

FEASIBILITY STUDY OF ROAD PROJECT: “MANOR – WADA HIGHWAY”

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Abstract: Road are very important mode of transportation in India than any other modes of transport. They allow people and automotive to traverse a diverse range of lands so that they can reach their destination without any hindrance. As the traffic is increasing day by day, the problem of congestion, accidents and insufficient lane configuration arises. Hence, the roads have to be improved to meet the standard. As the cost of construction and improvement of road projects take huge initial investment, it is very much important to carry out feasibility study before carrying out the actual work. Feasibility study deals with the technical, economical and financial aspects of the project. Hence, it helps in examining the practicability of the project to be carried out. In this project, the study area consists of Manor - Wada highway in the state of Maharashtra has been taken for feasibility study. Various survey and investigations are carried out, analyses have been done and the improvement proposal for the project highway is prepared. The cost required for the improvement is worked out. Only financial viability of the proposed improvement is then checked by this feasibility study.

Keywords: Feasibility, Traffic congestion, Initial investment, Technical, Economical and Financial aspects.

1. INTRODUCTION

A good quality road network is essential not only for the urban areas but also for the improvement of isolated places for which public transport options are limited. This helps in connecting the remote areas to connect to the places where employment opportunities are available. India has one of the largest road networks in the world. These roads make crucial contribution to the economical development, growth and bring important social benefits. As the population is increasing, the traffic on the roads is also increasing day by day. The design service volumes of the existing highways are exceeded by the vehicles which are causing serious traffic issues. Because of this, it is required to upgrade the existing highways capacities for the smooth flow of traffic.

Feasibility report is required to be prepared before the execution of project. A feasibility study helps in understanding various analysis carried out on the project so that the investor can take the investment decision and the project can be properly planned. Feasibility study basically deals with technical, economical and financial aspects of the project. All the aspects plays very important role in the decision of executing the project. It should be ensured that the feasibility study shall incorporate aspects of value engineering, quality audit and safety audit requirements in design and implementation.

The construction or up-gradation of any road project cost huge initial investment hence it is important to check the financial viability of the project so that we can come to know that from the project we are achieving our desired outcome or not. It should also overcome the present traffic problem. Also, it should be beneficial to the country's economy. It is therefore a requisite to prepare the feasibility report of the project.

1.1 Purpose of Feasibility study:

The purposed of Feasibility study is as follows.

- a. To have brief idea or description of existing scenario.
- b. To assess the viability.
- c. To identify feasible options.
- d. For understanding of risks and opportunities.
- e. To assist in the development of project documentations.
- f. To incorporate various aspects of engineering and safety requirements in the design and implementation.

1.2 Study Area:

The study area consists of Manor (Ch. 29.550) – Wada (Ch. 53.835) highway in the state of Maharashtra. The highway from Manor to Pali is SH-34 & Highway from Pali to Wada is SH-35. The length of road is 24.285Km. The highway is in plain and rolling terrain. The highway passes through Palghar district. The existing road is of 4 lane carriageway configuration for 17.985km. and balance length is of 2 lane configuration. Existing road is having flexible pavement.

