Schedules

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1. The Site

1.1 Site of "The Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhand". Project shall include existing status of the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

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

1.3 An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.

1.4 The alignment plans of the Project Highway are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project Highway is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. 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 Annexure-III based on site/design requirement.

1.5 The status of the environment clearances obtained or awaited is given in Annex - IV.

Annexure - I
(Schedule-A)

Site

Note: Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-I. All the chainages/location referred to in Annex-I to Schedule A shall be existing chainages.

1. Site

Site of "The Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhand on EPC Mode". The land, carriageway and structures comprising the Site are described below

2. Land

The Site of the Project Highway comprises the land (sum total of land already in possession and land to be possessed) as described below:

Sr. No.	Existing Chainage (Km) of NH 34		ROW
	From	To	
1	Km 100+300	Km 100+320	18 m
2	Km 100+320	Km 100+820	80 m
3	Km 100+820	Km 101+060	18 m

3. Carriageway

The existing carriageway is single lane (3.75m wide) at this stretch. The type of the existing pavement is flexible.

4. Major Bridges

The Site includes the following Major Bridges:

S. No.	Existing Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super-Structure		
NIL						

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

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

S.No.	Existing Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)	ROB/ RUB
		Foundation	Super Structure			
NIL						

6. Grade separators

The Site includes the following grade separators:

S. No	Existing Chainage (km)	Type of Structure		No. of Spans with span length (m)	Width (m)
		Foundation	Superstructure		
NIL					

7. Minor Bridges

The Site includes the following minor bridges

S. No.	Existing Chainage (km)	Type of Structure			No. of Spans with span length (c/c of exp gap)	Total Width (m)
		Foundation	Sub-Structure	Super-Structure		
1	101+142	Open	Stone Masonry	RCC beam + Deck Slab	1 X 20.0	5.50

8. Railway level crossings

The Site includes the following level crossing:

S. No.	Existing Chainage (km)	Remarks
NIL		

9. Underpasses (Vehicular, Non Vehicular)

The Site includes the following underpasses:

S. No.	Existing Chainage (Km)	Type of Structure	No. of Spans with span length (m)	Width (m)
NIL				

10. Culverts

The Site has the following culverts:

S. No	Existing Chainage (Km)	Type of culvert	Span/ Opening with Span length (m)	Width (m)
1	100+614	Slab	1 x 2.0	7.0

11. Bus bays

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

S. No.	Existing Chainage (Km)	Length (m)	Left Hand Side	Right Hand Side
NIL				

12. Truck Lay byes

The details of truck lay byes are as follows:

S. No.	Existing Chainage (Km)	Length (m)	Left Hand Side	Right Hand Side
NIL				

13. Road side drains

The details of the roadside drains are as follows:

S. No.	Existing Chainage (km)		Type	
	From	To	Masonry/ CC(Pucca)	Earthen(Kutcha)
1	100.300	101.060		Left - on toe of hill

14. Major junctions

The details of major junctions are as follows:

S. No	Existing Chainage (km)	At Grade	Grade Separated	Category of Cross Road+			
				NH	SH	MDR	Others
NIL							

15. Minor junctions

The details of the minor junctions are as follows:

S. No	Location-Existing Chainage (km)	Type of Junction	
		T-Junction	Cross Road
NIL			

16. Bypasses

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

S. No	Name of bypass (Town)	Existing Chainage (Km)		Length (Km)
		From	To	
NIL				

17. Other Structures : Following are the details of existing causeways:

S. No	Existing Chainage (km)	Structure Type	Openings / Spans X Length	Width (m)
NIL				

18. Existing Chainages corresponding to Design Chainage

Kilometer stone exist over the length of the existing highway. This is referred as "Existing chainage", while chainage (as mentioned in the drawings) along new design center line of the Project is referred to "Design chainage". The relationship between the "Existing chainage" and the "Design chainage" for the Project is given below:

Sr. No.	Existing chainage (Km)	Design chainage (Km)
1	100+300	86+980
2	101+060	87+730

Annex - II

(Schedule-A)

Dates for providing Right of Way

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

Sl. No	From Existing km to km	Length (km)	Width (m)	Date of providing ROW*
1	**2**	**3**	**4**	**5**
(i) Full Right of Way (full width)				
Stretch	100.320 to 100.660	0.340	80	On appointed Date
	100.810 to 100.820	0.010	80	
	100.820 to 100.920	0.100	18	
	101.030 to 101.060	0.030	18	
(ii) Part Right of Way (part width)				
Stretch	100.300 to 100.320	0.020	7	On appointed Date
	100.660 to 100.810	0.150	7	
	100.920 to 101.030	0.110	7	
(iii) Balance Right of Way (part width)				
Stretch	100.300 to 100.320	0.020	11	150 Days from Appointed date
	100.660 to 100.810	0.150	73	
	100.920 to 101.030	0.160	11	

** In case the balance Right of Way is not provided within 150 days of appointed date, the work has to be carried out in the available Right of Way by reducing the width of hard shoulder. Reduction in cost due to change in scope will be carried out as per Article 13 of EPC agreement.

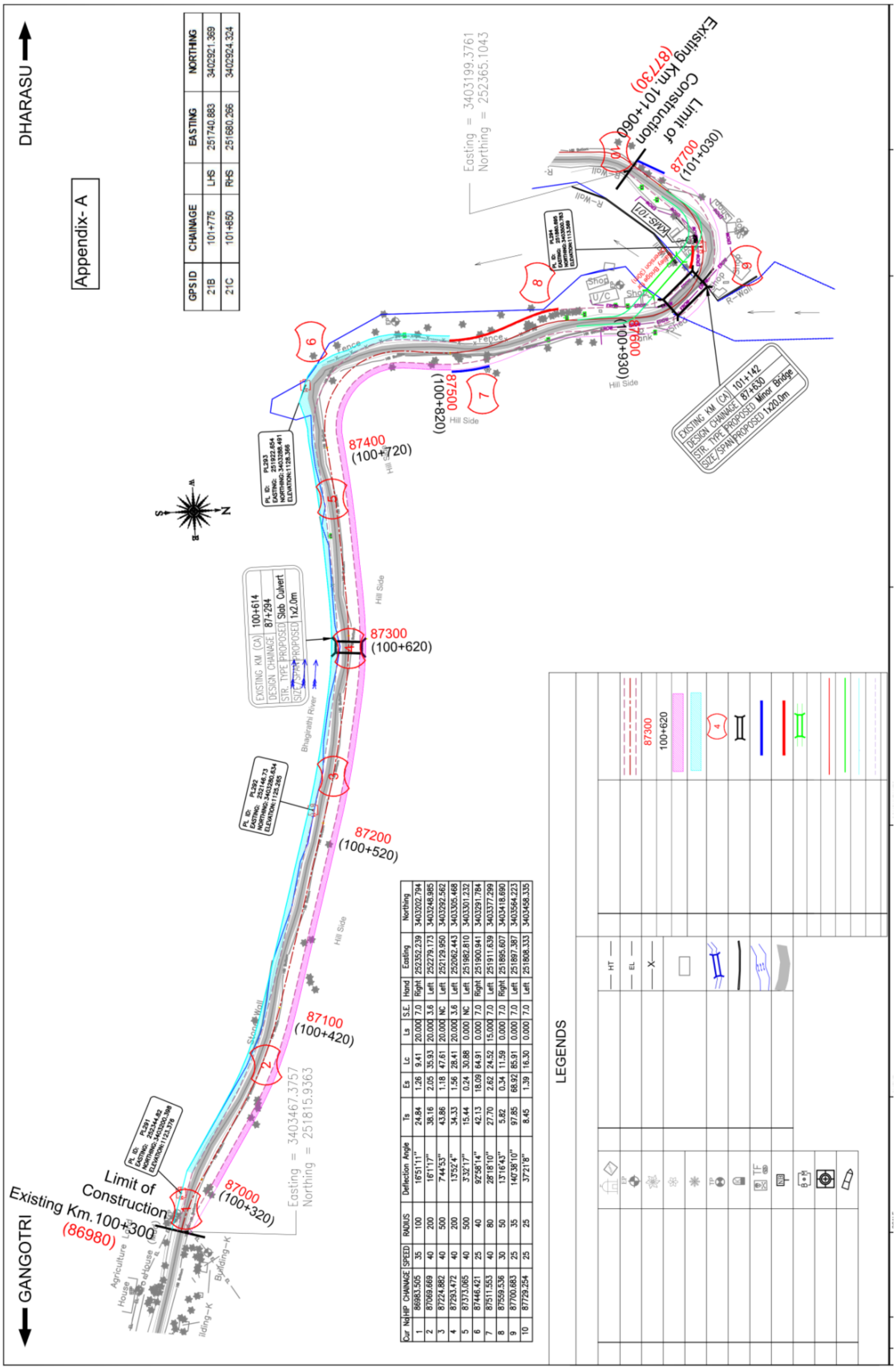
Annex-III

(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:

The alignment plan of the Project Highway is given under Appendix A.


DHARASU
GANGOTRI
Appendix- A
LEGENDS
Limit of Construction
Existing Km.100+300
(86980)
Existing Km.101+060
(87730)
87000 (100+320)
87100 (100+420)
87200 (100+520)
87300 (100+620)
87400 (100+720)
87500 (100+820)
87600 (100+930)
87700 (101+030)
Bhagirathi River
Hill Side

Annex - IV

(Schedule-A)

Environment Clearances

Not Applicable for this section.

SCHEDULE - B

(See Clause 2.1)

Development of the Project Highway

1. Development of the 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.

2. Rehabilitation and Upgradation

The project shall include "The Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhand on EPC Mode" described in Annex-I of this Schedule-B and in Schedule-C.

3. Specifications and Standards

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

Annex - I

(Schedule-B)

Description of Two-Laning

1. WIDENING OF THE EXISTING HIGHWAY

1.1 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 mountainous and steep terrain to the extent land is available.

1.2 WIDTH OF CARRIAGEWAY

1.2.1 Two-Laning with paved shoulders shall be undertaken. The paved carriageway shall be 7m wide in conformation with the typical cross sections drawings given under Appendix B1.

1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.2.1 above

2. GEOMETRIC DESIGN AND GENERAL FEATURES

2.1 General

Geometric design and general features of the Project Highway shall be in accordance with section 2 of the manual.

2.2 Design Speed

The design speed shall be the minimum design speed of 40 kmph except the locations given in alignment drawing (Annex –III, schedule A).

2.3 Improvement of the existing road geometry

2.3.1 Alignment of the road including bridge approaches shall be in accordance with Annex III, schedule A. Alignment of the protection work shall follow the proposed alignment of Project. For the purpose of setting out, coordinates of the proposed center line of the Project shall be as per Appendix B2.

The protection works shall be carried out to the extent possible within the given right of way.

