Technical Schedules

FOR

Widening/Up-Gradation of Intermittent Two Lane plus Paved Shoulder Stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km 263+070) [Donipawa] of 9.86 Km Length on Khellani-Khanabal Section of NH-244 in UT of Jammu and Kashmir on EPC Mode.

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. (NHIDCL)

SCHEDULES

Schedule-A

(See Clauses 2.1 and 8.1)

Site of the Project

1. The Site

(i) Site of the 4-lane project highway shall include land, buildings, structures and roadworks as described in **Annex-I** of this Schedule-A.

(ii) The dates of handing over the Right of Way to the Contractor are specified in **Annex-II** of this Schedule-A.

(iii) 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 (i) of this Agreement.

(iv) The alignment plans of the Project Highway are specified in **Annex-III.** The proposed profile of the Project Highways shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The Contractor, however, improve/upgrade the Road Profile as indicated in Annex-III based on site/design requirement.

(v) The status of the environment clearances obtained or awaited is given in **Annex-IV.**

Annex-I

Schedule-A (Site)

The site of the 4-lane project highway comprises section of National Highway-NH244 commencing from km 148+589 to km 176+532 of 2-lane road length 8.643 km and transition approaches from 2-lane to 4-lane of 79 m on 13 Nos. of stretches of Vailoo –Donipawa Section in the UnionTerritory of Jammu & Kashmir.The land, carriageway and structures comprising the Site are described below.

1. Land

The Site of the Project Highway comprises the land as described below:

Sr.No	Design Chainage in Km		Length (in m)	EROW (in m)	Remarks
	From	To			
1	148.59	148.79	0.201	30	Vailoo
2	150.94	151.24	0.3	30	Wanigam
3	151.69	152.29	0.6	30	Wandevalgam to Soiyan
4	153.49	154.09	0.6	30	Zalangam to Bindoo
5	157.74	158.91	1.17	30	Danveth to Mirpora sagam
6	160.44	161.14	0.7	30	Tengpawa to Buchoo
7	163.74	164.89	1.15	30	Hiller to Arhama
8	166.99	167.59	0.6	30	Akingam to Tulbagh
9	168.69	169.79	1.1	30	Badoora to Achabal
10	170.42	170.73	0.307	30	Achabal main market
11	171.59	172.41	0.82	30	Achabal to Kulgadh
12	173.89	175.09	1.2	30	Thajwara to Brakpora
13	176.39	176.532	0.142	30	Brakpora to Donipawa

2. Carriageway

The present carriageway of the Project Highway of 13 Nos. of Intermittent stretches is in 2L+PS configuration of having 7 m Carriageway + 2 x 1.5 bituminous paved shoulder & 1.0 earthen shoulder on either side. The type of the existing pavement is flexible.

3. Major Bridges

The Site includes the following Major Bridges:

Sr. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Overall Width (m)
		Foundation	Sub-structure	Super-structure		
1	163+984	Open	Wall type Circular Pier	PSC Box girder	3 x35	12.5

4. Road over-bridges (ROB)/Roadunder-bridges (RUB)

The Site includes the following ROB (road over railwayline)/RUB (road under railway line):

Sr. No.	Chainage (km)	Typeof Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Superstructure			
Nil						

5. Grade separators

The Site includes the following grade separators:

Sr. No.	Chainage (km)	Typeof Structure		No. of Spans with span length (m)	Width(m)
		Foundation	Superstructure		
Nil					

6. Minor bridges

The Site includes the following minor bridges:

Sr.No.	Design Chainage	Type of Structure			No of Spans with span length(m)	Overall Width (m)
		Foundation	Sub-Structurte	Super Structure		
1	148+589	Open	Wall type Abutment	PSC I Girder	1 x 23	5.5
2	151+096	Open	Wall type Abutment	Composite Steel Plate Girder	1 x 30	12.5
3	158+061	Open	Wall type Abutment	Rcc Solid Slab	1 x 10	12.4
4	163+790	Open	Wall type Abutment	Rcc Solid Slab	1 x 10	12.9
5	164+362	Open	Wall type Abutment	Rcc Solid Slab	1 x 10	12.5
6	164+400	Open	Wall type Abutment	RCC I Girder	1 x 24.23	12

7	164+769	Open	Wall type Abutment	RCC I Girder	1 x 40	12.4
8	164+840	Open	Wall type Abutment	Rcc Solid Slab	1 x 10	12.6
9	170+467	Open	Wall type Abutment	Rcc Solid Slab	1 x 13	12.5

7. Railway level crossings

The Site includes the following railwaylevel crossings:

Sr.No.	Location(km)	Remarks
Nil		

8. Under passes (vehicular, non-vehicular)

The Site includes the following underpasses:

Sr. No.	Chainage(km)	Type of Structure	No. of Spanswith span length (m)	Width(m)
Nil				

9. Culverts

The Site has the following culverts:

Sr. No.	Design Chainage (km)	Type of Prop. Structure	Span/Opening with span Length (m)	
			No	Clear Span
1	151+951	Rcc Box	1	2
2	152+280	Rcc Box	1	2
3	153+569	Rcc Box	1	2
4	153+810	Rcc Box	1	2
5	157+700	Rcc Box	1	2
6	158+121	Rcc Box	1	2
7	158+392	Rcc Box	1	2
8	158+667	Rcc Box	1	2
9	160+440	Rcc Box	2	2
10	160+701	Rcc Box	2	2
11	160+830	Rcc Box	1	4
12	160+897	Rcc Box	1	2
13	163+817	Rcc Box	1	2
14	164+190	Rcc Box	1	2
15	164+259	Rcc Box	1	2
16	164+334	Rcc Box	1	2
17	164+525	Rcc Box	1	2
18	164+620	Rcc Box	1	2
19	164+902	Rcc Box	1	2
20	167+312	Rcc Box	1	2
21	167+599	Rcc Box	1	2
22	168+797	Rcc Box	1	4
23	169+269	Rcc Box	1	2
24	169+639	Rcc Box	1	2

25	170+423	Rcc Box	1	2
26	170+545	Rcc Box	1	2
27	170+601	Rcc Box	1	2
28	171+582	Rcc Box	1	2
29	171+967	Rcc Box	1	2
30	172+220	Rcc Box	1	2
31	173+990	Rcc Box	1	2
32	174+396	Rcc Box	1	2
33	174+860	Rcc Box	1	2
34	174+980	Rcc Box	1	2
35	176+550	Rcc Box	1	2
36	176+550	Rcc hume pipe	1	1200mm

10. Busbay/Shelters

The details of bus bays on the Site are as follows:

Sr. No.	Chainage(km)	Side
1	148+589	Both
2	158+100	Both
3	164+480	Both

11. Truck Lay byes

Thedetailsoftrucklaybyesareasfollows:

Sr. No.	Chainage(km)	Length(m)	LeftHandSide	RightHandSide
Nil				

12. Roadside drains

The details of the road side drain are as follows:

Sr. No	Design Chainage in Km		Length (m)	PCC/Earthen	Side
	From km	To km			
1	148+589	148+790	201.5	PCC drain	LHS
2	148+589	148+790	201.5	Earthen	RHS
3	150+940	151+082	142	Earthen	LHS+RHS
4	151+112	151+240	128	Earthen	LHS+RHS
5	151+690	152+290	600	Earthen	LHS+RHS
6	153+490	154+090	600	Earthen	LHS+RHS
7	157+740	158+050	310	Earthen	LHS+RHS
8	158+060	158+910	850	Earthen	LHS+RHS
9	160+440	161+140	700	Earthen	LHS+RHS
10	163+740	162+790	50	Earthen	LHS+RHS
11	163+800	163+933	132.5	Earthen	LHS+RHS
12	164+038	164+115	77.5	Earthen	LHS+RHS
13	164+125	164+385	259.8	Earthen	LHS+RHS
14	164+409	164+710	300.45	Earthen	LHS+RHS
15	164+750	164+829	78.65	Earthen	LHS+RHS
16	164+839	164+890	51	Earthen	LHS+RHS

17	166+990	167+590	600	Earthen	LHS+RHS
18	168+690	169+790	1100	Earthen	LHS+RHS
19	171+590	172+410	820	Earthen	LHS+RHS
20	173+890	175+090	1200	Earthen	LHS+RHS
21	176+390	176+532	142	Earthen	LHS+RHS

13. Major junctions

The details of major junctions' areas follow:

Sr. No	Chainage (km)	Link		Type of junction	Type
		LHS	RHS		
1	148+589	Vailoo/Gadole		T JUNCTION	MAJOR
2	170+700	To Dailgam	-	T JUNCTION	MAJOR
3	170+700	-	To Shangus	T JUNCTION	MAJOR
4	176+600	Alstop	To Ananatnag Town	Y-JUNCTION	MAJOR

(NH: National-Highway, SH: State-Highway, MDR: Major District Road)

14. Minor junctions

The details of the minor junctions are as follows:

Sr. No	Chainage (Km)	Link		Type	Types
		LHS	RHS		
1	163+770	-	To Hillar	Y Junction	Minor
2	164+100	To Dailgam	-	T Junction	Minor
3	164+370	Arhama	-	T Junction	Minor
4	167+480	-	To Ziyarat	T Junction	Minor
5	168+705	-	-	Y Junction	Minor
6	169+150	To Dailgam	-	Y Junction	Minor
7	175+100	To Hajipora	-	Y Junction	Minor

15. Bypasses

The details of the existing road sections proposed to be bypassed are as follows:

Sr.No.	Name of bypass (town)	Chainage (km) From km to km	Length (in Km)
Nil			

16. Others

Nil

Annex-II

(As per Clause 8.3(i))

(Schedule-A)

Dates for providing Right of Way of Construction Zone

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

Sl.No.	From (Km)	To (Km)	Length (Km)	Width(m)	Date of providing Right of Way*
1	2		3	4	5
(i)Full Right of Way (FullWidth)					
1	148+589	176+532	9.866	26-30 m	150 (One hundred and fifty) days after the Appointed Date

The details of stretches in above length for which LA is being carried out and to be handed over is as under:

Sr. No	Design Chainage in Km		Length (in km)
	From	To	
1	148.59	148.79	0.201
2	150.94	151.24	0.3
3	151.69	152.29	0.6
4	153.49	154.09	0.6
5	157.74	158.91	1.17
6	160.44	161.14	0.7
7	163.74	164.89	1.15
8	166.99	167.59	0.6
9	168.69	169.79	1.1
10	170.42	170.73	0.307
11	171.59	172.41	0.82
12	173.89	175.09	1.2
13	176.39	176.532	0.142

*The dates specified herein shall in no case be beyond 150 (One ehundred and fifty) days after the Appointed Date

Annex-III

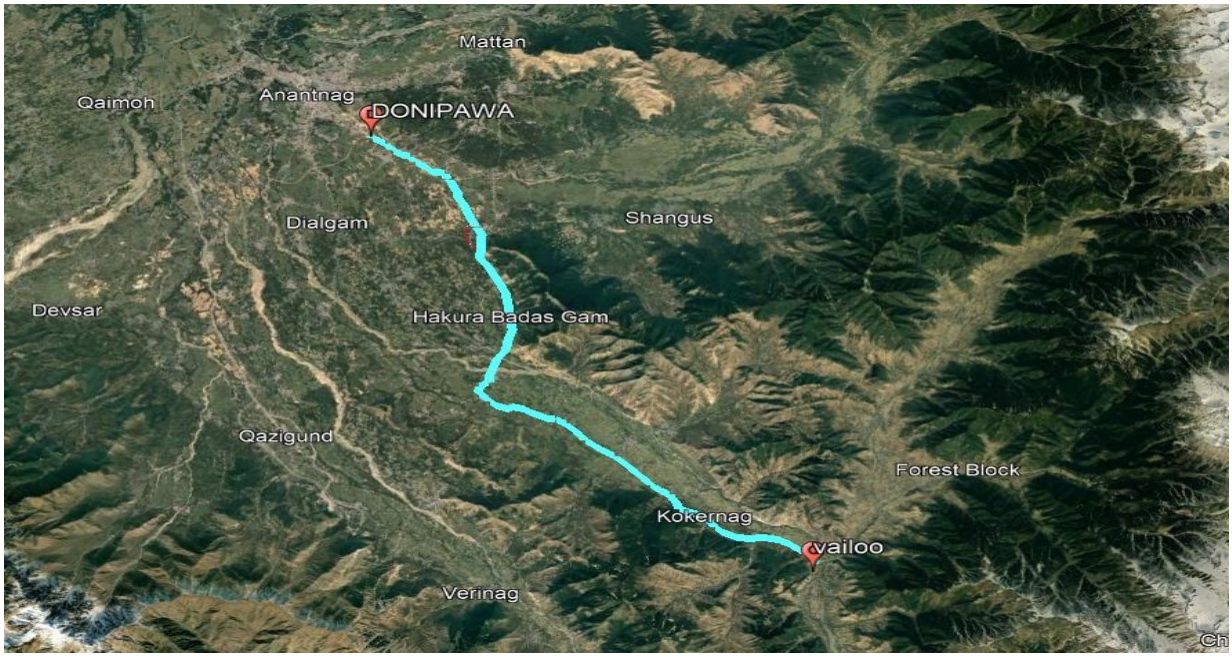
(Schedule-A)

Alignment Plans

The existing alignment of the Project Highway shall be modified in the following sections as per the alignment plan indicated below:

(i) The alignment of the Project Highway is enclosed in alignment plan and indicated below. Finished road level indicated in the alignment plan shall be followed by the contractor as minimum FRL. In anycase, the finished road level of the 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 Annex-III based on site/design requirement.

(ii) Traffic Signage plan of the Project Highway showing numbers & location of traffic signs are enclosed. The contractor however improve /upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/ Manual, in addition to MoRTH Circular no. RT-25035/07/2023-RS (Part) (221534), dated 20.07.2023.



Annex – IV

(Schedule-A)

Annex-IV **Environment Clearances**

Sr.No.	Clearances	Present Status
1	Environment clearance	Not Applicable

Annex-V
(Schedule-A)

Existing Utility

a) **Electrical Utilities**

S.NO	Type of Utility	Electrical Division	Unit	Quantity
1	**Electrical Utilities. PDD (Achabal to Vailoo)**			
1.1	Electrical Poles Nos (LT)	Sub Division Achabal/Division Anantnag	No.	48
1.2	Electrical Poles Nos (HT)		No.	110
1.3	Electrical cables (LT)		M	10400
1.4	Electrical cables (HT)		M	21800
1.5	Transformers/Sub-station		No	2
2	**Electrical Utilities. PDD (Donipawa to Achabal)**			
2.2	Electrical Poles Nos (LT)	Sub Division Anantnag /Division Anantnag	No.	9
2.3	Electrical Poles Nos (HT)		No.	2
2.4	Electrical cables (LT)		M	700
2.5	Electrical cables (HT)		M	300
2.6	Transformers/Sub-station		No	0
3	**Electrical Utilities. STD 33 KVA (Hiller to Vailoo)**	Sub Division Anantnag /Division Bijbehara		
3.1	Electrical Poles		No	57
3.2	Electrical cables		M	9000
3.3	Gantry		No	2

b) Public Health utilities (Water/Sewage Pipe Lines)

Sr. No	Chainage(km)		Sub-Division	Type	Length (in Rm)				Remarks
					Water Supply line		Sewage line		
	From	To			With Pumping	With Gravity	With Pumping	With Gravity	
1	148+589	176+603	Anantnag	**150 mm**		2700			
				100 mm DI		1900			
				100 mm GI		900			
				65 mm GI		400			
				50 mm GI		450			
				25 mm GI		1000			
				20 mm GI		1100			
				15 mm GI		800			
2	148+589	176+603	Kokernag	**250 mm**		1220			
				200 mm		3470			

				150 mm		8000			
				100 mm DI		535			
				100 mm GI		6285			
				80 mm GI		3260			
				65 mm		950			
				50 mm		700			
				40 mm GI		1300			
				25 mm		200			
				20 mm		230			
				15 mm		150			
3				0.40 lac gallon RCC Dome Type SR with 03 Nos. of sluice chamber			01 No.		
4	148+589	176+603	Dooru	**150 mm**		1970			
				100 mm DI		3545			
				100 mm GI		2580			

Schedule - B
(See Clause2.1)

Development of Project Highway

Development of the Project Highway shall include design and construction of the project highway as described in this Schedule-B and in Schedule-C.

Widening & Up-gradation of Project Highway
Widening & upgradation of Project Highway shall include Four laning of the Project Highway as described in Annex-I of this Schedule B and Schedule-C.

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 Four-Lanning (4-lanes) Project

1. Widening of the Existing Highway

(i) The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans Specified in Annex-III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for plain and rolling terrain to the extent land is available.

(ii) Width of Carriageway

Four Laning of the project Highway shall be undertaken as per typical cross section drawings shown/attached. Provided that in the built-up areas, the width of the carriageway shall be as specified in the following table:

S. No	Ch. From	Ch. To	Length (Km)	TCS No.	Section	Remarks
1	148.45	148.547	0.096	TCS16	Section 01	TYPICAL CROSS SECTION-16 TWO LANE BRIDGE APPROACH SECTION DOWN STREAM SIDE
2	148.55	148.577	0.030	TCS12	Section 01	TYPICAL CROSS SECTION-12 NEW CONSTRUCTION OF BRIDGE AT VAILOO ROAD JUNCTION
3	148.58	148.610	0.033	TCS16	Section 01	TYPICAL CROSS SECTION-16 TWO LANE BRIDGE APPROACH SECTION DOWN STREAM SIDE
4	148.610	148.804	0.194	TCS06	Section 01	TYPICAL CROSS SECTION-06 ECCENTRIC WIDENING OF FOUR LANE IN HILL AREA LHS SIDE ALONG WITH PROTECTION WORKS BOTH SIDE
5	150.93	150.98	0.055	TCS02	Section 02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
6	150.98	151.085	0.105	TCS05	Section 02	TYPICAL CROSS SECTION-05 CONCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA PROTECTION WORK BOTH SIDE
7	151.09	151.115	0.03	TCS10	Section 02	TYPICAL CROSS SECTION-010 CONCENTRIC WIDENING ON BOTH HAND SIDE SINGLE LANE BRIDGE BUILT-UP AREA
8	151.12	151.22	0.105	TCS05	Section 02	TYPICAL CROSS SECTION-05 CONCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA PROTECTION WORK BOTH SIDE
9	151.22	151.279	0.059	TCS02	Section 02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA

10	151.59	151.72	0.128	TCS02	Section 03	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
11	151.72	152.3	0.58	TCS03	Section 03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE
12	152.3	152.439	0.139	TCS02	Section 03	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
13	153.41	153.52	0.11	TCS02	Section 04	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
14	153.52	153.75	0.23	TCS15	Section 04	TYPICAL CROSS SECTION-15 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA / OPEN AREA RHS SIDE
15	153.75	154.05	0.3	TCS03	Section 04	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE
16	154.05	154.097	0.047	TCS02	Section 04	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
17	157.74	157.83	0.09	TCS02	Section 05	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
18	157.83	157.95	0.12	TCS01	Section 05	TYPICAL CROSS SECTION-01 NEW CONSTRUCTION OF FOUR LANE IN OPEN COUNTRY
19	157.95	158.05	0.1	TCS13	Section 05	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE
20	158.05	158.06	0.01	TCS08	Section 05	TYPICAL CROSS SECTION-08 BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY
21	158.06	158.15	0.09	TCS13	Section 05	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE
22	158.15	158.26	0.11	TCS14	Section 05	TYPICAL CROSS SECTION-14 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE
23	158.26	158.651	0.391	TCS03	Section 05	ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE
24	158.65	158.8	0.149	TCS13	Section 05	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE

25	158.8	158.914	0.114	TCS02	Section 05	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
26	160.44	160.55	0.11	TCS02	Section 06	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
27	160.55	160.73	0.18	TCS04	Section 06	TYPICAL CROSS SECTION-04 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA RHS SIDE
28	160.73	160.85	0.12	TCS02	Section 06	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
29	160.85	160.95	0.1	TCS03	Section 06	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE
30	160.95	161.114	0.164	TCS02	Section 06	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
31	163.74	163.795	0.055	TCS02	Section 07	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
32	163.8	163.805	0.01	TCS08	Section 07	TYPICAL CROSS SECTION-08 BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY
33	163.81	163.935	0.13	TCS13	Section 07	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE
34	163.94	164.05	0.115	TCS11	Section 07	TYPICAL CROSS SECTION-11 ECCENTRIC BRIDGE WIDENING OF FOUR LANE IN HILL AREA
35	164.05	164.1	0.05	TCS02	Section 07	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
36	164.1	164.2	0.1	TCS13	Section 07	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE
37	164.2	164.393	0.193	TCS03	Section 07	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE
38	164.39	164.418	0.025	TCS08	Section 07	TYPICAL CROSS SECTION-08 BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY
39	164.42	164.715	0.297	TCS13	Section 07	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE

40	164.72	164.755	0.04	TCS08	Section 07	TYPICAL CROSS SECTION-08 BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY
41	164.76	164.836	0.081	TCS13	Section 07	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE
42	164.84	164.938	0.102	TCS02	Section 07	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
43	166.99	167.15	0.16	TCS02	Section 08	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
44	167.15	167.35	0.2	TCS14	Section 08	TYPICAL CROSS SECTION-14 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE
45	167.35	167.53	0.18	TCS14	Section 08	TYPICAL CROSS SECTION-14 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE
46	167.53	167.601	0.071	TCS02	Section 08	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
47	168.63	168.8	0.17	TCS03	Section 09	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE
48	168.8	169.45	0.65	TCS03	Section 09	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE
49	169.45	169.79	0.34	TCS07	Section 09	TYPICAL CROSS SECTION-07 NEW CONSTRUCTION OF FOUR LANE IN HILLY AREA ALONG WITH PROTECTION WORKS BOTH SIDE
50	169.79	169.866	0.076	TCS02	Section 09	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
51	170.4	170.73	0.33	TCS09	Section 10	TYPICAL CROSS SECTION-09 CONCENTRIC WIDENING OF FOUR LANE IN HILL AREA WITH LOAD BEARING DRAIN BUILT-UP AREA
52	171.59	171.78	0.19	TCS02	Section 11	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
53	171.78	172.25	0.47	TCS04	Section 11	TYPICAL CROSS SECTION-04 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA RHS SIDE

54	172.25	172.409	0.159	TCS02	Section 11	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
55	173.85	173.9	0.05	TCS02	Section 12	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
56	173.9	174.3	0.4	TCS14	Section 12	TYPICAL CROSS SECTION-14 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE
57	174.3	174.6	0.3	TCS03	Section 12	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE
58	174.6	174.85	0.25	TCS02	Section 12	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
59	174.85	175.1	0.25	TCS03	Section 12	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE
60	175.1	175.21	0.11	TCS02	Section 12	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
61	176.38	176.603	0.223	TCS02	Section 13	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA
Total Length in Km			9.866			

(b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1(i) above.

2. Geometric Design and General Features

(i) General

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the Manual, referred to as the Manual in Sch-D or any other relevant IRC codes.

(ii) Design Speed

The design speed shall be the maximum design speed of 80Km/hr. and minimum design speed will vary from 20-65 Km/h on curves at Km 148+710, Km 150+970, Km 169+684, Km 170+668 for Plain & Rolling terrain.

(iii) Improvement of the Existing Road Geometrics

In the following 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 proper road signs and safety measures shall be provided:

Sr. No	Stretch		Type of deficiency	Remarks
	From Km	To Km		
1	148+589	148+804	Sharp Curves	Vailoo
2	150+925	150+073		Wangam
3	157+900	158+200		Danveth
4	169+500	169+800		Achabal Badoora
5	170+649	170+726		Achabal

Details of Bypasses are specified as under:

Sr. No.	Name of Bypass	Existing Chainage (km)		Design Chainage (km)		Design Length (km)
		From	To	From	To	
NIL						

Details of Realignment:

Sr. No.	Chainage (Design)		Length	Remarks
	From km	To km		
NIL				

(iv) Right of Way

The requirements of land and access to the lands beyond RoW are inevitable during execution of protection works. Additional land may be acquired at culverts/structures locations to channelize hill side stream for the construction of catch water drains (CWDs) for effective interception and disposal of hill runoff which can lead to erosion, slope instability, and pavement deterioration. This shall prevent uncontrolled surface runoff from entering the formation, to prevent surface runoff from directly reaching roadways, buildings, or other critical structures. Also, to implement safety measures effectively additional land if necessary may be acquired at the locations where slope stabilization anchors (e.g., soil nails, rock bolts) extend beyond RoW.Details of the Right of Way are given in Annexure-II of Schedule-A.

(v) Type of Shoulders

a) In built-up sections, footpaths/fully paved shoulders shall be provided as shown in corresponding typical cross sections given at para (xii) of Annexure I of Schedule B.

b) In open country/hilly areas, paved shoulders of 1.5m width shall be provided and balance 1.0 m width earthen shoulder on either side on shall be done as per MoRTH Specifications

Sr. No.	Design Chainage Stretch (in km)		Fully paved shoulders/Earthen Shoulder	Reference to cross section
	Start	End		
1.	148+589	176+532	2134m/2134m	TCS-01, TCS-13

c) Design and specifications of paved shoulders and granular material shall conform to the requirements specified in the relevant Manual.

(vi) Lateral and vertical clearances at underpasses

a) Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per the provision of Manual.

b) Lateral clearance: The width of the opening at the underpasses shall be as follows:

Sr. No.	Design Chainage (km)	Silent features	Minimum length of Viaduct to be provided	Road to be carried over/under the structure	Type of Structure	Location	Remarks
Nil							

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as per the provision of relevant Manual.

(b) Lateral clearance: The width of the opening at the overpasses shall be as follows:

Sr. No.	Location (Chainage) (from km to km)	Span/ opening (m)	Remarks
Nil			

(viii) Service Roads

Service roads width shall be constructed as per relevant manual at the locations and for the lengths indicated below:

Sl. No	Design Chainage (Km)		Bridge Length (m)	Length (km)	Side
	From	To			
Nil					

(ix) Grade Separated Structures

a) Grade separated structures shall be provided as per provision of the relevant Manual. The requisite particulars are given below:

Sr. No.	Locations	Length	Number of Span	Approach		Remarks, if any
				A1	A2	
Nil						

In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows:

Sr. No.	**Location**	**Type of structure Length (m)**	**Cross road at**			**Remarks, if any**
			Existing Level	Raised Level	Lowered Level	
Nil						

(x) Cattle and pedestrian underpass/overpass:

Cattle and pedestrian underpass/overpass shall be constructed as follows:

Sr. No.	Location	Type of crossing
Nil		

(xi) Vaiduct : Nil

(xii) Typical Cross section of the Project Highway

As per the drawing enclosed below

Following Typical Crosections shall be [rovided for project highway. However, to be designed as per 4-lane manual.

