

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



TECHNICAL SCHEDULE



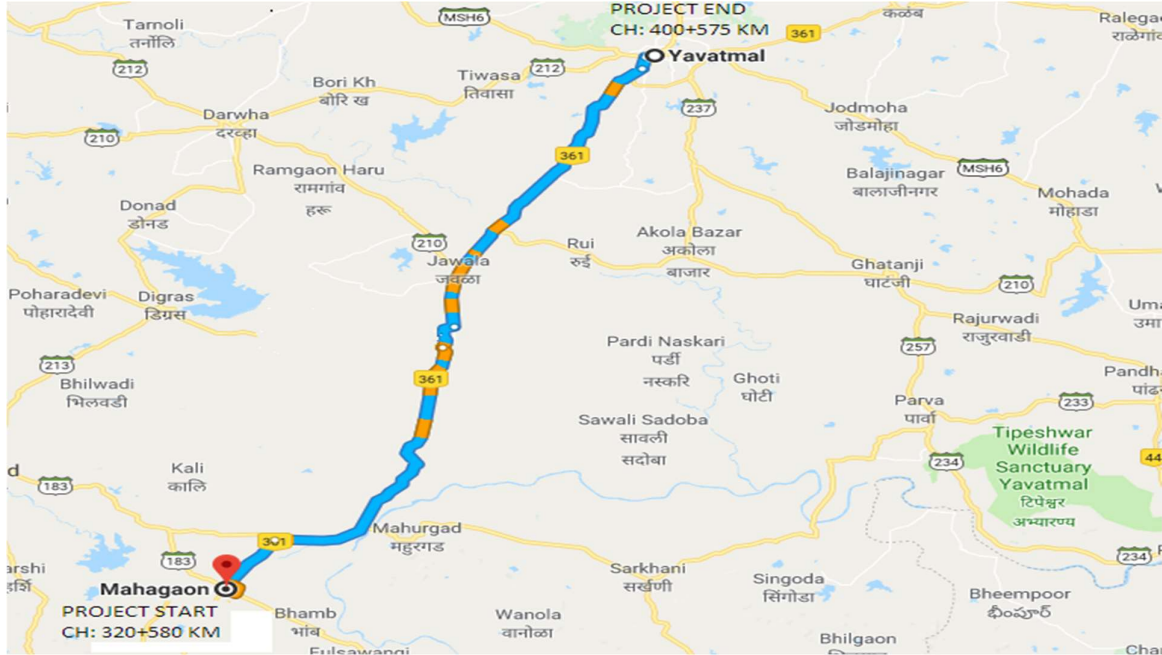
SCHEDULE - A
(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

- 1.1 Site of the Construction of Project Highway shall include the land, buildings, structures and road works as described in Annex I of this Schedule A.
- 1.2 The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.
- 1.3 An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.
- 1.4 The alignment plans of the Project Highway are specified in Annex-III. There is no modification in existing alignment. The proposed profile of the project highway shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The contractor, however, improves / upgrades the road profile as indicated in Annexure III based on the site design requirement.
- 1.5 The Status of the Environmental Clearance obtain or awaited is given in Annex-IV.

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



Annex - I
(Schedule-A)

SITE OF THE PROJECT

1. Site

The Site of Project Highway comprises of village **Amboda** (km 322.820 to km 322.860), **Hiwara Sangam** (km 329.990 to km 332.130), **Lonbehal** (km 348.880 to km 349.680), **Dattarampur** (km 363.920 to km 365.146) and **Kinhi** (km 397.360 to km 397.590) of the Mahagaon-Yavatmal Section of NH 361 in the state of Maharashtra. The Project Highway is in District Yavatmal. An Index Map of Project Highway is given in Appendix-I.

The Land, Carriageway and Structure comprising the site are described below:

Sr. No.	Site	Location on NH	Village/Landmark	Length of Road (km)
1	Site of Balance works in Mahagaon-Yavatmal section of NH-361	km 322.820 to km 322.860	Amboda	0.04
2		km 329.990 to km 332.130	Hiwara Sangam	2.14
3		km 348.880 to km 348.940	Lonbehal	0.06
4		km 349.230 to km 349.300	Lonbehal	0.07
5		km 349.540 to km 349.680	Lonbehal	0.14
6		km 363.920 to km 363.970	Dattarampur	0.05
7		km 364.960 to km 365.146	Dattarampur	0.186
8		km 397.360 to km 397.590	Kinhi	0.23

2. Land

The Site of Project Highway comprises the land (sum total of land already in possession) is described below:

Sr. No	Chainage (in km)	Avg Existing Width (m)
1	km 322.820 to km 322.860	60
2	km 329.990 to km 332.130	60
3	km 348.880 to km 348.940	60
4	km 349.230 to km 349.300	60
5	km 349.540 to km 349.680	60
6	km 363.920 to km 365.970	60
7	km 364.960 to km 365.146	60
8	km 397.360 to km 397.590	60

3. Carriageway

The following existing road has a 2-lane carriageway with width of 7m, rest of the locations are greenfield (Bypass):

Sr. No.	Chainage (in km)	Total Width of Carriage way (m)	Median Width (m)	Remark
1	364+960 to 365+146	7	-	2-lane Carriageway

4. Major Bridges: Nil

5. Road over-bridge (ROB)/Road under-bridge (RUB): Nil

6. Grade separators: Nil

7. Minor bridges: Nil

8. Railway level Crossing: Nil

9. Underpasses (vehicular, Non-vehicular, LVUP): Nil

10. Culvert: Nil

11. The Site has the existing culverts: Nil

12. Bus Bays: The details of bus bays on the Site are: Nil

13. Bus Shelter: Nil

14. Truck Lay byes: Nil

15. Road side drains: Nil

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



16. Major junctions: Nil

17. Minor Junction:

The details of Minor Junctions are as follows:

Sr. No.	Location/ Chainage (km)	Type of Junction	Remarks
1	330+250	Y- junction	RHS
2	331+250	T-junction	LHS
3	331+250	T-junction	RHS
4	331+850	Y- junction	RHS

18. Bypasses: Nil

19. Other structures: Nil

20. Stretches Passing through the forest area: Nil

Annex – II
(Schedule-A)

Dates for providing Right of Way

The dates on which the Authority shall provide Right of Way to the Contractor on different stretches of the Site are stated below:

Sr. No.	From km to km	Length (m)	Width (m)	Date of providing ROW
1	km 322.820 to km 322.860	40	60	On the appointment date
2	km 329.990 to km 332.130	2140	60	On the appointment date
3	km 348.880 to km 348.940	60	60	On the appointment date
4	km 349.230 to km 349.300	70	60	On the appointment date
5	km 349.540 to km 349.680	140	60	On the appointment date
6	km 363.920 to km 363.970	50	60	On the appointment date
7	km 364.960 to km 365.146	186	60	On the appointment date
8	km 397.360 to km 397.590	230	60	On the appointment date



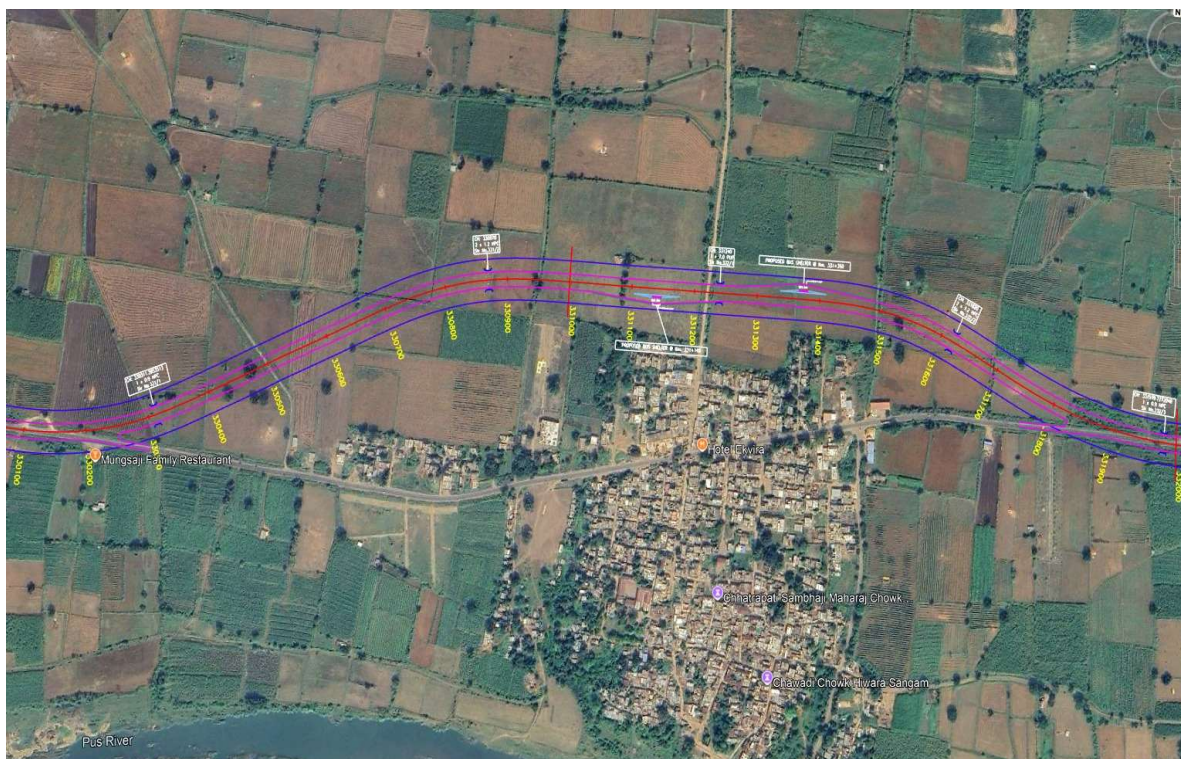
Annex - III *(Schedule-A)*

Alignment Plans

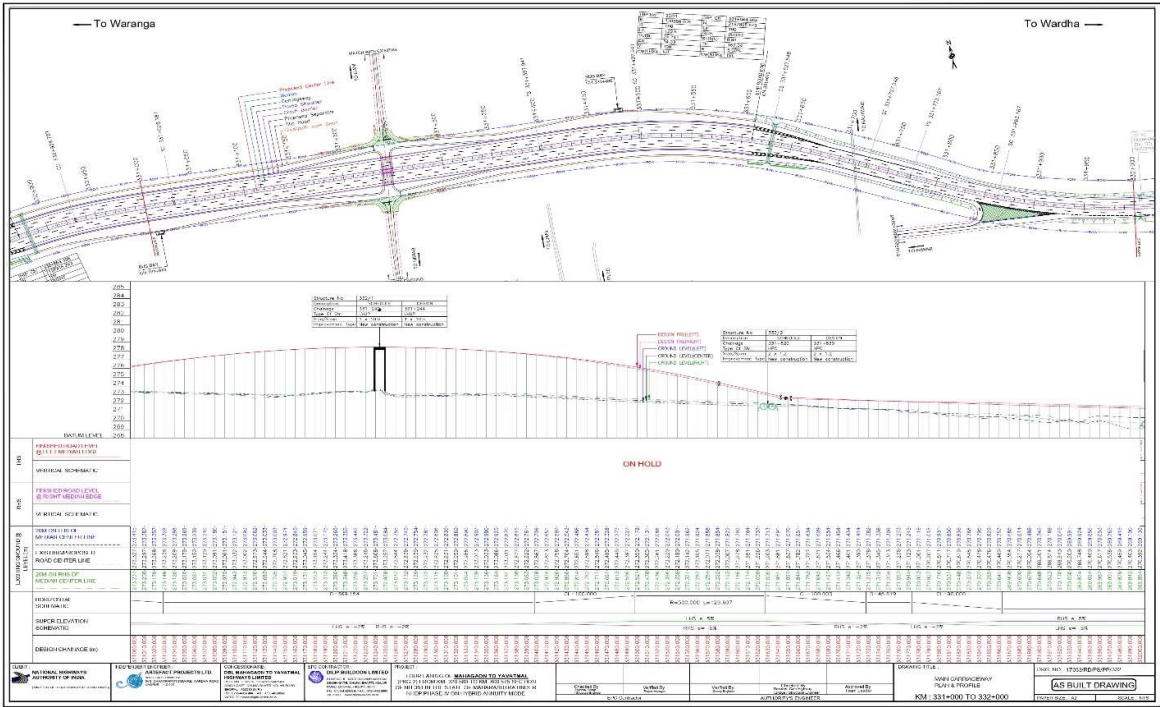
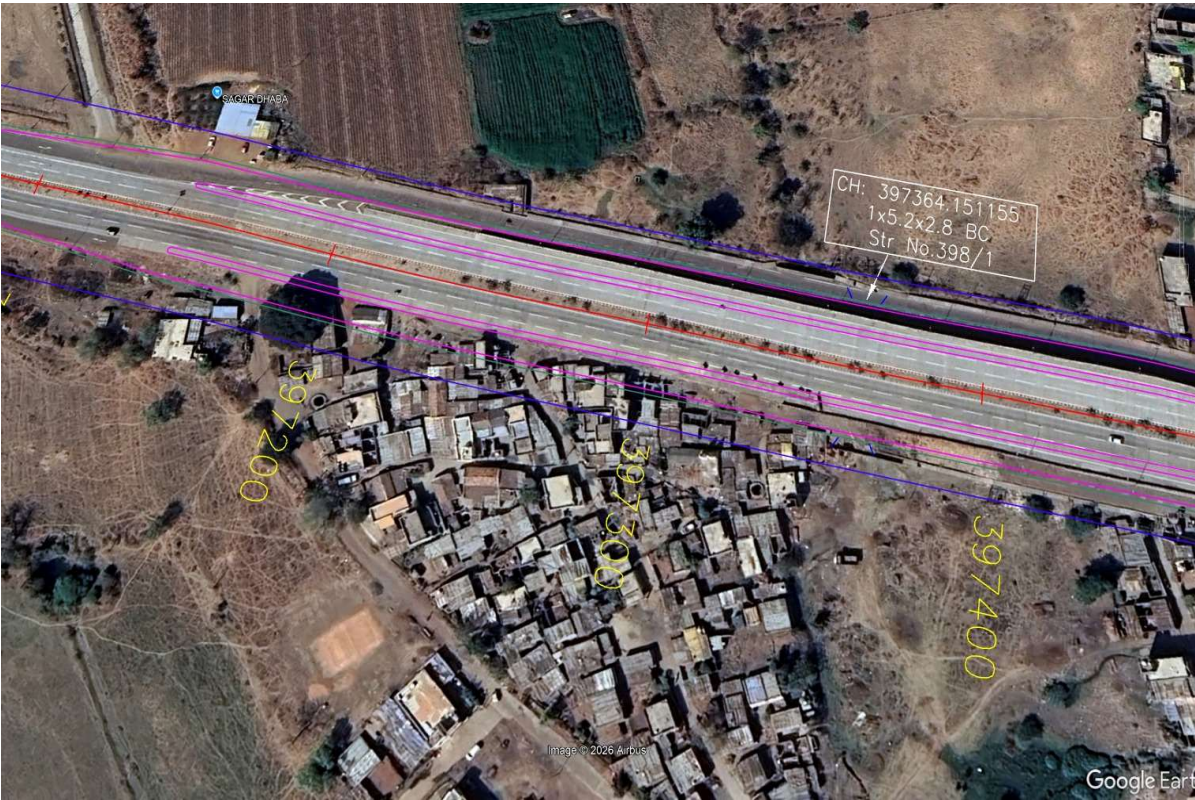
- (i) The alignment of Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by contractor as minimum FRL. In any case, finished road level of project highway shall not be less than those indicated in the alignment plan. The contractor shall, however, improve/ upgrade the Road profile as indicated in the Annex-III based on the site/design requirement.
- (ii) Traffic Signage plan of Traffic Highway showing the number and location of traffic sign is enclosed. The contractor shall, however, improve/ upgrade upon the traffic signage plan as indicated in the Annex-III based on the site/design requirement as per IRC: SP: 99 & IRC: 67.