2.3.2 Features of Landslide Protection Work

Protection work shall be provided for the following stretch:

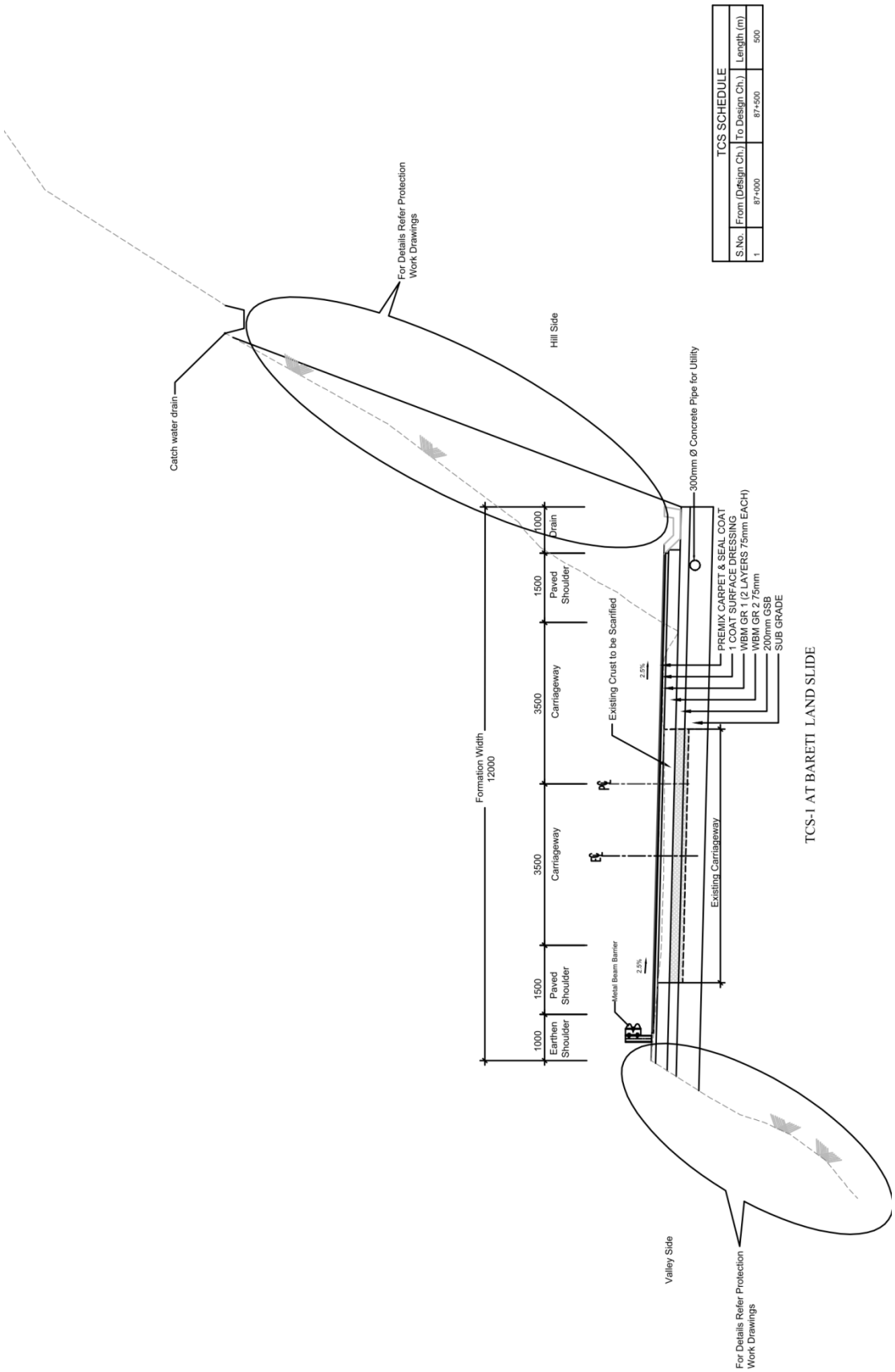
Sr. No.	Existing Chainage (Km) of NH 34**		Design Chainage@@		Length (m)
	From	To	From	To	
1	100+320	100+830	87+000	87+500	500 m

General arrangement of the proposed protection work is presented in **Appendix B3**. The protection arrangement shown is indicative only. Contractor shall submit detailed design and drawing along with requisite field investigation and test reports like geophysical investigations, geotechnical investigations, topographic survey, and hydrological survey etc. to Authority Engineer and shall obtain approval for the design before execution.

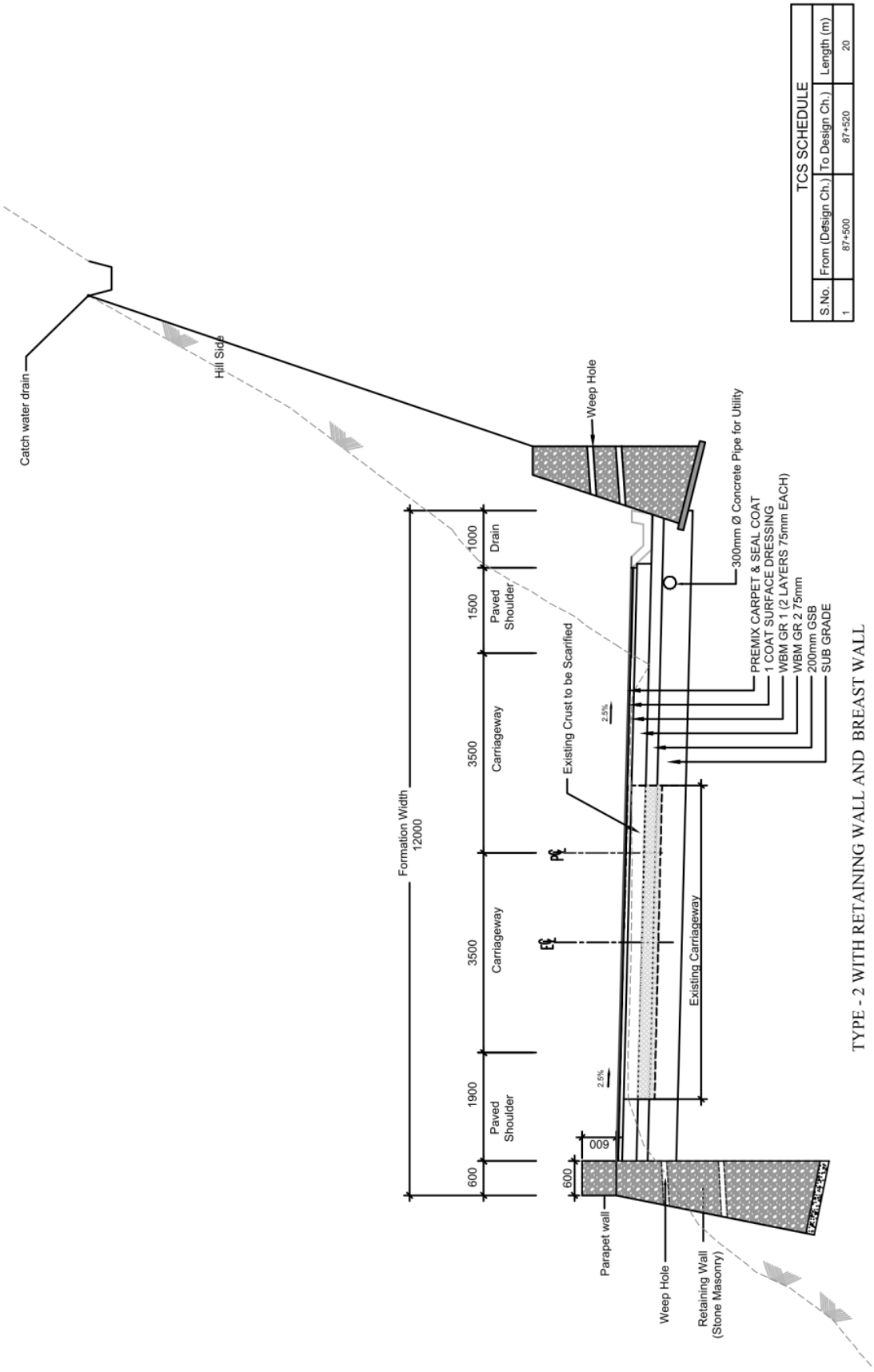
*** Any change in location shall be subject to approval from Authority Engineer.*

@@ Coordinates of proposed center line of road is given in Appendix B2 is only for setting out purpose.

Appendix – B1

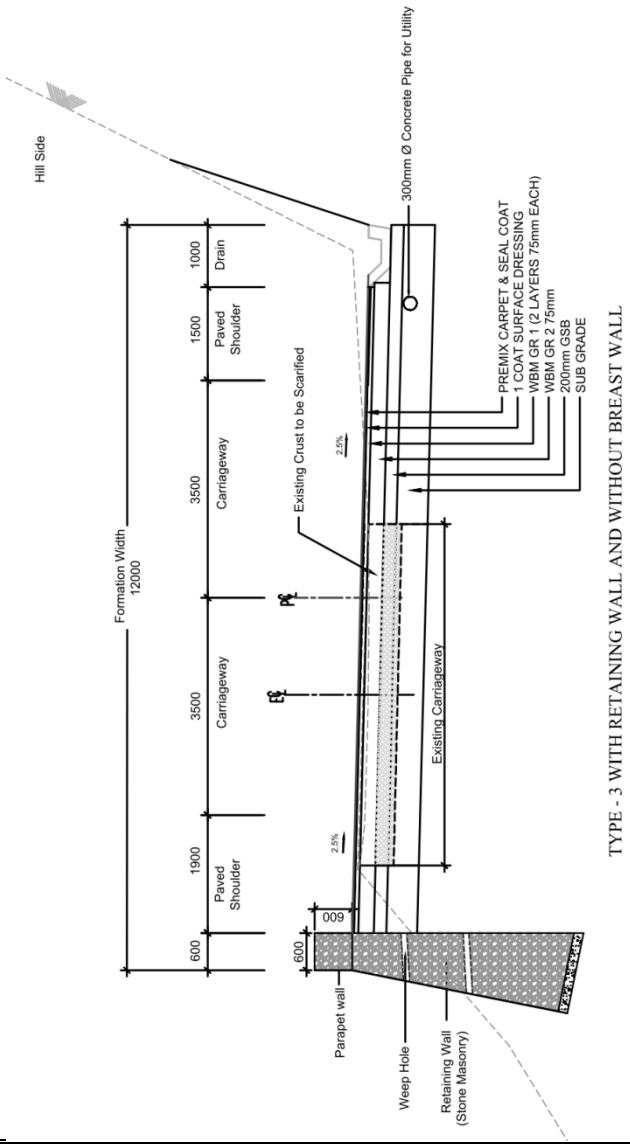

TCS SCHEDULE
S.No.
From (Design Ch.)
To Design Ch.)
Length (m)
1
87+000
87+500
500
For Details Refer Protection Work Drawings
Hill Side
Catch water drain
300mm Ø Concrete Pipe for Utility
PREMIX CARPET & SEAL COAT
1 COAT SURFACE DRESSING
WBM GR 1 (2 LAYERS 75mm EACH)
WBM GR 2 75mm
200mm GSB
SUB GRADE
Existing Crust to be Scarified
Existing Carriageway
Formation Width 12000
1000 Drain
1500 Paved Shoulder
3500 Carriageway
3500 Carriageway
1500 Paved Shoulder
1000 Earthen Shoulder
2.5%
Metal Beam Barrier
TCS-1 AT BARETI LAND SLIDE
Valley Side
For Details Refer Protection Work Drawings

Appendix – B1


TCS SCHEDULE
S.No.
From (Design Ch.)
To Design Ch.)
Length (m)
1
87+500
87+520
20
Catch water drain
Hill Side
Weep Hole
300mm Ø Concrete Pipe for Utility
PREMIX CARPET & SEAL COAT
1 COAT SURFACE DRESSING
WBM GR 1 (2 LAYERS 75mm EACH)
WBM GR 2 75mm
200mm GSB
SUB GRADE
Existing Crust to be Scarified
2.5%
Formation Width
12000
1000
Drain
1500
Paved Shoulder
3500
Carriageway
3500
Carriageway
1900
Paved Shoulder
600
Existing Carriageway
009
600
Parapet wall
Weep Hole
Retaining Wall (Stone Masonry)
TYPE - 2 WITH RETAINING WALL AND BREAST WALL