S. No.	TCS Type	Description	Length (Km)
1	TCS16	TYPICAL CROSS SECTION-16 TWO LANE BRIDGE APPROACH SECTION DOWN STREAM SIDE	0.096
2	TCS12	TYPICAL CROSS SECTION-12 NEW CONSTRUCTION OF BRIDGE AT VAILOO ROAD JUNCTION	0.030
3	TCS16	TYPICAL CROSS SECTION-16 TWO LANE BRIDGE APPROACH SECTION DOWN STREAM SIDE	0.033

4	TCS06	TYPICAL CROSS SECTION-06 ECCENTRIC WIDENING OF FOUR LANE IN HILL AREA LHS SIDE ALONG WITH PROTECTION WORKS BOTH SIDE	0.194
5	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.055
6	TCS05	TYPICAL CROSS SECTION-05 CONCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA PROTECTION WORK BOTH SIDE	0.105
7	TCS10	TYPICAL CROSS SECTION-010 CONCENTRIC WIDENING ON BOTH HAND SIDE SINGLE LANE BRIDGE BUILT-UP AREA	0.03
8	TCS05	TYPICAL CROSS SECTION-05 CONCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA PROTECTION WORK BOTH SIDE	0.105
9	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.059
10	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.128
11	TCS03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE	0.58
12	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.139
13	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.11
14	TCS15	TYPICAL CROSS SECTION-15 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA / OPEN AREA RHS SIDE	0.23
15	TCS03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE	0.3
16	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.047
17	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.09
18	TCS01	TYPICAL CROSS SECTION-01 NEW CONSTRUCTION OF FOUR LANE IN OPEN COUNTRY	0.12

19	TCS13	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE	0.1
20	TCS08	TYPICAL CROSS SECTION-08 BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY	0.01
21	TCS13	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE	0.09
22	TCS14	TYPICAL CROSS SECTION-14 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE	0.11
23	TCS03	ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE	0.391
24	TCS13	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE	0.149
25	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.114
26	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.11
27	TCS04	TYPICAL CROSS SECTION-04 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA RHS SIDE	0.18
28	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.12
29	TCS03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE	0.1
30	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.164
31	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.055
32	TCS08	TYPICAL CROSS SECTION-08 BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY	0.01
33	TCS13	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE	0.13
34	TCS11	TYPICAL CROSS SECTION-11 ECCENTRIC BRIDGE WIDENING OF FOUR LANE IN HILL AREA	0.115

34	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.05
35	TCS13	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE	0.1
36	TCS03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE	0.193
37	TCS08	TYPICAL CROSS SECTION-08 BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY	0.025
38	TCS13	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE	0.297
39	TCS08	TYPICAL CROSS SECTION-08 BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY	0.04
40	TCS13	TYPICAL CROSS SECTION-13 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA LHS SIDE	0.081
41	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.102
42	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.16
43	TCS14	TYPICAL CROSS SECTION-14 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE	0.2
44	TCS14	TYPICAL CROSS SECTION-14 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE	0.18
45	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.071
46	TCS03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE	0.17
47	TCS03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE	0.65
48	TCS07	TYPICAL CROSS SECTION-07 NEW CONSTRUCTION OF FOUR LANE IN HILLY AREA ALONG WITH PROTECTION WORKS BOTH SIDE	0.34

49	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.076
50	TCS09	TYPICAL CROSS SECTION-09 CONCENTRIC WIDENING OF FOUR LANE IN HILL AREA WITH LOAD BEARING DRAIN BUILT-UP AREA	0.33
51	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.19
52	TCS04	TYPICAL CROSS SECTION-04 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA RHS SIDE	0.47
53	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.159
54	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.05
55	TCS14	TYPICAL CROSS SECTION-14 ECCENTRIC WIDENING OF FOUR LANE IN OPEN COUNTRY AREA RHS SIDE	0.4
56	TCS03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE	0.3
57	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.25
58	TCS03	TYPICAL CROSS SECTION-03 ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE	0.25
59	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.11
60	TCS02	TYPICAL CROSS SECTION-02 CONCENTRIC WIDENING OF FOUR LANE IN BUILTUP AREA	0.223
	Total length		9.866 Km

3. Intersections and Grade Separators:

All intersections and grade separators shall be as per the provision of relevant Manual.

Existing intersections which are deficient shall be improved to the prescribed standards.

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

(i) At-grade intersections

(a) Major Junctions

At grade major junctions shall be improved at intersecting roads with the Project highway is given below:

Sr. No	Location of intersection	Type of intersection	Other features
1	148+589	T JUNCTION	Intersecting road to be developed/constructed as per drawing/layout enclosed {or actual length to be given]
2	170+690	T JUNCTION	
3.	164+370	T-JUNCTION	
4	176+550	Round About /Rotary of 12.5 m Dia.	

(b) Minor Junctions

At grade minor junctions shall be improved at intersecting roads with the Project highway is given below:

Sr. No	Location of intersection	Type of intersection	Other features
1	163+770	Y Junction	Intersecting road to be developed/constructed as per drawing/layout enclosed {or actual length to be given]
2	164+370	T Junction	
3	164+640	T Junction	
4	167+480	T Junction	
5	168+705	Y Junction	
6	169+640	Y Junction	
7	176+190	Y Junction	

(ii) Grade Separated intersections with/ without ramps:

Sl. No.	Location	Salient features	Minimum Length of viaduct to be provided	Roads to be carried over/ under the structures
Nil				

4. **Road Embankment and Cut Section**

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/cuttings shall conform to the Specifications and Standards given in Section 4 of the Manual and the specified cross-sectional details. Deficiencies in the plan and profile of the existing road shall be corrected. The following chainages shall be improved with mechanically stabilized embankment:

Sr. No.	Design Chainage		Length (m)	Extent of raising	Type of TCS	Remarks
	From km	To km				
1	169+580	169+730	150	Top of finished road level	TCS-06	Mechanically stabilized High Embankment

(ii) Raising of the existing road: The existing road shall be raised as per given Plan & Profile.

5. Pavement Design

(i) Pavement design shall be carried out in accordance with the provision of relevant Manual.

(ii) Type of pavement

Main carriageway of project highway including widening of existing road & overlay of existing road to 4-lane shall be constructed with Flexible pavement as per IRC:37-2018.

(iii) Design requirements

(a) Design Period and strategy

Flexible pavement for new pavement or for widening & strengthening of the existing pavement shall be designed for a minimum period of 20 years. Stage construction shall not be permitted. Pavement design shall be carried out in accordance with the provision of relevant Manual.

The minimum thickness is to be provided at strengthening/widening/overlaying sections is given below.

Proposed Flexible Pavement Thickness (mm) (Crust thickness)					Total*** (mm)
BC	DBM	WMM	GCB	Subgrade	
40	70	250	200	500	1060

(b) Type of pavement:

Flexible pavement shall be adopted. The contractor shall accordingly carry out pavement design after conducting requisite tests as per standard and specifications of relevant IRC Code and Morth Specification 5th Revision.

(c) Design Traffic

Not with standing anything to the contrary contained in this Agreement or the Manual, the Contractor shall design the pavement for design traffic of 20 (MSA) million standard axles and consider the CBR - 10% as per IRC:37 - 2018.

***** The finished level of the BC along the stretch including all geometric parameters & it also includes the quantities towards profile correcting coarse, camber, super-elevation etc.**

(iv) New/re- construction of Stretches

The following stretches of the existing road shall be new constructed. These shall be designed as new pavement.

Sr.No	Design Chainage		Length (m)	Type of TCS	DESCRIPTION
	From	To			
1	157.83	157.95	0.12	TCS01	TYPICAL CROSS SECTION-01 NEW CONSTRUCTION OF FOUR LANE IN OPEN COUNTRY
2	169.45	169.79	0.34*	TCS07	TYPICAL CROSS SECTION-07 NEW CONSTRUCTION OF FOUR LANE IN HILL AREA ALONG WITH PROTECTION WORKS BOTH SIDE
***Improvement at curve location near Achabal Quarry.**					

6. ROADSIDE DRAINAGE

Drainage system including surface and sub surface drains for the Project Highway shall be provided as per the provision of relevant Manual & TCSs Annexed.

Sl.no	Descriptions	Chainage		Length (m)	Remarks
1	V Drain/ **Roadside KC Drainage**	148.610	148.804	196	Refer TCS proposed
2	Load Bearing Drain	170.400	170.680	330	
3	RCC Cover Drain with Footpath	150.920	169.790	13276	
4	Chute drain	169.450	169.790	340	
5	Lined Surface Drain	169.450	196.790	340	

Road Side V-Drain

Design Chainage		Design Length	TCS Detail	Side	Roadside V-Drain Length (m)
From	To	(m)			
148.610	148.806	196	TCS06	LHS	196

RCC Rectangular Drain cum Footpath in Load Bearing.

Sr. No	Design Chainage		TCS Detail	Side	Total Length

	From	To	Design Length in m			(m)
1	170.400	170.730	330	TCS09	RHS	330

RCC Cover Drain with Footpath

Sr. No.	Design Chainage		Design Length	TCS Detail	Side	Length
	From	To				
1	150.925	150.98	0.055	TCS02	Both side	110
2	150.98	151.085	0.105	TCS05	Both side	210
3	151.115	151.22	0.105	TCS05	Both side	210
4	151.22	151.279	0.059	TCS02	Both side	118
5	151.592	151.72	0.128	TCS02	Both side	256
6	151.72	152.3	0.58	TCS03	Both side	1160
7	152.3	152.439	0.139	TCS02	Both side	278
8	153.41	153.52	0.11	TCS02	Both side	220
9	153.75	154.05	0.3	TCS03	Both side	600
10	154.05	154.097	0.047	TCS02	Both side	94
11	157.74	157.83	0.09	TCS02	Both side	180
12	158.26	158.651	0.391	TCS03	Both side	782
13	158.8	158.914	0.114	TCS02	Both side	228
14	160.44	160.55	0.11	TCS02	Both side	220
15	160.55	160.73	0.18	TCS04	Both side	360
16	160.73	160.85	0.12	TCS02	Both side	240
17	160.85	160.95	0.1	TCS03	Both side	200
18	160.95	161.114	0.164	TCS02	Both side	328
19	163.74	163.795	0.055	TCS02	Both side	110
20	164.05	164.1	0.05	TCS02	Both side	100
21	164.2	164.393	0.193	TCS03	Both side	386
22	164.836	164.938	0.102	TCS02	Both side	204
23	166.99	167.15	0.16	TCS02	Both side	320
24	167.53	167.601	0.071	TCS02	Both side	142
25	168.63	168.8	0.17	TCS03	Both side	340
26	168.8	169.45	0.65	TCS03	Both side	1300
27	169.79	169.866	0.076	TCS02	Both side	152
28	171.59	171.78	0.19	TCS02	Both side	380
29	171.78	172.25	0.47	TCS04	Both side	940
30	172.25	172.409	0.159	TCS02	Both side	318
31	173.85	173.9	0.05	TCS02	Both side	100
32	174.3	174.6	0.3	TCS03	Both side	600
33	174.6	174.85	0.25	TCS02	Both side	500
34	174.85	175.1	0.25	TCS03	Both side	500
35	175.1	175.21	0.11	TCS02	Both side	220
36	176.38	176.603	0.223	TCS02	Both side	446
37	148.610	148.804	0.194	TCS06	RHS	194
38	153.52	153.75	0.23	TCS15	LHS	230
Total Length - RCC Cover Drain with Footpath						**13276 m**

Chute Drains

Sr. No.	Design Chainage		Design Length	TCS Detail	Side	Total Length
	From	To				
1	169.45	169.79	340	TCS07	RHS	340

Line Surface Drain

Design Chainage		Design Length	TCS Detail	Side	Roadside Drain Length (m)
From	To	(m)			
169.45	169.79	340	TCS07	RHS	340

Unlined Surface Drain

Design Chainage		Design Length	TCS Detail	Side	Roadside Drain Length (m)
From	To	(m)			
157.830	174.300	2076	TCS-01 TCS-13 TCS-14	B/S	2076

7. DESIGN OF STRUCTURES

(i) General

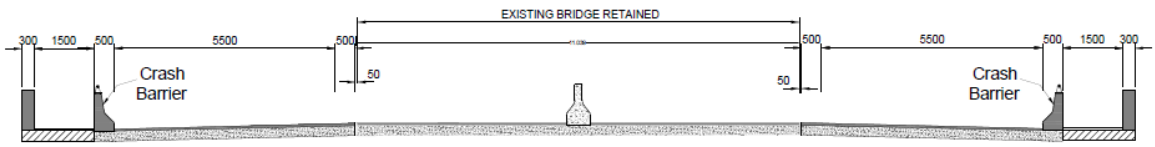
a) All bridges, culverts and structures shall be designed and constructed in accordance with the provision of relevant Manual and shall conform to the cross-sectional features and other details specified therein.

b) Width of the carriageway of new bridges and structures shall be as follows:

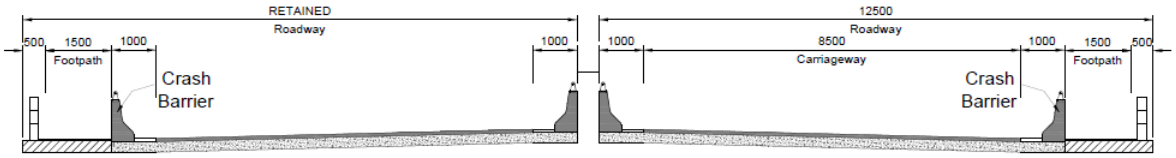
Sr. No.	Design Chainage in Km	Span (m)	Width of carriageway and cross-sectional features*	Bridge	Remarks
1	148+589	1x25 m	Total Deck Width = 12.5 m (9.5) MCW+ (.5*2) PL + (1.5*2) FP+(0.5*2) CB (Typical Cross Section attached)	MINOR BRIDGE	reconstruction of new bridge in 2 lane configurations on existing NH 244.
2	151+096	1x30 m	Total Deck Width = 27.6 m Existing width= 11 m Proposed to be widened = 16.6 m (22.5) MCW+ (.5) PL + (1.5*2) FP+(0.3) CB (Typical Cross Section attached)	MINOR BRIDGE	CONCENTRIC WIDENING of 8.3 m ON BOTH HAND SIDE of existing 11m SINGLE LANE BRIDGE BUILT-UP AREA
3	158+061		Total Deck Width = 12.5 m		Existing retained &

		1x10 m	(8.50) MCW+ (.5) PL + (1.5) FP+(2.0) CB (Typical Cross Section attached)	MINOR BRIDGE	reconstruction of parllel bridge in 2 lane configurations
4	163+790	1x10 m	Total Deck Width = 12.5 m (8.50) MCW+ (.5) PL + (1.5) FP+(2.0) CB (Typical Cross Section attached)	MINOR BRIDGE	Existing retained & reconstruction of parallel bridge in 2 lane configurations
5	163+984	3X35 m	Total Deck Width = 12.5 m (8.50) MCW+ (.5) PL + (1.5) FP+(2.0) CB (Typical Cross Section attached)	MAJOR BRIDGE	Existing retained & reconstruction of parallel bridge in 2 lane configurations
6	164+130	1x10 m	Total Deck Width = 12.5 m (8.50) MCW+ (.5) PL + (1.5) FP+(2.0) CB (Typical Cross Section attached)	MINOR BRIDGE	Existing retained & reconstruction of parallel bridge in 2 lane configurations
7	164+400	1x25 m	Total Deck Width = 12.5 m (8.50) MCW+ (.5) PL + (1.5) FP+(2.0) CB (Typical Cross Section attached)	MINOR BRIDGE	Existing retained & reconstruction of bridge in 2 lane configurations
8	164+769	1x40 m	Total Deck Width = 12.5 m (8.50) MCW+ (.5) PL + (1.5) FP+(2.0) CB (Typical Cross Section attached)	MINOR BRIDGE	Existing retained & reconstruction of bridge in 2 lane configuration
9	164+840	1x10 m	Total Deck Width = 12.5 m (8.50) MCW+ (.5) PL + (1.5) FP+(2.0) CB (Typical Cross Section attached)	MINOR BRIDGE	Existing retained & reconstruction of bridge in 2 lane configurations
10	170+467	1x13 m	Total Deck Width = 12.5 m (8.50) MCW+ (.5) PL + (1.5) FP+(2.0) CB (Typical Cross Section attached)	MINOR BRIDGE	Existing retained & widening of bridge in 4 lane configurations

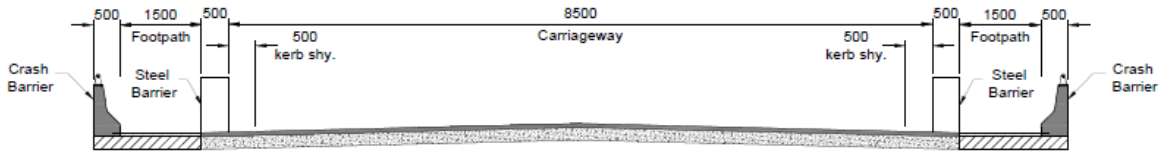
*MCW = Main Carriageway, PL = Pedestrian Railing with kerb shyness & FP= Footpath, CB= Crash Barrier



TYPICAL CROSS SECTION-010
CONCENTRIC WIDENING ON BOTH HAND SIDE SINGLE LANE BRIDGE BUILT-UP AREA



TYPICAL CROSS SECTION-11
ECCENTRIC BRIDGE WIDENING OF FOUR LANE IN HILL AREA



TYPICAL CROSS SECTION-12
NEW CONSTRUCTION OF BRIDGE AT VAILOO ROAD JUNCTION

(c) All bridges shall be high-level bridges.

(d) The following structures shall be designed to carry utility services as per site requirement.

Sr. No.	Bridge at km	Utility service to be carried	Remarks
1	All proposed bridges.		

(e) Cross-section of the new culverts and viaducts at deck level for the Project Highway shall conform to the typical cross-sections given.

(ii) Culverts

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

b) Reconstruction of existing culverts:

The existing culverts at the following locations shall be re-constructed as new RCC box culverts:

Sr.No.	Design Chainage	Proposed span arrangement/opening	Type of culvert
1	169+640	2x2	RCC BOX
2	167+115	2x2	RCC BOX
3	176+696	2x2	RCC BOX

(c) Widening of Existing Culverts:

All existing culverts which are not to be reconstructed shall be widened to the 4-lane roadway width of the Project Highway as per details below. Repairs and strengthening of existing structures where required shall be carried out.

Sr. No.	**Culvert location**	**Type, Span, height and width of existing culvert (m)**	**Remarks**
1	151+959	1x2	-
2	152+282	1x2	-
3	153+572	1x2	-
4	153+825	1x2	-
5	157+763	1x2	-
6	158+125	1x2	-
7	158+393	1x2	-
8	158+669	1x2	-
9	160+461	-	Retained
10	160+711	-	Retained
11	160+840	1x4	-
12	160+909	-	-
13	163+825	1x2	-
14	164+153	1x2	-
15	164+275	1x2	-
16	164+345	1x2	-
17	164+535	1x2	-
18	164+630	1x2	-
19	164+910	-	Retained
20	167+320	1x2	-
21	168+788	1x4	-
22	169+330	1x2	-
23	170+430	-	Retained
24	170+550	1x2	-
25	170+601	1x2	-

26	171+589	1x2	-
27	171+978	1x2	-
28	172+285	1x2	-
29	174+020	1x2	-
30	174+452	1x2	-
31	174+879	1x2	-
32	174+990	1x2	-
33	176+398	1x2	-

(d) Additional new culverts (RCC Box type) shall be constructed as per particulars given in the table below:

Sl. No	Culvert location	Span/Opening (m)
NIL		

(e) Repair/Replacement of railing/Parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

Sr. No.	Location at km	Type of repair required
NIL		

(f) Floor protection works shall be as specified in the relevant IRC Codes and Specifications.

(iii) Bridges

(a) Existing bridges to be re-constructed/widened

(i) The existing bridges at the following locations shall be re-constructed as new Structures:

Sr. No.	Bridge location (km)	Salient details of existing bridge	Adequacy or otherwise of the existing waterway, vertical clearance, etc*	Remarks
1	148+589	PSC I Girder 1x25 m	High level bridges	Required on existing alignment on NH 244

(ii) The following narrow bridges shall be widened:

Sr. No.	Location (Km)	Existing Width (m)	Extent of Widening (m)	Cross-section at deck level for widening
NIL				

(a) Attach cross-section

(b) Additional New bridges

New bridges at the following locations on the Project Highway shall be constructed. GADs for the new bridges are attached in the drawings folder.

Major Bridge: -

Sr. No.	Design Chainage In km	Span arrangement (No. x Length)	Total length in m	Overall Width in m	Remarks
01	163+984	3 x 35 m	105 m	12.5	High level bridge

Minor Bridge: -

Sr. No.	Design Chainage In km	Span arrangement (No. x Length)	Total length in (m)	Overall Width in m	Remarks
1	148+589	1x25 m	25 m excl. approaches	12.5	reconstruction of new bridge in 2 lane configurations
2	151+096	1x30 m	30 m excl. approaches	2x8.5 (plus 11 m existing road wirdh)	Existing retained & Widening on both sides
3	158+061	1x10 m	10 m excl. approaches	12.5	Existing retained & reconstruction of bridge in 2 lane configurations
4	163+790	1x10 m	10 m excl. approaches	12.5	Existing retained & reconstruction of bridge in 2 lane configurations
5	164+362	1x10 m	10 m excl. approaches	12.5	Existing retained & reconstruction of bridge in 2 lane configurations
6	164+400	1x25 m	25m excl. approaches	12.5	Existing retained & reconstruction of bridge in 2 lane configurations
7	164+769	1x40 m	40 m excl. approaches	12.5	Existing retained & reconstruction of bridge in 2 lane configurations
8	164+840	1x10 m	10 m excl. approaches	12.5	Existing retained & reconstruction of bridge in 2 lane configurations

9	170+467	1x13 m	13 m excl. approaches	12.5	Existing retained & reconstruction of bridge in 2 lane configurations

Additional New Viaduct

New viaducts at the following locations on the Project Highway shall be constructed of minimum length as under:

Sr. No.	Location	Total length (m)	Span Arrangement	Remarks
NIL				

Note:
In case, the Span arrangement is modified by the EPC Contractor as per site requirement, the same shall be done with the approval of the Competent Authority and without any additional financial implication. Notwithstanding, the span length shall be treated as minimum.
(c) The railings of existing bridges shall be replaced by crash barriers at the following locations:

Sr. No.	**Location (km)**	**Remarks**
All locations mentioned above under Minor & Major Bridges.		

(d) Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as follows:

Sr. No.	**Location (km)**	**Remarks**
Nil		

Drainage System for Viaduct Decks/Bridges:

An effective drainage system for bridge decks shall be provided as specified in the provision of relevant Manual.

(f) Structures in Marine Environment: Nil

(iv) Rail-Road Bridges

(a) Design, Construction and detailing of ROB/RUB shall be specified in the provision of relevant Manual.

(b) Road Over bridges

Road over bridges (road over rail) shall be provided at the following level crossings, as per GAD drawings attached:

Sl. No.	Location of Level crossing (Chainage km)	Length of bridge (m)
NIL		

(c) Road under-bridges:

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

Sr. No.	Location of Level crossing (Chainage km)	Number and length of span (m)
NIL		

(v) Grade Separated Structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2 (ix) and 3 of this Annex-I.

(vi) 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:

(a) Repair of existing Bridges

Sl. No.	Location of Bridge (km)	Nature of extent of repairs/strengthening to be carried out
Nil		

(b) ROB/RUB

Sl. No.	Location of ROB/RUB (km)	Nature of extent of repairs/strengthening to be carried out
NIL		

(c) Overpasses/Underpasses and other structures

Sl. No.	Location of Structure (km)	Nature of extent of repairs/strengthening to be carried out
NIL		

8. Traffic Control Devices and Road Safety Works

(i) Traffic control devices and road safety works shall be provided in accordance with the provisions of the relevant Manual.

(ii) Specifications of the reflective sheeting shall be Class C sheeting described in IRC:67 and type VIII/IX/XI as per ASTM D 4956-09 fixed over Aluminium or Aluminium Composite Material.

(a) Crash Barrier

(i) Thrie Metal beam crash barrier shall be provided along the project highway as per section 9 of the manual. It shall be provided at Culvert/ bridge approaches on both sides and at location of embankment with height greater than or equal to 3m.

(ii) The concrete crash barrier/ railing of bridge and culvert shall be painted in black and white stripes in general.

(b) Transverse Rumble strip

Transverse rumble strips in the form of thermoplastic bar marking shall be provided to warn the drivers to reduce the speed for safety. Stripes shall be in full width of pavement. The stripes shall be provided at sharp curves, village approaches, location approaching access road, intersections and any other hazardous locations on the project highway. Guidelines of IRC-35 shall be followed.

(c) Signage:

The signages shall be provided as per the Road signage plan enclosed. The minimum nos. of traffic sign boards are as here under-

Sr No.	Item	Unit	Qty.
1	Chevron	Nos.	99
2	Hazards marks	Nos.	49
3	Tripple Hazards at rotary	Nos.	10
4	Left hand Curve	Nos.	20
5	Right Hand Curve	Nos.	20
6	Speed Sign	Nos.	59
7	Stop Sign	Nos.	20
8	Round About	Nos.	10
9	Re Asurance Sign	Nos.	50
10	3 Direction Sign	Nos.	50
11	1 Direction Sign	Nos.	10
12	Major Road ahead	Nos.	10
13	Merging Ahead	Nos.	50
14	Two-way Hazard	Nos.	100
15	90 cm equilateral triangle	Nos	35
16	60 cm circular	Nos	13
17	90 cm high octagon	Nos	18
18	Village Name Boards of size 900x600	Nos	13
19	Place Identification Boards of size 1200x900	Nos	28
20	Advance Direction Sign Boards of 1800x1200	Nos	4

(d) **Road Marking:** The road markings with hot applied thermoplastic paint consisting of different lane markings, directional arrows, chevron marking, letterings, transverse bar

marking (speed calming measure) etc. shall cover the entire Project Highway and at all junctions/intersections as per IRC 35 2015,relevant code, manual.

(e) **Road studs:** The Reflective Pavement Markers (RRPM) i.e. road studs of prismatic retroreflective type conforming to ASTM D 4280, Table 9.1 of Manual to be provided following placement details as per IRC:35. The color pattern of road studs for edge line and center line with respect traffic movement is to be adopted as per Manual and as per relevant MoRT&H Circular.

Minimum number of road studs of different colors: 2500 Nos.

(f) Road Delineators: Minimum 900 nos of road delineators to be provided as per Manual and relevant IRC code.

9. Roadside Furniture

(i) Roadside furniture shall be provided in accordance with the provisions of the relevant Manual. Road side furniture shall be provided in accordance with the provision of relevant Manual.

(ii) Overhead traffic sign: nil

(iii) New Jersy Median Barrier – 9600 m

(iv) Steel Railing – 11640 m

(v) Thrie Beam metal Crash Barrier- 1620 m

(vi) Antiglare screen – 9600 Rm

(vii) M 20 Kerb Stone -11640 m

(viii) Boundary Pillars – 50 Nos.

(ix) Street Lightening Poles = 486 No.

(x) Sub-Station for Street Lightening Poles = 5 Nos.

(xi) Overhead Traffic Signs: Location and Size

The location & size of overhead traffic signs shall be as hereunder:

Location (Design)	Size	Remarks
01 No. decided by Engineer in Charge		

Note: The supply, erection, installation, commissioning of Street Lightning, Substation, HT Part, LT Part shall be the responsibility of EPC Contractor.

10. Compulsory Afforestation: 1000 Nos. as per IRC SP 21 2009 or relevant IRC.

11. Hazardous Locations: Km 169+525 to 169+675 at Achabal Quarry Location need to be improved to ensure safety.

12. The safety barriers shall also be provided at the following hazardous locations:

In addition to 8(iii), the safety barriers (Thrie Beam Crash Barriers along with reflectors) shall be provided at the following hazardous locations:

Sr. No.	Location stretches From (km) to (km)	LHS/RHS	Remarks
1	km 148+589 to km 148+807	RHS	All Bridges & culvert approaches shall be provided with safety.
2	km 151+000 to km 151+075	Both Sides	
3	km 151+100 to km 151+200	Both Sides	
4	Km 163+850 to km 163+950	Both Sides	
5	Km 164+050 to km 164+150	Both Sides	
6	Km 168+630 to km 169+863	LHS	
7	Km 169+500 to Km 169+863	RHS	

13. Special Requirement for Hill Road features at some locations

a) Retaining Wall:

The minimum requirement of Retaining wall shall be constructed with min. length 1971 m. The Contractor is required to conduct detail investigation to assess the work based on site survey, investigations and assessment before commencement of work. Any increase in length within 10% of total scope mentioned herein shall not constitute a Change of Scope. The provision of repair of the identified tension crack is in the scope of work.