Note: The alignment of project highway is as per the P&P during the Construction of the Four laning of Mahagaon-Yavatmal section of NH-361 from KM:320+580 to KM:400+575 (design length 80.195 km) in the state of Maharashtra on Hybrid annuity mode.

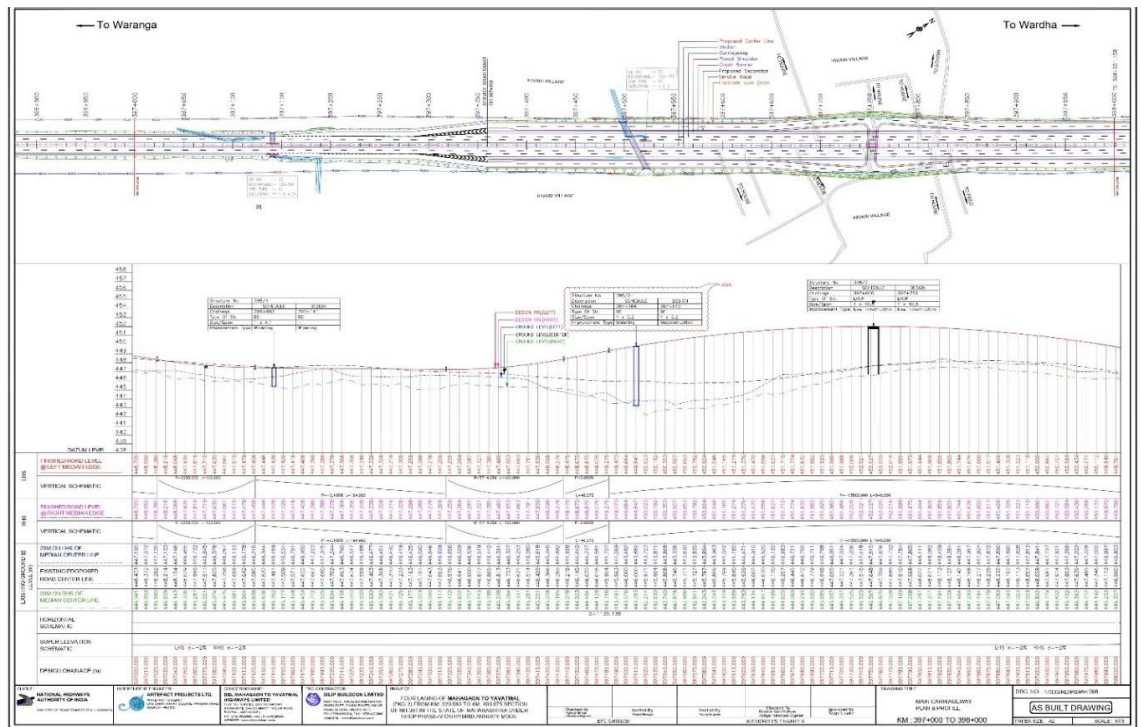
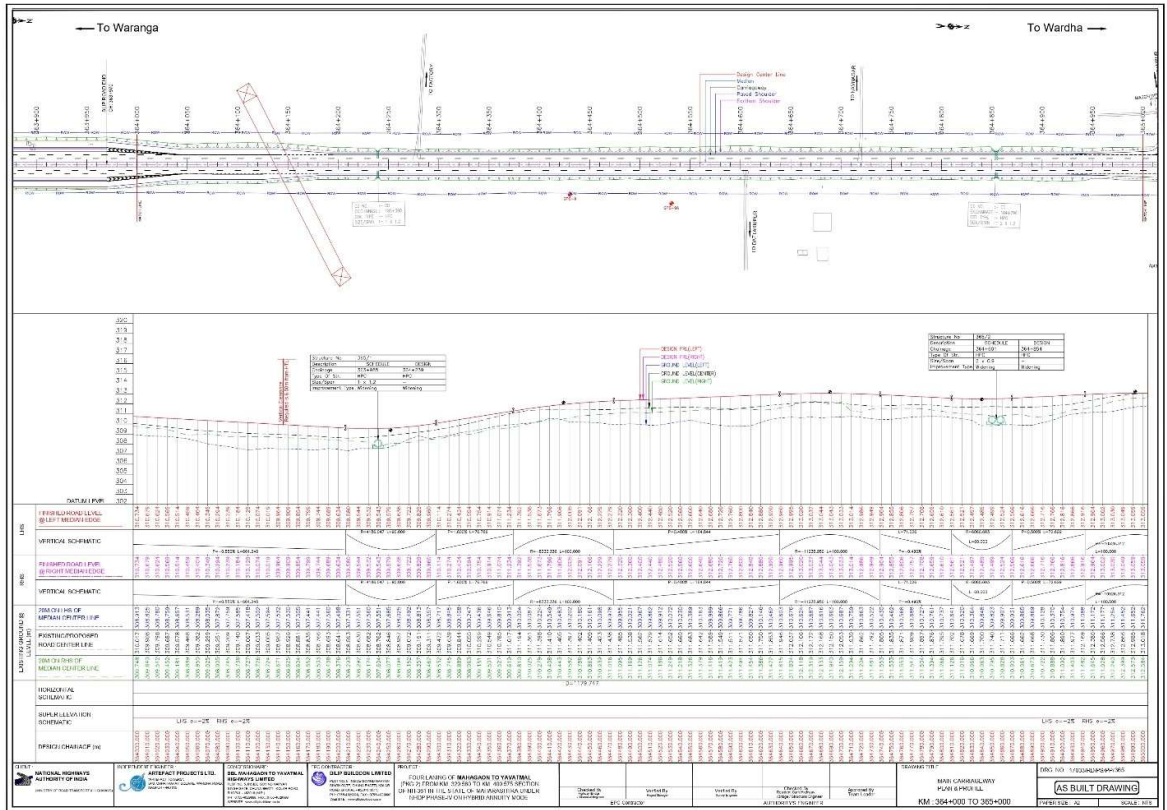
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Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



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Annex - IV
(Schedule-A)

Environment Clearances

Since the length of the project is less than 100km,

THERE IS NO NEED OF ENVIRONMENT CLEARANCE.

Annex - V
(Schedule-A)

1. Utility Shifting:

The Contractor shall undertake the work of shifting of any utility (including electric lines, water pipes, gas pipelines and telephone cables) to an appropriate location or alignment, in accordance with the provisions of Contract Agreement. Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department is part of the scope of work of the Contractor. The bidders may visit the site and assess the quantum of shifting of utilities for the project before submission of their bid. Copy of utility relocation plan is enclosed. The specifications of concerned Utility Owning Department shall be applicable and followed.

2. The Details of utility are as follows:

Sr. No	Type of Utility	Unit	Qty	Location/Stretch
A	Electrical Utility			km 329.990 to km 332.130 km 348.880 to km 348.940 km 349.230 to km 349.300 km 349.540 to km 349.680 km 363.920 to km 363.970 km 364.960 to km 365.146 km 397.360 to km 397.590
1	Electric Poles	Nos	36	
2.	Electric Cables	Meter	3280	
3	Transformer	Nos	8	
B	Water/Sewage Utility			
1	Pipe 110 mm HDPE 6Kg/cm2	Mtr	1250	km 329.990 to km 332.130 km 348.880 to km 348.940 km 349.230 to km 349.300 km 349.540 to km 349.680 km 363.920 to km 363.970 km 364.960 to km 365.146 km 397.360 to km 397.590
2	Crossing 1 No	Mtr	70	
C	Felling of Trees	Nos	34	km 329.990 to km 332.130 km 364.960 to km 365.146

Note :-

- A.** The details mentioned above are tentative, Contractors are advised to conduct a thorough site visit and coordinate with the relevant utility-owning agency to obtain accurate information about the utility lines before commencing any work. All costs and responsibilities associated with obtaining these details shall be borne by the contractor.



- B.** The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of Utility Owning Department and it is to be agreed solely between the Contractor and the Utility Owning Department. No change of scope shall be admissible and no cost shall be paid for using different type/spacing/size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of Utility owning Department and/or construction of project highway.
- C.** The Contractor shall carry out joint inspection with Utility Owning Department and get the estimates from Utility Owning Department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor. The decision/approval of Utility owning Department shall be binding on the Contractor.
- D.** The supervision charges at the rates/charges applicable of the Utility owning Department shall be paid directly by the Authority to the Utility owning Department as and when Contractor furnished demand of Utility Owning Department along with a copy of estimated cost given by the latter.
- E.** The dismantled material/scrap of existing Utility to be shifted/dismantled shall belong to the Contractor who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor is required to deposit the



SCHEDULE - B

(See Clause 2.1)

Development of the Project Highway

1 Development of the Project Highway

- (a) Development of the Project Highway shall include design and construction of the Project Highway as described in this Schedule-B and in Schedule-C.
- (b) Maintenance of the Project Highway in accordance with provisions of this Agreement and in conformity with requirements set forth in the Schedule E; and
- (c) Performance and fulfillment of all other obligation of the Contractor in accordance with the provisions of this Agreement and matter incidental thereto or necessary for the performance of any or all obligation of the Contractor under this Agreement.

2 Rehabilitation and Augmentation

Rehabilitation and Augmentation shall include Four-Laning of the Project Highway as described in the Annex-I of this Schedule B & Schedule C.

3 Specifications and Standards

The Project Highway shall be designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

4 Description of Project Highway

Construction of balance works in descoped section in the village Amboda, Hiwara Sangam, Lonbehal, Dattarampur & Kinhi in Four laning of Mahagaon-Yavatmal section of NH-361 from km 320.580 to km 400.575 (design length 80.195 km) in the state of Maharashtra on EPC mode, described in Annex-I of this Schedule-B and Annex-I of Schedule-C.

5 Specifications and Standards

The Project Highway shall be designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.



Annex - I
(Schedule-B)

Description of the Project Highway

1. DEVELOPMENT OF PROJECT HIGHWAY

Development of the Project Highway shall include detailed design, including plan & profile within available ROW and construction of the Project Highway as described in **Schedule-B** and **Schedule-C**. The alignment plans of the Project Highway are given in **Annex-III** of **Schedule-A** which is minimum requirement and are for guidance only. The proposed plan & profile, locations of different structures/ drains/ service & slip road / RE walls, chainages of different structures / drains/service & slip road / RE walls, length of different structures / drains / service & slip road / RE walls etc. of the project highway as indicated in the **Schedule A, Schedule B, Schedule C** and their Annexures, shall be treated as an approximate assessment and as minimum requirement. Based on site / design requirement, the Contractor shall finalize Detailed Project Report (DPR) including plan & profile of the project highway and submit the same to the Authority & its Engineer for acceptance, before the start of the execution of project.

Construction of balance works in descoped section in the village Amboda, Hiwara Sangam, Lonbehal, Dattarampur & Kinhi in Four laning of Mahagaon-Yavatmal section of NH-361 from km 320.580 to km 400.575 (design length 80.195 km) in the state of Maharashtra on EPC mode as described in **Annexure-I of Schedule-B** and in **Schedule-C**.

1.1 WIDTH OF CARRIAGEWAY

- 1.1.1 The Construction of balance works shall be undertaken as per TCS.
- 1.1.2 In built up section/areas the width of paved carriage way shall be in accordance with the TCS of elevated corridor enclosed – Not applicable
- 1.1.3 Except as otherwise provided in this Agreement, the width shall be adjusted to fit into appropriate plans and cross sections developed in accordance with TCS enclosed.
- 1.1.4 The entire cross-sectional elements shall be accommodated in the available ROW. If required suitable retaining structure shall be provided to accommodate the highway cross section within the available / proposed ROW. The details of such structure are mentioned in the Schedule B where retaining structure are to be provided. Shall constitute a COS

1.2 WIDTH OF MEDIAN

- 1.2.1 The median shall be provided as per TCS
- 1.2.2 The width of median including kerb shyness & antiglare screen shall be as per Typical cross sections mentioned in the Cl. 2.11 of the Schedule-B and as per Clause No. 2.5.6 & 2.5.7 IRC: SP:84-2019/ IRC: SP:87-2019.
- 1.2.3 New Jersey type concrete crash barriers/W beam crash barrier shall be used for Median as per relevant IRC / MoRT&H guidelines or as per TCS
- 1.2.4 A suitable paving block Etc. shall be proposed in case of flush median to prevent spreading

of soil on carriage way (Clause No.6.3.2 IRC SP 84:2019).

2. GEOMERIC DESIGN AND GENERAL FEATURES

2.1 General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual IRC SP 84- 2019 for four laning. Intermediate site distance (Desirable minimum site distance) shall be followed for design of all vertical curves including structures as well as highways **(Clause No.2.9.5 IRC SP 84:2019)**

2.2 Design speed

The design speed shall be as per IRC SP: 84-2019 i.e. ruling design speed of 100 kmph for plain rolling terrain and 60 kmph for hilly terrain unless otherwise specified in the Schedule B & Schedule D.

2.3 Improvement of the existing road geometrics

2.3.1 The existing road geometrics shall be improved as per the codal provisions. In the sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and appropriate road signs, pavement markings and safety measures shall be provided.

2.3.2 The entire cross-sectional elements shall be accommodated in the available/ proposed ROW. If required, suitable full height retaining structures shall be provided to accommodate the highway cross section within the available/ proposed ROW. The details of such sections are mentioned in Schedule-B. in case of any other section not included were retaining structure are to be provided shall constitute a COS. As details given in clause 2.10.

2.3.3 Realignments:

The following rad shall be improved to the standards as specified un the manual at the following locations:

Sr. No.	Existing Chainage (km)		Design Chainage (km)		Length (km)
	From	To	From	To	
As per Plan and Profile					

2.3.4 Bypasses

The existing road shall be bypassed to the standards as specified in the manual at the following locations:

Sr. No.	Name of bypass	Existing Chainage (km)		Design Chainage (km)		Length (km)
		From	To	From	To	
1	Hiwra	217.344	218.494	330.850	332.000	1.85

	Sangam					
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2.4 Stopping Sight Distance

The safe stopping sight distance and desirable minimum sight distance shall be adopted as per IRC SP:84-2019.

2.5 Right of Way

Details of the Right of Way along Project Highways and Side Roads are given in Annexure-II of Schedule A.

2.6 Type of Shoulder:

2.6.1 The Design Specification of paved shoulder shall conform to the requirements specified in paragraph 5.10 & 5.11 of the manual or as per TCS.

2.6.2 The earthen shoulder of width as per TCS on shoulder side shall be provided. thereof, confirming to Clause 401 of MoRT&H specification. (Clause No. 5.11 IRC: SP: 84-2019).

