income.

** Project management fees do not include major maintenance of Rs. 1,403.33 lakhs, Rs. 6,390.50 lakhs, Rs. 7,679.50 lakhs and Rs.14,070.00 lakhs incurred during the six months ended September 30, 2022, six months ended September 30, 2021, six months ended March 31, 2022 and year ended March 31, 2022 respectively for which the provision for major maintenance was made in earlier years.

*** Other expenses include printing and stationery, rent, rates and taxes and other miscellaneous expenses.

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Notes to consolidated financial information:

1. Investors can view the results of the IRB InvIT Fund ('Fund' or 'Trust') on the Trust's website (www.irbinvit.co.in) or on the websites of BSE (www.bseindia.com) or NSE (www.nseindia.com).

2. The unaudited Consolidated Interim Financial Information comprises of the Consolidated Statement of profit and loss, explanatory notes thereto and additional disclosures as required in paragraph 6 of Annexure A to the SEBI Circular no. CIR/IMD/DF/127/2016 dated November 29, 2016 ('SEBI Circular') of IRB InvIT Fund ('Fund') for the half year ended September 30, 2022("Consolidated Financial Information"). The Consolidated Financial Information has been prepared in accordance with recognition and measurement principles prescribed under Indian Accounting Standard -34 - Interim Financial Reporting (Ind AS 34) read with Rule 2(1)(a) of Companies (Indian Accounting Standards) Rules, 2015 ('Ind AS') and the SEBI Circular.

3. The Consolidated Financial Information for the six month ended March 31, 2022 are the derived figures between the audited figures in respect of the year ended March 31, 2022 and the published year to date figures up to September 30, 2021, which were subject to limited review. The Consolidated Financial Information for the half year ended March 31, 2022 and year ended March 31, 2022 have been prepared on the basis of the Consolidated Financial Information for the half year ended September 30, 2021, the audited annual consolidated financial statements as at and for the year ended March 31, 2022, and the relevant requirements of the SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended from time to time read with SEBI Circular.

4. IRB InvIT Fund was registered as an irrevocable trust under the Indian Trusts Act, 1882 on October 16, 2015 and as an infrastructure investment trust under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 on March 14, 2016. Units of IRB InvIT Fund have been listed on both the stock exchanges on May 18, 2017.

5. The Consolidated Financial Information for the half year ended September 30, 2022 have been reviewed by the Audit Committee of the Investment Manager at their meeting held on October 17, 2022 and thereafter approved by the Board of Directors of the Investment Manager at their meeting held on October 17, 2022.

6. The Board of Directors of the Investment Manager have declared 2nd Distribution of Rs. 2.05 per unit which comprises of Rs. 1.25 per unit as interest and Rs. 0.80 per unit as return of capital in their meeting held on October 17, 2022.

   Total distribution made by the Fund is Rs. 4.05 per unit (including 1st Distribution of Rs. 2.00 per unit) for the half year ended September 30, 2022.

7. The Statutory Auditors of the Fund have carried out Limited Review of the above Consolidated Financial Information.

8. In relation to acquisition of Vadodara Kim Expressway Project ("VK1 Project") from IRB Infrastructure Developers Limited (i.e., the Sponsor and the Project Manager of the Trust) ("Proposed Acquisition"), the Unitholders have approved the proposed acquisition of 100% of the equity share capital of VK1 on a fully diluted basis and the provision of a shareholder loan to VK1, the proceeds of which shall be utilized by VK1 for the repayment, in full, of the shareholder loan provided to VK1 by the Sponsor, for an aggregate purchase consideration of Rs. 34,200 lakhs at the Extra-Ordinary General Meeting (EGM) held on September 9, 2022. Share purchase agreement and other ancillary documents have also been executed on October 13, 2022.

9. IRB Pathankot Amritsar Toll Road Limited (IPATRL) has recognised revenue of Rs. 42,319.58 lakhs receivable from National Highways Authority of India against arbitration award for delay in completion of construction of the project based on the additional cost incurred by EPC contractor which shall be appropriated to the EPC contractor amounting to Rs. 41,784.26 lakhs included in the operation expenses for the half year ended September 30, 2022. The extension in concession period of 518 days shall accrue to the benefit of IPATRL and the Trust. The actual operation expenses for the half year ended September 30, 2022 is Rs. 3,181.27 lakhs.

10. ISDTL and IDAATL has successfully completed Concession Period on May 25, 2022 and March 31, 2022, respectively and handed over the Project Highway including Project Assets to National Highways Authority of India (NHAI) in terms of the Concession Agreement.

Additional Disclosures as required by Paragraph 6 to SEBI Circular No. CIR/IMD/DF/127/2016:

a. **Net Distributable Cash Flows for the half year ended September 30, 2022**

(i) **IRB InvIT Fund (Fund)**

(Rs. in Lakhs)

Sr. No.	Particulars	Six months ended September 30, 2022	Six months ended September 30, 2021	Six months ended March 31, 2022	Year ended March 31, 2022
1	Cash flows received from Project SPVs in the form of Interest (Refer note 1 & 2)	19,892.08	21,175.24	20,109.50	41,284.74
2	Cash flows received from Project SPVs in the form of Dividend	-	-	-	-
3	Any other income accruing at the Trust level and not captured above, including but not limited to interest/return on surplus cash invested by the Trust	329.14	151.63	160.59	312.22
4	Cash flows received from the project SPVs towards the repayment (Net) of the debt issued to the Project SPVs by the Trust (Refer note 3)	14,411.37	12,559.17	18,463.58	31,022.75
5	**Total cash inflow at the Trust level (A)**	**34,632.59**	**33,886.04**	**38,733.67**	**72,619.71**
	Less:				
6	Any payment of fees, interest and expense incurred at the Trust level, including but not limited to the fees of the Investment Manager	(5,885.48)	(6,246.89)	(6,301.04)	(12,547.93)
7	Income tax (if applicable) at the Standalone Trust Level	-	-	-	-
8	Repayment of external debt	(2,712.50)	(2,712.50)	(2,712.50)	(5,425.00)
9	**Total cash outflows / retention at the Trust level (B)**	**(8,597.98)**	**(8,959.39)**	**(9,013.54)**	**(17,972.93)**
10	**Net Distributable Cash Flows (C) = (A+B)**	**26,034.61**	**24,926.65**	**29,720.13**	**54,646.78**

Notes:

1) The embargo on the Escrow bank account for ITCTL was uplifted as per the Interim order of the Hon'ble Arbitral Tribunal. However, the withdrawals pertaining to past periods towards debt servicing of Rs. 11,193.00 lakhs (net of Rs. 4,402.39 lakhs considered in earlier period) has not been considered in the above Net Distributable Cash Flow. Currently, the funds are lying in liquid mutual fund.

2) Excludes interest due but not received of Rs. 5,678.53 lakhs, Rs. 6,603.58 lakhs, Rs. 6,567.50 lakhs and Rs. 13,171.08 lakhs for the six months ended September 30, 2022, six months ended September 30, 2021, six months ended March 31, 2022 and year ended March 31, 2022.

3) Netted – off with disbursement of long-term unsecured loan to projeet SPV (Refer RPT note).

(ii) **IDAA Infrastructure Limited (IDAATL)**

(Rs. in Lakhs)

Sr. No.	Description	Six months ended September 30, 2022	Six months ended September 30, 2021	Six Months ended March 31, 2022	Year ended March 31, 2022
1	Profit after tax as per Statement of profit and loss/income and expenditure (A)	42.40	1,172.44	(1,635.94)	(463.50)
2	Add: Depreciation and amortisation as per Statement of profit and loss/income and expenditure	-	8,964.47	14,272.94	23,237.41
3	Add/less: Any other item of non-cash expense / non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager	-	-	-	-
4	Add: Interest paid to the Fund	-	231.19	134.66	365.85
5	Add: Provision for Resurfacing Expenses (Net)	-	(2,276.21)	(2,427.26)	(4,703.47)
6	Add: Non-cash expenses	-	-	-	-
7	Less: NHAI Premium	-	-	-	-
8	Less: Principal repayment	-	-	-	-
9	Total Adjustments (B)	-	**6,919.45**	**11,980.34**	**18,899.79**
10	**Net Distributable Cash Flows (C) = (A+B)**	**42.40**	**8,091.89**	**10,344.40**	**18,436.29**

(iii) **IRB Surat Dahisar Tollway Limited (ISDTL)**

(Rs. in lakhs)

Sr. No.	Description	Six months ended September 30, 2022	Six months ended September 30, 2021	Six Months ended March 31, 2022	Year ended March 31, 2022
1	Profit after tax as per Statement of profit and loss/income and expenditure (A)	1,279.04	606.50	(3,586.69)	(2,980.19)
2	Add: Depreciation and amortisation as per Statement of profit and loss/income and expenditure	6,269.78	13,970.17	17,199.85	31,170.02
3	Add/less: Any other item of non-cash expense / non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager	-	-	-	-
4	Add: Interest paid to the Fund	-	1,625.75	413.98	2,039.73
5	Add: Provision for Resurfacing Expenses (Net)	-	(479.12)	(1,437.43)	(1,916.55)
6	Add: Non-cash expenses	(797.16)	584.81	7,796.41	8,381.22
7	Less: NHAI Premium	-	-	-	-
8	Less: Principal repayment	-	-	-	-
9	Total Adjustments (B)	**5,472.62**	**15,701.61**	**23,972.81**	**39,674.42**
10	**Net Distributable Cash Flows (C) = (A+B)**	**6,751.66**	**16,308.11**	**20,386.12**	**36,694.23**

(iv) **IRB Talegaon Amravati Tollway Limited (ITATL)**

(Rs. in lakhs)

Sr. No.	Description	Six months ended September 30, 2022	Six months ended September 30, 2021	Six Months ended March 31, 2022	Year ended March 31, 2022
1	Profit after tax as per Statement of profit and loss/income and expenditure (A)	(651.82)	(1,148.28)	(907.99)	(2,056.27)
2	Add: Depreciation and amortisation as per Statement of profit and loss/income and expenditure	742.06	530.21	763.93	1,294.14
3	Add/less: Any other item of non-cash expense / non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager	-	-	-	-
4	Add: Interest paid to the Fund	2,987.76	3,002.06	2,889.59	5,891.65
5	Add: Provision for Resurfacing Expenses (Net)	(1,177.06)	(359.84)	(803.83)	(1,163.67)
6	Add: Non-cash expenses	(1.05)	-	-	-
7	Less: NHAI Premium	-	-	-	-
8	Less: Principal repayment	-	-	-	-
9	Total Adjustments (B)	**2,551.71**	**3,172.43**	**2,849.69**	**6,022.12**
10	**Net Distributable Cash Flows (C) = (A+B)**	**1,899.89**	**2,024.15**	**1,941.70**	**3,965.85**

(v) **M.V.R Infrastructure and Tollways Limited (MITL)**

(Rs. in lakhs)

Sr. No.	Description	Six months ended September 30, 2022	Six months ended September 30, 2021	Six months ended March 31, 2022	Year ended March 31, 2022
1	Profit after tax as per Statement of profit and loss/income and expenditure (A)	470.04	(215.46)	317.45	101.98
2	Add: Depreciation and amortisation as per Statement of profit and loss/income and expenditure	1,725.67	1,366.68	1,755.43	3,122.11
3	Add/less: Any other item of non-cash expense / non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager	-	-	-	-
4	Add: Interest paid to the Fund	2,749.09	2,251.61	2,572.33	4,823.94
5	Add: Provision for Resurfacing Expenses (Net)	219.27	195.03	195.02	390.05
6	Add: Non-cash expenses	(39.70)	-	-	-
7	Less: NHAI Premium	-	-	-	-
8	Less: Principal repayment	-	-	-	-
9	Total Adjustments (B)	**4,654.33**	**3,813.32**	**4,522.78**	**8,336.10**
10	**Net Distributable Cash Flows (C) = (A+B)**	**5,124.37**	**3,597.86**	**4,840.3**	**8,438.08**

(vi) **IRB Jaipur Deoli Tollway Limited (IJDTL)**

(Rs. in lakhs)

Sr. No.	Description	Six months ended September 30, 2022	Six months ended September 30, 2021	Six months ended March 31, 2022	Year ended March 31, 2022
1	Profit after tax as per Statement of profit and loss/income and expenditure (A)	(2,253.68)	(5,006.85)	(2,170.27)	(7,177.12)
2	Add: Depreciation and amortisation as per Statement of profit and loss/income and expenditure	1,180.23	915.89	1,176.83	2,092.72
3	Add/less: Any other item of non-cash expense / non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager	-	-	-	-
4	Add: Interest paid to the Fund	6,293.19	7,017.03	7,102.73	14,119.76
5	Add: Provision for Resurfacing Expenses (Net)	1,501.80	(287.00)	(1,132.08)	(1,419.08)
6	Add: Non-cash expenses	158.36	-	(1,610.44)	(1,610.44)
7	Less: NHAI Premium	-	-	-	-
8	Less: Principal repayment	-	-	-	-
9	Total Adjustments (B)	**9,133.58**	**7,645.92**	**5,537.04**	**13,182.96**
10	**Net Distributable Cash Flows (C) = (A+B)**	**6,879.90**	**2,639.07**	**3,366.77**	**6,005.84**

(vii) **IRB Pathankot Amritsar Toll Road Limited (IPATRL)**

(Rs. in lakhs)

Sr. No.	Description	Six months ended September 30, 2022	Six months ended September 30, 2021	Six months ended March 31, 2022	Year ended March 31, 2022
1	Profit after tax as per Statement of profit and loss/income and expenditure (A)	(3,667.94)	(911.35)	(2,371.42)	(3,282.77)
2	Add: Depreciation and amortisation as per Statement of profit and loss/income and expenditure	1,818.57	0.10	938.54	938.64
3	Add/less: Any other item of non-cash expense / non cash income (net of actual cash flows for these items), if deemed necessary by the Investment Manager	-	-	-	-
4	Add: Interest paid to the Fund	6,953.21	7,062.11	7,011.60	14,073.71
5	Add: Provision for Resurfacing Expenses (Net)	710.37	(473.79)	(473.75)	(947.54)
6	Add: Non-cash expenses	635.94	(8,021.00)	(3,512.96)	(11,533.96)
7	Less: NHAI Premium	-	-	-	-
8	Less: Principal repayment	-	-	-	-
9	Total Adjustments (B)	**10,118.09**	**(1,432.58)**	**3,963.43**	**2,530.85**
10	**Net Distributable Cash Flows (C) = (A+B)**	**6,450.15**	**(2,343.93)**	**1,592.01**	**(751.92)**

d. **Statement of Earnings per unit**

(Rs. in lakhs except for unit data)

Particulars	Six Months ended September 30, 2022	Six Months ended September 30, 2021	Six Months ended March 31 , 2022	Year ended March 31, 2022
Profit for the period /year	17,631.39	18,075.71	12,190.28	30,265.99
Number of units outstanding for computation of basic and diluted earnings per unit	580,500,000	580,500,000	580,500,000	580,500,000
Earnings per unit (basic and diluted)	3.04	3.11	2.10	5.21

e. **Statement of contingent liabilities and commitments**

Contingent liabilities not provided for

(Rs. in lakhs)

Particulars	As at September 30, 2022	As at September 30, 2021	As at March 31, 2022
	Nil	Nil	Nil

Commitments

(Rs. in lakhs)

Particulars	As at September 30, 2022	As at September 30, 2021	As at March 31, 2022
Estimated value of contracts in capital account remaining to be executed	Nil	Nil	Nil
Commitment for acquisition of toll equipment & machineries	Nil	13.50	1.24
Other commitments	Nil	Nil	Nil

f. **Statement of Related party transactions**

I. **List of Related Parties**

i. Parties to the Fund*	IRB Infrastructure Developers Limited (IRBIDL) (Sponsor & Project Manager)
	IRB Infrastructure Private Limited (IRBFL) (Investment Manager)
	IDBI Trusteeship Services Limited (ITSL) (Trustee)

*As per SEBI (Infrastructure Investment Trusts) Regulations, 2014

Particulars	**IRB Infrastructure Developers Limited (Sponsor & Project manager)**	**IRB Infrastructure Private Limited (Investment manager)**	**IDBI Trusteeship Services Limited (Trustee of the IRB InvIT Fund)**
Promoters	Mr. Virendra D. Mhaiskar Mrs. Deepali V. Mhaiskar Virendra D. Mhaiskar HUF	IRB Infrastructure Developers Limited	IDBI Bank Limited Life Insurance Corporation of India General Insurance Corporation of India
Directors	Mr. Virendra D. Mhaiskar Mrs. Deepali V. Mhaiskar Mr. Chandrashekhar S. Kaptan Mr. Sunil H. Talati Mr. Sandeep J. Shah Ms. Priti Savla (w.e.f.10.02.2022) Mr. Carlos Ricardo Ugarte Cruz Coke (till 05.08.2022) Mr. Jose Angel Tamariz Martel Goncer (w.e.f. 29.12.2021) Mr. Ravindra Dhariwal (w.e.f. 05.08.2022) Mrs. Heena Raja (till 10.02.2022) Mr. Mukeshlal Gupta (till 29.12.2021) Mr. Sudhir Rao Hoshing (till 29.12.2021)	Mr. Vinod Kumar Menon Mr. Rajinder Pal Singh Mr. Sunil Tandon Mr. Nikesh Jain (w.e.f.16.03.2022)	Mr. J.Samuel Joseph Ms. Madhuri J. Kulkarni Ms. Padma Betai Ms. Jayshree Ranade (w.e.f. 20.09.2021) Mr. Pradeep Kumar Jain (w.e.f. 24.03.2022) Mr. Satyajit Tripathy (till 17.09.2021) Mr. Ravishankar G. Shinde (till 15.03.2022)

iii. Directors of Subsidiaries	Mr. Vinodkumar Menon
	Mr. Bajrang Lal Gupta
	Mr. Sumit Banerjee
	Mr. Omprakash Singh Ashok
	Mr. Rushabh Gandhi
	Mr. Darshan Suryakant Sangurdekar
	Mrs. Kshama Vengsarkar
	Mrs. Heena Raja (till 11.12.2021)

iv. Relatives of Directors	Mrs. Surabhi Banerjee
	Mrs. Nayana Rakesh Gandhi

II. Transactions with related parties during the period

(Rs in lakhs)

Sr. No.	Particulars	Relation	Six Months ended September 30, 2022	Six Months ended September 30, 2021	Six Months ended March 31, 2022	Year ended March 31, 2022
1	**Project Manager Fees**		**4,716.65**	**12,728.00**	**14,411.00**	**27,139.00**
	IRBIDL	Project Manager	4,716.65	12,728.00	14,411.00	27,139.00
2	**Contract expenses**		**41,784.26**	**-**	**-**	**-**
	IRBIDL	Project Manager	41,784.26	-	-	-
3	**Investment Management fees paid (including indirect taxes)**		**590.00**	**590.00**	**688.15**	**1,278.15**
	IRBFL	Investment Manager	590.00	590.00	688.15	1,278.15
4	**Secured advance Given**		**-**	**15,420.29**	**10,309.50**	**25,729.79**
	IRBIDL	Project Manager	-	15,420.29	10,309.50	25,729.79
5	**Secured advance recovered**		**-**	**14,813.08**	**10,916.71**	**25,729.79**
	IRBIDL	Project Manager	-	14,813.08	10,916.71	25,729.79
6	**Interest Income**		**-**	**230.04**	**105.04**	**335.08**
	IRBIDL	Project Manager		230.04	105.04	335.08
7	**Director sitting fees**	Director	**9.11**	**9.66**	**5.78**	**15.44**
	Mr. Vinodkumar Menon		1.75	1.75	1.32	3.07
	Mr. Rushabh Gandhi		0.71	0.71	0.66	1.37

Sr. No.	Particulars	Relation	Six Months ended September 30, 2022	Six Months ended September 30, 2021	Six Months ended March 31, 2022	Year ended March 31, 2022
	Mrs. Deepali V. Mhaiskar	Director of Sponsor	34.10	21.70	34.10	55.80
	Mr. Sudhir Rao Hoshing	Director of Sponsor	3.52	2.24	1.60	3.84
	Mr. Vinodkumar Menon	Director of Investment Manager	0.66	0.42	0.66	1.08
	Mr. Bajrang Lal Gupta	Director of Investment Manager	0.22	0.14	0.22	0.36
	Mr. Sumit Banerjee	Director of Investment Manager	1.21	0.77	1.21	1.98
	Mr. Sunil Talati	Director of Sponsor & Project Manager	0.22	0.14	0.22	0.36
	Mrs. Surabhi Banerjee	Relative of Director	0.66	0.42	0.66	1.08
	Mrs. Nayana Gandhi	Relative of Director	0.66	0.42	0.66	1.08

III. Related party outstanding balances

(Rs in lakhs)

Sr. No.	Particulars	Relation	As on September 30, 2022	As on March 31, 2022	As on September 30, 2021
1	**Trade Payables**		**10,877.64**	**1,037.62**	**285.72**
	IRBFL	Investment Manager	260.00	647.33	254.00
	IRBIDL	Project Manager	10,617.64	390.29	31.72
2	**Secured Advance**		**-**	**-**	**607.21**
	IRBIDL	Project Manager	-	-	607.21
3	**Retention money payable**		**95.32**	**-**	**-**
	IRBIDL	Project Manager	95.32	-	-

Except for as stated in note 8 above, the fund has not acquired any asset from related party during the six month period ended September 30, 2022 as well as in previous financial year ended March 31, 2022.

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

Vinod Kumar Menon

Vinod kumar Menon
Whole time Director

Place: Mumbai
Date: 17th October, 2022

Suresh Surana & Associates LLP
Chartered Accountants

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Review report on Half Yearly Standalone Unaudited Interim Financial Information

Review Report to
The Board of Directors
IRB Infrastructure Private Limited
(Investment Manager to IRB InvIT Fund)

1. We have reviewed the accompanying Statement of unaudited standalone financial information of IRB InvIT Fund ("Fund"), consisting of the Statement of profit and loss, explanatory notes thereto and the additional disclosures as required in paragraph 6 of Annexure A to the SEBI Circular No. CIR/IMD/DF/127/2016 dated November 29, 2016 (SEBI Circular") for the half year ended 30 September 2022 ('Statement') attached herewith, being submitted by IRB Infrasructure Private Limited ('Investment Manager') pursuant to the requirements of Regulation 23 of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 as amended, read with the SEBI Circular.

2. The preparation of this Statement in accordance with recognition and measurement principles laid down in Indian Accounting Standard 34, Interim Financial Reporting (Ind AS 34) read with Rule 2(1)(a) of Companies (Indian Accounting Standards) Rules, 2015, as amended and the SEBI Circular, is the responsibility of the Investment Manager and has been approved by the Board of Directors of the Investment Manager. Our responsibility is to issue a report on the Statement based on our review.

3. We conducted our review in accordance with the Standard on Review Engagements (SRE) 2410 – "Review of Interim Financial Information Performed by the Independent Auditor of the Entity" issued by The Institute of Chartered Accountants of India. This standard requires that we plan and perform the review to obtain moderate assurance as to whether the financial statements are free of material misstatement. A review is limited primarily to inquiries of Investment Manager's personnel and analytical procedures applied to financial data and thus provide less assurance than an audit. We have not performed an audit and accordingly, we do not express an audit opinion.

4. Based on our review conducted as above, nothing has come to our attention that causes us to believe that the accompanying Statement, prepared in accordance with the recognition and measurement principles laid down in the applicable Indian Accounting Standards (Ind AS) as defined in Rule 2(1)(a) of the Companies (Indian Accounting Standards) Rules, 2015, as amended and other recognised accounting practices and policies has not disclosed the information required to be disclosed in terms of Regulation 23 of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014 as amended, read with the SEBI Circular, including the manner in which it is to be disclosed, or that it contains any material misstatement.

SURESH SURANA & ASSOCIATES LLP
Chartered Accountants
MUMBAI

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Tel: 022 6640 4299, **Fax:** 022 6640 4274,
E-mail: info@irbinvit.co.in; **Website:** www.irbinvit.co.in
SEBI Registration Number: IN/InvIT/15-16/0001;

IRB InvIT Fund

(An irrevocable trust set up under the Indian Trusts Act, 1882, and registered as an infrastructure investment trust with the Securities and Exchange Board of India)

Unaudited Standalone Financial Results for the half year ended September 30, 2022

(Rs. In lakhs)

Sr. No.	Particulars	Six months ended September 30, 2022 (Unaudited)	Six months ended September 30, 2021 (Unaudited)	Six months ended March 31, 2022 (Audited – Refer note 7)	Year ended March 31, 2022 (Audited)
I	**Incomes and gains**				
	Interest on loan	25,570.60	27,778.82	26,677.00	54,455.82
	Profit on sale of investments	124.28	42.05	70.23	112.28
	Interest on income tax refund	-	-	0.43	0.43
	Other income (changes in fair value gain / (loss))	204.86	109.58	89.93	199.51
	Total income and gains	**25,899.74**	**27,930.45**	**26,837.59**	**54,768.04**
II	**Expenditure**				
	Valuation expenses	12.03	11.12	10.94	22.06
	Annual listing fee	39.75	30.49	30.32	60.81
	Audit fees	8.28	8.58	6.91	15.49
	Investment management fees (refer note b below)	590.00	590.00	688.15	1,278.15
	Trustee fees	14.75	14.75	14.75	29.50
	Finance cost (interest)	5,193.20	5,571.14	5,531.86	11,103.00
	Legal and professional expenses	25.37	14.08	18.06	32.14
	Impairment of investment in subsidiaries (net of Reversal)	915.71	-	6,918.56	6,918.56
	Other expenses*	2.10	6.73	0.05	6.78
	Total Expenses	**6,801.19**	**6,246.89**	**13,219.60**	**19,466.49**
III	**Profit from ordinary activities before tax (I) - (II)**	**19,098.55**	**21,683.56**	**13,617.99**	**35,301.55**
IV	Tax expense (current tax and deferred tax) / reversal	-	-	-	-
V	**Profit for the period after income tax (III) - (IV)**	**19,098.55**	**21,683.56**	**13,617.99**	**35,301.55**
VI	Items of Other Comprehensive Income	-	-	-	-
VII	**Total Comprehensive Income (after tax) (V) + (VI)**	**19,098.55**	**21,683.56**	**13,617.99**	**35,301.55**

*Other expenses include bank charges, rates & taxes, communication cost, printing & stationary and other miscellaneous expenses.

(www.irbinvit.co.in)

Additional Disclosures as required by Paragraph 6 of Annexure A to SEBI Circular No. CIR/IMD/DF/127/2016:

a) Net Distributable Cash Flows as at the Standalone Trust level

(Rs. In lakhs)

Sr. No.	Particulars	Six months ended September 30, 2022	Six months ended September 30, 2021	Six months ended March 31, 2022	Year ended March 31, 2022
1	Cash flows received from Project SPVs in the form of Interest (Refer note 1 & 2)	19,892.08	21,175.24	20,109.50	41,284.74
2	Cash flows received from Project SPVs in the form of Dividend	-	-	-	-
3	Any other income accruing at the Trust level and not captured above, including but not limited to interest/return on surplus cash invested by the Trust	329.14	151.63	160.59	312.22
4	Cash flows received from the project SPVs towards the repayment of the debt issued to the Project SPVs by the Trust (Refer note 3)	14,411.37	12,559.17	18,463.58	31,022.75
5	**Total cash inflow at the Trust level (A)**	**34,632.59**	**33,886.04**	**38,733.67**	**72,619.71**
	Less:				
6	Any payment of fees, interest and expense incurred at the Trust level, including but not limited to the fees of the Investment Manager	(5,885.48)	(6,246.89)	(6,301.04)	(12,547.93)
7	Income tax (if applicable) at the Standalone Trust Level	-	-	-	-
8	Repayment of external debt	(2,712.50)	(2,712.50)	(2,712.50)	(5,425.00)
9	**Total cash outflows / retention at the Trust level (B)**	**(8,597.98)**	**(8,959.39)**	**(9,013.54)**	**(17,972.93)**
10	**Net Distributable Cash Flows (C) = (A+B)**	**26,034.61**	**24,926.65**	**29,720.13**	**54,646.78**

e) Statement of Related party transactions

I. List of Related Parties

i. Subsidiaries/ SPVs	IDAA Infrastructure Limited (IDAAIL)
	IRB Jaipur Deoli Tollway Limited (IJDTL)
	IRB Pathankot Amritsar Toll Road Limited (IPATRL)
	IRB Surat Dahisar Tollway Limited (ISDTL)
	IRB Talegaon Amravati Tollway Limited (ITATL)
	IRB Tumkur Chitradurga Tollway Limited (ITCTL)
	M.V.R. Infrastructure & Tollways Limited (MITL)
ii. Parties to the Fund *	IRB Infrastructure Developers Limited (IRBIDL) (Sponsor & Project Manager)
	IRB Infrastructure Private Limited (IRBFL) (Investment Manager)
	IDBI Trusteeship Services Limited (ITSL) (Trustee)

*As per SEBI (Infrastructure Investment Trusts) Regulations, 2014

iii. Promoters / Directors of the parties to the Fund specified in (ii) above

Particulars	**IRB Infrastructure Developers Limited (Sponsor & Project manager)**	**IRB Infrastructure Private Limited (Investment manager)**	**IDBI Trusteeship Services Limited (Trustee of the IRB InvIT Fund)**
Promoters	Mr. Virendra D. Mhaiskar Mrs. Deepali V. Mhaiskar Virendra D. Mhaiskar HUF	IRB Infrastructure Developers Limited	IDBI Bank Limited Life Insurance Corporation of India General Insurance Corporation of India
Directors	Mr. Virendra D. Mhaiskar Mrs. Deepali V. Mhaiskar Mr. Chandrashekhar S. Kaptan Mr. Sunil H. Talati Mr. Sandeep J. Shah Mr. Jose Angel Tamariz Martel Goneer (w.e.f. 29.12.2021) Ms. Priti Savla (w.e.f. 10.02.2022) Mr. Ravindra Dhariwal (w.e.f. 05.08.2022) Mr. Mukeshlal Gupta (till 29.12.2021) Mr. Sudhir Rao Hoshing (till 29.12.2021) Mrs. Heena Raja (till 10.02.2022) Mr. Carlos Ricardo Ugarte Cruz Coke (till 05.08.2022)	Mr. Vinod Kumar Menon Mr. Rajinder Pal Singh Mr. Sunil Tandon Mr. Nikesh Jain (w.e.f. 16.03.2022)	Mr. J.Samuel Joseph Ms. Madhuri J. Kulkarni Ms. Padma Betai Ms. Jayshree Ranade (w.e.f. 20.09.2021) Mr. Pradeep Kumar Jain (w.e.f. 24.03.2022) Mr. Satyajit Tripathy (till 17.09.2021) Mr. Ravishankar G. Shinde (till 15.03.2022)

Sr. No.	Particulars	Relation	Six months ended September 30, 2022	Six months ended September 30, 2021	Six months ended March 31, 2022	Year ended March 31, 2022
8	**Distribution in form of capital**		**2,347.29**	**1,493.73**	**2,345.37**	**3,839.10**
	IRBIDL	Sponsor & Project Manager	2,039.51	1,297.87	2,039.51	3,337.38
	Mr. Virendra D. Mhaiskar	Director of Sponsor & Project Manager	269.28	171.36	269.28	440.64
	Mrs. Deepali V. Mhaiskar	Director of Sponsor & Project Manager	34.10	21.70	34.10	55.80
	Mr. Sudhir Rao Hoshing	Director of Sponsor & Project Manager	3.52	2.24	1.60	3.84
	Mr. Sunil Talati	Director of Sponsor & Project Manager	0.22	0.14	0.22	0.36
	Mr. Vinod Kumar Menon	Director of Investment Manager	0.66	0.42	0.66	1.08
9	**Trustee fee**		**14.75**	**14.75**	**14.75**	**29.50**
	ITSL	Trustee	14.75	14.75	14.75	29.50

III. Related party outstanding balances

(Rs. In lakhs)

Sr. No.	Particulars	Relation	As on September 30, 2022	As on September 30, 2021	As on March 31, 2022
1	**Equity Investment**		**127,505.48**	**127,505.48**	**127,505.48**
	ISDTL	Subsidiary	53,232.48	53,232.48	53,232.48
	IJDTL	Subsidiary	13,175.00	13,175.00	13,175.00
	IDAAIL	Subsidiary	19,812.00	19,812.00	19,812.00
	IPATRL	Subsidiary	9,909.00	9,909.00	9,909.00
	ITATL	Subsidiary	4,925.00	4,925.00	4,925.00
	ITCTL	Subsidiary	15,550.00	15,550.00	15,550.00
	MITL	Subsidiary	10,902.00	10,902.00	10,902.00
2	**Subordinated debt**		**99,431.00**	**99,431.00**	**99,431.00**
	IJDTL	Subsidiary	39,525.00	39,525.00	39,525.00
	IPATRL	Subsidiary	29,581.00	29,581.00	29,581.00
	ITATL	Subsidiary	14,775.00	14,775.00	14,775.00
	ITCTL	Subsidiary	15,550.00	15,550.00	15,550.00
3	**Secured loan receivable (Long term)**		**3,16,815.51**	**327,446.94**	**326,436.88**
	IJDTL	Subsidiary	87,913.63	91,772.22	91,475.70
	IPATRL	Subsidiary	89,853.37	92,751.65	92,601.88
	ITATL	Subsidiary	37,153.84	37,153.84	37,153.84
	ITCTL	Subsidiary	93,712.76	93,712.76	93,712.76
	MITL	Subsidiary	8,181.91	12,056.47	11,492.70
4	**Unsecured loan receivable (Long term)**		**46,418.38**	**68,661.90**	**51,208.38**
	ISDTL	Subsidiary	-	3,431.23	-
	IJDTL	Subsidiary	6,907.71	14,907.71	6,907.71
	IDAAIL	Subsidiary	-	2,083.29	-
	IPATRL	Subsidiary	15,490.04	15,490.04	15,490.04
	ITATL	Subsidiary	6,005.47	8,905.47	6,005.47
	ITCTL	Subsidiary	7,338.07	7,338.07	7,338.07
	MITL	Subsidiary	10,677.09	16,506.09	15,467.09

Sr. No.	Particulars	Relation	As on September 30, 2022	As on September 30, 2021	As on March 31, 2022
5	**Unsecured loan receivable (Short term)**		**17,754.20**	**18,885.90**	**16,214.90**
	ISDTL	Subsidiary	-	9,353.00	-
	ITATL	Subsidiary	2,756.00	-	-
	ITCTL	Subsidiary	265.20	265.20	265.20
	MITL	Subsidiary	14,733.00	9,267.70	15,949.70
6	**Interest receivable**		**20,827.69**	**24,177.06**	**30,744.56**
	ITCTL	Subsidiary	20,827.69	24,177.06	30,744.56
7	**Trade payables**		**260.00**	**254.00**	**647.33**
	IRBFL	Investment Manager	260.00	254.00	647.33

- Except for as stated in note 9 above, the fund has not acquired any asset from related party during the six month period ended September 30, 2022 as well as in previous financial year ended March 31, 2022.

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

Vinod Kumar Menon

Vinod Kumar Menon
Whole time Director

Place: Mumbai
Date: October 17, 2022

IRB InvIT Fund

(An irrevocable trust set up under the Indian Trusts Act, 1882, and registered as an infrastructure investment trust with the Securities and Exchange Board of India)

Registered Office: IRB Complex, Chandivali Farm, Chandivali Village, Andheri (E), Mumbai – 400 072, Maharashtra, India.
SEBI Registration Number: IN/InvIT/15-16/0001; **Tel**: 022 6640 4299; **Fax**: 022 6640 4274; **E-mail**: info@irbinvit.co.in; **Website:** www.irbinvit.co.in

Press Release:

Q2FY23 Results:
IRB InvIT Fund to distribute Rs. 2.05 per unit

- **Cumulative distribution for H1FY23 is Rs. 4.05 per unit**
- **Trust set to add HAM Asset, i.e., Vadodara Kim HAM project in Gujarat after overwhelming support by Unit Holders during EGM for the acquisition**
- **Total distribution since listing crosses Rs. 3,155 Crs mark; thus, more than 50% of the fund raised at IPO, 5 years ago**
- **Toll collection goes up by 19%; also FASTag collection rises to 96%**

Mumbai, October 17, 2022: , India's first listed Infrastructure Investment Trust

enterprise value of the Assets under Trust's portfolio will again cross Rs.

"The addition of HAM Asset to portfolio is in line with our strategy to explore investment opportunities to enhance Stakeholders' value and along with the other BOT Assets under portfolio, which would bring good revenue mix for the Trust." ***"The toll collection across all Assets has already surpassed pre-COVID levels and is witnessing continuous improvements in the same. The forthcoming festive season may see some further improvement in the same. With all these positive signs, we expect to have good remaining quarters of the FY23".***

Financial Highlights:

Period	Q2 FY 23 (Rs. in Crs)	Q2 FY 22 (Rs. in Crs)	H1 FY23^ (Rs. in Crs)	H1 FY 22 (Rs. in Crs)
Revenue				
EBIDTA				
Distribution				
Per Unit				

^ Total income for H1 FY23 includes revenue from arbitration award of Rs.423 crores

Business Highlights:

Annexure B Project wise details of all assets

Particulars	IDAA Infrastructure Limited (IDAA)*	IRB Surat Dahisar Tollway Limited (IRBSD)*	IRB Talegaon Amravati Tollway Limited (IRBTA)	IRB Jaipur Deoli Tollway Limited (IRBJD)	IRB Tumkur Chitradurga Tollway Limited (IRBTC)	M.V.R. Infrastructure And Tollways Limited (MVR)	IRB Pathankot Amritsar Toll Road Limited (IRBPA)
Concession period (in years)	15	12	22	25	26	20	20
Concession start date	January 2, 2007	February 20, 2009	September 3, 2010	June 14, 2010	June 4, 2011	August 14, 2006	December 30, 2010
Tolling start date	September 25, 2009	February 20, 2009	April 24, 2013	September 27, 2013	June 4, 2011	August 14, 2009	November 27, 2014
Total project cost (Rs. in Lakhs)	140,549.00	252,857.40	89,259.50	177,469.60	114,200.00	30,759.90	144,531.00
No. of Toll plazas	1	4	1	2	2	1	2
Km Length	65.00	239.00	66.73	148.77	114.00	68.63	102.42
Lane Km	390.00	1,434.00	267.00	595.00	684.00	275.00	410.00
State	Gujarat	Gujarat	Maharashtra	Rajasthan	Karnataka	Tamil Nadu	Punjab
National Highway	NH 8	NH 8	NH 6	NH 12	NH 4	NH 7	NH 15

*Handed over these Project Highways including Project Assets to National Highways Authority of India (NHAI) in terms of the Concession Agreement.

Annexure C Details of Project-wise Gross Toll revenue

(Amt in lakhs)

Particulars	Quarter ended September, 2022	Quarter ended June, 2022	Half year ended September, 2022	Year ended March 31, 2022
IRB Tumkur Chitradurga Tollway Limited	9,131.41	9,312.66	18,444.07	16,070.59
IRB Pathankot Amritsar Toll Road Limited	3,399.01	4,231.96	7,630.97	4,146.56
IRB Jaipur Deoli Tollway Limited	3,707.04	3,960.81	7,667.85	6,812.31
M.V.R. Infrastructure And Tollways Limited	3,643.15	3,522.10	7,165.25	6,754.76
IRB Talegaon Amravati Tollway Limited	2,147.81	2,374.25	4,522.06	4,177.00
IRB Surat Dahisar Tollway Limited	-	13,413.40	13,413.40	44,891.64
IDAA Infrastructure Limited	-	-	-	16,351.25
Total	**22,028.42**	**36,815.18**	**58,843.60**	**99,204.11**

Annexure D Details regarding the monies lent by the InvIT to the holding company or the special purpose vehicle in which it has investment

(Amt in lakhs)

Sr. No.	Particulars	Six month ended September 30, 2022
1	**Unsecured loans given**	
	IRB Talegaon Amravati Tollway Limited	2,756.00
	M.V.R. Infrastructure & Tollways Limited	711.00
2	**Repayment of Secured / unsecured loan given**	
	IRB Jaipur Deoli Tollway Limited	3,562.07
	M.V.R. Infrastructure & Tollways Limited	10,028.60
	IRB Pathankot Amritsar Toll Road Limited	2,748.51

S. SUNDARARAMAN
Registered Valuer
Registration No - IBBI/RV/06/2018/10238

RV/SSR/R/2023/09
Date: 17th October 2022

The Board of Directors
IRB Infrastructure Private Limited
3rd Floor, IRB Complex,
Chandivali Farm, Chandivali Village,
Andheri (E), Mumbai - 400 072,
Maharashtra, India.

The Board of Directors
IRB InvIT Fund
(IDBI Trusteeship Services Limited acting on behalf of the Trust)
IRB Complex,
Chandivali Farm, Chandivali Village,
Andheri (E), Mumbai - 400 072,
Maharashtra, India.

Sub: Financial Valuation as per SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended ("the SEBI InvIT Regulations")

Dear Sirs/Madams,

I, Mr. S. Sundararaman ("**Registered Valuer**" or "**RV**" or "**I**" or "**My**" or "**Me**") bearing IBBI registration number IBBI/RV/06/2018/10238, have been appointed vide letter dated 18th July 2022 as an independent valuer, as defined under the SEBI InvIT Regulations, by **IRB Infrastructure Private Limited** ("the **Investment Manager**" or "**IRBIM**"), acting as the investment manager for **IRB InvIT Fund** ("the **Trust**" or "**InvIT**"), and IDBI Trusteeship Services Limited ("**the Trustee**") acting as the trustee for the Trust, for the purpose of the financial valuation of the special purpose vehicles (defined hereinafter below) as per the requirements of the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended ("**SEBI InvIT Regulations**").

The Trust operates and maintains following special purpose vehicles (together referred to as "**SPVs**"):

Sr. No.	Name of the SPV
1	MVR Infrastructure & Tollways Limited ("MVR")
2	IRB Pathankot Amritsar Toll Road Limited ("IRBPA")
3	IRB Talegaon Amravati Tollway Limited ("IRBTA")
4	IRB Tumkur Chitradurga Tollway Limited ("IRBTC")
5	IRB Jaipur Deoli Tollway Limited ("IRBJD")

The SPVs were acquired by the Trust and are to be valued as per Regulation 21(4) contained in the Chapter V of the SEBI InvIT Regulations.

I have relied on explanations and information provided by the Investment Manager. Although, I have reviewed such data for consistency, those are not independently investigated or otherwise verified. My team and I have no present or planned future interest in the Trust, the SPVs or the Investment Manager except to the extent of this appointment as an independent valuer and the fee for this Valuation Report ("**Report**") which is not contingent upon the values reported herein. The valuation analysis should not be construed as investment advice, specifically, I do not express any opinion on the suitability or otherwise of entering into any financial or other transaction with the Trust.

I am enclosing the Report providing opinion on the fair enterprise value of the SPVs on a going concern basis as at 30th September 2022 ("**Valuation Date**"). Enterprise Value ("**EV**") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or

Mr. S. Sundararaman, Registered Valuer
Registered Valuer Registration No - IBBI/RV/06/2018/10238
5B,"A" Block, 5th Floor, Mena Kampala Arcade, New #18 & 20, Thiagaraya Road, T.Nagar, Chennai – 600 017, India
Telephone No.: +91 44 2815 4192

cash equivalents to meet those liabilities. The attached Report details the valuation methodologies used, calculations performed and the conclusion reached with respect to this valuation.

The analysis must be considered as a whole. Selecting portions of any analysis or the factors that are considered in this Report, without considering all factors and analysis together could create a misleading view of the process underlying the valuation conclusions. The preparation of a valuation is a complex process and is not necessarily susceptible to partial analysis or summary description. Any attempt to do so could lead to undue emphasis on any particular factor or analysis.

The information provided to me by the Investment Manager in relation to the SPVs included but not limited to historical financial statements, forecasts/projections, other statements and assumptions about future matters like forward-looking financial information prepared by the Investment Manager. The forecasts and projections as supplied to me are based upon assumptions about events and circumstances which are yet to occur.

By nature, valuation is based on estimates, however, considering the outbreak of COVID-19 Pandemic and the consequent economic slowdown, the risks and uncertainties relating to the events occurring in the future, the actual figures in future may differ from these estimates and may have an impact on the valuation of the SPVs.

Further, considering the current crisis in relation to COVID-19 in India and across the globe, I have been informed by the Investment Manager, that the forecasts / projections provided for the valuation exercises are prepared after reasonably evaluating and incorporating the impact of outbreak of COVID-19 pandemic as per prevalent conditions as on date.

I have not tested individual assumptions or attempted to substantiate the veracity or integrity of such assumptions in relation to the forward-looking financial information, however, I have made sufficient enquiry to satisfy myself that such information has been prepared on a reasonable basis.

Notwithstanding anything above, I cannot provide any assurance that the forward looking financial information will be representative of the results which will actually be achieved during the cash flow forecast period.

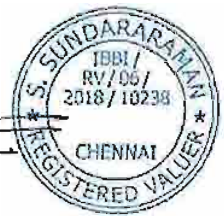
The valuation provided by RV and the valuation conclusion are included herein and the Report complies with the SEBI InvIT Regulations and guidelines, circular or notification issued by the Securities and Exchange Board of India ("SEBI") thereunder.

Please note that all comments in the Report must be read in conjunction with the caveats to the Report, which are contained in Section 10 of this Report. This letter, the Report and the summary of valuation included herein can be provided to Trust's advisors and may be made available for the inspection to the public and with the SEBI, the stock exchanges and any other regulatory and supervisory authority, as may be required.

RV draws your attention to the limitation of liability clauses in Section 10 of this Report including the clause on Limitation on account of COVID-19 and Uncertainty in Valuation.

This letter should be read in conjunction with the attached Report.

Yours faithfully,



S. Sundararaman
Registered Valuer
IBBI Registration No.: IBBI/RV/06/2018/10238
Place: Chennai
UDIN: 22028423BABKLF4448

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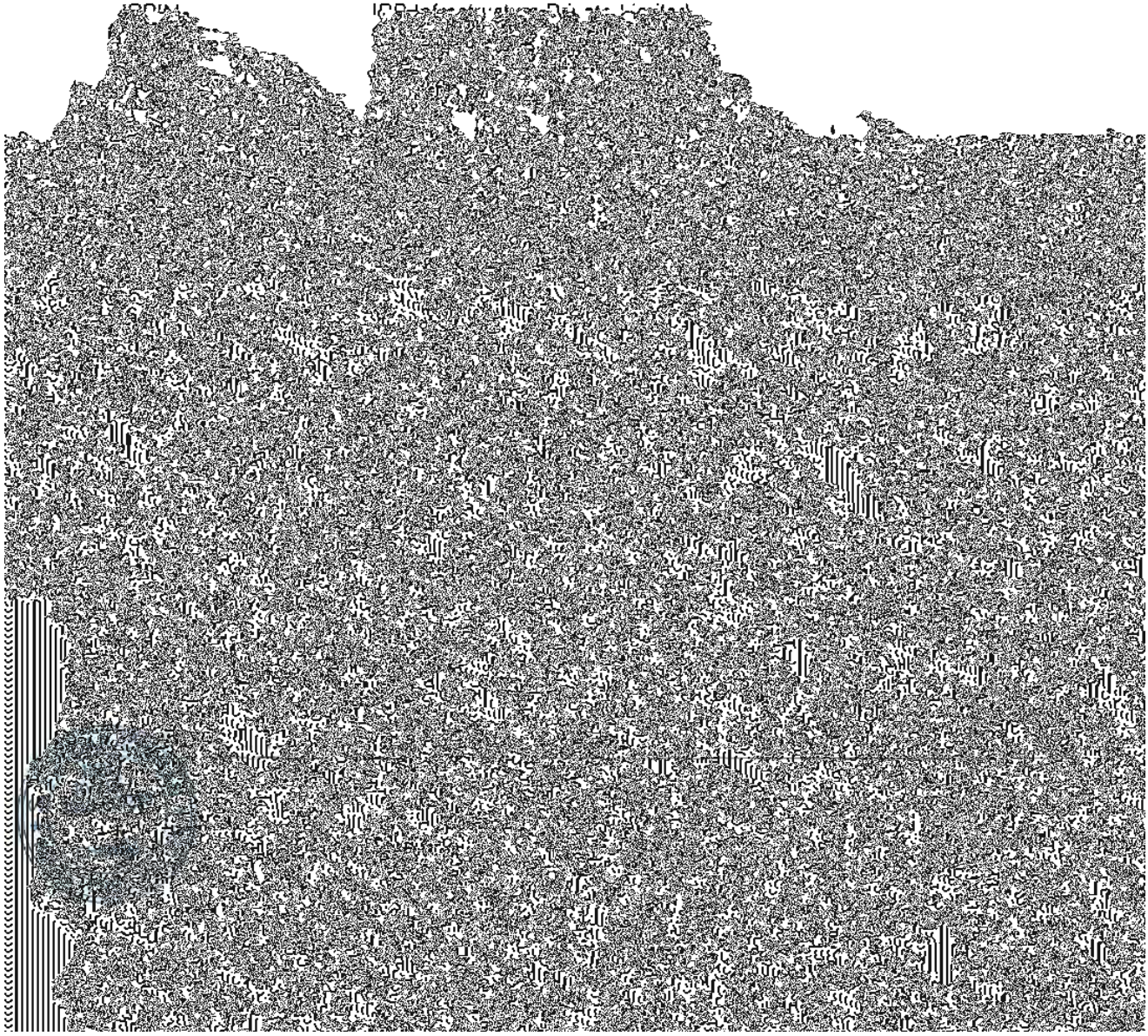
Definition, abbreviation & glossary of terms

Abbreviations	Meaning
BOT	Build, Operate and Transfer
Capex	Capital Expenditure
CCIL	Clearing Corporation of India Limited
COD	Commercial Operation Date
DCF	Discounted Cash Flow
DBFOT	Design, Build, Finance, Operate and Transfer
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
ETC	Electronic Toll Collection
EV	Enterprise Value
FCFF	Free Cash Flow to the Firm
FDI	Foreign Direct Investment
FY / Financial Year	Financial Year Ended 31st March
Ind AS	Indian Accounting Standards
INR	Indian Rupee
IRB	IRB Infrastructure Developers Limited
[illegible]	[illegible]



1. Executive Summary

1.1. Background

The Infrastructure Investment Trust

1.1.1. IRB InvIT Fund ("the Trust" or "InvIT") is constituted by "The Indenture of Trust" dated 16th October 2015, registered under the Registration Act, 1908 and is registered as an Indian infrastructure investment trust with the Securities and Exchange Board of India ("**SEBI**") pursuant to the SEBI (Infrastructure Investment Trusts) Regulations, 2014, as amended ("the **SEBI InvIT Regulations**").

1.1.2. The InvIT has been mainly formed to invest in infrastructure assets primarily being in the road sector in India. All of the Fund's road projects are implemented and held through special purpose vehicles. The InvIT is currently involved in owning, operating and maintaining a portfolio of five toll road assets in the Indian states of Maharashtra, Punjab, Karnataka, Tamil Nadu and Rajasthan pursuant to the concessions granted by the National Highways Authority of India ("**NHAI**"). The units issued by the Trust are listed on the National Stock Exchange of India Limited and Bombay Stock Exchange Limited since 18th May 2017.

1.1.3. Shareholding of the Trust as on 30th September 2022 is as under:

Sr. No.	Particulars	No. of Units	%
1	Sponsor & Sponsor Group	10,72,60,000	18.5%
2	Mutual Funds	3,80,90,000	6.6%
3	Financial Institutions or Banks	22,00,000	0.4%
4	Insurance Companies	1,24,50,000	2.1%
5	Provident or pension funds	2,45,000	0.0%
6	Foreign Portfolio Investors	15,40,75,654	26.5%
7	Non-institutional investors	26,61,79,346	45.9%
	Total	**58,05,00,000**	**100.0%**

Source: BSE Limited

The Sponsor

1.1.4. IRB Infrastructure Developers Limited ("IRB" or "the **Sponsor**") is a listed infrastructure development company, undertaking development of various infrastructure projects via the Public Private Partnership ("**PPP**") model in the toll road sector. It is one of the largest private roads and highways infrastructure developers in India. The equity shares of IRB are listed on the National Stock Exchange of India Limited and Bombay Stock Exchange Limited since 25th February 2008.

1.1.5. Shareholding of the Sponsor as on 30th June 2022 is as under:

Sr. No.	Particulars	No. of Shares	%
1	Promoter & Promoter Group	20,65,52,598	34.2%
2	Mutual Funds	1,87,78,178	3.1%
3	Financial Institutions or Banks	2,04,17,656	3.4%
4	Insurance Companies	84,772	0.0%
5	Foreign Portfolio Investors	29,37,99,919	48.7%
6	Non-institutional investors	6,42,66,877	10.6%
	Total	**60,39,00,000**	**100.0%**

Source. BSE Limited

Investment Manager

1.1.6. IRB Infrastructure Private Limited ("the **Investment Manager**" or "**IRBIM**") is a wholly-owned subsidiary of the Sponsor. The Investment Manager has approximately 19 years of experience in operating road Build Operate Transfer ("**BOT**") projects and is also experienced in developing, operating and maintaining toll plazas in the infrastructure sector.

S. SUNDARARAJAN 1891/ RV/05/ 2018 CHENNAI REGISTERED VALUER

1.1.7. Shareholding of the Investment Manager as on 30th September 2022 is as under:

Sr. No.	Particulars	%
1	IRB Infrastructure Developers Limited	100.0%

Source: Investment Manager

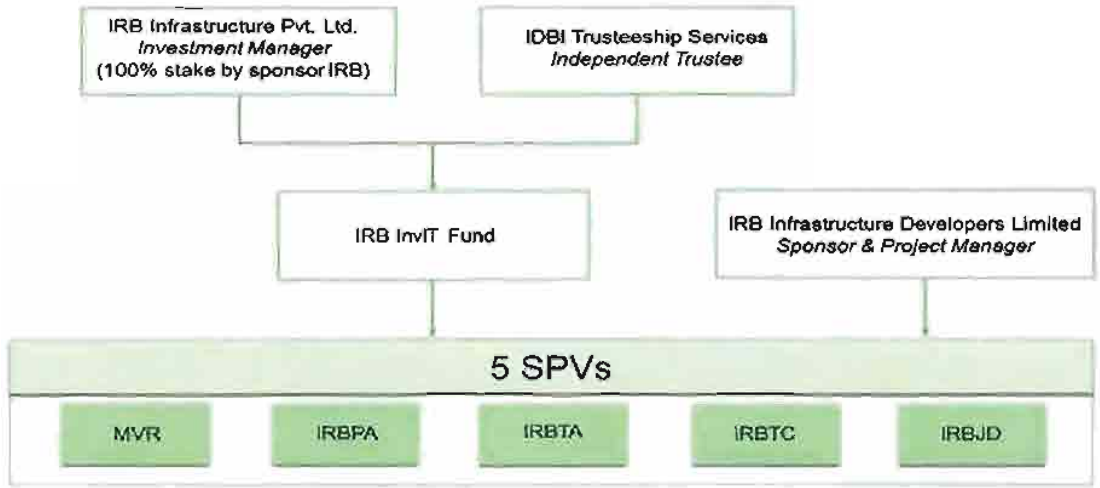
1.1.8. **Financial Assets to be Valued**

Enterprise Value ("EV") is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities. The financial assets under consideration are valued at Enterprise Value.