(i) Retaining Walls Locations:

RETAINING WALL					
S.no	Chainage		Length (m)	Height (m)	Side
	From	To			
1	148.589	148.680	91	3	LHS
2	148.785	148.807	22	3	LHS
3	151.120	151.170	50	3	B/S
4	157.800	157.950	150	3	LHS
5	160.730	160.850	120	3	RHS
6	163.800	163.950	150	3	RHS
7	164.420	164.450	30	3	LHS
8	164.780	164.950	170	3	RHS
9	173.930	174.100	170	3	RHS
10	167.000	167.220	220	1.5	LHS
11	167.300	167.360	60	1.5	LHS
12	158.100	158.230	130	2.5	RHS
13	158.350	158.470	120	2.5	RHS
14	158.912	158.960	48	2.5	RHS
15	164.600	164.700	100	2.5	RHS
16	169.540	169.600	60	2.5	LHS

17	170.680	170.730	50	2.5	RHS
18	174.500	174.600	100	2.5	RHS
19	168.700	168.830	130	2	LHS
Total			1971		

(ii) BREAST WALL

The minimum requirement of Breast wall is as follows. The Contractor is required to conduct detail investigation to assess the work based on site survey, investigations and assessment before commencement of work. Any increase in length within 10% of total scope mentioned herein shall not constitute a Change of Scope.

Breast Walls Locations:

BREAST WALL

S.no	Chainage		Length (m)	Height (m)	Side
	From	To			
1	148+610	148+804	194	3	RHS
Total Length (m)	194				

(iii) Reinforced Earth (RE) Wall

The minimum requirement of RE wall shall be constructed with min. length 150 m. The Contractor is required to conduct detail investigation to assess the work based on site survey, investigations and assessment before commencement of work. Any increase in length within 10% of total scope mentioned herein shall not constitute a Change of Scope.

S.no	Chainage		Length (m)	Height (m)	Side
	From	To			
1	169+450	169+790	150	15	RHS
2			150	6	RHS
Total Length (m)	300 m				

(iv) Gabion wall: Nil
(v) Special Slope Protection: Nil
(v) Road Side Footpath: Refer clause 6 above.

14. SAFETY AND TRAFFIC MANAGEMENT DURING CONSTRUCTION & MAINTENANCE PERIOD: -

(i) Rock fall protection during construction period (Providing and fixing 2.5 meters high fencing with vertical angle iron posts 150 mm x 150 mm x 10 mm placed & every 0.5 meters center to center founded in M15 grade cement concrete, 0.6 meter below ground level and three horizontal iron angle 50mm x 50mm x6mm for connecting vertical post.

(ii) Diversion road at bridge locations & main road

(iii) Portable Type Barricade in Construction Zone -350 Nos.

(iv) Traffic Signs & making for Diversion- Road Work ahead, Man at work, Hazard Marker, Traffic Diversion, Chevron, Speed Limit, Restriction Ends, Flag Man, Overtaking Prohibited, Work Traffic Exit, Drum Delineator

(v) Maintenance of existing road in traffic worthy condition (filling potholes, patches etc.). This shall include snow clearance and land slide clearance of already completed stretches mentioned under Para- 03 of schedule-A.

(vi) Snow Clearance [construction period+ maintenance period]: 9.866 Km during Construction + Maintenance Period from October to March or Nov- April for a year, whenever snow clearance required as per condition.

(a) Snow Clearance during Construction Period and Maintenance Period has to be carried which shall inter-alia include the following activities:

(i) Stocking of salt to be used for 6-month salt sprinkling shall be done after every clearance of snow

(ii) Necessary chaining on tyre shall be done wherever and whenever as per requirement.

(iii) Day and Night shift drivers shall be made available all time at site with active Contact no.

(iv) During any condition of breakdown of any Machinery, the same shall be replaced immediately,

(v) The site supervisors with minimum 3 years of snow clearance experience shall be available at site for supervision of this work along with one vehicle.

(vi) The contractor shall provide all the safety equipment's like helmets, PPE jackets, snowshoes etc. with winter clothes.

(vii) Camp arrangement for operators, machinery and material shall be made by the contractor.

(viii) Snow clearance is to be carried out immediately within 12 hours of snowfall. If it is observed that the snow clearance has not be carried out within 12 hours or more than 2 (two) instances in a month, damages shall be recovered or work to be executed by third party at your risk and cost.

(ix) Pre-snow and post snow clearance ideography/geo-tagged photography shall be made for reference and record each work done claim shall be supported with the photographs indicating date of snowfall, date of clearance and depth of snow, area/Locality/Lane/road ED-wise landmarks.

(x) The snow clearance hours start from deployment of machineries at site on directions of Engineer in charge during the winter season.

(xi) Inspections

(xii) The Contractor shall be required to perform all road maintenance activities along the project roads. The Contractor shall be required to submit Maintenance Report for each component of the works.

(xiii) The Contractor shall be required to utilize mechanized equipment and methods to perform these obligations.

(xiv) All maintenance activities shall be carried out in accordance with relevant specifications and IRC codes prescribed in the contract. The requisite quality control

tests as per specifications and codes are to be carried out by the Contractor at his cost as per directions of the Engineer.

(xv) Routine road maintenance means planned works and activities required to ensure public safety,

(xvi) Repair small defects and to maintain the road in the required condition. Adhoc maintenance means carrying out of unscheduled maintenance occasioned by irregular events such as accidents, natural calamities, abnormal weather conditions and the like.

15. Muck Disposal land management:

The muck to be generated shall be appropriately dumped in tips at various suitable locations so that it does not degrade the various elements of the natural environment. For final disposal of the material convenient locations have been identified viz-a-viz to environmental aspects. The most suitable locations for dumping of the muck that would be generated from the Vailoo-Donipawa road stretch under this agreement

Location specified in the Schedule is tentative and approximate assessment. The actual as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the specified in this Schedule –B shall not constitute a Change of Scope.

Details of Environment Management and Muck Disposal Management are as under:

Sl. No.	Location in km	Muck Dumping no.	Coordinates	Remarks
1	169+600 to 169+750	1	N520398.560 E3726126.731	Achabal (Quarry location)

16. Change of Scope

The length of Structures and bridges, muck disposal sites specified here in above shall be treated as an approximate assessment. The actual lengths as required based on detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule- B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

17. Shifting of obstructing utilities:

17.1 Shifting of obstructing utilities shall be done as per Ministry's circular RW/NH33044/29/2015-S&R(R)pt. dated 11.02.2021 as mentioned under schedule-B1. The Contractor shall be responsible for getting the utilities shifted as per approval of the concerned utility owning department. The assistance of the Authority is limited to giving a forwarding letter on the proposal of Contractor to the utility owning department whenever asked by the Contractor. The decision/approval of the utility owning department shall be binding on the Contractor.

Note: Utility duct shall be laid with 300mm dia. HDPE pipe all along the project length @ 500mand cross sectional in accordance with IS: 4984/14333 or any other relevant code with inspection chambers at acceptable interval as approved by Authority Engineer/ Employer.

17.2 Utility Shifting details are given in Sheet-II (Annex-I to Schedule Sheet-II (Annex-I to Schedule-B).Shifting of obstructing existing utilities as indicated in Schedule A to an

appropriate location in accordance with the standards and specifications of concerned Utility Owing 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.

Notes:

1. The type/spacing/size/specifications of poles/towers/lines/cables to be used in shifting work shall be as per the guidelines of Utility Owing Department and it is to be agreed solely between the Contractor and the Utility Owing 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 Owing Department and/or/construction of project highway. The Contractor shall carry out joint inspection with Utility Owing Department and get the estimates from Utility Owing Department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor to Utility Owing Department whenever asked by the Contractor. The decision/approval of Utility Owing Department shall be binding on the Contractor.

2. The supervision charges at the rates/charges applicable of the Utility Owing Department shall be paid directly by the Authority to the Utility Owing Department as and when Contractor* furnishes demand of Utility Owning Department along with a copy of estimated cost given by the latter.

3. The dismantled materials/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 dismantled material to Utility Owing Department as per the norms and practice and, in that case the amount of credit for dismantled material may be availed by the Contractor as per the estimate agreed between them.
4. The utilities shall be handed over after shifting work is completed to Utility Owning Department up to their entire satisfaction. The maintenance liability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned.

   Note -II Copy of utility shifting plans enclosed as Annexure-II to Schedule B1.

Schedule-B-1

The shifting of utilities shall be carried out by the Contractor as per actual items in the estimates furnished by utility owning department. The details of utilities are as follows:

Electrical Utilities

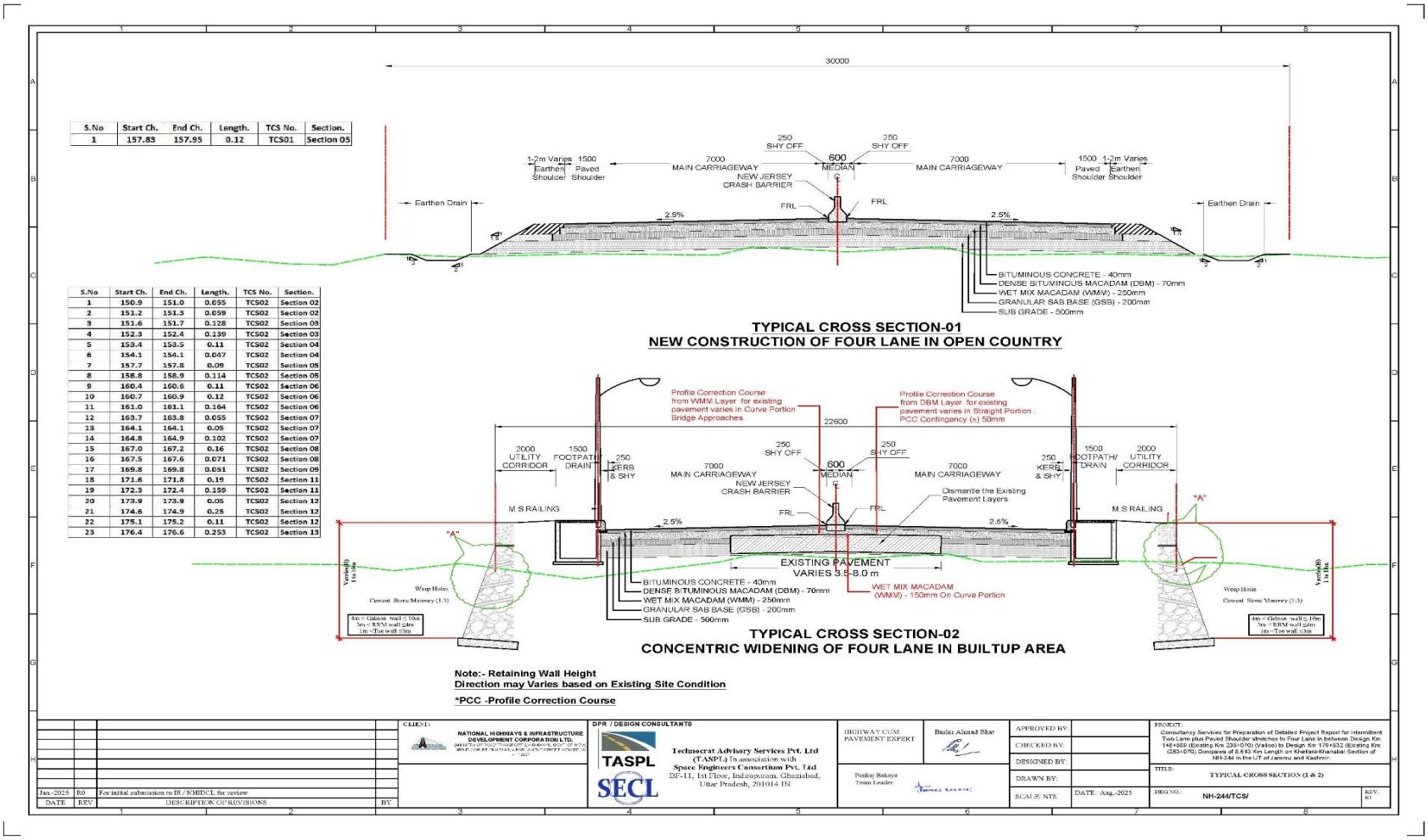
S.NO	Type of Utility	Electrical Division	Unit	Quantity
1	Electrical Utilities. PDD (Achabal to Vailoo)			
1.1	Electrical Poles Nos (LT)	Sub Division Achabal/Division Anantnag	No.	48
1.2	Electrical Poles Nos (HT)		No.	110
1.3	Electrical cables (LT)		M	10400
1.4	Electrical cables (HT)		M	21800
1.5	Transformers/Sub-station		No	2
2	Electrical Utilities. PDD (Donipawa to Achabal)			
2.2	Electrical Poles Nos (LT)	Sub Division Anantnag /Division Anantnag	No.	9
2.3	Electrical Poles Nos (HT)		No.	2
2.4	Electrical cables (LT)		M	700
2.5	Electrical cables (HT)		M	300
2.6	Transformers/Sub-station		No	0
3	Electrical Utilities. STD 33 KVA (Hiller to Vailoo)	Sub Division Anantnag /Division Bijbehara		
3.1	Electrical Poles		No	57
3.2	Electrical cables		M	9000
3.3	Gantry		No	2

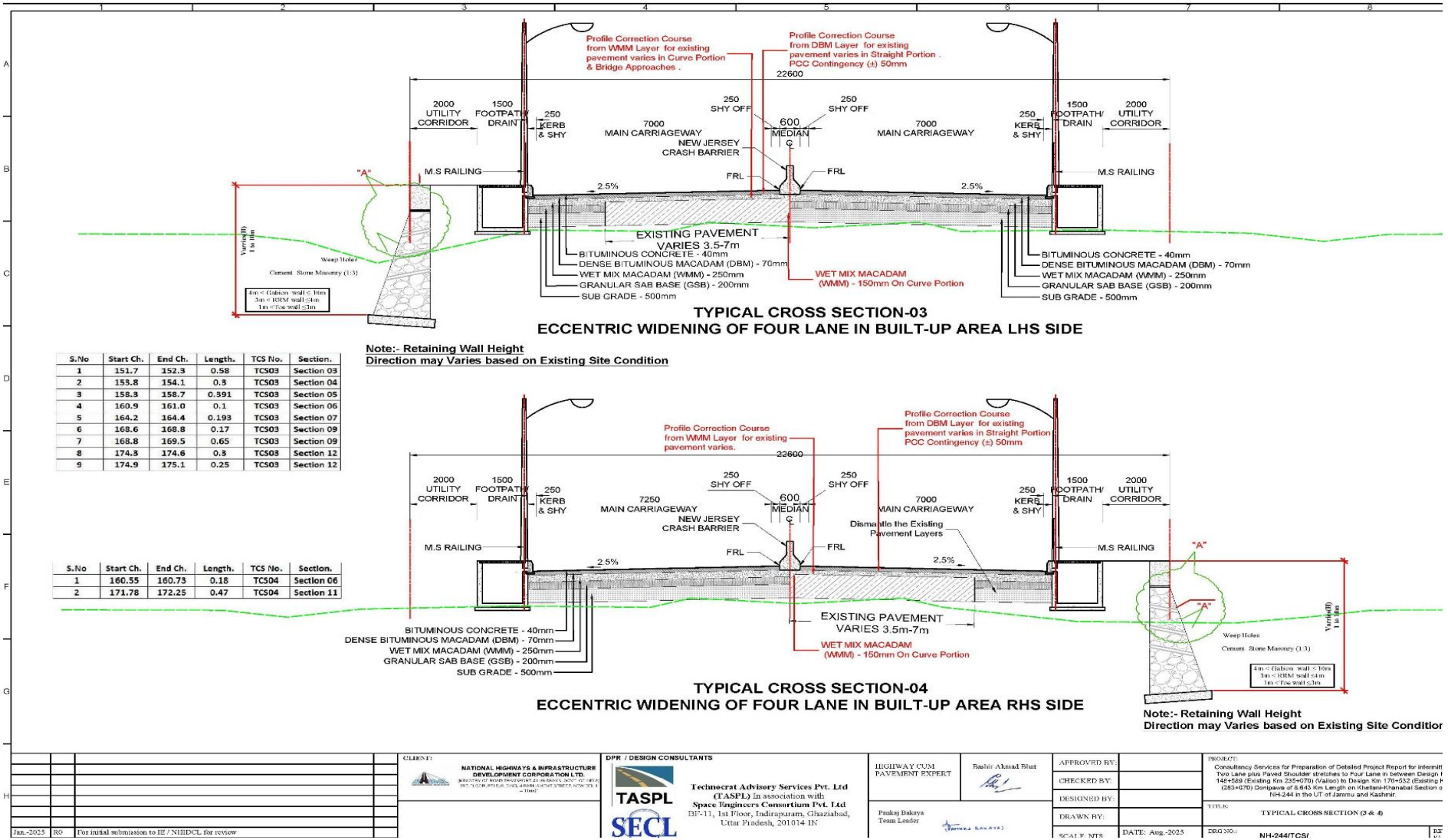
Public Health utilities (Water/Sewage Pipe Lines)

Sr. No	Chainage(km)		Sub-Division	Type	Length (in Rm)				Remarks
					Water Supply line		Sewage line		
	From	To			With Pumping	With Gravity	With Pumping	With Gravity	
1	148+589	176+603	Anantnag	150 mm		2700			
				100 mm DI		1900			
				100 mm GI		900			
				65 mm GI		400			
				50 mm GI		450			
				25 mm GI		1000			
				20 mm GI		1100			
				15 mm GI		800			
2	148+589	176+603	Kokernag	250 mm		1220			
				200 mm		3470			
				150 mm		8000			

				100 mm DI		535			
				100 mm GI		6285			
				80 mm GI		3260			
				65 mm		950			
				50 mm		700			
				40 mm GI		1300			
				25 mm		200			
				20 mm		230			
				15 mm		150			
3				0.40 lac gallon RCC Dome Type SR with 03 Nos. of sluice chamber			01 No.		
4	148+589	176+603	Dooru	150 mm		1970			
				100 mm DI		3545			
				100 mm GI		2580			

Typical Cross Section





TYPICAL CROSS SECTION-03
ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA LHS SIDE

Note:- Retaining Wall Height
Direction may Varies based on Existing Site Condition

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	151.7	152.3	0.58	TCS03	Section 03
2	153.8	154.1	0.3	TCS03	Section 04
3	158.3	158.7	0.391	TCS03	Section 05
4	160.9	161.0	0.1	TCS03	Section 06
5	164.2	164.4	0.193	TCS03	Section 07
6	168.6	168.8	0.17	TCS03	Section 09
7	168.8	169.5	0.65	TCS03	Section 09
8	174.3	174.6	0.3	TCS03	Section 12
9	174.9	175.1	0.25	TCS03	Section 12

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	160.55	160.73	0.18	TCS04	Section 06
2	171.78	172.25	0.47	TCS04	Section 11

TYPICAL CROSS SECTION-04
ECCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA RHS SIDE

Note:- Retaining Wall Height
Direction may Varies based on Existing Site Condition

Jan.-2025	R0	For initial submission to IE / NHIDCL for review	

CLIENT: NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

DPR / DESIGN CONSULTANTS: TASPL SECL
Technocrat Advisory Services Pvt. Ltd (TASPL) In association with Space Engineers Consortium Pvt. Ltd
BP-11, 1st Floor, Indirapuram, Ghaziabad, Uttar Pradesh, 201014 IN

HIGHWAY CUM PAVEMENT EXPERT: Bashir Ahmad Bhat
Pankaj Bakaya, Team Leader

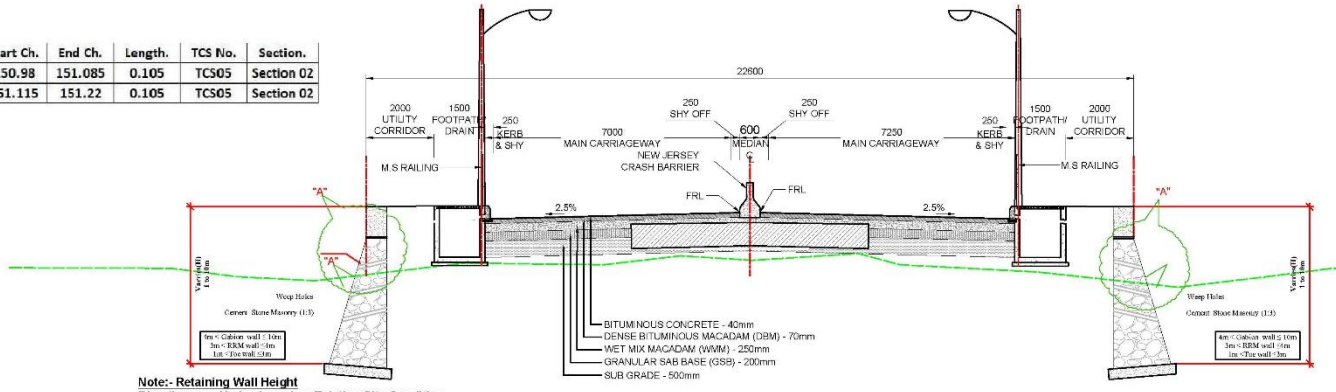
APPROVED BY:
CHECKED BY:
DESIGNED BY:
DRAWN BY:
SCALE: NTS
DATE: Aug.-2025

PROJECT: Consultancy Services for Preparation of Detailed Project Report for intermitt Two Lane plus Paved Shoulder stretches to Four Lane in between Design h 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing K (263+070) Donipawa of 9.640 Km Length on Khellani-Khanabal Section o NH-244 in the UT of Jammu and Kashmir.

TITLE: TYPICAL CROSS SECTION (3 & 4)

DRG NO.: NH-244/TCS/

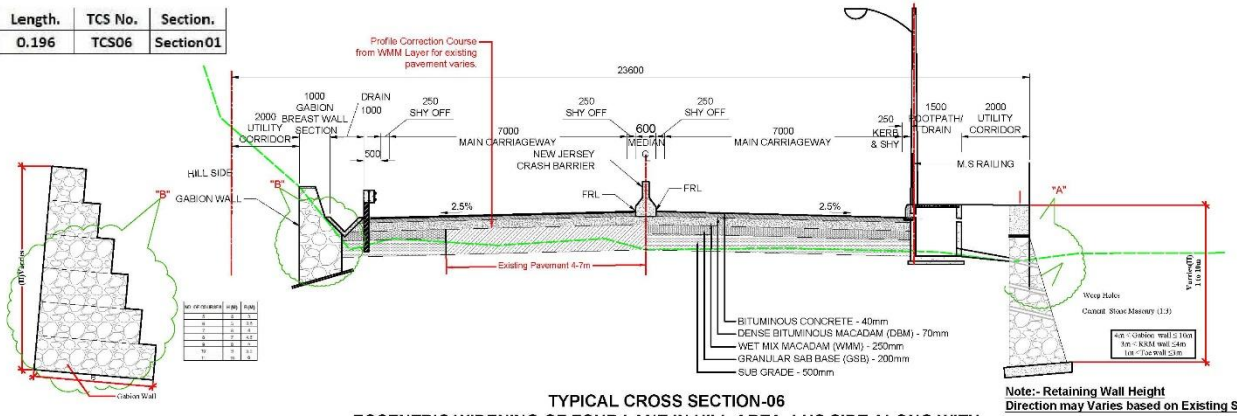
S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	150.98	151.085	0.105	TCS05	Section 02
2	151.115	151.22	0.105	TCS05	Section 02



Note:- Retaining Wall Height
Direction may Varies based on Existing Site Condition

TYPICAL CROSS SECTION-05
CONCENTRIC WIDENING OF FOUR LANE IN BUILT-UP AREA
PROTECTION WORK BOTH SIDE

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	148.610	148.806	0.196	TCS06	Section01



Note:- Retaining Wall Height
Direction may Varies based on Existing Site Condition

TYPICAL CROSS SECTION-06
ECCENTRIC WIDENING OF FOUR LANE IN HILL AREA LHS SIDE ALONG WITH
PROTECTION WORKS BOTH SIDE

DATE	REV	DESCRIPTION OF REVISIONS	BY
Jan.-2023	R0	For initial submission to IC / NHIDCL for review	

CLIENT: NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

DPR / DESIGN CONSULTANTS: TASPL, SECL
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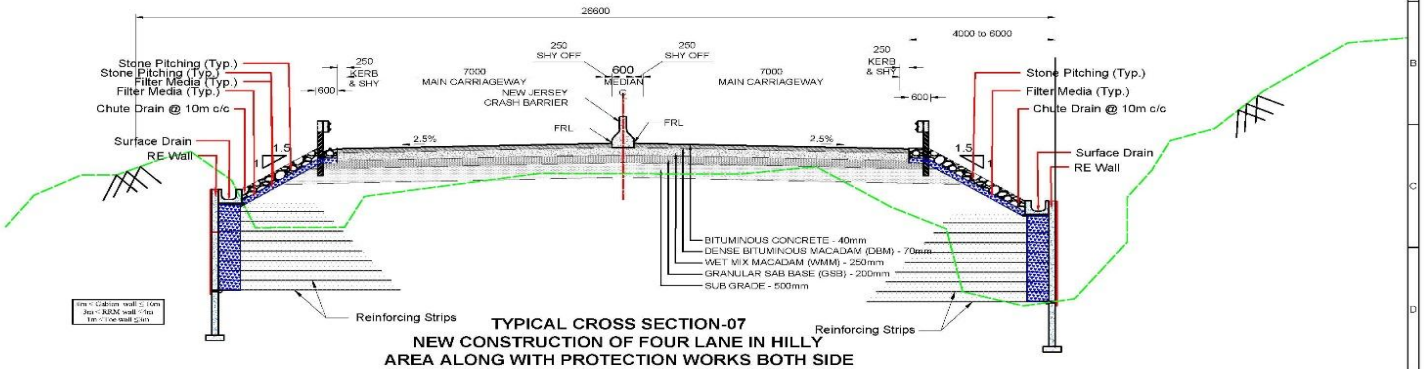
APPROVED BY:
CHECKED BY:
DESIGNED BY:
DRAWN BY:
SCALE: NTS
DATE: Aug.-2023

PROJECT: Consultancy Services for Preparation of Detailed Project Report for intermittent Two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km 263+070) Donipawa of 9.843 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir.