2.6.3 In open country, earthen shoulders and Paver Blocks shall be provided as per TCS. (Clause No. 2.6 IRC: SP: 84-2019) or paved shoulder should be as per TCS.

2.6.4 Paved shoulder and strip on median side shall be of same specification and pavement composition as of main carriageway (clause No 5.10 IRC SP:84-2019)

2.6.5 In built-up sections, footpaths/fully paved shoulder shall be provided with a width as per TCS. (Clause No. 2.15 & Clause No 2.6 IRC SP 84-2019)

2.7 Lateral and vertical clearances at underpasses

2.7.1 In case of VUP/ LVUP/ SVUP, the proposed structure, the finish road level in VUP/ LVUP/ SVUP shall be kept 150 mm above the ground level / service road / cross road (whichever is higher) to ensure that these VUP / LVUP / SVUP does not become water accumulation points. (clause No 2.10 IRC SP:84-2019)

2.7.2 The vertical and horizontal clearance at the underpasses shall be as per Clause 2.10.2 of the manual unless and otherwise specified in the Schedules. (Clause No. 2.10.2 IRC: SP:84-2019).

Sr. No.	Location (Design Chainages)	Span/Opening (m)	Remarks
1	331+240	1 x 10.5 x 3.5m	Light Vehicular Underpass

2.8 Lateral and vertical clearances at overpasses: NIL

2.9 Service roads / Slip roads / Connecting Roads:

2.9.1 Service Road: The height of embankment of service road shall confirm to Clause 4.2.1.

Width shall be as per TCS.

2.9.2 The Service roads shall be constructed / retained at the locations & for the lengths indicated below:

Sr. No.	Chainage (km)	Length of service road (m)		Total Length (m)	Width of Service Road (m)
		LHS	RHS		
1	322+820 to 322+860	40	-	40	7.5
2	330+870 to 331+610	740	740	1480	5.5
4	348+880 to 348+940	60	-	60	7.5
5	349+230 to 349+300	70	-	70	7.5
6	349+540 to 349+680	140	-	140	7.5
7	363+920 to 363+970	50	-	50	5.5
8	397+360 to 397+590	-	230	230	7.5

Note: Above length of service road is indicative and minimum specified. The actual length of service road shall be determined by the contractor in accordance with manual requirements with approval from Authority's Engineer. Any increase in the length specified in the schedule -B shall not constitute a Change of Scope.

2.9.3 The Parking bays shall be provided along service road: Nil

2.9.4 Slip Road : Nil

2.9.5 Separator between Main Carriageway and Service/Slip Road (clause No. 2.15 .1 IRC: SP: 84-2019) :

A separator between main carriageway and service/slip road shall be provided to prevent the pedestrians, local vehicles and animals entering the highway

Note:

- (i) Above length of the service/slip roads is minimum specified. The actual length of the service/slip/connecting roads shall be determined by the Contractor in accordance with the approved plan & profile and design approved from the Authority's Engineer. Any increase/decrease up to 5 percent length from the length specified in this Clause of Schedule-S shall not constitute a Change of Scope. Any additional length shall be dealt in Change of Scope.
- (ii) The Acceleration, deceleration lane, right turning storage lane, entry/exit lanes shall be constructed in addition to length given in above table and shall be deemed to be part of the scope and no Change of Scope shall be considered for the same. (Clause No; 2.12.2 IRC:SP:84:2019)

2.10 Grade separated structures

Grade separated structures shall be constructed as per paragraph 2.13 of the Manual. Proposed levels at structure locations as shown in plan & profile specified in Annexure-11 of schedule-S are minimum requirement and only for guidance and any increase in levels shall not

constitute any change of scope. Entry/Exit arrangement from main carriageway shall be 50m before/after the start/end of approach road to grade separator i.e. start/end of valley curve (clause No. 2.12.2.2 IRC: SP: 84-2019). RCC barrier shall start from start of valley curve and end after grade separator at end of valley curve.

The sub-structure shall be continued in the median portion with RCC barrier wherever superstructure has not been proposed in median portion. (Clause 7.1 (vii) IRC: SP:84-2019).

50 m long MBCB Safety barriers on structure approaches shall be provided on all four faces of each structure. MBCB provided towards median side of each structure shall be joined on ends in semi-circular shape. (Clause No. 4.3.5 and 4.9, IRC 119).

1.5 m wide footpaths shall be provided at grade intersection below structures for each direction of pedestrian movement (refer fig 3.1 to 3.6 IRC: SP: 84-2019).

The requisite particulars are given below: -

2.10.1 Vehicle Overpass (VOP)

Sr. No.	Design Chainage (km)	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Span Arrangement (m)	Minimum Vertical Clearance (m)	Skew Angle (to be specified)	Remarks
Nil								

2.10.2 Vehicle Underpasses (VUP)

Sr. No.	Design Chainage (km)	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Span Arrangement (m)	Minimum Vertical Clearance (m)	Skew Angle (to be specified)	Remarks
Nil								

2.10.3 Light Vehicle Underpasses (LVUP)

Sr. No.	Design Chainage (km)	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Span Arrangement (m)	Minimum Vertical Clearance (m)	Skew Angle (to be specified)	Remarks
1	331.240	14.5	14.5	As per TCS	1*10.5 (Clear Opening)	3.5	0	Hiwra

2.10.4 Small Vehicle Underpasses (SVUP)

Sr. No.	Design Chainage (km)	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Span Arrangement (m)	Minimum Vertical Clearance (m)	Skew Angle (to be specified)	Remarks
Nil								

2.10.5 Cattle and Pedestrian underpasses

Sr. No.	Design Chainage (km)	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Span Arrangement (m)	Minimum Vertical Clearance (m)	Skew Angle (to be specified)	Remarks
Nil								

2.10.6 Flyover

Sr. No.	Design Chainage (km)	LHS Roadway Width (m)	RHS Roadway Width (m)	Super Structure Provision in Median	Span Arrangement (m)	Minimum Vertical Clearance (m)	Remarks
NIL							

2.10.7 Interchanges (IC)

Sr. No.	Design Chainage (km)	Name of structure	Length (m)	Total Width (m)	Typical Cross Section	Remarks
Nil						

2.10.8 Details of Ramps, Crossroads and Connecting Roads at Interchanges (IC)

Sr. No.	Carriageway Widths including Kerb Shyness	Length (m)	Description of Ramps, Crossroads and Connecting Roads	Remarks
-				

2.11 Typical Cross Section (TCS) of Project Highway:

The project highway shall be constructed to Four Lane configuration. Typical cross sections along with different type of cross section required to be developed in different segment of project highway are indicated below:

Sr. No	Design Chainage		Length (Mtr)	TCS No	Side	Remark
	From	To				
1	322+820	322+860	40	TCS-6B	LHS	SR
2	348+880	348+940	60	TCS-6B	LHS	SR
3	349+230	349+300	70	TCS-6B	LHS	SR
4	349+540	349+650	110	TCS-2	LHS	SR
5	329+990	330+160	170	TCS-4	BHS	MCW
6	330+160	330+870	710	TCS-5	BHS	MCW

Sr. No	Design Chainage		Length (Mtr)	TCS No	Side	Remark
	From	To				
7	330+870	331+610	740	TCS-6C	BHS	LVUP with approaches (RE wall) and SR
8	331+610	331+960	350	TCS-5	BHS	MCW
9	331+960	332+000	40	TCS-4	BHS	MCW
10	332+000	332+070	70	TCS-4	BHS	MCW
11	332+070	332+100	30	TCS-5	BHS	MCW
12	332+100	332+130	30	TCS-5	LHS	MCW
13	349+650	349+680	30	TCS-2	LHS	SR
14	363+920	363+970	50	TCS-6A	LHS	SR
15	364+960	365+139	179	TCS-4	RHS	MCW
16	364+995	365+146	151	TCS-4	LHS	MCW
17	397+360	397+590	230	TCS-6B	RHS	SR

Note:

- Any variations in the lengths specified in the above table shall not constitute a Change of Scope.
- Lengths mentioned in the above list for cross section types concerned to structures are inclusive of structure length.
- Chainages may be adjusted according to location of structures as per drawings as per TCS given in Annexure II of Schedule B.
- Carriageway width tapering shall be provided 1 in 50 as per manual, wherever necessary.
- Intermediate Sight Distance (Desirable Minimum Sight Distance) shall be followed for design of all vertical curves (Summit and Valley Curves) including structures as well as highways. (Clause No. 2.9.5 IRC: SP:87-2019 / IRC: SP:84:2019 / IRC: SP:73:2023)
- Provide detailing of placement and specification of Railing, Fencing and electric poles, etc. (Clause No. 2.17 IRC: SP:87-2019 / IRC: SP:84:2019 / IRC: SP:73:2018)
- If there is any damage done to the existing roads/cross roads/service roads during the foundation work or any other construction activity, contractor must reconstruct the damaged portion on both sides of the cross/existing roads for minimum of 50m portion and shall not constitute a Change of Scope.
- Approaches (RE wall) shall be provided for above LVUP, designed as per Manual (IRC).

3 INTERSECTIONS AND GRADE SEPARATED STRUCTURE (section 3 IRC: SP: 84-2019)

All at-grade intersections and grade separated intersections shall be as per Section 3 of the manual. Existing at-grade intersections shall be improved to the prescribed standards.

The service road pavement composition shall be continued on crossroads of the intersections for the length specified for at-grade and grade separated intersections.

Properly designed intersections shall be provided at the locations and of types and features given in the tables below.

3.1 At-grade intersections:

3.1.2 Major Junctions:

S. No.	Existing Chainage (km)	Design Chainage (km)	Type of intersection	Category of cross road		
				NH	SH	Others
Nil						

3.1.3 Minor Intersections:

S. No.	Design Chainage (km)	Type of Junction	Leads to		Median Opening	Length of Cross road to be developed (m)		Category of cross road
			Left	Right		LHS	RHS	
1	330.250	Y	Agriculture Land	-	No	50	-	Village Road
2	331.250	T	-	Agriculture Land	Yes	-	50	Village Road
3	331.250	T	Agriculture Land	-	Yes	50	-	Village Road
4	331.850	Y	Hirwa	-	No	50	-	Village Road

Note:

1. Type of Junction to be improved as per manual (Clause No. 3.2.5 IRC SP 84-2019).
2. Pipe culverts shall be provided at junctions for proper drainage arrangements wherever required in consultation with NHAI
3. Junction improvement in Bituminous or cement concrete layers type pavement layers to be as per the existing cross roads.
4. Median openings as per site requirements shall be provided with consultation of NHAI/AE wherever required in addition to the locations provided above.
5. At access Roads profiles to be matched to existing road for required length in existing road surface layers.

3.2 At-Grade Intersections below Grade Separators / Interchanges

These shall be provided as given at para 2.10.3 of this Annexure-I of Schedule-B (Clause No. 3.4.7 of IRC: SP: 84-2019).

S. No.	Design Chainage (km)	Type of Junction	Leads to	U-Turn provision in Viaduct Spans	Category of cross road	Carriageway width of cross road	Length of Cross road to be developed (m)
--------	----------------------	------------------	----------	-----------------------------------	------------------------	---------------------------------	--

			Left	Right				LHS	RHS
1	331+240	T	Agriculture Land	-	No	Village Road	3.5 m	50	-

Notes

(i) The Contractor shall take up detailed engineering study to ascertain further details of all intersections and treatment of the intersections shall be designed in accordance with the latest guidelines mentioned in Section-3 of the Manual.

3

(ii) Junction improvement under grade separators shall be carried out as per Manual with proper entry/exit to crossroads and slip/service roads. Auxiliary lanes including storage, acceleration and deceleration lanes along with physical islands shall be provided.

(iii) Location of grade-separated structures is indicative. Exact location shall be decided in consultation with Independent Engineer / Authority Engineer.

(iv) Intersection layout, entry/exit, right turning lane, U-turns, geometric design and typical cross sections of interchange shall be as specified in Annexure to Schedule-B.

(v) Only entry or exit shall be designed at any location (provision of entry/exit by ghost island not permitted).

4 ROAD EMBANKMENT AND CUT SECTION

Construction of road embankment/cuttings shall conform to the Specifications and Standards given in section 4 of the manual. Notwithstanding anything to the contrary contained in this Agreement or Manual, the proposed profile of the project highway as indicated in the Annex-III of Schedule A shall be treated as minimum requirement.

Based on site/design requirement, the Contractor shall design the alignment plans and profiles of the project highway based on site/design requirement mentioned in Schedule B with approval from the Independent Engineer/Authority Engineer within the available Right of Way. However, it is clarified that bottom of subgrade level shall be at-least 1500 mm above HFL/Existing ground level whichever is higher for a Greenfield/ bypass stretch. The contractor can use fly ash for up to 25% of the total embankment filling required for the project, sourced from the nearest NTPC plant or any available location, subject to feasibility.

The side slopes shall not be steeper than 2H: 1V. In case, there is a ROW constraint then, suitable soil retaining structures shall be provided (Clause No. 4.2 IRC: SP: 84-2019).

5 PAVEMENT DESIGN

5.1 Pavement design shall be carried out in accordance with Section 5 of the Manual.

5.2 Type of Pavement and Design requirement (Clause No. 5.4 IRC: SP: 84-2019): The pavement shall be rigid type for the entire length of the project highway except service roads. Service Road/ Slip Road shall be Flexible type.

5.2.1 Design Period and Strategy: Pavement shall be constructed for the entire length of Project Highway including paved shoulders. Flexible Pavement shall be

designed for a minimum design period of 20 years and minimum sub grade CBR of 8% and maximum subgrade CBR of 10%, whereas Rigid pavement shall be designed for a minimum design period of 30 years. Stage construction shall not be permitted.

5.2.2 Recommended Pavement Design: - Notwithstanding anything to the contrary contained in this Agreement or the manual, the Concessionaire shall design the pavement of main carriageway as per earlier approved pavement design for 4 laning work of Mahagaon Yavatmal Section of NH 361.

5.2.3 The pavement for service road/slip roads shall be designed for projected traffic (as per the survey done by contractor at the time of design of project highway), subject to minimum as follows (Clause No. 5.5.4 IRC SP 84-2019)

- (i) Service Roads for minimum 10 MSA.
- (ii) Slip Roads for minimum 10 MSA.

5.3 In order to meet the intended functional requirement of respective pavement layers on main carriageway, the minimum thickness of respective pavement layers for main carriageway and connecting crossroads/ service roads/ slip roads/ entry/exit locations, acceleration/ deceleration lane, right turning lanes shall, however, in no case be less than as given below:

5.3.1 Main carriageway (Including tapering portion), paved shoulder, median side paved strip (Rigid)

Sl. No.	Description	Thickness (mm)	Remarks
1	PQC	300	M-40
2	Impermeable PVC Sheet	125 micron	
3	DLC	150	M-15
4	GSB	150	As per IRC 58 2015 .it is mentioned in clause 6.5.3 GSB gradation to be adopted from Appendix – VI Column no. 6 {AASHTO 93, Page 1-19 Grading 4, 5 and 6 (Un stabilized)} having permeability of 350 m/day
5	Subgrade	500	

5.3.2 Main carriageway, paved shoulder, median side paved strip, entry/ exit locations, acceleration/ deceleration lane, right turning lanes (Rigid) –For Toll Plaza location.