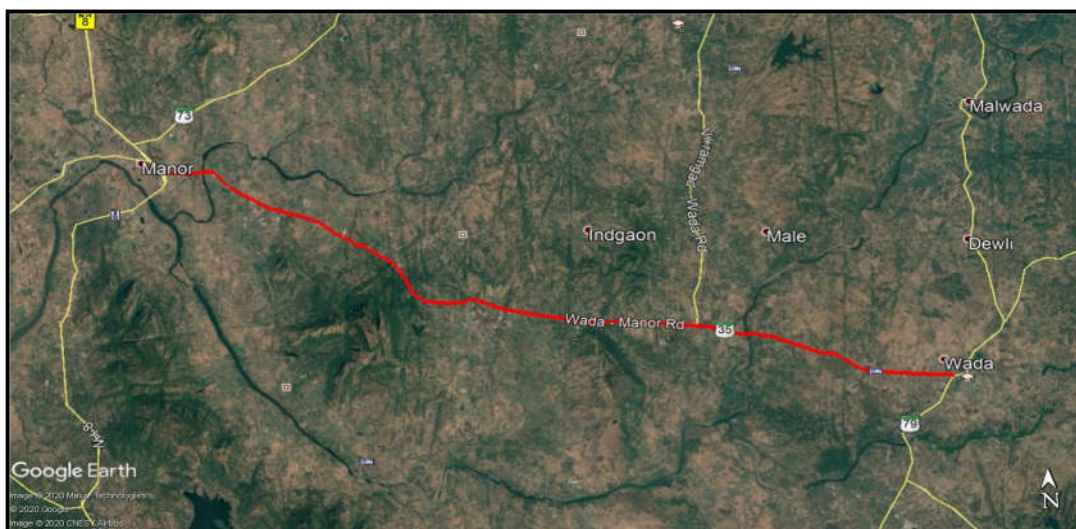


Figure 1: Study Area Image from Google Earth

1.3 Objective of study:

The main objectives of study are to prepare feasibility report which will include following:

- a. Traffic studies including traffic surveys and Axle load survey
- b. Inventory and condition of road and structures.
- c. Pavement investigation
- d. Sub-grade investigation
- e. Design of pavement and overlay with options for flexible or rigid pavements
- f. To prepare cost estimate of proposal
- g. To check the financial viability

2. TRAFFIC SURVEYS AND ANALYSIS

As per the site visit on the project road, two homogeneous sections are identified (Manor – Pali & Pali – Wada). The traffic surveys are then carried out on the project highway. The objective of the study is to appreciate the existing traffic and estimate the present travel characteristics. The results of the traffic surveys are as follows:-

2.1 Classified Traffic Volume Count:

The traffic volume count at both the homogeneous sections has been carried out for 7 days 24 hrs. Average daily traffic (ADT) is then calculated. To work out the annual average daily traffic (AADT), seasonality in traffic is considered and seasonal correction factor for the month of survey is applied. For seasonal correction factor data from Petrol pumps along the project road is taken. PCU factors as per IRC^[11] are then applied to determine the traffic in PCU. AADT in terms of Vehicles and PCU are represented below:

Table 1: Annual Average Daily Traffic (AADT)

Type of Vehicles	In terms of Vehicles/day		In terms of PCU/day	
	Ch. 41/000	Ch. 48/500	Ch. 41/000	Ch. 48/500
Two Wheeler	2771	2900	1385	1450
Three Wheeler (Auto)	71	88	71	88
Car/ Jeep / Van / Taxi	2393	2387	2393	2387
6 Seater / Utility	12	23	12	23
Mini Bus	15	32	22	47
Govt. Bus	100	193	299	580
Private Bus	58	59	173	176
Goods Auto	34	17	34	17
LCV	311	512	466	769
2 - Axle Trucks	1331	1305	3994	3915
3 - Axle Trucks	1135	930	5108	4186
Multi Axle Trucks	743	628	3345	2826

Type of Vehicles		In terms of Vehicles/day		In terms of PCU/day	
		Ch. 41/000	Ch. 48/500	Ch. 41/000	Ch. 48/500
Construction Equipment		1	0	5	0
Exempted Vehicles	Govt. Vehicles	1	1	0	0
	Ambulance	3	5	3	3
	Fire Fighting	0	0	0	0
Tractor With Trailer		3	3	14	14
Tractor Without Trailer		2	1	3	2
Cycle		7	1	4	1
Cycle Rickshaw		0	0	0	0
Animal Drawn		0	0	0	0
Hand Cart		0	0	0	0
TOTAL		8991	9081	17334	16483

2.2 Origin – Destination Survey:

The objective of origin - destination (O-D) survey is to gather information regarding travel characteristic of different road users on the project road. Results of O-D survey are used to describe the user characteristics both of passenger & goods vehicles such as distribution of local and through traffic. It was carried out by road side interview method for 24 hrs on sampling basis.

From the O-D survey carried out for passenger vehicles, it is observed than more than 90% traffic is from the nearby areas. From the O-D survey carried out for goods vehicles, it is observed that 46% of goods vehicles originating from Gujarat, 7% of goods vehicles from Delhi, 3% from all other states influence the project district.

2.3 Intersection Volume Count Survey:

The objective of the Intersection volume count survey is to understand traffic characteristics of each arm of intersection and to assess the need of signal control, grade separator etc. at the intersection to regulate safe traffic movement.