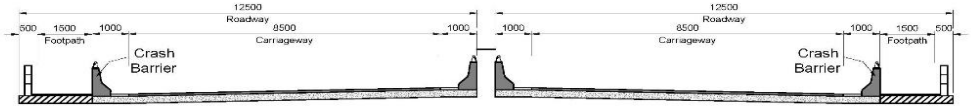
TITLE: TYPICAL CROSS SECTION (5 & 6)

DRG NO.: NH-244/TCS/ REV. R0

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	169.45	169.79	0.34	TCS07	Section 09



TYPICAL CROSS SECTION-07
NEW CONSTRUCTION OF FOUR LANE IN HILLY AREA ALONG WITH PROTECTION WORKS BOTH SIDE



S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	158.05	158.06	0.01	TCS08	Section 05
2	163.80	163.81	0.01	TCS08	Section 07
3	164.39	164.42	0.03	TCS08	Section 07
4	164.72	164.76	0.04	TCS08	Section 07

TYPICAL CROSS SECTION-08
BRIDGE WIDENING OF FOUR LANE IN OPEN COUNTRY

DATE	REV.	DESCRIPTION OF REVISIONS	BY
Jan.-2025	R0	For initial submission to IE / NHIDCL for review	

CLIENT: NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

DPR / DESIGN CONSULTANTS: Technocrat Advisory Services Pvt. Ltd (TASPL) In association with Space Engineers Consortium Pvt. Ltd, BP-11, 1st Floor, Indirapuram, Ghaziabad, Uttar Pradesh, 201014 IN

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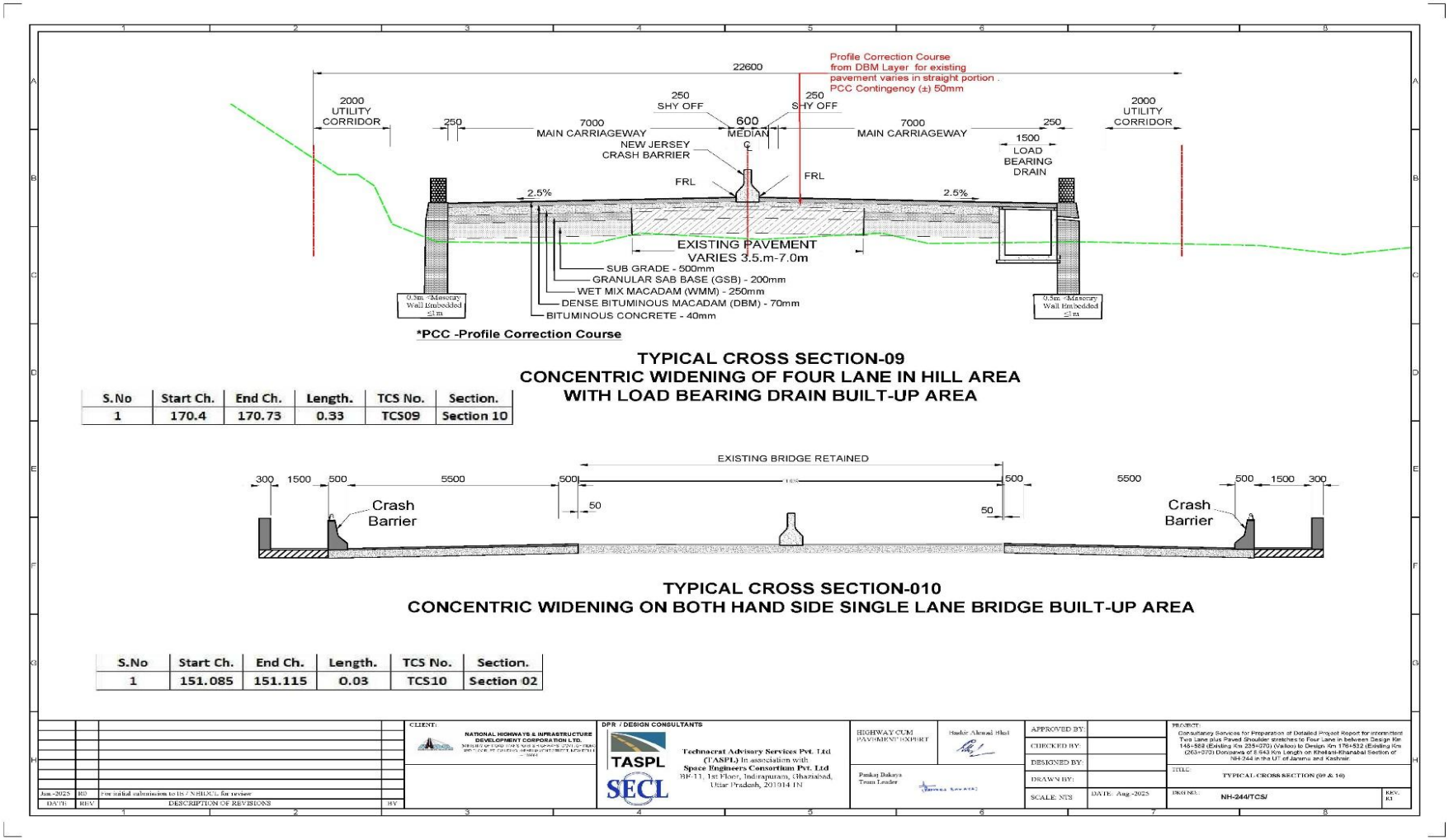
Pankaj Bakaya, Team Leader

APPROVED BY:	
CHECKED BY:	
DESIGNED BY:	
DRAWN BY:	
SCALE: NTS	DATE: Aug.-2025

PROJECT: Consultancy Services for Preparation of Detailed Project Report for intermittent Two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km 263+070) Donipawa of 8.643 Km Length on Khellani–Khanabal Section of NH-244 in the UT of Jammu and Kashmir.

TITLE: TYPICAL CROSS SECTION (7 & 8)

DRG NO.: NH-244/TCS/ REV. R3



TYPICAL CROSS SECTION-09
CONCENTRIC WIDENING OF FOUR LANE IN HILL AREA
WITH LOAD BEARING DRAIN BUILT-UP AREA

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	170.4	170.73	0.33	TCS09	Section 10

TYPICAL CROSS SECTION-010
CONCENTRIC WIDENING ON BOTH HAND SIDE SINGLE LANE BRIDGE BUILT-UP AREA

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	151.085	151.115	0.03	TCS10	Section 02

CLIENT: NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
DPR / DESIGN CONSULTANTS: TASPL SECL — Technocrat Advisory Services Pvt. Ltd (TASPL) In association with Space Engineers Consortium Pvt. Ltd, BF-11, 1st Floor, Indirapuram, Ghaziabad, Uttar Pradesh, 201014 IN
HIGHWAY CUM PAVEMENT EXPERT: Bashir Ahmad Bhat
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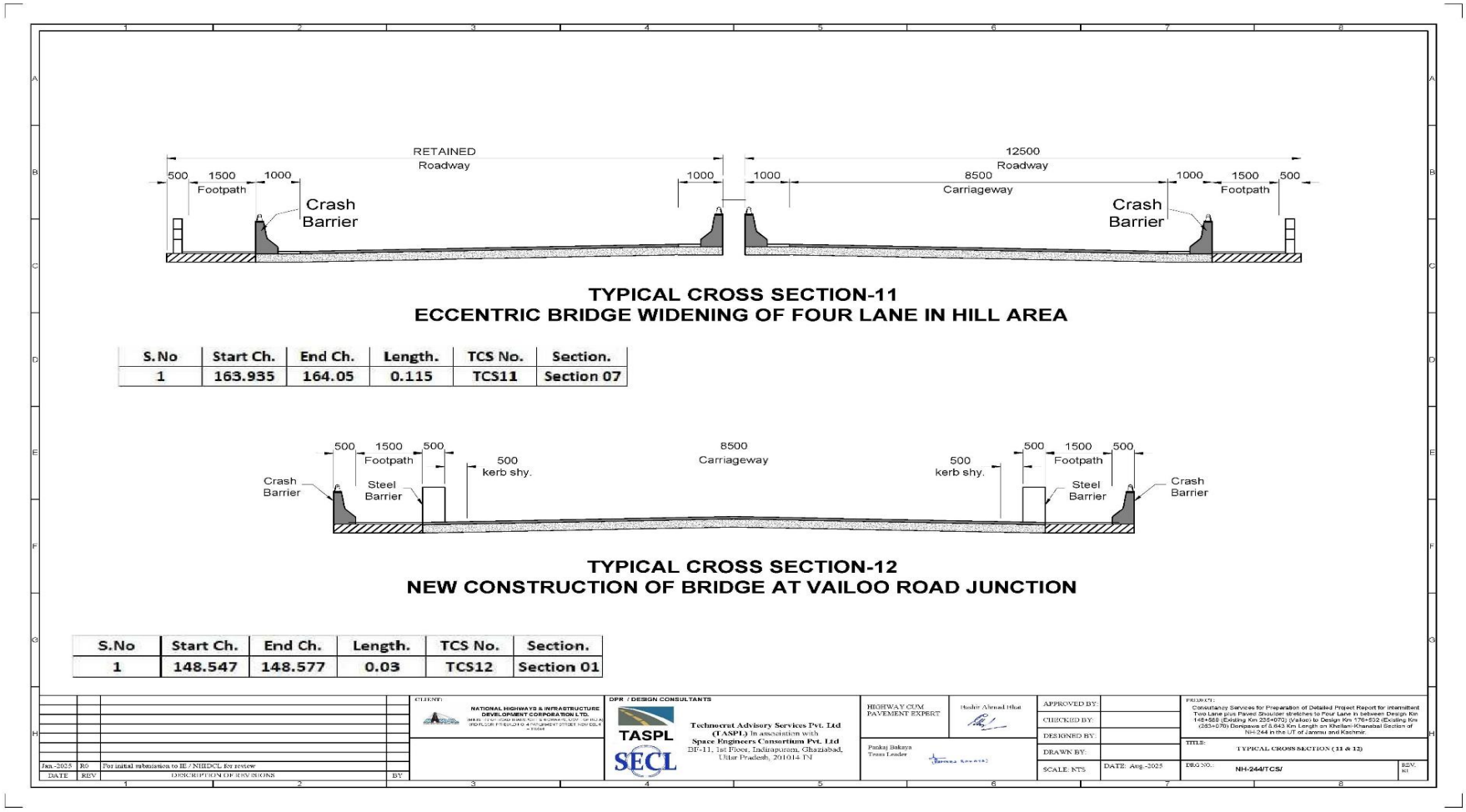
CHECKED BY:
DESIGNED BY:
DRAWN BY:
SCALE: NTS
DATE: Aug-2025
PROJECT: Consultancy Services for Preparation of Detailed Project Report for Intermittent Two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km 263+070) Donipawa of 9.943 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir.
TITLE: TYPICAL CROSS SECTION (09 & 10)
DRG NO.: NH-244/TCS/
REV: R3
Jun-2025 | RD | For initial submission to IA / NHIDCL for review
DATE | REV | DESCRIPTION OF REVISIONS | BY



TYPICAL CROSS SECTION-11
ECCENTRIC BRIDGE WIDENING OF FOUR LANE IN HILL AREA

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	163.935	164.05	0.115	TCS11	Section 07

TYPICAL CROSS SECTION-12
NEW CONSTRUCTION OF BRIDGE AT VAILOO ROAD JUNCTION

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	148.547	148.577	0.03	TCS12	Section 01

DATE	REV	DESCRIPTION OF REVISIONS	BY
Jan.-2025	R0	For initial submission to IE / NHIDCL for review	

CLIENT: NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

DPR / DESIGN CONSULTANTS: Technocrat Advisory Services Pvt. Ltd (TASPL) In association with Space Engineers Consortium Pvt. Ltd, DF-11, 1st Floor, Indirapuram, Ghaziabad, Uttar Pradesh, 201014 IN

HIGHWAY CUM PAVEMENT EXPERT: Bashir Ahmad Dhar

Pankaj Bakaya, Team Leader

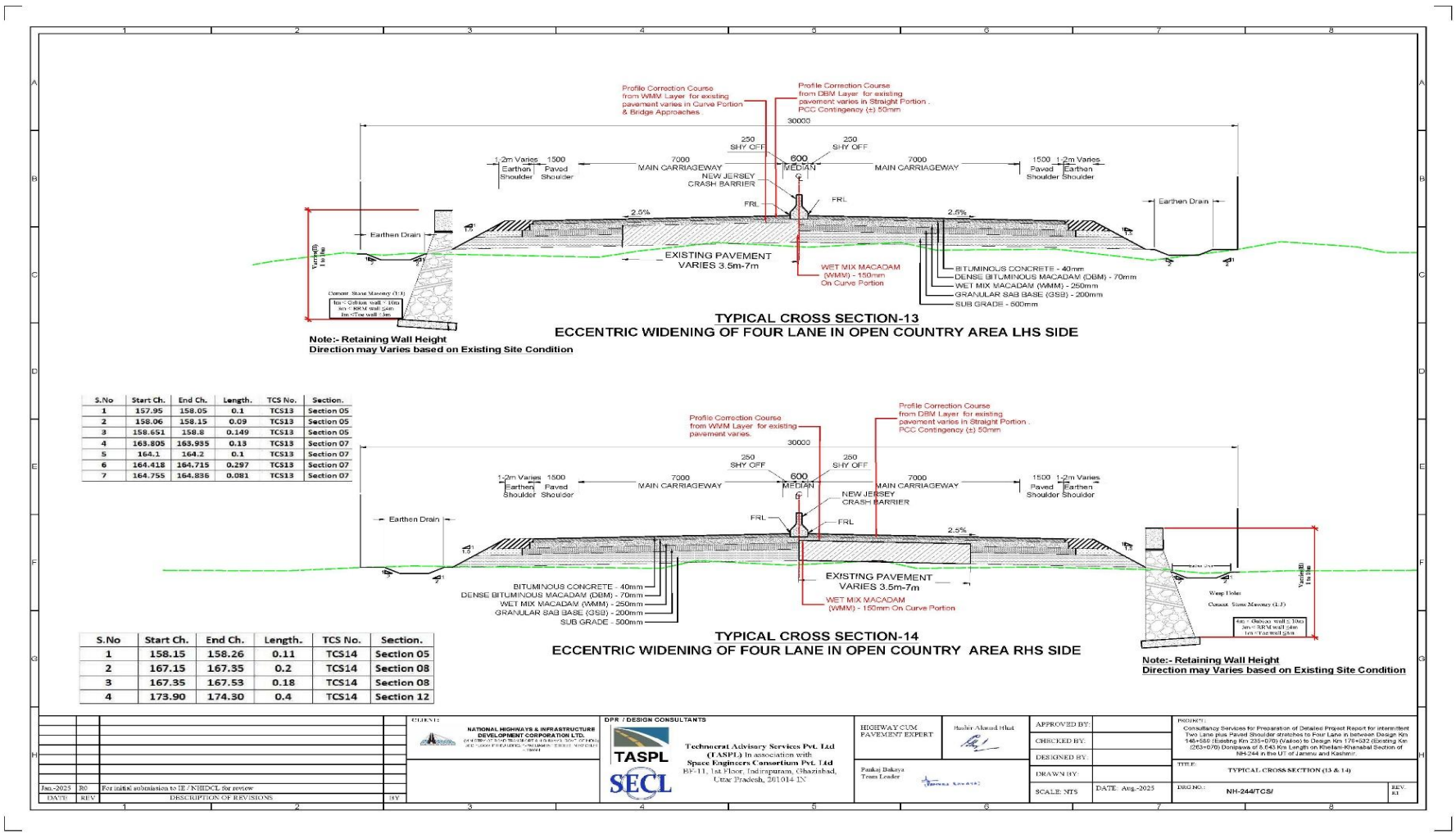
APPROVED BY:
CHECKED BY:
DESIGNED BY:
DRAWN BY:
SCALE: NTS
DATE: Aug.-2025

PROJECT: Consultancy Services for Preparation of Detailed Project Report for Intermittent Two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km 263+070) Donipawa of 9.643 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir.

TITLE: TYPICAL CROSS SECTION (11 & 12)

DRG NO.: NH-244/TCS/

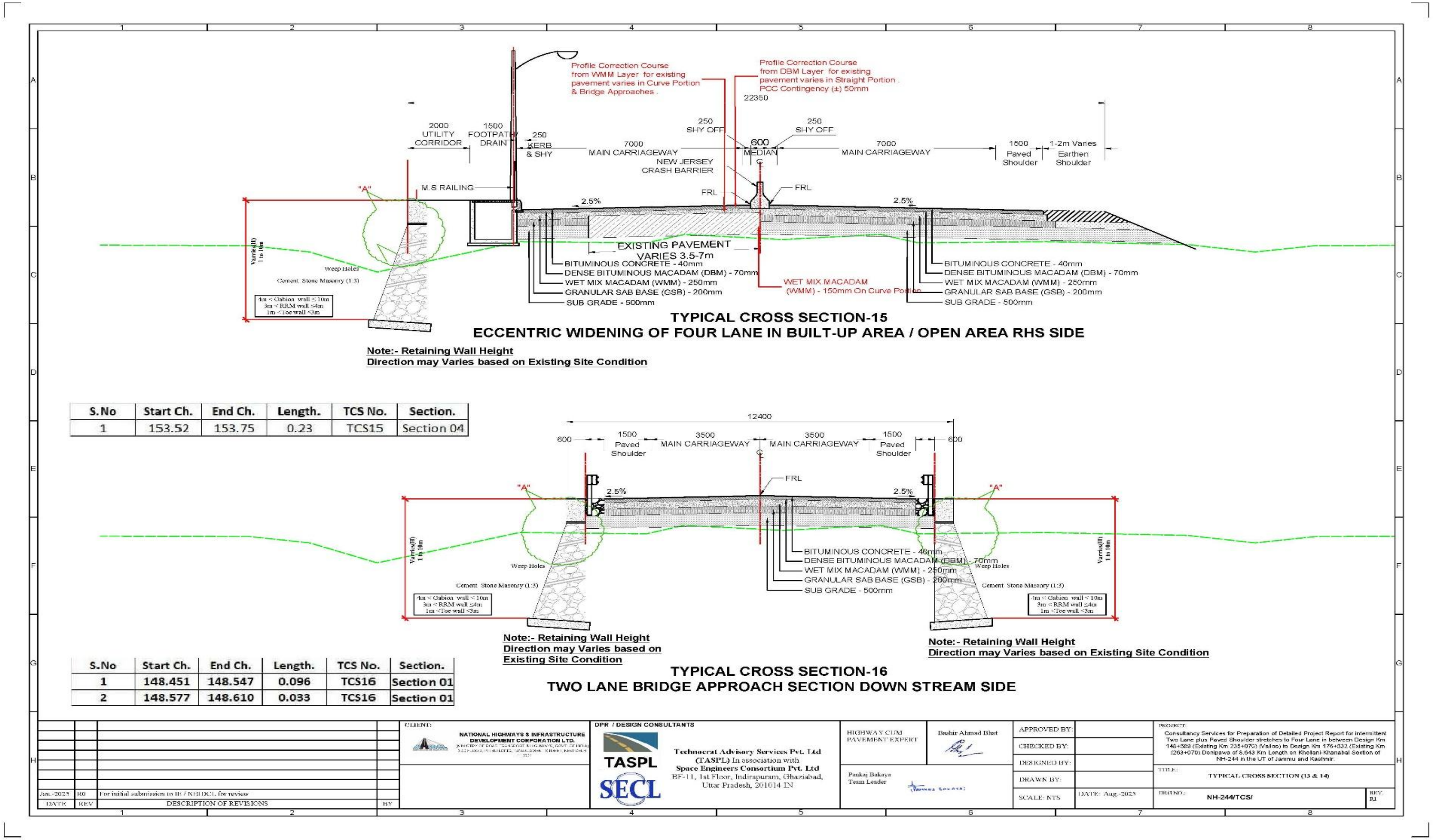
REV. NO.



S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	157.95	158.05	0.1	TCS13	Section 05
2	158.06	158.15	0.09	TCS13	Section 05
3	158.651	158.8	0.149	TCS13	Section 05
4	163.805	163.935	0.13	TCS13	Section 07
5	164.1	164.2	0.1	TCS13	Section 07
6	164.418	164.715	0.297	TCS13	Section 07
7	164.755	164.836	0.081	TCS13	Section 07

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	158.15	158.26	0.11	TCS14	Section 05
2	167.15	167.35	0.2	TCS14	Section 08
3	167.35	167.53	0.18	TCS14	Section 08
4	173.90	174.30	0.4	TCS14	Section 12

Widening/Up-Gradation of Intermittent Two Lane plus Paved Shoulder Stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km 263+070) [Donipawa] of 9.866 Km Length on Khellani–Khanabal Section of NH-244 in UT of Jammu and Kashmir on EPC Mode.



S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	153.52	153.75	0.23	TCS15	Section 04

S.No	Start Ch.	End Ch.	Length.	TCS No.	Section.
1	148.451	148.547	0.096	TCS16	Section 01
2	148.577	148.610	0.033	TCS16	Section 01

Schedule - C

(See Clause 2.1)

Project Facilities

1. Project Facilities

The Contractor shall construct the Project Facilities in accordance with the provisions of this Agreement. Such Project Facilities shall include:

(a) Toll plaza[s];

(b) Roadside furniture;

(c) Pedestrian facilities;

(d) Tree plantation;

(e) Truck lay-byes;

(f) bus-bays/bus shelters/bus stop;

(g) rest areas (02 no of toilet as way side amenities)

(h) rainwater harvesting; and

(i) 01 No. vehicle equivalent to Toyota Cresta/Scorpio latest model.

2. Description of Project Facilities

Each of the Project Facilities is described below:

(a) Toll Plaza: - Toll plaza to be designed as per latest available MoRT&H/NHAI guidelines. All the lanes of toll plaza shall be designed as Hybrid ETC System (HES) in all lane.

Location of Toll Plaza

Sr. No	Design Chainage	Length in m	No. of Lanes
Nil			

(b) Roadside furniture: - all roadside furniture like road marking, placing of signages to be design and proposed as per IRC:35-2015 and IRC:67-2012.

(c) Bus Stops: 13 nos.

Sl. No.	Design Chainage	Side (LHS/RHS)	Remarks
Location be decided during execution of the Project.			

(d) Rest Area: Rest are at obede signed as per latest available MoRT&H/NHAI/NHIDCL guidelines.

(e) High Mast Lighting & Electric Pole:
Provision of Electric Pole (Street Lighting) as per specification on all major junctions or as per the instruction of the Authority

Widening and Up-gradation of Vailoo Donipawa road stretch from intermittent two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km (263+070) Donipawa of 9.866 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir on EPC mode

Schedule-D

(See Clause2.1)

Specifications and Standards

1. Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex- I of this Schedule-D for construction of the Project Highway.

2. Design Standards

The Project Highway including Project Facilities shall conform to design requirements set out in the following documents:

Annex-I

(Schedule-D)

[Refer Annex-II for brief of specifications]

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 Two-Laning of Highways IRC: SP:84-2019, Guidelines referred to as the Manual, and MORTH Specifications for Road and Bridge Works. 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.

(i) 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.

(ii) 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:

Sr. No.	Item	Clause referred in Manual	Provision asper Manual	Modified Provision
1	Typical Cross section	2.16		These clauses are deemed to be amended as shown in the typical cross section (refer Schedule B).
2	Typical Cross Section	2.6.1, 2.7 and 2.16		
3	Radii of Horizontal Curves	2.9.4	Plain and Rolling terrain, Desirable Minimum Radius: 400 meters Absolute Minimum Radius: 250- meters respectively.	Plain and Rolling terrain, Desirable Minimum Radius: 400 meters Absolute Minimum Radius: 250- meters respectively.
4	Width of New Bridge	7.3		To be amended as shown in the typical Cross section (refer Schedule B)
5	Utility Duct	2.15	Utility Duct with 600mm dia….	Utility duct shall be laid in accordance with IS: 4984/14333 or any other relevant code with inspection chambers at acceptable interval as approved by Authority Engineer/ Employer.

Manual IRC SP:84 latest

ATTACHMENT-DI

TECHNICAL SPECIFICATIONS FOR ROAD & BRIDGE

Table of Contents

CLAUSE202 DISMANTLING CULVERTS, BRIDGES AND OTHER STRUCTURES/PAVEMENTS

SECTION300 Earthwork, Erosion Control and Drainage

CLAUSE301 EXCAVATION FOR ROADWAY AND DRAINS

CLAUSE304 EXCAVATION FOR STRUCTURES

CLAUSE305 EMBANKMENT CONSTRUCTION

Sub-Clause305.2.2.2 Borrow Materials

Sub-Clause305.2.2.4 Compaction

Requirements Sub-Clause 305.3 Construction

Operations

Sub-Clause305.8 Measurement for Payment

CLAUSE306 SOIL EROSION AND SEDIMENTATION CONTROL

SECTION400 Sub-Bases, Bases (Non-Bituminous) and Shoulders

CLAUSE401 GRANULAR SUB-BASE

Sub-Clause401.2.2 Physical Requirements

CLAUSE406 WET MIX MACADAM SUB-BASE/BASE

Sub-Clause406.4 Opening to Traffic

SECTION500 Base and Surface Courses (Bituminous)

Sub-Clause501.2 Materials

Sub clause 501.2.1 Binder

Binder of VG-10 grade shall be used or if available viscosity grade of bitumen shall be used in accordance with IS: 73

CLAUSE505 DENSE BITUMINOUS MACADAM

CLAUSE 507 BITUMINOUS CONCRETE

Binder of CRMB-60 grade shall be used.

SECTION800 Traffic Signs, Marking sand Other Road Appurtenances

CLAUSE 803 ROAD MARKINGS

CLAUSE806 ROAD DELINATORS

Snow Clearance during Construction & Maintenance Period

TECHNICAL SPECIFICATIONS

1 The Technical Specifications contained herein shall be read in conjunction with the other Bidding Documents as specified in Volume-VII.

Site Information General

The information given hereunder and provided elsewhere in these documents is given in good faith by the Employer, but the Contractor shall satisfy himself regarding all aspects of site conditions and no claim will be entertained on the plea that the information supplied by the Employer is erroneous or insufficient.

The area in which the works are located is in Plain and Rolling terrain,

Climatic Conditions

The temperature in this region is as under:

i) During summer months, the average maximum temperature recorded is 35°C

ii) During winter months, the minimum average temperature is-6°C.

Seismic Zone

The stretch lies in Seismic Zone-Vas defined in Fig.18 of IRC:6-2017.

2 GENERAL REQUIREMENTS

The Technical Specifications in accordance with which the entire work described hereinafter shall be constructed and completed by the Contractor shall comprise of the following:

Part-I: General Technical Specifications

The General Technical Specifications shall be the "SPECIFICATIONSFOR ROAD AND BRIDGE WORKS" (Fifth Revision, April 2013), IRCs & Circulars issued by the Ministry of Road Transport and Highways, Government of India and published by the Indian Roads Congress, henceforth called MORT&H Specifications, and deemed to be bound into this document.

Part-II: Supplementary Technical Specifications

The Supplementary Technical Specifications shall comprise of various Amendments/Modifications/ Additions to the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS "referred to in Part-I above and Additional Specifications for item of works which are not covered in Part-I.

A clause or a part thereof in "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (Fifth Revision April 2013",), referred in Part-I above, where Amended/Modified/Added upon, and incorporated in Part-II, referred to above, such Amendment/Modification/ Addition supersedes the relevant Clause or part of the Clause.

The Additional Specifications shall comprise of specifications for item of works which not covered in Part-I.

When an Amended/Modified/Added Clause supersedes a Clause or part thereof in the said Specifications, then any reference to the superseded Clause shall be deemed to refer to the Amended/Modified/Added Clause or part thereof.

In so far as Amended/Modified/Added Clause may come in conflict or be in consistent with any of the provisions of the said MORT&H Specifications under reference; the Amended/Modified/Added Clause shall always prevail.

The following Clauses in the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (Fifth

Revision April 2013",) have been Amended/Modified/Added upon

Sr. No.	Section No.	Section Title	Clause No.
1.	100	General	102,106,108,109, 111,112,114,115and121
2.	200	Site Clearance	201and202
3.	300	Earthwork, Erosion Control and Drainage	301,304,305and306
4.	400	Sub-base, Bases (Non-Bituminous) and Shoulders	401 and406
4.	500	Bases and Surface Courses (Bituminous)	501,505 and 507
5.	800	Traffic signs, Markings and otherRoad Appurtenances	803,806and811
6.	2100	Open Foundations	2104

PART-III Specifications for Miscellaneous Works

Technical Specifications for Miscellaneous works shall be the latest "Specifications volume I to VI, 1996 for Civil Works and General Specifications for Electrical Works PART I – INTERNAL, PART – II, EXTERNAL for electric work 1994 as published by the Central Public Works Department (CPWD), Government of India" and deemed to be bound into this document.

The latest edition till 60 days before the final date of submission of the bid of all specifications / standard shall be applicable.