Pavement Composition	Minimum Crust Thickness (mm)
Not Applicable	

5.3.3 Service roads / Slip roads

S. No.	Description	Thickness (mm)	Design MSA
1	BC	40	10

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



2	DBM	60	
3	WMM	250	
4	GSB	200	

5.4 Reconstruction of Stretches with New pavement (Clause No. 5.9.4 IRC: SP: 84-2019)

The following stretches of the existing road shall be dismantled/milled and reconstructed. These shall be designed as new pavement.

Sr. No.	Design Chainage		Pavement Composition (minimum)	Remarks
	From	To		
NIL				

6 ROADSIDE DRAINAGE:

6.1 Drainage system

Drainage system including surface and subsurface drains for the Project Highway including crossroads shall be provided as per section 6 of the manual. RCC Drain cum footpaths shall conform to the cross-sectional features and other details as given in Annexures to Schedule-B and shall be provided as under:

Details of RCC Drain Cum Footpath (Clause No. 2.13 & 6.2.6 IRC: SP: 84-2019)

Sr. No.	Design Chainage (km)	Design Chainage (km)	Length (m)	Length (m)	Width of Drain (m)	Total Length (m)	Remark
	From	To	LHS	RHS			
1	322+820	322+860	40	-	1.5	40	LHS
2	330+870	331+610	740	740	1.5	1480	BHS
3	348+880	348+940	60	-	1.5	60	LHS
4	349+230	349+300	70	-	1.5	70	LHS
5	349+540	349+680	140	-	1.5	140	LHS
6	363+920	363+970	50	-	1.5	50	LHS
7	397+360	397+590	-	300	1.5	300	RHS

6.2 Unlined & Lined Drains

Covered Lined drains shall be provided at RE wall locations in the project stretch. Unlined Drains other than above mentioned locations shall be provided in the entire project length which gets terminated at all crossroad locations. In case, the definite outfall is not available, a rainwater harvesting system shall be provided at the deepest location for dispersal of water.

6.3 Median Drain (Clause No. 6.3 IRC: SP: 84-2019)

Lined drain shall be provided in the center of the median at super elevation locations and depressed median. Draining of storm water from one carriageway to other carriageway is not permitted. the Contractor shall design the median drain based on site/design requirement mentioned in Schedule D with approval from the Independent Engineer and shall be connected with the nearest culvert/ outfall.

6.4 Drainage arrangement between Main Carriageway and Service/Slip Roads (Clause No. 2.15 IRC: SP: 84-2019)

A suitable drainage arrangement for draining storm water of main carriageway shall be provided. Storm water of main carriageway to service road is not permitted.

6.5 Drainage where Embankment Height is more than 3m (Clause No. 6.4 of IRC: SP: 84-2019)

Drainage chutes shall be provided at suitable interval on embankment slopes. The drainage arrangement shall include kerb, cement concrete drainage channel at the edge roadway, Cement Concrete Chutes, CC bedding, energy dissipation basin, etc. Mountable Kerb shall be provided beyond the post of MBCB to channelize storm water into chute. Clause No. 6.8.2.4 of IRC: SP: 84-2019.

6.6 Drainage for Structure (Clause No. 6.8 IRC: SP: 84-2019)

A suitable drainage arrangement for draining storm water from deck slab shall be provided. Water shall not fall on any surface of the structures, or remain standing or flowing over the road below structure.

6.7 Drainage for Underpass and Subways Structures (Clause No. 6.8.3 IRC: SP:84-2019)

A suitable drainage arrangement for draining storm water from Underpass and Subways shall be provided.

6.8 Drainage arrangement of Retaining Structures (No Clause in IRC: SP:84-2019)

Vertical Drop-down drainage pipes with suitable cleaning provision shall be provided at suitable interval. Drainage fixtures and dropdown pipes shall be of rigid, corrosion resistant material not less than 100mm dia. The Storm water of main carriageway draining on service road is not permitted.

7 Design of Structures

7.1 General

Project Highway is proposed to be constructed to Four lane configuration with provision for widening to six/eight-lane configuration in future. As such, superstructure of all bridges, culverts and structures is to be designed for edge movement of the vehicle considering stitching of new superstructure in future due to widening for additional lane. Special vehicle loading is to be considered in design of all bridges, culverts and structures.

All major structures will be designed preferably as continuous slab to reduce the number of expansion joints on the MJB/ ROBs/ flyover/ Interchange etc.

- 7.1.1 All bridges, culverts and structures shall be designed for IRC class Special Vehicle (SV) loading and congestion factor as per IRC: 6 and constructed in accordance with section-7 of the manual and shall conform to the cross-sectional features and other details specified therein.

7.1.2 The overall width of the bridge structures shall be as given in Para 7.3 of Annex-I of Schedule-B. (Clause No. 7.3 IRC: SP: 84-2019).

7.1.3 The Safety Barrier and Footpath on Bridges and RoB shall continue on approaches which must be provided as per TCS mentioned in Annexure-II of Schedule-B. The footpath shall be provided with paved surface & railing in Structure portion of ROB.

Sr. No.	Location at km	Skew Angle	Footpath Width (m)		Remarks
			Left	Right	
NIL					

7.1.4 All bridges shall be high level bridges.

7.1.5 All structures shall be designed to carry utility services on outer side of RCC barrier/Railing as per site requirement.

7.1.6 Cross section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross sections given in Section 2.10 of the Schedule-B.

7.2 Culverts (Clause No. 7.3 i IRC: SP: 84-2019)

7.2.1 Overall width of all culverts shall be equal to the roadway width of the approaches. The overall width of culverts shall be including width of main carriageway and slip/service roads/Entry Ramps/Exit Ramps/ Acceleration/Deceleration lanes, etc. All culverts shall also be continued in median and in gap between main carriageway and service road.

7.2.2 New/ Reconstruction of existing RCC pipe culverts: The existing culverts at the following locations shall be re-constructed as new culverts:

Design Chainage	Proposal	Structure Type	Span Arrangement
NIL			

7.2.3 **Widening of existing RCC pipe culverts (Clause No. 7.3 iii IRC: SP: 84-2019)** All existing culverts which are to be retained shall be widened to the proposed roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

7.2.4 Construction of New Culvert

a. Culverts

i. Overall width of all culverts shall be equal to the roadway width of the approaches.

ii. Reconstruction of existing culverts: NIL

iii. Widening of existing culverts: NIL

iv. Additional new culverts shall be constructed as per particulars given: 4 Nos

Sr. No	Location	Design Chainage	Span Arrangement	Type of Culvert	Culvert crossing
--------	----------	-----------------	------------------	-----------------	------------------

			(No* Length)		type
1	Amboda	km 330.320	1*0.9	HPC	NP-4
2	Amboda	km 330.880	2*1.2	HPC	NP-4
3	Hiwra Sangam	km 331.630	2*1.2	HPC	NP-4
4	Hiwra Sangam	km 332.005	1*1.2	HPC	NP-4

- v. Repairs/replacements of railing/parapets, flooring and protection works of the existing culvert shall be undertaken: **NIL**
- vi. Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

b. Bridges

i. Existing bridges to be re-constructed/widened: **NIL**

- (I) The existing bridges at the locations shall be re-constructed as new Structures.
- (II) The Major bridges shall be widened: **NIL**
- (III) The narrow bridges shall be widened: **NIL**

ii. Additional new bridges: **NIL**

iii. The railings of existing bridges shall be replaced by crash barriers at locations: **NIL**

iv. Repairs/replacements of railing/parapets of the existing bridges shall be undertaken: **NIL**

v. Drainage system for bridge decks

vi. An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of the Manual

vii. Structures in marine environment: **NIL**

All the structures are to be treated as Structures with Extreme/ Severe conditions of exposure.

7.2.5 Utility ducts in bypasses:

Utility ducts in bypasses (Greenfield as well as Brownfield projects which are being upgraded) in form of NP-4 RCC Pipe dia. 600 mm shall be provided across the Project Highway @ 0.50 km c/c and along with inspection chamber were directed for crossing of utilities anywhere as per manual requirements (Clause No. 2.16 IRC: SP:84-2019).

7.2.6 Rail-road bridges: **NIL**

Design, construction & detailing of ROB/RUB shall be specified in Section-7 of Manual.

7.2.7 Road over-bridges: **NIL**

Road over-bridges (road over rail) shall be provided at following level crossings, as per



GAD drawings attached.

7.2.8 Road under-bridges: NIL

Road under-bridges (road under railway line) shall be provided at the following level crossings, as per GAD drawings attached:

7.3 Grade separated structures

The grade separated structures shall be provided at the locations and of the type and lengths specified in paragraphs 2.9 and 3 of this Annex-I.

7.4 Repairs and strengthening of bridges and structures

The existing bridges and structures to be repaired/strengthened and the nature and extent of repairs /strengthening required are given below:

7.4.1 Bridges: NIL

7.4.2 ROB / RUB: NIL

7.4.3 Overpasses/Underpasses and other structures: 1 Nos. (LVUP)

7.4.4 List of Major Bridges and Structures: NIL

8 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORK

8.1 The Traffic Control devices and road safety work shall be provided in accordance with section 9 of the Manual and as per guideline given in IRC:8, IRC: 25, IRC: 67, IRC: 79, IRC: 103 and section 800 of the MoRTH Specification

8.2 Specifications of the reflective sheeting as per Section 9 of Manual IRC SP 84 – 2019 shall be provided and as directed by Authority.

8.3 Traffic Signs:

Traffic Sign include road sign, overhead sign & curb mounted signs along the entire Project Highway.

8.4 Pavement Marking:

The Pavement Marking shall cover road marking for entire Project Highway.

8.5 Safety Barrier:

Provide Crash Barrier along the Highway at all locations as suggested in the manual.

9 ROAD SIDE FURNITURE

It shall be provided as per the details mentioned in Schedule-C.

10 HAZARDOUS LOCATIONS

The safety barriers shall also be provided as per the provisions of manual.

11 MISCELLANEOUS WORKS

- a. Slope and Shoulder Protection: The said shoulder and earthen shoulders to be protected against the erosion by suitable protection measures i.e Geo cell with

Turfing.

- b. Embankment Protection/ drainage to be provided as per in accordance to provisions specified in the Manual.

12 UTILITY SHIFTING

The Contractor shall undertake the work of shifting of any utility (including electric lines, water pipes, gas pipelines and telephone cables) to an appropriate location or alignment, in accordance with the provisions of Contract Agreement. Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department is part of the scope of work of the Contractor. The bidders may visit the site and assess the quantum of shifting of utilities for the project before submission of their bid. Copy of utility relocation plan is enclosed. The specifications of concerned Utility Owning Department shall be applicable and followed.

The Details of utility are as follows:

Sr. No	Type of Utility	Unit	Qty	Location/Stretch
A	Electrical Utility			km 329.990 to km 332.130 km 348.880 to km 348.940 km 349.230 to km 349.300 km 349.540 to km 349.680 km 363.920 to km 363.970 km 364.960 to km 365.146 km 397.360 to km 397.590
1	Electric Poles	Nos	36	
2.	Electric Cables	Meter	3280	
3	Transformer	Nos	8	
B	Water/Sewage Utility			
1	Pipe 110 mm HDPE 6Kg/cm2	Mtr	1250	km 329.990 to km 332.130 km 348.880 to km 348.940 km 349.230 to km 349.300 km 349.540 to km 349.680 km 363.920 to km 363.970 km 364.960 to km 365.146 km 397.360 to km 397.590
2	Crossing 1 No	Mtr	70	
C	Felling of Trees	Nos	34	km 329.990 to km 332.130 km 364.960 to km 365.146

Note I:-

- A. The details mentioned above are tentative, Contractors are advised to conduct a thorough site visit and coordinate with the relevant utility-owning agency to obtain accurate information about the utility lines before commencing any work. All costs and responsibilities associated with obtaining these details shall be borne by the contractor.

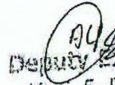


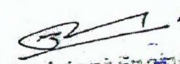
- B. The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of Utility Owning Department and it is to be agreed solely between the Contractor and the Utility Owning Department. No change of scope shall be admissible and no cost shall be paid for using different type/spacing/size/specifications in shifted work in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of Utility owning Department and/or construction of project highway.
- C. The Contractor shall carry out joint inspection with Utility Owning Department and get the estimates from Utility Owning Department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor. The decision/approval of Utility owning Department shall be binding on the Contractor.
- D. The supervision charges at the rates/charges applicable of the Utility owning Department shall be paid directly by the Authority to the Utility owning Department as and when Contractor furnished demand of Utility Owning Department along with a copy of estimated cost given by the latter.
- E. The dismantled material/scrap of existing Utility to be shifted/dismantled shall belong to the Contractor who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor is required to deposit the

Note II: -Copy of Utility shifting plans enclosed below.

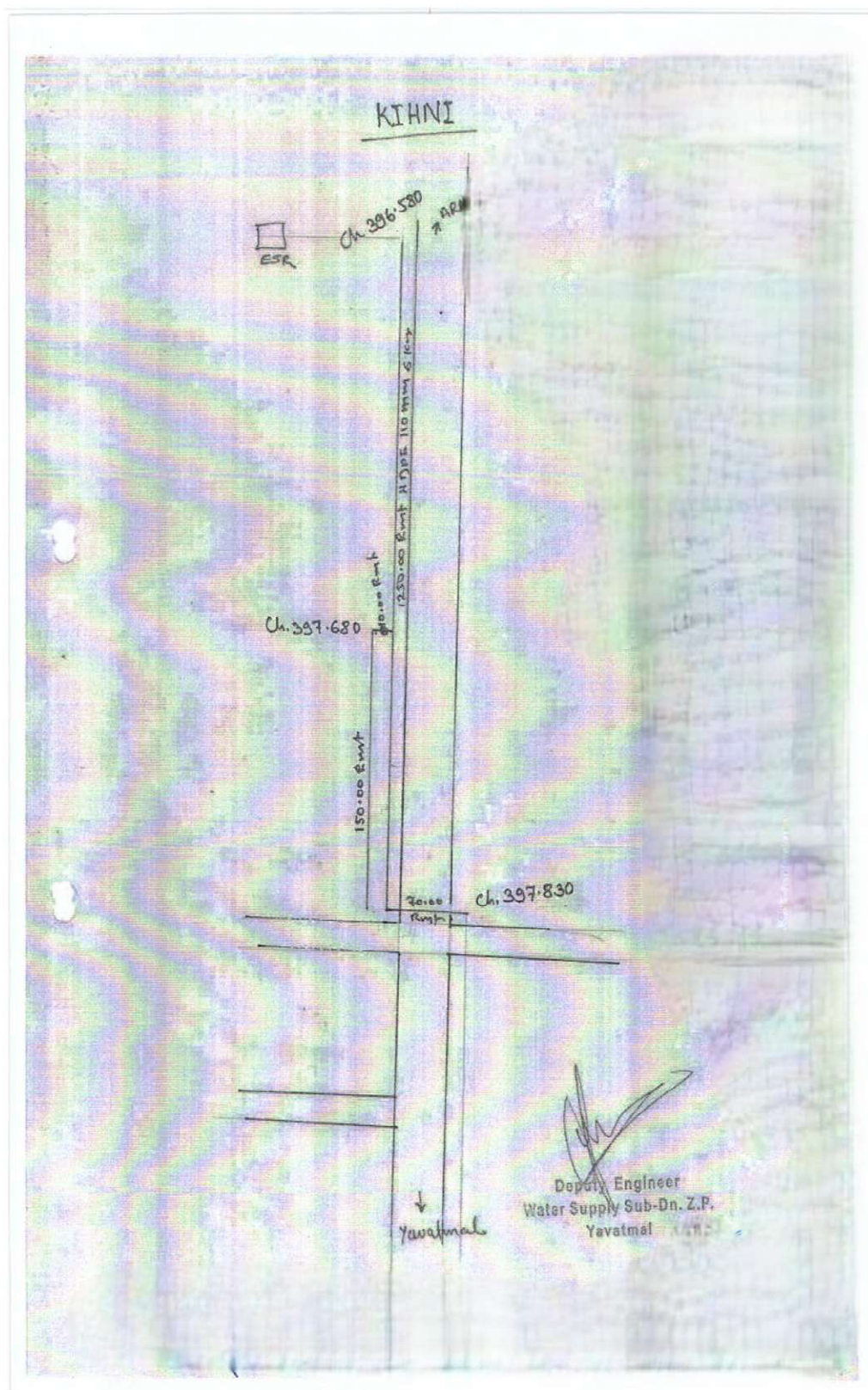


- 1) Erection of 11KV Line ON RSJ pole ≈ 0.24 km
- 2) Erection of 100 KVA DT ≈ 0.1 No
- 3) Shifting of LT Line 3 ϕ 4W AB cable ≈ 0.70 km
- 4) Shifting of 33KV Line ON RSJ pole ≈ 0.90 km
- 5) Erection of 33KV Isolator ≈ 3 No.
- 6) Erection of 33KV UG Line ≈ 0.16 km
- 7) Erection of 11KV UG Line ≈ 0.48 km
- 8) Erection of LT UG Line ≈ 0.80 km.
- 9) Erection of 33KV four pole structure ≈ 1 No