Sr. No.	Name of the SPV
1	MVR Infrastructure & Tollways Limited ('MVR")
2	IRB Pathankot Amritsar Toll Road Limited ("IRBPA")
3	IRB Talegaon Amravati Tollway Limited ("IRBTA")
4	IRB Tumkur Chitradurga Tollway Limited ("IRBTC")
5	IRB Jaipur Deoli Tollway Limited ("IRBJD")

(together referred to as "the SPVs")

Structure of the Trust as at 30th September 2022:



1.2. Purpose and Scope of Valuation

Purpose of Valuation

1.2.1. As per Regulation 21(4) of Chapter V of the SEBI InvIT Regulations,

"A full valuation shall be conducted by the valuer not less than once in every financial year: Provided that such full valuation shall be conducted at the end of the financial year ending March 31st within two months from the date of end of such year."

In this regard, the Investment Manager intends to undertake the fair enterprise valuation of the SPVs as on 30th September 2022.

1.2.2. In this regard, the Investment Manager have appointed Mr. S. Sundararaman (**"Registered Valuer"** or **"RV"** or **"I"** or **"My"** or **"Me"**) bearing IBBI registration number IBBI/RV/06/2018/10238 to undertake the fair valuation at the enterprise level of the SPVs as per the SEBI InvIT Regulations as at 30th September 2022. Enterprise Value (**"EV"**) is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities.

1.2.3. Registered Valuer declares that:

i. The RV is competent to undertake financial valuation in terms of SEBI InvIT Regulations;
ii. The RV is independent and has prepared the Report on a fair and unbiased basis;
iii. RV has valued the SPVs based on the valuation standards as specified / applicable as per the SEBI InvIT Regulations.

1.2.4. This Report covers all the disclosures required as per the SEBI InvIT Regulations and the valuation of the SPVs is impartial, true and fair and in compliance with the SEBI InvIT Regulations.

Scope of Valuation

1.2.5. **Nature of the Asset to be Valued**

The RV has been mandated by the Investment Manager to arrive at the Enterprise Value ("EV") of the SPVs. Enterprise Value is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities.

1.2.6. **Valuation Base**

Valuation Base means the indication of the type of value being used in an engagement. In the present case, RV has determined the fair value of the SPVs at the enterprise level. Fair Value Bases defined as under:

Fair Value

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the valuation date. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction in the principal (or most advantageous) market at the measurement date under current market conditions (i.e. an exit price) regardless of whether that price is directly observable or estimated using another valuation technique. Fair value or Market value is usually synonymous to each other except in certain circumstances where characteristics of an asset translate into a special asset value for the party(ies) involved.

1.2.7. **Valuation Date**

Valuation Date is the specific date at which the value of the assets to be valued gets estimated or measured. Valuation is time specific and can change with the passage of time due to changes in the condition of the asset to be valued. Accordingly, valuation of an asset as at a particular date can be different from other date(s).

The Valuation Date considered for the fair enterprise valuation of the SPVs is 30th September 2022 ("**Valuation Date**"). The attached Report is drawn up by reference to accounting and financial information as on 30th September 2022. The RV is not aware of any other events having occurred since 30th September 2022 till date of this Report which he deems to be significant for his valuation analysis.

1.2.8. **Premise of Value**

Premise of Value refers to the conditions and circumstances how an asset is deployed. In the present case, RV has determined the fair enterprise value of the SPVs on a Going Concern Value defined as under:

Going Concern Value

Going concern value is the value of a business enterprise that is expected to continue to operate in the future. The intangible elements of going concern value result from factors such as having a trained work force, an operational plant, necessary licenses, systems, and procedures in place etc.

1.2.9. For the amount pertaining to the operating working capital, the Investment Manager has acknowledged to consider the unaudited financial statements as on 30th September 2022 to carry out the valuation of the SPVs.

1.3. Summary of Valuation

I have assessed the fair enterprise value of each of the SPVs on a stand-alone basis by using the discounted cash flow method under the income approach. Following table summarizes my explanation on the usage or non usage of different valuation methods:

Valuation Approach	Valuation Methodology	Used	Explanation
Cost Approach	Net Asset Value	No	NAV does not capture the future earning potential of the business. Hence, NAV method has been considered for background reference only.
Income Approach	Discounted Cash Flow	Yes	The revenue of the projects are defined for a certain period of years as provided by M/s GMD Consultants in its Toll Revenue and O&M Cost Projection Report. As all the SPVs under considerations have executed projects under the BOT model, the ownership of the underlying assets shall be transfered after the expiry of the concession period. In case of all the SPVs, the total concession period is between 14 years to ~32 years. Hence, the growth potential of the SPVs and the true worth of its business would be reflected in its future earnings potential and therefore, DCF Method under the income approach has been considered as an appropriate method for the present valuation exercise.
Market Approach	Market Price	No	The equity shares of the SPVs are not listed on any recognized stock exchange in India. Hence, I was unable to apply the market price method.
	Comparable Companies	No	In the absence of any exactly comparable listed companies with characteristics and parameters similar to that of the SPVs, I am unable to consider this method for the current valuation.
	Comparable Transactions	No	In the absence of adequate details about the Comparable Transactions, I was unable to apply the CTM method.

Under the Discounted Cash Flow (DCF) Method, the Free Cash Flow to Firm (FCFF) has been used for the purpose of valuation of each of the SPVs. In order to arrive at the fair EV of the individual SPVs under the DCF Method, I have relied on unaudited financial statements as at 30th September 2022 prepared in accordance with the Indian Accounting Standards (Ind AS) and the financial projections of the respective SPVs prepared by the Investment Manager as at the Valuation Date based on their best judgement.

The discount rate considered for the respective SPVs for the purpose of this valuation exercise is based on the Weighted Average Cost of Capital for each of the SPVs. As all the SPVs under considerations have executed projects under the BOT model, the ownership of the underlying assets shall be transfered after the expiry of the concession period. At the end of the agreed concession period, the ownership of the road, the obligation to maintain the road and the right to collect tolls from the vehicles using the road revert to the government entity that granted the concession by the SPVs. Accordingly, terminal period value i.e. value on account of cash flows to be generated even after the expiry of concession period has not been considered.

Based on the methodology and assumptions discussed further, RV has arrived at the Fair Enterprise Value of the SPVs as on the Valuation Date:

Sr. No.	SPVs	Projection Period (Balance Concession Period)	WACC	Fair EV (INR Mn)
1	MVR	~4 Years 3 Months	9.6%	3,847
2	IRBPA*	~15 Years 2 Months	11.1%	16,185
3	IRBTA	~14 Years 8 Months	10.6%	9,961
4	IRSTC	~20 Years 3 Months	10.5%	21,561
5	IRBJD	~18 Years 1 Months	10.5%	18,563
Total				**70,117**

**In the current projections, the Investment Manager has revised the likely concession period and date of IRBPA to 2nd December 2037 (from 6th July 2036 as provided in the projections considered for the March 2022 valuation exercise) based on the arbitral award by Hon'ble Arbitration Tribunal and subsequent favorable order of Hon'ble Delhi High Court in March 2022, on account of delay in completion of construction of the project on account of the reasons not attributable to IRBPA.* Said award was *taken on record in the meeting of Board of Directors of IRBPA on 7th May 2022.*

This extension is subject to receiving final approval from NHAI. I have relied on the information provided by the Investment Manager in this regard.

(Refer Appendix 1 & 2 for the detailed workings)

Further to above considering that present valuation exercise is based on the future financial performance and based on opinions on the future credit risk, cost of debt assumptions, etc., which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and variations may be material. Accordingly, a quantitative sensitivity analysis is considered on the following unobservable inputs.

1. Weighted Average Cost of Capital (WACC) by increasing / decreasing it by 1.0%
2. Revenue by increasing / decreasing it by 10%
3. Expenses by increasing / decreasing it by 20%

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1. Fair Enterprise Valuation Range based on WACC parameter (1.0%)

INR Mn

Sr. No.	SPVs	WACC +1.0%	EV	Base WACC	EV	WACC -1.0%	EV
1	MVR	10.6%	3,771	9.6%	3,847	8.6%	3,925
2	IRBPA	12.1%	15,142	11.1%	16,185	10.1%	17,338
3	IRBTA	11.6%	9,331	10.6%	9,961	9.6%	10,655
4	IRBTC	11.5%	19,201	10.5%	21,561	9.5%	24,284
5	IRBJD	11.5%	17,180	10.5%	18,563	9.5%	20,118
			64,625		**70,117**		**76,320**

2. Fair Enterprise Valuation Range based on Revenue parameter (10%)

INR Mn

Sr. No.	SPVs	EV at Revenue -10.0%	EV at Base Revenue	EV at Revenue +10.0%
1	MVR	3,382	3,847	4,303
2	IRBPA	14,348	16,185	18,016
3	IRBTA	8,700	9,961	11,025
4	IRBTC	16,010	21,561	26,910
5	IRBJD	16,310	18,563	20,847
		58,749	**70,117**	**81,101**

3 Fair Enterprise Valuation Range based on Expense parameter (20%)

INR Mn

Sr. No.	SPVs	EV at Expenses +20.0%	EV at Base Expenses	EV at Expenses -20.0%
1	MVR	3,740	3,847	3,946
2	IRBPA	15,615	16,185	16,740
3	IRBTA	9,608	9,961	10,147
4	IRBTC	21,323	21,561	21,798
5	IRBJD	18,150	18,563	18,977
		68,435	**70,117**	**71,608**

The above represents reasonable range of fair enterprise valuation of the SPVs.

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2. Procedures adopted for current valuation exercise

2.1. I have performed the valuation analysis, to the extent applicable, in accordance with ICAI Valuation Standards 2018 ("IVS") issued by the Institute of Chartered Accountants of India read with SEBI InvIT Regulations.

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

2.2.1. Requested and received financial and qualitative information relating to the SPVs;

2.2.2. Obtained and analyzed data available in public domain, as considered relevant by me;

2.2.3. Discussions with the Investment Manager on:

- Understanding of the business of the SPVs – business and fundamental factors that affect its earning-generating capacity including strengths, weaknesses, opportunities and threats analysis and historical and expected financial performance;

2.2.4. Undertook industry analysis:

- Research publicly available market data including economic factors and industry trends that may impact the valuation;
- Analysis of key trends and valuation multiples of comparable companies/comparable transactions, if any, using proprietary databases subscribed by me;

2.2.5. Analysis of other publicly available information;

2.2.6. Selection of valuation approach and valuation methodology/(ies), in accordance with IVS, as considered appropriate and relevant by me;

2.2.7. Conducted physical site visit of the road assets of the SPVs;

2.2.8. Determination of fair EV of the SPVs.

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3. Overview of the InvIT and the SPVs

The Trust

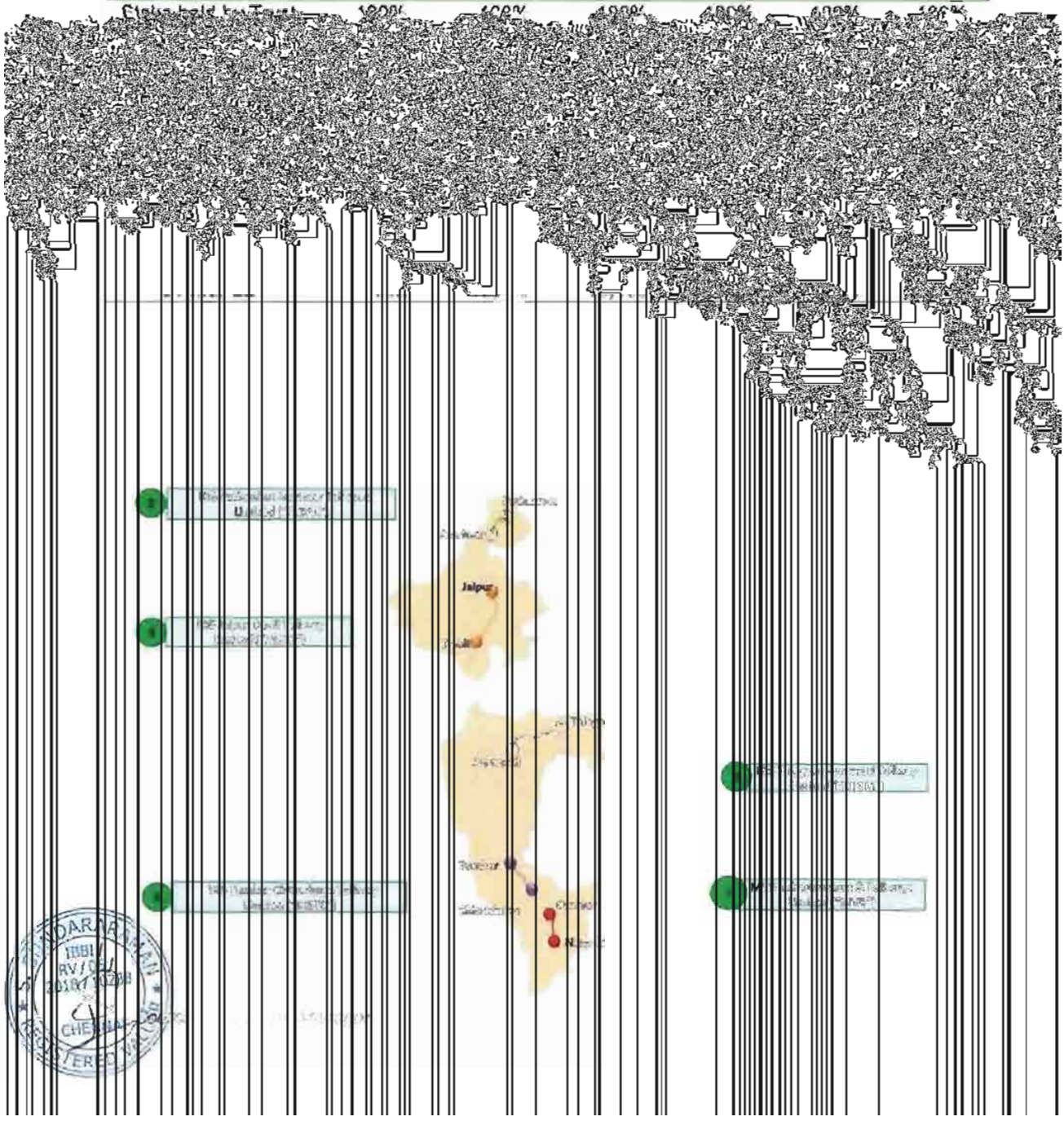
3.1. The Trust is registered with SEBI pursuant to the SEBI InvIT Regulations. The Trust was established on 16th October 2015 by IRB Infrastructure Developers Limited as the Sponsor.

3.2. It is mainly established to invest in infrastructure assets primarily being in the road sector in India. The units of the Trust are listed on the National Stock Exchange Limited and BSE Limited since 18th May 2017.

3.3. The InvIT comprises of five operational road projects having length of 2,231 lane Kms. It has presence across five states in India.

3.4. Following is the historical valuation summary of the SPVs of the Trust:

Valuation (INR Mn)	IRBSD	IRBTA	IRBJD	IRBTC	MVR	IRBPA
Stake held by Trust	100%	100%	100%	100%	100%	100%



Background of the SPVs

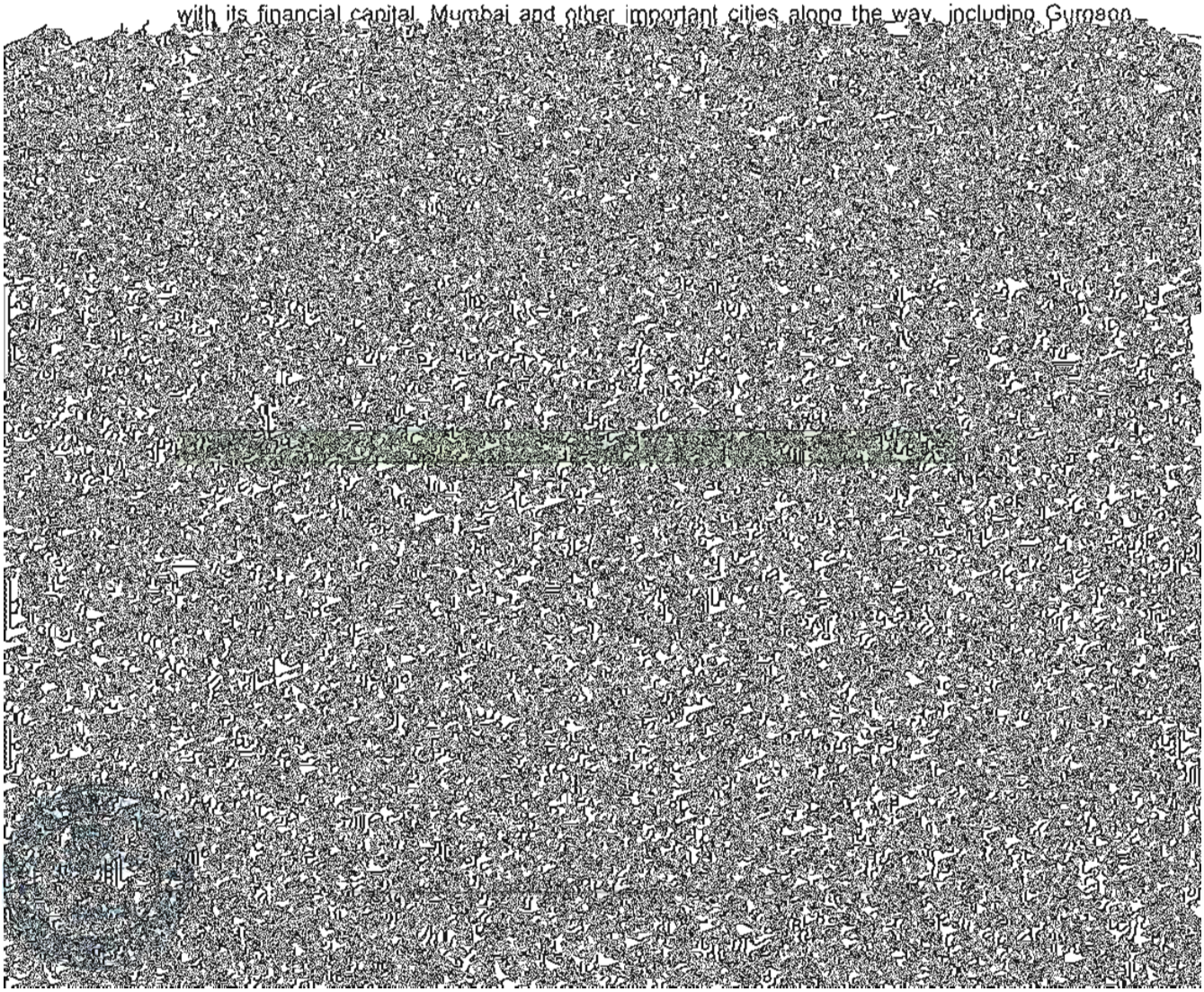
3.6. IRB Surat Dahisar Tollway Limited ("IRBSD")

3.6.1. Summary of details of IRBSD are as follows:

Parameters	Details
Total Length	1,434 Lane Kms
Nos. of Lanes	6
NH / SH	NH 8
States Covered	Maharashtra, Gujarat
Area (Start and End)	Surat – Dahisar
Project Cost	INR 25,286 Mn
PPP Model	DBFOT
Concession Granted by	NHAI
Appointed/ Tolling Start Date	20th February 2009
Original Concession Period (CP)	12 years from Appointed Date
Extension granted	463 days
End of CP (including extension)	26th May 2022
Trust's stake	100%

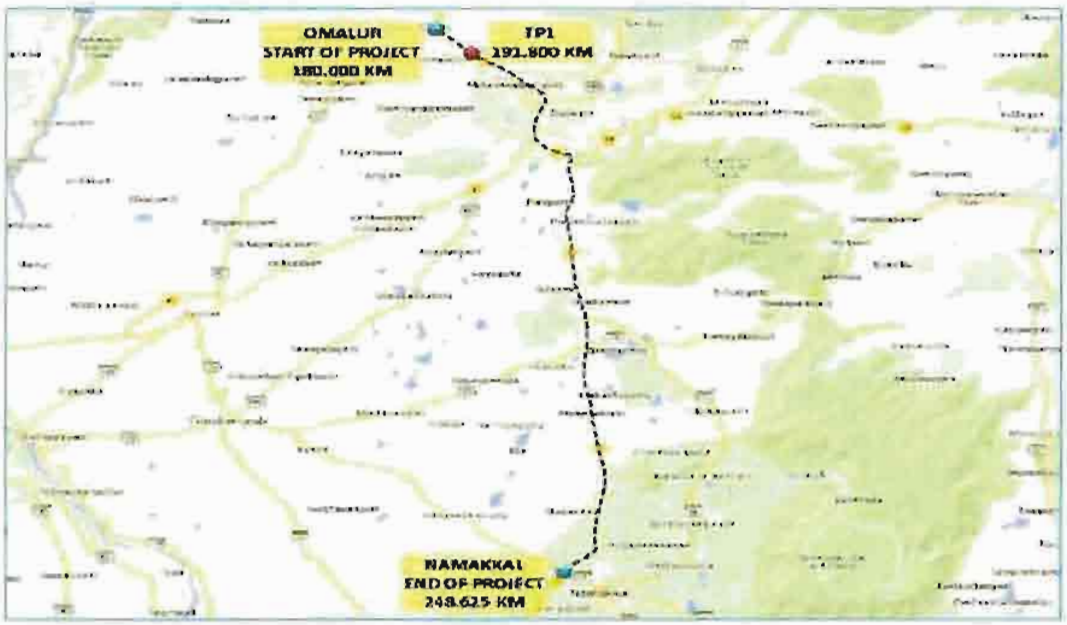
Source: Investment Manager

3.6.2. NH 8 is a four to six-lane National Highway in India. It connects India's national capital, New Delhi, with its financial capital, Mumbai and other important cities along the way, including Gurgaon,



3.7.2. NH 7 is one of India's busiest traffic routes, connecting the north and south of India via commercial hubs like Varanasi, Rewa, Jabalpur, Nagpur, Adilabad, Nirmal, Armoor in (Nizamabad), Kamareddy, Hyderabad, Kurnool, Anantapur, Chikkaballapur, Bangalore, Krishnagiri, Salem, Madurai, Tirunelveli and Kanyakumari.

3.7.3. The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

3.7.4. MVR project covers the Omalur and Namakkal section of NH 7 from 180.0 km to 248.6 km. The project has been implemented on a BOT basis by the NHAI and is a combination of construction and maintenance packages as given under:

- Maintenance package - From 180 km to 207.5 km
- Construction & Maintenance Package - From 207.5 km to 248.625 km

3.7.5. The project covers the stretch from Omalur to Namakkal and passes through two districts namely Salem and Namakkal. This project has been awarded for a concession period of 20 years starting from 14th August 2006. The project has been commissioned and is currently in the operation / maintenance phase. The project includes 1 Toll Fee Plaza, 8 Vehicular Underpasses, 36 Culverts, 11 pedestrian underpasses, 5 Flyovers & Railways Overbridges, 14 Minor bridges, and 16 Major Intersections. It has 68.625 Km Four-Lane Service Carriageway.

3.7.6. Projections provided by the Investment Manager considers an extension of 152 days from original concession end date, due to following:

- 15 days of extension due to floods in Chennai.
- 24 days of extension due to demonetization.
- 90 days of extension based on the Government of India notification on Force Majeure Clause (Notification No. F. 18/4/2020-PPD dated 13 May 2020) which got triggered due to suspension in toll operations owing to COVID-19 pandemic.
- 23 days of extension based on the Government of India notification on Force Majeure Clause (Notification No. COVID-19/RoadMap/JS(H)/2020 dated 26th August, 2021) which got triggered due to suspension in toll operations owing to second wave of COVID-19 pandemic.

3.7.7. My team had conducted physical site visit of the road stretch of MVR on 7th March 2022. Refer below for the piciures of the road stretch:

3.8. **IRB Pathankot Amritsar Toll Road Limited ("IRBPA")**

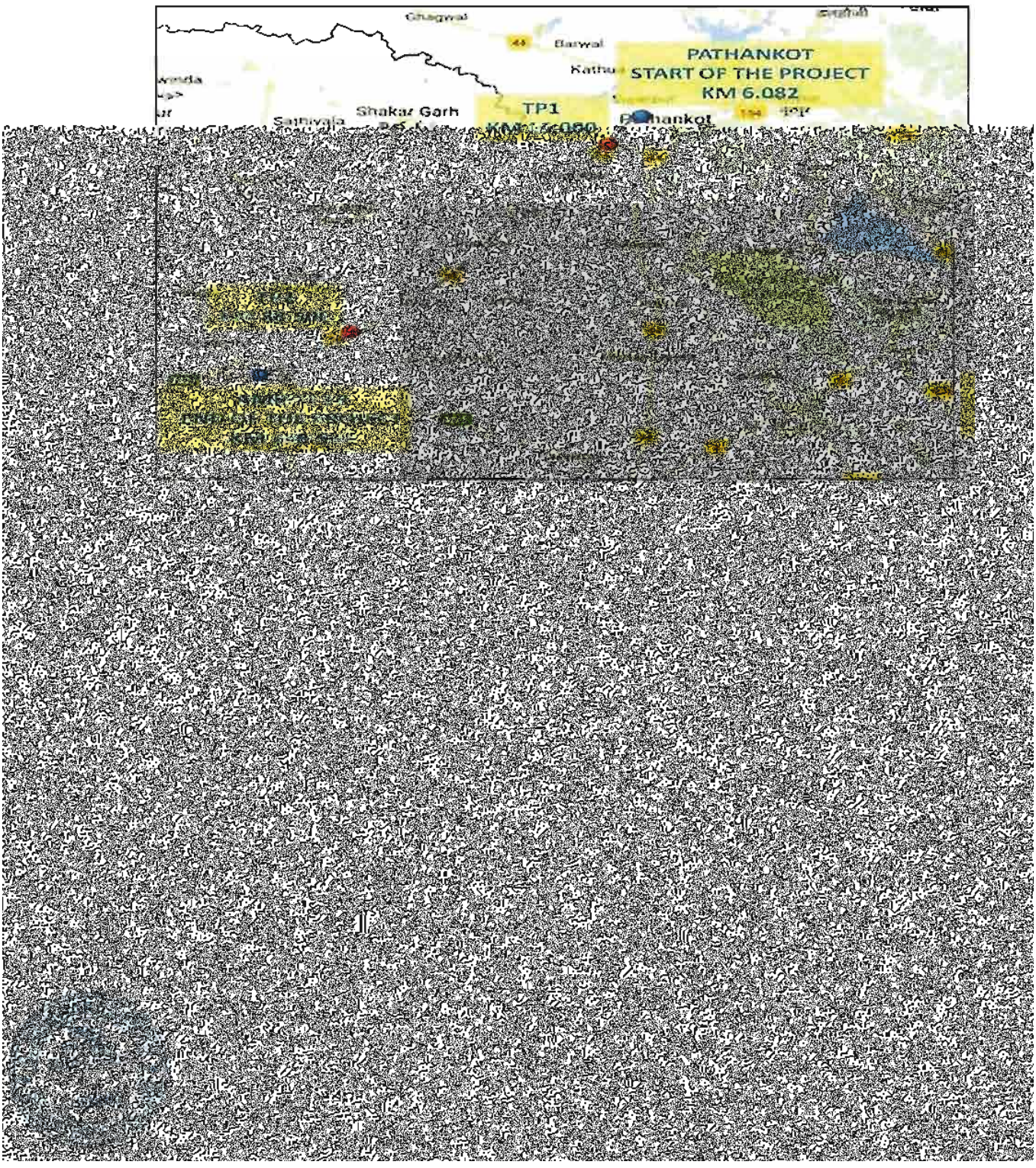
3.8.1. Summary of details of IRBPA are as follows:

Parameters	Details
Total Length	410 Lane Kms
Nos. of Lanes	4
NH / SH	NH 15
States Covered	Punjab
Area (Start and End)	Pathankot – Amritsar
Project Cost	INR 14,453 Mn
PPP Model	DBFOT
Concession Granted by	NHAI
Appointed Date	31st December 2010
Tolling Start Date	27th November 2014
Original Concession Period (CP)	20 years from Appointed Date
Extension (if any)	2,528 days
Likely End of CP (including extension)	2nd December 2037
Trust's stake	100%

Source: Investment Manager

3.8.2. NH 15 is a two to four lane National Highway in India. The NH 15 is one of the major highways of northwestern India, starting at Pathankot in the state of Punjab and traversing through the states of Punjab, Rajasthan and ending at Samakhiali of Gujarat. Important cities and towns, en-route, are Amritsar, Bhatinda, Ganganagar, Bikaner, Jaisalmer and Barmer. In the state of Punjab, NH 15 passes through the districts of Gurudaspur, Amritsar, Firozpur, Faridkot, Moga, Mukatsar and Bhatinda.The Pathankot – Amritsar NH 15 Project is part of the high-density traffic corridor, catering to various types of traffic, including urban, suburban and regional traffic.

3.8.3. The map below illustrates the location of the Project and the corridor it covers:



- 581 days of extension pursuant to arbitral award for delay in completion of construction of the project on account of the reasons not attributable to IRBPA. (Kindly refer point no 3.6.10)

3.8.8. Modification in the Concession Period due to target traffic clause as per Concession Agreement

As per the Clause 29 of the concession agreement between NHAI and IRBPA provided to us by the Investment Manager, if the actual traffic falls short or exceeds target traffic on a defined date, the concession period shall be revised subject to calculation specified therein. The target date and target traffic as provided in the concession agreement along with the projected traffic as on the target date are given below:

Particulars	Unit	Details
Target date as per CA	Date	01-Jan-19
Target traffic as per CA	PCUs	34,498
Actual Average Traffic	PCUs	25,087
Comparison of average traffic at test date with target	%	-27%
Original concession period	years	20.0
Increase in concession period (Max. upto 20%)	%	20%
Change in concession period	days	1,460
Revised concession period	years	24.0
Appointed date	Date	31-Dec-10
Additional days due to Toll Suspension (Demonetization)	Days	24
Additional days due to COVID-19 pandemic (First wave)	Days	90
Additional days due to farmers protest	Days	436
Additional days due to Arbitral Award	Days	518
Original concession end date	Date	30-Dec-30
Revised concession end date	Date	02-Dec-37

As informed to us by the Investment Manager, the actual traffic volume has fallen short of the target traffic as on the target date. This warranted for an extension of the concession period by 4 years (1,460 days).

3.8.9. Extension due to Farmer's Protest Force Majeure

During the period October 2020 to December 2021 the user toll collection of IRBPA were forcefully suspended on account of the farmer's civil commotion (agitation) against the farmer reform bill passed by Parliament of India.

The Concessionaire had notified the occurrence of Force Majeure event under Indirect Political Event to NHAI as per provisions of the Concession Agreement.

Further, NHAI had vide letter dated 27th August 2022 NHAI approved an extension of Concession period equal to the period affected by Force Majeure (i.e from 06.10.2020 to 15.12.2021, i.e. 436 days).

3.8.10. Extension due to delay in completion of construction

IRBPA 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 for delay in completion of construction of the project on account of the reasons not attributable to IRBPA.

Further, in July 2021 the Hon'ble Arbitration Tribunal has announced award in favour of the Concessionaire (IRBPA). I have been informed by the Investment Manager that the extension to concession period would entirely accrue to the benefit of IRBPA and the Trust.

I have been further informed that the petition filed by NHAI challenging the said Arbitral Award has been dismissed by the Hon'ble Delhi High Court in March 2022 and the Arbitral Award has been upheld.

As the final approval of NHAI for the extention has not been received, I have considered an additional one percent risk premium as compared to the previous valuation report.

3.8.11. My team had conducted physical site visit of the road stretch of IRBPA on 24th June 2022. Refer below for the pictures of the road stretch:

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3.9. IRB Talegaon Amravati Toll Road Limited ("IRBTA")

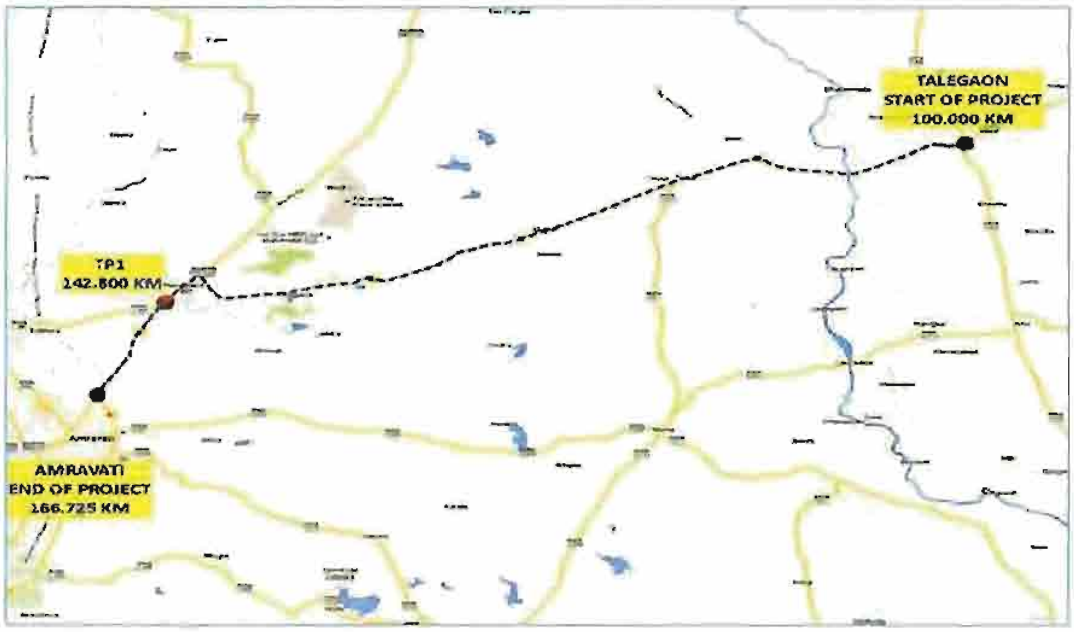
3.9.1. Summary of details of IRBTA are as follows:

Parameters	Details
Total Length	267 Lane Kms
Nos. of Lanes	4
NH / SH	NH 6
States Covered	Maharashtra
Area (Start and End)	Talegaon – Amravati
Project Cost	INR 8,926 Mn
PPP Model	DBFOT
Concession Granted by	NHAI
Appointed Date	3rd September 2010
Tolling Start Date	24th April 2013
Original Concession Period (CP)	22 years from Appointed Date
Extension (if any)	1,734 days
Likely End of CP (including extension)	2nd June 2037
Trust's stake	100%

Source: Investment Manager

3.9.2. NH 6 connects Hazira and Kolkata via Surat, Dhule, Amravati, Nagpur, Raipur, and Sambalpur. It intersects with several other national highways, including NH 3 near Dhule, NH 5 near Jharkoparia, NH 7 near Nagpur and NH 8 near Surat. NH 6 passes through five states, namely Gujarat, Madhya Pradesh, Orissa, Chhattisgarh and West Bengal. The Talegaon–Amravati NH 6 Project caters to various types of traffic such as urban, suburban and regional traffic. IRBTA project covers the Talegaon and Amravati section of NH-6 from 100 km to 166.7 km.

3.9.3. The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

3.9.4. This project has been awarded to IRBTA for a concession period of 22 years starting from 3rd September 2010 on the basis of a grant of INR 2,160 Mn receivable from the NHAI during the construction period. The project includes 66 Entry/Exit Ramps, 38 Bus Bays, 20 pedestrian underpasses, 21 Minor bridges, 3 Major bridges and 36 Major Intersections. It has 114.45 Km Four-Lane Service Carriageway and 4.2 Km long Service road.

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3.9.5. The project includes 1 Toll Fee Plaza, 15 Bus Bays, 1 Rail over Bridge, 11 Vehicular Underpasses, 11 pedestrian underpasses, 2 Flyovers, 25 Minor bridges, 1 Major bridge and 36 Major Intersections. It has 66.7 Km Four-Lane Service Carriageway and 26.5 Km long Service Road.

3.9.6. The project is in the state of Maharashtra and passes through Amravati district. En-route, it passes few major/minor urban centres, viz. Nandgaon Peth, Mozri, Tivsa, and Ramdara etc. before reaching end of project stretch at Talegaon. The corridor of the project is also known as Amravati — Nagpur Highway. The project has been commissioned and is currently in the operation / maintenance phase.

3.9.7. Projections provided by the Investment Manager considers an extension of 1,734 days from original concession end date, due to following:

- 24 days of extension due to demonetization.
- 1,606 days of extension owing to the target traffic clause as per Concession Agreement and the traffic survey conducted by SPV has been filed with NHAI vide letters dated 2nd April 2021, 14th October, 2020 and 25th September, 2020. The same has been recommended by the independent engineer appointed by IRBTA vide letter dated 28th July 2021. NHAI approval for the same is pending as on Report date.
- 90 days of extension based on the Government of India notification on Force Majeure Clause (Notification No. F. 18/4/2020-PPD dated 13 May 2020) which got triggered due to suspension in toll operations owing to COVID-19 pandemic.
- 13 days of extension based on the Government of India notification on Force Majeure Clause (Notification No. COVID-19/RoadMap/JS(H)/2020 dated 26th August, 2021) which got triggered due to suspension in toll operations owing to second wave of COVID-19 pandemic.

3.9.8. Modification in the Concession Period due to target traffic clause as per Concession Agreement

As per the Clause 29 of the concession agreement between NHAI and IRBTA provided to us by the Investment Manager, if the actual traffic falls short or exceeds target traffic on a defined date, the concession period shall be revised subject to calculation specified therein. The target date and target traffic as provided in the concession agreement along with the projected traffic as on the target date are given below:

Particulars	Unit	Details
Target date as per CA	Date	01-Apr-20
Target traffic as per CA	PCUs	41,052
Actual Average Traffic	PCUs	20,306
Comparison of average traffic at test date with target	%	-51%
Original concession period	Years	22.0
Increase in concession period (Max. upto 20%)	%	20%
Change in concession period	Days	1,606
Revised concession period	Years	26.4
Appointed date	Date	03-Sep-10
Additional days due to Toll Suspension (Demonetization)	Days	24
Additional days due to COVID-19 pandemic (First wave)	Days	90
Additional days due to pandemic (Second wave)	Days	13
Original concession end date	Date	02-Sep-32
Revised concession end date	Date	02-Jun-37

As informed to us by the Investment Manager, the actual traffic volume has fallen short of the target traffic as on the target date. This warranted for an extension of the concession period by 4.4 years (1,606 days).

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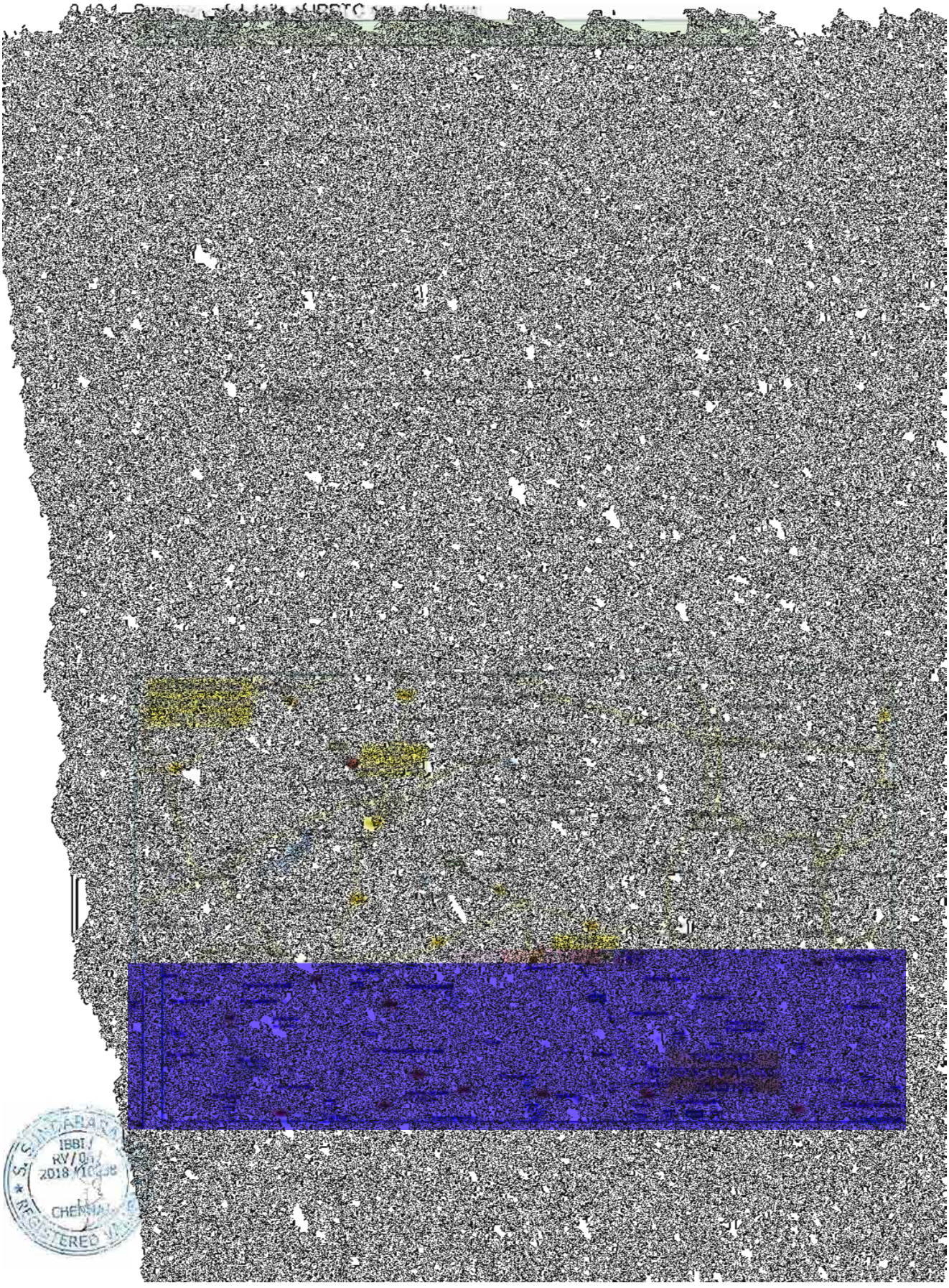
3.9.9. My team had conducted physical site visit of the road stretch of IRBTA by 14th October 2022. Refer below for the pictures of the road stretch:

3.10. IRB Tumkur Chitradurga Tollway Limited ("IRBTC")

3.10.1. [redacted]



3.10.4. This project has been awarded for a concession period of 26 years starting from 4th June 2011 on the basis of a premium of INR 1,404.0 Mn payable to the NHAI in the first year of concession period increased annually at 5%.The actual premium payment for the project is agreed upon with the Authority basis Deferred Premium policy.

3.10.5. The project includes 2 Toll Fee Plazas, 66 Entry/ Exit Ramps, 7 Truck Lay Byes, 147 Culverts, 6 Flyovers, 38 Bus Bays, 20 pedestrian underpasses, 21 Minor bridges, 3 Major bridges and 36 Major Intersections. It has 114.45 Km Four-Lane Service Carriageway and 4.2 Km long Service road.

3.10.6. The project is in the state of Karnataka and passes through districts, viz. Tumkur and Chitradurga. En-route, it passes few major/minor urban centres, viz. Tumkur, Sira, Hiriyur and Chitradurga. The project has been commissioned and is currently in the operation/ maintenance phase.

3.10.7. Projections provided by the Investment Manager considers an extension of 2,034 days from original concession end date, due to following:

- 24 days of extension due to demonetization.
- 90 days of extension based on the Government of India notification on Force Majeure Clause (Notification No. F. 18/4/2020-PPD dated 13 May 2020) which got triggered due to suspension in toll operations owing to COVID-19 pandemic.
- 1,899 days of extension owing to the target traffic clause as per Concession Agreement though it has been intimated to NHAI vide letter dated 14th April, 2021, approval for the same is pending as on report date.
- 22 days of extension based on the Government of India notification on Force Majeure Clause (Notification No. COVID-19/RoadMap/JS(H)/2020 dated 26th August, 2021) which got triggered due to suspension in toll operations owing to second wave of COVID-19 pandemic.

3.10.8. Modification in the Concession Period due to target traffic clause as per Concession Agreement

As per the Clause 29 of the concession agreement between NHAI and IRBTC provided to us by the Investment Manager, if the actual traffic falls short or exceeds target traffic on a defined date, the concession period shall be revised subject to calculation specified therein.

The target date and target traffic as provided in the concession agreement along with the projected traffic as on the target date are given below:

Particulars	Unit	Details
Target date as per CA	Date	01-Apr-20
Target traffic as per CA	PCUs	54,558
Actual Average Traffic	PCUs	40,951
Comparison of average traffic at test date with target	%	-25%
Original concession period	Years	26
Increase in concession period	%	20%
Change in concession period	Days	1,899
Revised concession period	Years	31.2
Appointed date	Date	04-Jun-11
Additional days due to Toll Suspension (Demonetization)	Days	24
Additional days due to COVID-19 pandemic (First wave)	Days	90
Additional days due to pandemic (Second wave)	Days	22
Original concession end date	Date	03-Jun-37
Revised concession end date	Date	29-Dec-42

As informed to us by the Investment Manager, the actual traffic volume has fallen short of the target traffic as on the target date. This warranted for an extension of the concession period by 5.2 years (1,899 days).

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3.10.9 My team had conducted physical site visit of the road stretch of IRBTC on 18th April 2022. Refer below for the pictures of the road stretch:

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3.11. IRB Jaipur Deoli Tollway Limited ("IRBJD")

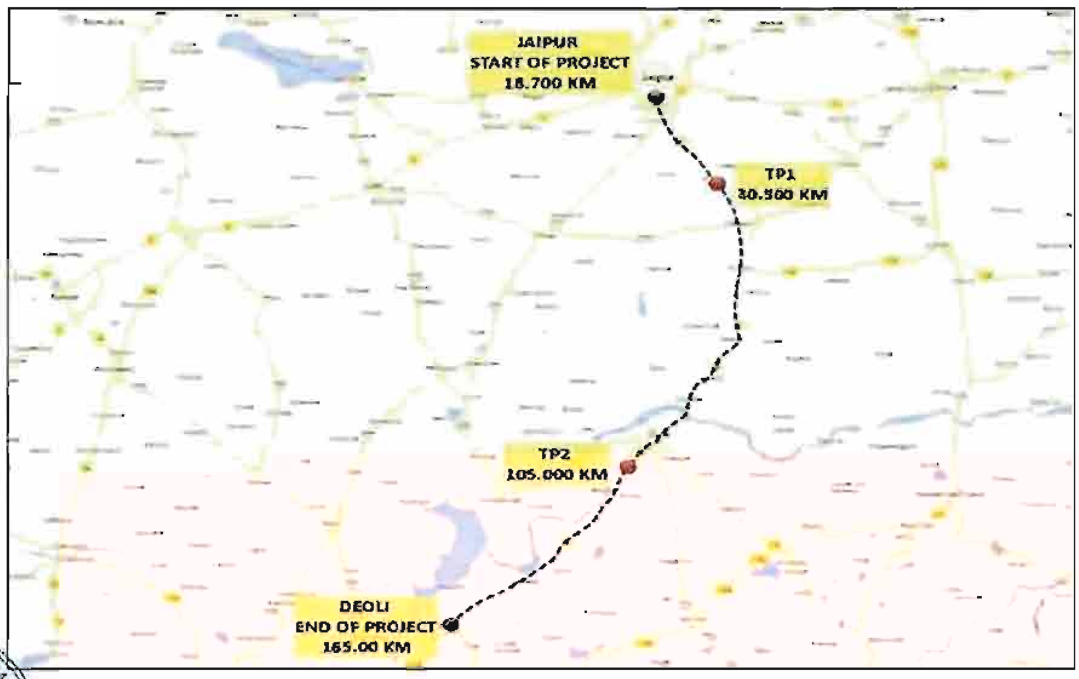
3.11.1. Summary of details of IRBJD are as follows:

Parameters	Details
Total Length	595 Lane Kms
Nos. of Lanes	4
NH / SH	NH 12
States Covered	Rajasthan
Area (Start and End)	Jaipur – Deoli
Project Cost	INR 17,747 Mn
PPP Model	DBFOT
Concession Granted by	NHAI
Appointed Date	14th June 2010
Tolling Start Date	27th September 2013
Original Concession Period (CP)	25 years from Appointed Date
Extension (if any)	1,957 days
Likely End of CP (including extension)	21st October 2040
Trust's stake	100%

Source: Investment Manager

3.11.2. NH 12 connects Jaipur and Jabalpur via Tonk, Kota, and Bhopal. It intersects with several other national highways like NH 3 at Biora, NH 7 at Jabalpur, NH 8 at Jaipur, NH 11 at Jaipur, and NH 69 at Bhopal. NH 12 passes through two states via Rajasthan and Madhya Pradesh. IRBJD project covers the Jaipur and Deoli section of NH-12 from km 18.7 to km 165.0. The project is in the state of Rajasthan and passes through districts, viz. Jaipur and Tonk. En-route, it passes few major/minor urban centres, viz. Shivdaspura, Chaksu, Tonk, and Deoli.

3.11.3. The map below illustrates the location of the Project and the corridor it covers:



Source: Investment Manager

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3.11.4. The project includes 2 toll fee plaza, 3 pedestrian underpasses, 11 vehicular underpasses, 5 cattle underpasses, 124 Culverts, 32 Bus Bays, 4 Flyovers, 23 Minor bridges, 1 Major bridges and 25 Major Intersections. It has 148.77Km Four-Lane Service Carriageway and 36.76 Km long Service road.

3.11.5. This project has been awarded to IRBJD for a concession period of 25 years starting from 14th June 2010 on the basis of a grant given by NHAI of INR 3,060.0 Mn during the concession period. The project has been commissioned and is currently in the operation / maintenance phase.

3.11.6. Projections provided by the Investment Manager considers an extension of 1,957 days from original concession end date, due to following:

- 24 days of extension due to demonetization.
- 1,826 days of extension owing to the target traffic clause as per Concession Agreement and the same has been approved by NHAI vide letter dated 18th March, 2020.
- 90 days of extension based on the Government of India notification on Force Majeure Clause (Notification No. F. 18/4/2020-PPD dated 13 May 2020) which got triggered due to suspension in toll operations owing to COVID-19 pandemic.
- 17 days of extension based on the Government of India notification on Force Majeure Clause (Notification No. COVID-19/RoadMap/JS(H)/2020 dated 26th August, 2021) which got triggered due to suspension in toll operations owing to second wave of COVID-19 pandemic.

3.11.7. We understand from the Investment Manager that the ongoing sand mining ban in Rajasthan imposed since the year 2017 has been relaxed by the Supreme Court of India vide order dated 11th November 2021. The Investment Manager is of the opinion that the abovementioned order shall positively affect the project route traffic.

3.11.8. Modification in the Concession Period due to target traffic clause as per Concession Agreement

As per the Clause 29 of the concession agreement between NHAI and IRBJD provided to us by the Investment Manager, if the actual traffic falls short or exceeds target traffic on a defined date, the concession period shall be revised subject to calculation specified therein.

The target date and target traffic as provided in the concession agreement along with the projected traffic as on the target date are given below:

Particulars	Unit	Details
Target date as per CA	Date	01-Oct-18
Target traffic as per CA	PCUs	30,344
Actual Average Traffic	PCUs	16,611
Comparison of average traffic at test date with target	%	-45%
Original concession period	Years	25
Increase in concession period (Max. upto 20%)	%	20%
Change in concession period	Days	1,826
Revised concession period	Years	30
Appointed date	Date	14-Jun-10
Additional days due to Toll Suspension (Demonetization)	Days	24
Additional days due to COVID-19 pandemic (First wave)	Days	90
Additional days due to pandemic (Second wave)	Days	17
Original concession end date	Date	13-Jun-35
Revised concession end date	Date	21-Oct-40

As informed to us by the Investment Manager, the actual traffic volume has fallen short of the target traffic as on the target date. This warranted for an extension of the concession period by 5 years

3.11.9. My team had conducted physical site visit of the road stretch of IRBJD on 16th December 2021. Refer below for the pictures of the road stretch:

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REGISTERED VALUER

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4. Overview of the Industry

4.1 Introduction

4.1.1 The road infrastructure is an important determinant of economic growth in India and it plays a significant role in the economy's overall development process.

4.1.2 Creation and operation of quality road infrastructure continue to be major requirements for enabling overall growth and development of India in a sustained manner.

4.1.3 Bridging of existing infrastructure gaps and creating additional facilities to cater to the increasing population are equally important. Apart from providing connectivity in terms of enabling movement of passengers and freight, roads act as force multipliers in the economy.

4.1.4 Further, roads play a significant role in times of natural calamities, wars and other such events in terms of timely evacuation of the impacted population, carriage of relief material and other associated movements. Government takes cognisance of this requirement and road infrastructure remains to be a focus area.

4.2 Road Network in India

4.2.1 India has the second largest road network in the world, spanning over 5.8 million kms. Over 64.5% of all goods in the country are transported through roads, while 90% of the total passenger traffic uses road network to commute.

Source: IBEF Roads Report, July 2022

4.2.2 Out of this around 1.41 lakh km are National Highways ("NHs"). Significantly, NHs constitute around 2 per cent of the total road network in the country but carry about 40% of the road traffic. The density of India's highway network at 1.89 km of roads per square kilometer of land – is similar to that of the France (1.98) and much greater than China's (0.49) or USA's (0.68).

4.3 Government Agencies for Road Development

4.3.1 The Ministry of Road Transport & Highway ("**MoRTH**") is responsible for development of Road Transport and Highways in general and construction & maintenance of National Highways.

4.3.2 The National Highways Authority of India ("**NHAI**") is an autonomous agency of the Government of India, set up in 1988 and is responsible for implementation of National Highways Development Project ("**NHDP**").