SCOPE OF WORKS

Road Works

Site clearance; setting -out and layout; widening of existing carriage way and strengthening including camber corrections; construction of new road/ parallel service road; bituminous pavements remodeling/construction of junctions, intersections, bus bays, lay byes; supplying and placing of drainage channels, flumes, guard posts, guard rails and other related items; construction/extension of cross drainage works, bridges, approaches and other related works; road markings, road signs and kilometer/ hectometer stones; protective works for roads/ bridges; all aspects of quality assurance of various components of works; rectification of the defects in the completed works during the Defect Liability Period for already executed works by previous contractor and instant tender work; submission of "As built" drawings and any other related documents; and other items of work as may be required to be carried out for completing the works in accordance with the drawings and provisions of the Contract to insure safety.

Other Items

Execution of any other items of work for the construction and completion of the Works in accordance with the provisions of the Contract including all incidental items as well as preparation and submittal of reports, plans as may be required.

During the period of the Contract the right of way and all existing roads shall be kept open for traffic and maintained in a safe and usable condition. Residents along and adjacent to the works are always to be provided with safe and convenient access to their properties. Traffic control and traffic diversions shall be used as necessary to protect the works and maintenance will be carried out as directed by the Engineer and provided in the Contract.

Any other items as required to fulfil all contractual obligations as per the Bid Documents.

PART II

SUPPLEMENTARY TECHNICAL SPECIFICATION

AMENDMENTS/MODIFICATIONS/ADDITIONS TO EXISTING CLAUSES OF GENERAL TECHNICAL SPECIFICATIONS

SECTION100 General

CLAUSE102 DEFINITIONS

The following abbreviations shall be added in this Clause: "MORT&H" : Ministry of Road Transport & Highways

(Previously known as 'MOST', Ministry of Surface Transport) "NHAI": National Highways Authority of India

CLAUSE106 CONSTRUCTION EQUIPMENT

Add the following sub para(g) and (h) after sub para (f)

- Adequate stand by equipment including spare parts shall be available.
- All measuring devices and gauges shall be in good working condition. Measuring devices that can affect product quality shall be calibrated prior to use and at prescribed intervals against certified equipment. Calibration procedures shall be established, maintained, and documented and corrective actions taken when results are unsatisfactory. Accuracy and fitness of measuring devices shall be ensured by proper maintenance.

CLAUSE108 SITE INFORMATION

Sub-Clause108.4 This clause shall be as follows:

"Identification of quarry sites and borrow areas shall be the responsibility of the Contractor. Materials procured from quarry sites and borrow areas identified by Contractor and to be used in Works must comply with the requirements of quality as stipulated in the Technical Specification for particular items of work."

CLAUSE109 SETTINGOUT

Sub-Clause109.8 Delete the 2nd and 3rd sentences in Clause 109.8 and substitute the following: "Setting out of the road alignment and measurement of angles shall be done by using Total Station."

CLAUSE111 PRECAUTIONS FOR SAFE GUARDING THE ENVIRONMENT

Sub-Clause111.1 General

Delete the text of Clause111.1 insentiently and substitute the following:

"The Contractor shall take all necessary measures and precautions and otherwise ensure that the execution of the Works and all associated operations on site or off-site are carried out in conformity with statutory and regulatory requirements including those prescribed elsewhere in this document.

The Contractor shall take all measures and precautions to avoid any nuisance or disturbance arising for the execution of the Works. This shall wherever possible be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated. All vehicles deployed for material haulage shall be spillage proof.

Haul roads shall be inspected at least once daily to clear any accidental spillage. In the event of any spoil, debris, wastes or any deleterious substance from the Site being deposited on any adjacent land, the Contractor shall immediately remove all such material at no cost to the Contract and restore the affected area to its original state to the satisfaction of the Engineer."

Sub-Clause111.2 Borrow Pits for Embankment Construction

Delete the text of Clause-111.2 and substitute the following:

"Prior approval shall be sought from the concerned State Authorities, and the Contractor shall comply with all local environmental regulations. For all borrow areas, the actual extent of area/zones to be excavated shall be demarcated with the signboards and the operational areas shall be access controlled.

In the case of borrow from tank beds, a regrade/improvement of the inlet channels (at least up to 100m stretch) shall be undertaken in consultation with the concerned state government departments (the Minor Irrigation department of the State PWD) and local bodies. The Contractor shall ensure that excavation of tank beds is uniform over the entire area and that the finished profile of the bed is smooth.

In the case of borrow from the dry highlands, all borrow areas shall be reinstated by the formation gentle side slopes, re-vegetated and connected to the nearest drainage channel to avoid the formation of pools during/after the rainy seasons.

Plant and machinery used in the borrow areas shall conform to State noise emission regulations. All operation areas shall be water sprinkled to contain dust levels to the National Ambient Air Quality Standards."

Sub-Clause111.3 Quarry Operations

Delete the text of Clause-111.3 and substitute the following:

"Aggregates shall be sourced only from quarry sites that comply with the local/state environmental and other applicable regulations. Occupational safety procedures/practices for the work force in all quarries shall be in accordance with applicable laws. Quarry and crushing units shall have adequate dust suppression measures, such as sprinklers, in work areas and along all approach roads to the quarry sites. These shall preferable be located on the upwind side."

Sub-Clause111.5 Pollution from Hot-Mix Plant and Batching Plants

Delete the 1st sentence of Clause 111.5 and substitute the following:

"Bituminous hot mix plant and concrete batching plants shall be located at least one (1) km away from the sensitive receptors (schools, hospitals, etc.) and at least 500m from urban settlements, unless otherwise required by the statutory requirements."

Sub-Clause111.8.1 Environmental Protection:

Add the following sentences in the first paragraph of Sub-Clause 111.8.1:

Water tankers with suitable sprinkling system shall be deployed along the haulage roads and in the work sites. Water shall be sprinkled regularly all along the routes to suppress airborne dusts from truck/dumper movements particularly on unpaved roads. Actual frequency will be agreed with the Engineer to suit site conditions."

Sub-Clause111.8.2 Air Quality

The Contractor shall device and implement methods of working to minimize dust, gaseous and other air-borne emissions and carry out the Works in such a manner as to minimize adverse impacts on the air quality. Construction camps shall have facilities for LPG fuel. The use of firewood shall not be permitted.

The Contractor shall utilize effective water sprays during delivery, manufacture, processing and handling of materials when dust is likely to be created, and to dampen stored materials during dry and windy weather. Stockpiles of friable materials shall be covered with clean tarpaulins, with applications of sprayed water during dry and windy weather. Stockpiles of materials or debris shall be dampened prior to their movement, except where this is contrary to the Specification.

Any vehicle with an open load-carrying area used for transporting potentially dust- producing material shall have properly fitting side and tail boards. Materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with clean tarpaulins in good condition. The tarpaulin shall be properly secured and extend at least 300mm over the edges of the side of the side and tailboards.

The Contractor shall monitor air-quality once weekly in all operational areas under the project and take the necessary steps to comply with the specified requirements. Air quality parameters will include SPM, RPM, SO_2, NOX, HC and CO. operational areas include work sites, haulage roads, hot mix plants, quarries, crushing plants, stockpiles, borrow sites and spoil disposal sites.

Sub-Clause111.8.3 Water Sources and Water Quality

The Contractor shall provide independent sources of water supply, such as bore wells, for use in the Works and for associated storage, workshop and work force compounds. Prior approval shall be obtained from the relevant State Authorities and all installations shall follow local regulations. Bore wells installed and used for the project shall be left in good operating condition for the use of NHAI and local communities. The Contractor shall prevent any interference with the supply to or abstraction from and prevent any pollution of water Resources (including underground percolating water) as a result of the execution of the Works.

Areas where water is regularly or repetitively used for dust suppression purposes shall be laid to fall to specially constructed settlement tanks to permit sedimentation of particulate matter. After settlement, the water may be re-used for dust

suppression and rinsing. The Contractor shall protect all watercourses, waterways, ditches, canals, drains, lakes and the likes from pollution as a result of the execution of the Works.

All water and other liquid waste products arising on the Site shall be collected and disposed of at a location on or off the Site and in a manner that shall not cause either nuisance or pollution.

The Contractor shall at all times ensure that all existing stream courses and drains within, and adjacent to, the Site are kept safe and free from any debris and any materials arising from the Works. The Contractor shall not discharge or deposit any matter arising from the execution of the Works into any water except with the permission of the Engineer and the regulatory authority concerned.

Work force camps shall have septic tank and soak away pits. Operational areas like POL storage areas/hot mix plant areas shall comply with local/state environmental regulations and safety procedures. Storage and handling areas shall be impervious and surrounded by an impervious lined drain to catch any accidental spills. Storm water shall be stored in lined holding tanks with oil, grease-tapping facility prior to disposal in to nearby water courses. The trappings and sludge of holding tanks shall be disposed of in accordance with the procedures approved by the local regulatory authority.

Sub-Clause111.20 Control and Disposal of Wastes

The Contractor shall control the disposal of all forms of waste generated by the construction operations and in all associated activities. No uncontrolled deposition or dumping shall be permitted. Wastes to be so controlled shall include, but shall not be limited to, all forms of fuels and engine oils, all types of bitumen, cement, and surplus aggregates, gravels, bituminous mixtures etc. The Contractor shall make specific provision for the proper disposal of these and any other waste products, conforming to local regulations and acceptable to the Engineer.

Spilling of oil and bituminous products during construction and transport shall be avoided to reduce the chances of contamination of surface as well as ground water.

Degraded materials shall be disposed of in a manner as approved by the Engineer and wastewater shall be disposed into septic tanks and soak pits etc. The Contractor shall make arrangements to clean-up spoil as soon as the work finishes in a stretch. If such sites are located outside the ROW, restoration of the site to a level acceptable to the land owner(s) will be carried out within a time period agreed between landowner(s) and the Contractor. Separators shall be used to separate POL materials from wastewater prior to discharging to the watercourses or as approved by the Engineer in conformance with directives and guidelines.

Disposal of solid waste materials shall be outlined in a plan for which environmental clearances shall be obtained from State environmental regulatory authorities. Potential locations for solid waste disposal are the natural depressions and borrow areas. The area used for dumping of uncontaminated debris shall be covered with **300mm soil and shall be planted.** Contaminated debris shall be dumped in depressions whose bed must be impervious stone quarry sites or depressions made

impervious with 450mm thick impervious floor apron as per MORT&H Technical Specifications. Each successive layer shall be covered with 500mm thick soil layer, and the area will be covered with 300mm thick layer and planted.

After Clause 111.12 Add the following new Clauses 111.13 to111.17 Sub-Clause 111.13 Haulage Roads

Existing roads used for hauling shall be strengthened and/ or widened by the Contractor in accordance with the requirements for normal and construction traffic.

Where such roads are not existing, the Contactor shall construct project specific single lane paved roads in settlement areas and gravel roads in open areas conforming to the Ministry of Road Transport and Highways (MORT&H) specifications.

The alignment of the haulage roads shall be fixed to avoid agricultural land to the extent possible. In unavoidable circumstances, suitable compensation shall be paid to the people whose land will be temporarily acquired for the duration of the operations. The compensation shall cover for loss of income for the duration of temporary acquisition and land restoration. Prior to the construction of the haul roads, topsoil shall be stripped and stockpiled for re- use.

Material dumping sites shall be access controlled to prevent the unauthorized entry of the people, grazing cattle, and stray animals.

Haulage road shall be reinstated upon completion of hauling for the use of local communities."

Sub-Clause111.14 Equipment and Vehicles used for the Works

Equipment's and vehicles deployed for the construction activities shall not be older than 5 years. Equipment's used for road and bridge works shall be based on new technology and shall generate noise and pollutants not exceeding the limits specified by the relevant State Authorities. Vehicles and machineries used for road and bridge works are to be regularly maintained to conform to the National Air Quality Standards. Blasting, if any, will be carried out using small charges.

Sub-Clause111.15 Noise Control

The Contractor shall consider noise as an environmental constrain in the planning and execution of the Works.

The Contractor shall take all necessary measures so that the operation of all mechanical equipment and construction processes on and off the site shall not cause any unnecessary or excessive noise, taking in to account applicable environmental requirements. The Contractor shall use all necessary measures and shall maintains all plant and silencing equipment in good conditions so as to minimize the noise emission during construction works.

Any member of the work force likely to be exposed to beyond their threshold noise levels shall be provided with protective equipment, such as earplugs, and shall be rotated every four hours.

Construction operations shall be limited to daytime hours only, particularly in the settlement areas.

Sub-Clause111.16 Vibration Control

The Contractor shall take measures during construction activities to control the movement of the work force and construction machinery/equipment, and to avoid/ minimize activities, which produce vibrations.

Sub-Clause111.17 Measurement

Monitoring of Air/Water/Noise and Soil quality shall be paid as per numbers of samples tested. For Compliance of all other provisions made in this Clause 111, it shall be deemed to be incidental to the work and no separate measurement shall be made. The Contractor shall be deemed to have made allowance for such compliance with these provisions in the preparations of his prices for items of work included in the Bills of Quantities and full compensation for such compliance shall be deemed to be covered by them."

CLAUSE112 ARRANGEMENT FOR TRAFFIC DURING CONSTRUCTION

Sub-Clause112.4 Traffic Safety and Control

Last line of Para5 shall be read as under:

"The signs shall be of approved design and of reflector type." **Add the following paragraph at the end of the clause:**

"Before commencement of any construction, the Contractor shall prepare and submit details of the arrangements for passing traffic during construction, design of barricades, signs, markings, lights, flags etc. conforming and satisfying the requirements of the "Guidelines on Safety in Road Construction Zones" of IRC: SP 55-2001 and get the same approved by the Engineer.

Sub-Clause112.6 Measurement for Payment and Rates

a) The provision of treated shoulder including construction of temporary cross drainage structures, if required, as described in Clause 112.2 including their maintenance, dismantling and clearing debris, where necessary, shall be considered as incidental to the works and shall be Contractor's responsibility.

b) The Construction of temporary diversion including temporary cross drainage structures as described in subclause112.3, shall be measured inclinometer and the unit contract rate shall be inclusive of full compensation for construction (including supply of material, labor, tools, etc.), maintenance as per sub clause 112.5, final dismantling, and disposal.

c) All Traffic safety and control devices during construction as per sub clause 112.4including providing, erecting and maintaining barrier, signs, markings, flags, lights and providing flag men etc. is included in item rate.

CLAUSE114 SCOPEOFRATESFORDIFFERENTITEMSOFWORK

Sub-Clause114.2 Item(ii) of Clause114.2 shall read as follows:

A detailed resource-based construction program including resources planning using computerized critical path network method/PERT in a form, which facilitates control of the progress of the works and consequences of any changes in terms of time. The program shall also include detailed network, activities for the submission and approval of materials, procurement of critical materials and equipment, fabrication of special products/ equipment and their installation and testing and for all

activities of the Contractor that are likely to affect the progress of work etc. including updating all such activities on the basis of decisions taken at the periodic site review meetings or as directed by the Engineer. The Contractor shall submit data via electronic media to the Engineer in a form readily compatible with Engineer's planning system.

The first issue of the detailed construction program including the detailed description of the system and the procedures shall be submitted to the Engineer for acceptance not later than 28 days after the date of receipt of the letter of acceptance.

The contractor shall submit to the Engineer for approval & consent, the updated & revised program at every three months interval or as such as directed by the Engineer. The updated & revised program shall be submitted showing the actual progress achieved (physical & financial) and the effects of the progress achieved on the timing of the remaining work including any change to the sequence of the activities

CLAUSE115 METHODOLOGY AND SEQUENCE OF WORK

The Clause shall be substituted as follows: Sub-Clause115.1 Submission of Method Statement

The Contractor shall submit methods statement within 28 days after the date of letter of acceptance. The methods statement shall be submitted in two parts.

The General part of the methods statement shall describe the Contractor's proposals regarding preliminary works, common facilities, and items that

require consideration at the early stage of the Contract. The General part shall be furnished along with the first issue of the construction program (refer clause 114.2) and shall include information on:

a) Sources of materials like coarse aggregate and fine aggregate, quantity and quality of materials available in different sources;

b) Sources of manufactured materials like cement, steel, bitumen reinforcement, prestressing strands and bearings. Wherever possible the Contractor shall identify at least two sources for each of the items; he shall also submit test certificates of recently manufactured materials for the consideration of the Engineer.

c) Locations of site facilities like batching plant, hot mix plant, aggregate processing plant, crushing plant etc.

d) Details of facilities/approaches for transportation of men, equipment and materials for construction of pavements, foundations and substructure in riverbed, and plan for free traffic flow and safe drainage.

e) Information on procedures to be adopted by the Contractor for prevention and mitigation of negative environmental impact due to construction activities.

f) Any other information required by the Engineer subsequent to the scrutiny of method statement

The General part of the Q.A. Program shall accompany the method statement under sub-clause 105.3.

The Special part of the methods statement shall be submitted to the Engineer by the Contractor for each important item of work like construction of embankments and subgrade, pavements, pile/well foundations, concreting, prestressing, repair and rehabilitation of existing structures, concrete superstructure, dismantling of structures and pavement and for any other item as directed by the Engineer.

These statements shall give information on

i) Details of personnel both for execution and quality control of the work.

ii) Equipment deployment with details of number of units, capacity, stand by arrangements

iii) Sequence of construction, details of temporary or enabling works like, diversions, cofferdams, formwork including specialized formwork for superstructure, details of borrow areas, method of construction of embankment and subgrade, pavements, piles, wells, concreting procedures, details of proprietary process and products (e.g. details of prestressing systems, proprietary piling systems, bearings, expansion joints etc.) and details of equipment to be deployed. Wherever necessary, technical literature, design calculations and drawings shall be included in the method statement.

iv) Testing and acceptance procedures including documentation.

v) Special part of the Q.A. Program referred in clause 105.3 for the particular item of work shall be submitted along with the methods statement for the concerned activity.

vi) Engineer shall examine and approve the methods statement or direct the Contractor to resubmit the statement with required modifications. The modified statement shall be submitted within 14 days of receipt of Engineer's comments.

The sole responsibility for the safety and adequacy of the methods adopted by the Contractor shall rest on the Contractor irrespective of any approval given by the Engineer.

Sub-Clause115.2 Approval of Proprietary Product/Process/System

Only proprietary products proven by International usage in comparable projects shall be permitted to be used. Fully authenticated details of licensing and collaboration arrangement shall be submitted by the manufacturer, where relevant.

Within 90 days of award of work the Contractor shall submit the following information for all proprietary products for approval by the Engineer.

i) Name of manufacturer and name of product /process/system.

Complete details of the manufacturer of the product/ process/ system shall be furnished. Details of projects where similar product/process/system has been successfully used shall be furnished. Authenticated copies of license/collaboration agreement shall be furnished.

ii) General features of the product/product process/system.

Detailed write up with methods statements shall be furnished for each product/ process/ system. This shall include complete working drawings & installation drawings, technical specifications covering fabrication, materials, system of corrosion protection etc.

i) Details of product development and development testing.

ii) Acceptance test and criteria.

Manufacturer shall submit a quality assurance system document. Details of acceptance test and criteria of acceptance shall be furnished in this document.

i) Installation procedure.

ii) Maintenance procedure and schedule.

iii) Warranty proposal.

The Engineer may instruct any additional tests for the purpose of accepting the product. The charges of these additional tests shall be borne by the Employer only in case the product satisfies the specifications.

CLAUSE120 FIELDLABORATORY

Sub-Clause120.2 Description

Replace the words “indicated in the drawings” in the first sentence of second paragraph of this Clause with the words “per provisions indicated in this Clause and at a location approved by the Engineer.”

Replace “electric supply etc. “to these cond sentence of first paragraph by “including uninterrupted power supply etc.”

Delete the first sentence of second paragraph “The floor space in the drawing “and substitute the following:

“The floor space required for the field laboratory shall be not less than 200 sq.m.

“The fourth sentence of second paragraphs “The furnishing in Table100-2” shall read as under.

“A good semi furnished office accommodation shall be provided to the Material Engineers of the Supervision Team as per the direction of the Engineer.”

Add the following at the end of this Clause:

“There shall also be provided a concrete paved area, for storing samples adjacent to the laboratory, of about 100sq.m and another 75 sq.m shall be suitably roofed with open sides giving protection against sunan drain.

Within14(fourteen) days of the commencement date, the Contractor shall prepare and submit a layout plan and details of the laboratory building and make/supplier of the equipment to the Engineer for his approval.

The field laboratory to be provided under the Contract shall be handed over to the Engineer in finished and fully equipped condition not later than 2-month safter the receipt of Notice to Commence Work, and the field laboratory with all equipment/ instrument shall be to the entire satisfaction of the Engineer. During the 2- month period starting from the Notice to Commence work, the laboratory tests shall be performed in another laboratory proposed by the Contractor and approved by the Engineer.

Laboratory Equipment General

The items of laboratory equipment shall be provided in the field laboratory depending upon the items to be executed as per Table mentioned below instead of Table 100-2 shown in MORTH:

The following items of laboratory equipment shall be provided in the field laboratory:

The equipment and instruments shall be new and shall be quality certified by Bureau of Indian Standards (BIS).

Sr. No.	Sub No.	Item, Specifications	Nos. required
A: General			
(i)	**Balance**		
	(a)	7kg to 10kg capacity semi-self-indicating Electronic Type–Accuracy 1 gm	2
	(b)	500 gm capacity semi-self-indicating Electronic Type–Accuracy 0.01gm	2
	(c)	Chemical balance 100gm capacity-Accuracy 0.0001gm	1
	(d)	Pan balance 5kg capacity-Accuracy 0.5gm	2
	(e)	Platform Scale–300kg capacity	1
	(f)	Triple Beam balance-25kg capacity Accuracy 1gm	2
(ii)	**Ovens-Electrically operated, thermostatically controlled**		
	(a)	From 100^{O}C to 220^{O}C–Sensitivity	2
(iii)	**Sieves, as per IS460-1962**		
	(a)	IS Sieves 450 mm internal dia. Of sieve sets as per BIS Of required sieve sizes complete with lidandpan	2set
	(b)	IS sieve 200mm internal dia. (brass frame and steel or brass wire cloth mesh) consisting of sieve sets of required sieve sizes complete with lid and pan	2set

(iv)	Sieve shaker capable of taking 200mm and 450mm dia. Sieves electrically Operated with times with assembly (As per BIS)		1
(v)	200tonescompressiontestingmachine		1
(vi)	Stopwatches1/5sec. Accuracy		2
(vii)	Glassware comprising of Beakers, Pipettes, dishes, measuring cylinders (100 to 1000		1 dozen
	Cc capacity) glass rods and funnels, glass thermometers range 0^{O}C to 100^{O}C and Metallic thermometers range 300^{O}C.		each
(viii)	Hotplates 200mm dia (1500 watt)		6
(ix)	**Enamel trays**		
	(a)	600mmx450mmx50mm	10
	(b)	450mmx300mmx40mm	10
	(c)	300mmx250mmx40mm	6
	(d)	Circularplatesof250mmdia.	6
(x)	Water Testing Kit		1
(xi)	First Aid Box		1
(xii)	Spatula Set of 100 and 200 long		3
(xiii)	DiggingTools (pixels, shovel, fork etc.)		As reqd.
(xiv)	Miscellaneous tools (sledge hammer, lump hammer, wooden peg setc.)		As reqd.
(xv)	Maximum and Minimum Thermometer		2 Set
(xvi)	Rain Gauge		1 Set
(xvii)	Timer 0-60minutes with alarm &1/5 sec accuracy.		3 Sets

B: For Soils and Aggregates		
(i)	Water still,3litre/hr with fittings and accessories	1
(ii)	Liquid limit device with Casagrande and ASTM grooving tools as per IS: 2720	1
(iii)	SamplingpipettesfittedwithpressureandsuctioninIets,10mlCapacity	2set
(iv)	Compaction apparatus (Proctor) as per IS: 2720 (Part 8) complete with collar, base plate and hammer	1set

(v)	Modified AASHTO compaction apparatus as perIS.2720(Part7)1980orHeavy Compaction Apparatus as per IS complete with collar, base plate and hammer		1set
(vi)	Sand pouring cylinder with conical funnel and tap and complete as perIS2720 (Part28)1980includingmodifiedequipment		4
(vii)	Sampling tins with lids 100 mm dia x75mmht½kg capacity and miscellaneous items like moisture, tins With lid(50grams)etc.		12
(viii)	Lab CBR testing equipment for conducting CBR testing, load frame with 5Ton capacity, electrically operated with speed control asperIS:2720(Part16), and Consisting of following:		**1set**
	(a)	CBRmoulds150-mmdia–175-mm ht complete with collar,base plate etc.	**24**
	(b)	Tripod stands for holding dial gauge holder	**24**
	(c)	CBR plunger with settlement dial gauge holder	**1**
	(d)	Surchargeweight147-mmdia2.5kgweight with central hole	48
	(e)	Spacerdisc148-mmdia,47.7-mm ht.With handle	3
	(f)	Perforated plate(Brass)	24
	(g)	Soakingtankforaccommodating24CBRmoulds	
	(h)	Provingringsof1000kg,2500kgand5000kgcapacity	1 each
	(i)	Dialgauges,25mmtravel-0.01mm/division	10
	(j)	**Aluminum Tis**	
	50x30m		36 no's
	55x35m		36 no's
	70x45m		36 no's
	70x50m		36 no's
	80x50m		36 no's
(ix)	Standard Penetration test equipment		1
(x)	Nuclear Moisture Density Meteor equivalent		2
(xi)	Speedy moisture meter complete with chemicals		2
(xii)	Unconfined compression test apparatus		1set
(xiii)	Aggregate Impact Test Apparatus		1
(xiv)	Aggregate Impact Test Apparatus as per IS2386(Part4)1963		1
(xv)	Los Angeles abrasion Test Apparatus as per IS2386(Part4)1963		1
(xvi)	RiffleBoxofSlotsizeof50mmasperASTMC-136		1

C: For Bitumen and Bituminous Mixes		
(i)	Constant temperature bath for accommodating bitumen	2
	Tests specimen electrically operated and thermostatically controlled,50-liter capacity temp.rangeambient 80oC	
(ii)	Penetrometerautomatictype, adjustableweightarrangementandneedlesasperIS. 1203–1978	2
(iii)	Solvent extraction or centrifuge type apparatus complete (AASHTO,T-164)with Extraction thimbles with stocks of solvent and filter paper	1
(iv)	Laboratory mixer including required accessories about.02cum capacity electrically Operated fitted with heating jacket	1
(v)	MarshallcompactionapparatusautomaticallyoperatedasperASTM1559-62Tand complete with electrically operated loading unit, compaction pedestal heating head assembly,dialmicrometre and bracketforflowmeasurement,loadtransferbar, specimenmould100mmdia.(4in)withbaseplate,collars,specimenextractor, compactionhammer4.53kg(10lb.)x457mm(18in)fall	1set
(vi)	DistantReadingDigitalThermometerforMeasuringTe mperaturesinAsphalticMixes	As required
(vii)	RiffleBox	1
(viii)	AutomaticAsphaltContentGauge[Nuclearareequivalent]	1
(ix)	ThinfilmOventestapparatustotherequirementofAASHTOT179,including accessories	1
(x)	RingBallApparatusasperIS1205-1978	1
(xi)	AsphaltInstituteVacuumViscometerasperIS 1206(partII)–1978	1
(xii)	BSU-TubeModifiedReverseFloroViscometerIS1206(PartIII)–1978	1
(xiii)	ApparatusforDeterminationofDuctilityTestasper IS1208–1978	1
(xiv)	PenSky–MartarsclosedTesterfortestingflashandfirepointasperIS1209–1978.	1
(xv)	ApparatusforFloatTest–IS–1210–1978	1

(xvi)	ApparatusforDeterminationofwatercontent(DeanandSharkMethod)IS–1211 –1978	1
(xvii)	ApparatusforDeterminationofLossonHeadingIS–1212-1978.	1
(xviii)	ApparatusofDeterminationofspecifiedGravityIS-1202-1978	1
(xix)	Corecuttingmachinewith100mmdia.Diamondcutting Edge	1
(xx)	ApparatusforElasticRecoverytestforModifiedBitumen	1
(xxi)	ApparatusforStorageStabilitytestforModifiedBitumen	1
(xxii)	ApparatusforSeparationtestformodifiedbitumen	1

D: For Cement, Cement Concrete and Materials			
(i)	Water still		1
(ii)	Vicat needle apparatus for setting time with plungers, as per IS.269-1967		1
(iii)	Moulds		
	(a)	150mmx300mmhtcylinderwithcappingcomponent	As required
	(b)	150mmx150mmx150mmcubicalforcompressivestrength	As required
	(c)	150mmx100mmx600mmbeamforflexuralstrength	As required
(iv)	Concrete permeability apparatus		1
(v)	High frequency mortar cube vibrator for cement testing		1
(vi)	Concrete mixer power driven,1 cuft. capacity		1
(vii)	Variable frequency and amplitude vibrating table size 1metre x 1 metre, as per the Relevant British Standard		1
(viii)	Flakiness & Elongation test apparatus		2each
(ix)	Aggregate impact test apparatus as per IS2386 (Part4) 1963		2
(x)	Los Angeles abrasion apparatus as per IS.2386(Part4)1963		1
(xi)	Flow table as per IS712-1973		1
(xii)	(a)	Equipment for slump test	2
	(b)	Compaction factor test equipment	1

(xiii)	Equipment for determination of specific gravity for fine and coarse aggregate as per IS2386 (Part3)1963	2
(xiv)	Flexural attachment to compression testingmachine	1
(xv)	Corecutting machine with 150mmdia. Diamond cutting edge	1
(xvi)	Needle vibrator	1
(xvii)	Vibrating hammer as per BS specification	1
(xviii)	Air entrainment meter ASTMC-231	1
(xix)	0.5Cft,1Cft cylinder for checking bulkdensity of aggregate with tamping rod	1
(xx)	Soundness testing apparatus for cement	1
(xxi)	Flexural Beam testing machine with accessories	1
(xxii)	Chemicals solution sand consumable	As reqd.
(xxiii)	ChlorideTesting kit for chemical analysis of chloride content.	1
(xxiv)	ION Exchange kit for rapid determination of sulphate content.	1

E: For Control of Profile and Surface Evenness			
(i)	Digital Level complete with all accessories		2 sets
(ii)	Distomat or equivalent		2 Nos.
(iii)	Theodolite –Electronically operated with computerized output attachment		2 sets
(iv)	Total Station with all accessories		2 sets
(v)	Towed Fifth Wheel Bump Indicator		1set
(vi)	3-meter straight edge and measuring wedge		2 sets
	Camber templates 2 lane		
(vii)	Stringline Arrangement with paver and sensor powers		1
	(a)	Crown type cross-section	2 sets
	(b)	Straight run cross-section	2 sets
(viii)	Steel tape		
	(a)	5m long	As reqd
	(b)	10 m long	As reqd
	(c)	20 m long	As reqd

	(d)	30 m long	As reqd
	(e)	50 m long	As reqd
	(e)	50 m long	As reqd
(ix)	Precision Staff		3 Sets

Note: The laboratory set-up must be complete including as etof reference standards, adequately staffed and operational to the satisfaction of the Engineer not later than 2 months from the date of receipt of Notice to commence theworks.

