

Operation & Maintenance Report- FY2027

**Upgradation to Two Lane with paved
shoulders under Package HAM-AM-2
in the State of Maharashtra under
MRIP on Hybrid Annuity Mode: AM2**

**SAMARTH INFRAENGG Technocrats
Private Limited**



May 2026

-TABLE OF CONTENTS-

Operation & Maintenance Report, FY2027- AM2	1
1.1 PROJECT AT GLANCE	3
1.2 SCOPE OF SERVICES	6
1.3 REVIEW OF CONCESSION AGREEMENT	6
1.4 REVIEW OF PAVEMENT DESIGN	9
1.5 MAINTENANCE REQUIREMENTS:	13
1.6 OVERVIEW OF THE PACKAGES	13
✓ Package 1: SH-312, Daryapur-Mhaisang and SH-280, Akola-Mhaisang	13
✓ Package 2: SH-282, Anjangaon to Daryapur section	17
✓ Package 3: SH-282, Daryapur-Murtizapur	20
✓ Package 4: SH-47, Daryapur-Waigaon	23
✓ Package 5: Amaravati- Kurha- Kaundynapur	27
✓ Package 6: Asara -Bhatkuli- Amaravati	30
✓ Package 7: Amaravati- Chandur bypass- Dhamangaon	35
✓ Package 8: Chikaldhara-Paratwada, Chikaldhara -Ghatang	39
✓ Package 9: Morshi- Dapori & Warud -Jarud- Haterna	42
1.7 ROAD & STRUCTURE INVENTORY	45
✓ Package 1: SH-312, Daryapur-Mhaisang and SH-280, Akola-Mhaisang	45
✓ Package 2: SH-282, Anjangaon to Daryapur section	46
✓ Package 3: SH-282, Daryapur-Murtizapur	48
✓ Package 4: SH-47, Daryapur-Waigaon	49
✓ Package-5: Amaravati- Kurha- Kaundynapur	51
✓ Package-6: Asara -Bhatkuli- Amaravati	53
✓ Package-7: Amaravati- Chandur bypass- Dhamangaon	55
✓ Package-8: Chikaldhara-Paratwada, Chikaldhara -Ghatang	56
✓ Package-9: Morshi- Dapori & Warud -Jarud- Haterna	58
1.8 COSTING	60
1.9 RATE ANALYSIS	61
1.10 IMMEDIATE REPAIRS COSTS	63
1.11 ROUTINE MAINTENANCE& INCIDENT MANAGEMENT COSTS	63
1.12 OPERATIONS COSTS	67
1.13 PERIODIC MAINTENANCE COSTS	68
1.14 TOTAL OPERATION & MAINTENANCE COSTS	69

LIST OF TABLES

Table 1: Package-wise Length and Achieved PCOD Length	2
Table 2: List of Project Corridor Details	3
Table 3: Independent Engineer details for Packages	4
Table 4: Chronology of Project Milestones	5
Table 5: Package-9, Project Road configuration	42
Table 6: Package-1, Details of Road Inventory	45
Table 7: Package-1, Details of Structures	46
Table 8: Package-2, Details of Road Inventory	47
Table 9: Package-2, Details of Structures	48
Table 10: Package-3, Details of Road Inventory	48
Table 11: Package-3, Details of Structures	49
Table-12: Package-4, Details of Road Inventory	50
Table-13: Package-4, Details of Structures	51
Table -14: Package-5, Detail of Road Inventory	51
Table-15: Package-5, Details of Structures	52
Table-16: Package-6, Details of Road Inventory	53
Table-17: Package-6, Details of Structures	54
Table 18: Package-7, Details of Road Inventory	55
Table-19: Package-7, Details of Structures	56
Table-20: Package-8, Details of Road Inventory	57
Table -21: Package-8, Details of Structures	57
Table 22: Package-9, Details of Road Inventory	58
Table-23: Package-9, Details of Structures	59
Table-24: Summary of Unit Rates (excluding GST)	61
Table 25: Summary of Major Material Rates (excluding GST)	62
Table-26: 1st year O&M Costs (including GST)	67
Table-27: Summary of Major Maintenance Costs	68
Table-28: Cost Abstract	69

Operation & Maintenance Report, FY2027- AM2

The Public Works Department, Government of Maharashtra (the “**Authority**”) is engaged in the development, maintenance and management of State Highways and Major District Roads in Maharashtra and upgrading to Two Lane with paved shoulders as part of this endeavor, the Authority has decided to undertake following roads:

1. Improvement to Roads joining District place in Akola District (Akola Mhaisang Daryapur) (SH 280, SH 312 length 41.59km),
2. Improvement to Roads joining Taluka place in Akola and Amravati District (Anjangaon Daryapur) (SH 282 length 26.80 km)
3. Improvement to Roads joining Taluka place in Akola and Amravati District (Daryapur Murtizapur) (SH 282 Length 22.42 km)
4. Improvement to Roads joining District place in Amaravati District (Daryapur Walgaon) (SH 47, length 44.15km)
5. Improvement to Amravati Mardi Kurha Kaundynapur up to District Border Road in Amaravati District Joining Kaundinyapur Holy place to Amaravati Dist. HQ (SH 280, SH 300 & SH 294)
6. Improvement to Amravati-Bhatkuli-Asara Road joining Bhatkuli Taluka HQ to Amaravati District HQ of (SH280)
7. Improvement to Amravati Chandur Railway Dhamangaon Road in Amravati Dist. Joining Chandur railway & Dhamangaon Taluka HQ to Amravati Dist. HQ (SH 297 &296)
8. Improvement to Roads for Chikaldara Hill Station in Amravati District (Paratwada Chikhaldara Ghatang Road) and
9. Improvement to Roads joining District place in Amravati District (Warud Gavankund Bahada Jarud Mangruli Kachurna Haterna and Morshi Pala Salbardi Dongaryavali Dapori)

The “**Project**” herewith referred as AM-2 in the State of Maharashtra on Design, Build, Operate and Transfer (“**DBOT**”) “Hybrid Annuity” basis for a total length of 352.15km. The Authority had accordingly invited the bid proposals and upon the evaluation of received bids, the Authority has awarded the Project to **M/s Welspun Enterprises Limited**.

Consequent to this, **M/s Welspun Enterprises Limited**, formed a Special Purpose Vehicle (SPV) in the name of **Welspun Road Infra Private Limited (Concessionaire)** for implementation/execution of the project.

Table 1: Package-wise Length and Achieved PCOD Length

Pkg	SH/MDR Nos	Length of Project As per CA			PCOD achieved length,			Pending Length for PCOD
		From Km	To Km	Length Km	From Km	To Km	Length Km	
Pkg-1	SH-280	0	25.1	41.59	0	25.1	41.59	-
	SH-312	0	16.49		0	16.49		
Pkg-2	SH-282	1	27.885	26.89	1	27.885	26.89	-
Pkg-3	SH-282	27.885	50.22	22.34	27.885	50.22	22.34	-
Pkg-4	SH-47	180	224.15	44.15	180	224.15	44.15	-
Pkg-5	SH-280	95	123.675	41.08	95	123.675	41.08	-
	SH-300	56.3	58.45		56.3	58.45		
	SH-294	41.8	52.05		41.8	52.05		
Pkg-6	SH-280	65.25	93.65	28.40	65.25	93.65	28.40	-
Pkg-7	SH-297	3	28.85	48.85	3	28.85	48.85	-
	ChundurBYP	0	4.7		0	4.7		
	SH-296	26.5	44.8		26.5	44.8		
Pkg-8	SH-305	24	56.338	52.57	24	56.338	52.57	-
	MDR-08	0	20.236		0	20.236		
Pkg-9	MDR-66	0	15.652	46.31	0.00	15.652	46.31	-
	MDR-45	0	15.443		0	15.443		
	MDR-45	15.443	30.653		15.443	30.653		
Total length of Packages				352.15	Achieved PCOD Length		352.15	-

The Concessionaire has achieved PCOD-1 for a length of 296.77 km on 11th Nov 2021 against the total Length of 352.15 km. Finally, completion certificate achieved for full length on 29th July 2022.

This project road is acquired by M/s Actis GP LLP and is presently under Operation and Maintenance phase.

Actis GP LLP Ltd has engaged M/s Samarth Infra-engg Technocrats to undertake due-diligence study for self-assessment and/or for its Concessioning Authority and/ or for InvIT purpose and/ or for its present/ future investors/ lenders whom this Report will be presented as Vendors Technical Due Diligence Report.

This report is the updated Due diligence report incorporating the improvements and developments and then to evaluate the asset condition and work out O&M Cost, Major Maintenance cost and additional facilities cost/improvement works of the project during the Concession period.

1.1 PROJECT AT GLANCE

The project, AM-2, consists of nine (9) package and covers seventeen (17) road sections in Amaravati Dist. and Akola Dist. These roads are part of few State Highways (SH) and Major District Roads (MDR). Most length of packages runs through plain and rolling terrain, except Package-8, Chikhaldara which is on hilly station passes through forest lands. Intermittent lengths of Package-5,6 & 7 also consists of forest lands.

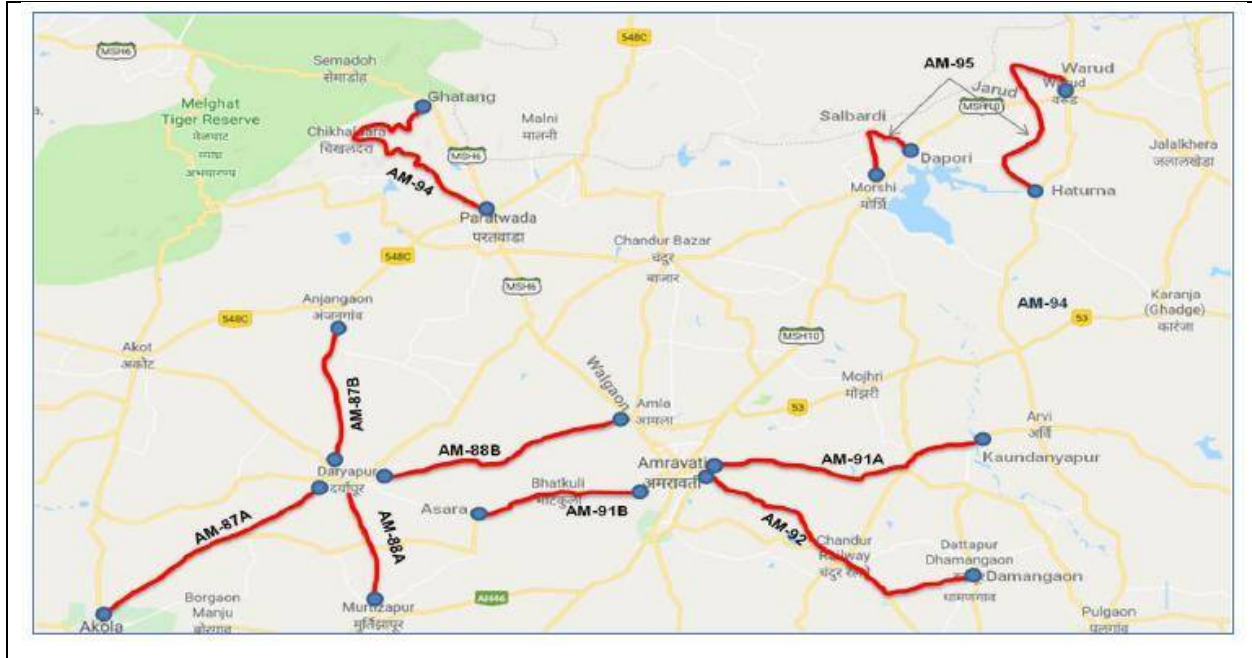
Table 2: List of Project Corridor Details