Intersection volume count survey was carried out two major junctions on the project highway i.e. Pali and Wada which are three armed junctions. There already exists a grade separator at the Manor junction where NH-48 intersects the project highway. The peak hour traffic at Pali and Wada junction is 1069 PCU/Hr. and 1479 PCU/Hr respectively. The traffic on all arms does not satisfy IRC specifications for signalization and therefore this junction does not warrant signalization. The total peak hour traffic at intersection is not more than 10,000 PCU/hr. Hence, at this junction, grade separator is not warranted.

2.4 Axle Load Survey:

The main objective of the axle load survey is to determine a Vehicle Damage Factor (VDF) of each type of commercial vehicle, their axle load spectrum, axle load distribution and expected damage on pavement and extent of overloading. The V.D.F. is a multiplier to convert the number of commercial vehicles of different axle load and axle configuration to the number of standard axle load repetitions. It is defined as equivalent number of standard axle per commercial vehicle. The axle load survey was conducted for

24 hours for 2 normal days at one location to assess the axle load spectrum and in turn to determine V.D.F.

Table 2: VDF of Vehicles

Type of Vehicle	Ch. 41/000 (Manor – Wada Road)		
	Manor – Wada	Wada - Manor	Adopted VDF
Bus	0.37	0.42	0.50
LCV	0.11	0.07	0.20
2 Axle	1.11	0.84	1.20
2 Axle Tandem (3XL)	2.55	3.32	3.40
2 Axle Tridem (4XL)	0.87	1.40	1.40
3 Axle Tandem (4XL)	5.49	3.60	5.50
3 Axle Tridem (5XL)	7.35	1.17	7.40
3 Axle Tandem-Tandem (5XL)	-	0.39	0.40

3. TRAFFIC FORECAST

Long term forecasting of traffic on the project road during the time horizon of the study is required for design of highway and assessing the economic and financial viability of the proposed investment. To establish future traffic growth rates, following approaches have been explored.

- a. Past trend in traffic growth on project road
- b. Growth of registered motor vehicles
- c. Transport demand elasticity approach (As per IRC:108-2015)

The transport demand elasticity method is a proven technique worldwide and is also the preferred technique in India. Efforts have been made to build time series past traffic data for the project road from the available data. Similarly, time series past data of population, State/District Income (Gross Domestic Product /Gross Value Added) and Per Capita Income for Maharashtra state and areas under influence has been developed. Results of O-D survey analysis are also used in working out the growth rates. The projected growth rates worked out for major vehicles groups such as Cars, Buses, 2 Wheelers, and Trucks are used for “Traffic Forecast”.

Growth rates adopted are as follows.

Table 3: Adopted Annual Growth Rates

Sr. No.	Vehicle Type	2019-24	2024-29	2029-34	Beyond 2034
1	2 Wheeler	11.20	10.60	9.10	7.40
2	Car	7.50	7.10	6.00	5.00
3	Buses	7.70	7.30	6.30	5.10
4	Trucks	5.00	5.00	5.00	5.00
5	LCV	6.10	5.80	5.00	5.00

These growth rates are used for projecting the traffic for 30 years.

Table 4: Traffic Projection

Year	Ch. 41/000		Ch. 48/500	
	AADT/ Vehicles per day	AADT/ PCU per Day	AADT/ Vehicles per day	AADT/ PCU per Day
2019-20	8991	17334	9081	16483
2020-21	9676	18359	9784	17481
2021-22	10420	19452	10547	18547
2022-23	11228	20617	11377	19685
2023-24	12105	21858	12279	20899
2024-25	13019	23152	13218	22163
2025-26	14009	24530	14236	23510
2026-27	15082	25996	15339	24947
2027-28	16245	27558	16537	26479
2028-29	17507	29223	17837	28115
2029-30	18714	30880	19076	29731
2030-31	20011	32637	20409	31445
2031-32	21404	34499	21841	33264
2032-33	22902	36473	23380	35194
2033-34	24511	38567	25036	37244
2034-35	25992	40621	26555	39238
2035-36	27566	42787	28171	41342
2036-37	29239	45072	29889	43563
2037-38	31018	47482	31716	45906
2038-39	32910	50025	33659	48379
2039-40	34922	52707	35726	50988
2040-41	37062	55537	37925	53743
2041-42	39338	58524	40265	56651
2042-43	41760	61675	42754	59720
2043-44	44337	65001	45405	62962
2044-45	47079	68512	48225	66384
2045-46	49998	72218	51228	69998
2046-47	53105	76130	54425	73815
2047-48	56412	80260	57830	77847
2048-49	59933	84621	61455	82105
2049-50	63682	89227	65317	86604