Appendix – B1

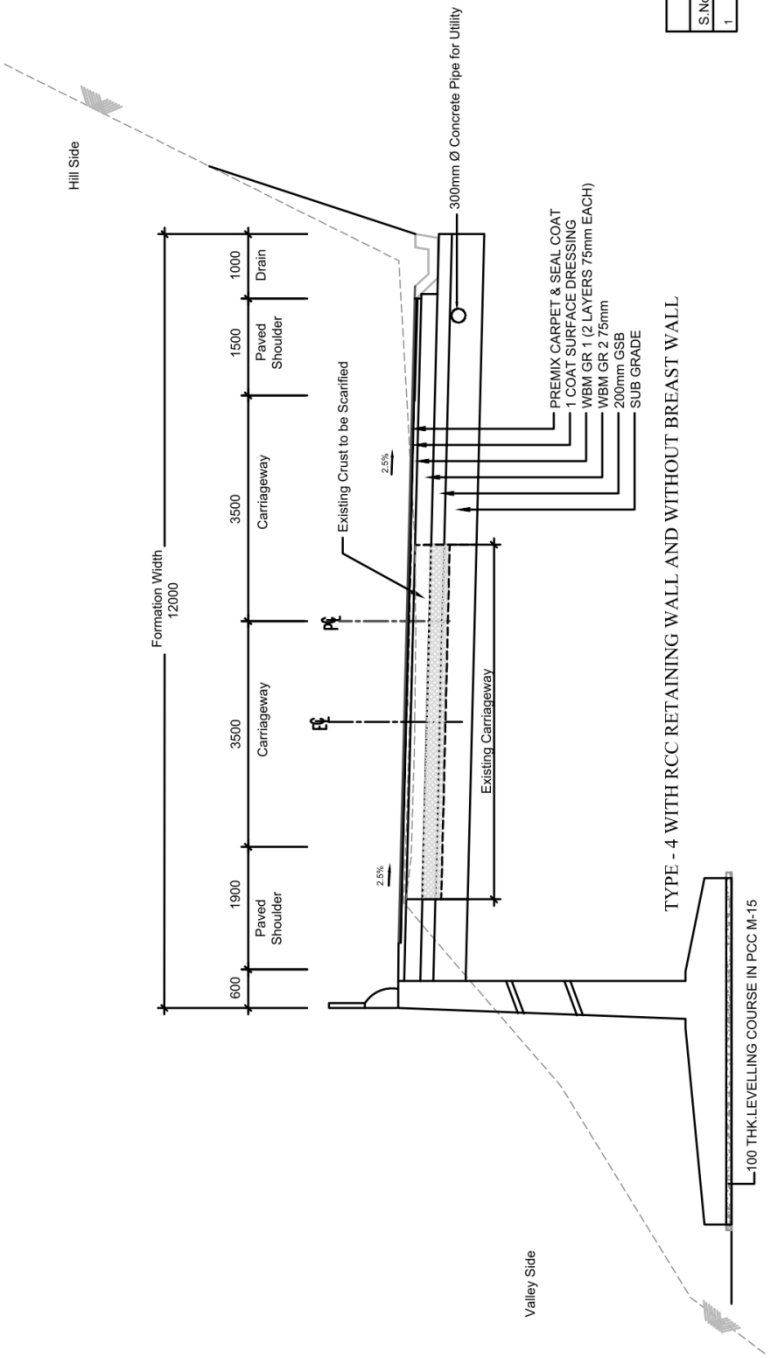
TCS SCHEDULE			
S.No.	From (Design Ch.)	To Design Ch.)	Length (m)
1	87+520	87+560	40



TYPE - 3 WITH RETAINING WALL AND WITHOUT BREAST WALL

Appendix – B1

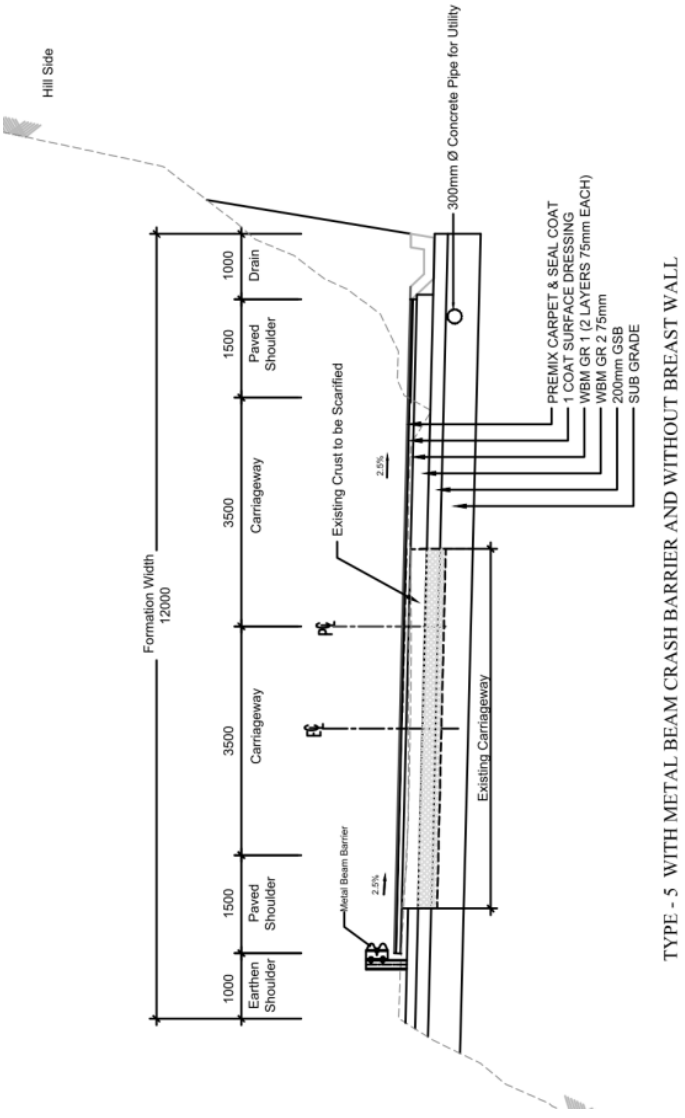
TCS SCHEDULE			
S.No.	From (Design Ch.)	To Design Ch.)	Length (m)
1	87+640	87+652	12



TYPE - 4 WITH RCC RETAINING WALL AND WITHOUT BREAST WALL

Appendix – B1

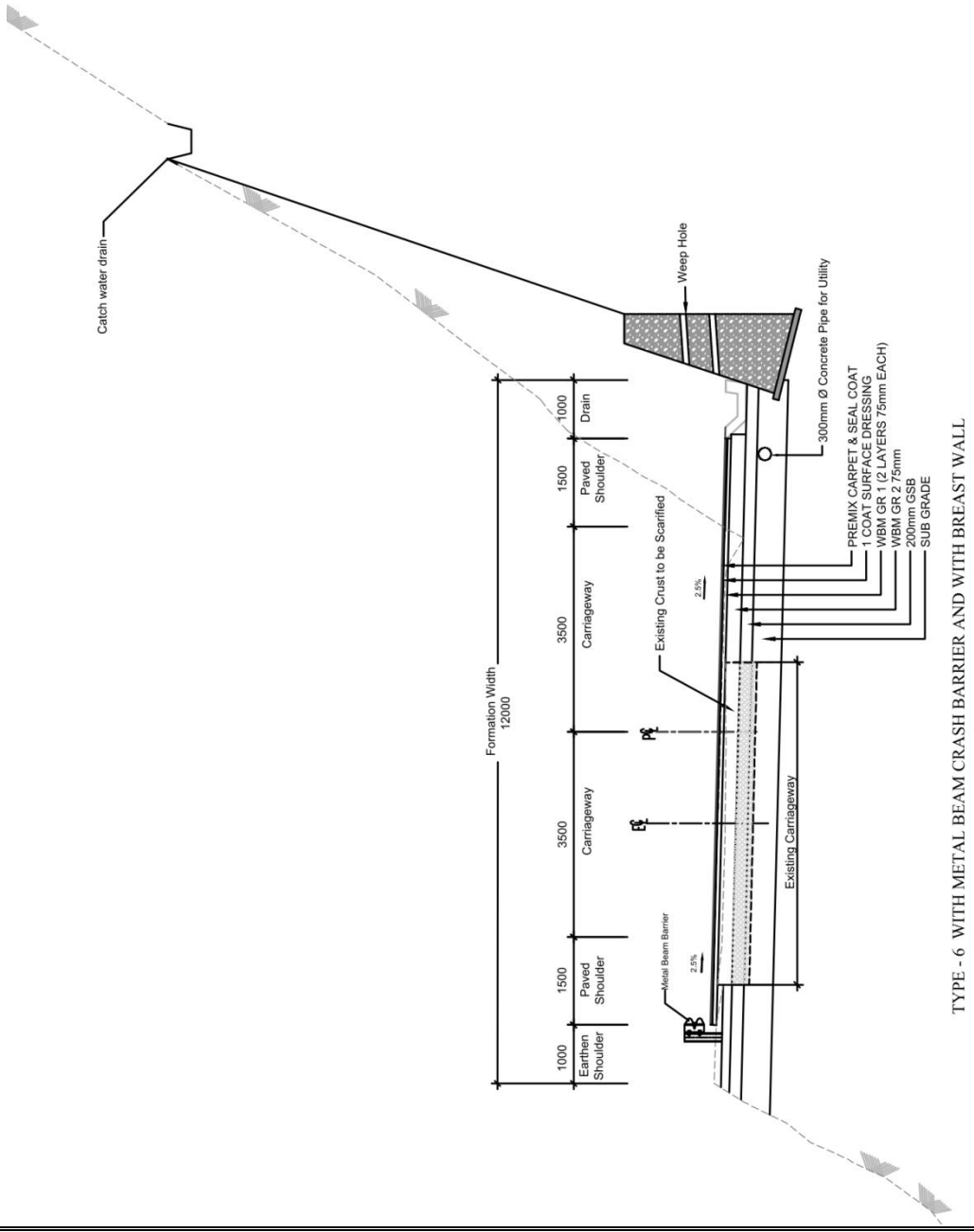
TCS SCHEDULE			
S.No.	From (Design Ch.)	To Design Ch.)	Length (m)
1	87+560	87+620	60
2	87+652	87+700	48



TYPE - 5 WITH METAL BEAM CRASH BARRIER AND WITHOUT BREAST WALL

Appendix – B1

TCS SCHEDULE			
S.No.	From (Dsign Ch.)	To Design Ch.)	Length (m)
1	86+980	87+000	20
2	87+700	87+730	30