Deputy Engineer
M. S. E. D. Co. Ltd.
Sub-Dn, Mahagaon


Assistant Engineer
M.S.E.D.C.L.D.C. Gm

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



15 Work Zone Traffic Management Plans (Clause No. 7.19 IRC: SP: 84-2019)

The traffic diversion plans shall be prepared as per IRC SP 55 for smooth flow of traffic and safety. A diversion plan shall be proposed for construction of Culvert, Grade Separated Structures, Bridges, RoB / RUB, etc. and traffic management plan for widening/ reconstruction of carriageway.

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.

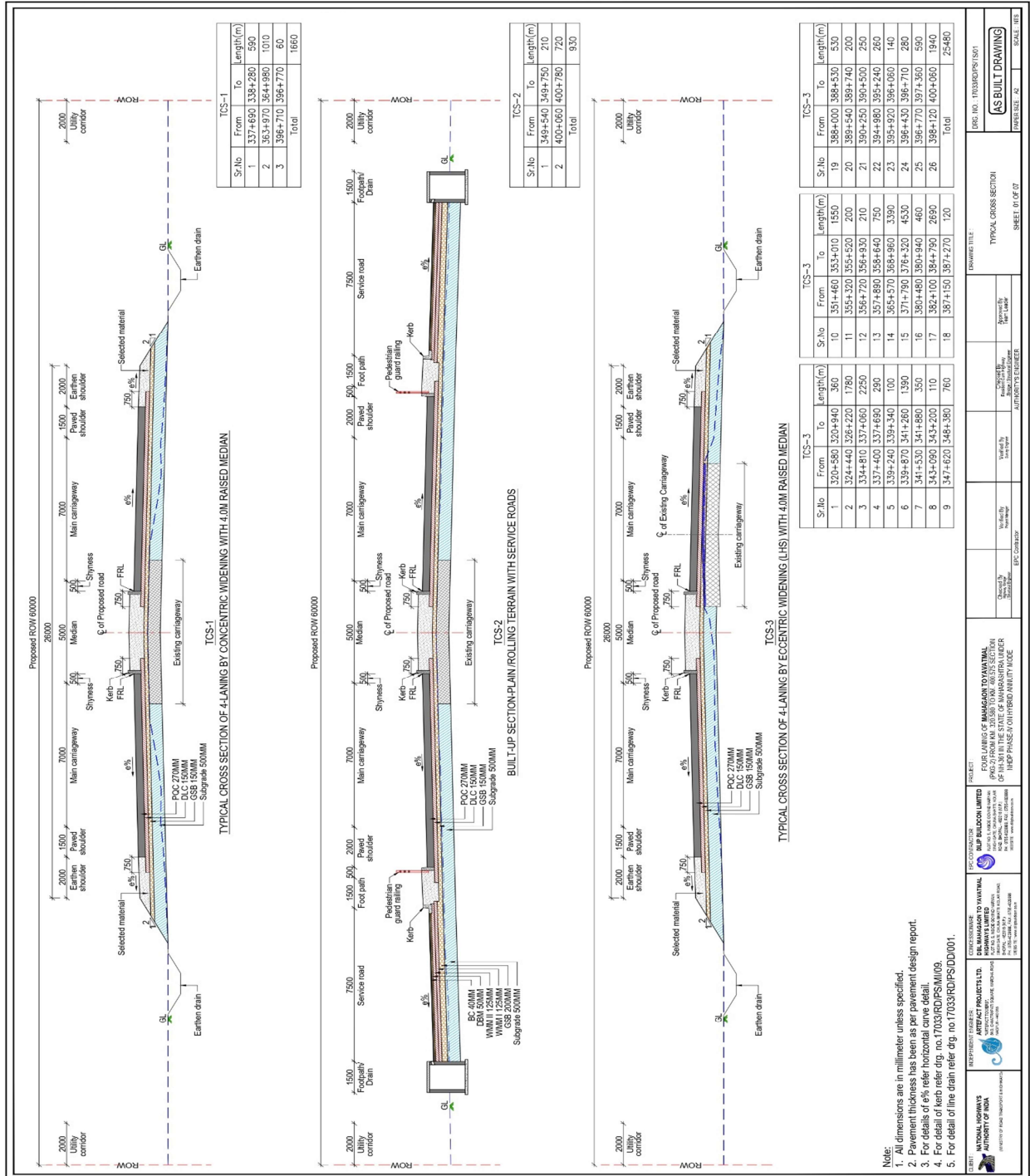


Appendix- II

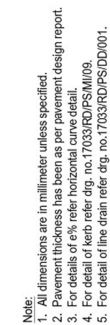
Schedule-B

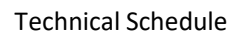
Applicable Typical Cross Section for the Project Stretch

Sr. No	Design Chainage		Length (Mtr)	TCS No	Side	Remark
	From	To				
1	322+820	322+860	40	TCS-6B	LHS	SR
2	348+880	348+940	60	TCS-6B	LHS	SR
3	349+230	349+300	70	TCS-6B	LHS	SR
4	349+540	349+650	110	TCS-2	LHS	SR
5	329+990	330+160	170	TCS-4	BHS	MCW
6	330+160	330+870	710	TCS-5	BHS	MCW
7	330+870	331+610	740	TCS-6C	BHS	MCW & SR
8	331+610	331+960	350	TCS-5	BHS	MCW
9	331+960	332+000	40	TCS-4	BHS	MCW
10	332+000	332+070	70	TCS-4	BHS	MCW
11	332+070	332+100	30	TCS-5	BHS	MCW
12	332+100	332+130	30	TCS-5		MCW
13	349+650	349+680	30	TCS-2	LHS	SR
14	363+920	363+970	50	TCS-6A	LHS	SR
15	364+960	365+139	179	TCS 4	RHS	MCW
16	364+995	365+146	151	TCS 4	LHS	MCW
17	397+360	397+590	230	TCS-6B	RHS	SR











SCHEDULE - C

(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

The Contractor shall construct the Project Facilities described in this Annexure-I to form part of the Project Highway. The Project Facilities shall include:

a) Toll Plaza

b) Roadside furniture

- i. Kilometer and Hectometer Stones
- ii. Traffic Signs
- iii. Overhead Signs
- iv. Road Marking
- v. Road Delineators
- vi. Reflective Pavement Markers & Solar Studs
- vii. Traffic Impact Attenuators
- viii. Boundary wall and Fencing

c) Operation and Maintenance centres

d) Way side Amenities / Service Areas

e) Truck lay-byes

f) Bus Bay and Bus shelter

g) Pedestrian Facilities

h) Highway Lighting

i) Rainwater Harvesting

j) Environmental Management Plan

k) Land Scaping and Tree Plantation

l) Advanced Traffic Management System (ATMS)

m) Highway Patrol Units

n) Emergency medical services

o) Crane Service

2 Description of Project Facilities

Each of the project facility is briefly described below:

1. Toll Plaza: Nil

2. Roadside furniture

2.1 Kilometer and Hectometer Stones (Clause No. 12.3 IRC: SP:84-2019)

Sl. No.	Item	Number	Remarks
1	Kilometer Marker/Stones	(2 X No. of kms) + 2	The km/ Hectometer stones/ marker can be concrete/ stones and shall be placed on both outer side of the earthen shoulder.
2	Hectometer Marker/ Stones	(8X No. of kms)	In case KM/ Hectometer marker are to be fixed on separator between main carriageway & service road then these should be fixed as reflective signs. In case of Access control highway/ Expressway, km/ Hectometer markers should be fixed as reflective signs. km/ Hectometer stones are required to provide on main carriageway and service road, both if continuous service road is provided throughout project length. (Service road length is more than 1 km)

2.2 Traffic Signs (Clause No. 9.2 IRC: SP:84-2019)

Traffic Signs include roadside signs, overhead signs and kerb mounted signs etc. shall be provided along the entire Project Highway and on all Side, Roads joining the main carriageway/service road.

A QR code shall be marked on back of each sign as per IRC 67.

All sign shall be of Micro Prismatic Grade Sheeting Corresponding to Class C sheeting as per ASTM D 4956 Type VIII, IX and XI. (Clause No. 9.2.3 IRC: SP:84-2019/ IRC: SP:84-2019).

All shoulder mounted signs shall be supported on GI Pipes.

Overhead Signs shall be placed on a structurally sound gantry or cantilever structure made of GI pipes. (Clause No. 9.2.4 IRC: SP:84-2019).

On multi-lane roads (6 lanes or above), signs shall be mounted overhead (Clause No. 4.6 of IRC: 67 2022).

The siting of signs shall confirm to Table 4.1 and Fig 4.1 of IRC 67. (Clause IRC: SP:84-2019). The two successive signs shall be placed at a minimum distance of 0.6 x V metre (V is design speed in kmph) (Clause No. 4.8 IRC 67 2022).

Overhead Gantry Signs shall be placed as given below (Clause No. 16.3.2 of IRC 67 2022):

Sl. No.	Item	Carriageway (Left, Right, Both)
1	Overhead Gantry signs	
a	Start of project	-
b	End of project	-
c	Toll Plaza location on both side	-

Sl. No.	Item	Carriageway (Left, Right, Both)
2	Overhead Gantry signs	-
a	At all major locations of crossroads i.e. NH, SH, MDR (start of grade separated structure/ at grade interchange)	At all junctions/ Flyovers, either left or Right as per Site Condition
b	At major trauma center, roads leading to religious places or any other important location	Both sides, as per Site Condition (Minimum 3 nos. of full width as descoped from the main project)
3	Double/ Butterfly Cantilever	-

The detailed minimum number of signage's indicating places, direction, distances, and other features shall be marked on the alignment plan and submitted.

Note: Below mentioned details are indicative and may change based on site condition:

S. No.	Road Signs	Number	Remarks
I	Mandatory/Regulatory		
1	Stop signs	4	At junctions
2	Give Way Signs	4	At crossroads of junctions
3	Prohibitory signs	-	-
4	No Parking signs	-	-
5	No Stopping signs	-	-
6	Speed Limit signs (Circular)	-	-
7	Speed Limit signs (Vehicle Type)	-	-
8	Vehicle Control signs	-	-
9	Restriction Ends sign	-	-
10	Compulsory Direction Control and other signs	-	-
II	Cautionary/Warning		
1	Left/Right Curve	1	At curve location
2	Left/Right Curve with side road	-	-
3	Right/Left Hairpin Bend	-	-
4	Right/Left Reverse Bend	-	-
5	Series of Bends	2	

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



S. No.	Road Signs	Number	Remarks
6	270 Degree Loop	-	-
7	Side Road	-	-
8	Y-intersection	2	Before Y intersection
9	Cross Road	-	-
10	Roundabout	-	-
11	Traffic Signals	-	-
12	T-Intersection	2	Before T- Junction
13	Major Road Ahead	2	At major road
14	Staggered Inter-section	-	-
15	Merging Traffic Ahead	2	At merging location
16	Narrow Road Ahead	-	-
17	Road Widens	-	-
18	Narrow Bridge Ahead	-	-
19	Steep Ascent/Descent	-	-
20	Reduced Carriageway	-	-
21	Start/End of Dual Carriageway	-	-
22	Gap in Median	-	-
23	Pedestrian Crossing	5	At grade crossing
24	Pedestrian crossing with backing board	-	-
25	School Ahead	-	-
26	Built Up Area	-	-
27	Two Way Operation (on main carriage way /service road)	-	-
28	Two Way Traffic on Cross Road Ahead	-	-
29	Danger Warning Sign	-	-
30	Deaf or Blind Persons Likely on Road Ahead	-	-
31	Cycle Crossing	-	-
32	Cycle Route Ahead (Warning for Cycles on road ahead)	-	-

S. No.	Road Signs	Number	Remarks
33	Dangerous Dip	-	-
34	Speed Breaker	5	On cross roads
35	Rumble Strip	-	-
36	Rough Road	-	-
37	Dangerous Ditch	-	-
38	Slippery Road	-	-
39	Slippery Road because of Ice	-	-
40	Opening or Swing Bridge	-	-
41	Overhead Cable	-	-
42	Play Ground Ahead	-	-
43	Quay Side or River Bank	-	-
44	Sudden Side Winds	-	-
45	Tunnel Ahead Warning	-	-
46	Falling Rocks	-	-
47	Cattle Crossing	-	-
48	Crash prone area ahead	-	-
III	Chevron Signs	-	-
1	Single Chevron	48	At curve location
2	Double Chevron	-	-
3	Triple Chevron	-	-
IV	Object Hazard Marker Sign		
1	Left/Right side Object Hazard Marker	8	At Hazardous location
2	Two way Object Hazard Marker	6	At Hazardous location
V	Informatory/Guide		
1	Direction and Place Identification signs	2	Near the place
2	Stack Type Advance Direction Sign (Shoulder Mounted)	-	-
3	Stack Type Advance Direction Sign with cautionary regulatory signs (Shoulder Mounted)	2	-

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



S. No.	Road Signs	Number	Remarks
4	Map Type Advance Direction Sign (Shoulder Mounted)	-	-
5	Map Type Advance Direction Sign for roundabout (Shoulder Mounted)	-	-
6	Flag Type Direction Sign	4	
7	Reassurance Sign	3	Overhead gantry
8	Place Identification Sign	2	Near the place
9	Tourism Related Sign	-	-
VI	Facility Information signs	-	-
1	Eating Place	-	-
2	Light Refreshment	-	-
3	Resting Place	-	-
4	First Aid Post	-	-
5	Toilet	-	-
6	Filling Station(Fuel Pump)	-	-
7	Hospital	-	-
8	U-Turn Ahead	-	-
9	Pedestrian Subway	-	-
10	Police Station	-	-
11	Repair Facility	-	-
12	Bus Stop	-	-
VII	Other Useful Information Signs		
1	Signs For Persons With Disabilities	-	-
2	Parking Information	-	-
3	Telephone Facilities	-	-
4	Toilet Facilities	-	-
VIII	Route Maker Signs		
1	State Highway Route Marker Sign	-	-
2	National Highway Route Marker Sign	-	-

Note: The locations of the placement of signages shall be finalized in consultation with Authority's Engineer/ NHAI, as per site requirement.