The projected traffic on the project road exceeds the design service volume of 60,000 PCU/day for four lane highway after year 2041-42 i.e. after 20 years.

4. ENGINEERING SURVEYS, INVESTIGATIONS & ANALYSIS

Different types of field studies, engineering surveys and investigations have been carried out to gather data and information necessary for Feasibility Study. The aim of the investigations is to develop an adequate supportive database for selecting and preparing the most appropriate proposal to meet the functional and structural efficiency and safety requirements of the project.

4.1 Road Inventory Survey:

The detailed inventory survey was carried out through dimensional measurements and visual inspections to note all the features of the existing road which are to be used for identification of improvements.

4.2 Pavement Investigation:

4.2.1 Pavement Condition Survey:

Condition of the pavement was evaluated based on the field measurements. Primary pavement surface distress, indicators such as cracking (narrow and wide), patching, raveling and potholes were estimated visually coupled with physical measurements. The extent of each distress has been visually estimated for every 200m length of the road in terms of percentage area affected. Rutting was measured as rut depth in wheel path using a 3m straight edge. Apart from this, edge breaking was also noted in terms of percentage length of road affected and shoulder drop-off in terms of depth. From the pavement condition survey, the project highway is in poor condition in approximately 4 km. length.

4.2.2 Pavement Composition:

Trial Pits are taken at 500m on alternate side of carriageway. The average pavement composition is as follows:

- a. Granular Layer - 415 mm.
- b. Bituminous Layer - 185 mm.
- c. Total Crust – 600 mm.

4.2.3 Sub-grade Investigation:

The investigations for sub-grade characteristics are intended for designing strengthening/overlay for the existing pavement and for designing new pavement. The material of sub-grade from trial pits is taken. The laboratory testing such as Gradation, Atterberg's limit, Free swelling index, Modified proctor test and C.B.R. test have been carried out. 4 days soaked CBR test result varies from 8.0% to 18.2%.

4.2.4 Falling Weight Deflectometer Test:

The objective of Falling weight Deflectometer test is to determine the structural strength of the existing pavement which would form the basis for designing the thickness and composition of overlays for rehabilitating / strengthening the existing pavement. Evaluation of pavement structural strength has been carried out in accordance with the requirements of IRC: 115-2014. The deflections for Manor – Wada highway is in the range of 1.2 mm to 2.4 mm with average value of 1.5mm.

4.3 Structure Inventory & Condition Survey:

Inventory survey of existing structures was carried out along the project road and all the details as per IRC:SP-35 were collected. Following table gives the summary of the number of structures found on the project road.

Table 5: Existing structure Details

Sr. No	Pipe Culvert	Slab Culvert	Minor Bridge	Major Bridge	Total
1	41	9	5	2	57

The condition survey of structures was carried out to ascertain the condition of various components of the structures by visual inspection. The observations of the condition survey are used for the improvement to be proposed for the project highway.

4.4 Topographic survey:

The basic objective of the topographic survey is to capture the essential ground features along the alignment in order to consider improvements and for working out improvements, rehabilitation and upgrading costs.

5. IMPROVEMENT PROPOSAL

The Manor Wada road is in fair condition having raveling as the main distress as recorded during condition survey. The pavement distress of the highway is more as no major maintenance work (Routine/Periodic) had been done since 2013. It is also observed that the height of embankment is low which is not more than 1m to 1.20m. Also, no longitudinal drains are available along the project road. The absence of longitudinal drains and the low no. of CD works has contributed to ineffective drainage system. This resulted in to the damage of BT layer and saturation of sub-grade / crust of road for most of the time of the year resulting into distress in pavement.