TYPE - 6 WITH METAL BEAM CRASH BARRIER AND WITH BREAST WALL

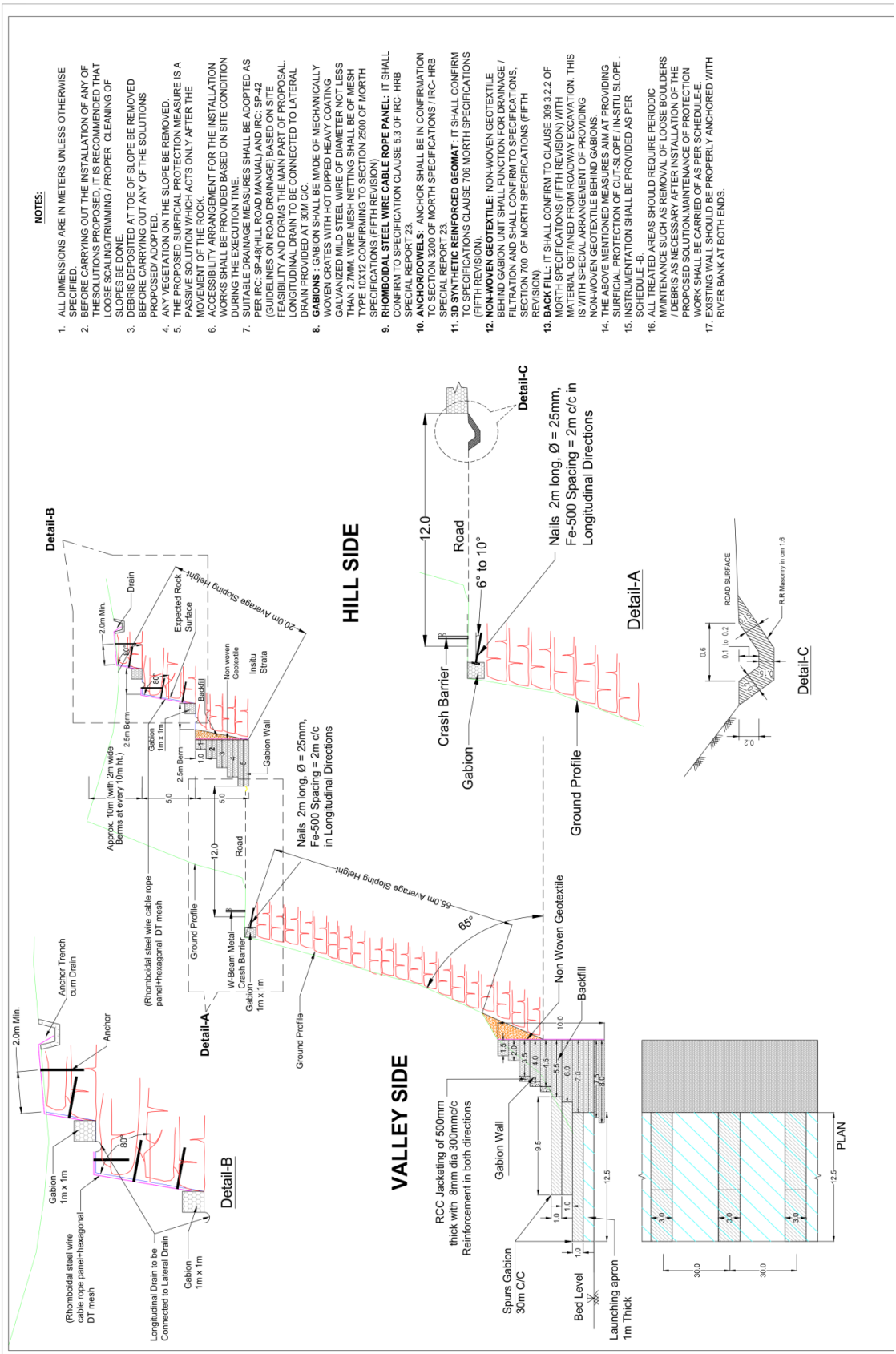
Appendix B2

Setting out Data for proposed center line of Road as per Design Chaingae

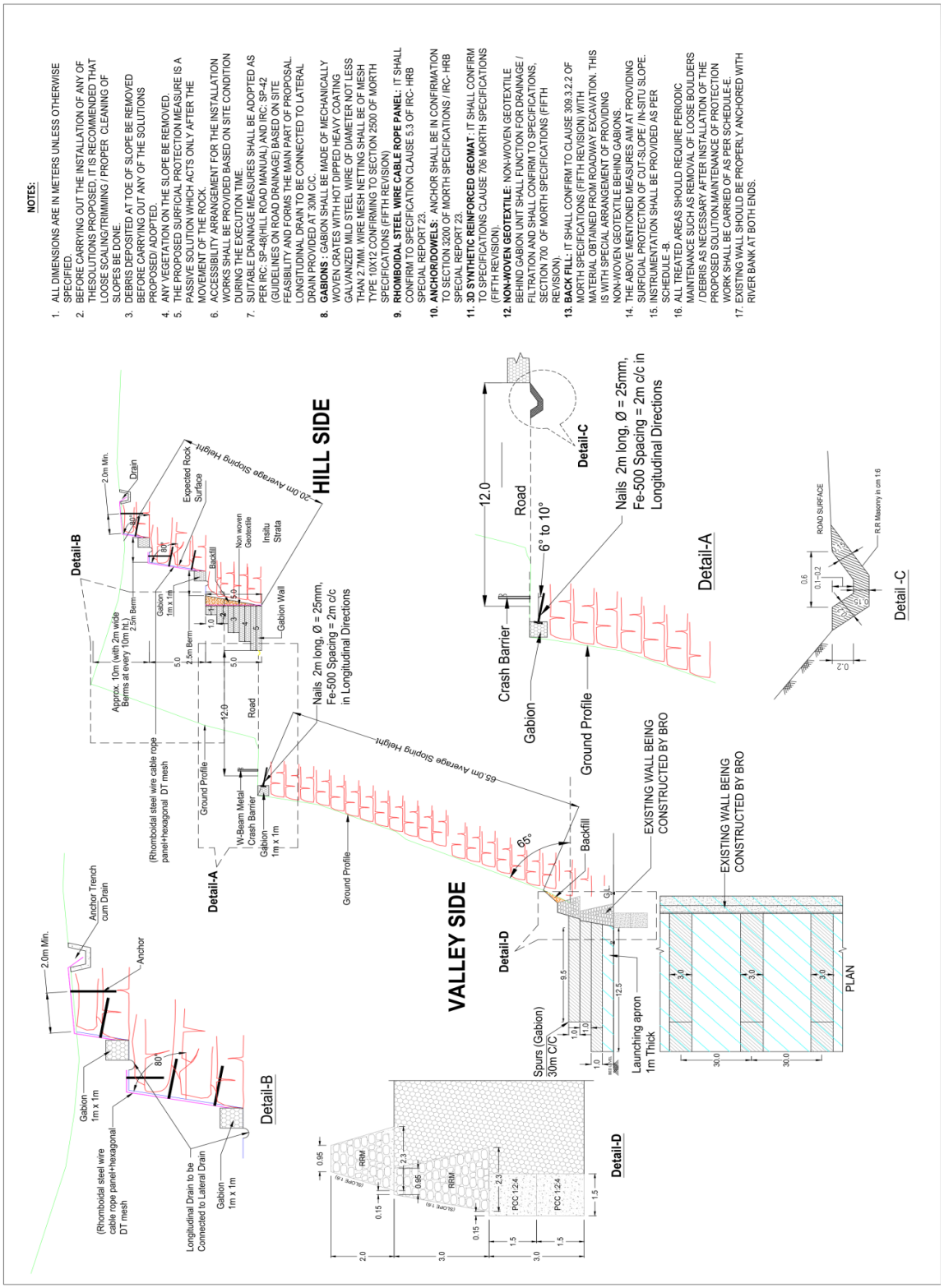
Chainage	X	Y
86900	252431.871	3403178.899
86910	252422.573	3403182.576
86920	252413.103	3403185.785
86930	252403.511	3403188.614
86940	252393.876	3403191.288
86950	252384.237	3403193.952
86960	252374.598	3403196.616
86970	252364.996	3403199.405
86980	252355.574	3403202.747
86990	252346.513	3403206.968
86995	252342.137	3403209.386
87000	252337.84	3403211.943
87010	252329.367	3403217.253
87020	252320.914	3403222.597
87030	252312.462	3403227.941
87040	252303.994	3403233.26
87050	252295.412	3403238.393
87060	252286.613	3403243.142
87070	252277.587	3403247.445
87080	252268.358	3403251.291
87090	252258.948	3403254.672
87100	252249.406	3403257.662
87110	252239.811	3403260.48
87120	252230.212	3403263.283
87130	252220.613	3403266.086
87140	252211.014	3403268.889
87150	252201.415	3403271.693
87160	252191.815	3403274.496
87170	252182.216	3403277.299
87180	252172.617	3403280.102
87190	252163.018	3403282.905
87200	252153.419	3403285.708
87210	252143.796	3403288.427
87220	252134.12	3403290.953
87230	252124.396	3403293.285
87240	252114.627	3403295.422
87250	252104.818	3403297.366
87260	252094.996	3403299.244
87270	252085.164	3403301.065
87280	252075.284	3403302.609
87290	252065.344	3403303.687
87300	252055.361	3403304.266
87310	252045.363	3403304.346
87320	252035.369	3403304.012
87330	252025.382	3403303.496
87340	252015.396	3403302.965
87350	252005.41	3403302.434
87360	251995.425	3403301.895
87370	251985.449	3403301.208

Chainage	X	Y
87380	251975.5	3403300.32
87390	251965.5	3403299.24
87400	251955.6	3403298.09
87410	251945.6	3403297.42
87415	251940.7	3403297.92
87420	251935.8	3403299.04
87425	251931.1	3403300.76
87430	251926.7	3403303.05
87435	251922.6	3403305.88
87440	251918.8	3403309.19
87445	251915.5	3403312.95
87450	251912.7	3403317.09
87455	251910.5	3403321.55
87460	251908.8	3403326.25
87470	251907.2	3403336.1
87475	251907.3	3403341.1
87480	251907.7	3403346.08
87490	251908.9	3403356.01
87500	251909.6	3403365.98
87510	251909.2	3403375.96
87520	251907.4	3403385.81
87530	251904.6	3403395.38
87540	251901	3403404.73
87550	251897.7	3403414.17
87560	251895.9	3403423.99
87570	251895.8	3403433.98
87580	251895.9	3403443.98
87590	251896	3403453.98
87600	251896.2	3403463.98
87610	251895.5	3403473.93
87620	251892.1	3403483.3
87630	251886.2	3403491.33
87640	251878.2	3403497.38
87650	251868.9	3403500.94
87660	251859	3403501.74
87670	251849.2	3403499.71
87680	251840.5	3403495.01
87690	251833.3	3403488.05
87700	251826.9	3403480.39
87710	251820.4	3403472.74
87720	251814	3403465.09
87730	251809.1	3403456.44
87740	251807.8	3403446.57
87750	251807.3	3403436.58
87760	251806.8	3403426.59
87770	251806.4	3403416.6
87780	251805.9	3403406.61
87790	251805.4	3403396.62
87800	251804.9	3403386.63

Appendix – B3


NOTES:
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. BEFORE CARRYING OUT THE INSTALLATION OF ANY OF THESOLUTIONS PROPOSED, IT IS RECOMMENDED THAT LOOSE SCALING/TRIMMING / PROPER CLEANING OF SLOPES BE DONE.
3. DEBRIS DEPOSITED AT TOE OF SLOPE BE REMOVED BEFORE CARRYING OUT ANY OF THE SOLUTIONS PROPOSED/ ADOPTED.
4. ANY VEGETATION ON THE SLOPE BE REMOVED.
5. THE PROPOSED SURFICIAL PROTECTION MEASURE IS A PASSIVE SOLUTION WHICH ACTS ONLY AFTER THE MOVEMENT OF THE ROCK.
6. ACCESSIBILITY ARRANGEMENT FOR THE INSTALLATION WORKS SHALL BE PROVIDED BASED ON SITE CONDITION DURING THE EXECUTION TIME.
7. SUITABLE DRAINAGE MEASURES SHALL BE ADOPTED AS PER IRC: SP-48(HILL ROAD MANUAL) AND IRC: SP-42 (GUIDELINES ON ROAD DRAINAGE) BASED ON SITE FEASIBILITY AND FORMS THE MAIN PART OF PROPOSAL. LONGITUDINAL DRAIN TO BE CONNECTED TO LATERAL DRAIN PROVIDED AT 30M C/C.
8. **GABIONS** : GABION SHALL BE MADE OF MECHANICALLY WOVEN CRATES WITH HOT DIPPED HEAVY COATING GALVANIZED MILD STEEL WIRE OF DIAMETER NOT LESS THAN 2.7MM. WIRE MESH NETTING SHALL BE OF MESH TYPE 10X12 CONFIRMING TO SECTION 2500 OF MORTH SPECIFICATIONS (FIFTH REVISION).
9. **RHOMBOIDAL STEEL WIRE CABLE ROPE PANEL**: IT SHALL CONFIRM TO SPECIFICATION CLAUSE 5.3 OF IRC- HRB SPECIAL REPORT 23.
10. **ANCHOR/DOWELS**: ANCHOR SHALL BE IN CONFIRMATION TO SECTION 3200 OF MORTH SPECIFICATIONS / IRC- HRB SPECIAL REPORT 23.
11. **3D SYNTHETIC REINFORCED GEOMAT** : IT SHALL CONFIRM TO SPECIFICATIONS CLAUSE 706 MORTH SPECIFICATIONS (FIFTH REVISION).
12. **NON-WOVEN GEOTEXTILE**: NON-WOVEN GEOTEXTILE BEHIND GABION UNIT SHALL FUNCTION FOR DRAINAGE / FILTRATION AND SHALL CONFIRM TO SPECIFICATIONS, SECTION 700 OF MORTH SPECIFICATIONS (FIFTH REVISION).
13. **BACK FILL**: IT SHALL CONFIRM TO CLAUSE 309.3.2.2 OF MORTH SPECIFICATIONS (FIFTH REVISION) WITH MATERIAL OBTAINED FROM ROADWAY EXCAVATION. THIS IS WITH SPECIAL ARRANGEMENT OF PROVIDING NON-WOVEN GEOTEXTILE BEHIND GABIONS.
14. THE ABOVE MENTIONED MEASURES AIM AT PROVIDING SURFICIAL PROTECTION OF CUT-SLOPE / IN-SITU SLOPE .
15. INSTRUMENTATION SHALL BE PROVIDED AS PER SCHEDULE -B.
16. ALL TREATED AREAS SHOULD REQUIRE PERIODIC MAINTENANCE SUCH AS REMOVAL OF LOOSE BOULDERS / DEBRIS AS NECESSARY AFTER INSTALLATION OF THE PROPOSED SOLUTION.MAINTENANCE OF PROTECTION WORK SHALL BE CARRIED OF AS PER SCHEDULE-E.
17. EXISTING WALL SHOULD BE PROPERLY ANCHORED WITH RIVER BANK AT BOTH ENDS.
HILL SIDE
VALLEY SIDE
Detail-A
Detail-B
Detail-C
PLAN
Road
Ground Profile
Crash Barrier
Gabion
Nails 2m long, Ø = 25mm, Fe-500 Spacing = 2m c/c in Longitudinal Directions
Non Woven Geotextile
Backfill
Gabion Wall
RCC Jacketing of 500mm thick with 8mm dia 300mmc/c Reinforcement in both directions
Spurs Gabion 30m C/C
Bed Level
Launching apron 1m Thick
Anchor Trench cum Drain
Anchor
Drain
Expected Rock Surface
Insitu Strata
Non woven Geotextile
Gabion 1m x 1m
(Rhomboidal steel wire cable rope panel+hexagonal DT mesh
Longitudinal Drain to be Connected to Lateral Drain
W-Beam Metal Crash Barrier
ROAD SURFACE
R.R Masonry in cm 1:6
20.0m Average Sloping Height
65.0m Average Sloping Height
6° to 10°
65°
80°