Pkg	Description	Length (Km)
Pkg-1	AM- 87A: Improvement to Roads joining District place in Akola District (Akola Mhaisang Daryapur) (SH 280 SH-312 Length 41.59 Km)	41.59
Pkg-2	AM- 87B: Improvement to Roads joining Taluka place in Akola and Amravati District (Anjangaon Daryapur) (SH 282 Length 26.80 Km)	26.8
Pkg-3	AM- 88A: Improvement to Roads joining Taluka place in Akola and Amravati District (Daryapur Murtizapur) (SH 282 Length 22.42 Km)	22.42
Pkg-4	AM- 88A: Improvement to Roads joining District place in Amravati District (Daryapur Walgaon) (SH47 Length 44.15 Km)	44.15
Pkg-5	AM- 91A: Improvement to Amravati Mardi Kurha Kaundynapur up to District Border Road in Amravati District Joining Kaundynapur Holy place to Amravati Dist. HQ (SH 280, SH 300 & SH 294). Length- 39.70 Km.	39.7
Pkg-6	AM- 91B: Improvement to Amravati-Bhatkuli-Asara Road joining Bhatkuli Taluka HQ to Amravati District HQ of (SH-280). Length- 28.92 Km.	28.92
Pkg-7	AM- 92: Improvement to Amravati Chandur Railway Dhamangaon Road in Amravati Dist. Joining Chandur Railway & Dhamangaon Taluka HQ to Amravati Dist. HQ (SH 297& 296). Length - 49.7 Km.	49.7
Pkg-8	AM- 94: Improvement to Roads for Chikhaldara Hill Station in Amravati District. (Paratwada -Chikhaldara - Ghatang Road) (SH-305, MDR-8). Length - 52.574 Km.	52.574
Pkg-9	AM- 95: Improvement to Roads joining District place in Amravati District. (Warud - Gavankund -Bahada - Jarud - Mangruli - Kachurna - Haturna and Morshi - Pala - Salbardi - Dongaryavali - Dapori) (MDR-66, MDR-45). Length - 46.305 Km.	46.305
TOTAL (Km)		352.15

Table 3: Independent Engineer details for Packages

Consultants	Package 1 to 4 & 9	Package 5 to 7	Package 8
Independent Engineer	G-Eng. Advisory Services Pvt Ltd JV Global Infra Solutions	AICON Engineering Pvt Ltd JV Real Strength Infrastructure	MS Consultant JV Krishna Techno Consultants

The locations of all packages shown on the map are as follows:



Photographs showing the various corridors of the project road are presented below:



A view of Project Road with 7.0m wide at Km:
4.000_SH-312, Package-1



A view of Project Road Km: 1.000 -Package 2



A view of Project Road Km: 27.885, Package-3



A view of Project Road Km: 181.100, Package 4



A view of Project Road Km: 69.145, Package 6



A view at Km: 29.600 -SH-296-Package 7

Following Table highlights the total project at a glance:

Table 4: Chronology of Project Milestones

SI No.	Description	Date
1.	Date of Signing the Concession Agreement	10 th Jan 2019
2.	Appointment Date	28 th May 2019
3.	Scheduled Project completion	27 th May 2021
4.	Scheduled End of Concession	12 years from Appointed date
5.	Date of issue of Provisional Completion Certificate	11 th Nov 2021
6.	Date of Issue of Final Completion Certificate	29 th July 2022
7.	Scheduled End of Concession Period Date	28 th May 2031

1.2 SCOPE OF SERVICES

The main objective of the study is to review the current status of project corridor including details pertaining to its construction and maintenance and to provide requisite technical due diligence for said project.

The scope of services as defined in the “terms of reference” for consultants is as below:

- Updating the inventory of Highway & Structures based on latest improvements in the project based on the discussions and data provided by project managers.
- Reviewing and updating the immediate repair works cost based on discussion with site team
- Revising the MMR based on any latest field investigation reports provided by client
- Preparation of detailed O&M & MMR cost estimate as per latest labour wages and material rates
- Preparation of detailed project report for each project
- Scope includes submission of project wise Annual Valuation Report including the revision of such reports based on discussion with your team.

1.3 REVIEW OF CONCESSION AGREEMENT

- 1) Concession Parties and date of execution of Agreement: PWD and WRIPL entered into the Concession Agreement on 10th Jan, 2019.
- 2) Appointed Date, Commercial Operation Date (Article 4, Article 15): The Concession Agreement was signed on 10th Jan, 2019. The Appointed Date as per the definition in the Concession Agreement would be required to be achieved by 09th June 2019. The same has been declared as 28th May 2019 with the approval of the competent authority vide letter no 2345/TC date 28th May 2019. Financial Closure occurred on 01st May 2019. The Concession Period is 12 years from the Appointed Date. Based on the aforesaid, it appears that there has been no delay in achieving the Appointed Date.
- 3) Concession Period (Clause 3): This includes Construction Period of 730 days and Operation Period of 10 years commencing from COD. As the Appointed Date is declared on 28.05.2019 and accordingly the expiry date of the Concession Period would be 27.05.2031. Due to COVID-19 outbreak under Force Majeure head in accordance with the clause 28.6.2 of the Concession Agreement, the Concession period would be extended beyond the Scheduled end of Concession Period by 184 days, ie., 10.11.2031.
- 4) Obligations of Concessionaire & Authority (Article 5 & 6): The Concessionaire and Authority have fulfilled most of the obligations. **Superintending Engineer, PWD, Amaravati**, in his letter no 2170/HAM dt 22.04.2021 to CE, **Public Works Region, Amaravati** has recommended an EOT of 184 days as per Maharashtra Govt. GR dated 29.7.2020 for the projects on the request of the Contractor under construction and no penalty would be imposed as consequence of such action.

Further 2nd EOT for 153 days has been requested by SPV considering Covid 2nd wave. Approval from authority for the same is not known. No further documentation is available regarding EOT. It is required to get the proper documents to understand EOT clearly from concessionaire.

- 5) Change in Ownership (Clause 5.3 read with Clause 7.1(k)): The Concessionaire shall not undertake or permit any Change in Ownership except with the prior approval of the Authority.
- 6) Performance Security (Article 9): The performance security is Rs 73.00Cr. The Concessionaire has fulfilled this condition. The YES bank of India has furnished the Bank Guarantee by way of Performance Security on 16.01.2019.
- 7) Right of Way (Article 10): If the Authority is unable to provide the remaining site within 180 days from the Appointed Date, the remaining Site of the Project Highway shall be removed from the scope of the work under the provision of Change of Scope. Right of Way is granted within 180 (one hundred and eighty) days of the Appointed Date shall be completed on or before the Scheduled Completion Date.
- 8) Scheduled Completion Date (Schedule-G, Article12): Construction period 730 days from the appointed date i.e., schedule date of completion is on 27th May 2021. As 184 days EOT granted by Maharashtra Govt due to COVID outbreak, the revised schedule date of completion is on 27th Nov'2021. Further, EOT-2 obtained upto 29th Apr 2022.

Mile Stone-I: Achieved on 04.11.2019 (As per CA Sch-G, Scheduled Completion Date is 24.11.2019 i.e., 180th day from Appointed Date)

Mile Stone-II: Achieved on 30.01.2020 (As per CA Sch-G, Scheduled Completion Date is 01.07.2020 i.e., 400th day from Appointed Date)

Mile Stone-III: Achieved on 30.11.2020 (As per CA Sch-G, Scheduled Completion Date is 17.01.2021 i.e., 600th day from Appointed Date)

- 9) Provisional Certificates, Completion Certificate and Punch List Items (Article 14 & Article 15): The Concessionaire has achieved PCOD for a length of 296.77 km on 11th Nov 2021 for Package 1 to 4 & 9 respective vide IE letter Nos is 365/Geng JV Global/ IE/Amravati/2021 dated 11th Nov 2021 and for Package 5,6 & 7 is RSI/TL/ WRIPL/HAM/ AM91(A&B),92/483 dated 11th Nov 2021. For Package-8 there is no PCOD achieved. The total length of the Project is 352.15 km out of which PCOD achieved for a length of 296.77km (The Punch List appended to the PCODs consists of (i) List A- items that were required to be completed within ninety (90) days (ii) List B-Items to be completed within a reasonable time period as assessed by IE. Finally, completion certificate achieved for full length on 29th July 2022.
- 10) Change of Scope (Article 16): Chief Engineer, P.W region has power of approval of change of scope subject to that no increase in scope by 5% of Bid project cost. If concessionaire fail to complete works on account of Force Majeure or for reasons attributable to Authority, the process of calculation of total cost of reduced scope shall be as per clause 16.6.1. If change of scope leads to a reduction or increase in the length of Project Highway, the O&M Payments as provided in Clause 23.7 shall be reduced or increased in proportion to reduction or increase in the length of Project Highway.

Package 5 and 7, additional works of 83.11 Crore as change of scope issued by Executive Engineer vide ref:3084/aud/20-21 dated 15.07.2020.

- 11) O&M Obligations of the Concessionaire (Article 17): Concessionaire has to fulfil the all the obligations during O&M operations. Maintenance Program to comply with the Maintenance Requirements, Maintenance Manual and Safety Requirements shall be provided On or before

COD and no later than 45 days prior to the beginning of each Accounting Year during the Operation Period. Irrespective of condition of the road, there shall be special maintenance in year 3 and year 7 from date of COD.

3rd year: Treatment of entire length by using Micro Seal Surfacing.

7th year: renewal of entire length by using 40mm thick bituminous concrete

Concessionaire fails to repair or rectify any defect or deficiency set forth in the Maintenance Requirements within the period specified period, Authority shall be entitled to recover Damages, to be calculated and paid for each day of delay until the breach is cured, at the higher of (a) 2% of the Performance Security, and (b) 0.1% of the cost of such repair or rectification as estimated by the Independent Engineer.

- 12) Remuneration of IE (Article 21): One half of the IE Fee shall be borne by Concessionaire.
- 13) Financial Close (Article 22): Given that the Concession Agreement was executed on 10th Jan 2019, the Financial Close was required to be achieved on or before 09th June 2019 considered 150 days period. The financial closure had occurred 01st May 2019. As, the appointed date was declared well within the time frames, there was no damages levied to both the parties by either party (Authority issued letter regarding Financial Close is not available in the correspondences)
- 14) Payment of Bid Project Cost (Article 23): 60% of Bid Project Cost, adjusted for Price Index multiple, shall be payable to Concessionaire in 5 equal installments of 12% each during construction period. The remaining 40% of Bid Project Cost, adjusted for Price Index multiple, shall be payable in 20 biannual installments commencing from 180th day of COD.
- Expenses in excess of O&M payments shall be borne by Concessionaire. O&M payments due payable to the Concessionaire shall be paid in 2 equal biannual installments and disbursed by the Authority together with corresponding installments of Annuity payments.
- 15) Insurance (Article 26): The Concessionaire has been fulfilling this obligation.
- 16) Force Majeure (Article 28): As per Clause 28.6.2, at any time after the Appointed Date, if any Force Majeure Event occurs) before COD, the Concession Period and the dates set forth in the Project Completion Schedule shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; or (b) after COD, the Concessionaire shall be entitled to receive Annuity payments plus interest due and payable under this Agreement.
- Due to COVID-19 outbreak under Force Majeure event in accordance with the clause 28.6.2 of the Concession Agreement, Concession period has been extended beyond the Scheduled end of Concession Period by 184 days.
- 17) Change in Law (Article 35): Change in law occurred due to eruption of COVID-19 and its impact by way of change in legislations by both the Central Government and respective State Governments.
- 18) Dispute resolution (Article 38): Any dispute not resolved amicably by conciliation, arbitration shall be held in accordance with Arbitration and Conciliation Act,1996. Place of such arbitration shall be the Mumbai and the language of arbitration proceedings shall be English. There are no disputes referred so far under the article 38.

1.4 REVIEW OF PAVEMENT DESIGN

✓ Manual of Specification and Standards

The Schedule-D states that “Two/Four-laning of the Project Highway shall conform to the Manual for Specifications and Standards for Hybrid Annuity Projects & IRC SP:73-2015 manual for Two laning State Highways published by the authority/MOSRTH*.

✓ Review of CA stipulations for Pavement Design

- Annexure-I of Schedule-B Clause 4.9 states that “Pavement design shall be in accordance with section 5 sub para 5.2.3” - Package-1 to Package-9. However, there is no such Clause no 5.2.3 in the Manual.
- For Design Traffic, Clause 5.4.1 of IRC SP 73-2015 states “Flexible pavement shall be designed for a minimum design period of 15 years, subject to the condition that Design Traffic shall not be less than 20 MSA”.

✓ Concessionaire’s Pavement Design

The Project involved construction of flexible & rigid pavements. Design of New construction was carried out in accordance with IRC 37. The pavement layer for new construction has been designed for 15-year design traffic both for the Bituminous layers and base and sub base layers.

The details such as applicable manual, minimum mSA as per manual, minimum crust for new carriageway & overlay on existing carriageway as per CA, Concessionaire’s Design CBR, design loading in mSA and crust considered in the project - package wise are furnished in the Tables below.