The issue of raveling on Manor Wada road can be addressed by providing the overlay in bituminous mix as per the requirement as revealed from the FWD test carried out on the project road. The crust of existing road is sufficient to cater the design traffic for the next 20 years. Hence, it is proposed to provide the overlay in bituminous mix instead of adopting the rigid pavement for improvement.

5.1 Improvement proposal for Road Work:

Summary of Improvement proposal for road work is as follows:

Table 6: Improvement Proposal for Road Portion

Description	Manor – Wada Section
Widening	Existing 2 lane road sections proposed to be widened to 4 lane with paved shoulder (Concentric widening)
	L – 6.300 Km.
Type of Pavement for improvement	Flexible Pavement (*Rigid Pavement – For Toll Plaza, Truck Terminal and Built-up Stretches)
Proposed Improvement of Pavement	Overlay over existing pavement
	New crust for widening / reconstruction
Drainage	RCC closed drain in Built-up area, RCC Open Drain in open areas

Description	Manor – Wada Section
Major At Grade Junctions	2 Nos.
Minor Junctions	29 Nos.
Street Lighting	Provided at Built-up area, Major Junctions, Grade separator location, Toll Plaza, Truck Terminal, bus bays and bus stops.
Bus shelters	17 Nos.
Toll Plaza	<ul style="list-style-type: none"> - 8 + 8 Lane Carriageway - Traffic Island, Protective Barriers, Traffic Impact attenuators - Toll Booth Structure including Canopy Structure - Concrete pavement for toll plaza including tapering portion - Traffic signs - Highmast and lighting
Truck Terminal	1 No.
Signages and Pavement Marking	All along the length of the project highway
Retaining Wall / Toe Wall	<ul style="list-style-type: none"> - At Approaches of incomplete Major / Minor bridges - At all other locations where it is required to retain the Embankment within available ROW in order to provide space for drain cum utility corridor.

5.2 Proposed Cross Section:

It is proposed to develop the Manor-Wada highway to 4 lane with paved shoulder configuration. The typical cross section of road in open area is as given below.

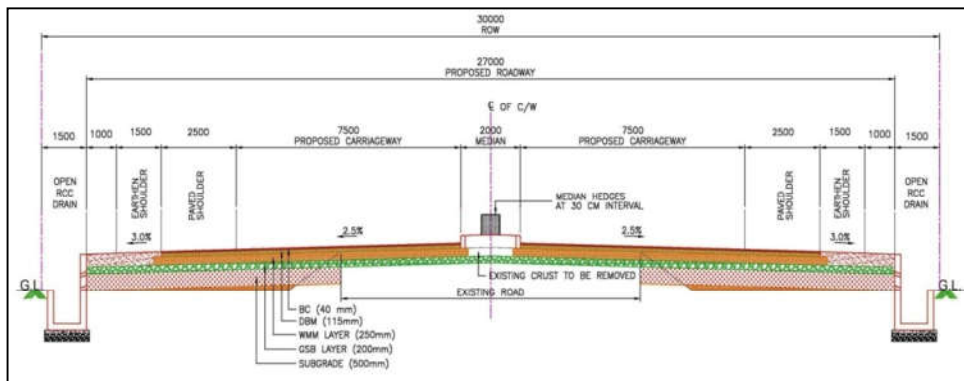


Figure 2: Typical Cross Section

5.3 Proposed Crust:

Overlay design for existing carriageway portion is carried out as per IRC:115-2014. For design of overlay, results obtained from falling weight deflectometer test (FWD) are used.

The design of flexible pavement for new pavement in new alignment/ realignment/ widening/ reconstruction portion is done as per stipulations given in IRC:37-2018. The pavement design is done adopting subgrade CBR of 8% and MSA as mentioned below.

Table 7: Proposed Crust

Design Traffic	Design life	Proposed Improvement	Crust Proposed (mm)				
			BC	DBM	WMM	GSB	Total
20 MSA	10 years	Overlay	40	115	-	-	155
50 MSA	20 years	Widening	40	115	250	200	605

However for Built-area, Toll Plaza and Truck Terminal rigid pavement is proposed.
Crust Thickness: PQC-300mm, DLC-150mm and GSB-150mm.