4.3.3 The NHDP in the context of NHs is nearing completion- in seven phases. Later, the other highway development programmes like Special Accelerated Road Development Programme for Development of Road Network in North Eastern States (SARDP- NE) and National Highways Interconnectivity Improvement Project (NHIIP) were also taken up by MoRTH. Further, Bharatmala Pariyojana is ongoing. For majority of the projects under NHDP and Bharatmala Pariyojana, NHAI is the implementation agency. Other NH related programmes/works are being implemented through agencies like National Highways Infrastructure Development Corporation Limited

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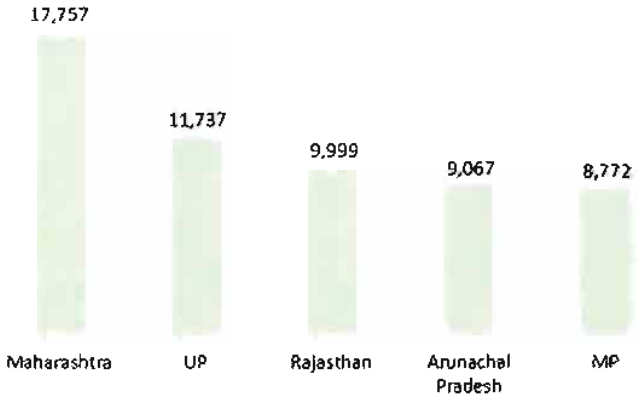
(NHIDCL), State Public Works Departments (PWDs), State Road Development Corporations and the Border Road Organizations

4.3.4 Roads in the jurisdiction of state governments are under different categories like State Highways ("SHs") and Major District Roads. They are being developed/ upgraded through State PWDs and State Road Development Corporations. Pradhan Mantri Gramm Sadak Yojana is being implemented for rural roads through the Ministry of Rural Affairs with active participation by state governments. Further, roads within urban areas mostly with PWDs and Urban Local Bodies.

4.3.5 State Governments have a significant role to play in developing the SHs, Major District Roads, Other District Roads to ensure the last mile connectivity. States have varying levels of maturity in terms of road infrastructure development due to issues such as inadequate identification and prioritization of projects, funding shortfall, limited institutional capacity to implement projects, etc.

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



4.4 Trend of Road and Highways Construction

4.4.1 The length of National Highways awarded has almost doubled in the years FY15 to FY18 compared to FY11 to FY14. Length of NHs constructed has increased by 70% during the same period. This pace is expected to gain further ground, with the ambitious targets set by the ministry and the implementation of the Bharatmala Pariyojana as MORTH is planning to construct around 65,000 km of national highways at a cost of Rs 5.35 trillion (US$ 74.15 billion) by 2022.

4.4.2 India has become the fastest highway developer in the world with 27 kms of highways built each day in 2017-18 and plans to construct 25,000 kilometres of national highways in 2022-23 at a pace of 50 km per day.

4.4.3 Under the Union Budget 2022-23, the Government of India has allocated Rs. 199,107 crore (US$ 26.04 billion) to the Ministry of Road Transport and Highways.

4.4.4 The GST on construction equipment has been reduced to 18% from 28%, which is expected to give a boost to infrastructure development in the country.

4.4.5 The NHDP is a project to upgrade, rehabilitate and widen major highways in India to a higher standard. The project was started in 1998 to be implemented in 7 phases.

4.4.6 With the launch of Bharatmala project, 10,000 km of highway construction left under NHDP was merged with Phase I of the Bharatmala project.

4.4.7 The Indian government launched Gati Shakti-National Master Plan, which has consolidated a list of 31 high impact projects, out of which road infrastructure projects were the top priority. The major

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highway projects include the Delhi-Mumbai expressway (1,350 kilometres), Amritsar-Jamnagar expressway (1,257 kilometres) and Saharanpur-Dehradun expressway (210 kilometres).

4.4.8 The main aim of this program is a faster approval process which can be done through the Gati shakti portal and digitized the approval process completely.

4.4.9 In December 2021, the government set a highway monetization target of Rs. 2 trillion (US$ 26.20 billion) for the next 3 years.

4.4.10 The Ministry of Road Transport and Highways awarded road projects with a total length of 10,467 kms in FY21.

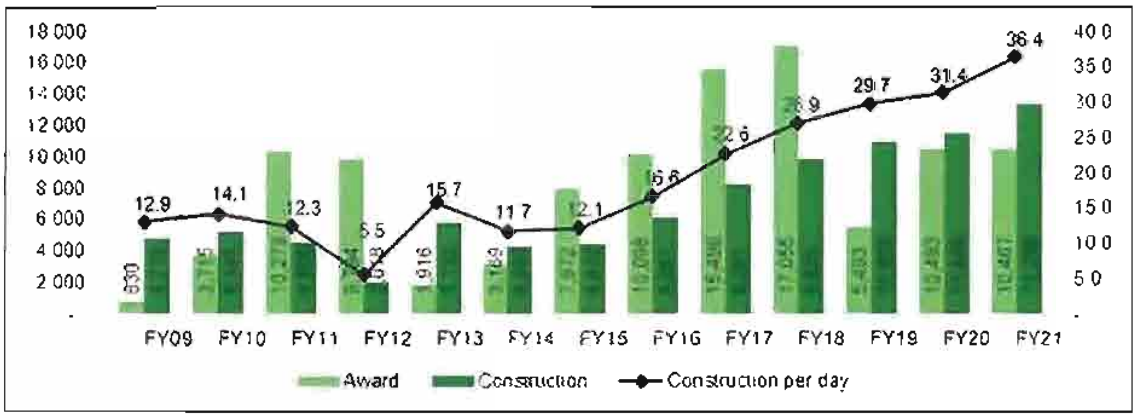
4.4.11 5,835 kms of highways have been constructed until October 2021, while 13,298 kms of highway was constructed in FY21 across India.

4.4.12 The Government of India has allocated Rs. 111 lakh crore (US$ 13.14 billion) under the National Infrastructure Pipeline for FY 2019-25. The Roads sector is expected to account for 18% capital expenditure over FY 2019-25.

4.4.13 NHAI is planning to raise Rs. 40,000 crore (US$ 5.72 billion) to monetise its highway assets through Infrastructure Investment Trust (InvIT).

4.4.14 The development of market for roads and highways is projected to exhibit a CAGR of 36.16% during 2016-2025, on account of growing government initiatives to improve transportation infrastructure in the country.

Details of national highways awarded (by NHAI) and constructed in India (KMs):



4.5 Implementation of important projects and expressways:

4.5.1 Bharatmala Pariyojna

Bharatmala Pariyojana is a new umbrella program for the highways sector that focuses on optimizing efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through effective interventions like development of Economic Corridors, Inter Corridors and Feeder Routes, National Corridor Efficiency Improvement, Border and International connectivity roads, Coastal and Port connectivity roads and Green-field expressway.

The Bharatmala Pariyojana envisages development of about 26,000 km length of Economic Corridors, which along with Golden Quadrilateral (GQ) and North-South and East-West (NS-EW) Corridors are expected to carry majority of the Freight Traffic on roads.

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A total length of 34,800 km in road projects have been proposed to be constructed with an estimated outlay of Rs 5.35 trillion (US$ 74.15 billion) under Bharatmala Pariyojana Phase-I over a five year period (2017-18 to 2021-22).

Components under Bharatmala Pariyojana Phase-I are as given below:

Component	Length (Km)	Cost (INR Crore)
Economic corridors development	9,000	1,20,000
Inter-corridor & feeder roads	6,000	80,000
National Corridors Efficiency	5,000	1,00,000
Border & International connectivity	2,000	25,000
Coastal & port connectivity roads	2,000	20,000
Expressways	800	40,000
Sub Total	**24,800**	**3,85,000**
Other works - under NHDP	10,000	1,50,000
Total	**34,800**	**5,35,000**

Source: Ministry of Road Transport and Highways, Government of India

More than 20,000 km length of roads has already been awarded under the Bharatmala Pariyojana project of which ~7,375 kms have been constructed till December 2021.

4.5.2 Char Dham Vikas Mahamarg Pariyojna:

This project envisages development if easy access to the four dhams in India – Gangotri, Yamunotri, Kedarnath and Badrinath. Development of this route of 889 km route us expected at an estimated cost of INR 12,000 Crores.

4.5.3 Eastern peripheral and western peripheral expressway

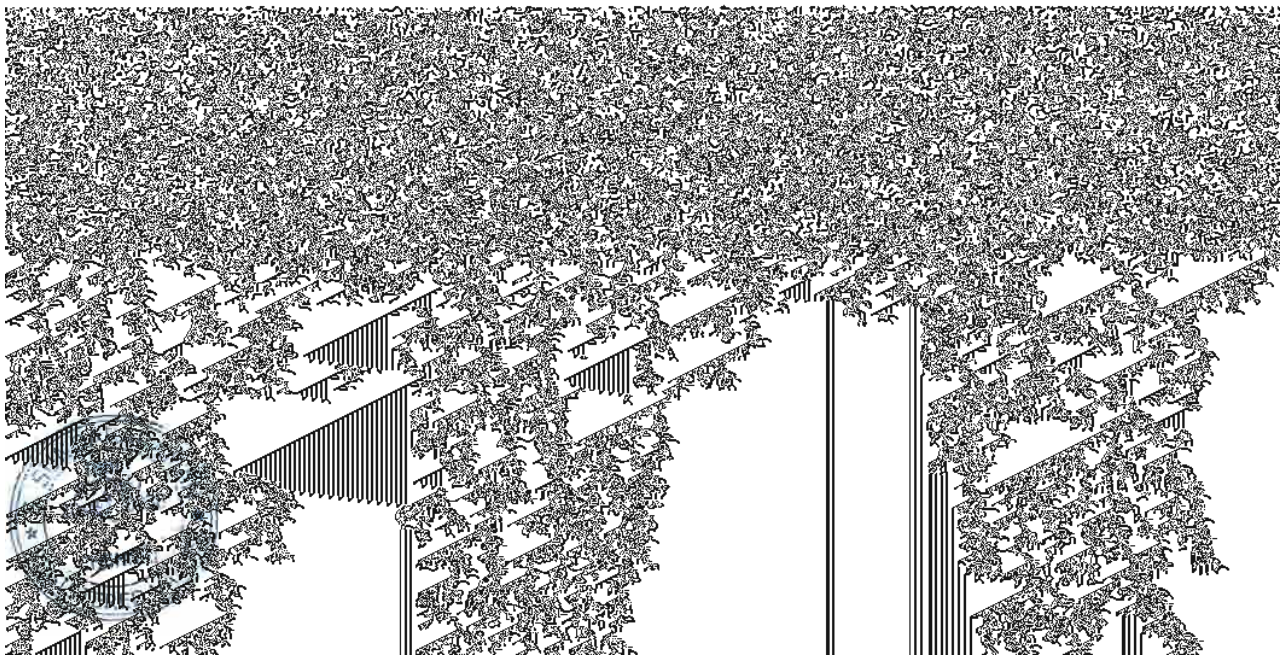
These two projects will connect NH-1 and NH-2 from western and eastern side of Delhi.

4.5.4 Setu Bharatam:

This project aims to replace crossings on NHs with Road Over Bridges and Road Under Bridges. It is projected to construct 174 such structures.

4.5.5 To further augment road infrastructure, more economic corridors are also being planned by Government of India as revealed in Budget 2021-22.

a. 3,500 km of National Highway works in the state of Tamil Nadu at an investment of INR



4.6 Opportunities in road development & maintenance in India

a. India has joined the league of 15 of global alliance which will work towards the ethical use of smart city technologies

b. The Government aims to construct 65,000 kms of national highways at a cost of Rs. 5.35 lakh crore (US$ 741.51 billion).

c. The government also aims to construct 23 new national highways by 2025.

d. Road building in India is second least expensive in Asia.

e. Andhra Pradesh will spend US$ 296.05 million to build 8,970 kms of roads.

f. In February 2022, NHAI rolled out a plan to construct 5,795 kilometres of highways that will connect 117 districts. The plan was worth Rs. 1 trillion (US$ 13.09 billion).

4.7 Public Private Partnership ("PPP") Models of road development and maintenance in India

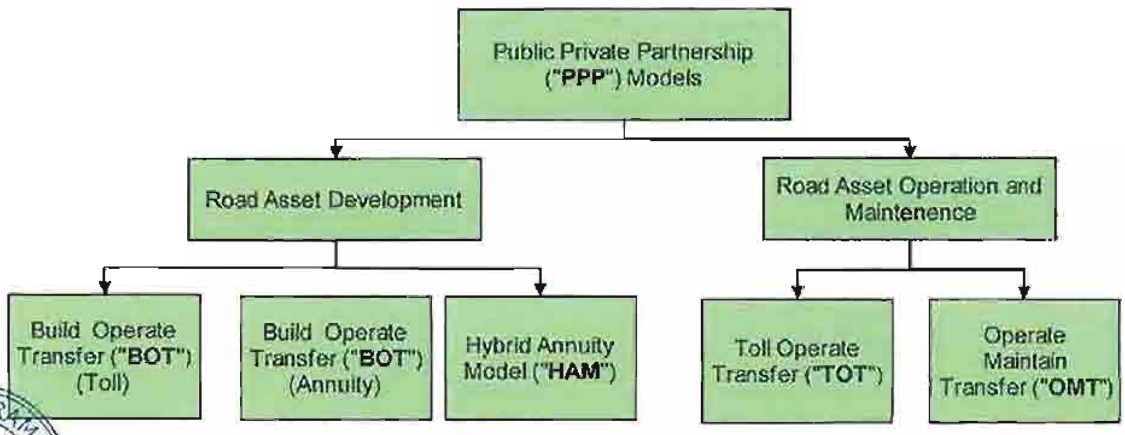
4.7.1 India has a well-developed framework for Public-Private-Partnerships (PPP) in the highway sector. PPP has been a major contributor to the success story of the roads and highway sector in India. With the emergence of private players over the last decade, the road construction market has become fragmented and competitive. Players bidding for projects also vary in terms of size.PPP modes have been used in India for both development and operation & maintenance of road assets.

4.7.2 In FY21, there were 125 PPP projects worth US$ 23.25 billion in India.

4.7.3 NHAI targets 450 kilometres of the Build-operate-transfer (BOT) projects in FY22 and is looking forward to bidding out 600-1000 kilometres of highway stretch under the Build-operate-transfer (BOT) model as of November 2021.

4.7.4 In August 2020, the Government of India revised the Model Concession Agreement for BOT projects to plug delays by imposing a deadline on the NHAI and incentivising timely work by concessionaires. According to revised norms, the NHAI will have to hand over 90% of the project land (vacant and ready to build) to private developers, thus creating a more market-friendly sector and attracting more private players.

4.7.5 PPP modes have been used in India for both development and operation & maintenance of road assets.



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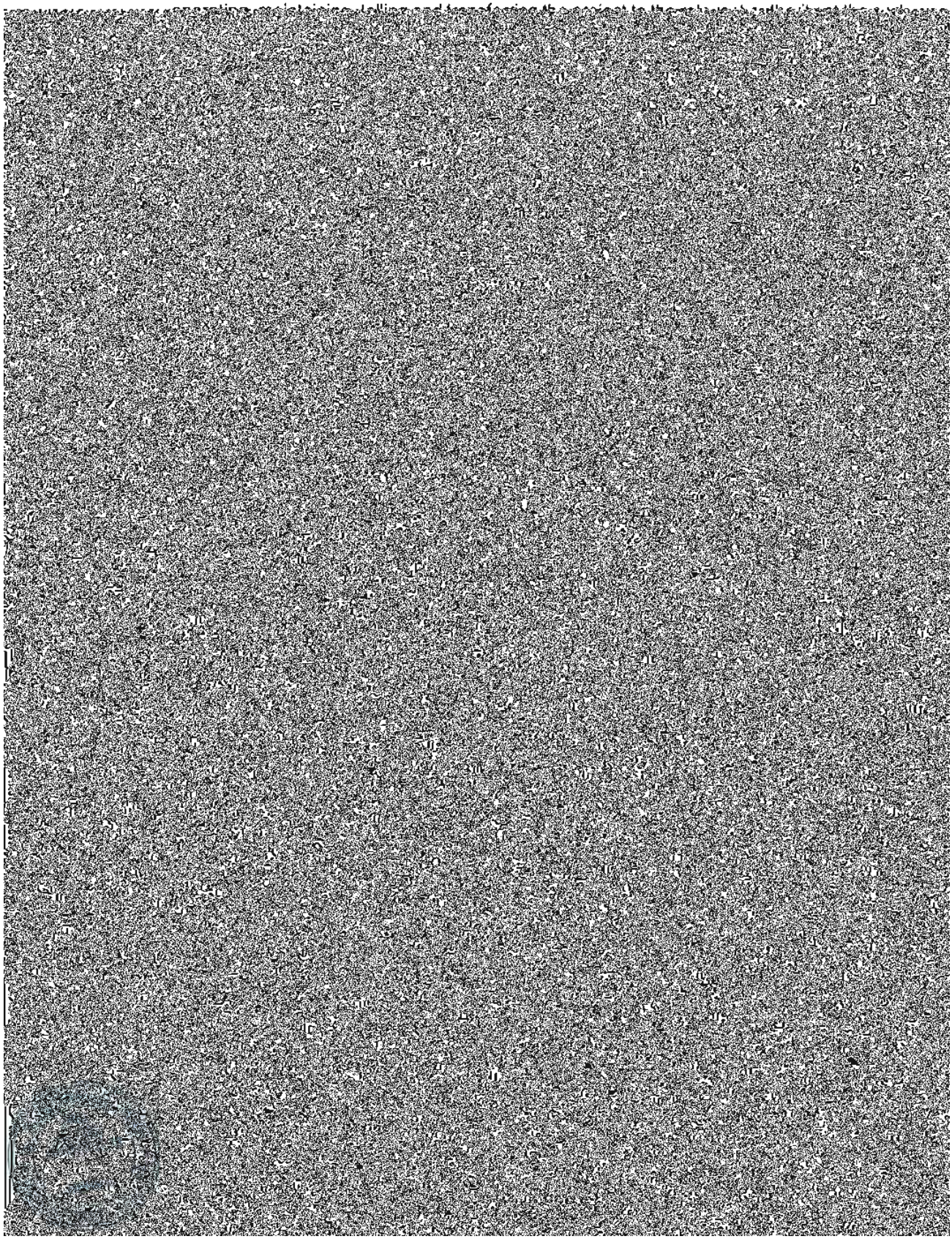
4.7.6 **Road Asset Development Models**

- **BOT Toll**
  - In a BOT toll project, the concessionaire is responsible for designing, building, financing,



4.9.3 Policy Support :

100% FDI is allowed under automatic route subject to applicable laws and regulations, standardized process for bidding and tolling. Under Union Budget 2020-21, the Government of India has allocated Rs. 19,500 crore (US$ 2.79 billion) for Pradhan Mantri Gram Sadak Yojana (PMGSY) which is a scheme for development of rural roads in India. Government of India has set up India Infrastructure Finance Company (IIFCL) to provide long-term funding for infrastructure projects.

4.10 Challenges & Issues in the Sector

4.10.1 Land Acquisition Delays & Cost :

- Land acquisition cost has increased more than 30% since 2017, primarily due to enhanced compensation payment requirements as per 'The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013'.
- Delay in pre-construction activities (such as land acquisition, relocation) affects project timelines. Land acquisition for road projects involves various stages. Each stage involves a number of stakeholders and regulatory bodies. Thus processes consume considerable time.

4.10.2 Regulatory Approvals & Disputes :

- Road development process requires a number of approvals such as environmental clearance, forest clearance, railways clearance, etc. Each of these activities takes considerable time and non-adherence to timelines result in cost overruns due to delays.
- Claims arising out of disputes between the concessionaire/ contractor and the government authorities are also a significant cost which can lead to large liabilities.

4.10.3 Operational Issues :

- Uncertainty of toll revenue collection and variation of collected toll revenue compared to projected levels as Actual traffic is much less than the anticipated traffic.
- Often unforeseen weather conditions require unplanned O&M, over and above the routine and periodic maintenance activities. This results in enhanced O&M expenses. The increase in O&M costs is also affecting the project returns.

4.10.4 Financing road construction projects :

- In the case of toll motorways, the challenge of financing construction projects is different but still remains. Traditionally, the construction of toll motorways is a profitable investment but in the times of recession, funding may be rare or non existent.
- Powerful national economies may be able to efficiently tackle the problem but weaker economies can hardly find the financing sources for road construction projects.

4.10.5 Climate Change

- The road sector is vulnerable to climate change impacts. Climate change and extreme weather events pose a significant challenge to the safety, reliability, effectiveness and sustainability of road transportation systems. Tsunami waves, wildfires, floods and hurricanes constitute a big risk for passengers, vehicles and goods, as well as for the integrity of the transport infrastructure.
- Since reliable road transport is an essential driver of economic growth and social wellbeing worldwide, national road authorities and motorway operators must adapt the infrastructure to climate change and increase the resilience of road transport to extreme weather

4.10.6 Economy and cost effectiveness :

- Among all transport modes, road transport occupies a significant place in short- and medium distance travel operations. However, the unit cost of transportation (per ton × km), compared with other modes of transport, remains high and is getting higher and cost-ineffective as the travel distance increases.
- Road transport cost comprises direct costs (fuel, capital depreciation, maintenance, motorway tolls, ferry fares and wages) and external costs (noise, congestion, infrastructure damages, health and environmental issues).

Recent Initiatives by Government of India

4.10.7 Bhoomi Rashi – Land Acquisition Portal

The ministry has corroborated with the National Informatics Centre, to create Bhoomirashi, a web portal which digitises the cumbersome land acquisition process, and also helps in processing notifications relating to land acquisition online. Processing time, which was earlier two to three months has come down to one to two weeks now.

4.10.8 FASTag – Electronic Toll Collection

National Electronic Toll Collection (NETC) system, has been implemented on pan India basis in order to remove bottlenecks and ensure seamless movement of traffic and collection of user fee as per the notified rates, using passive Radio Frequency Identification (RFID) technology. In Q2 2022, NETC processed about 829 million transactions worth INR 129 billion. The transactions volume increased by 89% while value increased by 72% as compared to Q2 2021. As of March 2022, the total number of banks live with NETC FASTag were 36 while about 52.9 million NETC FASTags have been issued since the inception of the NETC program.

4.10.9 Revival of languishing projects

Projects which were languishing for a number of years have been attempted to be revived, with the help of a number of policy measures taken by the government. Some of the policy measures like Premium deferment in stressed projects, extension of concession period for languishing projects to the extent of delay not attributable to concessionaires, One Time Capital Support for physical completion of languishing projects that have achieved at least 50 per cent physical progress, through one time fund infusion by NHAI, subject to adequate due diligence on a case to case basis.

4.10.10 Rural development

Under the Union Budget 2021-22, the Government of India allocated Rs. 19,000 (US$ 2.37 billion) for Pradhan Mantri Gram Sadak Yojana (PMGSY), a 36% rise over the earlier estimate of 2021-22. Under the Union Budget 2020-21, the Government of India has allocated Rs. 19,500 crore (US$ 2.79 billion) for Pradhan Mantri Gram Sadak Yojana (PMGSY).

4.10.11 Improve safety standards

In October 2021, the government announced rules to improve road safety, such as fixed driving hours for commercial truck drivers and a mandate to install sleep detection sensors in commercial vehicles. In October 2020, a memorandum of understanding (MoU) has been signed with the National Highways Authority of India (NHAI) by Guru Nanak Dev University (GNDU) to conduct advanced research on various aspects, including highway architecture, protection and revitalisation. The GNDU will undertake studies on ~137 km length of the National Highways passing through Pathankot, Gurdaspur and Amritsar districts.

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4.10.12 Portfolios in roads & highways sector

In October 2020, the National Investment and Infrastructure Fund (NIIF) is making progress towards integrating its road and highway portfolio. The NIIF has acquired Essel Devanahalli Tollway and Essel Dichpally Tollway through the NIIF master fund. These road infra-projects will be supported by Athaang Infrastructure, NIIF's proprietary road network, assisted by a team of established professionals with diverse domain expertise in the transport field.

4.10.13 International Tie-ups

In December 2020, the Ministry of Road Transport and Highways signed an MoU with the Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology of the Republic of Austria on technology cooperation in the road infrastructure sector.

4.10.14 Encourage private funding to reduce finance constraints

- Cumulative FDI inflows in construction development stood at US$ 26.21 billion between April 2000-March 2022. Maif 2 Investments India Pvt. Ltd. became the first-largest foreign investment in Indian roads sector under toll-operate-transfer (TOT) mode worth Rs. 9,681.5 crore (US$ 1.50 billion).
- In October 2020, the Asian Development Bank (ADB) and the Government of India signed a US$ 177 million loan to upgrade 450 kms of state highways and major district roads in Maharashtra.
- In January 2021, the Government of India and New Development Bank (NDB) signed two loan agreements for US$ 646 million for upgrading the state highway and district road networks in Andhra Pradesh.
- In August 2020, the Government of India revised the Model Concession Agreement for BOT projects to plug delays by imposing a deadline on the NHAI and incentivising timely work by concessionaires.
- According to revised norms, the NHAI will have to hand over 90% of the project land (vacant and ready to build) to private developers, thus creating a more market-friendly sector and attracting more private players.

Sources: IBEF Roads Report, July 2022; KPMG Report - Roads and Highway Sector; website of Ministry of Road Transport and Highways, Government of India.

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5. Valuation Methodology and Approach

5.1. The present valuation exercise is being undertaken in order to derive the fair EV of the SPVs.

5.2. The valuation exercise involves selecting a method suitable for the purpose of valuation, by exercise of judgment by the valuers, based on the facts and circumstances as applicable to the business of the company to be valued.

5.3. There are three generally accepted approaches to valuation:

(a) "Cost" approach

(b) "Market" approach

(c) "Income" approach

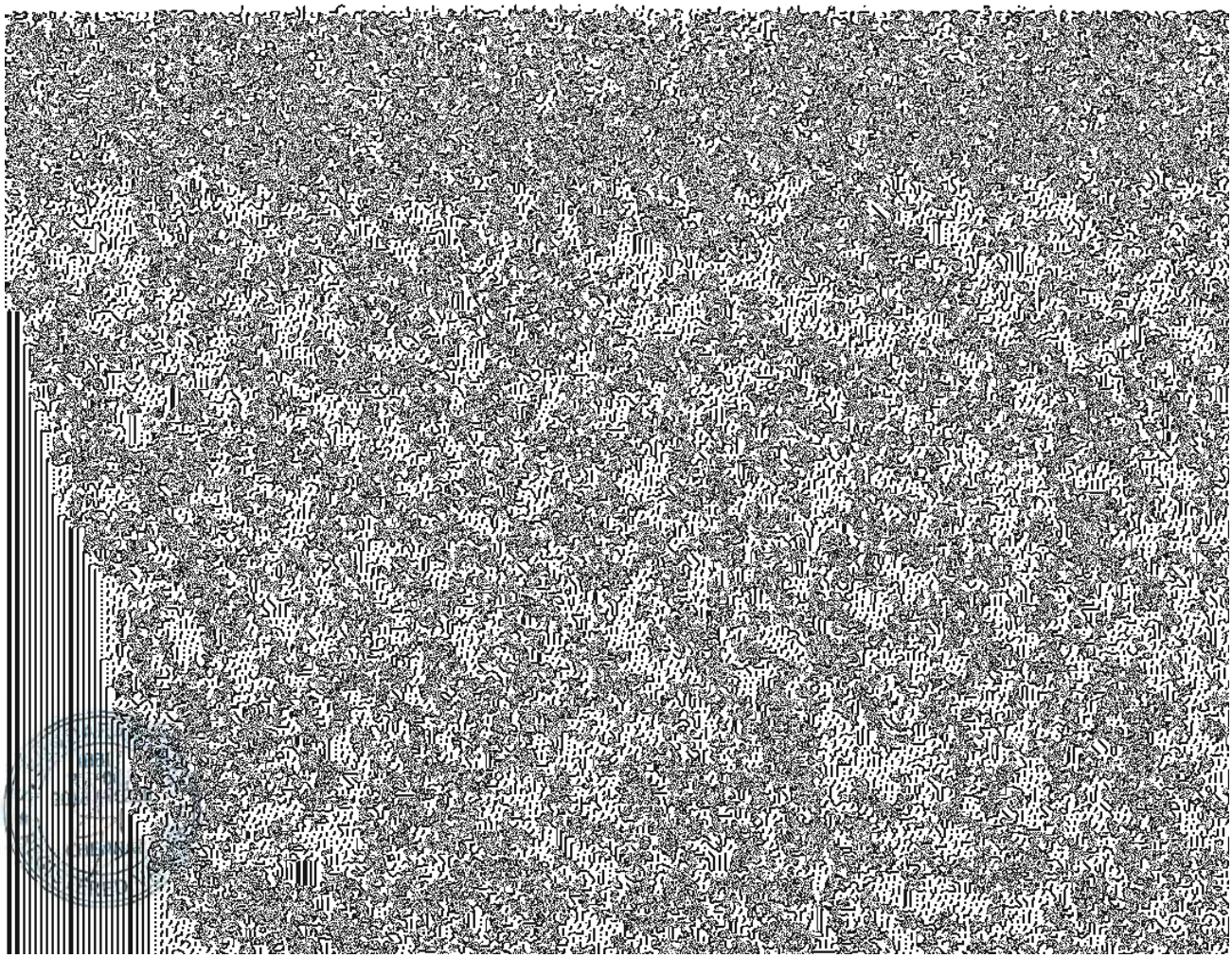
5.4. **Cost Approach**

The cost approach values the underlying assets of the business to determine the business value. This valuation method carries more weight with respect to holding companies than operating companies. Also, cost value approaches are more relevant to the extent that a significant portion of the assets are of a nature that could be liquidated readily if so desired.

Net Asset Value ("NAV") Method

The NAV Method under Cost Approach considers the assets and liabilities, including intangible assets and contingent liabilities. The Net Assets, after reducing the dues to the preference shareholders, if any, represent the value of a company.

The NAV Method is appropriate in a case where the main strength of the business is its asset backing rather than its capacity or potential to earn profits. This valuation approach is also used in



Market Price Method

Under this method, the market price of an equity share of the company as quoted on a recognized stock exchange is normally considered as the fair value of the equity shares of that company where such quotations are arising from the shares being regularly and freely traded. The market value generally reflects the investors' perception about the true worth of the company.

5.6. **Income Approach**

The income approach is widely used for valuation under "Going Concern" basis. It focuses on the income generated by the company in the past as well as its future earning capability. The Discounted Cash Flow Method under the income approach seeks to arrive at a valuation based on the strength of future cash flows.

Discounted Cash Flow ("DCF") Method

Under DCF Method value of a company can be assessed using the Free Cash Flow to Firm Method ("FCFF") or Free Cash Flow to Equity Method ("FCFE"). Under the DCF method, the business is valued by discounting its free cash flows for the explicit forecast period and the perpetuity value thereafter. The free cash flows represent the cash available for distribution to both, the owners and creditors of the business. The free cash flows in the explicit period and those in perpetuity are discounted by the Weighted Average Cost of Capital ("WACC"). The WACC, based on an optimal vis-à-vis actual capital structure, is an appropriate rate of discount to calculate the present value of future cash flows as it considers equity-debt risk by incorporating debt-equity ratio of the firm.

The perpetuity (terminal) value is calculated based on the business' potential for further growth beyond the explicit forecast period. The "constant growth model" is applied, which implies an expected constant level of growth for perpetuity in the cash flows over the last year of the forecast period.

The discounting factor (rate of discounting the future cash flows) reflects not only the time value of money, but also the risk associated with the business' future operations. The EV (aggregate of the present value of explicit period and terminal period cash flows) so derived, is further reduced by the value of debt, if any, (net of cash and cash equivalents) to arrive at value to the owners of the business.

Conclusion on Valuation Approach

5.7. It is pertinent to note that the valuation of any company or its assets is inherently imprecise and is subject to certain uncertainties and contingencies, all of which are difficult to predict and are beyond my control. In performing my analysis, I have made numerous assumptions with respect to industry performance and general business and economic conditions, many of which are beyond the control of the SPVs. In addition, this valuation will fluctuate with changes in prevailing market conditions, and prospects, financial and otherwise, of the SPVs, and other factors which generally influence the valuation of companies and their assets.

5.8. The goal in selection of valuation approaches and methods for any financial instrument is to find out the most appropriate method under particular circumstances on the basis of available information. No one method is suitable in every possible situation. Before selecting the appropriate valuation approach and method, I have considered various factors, inter-alia, the basis and premise of current valuation exercise, purpose of valuation exercise, respective strengths and weaknesses of the possible valuation approach and methods, availability of adequate inputs or information and its reliability and valuation approach and methods considered by the market participants.

Cost Approach

The existing book value of EV of the SPVs comprising of the value of its Net fixed assets, Net intangible assets and working capital based on the unaudited financial statements as at 30th September 2022 and based on the audited financial statements as at 31st March 2022 prepared as per Indian Accounting Standards (Ind AS) are as under:

Book EV (INR Mn)	31-Mar-22	30-Sep-22
MVR	1,875.7	1,684.0
IRBPA	13,129.1	12,484.9
IRBTA	5,620.6	5,615.2
IRBTC	10,734.1	10,710.6
IRBJD	13,469.3	13,212.9
Total	**44,828.8**	**43,707.6**

In the present case, The SPVs operate and maintain the project facilities in accordance with the terms and conditions under the relevant concession agreement. During the concession period, the SPVs operate and maintain the road asset and earn revenues through charges, fees or tolls generated from the asset. The amount of charges, fees or tolls that they may collect are notified by the relevant government agency, which are usually revised annually as specified in the relevant concessions and toll notifications. In such scenario, the true worth of the business is reflected in its future earning capacity rather than the cost of the project. Accordingly, I have not considered the cost approach for the current valuation exercise.

Market Approach

The present valuation exercise is to undertake fair EV of the SPVs engaged in the road infrastructure projects for a predetermined tenure. Further, the tariff revenue and expenses are very specific to the SPVs depending on the nature of their geographical location, stage of project, terms of profitability. In the absence of any exactly comparable listed companies with characteristics and parameters similar to that of the SPVs, I have not considered CCM method in the present case. In the absence of adequate details about the Comparable Transactions, I was unable to apply the CTM method. Currently, the equity shares of the SPVs are not listed on any recognized stock exchange of India. Hence, I was unable to apply market price method.

Income Approach

Each of the SPVs operates under a BOT or DBFOT concession agreement with the NHAI. Government authorities in India typically award highway infrastructure development projects under BOT concessions, which are characterized by three distinct phases:

1. Build: upon successfully securing a project concession through a competitive bid, a concessionaire secures financing for, and completes construction, of a road;
2. Operate: during the agreed concession period, the concessionaire operates, manages and maintains the road at its own expense and earns revenues by collecting tolls from vehicles using the road; and
3. Transfer: at the end of the agreed concession period, the ownership of the road, the obligation to maintain the road and the right to collect tolls from the vehicles using the road revert to the government entity that granted the concession.

A DBFOT project involves, in addition to the activities required under a BOT project, the provision of engineering design and financing for such project.

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Currently, each of the SPVs are completed and are revenue generating SPVs. The revenue of the SPVs is based on tenure, traffic volumes, operations and other factors that are unique to each of the SPVs. The growth potential of the SPVs and the true worth of its business would be reflected in future earnings of each of the SPVs. I have been provided with the projected financial information for each of the SPVs under consideration, by the Investment Manager. Accordingly, DCF Method under the income approach has been considered as an appropriate method for the present valuation exercise.

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6. Valuation of the SPVs

6.1. I have estimated the EV of the SPVs using the DCF Method. While carrying out this engagement, I have relied extensively on the information made available to me by the Investment Manager. I have considered projected financial statement of the SPVs as provided by the Investment Manager.

Valuation

6.2. The key assumptions of the projections provided to us by the Investment Manager are:

Key Assumptions:

6.2.1. **Toll Revenue**: As per the concession agreements for the respective SPVs, each SPV is allowed to levy, demand, collect and appropriate the fees (called as toll fees) from vehicles and persons liable to payment of fees for using their respective road asset or any part thereof and refuse entry of any vehicle to the road asset if the due fee is not paid. Toll revenues depend on toll receipts, which in turn depend on traffic volumes and toll fees on the toll roads.

Concession Period

The Concession Period refers to the period where the Concessionaire is granted with the exclusive rights, license and authority to demand, collect and appropriate fee, operate, manage and maintain the project highway subject to the terms and conditions mention in their respective concession agreement. The cash flow projection are prepared by the Investment Manager for the balance concession period remaining from the Valuation Date as summarized below:

SPV	Concession Period End Date		Extension Period	
	Original	Revised	For Traffic Variance	For Other Reasons
MVR	13th August 2026	12th January 2027	-	152
IRBPA	30th December 2030	2nd December 2037	1,460	1,068
IRBTA	2nd September 2032	2nd June 2037	*1,606	127
IRBTC	3rd June 2037	29th December 2042	*1,899	136
IRBJD	13th June 2035	21st October 2040	1,826	131

**subject to NHAI approval*

I understand, as per the extant provisions of the Concession Agreements for the respective SPVs in relation to the traffic variation, the concession period could be modified to take into the account shortfall or excess in actual average traffic vis-à-vis the target traffic ranging beyond 2.5% and such concession extension or truncation shall be subject to a cap of 20% extension for shortfall and 10% for truncation for excess.

Accordingly, in the Investment Manager has considered an extension period based on its calculation which is subject to the approval from the NHAI Authorities in case of IRBTA & IRBTC. I have relied on the information provided by the Investment Manager.

SPVs	NHAI Approval Order	Description
IRBPA	Received	Incremental concession period of 4 years (1,460 days) arising out of variation in traffic has been considered for valuation and NHAI approval for the same is received vide letter dated 5th March 2021
IRBPA	Received	Incremental concession period of 436 days arising out of Force Majeure event due to user toll collection suspension on account of the farmer's civil commotion (agitation), vide NHAI letter dated 27th August 2022
IRBPA	Not received	Incremental concession period of 518 days arising out of Arbitral Award d for delay in completion of construction of the project on account of the reasons not attributable to IRBPA, vide arbitral award dated July 2021. Moreover, the petition challenging the Award filed by NHAI in the Hon'ble Delhi High Court was dismissed by the Court on 8th March 2022
IRBTA	Not received (Filed traffic survey with NHAI vide letters dated 2nd April 2021, 14th October, 2020 and 25th September 2020)	Incremental concession period of 4.4 years (1,606 days) arising out of variation in traffic has been considered for valuation. SPV has already filed a traffic survey calculation with NHAI vide letters dated 2nd April 2021, 14th October, 2020 and 25th September 2020 for extension. The same has been recommended by the independent engineer appointed by IRBTA vide letter dated 28th July 2021. However, NHAI approval for the same is pending as on report date
IRBTC	Not received (Filed with NHAI vide letter dated 14th April, 2021)	Incremental concession period of 5.2 years (1,899 days) arising out of variation in traffic as per Concession Agreement, though it has been intimated to NHAI vide letter dated 14th April 2021, approval for the same is pending as on report date
IRBJD	Received	Incremental concession period of 5 years (1,826 days) arising out of variation in traffic has been considered for valuation as per the NHAI approval dated 18th March 2020.

Extension for Other Reasons: NHAI vide its various orders has extended the concession period of the BOT Toll Projects for reasons including natural calamities, lockdowns on account of COVID-19, etc.

I have considered the projection period for the current valuation exercise based on the balance concession period as represented by the Investment Manager.

Traffic Volumes

Traffic volumes are directly or indirectly affected by a number of factors, many of which are outside of the control of the SPVs, including: toll fees; fuel prices in India; the frequency of traveller use; the quality, convenience and travel efficiency of alternative routes outside the SPV's network of toll roads; the convenience and extent of a toll road's connections with other parts of the local, state and national highway networks; the availability and cost of alternative means of transportation, including rail networks and air transport; the level of commercial, industrial and residential development in areas served by the SPVs' projects; adverse weather conditions; and seasonal holidays.

Toll Rates

During the concession period, the SPVs operate and maintain the road asset and earn revenues through charges, fees or tolls generated from the asset. The amount of charges, fees or tolls that they may collect are notified by the relevant government agency, which are usually revised annually as specified in the relevant concessions and toll notifications. The revision typically either (i) is linked to the extent of variation in the Wholesale Price Index for all commodities as published by the Ministry of Industry (the "WPI") or (ii) comprises a fixed component, which is three percent and a component linked to variation in the WPI, which is capped at 40% of the variation in the WPI.

The toll rates for the projected period have been derived in the manner stipulated in the individual concession agreements of the SPVs. The variable determinant supporting escalation in toll tariff is WPI which is considered as 5.0% p.a. through the projected period based on the discussion with the Investment Manager.

In the present case, the Investment Manager has appointed M/s GMD Consultants, an independent third-party research agency to forecast the traffic volumes and toll revenues for

the SPVs' projects and to prepare traffic reports for the SPVs under consideration. As confirmed by the Investment Manager, the traffic volumes and toll revenues for each SPV has been estimated by the traffic consultant after considering overall structure and condition of the projects including analysis of demand and supply and strategic geographical locations of the individual road projects. This was one of the most important input in projecting the toll revenues.

6.2.2. **Operating & Maintenance Expenses (Routine maintenance)**: A SPV is generally responsible for carrying out operation and maintenance activities at its toll road during its concession period. Within the scope of such operation and maintenance obligations, the SPV may be required to undertake routine and periodic maintenance of project roads, maintain and comply with safety standards to ensure smooth and safe traffic movement, deploy adequate human resources for incident management, maintain proper medical and sanitary arrangements for personnel deployed at the site, prevent any unauthorized entry to and exit from the project as may be required. The Project Manager, together with the SPVs, manages the critical day-to-day operation and maintenance of the SPVs. In the present case, the Investment Manager has relied on the technical study report provided by the external professional agency (M/s GMD Consultants) for estimating the O&M (routine) expenses for the projected period. Further, I have been informed that the SPVs have entered into long term agreement with the Sponsor to provide O&M support with respect to Routine and Periodic maintenance and the cost considered in the projections are in-line with the terms of these contracts.

6.2.3. **Major Maintenance Expenses (Periodic maintenance):**

Estimating the Major Maintenance Expenses

Period maintenance expenses will be incurred on periodic basis say every 5 years or more, depending on the condition of the road stretch. These are the costs incurred to bring the road assets back to its earlier condition or keep the road assets in its present condition. Similar to O&M routine maintenance expenses, Investment Manager has relied on the technical study report provided by the external professional agency (M/s GMD Consultants) for estimating major maintenance expenses for the projected period.

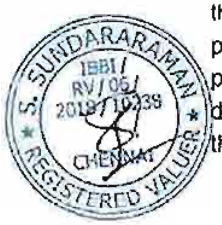
Provisions for Major Maintenance Expenses and Cash Flow Adjustments

As per the financial requirements, provision is required for appropriate major maintenance expense over a period until the actual expenditure is incurred. These are non-cash expenses. Hence, for my DCF analysis, such provisions are added back in their respective years and the actual expenditure expected to be incurred during the particular interval of 5-7 years is deducted in those respective years in order to arrive at net cash flows.

The Investment Manager has provided me the estimated Major Maintenance Expenses.

6.2.4. **Depreciation and Amortization**: The toll collection rights (intangible assets) of the SPVs are being amortized using revenue-based amortization method. Under this method, the carrying value of the toll collection rights is amortised in the proportion of the actual toll revenue for the year to the projected revenue for the balance toll period, to reflect the pattern in which the economic benefits of the assets will be consumed. Further, for other fixed assets, depreciation is calculated on written down value method (WDV) using the useful lives prescribed by the Companies Act, 2013.

6.2.5. **NHAI Premium**: NHAI premium is the payment made by the concessionaire to NHAI for bagging the right to finance, develop, maintain and collect tolls from the road project during the concession period. Based on the future traffic estimates, the developers have to bid the premium amount that they pay to NHAI upfront. Further, developers can defer premium payment only if they do not collect enough toll revenue in a year to pay for it after servicing debt and other maintenance costs. They have to pay interest on the premium deferred. For the DCF, the NHAI premium provision (which is expensed out in the Profit & Loss) is added



back since it is non-cash expenditure and the actual premium & interest on the same paid in each of the projected years is deducted to arrive at the net cash flows. Based on the representation of the Investment Manager, in case of IRBTC, interest on deferred NHAI premium is assumed at 8.15% per annum throughout the balance project life (based on the bank rate applicable as of 30th September 2022).

6.2.6. **Revenue Share:** The revenues collected from the toll would be shared annually and paid to the NHAI in the form of a concession fee. The percentage of revenue that the Road Project has to share with the NHAI is defined in the Concession Agreement. This is applicable in case of MVR only. The SPV records revenue on the net of share of revenue basis only. Further, the projections provided by the Investment Manager are on the basis of share of revenue that belongs to the individual SPV only. Accordingly, no additional adjustment in relation to share of revenue that belongs to NHAI is required in order to derive the enterprise values of the SPV.

6.2.7. **Capital Expenditure ("Capex"):** As represented by the Investment Manager, regarding the maintenance Capex, the same has already been considered in the Operations & Maintenance expenditure and Major maintenance expenditure for the projected period and regarding the expansion Capex, the SPVs are not expected to incur any capex in the projected period.

6.2.8. **Working Capital:** The entire collection of tolls is in cash and routine expenses are in cash or a credit period is available. In these cases the effective working capital deployed is relatively small or negative in certain instances. Further, I understand the working capital is expected to be stable and is not expected to vary drastically over a period of time. Hence, changes in working capital have been considered as an adjustment for its release or payment in the projected cash flows towards the end of the concession period.

6.2.9. **Taxes:** As per the discussions with the Investment Manager, taxes payable by the SPVs for the projected period shall be MAT rates or normal tax rates, whichever is applicable. While projecting the tax numbers, 80-IA benefits under the Income Tax Act, 1961 has been considered to arrive at tax payable by the SPVs.

6.3. **Impact of Ongoing Material Litigation on Valuation**

As on 30th September 2022, there are ongoing tax litigations as shown in Appendix 4 which are having no deposits paid under dispute/ protest for the SPVs, as informed by the Investment Manager. As represented by the Investment Manager, the Sponsor would indemnify the Trust and its SPVs against any financial losses suffered or incurred in connection with any pending or threatened claims against the Trust made prior to the transfer of the assets to the Trust, hence no impact has been factored on the valuation of the SPVs.

6.4. **Modification in Concession Period**

As per the Concession Agreement clause between NHAI and SPVs as provided to us by the management of the Sponsors, "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.

6.5. Calculation of Weighted Average Cost of Capital for the SPVs

6.5.1. Cost of Equity:

Cost of Equity (CoE) is a discounting factor to calculate the returns expected by the equity holders depending on the perceived level of risk associated with the business and the industry in which the business operates.

For this purpose, I have used the Capital Asset Pricing Model (CAPM), which is a commonly used model to determine the appropriate cost of equity for the SPVs.

K(e) = Rf + [ERP * Beta)] + CSRP

Wherein:
K(e) = cost of equity
Rf = risk free rate
ERP = Equity Risk Premium
Beta = a measure of the sensitivity of assets to returns of the overall market
CSRP = Company Specific Risk Premium (In general, an additional company-specific risk premium will be added to the cost of equity calculated pursuant to CAPM).
For valuation exercise, I have arrived at adjusted cost of equity of the SPVs based on the above calculation (Refer Appendix 2).

6.5.2. Risk Free Rate:

I have applied a risk free rate of return of 7.3% on the basis of the zero coupon yield curve as on 30th September 2022 for government securities having a maturity period of 10 years, as quoted on the website of Clearing Corporation of India Limited ("CCIL").

6.5.3. Equity Risk Premium ("ERP"):

Equity Risk Premium is a measure of premium that investors require for investing in equity markets rather than bond or debt markets. The equity risk premium is estimated based on consideration of historical realised returns on equity investments over a risk-free rate as represented by 10 year government bonds. Based on the aforementioned, a 7% equity risk premium for India is considered appropriate.

6.5.4. Beta:

Beta is a measure of the sensitivity of a company's stock price to the movements of the overall market index. In the present case, I find it appropriate to consider the beta of companies in similar business/ industry to that of the SPVs for an appropriate period.

Based on my analysis of the listed InvITs and other companies in road infrastructure sectors, I find it appropriate to consider the beta of Ashoka Buildcon Limited and IRB Infrastructure Developers Limited for an appropriate period for the current valuation exercise.

I have further unlevered the beta of such companies based on market debt-equity of the respective company using the following formula:
Unlevered Beta = Levered Beta / [1 + (Debt / Equity) *(1-T)]

Further I have re-levered it based on debt-equity at 50:50 based on the average debt:equity ratio of a Road BOT project over its life of concession using the following formula:
Re-levered Beta = Unlevered Beta * [1 + (Debt / Equity) *(1-T)]

Accordingly, as per above, I have arrived at re-levered betas of the SPVs. (Refer Appendix 2)

6.5.5. Company Specific Risk Premium ("CSRP"):

Discount Rate is the return expected by a market participant from a particular investment and shall reflect not only the time value of money but also the risk inherent in the asset being valued as well as the risk inherent in achieving the future cash flows. In the present case, considering the length of the explicit period, the basis of deriving the underlying cash flows and basis my discussion with Investment Manager, I found it appropriate to consider the following CSRPs:

SPVs	CSRP
MVR	0%
IRBPA	3%
IRBTA	2%
IRBTC	2%
IRBJD	2%

6.5.6. **Cost of Debt:**

The calculation of Cost of Debt post-tax can be defined as follows:
K(d) = K(d) pre-tax * (1 - T)

Wherein:
K(d) = Cost of debt
T = tax rate as applicable

For valuation exercise, pre-tax cost of debt has been considered as 8.5%, as represented by the Investment Manager.

6.5.7. **Debt : Equity Ratio:**

In present valuation exercise, I have considered debt: equity ratio of 50:50 based on average debt:equity ratio of a Road BOT project over its life of concession. Accordingly, I have considered the same weightage to arrive at the WACC of the SPVs.

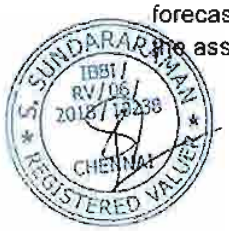
6.5.8. **Weighted Average Cost of Capital (WACC):**

The discount rate, or the WACC, is the weighted average of the expected return on equity and the cost of debt. The weight of each factor is determined based on the company's optimal capital structure.

Formula for calculation of WACC:
WACC = [K(d) * Debt /(Debt + Equity)] + [K(e) * (1 - Debt /(Debt + Equity))]

Accordingly, as per above, I have arrived the WACC for the explicit period of the SPVs. (Refer Appendix 2).

6.6. At the end of the agreed concession period, the ownership of the road, the obligation to maintain the road and the right to collect tolls from the vehicles using the road revert to the government entity that granted the concession by the SPVs. Hence, SPVs are not expected to generate cash flow after the expiry of their respective concession agreements. Accordingly, I found it appropriate not to consider terminal period value, which represents the present value at the end of explicit forecast period of all subsequent cash flows to the end of the life of the asset or into perpetuity if the asset has an indefinite life, in this valuation exercise.



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7. Valuation Conclusion

7.1. The current valuation has been carried out based on the discussed valuation methodology explained herein earlier. Further, various qualitative factors, the business dynamics and growth potential of the business, having regard to information base, management perceptions, key underlying assumptions and limitations were given due consideration.

7.2. I have been represented by the Investment Manager that there is no potential devolvement on account of the contingent liability as of valuation date; hence no impact has been factored in to arrive at EV of the SPVs.

7.3. Based on the above analysis, the EV as on the Valuation Date of the SPVs is as mentioned below:

SPVs	Explicit Projection period		Enterprise Value (INR Mn)
	End Date	Balance Period	
MVR	12th Jan 2027	~4 Years 3 Months	3,847
IRBPA	2nd December 2037	~15 Years 2 Months	16,185
IRBTA	2nd June 2037	~14 Years 8 Months	9,961
IRBTC	29th December 2042	~20 Years 3 Months	21,561
IRBJD	21st October 2040	~18 Years 1 Months	18,563
Total of SPVs			**70,117**

(Refer Appendix 1)

7.4. EV is described as the total value of the equity in a business plus the value of its debt and debt related liabilities, minus any cash or cash equivalents to meet those liabilities.

7.5. The fair EV of the SPVs is estimated using DCF method. The valuation requires Investment Manager to make certain assumptions about the model inputs including forecast cash flows, discount rate, and credit risk.

7.6. Valuation is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and the variations may be material.

7.7. Accordingly, I have conducted sensitivity analysis on certain model inputs, the results of which are as indicated below:

1. Weighted Average Cost of Capital (WACC) by increasing / decreasing it by 1.0%
2. Revenue by increasing / decreasing it by 10%
3. Expenses by increasing / decreasing it by 20%

1. Fair Enterprise Valuation Range based on WACC parameter (1.0%)

INR Mn

Sr. No.	SPVs	WACC +1.0%	EV	Base WACC	EV	WACC -1.0%	EV
1	MVR	10.6%	3,771	9.6%	3,847	8.6%	3,925
2	IRBPA	12.1%	15,142	11.1%	16,185	10.1%	17,338
3	IRBTA	11.6%	9,331	10.6%	9,961	9.6%	10,655
4	IRBTC	11.5%	19,201	10.5%	21,561	9.5%	24,284
5	IRBJD	11.5%	17,180	10.5%	18,563	9.5%	20,118
			64,625		**70,117**		**76,320**

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2. Fair Enterprise Valuation Range based on Revenue parameter (10%)

INR Mn

Sr. No.	SPVs	EV at Revenue -10.0%	EV at Base Revenue	EV at Revenue +10.0%
1	MVR	3,382	3,847	4,303
2	IRBPA	14,348	16,185	18,016
3	IRBTA	8,700	9,961	11,025
4	IRBTC	16,010	21,561	26,910
5	IRBJD	16,310	18,563	20,847
		58,749	**70,117**	**81,101**

3. Fair Enterprise Valuation Range based on Expense parameter (20%)

INR Mn

Sr. No.	SPVs	EV at Expenses +20.0%	EV at Base Expenses	EV at Expenses -20.0%
1	MVR	3,740	3,847	3,946
2	IRBPA	15,615	16,185	16,740
3	IRBTA	9,608	9,961	10,147
4	IRBTC	21,323	21,561	21,798
5	IRBJD	18,150	18,563	18,977
		68,435	**70,117**	**71,608**

The above represents reasonable range of fair enterprise valuation of the SPVs.

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8. Additional Procedures to be complied with in accordance with InvIT regulations

Scope of Work

8.1. The Schedule V of the SEBI InvIT Regulations prescribes the minimum set of mandatory disclosures to be made in the valuation report. In this reference, the minimum disclosures in valuation report may include following information as well, so as to provide the investors with the adequate information about the valuation and other aspects of the underlying assets of the InvIT.

The additional set of disclosures, as prescribed under Schedule V of InvIT Regulations, to be made in the valuation report of the SPVs are as follows:

- List of one-time sanctions/approvals which are obtained or pending;
- List of up to date/overdue periodic clearances;
- Statement of assets included;
- Estimates of already carried as well as proposed major repairs and improvements along with estimated time of completion;
- Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any;
- On-going material litigations including tax disputes in relation to the assets, if any;
- Vulnerability to natural or induced hazards that may not have been covered in town planning/ building control.