Appendix – B3


NOTES:
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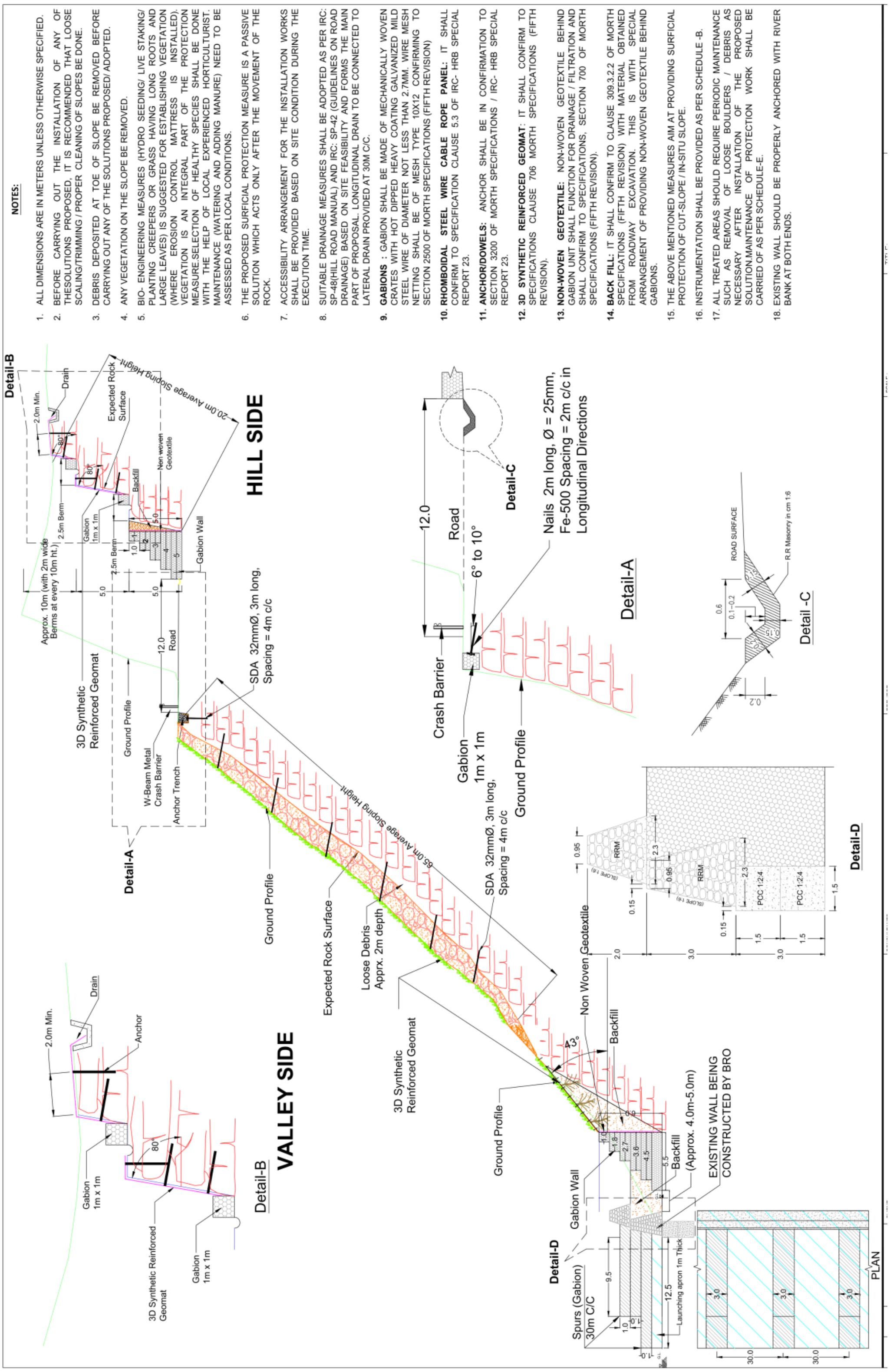
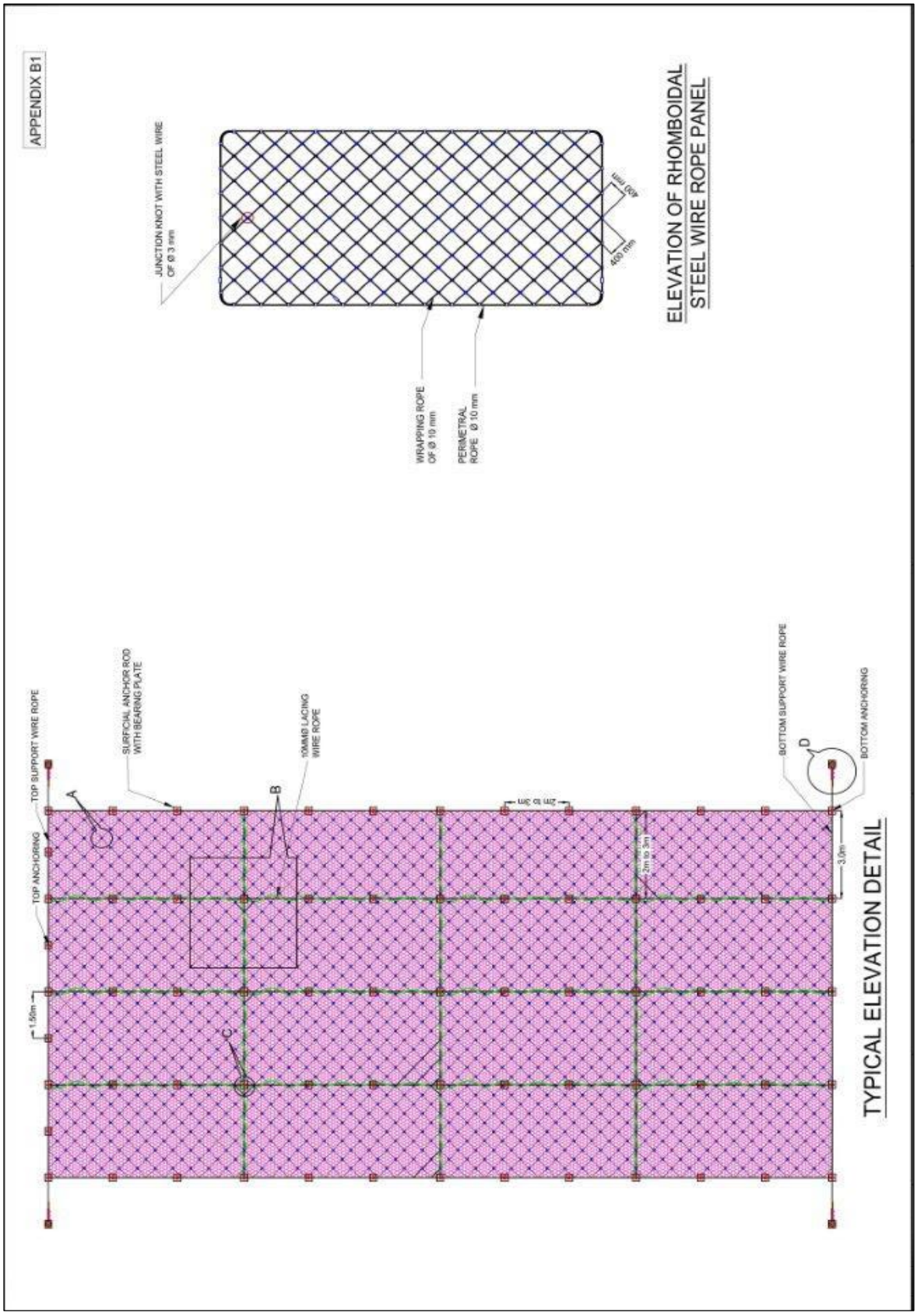
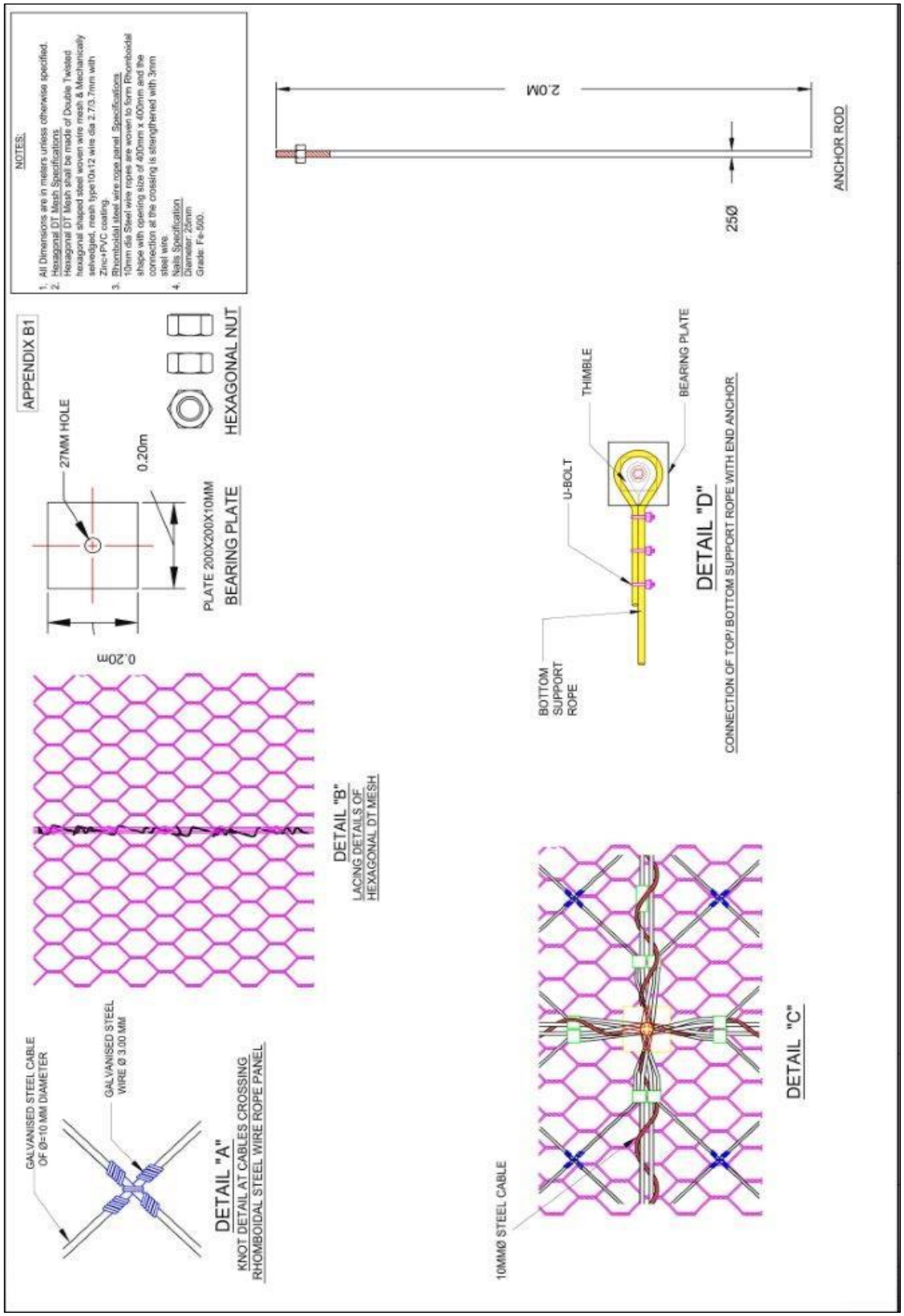
3. DEBRIS DEPOSITED AT TOE OF SLOPE BE REMOVED BEFORE CARRYING OUT ANY OF THE SOLUTIONS PROPOSED/ ADOPTED.
4. ANY VEGETATION ON THE SLOPE BE REMOVED.
5. THE PROPOSED SURFICIAL PROTECTION MEASURE IS A PASSIVE SOLUTION WHICH ACTS ONLY AFTER THE MOVEMENT OF THE ROCK.
6. ACCESSIBILITY ARRANGEMENT FOR THE INSTALLATION WORKS SHALL BE PROVIDED BASED ON SITE CONDITION DURING THE EXECUTION TIME.
7. SUITABLE DRAINAGE MEASURES SHALL BE ADOPTED AS PER IRC: SP-48(HILL ROAD MANUAL) AND IRC: SP-42 (GUIDELINES ON ROAD DRAINAGE) BASED ON SITE FEASIBILITY AND FORMS THE MAIN PART OF PROPOSAL. LONGITUDINAL DRAIN TO BE CONNECTED TO LATERAL DRAIN PROVIDED AT 30M C/C.
8. **GABIONS** : GABION SHALL BE MADE OF MECHANICALLY WOVEN CRATES WITH HOT DIPPED HEAVY COATING GALVANIZED MILD STEEL WIRE OF DIAMETER NOT LESS THAN 2.7MM. WIRE MESH NETTING SHALL BE OF MESH TYPE 10X12 CONFIRMING TO SECTION 2500 OF MORTH SPECIFICATIONS (FIFTH REVISION)
9. **RHOMBOIDAL STEEL WIRE CABLE ROPE PANEL**: IT SHALL CONFIRM TO SPECIFICATION CLAUSE 5.3 OF IRC- HRB SPECIAL REPORT 23.
10. **ANCHORDOWELS**: ANCHOR SHALL BE IN CONFIRMATION TO SECTION 3200 OF MORTH SPECIFICATIONS / IRC- HRB SPECIAL REPORT 23.
11. **3D SYNTHETIC REINFORCED GEOMAT**: IT SHALL CONFIRM TO SPECIFICATIONS CLAUSE 706 MORTH SPECIFICATIONS (FIFTH REVISION).
12. **NON-WOVEN GEOTEXTILE**: NON-WOVEN GEOTEXTILE BEHIND GABION UNIT SHALL FUNCTION FOR DRAINAGE / FILTRATION AND SHALL CONFIRM TO SPECIFICATIONS, SECTION 700 OF MORTH SPECIFICATIONS (FIFTH REVISION).
13. **BACK FILL**: IT SHALL CONFIRM TO CLAUSE 309.3.2.2 OF MORTH SPECIFICATIONS (FIFTH REVISION) WITH MATERIAL OBTAINED FROM ROADWAY EXCAVATION. THIS IS WITH SPECIAL ARRANGEMENT OF PROVIDING NON-WOVEN GEOTEXTILE BEHIND GABIONS.
14. THE ABOVE MENTIONED MEASURES AIM AT PROVIDING SURFICIAL PROTECTION OF CUT-SLOPE / IN-SITU SLOPE.
15. INSTRUMENTATION SHALL BE PROVIDED AS PER SCHEDULE -B.
16. ALL TREATED AREAS SHOULD REQUIRE PERIODIC MAINTENANCE SUCH AS REMOVAL OF LOOSE BOULDERS / DEBRIS AS NECESSARY AFTER INSTALLATION OF THE PROPOSED SOLUTION.MAINTENANCE OF PROTECTION WORK SHALL BE CARRIED OF AS PER SCHEDULE-E.
17. EXISTING WALL SHOULD BE PROPERLY ANCHORED WITH RIVER BANK AT BOTH ENDS.
HILL SIDE
VALLEY SIDE
Detail-A
Detail-B
Detail-C
Detail-D
Detail -C
PLAN
Expected Rock Surface
Drain
Backfill
Insitu Strata
Non woven Geotextile
Gabion Wall
Road
Ground Profile
Crash Barrier
Gabion
Nails 2m long, Ø = 25mm, Fe-500 Spacing = 2m c/c in Longitudinal Directions
Approx. 10m (with 2m wide Berms at every 10m ht.)
(Rhomboidal steel wire cable rope panel+hexagonal DT mesh
W-Beam Metal Crash Barrier
EXISTING WALL BEING CONSTRUCTED BY BRO
Anchor Trench cum Drain
Anchor
Longitudinal Drain to be Connected to Lateral Drain
Spurs (Gabion) 30m C/C
Launching apron 1m Thick
ROAD SURFACE
R.R Masonry in cm 1:6