❖ Package 1 to 4

Sl.No	Description	Package-1	Package-2	Package-3	Package-4
1	As per CA				
(a)	Applicable Manual	Manual - IRC SP 73-2015.			
	Applicable Clause	Annexure-I of Schedule-B Clause 4.9 states that pavement design shall be in accordance with section 5 sub para 5.2.3. However, there is no clause as 5.2.3 in the Manual.			
(b)	MSA as per Manual	MSA shall not be less than 20 MSA as per clause 5.4.1			
(c)	Minimum Crust in Pavement Design clause in CA				
(i)	Flexible Pavement	Not given	Not given	Not given	Not given
(ii)	Overlay thickness	Not given	Not given	Not given	Not given
(iii)	Rigid Pavement	Not given	Not given	Not given	Not given
(d)	Crust shown in TCS drawings				
(i)	Flexible Pavement	40+50+250+200	40+65+250+200	40+65+250+200	40+65+250+200
(ii)	Overlay thickness	NA	40+65	40+65	40+65
(iii)	Rigid Pavement	250+100+200	250+100+200	250+100+200	250+100+200
(iv)	CBR in %	10	10	10	10
2	As per Pavement Design Report				
(a)	Design Period	15	15	15	15
(b)	Actual MSA	2.6	5.52	7.18	5.55
	Design MSA considered	10	10	10	10
(c)	CBR in %	10	10	10	10
(d)	Flexible Pavement Design BC+DBM+WMM+GSB	40+50+250+200	40+50+250+200	40+50+250+200	40+50+250+200
(e)	Overlay Design	NA	Not Available	Not Available	Not Available
(f)	Rigid Pavement Design PQC+S Layer+DLC+GSB	250+125+100+200	250+125+100+200	250+125+100+200	250+125+100+200
(g)	Remarks	Pavement Design as per IRC 37-2012, for 20 MSA with 10% CBR is as 40+65+250+200. Adopted crust 40+50+250+200 thickness will satisfy 15 MSA			

❖ Package 5, 6 & 7

Sl.No	Description	Package-5	Package-6	Package-7
1	As per CA			
(a)	Applicable Manual	Manual - IRC SP 73-2015.		
	Applicable Clause	Annexure-I of Schedule-B Clause 4.9 states that pavement design shall be in accordance with section 5 sub para 5.2.3. However, there is no clause as 5.2.3 in the Manual.		
(b)	MSA as per Manual	MSA shall not be less than 20 MSA as per clause 5.4.1		
(c)	Minimum Crust in Pavement Design clause in CA			
(i)	Flexible Pavement	40+80+250+260	40+65+250+260	40+80+250+260
(ii)	Overlay thickness	40+80	-	40+80
(iii)	Rigid Pavement	280+100+200	280+100+200	280+100+200
(d)	Crust shown in TCS drawings			
(i)	Flexible Pavement	40+80+250+260	40+65+250+260	40+80+250+260
(ii)	Overlay thickness	40+80	40+65	40+80
(iii)	Rigid Pavement	280+100+200	280+100+200	280+100+200
(iv)	CBR in %	8	8	8
2	As per Pavement Design Report			
(a)	Design Period	15	15	15
(b)	Actual MSA	25.98/14.06	2.24	2.76
	Design MSA considered	30/20	20	20
(c)	CBR in %	9/8	9	8
(d)	Flexible Pavement Design BC+DBM+WMM+GSB	40+80+250+260	40+65+250+260	40+80+250+260
(e)	Overlay Design	40+80	40+65	40+80
(f)	Rigid Pavement Design PQC+S Layer+DLC+GSB	280+100+200	280+100+200	280+100+200 and 250+100+200
(g)	Remarks	Pavement Design as per IRC 37-2012, for 30mSA/20mSA with 9% & 8% CBR is 40+80+250+260 (mentioned as minimum thickness).	The adopted crust i.e., 40+65+250+260 satisfies 20 MSA with 9% CBR as per IRC 37-2012.	

❖ Package 8 & 9

Sl.No	Description	Package-8	Package-9
1	As per CA		
(a)	Applicable Manual	Manual - IRC SP 73-2015.	
	Applicable Clause	Annexure-I of Schedule-B Clause 4.9 states that pavement design shall be in accordance with section 5 sub para 5.2.3. However, there is no clause as 5.2.3 in the Manual.	
(b)	MSA as per Manual	MSA shall not be less than 20 MSA as per clause 5.4.1	
(c)	Minimum Crust in Pavement Design clause		
(i)	Flexible Pavement	Not given	Not given
(ii)	Overlay thickness	Not given	Not given
(iii)	Rigid Pavement	Not given	Not given
(d)	Crust shown in TCS drawings		
(i)	Flexible Pavement	25+50+250+150	25+50+250+150
(ii)	Overlay thickness	25+50	25+50
(iii)	Rigid Pavement	300+100+200	300+100+200
(iv)	CBR in %	-	-
2	As per Pavement Design Report		
(a)	Design Period	15	Not Available
(b)	Actual MSA	8.13	Not Available
	Design MSA considered	10	Not Available
(c)	CBR in %	10	9
(d)	Flexible Pavement Design BC+DBM+WMM+GSB	40+50+250+150	30+50+250+200
(e)	Overlay Design	40+50	30+50
(f)	Rigid Pavement Design PQC+S Layer+DLC+GSB	250+100+200	270+100+200 (submitted but kept hold)
(g)	Remarks	Pavement Design as per IRC 37-2012, for 20 MSA with 10% CBR is as <u>40+70+250+150</u> However, 40+50+250+150 crust is adopted which satisfy 13 MSA with 10% CBR	Pavement Design as per IRC 37-2012, for 20 MSA with 9% CBR is as <u>30+80+250+200</u> However, 30+50+250+200 crust is adopted which satisfy 10 MSA

1.5 MAINTENANCE REQUIREMENTS:

As per Schedule-K

S. No	Description	Length (Km)	Lanes	Applicable Schedule for O&M	Maximum Roughness Allowed
1	AM-2	352.15	2L/ 2LPS	Schedule-K	2750 mm/Km

As per Manual, IRC SP:73-2015:

S. No	Description	Length (Km)	Lanes	New pavement roughness in each lane	Maximum allowable deflection	Frequency of Roughness Test	Frequency of FWD Test
1	AM-2	352.15	2L/ 2LPS	2000 mm/Km	1.2mm	Twice a Year	In every 5 Years

1.6 OVERVIEW OF THE PACKAGES

✓ **Package 1: SH-312, Daryapur-Mhaisang and SH-280, Akola-Mhaisang**

Package-1, comprises two state highways SH-312 (Daryapur-Mhaisang, km0 to km16.49) and SH-280 (Akola-Mhaisang, km0- km25.1) of length 16.49 km and 25.1km respectively, with the total length of 41.59km. The PCOD obtained on 11th Nov 2021 for a length of 41.012km. Further received Completion Certificate on 29th July 2022 for full length.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 10m Rigid pavement.

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-280, Length (km)	SH-312 Length (km)
2-Lane	7	Flexible	22.200	15.69
2-Lane with PS	10	Rigid	2.900	0.800
			25.1	16.49
Total			41.59	

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Akola, Ghusar, Aapatapa, Ambikapur, Ramthirth etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations

Typical view of project road is shown below:



A view of Project Road with 7.0m wide at Km:
1.000_SH-312



A view of Project Road with 7.0m wide at Km:
4.000_SH-312



A view of the Project Road with 7.0m wide With at
Km: 17.000_SH-280



A view of the Project Road with 7.0m wide With at
Km: 13.000_SH-280

The Project Road has 2 Major junctions and 25 minor junctions in SH-280 and 1 Major junction and 11 minor junctions in SH-312 along the project road.

Photographs showing Junctions are presented below:



Minor Junction at km 15.750 RHS_Sh-312



Minor Junction at km 49.400 LHS_SH-312



Minor Junction at km 6.550 LHS_Sh-312



Minor Junction at km 24.640 LHS_Sh-280



Minor Junction at km 20.640 LHS_SH-280



Minor Junction at km 14.840 RHS_SH-280



Minor Junction at km 1.200 RHS_SH-280



Major Junction at km 0.000 LHS_SH-280

All together the Project Road has about 15 no's Bus bays with shelters in SH-280 and 09 no's Bus bays with shelters in SH-312 along the project corridor. Few photos taken at the bus shelters and bus bays are presented below:



Bus shelter @ Km 9.600 -LHS_SH-312



Bus shelter @ Km 6.200-LHS_SH-312



Bus Bay with Bus shelter @ Km 20.700-RHS_SH-280



Bus Bay with Bus shelter @ Km 19.000-RHS_SH-280

✓ **Package 2: SH-282, Anjangaon to Daryapur section**

Package-2, is a part of state highway SH-282(Anjangaon to Daryapur section, km1 to km27.89) with the total length of 26.89km. The PCOD obtained on 11 Nov 2021 for a length of 26.65km. Further received Completion Certificate on 29th July 2022 for full length.

The most length of project corridor has flexible pavement with 7.0m wide plus 1.5m-2.5m earthen shoulder on each side, whereas, in Built-up sections, it has 15m Rigid/Flexible pavement.

Pavement Configuration	Carriageway width, m	Flexible/Rigid	Length (km)
2-Lane	7	Flexible	25.000
4-lane (Rigid)	15	Rigid	1
4-lane (Flexi)	15	Flexible	0.885
Total			26.885

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like hantoda, Vihigaon, Parlhaddpur, Saidapur, Wadal, Antargaon and Babhali etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations.

Typical view of project road is shown below:



A view of Project Road Km: 1.000



A view of Project Road Km: 6.000



A view of Project Road Km: 12.000



A view of Project Road Km: 18.000

The Project Road has 2 major junctions and 20 minor junctions along the project road.

Photographs showing Junctions are presented below:



Minor Junction at km 1+800 - LHS



Minor Junction at km km 4+000 - RHS



Minor Junction at km 5+920 - RHS



Minor Junction at km 6+040 - LHS



Minor Junction at km 8+680 - LHS



Minor Junction at km 10+460 - RHS



Minor Junction at km 11+820 - LHS



Minor Junction at km 14+060 - LHS

All together the Project Road has about 16 nos Bus bays, 3 nos with only Bus shelters along the project corridor.

Few photos taken at the bus shelters and bus bays are presented below:



Bus bay @ Km 14.000



Bus bay @ Km 17.500



Bus Bay with Bus Shelter @ Km 19.350 (Bus Shulter Under Construction)



Bus Bay with Bus shelter @ Km 23.200

✓ Package 3: SH-282, Daryapur-Murtizapur

Package-3, is a part of state highway SH-282 (Daryapur-Murtizapur, km27.885 to km50.22) with the total length of 22.34km. The PCOD obtained for this full length on 11 Nov 2021. Further received Completion Certificate on 29th July 2022 for full length.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Daryapur village Built-up section, it has 15m Rigid pavement.

Pavement Configuration	Carriageway width, m	Flexible/Rigid	Length (km)
2-Lane	7	Flexible	21.22
2-lane with PS (Rigid)	10	Rigid	0.40
4-lane (Rigid)	15	Flexible	0.715
Total			22.335

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Panora Fata, Takli, Durgwada, Rasulpur Fata etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations. Maximum embankment height is observed near ROB locations.

Typical view of project road is shown below:



A view of Project Road Km: 27.885



A view of Project Road Km: 28.000



A view of Project Road Km: 34.000



A view of Project Road Km: 42.000

The Project Road has 3 major junctions and 15 minor junctions along the project road.

Photographs showing Junctions are presented below:



Major Junction at km 27+885 -BHS



Major Junction at km 49+400 -LHS



All together the Project Road has about 7 no's Bus bays with shelters, 04 no's only Bus Shelters.
Few photos taken at the bus shelters and bus bays are presented below:



✓ **Package 4: SH-47, Daryapur-Waigaon**

Package-4, comprises state highway SH-47 (Daryapur-Waigaon, km180 to km224.15) with the total length of 44.15km. The PCOD obtained for full length on 11 Nov 2021. Further received Completion Certificate on 29th July 2022 for full length.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 4lane m Rigid pavement.

Pavement Configuration	Carriageway width, m	Flexible/Rigid	Length (km)
2-Lane	7	Flexible	40.850
4-lane (Rigid)	14	Rigid	2.00
4-lane (Flexi)	14	Flexible	1.300
Total			44.150

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Daryapur, kapshi, Shahpur, Ahmadpur, Arala, ZANJI and Wandi etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations.

Typical view of project road is shown below:



A view of Project Road Km: 224.000



A view of Project Road Km: 218.000



A view of Project Road Km: 181.100



A view of Project Road Km: 182.800

The Project Road has 3 major junctions and 33 minor junctions along the project road.

Photographs showing Junctions are presented below:



Major Junction at km 182+400 -BHS



Major Junction at km 224+150 -BHS



Minor Junction at km 223.630



Minor Junction at km 217.00 -RHS



Minor Junction at km km 213.180 -LHS



Minor Junction at km km 203.300-LHS



Minor Junction at km 196.00-LHS



Minor Junction at km 188.640-RHS

All together the Project Road has about 16 nos. Bus bays with shelters and 02 nos. Bus Shelters.