Limitations

8.2. This Report is based on the information provided by the representatives of the Investment Manager. The exercise has been restricted and kept limited to and based entirely on the documents, records, files, registers and information provided to me. I have not verified the information independently with any other external source.

8.3. I have assumed the genuineness of all signatures, the authenticity of all documents submitted to me as original, and the conformity of the copies or extracts submitted to me with that of the original documents.

8.4. I have assumed that the documents submitted to me by the representatives of Investment Manager in connection with any particular issue are the only documents related to such issue.

8.5. I have reviewed the documents and records from the limited perspective of examining issues noted in the scope of work and I do not express any opinion as to the legal or technical implications of the same.

Analysis of Additional Set of Disclosures for the SPVs

A. <u>List of one-time sanctions/approvals which are obtained or pending:</u>

The list of such sanctions/ approvals obtained by the SPVs or pending till 30th September 2022 is provided in Appendix 3.

B. <u>List of up to date/ overdue periodic clearances:</u>

The Investment Manager has confirmed that the SPVs are not required to take any periodic clearances and hence there are no up to date/ overdue periodic clearances as on 30th September 2022.

C. Statement of assets included:

The details of assets of the SPVs as at 30th September 2022 are as mentioned below:

INR Mn

Sr. No.	SPVs	Net Fixed Assets	Net Intangible Assets	Other Non - Current Assets	Current Assets
1	MVR	10.2	1,830.0	-	2,129.0
2	IRBPA	0.0	12,301.0	-	1,518.3
3	IRBTA	0.0	5,701.9	-	17.2
4	IRBTC	0.1	71,406.1	0.0	532.8
5	IRBJD	0.0	13,377.1	0.0	30.6

D. Estimates of already carried as well as proposed major repairs and improvements along with estimated time of completion:

I have been informed that maintenance is regularly carried out by SPVs in order to maintain the working condition of the assets. Following is the estimate of already carried as well as proposed major repairs of the SPVs:

Historical major repairs

INR Mn

SPVs	FY 18	FY 19	FY 20	FY 21	FY 22	HY1 FY23
MVR		127.8	53.7	-	-	
IRBPA			268.4	312.7	218.0	
IRBTA			27.8	3.6	228.2	145.0
IRBTC			185.4	85.3	-	
IRBJD			315.4	324.3	437.0	

Source: Investment Manager

Forecasted major repairs

INR Mn

SPVs	HY2 FY23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
MVR		173.7	173.7	-	-			
IRBPA		-	326.5	295.8	81.0	-	150.8	474.5
IRBTA	108.5	-	-	-	-	335.7	416.5	50.4
IRBTC		-	434.8	-	-	-	-	553.2
IRBJD		-	-	-	776.2	843.0	1,103.7	228.4

Source: Investment Manager

E. Revenue pendencies including local authority taxes associated with InvIT asset and compounding charges, if any:

Investment Manager has informed me that there are no material dues including local authority taxes (such as Municipal Tax, Property Tax, etc.) pending to be payable to the government authorities with respect to the SPVs (InvIT assets).

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F. On-going material litigations including tax disputes in relation to the assets, if any:

As informed by the Investment Manager, no key changes have occurred from the previous valuation report in the list of all material litigations, (including tax litigations, if any) against the SPVs. As informed by the Investment Manager, the status of ongoing litigations are updated in Appendix 4. Investment Manager has informed us that it expects majority of the cases to be settled in favour of SPVs. Further, Investment Manager has informed us that majority of the cases are having low to medium risk and accordingly no material outflow is expected against the litigations. As represented by the Investment Manager, the Sponsor would indemnify the Trust and its SPVs against any financial losses suffered or incurred in connection with any pending or threatened claims against the Trust made prior to the transfer of the assets to the Trust.

I was not provided with the documents for certain cases as mentioned in the below table:

Sr. No.	SPVs	No. of Cases	Remarks
1	MVR	2	Documents not provided
2	IRBPA	3	Documents not provided
3	IRBTC	1	Documents not provided
4	IRBJD	3	Documents not provided

Hence, I have relied on the Investment Manager with respect to the current status of the abovementioned cases.

G. Vulnerability to natural or induced hazards that may not have been covered in town planning/ building control:

Investment Manager has confirmed to me that there are no such natural or induced hazards which have not been considered in town planning/ building control.

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9. Sources of Information

For the purpose of undertaking this valuation exercise, I have relied on the following sources of information provided by the Investment Manager:

9.1. Unaudited financial statements of the SPVs as on 30th September 2022;

9.2. Projected financial information for the remaining project life for each of the SPVs;

9.3. Toll Revenue And O&M Cost Projection Report prepared by M/s GMD Consultants for all the SPVs;

9.4. Details of brought forward losses and MAT credit (as per Income Tax Act) of the SPVs as at 31st March 2022;

9.5. Details of Written Down Value (WDV) (as per Income Tax Act) of assets as at 31st March 2022;

9.6. Concession Agreement of each of the SPVs with NHAI;

9.7. Operation & Maintenance Work Order for each of the SPVs with the Sponsor dated 27th May 2019;

9.8. List of licenses / approvals, details of tax litigations, civil proceeding and arbitrations of the SPVs;

9.9. Details of projected Repairs and Capital Expenditure (Capex);

9.10. As on 30th September 2022, IRB InvIT Fund holds equity stake in the SPVs as mentioned in the Section 3 of this Report. As represented to us by the Investment Manager, there are no changes in the shareholding pattern from 30th September 2022 to the date of issuance of this Report;

9.11. Management Representation Letter by the Investment Manager dated 14th October 2022;

9.12. Relevant data and information about the SPVs provided to us by the Investment Manager either in written or oral form or in the form of soft copy;

9.13. Information provided by leading database sources, market research reports and other published data.

The information provided to me by the Investment Manager in relation to the SPVs included but not limited to historical financial statements, forecasts/projections, other statements and assumptions about future matters like forward-looking financial information prepared by the Investment Manager. The forecasts and projections as supplied to me are based upon assumptions about events and circumstances which are yet to occur.

By nature, valuation is based on estimates, however, considering the outbreak of COVID-19 Pandemic and the consequent economic slowdown, the risks and uncertainties relating to the events occurring in the future, the actual figures in future may differ from these estimates and may have a significant impact on the valuation of the SPVs.

I have not tested individual assumptions or attempted to substantiate the veracity or integrity of such assumptions in relation to the forward-looking financial information, however, I have made sufficient enquiries to satisfy myself that such information has been prepared on a reasonable basis.

Notwithstanding anything above, I cannot provide any assurance that the forward looking financial information will be representative of the results which will actually be achieved during the cash flow forecast period.

Further, considering the current crisis in relation to COVID-19 in India and across the globe, I have been informed by the Investment Manager, that the forecasts / projections provided for the valuation exercises are prepared after reasonably evaluating and incorporating the impact of outbreak of COVID-19 pandemic as per prevalent conditions as on date.

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10. Exclusions and Limitations

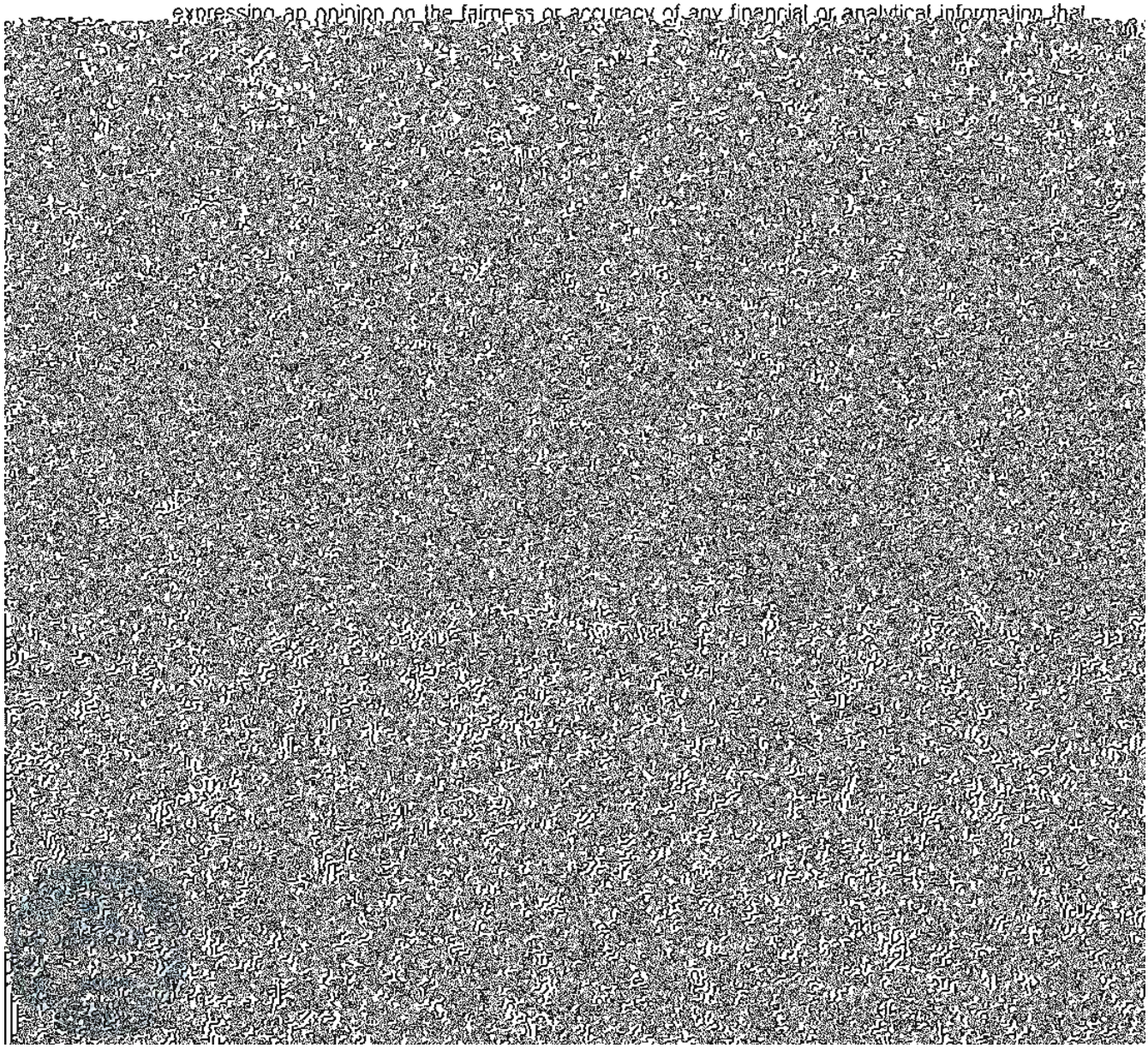
10.1. My Report is subject to the limitations detailed hereinafter. This Report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to herein.

10.2. Valuation analysis and results are specific to the purpose of valuation and is not intended to represent value at any time other than the valuation date of 30th September 2022 ("Valuation Date") mentioned in the Report and as per agreed terms of my engagement. It may not be valid for any other purpose or as at any other date. Also, it may not be valid if done on behalf of any other entity.

10.3. This Report, its contents and the results are specific to (i) the purpose of valuation agreed as per the terms of my engagements; (ii) the Valuation Date and (iii) are based on the financial information of the SPVs till 30th September 2022. The Investment Manager has represented that the business activities of the SPVs have been carried out in normal and ordinary course between 30th Septemebr 2022 and the Report Date and that no material changes have occurred in the operations and financial position between 30th September 2022 and the Report date.

10.4. I have been informed by the Investment Manager that there will be limited impact of the on-going COVID-19 pandemic outbreak on the operations of the SPVs and the projections provided to me are after considering the same.

10.5. The scope of my assignment did not involve me performing audit tests for the purpose of expressing an opinion on the fairness or accuracy of any financial or analytical information that



10.12. Valuation is not a precise science and the conclusions arrived at in many cases may be subjective and dependent on the exercise of individual judgment. There is, therefore, no indisputable single value. I have arrived at an indicative EV based on my analysis. While I have provided an assessment of the value based on an analysis of information available to me and within the scope of my engagement, others may place a different value on this business.

10.13. Any discrepancies in any table / appendix between the total and the sums of the amounts listed are due to rounding-off.

10.14. Valuation is based on estimates of future financial performance or opinions, which represent reasonable expectations at a particular point of time, but such information, estimates or opinions are not offered as predictions or as assurances that a particular level of income or profit will be achieved, a particular event will occur or that a particular price will be offered or accepted. Actual results achieved during the period covered by the prospective financial analysis will vary from these estimates and the variations may be material.

10.15. I do not carry out any validation procedures or due diligence with respect to the information provided/extracted or carry out any verification of the assets or comment on the achievability and reasonableness of the assumptions underlying the financial forecasts, save for satisfying ourselves to the extent possible that they are consistent with other information provided to me in the course of this engagement.

10.16. My conclusion assumes that the assets and liabilities of the SPVs, reflected in their respective latest balance sheets remain intact as of the Report date.

10.17. Whilst all reasonable care has been taken to ensure that the factual statements in the Report are accurate, neither myself, nor any of my associates, officers or employees shall in any way be liable or responsible either directly or indirectly for the contents stated herein. Accordingly, I make no representation or warranty, express or implied, in respect of the completeness, authenticity or accuracy of such factual statements. I expressly disclaim any and all liabilities, which may arise based upon the information used in this Report. I am not liable to any third party in relation to the issue of this Report.

10.18. The scope of my work has been limited both in terms of the areas of the business & operations which I have reviewed and the extent to which I have reviewed them. There may be matters, other than those noted in this Report, which might be relevant in the context of the transaction and which a wider scope might uncover.

10.19. For the present valuation exercise, I have also relied on information available in public domain; however the accuracy and timelines of the same has not been independently verified by me.

10.20. In the particular circumstances of this case, my liability (in contract or under any statute or otherwise) for any economic loss or damage arising out of or in connection with this engagement, however the loss or damage caused, shall be limited to the amount of fees actually received by me from the Investment Manager, as laid out in the engagement letter for such valuation work.

10.21. In rendering this Report, I have not provided any legal, regulatory, tax, accounting or actuarial advice and accordingly I do not assume any responsibility or liability in respect thereof.

10.22. This Report does not address the relative merits of investing in InvIT as compared with any other alternative business transaction, or other alternatives, or whether or not such alternatives could be achieved or are available.

10.23. I am not an advisor with respect to legal, tax and regulatory matters for the proposed transaction. No investigation of the SPVs' claim to title of assets has been made for the purpose of this Report and the SPVs' claim to such rights have been assumed to be valid. No consideration has been given to liens or encumbrances against the assets, beyond the loans disclosed in the accounts. Therefore, no responsibility is assumed for matters of a legal nature.

10.24. I have no present or planned future interest in the Trustee, Investment Manager or the SPVs and the fee for this Report is not contingent upon the values reported herein. My valuation analysis should not be construed as investment advice; specifically, I do not express any opinion on the

suitability or otherwise of entering into any financial or other transaction with the Investment Manager or SPVs.

10.25. I have submitted the draft valuation report to the Trust and Investment Manager for confirmation of accuracy of the factual data used in my analysis and to prevent any error or inaccuracy in this Report.

10.26. **Limitation of Liabilities**

10.26.1. It is agreed that, having regard to the RV's interest in limiting the personal liability and exposure to litigation of its personnel, the Sponsor, the Investment Manager and the Trust will not bring any claim in respect of any damage against any of RV personally.

10.26.2. In no circumstances RV shall be responsible for any consequential, special, direct, indirect, punitive or incidental loss, damages or expenses (including loss of profits, data, business, opportunity cost, goodwill or indemnification) in connection with the performance of the services whether such damages are based on breach of contract, tort, strict liability, breach of warranty, negligence, or otherwise, even if the Investment Manager had contemplated and communicated to RV the likelihood of such damages. Any decision to act upon the deliverables (including this Report) is to be made by the Investment Manager and no communication by RV should be treated as an invitation or inducement to engage the Investment Manager to act upon the deliverable(s).

10.26.3. It is clarified that the Investment Manager will be solely responsible for any delays, additional costs, or other liabilities caused by or associated with any deficiencies in their responsibilities, misrepresentations, incorrect and incomplete information including information provided to determine the assumptions.

10.26.4. RV will not be liable if any loss arises due to the provision of false, misleading or incomplete information or documentation by the Investment Manager.

10.27. **Limitation on account of COVID-19 and Uncertainty in Valuation**

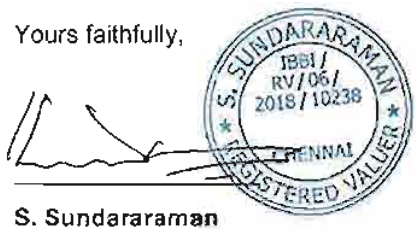
10.27.1. It is important to highlight that the COVID-19 pandemic has created uncertainty in valuation. The mitigation in the spread of COVID-19 and commencement of vaccination process has led to relaxation of restrictions and consequent opening up of the economy. Accordingly, the impact assessment of COVID-19 is a continuing process given the uncertainties associated with its nature and durations.

10.27.2. I have been informed by the Investment Manager, that the forecasts / projections provided for the valuation exercises are prepared after reasonably evaluating and incorporating the impact of outbreak of COVID-19 pandemic as per prevalent conditions as on date. The estimates and judgement made by the Investment Manager, could vary on future developments, including, among other things, any new information concerning the impact created by the COVID-19 pandemic on the economy and consequent effect on the business and on the customer's ability to make the payment. The Investment Manager continues to monitor any material changes to future economic conditions, which will be given effect, where relevant, in the respective future period.

10.27.3. Despite efforts to manage the impacts of the pandemic to the SPVs, the ultimate impact of COVID-19 also depends on factors beyond management's knowledge or control, including the duration and severity of this outbreak as well as actions taken to contain its spread and mitigate its public health effects.

10.28. Further, this Report is necessarily based on financial, economic, monetary, market and other conditions as in effect on, and the information made available to me or used by me up to, the date hereof. Subsequent developments in the aforementioned conditions may affect this Report and the assumptions made in preparing this Report and I shall not be obliged to update, revise or reaffirm this Report if information provided to me changes.

Yours faithfully,



S. Sundararaman

Registered Valuer
IBBI Registration No.: IBBI/RV/06/2018/10238
Place: Chennai
UDIN: 22028423BABKLF4448

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Appendix 1 – Valuation of SPVs as on 30th September 2022

Abbreviations	Meaning
EBITDA	Operating Earnings Before Interest, Taxes, Depreciation and Amortization
MME Provision	Provision for Major Maintenance Expenses recorded in SPVs' Books
MME	Actual Major Maintenance Expenses incurred during the year
Capex	Capital Expenditure
Wcap	Incremental Working Capital
FCFF	Free Cash Flow to the Firm
CAF	Cash Accrual Factor
DF	Discounting Factor
PVFCFF	Present value of Free Cash Flow to the Firm

Appendix 1.1 – Valuation of MVR as on 30th September 2022 under the DCF Method

WACC 9.6% — **INR Mn**

Year	Revenue	EBITDA after MME Provision	EBITDA Margin	MME Provision	MME	Capex	Wcap	Tax	FCFF	CAF	DF	PVFCFF
FY23	576	549	95%	39	-	-	-	(60)	489	0.25	0.98	478
FY24	1,277	1,211	95%	79	(174)	-	-	(136)	902	1.00	0.91	823
FY25	1,384	1,315	95%	79	(174)	-	-	(147)	994	2.00	0.83	828
FY26	1,501	1,429	95%	-	-	-	-	(172)	1,256	3.00	0.76	954
FY27*	1,272	1,196	94%	-	-	-	20	(123)	1,092	3.89	0.70	764
Enterprise Value												3,847

*12 January 2027

Appendix 1.2 – Valuation of IRBPA as on 30th September 2022 under the DCF Method

WACC 11.1% — **INR Mn**

Year	Revenue	EBITDA after MME Provision	EBITDA Margin	MME Provision	MME	Capex	Wcap	Tax	FCFF	CAF	DF	PVFCFF
FY23	792	712	90%	69	-	-	-	(61)	652	0.25	0.97	635
FY24	1,670	1,421	85%	139	-	-	-	(135)	1,285	1.00	0.90	1,157
FY25	1,849	1,587	86%	139	(326)	-	-	(154)	1,106	2.00	0.81	897
FY26	2,048	1,773	87%	139	(296)	-	-	(176)	1,301	3.00	0.73	950
FY27	2,268	1,979	87%	139	(81)	-	-	(200)	1,698	4.00	0.66	1,116
FY28	2,498	2,193	88%	134	-	-	-	(226)	1,967	5.00	0.59	1,164
FY29	2,735	2,414	88%	134	(151)	-	-	(252)	2,011	6.00	0.53	1,072
FY30	2,999	2,662	89%	134	(475)	-	-	(281)	1,906	7.00	0.48	914
FY31	3,311	3,017	91%	134	-	-	-	(338)	2,679	8.00	0.43	1,157
FY32	3,648	3,346	92%	134	-	-	-	(380)	2,966	9.00	0.39	1,154
FY33	3,957	3,647	92%	134	-	-	-	(418)	3,228	10.00	0.35	1,130
FY34	4,312	3,994	93%	134	-	-	-	(463)	3,531	11.00	0.32	1,113
FY35	4,699	4,373	93%	134	-	-	-	(511)	3,861	12.00	0.28	1,096
FY36	5,143	4,800	93%	-	-	-	-	(626)	4,174	13.00	0.26	1,067
FY37	5,590	5,247	94%	-	-	-	-	(1,200)	4,047	14.00	0.23	931
FY38	4,171	3,925	94%	-	-	-	(17)	(905)	3,003	14.84	0.21	633
Enterprise Value												16,185

*31st December 2037

Appendix 1.3 – Valuation of IRBTA as on 30th September 2022 under the DCF Method

WACC	10.6%											INR Mn
Year	Revenue	EBITDA after MME Provision	EBITDA Margin	MME Provision	MME	Capex	Wcap	Tax	FCFF	CAF	DF	PVFCFF
FY23	510	477	94%	64	(108)	-	(60)	(45)	265	0.25	0.98	258
FY24	1,066	916	86%	125	-	-	-	(105)	810	1.00	0.90	732
FY25	1,179	1,020	87%	125	-	-	-	(120)	900	2.00	0.82	736
FY26	1,303	1,136	87%	125	-	-	-	(136)	1,000	3.00	0.74	739
FY27	1,449	1,273	88%	125	-	-	-	(156)	1,118	4.00	0.67	747
FY28	1,609	1,425	89%	125	(336)	-	-	(177)	912	5.00	0.60	551
FY29	1,769	1,576	89%	125	(416)	-	-	(198)	961	6.00	0.55	525
FY30	1,956	1,753	90%	50	(50)	-	-	(237)	1,466	7.00	0.49	724
FY31	2,149	1,882	88%	214	-	-	-	(225)	1,657	8.00	0.45	740
FY32	2,379	2,098	88%	214	-	-	-	(255)	1,843	9.00	0.40	744
FY33	2,617	2,323	89%	214	-	-	-	(287)	2,035	10.00	0.36	743
FY34	2,884	2,575	89%	214	(493)	-	-	(323)	1,759	11.00	0.33	580
FY35	3,165	2,840	90%	214	(575)	-	-	(361)	1,904	12.00	0.30	568
FY36	3,483	3,141	90%	-	-	-	-	(441)	2,701	13.00	0.27	728
FY37	3,804	3,445	91%	-	-	-	-	(484)	2,962	14.00	0.24	722
FY38*	721	656	91%	-	-	-	(22)	(92)	542	14.59	0.23	125
Enterprise Value												9,961

*2nd June 2037

Appendix 1.4 – Valuation of IRBTC as on 30th September 2022 under the DCF Method

WACC	10.5%													INR Mn
Year	Revenue	EBITDA after MME Provision	EBITDA Margin	MME Provision	MME	Capex	Wcap	Premium to NHAI	Revenue share to NHAI	Tax	FCFF	CAF	DF	PVFCFF
FY23	1,738	1,699	98%	54	-	-	-	-	(1,119)	(177)	403	0.25	0.98	393
FY24	3,732	3,628	97%	109	-	-	-	-	(1,837)	(396)	1,395	1.00	0.91	1,262
FY25	4,144	4,035	97%	109	(435)	-	-	-	(3,417)	(443)	(261)	2.00	0.82	(214)
FY26	4,592	4,480	98%	111	-	-	-	-	(3,751)	(495)	234	3.00	0.74	173
FY27	5,083	4,943	98%	111	-	-	-	-	(4,358)	(548)	37	4.00	0.67	25
FY28	5,640	5,512	98%	111	-	-	-	-	(5,931)	(614)	(1,033)	5.00	0.61	(627)
FY29	6,217	6,081	98%	111	-	-	-	-	(5,237)	(679)	164	6.00	0.55	90
FY30	6,844	6,701	98%	111	(553)	-	-	-	(3,461)	(751)	1,936	7.00	0.50	963
FY31	7,531	7,351	98%	178	-	-	-	-	(3,550)	(813)	2,989	8.00	0.45	1,346
FY32	8,295	8,105	98%	178	-	-	-	-	(3,724)	(900)	3,481	9.00	0.41	1,419
FY33	9,096	8,866	98%	178	-	-	-	-	(3,911)	(990)	3,985	10.00	0.37	1,470
FY34	9,957	9,747	98%	178	-	-	-	-	(4,107)	(1,089)	4,551	11.00	0.33	1,520
FY35	11,007	10,787	98%	178	(890)	-	-	-	(4,312)	(1,209)	4,378	12.00	0.30	1,323
FY36	12,042	11,812	98%	-	-	-	-	-	(4,528)	(1,359)	5,925	13.00	0.27	1,621
FY37	13,198	12,948	98%	-	-	-	-	-	(4,754)	(1,490)	6,704	14.00	0.24	1,660
FY38	14,423	14,160	98%	-	-	-	-	(4,160)	(532)	(2,187)	8,981	15.00	0.22	1,585
FY39	15,807	15,531	98%	-	-	-	-	(5,242)	-	(2,469)	7,820	16.00	0.20	1,586
FY40	17,327	17,036	98%	-	-	-	-	(5,504)	-	(2,899)	8,633	17.00	0.18	1,585
FY41	18,859	18,555	98%	-	-	-	-	(5,779)	-	(3,216)	9,581	18.00	0.17	1,589
FY42	20,570	20,251	98%	-	-	-	-	(6,068)	-	(3,569)	10,613	19.00	0.15	1,596
FY43*	16,784	16,533	99%	-	-	-	22	(4,779)	-	(2,958)	8,818	19.87	0.14	1,216
Enterprise Value														21,661

*20th December 2042

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Appendix 1.5 – Valuation of IRBJD as on 30th September 2022 under the DCF Method

WACC 10.5% INR Mn

Year	Revenue	EBITDA after MME Provision	EBITDA Margin	MME Provision	MME	Capex	Wcap	Tax	FCFF	CAF	DF	PVFCFF
FY23	792	720	90%	194	-	-	-	(62)	658	0.25	0.98	642
FY24	1,719	1,559	91%	389	-	-	-	(150)	1,409	1.00	0.90	1,275
FY25	1,916	1,736	91%	389	-	-	-	(175)	1,562	2.00	0.82	1,279
FY26	2,115	1,919	91%	389	-	-	-	(200)	1,718	3.00	0.74	1,273
FY27	2,330	2,124	91%	389	(778)	-	-	(229)	1,119	4.00	0.67	750
FY28	2,585	2,369	92%	389	(543)	-	-	(264)	1,262	5.00	0.61	765
FY29	2,831	2,604	92%	389	(1,104)	-	-	(237)	1,203	6.00	0.55	660
FY30	3,114	2,878	92%	228	(228)	-	-	(384)	2,284	7.00	0.50	1,134
FY31	3,402	3,042	89%	414	-	-	-	(351)	2,691	8.00	0.45	1,209
FY32	3,730	3,345	90%	414	-	-	-	(394)	2,951	9.00	0.41	1,200
FY33	4,061	3,557	90%	414	(131)	-	-	(438)	3,088	10.00	0.37	1,136
FY34	4,436	4,012	90%	414	(1,163)	-	-	(488)	2,341	11.00	0.33	779
FY35	4,847	4,401	91%	414	(754)	-	-	(543)	3,104	12.00	0.30	935
FY36	5,278	4,808	91%	-	-	-	-	(673)	4,136	13.00	0.27	1,127
FY37	5,715	5,220	91%	-	-	-	-	(867)	4,352	14.00	0.25	1,073
FY38	6,166	5,666	92%	-	-	-	-	(1,390)	4,279	15.00	0.22	955
FY39	6,740	6,196	92%	-	-	-	-	(1,559)	4,637	16.00	0.20	936
FY40	7,325	6,753	92%	-	-	-	-	(1,700)	5,053	17.00	0.18	923
FY41**	4,406	4,070	92%	-	-	-	(14)	(1,024)	3,032	17.78	0.17	512
Enterprise Value												16,262

Appendix 2 – Weighted Average Cost of Capital of the SPVs as on 30th September 2022

Particulars	MVR	IRBPA	IRBTA	IRBTC	IRBJD	Remarks
Risk Free Rate (Rf)	7.3%	7.3%	7.3%	7.3%	7.3%	Risk Free Rate has been considered based on zero coupon yield curve as at 30th September 2022 of Government Securities having maturity period of 10 years, as quoted on CCIL's website
Equity Risk Premium (ERP)	7.0%	7.0%	7.0%	7.0%	7.0%	Based on historical realized returns on equity investments over a risk free rate represented by 10 years government bonds, a 7% equity risk premium is considered appropriate for India
Beta (relevered)	0.70	0.70	0.70	0.69	0.69	Beta has been considered based on the beta of companies operating in the similar kind of business in India
Base Cost of Equity (Ke)	12.2%	12.2%	12.2%	12.1%	12.2%	Base Ke = Rf + (ERP) * β
Company Specific Risk Premium (CSRP)	0.0%	3.0%	2.0%	2.0%	2.0%	Based on tenure risk and SPV specific risk(s)
Adjusted Cost of Equity (Ke)	**12.2%**	**15.2%**	**14.2%**	**14.1%**	**14.2%**	**Adjusted Ke = Rf + (ERP) * β + CSRP**
Pre-tax Cost of Debt (Kd)	8.5%	8.5%	8.5%	8.5%	8.5%	As represented by the Investment Manager
Tax rate of SPV	17.5%	18.2%	17.5%	19.7%	19.1%	Tax Rate Applicable to SPVs is considered
Post-tax Cost of Debt	**7.0%**	**6.9%**	**7.0%**	**6.8%**	**6.9%**	**Post-tax Kd = Pre-tax Kd * (1-Tax rate)**
Debt / (Debt + Equity)	50.0%	50.0%	50.0%	50.0%	50.0%	Debt : Equity ratio computed as [D/(D+E)] is considered as 50%
WACC	**9.6%**	**11.1%**	**10.6%**	**10.5%**	**10.5%**	**WACC = [Ke * (1 - D/(D+E))] + [Kd * (1-t) * D/(D+E)]**

Appendix 3.1 – MVR: Summary of approval and licences

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
1	Licence no. CLRA/ALCCHENNAI-1/2020/L-116 B3 under the Contract Labour (Regulation and Abolition) Act, 1971, dated 21.07.2022	Regional Labour Commissioner (Central), Chennai	Valid up to 03.08.2023
2	Certificate for registration of DG Sets (40KVA and 125KVA no. 03/2012-13)	Government of Tamil Nadu, Electrical Inspector, Salem	Valid upto 02.05.2024

Source: Investment Manager

Appendix 3.2 – IRBPA: Summary of approval and licences

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
1	Labour License for Contract Labours 46 (1-05)/2015/JAL dated 01.09.2022	Office of the Assist. Labour Commissioner, Jalandhar	01-Sep-23
2	Inspection Certificate, WIM at Ladpalwan Toll Plaza and Receipt No. 220376182. LMUR No.-37202173165, VC S no.9120220376214	Controller Legal Metrology, Punjab, Pathankot	16-Jun-23
3	Inspection Certificate, Static Weigh Bridge at Ladpalwan Toll Plaza PTK Side LMUR No. 37202071327, VC S. no. 9120210374509 and Fee Receipt No. 210374460	Controller Legal Metrology, Punjab, Pathankot	22-Nov-22
4	Inspection Certificate, Static Weigh Bridge at Ladpalwan Toll Plaza ASR Side LMUR No. 37202071327, VC S. no. 9120210374509 and Fee Receipt No. 210374460	Controller Legal Metrology, Punjab, Pathankot	22-Nov-22
5	Inspection Certificate, WIM at Waryam Nangal Toll LMUR No. 26202165058, VC S no.91202202621356 Fee Receipt 220262259	Controller Legal Metrology, Punjab Amatsar	11-Aug-23
6	Inspection Certificate, Static Weigh Bridge at Waryam Nangal Toll Plaza PTK Side LMUR No. 26202062518, VC S. no. 91202102612520 and Fee Receipt No. 210266754	Controller Legal Metrology, Punjab, Amatsar	31-Oct-22
7	Inspection Certificate, Static Weigh Bridge at Waryam Nangal Toll Plaza ASR Side LMUR No. 26202062518, VC S. no. 91202102612520 and Fee Receipt No. 210266754	Controller Legal Metrology, Punjab, Amatsar	31-Oct-22

Source: Investment Manager

Appendix 3.3 – IRBTA: Summary of approval and licences

Sr. No.	Description of the permits	Issuing Auth	ority	Validity/Current status
1	Principle employer registration - No. (Labour License No.ALCN/46(L)/158/2010-CL, dated 26.11.2019)	Office the Regional L	abour, Nagpur	Valid upto 20/12/2022
2	License for Building & Other Construction activitie s No. ALCN/42 (R)/150/2010/BOCW, dated 26/11/2019	Office the Regional L	abour, Nagpur	Valid upto 02/09/2032
3	Inspection Certificate for WIM installed at Nandagaon Toll Plaza	Inspector, Legal Metro	logy , Amravati	Valid upto 23/06/2023
4	Inspection Certificate for Static Weigh Bridge at Nandagaon Toll :Plaza (Amravati Side)	Inspector, Legal Metro	, Amravati	Valid upto 24/01/2023
5	Inspection Certificate for Static Weigh Bridge at Nandagaon Toll :Plaza (Nagpur Side)	Inspector, Legal Metro	, Amravati	Valid upto 24/01/2023

Source: Investment Manager

Appendix 3.4 – IRBTC: Summary of approval and licences

Sr. No.	Description of the permits	Issuing Authority	Validity/Current status
1	Certificate of Principle employer registration	Asst. Labour Commissioner (Central), Bangalore	One time permission
2	Labour License for Local Labours	Asst. Labour Commissioner (Cenical), Hubli	Valid up to 05.04.2023
3	Labour License for Local Labours	Asst. Labour Commissioner (Central), Bangalore	Valid up to 30.03.2023
4	License for Generator more than 5 KVA (62.5 KVA & 125KVA, 100 KV HT)	a) Electrical Inspector, Tumkur (Kanjeevanahalli toll) b)Electrical Inspector, Chitradurga (Gullalu Toll) c) Electrical Inspector, Chitradurga (Gullalu Toll HT)	a)Valid up to 01.06.2023 b)Valid up to 08.05.2023 c) Valid up to 23.05.2023 (HT)
5	Inspection Certificate for WIM installed at Gullalu Toll Plaza	Assistant Controller, Legal Metrology Department, Chitradurga	a)Valid up to 13.09.2023 (4 Nos indicators restamping work done 188, 192 193 & 194) b)Valid up to 15.04.2023 (1 No Indicator 1 No Indicator S.no 186 restamping work done) c)Valid up to 13.12.2022 (3 Nos Indicator restamping work done 187, 189 & 196). d) Valid up to 05.08.2023 (4 Nos Indicator restamping work done 190, 191, 195 & 197)
6	Inspection Certificate for WIM installed at Kanjeevanhalli Toll No. 9120160352273 and 9120160352274 dated 16.03.2016	Assistant Controller, Legal Metrology Department, Tumkur	1.Valid up to 01.08.2023 (9 Nos indicators, NOTE : 3 Nos Indicator-198,200 & 206 under repair)
7	a) 01 No of 100 MT Static Weigh Bridge at Gullalu Toll Plaza towards Tumkur side b) 01 No of 100 MT Static Weigh Bridge at Gullalu Toll Plaza towards Chitradurga side	Assistant Controller of Legal Metrology, Chitradurga	Valid up to 21.12.2022 Valid up to 15.04.2023
8	a) 01 No of 100 MT Static Weigh Bridge at Kanjeevanahally Toll Plaza (Towards Tumkur Side) b) 01 No of 100 MT Static Weigh Bridge at Kanjeevanahally Toll Plaza (Towards Chitradurga Side)	Assistant Controller of Legal Metrology, Tumkur Assistant Controller of Legal Metrology, Tumkur	Valid up to 22.03.2023 Valid up to 22.12.2022

Source: Investment Manager

Appendix 3.5 – IRBJD: Summary of approval and licences

Sr. No.	Description of the permits	Issuing Authority	Validity/ Current status
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 03.10.2013	Regional Labour Commissioner (Central), Jaipur	Valid up to 02.10.2023
2	**Provisional permission for energization of installation (DG) set/Captive power) under Rule 63 & 47 A of Indian Electricity Rules, 1956**		
i	Barkheda-Chandai Toll Plaza	Sr Electrical Inspector, Jaipur	Valid up to 31.03.2024
ii	Sonwa Toll Plaza	Sr Electrical Inspector, Jaipur	Valid up to 31.03.2024
3	**WIM System**		
i	Inspection certificate for Barkheda -Chandai Toll Plaza	Weigh and Measure Department, Jaipur	Stamping Certificate renewed upto 17.01.2022 Applied for Renewal
ii	Inspection certificate for Sonwa Toll Plaza	Weigh and Measure Department, Tonk	Stamping Certificate renewed upto 17.02.2022 Applied for Renewal
4	**Static Weigh Bridge**		
i	Inspection Certificate for Static Weight Bridge at Barkheda-Chandai Toll Plaza	Weigh and Measure Department, Jaipur	1.Stamping of WBE 44 - Renewed upto 16.06.2023 2. Stamping Certificate for WBE 47 (Tonk Side) Renewed upto 16.06.2023
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 26.06.2022 Applied for Renewal

Source: Investment Manager

Appendix 3.6: Approvals applied for, but not yet received

Sr. No.	SPV	Approvals
1	IRBJD	Inspection certificate for Barkheda -Chandlai Toll Plaza
2	IRBJD	Inspection certificate for Sonwa Toll Plaza
3	IRBJD	Inspection Certificate for Static Weight Bridge at Sonwa Toll Plaza

Source: Investment Manager

Appendix 4: Summary of Ongoing Litigations (1/3)

Sr. No	SPVs	Matter	Pending Before	Particulars	Amount involved (INR Million)
1	MVR	Civil Litigation	Madras High Court	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. Current Status: The matter is currently pending.	Not quantified
2	MVR	Arbitration with NHAI	Arbitration Tribunal	Background of the case: MVR initiated arbitration proceedings against NHAI before the Arbitration Tribunal Consisting of Dr. Anjit 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. NHAI had filed its counter claim. 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 the matter is pending	48.9 + interest @ 8% pa wef 17.02.2022
3	MVR	Arbitration with NHAI	Arbitration Tribunal	Background of the case: NHAI had initiated arbitration proceedings against MVR before the Arbitration Tribunal Consisting of Dr. Anjit 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 188.860) and Rs. 77.70 Mn (towards provision of safety barriers in missing location on the Project Highway). The proceedings are in progress. Current Status: The matter is pending.	203.8
4	MVR	Direct Tax Matters	CIT (A)	Background of the case: MVR has received order u/s 143(3) of Income Tax Act, 1961 ("ITA 1961") dated 18 Feb 2014 for A.Y. 2011-12. The matter pertains to addition on account of recomputation of Long Term Capital Gains u/s 50C and Disallowance of depreciation. Assessing Officer has also levied interest u/s 234B and 234D of ITA 1961. However, MVR does not accept the views, findings and contentions of the Assessing Officer and has filed an appeal against the order on 14 Mar 2014. MVR also contends that it was entitled for deduction u/s 80-IA but no such deduction was allowed by the Assessing Officer. Current Status: Appeal to the Commissioner of Income-tax (Appeals) has been filed against the order and the same is under process.	8.5

Source: Toll Operator Manager

Appendix 4: Summary of Ongoing Litigations (2/3)

Sr. No	SPVs	Matter	Pending Before	Particulars	Amount Involved (INR Million)
5	IRBPA	Civil Litigation	NA	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. 2,522.5 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. Current Status: The Hon'ble Arbitral Tribunal pronounced unanimous Award on 13/07/2021 (to be read with correction order dated 27/07/2021 in favour of IRBPA i.e. compensation of Rs 252.251 Cr along with 9% interest wef 27/11/2014 till the date of realisation; and extension of 518 days in Concession Period along with the cost of arbitration of Rs 1.58 Crores. The petition challenging the Award (Section 34) was filed by NHAI in the Hon'ble Delhi High Court which was dismissed by the Court on 08.03.2022. IRBPA has served a legal notice for execution of the Award on 30.03.2022. No response received from NHAI. Therefore, IRBPA filed an execution application in the Delhi High Court. As per direction of the Court, NHAI released payment of 75% of the Arbitral Award (i.e. 317.39 Crore) against the submission of Bank Guarantees of equivalent amount. NHAI appealed against the Section 34 order of the Hon'ole Delhi High Court and the matter is pending.	2,522.5 + interest @ 9% wef 27.11.2014
6	IRBPA	Regulatory Action (ESIC)	NA	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. Current Status: No further communication has been received in this regard.	5.8
7	IRBPA	Arbitration with NHAI	Arbitration Tribunal	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 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 NHAI, IRBPA crystallised this matter as the dispute and subsequently invoked arbitration as per Clause 44.3 of the Concession Agreement. Current Status: NHAI released partial amount of Rs. 36.03 Crore on 25.08.2022 and approved extension of Concession Period by 438 days. However, IRBPA has requested NHAI 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.	849.7
8	IRBTC	Civil Litigation	Delhi High Court	Background of the case: NHAI filed a Contempt Petition before the Hon'ble Delhi High Court to initiate contempt proceeding against the alleged contemnor for wilfully and deliberately disobeying the order dated 19.12.2019 of the Hon'ble Delhi High Court passed in the FAO (OS) (Comm) no. 370/2019. Current Status: This matter was disposed off by the Hon'ble Court on 26.04.2022	NA

Source: Investment Manager

Appendix 4: Summary of Ongoing Litigations (3/3)

Sr. No	SPVs	Matter	Pending Before	Particulars	Amount Involved (INR Million)
9	IRBTC	Civil Litigation	Delhi High Court	Background of the case: Due to a dispute on the deferred premium calculation of the previous years between the IRBTC and the NHAI, the concessionaire has filed an appeal with the Honorable High Court of Delhi for resolution against the NHAI'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. 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 10.0.6.2022. Subsequently, the Arbitral Tribunal was constituted and the Learned Tribunal by its order dated 14.07.2022 directed NHAI to withdraw Rs. 97.8 Crore as an interim measure and then by interim order dated 09.08.2022 further directed NHAI 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	Not quantified
10	IRBJD	Criminal Litigation	NA	Background of the case: Pradeep Sogani, Shankar Lal Sharma and certain others (collectively the "Complainants") have lodged 10 first information reports against Virendra Mahiskar, MD, 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 FIRs 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. Current Status: The matter is currently pending.	Not quantified
11	IRBJD	Civil Litigation (Writ Petition)	Rajasthan High Court	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 Current Status: The matter is currently pending.	Not quantified
12	IRBJD	Civil Litigation (Writ Petition)	Rajasthan High Court	Background of the case: Girdhari lal Jat had filed writ petition against IRB Jaipur Deoli Tollway Pvt. Ltd. and others in Rajasthan High Court, Jaipur Bench, with respect to the National Highway 12 (Jaipur – Tonk - Deoli section), praying that directions to be given to respondents to take stern action in the matter of removal of illegal barricades in the villages Khajalpura, Dhar Mod, Barkheda and Bhadarwas, to do enquiry against the wrongdoers who have been involved in installing the said illegal barriers, etc. Current Status: The matter is currently pending.	Not quantified
13	IRBJD	Direct Tax Matters	CIT (A)	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. Current Status: Department has filed an Appeal with ITAT and the same is under process.	27.2

Source: Investment Manager

<<End of Report>>

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CFAS-2/MUM/2023/013

18th October 2022

The Board of Directors, **IRB InvIT Fund** (IDBI Trusteeship Services Limited acting on behalf of the Trust) IRB Complex, Chandivali Farm, Chandivali Village, Andheri (East), Mumbai – 400 072	**The Board of Directors,** **The Investment Manager,** **IRB Infrastructure Private Limited** 3rd Floor, IRB Complex, Chandivali Farm, Chandivali Village, Andheri (East), Mumbai – 400 072

Sub: Review opinion on the valuation report for Internal Assessment

Dear Sirs / Madams,

We, Baker Tilly DHC Business Private Limited (**"DHC" or "we"**) have been appointed by **by IRB Infrastructure Private Limited ("the Investment Manager" or "IRBIM"), acting as the investment manager for IRB InvIT Fund ("the Trust" or "InvIT")**, and **IDBI Trusteeship Services Limited ("the Trustee") acting as the trustee for the Trust,** for the purpose as detailed out in this letter **("Engagement")**.

Background

IRB Infrastructure Developers Limited (the "**Sponsor**") has set up IRB InvIT Fund as an irrevocable trust under the Indian Trusts Act, 1882, and registered the Trust with the Securities and Exchange Board of India ("**SEBI**") as an infrastructure investment trust under the Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014, as amended ("**SEBI InvIT Regulations**"). The investment manager of the Trust is IRB Infrastructure Private Limited (the "**Investment Manager**" or "**IRBIM**"), which is a wholly-owned subsidiary of the Sponsor.

IRB InvIT Fund has acquired the following road projects from the Sponsor (together referred to as "**SPVs**"):

Sr. No.	Name of the SPVs
1	MVR Infrastructure & Tollways Limited
2	IRB Pathankot Amritsar Toll Road Limited
3	IRB Talegaon Amravati Tollway Limited
4	IRB Tumkur Chitradurga Tollway Limited
5	IRB Jaipur Deoli Tollway Limited

BAKER TILLY DHC BUSINESS PVT. LTD. CHENNAI

Scope and Purpose of the Review Opinion

As per the requirements of the SEBI InvIT Regulations, a half yearly valuation of the assets of the InvIT shall be conducted by the valuer for the half-year ending 30th September for a publicly offered InvIT. In this regard, the Trust and the Investment Manager have appointed Mr. S. Sundararaman, bearing IBBI registration number IBBI/RV/06/2018/10238 (the "**Valuer**") to perform Fair Enterprise Valuation (the "**Valuation**") of the SPVs as on 30th September 2022 as per the SEBI InvIT Regulations. The Valuer had provided his Fair Enterprise Valuation of the SPVs as at 30th September 2022 vide his valuation report dated 17th October 2022 (the "**Valuation Report**") to the Investment Manager and the Trust.

In this regard, the Investment Manager and the Trust, for their internal evaluation, has requested DHC:

1. To undertake an independent valuation of the SPVs;
2. To review the Valuation Report prepared by the Valuer; and
3. Provide a Review Opinion on:
    a. Whether the Valuation of SPVs, as conducted by the Valuer is reasonable; and
    b. Whether the Valuation Report of the Valuer is in compliance with requirements of the SEBI InvIT Regulations.

This Review Opinion Report ("**Review Opinion**") is only for the internal evaluation of the Board of Directors of the Investment Manager and the Trust. This Review Opinion is not prepared for any statutory compliance or requirements of the SEBI InvIT Regulations or any other laws nor can be used for the purpose other than those mentioned in this Review Opinion.

This Review Opinion is subject to the scope, assumptions, exclusions, limitations and disclaimers detailed hereinafter. As such, the report is to be read in totality, and not in parts, in conjunction with the relevant documents referred to therein. This Review Opinion is our deliverable in respect of our Engagement.

Sources of Information

For the purpose of undertaking this exercise, we have relied on the following sources of information provided by the management and representatives of the Investment Manager and the Trust ("**Management**"):

1. Valuation Report dated 17th October 2022 prepared and submitted by the Valuer to the Management;
2. Unaudited provisional financial statements of the SPVs as on 30th September 2022;
3. Projected financial information for the remaining project life for each of the SPVs;
4. Toll Revenue And O&M Cost Projection Report prepared by M/s GMD Consultants for all the SPVs;
5. Details of brought forward losses and MAT credit (as per Income Tax Act) of the SPVs as at 31st March 2022;
6. Details of Written Down Value (WDV) (as per Income Tax Act) of assets as at 31st March 2022;
7. Concession Agreement of each of the SPVs with NHAI;
8. Operation & Maintenance Work Order for each of the SPVs with the Sponsor dated 27th May 2019;
9. List of licenses / approvals, details of tax litigations, civil proceeding and arbitrations of the SPVs;
10. Details of projected Repairs and Capital Expenditure (Capex);

BAKER TILLY DHC BUSINESS PVT. LTD. CHENNAI

11. As represented to us by the Investment Manager, there are no changes in the shareholding pattern of the SPVs from 30th September 2022 to the date of issuance of this Review Opinion;
12. Management Representation Letter by the Investment Manager dated 14th October 2022;
13. Relevant data and information about the SPVs provided to us by the Investment Manager either in written or oral form or in the form of soft copy;
14. Information provided by leading database sources, market research reports and other published data.
15. The information provided to DHC included forecasts/projections, other statements and assumptions about future matters like forward-looking financial information prepared by the Management. The forecasts and projections as supplied to us are based upon assumptions about events and circumstances which have not occurred. We have not tested individual assumptions or attempted to substantiate the veracity or integrity of such assumptions in relation to the forward-looking financial information, however, we have made sufficient enquiries to satisfy ourselves that such information has been prepared on a reasonable basis. Notwithstanding anything above, DHC cannot provide any assurance that the forward looking financial information will be representative of the results which will actually be achieved during the forecast period.
16. We have prepared this Review Opinion from information supplied by and from discussions with the Management. We have not verified the accuracy, reliability and competence of the information supplied; the procedures that we used to perform the work did not constitute an audit or review made under any generally accepted accounting standard.

Procedures Adopted

In connection with this Review Opinion, we have obtained the Valuation Report and held conversations with the Management about the methodologies and assumptions underlying the valuation analysis. In connection with this exercise, we have adopted the following procedures for providing our Review Opinion:

1. Requested and received financial and qualitative information relating to the SPVs;
2. Obtained the Valuation Report from the Management;
3. Obtained and analyzed data available in public domain, as considered relevant by us;
4. Discussions with the Management on:
   Understanding of the businesses of SPVs – business and fundamental factors that affect its income-generating capacity including strengths, weaknesses, opportunities and threats analysis and historical and expected financial performance;
5. Undertook industry analysis:
   Research of publicly available market data including economic factors and industry trends that may impact the Valuation; and analysis of key trends and valuation multiples of comparable companies/comparable transactions, if any, using proprietary databases subscribed by us;
6. Selection of internationally accepted valuation approach and valuation methodology/(ies), in accordance with the requirements, as considered appropriate and relevant by us and arriving at a range of Fair Enterprise Values of the SPVs.

BAKER TILLY DHC BUSINESS PVT. LTD. CHENNAI

We do not carry out any validation procedures or due diligence with respect to the information provided/ extracted or carry out any verification of the assets or comment on the achievability and reasonableness of

the assumptions underlying the financial forecasts, except for satisfying ourselves to the extent possible that they are consistent with other information provided to us in the course of this Engagement.

Assumptions, Qualifications and Exclusions & Limitations

a. Assumptions and Reliance:

In performing its analyses and rendering this Review Opinion, DHC, with the Trust's consent:

- Relied upon the accuracy, completeness, and fair presentation of all information, data, advice, opinions and representations obtained from public sources, or provided to it from private sources, including the Management, and did not independently verify such information;
- Assumed that any estimates, evaluations, forecasts and projections furnished to DHC were reasonably prepared and based upon the best currently available information and good faith judgment of the Management, and DHC expresses no opinion with respect to such projections or the underlying assumptions;
- Assumed that the information provided, and representations made by the Management regarding the SPVs and the Trust are substantially accurate;
- Assumed that there has been no material change in the information provided regarding the SPVs since 30th September 2022 till date of this Review Opinion, and that there is no information or facts that would make the information reviewed by DHC incomplete or misleading.

To the extent that any of the foregoing assumptions or any of the facts on which this Review Opinion is based prove to be untrue in any material respect, this Review Opinion cannot and should not be relied upon. Furthermore, in DHC's analysis and in connection with the preparation of the Review Opinion, DHC has made numerous assumptions with respect to industry performance, general business, market & economic conditions and other matters, many of which are beyond the control of any party.

b. Qualifications:

The analysis is qualified by the following:

- DHC has prepared the Review Opinion effective as of the date hereof. This Review Opinion is necessarily based upon on financial, economic, monetary, market and other conditions as in effect on, and the information made available to DHC or used by DHC up to the date hereof. Subsequent developments in the aforementioned conditions may affect this Review Opinion and the assumptions & analysis made for providing this Review Opinion, and DHC shall not be obliged to update, revise or reaffirm this Review Opinion if information provided to DHC changes.
- DHC did not evaluate the SPVs' and/or Trust's solvency or conduct an independent appraisal of any specific assets or liabilities (contingent or otherwise).
- This Review Opinion should not be construed as a credit rating, solvency opinion, a fairness opinion, an analysis of the Trust's / SPVs' credit worthiness, tax advice, regulatory advice or an accounting advice. DHC has not made, and assumes no responsibility to make, any representation, or render any opinion, as to any legal, tax or accounting matter. Accordingly DHC does not assume any responsibility or liability in respect thereof.
- The work performed by DHC was performed in accordance with instructions provided by the Management and was performed exclusively for the Management's use only.