5.4 Improvement to Structures:

Based on the condition survey of the bridges and CD Structures, recommendations for the (existing) structures include widening, rehabilitation/repair, new construction for existing bridges & other CD structures.

The category wise detailed statement of improvement of structures is given below.

Table 8: Improvement proposal for Structure Portion

Type of Structure	Retained with Repairs	Retained	Reconstruction	New Construction
Major Bridge	-	2	-	-
Minor Bridge	-	1	4	-
Pipe Culverts	4	33	4	17
Slab Culverts	6	-	3	4

5.5 Geometrical Design:

From the topographic survey, the horizontal and vertical alignment is designed as per section 2 of IRC:SP:84-2019. Both the geometrics are improved to possible extent.

6. COST ESTIMATE

Rate analysis is prepared for the project road by obtaining rates from Maharashtra Schedule of Rates, 2019-20. Lead charges for the materials are also considered. Detailed quantities are worked out for each item and detailed cost estimate is prepared. The Abstract of cost estimate is as follows.

Table 9: Abstract of Cost Estimate

Sr. No.	Description	Design Length (Km)	Total Amount in Crore	% Weightage w.r.t Total Civil Cost
		24.270		
I	Civil Construction Cost of Work			
1	Site Clearance and Dismantling	1,48,84,010	1.49	0.56
2	Earthwork	21,40,42,864	21.40	8.04
3	Granular Base Course and Sub base	26,62,52,675	26.63	10.00
4	Pavement	93,41,03,136	93.41	35.07
5	Drainage and Protective Works	75,76,12,307	75.76	28.44
6	Road Furniture	3,83,20,323	3.83	1.44
7	Culverts (Pipe/ Box/ Slab Culverts)		0.00	
	7A) Pipe / Box Culvert	4,05,35,016.000	4.05	1.52
	7B) Slab Culvert	99,43,378.000	0.99	0.37
8	Structure (MNB / MJB / Flyover)		0.00	
	8A) Minor Bridge	4,64,53,465.000	4.65	1.74
	8B) Major Bridge (Incomplete)	2,88,78,727.000	2.89	1.08
	8C) Major Bridge (R & R)	2,84,00,371.000	2.84	1.07
	8D) Flyover	0.000	0.00	0.00
9	Repairs & Rehabilitation	60,86,951.000	0.61	0.23
10	Miscellaneous	24,84,08,449	24.84	9.33
11	Royalty	2,95,41,857	2.95	1.11
A	Total Civil Construction Cost of Work = Rs.	2,66,34,63,530	266.35	100.00
	Add GST@12% (A x 0.12)	31,96,15,624	31.96	
B	TOTAL CIVIL COST (including GST) = Rs.	2,98,30,79,154	298.31	
C	Add 0.50% Vigilance & Quality Control Testing charges	1,49,15,396	1.49	
D	Maintenance during construction (5% of civil works i.e. 0.05 x B) = Rs.	14,91,53,958	14.92	
E	Total cost of work for tendering purpose (B + C + D) = Rs.	3,14,71,48,507	314.71	
F	Contingency 1.0% on B	2,98,30,792	2.98	
G	Total Civil Construction cost (E + F)	3,17,69,79,299	317.70	
H	Agency Charges 1.5% on G	4,76,54,689	4.77	
I	Supervision 1.65% on G	5,24,20,158	5.24	
J	5% per year of B as per phasing Price Escalation	25,17,71,881	25.18	
K	CENTAGES Total (H+I+J)	35,18,46,728	35.18	
L	Total project cost (G+K)	3,52,88,26,027	352.88	
M	Utility Shifting @ Rs. 50000/- per Km	12,13,500	0.12	
N	Land Acquisition	35,00,00,000	35.00	
O	Tree Cutting	36,40,500	0.36	
P	Total Capital cost of the project (L+M+N+O)	3,88,36,80,027	388.37	

7. FINANCIAL ANALYSIS

Based on the project structure, traffic study and toll rate analysis, financial feasibility analysis is to be carried out. The objective of the financial analysis is to ascertain the existence of sustainable project returns, which shall successfully meet the expectations of its financial investors.