Few photos taken at the bus shelters and bus bays are presented below:



Bus bay with Bus shelter @ Km 193.720-LHS



Bus bay @ Km 195.200-LHS



Bus bay with Bus shelter @ Km 201.050-RHS



Bus Bay with Bus shelter @ Km 217.250-RHS

✓ **Package 5: Amaravati- Kurha- Kaundynapur**

Package-5, comprises three state highways, SH-280 (Amaravati- Kurha, km95 to km123.675), SH-300 (Kurha town, km56.3- km58.45) and SH-294 (Kurha - Kaundynapur, km41.8- km52.05) of length 28.68 km, 2.15 km and 10.25 km respectively with the total length of 41.08 km. The PCOD obtained on 11 Nov 2021 for 41.035 km length. Further received Completion Certificate on 29th July 2022 for full length.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 4lane m Rigid pavement.

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-280 Length, km	SH-300 Length, km	SH-294 Length, km
2-Lane	7	Flexible	22.575	0.350	8.700
2-Lane with PS	10	Flexible	5.350	0.650	0.500
2-Lane with PS	10	Rigid			1.050
4-lane (Rigid)	15	Rigid	0.750		
4-lane (Flexi)	15	Flexible	-		
4-lane with PS (Flexi)	19	Flexible	-	1.150	
			28.675	2.150	10.250
Total			41.075		

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Amravati, Parsoda, Diwankhed, Pimplekuta, Mardi, Virgavhan, Kondnyapur and Kurha etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations.

Typical view of project road is shown below:



A view of Project Road at Km: 43.000_SH - 294



A view of Project Road at Km: 50.000_SH - 294



A view of the Project Road at Km: 57.700_SH - 300



A view of the Project Road at Km: 58.000_SH - 300



A view of the Project Road at Km: 97.000_SH - 280



A view of the Project Road at Km: 107.000_SH - 280

The Project Road has 8 major junctions and 28 minor junctions along the project road.

Photographs showing Junctions are presented below:



Major Junction at km 46.400 - RHS_SH - 294



Minor Junction at km 51.185 - LHS_SH - 294



Minor Junction at km 57.985 - LHS_SH - 300



Minor Junction at km 58.134 - LHS_SH - 300



Minor Junction at km 95.450 - RHS_SH - 280



Minor Junction at km 106.900 - LHS_SH - 280

All together the Project Road has about 19 nos Bus bays with shelters.

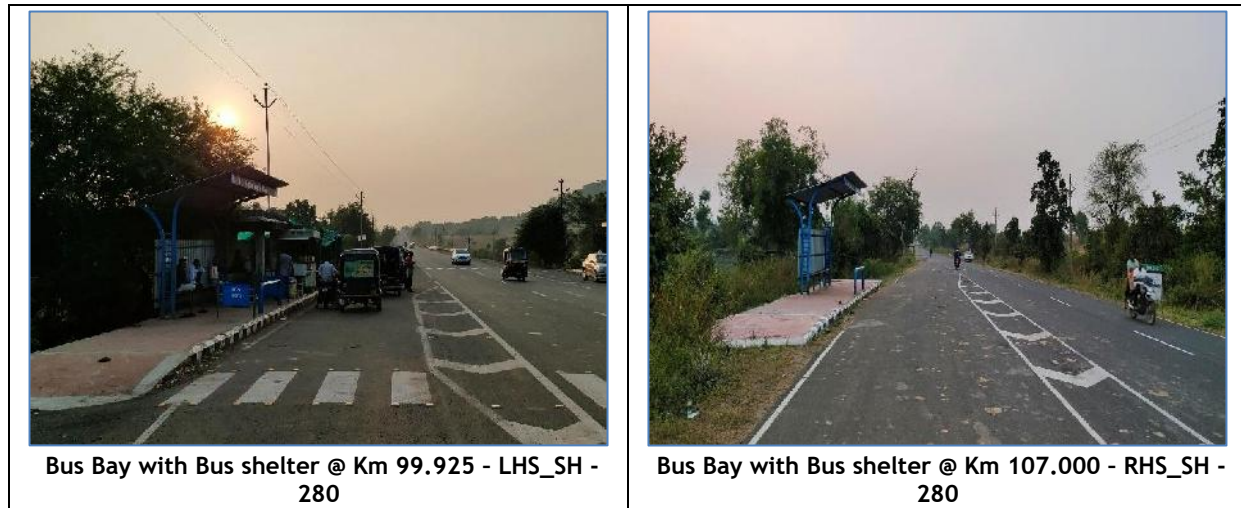
Few photos taken at the bus shelters and bus bays are presented below:



Bus Bay & Bus shelter @ Km 51.450 - LHS_SH - 294



Bus Bay & Bus shelter @ Km 51.450 - LHS_SH - 294



There are two (2) nos. of Truck laybys along the Project Road on both side of the carriageway in Mardi village. The Truck layby consists of Flexible Pavement and the condition appears to be fair.

Few photographs depicting the truck lay bye locations are presented below:



✓ Package 6: Asara -Bhatkuli- Amaravati

Package-6, is a part of state highway SH-280(Asara -Bhatkuli- Amaravati section, km65.25 to km93.65) with the total length of 28.40km. The PCOD obtained on 11 Nov 2021 for a length of 27.3km. Further received Completion Certificate on 29th July 2022 for full length.

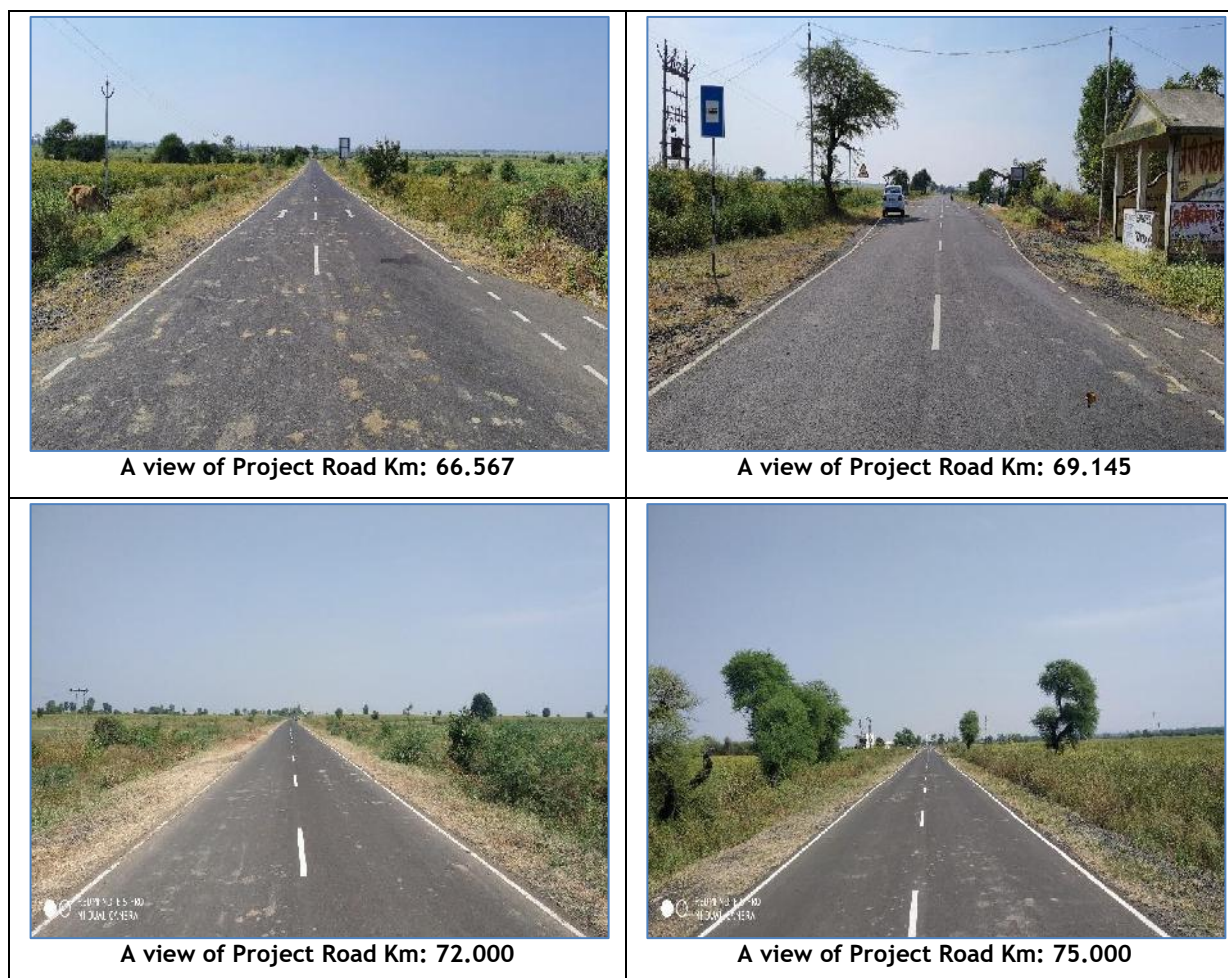
The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 2Lane/4lane with paved shoulder Rigid pavement.

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-280 Length, km
2-Lane	7	Flexible	19.650
2-Lane with PS	10	Flexible	6.150
2-Lane with PS	10	Rigid	1.600
4-lane (Rigid)	15	Rigid	
4-lane (Flexi)	15	Flexible	-
4-lane with PS (Flexi)	19	Flexible	1.000
Total			28.400

The project corridor generally runs in plain terrain for most of length except in few locations where it is slightly rolling. The land use along the project road is mostly agricultural. It passes through small village settlements like Asara Phata, Jasapur Phata, Sayat Village, Bhatkuli Mandi, Nimba Phata, Gaurkhed, Pandhari and Lontek etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations.

Typical view of project road is shown below:





A view of Project Road Km: 77.800



A view of Project Road Km: 79.000



A view of Project Road Km: 81.000



A view of Project Road Km: 86.000



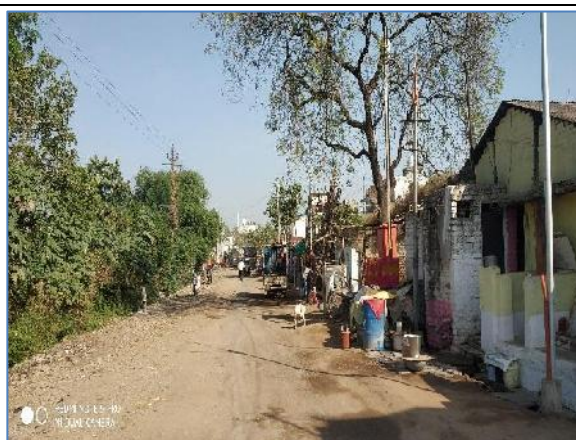
A view of Project Road Km: 86.800



A view of Project Road Km: 88.150



A view of Project Road Km: 91.000



A view of Project Road Km: 93.000_Under Construction

The Project Road has 3 major junctions and 24 minor junctions along the project road.

Photographs showing Junctions are presented below:



Major Junction at km 65.250 -RHS



Minor Junction at km 66.567-LHS



Minor Junction at km 69.145-LHS



Minor Junction at km 71.392-RHS



Minor Junction at km km 78.970 -RHS



Minor Junction at km 86.710-RHS

All together the Project Road has about 21 no's Bus bays with shelters.Few photos taken at the bus shelters and bus bays are presented below:



Bus Bay with Bus shelter @ Km 65.605-RHS



Bus bay with Bus shelter @ Km 71.650-BHS



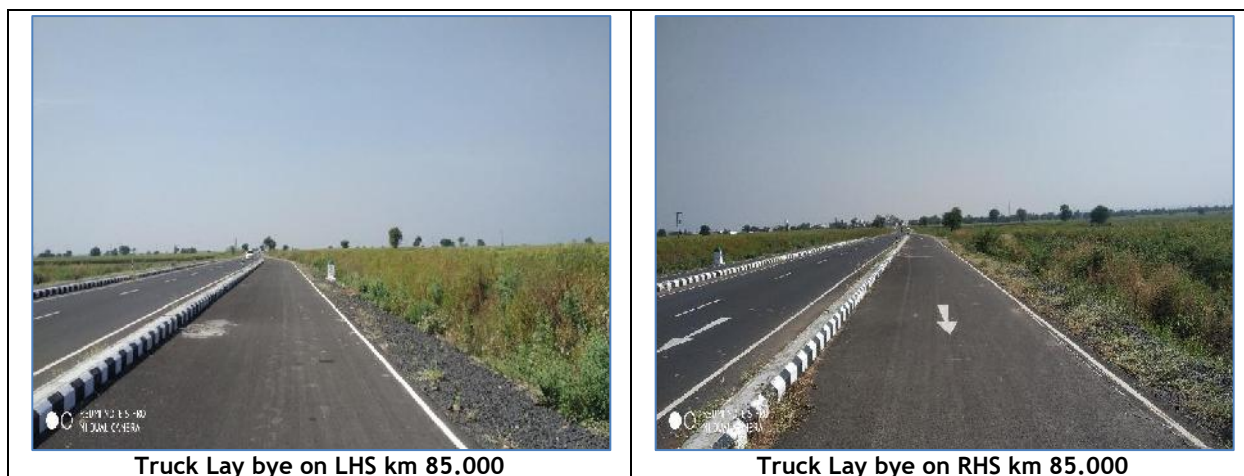
Bus bay with shelter @ Km 71.750-BHS



Bus Bay with Bus shelter @ Km 85.620-LHS

The Project Road has two (2) nos. of Truck lay byes along the Project Road. All the truck lay byes have been provided with Flexible Pavement and the condition appears to be fair. Separator is provided between main carriageway and Truck lay bye portion

Few photographs depicting the truck lay bye locations are presented below:



✓ Package 7: Amaravati- Chandur bypass- Dhamangaon

Package-7, comprises three road sectional lengths SH-297(Amaravati-Chandur Rly. Station, km3 to km28.85), Chandur bypass (km0 to km4.7) and SH-296 (Chandur bypass- Dhamangaon, km26.5- km44.8) of length 25.85 km,4.7km and 18.3km respectively, with the total length of 48.85km. The PCOD obtained on 11 Nov 2021 for a length of 48.61km. Further received Completion Certificate on 29th July 2022 for full length.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 10m/15m Rigid pavement.