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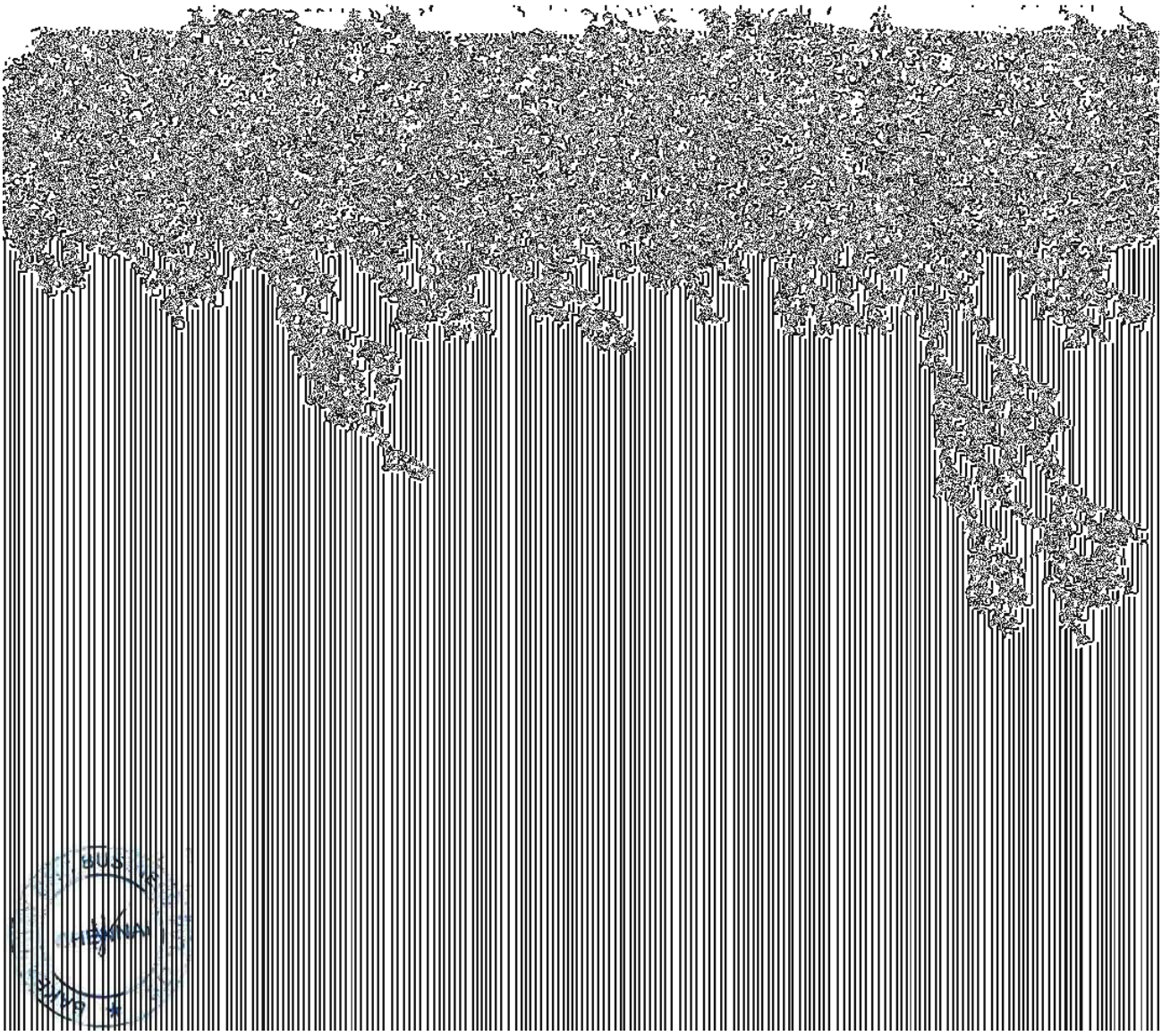
- This Review Opinion is not statutorily mandated under the Companies Act, 2013 ("Companies Act"), the Companies (Registered Valuers and Valuation Rules, 2018) ("Rules") as per any other rules, regulations, standards, bye-laws, ordinance, notifications issued pursuant to such Act or Rules or under the SEBI InvIT Regulations or any other regulations under SEBI Act, 1992 ("SEBI Act"). Accordingly, our Review Opinion Report does not constitute nor can be construed as a valuation carried out by a registered valuer in accordance with such Companies Act or Rules or SEBI Act or as per any rules, regulations, standards, bye-laws, ordinance, notifications issued pursuant to such Companies Act or Rules or SEBI Act and any such use of this Review Opinion is not permitted.

c. Exclusions & Limitations:

- This Review Opinion is furnished to the Management in connection with its consideration of the Valuation report prepared by the Valuer. It is not intended to, and does not, confer any rights or remedies upon any other person, and is not intended to be used, and may not be used, by any other person or for any other purpose, without DHC's consent.
- Providing review opinion on a valuation report is not a precise science and the conclusions arrived



- This Review Opinion is solely that of DHC, and DHC's liability in connection with this Review Opinion shall be limited in accordance with the terms set forth in the engagement letter between DHC and the Trust dated 19th July 2022 (the "Engagement Letter").
- The use and disclosure of this Review Opinion is strictly limited, as laid out in the Engagement Letter.

Conclusion

Based on our independent calculation and on consideration of all the relevant factors and circumstances including aforementioned assumptions and limitations:

- We believe that the fair enterprise values of the SPVs as recommended by the Valuer in his Valuation Report is reasonable in our opinion; and
- We are of the opinion that the Valuation report prepared by the Valuer is in compliance with the requirements of SEBI InvIT regulations.

Yours sincerely,

For and on behalf of
Baker Tilly DHC Business Pvt. Ltd.

NS Sundar

JAIPUR TO DEOLI SECTION OF NH-12

(KM 18.700 To 165.00)

IN THE STATE OF RAJASTHAN

OCTOBER 2022

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

GMD CONSULTANTS NAVI MUMBAI

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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 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 based on traffic data of year 2017-18 and submitted in April 2018. The report was further updated with traffic Data of period from April 2018 to September 2018 and was submitted in October 2018. A revised report was submitted with updated traffic of year 2018-19 in April 2019. 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 and now concessionaire has provided traffic data from April 2022 to September 2022, report is updated with this six-monthly traffic data.

CHAPTER 2

TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Surveys

In the course of our work, we have collected required information for project corridor to understand the general traffic and travel characteristics on 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-12for base year 2015-16, 2016-17,2017-18, 2018-19, 2019-20, 2020-21, 2021-22 and Six-Monthly traffic data from April 2022 to September 2022.
- 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 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
		Six Monthly Data from April 22 to September 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22
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
		AADT for year 2019-2020	For year 2019-2020	For year 2019-2020	For year 2019-2020	For year 2019-2020

SR. NO	LOCATION	CTV	Single Journey Traffic	Return Pass Traffic	Monthly Pass Traffic	Local Traffic
		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
		Six Monthly Data from April 22 to September 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22

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

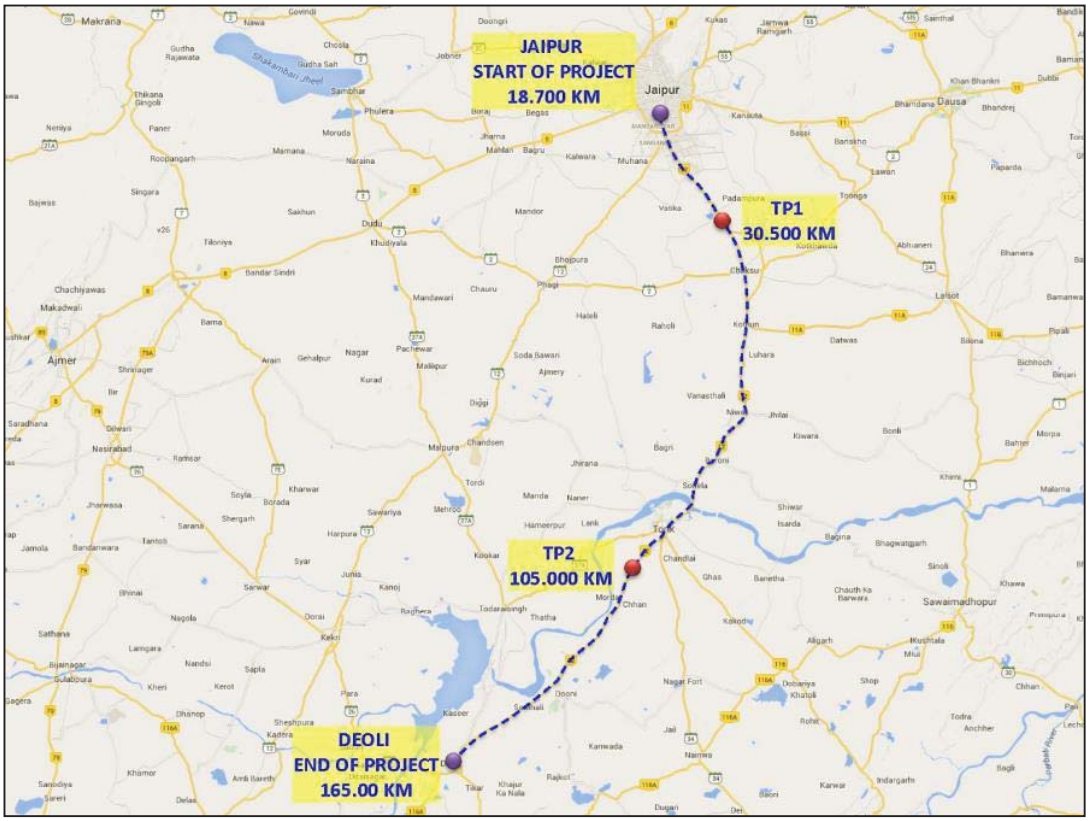

Figure 2-1: Toll Plaza Locations

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 below.

Table 2-2 : Vehicle Classification System

Vehicle Type	
Auto Rickshaw	
Passenger Car	Car, Jeep, Taxi & Van (Old / new technology)
Bus	Mini Bus
	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 project highway is currently under toll operation, the data collected is corresponding to category of tollable vehicles. Following are the type of vehicles as per concession agreement.

- Car / Jeep / van
- Mini Bus /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. Component 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 year 2015-16, 2016-17 2017-18, 2018-19, 2019-20, 2020-21, 2021-22 and from April 2022 to September 2022 as under for both toll plazas–

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

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2015-16	Annual Average Daily Traffic (Nos.) FY 2016-17	Annual Average Daily Traffic (Nos.) FY 2017-18	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	Average Daily Traffic April-2022 to Sept 2022
1	Car	5672	7063	7360	8428	8860	9044	7684	8941
2	Mini Bus / LCV	1462	1539	1529	1506	1370	1056	377	394
3	Truck / Bus	3025	2869	2205	1109	1278	996	1178	1321
4	Multi Axle	2190	2365	2152	1453	1402	1390	1616	2125
5	Oversized Vehicles	3	2	84	60	50	28	5	9
	Total	**12352**	**13838**	**13330**	**12556**	**12960**	**12515**	**10860**	**12791**

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 2015-16	Annual Average Daily Traffic (Nos.) – FY 2016-17	Annual Average Daily Traffic (Nos.) – FY 2017-18	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	Average Daily Traffic April-2022 to Sept 2022
1	CAR	3072	2810	2915	3276	3446	3736	3612	4072
2	Mini Bus/ LCV	861	893	880	780	661	573	235	228
3	Truck/Bus	1407	819	906	691	778	767	913	922
4	Multi Axle	1637	1584	1746	1315	1248	1556	2031	2291
5	Oversized Vehicles	3	3	25	25	19	18	6	12
	Total	**6979**	**6108**	**6472**	**6087**	**6151**	**6650**	**6798**	**7525**

Pandemic of COVID-19 (Corona Virus) has impacted the entire world. Taking precaution, Government of India announced a complete lockdown in last week of March 2020 and traffic on highways was stopped which was eased out progressively later. Traffic on project corridor is recovering at good rate but still traffic numbers had effect of Pandemic. There after India was hit by Covid-19 second and third wave in April 21 to July 21 and December 21 to March 22. Recovering traffic pattern was somewhat again disturbed due to second and third wave of Covid-19. Traffic numbers for the period from April 2020 to March 2021 are not representative of traffic pattern at project corridor due to pandemic lockdown impact. However, for integrity of data same shown above. NHAI also has, in principle, approved providing extension of concession period to make up for the loss of revenue due to lockdown. Traffic has been affected due to second wave of COVID-19 in period from April 21 to July 21 and from December 21 to March 22 due to third wave of Covid-19. Traffic from April 2021 to March 2022 was also affected but now by and large traffic has normalized on project stretch hence no additional recovery is considered.

The above data was arrived at by applying standard trip frequencies to monthly passes and return journey tickets issued.

The above data was arrived at by applying standard trip frequencies to monthly passes and return journey tickets issued. Currently there is mining ban in area which has impacted traffic temporarily. It is reported that environment clearance is obtained

by select lease holders for mining and final Supreme Court order is received in mid November 2021. Opening of mining activity would bring positive impact on traffic flow on project road corridor.

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
Mini Bus	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

Toll Plaza Location	Period	PCU	PCU Index
	FY 2019-20	21283	1.64
	FY 2020-21	19998	1.60
	FY 2021-22	19077	1.76
	FY 2022-23	23098	1.81
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	17542	2.33

It can be observed from above that project traffic has a PCU index ranging 1.5 to 2.2 which indicates 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 year 2021-22 have been considered as the base numbers.

It is observed that car traffic forms 70% of total traffic at toll plaza location 30.5 while multi axle vehicles are 17% of total traffic. 10% of traffic is Truck /Bus while LCV traffic forms the balance 3%. Overall, about 30% of traffic is commercial in nature.

At toll plaza location 105.0 car traffic forms 54% of total traffic at toll plaza while multi axle and LCV are 31% and 3%. Truck/ Bus volume is 12% of the total traffic.

Overall, about 46% 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 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)

Following table provides numbers of vehicle falling in each of above category on base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20 2020-21, 2021-22 and April 2022 to September 2022.

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

Sr. No	Type	Traffic Volume (Nos.) for FY 2015-16	Traffic Volume (Nos.) for FY 2016-17	Traffic Volume (Nos.) for FY 2017-18	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 April-22 to Sep-22
1	Single Journey	4240	4703	4852	4395	5113	6409	4900	5219
2	Return Journey	6166	6458	6174	5372	5188	3676	5858	7448
3	Overweight vehicles	537	369	131	314	2	0	0	0
4	Monthly Pass	1409	2308	2173	2475	2657	2430	102	124

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 type of journey at KM 105.000 are given in following table.

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

Sr. No	Type	Traffic Volume (Nos.) for FY 2015-16	Traffic Volume (Nos.) for FY 2016-17	Traffic Volume (Nos.) for FY 2017-18	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 April-22 to Sep-22
1	Single Journey	3075	3314	3422	2999	3379	4475	3950	3994
2	Return Journey	2200	1888	2248	2036	1978	1634	2816	3494
3	Overweight vehicles	315	215	109	252	6	0	0	0
4	Monthly Pass	1389	691	693	800	788	541	32	37

Here single journey (53%) forms highest portion of traffic followed by return journey (46%) and monthly pass journey (1%). 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. Component of overweight vehicle remain 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. 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 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 pattern 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 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

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

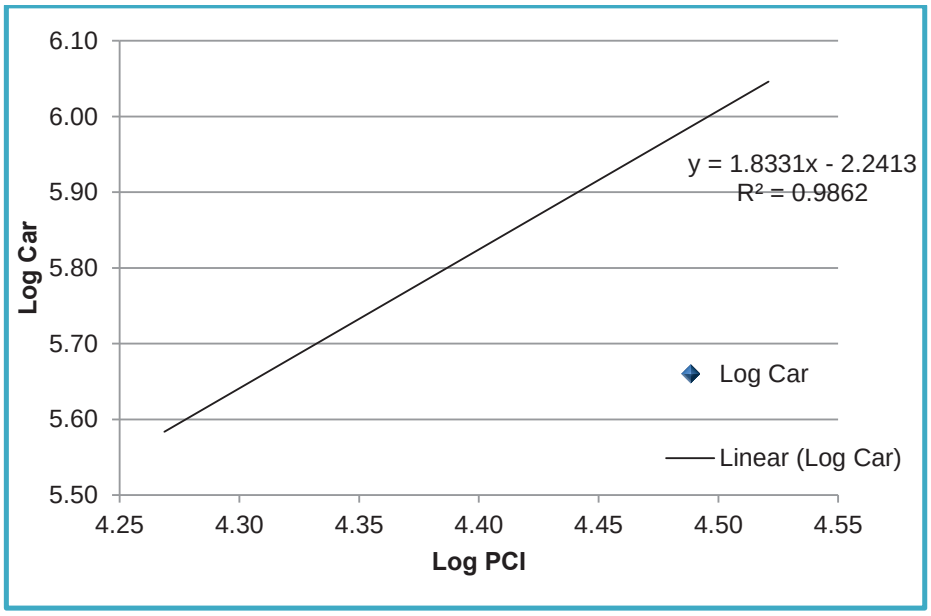

Figure 3-1: Regression and Elasticity PCI vs. Car-Extrapolation

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

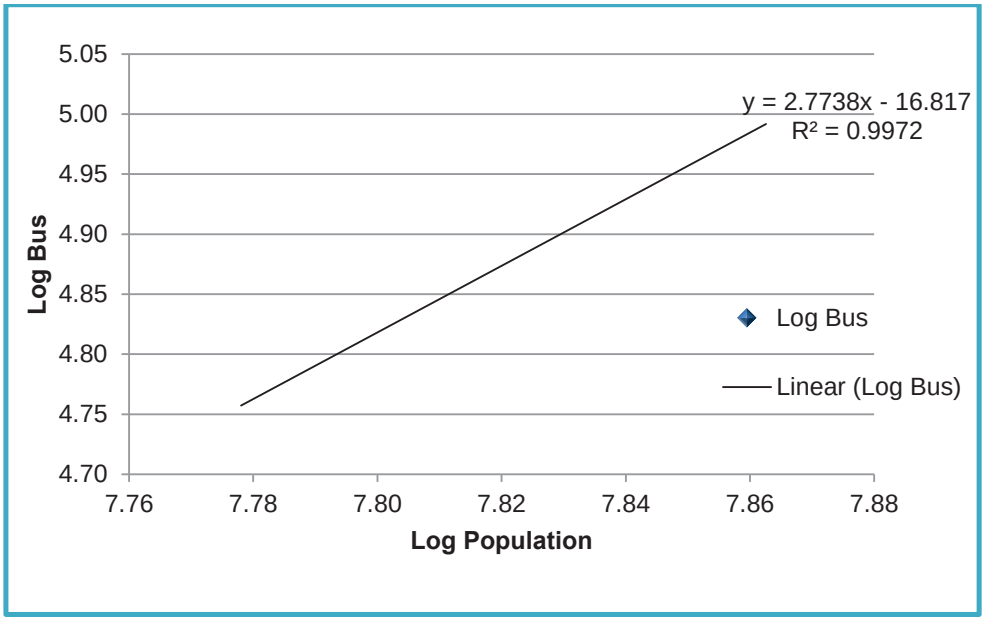

Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

Elasticity of goods traffic has been worked out by regression analysis with NSDP. 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%

Following figure depict regression analysis and extrapolation.

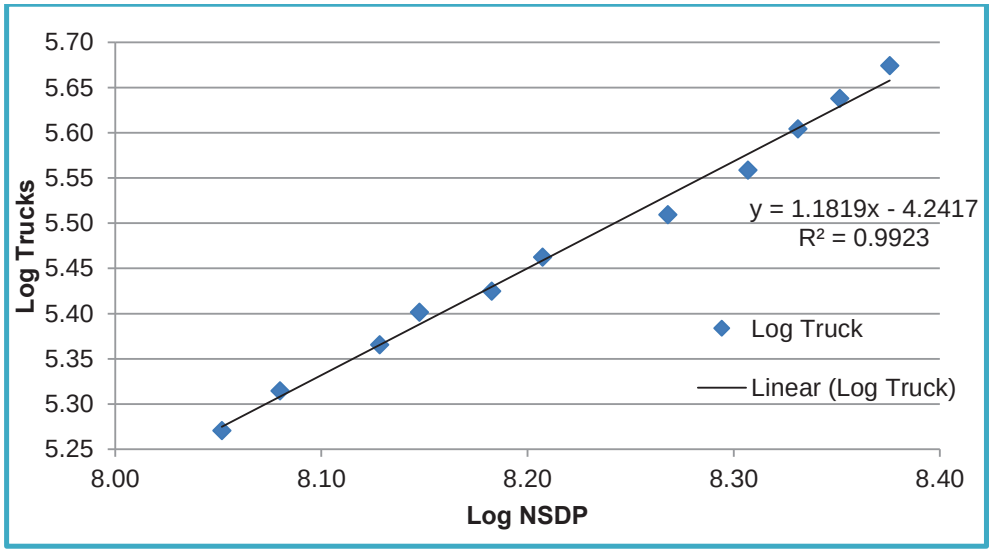

Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation

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 statistical measure of how close the data are to the fitted regression line. It varies from 0 to 1. 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

	Vehicle Category	Independent Variable	Regression Equation	R Square	Elasticity Coefficient (y)	Average Growth	Growth Elastic
Rajasthan		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%
		NSDP	y = 1.1819x - -4.2417	R^2 = 0.9923	1.1819	7.43%	8.78%

r local, regional, national factors should also be considered before finalizing growth factors. luencing economic re discussed in subsequent sections.

3.4 ^

Historic traffic data forms useful information for any highway

Deoli has recently been commissioned and tolling only commenced . Following factors also istency in traffic volume on project during

b) Ban on mining in Rajasthan

last 4 km was completed recently)

d) Covid-19 Impact from Feb-20 onwards by successive waves

It is assumed that as 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.

Traffic on project stretch was affected due to COVID-19 lockdown announced by Central government in March 2020. Traffic is affected by subsequent second and third waves as well in year 2021-22. Traffic for period from April 2021 to March 2022 was also impacted due to COVID-19 lockdown hence same is not considered for historical growth.

3.5 Other Factors Influencing Growth

There are many factors which have 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.

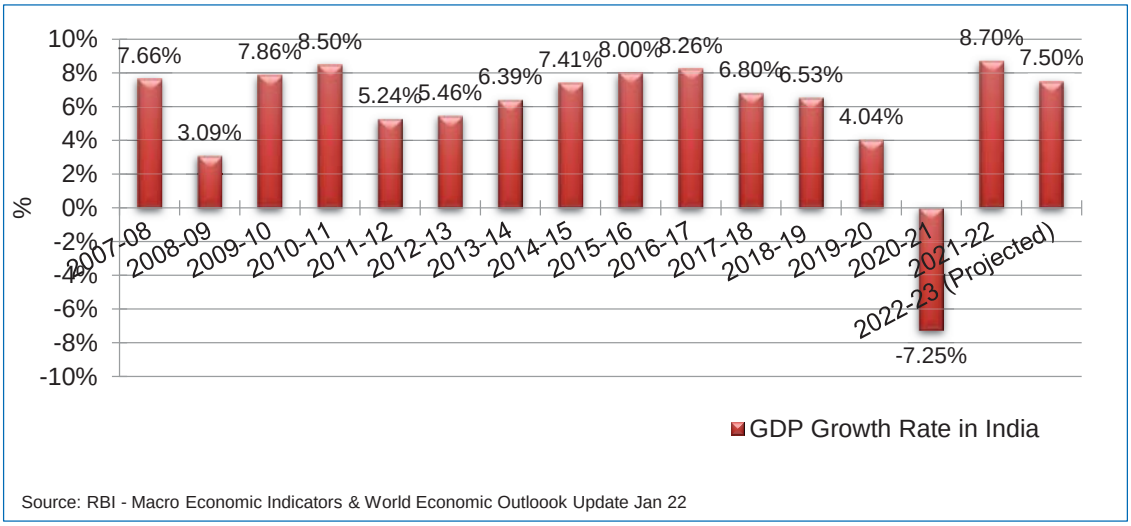

Figure 3-4 : Growth of GDP in India

FY 2017-18 recorded a growth of 6.7% which had slight impact of GST and demonetization. Indian economy appears on recovery path with estimated growth of 6.8% in FY 2018-19. Government took major policy decision 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 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. World Economic Outlook update also has predicted a growth rate of about 7.5 % in 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 under. Rate of growth is moderated in light of overall regional trend. 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, 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. Curb on mining activity in area due to ban on quarrying has affected traffic on this project. It is expected that complete mining ban would be lifted soon, and traffic would normalize.

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

Up to Year/ Vehicle Type	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	9.51%	8.69%	7.54%	6.46%	5.45%	4.50%
Mini Bus /LCV	6.25%	5.67%	5.23%	4.52%	3.59%	2.70%
Truck / Bus	6.81%	6.81%	5.97%	5.19%	4.47%	3.81%
Multi Axle	6.81%	5.76%	5.06%	4.41%	3.81%	3.26%
Oversized Vehicles	6.81%	5.76%	5.06%	4.41%	3.81%	3.26%

Table 3-6 : Recommended Growth Rates Pessimistic

Year/ Vehicle Type	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	8.51%	7.69%	6.54%	5.46%	4.45%	3.50%
Mini Bus /LCV	5.25%	4.67%	4.23%	3.52%	2.59%	1.70%
Truck / Bus	5.81%	5.81%	4.97%	4.19%	3.47%	2.81%
Multi Axle	5.81%	4.76%	4.06%	3.41%	2.81%	2.26%
Oversized Vehicles	5.81%	4.76%	4.06%	3.41%	2.81%	2.26%

Table 3-7 : Recommended Growth Rates Most Likely

Year/ Vehicle Type	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	9.01%	8.19%	7.04%	5.96%	4.95%	4.00%
Mini Bus /LCV	5.75%	5.17%	4.73%	4.02%	3.09%	2.20%
Truck / Bus	6.31%	6.31%	5.47%	4.69%	3.97%	3.31%
Multi Axle	6.31%	5.26%	4.56%	3.91%	3.31%	2.76%
Oversized Vehicles	6.31%	5.26%	4.56%	3.91%	3.31%	2.76%

Currently there is ban on mining and quarrying in Rajasthan. Rajasthan government has started giving permission to mining in piecemeal basis. It is reported that environment clearance is obtained by select lease holders for mining and they are waiting for final Supreme Court order to start mining. Opening of mining activity would bring positive impact on traffic flow on project road corridor.

3.7 COVID-19 Impact

Corona virus crisis affected the traffic since March 2020 onwards. Traffic in year 2020-21 was negatively affected by lockdown. Impact of Covid-19 is analyzed in next section of this chapter. All social and economic activities had been completely disrupted due worldwide pandemic of Corona Virus. This had affected traffic on project stretch as well. Traffic was severely affected form March 2020 due to lockdown. Government considered partial lifting of lockdown and allowing selective economic activities on zone-to-zone basis in May 2020. Government has decided to open economic activities in phases and by now almost all the activities are open with some restrictions.

Concessionaire shared traffic data for year 2020-21 and 2021-22. At all toll plaza commercial traffic has almost reached back to previous level. Passenger traffic, which picked up quite late, has also recovered handsomely in later months and has reached back to original level. But traffic was further affected due to second wave of COVID-19 in April 21 to July 21 and third wave in December 2021 to March 2022.

Government has announced a mega economic stimulate and package of Rs. 20 Lakh Crore to bring the economy back on track and recover the losses. But now by and large traffic is normalized on project stretch hence no additional recovery growth is taken in projections now.

CHAPTER 4
TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in previous section of 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 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
2022-23	8941	394	1321	2125	9	**12791**	**23098**
2023-24	9792	419	1411	2270	9	**13901**	**24909**
2024-25	10722	444	1507	2424	9	**15106**	**26858**
2025-26	11530	467	1596	2547	9	**16149**	**28521**
2026-27	12399	491	1692	2676	9	**17267**	**30294**
2027-28	13334	516	1792	2811	9	**18462**	**32174**
2028-29	14339	543	1899	2953	9	**19743**	**34180**
2029-30	15421	570	2013	3102	9	**21115**	**36315**
2030-31	16416	595	2117	3238	9	**22375**	**38271**
2031-32	17476	622	2227	3380	9	**23714**	**40341**
2032-33	18604	649	2342	3528	9	**25132**	**42520**
2033-34	19805	677	2464	3683	9	**26638**	**44827**
2034-35	21084	707	2591	3845	9	**28236**	**47261**
2035-36	22233	732	2706	3991	9	**29671**	**49449**
2036-37	23444	758	2828	4143	9	**31182**	**51749**
2037-38	24720	785	2954	4301	9	**32769**	**54155**
2038-39	26066	812	3086	4465	9	**34438**	**56675**
2039-40	27485	840	3224	4635	9	**36193**	**59315**
2040-41	28724	863	3347	4786	9	**37729**	**61637**

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
2022-23	4072	228	922	2291	12	**7525**	**17542**
2023-24	4458	243	985	2447	12	**8145**	**18843**
2024-25	4882	258	1051	2614	12	**8817**	**20239**
2025-26	5250	272	1114	2746	12	**9394**	**21411**
2026-27	5646	286	1180	2886	12	**10010**	**22656**
2027-28	6072	300	1250	3033	12	**10667**	**23975**
2028-29	6530	316	1324	3187	12	**11369**	**25372**
2029-30	7022	332	1403	3348	12	**12117**	**26849**
2030-31	7476	347	1475	3495	12	**12805**	**28203**
2031-32	7958	363	1551	3649	12	**13533**	**29630**
2032-33	8472	379	1631	3810	12	**14304**	**31133**
2033-34	9019	396	1715	3978	12	**15120**	**32713**
2034-35	9602	414	1804	4153	12	**15985**	**34378**
2035-36	10125	428	1885	4312	12	**16762**	**35880**
2036-37	10676	443	1968	4477	12	**17576**	**37445**
2037-38	11258	459	2056	4648	12	**18433**	**39085**
2038-39	11871	475	2148	4825	12	**19331**	**40794**
2039-40	12518	492	2244	5009	12	**20275**	**42583**
2040-41	13081	506	2330	5172	12	**21101**	**44158**

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
2022-23	8941	394	1321	2125	9	**12791**	**23098**
2023-24	9703	415	1399	2249	9	**13775**	**24684**
2024-25	10529	436	1480	2379	9	**14833**	**26369**
2025-26	11217	454	1553	2476	9	**15709**	**27740**
2026-27	11951	472	1631	2577	9	**16640**	**29189**
2027-28	12732	492	1712	2681	9	**17626**	**30711**
2028-29	13565	512	1797	2789	9	**18672**	**32315**
2029-30	14452	533	1886	2902	9	**19782**	**34009**
2030-31	15240	551	1965	3000	9	**20765**	**35502**
2031-32	16072	571	2047	3102	9	**21801**	**37069**
2032-33	16949	591	2132	3208	9	**22889**	**38708**
2033-34	17874	611	2221	3317	9	**24032**	**40421**
2034-35	18849	632	2314	3430	9	**25234**	**42215**
2035-36	19687	649	2395	3526	9	**26266**	**43753**
2036-37	20562	666	2478	3624	9	**27339**	**45344**
2037-38	21477	683	2563	3726	9	**28458**	**46998**
2038-39	22432	700	2651	3830	9	**29622**	**48711**
2039-40	23430	718	2743	3938	9	**30838**	**50498**
2040-41	24251	731	2821	4027	9	**31839**	**51973**

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
2022-23	4072	228	922	2291	12	**7525**	**17542**
2023-24	4418	241	976	2424	12	**8071**	**18670**
2024-25	4794	253	1032	2565	12	**8656**	**19866**
2025-26	5107	263	1083	2669	12	**9134**	**20815**
2026-27	5441	275	1137	2778	12	**9643**	**21820**
2027-28	5797	287	1193	2890	12	**10179**	**22866**
2028-29	6175	299	1252	3007	12	**10745**	**23965**
2029-30	6579	311	1314	3129	12	**11345**	**25122**
2030-31	6938	322	1369	3235	12	**11876**	**26140**
2031-32	7316	334	1426	3345	12	**12433**	**27202**
2032-33	7715	346	1485	3459	12	**13017**	**28309**
2033-34	8136	358	1547	3577	12	**13630**	**29465**
2034-35	8580	370	1612	3699	12	**14273**	**30671**
2035-36	8962	380	1668	3803	12	**14825**	**31704**
2036-37	9360	390	1725	3909	12	**15396**	**32765**
2037-38	9776	400	1784	4019	12	**15991**	**33868**
2038-39	10210	410	1846	4132	12	**16610**	**35011**
2039-40	10664	420	1910	4248	12	**17254**	**36194**
2040-41	11038	428	1964	4344	12	**17786**	**37174**

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
2022-23	4072	228	922	2291	12	**7525**	**17542**
2023-24	4438	242	980	2435	12	**8107**	**18753**
2024-25	4838	256	1042	2589	12	**8737**	**20053**
2025-26	5178	268	1099	2707	12	**9264**	**21113**
2026-27	5542	280	1158	2830	12	**9822**	**22225**
2027-28	5932	293	1221	2959	12	**10417**	**23404**
2028-29	6349	307	1287	3094	12	**11049**	**24648**
2029-30	6797	321	1357	3236	12	**11723**	**25966**
2030-31	7201	333	1421	3363	12	**12330**	**27151**
2031-32	7631	347	1487	3494	12	**12971**	**28390**
2032-33	8086	361	1557	3631	12	**13647**	**29692**
2033-34	8568	375	1630	3773	12	**14358**	**31053**
2034-35	9078	390	1706	3920	12	**15106**	**32475**
2035-36	9528	402	1773	4050	12	**15765**	**33729**
2036-37	10000	414	1843	4185	12	**16454**	**35037**
2037-38	10494	426	1916	4322	12	**17170**	**36384**
2038-39	11013	439	1991	4464	12	**17919**	**37787**
2039-40	11558	453	2070	4611	12	**18704**	**39251**
2040-41	12021	463	2138	4739	12	**19373**	**40509**

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 extension of additional 24 days

Traffic was severely impacted on project highway during 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 would 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 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:-

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

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 year 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.

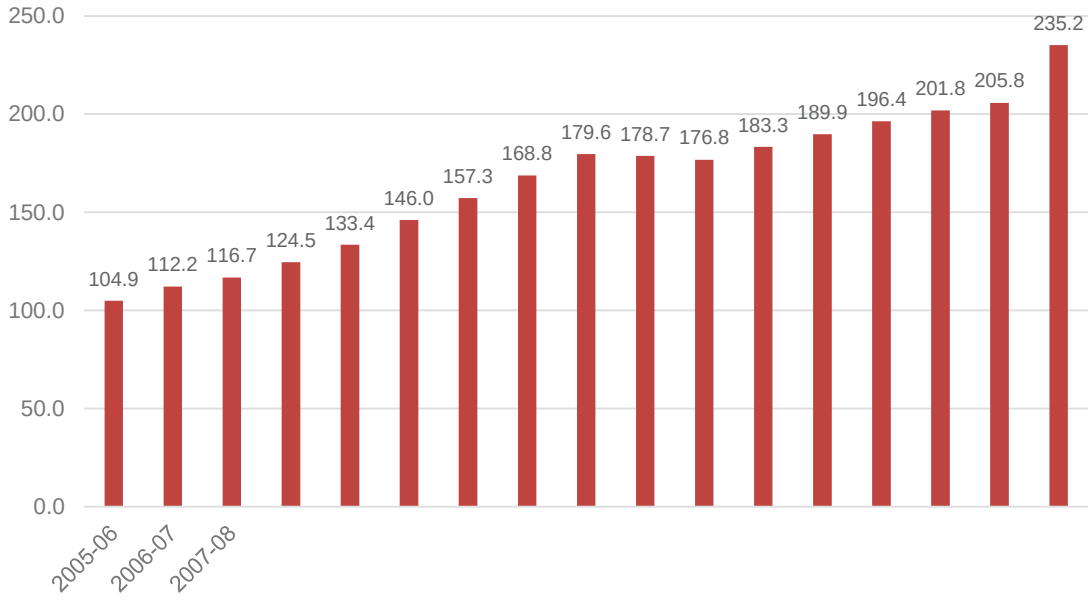

Figure 5-1 : Historical Rate of WPI Inflation in India

Except the negative growth of WPI in year 2015-16 average inflation in WPI from year 2005-2021 is 5.00%. For Future year initially it is takes 5% and suitably stepped down for future year.

It has been observed that 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
Truck/ Bus (Single Journey of Ten Times)	2700

Category	Rate (Rs)
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.)
Mini Bus /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 Mini Bus	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

There are number of bypasses and structures in each package. Equivalent length for structures is added to tollable length at each toll plaza. Bypasses having cost more than Rs. 10 Cr. are to be charged 1.5 times the normal fee. This has been incorporated in rates. 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
2022-23	110	175	365	570	710
2023-24	120	185	385	595	745
2024-25	125	195	405	625	785
2025-26	130	205	425	660	825
2026-27	135	215	450	695	865
2027-28	145	225	470	730	910
2028-29	150	240	495	765	955
2029-30	160	250	515	800	1000
2030-31	165	260	540	840	1050
2031-32	175	275	570	880	1100
2032-33	180	290	595	925	1150
2033-34	190	300	625	970	1210
2034-35	200	315	655	1015	1265
2035-36	210	330	690	1065	1330
2036-37	220	350	720	1115	1395
2037-38	230	365	755	1170	1465
2038-39	245	385	795	1230	1535
2039-40	255	405	835	1290	1610
2040-41	265	425	875	1355	1690

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

Year	CAR	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2022-23	170	265	550	855	1065
2023-24	175	280	580	895	1120
2024-25	185	295	610	940	1175
2025-26	195	310	640	990	1235
2026-27	205	325	670	1040	1300
2027-28	215	340	705	1095	1365
2028-29	225	360	740	1145	1430
2029-30	235	375	775	1200	1500
2030-31	250	395	815	1260	1570
2031-32	260	410	855	1320	1650
2032-33	275	430	895	1385	1730
2033-34	285	455	940	1450	1810
2034-35	300	475	985	1525	1900
2035-36	315	500	1030	1595	1995
2036-37	330	525	1085	1675	2090
2037-38	345	550	1135	1760	2195
2038-39	365	575	1190	1845	2305
2039-40	380	605	1250	1935	2420
2040-41	400	635	1315	2035	2540

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)
2022-23	1750	350	3650	730	5700	1140
2023-24	1850	370	3850	770	5950	1190
2024-25	1950	390	4050	810	6250	1250
2025-26	2050	410	4250	850	6600	1320
2026-27	2150	430	4500	900	6950	1390
2027-28	2250	450	4700	940	7300	1460
2028-29	2400	480	4950	990	7650	1530
2029-30	2500	500	5150	1030	8000	1600
2030-31	2600	520	5400	1080	8400	1680
2031-32	2750	550	5700	1140	8800	1760
2032-33	2900	580	5950	1190	9250	1850
2033-34	3000	600	6250	1250	9700	1940
2034-35	3150	630	6550	1310	10150	2030
2035-36	3300	660	6900	1380	10650	2130
2036-37	3500	700	7200	1440	11150	2230
2037-38	3650	730	7550	1510	11700	2340
2038-39	3850	770	7950	1590	12300	2460
2039-40	4050	810	8350	1670	12900	2580
2040-41	4250	850	8750	1750	13550	2710

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

Year	Mini Bus /LCV	Truck/ Bus	Multi Axle
2022-23	285	395	435
2023-24	300	415	455
2024-25	315	435	480
2025-26	330	455	505
2026-27	345	480	530
2027-28	360	505	555
2028-29	375	530	580
2029-30	390	555	605
2030-31	410	580	630
2031-32	430	605	660
2032-33	450	630	690
2033-34	470	660	720
2034-35	490	690	750
2035-36	510	720	785
2036-37	535	750	820
2037-38	560	785	855
2038-39	585	820	895
2039-40	610	855	935
2040-41	635	895	975

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

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

Year	Car	Mini Bus /LCV	Truck/ Bus	Multi Axle	Oversized Vehicle	Truck/Bus - 100 Trips
2022-23	3735	5915	12240	18945	23655	24480
2023-24	3925	6215	12860	19905	24850	25720
2024-25	4125	6525	13510	20915	26110	27025
2025-26	4335	6860	14200	21980	27440	28400
2026-27	4555	7210	14925	23100	28840	29850
2027-28	4790	7580	15690	24285	30320	31380
2028-29	5020	7945	16445	25455	31780	32890
2029-30	5260	8330	17240	26685	33315	34480
2030-31	5515	8730	18075	27975	34925	36150
2031-32	5785	9155	18950	29335	36620	37900
2032-33	6065	9600	19875	30760	38405	39745
2033-34	6360	10070	20845	32260	40275	41685
2034-35	6670	10560	21860	33840	42245	43725
2035-36	7000	11080	22935	35500	44320	45870
2036-37	7345	11625	24060	37245	46495	48125
2037-38	7705	12195	25250	39080	48790	50495
2038-39	8085	12800	26495	41010	51200	52990
2039-40	8485	13435	27810	43045	53740	55620
2040-41	8910	14105	29190	45185	56410	58385

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

Year	CAR	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles
2022-23	95	155	325	505	620
2023-24	100	160	340	535	650
2024-25	105	170	355	560	680
2025-26	110	180	375	590	715
2026-27	115	190	395	620	755
2027-28	125	200	415	650	790
2028-29	130	205	435	680	830
2029-30	135	220	455	715	870
2030-31	140	230	480	750	910
2031-32	150	240	500	785	955
2032-33	155	250	525	825	1005
2033-34	165	265	550	865	1050
2034-35	170	275	580	905	1105
2035-36	180	290	605	950	1155
2036-37	190	305	635	1000	1215
2037-38	195	320	665	1045	1275
2038-39	205	335	700	1100	1335
2039-40	215	350	735	1155	1405
2040-41	230	370	770	1210	1475

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

Year	CAR	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles
2022-23	145	230	485	760	925
2023-24	150	245	510	800	975
2024-25	160	255	535	840	1025
2025-26	165	270	565	885	1075
2026-27	175	280	590	930	1130
2027-28	185	295	620	975	1190
2028-29	195	310	650	1025	1245
2029-30	200	325	685	1070	1305
2030-31	210	340	715	1125	1370
2031-32	220	360	750	1180	1435
2032-33	235	375	790	1235	1505
2033-34	245	395	825	1295	1580
2034-35	255	415	865	1360	1655
2035-36	270	435	910	1425	1735
2036-37	280	455	955	1495	1820
2037-38	295	480	1000	1570	1910
2038-39	310	500	1050	1650	2005
2039-40	325	525	1105	1730	2105
2040-41	340	550	1160	1815	2210

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)
2022-23	1550	310	3250	650	5050	1010
2023-24	1600	320	3400	680	5350	1070
2024-25	1700	340	3550	710	5600	1120
2025-26	1800	360	3750	750	5900	1180
2026-27	1900	380	3950	790	6200	1240
2027-28	2000	400	4150	830	6500	1300
2028-29	2050	410	4350	870	6800	1360
2029-30	2200	440	4550	910	7150	1430
2030-31	2300	460	4800	960	7500	1500
2031-32	2400	480	5000	1000	7850	1570
2032-33	2500	500	5250	1050	8250	1650
2033-34	2650	530	5500	1100	8650	1730
2034-35	2750	550	5800	1160	9050	1810
2035-36	2900	580	6050	1210	9500	1900
2036-37	3050	610	6350	1270	10000	2000
2037-38	3200	640	6650	1330	10450	2090
2038-39	3350	670	7000	1400	11000	2200
2039-40	3500	700	7350	1470	11550	2310
2040-41	3700	740	7700	1540	12100	2420

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

Year	Mini Bus /LCV	Truck/ Bus	Multi Axle
2022-23	250	355	370
2023-24	265	375	390
2024-25	280	395	410
2025-26	295	415	430
2026-27	310	435	450
2027-28	325	455	475
2028-29	340	475	495
2029-30	355	495	515
2030-31	370	515	540
2031-32	385	540	565
2032-33	400	565	590
2033-34	420	590	615
2034-35	440	615	645
2035-36	460	645	675
2036-37	480	675	705
2037-38	500	705	735
2038-39	525	735	770
2039-40	550	770	805
2040-41	575	805	840

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

Year	CAR (Non-Commercial Vehicles)	CAR SPL (10 to 20 Km)	LCV / Mini Bus SPL	LCV / Mini Bus (10 to 20 Km)
2022-23	315	1705	2800	7545
2023-24	330	1790	2940	7920
2024-25	345	1880	3085	8315
2025-26	365	1975	3240	8730
2026-27	385	2075	3400	9165
2027-28	405	2180	3570	9625
2028-29	420	2280	3730	10060
2029-30	445	2385	3900	10515
2030-31	465	2490	4075	10990
2031-32	485	2600	4260	11485
2032-33	510	2715	4450	12000
2033-34	535	2835	4650	12540
2034-35	560	2965	4860	13105
2035-36	590	3100	5080	13695
2036-37	620	3240	5310	14310
2037-38	650	3385	5550	14955
2038-39	680	3535	5800	15630
2039-40	715	3695	6060	16335
2040-41	750	3860	6335	17070

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

Year	Car	Mini Bus /LCV	Truck/ Bus	Multi Axle	Oversized Vehicle	Truck/Bus - 100 Trips
2022-23	3185	5150	10785	16915	20590	21570
2023-24	3350	5410	11330	17770	21630	22660
2024-25	3520	5680	11905	18670	22730	23810
2025-26	3695	5970	12510	19620	23885	25025
2026-27	3885	6275	13150	20620	25105	26300
2027-28	4085	6600	13825	21680	26390	27650
2028-29	4280	6915	14490	22725	27665	28980
2029-30	4490	7250	15190	23820	29000	30380
2030-31	4705	7600	15925	24975	30405	31855
2031-32	4935	7970	16700	26190	31880	33400
2032-33	5175	8360	17510	27460	33430	35025
2033-34	5425	8765	18365	28800	35065	36735
2034-35	5690	9195	19265	30210	36780	38530
2035-36	5970	9645	20210	31690	38580	40420
2036-37	6265	10120	21205	33250	40480	42405
2037-38	6575	10620	22250	34890	42475	44500
2038-39	6900	11145	23350	36615	44575	46700
2039-40	7240	11695	24505	38430	46785	49015
2040-41	7600	12280	25725	40340	49110	51450

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 2022-23 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
2022-23	89.09	63.80	**152.89**
2023-24	101.25	72.22	**173.47**
2024-25	114.28	81.10	**195.39**
2025-26	127.39	90.10	**217.49**
2026-27	141.79	100.13	**241.93**
2027-28	159.08	111.88	**270.96**
2028-29	176.07	123.60	**299.66**
2029-30	196.11	136.61	**332.72**
2030-31	216.68	150.25	**366.93**
2031-32	240.05	166.12	**406.17**
2032-33	263.86	182.54	**446.41**
2033-34	291.17	201.06	**492.22**
2034-35	322.02	220.77	**542.79**
2035-36	354.20	242.55	**596.75**
2036-37	387.38	264.91	**652.30**
2037-38	424.45	288.83	**713.28**
2038-39	468.07	316.63	**784.70**
2039-40	513.35	347.63	**860.98**
2040-41	557.62	377.75	**935.37**

Table 5-18 : Toll Revenue Pessimistic Scenario

(Rs. Crores)

Year	Toll at Plaza 30.500	Toll at Plaza 105.000	Total
2022-23	89.09	63.80	**152.89**
2023-24	100.30	71.56	**171.85**
2024-25	112.17	79.63	**191.80**
2025-26	123.84	87.62	**211.46**
2026-27	136.52	96.51	**233.03**
2027-28	151.73	106.77	**258.49**
2028-29	166.31	116.83	**283.14**
2029-30	183.53	127.89	**311.42**
2030-31	200.88	139.35	**340.22**
2031-32	220.43	152.58	**373.02**
2032-33	240.05	166.08	**406.12**
2033-34	262.41	181.24	**443.65**
2034-35	287.56	197.13	**484.69**
2035-36	313.27	214.53	**527.80**
2036-37	339.22	232.05	**571.27**
2037-38	368.11	250.51	**618.62**
2038-39	401.99	271.99	**673.98**
2039-40	436.72	295.82	**732.54**
2040-41	469.83	318.45	**788.29**

Table 5-19 : Toll Revenue Most Likely Scenario

(Rs. Crores)

Year	Toll at Plaza 30.500	Toll at Plaza 105.000	Total
2022-23	89.09	63.80	**152.89**
2023-24	100.73	71.85	**172.58**
2024-25	113.17	80.29	**193.47**
2025-26	125.58	88.76	**214.34**
2026-27	139.06	98.16	**237.23**
2027-28	155.31	109.13	**264.44**
2028-29	171.11	119.96	**291.07**
2029-30	189.68	132.00	**321.68**
2030-31	208.67	144.52	**353.19**
2031-32	230.08	159.02	**389.10**
2032-33	251.72	173.96	**425.68**
2033-34	276.47	190.77	**467.24**
2034-35	304.34	208.50	**512.83**
2035-36	333.16	227.97	**561.13**
2036-37	362.50	247.84	**610.34**
2037-38	395.26	268.83	**664.09**
2038-39	433.81	293.19	**727.01**
2039-40	473.52	320.38	**793.90**
2040-41	511.88	346.48	**858.37**

CHAPTER 6
OPERATION AND MAINTENANCE

6.1 Operation & Maintenance

Following are project parameters which would contribute towards cost of operation and maintenance.

Future cost of operation and maintenance is estimate on guess basis. Keeping all above factors in view, 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 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 few sections. This operation and its cost is 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 2020-2021is 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		
2022-23	12.20				0.07	0.04	0.00	15.71	Regular O & M
2023-24	12.45				0.07	0.04		16.82	Regular O & M
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

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
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
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 to 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 area and add value to development of region. All these developments have potential to give positive impact to traffic flow on project. As estimated in this study report project traffic revenue is expected to grow at rate of 6-8% per annum.

Following can considered as major outcome of study

a) There is good amount of tollable traffic running on project

b) Project corridor has potential to witness traffic growth @ 6-8% post COVID-19 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 above it can be considered a stable healthy project from traffic and revenue point of view

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OCTOBER
2022

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

GMD Consultants

PATHANKOT TO AMRITSAR SECTION OF NH-15

(KM 6.082 TO 108.502) IN THE STATE OF PUNJAB

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

OCTOBER 2022

GMD CONSULTANTS ★ NAVI MUMBAI ★

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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			

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 period from April 2018 to September 2019 and was submitted in October 2018. A revised report was submitted with updated traffic of year 2018-19 in April 2019. Report was further updated with yearly traffic data of 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 plaza from early October 2020. Traffic data from April 2020 to October 2020 was available, this report was updated taking this latest traffic data into consideration. Toll operation started on project stretch some nine months back in December 2021 and concessionaire has shared the data. Hence the data from April-2022 to September-2022 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 required information for project corridor to understand the general traffic and travel characteristics on the corridor.

Toll operation on project was suspended due to farmer's agitation. Now toll operation is resumed from December 2021 and only nine-month data is available which is also affected due to Covid-19 Third wave. Concessionaire has made available six monthly traffic data now hence report is updated on the basis of such six-month data from April-2022 to September-2022.

The following traffic data has been collected for project.

- Classified traffic volume counts at the two toll plaza locations on Pathankot Amritsar section of NH-15for base year 2016-17, 2017-18, 2018-19, 2019-20, traffic data from April 2020 to October 2020 and traffic data from April 2022 to September 2022. Toll operation was suspended temporarily due to farmer's agitation thereafter and has been resumed just nine months back.
- 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 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. 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 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
		Six Monthly Data from April 22 to September 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22
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)
		Six Monthly Data from April 22 to September 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22

*Toll operation is suspended since October 20 on project stretch due to farmer's agitation and has been resumed just 9 months back.

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

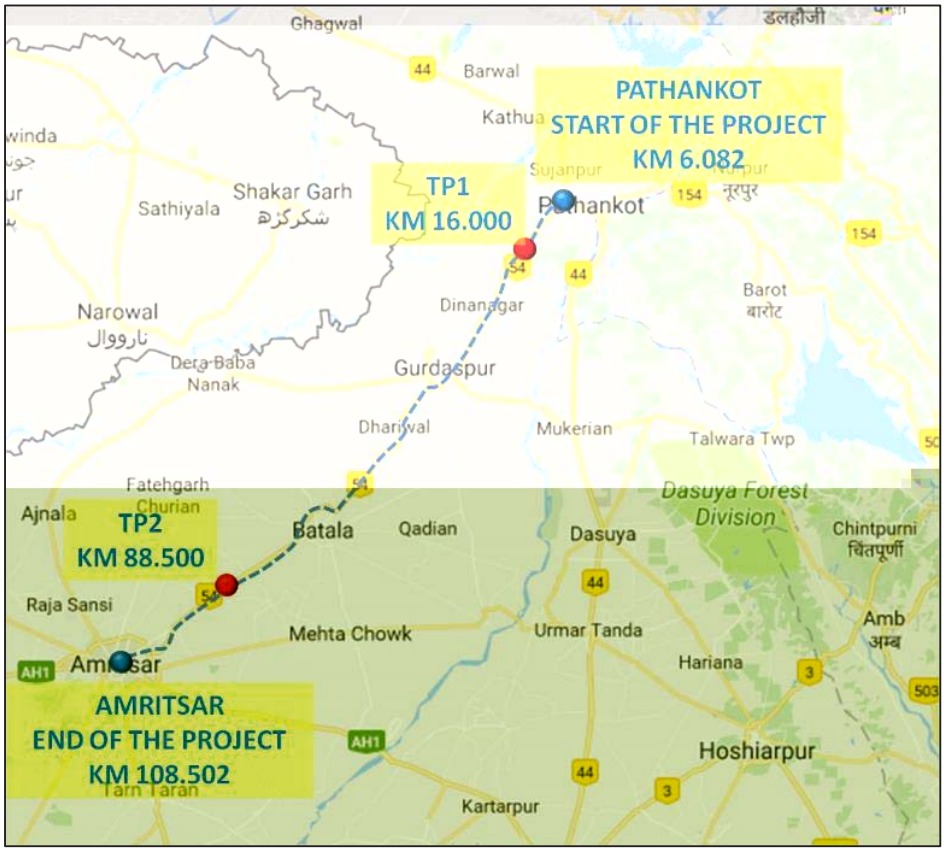

Figure 2-1: Toll Plaza Locations

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 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 in below.

Table 2-2 : Vehicle Classification System

Vehicle Type	
Auto Rickshaw	
Passenger Car	Car, Jeep, Taxi & Van (Old / new technology)
Bus	Mini Bus
	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 project highway is currently under toll operation, the data collected is corresponding to category of toll able vehicles. Following are the type of vehicles as per concession agreement.

- Car / Jeep / van
- Mini Bus /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. Component 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 year 2016-17, 2017-18, 2018-19, 2019-20, April 2020 to October-2020 and April 2022 to September-2022 as under for toll plazas after resumption of traffic on project stretch.

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)*	Average Daily Traffic April-2022 to Sept 2022
1	Car	8094	8916	9220	9402	5404	5780
2	Mini Bus / LCV	999	992	881	804	660	695
3	Truck / Bus	1470	1343	1109	1063	738	2169
4	Multi Axle	2940	2979	2450	2113	2013	1429
5	Oversized Vehicles	604	22	17	32	16	4

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)	Average Daily Traffic April-2022 to Sept 2022
1	CAR	10428	11238	11271	11633	6284	7439
2	Mini Bus/ LCV	578	598	574	587	496	415
3	Truck/Bus	840	849	841	845	395	1258
4	Multi Axle	688	939	1177	1239	1181	1073
5	Oversized Vehicles	479	26	8	15	62	4
	Total	**13013**	**13649**	**13870**	**14319**	**8418**	**10189**

Toll operation was suspended on stretch and has been resumed just nine months back. Hence report is updated for six-month data from April-2022 to September-2022.

The above data was arrived at by applying standard trip frequencies to monthly passes and return journey tickets issued.