Sub-Clause120.3 Ownership

This Clause shall readas under:

"Land for the laboratory shall be provided by the Contractor. "

Sub-Clause 120.4 Maintenance

ThisClauseshallreadas under:

"TheContractorshallarrangetomaintainthefieldlaboratoryincludingsample storeyardsina satisfactorymanneruntiltheissueofTakingoverCertificatefor thewholework. Maintenanceincludesallactivitiesdescribedin Clause120.4and maintenance of equipment and running of the same including chemicals and consumables."

Sub-Clause120.5 Rate

The construction, supply, installation, maintenance, and operation including all consumables like chemicals &reagents etc., and all other expenses involved in connectiontheretoforthe field laboratory shall be incidental to the work, and shall not be paid for separately.

SECTION200 Site Clearance

CLAUSE201 CLEARING AND GRUBBING

Sub-Clause201.1 Scope

Replace with following Para:

This work shall consist of cutting, excavating, removing, and disposing of all materials such as trees of girth up to 300 mm, bushes, shrubs, stumps, roots, grass weeds, rubbish etc. and top soil up to 150 mm, which in the opinion of Engineer is unsuitable for incorporation in the work including draining out stagnant water if any from the area of road land, drain, cross drainage structure and other area as specified in the drawing or instructed by Engineer. It shall include necessary excavation by harrow discs or any other suitable equipment, backfilling of the pits by suitable soil, resulting from uprooting of trees & stumps and making the surface in proper grade by suitable equipment and compacted by power roller to required compaction as per Clause 305.3.4. The work also includes handling, salvaging and disposal of cleared material. Clearing and grubbing

shall be performed less than one month in advance of earthwork operation and in accordance with requirement of the specifications.

CLAUSE202 DISMANTLING CULVERTS, BRIDGES AND OTHER STRUCTURES/PAVEMENTS

Sub-Clause202.5 Disposal of Materials

The first paragraph of the subclause shall read as below:

All materials obtained of dismantling/milling shall be the property of the Contractor for which he shall quote a rate for rebate in BOQ Bill No. 1, and the Contractor shall be free touse this material in work, or he may sell/dispose the material to as desired / deemed fit by him.

The existing pavement crust shall be reused as indicated below:

Contractor shall be free to use dismantled / milled material, as is where basisis, or by suitably modifying the material, or by crushing the material, or by breaking the material, and screening the same, provided it meets the specifications and is approved by the Engineer.

SECTION 300 Earthwork, Erosion Control and Drainage CLAUSE301

EXCAVATIONFORROADWAYANDDRAINS

Sub-Clause301.1 Scope

Add the following as second paragraph under this clause:

"Theworkshallalsoincludeexcavationforchanneltrainingatculverts/bridges, excavation of existing shoulders and medians for purposes of widening the pavement and excavation of existing embankment for reconstruction to specification."

CLAUSE304 EXCAVATIONFORSTRUCTURES

Sub-Clause304.3.2Excavation

At the end of 1st paragraph of Clause304.3.2 inserts the following additional sentences:

"The Contractor shall ensure the stability and structural integrity of adjacent existing foundations and structures and if necessary shall, at his own expense, install temporary or permanent sheet piles, cofferdams, shoring or similar as support or protection to the satisfaction of the Engineer."

CLAUSE305 EMBANKMENT CONSTRUCTION

Sub-Clause 305.2 Material and General Requirements Sub-Clause 305.2.1

Physical Requirements:

Sub-Clause305.2.1.2Addthefollowingaftersecondparagraph:

"SoilshavingmediumandhighswellingpotentialshallbedefinedbasedonLiquid Limit, Plastic Limit, Shrinkage Limit, Gradation, Free swelling Index, Field dry DensityandFieldMoistureContentandtypesofClaymineralspresentinthesoil and as directed by the Engineer. The location and the extent of these soils with mediumtohighswellingpotentialshouldbedefinedasdirectedbytheEngineer."

Sub-Clause 305.2.2.2 Borrow Materials

Para1 of this Clause shall read as under:

" No borrow area shall be made available by the Employer for this work. The arrangement for the source of supply of the material for embankment and sub- gradeaswellascompliancetothedifferentenvironmentalrequirementsinrespect of excavation and borrow are as stipulated, from time to time, by the Ministry of Environmental and Forest, Government of India and the local bodies, as applicable, shall be the sole responsibility of the Contractor."

Sub-Clause305.2.2.4CompactionRequirements

In Clause305.2.2.4 delete Table 300-2and substitute the following:

Table300-2

Compaction Requirements of Embankment and Subgrade

Sr.No.	Type of Work/Material	Relative Compaction as %age of maximum Laboratory dry density as per IS 2720 (Part 8)
1	Subgrade and earthen shoulders	Notlessthan97%
2	Embankment	Notlessthan95%
3	Expansive clays	Not allowed
4	Design CBR of Subgrade & Shoulder has been taken5.The borrow earth used for subgrade material must satisfied the requirement of the design CBR of 5 %	

Para 2 of this Clause given below Table300-2 shall read as under:

The contractor shall at least 21 working days before commencement of construction of embankment and the subgrade; submit the following to the Engineer for approval:

(i) The values of maximum dry density and optimum moisture content obtained inaccordancewithIS:2720(Part8)for each fill material proposed to be used in the construction of embankment and subgrade.

(ii) ThegraphsofDensityplottedagainstmoisturecontentfromwhicheachofthevaluesin(i)aboveofmaximumdrydensityandoptimumm

oisture content were determined.

(iii) The dry density-moisture content-CBR relationships ,heavy comp active efforts conforming to the IS2770(part 8)foreachofthefillmaterialproposedtobeused in thesubgrade.

The above information shall form the basis for compaction only upon its approval by the Engineer."

Sub-Clause305.3 Construction Operations

Sub-Clause 305.3.4 Compacting Ground Supporting Embankment/Subgrade Para 1 of this clause shall be read as

"Where necessary the original ground shall be levelled, scarified, mixed with water and then compacted by rolling to facilitate placement of first layer of embankment so as to achieve minimum dry density as given in Table300-2.

Sub-Clause305.8 Measurement for Payment

Substitute Clause 305.8.1 shall be read as

"Earth embankment/sub-grade construction shall be measured separately by taking cross sections at intervals after clearing and grubbing and if necessary compactionoforiginalgroundbeforetheembankmentworkstartsandafterits completion and computing the volumes of earthwork in cubic meters by the method of average and areas."

CLAUSE306 SOIL EROSION AND SEDIMENTATION CONTROL

Sub-Clause306.4 Measurements for Payment

SubstituteClause306.4asfollows:

"All temporary sedimentation and pollution control works shall be deemed as incidental to the earthwork and other items of work and as such no separate payment shall be made for the same."

SECTION400 Sub-Bases, Bases(Non-Bituminous)and Shoulders

CLAUSE401 GRANULAR SUB BASE

Sub-Clause401.1 Scope

Add the following at the end of this Clause:

"AsitetrialshallbeperformedinaccordancewithClause901.16." Sub-Clause 401.2.2 Physical Requirements

Addattheend of this clause as under:

The Contractor shall, at least21 working days before the commencement of the construction of the sub-base course, submit to the Engineer, the results for approval of the laboratory testing on the physical properties defined above. The construction of the sub-base course shall be taken up only upon the Engineer's approval of the material.

Grading-I of table 400-1 shall be adopted at site.

CLAUSE406	WET MIX MACADAM SUBBASE/BASE
Sub-Clause406.4	Opening to Traffic
	The Clause shall be read as follows:
	No vehicular traffic of any kind shall be allowed on the finished wet mix macadam surface.
SECTION 500	Base and Surface Courses (Bituminous)
Sub-Clause 501.2	Materials
Subclause501.2.1	Binder
	Binder of VG-10 grade shall be used or if available viscosity grade of bitumen shall be used in accordance with IS: 73
Sub-Clause 501.2.2	Delete“Crushed gravel or other hard smaterial”fromfirstLineofPara1.” Para 3 is deleted.
CLAUSE 505	DENSE BITUMINOUS MACADAM
Sub-Clause505.2.1	Bitumen
	Binder of VG-10 grade shall be used or if available viscosity grade of bitumen shall be used in accordance with IS: 73.
CLAUSE 507	BITUMINOUS CONCRETE
Sub-Clause507.2.1	Bitumen
	BinderofCRMB-60gradeshallbeused.
SECTION 800	Traffic Signs, Markings and Other Road Appurtenances
CLAUSE 803	ROAD MARKINGS
Sub-Clause803.2	Materials
	This clause shall read as under:
	“Road markings shall be hot applied thermoplastic compound and the materials shallmeettherequirementsasspecifiedinClause803.4.
	The road markings shall be laid in one layer with appropriate road marking machineapprovedbytheEngineer.Beforetheroad-markingmachineisusedon the permanent works, the satisfactory working of the machine shall be demonstrated on a suitable site, which is not part of the permanent works. The rate of application shall be checked and adjusted as necessary before application on a large scale is commenced, and thereafter daily."
CLAUSE806	ROAD DELINATORS

Sub-Clause806.2 This clause shall read as follows:

a) Triangular Object Marker shall be 300mm side with four red reflectors, made out of 2mm thick aluminum sheet, face to be fully covered by high intensity grade white retro reflective sheeting of encapsulated lens type as per clause 801. The background/border/symbols shall be made by screen- printing of desired color as per sign details. The sign plate shall be fixed with 6mm dia. aluminum rivets on MS angle iron frame. The angle iron frame shall be made with angle of size 40mmx40mmx5mm. The sign shall be fixed with nut-bolts & welding on MS pipe 50mm dia (NB-MW) and 500mmhigh.

b) Rectangular hazard marker 600mm x 300mm made out of2mm thick aluminum sheet, face to be fully covered by high intensity grade white retro reflective sheeting of encapsulated lens type. The background/ border/ symbols shall be made by screen-printing of desired color as per sign details. The sign plate shall be fixed with 6mm dia aluminum rivets on MS angle iron frame. The angle iron frame shall be made with angle of size 40mmx40mmx5mm. The sign shall be fixed to 80mm dia (NB-MW) MS pipe.

c) Roadway Indicators shall be 1000mm high made with 100 mm dia. NB medium weight MS pipe. One reflector of high intensity grade retro reflective sheeting with encapsulated lens shall be provided on top of the reflector. The white & red reflector shall be provided alternatively of 40mm width, so that total width of reflector shall be 120mm. A wire mesh cover of 150mm height shall be provided on top.

d) All components of signs & supports shall be thoroughly descaled, cleaned, primed and painted with two coats of epoxy paint. The sign backside shall be with grey color and post shall be white color/alternate white &black bands. The post below ground shall be painted with three coats of red lead.

Clause2100 Open Foundation

Sub-Clause2104.1Preparationof Foundation

Please add the following as a last para-

Considering the soil SBC as per Geotechnical report, 1 m of depth below the founding level of bridges shall be removed and replaced with granular sand. The cost of the excavation and sand shall be made from respective items.

Schedule-E

(See Clauses 2.1and 14.2)

Maintenance Requirements

1. Maintenance Requirements

(i) The Contractor shall, at all times maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

(ii) The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfilment of the Maintenance obligations by the Contractor.Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

(iii) All Materials works and construction operations shall conform to the MORTH Specifications for Road and Bridge Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted.

[Specify all the relevant documents]

2. Repair/rectification of Defects and deficiencies

The obligations of the Contractor in respect of Maintenance Requirements shall include repair and rectification of the Defects and deficiencies specified in Annex - I of this Schedule-E within the time limit set forth therein.

3. Other Defects and deficiencies

In respect of any Defect or deficiency not specified in Annex - I of this Schedule-E, the Authority's Engineer may, inconformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards, and any deviation or deterioration beyond the permissible limit shall be repaired or rectified by the Contractor with in the time limit specified by the Authority's Engineer.

4. Extension of time limit

Notwithstanding anything to the contrary specified in this Schedule-E, if the nature and extent of any Defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice.Such additional time shall be determined by the Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

5. Emergency repairs/restoration

Notwithstanding anything to the contrary contained in this Schedule-E, if any Defect, deficiency or deterioration in the Project Highway poses a hazard to safety or risk of damageto property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

6. Daily inspection by the Contractor

The Contractor shall, through its engineer, undertake a daily visual inspection of the Project Highwayand maintaina record thereof ina registerto be keptinsuch form and manner as the Authority'sEngineermayspecify.Suchrecordshallbekeptin safe custody of the Contractor and shall be open to inspection by the Authority and the Authority's Engineer at any time during office hours.

7. Pre-monsoon inspection/post-monsoon inspection

TheContractorshallcarryoutadetailedpre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC: SP35. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

8. Repairs on account of natural calamities

(a) All damages occurring to the Project Highway on account of a Force Majeure Event orwilful default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the ratesagreed between the Parties

Annex-I

(Schedule-E)

Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below.

Table-1: Maintenance CriteriaforPavements:

AssetType	Performance Parameter	Level of Service (LOS)		Frequencyof Inspection	Tools/Equipment	StandardsandReferencesforInspectionand Data Analysis	Timelimit for Rectification/ Repair	Maintenance Specifications
		Desirable	Acceptable					
lexiblePaveme t(Pavement fMCW,Service oad,Approach sofGradestruct re,approaches fconnectingroa ls,sliproads,lay yesetc.asapplic ble)	Potholes	Nil	<0.1%ofareaan d subject tolimitof10mm in depth	Daily	LengthMeasurementU nit like Scale, Tape,odometeretc.	IRC 82: 2015 and Distress IdentificationManual for Long Term Pavement PerformanceProgram,FHWA2003(http://www.tfhrc.com/pavement/lttp/reports/03031/)	24-48hours	MORT&H Specification300 .2
	Cracking	Nil	<5%subjecttoli mitof0.5 sq.mfor any 50 mlength	Daily			7-15days	MORT&H Specification300 .3
	Rutting	Nil	< 5mm	Daily	StraightEdge		15-30days	MORT&H Specification300 .2
	CorrugationsandShovin g	Nil	<0.1% ofarea	Daily	LengthMeasurementU nitlike		2-7days	IRC:82- 2015
	Bleeding	Nil	< 1%ofarea	Daily	Scale,Tape,odometeretc .		3-7days	MORT&H Specification300 .4
	Ravelling/Stripping	Nil	< 1%ofarea	Daily			7-15days	IRC:82-2015readwith IRCSP81
	Edge Deformation/ Breaking	Nil	< 1 m for any100msectio n and width<0.1matan ylocation,restrict ed to 30cm from theedge	Daily			7-15days	IRC:82-2015
	RoughnessBI	2000mm/k m	2400mm/km	Bi-Annually	Class I ProfilometerSCRIM(Si deway-forceCoefficientRoutine InvestigationMachineo	ClassIProfilometer:ASTME950(98) :2004 −Standard Test Method for measuringLongitudinalProfileofTravelledSurface swithAccelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000-StandardGuideforClassificationofAutomaticPave	180 days	IRC:82-2015
	SkidNumber	60SN	50SN	Bi-Annually			180 days	BS:7941-1- 2006
	Pavement Condition Index	3	2.1	Bi-Annually			180 days	IRC:82- 2015

AssetType	PerformanceParameter	Level of Service (LOS)		FrequencyofInspection	Tools/Equipment	StandardsandReferencesforInspectionand Data Analysis	TimelimitforRectification/ Repair	MaintenanceSpecifications
		Desirable	Acceptable			ConditionSurveyEquipment		
	Other Pavement Distresses			Bi-Annually			2-7days	IRC:82- 2015
	Deflection/ Remaining Life			Annually	FallingWeight Deflectometer	IRC115: 2014	180 days	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting road, slip roads, lay byes etc.as applicable)	Roughness BI	2200mm/km	2400mm/km	Bi-Annually	ClassI Profilometer	ASTME950(98):2004andASTME1656-94: 2000	180 days	IRC:SP:83-2018
	Skid	Skid Resistance no. at Different speed of vehicles		Bi-Annually	SCRIM (Sideway-force	IRC:SP:83-2018	180 days	IRC:SP:83-2018
		MinimumSN 36 33 32 31 31		**Traffic Speed (Km/h)** 50 65 80	Coefficient RoutineInvestigation Machineor equivalent)			
Embankment /Slope	Edge drop at shoulders	Nil	40mm	Daily	Length MeasurementUnit like Scale, Tape, odometeretc.	IRC	7-15days	MORT&H Specification 408.4
	Slope of camber/crossfall	Nil	<2%variation inprescribed slope of camber/crossfall	Daily			7-15days	MORT&H Specification 408.4
	Embankment Slopes	Nil	<15%variation inprescribesideslope	Daily			7-15days	MORT&H Specification 408.4

	Embankment Protection	Nil	Nil	Daily	NA		7-15days	MORT&H Specification
	Rain Cuts/ Gullies inslope	Nil	Nil	DailySpecially During RainySeason	NA		7-15days	MORT&H Specification
	Drainage & Snow clearance.							
19	**Pumping**	quantity of fines andwater expelled throughopen joints and cracksNos Nos/100 m stretch	0	not discernible	No Action			
			1 to2	slight/occasionalNos< 10%	Repaircracksandjoints Withoutdelay.	Inspect and repair sub-drainage at distressedsections and upstream.		
			3 to4	appreciable/ Frequent10-25%	Lift or jackslabwithin30days.			
			5	abundant, crackdevelopment> 25%	Repair distressed pavement			
20	**Snow Clearance during maiatianance Period**	Road shall be clean and no slip/skid shall occured	NA	Snowy: Roads have a COF of 0.2 to 0.3 Icy: Roads have a COF of 0.1 to 0.212	Spreading of moorum & dust to avoid slip/skid	Not Applicablle		

Table-2: Maintenance Criteria for RigidPavements:

[deleted]

Table-3: Maintenance Criteria for Safety Related Items and OtherFurniture Items:

<table>
<tr><th>AssetType</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequencyof Measurement</th><th>Testing Method</th><th>RecommendedRemedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td rowspan="5">Highway</td><td rowspan="5">Availability of Safe Sight Distance</td><td colspan="3">AsperIRCSP:84-2019, a minimum of safe stopping sight distance shall be availablethroughout.</td><td rowspan="5">Monthly</td><td rowspan="5">Manual Measurements with Odometer along with video/imagebackup</td><td colspan="2" rowspan="5">Removal of obstruction within 24 hours, in caseofsightlineaffectedbytemporaryobjects such as trees, temporary encroachments.
Incaseofpermanentstructureordesign deficiency:
Removalofobstruction/improvementofdeficien cyattheearliestSpeedRestrictionboardsand suitabletrafficcalmingmeasuressuchas transverse barmarking, blinkers, etc. shall be applied during the period of rectification.</td><td rowspan="5">IRC:SP84-2019</td></tr>
<tr><td>DesignSpeed, kmph</td><td>DesirableMinimum Sight Distance (m)</td><td>Safe Stopping Sight Distance (m)</td></tr>
<tr><td>100</td><td>360</td><td>180</td></tr>
<tr><td>80</td><td>260</td><td>130</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Pavement Marking</td><td>Wear</td><td><70%ofmarkingremaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re-painting</td><td>Cat-1 Defect – within24hours
Cat-2Defectwithin 2months-</td><td>IRC:35-2015</td></tr>
<tr><td></td><td>Day time Visibility</td><td>DuringexpectedlifeService Time Cement Road - 130mcd/m^2/lux BituminousRoad-100mcd/m^2/lux</td><td>Monthly</td><td>AsperAnnexure-DofIRC:35-2015</td><td>Re-painting</td><td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><th>AssetType</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequencyof Measurement</th><th>TestingMethod</th><th>RecommendedRemedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td></td><td></td><td>Initial and Minimum</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

<table>
<tr>
<td></td>
<td>Night Time Visibility</td>
<td>
Performance for Dry Retro
(RL)RetroReflectivity (mcd/m^2/lux)
<table>
<tr><td>Design Speed</td><td>Initial(7days)</td><td>Minimum Threshold level (TL) &warranty period required upto2 years</td></tr>
<tr><td>Upto 65</td><td>200</td><td>80</td></tr>
<tr><td>65 - 100</td><td>250</td><td>120</td></tr>
<tr><td>Above 100</td><td>350</td><td>150</td></tr>
<tr><td colspan="3">Initial and Minimum Performancefor NightVisibilityunderwet Condition (Retroreflectivity):</td></tr>
</table>
</td>
<td>Bi-Annually</td>
<td>As per Annexure-E of IRC:35- 2015</td>
<td>Re-painting</td>
<td>Cat-1 Defect – within 24 hours
Cat-2 Defect – within 2 months</td>
<td>IRC:35-2015</td>
</tr>
</table>

		Initial 7 days Retro reflectivity: 100 mcd/m^2/lux MinimumThresholdLevel: 50mcd/m^2/lux					
	Skid Resistance	Initial and Minimum performance for SkidResistance:	Bi-Annually	As per Annexure-GofIRC:35-2015		Within24hours	IRC:35-2015
AssetType	**Performance Parameter**	**Level of Service (LOS)**	**Frequencyof Measurement**	**TestingMethod**	**RecommendedRemedial measures**	**Time limit for Rectification**	**Specifications and Standards**
		Initial (7days): 55BPN Min. Threshold: 44BPN *Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transversebar markingsetc.					
	ShapePosition and	Shape and Position as per IRC: 67- 2012. Signboard should be clearly Visible for the design speed of the section.	Daily	Visual with video/image backup		48 hours in case of Mandatory Signs, Cautionary and Informatory	IRC:67-2012

RoadSigns	Retro reflectivity	As per specifications in IRC:67-2012	Bi-Annually	Testingof each Signboard usingRetroReflectivityMeasuringDevice.Inaccordancewith ASTM D 4956-09.	Improvement of shape, in case ifshapeisDamaged. Relocation aspe r requirement change of signboard	Signs (Single and Dual post signs) 15DaysincaseofGantry/Cantilever Sign boards 48hoursincaseof Mandatory Signs, Cautionary and Informatory Signs (Single and Dual postsigns) 1Monthincase of Gantry/Cantilever Sign boards	RC:67-2012
Kerb	KerbHeight	As per IRC 86:2018 dependingupontypeof Kerb	Bi-Annually	Useofdistancemeasuringtape	Raising KerbHeight	Within1 Month	IRC86:2018
	KerbPainting	Functionality: Functioning of Kerb painting as intended	Daily	Visualwithvideo/image backup	KerbRepainting	Within7-days	IRC35:2015
Other Road Furniture	Reflective Pavement	NumbersandFunctionality as per specifications in	Daily	Counting	NewInstallation	Within2 months	IRC:SP:84-2019,IRC:35-
AssetType	**Performance Parameter**	**Level of Service (LOS)**	**Frequencyof Measurement**	**TestingMethod**	**RecommendedRemedial measures**	**Time limit for Rectification**	**Specifications and Standards**
	Markers(Road Studs)	IRC:SP:84-2019and IRC: 35-2015, unless specified in Schedule-B.					2015

	Pedestrian Guardrail	Functionality: Functioning ofguardrail asintended	Daily	Visual withvideo/image backup	Rectification	Within15 days	IRC:SP:84-2019
	Traffic Safety Barriers	Functionality: Functioningof Safety Barriers as intended	Daily	Visual with video/image backup	Rectification	Within7days	IRC:SP:84- 2014, IRC:119-2015
	End Treatment of	Functionality: Functioning ofEnd Treatment asintended	Daily	Visual withvideo/image	Rectification	Within7days	IRC:SP:84-2019,
	Traffic Safety Barriers			backup			IRC:119 - 2015
	Attenuators	Functionality: Functioning of Attenuatorsasintended	Daily	Visual with video/imageback up	Rectification	Within7days	IRC:SP-2014, IRC:119-2015
	GuardPosts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended	Daily	Visual with video/imageback up	Rectification	Within15 days	IRC:79-2019
	OverheadSign Structure	Overhead sign structure shall be structurally adequate	Daily	Visual with video/image backup	Rectification	Within15 days	IRC:67-2012
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended	Daily	Visual withvideo/image backup	Rectification	Within7days	IRC:SP:84-2019