HILL SIDE
VALLEY SIDE
Detail-A
Detail-B
Detail-C
Detail-D
PLAN
NOTES:
SDA 32mmØ, 3m long, Spacing = 4m c/c
Nails 2m long, Ø = 25mm, Fe-500 Spacing = 2m c/c in Longitudinal Directions
3D Synthetic Reinforced Geomat
Ground Profile
Expected Rock Surface
Loose Debris Apprx. 2m depth
Crash Barrier
Gabion 1m x 1m
Gabion Wall
Non Woven Geotextile
Backfill
EXISTING WALL BEING CONSTRUCTED BY BRO
Spurs (Gabion) 30m C/C

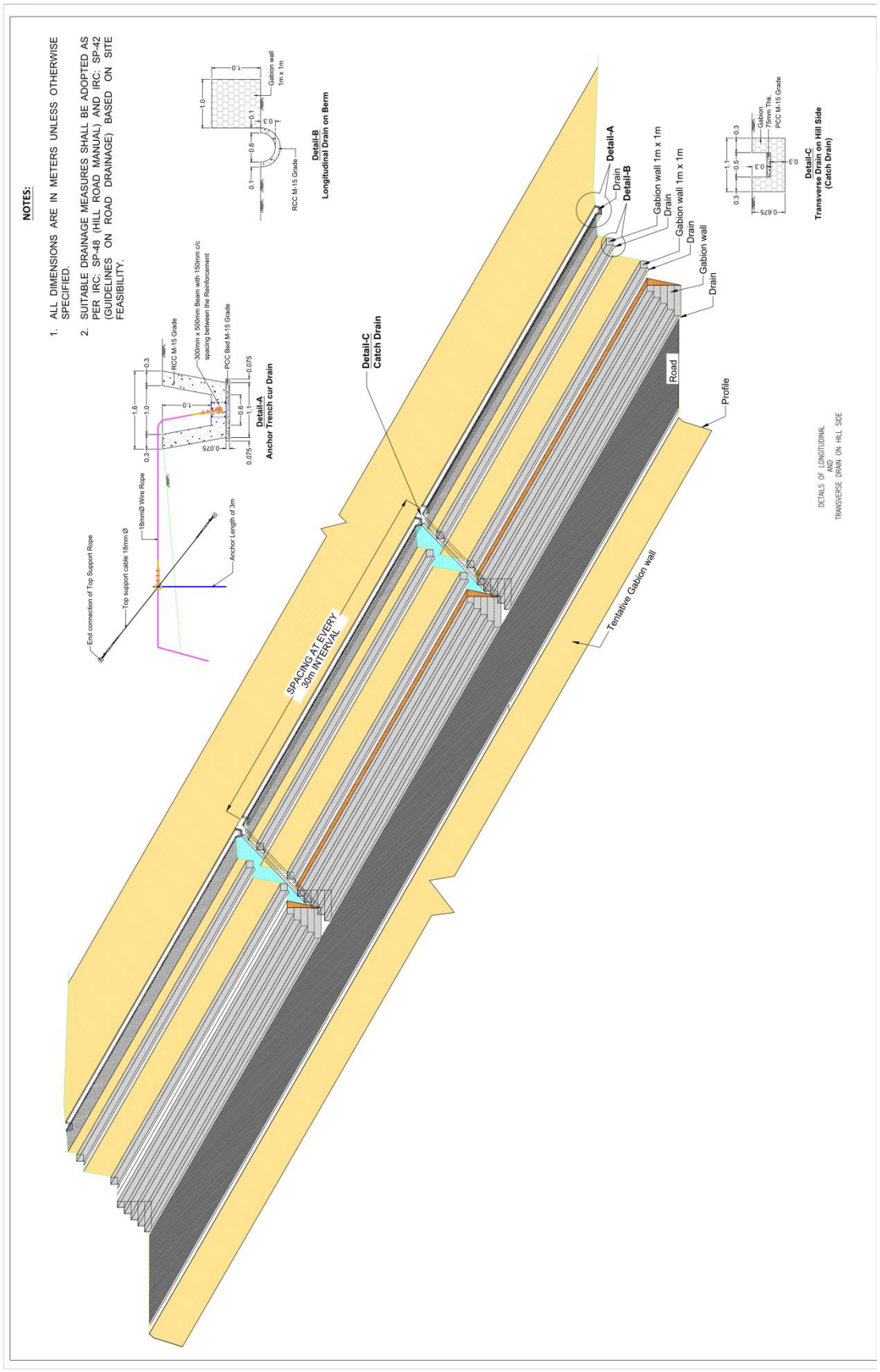
Appendix – B3


APPENDIX B1
ELEVATION OF RHOMBOIDAL
STEEL WIRE ROPE PANEL
JUNCTION KNOT WITH STEEL WIRE
OF Ø 3 mm
400 mm
400 mm
WRAPPING ROPE
OF Ø 10 mm
PERIMETRAL
ROPE Ø 10 mm
TYPICAL ELEVATION DETAIL
TOP SUPPORT WIRE ROPE
TOP ANCHORING
SURFICIAL ANCHOR ROD
WITH BEARING PLATE
10MM Ø LACING
WIRE ROPE
BOTTOM SUPPORT WIRE ROPE
BOTTOM ANCHORING
A
B
C
D
2m to 3m
2m to 3m
3.0m
1.50m

Appendix – B3


NOTES:
1. All Dimensions are in meters unless otherwise specified.
2. Hexagonal DT Mesh Specifications
Hexagonal DT Mesh shall be made of Double Twisted hexagonal shaped steel woven wire mesh & Mechanically selvedged, mesh type10x12 wire dia 2.7/3.7mm with Zinc+PVC coating.
3. Rhomboidal steel wire rope panel Specifications
10mm dia Steel wire ropes are woven to form Rhomboidal shape with opening size of 400mm x 400mm and the connection at the crossing is strengthened with 3mm steel wire.
4. Nails Specification
Diameter: 25mm
Grade: Fe-500.
2.0M
25Ø
ANCHOR ROD
APPENDIX B1
27MM HOLE
0.20m
PLATE 200X200X10MM
BEARING PLATE
HEXAGONAL NUT
0.20m
DETAIL "B"
LACING DETAILS OF HEXAGONAL DT MESH
THIMBLE
BEARING PLATE
U-BOLT
BOTTOM SUPPORT ROPE
DETAIL "D"
CONNECTION OF TOP/ BOTTOM SUPPORT ROPE WITH END ANCHOR
GALVANISED STEEL CABLE OF Ø=10 MM DIAMETER
GALVANISED STEEL WIRE Ø 3.00 MM
DETAIL "A"
KNOT DETAIL AT CABLES CROSSING RHOMBOIDAL STEEL WIRE ROPE PANEL
10MMØ STEEL CABLE
DETAIL "C"

Appendix – B3


NOTES:
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. SUITABLE DRAINAGE MEASURES SHALL BE ADOPTED AS PER IRC: SP-48 (HILL ROAD MANUAL) AND IRC: SP-42 (GUIDELINES ON ROAD DRAINAGE) BASED ON SITE FEASIBILITY.
Detail-B
Longitudinal Drain on Berm
RCC M-15 Grade
Gabion wall 1m x 1m
Detail-A
Anchor Trench cur Drain
RCC M-15 Grade
300mm x 500mm Beam with 150mm c/c spacing between the Reinforcement
PCC Bed M-15 Grade
16mmØ Wire Rope
Anchor Length of 3m
End connection of Top Support Rope
Top support cable 16mm Ø
Detail-C
Catch Drain
Detail-A
Detail-B
Drain
Gabion wall 1m x 1m
Drain
Gabion wall 1m x 1m
Drain
Gabion wall
Drain
Road
Profile
Tentative Gabion wall
SPACING AT EVERY 30m INTERVAL
Detail-C
Transverse Drain on Hill Side
(Catch Drain)
Gabion
Thickness Thk.
PCC M-15 Grade
DETAILS OF LONGITUDINAL AND TRANSVERSE DRAIN ON HILL SIDE

2.3.3 Instrumentation for Monitoring

Following monitoring instruments shall be provided at Landslide protection work

Type of Instrument	
Piezometer	**Inclinometer**
2 nos.	6 nos.