Pandemic of COVID-19 (Corona Virus) has impacted entire world this year. Taking precaution, Government of India announced a complete lockdown in last week of March 2020 and traffic on highways was stopped which was eased out progressively later. Traffic has been normalized on almost all stretches in India post COVID-19. Hence it is expected that traffic on project stretch will also follow normal growth pattern.

Pathankot -Amritsar stretch is gateway of Jammu and Kashmir to rest of India. Traffic from Jammu & Kashmir was quite affected to due to post article 370 situations in Valley. As expected, that traffic picked as normalcy returns to valley and trade starts improving. Collection of tolls at both toll plazas of project corridor was suspended due ongoing agitation of Farmers in the state. Toll operation has been resumed on toll plazas from December 2021. The traffic data available is of just nine months and may be affected by third wave of Covid-19 in that period.

Report has been updated with partial traffic number of April 2022 – September-2022 period.

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 table given below.

Table 2-5 : PCU Factors Adopted for Study

Vehicle Type	PCUs
Car	1.0
Mini Bus	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 (April-2022 to September-2022)	16.00	10076	19776	1.96
	88.50	10189	16680	1.64

There was ban on mining in Punjab in year 2017-18 due to which growth of large size vehicles (multi-axle) slowed down. The same is reflecting in reduction of PCU Index. It can be observed from above that project traffic has a PCU index ranging

between 1.4 to 1.8 which indicates 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 57% of total traffic at toll plaza location Km 16.00 while multi axle vehicles are 14% of total traffic. 8% of traffic is Truck /Bus while LCV traffic forms the balance 6%. Overall, about 28% of traffic is commercial in nature.

At toll plaza location Km 88.50 car traffic forms 73% of total traffic at toll plaza while multi axle and truck / bus are 11% and 12%. LCV volume is 3% of the total traffic. Over all about 20% 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)

Following table provides numbers of vehicle 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.) for April-22to September 22
1	Single Journey	4255	4785	4574	4407	3786	5630

2	Return Journey	5364	4648	4322	4236	1924	4304
3	Monthly Pass	4488	4820	4781	4771	3121	142

A significant part of the traffic at KM 16.00 is monthly and return journey which is 1% and 43% respectively. Single journey component is 56%. This indicated presence of dedicated urban traffic on corridor.

Similarly, traffic numbers for type of journey at KM 88.50 is return and monthly journey 1% and 42% respectively. Single journey component is 57%.

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.) for April-22to September 22
1	Single Journey	2656	2858	3177	3616	3406	5807
2	Return Journey	5352	5434	5620	5736	2332	4278
3	Monthly Pass	5005	5360	5073	4967	2680	104

Here return journey form highest portion of traffic followed by monthly pass and single journey. As discussed previously traffic data for period from April to September 2020 is impacted due to lockdown and toll collection was suspended on project road due to Farmer's agitation in state till December 21. Hence traffic data for period April-2022 to September 2022 is used for journey type bifurcation.

Secondary Data Collection.

There are several other factors which have substantial impact on traffic pattern and growth on any project corridor. 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 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 pattern 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 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, hence all developmental parameter pertaining 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 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, 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 Punjab is used as the base data for analysis of growth.

3.3 Estimation of Traffic Demand Elasticity

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:

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

Where,

P = Number of Vehicles (Mode wise)

EI = Economic Indicator

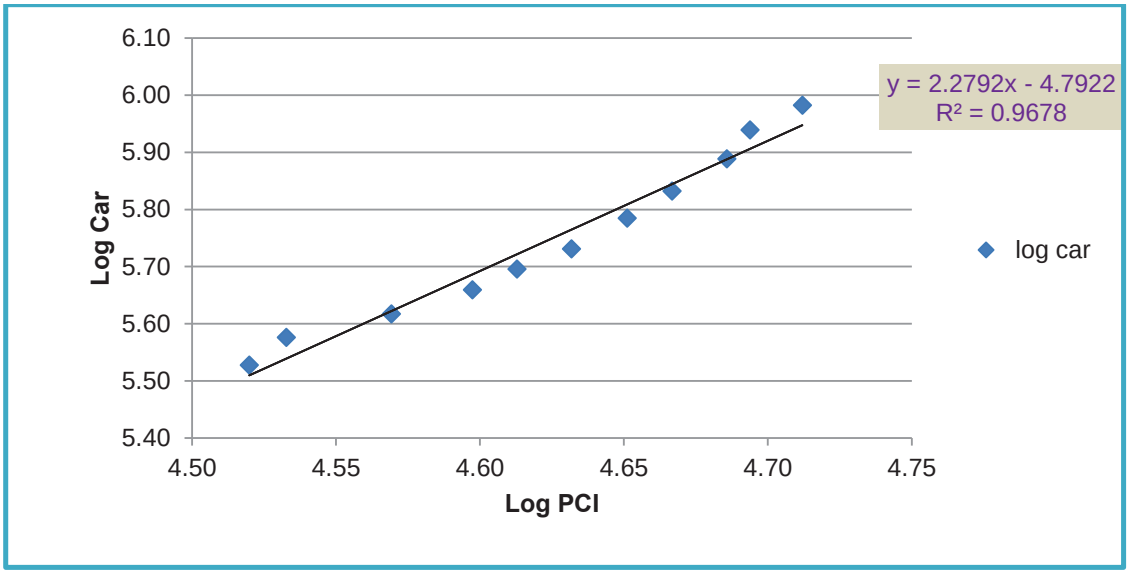

Figure 3-1: Regression and Elasticity PCI vs. Car-Extrapolation

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

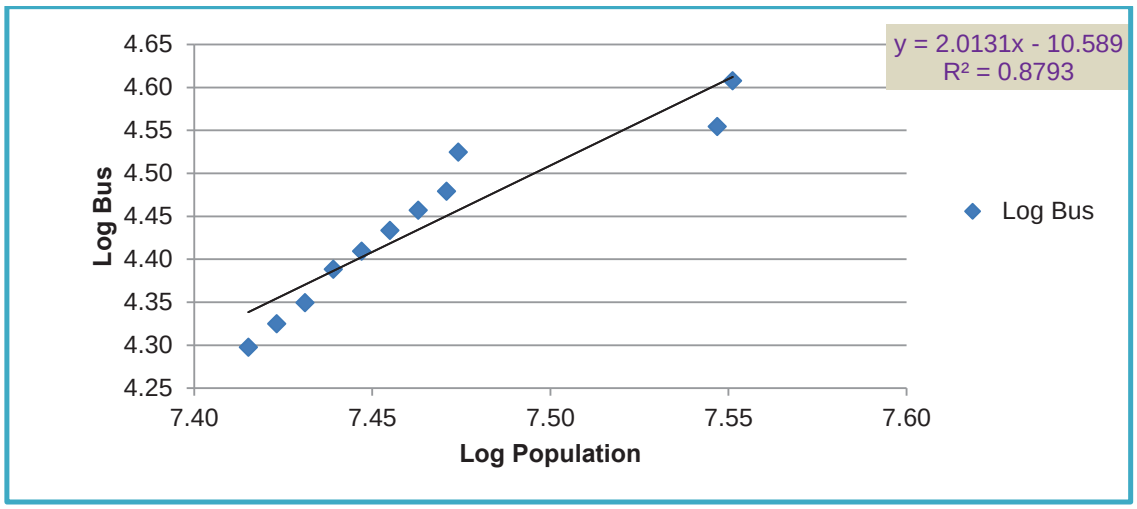

Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

Elasticity of goods traffic has been worked out by regression analysis with NSDP. 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)
2004-05	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%

Following figure depict regression analysis and extrapolation.

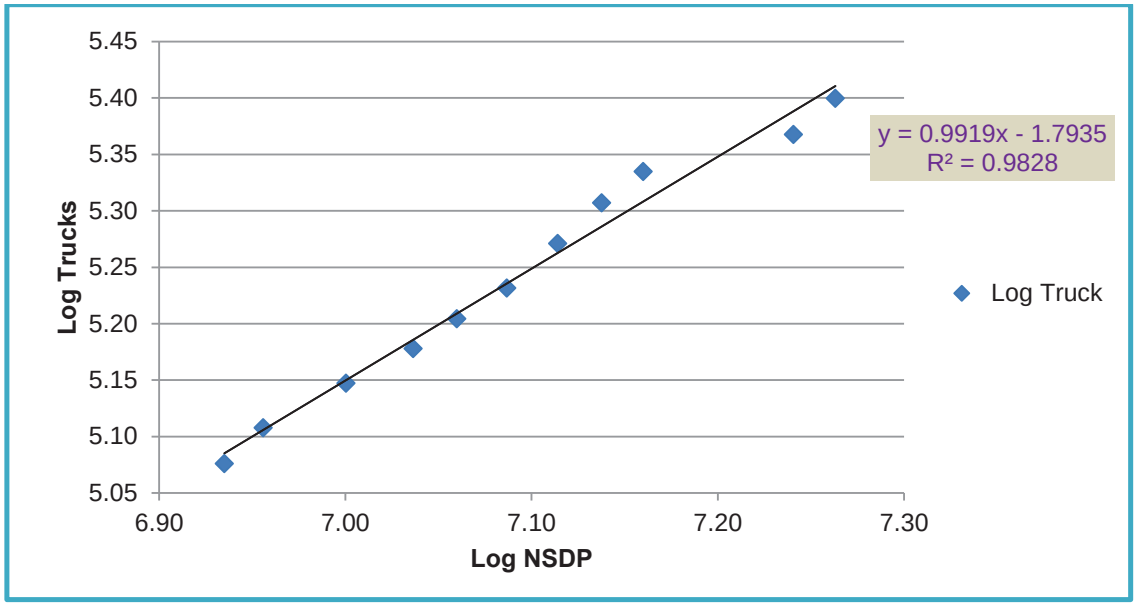

Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation

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	R² = 0.9678	2.2792	4.54%	10.34%	Good Regression
	Bus	Population	y = 2.0131x - 10.5894	R² = 0.8793	2.0131	3.29%	6.63%	Good Regression
	Truck	NSDP	y = 0.9919x - 1.7935	R² = 0.9828	0.9919	7.96%	7.90%	Good Regression

Economical 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 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 trend of growth. Project stretch of Pathankot to Amritsar has recently been commissioned and tolling commenced in 2014. Only few years traffic data is available which is not sufficient to establish any credible trend. Moreover, due to ban on mining in area commercial traffic is temporarily affected. Lockdown for Corona Virus pandemic (COVID-19) disrupted project traffic in March 2020. Traffic for 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 same cannot be considered for historical growth

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

3.5 Other Factors Influencing Growth

There are many factors which have 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.

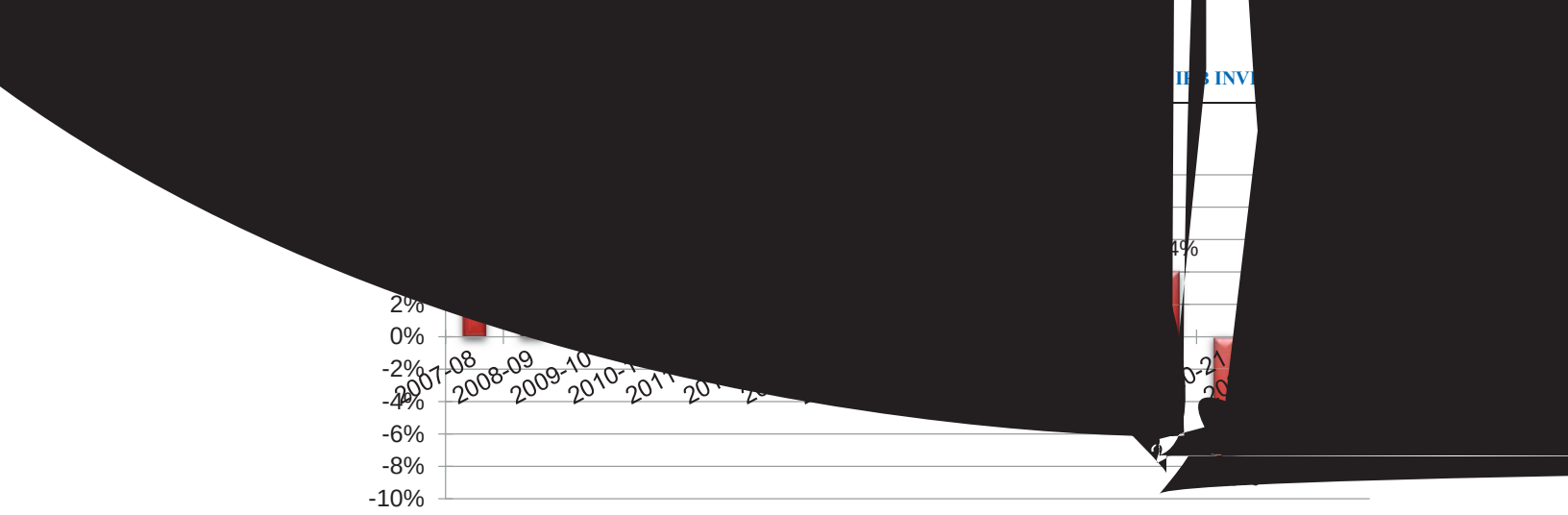

Figure 3-4 : Growth of GDP in India

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

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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 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. World Economic Outlook update also has predicted a growth rate of about 7.5 % in 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 under. 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 economical model growths are considered.

Rate of growth is moderated in light of overall regional trend. 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, rate of growth diminishes. Same growth rate is not sustainable for long. It is an established practice to step down future growth rates at interval of 5 years.

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Table 3-5 : Recommended Growth Rates Optimistic

Year/ Vehicle Type	2020-22	2022-27	2027-32	2032-37	2037-42
Car/Jeep/Van	8.84%	7.84%	6.84%	5.84%	5.34%
LCV	7.40%	6.40%	5.40%	4.40%	4.15%
Truck/Bus	6.13%	5.13%	4.13%	3.13%	2.88%
Multi Axle (> 2 axle)	8.40%	7.40%	6.40%	5.40%	5.15%

Table 3-6 : Recommended Growth Rates Pessimistic

Year/ Vehicle Type	2020-22	2022-27	2027-32	2032-37	2037-42
Car/Jeep/Van	7.34%	6.34%	5.34%	4.34%	3.84%
LCV	5.90%	4.90%	3.90%	2.90%	2.65%
Truck/Bus	4.63%	3.63%	2.63%	1.63%	1.38%
Multi Axle (> 2 axle)	6.90%	5.90%	4.90%	3.90%	3.65%

Table 3-7 : Recommended Growth Rates Most Likely

Year/ Vehicle Type	2020-22	2022-27	2027-32	2032-37	2037-42
Car/Jeep/Van	8.34%	7.34%	6.34%	5.34%	4.84%
LCV	6.90%	5.90%	4.90%	3.90%	3.65%
Truck/Bus	5.63%	4.63%	3.63%	2.63%	2.38%
Multi Axle (> 2 axle)	7.90%	6.90%	5.90%	4.90%	4.65%

With return of normalcy in J & K valley it is expected that transportation of famous Kashmiri apple has also started picking up and same is expected have positive impact in future traffic. This is expected to contribute and enhanced traffic growth on project corridor.

Currently toll operation was suspended on project stretch due to farmer's agitation in state. Toll operation is resumed on project stretch from December 2021 onwards. Thus, traffic is available for just nine months and same was affected by third wave of Covid-19. By and large traffic operation is regular on project stretch. Concessionaire has made available six monthly traffic data from April-2022 to September 2022. Current report has been updated using the same traffic data.

3.7 COVID-19 Impact

Current Corona virus crisis affected the traffic since March 2020 onwards. Traffic in year 2020-21 was negatively affected by lockdown. Impact of Covid-19 is analyzed in next section of this chapter. All social and economic activities had been completely disrupted due worldwide pandemic of Corona Virus. This had affected traffic on project stretch as well. Traffic was severely affected form March-2020 due to lockdown. Government considered partial lifting of lockdown and allowing selective economic activities on zone to zone basis in May 2020. Government has decided to open economic activities in phases and by now almost all the activities are open with some restrictions.

Further, toll operation was suspended since October 2020 on project stretch due to farmer's agitation hence which is resumed just three months back in December 2021. Concessionaire has made available six monthly traffic data from April-2022 to September 2022. Current report has been updated using the same traffic data

CHAPTER 4

TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in previous section of 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 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
2022-23	5780	695	2169	1429	4	10076	19776
2023-24	6234	739	2280	1534	4	10791	21104
2024-25	6723	787	2396	1647	4	11557	22521
2025-26	7250	837	2519	1768	4	12378	24037
2026-27	7819	890	2648	1898	4	13259	25657
2027-28	8354	938	2758	2019	4	14073	27139
2028-29	8926	988	2872	2147	4	14937	28704
2029-30	9537	1041	2992	2284	4	15858	30371
2030-31	10189	1097	3116	2430	4	16836	32136
2031-32	10886	1156	3245	2585	4	17876	34006
2032-33	11522	1206	3347	2724	4	18803	35648
2033-34	12195	1259	3452	2870	4	19780	37373
2034-35	12908	1314	3561	3025	4	20812	39193
2035-36	13662	1371	3672	3188	4	21897	41099
2036-37	14460	1431	3787	3360	4	23042	43106
2037-38	15233	1490	3896	3533	4	24156	45073

Table 4-2 : Total Tollable Traffic @ Toll Plaza 2- Chainage 88.50 KM

(Optimistic Growth Scenario)

Year	CAR	Minibus	Truck/Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2022-23	7439	415	1258	1073	4	10189	16680
2023-24	8022	440	1322	1152	4	10940	17850
2024-25	8650	468	1389	1237	12	11756	19140
2025-26	9328	497	1460	1328	13	12626	20488
2026-27	10060	528	1534	1426	14	13562	21934
2027-28	10748	556	1597	1517	15	14433	23267
2028-29	11483	585	1663	1614	16	15361	24685
2029-30	12269	616	1731	1717	17	16350	26189
2030-31	13108	649	1802	1827	18	17404	27790
2031-32	14005	684	1876	1943	19	18527	29488
2032-33	14823	713	1933	2048	20	19537	30998
2033-34	15689	744	1994	2158	21	20606	32593
2034-35	16606	777	2056	2274	22	21735	34272
2035-36	17576	812	2120	2397	23	22928	36044
2036-37	18603	847	2186	2526	24	24186	37907
2037-38	19596	882	2248	2655	25	25406	39723

Similarly, traffic projections for Pessimistic scenario are given as under.

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
2022-23	5780	695	2169	1429	4	10076	19776
2023-24	6147	729	2247	1512	4	10639	20804
2024-25	6536	765	2327	1601	4	11233	21887
2025-26	6951	801	2410	1695	4	11861	23028
2026-27	7392	839	2497	1794	4	12526	24233
2027-28	7786	871	2562	1881	4	13104	25261
2028-29	8202	905	2629	1973	4	13713	26343
2029-30	8640	940	2697	2069	4	14350	27470
2030-31	9102	976	2768	2170	4	15020	28653
2031-32	9588	1014	2840	2276	4	15722	29889
2032-33	10005	1044	2887	2364	4	16304	30888
2033-34	10439	1074	2934	2456	4	16907	31922
2034-35	10893	1105	2982	2552	4	17536	32999
2035-36	11366	1137	3030	2651	4	18188	34109
2036-37	11860	1169	3079	2754	4	18866	35262
2037-38	12316	1200	3122	2854	4	19496	36343

Table 4-4 : Total Tollable Traffic @ Toll Plaza 2- Chainage 88.50 KM

(Pessimistic Growth Scenario)

Year	CAR	Minibus	Truck/Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2022-23	7439	415	1258	1073	4	10189	16680
2023-24	7911	435	1303	1136	4	10789	17603
2024-25	8413	457	1350	1202	12	11434	18612
2025-26	8946	479	1399	1273	13	12110	19649
2026-27	9513	503	1450	1348	14	12828	20747
2027-28	10021	522	1488	1414	15	13460	21699
2028-29	10556	542	1526	1483	16	14123	22693
2029-30	11120	563	1566	1556	17	14822	23741
2030-31	11714	585	1606	1632	18	15555	24835
2031-32	12339	607	1647	1711	19	16323	25976
2032-33	12875	625	1675	1777	20	16972	26924
2033-34	13435	643	1703	1846	21	17648	27910
2034-35	14018	661	1731	1917	22	18349	28928
2035-36	14627	679	1759	1991	23	19079	29986
2036-37	15263	699	1787	2068	24	19841	31087
2037-38	15849	717	1810	2144	25	20545	32115

Similarly, traffic projections for Most Likely are given as under.

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
2022-23	5780	695	2169	1429	4	10076	19776
2023-24	6204	736	2270	1527	4	10741	21008
2024-25	6660	780	2375	1632	4	11451	22317
2025-26	7149	827	2485	1744	4	12209	23711
2026-27	7673	876	2600	1864	4	13017	25193
2027-28	8160	919	2696	1974	4	13753	26528
2028-29	8677	964	2795	2090	4	14530	27931
2029-30	9228	1012	2897	2213	4	15354	29414
2030-31	9814	1062	3002	2343	4	16225	30975
2031-32	10436	1115	3111	2481	4	17147	32624
2032-33	10993	1159	3193	2602	4	17951	34038
2033-34	11580	1204	3278	2729	4	18795	35519
2034-35	12199	1251	3364	2863	4	19681	37069
2035-36	12850	1300	3453	3003	4	20610	38691
2036-37	13536	1350	3544	3150	4	21584	40386
2037-38	14192	1399	3629	3296	4	22520	42028

Table 4-6 : Total Tollable Traffic @ Toll Plaza 2- Chainage 88.500 KM

(Most Likely Growth Scenario)

Year	CAR	Minibus	Truck/Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU
2022-23	7439	415	1258	1073	4	10189	16680
2023-24	7985	439	1315	1147	4	10890	17768
2024-25	8571	464	1376	1226	12	11649	18966
2025-26	9200	492	1440	1310	13	12455	20212
2026-27	9875	521	1507	1400	14	13317	21541
2027-28	10502	546	1561	1482	15	14106	22741
2028-29	11168	573	1617	1569	16	14943	24011
2029-30	11877	601	1674	1661	17	15830	25352
2030-31	12630	630	1735	1758	18	16771	26772
2031-32	13431	661	1798	1861	19	17770	28277
2032-33	14149	686	1845	1952	20	18652	29587
2033-34	14905	713	1894	2047	21	19580	30963
2034-35	15702	741	1944	2147	22	20556	32406
2035-36	16541	770	1995	2252	23	21581	33919
2036-37	17425	799	2046	2362	24	22656	35499
2037-38	18268	828	2095	2472	25	23688	37032

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 under.

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 concession period. Extension of concession period is worked out as per provisions of concession agreement. 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 in toll in the year FY17 for a period of 24 days, the Concessionaire would be entitled to extension of additional 24 days.

Traffic was severely impacted on project highway during 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. Thus a total of about 6 years would be added to original concession period. Projection of revenue and traffic has been done accordingly.

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. Applicable discounted rate is 2/3 times the normal rate. Concessionaire has also issued 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:-

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

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

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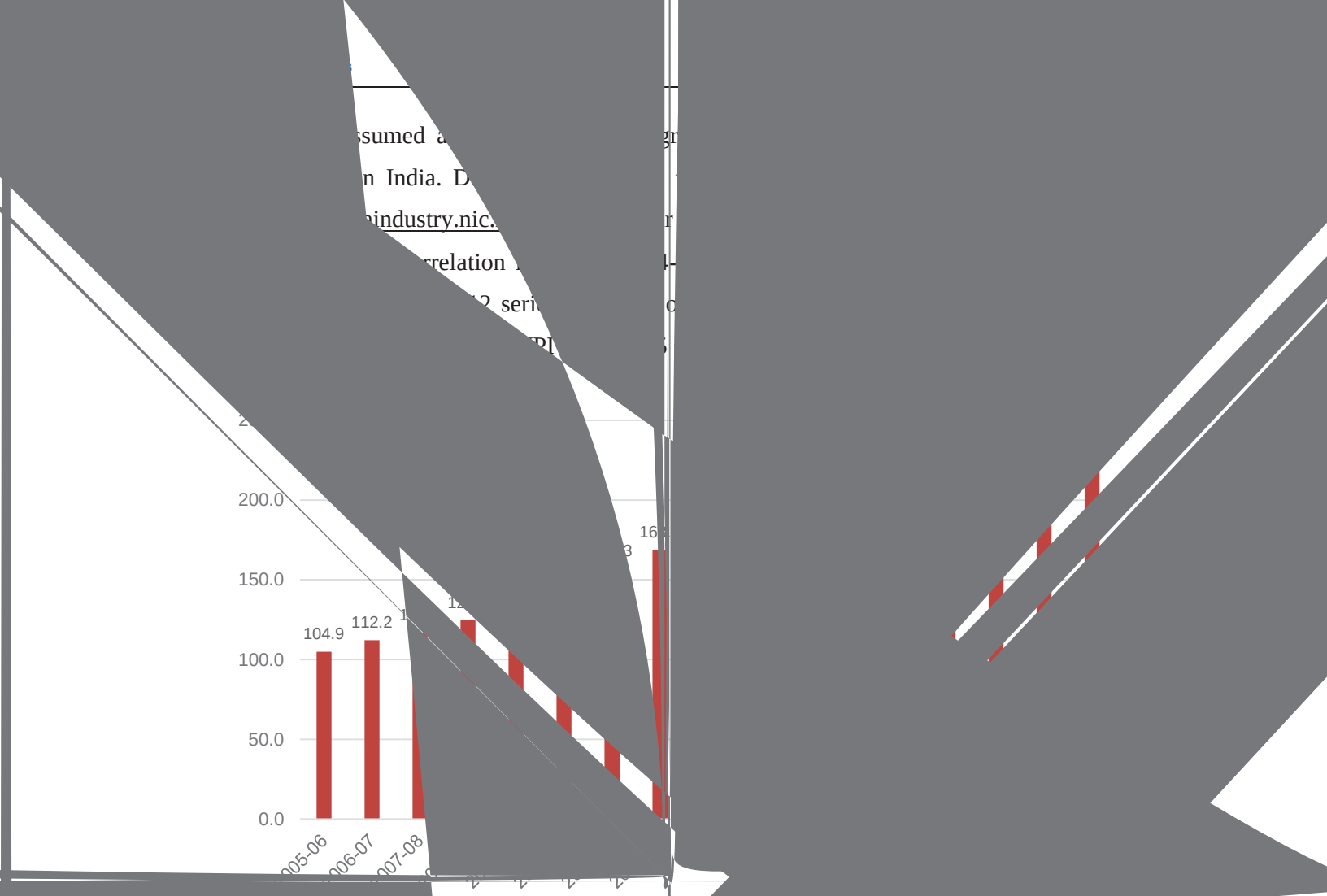

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Table 5-1 : Base Toll Rates 2007 - 08

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 Mini Bus	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 number of bypasses and structures in each package. Equivalent length for structures is added to tollable length at each toll plaza. Bypasses having cost more than Rs. 50 Cr. are to be charged as per fee notification which provide incremental rate over basic rate for Rs. 15 Cr cost of bypass. 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
2022-23	125	190	190	390	390	590	765
2023-24	130	200	200	410	410	620	805
2024-25	135	210	210	430	430	650	845
2025-26	145	220	220	450	450	685	890
2026-27	150	235	235	475	475	720	935
2027-28	160	245	245	500	500	755	980
2028-29	165	260	260	525	525	795	1030
2029-30	175	270	270	550	550	835	1085
2030-31	185	285	285	580	580	880	1140
2031-32	195	300	300	610	610	925	1200
2032-33	205	315	315	640	640	975	1265
2033-34	215	330	330	675	675	1025	1330
2034-35	225	350	350	710	710	1080	1400
2035-36	240	370	370	750	750	1135	1475
2036-37	250	390	390	790	790	1200	1550
2037-38	265	410	410	830	830	1260	1635

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

Year	CAR	Minibus	LCV	Truck	Bus	Multi axle	Oversized Vehicles
2022-23	185	285	285	585	585	885	1150
2023-24	195	300	300	615	615	930	1205
2024-25	205	315	315	645	645	980	1265
2025-26	215	335	335	675	675	1030	1330
2026-27	225	350	350	710	710	1080	1400
2027-28	240	370	370	750	750	1135	1470
2028-29	250	385	385	785	785	1195	1545
2029-30	265	405	405	825	825	1255	1625
2030-31	280	430	430	870	870	1320	1710
2031-32	290	450	450	915	915	1390	1800
2032-33	310	475	475	965	965	1460	1895
2033-34	325	500	500	1015	1015	1540	1995
2034-35	340	525	525	1070	1070	1620	2100
2035-36	360	555	555	1125	1125	1705	2210
2036-37	380	580	580	1185	1185	1795	2330
2037-38	400	615	615	1250	1250	1895	2455

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

Year	CAR
2022-23	315
2023-24	330
2024-25	345
2025-26	365
2026-27	385
2027-28	405
2028-29	425
2029-30	445
2030-31	470
2031-32	495
2032-33	520
2033-34	545
2034-35	575
2035-36	605
2036-37	635
2037-38	670

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
2022-23	4145	6380	12975	12975	19685	25515
2023-24	4350	6700	13630	13630	20680	26800
2024-25	4575	7040	14320	14320	21730	28160
2025-26	4805	7400	15050	15050	22835	29595
2026-27	5050	7775	15820	15820	24000	31105
2027-28	5310	8175	16630	16630	25230	32700
2028-29	5585	8595	17485	17485	26530	34380
2029-30	5870	9040	18390	18390	27900	36160
2030-31	6175	9510	19345	19345	29345	38035
2031-32	6500	10005	20350	20350	30875	40015
2032-33	6840	10530	21415	21415	32490	42110
2033-34	7195	11080	22540	22540	34200	44325
2034-35	7575	11665	23730	23730	36005	46660
2035-36	7980	12285	24990	24990	37910	49135
2036-37	8405	12935	26320	26320	39930	51750
2037-38	8850	13630	27725	27725	42065	54515

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

Year	CAR	Minibus	LCV	Truck	Bus	Multi axle	Oversized Vehicles
2022-23	105	165	165	340	340	520	665
2023-24	110	175	175	355	355	545	700
2024-25	120	185	185	375	375	575	735
2025-26	125	195	195	395	395	600	770
2026-27	130	205	205	415	415	635	810
2027-28	135	215	215	435	435	665	850
2028-29	145	225	225	460	460	700	895
2029-30	150	235	235	480	480	735	940
2030-31	160	250	250	505	505	775	990
2031-32	170	260	260	535	535	815	1040
2032-33	175	275	275	560	560	855	1095
2033-34	185	290	290	590	590	900	1155
2034-35	195	305	305	620	620	950	1215
2035-36	205	320	320	655	655	1000	1280
2036-37	215	335	335	690	690	1055	1350
2037-38	230	355	355	725	725	1110	1420

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

Year	CAR	Minibus	LCV	Truck	Bus	Multi axle	Oversized Vehicles
2022-23	160	250	250	510	510	780	995
2023-24	170	260	260	535	535	820	1045
2024-25	175	275	275	565	565	860	1100
2025-26	185	290	290	590	590	905	1155
2026-27	195	305	305	620	620	950	1215
2027-28	205	320	320	655	655	1000	1275
2028-29	215	335	335	685	685	1050	1345
2029-30	225	355	355	725	725	1105	1410
2030-31	240	370	370	760	760	1160	1485
2031-32	250	390	390	800	800	1220	1565
2032-33	265	410	410	840	840	1285	1645
2033-34	280	435	435	885	885	1355	1730
2034-35	295	455	455	935	935	1425	1825
2035-36	310	480	480	980	980	1500	1920
2036-37	325	505	505	1035	1035	1580	2020
2037-38	345	530	530	1090	1090	1665	2130

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

Year	CAR
2022-23	315
2023-24	330
2024-25	345
2025-26	365
2026-27	385
2027-28	405
2028-29	425
2029-30	445
2030-31	470
2031-32	495
2032-33	520
2033-34	545
2034-35	575
2035-36	605
2036-37	635
2037-38	670

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
2022-23	3560	5535	11330	11330	17315	22145
2023-24	3740	5815	11905	11905	18190	23265
2024-25	3930	6110	12505	12505	19110	24445
2025-26	4130	6420	13145	13145	20085	25690
2026-27	4345	6750	13815	13815	21110	27000
2027-28	4565	7095	14525	14525	22190	28385
2028-29	4800	7460	15270	15270	23335	29845
2029-30	5050	7845	16060	16060	24540	31385
2030-31	5310	8255	16895	16895	25810	33015
2031-32	5585	8685	17775	17775	27155	34735
2032-33	5880	9140	18705	18705	28580	36555
2033-34	6190	9620	19685	19685	30080	38475
2034-35	6515	10125	20725	20725	31670	40505
2035-36	6860	10665	21825	21825	33345	42650
2036-37	7225	11230	22985	22985	35120	44920
2037-38	7610	11830	24210	24210	36995	47320

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. Toll operation was suspended at both toll plazas from October, 2020 to December, 2021due to ongoing Farmer's agitation in the state. Current report is updated with six monthly traffic data made available by Concessionaire from April 2022 to September 2022.

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 2022-23 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
2022-23	87.91	62.77	**150.68**
2023-24	97.24	69.77	**167.01**
2024-25	106.95	77.93	**184.88**
2025-26	118.78	86.04	**204.82**
2026-27	131.30	95.51	**226.81**
2027-28	144.89	104.93	**249.83**
2028-29	157.76	115.72	**273.48**
2029-30	173.22	126.65	**299.87**
2030-31	190.83	140.28	**331.12**
2031-32	209.82	155.00	**364.81**
2032-33	228.18	167.49	**395.67**
2033-34	247.96	183.24	**431.20**
2034-35	269.65	200.21	**469.87**
2035-36	295.35	218.95	**514.31**
2036-37	320.76	238.22	**558.98**
2037-38	348.31	260.73	**609.04**

Table 5-11 : Toll Revenue Optimistic Scenario

(Rs. Crores)

Year	Toll at Plaza 16.00	Toll at Plaza 88.50	Total
2022-23	87.91	62.77	**150.68**
2023-24	98.67	70.71	**169.39**
2024-25	110.08	80.13	**190.21**
2025-26	124.01	89.70	**213.71**
2026-27	139.07	100.95	**240.02**
2027-28	155.74	112.47	**268.21**
2028-29	171.94	125.81	**297.75**
2029-30	191.57	139.65	**331.22**
2030-31	214.09	156.93	**371.02**
2031-32	238.80	175.89	**414.69**
2032-33	263.46	192.84	**456.30**
2033-34	290.42	214.01	**504.43**
2034-35	320.37	237.26	**557.63**
2035-36	355.98	263.23	**619.21**
2036-37	392.21	290.51	**682.72**
2037-38	432.09	322.47	**754.56**

Table 5-12 : Toll Revenue Most Likely Scenario

(Rs. Crores)

Year	Toll at Plaza 16.00	Toll at Plaza 88.50	Total
2022-23*	87.91	62.77	**150.68**
2023-24	98.21	70.41	**168.61**
2024-25	109.08	79.42	**188.50**
2025-26	122.32	88.50	**210.82**
2026-27	136.51	99.17	**235.68**
2027-28	152.18	109.97	**262.15**
2028-29	167.29	122.42	**289.71**
2029-30	185.47	135.24	**320.71**
2030-31	206.28	151.22	**357.50**
2031-32	229.03	168.70	**397.73**
2032-33	251.51	184.06	**435.57**
2033-34	275.98	203.28	**479.26**
2034-35	303.00	224.28	**527.29**
2035-36	335.14	247.62	**582.76**
2036-37	367.52	271.97	**639.49**
2037-38	402.90	300.49	**703.39**

Note:

*Toll operation was suspended since October 2020 on project stretch due to farmer's agitation and has been resumed just three months back in December 2021. Report has been updated in Six monthly traffic date made available by Concessionaire from April 2022 to September 2022.

CHAPTER 6

OPERATION &MAINTENANCE COST

6.1 General

Following are project parameters which would contribute towards cost of operation and maintenance.

Future cost of operation and maintenance is estimate on 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 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 few sections. This operation and its cost is 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 2022-23 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	

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 to 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 area and add value to development of region. All these developments have potential to give positive impact to traffic flow on 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.

Following can considered as major outcome of study

a) There is good amount of toll able traffic running on 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 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 above it can be considered a stable healthy project from 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)

GMD CONSULTANTS NAVI MUMBAI

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OCTOBER 2022

TALEGAON TO AMRAVATI SECTION OF NH-6

(KM 100.000 TO KM 166.725)

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TOLL REVENUE AND O&M COST

PROJECTION REPORT

(FINAL)

OCTOBER 2022

GMD CONSULTANTS
NAVI MUMBAI

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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 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 of year 2016-17 and report was submitted in October 2017. 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 period from April 2018 to September 2018 and was submitted in October 2018. A revised report was submitted with updated traffic of year 2018-19 in April 2019. 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 and now concessionaire has provided traffic data from April 2022 to September 2022, report is updated with this six monthly traffic data.

CHAPTER 2
TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Surveys

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

The following traffic data has been collected for 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 and Six-Monthly traffic data from April 2022 to September 2022.
- 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
		Six Monthly Data from April 22 to September 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22

The locations of each of the traffic survey are illustrated in following Figure

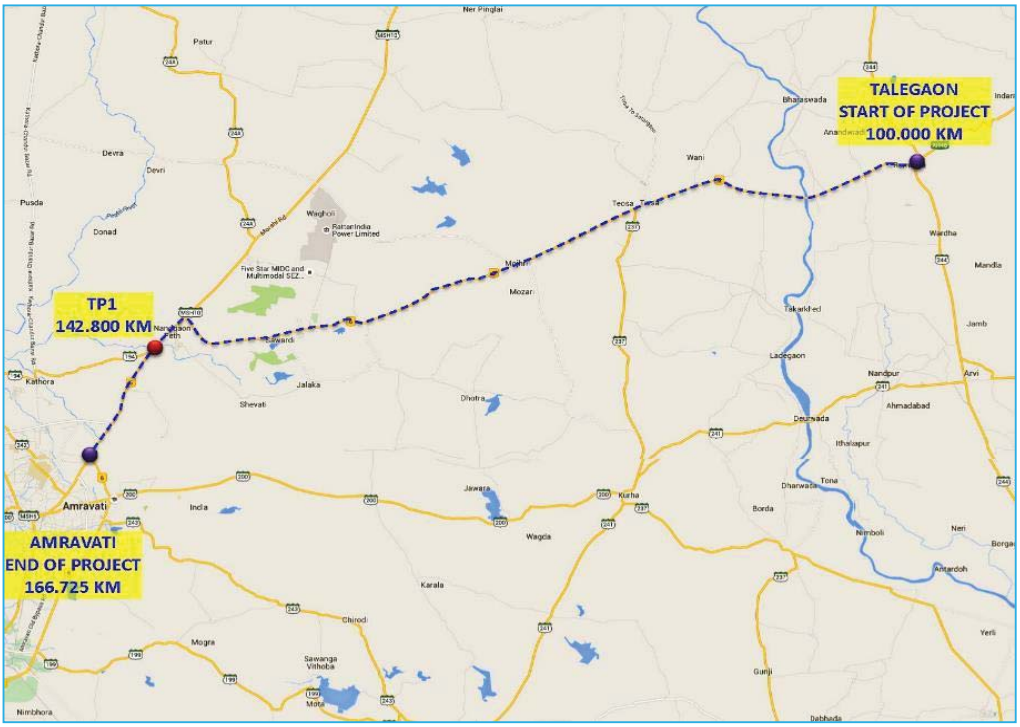

Figure 2-1: Toll Plaza Location

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	Mini Bus

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

- Car / Jeep / van
- Mini Bus /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. Component 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 and from April 2022 to September 2022 as under for toll plaza –

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

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) – FY 2015-16	Annual Average Daily Traffic (Nos.) – FY 2016-17	Annual Average Daily Traffic (Nos.) – FY 2017-18	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	Average Daily Traffic April-22 to Sept 22
1	Car	5105	5825	6275	6738	7407	7090	5937	6531
2	Mini Bus/ LCV	1253	1374	1439	1511	1408	1217	620	681
3	Truck/Bus	1238	1290	1362	1421	1623	1374	1340	1473
4	Multi Axle	1742	1962	2233	2285	2173	2297	2327	2560
5	Oversized Vehicles	2	1	4	2	4	4	7	8
	Total	**9340**	**10452**	**11313**	**11957**	**12616**	**11981**	**10231**	**11253**

Pandemic of COVID-19 (Corona Virus) has impacted entire world. Taking precaution, Government of India announced a complete lockdown in last week of March 2020 and traffic on highways was stopped which was eased out progressively later. There after India was hit by Covid-19 second and third wave in April 21 to July 21 and December 21 to March 22. Recovering traffic pattern was somewhat again disturbed due to second and third wave of Covid-19. Traffic numbers for the period from April 2020 to March 2021 are not representative of traffic pattern at project corridor due to pandemic lockdown impact. However, for integrity of data same has been shown above. NHAI also has, in principal, approved providing extension of concession period to make up for the loss of revenue due to lockdown. Traffic has been affected due to second wave of COVID-19 in period from April 21 to July 2021 and from December 21 to March 22 due to third wave of Covid-19. Hence traffic from April 2021 to March 2022 is also affected by Covid impact. Report is updated with six monthly traffic data made available by Concessionaire from April 2022 to September 2022

The above data was arrived at by applying standard trip frequencies to monthly passes and return journey tickets issued.

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
Mini Bus	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)	11253	23528	2.09

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 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 of for period April 2022 to Sept 2022 have been considered as the base numbers.

It is observed that car traffic forms 58% of total traffic at toll plaza location 142.800 where multi axle commercial vehicles comprise 23% of total traffic. Over all about 42% 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)

Following table provides numbers of vehicle falling in each of above category. on base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22 and from April 2022 to September 2022 as under for toll plaza –

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

Sr. No	Type	Traffic Volume (Nos.) for FY 2015-16	Traffic Volume (Nos.) for FY 2016-17	Traffic Volume (Nos.) for FY 2017-18	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 April-22to September 22
1	Single Journey	4160	4637	5160	5285	5513	6647	5828	6411
2	Return Journey	2860	2988	3294	3514	3341	1906	4274	4702
3	Monthly Pass	2320	2416	2859	3158	3761	3428	129	140

A significant part of the traffic at KM 142.800 is single journey 57% followed by return journey 42% 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. 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 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 pattern 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 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, 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 Maharashtra is used as the base data for analysis of growth.

3.3 Estimation of Traffic Demand Elasticity

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 category 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:

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

Where,

P =*Number of Vehicles (Mode wise)*

EI = *Economic Indicator*

A = *Regression constant*

k = *Elasticity coefficient (Regression coefficient)*

The elasticity for car 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).

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

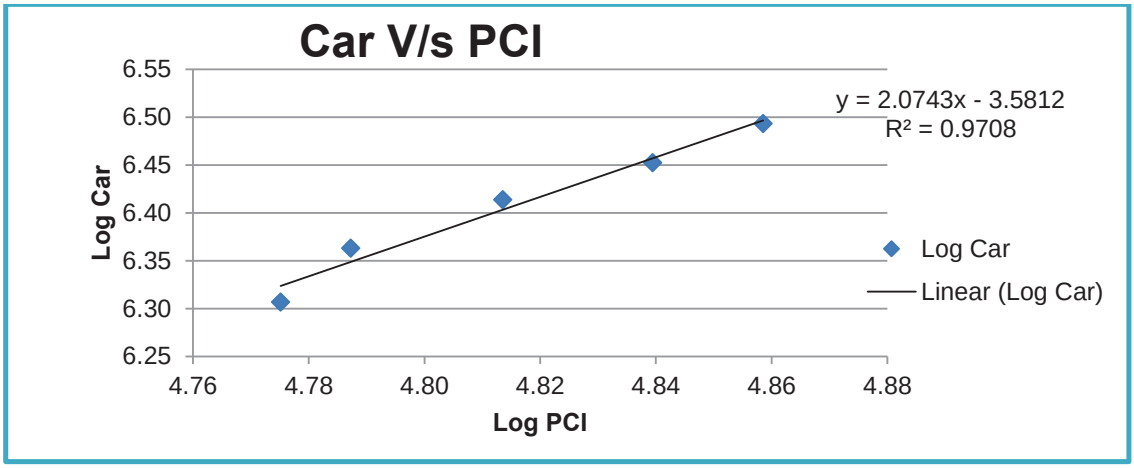

Figure 3-1: Regression and Elasticity PCI vs. Car–Extrapolation

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

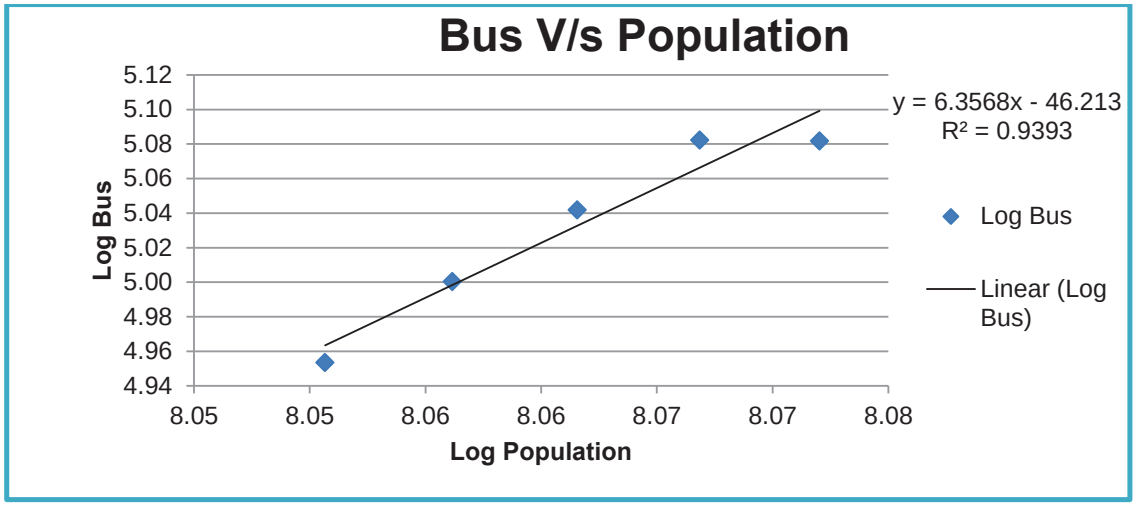

Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

Elasticity of goods traffic has been worked out by regression analysis with NSDP. 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
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%

Following figure depict regression analysis and extrapolation.

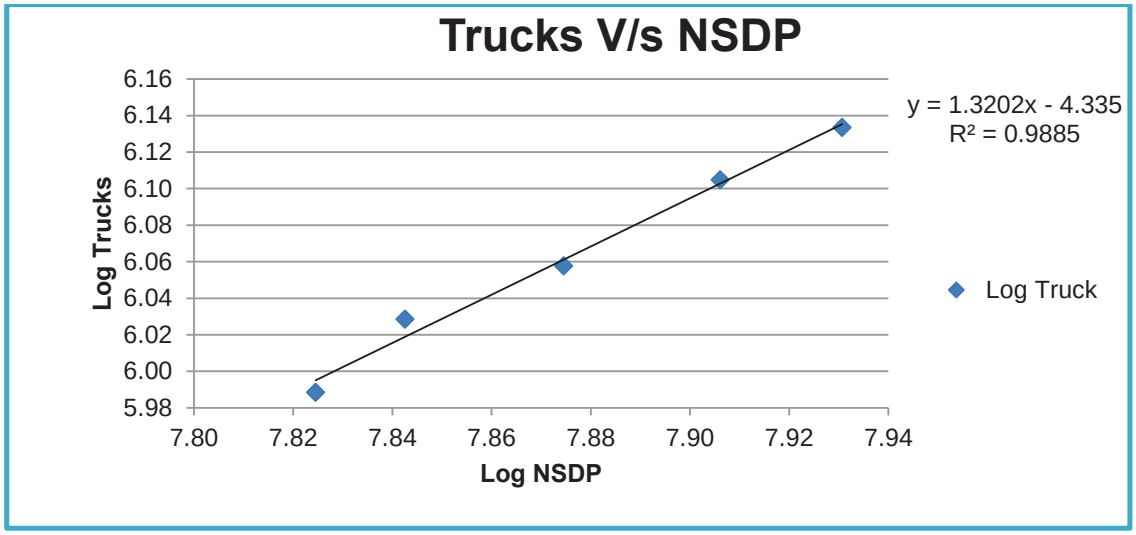

Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation

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 statistical measure of how close the data are to the fitted regression line. It varies from 0 to 1. 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	R² = 0.9708	2.0743	4.93%	11.08%
	Bus	Population	y = 6.3568x - -46.2131	R² = 0.9393	6.3568	1.24%	6.82%
	Truck	NSDP	y = 1.3202x - -4.335	R² = 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 trend of growth. Project stretch of Talegaon to Amravati has recently been commissioned and tolling commenced in 2013. Stable traffic data from year 2015-16 is only available for stretch which is not enough to establish any growth pattern for future. Following table present details of historic traffic on project road.

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2015-16	Annual Average Daily Traffic (Nos.) FY 2016-17	Annual Average Daily Traffic (Nos.) FY 2017-18	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	Average Daily Traffic April-22 to Sept 22
1	Car	5105	5825	6275	6738	7407	7090	5937	6531
2	LCV/Mini Bus	1253	1374	1439	1511	1408	1217	620	681
3	BUS/Truck	1238	1290	1362	1421	1623	1374	1340	1473
4	Mav	1742	1962	2233	2285	2173	2297	2327	2560
5	OSV	2	1	4	2	4	4	7	8
	Total	**9340**	**10452**	**11313**	**11957**	**12616**	**11981**	**10231**	**11253**

Traffic for period from April 2020 to March 2021 and also traffic in period from April 21 to March-22 is impacted due to COVID-19 lockdown and successive first, second and third waves. Though traffic on project corridor has shown impressive recovery growth in period from October 2020 to March 2021 and thereafter but these numbers are affected by COVID-19 pandemic and cannot be taken as normal stabilized traffic numbers. Hence same is not considered for historical growth.

3.5 Other Factors Influencing Growth

There are many factors which have 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.

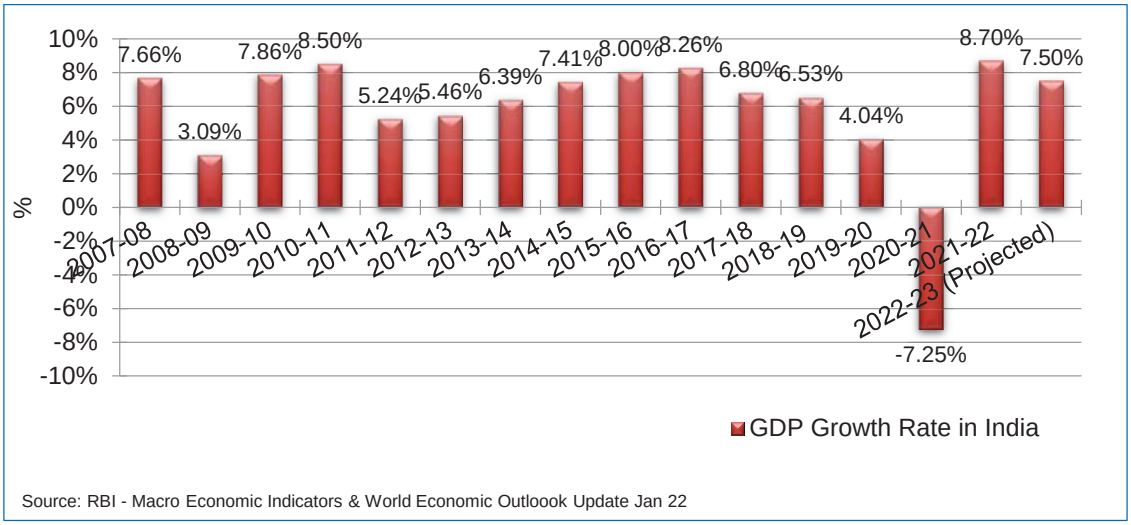

Figure 3-4 : Growth of GDP in India

FY 2017-18 recorded a growth of 6.7% which had slight impact of GST and demonetization. Indian economy appears on recovery path with estimated growth of 6.8% in FY 2018-19. Government took major policy decision 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 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. World Economic Outlook update also has predicted a growth rate of about 7.5 % in 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 under. Rate of growth is moderated in light of overall regional trend. 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, rate of growth diminishes. Same

growth rate is not sustainable for long. It is established practice to stepdown 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	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	7.64%	6.53%	6.11%	5.64%	5.22%	4.51%
Mini Bus /LCV	6.00%	5.43%	5.06%	4.75%	4.46%	4.22%
Truck / Bus	6.42%	6.42%	5.84%	5.53%	4.96%	4.40%
Multi Axle	7.51%	6.78%	6.17%	5.84%	5.24%	4.65%
Oversized Vehicles	7.51%	6.42%	5.84%	5.53%	4.96%	4.40%

Table 3-6 : Recommended Growth Rates Pessimistic

Year/ Vehicle Type	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	7.14%	6.03%	5.61%	5.14%	4.72%	4.01%
Mini Bus /LCV	5.50%	4.93%	4.56%	4.25%	3.96%	3.72%
Truck / Bus	5.92%	5.92%	5.34%	5.03%	4.46%	3.90%
Multi Axle	7.01%	6.28%	5.67%	5.34%	4.74%	4.15%
Oversized Vehicles	7.01%	5.92%	5.34%	5.03%	4.46%	3.90%

Table 3-7 : Recommended Growth Rates Most Likely

Year/ Vehicle Type	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	7.39%	6.28%	5.86%	5.39%	4.97%	4.26%
Mini Bus /LCV	5.75%	5.18%	4.81%	4.50%	4.21%	3.97%
Truck / Bus	6.17%	6.17%	5.59%	5.28%	4.71%	4.15%
Multi Axle	7.26%	6.53%	5.92%	5.59%	4.99%	4.40%
Oversized Vehicles	7.26%	6.17%	5.59%	5.28%	4.71%	4.15%

3.7 COVID-19 Impact

Current Corona virus crisis affected the traffic since March 2020 onwards. Traffic in year 2020-21 was negatively affected by lockdown. Impact of Covid-19 is analyzed in next section of this chapter. All social and economic activities had been completely disrupted due worldwide pandemic of Corona Virus. This had affected traffic on project stretch as well. Traffic was severely affected from March 2020 due to lockdown. Government considered partial lifting of lockdown and allowing selective economic activities on zone to zone basis in May 2020. Government has decided to open economic activities in phases and by now almost all the activities are open with some restrictions.

Concessionaire shared traffic data for year 2020-21 and 2021-22. At all toll plaza commercial traffic has almost reached back to previous level. Passenger traffic, which picked up quite late, has also recovered handsomely in later months and has reached back to original level. But traffic was further affected due to second wave of COVID-19 in April 21 to July 21 and third wave in December 2021 to March 2022.

Government has announced a mega economic stimulate and package of Rs. 20 Lakh Crore to bring the economy back on track and recover the losses. It is observed that traffic has almost normalized on project stretch has additional recovery growth has not been considered in projections.