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-297, (km)	Chandur BYP, (km)	SH-312 L (km)
2-Lane	7	Flexible	18.55		17.00
2-Lane with PS	10	Rigid	1.50		
2-Lane with PS	9m/10m	Flexible	5.80	4.70	
4-Lane with PS	15	Rigid			1.30
			25.85	4.7	18.3
Total			41.59		

The project corridor generally runs in plain terrain for most of length except in few locations where it has rolling. The land use along the project road is mostly agricultural and forest. It passes through

small village settlements like Amaravati, Phora, Chirodi, Basalapur, Chandur bypass, Chandur Rly station, Sirajgaon, Virul ronghe, Dhamangaon etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations. Maximum embankment height is observed near ROB locations.

Typical view of project road is shown below:



A view of Project Road Km: 1.675 Chandur Bypass



A view of Project Road Km: 23.400 -SH-297



A view of Project Road Km: 26.500 -SH-296



A view of Project Road Km: 29.600 -SH-296

The Project Road has 10 major junction and 39 minor junctions along the project road.

Photographs showing Junctions are presented below:



All together the Project Road has about 26 no's Bus bays with shelters, along the project corridor.

Few photos taken at the bus shelters and bus bays are presented below:



Bus bay with Bus shelter @ Km 19.650-SH-297



Bus bay with shelter @ Km 28.875 -SH-296



Bus Bay with Bus shelter @ Km 23.850 -SH-297



Bus Bay with Bus shelter @ Km 30.760-SH-296

The Project Road has two (2) nos. of Truck lay byes in SH-297 on either side, near to Bohra village. All the truck lay byes have been provided with Flexible Pavement and the condition appears to be fair. Separator is provided between main carriageway and Truck lay bye portion

Few photographs depicting the truck lay bye locations are presented below:



Truck lay bye@ Km 14.400 -SH-297-RHS



Truck lay bye@ Km 14.400 -SH-297-LHS

✓ **Package 8: Chikaldhara-Paratwada, Chikaldhara -Ghatang**

Package-8, comprises one State Highway and one Major District Road i.e., SH-305 (Chikaldhara-Paratwada, km24 to km56.338) and MDR-08 (Chikaldhara -Ghatang, km0- km20.236) of length 32.34 km and 20.24km respectively, with the total length of 52.57km. Completion Certificate received on 29th July 2022 for full length.

The most length of project corridor has flexible pavement of 5.5m/7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 11m Rigid pavement.

Pavement Configuration	Carriageway width, m	Flexible/Rigid	SH-305, (km)	MDR-08 (km)
Intermediate	5.5	Flexible	17.75	11.23
2-Lane	7	Flexible	13.368	8.756
2-Lane with PS	11	Rigid	1.220	0.250
			25.85	20.24
Total Length			52.57	

The project corridor generally runs in plain terrain for the initial few kilometers and balance length passes though hilly and rolling terrain. The land use along the project road is forest lands and passes through Hill-stations Chikaldara at the end point. It passes through some agricultural lands and small village settlements like Chikhaldhara, Aladoh, Motha, Madki, Dhamangaon, Ekaspur, Shahapur, Tetu and Salona etc.

In general, road embankments are in the range of 0.5m-1.5m for few kilometers and most lengths passes through hill-cut sections of varying embankment heights.

Typical view of project road is shown below:



A view of Project Road (SH-305) Km: 56.000



A view of Project Road (SH-305) Km:53.100



A view of Project Road (SH-305) Km: 50.000



A view of Project Road (SH-305) Km: 47.200



A view of Project Road (MDR-8) Km: 0.050



A view of Project Road MDR-8) Km: 1.000



A view of Project Road (MDR-8) Km: 2.000



A view of Project Road (MDR-8) Km: 11.000

The Project Road has 3 major junctions and 35 minor junctions along the project road. Photographs showing Junctions are presented below:



Major Junction at (SH-305) km 56+338 -LHS



Major Junction at (SH-305) km 24+000 -BHS



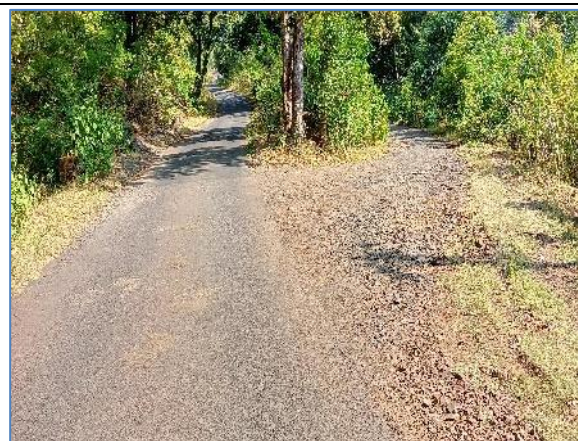
Minor Junction at (SH-305) km 24.900



Minor Junction at (SH-305) km 47.150 -RHS



Minor Junction at (MDR-8) km 8.200 -LHS



Minor Junction at (MDR-8) km 8.050-LHS

✓ **Package 9: Morshi- Dapori & Warud -Jarud- Haterna**

Package-9, comprises two Major District Roads, MDR-66 (Morshi- Dapori, km0 to km15.652), MDR-45, Warud -Jarud (km0- km15.443), Jarud - Haterna(km15.443- km30.653) of length 15.65 km and 30.653 km respectively with the total length of 46.31 km. The PCOD obtained on 11 Nov 2021 for 45.675 km length. Completion Certificate received on 29th July 2022 for full length.

The most length of project corridor has flexible pavement of 7m wide with 1.5m-2.5m earthen shoulder on either side. Whereas, in Built-up sections, it has 5.5m/7.5m lane Rigid pavement.

Table 5: Package-9, Project Road configuration

Pavement Configuration	Carriageway width (m)	Flexible/ Rigid	MDR-66 (km)	MDR-45 Warud-Jarud (km)	MDR-45, Jarud-Haterna (km)
Intermediate Lane	5.5	Rigid		2.91	6.195
2-Lane	7	Flexible	13.352	9.7	5.355
2-Lane (Rigid)	7.5	Rigid	2.3	2.833	3.66
			15.652	15.443	15.21
Total			46.31		

The project corridor generally runs through rolling terrain for most of length except in few locations where it is plain terrain. The land use along the project road is mostly agricultural and forest lands. It passes through small village settlements like Warud, Temburkheda, Gavhankund, Pala, Salbardi, Jarud and haterna etc.

In general, road embankments are in the range of 0.5m-1.5m height. Embankments higher than 1.5m are observed mainly in the approaches of CD structure locations.

Typical view of project road is shown below:



A view of Project Road Km: 16.000_MDR - 45



A view of Project Road Km: 20.000_MDR - 45



The Project Road has 6 major junctions and 13 minor junctions along the project road.

Photographs showing Junctions are presented below:



Minor Junction at km 21+400 - LHS_MDR - 45



Minor Junction at km km 24+450 - RHS_MDR - 45



Minor Junction at km 26+710 - RHS_MDR - 45



Major Junction at km 30+653 - _MDR - 45



Minor Junction at km 8+200 - LHS_MDR - 66



Minor Junction at km 12+625 - RHS_MDR - 66



Minor Junction at km 14+900 - LHS_MDR - 66



Minor Junction at km 15+250 - LHS_MDR - 66

1.7 ROAD & STRUCTURE INVENTORY

✓ Package 1: SH-312, Daryapur-Mhaisang and SH-280, Akola-Mhaisang

- ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights the executed works on ground.

Table 6: Package-1, Details of Road Inventory

S.No	Description	Unit	As per Site	SH-280	SH-312
1	Start Chainage (Km)	Km.		0	0
2	End chainage (Km)	Km.		25.1	16.49
3	Length of the Project Corridor	Km's	41.59	25.1	16.49
4	Major Bridges	Nos.	1	0	1
5	Minor Bridges	Nos.	9	8	1
6	Culverts (Pipe)	Nos.	40	23	17
7	Culvert (Slab/Box)	Nos.	21	11	10
8	Major Junctions	Nos.	3	2	1
9	Minor junctions	Nos.	36	25	11
10	Bus Bays with Shelter	Nos.	18	11	7
11	Bus Shelter	Nos.	6	4	2
12	RCC Cover Drain	Km's	5.65	4.35	1.3

S.No	Description	Unit	As per Site	SH-280	SH-312
13	Earthen Drain	Km's	75.28	43.6	31.68
14	Road Markings	Sq.m	17905	10485	7420
15	W-Beam Safety Barriers	Km's	5.319	2.228	3.091
16	Rigid Concrete Barrier	Km's	0.397	0.224	0.173
17	Delineators	Nos.	126	63	63
18	Kilometre Stones	Nos.	40	23	17
19	Hectometre Stones	Nos.	127	79	48
20	Road Signs	No's	390	210	180
21	Urban Length	Kms	3.7	2.9	0.8
22	Rural Length	Kms	37.89	22.2	15.69

- STRUCTURE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 7: Package-1, Details of Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)	Remarks
1	15+350	15+450	MJB	Retained/ Rehabilitation	Retained/ Rehabilitation	Old	21 x 7.4 + 1 x 4.9	7.9	
2	2+600	2+665	MNB	Reconstruction	Reconstructed	New	4 x 5	12	
3	5+000	5+054	MNB	Retained	Retained	Old	4 x 4	10.8	
4	7+900	7+880	MNB	Reconstruction	Reconstructed	New	6 x 5	12	
5	7+950	8+073	MNB	Reconstruction	Reconstructed	New	2 x 5	12	
6	9+950	9+995	MNB	Reconstruction	Reconstructed	New	2 x 5	12	
7	13+050	13+183	MNB	Reconstruction	Reconstructed	New	4 x 5	12	
8	13+990	14+108	MNB	Widening	Widened	Old	3 x 6	12	
9	19+400	19+533	MNB	Reconstruction	Reconstructed	New	6 x 5	12	
10	23+780	23+859	MNB	Widening	Widened	Old	1 x 7.5	12	

✓ **Package 2: SH-282, Anjangaon to Daryapur section**

- ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of

1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights the scope comparison of the executed works on ground.