2.3 Road Marking (Clause No. 9.2 IRC: SP: 84-2019)

Road Markings shall be Hot applied thermoplastic materials with reflectorized beads to achieve visibility confirming to clause 2.7.2 of IRC 35 (Clause No. 2.2 IRC: 35).

The cold applied plastics pavement markings shall be used for School Zone Markings, Audible Raised Profile Edge Lines and Block Markings (BM 01/02/03) (Clause No. 2.4 of IRC: 35).

S. No.	Item	Unit		Remarks
		Length (m)	Number	
1	Longitudinal Marking	4 X 2920	-	-
2	Transverse Marking	-	-	-
3	Hazard Marking	-	-	-
4	Block Marking	-	-	-
5	Arrow Marking	-	-	-
6	Directional Marking	-	-	-
7	Facility Marking	-	-	-
8	Centre Line	4 X 2920	-	-
9	Traffic Lane Lines	-	-	-
10	No Overtaking Lines	-	-	-
11	Warning Lines	-	-	-
12	Border or Edge Lines	-	-	-
13	Longitudinal Markings for Undivided Roads	-	-	-
14	Longitudinal Markings for divided Roads	-	-	-
15	Longitudinal Markings for Ramps/Slip Roads/One Way Streets	-	-	-
16	Stop Line	-	-	-
17	Give Way Lines	-	-	-
18	Diagonal Markings	-	-	-
19	Chevron Markings	-	4	-

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



S. No.	Item	Unit		Remarks
		Length (m)	Number	
20	Continuity Line	-	-	-
21	Word Messages	-	-	-
22	Lane Change	-	-	-
23	Merging/Diverging Markings	-	-	-
24	Hatch Markings	-	-	-
25	Raised Profile Edge Lines	-	-	-
26	Lane Reduction / Narrowing Situations and Transitions (lane Balancing)	-	-	-
27	Directional Arrows	-	-	-
28	Mandatory Turn Arrows	-	-	-
29	Guidance Arrows	-	-	-
30	Deflection Arrows	-	-	-
31	Bifurcation Arrows	-	-	-
32	Arrows on Side Road Approaches	-	-	-
33	Arrows on Main Road Approaches	-	-	-
34	Word Messages	-	-	-
35	Yellow Box Markings	-	-	-
36	Ghost Island	-	-	-
37	Marking for Speed Breakers	-	4	-
38	Pedestrian Crossing	-	6	-
39	Markings when highway passes through settlement fig 9.4 of IRC SP 84/87	-	-	-
40	Transverse Bar Markings	-	-	-
41	Bus-bay Marking	-	2	-
42	Truck Layby - Markings	-	-	-
43	Toll Plaza Marking	-	-	-
44	School Zone Markings	-	-	-
45	Object Markings within Carriageway	-	-	-
46	Markings Adjacent to Objects Carriageway	-	-	-

S. No.	Item	Unit		Remarks
		Length (m)	Number	
47	i. Subway Piers, Abutments, Culverts Head Walls, Concrete Barrier	-	-	-
48	ii. Electrical Poles	-	-	-
49	iii. Guard Rails	-	2	-
50	iv. Trees	-	-	-
51	v. Kerbs	2X2326	-	-
52	Directional Markings as per Annexure: A	-	6	-
53	Facility marking as per Annexure-A7 of IRC 35	-	-	-

Note: The locations of the placement of signages shall be finalized in consultation with Authority's Engineer/ NHAI, as per site requirement.

2.4 Road Delineators (Clause No. 9.4 IRC: SP:84-2019)

S.No.	Item	Number/ Length (m)	Remarks
1	Roadway Indicators	10	
2	Median Marker on Median/RCC Barrier (Clause 4 of IRC 79 2019)	-	
3	Object Markers	-	
4	Flexible Object Markers (Clause 6 of IRC 79 2019) i. On Metal Beam Barrier ii. On Toll Booth/Toll Island iii. On Entry/Exit of Tunnel iv. On Exit from Main carriageway	-	
5	Solar Blinkers on Median Opening, on exit from main carriageway and traffic islands of grade separated intersections	-	

Note: The locations of the marking shall be finalized in consultation with Authority's Engineer/NHAI, as per site requirement.

2.5 Reflective Pavement Markers & Solar Studs (Clause No. 9.5 IRC: SP: 84-2019)

The Prismatic Retro-Reflective type confirming to ASTM D-4280 Pavement Markers & Solar Power Studs on Highway shall be provided in accordance with Schedule - D.

SI No.	Item	Number	Location	Remarks
A. For 4/6 Lane Projects				
1	White Colour one coloured face Road Studs	-	Traffic lane line & centre of carriageway	Uni-directional carriageway
2	Red Colour one coloured face Road Studs	662	Left hand edge of the carriageway, entry to truck lay bye / bus bay, start of service road, chevron/diagonal markings on gorge	
3	Yellow / Amber Colour one coloured face Road Studs	334	Median side edge line, zebra crossing	
4	Green Colour one coloured face Road Studs	-	Lay byes, left hand side of the carriageway in case of multi-lane divided carriageways, crossable continuous line like in acceleration/ deceleration lanes involving lane changing	
B- For 2 Lane PS Projects - NA				
5	White Colour Two coloured face Road Studs		Traffic lane line & centre of carriageway	Bi-directional carriageway
6	Red Colour Two coloured face Road Studs		Left hand edge of the carriageway, entry to truck lay bye / bus bay, start of service road, chevron/diagonal markings on gorge	
7	Green Colour Two coloured face Road Studs		Lay byes, left hand side of the carriageway in case of multi-lane divided carriageways, crossable continuous line like in acceleration/ deceleration lanes involving lane changing	
8	Solar Studs on Major/Minor bridge, RoB, and all structures (Interchange/Flyover/VUP) and Builtup areas, In storage lane of median opening and Exit/Entry from main carriageway			

2.6 Traffic Impact Attenuators (Clause No. 9.6 IRC: SP:84-2019)

2.6.1 Provide Impact Attenuators in Gore Areas. It shall be self-restoring confirming to section 10.6 of IRC SP 99 i.e. Manual of Specifications and Standards for Expressways at following locations:

S.No.	Item	Chainage Number	Remarks
1	On flyover/grade separated structure at exit from main carriageway	-	-
2	On Island of Toll Plaza	-	-
3	Any other location which Safety Hazard	-	-

2.6.2 Providing End Terminals (IRC SP 99) Provide End Terminals P-4 type confirming to EN 1317-4 to Parapet Walls of Culverts, Structures ends for the safety of approaching traffic etc.

- 2.7 Boundary wall and Fencing (Clause No. 12.2 IRC: SP: 84-2019/IRC: SP:84-2019): NIL**
- 3 Operation and Maintenance centres (Clause No. 12.15 IRC: SP: 84-2019/ IRC: SP:84-2019): NIL**
- 4 Way side Amenities / Service Areas/Rest Area (Clause No. 12.6 IRC: SP: 84-2019/ IRC: SP:84-2019) : NIL**
- 5 Truck lay-byes: (Clause No. 12.6 IRC: SP: 84-2019/ IRC: SP:84-2019) : NIL**
- 6 Bus Bay and Bus shelter: (Clause No. 12.7 IRC: SP: 84-2019/ IRC: SP: 84-2019)**
Provision of Busbay and bus shelter on highways as per IRC 80: 2022 including paving of layby, signs, markings, speed calming measures, drainage, lighting etc., in built-up areas, intersections of NH/SH/MDR and roads leading to large settlements is as follows:

6.1 Bus Bay with tapers shall be provided along with passenger's shelters shall be constructed at the following locations.

Sr. No.	Design (Existing) Chainage (km)		Entry Taper Length	Bus Bay Length	Exit Taper Length
	Left	Right			
1		331.010	45	120	45
2	331.480		45	120	45

6.2 Kerb Side Bus Stop with Pedestrian shelter shall be provided at the following locations: NIL

6.3 Bus Bay Pavement Provide pavement composition (Flexible/Rigid/ Paver Blocks)

as follows: N.A.

7 Pedestrian Facilities (Clause No. 9.8 IRC: SP: 84-2019)

Pedestrian Facilities shall be provided in accordance with the Manual of Specifications and Standards as referred in Clause 9.8 of Schedule D and IRC 103 2022. This shall consist of footpath (sidewalks), pedestrian guard rails and pedestrian crossing.

The details are as mentioned below:

S. No.	Pedestrian facilities	Chainage	Side	Remarks
1	Pedestrian guardrails shall be 150 mm from Carriageway/Paved Shoulder i. Hazardous Locations on Straight Stretches ii. At Junctions/Intersections iii. Schools iv. Bus Stop/Railway Stations v. Overpass, Subway vi. Central Reserve	Nil		
2	Footpath paving including fixing of Tactile pavers	Nil		
3	Pedestrian Crossing i. With Zebra Marking ii. With Tabletop Crossing iii. At Intersections iv. At Schools	330.25 331.250 331.250 331.85	LHS RHS LHS LHS	It should be provided at Major/minor junction and service road

8 Highway Lighting (Clause No. 12.5 IRC: SP: 84-2019)

The street light poles shall be 1 piece, continuous-tapered, Octagonal poles and shall be manufactured from one length of steel sheet, formed in continuous tapered tube, with one continuous arc-welded vertical seam. The minimum wall thickness for lighting poles shall not be less than 4 mm. The Bottom Diameter shall be minimum 175 mm. The Top Diameter shall be minimum 75 mm. The door on window of pole shall be antitheft. All electrical cable should be concealed. All electrical lighting fixers shall be LED. The fixtures shall be concealed except on poles. Lighting poles shall be fixed on outer side of steel/concrete barrier. The lighting shall be providing at the following locations:

S. No.	Lighting facilities	Chainage		Side	Lighting Source: Electricity Board/ Generator/ Solar
		From	To		
1	Toll Plaza area: The lighting in and around toll plaza, toll booths, office building, on the approach road, etc. shall be as per Section 12 of the Manual. In addition to at least two high mast light shall be provided on either side of toll plaza			NA	
2	Rest Areas: The entire Rest areas shall be provided with lighting with average illumination to 40 Lux			NA	
3	Truck laybye-: The entire area of truck lay-byes and 50m length of the project highway on its either side shall be illuminated at night to provide an average illumination of 40Lux. Suitable designed electric poles having aesthetic appeal and energy saving bulbs (LED) may be used to provide required illumination. Alternatively, photo voltaic lamps may be used			NA	
4	Bus Bay & Bus shelter locations: The entire bus bay & bus shelter area shall be provided with Lighting (Average illumination of 40Lux.).	331+010		RHS	Solar
		331.48		LHS	Solar
5	Grade separated structures, interchanges, flyovers, (vehicular/ pedestrian) underpasses and Vehicle overpasses: Lighting requirement shall be as per section 12 of the manual. The top and underside of the grade separated structures including service road/ slip road, interchange area at the ground level up to 50m beyond the point from where flaring of the main carriageway takes place shall be provided with lighting. Also, on all legs of at grade interchange/ crossings the lighting shall be provided 50m beyond the point of Centre on all legs. The minimum illumination shall be 40	330.870 to 331.600 & 397		MCW & Service Road BHS	Electricity Board

S. No.	Lighting facilities	Chainage		Side	Lighting Source: Electricity Board/ Generator/ Solar
		From	To		
	Lux., at the extreme edge of the Highway				
6	Built-up sections on the project highway both in the median of main carriageway and on the service roads on both sides	NA			
7	On Median Openings provide 1 nos. high mast lighting of 25m height				
8	On Major Bridges and its approaches higher than 3m				

9 Rainwater Harvesting

The provision of rainwater harvesting shall be provided at every 500m staggered in the entire project length and shall be executed as per requirement of IRC SP: 42-2014 and IRC SP: 50-2013. Additionally, wherever urban drains are provided, which do not have a definite outfall for discharge of water, at such location one pit for rain water harvesting shall be provided along the side drains at the lowest point/ where the water stagnates. The type and location of rain water harvesting is as follows as per IRC SP 42. The locations shall be decided in consultation with AE.

10 Environmental Management Plan (Attach MOEF Mitigation Report in Schedule D)

The Contractor shall implement the Environmental Management plan & action Plan for undertaking possible mitigation measures in accordance with environmental clearance accorded by Ministry of Environment and Forests and climate change. The conditions & directions stipulated by the MOEF shall be complied by the contractor/ Contractor

11 Land Scaping and Tree Plantation (Section 11 of IRC SP 2019/IRC SP 87 2019)

The Contractor shall plant trees and shrubs of required numbers and types at the appropriate locations within Right of Way and in the land earmarked by the Authority for afforestation as per Schedule D at the following areas.

SI. No.	Types of Plantation	Location (km)	Number of trees to be planted	Remarks
1	Shrubs	In median except Structures + Frist row from side of drain	2 rows of 333 plants (staggered) for the median of 3 meter and more	Ornamental type plantation shall be provided
2	Plantations	In available open land within ROW	3 Rows each side, as per IRC SP:21:2009 with iron mesh tree guard, as per space availability.	



Drip irrigation system for median plantation by gravity/pressure sources with all necessary components/systems and emitting devices at plants shall be provided.

The Contractor shall maintain the trees and shrubs in good condition during Contract period as per the Contract agreement.

- 12 Advanced Traffic Management System (ATMS):** 2 Nos of PTZ Cameras to installed & linked with the existing system, in consultation with AE & Concessionaire of the Mahagaon Yavatmal Section of NH 361.
- 13 Highway Patrol Units (Clause No.12.10 IRC: SP: 84-2019/ IRC: SP:84-2019) - NIL**
- 14 Emergency medical services (Clause No. 12.11 IRC: SP: 84-2019/ IRC: SP:84-2019): NIL**
- 15 Crane Service: (Clause No. 12.12 IRC: SP: 84-2019/ IRC: SP: 84-2019) - NIL**

SCHEDULE - D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1 Project Highway

The Contractor shall comply with the Specifications and Standards set forth in Annex-I of this Schedule-D for construction of four lane Highway with Six-Lane Structures.

2 Design Standards

The Project Highway including project facilities shall confirm to design requirements set out in Manual of specifications and standards for 4-Laning of Highway, referred to herein as the Manual IRC: SP: 84-2019.