CHAPTER 4

TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in previous section of 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 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)
2022-23	6531	681	1473	2560	8	**11253**	**23528**
2023-24	6958	718	1569	2724	8	**11977**	**25036**
2024-25	7411	757	1669	2898	8	**12743**	**26631**
2025-26	7864	795	1766	3066	8	**13499**	**28188**
2026-27	8344	835	1868	3245	8	**14300**	**29839**
2027-28	8853	877	1977	3434	8	**15149**	**31589**
2028-29	9394	921	2092	3634	8	**16049**	**33441**
2029-30	9968	967	2214	3846	8	**17003**	**35404**
2030-31	10529	1013	2336	4058	8	**17944**	**37354**
2031-32	11122	1060	2465	4282	8	**18937**	**39412**
2032-33	11748	1110	2601	4518	8	**19985**	**41583**
2033-34	12410	1162	2744	4768	8	**21092**	**43877**

Year	CAR	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU (Including Non-Paid Traffic)
2034-35	13109	1217	2896	5031	8	**22261**	**46298**
2035-36	13793	1271	3039	5281	8	**23392**	**48617**
2036-37	14514	1328	3189	5543	8	**24582**	**51053**
2037-38	15271	1386	3347	5818	8	**25830**	**53608**

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)
2022-23	6531	681	1473	2560	8	**11253**	**23528**
2023-24	6926	715	1561	2711	8	**11921**	**24917**
2024-25	7344	750	1653	2871	8	**12626**	**26384**
2025-26	7756	784	1741	3024	8	**13313**	**27799**
2026-27	8191	820	1834	3185	8	**14038**	**29292**
2027-28	8650	857	1931	3354	8	**14800**	**30858**
2028-29	9135	896	2033	3533	8	**15605**	**32513**
2029-30	9647	937	2142	3721	8	**16455**	**34259**
2030-31	10143	976	2249	3908	8	**17284**	**35976**
2031-32	10663	1017	2362	4104	8	**18154**	**37779**
2032-33	11211	1060	2481	4310	8	**19070**	**39675**
2033-34	11786	1105	2605	4526	8	**20030**	**41662**
2034-35	12391	1152	2736	4754	8	**21041**	**43756**
2035-36	12975	1197	2857	4966	8	**22003**	**45725**

Year	CAR	Minibus /LCV	Truck/ Bus	Multi axle	Oversized Vehicles	Total No.	Total PCU (Including Non-Paid Traffic)
2036-37	13588	1244	2985	5187	8	**23012**	**47787**
2037-38	14229	1293	3118	5418	8	**24066**	**49940**

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)
2022-23	6531	681	1473	2560	8	**11253**	**23528**
2023-24	6942	717	1564	2718	8	**11949**	**24977**
2024-25	7377	753	1660	2885	8	**12683**	**26505**
2025-26	7810	789	1753	3046	8	**13406**	**27996**
2026-27	8267	827	1851	3216	8	**14169**	**29569**
2027-28	8752	866	1954	3396	8	**14976**	**31231**
2028-29	9264	907	2063	3585	8	**15827**	**32982**
2029-30	9807	951	2178	3785	8	**16729**	**34836**
2030-31	10335	993	2292	3984	8	**17612**	**36665**
2031-32	10892	1037	2413	4194	8	**18544**	**38596**
2032-33	11479	1084	2540	4415	8	**19526**	**40629**
2033-34	12097	1133	2674	4648	8	**20560**	**42771**
2034-35	12749	1183	2815	4893	8	**21648**	**45023**
2035-36	13382	1233	2948	5123	8	**22694**	**47165**
2036-37	14047	1285	3086	5365	8	**23791**	**49411**
2037-38	14745	1339	3231	5618	8	**24941**	**51764**

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

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

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 ɔ̃ʒ ɧ ʊ ɔ ₃)

Type of Vehicle	Base Rate of Fee / Km (in Rs.)
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 2018-19.

Amravati bypass qualifies for adding to toll rate since its cost is more than 10 Cr. There is not structure in 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**

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
2022-23	115	180	365	560	710
2023-24	120	185	385	590	745
2024-25	125	195	405	620	785
2025-26	130	205	425	650	825
2026-27	140	215	445	685	865
2027-28	145	225	470	720	910
2028-29	150	240	490	755	955
2029-30	160	250	515	790	1000
2030-31	165	260	540	830	1050
2031-32	175	275	565	870	1100
2032-33	185	290	595	915	1155
2033-34	195	300	620	960	1210
2034-35	200	315	650	1005	1270
2035-36	210	335	685	1055	1330
2036-37	220	350	720	1105	1395
2037-38	235	365	755	1160	1465

Table 5-4 : Toll Rates for Return Journey @ KM 142.800

Year	CAR	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2022-23	170	265	550	845	1065
2023-24	180	280	575	885	1120
2024-25	185	295	605	930	1175
2025-26	195	310	635	980	1235
2026-27	205	325	670	1030	1300
2027-28	220	340	700	1080	1365
2028-29	230	360	735	1135	1430
2029-30	240	375	770	1190	1500
2030-31	250	395	810	1245	1570
2031-32	265	410	850	1305	1650
2032-33	275	430	890	1370	1730
2033-34	290	455	935	1435	1815
2034-35	305	475	980	1505	1900
2035-36	320	500	1025	1580	1995
2036-37	335	525	1075	1660	2095
2037-38	350	550	1130	1740	2195

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 2036-37 (End of Concession Period+ 5 Years) starting from the year 2020-21 are shown in tables below.

Table 5-6 : Toll Revenue Optimistic Scenario

(Rs. Crores)

Year	Toll at Plaza 142.800	Total
2022-23	95.53	**95.53**
2023-24	107.14	**107.14**
2024-25	119.04	**119.04**
2025-26	132.12	**132.12**
2026-27	147.58	**147.58**
2027-28	164.73	**164.73**
2028-29	182.02	**182.02**
2029-30	202.15	**202.15**
2030-31	223.17	**223.17**
2031-32	248.20	**248.20**
2032-33	274.39	**274.39**
2033-34	303.79	**303.79**
2034-35	335.04	**335.04**
2035-36	370.52	**370.52**
2036-37	406.66	**406.66**
2037-38	448.82	**448.82**

Table 5-7 : Toll Revenue Pessimistic Scenario

(Rs. Crores)

Year	Toll at Plaza 142.800	Total
2022-23	95.53	**95.53**
2023-24	106.65	**106.65**
2024-25	117.93	**117.93**
2025-26	130.30	**130.30**
2026-27	144.86	**144.86**
2027-28	160.92	**160.92**
2028-29	176.95	**176.95**
2029-30	195.59	**195.59**
2030-31	214.94	**214.94**
2031-32	237.86	**237.86**
2032-33	261.72	**261.72**
2033-34	288.39	**288.39**
2034-35	316.50	**316.50**
2035-36	348.31	**348.31**
2036-37	380.42	**380.42**
2037-38	417.93	**417.93**

Table 5-8 : Toll Revenue Most Likely Scenario

(Rs. Crores)

Year	Toll at Plaza 142.800	Total
2022-23	95.53	**95.53**
2023-24	106.89	**106.89**
2024-25	118.51	**118.51**
2025-26	131.23	**131.23**
2026-27	146.28	**146.28**
2027-28	162.89	**162.89**
2028-29	179.53	**179.53**
2029-30	198.95	**198.95**
2030-31	219.15	**219.15**
2031-32	243.09	**243.09**
2032-33	268.13	**268.13**
2033-34	296.16	**296.16**
2034-35	325.85	**325.85**
2035-36	359.52	**359.52**
2036-37	393.57	**393.57**
2037-38	433.41	**433.41**

CHAPTER 6
OPERATION & MAINTENANCE

6.1 Operation & Maintenance

Operation and maintenance cost of project depends on number of factors like quality of construction, response of maintenance team to early damage, local climate (rain etc.).

Future cost of operation and maintenance is estimate on guess basis. Keeping all above factors in view, 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 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 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		
2022-23	12.45	1.47	15.76	3.82	0.02	0.59	0.00	41.45	Renewal of Wearing course + Pavement repair
2023-24	12.45				0.02	0.59		16.66	Regular O & M
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

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		
2032-33	12.45			2.29	0.02	0.59		30.38	Regular O & M
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 area which will boost economic growth of area and add value to development of region. All these developments have potential to give positive impact to traffic flow on project. Following can considered as major outcome of study

a) There is good amount of tollable traffic running on project

b) Project corridor has potential to witness traffic growth @ 6-8% annually post COVIC-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

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

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 2022

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GMD CONSULTANTS ★ NAVI MUMBAI ★

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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**	-	

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 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 of year 2016-17 and report was submitted in October 2017. 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 period from April 2018 to September 2018 and was submitted in October 2018. A revised report was submitted with updated traffic of year 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 and now concessionaire has provided traffic data from April 2022 to September 2022, report is updated with this six monthly traffic data.

CHAPTER 2
TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Surveys

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

The following traffic data has been collected for 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 and Six-Monthly traffic data from April 2022 to September 2022.
- 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 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
		Six Monthly Data from April 22 to September 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22
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
		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
		Six Monthly Data from April 22 to September 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22

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

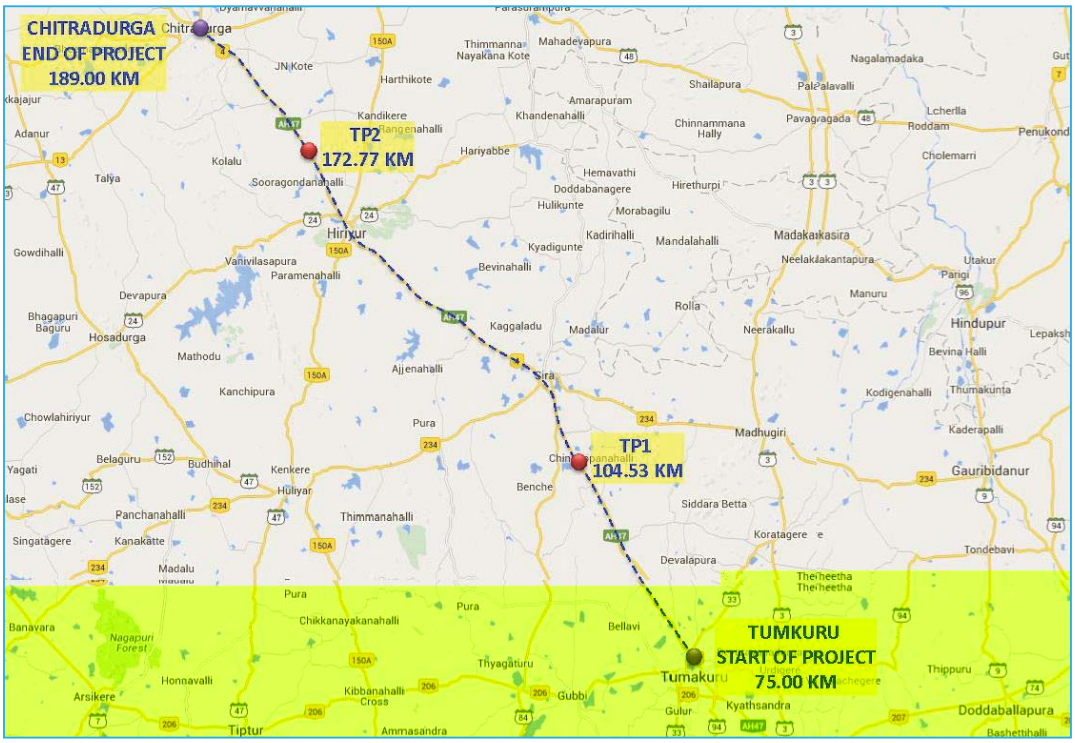

Figure 2-1: Traffic Survey Locations

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	Mini Bus
	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 is corresponding to category of tollable vehicles. 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. Component 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 and from April 2022 to Sep " [f] to ɹ ȳ ʞ - ɜ̈

Table 2-3 : Traffic Data at Toll Plaza at Km 172.770

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) – FY 2015-16	Annual Average Daily Traffic (Nos.) – FY 2016-17	Annual Average Daily Traffic (Nos.) – FY 2017-18	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	Average Daily Traffic April-22 to Sept 22
1	CAR	4395	4803	5261	5244	5560	7633	11046	13200
2	LCV	2205	2237	2514	2918	2752	2652	2006	2164
3	Truck/Bus	2882	2976	3066	3157	3167	2631	3423	4510
4	HCM /EME/ MAV	5356	5365	5563	5748	5033	4968	5831	6517
5	Oversized Vehicles	47	80	46	31	37	14	15	21
	Total	**14885**	**15460**	**16451**	**17099**	**16548**	**17898**	**22322**	**26412**

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 2015-16	Annual Average Daily Traffic (Nos.) – FY 2016-17	Annual Average Daily Traffic (Nos.) – FY 2017-18	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	Average Daily Traffic April-22 to Sept 22
1	CAR	5340	6203	6577	6855	7664	10224	8597	10616
2	LCV	2494	2581	2999	3401	3237	3103	1803	1983
3	Truck/Bus	3562	3727	3743	3888	3896	3133	3005	3994
4	HCM /EME/ MAV	6116	6140	6464	6656	5833	5617	5305	5962
5	Oversized Vehicles	166	130	43	35	45	18	15	22
	Total	**17678**	**18782**	**19826**	**20834**	**20675**	**22094**	**18725**	**22576**

Pandemic of COVID-19 (Corona Virus) has impacted entire world. Taking precaution, Government of India announced a complete lockdown in last week of March 2020 and traffic on highways was stopped which was eased out progressively

later. Traffic on project corridor is recovering at good rate but still traffic numbers had effect of Pandemic. There after India was hit by Covid-19 second and third wave in April 21 to July 21 and December 21 to March 22. Recovering traffic pattern was somewhat again disturbed due to second and third wave of Covid-19. Traffic numbers for the period from April 2020 to March 2021 are not representative of traffic pattern at project corridor due to pandemic lockdown impact. However, for integrity of data same shown above. NHAI also has, in principal, approved providing extension of concession period to make up for the loss of revenue due to lockdown. Traffic has been affected due to second wave of COVID-19 in period from April 21 to July 2021 and from December 21 to March-22 due to third wave of Covid-19. Hence traffic from April 2021 to March 2022 is also affected by Covid impact. But as observed traffic has almost normalized on project stretch post COVID-19

The above data was arrived at by applying standard trip frequencies to monthly passes and return journey tickets issued.

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
Mini Bus	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 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	26412	59396	2.25
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	22576	52499	2.33

It can be observed from above that project traffic has PCU index near 2.5 which indicates 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 period April 2021 to March 2022 have been considered as the base numbers.

It is observed that at Toll KM 172.770 Car traffic forms 50% of total traffic while as HCM / EME / MAV comprises 25% of total traffic. Overall about 50% of traffic is commercial in nature, and at Toll KM 104.530 Car traffic forms 47% of total traffic while as HCM / EME / MAV comprises 26% of total traffic. Overall about 53% of traffic is commercial in nature

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

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

Following table provides numbers of vehicle falling in each of above category

Table 2-7 : Journey Type Bifurcation of Traffic at KM 172.770

Sr. No	Type	Traffic Volume (Nos.) for FY 2015-16	Traffic Volume (Nos.) for FY 2016-17	Traffic Volume (Nos.) for FY 2017-18	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 d .

Table 2-8 : Journey Type Bifurcation of Traffic at KM 104.530

Sr. No	Type	Traffic Volume (Nos.) for FY 2015-16	Traffic Volume (Nos.) for FY 2016-17	Traffic Volume (Nos.) for FY 2017-18	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 April-22to September 22
1	Single Journey	13121	13721	14291	15053	14807	16990	13821	16638
2	Return Journey	3700	4032	4580	4820	4910	4456	4782	5796
3	Local Single Journey	378	419	392	387	385	316	65	69
4	Monthly Pass	494	501	481	574	573	332	57	73

A significant part of the traffic at KM 104.530 is single journey (74%) followed by return journey (26%) 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. 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 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 pattern 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 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, 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 Karnataka is used as the base data for analysis of growth.

3.3 Estimation of Traffic Demand Elasticity

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 category 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:

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

Where,

P = *Number of Vehicles (Mode wise)*

EI = *Economic Indicator*

A = *Regression constant*

k = *Elasticity coefficient (Regression coefficient)*

The elasticity for car and bus (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).

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

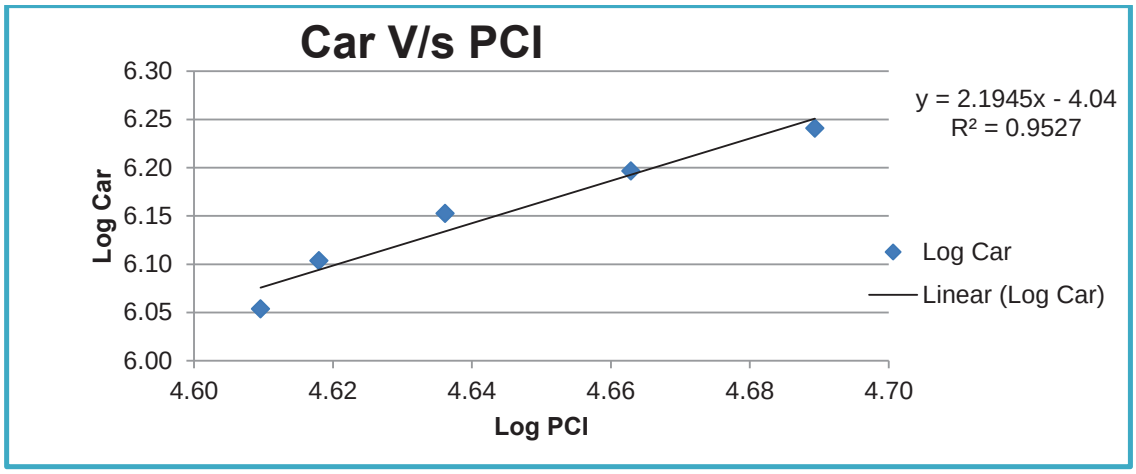

Figure 3-1: Regression and Elasticity PCI vs. Car–Extrapolation

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

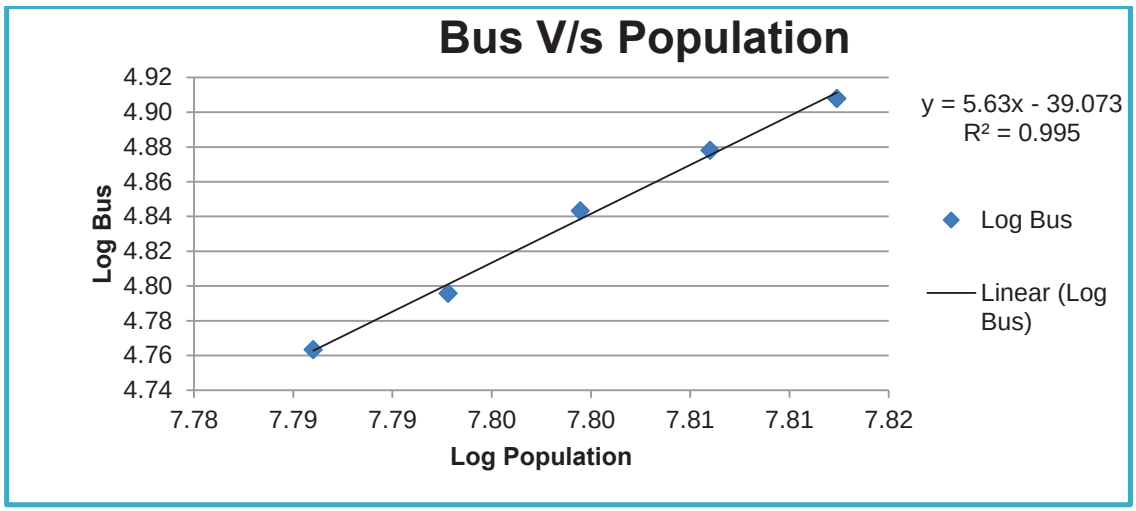

Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

Elasticity of goods traffic demand has been worked out by regression analysis with NSDP. 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
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

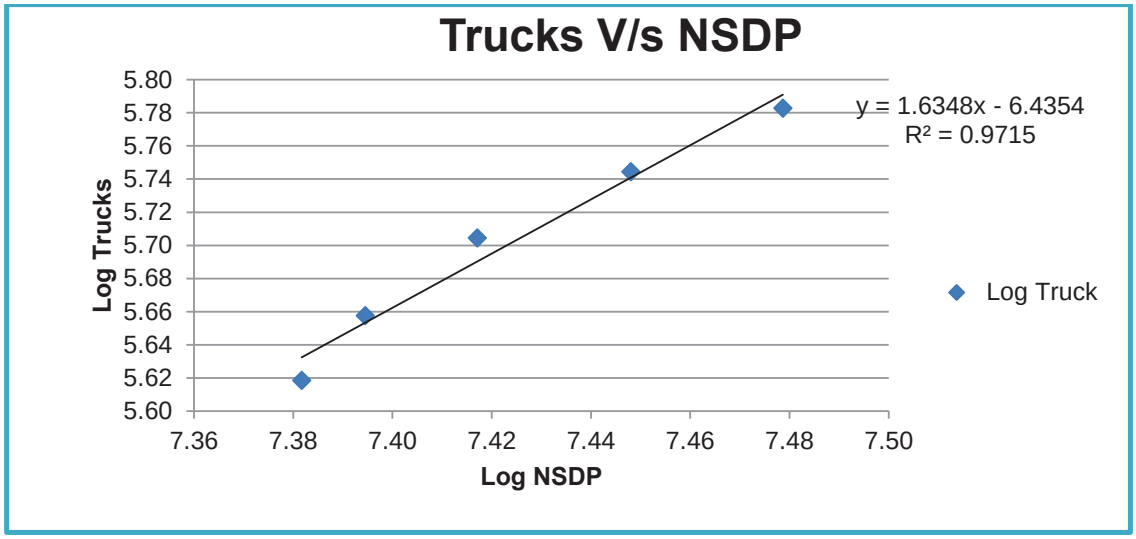

Figure 3-3: Regression and Elasticity NSDP vs. Goods Traffic – extrapolation

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. 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	R² = 0.9527	2.1945	4.72%	10.35%
	Bus	Population	y = 5.63x - -39.0727	R² = 0.995	5.6300	1.53%	8.62%
	Truck	NSDP	y = 1.6348x - -6.4354	R² = 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 economy 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 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 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 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.

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 2020

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								
At Sira	**2007-08**	**2009-10**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**April 22-Sept 22**
CAR	2571	3061	6203	6577	6855	7664	10224	8597	10616
LCV	493	1462	2581	2999	3401	3237	3103	1803	1983
Truck/Bus	9211	4386	3727	3743	3888	3896	3133	3005	3994
HCM /EME/ MAV	524	5498	6140	6464	6656	5833	5617	5305	5962
Oversized Vehicles	0	0	130	43	35	45	18	15	22

Total	**12799**	**14407**	**18782**	**19826**	**20834**	**20675**	**22094**	**18725**	**22576**

Table 3-6 : Historical Traffic Volume at Chitradurga

Location	**Year**								
At 1 tap Chitradurga	**2007-08**	**2009-10**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**April 22-Sept 22**
CAR	1664	2356	4803	5261	5244	5560	7633	11046	13200
LCV	385	1475	2237	2514	2918	2752	2652	2006	2164
Truck/Bus	7907	9628	2976	3066	3157	3167	2631	3423	4510
HCM /EME/ MAV	524	564	5365	5563	5748	5033	4968	5831	6517
Oversized Vehicles	0	0	80	46	31	37	14	15	21
Total	**10480**	**14023**	**15460**	**16451**	**17099**	**16548**	**17898**	**22322**	**26412**

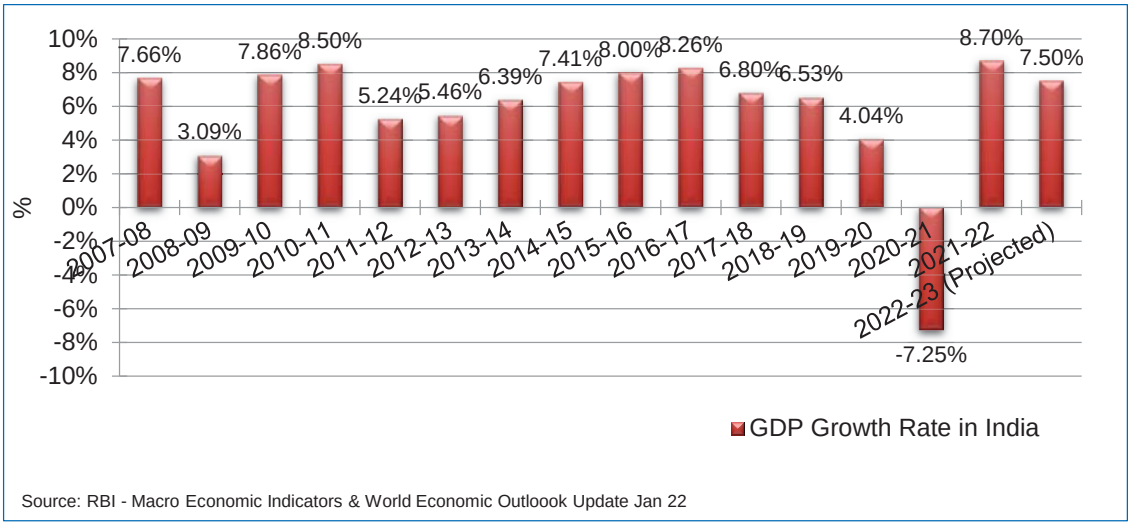

Figure 3-4 : Growth of GDP in India

FY 2017-18 recorded a growth of 6.7% which had slight impact of GST and demonetization. Indian economy appears on recovery path with estimated growth of 6.8% in FY 2018-19. Government took major policy decision 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 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. World Economic Outlook update also has predicted a growth rate of about 7.5 % in next year 2022-23.

3.6 Recommended Growth Rates of Traffic

Rate of growth is moderated in light of overall regional trend. 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, rate of growth diminishes. Same growth rate is not sustainable for long. It is established practice to stepdown 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.

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 under.

Table 3-7 : Recommended Growth Rates in an Optimistic Scenario

Year/ Vehicle Type	2021-23	2023-26	2026-31	2031-36	2036-41	2041-46
CAR	7.09%	6.06%	5.66%	5.21%	4.61%	3.94%
LCV	7.00%	6.45%	6.05%	5.59%	5.16%	4.80%
Truck / Bus	5.68%	5.68%	5.26%	4.85%	4.44%	4.04%
HCM /EME/ MAV	7.14%	6.51%	6.03%	5.55%	5.09%	4.63%
Oversized Vehicles	7.14%	7.14%	6.61%	6.08%	5.57%	5.06%

Table 3-8 : Recommended Growth Rates in a Pessimistic Scenario

Year/ Vehicle Type	2021-23	2023-26	2026-31	2031-36	2036-41	2041-46
CAR	6.59%	5.56%	5.16%	4.71%	4.11%	3.44%
LCV	6.50%	5.95%	5.55%	5.09%	4.66%	4.30%
Truck / Bus	5.18%	5.18%	4.76%	4.35%	3.94%	3.54%
HCM /EME/ MAV	6.64%	6.01%	5.53%	5.05%	4.59%	4.13%
Oversized Vehicles	6.64%	6.64%	6.11%	5.58%	5.07%	4.56%

Table 3-9 : Recommended Growth Rates in a Most Likely Scenario

Year/ Vehicle Type	2021-23	2023-26	2026-31	2031-36	2036-41	2041-46
CAR	6.8%	5.8%	5.4%	5.0%	4.4%	3.7%
LCV	6.7%	6.2%	5.8%	5.3%	4.9%	4.5%
Truck / Bus	5.4%	5.4%	5.0%	4.6%	4.2%	3.8%
HCM /EME/ MAV	6.9%	6.3%	5.8%	5.3%	4.8%	4.4%
Oversized Vehicles	6.9%	6.9%	6.4%	5.8%	5.3%	4.8%

3.7 COVID-19 Impact

Current Corona virus crisis affected the traffic since March 2020 onwards. Traffic in year 2020-21 was negatively affected by lockdown. Impact of Covid-19 is analyzed in next section of this chapter. All social and economic activities had been completely disrupted due worldwide pandemic of Corona Virus. This had affected traffic on project stretch as well. Traffic was severely affected form March 2020 due to lockdown. Government considered partial lifting of lockdown and allowing selective economic activities on zone to zone basis in May 2020. Government has decided to open economic activities in phases and by now almost all the activities are open with some restrictions.

Concessionaire shared traffic data for year 2020-21 and 2021-22. At all toll plaza commercial traffic has almost reached back to previous level. Passenger traffic, which picked up quite late, has also recovered handsomely in later months and has reached back to original level. But traffic was further affected due to second wave of COVID-19 in April 21 to July 21 and third wave in December 2021 to March 2022.

Government has announced a mega economic stimulate and package of Rs. 20 Lakh Crore to bring the economy back on track and recover the losses. Impact of these are seen in project traffic growth as well and it is observed that traffic has almost normalized on project stretch post COVID-19.

Taking recommended traffic growth as discussed above into consideration traffic forecast for concession period is done and presented in next chapter.

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
2022-23	13200	2164	4510	6517	21	**26412**	**59396**
2023-24	14000	2303	4765	6941	22	**28031**	**63083**
2024-25	14849	2452	5035	7393	23	**29752**	**67004**
2025-26	15689	2600	5299	7838	24	**31450**	**70865**
2026-27	16577	2757	5577	8311	25	**33247**	**74956**
2027-28	17515	2924	5870	8811	26	**35146**	**79278**
2028-29	18506	3100	6178	9342	27	**37153**	**83851**
2029-30	19553	3287	6502	9905	29	**39276**	**88693**
2030-31	20570	3470	6817	10455	30	**41342**	**93409**
2031-32	21641	3664	7147	11036	32	**43520**	**98384**
2032-33	22768	3869	7494	11649	34	**45814**	**103627**
2033-34	23953	4085	7857	12296	36	**48227**	**109146**
2034-35	25201	4313	8238	12978	38	**50768**	**114957**
2035-36	26362	4536	8604	13638	40	**53180**	**120529**
2036-37	27577	4770	8986	14332	42	**55707**	**126373**
2037-38	28849	5016	9385	15060	44	**58354**	**132496**
2038-39	30179	5274	9801	15826	46	**61126**	**138917**
2039-40	31571	5546	10236	16631	48	**64032**	**145654**
2040-41	32814	5812	10650	17401	50	**66727**	**152012**
2041-42	34107	6091	11081	18206	52	**69537**	**158648**
2042-43	35449	6383	11529	19048	54	**72463**	**165570**

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
2022-23	10616	1983	3994	5962	22	**22576**	**52499**
2023-24	11259	2110	4222	6350	23	**23964**	**55769**
2024-25	11941	2246	4462	6763	24	**25436**	**59238**
2025-26	12617	2382	4697	7171	25	**26892**	**62663**
2026-27	13331	2526	4943	7603	26	**28429**	**66280**
2027-28	14087	2678	5203	8061	27	**30056**	**70109**
2028-29	14884	2839	5476	8547	29	**31775**	**74163**
2029-30	15726	3010	5764	9062	31	**33593**	**78452**
2030-31	16544	3178	6043	9565	33	**35363**	**82631**
2031-32	17405	3356	6335	10096	35	**37227**	**87034**
2032-33	18312	3544	6642	10656	37	**39191**	**91673**
2033-34	19265	3742	6963	11248	39	**41257**	**96559**
2034-35	20267	3951	7300	11873	41	**43432**	**101707**
2035-36	21202	4155	7624	12477	43	**45501**	**106647**
2036-37	22180	4369	7963	13112	45	**47669**	**111829**
2037-38	23203	4594	8316	13778	47	**49938**	**117255**
2038-39	24274	4831	8685	14479	49	**52318**	**122952**
2039-40	25394	5080	9070	15215	51	**54810**	**128921**
2040-41	26393	5323	9436	15918	53	**57123**	**134555**
2041-42	27431	5579	9818	16654	55	**59537**	**140444**
2042-43	28512	5846	10214	17424	57	**62053**	**146588**

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
2022-23	13200	2164	4510	6517	21	**26412**	**59396**
2023-24	13934	2292	4743	6908	22	**27899**	**62786**
2024-25	14709	2429	4988	7323	23	**29472**	**66374**
2025-26	15468	2564	5225	7728	24	**31009**	**69873**
2026-27	16266	2706	5473	8155	25	**32625**	**73554**
2027-28	17105	2856	5732	8606	26	**34325**	**77429**
2028-29	17987	3014	6004	9081	27	**36113**	**81506**
2029-30	18915	3181	6289	9583	28	**37996**	**85803**
2030-31	19805	3343	6561	10067	29	**39805**	**89935**
2031-32	20737	3514	6846	10576	30	**41703**	**94273**
2032-33	21712	3693	7143	11110	31	**43689**	**98815**
2033-34	22734	3881	7453	11671	32	**45771**	**103578**
2034-35	23804	4079	7776	12260	34	**47953**	**108574**
2035-36	24782	4269	8082	12823	35	**49991**	**113293**
2036-37	25801	4468	8400	13411	37	**52117**	**118219**
2037-38	26862	4676	8730	14025	39	**54332**	**123354**
2038-39	27966	4893	9074	14668	41	**56642**	**128718**
2039-40	29115	5121	9431	15341	43	**59051**	**134318**
2040-41	30116	5341	9765	15974	45	**61241**	**139508**
2041-42	31151	5570	10110	16633	47	**63511**	**144896**
2042-43	32221	5809	10467	17319	49	**65865**	**150492**

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
2022-23	10616	1983	3994	5962	22	**22576**	**52499**
2023-24	11207	2100	4201	6321	23	**23852**	**55508**
2024-25	11831	2225	4418	6700	24	**25198**	**58681**
2025-26	12442	2348	4628	7071	25	**26514**	**61780**
2026-27	13084	2478	4848	7461	26	**27897**	**65037**
2027-28	13759	2615	5078	7873	27	**29352**	**68466**
2028-29	14468	2760	5319	8308	28	**30883**	**72077**
2029-30	15215	2912	5572	8767	29	**32495**	**75881**
2030-31	15930	3061	5813	9210	30	**34044**	**79541**
2031-32	16680	3217	6065	9676	31	**35669**	**83382**
2032-33	17465	3381	6328	10165	32	**37371**	**87407**
2033-34	18287	3552	6603	10679	34	**39155**	**91633**
2034-35	19147	3732	6890	11219	36	**41024**	**96063**
2035-36	19934	3906	7161	11734	38	**42773**	**100250**
2036-37	20754	4087	7443	12272	40	**44596**	**104618**
2037-38	21607	4277	7737	12835	42	**46498**	**109180**
2038-39	22495	4476	8042	13424	44	**48481**	**113941**
2039-40	23420	4684	8358	14039	46	**50547**	**118903**
2040-41	24225	4885	8654	14618	48	**52430**	**123512**
2041-42	25058	5095	8961	15221	50	**54385**	**128303**
2042-43	25919	5314	9279	15849	52	**56413**	**133282**

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
2022-23	13200	2164	4510	6517	21	**26412**	**59396**
2023-24	13967	2298	4754	6924	22	**27965**	**62933**
2024-25	14778	2440	5011	7358	23	**29610**	**66686**
2025-26	15577	2581	5262	7783	24	**31227**	**70366**
2026-27	16420	2730	5525	8233	25	**32933**	**74251**
2027-28	17308	2888	5801	8708	26	**34731**	**78346**
2028-29	18244	3055	6090	9211	27	**36627**	**82668**
2029-30	19231	3232	6394	9743	28	**38628**	**87231**
2030-31	20184	3404	6687	10260	29	**40564**	**91652**
2031-32	21184	3586	6993	10804	30	**42597**	**96295**
2032-33	22234	3777	7314	11377	31	**44733**	**101178**
2033-34	23335	3979	7650	11980	33	**46977**	**106312**
2034-35	24491	4192	8002	12615	35	**49335**	**111710**
2035-36	25559	4398	8336	13225	37	**51555**	**116843**
2036-37	26674	4614	8686	13865	39	**53878**	**122221**
2037-38	27837	4841	9050	14536	41	**56305**	**127845**
2038-39	29051	5079	9429	15239	43	**58841**	**133726**
2039-40	30317	5328	9824	15975	45	**61489**	**139871**
2040-41	31435	5570	10197	16674	47	**63923**	**145626**
2041-42	32593	5823	10583	17404	49	**66452**	**151615**
2042-43	33794	6088	10984	18166	51	**69083**	**157855**

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
2022-23	10616	1983	3994	5962	22	**22576**	**52499**
2023-24	11234	2105	4212	6335	23	**23909**	**55639**
2024-25	11887	2235	4440	6732	24	**25318**	**58962**
2025-26	12530	2365	4662	7121	25	**26703**	**62221**
2026-27	13207	2502	4895	7532	26	**28162**	**65656**
2027-28	13921	2647	5140	7967	27	**29702**	**69285**
2028-29	14675	2801	5397	8427	28	**31328**	**73115**
2029-30	15469	2963	5667	8913	30	**33042**	**77158**
2030-31	16237	3121	5927	9385	31	**34701**	**81072**
2031-32	17042	3287	6199	9882	33	**36443**	**85187**
2032-33	17887	3462	6483	10406	35	**38273**	**89514**
2033-34	18773	3647	6780	10958	37	**40195**	**94061**
2034-35	19704	3841	7091	11539	39	**42214**	**98840**
2035-36	20563	4029	7388	12097	41	**44118**	**103392**
2036-37	21459	4227	7698	12681	43	**46108**	**108152**
2037-38	22396	4434	8021	13294	45	**48190**	**113136**
2038-39	23373	4651	8357	13937	47	**50365**	**118349**
2039-40	24392	4879	8707	14611	49	**52638**	**123802**
2040-41	25290	5101	9037	15250	51	**54729**	**128907**
2041-42	26223	5333	9379	15917	53	**56905**	**134225**
2042-43	27190	5575	9735	16614	55	**59169**	**139768**

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

Traffic was severely impacted on project highway during 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 would be provided to 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 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:-

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

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 year 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.

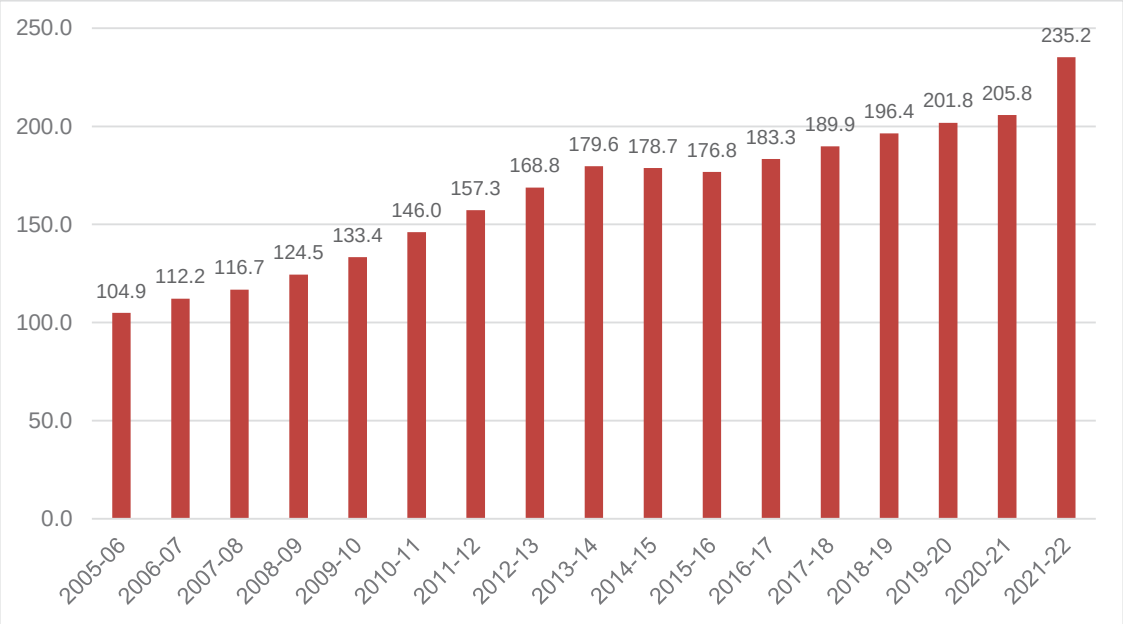

Figure 5-1 : Historical Rate of WPI Inflation in India

Except the negative growth of WPI in year 2015-16 average inflation in WPI from year 2005-2021 is 5.00%. For future years initially it is 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 Mini Bus	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)	TollableHighway+ 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
2022-23	80	125	265	410	500
2023-24	80	130	275	435	525
2024-25	85	140	290	455	555
2025-26	90	145	305	480	580
2026-27	95	155	320	500	610
2027-28	100	160	335	530	645
2028-29	105	170	355	555	675
2029-30	110	175	370	580	705
2030-31	115	185	390	610	740
2031-32	120	195	405	640	775
2032-33	125	205	425	670	815
2033-34	130	215	445	700	855
2034-35	140	225	470	735	895
2035-36	145	235	490	770	940
2036-37	155	245	515	810	985
2037-38	160	260	540	850	1035
2038-39	170	270	570	890	1085
2039-40	175	285	595	935	1140
2040-41	185	300	625	980	1195
2041-42	195	315	655	1030	1255
2042-43	205	330	690	1080	1320

Table 5-6 : Toll Rates for Return Journey @ 172.770 & @104.530

Year	CAR	LCV	Truck / Bus	HCM /EME/ MAV	Oversized Vehicles
2022-23	115	190	395	620	750
2023-24	120	195	415	650	790
2024-25	130	210	435	680	830
2025-26	135	220	455	715	870
2026-27	140	230	480	755	915
2027-28	150	240	505	790	965
2028-29	155	255	530	830	1010
2029-30	165	265	555	870	1060
2030-31	170	280	580	910	1110
2031-32	180	290	610	955	1165
2032-33	190	305	640	1005	1220
2033-34	200	320	670	1050	1280
2034-35	210	335	705	1105	1345
2035-36	220	350	740	1155	1410
2036-37	230	370	775	1215	1480
2037-38	240	390	810	1275	1550
2038-39	250	405	855	1335	1630
2039-40	265	425	895	1405	1710
2040-41	280	450	940	1475	1795
2041-42	290	470	985	1545	1885
2042-43	305	495	1035	1625	1975

Table 5-7 : Toll Rates for Local Single Journey@ 172.770 & @104.530

Year	CAR	LCV	Truck / Bus	HCM /EME/ MAV
2022-23	65	75	135	270
2023-24	70	80	140	285
2024-25	75	85	145	300
2025-26	80	90	150	315
2026-27	85	95	160	330
2027-28	90	100	170	345
2028-29	95	105	180	360
2029-30	100	110	190	375
2030-31	105	115	200	390
2031-32	110	120	210	410
2032-33	115	125	220	430
2033-34	120	130	230	450
2034-35	125	135	240	470
2035-36	130	140	250	490
2036-37	135	145	260	510
2037-38	140	150	270	535
2038-39	145	155	280	560
2039-40	150	160	295	585
2040-41	155	165	310	610
2041-42	160	170	325	635
2042-43	165	180	340	665

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)
2022-23	2585	315	635	1015	4180	3785	2890	8755	4825	7920	13725	16710	10455	14005
2023-24	2715	330	665	1065	4390	3975	3035	9195	5065	8320	14420	17555	10985	14715
2024-25	2855	345	700	1115	4610	4175	3185	9660	5320	8735	15150	18445	11545	15460
2025-26	3000	365	735	1175	4845	4385	3345	10155	5585	9170	15920	19385	12135	16245
2026-27	3155	385	770	1230	5095	4600	3510	10670	5865	9630	16735	20375	12755	17075
2027-28	3315	405	810	1295	5355	4830	3690	11220	6155	10110	17595	21415	13410	17950
2028-29	3475	420	845	1350	5610	5050	3855	11760	6435	10565	18440	22450	14060	18815
2029-30	3640	440	885	1415	5885	5275	4025	12325	6720	11040	19330	23535	14745	19725
2030-31	3820	465	925	1475	6170	5515	4210	12925	7025	11540	20265	24675	15460	20680
2031-32	4005	485	965	1545	6470	5765	4395	13550	7340	12060	21250	25870	16210	21680
2032-33	4200	510	1010	1610	6780	6020	4595	14210	7670	12600	22285	27130	17000	22735
2033-34	4405	535	1055	1685	7115	6295	4800	14905	8015	13165	23370	28450	17835	23845
2034-35	4620	560	1105	1760	7460	6575	5020	15630	8375	13760	24515	29845	18710	25010
2035-36	4845	590	1150	1840	7825	6870	5245	16400	8755	14380	25715	31305	19630	26240

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)
2036-37	5085	615	1205	1920	8210	7180	5480	17205	9150	15025	26980	32845	20595	27530
2037-38	5335	650	1260	2010	8615	7505	5725	18055	9560	15700	28310	34465	21615	28885
2038-39	5600	680	1315	2100	9040	7840	5985	18945	9990	16410	29710	36170	22685	30315
2039-40	5875	715	1375	2195	9490	8195	6255	19885	10440	17145	31185	37960	23810	31815
2040-41	6165	750	1435	2295	9960	8565	6535	20875	10910	17920	32735	39850	25000	33395
2041-42	6475	785	1500	2395	10460	8950	6830	21915	11400	18725	34365	41835	26245	35060
2042-43	6800	825	1570	2505	10980	9350	7135	23010	11915	19570	36080	43925	27560	36815

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) starting from the year 2020-21are shown in tables below.

Table 5-9 : Toll Revenue Optimistic Scenario

(Rs. Crores)

Year	Toll at Plaza 177.2	Toll at Plaza 104.53	Total
2022-23	177.21	159.32	**336.53**
2023-24	197.35	177.59	**374.94**
2024-25	220.21	198.10	**418.31**
2025-26	245.14	220.60	**465.75**
2026-27	271.64	244.34	**515.98**
2027-28	304.02	273.53	**577.56**
2028-29	336.67	303.01	**639.69**
2029-30	372.47	335.11	**707.58**
2030-31	411.75	370.65	**782.40**
2031-32	455.75	410.19	**865.94**
2032-33	501.63	451.43	**953.06**
2033-34	552.32	497.07	**1049.39**
2034-35	613.58	552.05	**1165.64**
2035-36	674.37	606.88	**1281.25**
2036-37	742.71	668.31	**1411.02**
2037-38	815.32	733.96	**1549.28**
2038-39	897.86	808.20	**1706.06**

Year	Toll at Plaza 177.2	Toll at Plaza 104.53	Total
2039-40	988.88	890.23	**1879.11**
2040-41	1081.62	973.56	**2055.18**
2041-42	1185.24	1067.02	**2252.26**
2042-43	1299.18	1169.59	**2468.77**

Table 5-10 : Toll Revenue Pessimistic Scenario

(Rs. Crores)

Year	Toll at Plaza 177.2	Toll at Plaza 104.53	Total
2022-23	177.21	159.32	**336.53**
2023-24	196.40	176.78	**373.18**
2024-25	218.10	196.28	**414.38**
2025-26	241.64	217.52	**459.16**
2026-27	266.49	239.79	**506.27**
2027-28	296.85	267.14	**564.00**
2028-29	327.16	294.50	**621.66**
2029-30	360.23	324.14	**684.37**
2030-31	396.34	356.79	**753.12**
2031-32	436.58	392.94	**829.53**
2032-33	478.19	430.39	**908.58**
2033-34	524.01	471.67	**995.68**
2034-35	579.38	521.37	**1100.75**
2035-36	633.76	570.40	**1204.16**
2036-37	694.66	625.16	**1319.82**
2037-38	758.92	683.33	**1442.25**
2038-39	831.78	748.88	**1580.65**

Year	Toll at Plaza 177.2	Toll at Plaza 104.53	Total
2039-40	911.70	820.96	**1732.65**
2040-41	992.39	893.54	**1885.94**
2041-42	1082.27	974.70	**2056.97**
2042-43	1180.62	1063.34	**2243.96**

Table 5-11 : Toll Revenue Most Likely Scenario (Rs. Crores)

Year	Toll at Plaza 177.2	Toll at Plaza 104.53	Total
2022-23	177.21	159.32	**336.53**
2023-24	196.87	177.17	**374.04**
2024-25	219.13	197.17	**416.30**
2025-26	243.36	219.04	**462.40**
2026-27	269.00	242.05	**511.06**
2027-28	300.36	270.32	**570.68**
2028-29	331.81	298.72	**630.53**
2029-30	366.20	329.60	**695.80**
2030-31	403.83	363.69	**767.52**
2031-32	445.91	401.54	**847.45**
2032-33	489.59	440.89	**930.48**
2033-34	537.77	484.34	**1022.12**
2034-35	596.04	536.62	**1132.66**
2035-36	653.55	588.49	**1242.03**
2036-37	718.11	646.50	**1364.61**
2037-38	786.46	708.28	**1494.74**
2038-39	864.03	778.09	**1642.12**

Year	Toll at Plaza 177.2	Toll at Plaza 104.53	Total
2039-40	949.28	855.06	**1804.34**
2040-41	1035.80	932.87	**1968.67**
2041-42	1132.30	1020.03	**2152.33**
2042-43	1238.21	1115.47	**2353.69**

CHAPTER 6

OPERATION & MAINTENANCE

6.1 Operation & Maintenance

Following are project parameters which would contribute towards cost of operation and maintenance.

Future cost of operation and maintenance is estimate 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 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 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 few sections. This operation and its cost are spread over three years. But since project is commissioned and running traffic for last many years, periodic maintenance shall be as per condition of pavement and other infrastructure. Inputs of concessionaire 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		
2022-23	8.56				0.01	0.04	0.00	10.45	Regular O & M
2023-24	8.56				0.01	0.04		10.97	Regular O & M
2024-25	8.56	0.98	13.74	19.91	0.01	0.04		57.94	Renewal of Wearing course + Pavement repair
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

Year	Annual Maintenance	Thermoplastic Painting	Renewal Coat with	Special Repair of	Structure maintenance	Electric System		Total Expenditure	Remarks
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 positive impact to traffic flow on project. Following can considered as major outcome of study

a) There is good amount of tollable traffic running on project

b) Project corridor has potential to witness traffic growth @ 6-8% 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 above it can be considered a stable healthy project from 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

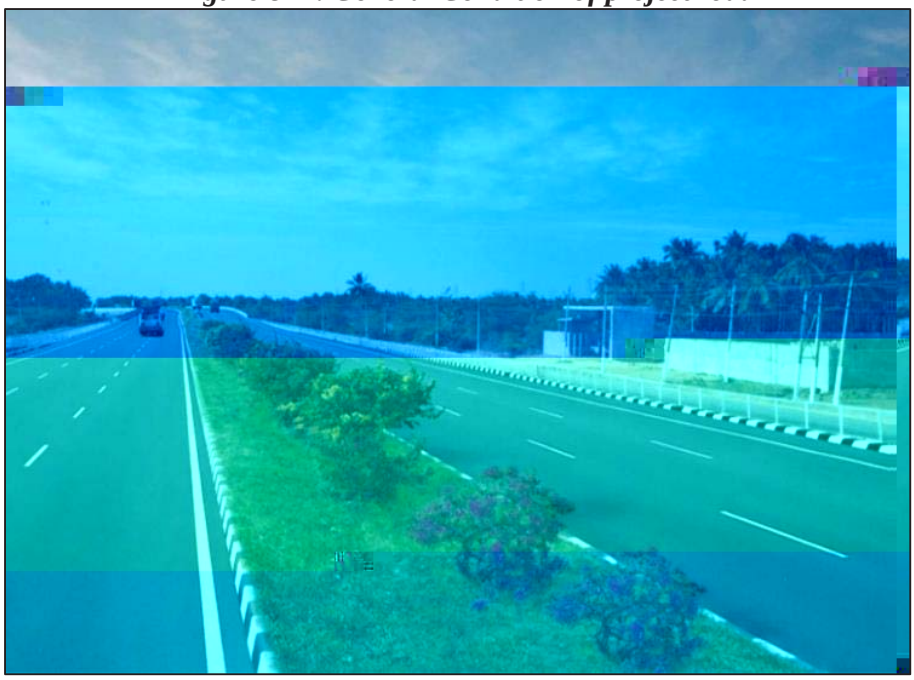

Figure 8-2 : General Condition of project road

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CBD Belapur, Navi Mumbai. 400 614. Maharashtra.
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OMALAUR TO NAMAKKAL (KM 180.00 TO KM 248.625)

SECTION OF NH-7 IN THE STATE OF TAMIL NADU.

OCTOBER 2022

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

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GMD CONSULTANTS
NAVI MUMBAI

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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 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 of year 2016-17 and report was submitted in October 2017. 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 period from April 2018 to September 2018 and was submitted in October 2018. 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 and now concessionaire has provided traffic data from April 2022 to September 2022, report is updated with this six monthly traffic data.

There are no further updates to the O & M cost projections included in our previous report.

CHAPTER 2

TRAFFIC SURVEYS AND ANALYSIS

2.1 Traffic Surveys

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

The following traffic data has been collected for project.

- Classified traffic volume counts at toll plaza location on Omalur - Namakkal section of NH-7for base year 2015-16, 2016-17, 2017-18 2018-19, 2019-20, 2020-21,2021-22 and Six-Monthly traffic data from April 2022 to September 2022.
- 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 following homogenous sections from traffic point of view.