Table 8: Package-2, Details of Road Inventory

S.No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	1.000
2	End chainage (Km)	Km.	27.885
3	Length of the Project Corridor	Km's	26.885
4	Minor Bridges	Nos.	3
5	Culverts (Pipe)	Nos.	19
6	Culvert (Slab/Box)	Nos.	6
7	Major Junctions	Nos.	2
8	Minor junctions	Nos.	20
9	Bus Bays with Shelter	Nos.	16
10	Bus bays	Nos.	-
11	Bus Shelter	Nos.	3
12	RCC Cover Drain	Km's	1.000
13	Earthen Drain	Km's	50.000
14	Median Opening	Nos.	0.200
15	Road Markings	Sq.m	12098
16	W-Beam Safety Barriers	Km's	0.600
17	Rigid Concrete Barrier	Km's	0.269
18	Delineators	Nos.	204
19	Kilometre Stones	Nos.	26
20	Hectometre Stones	Nos.	104
21	Road Signs	No's	114
22	Urban Length	Kms	1.885
23	Rural Length	Kms	25.000

- BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 9: Package-2, Details of Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)
1	13+500	13+580	MNB	Reconstruction	Reconstructed	New	6 x 5.0	12.0
2	17+500	-	MNB	Repair & retained	Retained	Old	2 x 4.00	10.60
3	27+600	27+745	MNB	Reconstruction	RHS-Completed	-	6 x 5.0	24.0

✓ **Package 3: SH-282, Daryapur-Murtizapur**

- ROAD WORKS

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 10: Package-3, Details of Road Inventory

S.No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	27.885
2	End chainage (Km)	Km.	50.22
3	Length of the Project Corridor	Km's	22.335
4	ROBs	Nos.	1
5	Major Bridges	Nos.	1
6	Minor Bridges	Nos.	4
7	Culverts (Pipe)	Nos.	14
8	Culvert (Slab/Box)	Nos.	6
9	Major Junctions	Nos.	3
10	Minor junctions	Nos.	15
11	RCC Wall	Km's	1.54
12	Bus Bays with Shelter	Nos.	7
13	Bus Shelter	Nos.	4
14	RCC Cover Drain	Km's	0.8
15	Earthen Drain	Km's	38
16	Road Markings	Sq.m	10064
17	W-Beam Safety Barriers	Km's	0.75

S.No	Description	Unit	As per Site
18	Rigid Concrete Barrier	Km's	0.12
19	Concrete Railing	Kms	0.440
20	Steel Railing	Kms	1.250
21	Delineators	Nos.	259
22	Kilometre Stones	Nos.	22
23	Hectometre Stones	Nos.	70
24	Road Signs	No's	142
25	Urban Length	Kms	1.935
26	Rural Length	Kms	20.4

- BRIDGE WORKS**

List of Bridges found during the inventory surveys along the corridor are as follows:

Table 11: Package-3, Details of Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)	Remarks
1	36+500	36+647	MJB	Retained	Retained	Old	20 x 8.50	8	
2	34+850	34+885	MNB	Repair & Retained	Retained	Old	8 x 7.00	9.9	
3	40+220	40+170	MNB	Repair & Retained	Retained	Old	5 x 5.00	10.5	
4	40+840	40+815	MNB	Widening	Widened	Old	3 x 5.30	12	
5	45+130	45+135	MNB	Retained	Retained	Old	6 x 5.00	10.5	
6	49+400	49+900	ROB	No Proposal	Retained	Old	1 x 14 + 2 x 20	11	

✓ **Package 4: SH-47, Daryapur-Waigaon**

- ROAD WORKS**

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights the details of the executed works on ground.

Table-12: Package-4, Details of Road Inventory

S. No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	180.000
2	End chainage (Km)	Km.	224.150
3	Length of the Project Corridor	Km's	44.150
4	Major Bridges	Nos.	2
5	Minor Bridges	Nos.	13
6	Culverts (Pipe)	Nos.	23
7	Culvert (Slab/Box)	Nos.	21
8	Major Junctions	Nos.	3
9	Minor junctions	Nos.	33
10	Bus Bays with Shelter	Nos.	16
11	Bus bays	Nos.	-
12	Bus Shelter	Nos.	2
13	RCC Cover Drain	Km's	6.300
14	RCC Open Lined Drain	Km's	Nil
15	Earthen Drain	Km's	81.7
16	Median Opening	Nos.	0.192
17	Road Markings	Sq.m	19800
18	W-Beam Safety Barriers	Km's	5.132
19	Rigid Concrete Barrier	Km's	0.464
20	Delineators	Nos.	239
21	Kilometer Stones	Nos.	45
22	Hectometer Stones	Nos.	176
23	Road Signs	No's	342
24	Urban Length	Kms	3.300
25	Rural Length	Kms	40.850

- BRIDGE WORKS**

List of Bridges found during the inventory surveys along the corridor are as follows:

Table-13: Package-4, Details of Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m) As per CA	Width (m)	Remarks
1	180+450	180+460	MJB	Retain/ Rehabilitation	Retained	Old	12 x 9	8.4	
2	186+530	186+600	MNB	Widening	Widened	Old	3 x 4.0	12.0	
3	187+800	187+880	MNB	Widening	Widened	Old	3 x 4.4	12.0	
4	188+960	189+030	MNB	Widening	Widened	Old	3 x 3	12.0	
5	193+450	193+690	MNB	Widening	Widened	Old	3 x 4	12.0	
6	195+570	195+840	MNB	Retained	Retained	Old	3 x 5	10.8	
7	197+440	197+540	MNB	Reconstruction	Reconstructed	New	3 x 10	12.0	
8	201+650	201+800	MJB	Retain/ Rehabilitation	Retained	Old	10 x 6.5	8.0	
9	205+600	205+630	MNB	Retained	Retained	Old	4 x 5	12.0	
10	207+820	207+910	MNB	Retained	Retained	Old	3 x 4.5	12.1	
11	210+350	210+460	MNB	Retained	Retained	Old	11 x 4.5	8.3	Same location New Structure Proposed with span of 11 x 5.0m
12	215+980	215+860	MNB	Retained	Retained	Old	2 x 9	12.1	
13	217+100	217+020	MNB	Retained	Retained	Old	4 x 4.5	15.0	
14	220+300	220+340	MNB	Retained	Retained	Old	2 x 6	12.1	
15	220+600	220+625	MNB	Retained	Retained	Old	2 x 6	12.1	

✓ **Package-5: Amaravati- Kurha- Kaundynapur**

- ROAD WORKS**

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table -14: Package-5, Detail of Road Inventory

S No	Description	Unit	As per Site	SH-280	SH-300	SH-294
1	Start Chainage (Km)	Km.		95	56.300	41.800
2	End chainage (Km)	Km.		123.675	58.450	52.050
3	Length of the Project Corridor	Km's	41.075	28.675	2.150	10.250

S No	Description	Unit	As per Site	SH-280	SH-300	SH-294
4	Major Bridges	Nos.	0	0	0	1
5	Minor Bridges	Nos.	16	11	3	2
6	Culverts (Pipe)	Nos.	48	35	10	3
7	Culvert (Slab/Box)	Nos.	18	11	1	6
8	Major Junctions	Nos.	8	5	2	1
9	Minor junctions	Nos.	28	18	4	6
10	Bus Bays with Shelter	Nos.	19	15	0	4
11	Truck Lay bye	Nos.	2	2	0	0
12	RCC Cover Drain	Km's	6.300	2.200	2.300	1.800
13	Earthen Drain	Km's	57.100	40.2	1.3	15.6
14	Road Markings	Sq.m	16691	11958.75	697.50	4035.00
15	W-Beam Safety Barriers	Km's	2.460	1.17	0	1.29
16	Rigid Concrete Barrier	Km's	0.440	0.22	0.16	0.06
17	Concrete Railing	Kms	0.410	0.08	0	0.33
18	Kilometre Stones	Nos.	39	26	2	11
19	Hectometre Stones	Nos.	105	73	0	32
20	Road Signs	No's	634	407	55	172
21	Urban Length	Kms	5.5	3.3	1.15	1.05
22	Rural Length	Kms	35.575	25.375	1	9.2

• BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table-15: Package-5, Details of Structures

S No	SH. No	Existing Chainage	Design Chainage	Type of Structure	Proposed type as per schedule B	Structure status As per site	Age of Structure	Existing Span arrangement (m)	Proposed Span arrangement (m)	Existing Width (m)	Proposed width (m)	Remarks
1	SH - 294	51+910	51+910	MJB	No proposal	-	Old	24 x 6.35	-	8	-	Proposal not given in schedule B
2	SH - 294	44+295	44+308	MNB	Widening	-	Old	2 x 7.1	-	8	12	Widening not done
3	SH - 294	49+980	49+995	MNB	Re Construction	Reconstructed	New	3 x 7.0	3 x 7.0	12	12	-
4	SH - 300	57+100	57+115	MNB	Widening	Widened	Old	1 x 7.6	-	7.9	24	-
5	SH - 300	58+150	58+150	MNB	New Construction	Constructed	New	2 x 6.0	2 x 6.0	24	24	Existing cause way converted into MNB.
6	SH - 300	58+250	58+250	MNB	Re Construction	Reconstructed	New	3 x 10.0	3 x 10.0	24	24	-
7	SH - 280	95+587	95+587	MNB	Widening	-	Old	2 x 6.0	-	9	24	Widening not done
8	SH - 280	99+560	99+559	MNB	Re Construction	Reconstructed	New	3 x 7.0	3 x 7.0	12	12	-

S No	SH. No	Existing Chainage	Design Chainage	Type of Structure	Proposed type as per schedule B	Structure status As per site	Age of Structure	Existing Span arrangement (m)	Proposed Span arrangement (m)	Existing Width (m)	Proposed width (m)	Remarks
9	SH - 280	101+750	101+750	MNB	Re Construction	Reconstructed	New	1 x 8.0	1 x 8.0	12	12	-
10	SH - 280	102+675	102+670	MNB	New Construction	Constructed	New	2 x 7.5	2 x 7.5	8.5	16	Existing cause way converted into MNB.
11	SH - 280	107+687	107+687	MNB	No proposal	-	Old	1 x 7.5	-	12.3	-	Proposal not given in schedule B
12	SH - 280	108+925	108+922	MNB	Widening	Widened	Old	4 x 6.0	-	7.9	12	-
13	SH - 280	110+180	110+180	MNB	New Construction	Not Constructed	Old	1 x 3.4	2 x 5.0	12	12	Slab culvert is present Minor bridge should be constructed
14	SH - 280	113+345	113+342	MNB	New Construction	Constructed	New	2 x 6.0	2 x 6.0	10	10	Existing slab culvert converted into MNB.
15	SH - 280	115+875	115+860	MNB	Re Construction	-	Old	6 x 5.0	6 x 8.0	7.9	12	Not Constructed
16	SH - 280	118+340	118+330	MNB	New Construction	Constructed	New	2 x 4.0	2 x 4.0	10.75	10.75	Existing cause way converted into MNB.
17	SH - 280	119+370	119+358	MNB	Re Construction	Reconstructed	New	1 x 10.0	1 x 10.0	-	12	-
18	SH - 280	121+350	121+340	MNB	Widening	Widened	Old	2 x 4.5	-	7.9	12	-

✓ **Package-6: Asara -Bhatkuli- Amaravati**

• **ROAD WORKS**

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table-16: Package-6, Details of Road Inventory

S.No	Description	Unit	As per Site
1	Start Chainage (Km)	Km.	65.25
2	End Chainage (Km)	Km.	93.65
3	Length of the Project Corridor	Km's	28.4
4	Minor Bridges	Nos.	13
5	Culverts (Pipe)	Nos.	34
6	Culvert (Slab/Box)	Nos.	5
7	Major Junctions	Nos.	3
8	Minor junctions	Nos.	24
9	Bus Bays with Shelter	Nos.	21

S.No	Description	Unit	As per Site
10	Truck Lay bye	Nos.	2
11	RCC Cover Drain	Km's	3
12	Earthen Drain	Km's	45.7
13	Road Markings	Sq.m	11993
14	W-Beam Safety Barriers	Km's	0.730
15	Rigid Concrete Barrier	Km's	0.660
16	Concrete Railing	Kms	0.14
17	Kilometre Stones	Nos.	25
18	Hectometre Stones	Nos.	91
19	Road Signs	No's	272
20	Urban Length	Kms	2.6
21	Rural Length	Kms	25.8

- BRIDGE WORKS**

List of Bridges found during the inventory surveys along the corridor are as follows:

Table-17: Package-6, Details of Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)
1	65+785	65+785	MNB	Widening	Widened	Old	1 x 7.9	12
2	68+255	68+240	MNB	Widening	Widened	Old	2 x 8.0	12
3	70+280	70+255	MNB	Widening	Widened	Old	2 x 5.0	12
4	71+320	71+300	MNB	New	New	New	1 x 6.0	12
5	71+425	71+405	MNB	New	New	New	1 x 6.0	12
6	71+670	71+670	MNB	New	Not Constructed	-	1 x 6.0	-
7	74+715	74+681	MNB	Widening	Widened	Old	1 x 9.0	12
8	76+215	76+200	MNB	Widening	Widened	Old	1 x 7.4	12
9	76+625	76+625	MNB	New	Constructed	New	2 x 5.0	12
10	77+285	77+285	MNB	Reconstruction		Old	3 x 6.0	24
11	78+525	78+525	MNB	No proposal	Retained	Old	8 x 6.0	7.4
12	82+500	82+478	MNB	Widening	Widened	Old	3 x 8.0	12
13	89+015	89+015	MNB	New	Not Constructed	-	1 x 7.5	-
14	89+575	89+550	MNB	New	Not Constructed	-	2 x 4.0	-
15	92+875	92+875	MNB	No proposal	Retained	Old	3 x 10.0	11