2.4 Right of Way

The Site of the Project Highway comprises the land as described in Annexure-II of Schedule-A

2.5 Type of Shoulders

- Paved Shoulders 1.5m on hill side
- Paved shoulder 1.90m on valley side at parapet wall locations.
- Paved shoulder 1.5m and 1m granular shoulder on valley side at crash barrier locations.

a) Design and specification of hard shoulder and granular material shall confirm to the requirements specified in paragraph 5.10 and 5.11 of the Manual.

2.6 Lateral and vertical clearances at underpasses

2.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.11 of the Manual.

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

S. No.	Design Chainage (Km)	Span/opening (m)	Remarks
NIL			

2.7 Lateral and vertical clearances at overpasses

2.7.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per paragraph 2.12 of the Manual.

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

S. No.	Design Chainage (Km)	Span/opening (m)	Remarks
NIL			

2.8 Service roads

Service roads/Slip Roads shall be constructed at the locations and for the lengths indicated below:

S. No	Design Chainage (Km)	RHS/LHS	Length of the Service Road (m)
NIL			

2.9 Grade separated structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.14 of the Manual. The requisite particulars are given below:

S. No.	Design Chainage (Km)	Length (m)	Number and length of spans	Approach gradient	Remarks, if any
NIL					

2.9.2 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:

S. No.	Design Chainage (Km)	Type of structure Length (m)	Cross road at		
			Existing level	Raised Level	Lowered Level
NIL					

2.10 Cattle and pedestrian under pass / over pass

Cattle and pedestrian underpass shall be constructed as follows:

S. No.	Design Chainage (Km)	Type of Crossing
NIL		

2.11 Typical cross-sections of the Project Highway

Indicative typical cross sections along with different types of cross-sections required to be developed in different segments of the project highway are indicated in Appendix B-I. Cross Section schedule for the project highway is as follows:

Sl. No.	Design Chainage (Km)		Length (km)	Applicability	TCS Type	Remarks
	From	To				
1	87+000	87+500	0.500	TCS for Bareti landslide location	TCS-1	TCS is given under Appendix B1
2	87+500	87+520	0.020	TCS with retaining on valley side and breast wall on hill side	TCS-2	
3	87+520	87+560	0.040	TCS with retaining on valley side	TCS-3	
4	87+640	87+652	0.012	TCS with RCC retaining on valley side	TCS-4	
5	87+560 87+652	87+620 87+700	0.060 0.048	TCS with MCB on valley side	TCS-5	

Sl. No.	Design Chainage (Km)		Length (km)	Applicability	TCS Type	Remarks
	From	To				
6	86+980 87+700	87+000 87+730	0.020 0.030	TCS with MCB on valley side and breast wall on hill side	TCS-6	

3. INTERSECTIONS AND GRADE SEPARATORS

All intersections and grade separators shall be as per section 3 of the 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 table below:

a) **At-grade intersections (Major Junctions)**

S. No.	Design Chainage (Km)	Type of Intersection	Other features	Remarks
NIL				

b) **At-grade intersections (Minor Junctions)**

S. No.	Design Chainage (Km)	Type of Intersection	Other features
NIL			

c) Grade separated intersection without ramps

S. No.	Design Chainage (Km)	Salient features	Minimum length of viaduct to be provided	Road to be carried over/under the structures
NIL				

4. ROAD EMBANKMENT AND CUT SECTION

4.1 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 (refer Appendix – B1).. Deficiencies in the plan and profile of the existing road shall be corrected.

Raising of the existing road shall be as required for the correction of vertical profile as per alignment plan given under Annex III, Schedule A.

5. PAVEMENT DESIGN

5.1 Existing pavement shall be reconstructed with following pavement layers:

a) Pre-Mix Carpet with seal coat

b) Surface dressing – single coat

c) WBM Grade 2 one layer – 75mm

d) WBM Grade 1 in two layers – 75mm each

e) Granular Sub Base: 200mm

f) Subgrade 500mm with CBR 10%

5.2 Type of pavement

The pavement shall be Flexible pavement.

5.3 Design Requirements

As per para 5.1 above.

5.3.1 Design Period and strategy

Pavement layers shall be as per para 5.1 above.

5.3.2 Design Traffic

Pavement layers shall be as per para 5.1 above.

5.4 Reconstruction of stretches

The following stretches of the existing road shall be reconstructed. These shall be provided with new pavement as per para 5.1 above.

Sr. No.	Existing chaiange (Km)		Design Chainage (km)	
	From	To	From	To
1	100+300	101+060	86+980	87+730

6. ROADSIDE DRAINAGE

Drain on hill side shall be provided as shown in the typical cross section (refer Appendix B1)and Drainage system including surface and subsurface drains for the Project shall be provided as per Section 6 and 13 of the Manual.

7. DESIGN OF STRUCTURES

7.1 General

7.1.1 All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of the manual and shall conform to the cross-sectional features and other details specified therein.

7.1.2 Width of the carriageway of new bridge shall be as shown in the General arrangement of drawing of bridge under Appendix B4.

7.1.3 Thefollowing structures shall be provided with footpaths:

S. No.	Design Chainage (Km)	Remarks
1	87+630	

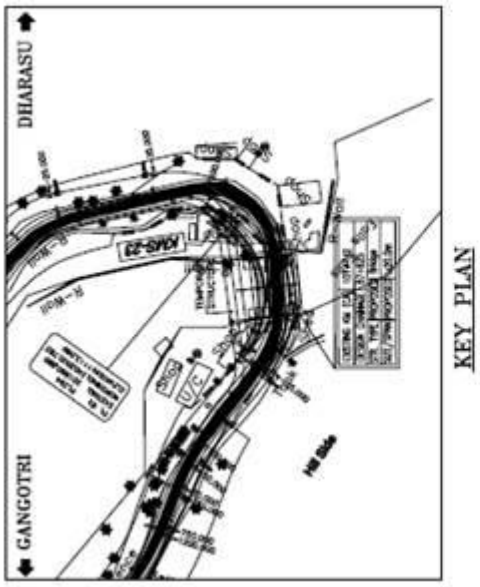
7.1.4 All bridges shall be high-level bridges. **Yes**

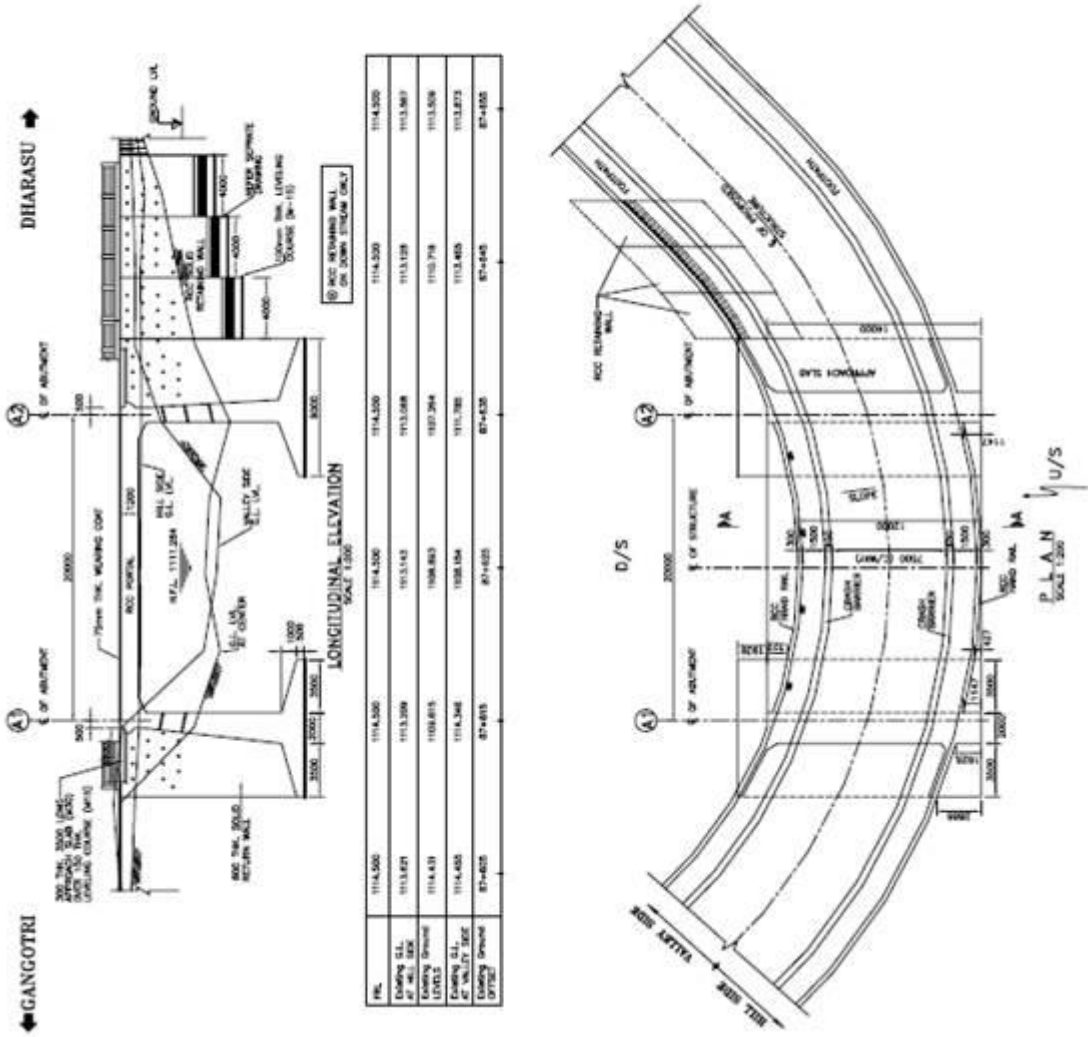
7.1.5 The following structures shall be designed to carry utility services specified in table below.

S. No.	Design Chainage (Km)	Utility service to be carried	Remarks
1	87+630	Yes	

7.1.6 Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections for the Project Highway.

Appendix B4


DHARASU
GANGOTRI
KEY PLAN


DHARASU
GANGOTRI
LONGITUDINAL ELEVATION
SCALE 1:200
PLAN
SCALE 1:200
D/S
U/S
VALLEY SIDE
HILL SIDE

7.2 Culverts

7.2.1 The Culverts overall width shall be equal to the roadway width of the approaches.

7.2.2 ***Reconstruction of existing culverts***:

The existing culverts at the following locations shall be re-constructed as new culverts.

S. No	Design Chainage (Km)	Type of Culvert	Span Arrangement
		Proposed	And opening Proposed (nos.x m.)*
1	87+294	Slab	1x2.0

*Note- height of opening shall be kept according to adjoining TCS.

7.2.3 ***Widening of Existing Culverts***

All existing culverts, which are not to be reconstructed, shall be widened up to the roadway width of the Project Highway & as per the typical cross section given in the Manual and the existing width portion of culverts shall be repaired as per site requirements.