These sections can be

- Omalur to Salem
- Salem to Rasipuram
- Rasipuram to Namakkal

Table 2-1below 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
		Six Monthly Data from April 22 to September 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22	For April 22 to Sept 22

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

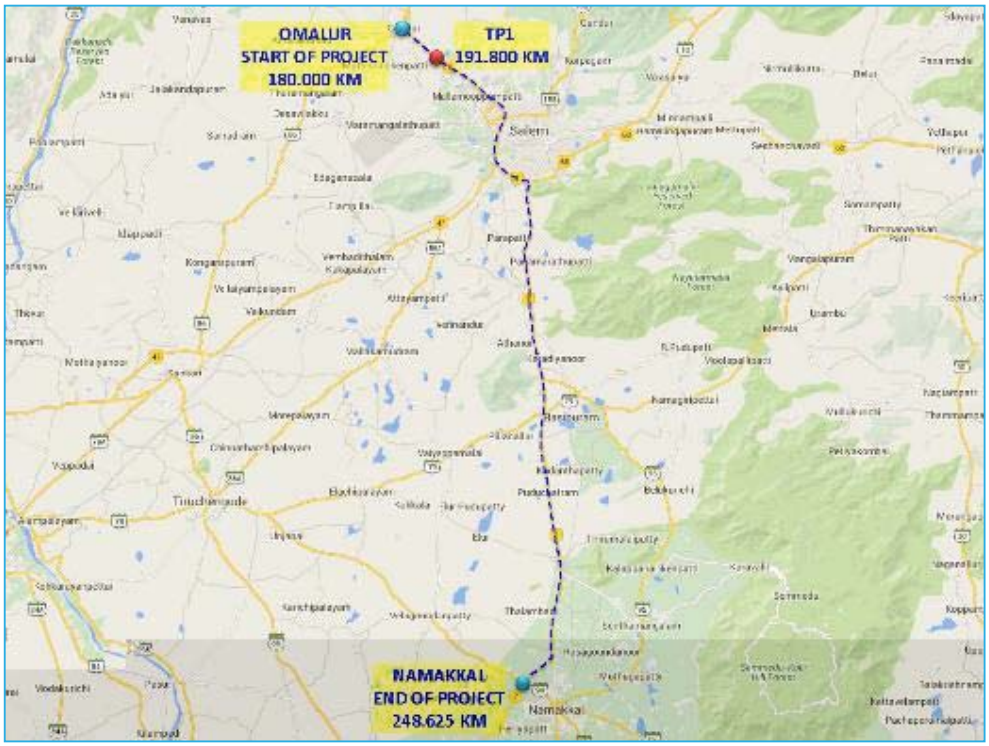

Figure 2-1: Toll Plaza Locations

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	Mini Bus
	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 project highway is currently under toll operation, the data collected is corresponding to category of tollable vehicles. Following are the type 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 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 and from April 2022 to September 2022 as under for toll plaza –

Table 2-3 : Traffic Data at Toll Plaza at Km 191.800

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) – FY 2015-16	Annual Average Daily Traffic (Nos.) – FY 2016-17	Annual Average Daily Traffic (Nos.) – FY 2017-18	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	Average Daily Traffic April-22 to Sept 22
1	CAR	10179	10765	12033	12645	13352	12618	14831	17083
2	LCV	3694	3966	4307	4672	4632	4290	2748	3325
3	Truck/Bus	3091	3148	3085	3199	3446	2666	3075	3721
4	Multi Axle	2482	2710	2552	2952	2873	3017	3350	4055
	Total	**19447**	**20589**	**21977**	**23468**	**24304**	**22591**	**24004**	**28184**

The above data was arrived at by applying standard trip frequencies to monthly passes and return journey tickets issued.

Pandemic of COVID-19 (Corona Virus) has impacted entire world. Taking precaution, government of India announced a complete lockdown in last of March 2020 and traffic on highways was stopped which was eased out progressively later. Traffic on project corridor was recovering at good rate but still traffic numbers had effect of Pandemic. There after India was hit by Covid-19 second and third wave in February 21 to July -21 and December 21 to March-22. Recovering traffic pattern was somewhat again disturbed due to second and third wave of Covid-19. Traffic numbers for the period from April-2021 to March 2022 are not representative of traffic pattern at project corridor due to

pandemic lockdown impact. However, for integrity of data has been shown above. NHAI also has, in principal, approved providing extension of concession period to make up for the loss of revenue due to lockdown. Traffic has been affected due to second wave of COVID-19 in period from April-21 to July 2021 and from December 21 to March-22 due to third wave of Covid-19. Current report is updated with six monthly traffic data made available by Concessionaire from April 2022 to September 2022.

The above data was arrived at by applying standard trip frequencies to monthly passes and return journey tickets issued.

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 3-4

Table 2-4 : PCU Factors Adopted for Study

Vehicle Type	PCUs
Car	1.0
Mini Bus	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	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 (Upto Sept-2022)	191.800	28184	51481	1.83

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 2021 to March 2022 have been considered as the base numbers.

It is observed that car traffic forms 61% of total traffic at toll plaza location Km 191.800 LCV and bus / truck share 12% and 13% respectively. Multi axle consists of 14% of total traffic. Over all about 39% of traffic is commercial in nature. 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)

Following table provides numbers of vehicle falling in each of above category on base year 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21,2021-22 and from April 2022 to Sept 2022.

Table 2-6 : Journey Type Bifurcation of Traffic at KM 191.800

Sr. No	Type	Traffic Volume (Nos.) for FY 2015-16	Traffic Volume (Nos.) for FY 2016-17	Traffic Volume (Nos.) for FY 2017-18	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 April-22to September 22
1	Single Journey	13103	13942	15354	16311	16931	16626	16244	19175
2	Return Journey	4146	4264	4462	5210	5280	4492	7196	8326
3	Monthly Pass	2198	2383	2161	1947	2093	1473	564	683

The single journey component in total traffic numbers is as high as 68% while the return journey component is 30%. Monthly pass share is as low as 2%. As the project corridor serves as primary link for traffic between Madurai and Bangalore the component of single journey ticket is much higher. Moreover, toll structure of 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. 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

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 pattern 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 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 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, 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 the state of Tamil Nadu is used as the base data for analysis of growth

3.3 Estimation of Traffic Demand Elasticity

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 category 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:

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

Where,

P =*Number of Vehicles (Mode wise)*

EI =*Economic Indicator*

A =*Regression constant*

k = *Elasticity coefficient (Regression coefficient)*

The elasticity for car and bus (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).

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

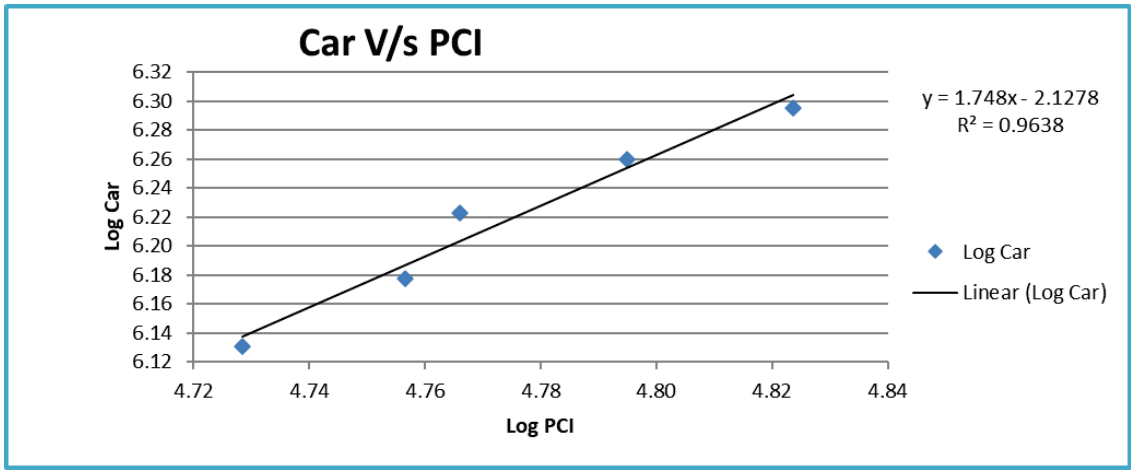

Figure 3-1: Regression and Elasticity PCI vs. Car–Extrapolation

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

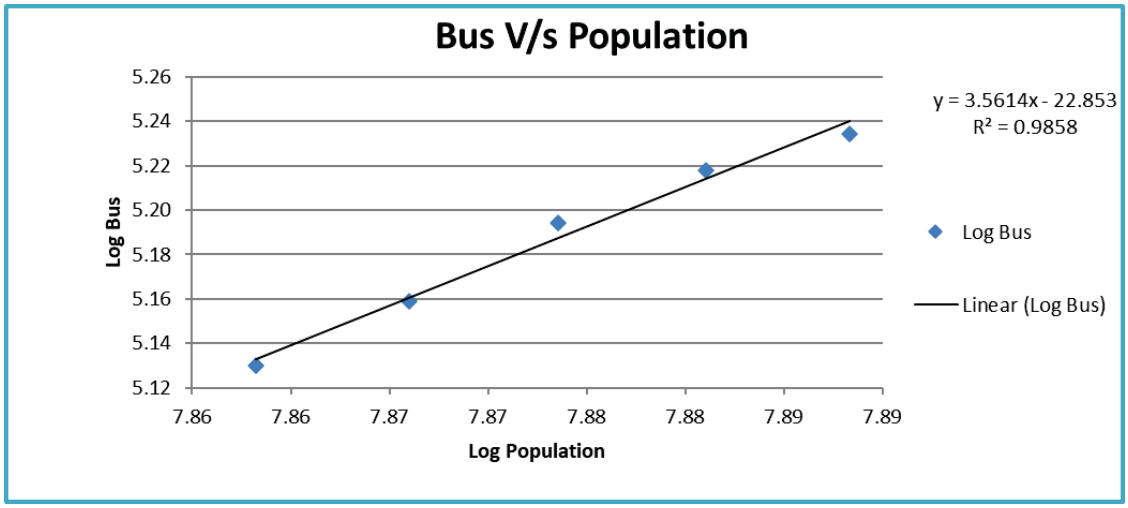

Figure 3-2: Regression and Elasticity Population vs. Bus – Extrapolation

Elasticity of goods traffic has been worked out by regression analysis with NSDP. 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 (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%

Following figure depict regression analysis and extrapolation.

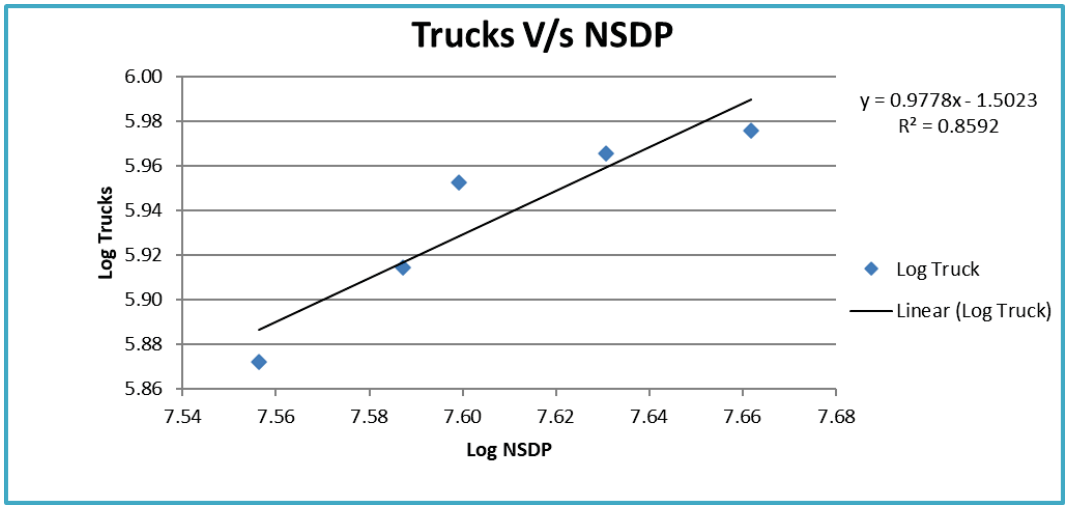

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Table 3-5 : Historical Traffic at Project Stretch

Sr. No	Type of Vehicle	Annual Average Daily Traffic (Nos.) FY 2015-16	Annual Average Daily Traffic (Nos.) FY 2016-17	Annual Average Daily Traffic (Nos.) FY 2017-18	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	Average Daily Traffic April-22 to Sept 22
1	CAR	10179	10765	12033	12645	13352	12618	14831	17083
2	LCV	3694	3966	4307	4672	4632	4290	2748	3325
3	Truck/Bus	3091	3148	3085	3199	3446	2666	3075	3721
4	Multi Axle	2482	2710	2552	2952	2873	3017	3350	4055
	Total	**19446**	**20589**	**21977**	**23468**	**24304**	**22591**	**24004**	**28184**

Traffic for period from April 2020 to March 2021 is impacted due to COVID-19 lockdown. Though traffic on project corridor has shown impressive recovery growth in period from October 2020 to March 2021 but these numbers are affected by COVID-19 pandemic and cannot be taken as normal stabilized traffic numbers. There after project traffic was affected due to second and third wave of Covid-19 in period of February 2021 to July 2021 and from December 2021 to March 2022. Hence same is not considered for historical growth. It was expected that project stretch may register a good recovery growth in next year's in post COVID -19 scenario.

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.

for long. It is established practice to stepped 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 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	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	7.46%	4.58%	4.24%	3.87%	3.36%	2.81%
Mini Bus /LCV	5.93%	3.09%	2.88%	2.72%	2.65%	2.53%
Truck / Bus	7.48%	3.86%	3.52%	3.19%	2.86%	2.53%
Multi Axle	7.48%	3.86%	3.52%	3.19%	2.86%	2.53%

Table 3-7 : Recommended Growth Rates Pessimistic

Year/ Vehicle Type	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	6.96%	4.08%	3.74%	3.37%	2.86%	2.31%
Mini Bus /LCV	5.43%	2.59%	2.38%	2.22%	2.15%	2.03%
Truck / Bus	6.98%	3.36%	3.02%	2.69%	2.36%	2.03%
Multi Axle	6.98%	3.36%	3.02%	2.69%	2.36%	2.03%

Table 3-8 : Recommended Growth Rates Most Likely

Year/ Vehicle Type	2021-2023	2023-2026	2026-2031	2031-2036	2036-2041	2041-2046
CAR	7.21%	4.33%	3.99%	3.62%	3.11%	2.56%
Mini Bus /LCV	5.68%	2.84%	2.63%	2.47%	2.40%	2.28%
Truck / Bus	7.23%	3.61%	3.27%	2.94%	2.61%	2.28%
Multi Axle	7.23%	3.61%	3.27%	2.94%	2.61%	2.28%

3.7 COVID-19 Impact

Current Corona virus crisis affected the traffic since March 2020 onwards. Traffic in year 2020-21 was negatively affected by lockdown. Impact of Covid-19 is analyzed in next section of this chapter. All social and economic activities had been completely disrupted due worldwide pandemic of Corona Virus. This had affected traffic on project stretch as well. Traffic was severely affected from March 2020 due to lockdown. Government considered partial lifting of lockdown and allowing selective economic activities on zone to zone basis in May 2020. Government has decided to open economic activities in phases and by now almost all the activities are open with some restrictions.

Concessionaire has shared traffic data for year 2020-21 and 2021-22. At all toll plaza commercial traffic has almost reached back to previous level. Passenger traffic, which picked up quite late, has also recovered handsomely in later months and has reached back to original level. But traffic was further affected due to second wave of COVID-19 in April-21 to July 21 and third wave in December 2021 to March -2022.

Government has announced a mega economic stimulate and package of Rs. 20 Lakh Crore to bring the economy back on track and recover the losses. It is observed that traffic has been normalized on project stretch now post COVID-19.

Taking recommended traffic growth and factors as discussed above into consideration traffic forecast for concession period is done and presented in next chapter.

CHAPTER 4

TRAFFIC FORECAST

4.1 Traffic Projections

Growth rates recommended in previous section of 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 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)
2022-23	17083	3325	3721	4055	**28184**	**51481**
2023-24	17865	3428	3865	4211	**29369**	**53552**
2024-25	18683	3534	4014	4374	**30605**	**55709**
2025-26	19476	3636	4154	4527	**31793**	**57764**
2026-27	20302	3741	4300	4686	**33029**	**59901**

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)
2022-23	17083	3325	3721	4055	**28184**	**51481**
2023-24	17779	3411	3847	4191	**29228**	**53296**
2024-25	18504	3500	3976	4331	**30311**	**55172**
2025-26	19196	3583	4096	4462	**31337**	**56938**
2026-27	19913	3668	4219	4596	**32396**	**58754**

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)
2022-23	17083	3325	3721	4055	**28184**	**51481**
2023-24	17821	3419	3856	4201	**29297**	**53422**
2024-25	18592	3515	3996	4352	**30455**	**55437**
2025-26	19333	3607	4127	4495	**31562**	**57352**
2026-27	20104	3702	4261	4641	**32708**	**59325**

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 extension of additional 24 days. Traffic was severely impacted on 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 car /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. Rate will be constant throughout 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 year 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.

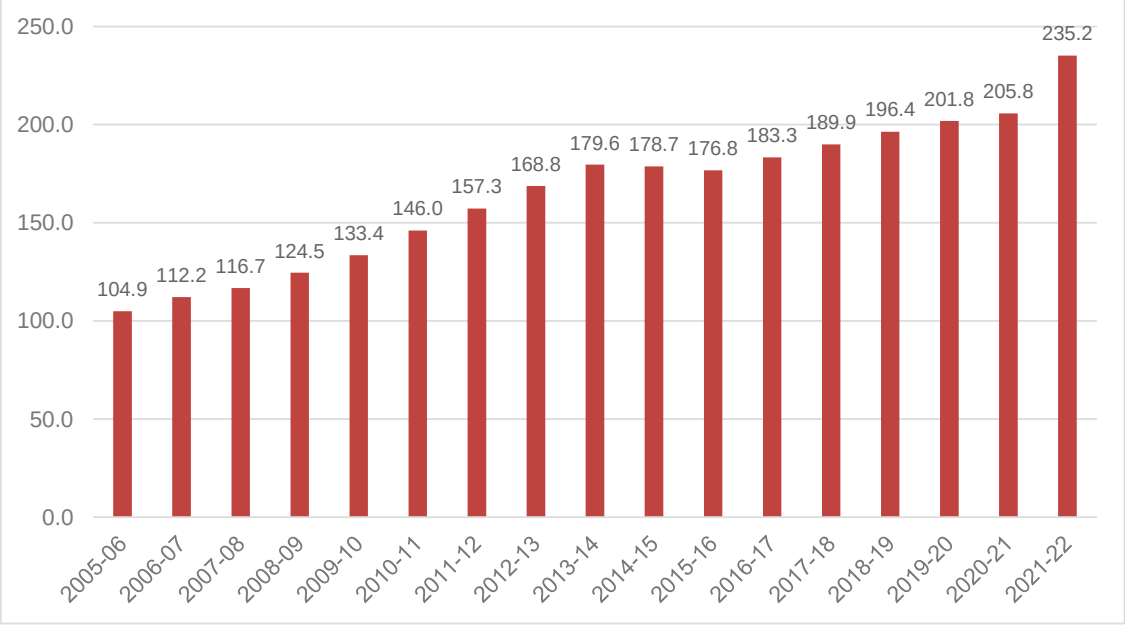

Figure 5-1 : Historical Rate of WPI Inflation in India

Except the negative growth of WPI in year 2015-16 average inflation in WPI from year 2005-2021 is 5.00%. For future years initially it is 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
2022-23	90	155	315	505	15	15	25
2023-24	95	165	330	530	15	15	25
2024-25	100	175	345	555	15	15	25
2025-26	105	180	365	585	15	15	25
2026-27	110	190	380	610	15	15	25

Table 5-3 : Toll Rates for Multiple Journeys @ 191.800

Year	Car	Mini Bus /LCV	Truck/ Bus	Multi Axle
2022-23	135	235	470	755
2023-24	140	245	495	795
2024-25	150	260	520	835
2025-26	155	270	545	875
2026-27	165	285	570	920

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
2022-23	2685	4700	9400	15105	150	300	1000
2023-24	2820	4935	9870	15860	150	300	1000
2024-25	2960	5180	10360	16650	150	300	1000
2025-26	3110	5440	10880	17485	150	300	1000
2026-27	3265	5710	11425	18360	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 2022-23 are shown in tables below.

Table 5-5 : Toll Revenue Optimistic Scenario

(Rs. Crores)

Year	Toll Plaza 191.800	Total
2022-23	147.09	**147.09**
2023-24	165.52	**165.52**
2024-25	180.24	**180.24**
2025-26	196.49	**196.49**
2026-27	212.73	**212.73**

Table 5-6 : Toll Revenue Pessimistic Scenario

(Rs. Crores)

Year	Toll Plaza 191.800	Total
2022-23	147.09	**147.09**
2023-24	164.76	**164.76**
2024-25	178.52	**178.52**
2025-26	193.70	**193.70**
2026-27	208.70	**208.70**

Table 5-7 : Toll Revenue Most Likely Scenario

(Rs. Crores)

Year	Toll Plaza 191.800	Total
2022-23	147.09	**147.09**
2023-24	165.16	**165.16**
2024-25	179.41	**179.41**
2025-26	195.15	**195.15**
2026-27	210.74	**210.74**

CHAPTER 6

OPERATION & MAINTENANCE

6.1 Operation & Maintenance

Following are project parameters which would contribute towards cost of operation and maintenance.

Future cost of operation and maintenance is estimate 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 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 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 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		
2022-23	5.13				0.14	0.23	6.69	Regular O & M
2023-24	5.13	1.51	6.08	6.23	0.14	0.23	24.66	Renewal of Wearing course + Pavement repair
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 IT capital of country and the project stretch falls in its catchment. There are many upcoming projects in area which are proposed to boost economic growth of area and add value to development of the region. All the developments considered in the Report have the potential to have a positive impact to traffic flow on project. Following can considered as major outcome of study

a) There is a healthy volume of tollable traffic running on project

b) Project corridor has the potential to witness traffic growth @ 6-8% annually in post COVID-19 scenario due to various development 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 above it can be considered a stable healthy project from 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

GMD Consultants

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Annexure G Details of borrowings

Details of Borrowings or repayment of borrowings on standalone and consolidated are as follows:

(Amt in lakhs)

Particulars	Opening Balance 01.04.2022	Loan availed during the period*	Loan repaid during the period	Closing Balance 30.09.2022
Secured loan	**14,220.55**	-	271.25	**13,949.30**

- CARE Ratings Limited has reaffirmed "CARE AAA; Stable" to long term bank facilities availed by the Trust.
- The last repayment date for the above borrowings from SBI as well as Indian Bank is December, 2033.

Annexure H Details of operating expenses at consolidated level

(Amt in lakhs)

Particulars	Six months ended September 30, 2022
Operation expenses (Refer note a)	45,028.59
Project management fees (Refer note b)	3,218.00
Valuation expenses	22.06
Annual Listing Fees	39.75
Trustee Fees	14.75
Audit fees	18.17
Insurance & security expenses	22.28
Employee benefits expenses	895.38
Investment management fees	590.00
Depreciation on property, plant and equipment	0.36
Amortisation of intangible assets	16,605.66
Finance costs (Interest)	6,868.48
Finance costs (Others)	298.82
Repairs and maintenance	-
Legal and professional fees	478.50
Other expenses (Refer note c)	50.48
Total Expenses and losses	**74,151.28**

a) IRB Pathankot Amritsar Toll Road Limited (IPATRL) has recognised revenue of Rs. 42,319.58 lakhs receivable from National Highways Authority of India against arbitration award for delay in completion of construction of the project based on the additional cost incurred by EPC contractor which shall be appropriated to the EPC contractor amounting to Rs. 41,784.26 lakhs included in the operation expenses for the half year ended September 30, 2022. The actual operation expenses for the half year ended September 30, 2022 is Rs. 3,181.27 lakhs.

b) Project management fees do not include major maintenance of Rs. 1,403.33 lakhs incurred during the half year ended September 30, 2022 for which the provision for major maintenance was made in earlier years.

c) Other expenses include printing and stationery, rent, rates and taxes and other miscellaneous expenses.

Annexure I

MATERIAL LITIGATION AND REGULATORY ACTION

Except as stated in this report and annexures, there is no material litigation or regulatory action, pending against (i) the Trust, the Sponsor, the Investment Manager, the Project Manager, the Trustee, and (ii) the Associates of the Trust, the Sponsor, the Project Manager and the Investment Manager. As per confirmation provided by the Sponsor, the Project Manager or their Associates, except as stated in this report and annexures (i) There are no material update on litigations & regulatory actions against them disclosed earlier (ii) There are no additional material litigations or regulatory actions which may have bearing on their activities or revenues or cash flows.

Material Litigation against the Investment Manager and the Project SPVs

IRB Infrastructure Private Limited

Pending Civil Litigation against IRB Infrastructure Private Limited

Anishaben ("Appellant") preferred an appeal before the Additional District Judge of Nadiad against Special Land Acquisition Officer, the IRB Infrastructure Pvt. Ltd., NHAI and Collector, Kheda ("Respondents") seeking that the order ("Order") passed by the Additional Senior Civil Judge, Nadiad be dismissed on account of erroneous assessment of documental proofs and other proofs. Pursuant to the Order, the Appellant's tentative stay order under Order 39 Rule 1 of the CPC was rejected by the Additional Senior Civil Judge, Nadiad on the grounds that the public interest would be hampered if the stay was imposed. The Appellant had originally filed a civil case bearing No. 168 of 2015 before the Principal Senior Civil Judge, Nadiad against the Respondents seeking that the Respondents be prohibited from constructing, farming, entering the Appellant's land or constructing any illegal structure on the ground that the alleged construction by Respondents resulted in causing damage to the crops of the Appellant and was done without completing the procedure for land acquisition. The matter is currently pending.

Pending Regulatory Action against IRB Infrastructure Private Limited

The Assistant Conservator of Forests, Forest Department, Pune, has issued notice to the Investment Manager directing to show cause as to why no legal proceedings should be initiated against the Investment Manager under the provisions of the Indian Wildlife Protection Act, 1972, for negligence on the part of the Investment Manager in the installation and repairing of the compound adjoining the Mumbai – Pune Expressway which is meant to prevent wild animals from entering the highway. Such alleged negligence resulted in the death of 1 (one) male leopard. The notice demands the Investment Manager to record its statement personally in the offices of the Assistant Conservator of Forests, Forest Department, Pune. Mhaiskar Infrastructure Private Limited has replied to the said notice refuting the allegations of negligence. No further communication has been received in this regard.

Pending Civil Litigation against IJDTL

1. Jagannath University (the "Petitioner") had filed a writ petition before the Rajasthan High Court against the project manager of IJDTL 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 April 8, 2013 and (b) 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 April 8, 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 IJDTL has filed its reply denying the averments made by the Petitioner. The matter is currently pending.

2. Girdhari Lal Jat had filed writ petition against IJDTL and others in Rajasthan high Court, Jaipur Bench, with respect to the National Highway 12 (Jaipur – Tonk - Deoli section), praying that directions to be given to respondents to take stern action in the matter of removal of illegal barricades in the villages Khajalpura, Dhar Mod, Barkheda and Bhadarwas, to do enquiry against the wrongdoers who have been involved in installing the said illegal barriers, etc. The petition is disposed of as infructuous.

Taxation Proceedings involving IJDTL

There is one direct tax proceeding pending against IJDTL, which involves an aggregate amount of Rs. 15.27 million.

Other Proceedings involving IPATRL

1. IPATRL has initiated arbitration proceedings against National Highways Authority of India ("NHAI") before the Hon'ble Arbitration Tribunal. IPATRL requested to NHAI to extend the concession period by 518 days, and requested to release compensation of Rs. 252.25 crores incurred during the extended period, as the Extension of Time (EOT) of 518 days was duly recommended by the Independent Engineer for delay in completion of construction on account of the reasons not attributable to IPATRL. However, NHAI rejected the claims of IPATRL. Subsequently, IPATRL invoked arbitration against NHAI.

   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 26.11.2021 which was dismissed by the Court on 08.03.2022. IPATRL has served a legal notice for execution of the Award on 30.03.2022. However, no response was received from NHAI. Thereafter, on 10.05.2022, NHAI filed appeal under Section 37 against the Delhi High Court (Section 34) order dated 08.03.2022. The matter is pending.

   Meanwhile, IPATRL had filed application for execution of Section 34 order dated 08.03.2022 in the Delhi High Court. The Court vide its order dated 20.05.2022 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 20.05.2022, IPATRL complied with the SOP of NHAI and submitted a BG of Rs 317.3 Cr on 24.05.2022 towards release of 75% of Payout Amount. Subsequently, NHAI released net amount of Rs 310.91 Cr after statutory deductions. The matter is pending.

2. 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 Punjab who forcefully stopped the operation of the toll plazas in Punjab. IPATRL 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 amounting to Rs. 121.28 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 no written settlement reached between the Parties, IPATRL crystallised this matter as the dispute and subsequently invoked arbitration as per Clause 44.3 of the Concession Agreement. As

per request of NHAI, the arbitration was kept in abeyance and the matter was referred for conciliation through CCIE-1. Meanwhile, NHAI paid a partial amount of Rs. 36.03 Crore on 25.08.2022 and approved extension in Concession Period by 436 days. IPATRL has requested for resuming the Conciliation through CCIE-1 for the balance claim amount and extension to Concession Period by 441 days. The matter is pending.

Pending Regulatory Action involving IPATRL

Employees' State Insurance Corporation, sub-regional office Marol ("ESI") issued a notice to IPATRL demanding payment of Rs. 83,637/- towards pending employers' contributions and employees' contributions required to be paid by IPATRL, in its capacity as the principal employer, under Section 40 read with Section 39 of the Employees' State Insurance Act, 1948. Further, ESI has also directed IPATRL to show cause as to why the assessment of an amount of Rs. 5.83 million towards contributions payable in respect of the employees should not be recovered from IPATRL. IPATRL has replied to the aforementioned notice. No further communication has been received in this regard.

Pending Civil Litigation against ISDTL

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 ISDTL. The Plaintiffs have alleged that on January 5, 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 ` 0.5 million incurred by the Plaintiffs along with damages of ` 50 million 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 ` 50.5 million over such property until the decretal amount is paid. The Plaintiffs have filed an application for adding ISDTL as a necessary party in the suit. The ISDTL, its directors and employees have filed their reply in the matter. The Civil Judge (Senior Division) at Vasai has vide its Judgement dated July 9, 2019 directed the respondents jointly and severally to pay ` 50 Lakhs with interest at the rate of 9% p.a. to the Plaintiffs. ISDTL has filed writ petition in Bombay High Court challenging the Judgement of the Vasai Court Dated July 9, 2019. The plaintiffs have also challenged the judgement before the Bombay high court. Both the matters are pending.

2. Jimmy Gonsalves and another (the "Petitioners") have filed a public interest litigation before the High Court of Bombay against the MoRTH, NHAI, ISDTL 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 ISDTL 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. ISDTL and Ideal Road Builders Private Limited are yet to file their respective replies in this matter. The matter is currently pending.

Pending Civil Litigation against MITL

Certain colleges in Salem (the "Petitioners") have filed 25 writ petitions before the High Court of Madras, against MITL 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 MITL 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 MITL to collect entry fee from the college buses of the Petitioners at par with the rates applicable to school buses. The High Court of Madras has dismissed the petitions filed by the 3 colleges / educational institutions. The matters filed by the other colleges / educational institutions are currently pending.

Other Proceedings involving MITL

1. MITL had initiated arbitration proceedings against National Highways Authority of India ("NHAI") before the Arbitration Tribunal for its claim to the tune of ` INR 5.14 Crores (towards positive Change of scope for construction of additional arm of flyover) and INR` 0.26 Crore (negative Change of Scope on account of deletion of 19 hume pipe culverts) (hereinafter referred to as "Reference 1"). The conciliation meeting between NHAI and MITL meeting was concluded. As NHAI did not respond on the matter, MITL invoked Arbitration proceedings against NHAI. The arbitration proceedings have concluded and the Hon'ble Arbitral Tribunal has pronounced the Award in favour of MITL on February 17, 2022 and NHAI was directed to pay Rs. 4,89,71,505/-. In case the payment is not made within a period of two months, MITL will be entitled to interest @ 8% per annum from the date of Award till date of payment of the aforesaid amount by the NHAI to the MITL. MITL filed an application in the Hon'ble Delhi High Court for enforcement of the Arbitral Award on 19.09.2022. The matter is pending.

2. National Highways Authority of India ("NHAI") had filed an application for permission to file Additional Counter Claim on 28/02/2020 in the arbitration matter Reference 1. Hon'ble Arbitral Tribunal has directed that the amendment with respect to the counterclaim of NHAI will be dealt with in a separate proceeding simultaneously with the (Reference 1) proceedings. Thus, the arbitration proceedings initiated by NHAI (Claimant) before the Hon'ble Tribunal for Rs. 12.61 Crore (Flyover at KM188/850 – left out structure on LHS) & Rs. 7.77 Crore (towards provision of safety structure i.e. pedestrian guard rail & safety barriers) (hereinafter referred to as "Reference 2"). The arbitration proceedings are in progress and the matter is pending.

Taxation Proceedings involving MITL

1. There is one direct tax proceeding pending against MITL, which involves an aggregate amount of Rs. 9.46 million.

Taxation Proceedings involving IDAAIPL

1. There is one indirect tax proceeding pending against IDAAIL, which involves an aggregate amount of Rs. 9.37 million.

IRB Tumkur Chitradurga Tollway Ltd (ITCTL)

Other Proceedings involving IRB Tumkur Chitradurga Tollway Limited

Due to a dispute on the deferred premium calculation of the previous years and revocation of deferment sanction between the IRB Tumkur Chitradurga Tollway Limited (Subsidiary Company or Concessionaire) and the NHAI, the Concessionaire had filed an appeal with the Honorable High Court of Delhi against the Section 9 order dated November 25, 2019. As per the interim order of the Division Bench of Honorable Delhi High Court, withdrawals from Escrow Account are not permitted till final order in the matter. NHAI has also appealed against the order dated November 25, 2019. The matter has been disposed off by the Division Bench and referred to Arbitration. The Arbitration Tribunal has been constituted and the Concessionaire has already filed the appeal for relief from the embargo on escrow account. The Learned Tribunal by its order dated 14.07.2022 directed NHAI to withdraw Rs. 97.8 Crore as an interim relief and subsequently by interim order dated 09.08.2022, Learned Tribunal further directed NHAI to withdraw Rs 453.9 Crore and ITCTL to withdraw Rs 193 Crore from the Escrow Account. The embargo on the operation of Escrow Account was also lifted. ITCTL also filed a Statement of Claim on 20.09.2022 seeking consolidated compensation of Rs. 94.98 Crore + interest and consolidated extension to Concession Period of 138.03 days. Concessionaire filed a Statement of Claim on 20.09.2022 seeking consolidated compensation of Rs. 94.98 Crore + interest and consolidated extension to Concession period of 138.03 days. The

arbitration proceedings are in progress and the matter is pending.

IRB Talegaon Amravati Tollway Limited

Arun Rohidas Patil has filed Public Interest Litigation in Bombay High Court, Nagpur Bench, alleging 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 IRB Talegaon Amravati Tollway Limited is recently involved in this Public Interest Litigation after the order of High Court to make concessionaire as a party in the Public Interest Litigation. The Company is not yet served with the copy of the petition and not made a party in the matter yet. The matter is pending.

Material Litigations against the Sponsor

IRB Infrastructure Developers Limited

Kishore Mukherjee has filed Writ Petition / PIL in the Calcutta High Court against the IRB Infrastructure Developers Limited and others. The petitioner has prayed that the notice for tender for Palsit to Dankuni project should be stopped, Environment Impact Assessment should be obtained and pending the disposal of the matter the Respondents should be directed not to uproot any trees from Panagarh to Dankuni in NH 19. IRB Infrastructure Developers Limited is in the process to file its reply in the matter. The matter is pending.

Material Litigations against the Trustee

Pending Civil Litigations against the Trustee

1. **Hubtown Limited** (the **"Plaintiff")** had filed a case before the High Court of Bombay against the Trustee and its directors (the **"Defendants")** for having informed the bankers of the Plaintiff regarding the defaults committed by the Plaintiff. The Trustee has stated that the Plaintiff is a guarantor for the debt for which the Trustee is acting as a debenture trustee and in case of defaults, the relevant documents authorize the Trustee to share information about such default to CIBIL/RBI and other creditors. The aggregate amount claimed is Rs. 3,000 million. The matter is currently pending in the Court for settlement.

2. **SBI Cap Trustee** (the **"Plaintiff")** had filed a suit before the City Civil Court, Bangalore against the Trustee and others (the "**Defendants**") requiring sale of pledged shares for a particular price by SREI Fund/Investors, for whom the Trustee was acting as the share pledge trustee. India Competitive Global Fund (ICGC) acting through the SREI Investment Manager had a First & Exclusive Charge over the Pledged shares. At the instructions of the ICGC & SREI Investment Manager had transferred the Pledged shares to their demat account as they

has First & Exclusive right over the shares. We as Share Pledge Trustee have acted on the instructions of the Lenders/Investors. ICGC/SREI sold the shares and appropriated the amounts towards their dues and transferred the surplus amount to the Plaintiff. The Plaintiff is acting for a consortium of lenders and has residual interest. The Plaintiff's case is that the ICGC/SREI has appropriated more amount than their dues. The aggregate claim amount is Rs. 1,550.3 million. The Branch Manager of SBI along with their counsel submitted to the Court that they are willing to explore settlement. The Court referred the matter for pre-conciliation efforts. In the afternoon session, our Advocate appeared before the Conciliator. Advocate briefly explained the dispute to the Conciliator. The Plaintiff informed the Conciliator that if Trinity provides the details of the loan transaction and a statement of accounts in relation to the same, this information would help them resolve the dispute quickly. The case was listed on 30.09.2021 for further conciliation. As no representative was present on behalf of the Company, the Court has recorded that there is no settlement between the parties. The case was adjourned to October 27, 2021 for the parties to proceed with the litigation. The case is now revolving around the proving of the dues by ICGC/SREI and appropriation of amounts. We as ITSL had no role in sale of shares, maintenance of books of accounts and appropriation of amounts and transfer of surplus amount. The matter was adjourned to 16.11.2021 for framing of Issues, 23.11.2021 for filing of list of witnesses ICGC, SREI & ITSL, for filing of affidavit of evidence by SBI, 07.12.2021 for cross examination of witnesses of SBI, 14.12.2021 for filing of affidavit of evidence by ICGC/SREI /Trinity/ITSL and 21.12.2021 for cross examination of witnesses of Trinity and ITSL and 07.01.2022 for further orders. We as ITSL has filed an application under Order 1 Rule 10(2) read with Section 151 of the Code of Civil Procedure, 1908 for unsuiting ITSL from the suit and for deleting the name of ITSL from the array of the parties. The matter is now listed on 30.06.2022 for arguments on the application of ITSL for deleting the name of ITSL from the array of the parties. ITSL has no role in sale of shares & appropriation of sale proceeds. The Plaintiff appeared and filed the amended plaint and copies of the documents in two volumes (volume I consisting of 410 pages and volume II consisting of 598 pages). The Learned Judge upon examining the volumes observed that the Plaintiff had not filed the statement of truth. Therefore, the Learned Judge adjourned the matter for filing the statement of truth and additional written statement, if any.

ITSL has filed its additional Written Statement on 12th August, 2022. The matter was adjourned to 11th October, 2022 for Statement of Admission & Denial.

3. **Balmer Lawrie and Company Limited** and another (the "**Plaintiffs**") had filed a petition before the Calcutta High Court against the Trustee and certain others (the "**Defendants**") challenging the validity of the sale transaction of 1,48,20,000 shares in Transafe Services Limited by the Defendant to the Plaintiff. The Plaintiffs have inter alia sought (a) the recovery of consideration received by the Defendants for the allegedly void contract being Rs. 237.12 million and (b) interest at the rate of 18% per annum on the decretal amount. The success of the Petitioner against the Trustee in the instant petition being agitated is remote. The matter is

currently pending.

4. **Loancore Servicing Solutions Private Limited** (the "**Petitioner**") had filed a Company petition no. 293/59/ND/2019 before the National Company Law Tribunal ("NCLT"), Principal Bench at New Delhi against the Religare Enterprise Limited and others including the Trustee (the "Respondents") alleging that the Respondents sold the shares of the Religare Enterprise Limited under the dominion and control of the Petitioners to Respondent no. 3-5. It is further alleged that the Trustee appropriated the shares and had transferred them to the Respondents nos. 3 to 5. It is furthermore alleged that the pledged shares had been sold to consciously deprive the Petitioner of its rights and to facilitate an illegal takeover of Respondent no. 1 by the Trustee through Respondent no. 5 acting in concert. The alleged damages claim amount is Rs. 700 million is against the Respondent nos. 2 to 5. The NCLT has refused to pass any interim orders as asked by the Petitioner. The Petitioners has failed to produce any evidence or otherwise establish that it has any form of contractual privity or other relationship of any manner with the Trustee and therefore has absolutely no locus to make any claims against the Trustee. The success of the Petitioner against the Trustee in the instant petition being agitated is remote. Senior Counsel, Mr. Darpan Wadhwa appearing for Religare has submitted that they have placed on records a forensic report stating that the agreement Loancore has been relying upon is forged. The next date of hearing is November 10, 2022.

5. **Future Corporate Resources Limited** (FCRL) In the matter of FCRL ESOP Trust, SEBI Adjudicating Officer has passed an order dated the February 3, 2021, on the ground of insider trading against eight persons including FCRL Employees Trust of which ITSL is a trustee. FCRL along with FCRL Employee Welfare Trust has been jointly and severally directed to disgorge an amount of Rs. 2,75,68,650/-. ITSL has submitted that ITSL as a trustee has acted on the instructions of the committee and not liable for insider trading and has not gained or received any amount. ITSL and FCRL Employee Welfare Trust are separate. All the said persons have filed an appeal before SAT against the said SEBI Order dated the February 3, 2021. SAT has given the next date of hearing on 19.10.2022. The order is against FCRL Employees Trust and not against ITSL. The matter is sub-judice.

6. **Muthoot Finance Ltd.Vs. Trustees Association of India (TAI),** ITSL, Axis Trustee & SBICAP Trustee) — (Case No.29 of 2021) before Competition Commission of India(CCI).

On 10.09.2021, the Competition Commission of India (CCI) received an information from Muthoot Finance Limited (Informant) against Trustees Association of India (TAI) and three of its members, i.e., IDBI Trusteeship Services Limited, Axis Trustee Services Limited, and SBI CAP Trustee Company Limited (collectively referred to as 'OPs') for alleged contravention of Sections 3(3) and 4 of the Competition Act, 2002 (Competition Act) (hereinafter referred to as the 'Information'). I.e. for entering into anti-competitive agreement and formation of Cartel.

CCI.

The CCI has passed an order dated 23.12.2021 under Section 26(1) of the Competition Act, 2002 (Competition Act) directing the Director General to investigate the conduct of Trustees' Association of India's (TAI), IDBI Trusteeship Services Limited (IDBI), Axis Trustee Services Limited and SBICAP Trustee Company (together referred to as the 'OPs') and its office bearers for prima facie violating Section 3(1) read with Section 3(3) of the Competition Act (Prima Facie Order) dealing with anti-competitive horizontal agreement (including cartel).

TAI, ITSL, Axis Trustee & SBICAP Trustee filed Civil Writ Petition Nos. 3781 of 2022, 3791 of 2022, 3842 of 2022 and 3847 of 2022 respectively before Bombay High Court challenging the jurisdiction of CCI as the SEBI as Sectoral Regulator has Jurisdiction to decide the matter. The matter has been adjourned to 10th November, 2022 for filing Opinion by SEBI and rejoinders by other parties.

7. R.K. Mohata Family Trust Vs. ITSL & Ors.

One Mr. R.K.Mohata Family Trust has filed Commercial Suit (lodging) No. 27568 of 2021 before Bombay High Court against ITSL & RHFL praying for holding of meeting of debenture holders of RHFL as also damages of Rs. 1,05,50,902 against ITSL towards his investment. Hon'ble Bombay High Court vide their orders dated the 31.03.2022 read with the Order dated the 06.04.2022 and the order dated the 10.05.2022 directed ITSL to hold the meeting of debenture holders. ITSL convened a meeting of the debenture holders on 13.05.2022 and as directed by Hon'ble Bombay High Court and the Results of the voting of meeting have been placed before the Hon'ble Bombay High Court in sealed cover. The matter is sub-judice before the Hon'ble Bombay High Court. Next date of hearing in the matter is yet to be decided by the High Court.

8. SCR 109885 - 1/394/14 - J Patel & 68 Others (All investors of Dynamic India Fund III) Vs. Dynamic India Fund III, International Financial Services, ICICI Venture Funds Management Company Limited, ICICI Bank and ITSL, before Supreme Court of Mauritius.

Suit is filed by investors seeking compensation and damages of Rs. USD 103, 699, 976 for the loss of their investments in Dynamic India Fund III from Dynamic India Fund III, International Financial Services, ICICI Venture Funds Management Company Limited, ICICI Bank and ITSL.

All the Defendants including ICICI Venture have raised preliminary objections to the Suit.

DIF III has raised five preliminary objections to the Suit viz. (i) Plaintiffs have been wrongly styled; (ii) Suit is a disguised derivative action and the appropriate court to hear it is the Commercial Court and not the Civil Court; (iii) there is a connected Stay Application filed before the Commercial Court by DIF III that the Suit has to be stayed as the Suit is a Class Action suit and hence the Commercial Court and not the Civil Court has the jurisdiction to hear the Suit; (iv) the Plaintiffs should have put the other shareholders of DIF III into cause; and (v) the Plaintiffs have to provide Security for costs to all the Defendants.

The other Defendants have raised preliminary objections with respect to privity of contract and jurisdiction of Mauritius Courts.

Nearly 6 years after the Suit was filed in 2014 in Mauritius, on January 28, 2020, the

ICICI Venture Fund Management Company Ltd. is taking care of the matter on behalf of ITSL as a Trustee and also appointed Counsels to defend ITSL. We have taken up the matter with the ICICI Venture stating that WITECO now ITSL is also not a Mauritius resident and Mauritius court is not the convenient forum to hear the disputes raised and hence lacks the jurisdiction. Further, ITSL is acting only as a trustee and there cannot be any claim against ITSL at all as ICICI Venture Fund Management Company Ltd. was Investment Manager of the Fund who has managed all affairs of the Fund.

This matter has been put sine die i.e. adjourned with no appointed date for resumption, pending the outcome of the appeal filed by plaintiffs.

9. Contempt Application/Petition before NCLT Hyderabad -

Contempt Application/Petition has been filed by Kalyan Toll Infrastructure Ltd. against ITSL & it's Directors, pursuant to the NCLT Order dated the 26th April, 2021 in the case of Lanco Hoskote Highway Ltd. for non-issuance of NOC for satisfaction of mortgage charge dated 01.12.2014 created by Lanco Hoskote Highway Ltd. as a third party mortgagor in favour of ITSL for the benefit of 25 CDR Lenders of Lanco Infatech Ltd., Non-issuance of NOC by ITSL for satisfaction of charge is owing to non-receipt of back to back NOC from CDR lenders for whose benefit ITSL is holding the mortgage charge.

ITSL has engaged **S&H Law Advisors** to represent ITSL & it's Directors before NCLT, Hyderabad. Proceedings are closely followed up. The matter is listed on 14/10/2022 for filing counter by ITSL.

Annexure J

RISK FACTORS

ect SPVs owned by the

Risks Related to our Organization and the Structure of the Trust

1. The debt financing provided by the Trust to each of the Project SPVs comprises of certain unsecured, interest free and interest-bearing loans as well as loans that is secured by a subordinate charge on (i) the cash flows deposited in the escrow account and (ii) the escrow account of such Project SPV. The payment obligations of the respective Project SPVs in relation to such debt financing will be subordinated to all existing and future obligations of the Project SPVs towards any secured senior lenders.

2. Any payment by the Project SPVs, including in an event of termination of the relevant concession agreement, is subject to a mandatory escrow arrangement which restricts their flexibility to utilize the available funds.

3. We must maintain certain investment ratios, which may present additional risks to us.

4. The Valuation Report, and any underlying reports, are not opinions on the commercial merits of the Trust or the Project SPVs, nor are they opinions, expressed or implied, as to the future trading price of the Units or the financial condition of the Trust, and the valuation contained therein may not be indicative of the true value of the Project SPVs' assets.

5. Certain of the Project SPVs have experienced losses in prior years and any losses in the future could adversely affect our business, financial condition and results of operations, our ability to make distributions to the Unitholders and the trading price of our Units.

6. We may not be able to make distributions to Unitholders or the level of distributions may fall.

Risks Related to Our Business and Industry

7. Our failure to extend applicable concession agreements or our inability to identify and acquire new road assets that generate comparable or higher revenue, profits or cash flows than the Project SPVs may have a material adverse impact on our business, financial condition and results of operations and our ability to make distributions.

8. The Project SPVs' toll-road concessions may be terminated prematurely under certain circumstances.

9. A decline in traffic volumes would materially and adversely affect our business prospects, financial condition and results of operations and our ability to make distributions to Unitholders.

10. Certain investigations are pending against the Related Parties of the Sponsor, the outcome of which may materially and adversely affect the Sponsor / our reputation, business and financial condition.

11. IRB Tumkur Chitradurga Tollway Limited (IRBTC) and M.V.R. Infrastructure and Tollways Limited (MVR) are required to pay annual premiums / negative grants in consideration for being granted the right to build and operate their respective projects. Failure to make such payments could result in the termination of the relevant concession agreement by the NHAI.

12. Changes in the policies adopted by governmental entities or in the relationships of any member of the Trust Group with the Government or State Governments could materially and adversely affect our business, financial performance and results of operations.

13. Certain provisions of the standard form of concession agreement may be non-negotiable or untested, and the concession agreements may contain certain restrictive terms and conditions which may be subject to varying interpretations.

14. We may be subject to increases in costs, including operation and maintenance costs, which we cannot recover by increasing toll fees under the concession agreements.

15. Certain actions of the Project SPVs require the prior approval of the NHAI, and no assurance can be given that the NHAI will approve such actions in a timely manner or at all.

16. Leakage of the toll fees on the Project SPVs' roads may materially and adversely affect our revenues and financial condition.

17. We will depend on certain directors, executive officers and key employees of the Investment Manager, the Project Manager and the Project SPVs, and such entities may be unable to retain such personnel or to replace them with similarly qualified personnel, which could have a material, adverse effect on the business, financial condition, results of operations and prospects of the Trust Group.

18. There can be no assurance that we will be able to successfully undertake future acquisitions of road assets or efficiently manage the infrastructure road assets we have acquired or may acquire in the future.

19. The Project SPVs' concessions are illiquid in nature, which may make it difficult for us to realise, sell or dispose of our shareholdings in the Project SPVs.

20. The Project SPVs may be required to undertake certain development of the Road Assets owned by the Trust, which may present additional risks to us.

21. The Project SPVs may not be able to comply with their maintenance obligations under the concession agreements, which may result in the termination of the concession agreements, the suspension of the Project SPVs' rights to collect tolls or the requirement that the Project SPVs pay compensation or damages to the NHAI.

22. Our insurance policies may not provide adequate protection against various risks associated with our operations.

23. The Project SPVs, the Sponsor, the Investment Manager, the Project Manager and the Trustee are involved in certain legal and other proceedings, which may not be decided in their favour.

24. We do not own the "IRB" trademark and logo. Our license to use the "IRB" trademark and logo may be terminated under certain circumstances and our ability to use the trademark and logo may be impaired.

25. We will depend on various third parties to undertake certain activities in relation to the operation and maintenance of the Initial Road Assets. Any delay, default or unsatisfactory performance by these third parties could materially and adversely affect our ability to effectively operate or maintain the Initial Road Assets.

26. The Project SPVs may be held liable for the payment of wages to the contract labourers engaged indirectly in our operations.

27. Our contingent liabilities could adversely affect our results of operations, cash flows and financial condition.

28. Our actual results may be materially different from the expectations expressed or implied in the Revenue, Profit and Cash Flow Projections and the assumptions in the Final Offer Document are inherently uncertain and are subject to significant business, economic, financial, regulatory and competitive risks and uncertainties that could cause actual results to differ materially from those projected.

29. Our business will be subject to seasonal fluctuations that may affect our cash flows.

30. Certain Project SPVs' operations and revenue are, currently, geographically concentrated in Gujarat, Maharashtra and other Indian states and consequently will be exposed to certain risks emanating therefrom.

31. The Initial Road Assets are concentrated in the infrastructure sector and toll-road industry in India, and our business could be adversely affected by an economic downturn in that sector or industry.

32. Political and other agitations against the collection of tolls may affect our ability to collect tolls over prolonged periods, which could have a material, adverse effect on our business, results of operation and financial condition.

33. The cost of implementing new technologies for collection of tolls and monitoring our projects could materially and adversely affect our business, financial condition and results of operations.

34. We may be unable to renew or maintain the statutory and regulatory permits and approvals required to operate the Initial Road Assets.

35. Compliance with, and changes in, safety, health and environmental laws and regulations in India may materially and adversely affect our business.

36. The Project SPVs' financing agreements entail interest at variable rates, and any increases in interest rates may adversely affect our results of operations, financial condition and cash flows.

37. The Project SPVs are subject to restrictive covenants under their financing agreements that could limit our flexibility in managing our business or to use cash or other assets.

38. We have obtained a credit rating of IND AAA for the senior debt of the Trust from India Ratings and Research, assuming the Trust's consolidated "external debt" (including debt availed by InvIT and the Project SPVs from banks and institutions but excluding debt infused by InvIT into the Project SPVs) as on September 30, 2021 would be up to Rs. 14.49 billion. We have also obtained a credit rating of CARE AAA from CARE Ratings, assuming that the debt exposure of the Trust Group at Rs. 14.62 billion as on June 30, 2021. Any downgrade of our credit rating may restrict our access to capital and materially and adversely affect our business, financial condition and results of operations.

39. We will enter into related-party transactions. There can be no assurance that we could not have achieved more favourable terms if such transactions had been entered into with third parties.

40. The Sponsor, whose interests may be different from the other Unitholders, may be able to exercise significant influence over certain activities of the Trust.

41. The Right of First Offer (ROFO)/ Right of First Refusal (ROFR) Deed and the Future Assets Agreement may terminate in certain circumstances and shall be subject to the terms of the concession agreement and applicable law.

42. The Sponsor is a listed company and operates other road assets, and anything that impacts the business, results of operations and trading price of the Sponsor's equity shares may have a material, adverse effect on the Trust and the trading price of the Units.

43. The Investment Manager may not be able to implement its investment or corporate strategies and the fees payable to the Project Manager are dependent on various factors.

44. Parties to the Trust are required to maintain the eligibility conditions specified under Regulation 4 of the InvIT Regulations on an ongoing basis. The Trust may not be able to ensure such ongoing compliance by the Sponsor, the Investment Manager, the Project Manager and the Trustee, which could result in the cancellation of the registration of the Trust.

45. The Investment Manager is required to comply with certain ongoing reporting and management obligations in relation to the Trust. There can be no assurance that the Investment Manager will be able to comply with such requirements.

Risks Related to Tax

46. Changes in legislation or the rules relating to tax regimes could materially and adversely affect our business, prospects and results of operations.

47. Some of our roads assets enjoy certain benefits under Section 80-IA of the Income Tax Act and any change in these tax benefits applicable to us may materially and adversely affect our results of operations.

48. Tax laws are subject to changes and differing interpretations, which may materially and adversely affect our operations.

49. Entities operating in India are subject to a variety of Government and State Government tax regimes and surcharges and changes in legislation or the rules relating to such tax regimes and surcharges could materially and adversely affect our business.

50. Investors may be subject to Indian taxes arising out of capital gains on the sale of Units. The provisions of the Income-tax Act, 1961 (Act) provide that the dividend received from a business trust (REITs/ InvITs qualify as a business trust under the Act) is taxable in the hands of the unitholders where the Special Purpose Vehicle (SPV) in which the business trust holds a controlling interest (and which has declared dividends to the business trust which have been, in turn, declared/ distributed by the business trust to its unitholders) has opted to be governed by the provisions of section 115BAA of the Act.