✓ **Package-7: Amaravati- Chandur bypass- Dhamangaon**

• **ROAD WORKS**

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 18: Package-7, Details of Road Inventory

S No	Description	Unit	As per Site	SH-297	Chandur Bypass	SH-296
1	Start Chainage (Km)	Km.		3	0	26.5
2	End chainage (Km)	Km.		28.85	4.7	44.8
3	Length of the Project Corridor	Km's	48.85	25.85	4.7	18.3
4	Minor Bridges	Nos.	14	8	1	5
5	Culverts (Pipe)	Nos.	70	34	9	27
6	Culvert (Slab/Box)	Nos.	6	1	1	4
7	Major Junctions	Nos.	10	5	2	3
8	Minor junctions	Nos.	39	20	0	19
9	Bus Bays with Shelter	Nos.	26	11	0	15
10	Truck Lay bye	Nos.	2	2	Nil	Nil
11	Solar Blinkers	Nos.	2	Nil	Nil	Nil
12	RCC Cover Drain	Km's	6.62	2.64	0	3.98
13	Earthen Drain	Km's	62.8	20	9.4	33.4
14	Road Markings	Sq.m	21952.5	11580	2115	8257.5
15	W-Beam Safety Barriers	Km's	20.397	0.705	0.405	19.287
16	Rigid Concrete Barrier	Km's	0.4815	0.208	0.118	0.1555
17	Delineators	Nos.	55	46	0	9
18	Kilometre Stones	Nos.	36	13	5	18
19	Hectometre Stones	Nos.	142	49	19	74
20	Road Signs	No's	720	440	30	250
21	Urban Length	Kms	5.05	2.75	0	2.3
22	Rural Length	Kms	43.3	23.1	4.7	15.5

- BRIDGE WORKS**

List of Bridges found during the inventory surveys along the corridor are as follows:

Table-19: Package-7, Details of Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)
1	2+545	2+545	MNB	Reconstruction	Reconstructed	New	5 x 7	12
2	14+795	14+987	MNB	Widening	Widened	Old	1 x 6.5	12
3	15+980	16+070	MNB	Reconstruction	Not constructed	Old	3 X 5	8.3
4	18+650	18+743	MNB	New construction	Not Constructed	Old	5 X 1.2	9.9
5	20+160	20+247	MNB	Reconstruction	Reconstructed	New	2 x 6	12
6	23+605	23+694	MNB	New construction	Not Constructed	Old	2 x 5	12
7	24+685	24+770	MNB	Reconstruction	Reconstructed	New	2 x 7.55	12
8	25+485	25+570	MNB	Reconstruction	Reconstructed	New	2 x 8	12
9	28+740	28+830	MNB	Widening	Widened	Old	3 x 6.5	12
10	30+300	30+302	MNB	Widening	Widened	Old	1 x 6	12
11	31+540	31+539	MNB	Reconstruction	Reconstructed	New	1 x 8	12
12	34+875	34+875	MNB	Widening	Widened	Old	2 x 6.35	12
13	38+025	38+025	MNB	No proposal	Retained	Old	1 x 6	11
14	41+110	41+110	MNB	Reconstruction	Reconstructed	New	1 x 15	12
15	44+525	44+525	MNB	New construction	New Reconstructed	New	2 x 6	12

✓ **Package-8: Chikaldhara-Paratwada, Chikaldhara -Ghatang**

- ROAD WORKS**

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table-20: Package-8, Details of Road Inventory

S. No	Description	Unit	As per Site	SH-305	MDR-8
1	Start Chainage (Km)	Km.		24	0
2	End chainage (Km)	Km.		56.338	20.236
3	Length of the Project Corridor	Km's	52.574	32.338	20.236
4	Major Bridges	Nos.	1	1	0
5	Minor Bridges	Nos.	9	4	5
6	Culverts (Pipe)	Nos.	126	60	66
7	Culvert (Slab/Box)	Nos.	14	11	3
8	Major Junctions	Nos.	3	2	1
9	Minor junctions	Nos.	35	27	8
10	RCC Cover Drain	Km's	0.84	0.84	0
11	RCC Open Lined Drain	Km's	0	0	0
12	Earthen Drain	Km's	9.1	9.1	0
13	Road Markings	Sq.m	23748	14642.1	9106.2
14	W-Beam Safety Barriers	Km's	2.883	2.883	Nil
15	Rigid Concrete Barrier	Km's	0.5	0.5	Nil
16	Delineators	Nos.	23	23	0
17	Kilometre Stones	Nos.	10	10	0
18	Hectometre Stones	Nos.	37	37	0
19	Road Signs	No's	39	39	Nil
20	Urban Length	Kms	5.72	4.22	1.5
21	Rural Length	Kms	46.854	28.118	18.736

- BRIDGE WORKS**

List of Bridges found during the inventory surveys along the corridor are as follows:

Table -21: Package-8, Details of Structures

S No.	RELEVANT SH/MDR /ODR	Existing Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)
1	SH 305	53+130	MJB	New Construction	New	New	40 x 6.0	12
2	SH 305	28+060	MNB	Retain	Retained	Old	2 x 4.15	8.2
3	SH 305	37+950	MNB	Retain	Retained	Old	2 x 5.25	8.1

S No.	RELEVANT SH/MDR /ODR	Existing Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)
4	SH 305	47+345	MNB	Retain	Retained	Old	1 x 6.35	8.2
5	SH 305	48+950	MNB	Retain	Retained	Old	1 x 3.80 + 1 x 3.52	8
6	MDR 8	5+549	MNB	Retain	Retained	Old	2 x 5.10	8.3
7	MDR 8	6+260	MNB	Retain	Retained	Old	2 x 4.00	8
8	MDR 8	8+460	MNB	Retain	Retained	Old	2 x 4.20	8.3
9	MDR 8	16+488	MNB	Retain	Retained	Old	2 x 3.20	8.25
10	MDR 8	17+008	MNB	Retain	Retained	Old	2 x 3.20	8.2

✓ **Package-9: Morshi- Dapori & Warud -Jarud- Haterna**

• **ROAD WORKS**

The project corridor has been constructed with the cross-sectional elements matching to those TCS drawings as per schedules. In general, the paved carriageway width is 7.0 plus earthen shoulders of 1.5m-2.5m has been provided excluding the built-up locations, where it has rigid/flexible with 2L/4L configuration.

The following table highlights of the executed works on ground.

Table 22: Package-9, Details of Road Inventory

S No	Description	Unit	As per Schedule	As per Site	MDR-45	MDR-66
1	Start Chainage (Km)	Km.			0	0
2	End chainage (Km)	Km.			30.653	15.652
3	Length of the Project Corridor	Km's			30.653	15.652
4	Medical Aid-Post	Nos.	1	NIL	NIL	NIL
5	Traffic Aid-Post	Nos.	1	NIL	NIL	NIL
6	Major Bridges	Nos.	1	NIL	NIL	1
7	Minor Bridges	Nos.	7	8	6	2
8	Culverts (Pipe)	Nos.	56	66	42	24
9	Culvert (Slab/Box)	Nos.	5	5	5	0
10	Major Junctions	Nos.	6	6	4	2
11	Minor junctions	Nos.	13	13	11	2
12	RCC Cover Drain	Km's	8.132	1.87	0	1.87

S No	Description	Unit	As per Schedule	As per Site	MDR-45	MDR-66
13	RCC Open Lined Drain	Km's	NIL	NIL	NIL	NIL
14	Masonary Drain	Km's	NIL	NIL	NIL	NIL
15	Separator Drain	Kms	NIL	NIL	NIL	NIL
16	Hume pipe drain	Kms	NIL	NIL	NIL	NIL
17	Earthen Drain	Km's	38.173	38.173	24.151	14.022
18	Median drain	Km's	NIL	NIL	NIL	NIL
19	Median Cuts	No's	NIL	NIL	NIL	NIL
20	Chutes	Nos.	NIL	NIL	NIL	NIL
21	Median Opening	Nos.	NIL	NIL	NIL	NIL
22	Median Kerb Damages	Km's	NIL	NIL	NIL	NIL
23	Median Plantation_Functional	Km's	NIL	NIL	NIL	NIL
24	Median Plantation_ Non-Functional	Km's	NIL	NIL	NIL	NIL
25	Road Markings	Sq.m	20743.2	20743.2	13793.85	6949.35
26	W-Beam Safety Barriers	Km's	4.511	4.511	3.747	4.511
27	Rigid Concrete Barrier	Km's	0.147	0.147	0.075	0.072
28	Delineators	Nos.	700	700	444	256
29	Kilometre Stones	Nos.	47	44	28	16
30	Hectometre Stones	Nos.	186	174	111	63
31	Road Signs	No's	NIL	606	413	193
32	Urban Length	Kms	8.052	8.052	5.652	2.4
33	Rural Length	Kms	38.253	38.253	25.001	13.252

• BRIDGE WORKS

List of Bridges found during the inventory surveys along the corridor are as follows:

Table-23: Package-9, Details of Structures

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)	Remarks
1	MDR-66	5+180	MNB	Retain	Retained	Old	2 x 10	8.40	
2	MDR-66	8+444	MJB	No Proposal	Retained	Old	10 x 4.5	8.50	
3	MDR-66	15+510	MNB	New	New	New	1 x 7.5	12.00	Span- 2 x 7.5m proposed in Sch-B
4	MDR-45	8+452	MNB	Retain	Retained	Old	1 x 11.2	8.4	
5	MDR-45	12+713	MNB	Retain	Retained	Old	2 x 6	9.00	

S No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure	Proposal As per Sch-B	Structure Status As per Site	Age of Structure	Proposed Span(m)	Width (m)	Remarks
6	MDR-45	15+050	MNB	Retain	Retained	Old	2 x 6	8.30	
7	MDR-45	16+200	RUB	No Proposal	Retained	Old	1 x 6.9	6.00	
8	MDR-45	22+350	MNB	Retain	Retained	Old	3 x 4.7	8.5	
9	MDR-45	29+000	MNB	Retain	Retained	Old	2 x 7	9.00	
10	MDR-45	30+510	MNB	Reconstruction	New	New	1 x 7.5	8.60	Span- 2 x 7.5m proposed in Sch-B

1.8 COSTING

Cost Component for various items and activities have been worked out by considering the Best Industry practice and most appropriate methods. Detailed quantities for work items have been estimated based on the details presented in previous chapters for various heads.

The gist of the cost components considered are presented below:

- Immediate Repair's Cost
- Routine Maintenance Cost
- Incident Management Cost
- Periodic Maintenance Cost
- Operations Cost
- Year by Year total O&M Costs

1.9 RATE ANALYSIS

Detailed rate analysis has been carried out based on MORTH guidelines to arrive at the unit rates of various items. Material rates and their leads from the project corridor are considered as per the material investigations done on the project road. Summary of unit rates arrived at are presented in table below:

Table-24: Summary of Unit Rates (excluding GST)

S No	Type of Material	Units	Source	Average Lead in Kms	Market Rates Adopted with Lead
1	Aggregate				
a)	40 mm	Cum	Crusher	45.72	1,238
b)	20 mm	Cum	Crusher	45.72	1,317
c)	12 mm	Cum	Crusher	45.72	1,214
d)	6 mm	Cum	Crusher	45.72	1,143
e)	Dust	Cum	Crusher	45.72	1,145
2	Gravel/ Moorum				
	Embankment	Cum	Borrow Area	7.00	259
	Subgrade	Cum	Borrow Area	7.00	259
3	Other Major Material				
	Bitumen 60/70	tonne	Mumbai	681.00	48,832
	Bitumen 80/100	tonne	Mumbai	681.00	47,634
	CRMB	tonne	Mumbai	681.00	44,139
	Emulsion	tonne	Mumbai	681.00	59,767
	Steel	tonne	Outlet	81.00	54,365
	HTS Strands	tonne	Amravati	81.00	75,365
	Cement	tonne	Amravati	81.00	7,765
	Structural Steel	tonne	Amravati	81.00	76,265
	VG-40 (for FY27)	tonne	Mumbai	681.00	85,873
	VG-40 (for FY28 onwards)	tonne	Mumbai	681.00	57,019

Table 25: Summary of Major Material Rates (excluding GST)

S No	Activities	Unit	Rate (Rs)	Remarks
1	BC (for FY27)	Cum	17,800	VG-40
	BC (for FY28 onwards)	Cum	12,721	VG-40
2	Tack Coat	Sqm	17	
3	DBM	Cum	11,609	VG-40
4	PC	Sqm	46	
5	WMM	Cum	2,895	
6	GSB	Cum	2,182	
7	Embankment	Cum	709	
8	Subgrade	Cum	752	
9	Shoulder Filling	Cum	752	
10	Thermoplastic Paint	Sqm	453	
11	Road Studs	Nos	200	
12	DLC	Cum	4,623	
13	PQC	Cum	9,513	
14	RE panel	Sqm	4,083	
15	M-15	Cum	8,123	
16	M-20	Cum	8,582	
17	M-25	Cum	9,181	
18	M-30	Cum	9,198	
19	M-35	Cum	10,174	
20	M-40	Cum	11,555	
21	M-45	Cum	11,843	
22	M-50	Cum	13,592	
23	Reinforcement steel	MT	78,004	
24	1.2m Dia pile	Rm	14,408	
25	HT strands	MT	1,35,568	

Note:

- 1) For Major Maintenance in FY27, the prevailing market rate of bitumen has been considered. However, for the remaining concession period from FY28 onwards, FY25 rates have been adopted and escalated at 5% per annum for a period of 2 years, considering that the cost estimates are presented at FY27 base-year prices.
- 2) Labour: State Minimum Wages as on Feb'2026 for "Zone III" Category of construction workers Rates

1.10 IMMEDIATE REPAIRS COSTS

Costs associated with immediate repairs are estimated based on the detailed asset inventory and condition assessment surveys, Pavement condition and structural condition assessment surveys. Items which are not executed as part of scope or in damaged condition have been considered for immediate costs as a part of 1-year capex. Following items are mainly considered for immediate costs:

- Scope which is not executed
- Road work items
- Bridge Work Items
- Pavement Rehabilitation works
- Structural Rehabilitation works
- Drainage Works
- Slope Protection works
- Safety Works

Presently, there are no immediate requirement costs anticipated for FY2027.