Highway Lighting System	Highway Lights	Illumination: Minimum 40 Lux illuminationontheroad surface	Daily	Theilluminationlevelshallbe measured with luxmeter	ImprovementinLighting System	24 hours	IRC:SP:84-2019
		Nomajorfailureinthe lighting system	Daily	-	Rectification offailure	24 hours	IRC:SP:84-2019
AssetType	**Performance Parameter**	**Level of Service(LOS)**	**Frequencyof Measurement**	**TestingMethod**	**RecommendedRemedial measures**	**Time limit for Rectification**	**Specifications and Standards**
		Nominorfailureinthe lighting system	Monthly	-	Rectification offailure	8hours	IRC:SP:84-2019
	Toll Plaza Canopy Lights	Minimum 40 Lux illuminationontheroad surface	Daily	Theilluminationlevelshallbe measured with luxmeter	ImprovementinLighting System	24 hours	IRC:SP:84-2019
		Nomajor/minorfailurein the lighting system	Daily	-	Rectification of failure	8hours	IRC:SP:84-2019
Trees and Plantation including median plantation	Obstruction in a minimum head-room of 5.5 m above carriageway orobstruction in visibility of roadsigns	Noobstructionduetotrees	Monthly	Visual with video/imageback up	Removaloftrees	Immediate	IRC:SP:84-2019
	Deterioration inhealth of trees	Health of plantation shall be as per requirement of specifications &	Daily	Visual with video/imageback up	Timely watering and treatment. Or	Within90 days	IRC:SP:84-2019

	and bushes	instructions issued by Authority from Time to time			Replacement ofTreesandBushes.		
	Vegetation affectingsight line and road structures	Sight line shall be	Daily	Visual with video/imageback up	RemovalofTrees	Immediate	IRC:SP:84-2019
Rest Areas	Cleaning of toilets	-	Daily	-	-	Every4hours	
	Defects in electrical, water and sanitary installations	-	Daily	-	Rectification	24 hours	
Other				-	Rectification	15 days	IRC:SP:84-2019
Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measurement**	**TestingMethod**	**RecommendedRemedial measures**	**Time limit for Rectification**	**Specifications and Standards**
Project Facilities and	DamageordeteriorationinApproach Roads, Pedestrian facilities, trucklay-bys, bus- bays,bus-shelters, cattle crossings, Traffic Aid Posts, Medical		Daily				

Approach roads	Aid Posts and otherworks						
Pipe/box/ slab culverts	Free waterway/ unobstructed flowsection	85%ofculvertnormalflow area to available.	2 times in a year (beforeand afterrainy season)	InspectionbyBridgeEngineer as per IRC SP: 35-1990 and recordingofdepthofsilting and area of vegetation.	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrelbefore rainyseason.	15 days before onset of monsoon and within 30 days after end ofrainy season.	IRC:5-2015, IRC:SP:40-2019 and IRC:SP:13-2004
	Leak-proof expansion joints ifany	No leakage through expansionjoints	Bi-Annually	Physical inspection of expansion joints as per IRC SP: 35- 1990 if any, for leakage strains on wallsatjoints.	Fixing with sealant suitably	30daysorbefore onset of rains whichever comes earlier	IRC:SP:40-2019andIRC SP:69-2011
	Structurally sound	Spalling of concrete not more than 0.25 sqm	Bi-Annually	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording thedefects	Repairs to spalling, cracking, delamination, rusting shall be followedas per IRC:SP:40-2019.	15 days	IRC:SP:40-2019 and MORTH Specifications clause2800
		Delaminationofconcrete not more than 0.25 sq.m.					
		Crackswiderthan0.3mm not more than 1m aggregatelength					
	Protection works in goodcondition	Damagedofroughstone apronorbankrevetment not more than 3 sqm, damage to solidapron (concreteapron)notmore than 1 sqm	2 times in a year (before and afterrainy season)	ConditionsurveyasperIRC SP:35-1990	Repairs todamaged aprons andpitching	30 days after defect observationor2 weeks before onset ofrainy	IRC:SP 40-2019and IRC:SP:13- 2004.

						seasonwhichever isearlier.	
Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequencyof Measurement**	**TestingMethod**	**RecommendedRemedial measures**	**Time limit for Rectification**	**Specifications and Standards**
Bridges including ROBs Flyover etc. as applicable	Ridingquality or usercomfort	Nopotholeinwearingcoat on bridge deck	Daily	VisualinspectionasperIRC SP:35-1990	RepairstoBCorwearing coat	15 days	MORT&H Specification 2811
	Bumps	No bump at expansionjoint	Daily	VisualinspectionasperIRC SP:35- 1990	Repairs to BC on either side of expansion joints, profile correction course onapproachslabincaseof settlementtoapproach embankment	15 days	MORT&H Specification 3004 & 2811.
	User safety (condition of crash barrier andguardrail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Daily	Visual inspection anddetailed conditionsurvey asperIRC SP: 35- 1990.	Repairs and replacementof safety barriers as the case may be	3days	IRC:5-2015, IRCSP:84-2019and IRCSP:40-2019.

Bridge - Super Structure	Rusted reinforcement Spalling of concrete Delamination	Not more than 0.25 sq.m Not more than 0.50 sq.m Not more than 0.50 sq.m	Bi-Annually	Detailedconditionsurveyasper IRCSP:35-1990using Mobile Bridge InspectionUnit	All the corroded reinforcementshallneed tobethoroughlycleaned fromrustingandapplied with anti-corrosive coating before carrying outtherepairstoaffected concrete portionwith epoxymortar/concrete.	15 days	IRCSP:40-2019 and dMORTH Specification 1600.
	Cracks wider than 0.30mm	Not more than 1m total length	Bi-Annually	Detailedconditionsurveyasper IRCSP:35-1990using Mobile Bridge InspectionUnit	Grouting with epoxy mortar, investigating causes for cracks developmentandcarryout necessary rehabilitation.	48 Hours	IRCSP:40-2019 and dMORTH Specification 2800.
	Rainwater seepage	Leakage- nil	Quarterly	Detailedconditionsurveyasper IRCSP:35-1990using Mobile Bridge InspectionUnit	Groutingofdeckslabat Leakage areas, waterproofing, repairs to drainage	1months	MoRTH specifications

Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measurement**	**TestingMethod**	**Recommended Remedial measures**	**Time limit for Rectification**	**Specifications and Standards**

	throughdeck slab				spouts		2600&2700.
	Deflectiondue to permanent loads and liveloads	Within design limits.	Once in Every 10 Years for spansmore than40m	Loadtestmethod	Carry outmajor rehabilitationworks on bridgetoretainoriginal designloadscapacity	6months	IRCSP:51-2015.
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Onceinevery 5 years for spans more than 30m and Every 10 Years for spansbetween 15 to30m	Laserdisplacementsensorsor laservibro-meters	Strengtheningstructure of super	4months	AASHTO LRFD specifications
	Leakagein Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphaltplugand copperstripjoint.	Bi-Annually	Detailedconditionsurveyas per IRC SP:35-1990 using Mobile Bridge InspectionUnit	Replaceofexpansionjoint seal in	15 days	MORTH specifications 2600andIRCSP:40-2019.
	Debris and dust in strip seal expansion joint	No dust debris expansion orinjoint gap.	Monthly	Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge InspectionUnit	Cleaning ofexpansion joint gapsthoroughly	3days	MORTH specifications 2600 and IRCSP:40-2019.

	Drainage spouts	No downtake pipe missing/brokenbelowsoffit of the deckslab. No silt, debris, clogging of drainage	Monthly	Detailedconditionsurveyasper IRCSP:35-1990using Mobile Bridge InspectionUnit	Cleaning of drainage spouts thoroughly. Replacement of missing/brokendowntake		MORTH
Asset Type	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measurement**	**TestingMethod**	**RecommendedRemedial measures**	**Time limit for Rectification**	**Specifications and Standards**
		spoutcollectionchamber.			pipes with a minimumpipe extension of 500mm below soffit of slab. Providing sealant around thedrainagespoutifany leakagesobserved.	3days	specification 2700.
Bridge-substructure	Cracks/spalling of concrete/ rustedsteel	No cracks, spalling of concrete and rusted steel	Bi-Annually	Detailedconditionsurveyasper IRCSP:35-1990using Mobile Bridge InspectionUnit	All thecorroded reinforcementshallneed tobethoroughlycleaned fromrustingandapplied with anti-corrosivecoatingbefore carrying out repairs tosubstructureby grouting/guniting and micro concretingexpen dingontypeof defectnoticed	30 days	IRCSP:40-2019 and MORTH specification 2800.

	Bearings	Delamination of bearing reinforcement notmore than 5%, crackingortearingofrubber notmorethan2locations perside, no rupture Of reinforcement or rubber	Bi-Annually	Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge InspectionUnit	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order toget uniformloadtransferon tobearings.	3months	MORTH specification 2810andIRC SP:40-2019.
Bridge Foundations	Scouring around foundations	Scouring shall not be lower than maximum scour level for the bridge	Bi-Annually	Condition survey and visualinspection as per IRC SP:35-1990 UsingMobileBridgeInspection Unit. In case of doubt, use Underwatercamera for inspection of deep wells inmajor	Suitableprotectionworks aroundpier/abutment	1month	IRCSP:40-2019,IRC 83-2014, MORTH specification 2500
AssetType	**Performance Parameter**	**Level of Service (LOS)**	**Frequency of Measurement**	**TestingMethod**	**RecommendedRemedial measures**	**Time limit for Rectification**	**Specifications and Standards**
				Rivers.			
	Protection works in good condition	Damaged of rough stone apron or bank revetmentnot more than 3	2timesinayear (before and after rainy season)	ConditionsurveyasperIRC SP:35- 1990	Repairs todamaged aprons andpitching.	30 daysafter defectobservation or2	IRC:SP 40-2019 and IRC:SP:13-2004.

		sq.m, damage to solidapron (concrete apron) not morethan1sq.m				weeks befor e onset of rainy season whicheveris earlier.	
Note: Any Structure during the entire contract period which is found that does not comply with all requirements of this Table will be prepared, rehabilitated or even Reconstructed under the scope of the contractor.							

Table 4: Maintenance Criteria for Hill Roads

In addition to above, for hill roads the following provisions for maintenance is also to done.

a) HillRoads		
(i)	Damage to Retainingwall/Breast wall	7(Seven) days
(ii)	Landslides requiring clearance	12(Twelve) hours
(iii)	Snow requiring clearance	24(Twenty-Four) hours

Note: For all tables 1to5 above, latest BIS & IRC standards (even those not indicated herewith) along with MoRT&H specifications shall be binding for all maintenance activities.

A. Flexible Pavement

Nature of Defect or deficiency		Time limit for repair/ rectification
(b)	**Granular earth shoulders, sideslopes, drains and culverts**	
(i)	Variation by more than 1% in the prescribed slope of camber/crossfall (shall not be less than the camber on the main carriageway)	7(seven) days
(ii)	Edge drop at shoulders exceeding 40mm	7(seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30(thirty) days
(iv)	Raincuts/gulliesinslope	7(seven)days
(v)	Damage to or silting of culverts and side drains	7(seven)days
(vi)	Desilting of drains in urban/semi-urban areas	24(twenty-four) hours
(vii)	Railing, parapets, crashbarriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Roadside furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	48(forty-eight) hours
(ii)	Painting of km stone, railing, parapets, crashbarriers	As and when required/Once every year
(iii)	Damaged/missing signs road requiring replacement	7(seven)days
(iv)	Damagetoroadmarkups	7(seven)days
(d)	**Roadlighting**	
(i)	Any major failure of the system	24(twenty-four) hours
(ii)	Faultsandminorfailures	8(eight)hours
(e)	**Trees and plantation**	
(i)	Obstruction in a minimum head-room of 5m above carriageway or obstruction in visibility of road signs	24(twenty-four) hours
(ii)	Removal of fall entrees from carriageway	4 (four) hours
(iii)	Deterioration in health of trees and bushes	Timely watering and treatment
(iv)	Trees and bushes requiring replacement	30(thirty) days
(v)	Removal of vegetation affecting sight lineand road structures	15(fifteen) days
(f)	**Restarea**	
(i)	Cleaningof toilets	Every4 (four) hours
(ii)	Defects in electrical, water and sanitary installations	24(twenty-four) hours
(g)	**[TollPlaza]**	

(h)	**Other Project Facilities and Approachroads**	
(i)	Damage in approach roads, pedestrian facilities, trucklay-byes, bus-bays, bus-shelters, cattle crossings, [TrafficAidPosts, Medical Aid Posts] and service roads	15(fifteen)days
(ii)	Damaged vehicles or debris on the road	4(four) hours
(iii)	Malfunctioning of the mobilecrane	4(four) hours
Bridges		
(a)	**Superstructure**	
(i)	Any damage, cracks, spalling/scalingTemporary measures Permanent measures	within 48 (forty-eight) hours within15 (fifteen)days or as specified by theAuthority's Engineer
(b)	**Foundations**	
(i)	Scouringand/orcavitation	15(fifteen) days
(c)	**Piers, abutments, return walls and wingwalls**	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30(thirty)days
(d)	**Bearings(metallic)ofbridges**	
(i)	Deformation, damages, tilting or shifting ofbearings	15(fifteen)days Greasing of metallic bearings once in a year
(e)	**Joints**	
(i)	Malfunctioningofjoints	15(fifteen)days
(f)	**Otheritems**	
(i)	Deformingofpadsinelastomeric bearings	7(seven)days
(ii)	Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes	3(three) days
(iii)	Damage or deteriorationin kerbs, parapets, handrails andcrash barriers	3 (three) days (immediately within 24 hours if posing danger to safety)
(iv)	Rain-cuts or erosion of banks of the side slopes of approaches	7(seven)days
(v)	Damage to wearing coat	15(fifteen)days
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guidebunds	30(thirty)days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15(fifteen)days
(g)	**HillRoads**	
(i)	Damage to retainingwall/breastwall	7(seven)days
(ii)	Landslides requiring clearance	12(twelve)hours
(iii)	Snow requiring clearance	24(twenty-four) hours
(iv)	Spreading of Dust/moorum on Road Surface after snow clearance to avoid Slip & Skid to vehicles ply.	24 (twenty-four) hours

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

9. Routine Maintenance of already completed stretch & snow cleareance: Nil

Schedule-F

1. Applicable Permits

(See Clause 4.1(vii)(a))

Applicable Permits

(i) The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:

(a) Permission of the State Government for extraction of boulders from quarry;

(b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;

(c) Licence for use of explosives;

(d) Permission of the State Government for drawing water from river/reservoir;

(e) Licence from inspector of factories or other competent Authority for setting up batching plant;

(f) Clearance of Pollution Control Board for setting up batching plant;

(g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;

(h) Permission of Village Panchayats and State Government for borrow earth; and

(i) Any other permits or clearances required under Applicable Laws.

(ii) Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

Schedule–G

(See Clauses7.1 and 19.2)

Annex-I

(SeeClause7.1)

Form of Bank Guarantee

[Performance Security/Additional Performance Security]

[MD, National Highways & Infrastructure Development Corporation Limited, NewDelhi] WHEREAS:

(A) [name and address of contractor](Herein after called the**"Contractor**")and[nameand address of the authority], (hereinafter called the **"Authority"**) have entered into an agreement (hereinafter called the "Agreement") Widening and Up-gradation of Vailoo Donipawa road stretch from intermittent two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km (263+070) Donipawa of 9.866 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir on EPC mode

(B) The Agreement requires the Contractor to furnish a Performance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period and Maintenance Period} (as defined in the Agreement) in a sum of Rs…..cr.(Rupees……..….. crore) (the **"Guarantee Amount"**).

(C) We, through our branch at (the **"Bank"**) have agreed to furnish this bank guarantee (hereinafter called the **"Guarantee"**) by way of PerformanceSecurity.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sumspecified therein.

2. AletterfromtheAuthority,underthehandofanofficernotbelowtherankof[General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all orany of its obligations under and in accordance with the Agreement shallbeconclusive,finalandbindingontheBank.TheBankfurtheragrees thattheAuthorityshall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption withanyother bodyorcorporation orotherwise, shall notinanyway or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this

Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bankunder this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfilment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authorityagainst the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of theliberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matteror thingwhatsoever whichunderanylaw relatingtosureties and guarantorswould but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfilment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

7. Not with standing anything contained here in before,the liabilityof the Bankunder this Guaranteeis restricted to the Guarantee Amount and this Guarantee will remain in force for the periodspecified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of theAuthority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in provingsuch notice,whengivenbypost,itshallbesufficientto provethattheenvelopecontaining the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remainin force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

12. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

S. No	Particulars	Details
1	NameofBeneficiary	NationalHighways&InfrastructureDevelopment Corporation Limited
2	BeneficiaryBankAccount No.	90621010002610

3	BeneficiaryBankBranch	IFSC SYNB0009062
4	BeneficiaryBankBranch Name	Transport Bhawan, NewDelhi
5	BeneficiaryBankAddress	CanaraBank(erstwhileSyndicateBank)transport Bhawan,1st Parliament Street, NewDelhi-110001

Signed and sealed this……. day of……..,20……at……..

SIGNED, SEALED AND DELIVERED

ForandonbehalfoftheBankby:

(Signature)(Name)(Designation)(CodeNumber)(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex – II

(Schedule - G)

(SeeClause19.2)

Form for Guarantee for Advance Payment

[MD, National Highways & Infrastructure Development Corporation Limited, NewDelhi] WHEREAS: [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "Authority") for the Widening and Up-gradation of Vailoo Donipawa road stretch from intermittent two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km (263+070) Donipawa of 8.643 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir on EPC mode

In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @Bank Rate + 3% advance payment (herein after called"**AdvancePayment**") equal to 10% (tenpercent) of the Contract Price; and that the Advance Payment shall be made in two instalments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundredand ten percent) of such instalment to remain effective till the complete and full repayment of the instalment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} instalment of the Advance Payment is Rs. ------ cr.(Rupeescrore) and the amount of this Guarantee is Rs.-------cr.(Rupees------crore)(the "**GuaranteeAmount**")[$].

(A) We, ……through ourbranchat..... (the"**Bank**")have agreedtofurnish this bank guarantee (hereinafter called the **"Guarantee"**) for the Guarantee Amount.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Paymentunder and inaccordancewith the Agreement, and agrees and undertakes to pay tothe Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum ofthe Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specifiedtherein.

1. A letterfrom the Authority, under thehandofanofficer notbelow therankof [General Managerin the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all orany of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreementand its decision that the Contractor is in default shall be final and binding on the Bank, not withstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption withanyother bodyorcorporation orotherwise, shall notinanyway or manner affect the liability or obligation of the Bank under this Guarantee.

3. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

$The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment.

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4. The Authority shall have the liberty, without affecting in any manner the liability of the Bankunder this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thingwhatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
5. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.
6. Not withstanding anything contained herein before, the liabilityof the Bankunder this Guaranteeis restricted to the Guarantee Amount and this Guarantee will remain in force for the periodspecified in paragraph 8 below and unless a demand or claim in writing is made by the Authority ontheBankunderthis Guaranteeallrights oftheAuthorityunderthis Guaranteeshallbeforfeited and the Bank shall be relieved from its liabilities hereunder.
7. The Guarantee shall cease to be in force and effect on ****$unless a demand or claim under this Guaranteeis made inwritingon or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.
8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in provingsuch notice,whengiven bypost,itshallbesufficientto prove that the envelopecontaining the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.
10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.
11. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

S. No	Particulars	Details
1	NameofBeneficiary	NationalHighways&InfrastructureDevelopment Corporation Limited
2	BeneficiaryBankAccount No.	90621010002610
3	BeneficiaryBankBranch	IFSC SYNB0009062
4	BeneficiaryBankBranch Name	Transport Bhawan, NewDelhi
5	BeneficiaryBankAddress	CanaraBank(erstwhileSyndicateBank)transport Bhawan,1st Parliament Street, NewDelhi-110001

Signed and sealed this…….day of……..,20……at…….

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)(Name)(Designation)(CodeNumber)(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

$Insertadatebeing90(ninety)daysaftertheendofoneyearfromthedateofpaymentoftheAdvancepayment tothe Contractor (in accordance with Clause 19.2 of the Agreement).

(ii) The address, telephone number and other details of the head office of the Bank as well as ofissuing branch should bementioned on the covering letter of issuing branch.

Annex-III

(Schedule - G)
(SeeClause7.5.v)
Form for Guarantee for Withdrawal of RetentionMoney

The Managing Director,
National Highways & Infrastructure Development Corporation Limited
New Delhi

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [name and address of the authority],(hereinaftercalledthe"**Authority**")fortheconstructionofthe*****sectionof [National Highway No. **] on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement.

(B) In accordance with Clause 7.5.3 of the Agreement, the Contractor may withdraw the retention money (hereinafter called the "**Retention Money**") after furnishing to the Authority a bank guarantee for an amount equal to the proposed withdrawal.

(C) We,…….. throughourbranch at ..... (the"**Bank**") haveagreed To furnish this bank guarantee (herein after called the"**Guarantee**") for the amount of Rs. ---------cr. (Rs---------- crore) (the "**Guarantee Amount**").

NOW, THEREFORE, the Bank hereby unconditionally and irrevocably guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably undertakes topay tothe Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sumspecified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of General Manager in the National Highways & Infrastructure Development Corporation Limited (NHIDCL), that the Contractor has committed default in the due and faithful performance of all or any of its obligations for under and in accordance with the Agreement shall be conclusive, final and binding on theBank. TheBank furtheragrees that theAuthority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or anydispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the dischargeofthe Contractorfor any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Retention Money and any of the rights and powers exercisable by the Authority against the Contractor,and either to enforceor forbear from enforcing any ofthe terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Retention Money.

7. Not withstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect 90(ninety) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares andwarrantsthatit hasthepowertoissuethisGuaranteeandtheundersignedhasfullpowerstodosoon behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment there of forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and inproving such notice,when given by post,it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer ofthe Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remainin force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

12. This guarantee shall also be operatable a tour… ..... Branch at NewDelhi, from whom, Confirmation regarding the issue of this guarantee or extension/renewal there of shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance MessagingSystem) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

S.No	**Particulars**	**Details**
1	NameofBeneficiary	NationalHighways&InfrastructureDevelopment Corporation Limited
2	BeneficiaryBankAccount No.	90621010002610
3	BeneficiaryBankBranch	IFSC SYNB0009062
4	BeneficiaryBankBranch Name	Transport Bhawan, NewDelhi
5	BeneficiaryBankAddress	CanaraBank(erstwhileSyndicateBank)transport Bhawan,1stParliamentStreet,NewDelhi-110001

Signed and sealed this……. dayof……..., 20……at …….

SIGNED, SEALED AND DELIVERED For and on
Behalf of the Bank by:

(Signature)
(Name)

(Designation) (Code
Number) (Address)NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Schedule-H

See Clauses10.1(iv) and 19.3

1.0 Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs. 127.53 CR.

1.2 Proportions of the Contract Price for different stages of Construction of the Project Highway shall be as specified below:

S. No.	Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
	1	**2**	**3**	**4**
1	Road works including culverts, widening and repair of culverts.	32.79%	**A - Widening and strengthening of existing road**	
			(1) Earthwork upto top of the emankment	2.23%
			(2) Subgrade (SG)	1.75%
			(3) Subbase course (GSB)	3.80%
			(4) Non bituminous base course (WMM)	6.89%
			(5) Bituminous base course	11.49%
			(6) Wearing coat	6.02%
			(7) Site Clearance & Dismantaling	0.44%
			B.1 - Reconstruction/ New alignment/bypass (Flexible pavement)	
			(1) Earthwork upto top of the emankment	4.20%
			(2) Subgrade (SG)	3.29%
			(3) Subbase course (GSB)	7.15%
			(4) Non bituminous base course (WMM)	12.96%
			(5) Bituminous base course	21.62%
			(6) Wearing coat	11.33%
			(7) Site Clearance & Dismantaling	0.83%
			D. - Reconstruction/ New culverts on existing road, realignments and bypasses.	
			(1) Hume pipe culvert	0.00%
			(2) Box culverts	6.00%
2	Minor Bridges/ Underpasses/ Overpasses	13.39%	**A.1 - Widening and repairs of Minor Bridges**	
			(1) **Foundation**: (on completion of the foundation work of abutments, piers.)	2.23%

			(2) **Sub-structure**: (on completion of abutments, piers upto abutment/pier cap.)	10.84%
			(3) **Super-structure** (on completion of the super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. complete in all respect)	7.92%
			(4) **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.	1.23%
			A.2 - New/Reconstruction of Minor Bridges	
			(1) **Foundation** : (on completion of the foundation work of abutments, piers.)	7.82%
			(2) **Sub-structure** : (on completion of abutments, piers upto abutment/pier cap.)	37.94%
			(3) **Super-structure** (on completion of the super structure upto deck slab including bearing.	27.74%
			(4) **Miscellaneous Works** : On completion of wearing coat, expansion joint, crash barrier, railings, protection works and any remaining work associated to bridge including tests on bridge.	3.14%
			(5) **Approaches** (on completion of approaches including retaining walls, stone pitching, protection works complete in all respect and fit for use.	1.15%
			(6) **Guide Bunds and River Training works**: (On completion of Guide Bunds and river training works complete in all respects.)	-
3	Major Bridge works and ROB/RUB/elevated sections/flyovers including viaducts, if any	8.55%	**A.2 - New/ Reconstruction of Major bridges**	
			(1) Foundation : Foundation of abutment, piers	
			(i) Well Foundation	0.00%
			(ii) Pile Foundation	0.00%
			(iii) Open Foundation	11.43%
			(2) Sub-structure:	52.41%
			(3)Super-structure (including bearings)	27.78%

			(4) Wearing Coat including expansion joints	3.72%
			(5) Miscellaneous Items (like hand rails, crash barriers, road markings etc.)	2.93%
			(6) Wing walls/return walls	1.09%
			(7) Guide Bunds, River Training works etc.	0.00%
			(8) Approaches (including Retaining walls, stone pitching and protection works for floor, embankment slope, etc.)	0.64%
4	Other works	34.60%	**(i) Toll plaza icluding it's approach**	0.00%
			(ii) Road side drains	
			Lined Drain (Rectangular) -RCC Cover Drain	22.61%
			Lined Drain (Triangular) - KC Drain	0.11%
			Lined Surface Drain	0.19%
			Chute Drain	0.16%
			Load Bearing Drain	0.63%
			Unlined Drain	0.02%
			(iii) Road signs, markings, km stones, safety devices etc.	1.14%
			(iv) Overhead gantry mounted sign	0.21%
			(v) Project facilities	
			(a) Bus Bay with Bus Shelter	0.00%
			(b) Truck laybyes	0.00%
			(c) Rest area/ Wayside amenity	0.00%
			(d) others	
			- Highway Lighting	4.59%
			- Utility ducts	0.00%
			- Toilet Block	0.00%
			- Rainwater harvesting	0.00%
			- Highway Patrol	0.00%
			- Ambulance	0.00%
			- Crane	0.00%
			(vi) Road side plantation	0.00%
			(vii) Protection works other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.	
			(a) Crash barrier (W Metal beam and RCC crash barrier other than Str.)	1.45%
			(b) Retaining wall (3m Ht.)	11.36%
			(c) Retaining wall (2.5m Ht.)	2.01%
			(d) Retaining wall (2m Ht.)	0.94%
			(e) Retaining wall (1.5m Ht.)	1.72%

			(f) RE Wall (15m)	8.04%
			(g) RE Wall (6m)	3.25%
			(h) Breast Wall (3m ht.)	1.07%
			(i) New Jersey Crash Barrier	19.40%
			(j) Stone Pitching with Filter Media	1.21%
			(k) MS Railing	12.02%
			(viii) Antiglare	0.00%
			(ix) Junction improvement	6.01%
			(x) Side Slope Protection works Hydroseeding, Turfing and stone pitching	0.00%
			(xi) Snow Clearance	0.00%
			(xii) Foot Over Bridge	0.00%
			(xiii) Canopy at RUB location	0.00%
			(xiv) Temporary Diversion	1.87%
			Miscellaneous	0.00%
5	Electrical utilities and public Health Utilities (Water pipe lines and sewage lines)	10.67%	(i) Electrical Utilities	16.43%
			(ii) Public Health Engineering (PHE)	83.57%

1.3 Procedure of estimating the value of work done.

1.3.1 Road works

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

Table 1.3.1

Stage of Payment	**Percentage - weightage**	**Payment Procedure**
A - Widening and strengthening of existing road		
(1) Earthwork upto top of the embankment	2.23%	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) Subgrade	1.75%	
(3) Subbase course (GSB)	3.80%	
(4) Non bituminous base course*	6.89%	
(5) Bituminous base	11.49%	
(6) wearing coat	6.02%	
(7) Site Clearance & Dismantaling	0.44%	
B.1 - Reconstruction/ New realignment/bypass (Flexible pavement)		
(1) Earthwork upto top of the the embankment	4.20%	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 500m which ever is less.
(2) Subgrade	3.29%	
(3) Subbase course (GSB)	7.15%	
(4) Non bituminous base course*	12.96%	
(5) Bituminous base	21.62%	
(6) wearing coat	11.33%	
(7) Site Clearance & Dismantaling	0.83%	
D. - Reconstruction/ New culverts on existing road, Realignments, bypasses:		Cost of each culvert shall be determined on pro rata basis with respect to the total
(1) Hume Pipe culvert	0.00%	

(2) Box Culvert	6.00%	number of culverts. Payment shall be made on the completion of atleast one culvert. 75% of the cost will be payable on completion of box/ abutments 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.