The Project Highway shall be designed and constructed in conformity with the latest Specifications and Standards of MoRT&H and IRC: SP:84-2019 along with all relevant IRCs with up-to-date amendments including following:

IRC: 5	Standard Specifications and Code of Practice for Road Bridges, Section-I, General Features of Designs.
IRC: 6	Standard Specifications and Code of Practice of Road Bridges, Section - II, Loads and Stresses
IRC: 21	Standard Specifications and Code of Practice for Road Bridges, Section - III, Cement Concrete (Plain and Reinforced) Second Revision)
IRC:22	Composite construction for road bridges, steel road bridges (Re print 1994)
IRC: 5	General features of design.
IRC: 78	Standard Specifications and Code of Practice for Road Bridges, Section IV, Foundations and Substructure.
IRC:18	Design Criteria for pre-stressed Concrete Road Bridges, (Post Tensioned Concrete)
IRC: SP: 21	Guidelines on Landscaping and Tree Plantation
IRC: 83	Standard Specifications and Code of Practice for Road Bridges, Section-IX, Bearings Part - 1, Metallic Bearings.
IRC: SP-37	Design of Flexible Pavement.
IRC: SP: 52	Recommended about the alignment survey and geometric design of Hill roads
IRC SP: 55	Guideline on Traffic management in work zone.
IRC: SP: 42	Guidelines for Road drainage

Annex - I

(Schedule-D)

Specifications and Standards for Construction

1 Specifications and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Four-Laning of Highways (IRC: SP:84-2019), referred to as the Manual, and MORTH Specifications for Road and Bridge Works (fifth Revision). Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

2 Deviations from the Specifications and Standards

- 2.1 The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively.
- 2.2 Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below:

Sl. No.	Clause Referred in Manual	Provision as per Manual	Modified Provision
1	2.2	For Plain & Rolling terrain, Ruling/Min Design Speed is 100/80 km/h respectively.	Minimum design speed of 100 km/h at all stretches is adopted.
2	2.17	Typical Cross-Sections	As Specified in Schedule 'B'.
3	7.4	Cross Section of Bridge	As Specified in Schedule 'B'.
4	2.5	Median Width	As per TCS Schedule described in Schedule 'B' (TCS).
5	2.5.1	Median	The median shall be as given in Schedule B (TCS). Median shall include 0.5m wide edge strip on each side, which shall have same pavement configuration of Main Carriageway as per Clause no. 2.5.3 of Manual.
6	5.2 and 5.4.1	Type of Pavement and Design Requirements	The type of pavement and Design Requirements shall be as specified in Schedule B.
7	7.3	Overall width of structures	The Overall Deck Configuration of all structures shall be as per Schedule B.
8	7.2	Design Loads and Stresses	All bridges, culverts and structures shall be designed and constructed for IRC class special vehicle (SV) loading as per IRC: 6: 2017.
9	6.4.2	Drainage where	Adequate Continuous Surface RCC drain (Except

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



Sl. No.	Clause Referred in Manual	Provision as per Manual	Modified Provision
		Embankment Height is more than 6 metres.	Structures having approach slabs) shall be provided on both side Earthen Shoulder including RCC Chutes at designed intervals with energy dissipation basin irrespective of any Height of Embankment. The drainage system shown in TCS shall be treated as minimum.
10	9.7.5	Median Barriers	Thrie-beam metal crash barriers and RCC crash Barriers as mentioned in Schedule B (TCS).
11	9.7.1	Road side safety barriers	Thrie-beam metal crash barriers shall be provided in entire length on outer side earthen shoulder of each main carriageway and Loops/ Ramps of interchanges as per TCS referred in Schedule-B but excluding stretches covered by bridges and structures, where concrete barriers to be provided.

SCHEDULE-H			
(See Clauses 10.1 (iv) and 19.3)			
CONTRACT PRICE WEIGHTAGES			
60,04,00,000.00			
1.1 The Contract Price for this Agreement is Rs-60,04,00,000.00			
1.2 Proportions of the Contract Price for different stages of Construction of the Project Highway shall be as specified below:			
Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length 80.195 km) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.			

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
Road Works including Culverts, widening and repair of culverts	68.04%	A. Widening and Strengthening of the Existing Road /Bypass	
		(1) Earth work	21.52%
		(2) Sub-Grade	11.54%
		(3) Sub Base Course-GSB	7.06%
		(4) DLC-Dry Lean Concrete	9.06%
		(5) PQC-Pavement Quality Concrete	33.99%
		(6) Median Filling	3.72%
		(7) Concrete Kerb	0.27%
		B.1-Reconstruction/ New 6-Lane VUP/Flyover/ Realignment/Bypass (Flexible Pavement)	
		(1) Earthwork up to top of the embankment	-
		(2) Sub- grade	-
		(3) Sub-base Course	-
		(4) Non bituminous Base course (WMM)	-
		(5) Bituminous Base course	-
		(6) Wearing Coat	-
		B.2-Reconstruction/ Widening/Strengthening of existing Road (Rigid Pavement)	
		(1) Earthwork up to top of the embankment	-
		(2) Sub- grade	-
		(3) Sub-base Course	-
		(4) Bituminous Base course/ Profile Correction Course	-

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(5) Dry Lean Concrete (DLC) Course	-
		(6) Pavement Quality Concrete (PQC) Course	-
		C.1- Reconstruction/ New Service Road/Slip Road (Flexible Pavement)	
		(1) Earthwork up to top of the embankment	0.62%
		(2) Sub- grade	2.54%
		(3) Sub-base Course	1.92%
		(4) Non bituminous Base course (WMM)	2.49%
		(5) Bituminous Base course	1.60%
		(6) Wearing Coat	1.31%
		(7) Separator	0.70%
		C.2-Reconstruction/ New Service Road (Rigid Pavement)	
		(1) Earthwork up to top of the embankment	-
		(2) Sub- grade	-
		(3) Sub-base Course	-
		(4) Dry Lean Concrete (DLC) Course	-
		(5) Pavement Quality Concrete (PQC) Course	-
		D. Reconstruction & New Culverts on existing road, realignments, Bypasses	
		Culvert	1.67%
Minor bridges/ Underpasses/ Overpasses	15.48%	A.1-Widening and repairs of Minor Bridges (length>6m &<60m)	
		Minor Bridges	
		(1) Foundation: On completion of the foundation work of abutments and pier.	-
		(2) Sub-Structure: On completion of the foundation work of abutments and piers with abutment/pier cap.	-
		(3) Super-structure: On completion of the Super-structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	-
		(4) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use	-

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		A.2-New Minor bridges (length >6 m and < 60 m)	
		(1) Foundation: On completion of the foundation work of abutments and pier.	-
		(2) Sub-Structure: On completion of the foundation work of abutments and piers with abutment/pier cap.	-
		(3) Super-structure: On completion of the Super-structure upto deck slab including bearings.	-
		(4) Miscellaneous Works: On completion of wearing coat, bearings, expansion joints, crash barriers, railings, protection works and any remaining work associated to bridge including tests on bridge.	-
		(5) Approaches: On completion of approaches including wing wall/ return wall, retaining walls, stone pitching, protection works for floor, embankment slope etc. complete in all respect and fit for use.	-
		(6) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	-
		B.1-Widening and Repairs of underpasses/overpasses	-
		B.2-New Underpasses/Overpasses (VUP, LVUP, SVUP & AUP (Less Than 60m)	
		(1) Foundation: On completion of the foundation work of abutments and piers	2.88%
		(2) Sub-structure : On completion of abutments and piers with abutment/ pier cap.	1.67%
		(3) Super structure: On completion of the super-structure upto deck slab including bearing.	28.65%
		(4) Miscellaneous Works . On completion of wearing coat, expansion joint, crash barrier, railings and any remaining work associated to bridge including tests on bridge	1.97%

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		(5) Approaches: On completion of approaches including Wing walls/ Return walls, Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	58.70%
Major bridge (length>60m) works and ROB/RUB/ elevated sections/ flyovers including viaducts, if any	-	A.1- Widening and repairs of Major Bridges	
		(1) Foundation	-
		i) Pile Foundation	-
		ii) Open Foundation	-
		(2) Sub-structure	-
		(3) Super-structure (including bearings)	-
		(4) Wearing Coat including expansion joints	-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-
		(6) Wing walls/return walls	-
		(7) Guide bunds, River Training works etc.	-
		(8) Approaches (including Retaining walls, stone pitching and protection works)	-
		A.2- New Major Bridges	-
		(1) Foundation ;	-
		i) Well Foundation	-
		ii) Pile Foundation	-
		iii) Open Foundation	-
		(2) Sub-structure	-
		(3) Super-structure (including bearings)	-
		(4) Wearing Coat including expansion joints	-
		(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	-
		(6) Wing walls/return walls	-
		(7) Guide Bunds, River Training works etc.	-
		(8) Approaches (including Retaining walls, stone pitching and protection works)	-
		B.1- Widening and repairs of	-
		(a) ROB	-
		(b) RUB	-
		(1) Foundation	-

Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		i) Pile Foundation	-
		ii) Open Foundation	-
		(2) Sub-structure	-
		(3) Super-structure (including bearings)	-
		(4) Wearing Coat: (a) in case of ROB wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified as specified.	-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-
		(6) Wing walls/return walls	-
		(7) Approaches (including Retaining walls, stone pitching and protection works)	-
		B.2- New ROB/RUB	-
		(a)ROB	-
		(b)RUB	-
		(1)Foundation	-
		i) Well Foundation	-
		ii) Pile Foundation	-
		iii) Open Foundation	-
		(2) Sub-structure	-
		(3) Super-structure (including bearings)	-
		(4) Wearing Coat: (a) in case of ROB wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB- rigid pavement under RUB including drainage facility complete in all respects as specified.	-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-
		(6) Wing walls/return walls	-
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	-
		C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators	-
		(1) Foundations	-
		i) Pile Foundation	-



Item	Weightage in Percentage to the Contract Price	Stage for Payment	Percentage weightage
1	2	3	4
		ii) Open Foundation	-
		(2) Sub-Structure	-
		(3) Super-Structure (Including bearings)	-
		(4) Wearing Coat including expansion joints	-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-
		(6) Wing walls/Return walls	-
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	-
		C.2- New Elevated Section / Flyovers / Grade Separators / AUP (Greater Than 60m)	-
		(1) Foundation	-
		i) Well Foundation	-
		ii) Pile Foundation	-
		iii) Open Foundation	-
		(2) Sub-structure	-
		(3) Super-structure (including bearings)	-
		(4) Wearing Coat including expansion joints	-
		(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-
		(6) Wing walls/Return walls	-
		(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	-
Other Works	16.49%	Other works	
		(1) Drain	17.77%
		(2) Road Sign, marking, km Stone safety devices etc., HTMS	2.27%
		(3) Project Facilities (Plantation)	10.16%
		(4) Bus Bays & Bus Shelter	6.98%
		(5) Junction Improvement	29.72%
		(6) Gantry & Crash Barrier	17.00%
		(7) Electrical works miscellaneous	4.96%
		(8) Utility Shifting (Electrical and water)	11.14%
	100.00%		

1. Procedure of estimating the Value of work done.

1.1 Road Works

Procedure for estimating the value of road work done shall be as follows:

Table 1.1

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
A. Widening and Strengthening of the Existing Road /Bypass		
(1) Earth work	21.52%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length or 500m whichever is less
(2) Sub-Grade	11.54%	
(3) Sub Base Course-GSB	7.06%	
(4) DLC-Dry Lean Concrete	9.06%	
(5) PQC-Pavement Quality Concrete	33.99%	
(6) Median Filling	3.72%	
(7) Concrete Kerb	0.27%	
B.1-Reconstruction/ New 6-Lane VUP/Flyover/ Realignment/Bypass (Flexible Pavement)		
(1) Earthwork up to top of the embankment	-	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length or 500m whichever is less
(2) Sub- grade	-	
(3) Sub-base Course	-	
(4) Non bituminous Base course (WMM)	-	
(5) Bituminous Base course	-	
(6) Wearing Coat	-	
B.2-Reconstruction/ Widening/Strengthening of existing Road (Rigid Pavement)		
(1) Earthwork up to top of the embankment	-	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10
(2) Sub- grade	-	
(3) Sub-base Course	-	

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(4) Bituminous Base course/ Profile Correction Course	-	(ten) percent of the total length or 500m whichever is less
(5) Dry Lean Concrete (DLC) Course	-	
(6) Pavement Quality Concrete (PQC) Course	-	
C.1- Reconstruction/ New Service Road/Slip Road (Flexible Pavement)		
(1) Earthwork up to top of the embankment	0.62%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length or 500m whichever is less
(2) Sub- grade	2.54%	
(3) Sub-base Course	1.92%	
(4) Non bituminous Base course (WMM)	2.49%	
(5) Bituminous Base course	1.60%	
(6) Wearing Coat	1.31%	
(7) Separator	0.70%	
C.2-Reconstruction/ New Service Road (Rigid Pavement)		
(1) Earthwork up to top of the embankment	-	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length or 500m whichever is less
(2) Sub- grade	-	
(3) Sub-base Course	-	
(4) Dry Lean Concrete (DLC) Course	-	
(5) Pavement Quality Concrete (PQC) Course	-	
D. Reconstruction & New Culverts on existing road, realignments, Bypasses		Cost of completed culverts shall be determined pro rata basis with respect to the total no. of culverts. The payment shall be made on the completion of at least one culvert. 75% of the cost will be payable on completion of box culverts and slab/pipe and head wall. Remaining 25% will become payable on completion of protection works including return wing walls and any other work associated with culverts.
Culvert	1.67%	

@. For example, if the total length of bituminous work to be done is 100 km, the

cost per km bituminous work shall be determined as follows:

Cost per km = P x weightage for road work x weightage for bituminous work x (1/L)

Where P= Contract Price L =Total length in km

Similarly, the rates per km for other stages shall be worked out accordingly.

Note: The length affected due to law-and-order problems or litigation during execution due to which the Contractor is unable to execute the work, may be deducted from the total project length for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the Contract Agreement.