Basic parameters of financial analysis are as follows:

Table 10: Parameters of Financial Analysis

Project Details:	
Evaluation Year for Cost Estimate	2020
Year of Construction begins	2020
Construction Period (months)	24
Opening Year to Traffic	Dec. 2022
Total Length of the Project (Km.)	24.270
Project Cost Details:	
Total Project Cost (incl.IDC etc.)	361.00
Grant During Construction	144.40
Net Project Cost	216.60
Debt (70%)	151.62
Equity (30%)	64.98
Annual Escalation in Toll Rate (%)	3.00% per Annum
O&M Cost & Other Assumptions:	
Routine Maintenance Cost	0.05 Crores/Km./Annum
Periodic Maintenance Cost	0.60 Crores/Km./Annum
Elec. & Patrolling Expenses	0.01 Crores/Km./Annum
Toll Collection Expenses	1.50 Crores/Km./Annum
Office Expenses	2.00 Crores/Km./Annum
Insurance Expenses	0.15 % of total project cost
Loan Repayment (during operation)	11 Years
Concession Period	22 Years (Including construction period)
Interest Rate	10.15%
Construction Cost Phasing	40%-60%

7.1 Net Present Value:

Net present Value is the difference between present value of all cash inflows and present value of all cash outflows over a period of time. This method of NPV is used to check the profitability of the project investment so that whether the decision of implementation of project can be taken up.

NPV is calculated for the project highway. The results are as follows.

Table 11: NPV Calculation

Year	Particulars	Cash Flow Rs. (In Cr.)	Year	Discounted Factor @ 12%	Discounted Cash Flow Rs. (In Cr.)
2020-2021	Cost of Project	-144.40	0	1.00	-144.40
2020-2021	Grant	57.76	0	1.00	57.76
2020-2021	Loan	151.62	0	1.00	151.62
2021-2022	Cost of Project	-216.60	1	0.89	-193.39
2021-2022	Grant	86.64	1	0.89	77.36
2022-2023	Cash Flow	10.80	2	0.80	8.61
2023-2024	Cash Flow	12.02	3	0.71	8.56
2024-2025	Cash Flow	13.73	4	0.64	8.72
2025-2026	Cash Flow	14.95	5	0.57	8.48
2026-2027	Cash Flow	-3.27	6	0.51	-1.65
2027-2028	Cash Flow	17.89	7	0.45	8.09
2028-2029	Cash Flow	19.41	8	0.40	7.84
2029-2030	Cash Flow	21.85	9	0.36	7.88
2030-2031	Cash Flow	24.05	10	0.32	7.74
2031-2032	Cash Flow	1.10	11	0.29	0.32
2032-2033	Cash Flow	27.24	12	0.26	6.99
2033-2034	Cash Flow	28.68	13	0.23	6.57
2034-2035	Cash Flow	30.82	14	0.20	6.31
2035-2036	Cash Flow	33.01	15	0.18	6.03
2036-2037	Cash Flow	8.45	16	0.16	1.38
2037-2038	Cash Flow	37.97	17	0.15	5.53
2038-2039	Cash Flow	41.44	18	0.13	5.39
2039-2040	Cash Flow	39.35	19	0.12	4.57
2040-2041	Cash Flow	42.60	20	0.10	4.42
2041-2042	Cash Flow	46.37	21	0.09	4.29
NPV=					65.02

The payback period observed from the cash flow is 16.20 years after construction period.

8. CONCLUSION

- 8.1 The concession period of project is 22 years. The Net present Value of the project highway works out to be 62.02 Crores. The payback period of the project is 16.20 years. Hence, the project is financially viable. The project can be taken up on BOT basis.
- 8.2 From the traffic projection data, it is cleared that the 4 lane carriageway configuration is sufficient for next 22 years.
- 8.2 The project road is important link to connect with Mumbai – Ahmedabad highway, NH-48 (old NH-8) at Manor and Mumbai – Nashik highway, NH-160 (old NH-3) at Bhiwandi.
- 8.3 There are many small and large scale industries along the project highway. After the improvement of the road it will also help in industrial development.
- 8.4 Villages along the project highway will get the employment when the project will be started. Availability of workers will not be a huge problem.

- 8.5 When the project road is improved, it will enable much lower travel time, transportation cost and improved riding comfort. This would attract traffic from surrounding road network of the project road.

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