* Note - In case of CTB and AIL layer, this stage may be modified suitably to permit separate weightages for each of these layers.

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

1.3.2 Minor Bridges and Underpasses/Overpasses

Procedure for estimating the value of Minor Bridge and underpasses/Overpasses shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	Weightage	Payment Procedure
A.1 - Widening and repairs of Minor Bridges		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, piers.)	2.23%	(i) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage i.e completion of atleast 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 abutments, piers upto abutment/pier cap.)	10.84%	(ii) Sub - structure - Payment shall be made on pro-rata basis on completion of stage i.e. completion of atleast one sub-structure upto abutment/ pier cap level of each bridge.

(3) **Super-structure** (on completion of the super structure in all respects including wearing coat, bearings, expansion joints, hand rails, crash barrier road sign, & marking, tests on completion etc. complete in all respect)	7.92%	(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 wing wall/ return wall, retaining walls, stone pitching, protection works for floor, embankment slope etc.complete in all respect and fit for use.	1.23%	(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 of Minor Bridges		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, piers.)	7.82%	(i) Foundation: Payment against foundation shall be made on pro-rata basis on completion of a stage completion of atleast 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 abutments, piers upto abutment/pier cap.)	37.94%	(ii) Sub - structure - Payment shall be made on pro-rata basis on completion of stage i.e. completion of atleast 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.	27.74%	(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 MoRTH 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, protection works and any remaining work associated to bridge including tests on bridge.	3.14%	(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 retaining walls, stone pitching, protection works complete in all respect and fit for use.	1.15%	(v)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.)	0.00%	(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.

1.3.3 Major Bridge works, ROB/RUB and Structures

Procedure for estimating the value of major Bridge works, ROB/RUB and structure work shall be as stated in table 1.3.3:

Table 1.3.3

Stage of payment	Weightage	Payment procedure
A.2 - New/ Reconstruction 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.
(iii) Open Foundation	11.43%	(iii) Open Foundation: Payment shall be made on completion of a stage i.e. on completion of atleast one foundation.
(2) Sub-structure	52.41%	(ii) Sub-Structure:. Payment against Sub-structure shall be made on pro-rata basis on completion of a stage i.e. completion of atleast one sub-structure of abutments/piers upto abutment/ pier cap level of each of the major bridge.

(3) Super-structure (including bearings)	27.78%	(3) Super-structure: Payment shall be made on prorata basis on completion of a stage i.e. completion of superstructure upto deck slab including bearings of at least one span as specified here in 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. (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	3.72%	(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 barriers, road markings etc.	2.93%	(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	1.09%	(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.
(7) Guide Bunds, River Training works etc.	0.00%	(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 for floor, embankment slope etc.)	0.64%	(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.
(6) Wing walls/return walls	0.00%	(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.

Note :

(1) In case of innovative Major bridge projects like cable suspension/cable stayed/extra dozed and exceptionally long span bridges, the schedule may be modified as per site requirements before bidding with due approval of DG(RD)&SS, MOR&TH.

(2) The schedule for exclusive tunnel projects may be prepared as per site requirements before bidding with due approval of DG(RD)&SS, MOR&TH.

1.3.4 other works

Procedure for estimating the value of other works done shall be as stated in table 1.3.4:

Table 1.3.4

Stage of Payment	**Weightage**	**Payment Procedure**
(i) Toll plaza	0.00%	Unit of measurement is each completed toll plaza. Payment for each toll plaza shall be made on pro rata basis with respect to the total of all toll plazas as specified here in under :
(a) DLC(LHS)		(a) DLC (LHS) : Payment of 12.5% on pro-rata basis shall be made on completion of a stage i.e. completion of DLC on LHS.
(b) DLC (RHS)		(b) DLC (RHS) : Payment of 12.5% on pro-rata basis shall be made on completion of a stage i.e. completion of DLC on LHS.
(c) PQC(LHS)		(c) PQC(LHS): Payment of 25% on pro-rata basis shall be made on completion of a stage i.e. completion of PQC on LHS.
(d) PQC(RHS)		(d)PQC(RHS): Payment of 25% on pro-rata basis shall be made on completion of a stage i.e. completion of PQC on RHS.
(e)Admin Building		(e) Admin Building: Payment of 10% on pro-rata basis shall be made on completion of a stage i.e. completion of Admin Building and miscellaneous works.
(f) Toll Booth, canopy, safety items and all other associated works		(f) Toll Booth, canopy, safety items and all other associated works: Payment of 15% on pro-rata basis shall be made on completion of a stage i.e. completion of Toll Booth, canopy, safety items and all other associated works.
(ii) Road side drains		Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (five per cent) of the total length.

Lined Drain (Rectangular) -RCC Cover Drain	22.61%	(a) Covered Drains: Unit of measurement is linear length in metre . Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
Lined Drain (Triangular) - KC Drain	0.11%	(b) KC drain: Unit of measurement is linear length in metre. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
Lined Surface Drain	0.19%	(c) Surface drain: Unit of measurement is linear length in metre . Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
Chute Drain	0.16%	(d) Chute drain: Unit of measurement is linear length in metre . Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
Load Bearing Drain	0.63%	(e) Load bearing drain: Unit of measurement is linear length in metre . Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
Unlined Drain	0.02%	(f) Unlined drain: Unit of measurement is linear length in metre . Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
(iii) Road signs, markings, km stones, safety devices etc.	1.14%	Unit of measurement is linear length in km. Payment shall be made on prorata basis on completion of a stage in a length of not less than one Km on both sides.
(iv) Overhead gantry mounted signs	0.21%	Unit of measurement is each number. Payment shall be made on pro-rata basis on completion of each overhead gantry mounted sign
(v) Project Facilities		Unit of measurement is each number. Payment shall be made on pro rata basis for completed facilities.
(a) Bus Bay with Bus Shelter	0.00%	
(b) Truck laybyes	0.00%	
(c) Rest area/ Wayside amenity	0.00%	
(d) others		
- Highway Lighting	4.59%	Unit of measurement is each number. Payment shall be made on pro rata basis for each completed facility.
- Utility ducts	0.00%	Unit of measurement is linear length in metre . Payment shall be made on pro rata basis on completion of a stage in a length of not less than 100 m on one side.
- Toilet Block	0.00%	Unit of measurement is each number. Payment shall be made on pro rata basis for each completed facilities.
- Rainwater harvesting	0.00%	Unit of measurement is each no. Payment shall be made on pro rata basis on completion of each RWHS
- Highway Patrol	0.00%	Payment shall be done on Pro rata basis every six month
- Ambulance	0.00%	

- Crane	0.00%	
(vi) Roadside Plantation	0.00%	Unit of measurement is linear length in Km. Payment shall be made on pro rata basis on completion of one Km.
(vii) Repair of Protection works other than approaches to the bridges, elevated sections, flyovers/ grade separators and ROBs/RUBs.	0.00%	Unit of measurement is linear length. Payment against items (a), (b) & (c) shall be made on pro rata basis on completion of a stage in a length of not less than 10% (ten per cent) of the total length and 100 m whichever is less.
(a) Crash barrier (W Metal beam and RCC crash barrier other than Str.)	1.45%	
(b) Retaining wall (3m Ht.)	11.36%	
(c) Retaining wall (2.5m Ht.)	2.01%	
(d) Retaining wall (2m Ht.)	0.94%	
(e) Retaining wall (1.5m Ht.)	1.72%	
(f) RE Wall (15m)	8.04%	
(g) RE Wall (6m)	3.25%	
(h) Breast Wall (3m ht.)	1.07%	
(i) New Jersey Crash Barrier	19.40%	
(j) Stone Pitching with Filter Media	1.21%	
(k) MS Railing	12.02%	
(viii) Antiglare	0.00%	Unit of measurement is linear length in Km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 1 Km on both side.
(ix) Junctions improvement	6.01%	Unit of measurement is each junction, payment shall be made on pro rata basis for each completed junction.
(x) Side Slope Protection works Turfing and stone pitching	0.00%	Unit of measurement is linear length in Km. Payment shall be made on pro rata basis on completion of a stage.
(xi) Snow Clearance	0.00%	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
(xii) Foot Over Bridge	0.00%	Unit of measurement is each number. Payment shall be made on pro rata basis for completed facilities.
(xiii) Canopy at RUB location	0.00%	Cannopy: Payment shall be made on completion
(xiv) Temporary Diversion	1.87%	Unit of measurement is each Temporary Diversion. Payment shall be made on pro rata basis on completion of each Diversion requirement.
Miscellaneous	0.00%	Payment shall be made on pro rata basis for completed facilities.
2.1 The cost for maintenance shall be as stated in Clause 14.1.1.		

2.2 Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Clause 19.7.

1.3.5 Electrical utilities and Public Health Utilities (Water pipe lines and sewage lines)

Procedure for estimating the value of other works done shall be as stated in table 1.3.5:

Table 1.3.5

Stage of Payment	Weightage	Payment Procedure
(i) Electrical Utilities	16.43%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of Electrical Utilities. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Poles-20%, (ii) Conductor stringing including laying of cable-30%, (iii) DTR erection (if involved)-15% and (iv) Charging of line including dismantling and site clearance-35% (with DTR) and 50% without DTR)
(ii) Public Health Engineering (PHE)	83.57%	Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipe line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%)

Schedule-I

(See Clause 10.2(iv))

Drawings

1. Drawings

In compliance of the obligations set forth in Clause 10.2 of this Agreement, the Contractorshall furnish to the Authority's Engineer, free of cost, all Drawings listed in Annex-I of this Schedule- I.

2. Additional Drawings

If the Authority's Engineer determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed in Annex-I, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractor shall promptly prepare and furnish such drawings to the Authority's Engineer, as if such drawings formed part of Annex-I of this Schedule-I.

Annex – I (Schedule I)

List of Drawings

1. The Project drawings, as defined in Clause1.1, Definitions, Article1, Definitions and Interpretation, Part-I: Preliminary, of the Contract Agreement shall consist:

   (a) Working Drawings of all the components/elements of the Project as determined by Authority Engineer/Authority, and

   (b) As-built drawings for the Project components/elements as determined by AE/Authority.As-built drawings shall be duly certified by Authority Engineer.

2. A minimum list of the drawings of the various components/elements of the Project and project facilities required to be submitted by the Contractor is given below:

A. BRIDGE

General Arrangement Drawing
Reinforcement Drawing

B. ROAD (PLAN&PROFILE)

Plan&Profile
Cross Sections
Drawings of horizontal alignment, vertical profile and crosssections
Drawings of cross drainage works
Drawings of traffic diversion plans and traffic control measures
Drawings of road drainage measures
Drawings of typical details slope protection measures
Drawings of landscaping and horticulture
Drawings of street lighting

C. STANDARD DRAWINGS

Detail of Mandatory Regulatory Signs
Detail of Mandatory Regulatory Signs & Compulsory Direction Control and Other Signs
DetailofInformatroySigns
Detail of Cautionary Signs-TS
Detail of cautionary warning signs
Detail of cautionary warning signs
Details of route marking (chevron marking)
Details of road marking
Details of directional signs
Details Toe drain
Details of pitching, filter material, chute drain and energy dissipation basin-std
Details of double headmetal beam crash barrier
Details for 200-meter 1 km & km post
Detail for boundary stone & guardpost
Drain retaining wall & kerb

Schedule-J

(SeeClause10.3(ii))

Project Completion Schedule

1. Project Completion Schedule [730 days]

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule-J for each of the Project Milestones and the **Scheduled Completion Date**.Within 15 (fifteen) days of the date ofeach Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

2. Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the 191th (One hundred and ninety-one) day from the Appointed Date (the "**Project Milestone-I**").

(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

3. Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the 327th (Three hundred and twenty-seven) day from the Appointed Date (the "ProjectMilestone-II").

(ii) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for anamountnot less than 35% (thirty-five per cent) of the Contract Price and should have started construction of all bridges.

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the 463th (four hundred and sixty-three) day from the Appointed Date (the "Project Milestone-III").

(ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price and should have started construction of all project facilities.

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the **545 th** (Five hundred and forty-five) day from the Appointed Date.

(ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

6. Extension of time

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

Schedule – K

(See Clause 12.1 (ii))

Tests on Completion

1. Schedule for Tests

(i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project Highway to Tests, and no later than 10(ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.

(ii) The Contractor shall notify the Authority's Engineer of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests.The Authority's Engineer shall there upon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

2. Tests

A. Road and Bridge

(i) Visual and physical test: The Authority's Engineershallconductavisualandphysical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [***].

(ii) Riding quality test: Riding quality of each lane ofthecarriagewayshall bechecked with the help of a Network Survey Vehicle (NSV) fitted with latest equipments and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometre.

(iii) Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway ResearchBoard on Nondestructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) metres or more shall also be subjected to load testing.

(iv) Other tests: The Authority's Engineer may require the Contractor to carryout or cause to be carried additional tests, in accordance with Good Industry Practice, for determiningthe compliance of the Project Highwaywith Specifications andStandards, except tests as specified in clause 5,but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

B. OtherTests

(i) Environmental audit: TheAuthority's Engineer shall carryout a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.

(ii) Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, safety audit to determine conformity of the Project Highway with the safety

requirements and Good Industry Practice.

3. Agency for conducting Tests

All Tests set forth in this Schedule-K shall be conducted by the Authority's Engineer or such other agency or person as it may specify in consultation with the Authority.

4. Completion Certificate

Upon successful completion of Tests, the Authority's Engineer shall issue the Completion Certificate in accordance with the provisions of Article 12.

5. The Authority Engineer will carryout tests with following equipment at his own cost in the presence of contractor's representative.

Sr. No.	Key metrics of Asset	Equipment to be used	Frequency of condition survey
1	Surface of defects pavement	Network Survey Vehicl e (NSV)	At least twice a year (As per survey Months defined for the state basis rainy season)
2	Roughness of pavement	Network Survey Vehicle (NSV)	At least twice a year (As per survey months defined for the state basis rainy season)
3	Strength of pavement	Falling Weight Deflectometer (FWD)	At least once a year
4	Bridges	Mobile Bridge Inspection Unit (MBU)	At least twice a year (As per survey monthsdefinedforthestatebasisrainy season)
5	Roadsigns	Retro-reflectometer	At least twice a year (As per survey Months defined for the state basis rainy season)

The first testing with the help of NSV shall be conducted at the time of issue of Completion Certificate.

Schedule-L

(SeeClause12.2)

CompletionCertificate

1 I, …… (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated.....(the**"Agreement"**), the Widening and Up-gradation of Vailoo Donipawa road stretch from intermittent two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km (263+070) Donipawa of 8.643 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir on EPC modethrough.....(Nameof Contractor),hereby certify that the Tests in accordance with Article-12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway canbesafelyandreliablyplacedin service of the Users thereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the……dayof…20…. Scheduled Completed

Date for which was the……day of……20….

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's Engineer by:

(Signature)

(Name)(Designation)(Address)

Schedule-M

(SeeClauses14.6,15.2and19.7)

Payment Reduction for Non-Compliance

1. Payment reduction for non-compliance with the Maintenance Requirements

(i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.

(ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.

(iii) The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph2.

2. Percentage reductions in lump sum payments on monthly basis

(i) The following percentages shall govern the payment reduction:

S.No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, othersurfacedefects	15%
(ii)	Repairs of Edges, Rutting	5%
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions	10%
(ii)	Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees	5%
(c)	**Bridges and Culverts**	
(i)	Desilting, cleaning. Vegetation growth, damaged pitching, flooring, parapets, wearingcourse, footpaths, any damage to foundations	20%
(ii)	Any Defects in superstructures, bearings and sub-structures	10%
(iii)	Painting, repairs/replacement kerb, railings, parapets, guideposts/crashbarriers	5%
(d)	**Road side Drains**	
(i)	Cleaning and repair of drains	5%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of roadsigns, delineators, roadmarkings, 200 m/km/5thkmstones	5%
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, brokendown/accidental vehicles, fallen trees, road blockade sormal functioning of mobile crane	10%
(ii)	Anyother Defects in accordance with paragraph1.	5%
(g)	**Defects in Other Project Facilities**	5%
(h)	**Deduction on account of non-complaince for Snow Clearance**	The deduction shall be made on per hour basis on rates derived from schedule-H

(ii) The amount to be deducted from monthly lump-sum payment for non-compliance of particular item shall be calculated as under:

$$R = {}^{P}/_{100} \times (M1 \text{ or } M2) \times {}^{L1}/_{L}$$

Where,

P= Percentage of particular item/Defect/deficiency for deduction

M1= Monthly lump-sum payment in accordance para 1.2 above of this Schedule

M2= Monthly lump-sum payment in accordance para1.2 above of this Schedule

L1=Non-complying length

L=Total length of the road,

R=Reduction (the amount to be deducted for non-compliance for a particular item/Defect/deficiency

The total amount of reduction shall be arrived at by summation of reductions for such items/Defects/deficiency or non-compliance.

For any Defect in a part of one kilometer, the non-conforming length shall be taken as one kilometer.

Schedule-N

(SeeClause18.1 (i))

Selection of Authority's Engineer

1. Selection of Authority's Engineer

(i) The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.

(ii) In the event of termination of the Technical Consultants appointed in accordance with the provisions of Paragraph 1.1, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of this Schedule-N.

2. Terms of Reference

The Terms of Reference for the Authority's Engineer (the **"TOR"**) shall substantially conform with Annex 1 to this Schedule N.

3. Appointment of Government entity as Authority's Engineer

Not withstanding anything to the contrary contained in this Schedule, the Authority may in its discretion appoint a government-owned entity as the Authority's Engineer; provided that such entity shall be a body corporate having as one of its primary functions the provision of consulting, advisory and supervisory services for engineering projects; provided further that a government-owned entity which is owned or controlled by the Authority shall not be eligible for appointmentasAuthority's Engineer.

Annex-I

(Schedule-N)

Terms of Reference for Authority's Engineer

1. Scope

(i) These Terms of Reference (the "**TOR**") for the Authority'sEngineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the[name and address of the Authority](the "**Authority**")and (the "ContractorWidening and Up-gradation of Vailoo Donipawa road stretch from intermittent two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km (263+070) Donipawa of 8.643 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir on EPC mode (Pkg–VI),and a copyof which is annexed here to and marked as Annex-A to form part of this TOR.

#-Incase the bid of Authority's Engineeris invited simultaneously with the bid of EPC project, then the status of bidding of EPC project only to be indicated

(ii) The TOR shall apply to construction and maintenance of the Project Highway.

2. Definition sand interpretation

(i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.

(ii) References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of thisTOR.

(iii) The rules of interpretation stated in Article 1 of the Agreement shall apply, mutatis mutandis, to thisTOR.

3. General

(i) The Authority's Engineer shall discharge its duties in afair, impartial land efficient manner, consistent with the highest standards of professional integrity and Good IndustryPractice.

(ii) The Authority's Engineer shall perform the duties and exercise the authority in accor dance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:

(a) Any Time Extension;

(b) Any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment; or

(d) issuance of Completion Certificateor

(e) any other matter which is not specified in (a), (b), (c) or (d) above and which creates a financial liability on either Party.

(iii) The Authority's Engineer shall submit regular periodic reports, atleast once everymonth, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.

(v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.

(vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing are asoned written statement relying on good industry practice and authentic literature.

4. Construction Period

(i) During the Construction Period, the Authority's Engineer shall review and approve the Drawings furnished by the Contractor along with supporting data, including the geo- technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete such review and approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

(ii) The Authority's Engineer shall review and approve any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving suchDrawings.

(iii) TheAuthority'sEngineershallreviewandapprovetheQualityAssurancePlansubmitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty one) days stating the modifications, if any, required thereto.

(iv) The Authority's Engineer shall complete the review and approve of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.

(v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) ofthe Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.

(vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

(vii) TheAuthority'sEngineershallinspecttheConstructionWorksandtheProjectHighway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

(viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests atsuch time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4 (ix), the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for

Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to GoodIndustry Practice for quality assurance.

(x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejectionoftheirresultsshallbedeterminedbytheAuthority'sEngineerinaccordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

(xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

(xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable eventorotherwise; provided that incase of anyworkrequiredon account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

(xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forth with.

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

(xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractorhas carried out remedial measure, the Authority's Engineer shall inspectsuch remedial measures forthwith and make a report to the Authority recommendingwhether or not the suspension hereunder may be revoked.

(xvii) In the event that the Contractor carries out any remedial measures to secure the safetyof suspended works and Users, and requires the Authority's Engineerto inspect such works, the Authority's Engineer shall inspect the suspended works within 3(three)days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental there to, the Authority's Engineer shall act under and inaccordance with the provisions of Article 12 and Schedule-K.

5. MaintenancePeriod

(i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

(ii) The Authority's Engineer shall under take regular inspections, at leastonceeverymonth, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and theContractor.

(iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in thisbehalf.

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards andshallalso specify the time limitfor repair or rectificationof anydeviation or deterioration beyond the permissiblelimit.

(v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shallgrant permission with such modifications, as it may deem necessary, within 5 (five) daysof receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause14.5.

6. Determination of cost sand time

(i) The Authority's Engineer shall determine the costs, and/or the irreasonableness, that are required to be determined by it under theAgreement.

(ii) TheAuthority'sEngineershalldeterminetheperiodofTimeExtensionthatisrequired to be determined by it under theAgreement.

(iii) The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause18.5.

7. Payments

(i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2 (iv)(d).

(ii) Authority'sEngineershall-

(a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and

(b) within 15 (fifteen) days of the receipt of the Stage Payment Statementreferred to in Clause 19.4, deliver to the Authorityand the Contractor an Interim PaymentCertificate certifying the amount due and payable totheContractor, after adjustments in accordance with the provisions of Clause 19.10.

(iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.

(iv) TheAuthority'sEngineershallcertifyfinalpaymentwithin30(thirty) daysof the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause19.16.

8. Otherdutiesandfunctions

The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

9. Miscellaneous

(i) A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forth with.

(ii) The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built'Drawings, and keep the minits safe custody.

(iii) Within 90(ninety)days of the Project Completion Date, the Authority's Engineer shall obtain complete set of as-built Drawings,in 2(two) hardcopies and in microfilm form or in such other medium as may be acceptable to the Authority ,reflecting the Project Highway as actually designed, engineered and constructed,including an as-built survey illustrating the layout of the Project Highway and set backlines ,if any,of the buildings and structures forming part of Project Facilities;and shall hand the mover to the Authority against receipt there-of.

(iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Disputebetween theParties.

(v) The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

Schedule-O

(SeeClauses19.4(i),19.6(i), and19.8(i))

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) The estimated amount for the Works executed in accordance with Clause19.3

(i)subsequent to the last claim;

(b) Amounts reflecting adjustments in price for the afore said claim;

(c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;

(d) amounts reflecting adjustment inprice, if any, for(c)above inaccordance with the provisions of Clause 13.2 (iii)(a);

(e) total of(a), (b), (c)and(d) above;

(f) Deductions:

i. Any amount to be deducted inaccordance with the provisions of the Agreement except taxes;

ii. Any amount towards deduction of taxes; and

iii. Totalof(i)and (ii)above.

(g) Net claim:(e)–(f)(iii);

(h) The amounts received by the Contractor up to the last claim:

i. For the Works executed (excluding Change of Scope orders);

ii. For Change of Scope Orders, and

iii. Taxes deducted

2. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(a) The monthly payment admissibleinaccordancewiththeprovisionsoftheAgreement;

(b) thedeductionsformaintenanceworknotdone;

(c) net payment for maintenance due, (a)minus(b);

(d) amountsreflectingadjustmentsinpriceunderClause19.12; and

(e) amounttowardsdeductionoftaxes

3. Contractor'sclaimforDamages

Note: The Contractor shall submit its claims in a form acceptable to the Authority.

Schedule - P

(SeeClause20.1)

Insurance

1. Insurance during Construction Period

(i) The Contractor shall affect and maintain at its own cost, from the Appointed Date till the date of issue of the CompletionCertificate, the following insurances for any loss or damage occurring on account of Non-Political Event of Force Majeure, malicious act, accidental damage, explosion, fire andterrorism:

(a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] percent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and

(b) insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at theSite.

(ii) The insurance under subpara(a) and (b) of paragraph 1(i)above shall coverthe Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercialterms.

2. Insurance for Contractor's Defects Liability

The Contractor shall affect and maintain insurance cover of not less than 15% of the Contract Price for the Works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

3. Insurance against injury to persons and damage to property

(i) The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), whichmay arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number ofoccurrences.

The insurance cover shall be not less than: Rs.2,00,00,000/-(Two Crore only)

(ii) Theinsuranceshall be extended to cover liabilityfor all loss and damage to the Authority's propertyarisingoutoftheContractor’sperformanceofthisAgreementexcluding:

(a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and

(b) damage which is an unavoidable result of the Contractor's obligations to execute theWorks.

4. Insurance to be in joint names

The insurance under paragraphs 1 to 3 above shall be in the joint names of the Contractor and the Authority.

Schedule-Q

(SeeClause14.10)

Testson Completion of Maintenance Period

1. Riding Quality test

Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,200 (two thousand and two hundred only)] mm for each kilometer.

2. Visual and physical test

The Authority's Engineer shall conduct a visual and physical check of construction to determinethatallworksandequipmentformingpartthereofconformto theprovisions of this Agreement. The physical tests shall include measurement of cracking, rutting, stripping and potholes and shall be as per the requirement of maintenance mentioned in Schedule-E.

Schedule-R

(SeeClause14.10)

Taking Over Certificate

I,.....(NameanddesignationoftheAuthority'sRepresentative)underandinaccordance with the Agreement dated …… (the "**Agreement**"), Widening and Up-gradation of Vailoo Donipawa road stretch from intermittent two Lane plus Paved Shoulder stretches to Four Lane in between Design Km 148+589 (Existing Km 235+070) (Vailoo) to Design Km 176+532 (Existing Km (263+070) Donipawa of 8.643 Km Length on Khellani-Khanabal Section of NH-244 in the UT of Jammu and Kashmir on EPC mode (Pkg–VI)(the "Project Highway") onEngineering, Procurement andConstruction (EPC) basis through (NameofContractor),herebycertifythattheTestsoncompletionofMaintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project highway from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority'sRepresentative)

(Address)

***** End of the Document*****