1.11 ROUTINE MAINTENANCE& INCIDENT MANAGEMENT COSTS

Routine maintenance costs include general maintenance costs of road elements, bridge elements and road furniture and appurtenances. This can be mainly divided into two parts as:

- General Maintenance of Works
- Repairs to Highway & Bridge Elements

✓ **GENERAL ROUTINE MAINTENANCE**

General Routine Maintenance of Roads generally include following items:

- Cleaning of Project facilities
- Structures cleaning,
- Cleaning of ROW
- Cleaning and Maintenance of Toll Plaza
- Unlined Drain Maintenance
- Lined Drain Maintenance
- Maintenance of Highway Lighting at Toll Plaza and other project locations
- Median Plantation maintenance & Avenue plantation maintenance:
- Maintenance of Road Furniture
- Maintenance of Road Safety Items

The above items are estimated by considering the detailed break-up of following items:

- Manpower including Managers/Labour etc
- Vehicles for Labour Transport/Water Tankers/Sweeping Machines Etc
- Resources/Equipment's such as grass cutters, tools, jet sprayers, hydraulic trimmers etc

✓ **REPAIRS TO HIGHWAY & BRIDGE WORKS**

Repairs to highway and bridge works have been estimated based on the assumed quantities (Percentage basis) of execution for every year.

These items include the following:

A. Roads

1	Providing treatment for sealing of road surface / isolated cracks at scattered locations
	i) covered with 6.7 mm size stone chipping @ 0.1 cum/ 10 sqm.
	ii) covered with dry coarse sand passing through 2.36 mm sieve and retained on 180-micron sieve @ 0.03 cum/10 sqm heated to 600 C
	iii) filling discrete cracks with slow curing bitumen emulsion as per Technical Specification Clause 3004.3.3
2	Providing treatment to bleeding bituminous surface at scattered locations
3	Providing localized repair to rutted portion and edge breaking of bituminous surface
4	Providing treatment and repair to pot-holes and patch work
5	Providing and laying dense bituminous macadam using bitumen grade VG 40 complete as per Technical Specification Clause 507
6	Providing and laying bituminous concrete (asphaltic concrete)
	(a) Using bitumen (VG-40) as per IRC: SP: 53
7	Road Roughness survey
8	Turfing on embankment slopes and at all other Project Facilities
9	Providing repair to stone pitching/apron at scattered locations
10	Rain Cuts Maintenance: Restoration of rain cuts soil, moorum, gravel or a mixture of these
11	Providing and laying apron/ stone pitching on slopes of guide bunds/ road embankment / other location
12	Providing and laying stone aggregate filter material (150 mm compacted thickness) underneath pitching
13	Unlined drain
14	Filling in median island with approved materials with all leads and lifts complete as per TS Clause No. 407
15	Replacing damaged / broken railing with new pre-cast / cast-in-situ, concrete railing to match with existing design and pattern.
24	Carrying out repair to road signs including strengthening resetting or otherwise repairing signs and delineators
	a) Road sign board mounted on single post
	b) Road sign board mounted on double post
	c) Overhead/ Gantry Sign boards
	d) Delineator
25	Supplying and fixing at site retro-reflectorized type sign boards/signs
	90cm Equilateral triangle
	60cm circular
	90 cm circular
	90cm high octagon
	80cm x 60cm rectangle
	Chevron signs 60cm x 45cm

	Place identification signs (Fig 15.7 of IRC 67)
	Providing and fixing Object Markers
	Providing and fixing of retro-reflectorized Route Marker signs (size 450mm x 600mm)
26	Hazard Marker Sign:
	a) size 90 x 30 cm
	b) size 30cm triangular side cluster of red reflectors (screen printed)
27	Cats Eyes/Raised pavement marker (NMC Nails Less)
28	Painting two coats on old surface after minor repairs to give an even and smooth surface and printing letters and figures with synthetic enamel paint
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
29	Providing painting lettering and fixing of distance measurement stones including dismantling of old damaged/ broken ones, confirming to TS Clause 804
	a) Hectometer stones
	b) Kilometer Stone
	c) 5 Kilometer stone
	d) Boundary stone
	e) Guard stone
30	Providing and fixing road delineators conforming to TS Clause No. 805 as directed by the Engineer.
31	Repainting the kerb stones and separation barrier with first quality synthetic enamel paint of approved brand
32	Painting all types of pavement markings including lines, dashes, arrows etc. on roads as per relevant IRC/MOST standards after cleaning the surface complete in all respects as directed by the Engineer.
	a) Hot applied Thermoplastic compound
	(i) Lane / Centre Line / Edge Line
	(ii) Direction Arrows
	(iii) Diagonal Chevrons Markings
33	Supplying and laying cast-in-situ cement concrete kerb without channel section
	a) by Manual/machine including formwork
34	Major repair / replacement of metal beam crash barrier (W profile guard rails)
35	Providing and fixing chain link/ welded mesh fencing / square bars fencing
36	Dismantling the old damaged chain link/welded mesh / square bars fencing and replacing it with new chain link/ welded mesh/square bars fencing
37	Provision of rumble strips
38	Shoulder Maintenance:
39	synthetic enamel paint of approved brand on metal pedestrian guard rail
40	Dismantling of wearing course

B. Bridges

1. Wearing coat comprising of 50 mm thick BC.
 2. Cleaning and adding rubber sealant near expansion joints.
 3. Modular Expansion joints.
 4. Replacement of Damaged Concrete Railing all complete as per technical specifications and as directed by the Engineer
 5. Provision of an RCC crash barrier (0.35sqm cross sectional area) constructed with M-40 grade concrete including reinforcement
 6. Cleaning of rocker & roller bearing using high pressure water jet, free from rust scales, re-setting & greasing the bearings using graphite grease including cost of materials, labour etc., complete.
 7. POT PTF Bearings greasing and maintaining (sand plastering).
 8. Elastomeric Bearings and maintaining.
 9. Cutting of groove of 15 mm x 15 mm along crack and sealing the same with epoxy putty including cost of material, labour etc.
 10. Carrying out 50 to 60 mm thick shortcreting using a mix proportion of 1:2:2 (cement: sand:6 mm down aggregate) added with Polypropylene fibers at a dosage rate of 125 gms/bag of cement including cost of labour, material, scaffolding, equipment etc complete.
 11. Repair of Floor Aprons, pitching and other protection works
 12. Cleaning of Drainage Spouts
 13. M-25 Concrete
 14. Providing and filling joint sealing compound as per drawings of pourable grade, (Bitumastic sealant in the gap b/w Abutment & Approach slab. As per Technical specifications
 15. Providing and laying Filter material underneath pitching in slopes.
 16. Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankments.
 17. Test s UPV, RHT and Load test for span 15m and above as per Schedule I.
 18. Vegetation cleaning before and after monsoon.
 19. Repair of damaged structure portion due accidents and any others.
 20. Level of Service if applicable.
- ✓ **INCIDENT MANAGEMENT COST**

Incident Management & Safety items include the following:

- ✓ Regular patrolling & reaching accident/incident site,
 - ✓ providing relief to injured persons including taking them to nearest hospital and attending to the safety requirements at the location (putting cones, safely guide & manage the traffic using signs, safety barricades, etc.),
 - ✓ removal of accident /breakdown vehicles, removing of dead animals/birds lying on the highway and loading, unloading, transportation & disposal of surplus material left over by accidental vehicle or otherwise lying on road (on carriageway) and
 - ✓ Encroachment prevention & removal with all lead & lifts complete with proper communication equipment,
- ✓ consumables, materials, suitable Towing vehicles, Ambulance, patrolling vehicles and manpower like drivers, helpers, para-medical staff, labours including deployment of crane and all works shall be done as per requirement and as directed by Client representative and as per Relevant Specifications as applicable.

1.12 OPERATIONS COSTS

Cost towards Operations include the following:

- Electricity Bill of lighting
- Operation and management costs of rest areas and lay byes
- SPV Costs
- Survey Costs
- Insurance
- IE Fee
- Administrative Cost
- Electricity Bill of lighting

Following table depicts the cost of operations for the project:

Table-26: 1st year O&M Costs

S No	Description	Amount in Lakhs.	Remarks
	SPV - Expenditure		
1	SPV staff	322.56	
2	Highway lighting	-	
3	Tolling and HTMS AMC/ Spare Parts	-	
4	Surveys & Investigations (BBD, Roughness)	10.77	
5	IE fees	-	
6	Insurance Charges	76.40	
7	Audit Charges	154.35	
8	Admin cost - Board Meeting Expenses, valuation etc.		
	Agency - Expenditure	-	
9	Toll Operation - Agency	-	
10	Route patrolling	-	
11	Routine maintenance	537.10	
12	Repair of Road - BoQ Items	312.66	
13	Repair of Structures	19.58	
	Total Amount in Lakhs	1,433.43	

Note: The cost is inclusive of GST@18% without escalation and the amount is in Lakhs considering FY27 rates.

1.13 PERIODIC MAINTENANCE COSTS

Cost towards major maintenance include following:

- ✓ Cost of Periodic maintenance of Pavement based on Finalized MM schedule
- ✓ Cost of Periodic Maintenance of Structures
- ✓ Cost of Periodic replacement of Toll Equipment's & Software

Following table includes the cost of Major Maintenance works for the project:

Table-27: Summary of Major Maintenance Costs

Year	Periodic Maintenance cost in Lakhs				
	Functional +Structural overlay MCW+ S/R	Major Maintenance of Rigid Pavement	Replacement of ATMS	Replacement of TMS	Structure specified repairs
2026-2027	68.25	-	-	-	-
2027-2028	-	-	-	-	-
2028-2029	16,146.20	300.84	-	-	-
2029-2030	-	-	-	-	-
2030-2031	-	-	-	-	-
2031-2032	-	-	-	-	77.22
Total:	16,214.45	300.84	-	-	77.22

Note: The cost is inclusive of GST@18% without escalation and the amount is in Lakhs considering FY27 rates.

1.14 TOTAL OPERATION & MAINTENANCE COSTS

Year on year operation cost is summation of following:

- ✓ Immediate Costs
- ✓ Routine Maintenance
- ✓ Periodic Maintenance
- ✓ Operations Cost

Following table presents the summary of Operations & Maintenance cost for the project

Table-28: Cost Abstract

Year	SUMMARY OF VARIOUS EXPENSES in Rs. Lakhs				
	Immediate Repair's Cost	Toll Collection Expenses	Routine Maintenance Expenses	Periodic Maintenance (Functional +Structural Overlay)	Total Cost
2026-2027	-	-	1,432.91	68.25	1,501.16
2027-2028	-	-	1,432.91	-	1,432.91
2028-2029	-	-	1,432.91	16,447.04	17,879.95
2029-2030	-	-	1,432.91	-	1,432.91
2030-2031	-	-	1,464.11	-	1,464.11
2031-2032	-	-	1,002.04	77.22	1,079.26
Total Cost:	-	-	8,197.80	16,592.51	24,790.31

Note: The cost is inclusive of GST @18% without escalation and the amount is in Lakhs considering FY27 rates.