1.2 Minor Bridges and Underpasses /Overpasses

Procedure for estimating the value of Minor Bridge and Underpass/Overpass shall be stated in table 1.2

Table 1.2

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
A.1-Widening and repairs of Minor Bridges (length>6m &<60m)	Minor bridges/ Underpasses/ Overpasses	Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges.
Minor Bridges	-	
(1) Foundation: On completion of the foundation work of abutments and pier.	-	(i) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e completion of at least two foundations of each bridge. In case where load testing is specified for foundation, the trigger of first payment shall include load testing also.
(2) Sub-Structure: On completion of the foundation work of abutments and piers with abutment/pier cap.	-	(ii) Sub - structure - Payment shall be made on pro-rata basis on completion of stage i.e. completion of at least one sub-structure upto abutment/ pier cap level of each bridge.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(3) Super-structure: On completion of the Super-structure in all respect including wearing coat, bearings, expansion joints, hand rails, crash barriers, road signs & markings, tests on completion etc. complete in all respect.	-	(iii) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span in all respects as specified in the column of "Stage of Payment" in this sub-clause.
(4) Approaches: On completion of approaches including Retaining walls, stone pitching, protection works complete in all respect, tests on completion in all respect and fit for use	-	(iv) Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing walls/ return walls, retaining walls, stone pitching in all respect as specified in the column of "Stage of Payment" in this sub-clause for each bridge.
A.2-New Minor bridges (length >6 m and < 60 m)		Cost of each minor bridge shall be determined on pro rata basis with respect to the total linear length (m) of the minor bridges.
(1) Foundation: On completion of the foundation work of abutments and pier.	-	(i) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of at least two foundations of each bridge. · In case where load testing is specified for foundation, the trigger of first payment shall include load testing also.
(2) Sub-Structure: On completion of the foundation work of abutments and piers with abutment/pier cap.	-	(ii) Sub - structure - Payment shall be made on pro-rata basis on completion of stage i.e. completion of at least one sub-structure upto abutment/ pier cap level of each bridge.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(3) Super-structure: On completion of the Super-structure upto deck slab including bearings.	-	(iii) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span upto deck slab including bearing as specified in the column of "Stage of Payment" in this sub-clause. If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRT&H Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Miscellaneous Works: On completion of wearing coat, bearings, expansion joints, crash barriers, railings, protection works and any remaining work associated to bridge including tests on bridge.	-	(iv) Miscellaneous Works: Payment shall be made on pro-rata basis on completion of a stage, i.e., completion of wearing coat, expansion joint, crash barrier, railing, protection works, drainage and any other remaining work associated to bridge including tests on bridge for each bridge.
(5) Approaches: On completion of approaches including wing wall/ return wall, Retaining walls, stone pitching, protection works for floor, embankment slope etc. complete in all respect and fit for use.	-	(iv) Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing walls/ return walls, retaining walls, stone pitching in all respect as specified in the column of "Stage of Payment" in this sub-clause for each bridge.
(6) Guide Bunds and River Training Works: On completion of Guide Bunds and river training works complete in all respects	-	vi) Guide Bunds and River Training Works: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of Guide Bunds and River training Works in all respects as specified for each bridge.
B.1-Widening and Repairs of underpasses/overpasses	-	Cost of each underpass/overpass shall be determined on pro rata basis with respect to the total linear length of the underpasses/overpasses. Payment shall be made on the completion of widening & repair works of a underpass/overpass.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
B.2-New Underpasses/Overpasses (VUP, LVUP,SVUP &AUP (Less Than 60m)		Cost of each Underpass/Overpass shall be determined on pro-rata basis with respect to the total linear length (m) of the Underpasses/Overpasses.
(1) Foundation: On completion of the foundation work of abutments and piers	2.88%	(i) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of foundation(s) of each underpass/overpass. In case where load testing is specified for foundation, the triggering of first payment shall include load testing also.
(2) Sub-structure : On completion of abutments and piers with abutment/ pier cap.	1.67%	(ii) Sub - structure - Payment shall be made on pro-rata basis on completion of stage i.e. completion of at least one sub-structure upto abutment/ pier cap level of each bridge.
(3) Super structure: On completion of the super-structure upto deck slab including bearing.	28.65%	(iii) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e., completion of super-structure of at least one span upto deck slab including bearing as specified in the column of "Stage of Payment" in this sub-clause. If pre-cast girders/ segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRT&H Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Miscellaneous Works . On completion of wearing coat, expansion joint, crash barrier, railings and any remaining work associated to bridge including tests on bridge	1.97%	(iv) Miscellaneous Works: Payment shall be made on pro-rata basis on completion of a stage, i.e., completion of wearing coat, expansion joint, crash barrier, railing, protection works, drainage and any other remaining work associated to bridge including tests on bridge for each bridge.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(5) Approaches: On completion of approaches including Wing walls/ Return walls, Retaining walls/ Reinforced Earth walls, stone pitching, protection works complete in all respect and fit for use.	58.70%	(iv) Approaches: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of approaches including wing walls/ return walls, retaining walls, stone pitching in all respect as specified in the column of "Stage of Payment" in this sub-clause for each bridge.

1.3 Major Bridge works, ROB/RUB and Structures

Procedure for estimating the value of Major Bridge works, ROB/RUB and Structures Work shall be as stated in table 1.3

Table 1.3

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
A.1- Widening and repairs of Major Bridges	Major bridge (length>60m) works and ROB/RUB/ elevated sections/ flyovers including viaducts, if any	Cost of each Major Bridge shall be determined on pro-rata basis with respect to the total linear length (m) of the Major Bridges.
(1) Foundation	-	(1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of at least one foundation of each of the major bridge as specified herein under.
i) Pile Foundation	-	(i) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling up to bottom of pile cap for each pile on pro-rata basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
ii) Open Foundation	-	(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of at least one foundation.
(2) Sub-structure	-	(2) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of at least one sub-structure of abutments/piers up to abutment/pier cap level of each of the major bridge.
(3) Super-structure (including bearings)	-	(3) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure up to deck slab including bearings of at least one span as specified herein under: If pre-cast RCC/PSC steel girders/segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing Coat including expansion joints	-	(4) Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each major bridge.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-	(5) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each major bridge.
(6) Wing walls/return walls	-	(6) Wing walls/return walls: Payment shall be made on completion of all wing walls/return walls complete in all respects as specified for each major bridge.
(7) Guide bunds, River Training works etc.	-	(7) Guide Bunds, River Training Works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified for each major bridge.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(8) Approaches (including Retaining walls, stone pitching and protection works)	-	(8) Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works etc. complete in all respects as specified for each major bridge.
A.2- New Major Bridges	-	Cost of each Major Bridge shall be determined on pro-rata basis with respect to the total linear length (m) of the Major Bridge.
(1) Foundation ;	-	(1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of at least one foundation of each of the major bridge as specified herein under.
i) Well Foundation	-	(i) Well Foundation (a) Cutting Edge of Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb. (b) Well Sinking: Payment of 65% shall be made on completion of well sinking up to bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion up to 10 m and (ii) on completion of each subsequent 5 m or part thereof. (c) Bottom Plug + Top Plug (if provisioned as per design) + Well Cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, backfill, top plug and well cap.
ii) Pile Foundation	-	(ii) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling up to bottom of pile cap for each pile on pro-rata basis. (b) Pile Cap: Payment of 30% shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
iii) Open Foundation	-	(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of at least one foundation.
(2) Sub-structure	-	(ii) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of at least one sub-structure of abutments/piers up to abutment/pier cap level of each of the major bridge.
(3) Super-structure (including bearings)	-	(3) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure up to deck slab including bearings of at least one span as specified herein under. If pre-cast RCC/PSC steel girders/segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon. For cable stayed bridge and suspension cable bridge, detailed payment stage may be included on case to case basis.
(4) Wearing Coat including expansion joints	-	(4) Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each major bridge.
(5) Miscellaneous Items like handrails, crash barrier, road markings etc.	-	(5) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each major bridge.
(6) Wing walls/return walls	-	(6) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each major bridge.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(7) Guide Bunds, River Training works etc.	-	(7) Guide Bunds, River Training Works: Payments shall be made on completion of all guide bunds/river training works etc. complete in all respects as specified for each major bridge.
(8) Approaches (including Retaining walls, stone pitching and protection works)	-	(8) Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works etc. complete in all respects as specified for each major bridge.
B.1- Widening and repairs of		Cost of each ROB/RUB shall be determined on pro-rata basis with respect to the total linear length (m) of the ROB/RUBs.
(a) ROB	-	
(b) RUB	-	
(1) Foundation	-	(1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of at least one foundation of each of the ROB/RUB as specified herein under.
i) Pile Foundation	-	(i) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling up to bottom of pile cap for each pile on pro-rata basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
ii) Open Foundation	-	(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of at least one foundation.
(2) Sub-structure	-	(2) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of at least one sub-structure of abutments/piers up to abutment/pier cap level of each of the ROB/RUB.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(3) Super-structure (including bearings)	-	(3) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure up to deck slab including bearings of at least one span as specified herein under. If pre-cast RCC/PSC steel girders/segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing Coat: (a) in case of ROB wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified as specified.	-	(4) Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each of the ROB and in case of RUB – wearing coat including expansion joints complete for each of the ROB; and in case of RUB – rigid pavement under RUB including drainage and crash barrier complete in all respects as specified for each of the RUB.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-	(5) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the ROB/RUB.
(6) Wing walls/return walls	-	(6) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the ROB/RUB.
(7) Approaches (including Retaining walls, stone pitching and protection works)	-	(7) Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works etc. complete in all respects as specified for each ROB/RUB.
B.2- New ROB/RUB		Cost of each ROB/RUB shall be determined on pro-rata basis with respect to the total linear length (m) of the ROB/RUBs.
(a)ROB	-	
(b)RUB	-	

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(1) Foundation	-	(1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of at least one foundation of each of the ROB/RUB as specified herein under.
i) Well Foundation	-	(i) Well Foundation (a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb. (b) Well Sinking: Payment of 65% shall be made on completion of well sinking up to bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion up to 10 m and (ii) on completion of each subsequent 5 m or part thereof. (c) Bottom Plug + Top Plug (if provisioned as per design) + Well Cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, backfill, top plug and well cap.
ii) Pile Foundation	-	(ii) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling up to bottom of pile cap for each pile on pro-rata basis. (b) Pile Cap: Payment of 30% shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
iii) Open Foundation	-	(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of at least one foundation.
(2) Sub-structure	-	(2) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of at least one sub-structure of abutments/piers up to abutment/pier cap level of each of the ROB/RUB.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(3) Super-structure (including bearings)	-	(3) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure up to deck slab including bearings of at least one span as specified herein under. If pre-cast girders/segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book. Applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing Coat: (a) in case of ROB wearing coat including expansion joints complete in all respects as specified and (b) in case of RUB-rigid pavement under RUB including drainage facility complete in all respects as specified.	-	(4) Wearing Coat: Payment shall be made on completion of: (a) in case of ROB – wearing coat including expansion joints complete in all respects as specified for each of the ROB; and (b) in case of RUB – rigid pavement under RUB including drainage etc. complete in all respects as specified for each of the RUB.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-	(5) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the ROB/RUB.
(6) Wing walls/return walls	-	(6) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the ROB/RUB.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	-	(7) Approaches: Payments shall be made on completion of both approaches of each ROB including stone pitching, protection works etc. complete in all respects as specified herein under. If reinforced soil wall is used with fascia panel/blocks, interim payment shall be made @ 75% of the cost of that element, as derived from MoRTH Data Book. Applicable SOR of State PWD on

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
		Base Date with tender discount/premium applied thereon.
C.1- Widening and repair of Elevated Section/Flyovers/Grade Separators		Cost of each structure shall be determined on pro-rata basis with respect to the total linear length (m) of the structures.
(1) Foundations	-	(1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of at least one foundation of each of the structure as specified herein under.
i) Pile Foundation	-	(i) Pile Foundation (a) Piling: Payment of 70% shall be made on completion of piling up to bottom of pile cap for each pile on pro-rata basis. (b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap. In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.
ii) Open Foundation	-	(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of at least one foundation.
(2) Sub-Structure	-	(2) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of at least one sub-structure of abutments/piers up to abutment/pier cap level of each of the structure.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(3) Super-Structure (Including bearings)	-	(3) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure up to deck slab including bearings of at least one span as specified herein under. If pre-cast girders/segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing Coat including expansion joints	-	(4) Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each of the structure.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-	(5) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the structure.
(6) Wing walls/Return walls	-	(6) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the structure.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	-	(7) Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works etc. complete in all respects of each structure.
C.2- New Elevated Section / Flyovers / Grade Separators / AUP (Greater Than 60m)		Cost of each structure shall be determined on pro-rata basis with respect to the total linear length (m) of the structures.
(1) Foundation	-	(1) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e. completion of at least one foundation of

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
		each of the structure as specified herein under.
i) Well Foundation	-	<p>(i) Well Foundation</p> <p>(a) Cutting Edge + Well Curb: Payment of 10% shall be made on completion of a stage i.e. completion of cutting edge + well curb.</p> <p>(b) Well Sinking: Payment of 65% shall be made on completion of well sinking up to bottom of well cap. The payment stage shall be further sub-divided on pro-rata basis i.e. (i) on completion up to 10 m and (ii) on completion of each subsequent 5 m or part thereof.</p> <p>(c) Bottom Plug + Top Plug (if provisioned as per design) + Well Cap: Payment of 25% shall be made on completion of a stage i.e. completion of bottom plug, backfill, top plug and well cap.</p>
ii) Pile Foundation	-	<p>(i) Pile Foundation</p> <p>(a) Piling: Payment of 70% shall be made on completion of piling up to bottom of pile cap for each pile on pro-rata basis.</p> <p>(b) Pile Cap: Payment of 30% on pro-rata basis shall be made on completion of pile cap.</p> <p>In case where load testing is required for foundation, the trigger of first payment shall include load testing also where specified.</p>
iii) Open Foundation	-	(ii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of at least one foundation.
(2) Sub-structure	-	(2) Sub-Structure: Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of at least one sub-structure of abutments/piers up to abutment/pier cap level of each of the structure.

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(3) Super-structure (including bearings)	-	(3) Super-structure: Payment shall be made on pro-rata basis on completion of a stage i.e. completion of superstructure up to deck slab including bearings of at least one span as specified herein under. If pre-cast girders/segments are used, interim payments shall be made at 75% of the cost of that element, as derived from MoRTH Data Book, applicable SOR of State PWD on Base Date with tender discount/premium applied thereon.
(4) Wearing Coat including expansion joints	-	(4) Wearing Coat: Payment shall be made on completion of wearing coat including expansion joints complete in all respects as specified for each of the structure.
(5) Miscellaneous Items like hand rails, crash barrier, road markings etc.	-	(5) Miscellaneous: Payments shall be made on completion of all miscellaneous works like hand rails, crash barriers, road markings etc. complete in all respects as specified for each of the structure.
(6) Wing walls/Return walls	-	(6) Wing walls/return walls: Payments shall be made on completion of all wing walls/return walls complete in all respects as specified for each of the structure.
(7) Approaches (including Retaining walls/Reinforced Earth wall, stone pitching and protection works)	-	(7) Approaches: Payments shall be made on completion of both approaches including stone pitching, protection works etc. complete in all respects of each structure.

1.4 Other Works

Procedure for estimating the value of Other Works shall be as stated in table 1.4

Table 1.4

Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
Other works	-	

Construction of Balance works in descoped Sections in the work of 4-laning of Mahagaon-Yavatmal Section of NH-361 from km 320.580 to km 400.575 (design length **80.195 km**) in the State of Maharashtra in the Villages Hiwra Sangam & Dattarampur on EPC mode.



Stage of Payment	Percentage weightage	Payment Procedure
1	2	3
(1) Drain	17.77%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length or 500m whichever is less
(2) Road Sign, marking, km Stone safety devices etc., HTMS	2.27%	
(3) Project Facilities(Plantation)	10.16%	Unit of measurement will be per number of tree. The payment shall be based on actual trees planted and survived on project completion date.
(4) Bus Bays & Bus Shelter	6.98%	Payment Shall be made on pro rata basis for completed facilities.
(5) Junction Improvement	29.72%	Payment Shall be made on pro rata basis for completed facilities.
(6) Gantry & Crash Barrier	17.00%	Unit of measurement is linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in a length of not less than 10 (ten) percent of the total length or 500m whichever is less
(7) Electrical works miscellaneous	4.96%	Payment Shall be made on pro rata basis for completed facilities.
(8) Utility Shifting (Electrical and water)	11.14%	Payment Shall be made on pro rata basis for completed facilities.