S. No	Design Chainage (Km)	Structure Type	Openings / Spans x Length	Width of existing culvert (m)	Remark
NIL					

7.2.4 Additional new culverts (given in table below) shall be constructed for width equal to the roadway width of the Project Highway & as per typical cross-section given in the manual:

S. No.	Design Chainage (Km)	Proposed type	No. of Spans X span length (m)
NIL			

7.2.5 Repairs/replacements of railing/parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

S. No.	Design Chainage (Km)	Type of repair required
NIL		

7.2.6 Floor protection works shall be as specified in the relevant IRC Codes and Specifications

7.3 Bridges

7.3.1 Existing bridges to be re-constructed/widened:

i. The Existing bridges at the following locations shall be reconstructed as new Structure:

S. No	Bridge Location (Design Chainage, in Km)	Salient Features of Existing Bridge		Features of Proposed Bridge	
		No. of Spans with Span Length (c/c of exp. Gap)	Total Width (m)	Proposed Length (m)	Total proposed Width
1	87+630	1 x 20.0	5.50	20.0	14.0

NOTE: GAD is given in Appendix B4.

(ii) The following narrow bridges shall be widened:

S. No.	Design Chainage (Km)	Width (m)	Extent* of Widening	Span Arrangement (m)	Type of Structure			Cross Section at Deck Level for widening
					Foundation	Sub-Structure	Super-Structure	
NIL								

7.3.2 *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.

S. No.	Bridge Location (Design Chainage, in Km)	Total Length (m)	Remarks
NIL			

7.3.3 The railings of existing bridges shall be replaced by crash barriers at the following locations:

S. No.	Design Chainage (Km)	Total length (m)	Remarks
NIL			

7.3.4 Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as follows

S. No.	Design Chainage (Km)	Existing span arrangement (m)	Remarks
NIL			

7.3.5 *Drainage system for bridge deck*
An effective drainage system for bridge decks shall be provided as specified in paragraph 7.20 of the Manual

7.3.6 *Structures in marine environment*
The Project Alignment does not lie in Marine Alignment.

7.3.7 Bailey bridge for Diversion

For diversion of traffic, a bailey bridge of following configuration shall be constructed on downstream side of existing bridge:

Sl. No.	Ex. Chainage	Proposed Span/Opening (m.)	Proposed Carriageway Width(m)	Loading Requirement	Structure type
1	101+142	1x30.0	4.25	IRC Class 30R	DS configuration (Double story single stage)

Note: Salvage value of this bridge to be considered.

7.4 Rail-road bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in the Manual. The Width of proposed ROB shall be as specified in Schedule D.

7.4.2 **Road over-bridges**

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

S. No	Proposed Structure	Existing Chainage	Design Chainage	Name of Crossing	Proposed structural configuration	Proposed Super Structure	Proposed span arrangement (m)	Total Width of Structure
NIL								

7.4.3 **Road under-bridges**

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

S. No	Design Chainage (Km)	Number and length of span (m)
NIL		

7.5 Grade separated structures

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

7.6 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. Bridges

S. No.	Design Chainage (Km)	Nature and extent of repairs /strengthening to be carried out
NIL		

B. ROB / RUB

S. No.	Design Chainage (Km)	Nature and extent of repairs /strengthening to be carried out
NIL		

C. Overpasses/Underpasses and other structures

S. No.	Design Chainage (Km)	Nature and extent of repairs /strengthening to be carried out
NIL		

7.7 List of Major Bridges and Structures

The following is the list of the Major Bridges and Structures:

S. No.	Type of Structure	Design Chainage (Km)	Remark
NIL			

Note: - *1. The location and vent size of all the culverts proposed for irrigation purposes shall be decided in consultation with irrigation authority/ independent engineer.*

2. Width of culvert shall be reconciled as per cross section at that location

3. Cross road culvert to be provided at the location of Major Junction/ Minor Junctions or utility purposes etc. shall be decided with independent Engineer shall not be treated as change of scope.

8. TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORK.

8.1 Traffic control devices and road safety works shall be provided in accordance with Section 9 of the IRC:SP:73-2015.

8.2 Specifications of the reflective sheeting shall be as per the Manual of Specifications (IRC:SP:73-2015).

9. ROAD SIDE FURNITURE

9.1 Road side furniture shall be provided in accordance with the provisions of Section 11 of the IRC:SP:73-2015 and as given under typical cross section (refer Appendix B1) .

9.2 Overhead traffic signs: location and size

NIL

10. COMPULSORY AFFORESTATION

The minimum number of trees 500 are required to be planted by the contractor as compensatory afforestation shall be as per Forest Conservation Act and as per conditions

of revenue authority while giving permission. Any increase or decrease in numbers of trees as specified (as 500) shall not be treated as change of scope.

11. HAZARDOUS LOCATIONS

The road side safety/Crash barriers shall be provided at following locations for minimum length as per the Manual of Specifications (IRC:SP:73-2015). However, the actual length shall be identified as per requirement of clause 9.4 of IRC:SP:73-2015 in consultation with Authority Engineer. Any increase or decrease in length as specified shall not be treated as change of scope.

S. No.	Design Chainage (km)		Type	Side	Length of Barrier (m)
	From	To			
1	87+000	87+500	W-beam metal crash barrier	LHS	500
2	87+640	87+652	Concrete crash barrier	LHS	12
3	87+560	87+620	W-beam metal crash barrier	LHS	70
4	87+652	87+700	W-beam metal crash barrier	LHS	48
5	86+980	87+000	W-beam metal crash barrier	LHS	20
6	87+700	87+730	W-beam metal crash barrier	LHS	30

12. SPECIAL REQUIREMENTS FOR HILL ROAD

Land slide protection work as para 2.3.2 above shall be provided.

13. CHANGE OF SCOPE

The length of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The Contractor in accordance with the Specifications and Standards shall determine the actual lengths as required on the basis of detailed investigations. 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.

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) Roadside furniture;

b) Utility Duct

c) Instrumentation for monitoring of landslide protection

2. Description of Project Facilities

Each of the Project Facilities is described below:

a) Roadside furniture;

The roadside furniture shall include the provision of:

i. **Traffic Signs**:
Traffic signs include roadside signs, overhead signs and kerb-mounted signs along the entire Project Highway as per the manual of specifications.

ii. Pavement Markings:
Pavement markings shall cover road marking as per the manual of specifications.

iii. Crash barrier
As per clause 9.4 of IRC:SP-73 and as per details given in schedule-B

iv. Delineators
Delineators shall be provided at the locations as suggested in Manual.

b) Utility Duct

Utility duct with 300mm dia NP 4 pipe with chambers shall be provided as per Appendix B1.

c) Instrumentation for monitoring of landslide protection

Instrumentation shall be provided as per clause 2.3.3 of Schedule B.

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SCHEDULE – D

(See Clause 2.1)

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 Road, Bridge and Slide treatment.

2. Design Standards

The Road, Bridge and Slide treatment including Project Facilities shall conform to design requirements set out in the following documents:

Manual of Specifications and Standards for Two-Laning of Highways (IRC:SP:73-2015), referred to herein as the Manual.

Special Report 23, State of the Art: Design, Construction of Rock fall Mitigation System, Published by IRC Highway Research Board, 2014 and European Technical Approval Guidelines (ETAG)-27.

Annex - I

(Schedule-D)

Specifications and Standards for Construction

1. Specification and Standards

All Materials, works and construction operations shall conform to the Manual of Specifications and Standards for Two-Lanning of Highways (IRC:SP:73-2015), 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 Engineer in charge.

2. Deviations from the Specifications and Standards

2.1. The terms "Concessionaire", "Independent Engineer" and "Concession Agreement" used in the Manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively.

2.2. Notwithstanding anything to the contrary contained in Paragraph 1 above, the following Specifications and Standards shall apply to the Project Highway, and for purposes of this Agreement, the aforesaid Specifications and Standards shall be deemed to be amended to the extent set forth below:

a. In case of usage of soil stabilization technology, soil stabilizer shall be accredited by IRC.

b. Carriageway shall be 7.0m with 1.5m hard shoulder wherever ROW is available. IRC:SP:73-2015 shall be followed to the extent as required for execution of work in consonance with plan & profile and TCS

Sr. No.	Item	Clause referred in Manual	Provision as per Manual	Modified Provision
1	Design Speed	2.2.1	Mountainous and steep terrain (cross slope of the ground more than 25%) Minimum design speed 40 kmph.	The design speed shall be the minimum design speed of 40 kmph except the locations given in alignment drawing (Annex –III, schedule A).
2	Width of shoulders	2.6.1		These clauses are deemed to be amended as shown in the typical cross section (refer Appendix – B1 of schedule B).
3	Road way width	2.7		
4	Typical cross section	2.16		
5	Radii of Horizontal Curves	2.9.4	Mountainous & steep terrain, Desirable Minimum	Mountainous & steep terrain, Desirable Minimum Radii and

Sr. No.	Item	Clause referred in Manual	Provision as per Manual	Modified Provision
			Radii and Absolute Minimum shall be 150m and 75m respectively.	Absolute Minimum shall be 150m and 75m respectively except at the locations given in alignment drawing (Annex –III, schedule A).

3 Special Report 23, State of the Art: Design**,** Construction of Rockfall Mitigation System, Published by IRC Highway Research Board, 2014 ***and*** European Technical Approval Guidelines (ETAG)-27.

4 Specification for Monitoring Instruments shall be in accordance with IS 14395 and IRC 75.

Schedule – E

(See Clause 2.1 and 14.2)

MAINTENANCE REQUIREMENTS

1. Maintenance Requirements

1.1. The Contractor shall, at all-time maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

1.2 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-fulfillment 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.

1.3. All Materials, works and construction operations shall conform to the "SPECIFICATIONS FOR ROAD ANDBRIDGE WORKS (FIFTH REVISION, April 2013)", including latest corrections slips, issued by the Ministry of Surface Transport & Highways, Government of India and published by the Indian Roads Congress.

This being not an item rate contract, the procedure for Measurement and Payment for the items of works shall be in accordance with provision of Article 19 of the Agreement. Therefore the Sub Clauses of measurement for payment and rates in above specifications stand deleted.

Where the specifications for a work are not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

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, in conformity 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 within 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 damage to 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 Highway and maintain a record thereof in a register to be kept in such form and manner as the Authority's Engineer may specify. Such record shall be kept in 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

The Contractor shall carry out a detailed pre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC: SP:35. 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

All damages occurring to the Project Highway on account of torrential rains, floods, earthquake or other natural disasters shall be undertaken by the Contractor at its own cost and/or out of the proceeds of insurance.

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.

Nature of Defect or deficiency		**Time limit for repair/ rectification**
ROADS		
(a)	**Carriageway and paved shoulders**	
(i)	Breach or blockade	Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days.
(ii)	Any significant change in roughness value from original value [more than 5%] in a stretch of 1 km (as measured by a Calibrated bump integrator)	120 (one hundred and twenty) days
(iii)	Pot holes	24 hours
(iv)	Any cracks in road surface	15 (fifteen) days
(v)	Any depressions, rutting exceeding 10 mm in road surface.	30 (thirty) days
(vi)-	Bleeding/skidding-	7 (seven) days
(vii)	Any other defect/distress on the road	15 (fifteen) days
(viii)	Damage to pavement edges	15 (fifteen) days
(ix)	Removal of debris, dead animals	6 hours
(x)	Any other defects/deficiency not covered above but pointed out by Engineer	3 (Three) days

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(b)	**Granular earth shoulders, side slopes, drains and culverts**	
(i)	Variation by more than 1% in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	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 hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road side furniture including road sign and pavement marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	48 hours
(ii)	Painting of Km stone, railing, parapets, crash barriers	As and when required/Once every year
(iii)	Damaged/missing road signs requiring replacement	7 (seven) days
(iv)	Damage to road mark ups	7 (seven) days
(d)	**Trees and plantation**	
(i)	Obstruction in a minimum head-room of 5 m above carriageway or obstruction in visibility of road signs	24 hours
(ii)	Removal of fallen trees from carriageway	4 hours

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(iii)	Removal of vegetation affecting sight line and road structures	15 (fifteen) days
(e)	**Bridges**	
	Superstructure	
(i)	Any damage, cracks, spalling/ scaling Temporary measures Permanent measures	within 48 hours within 15 (fifteen) days or as specified
	Foundations	
(i)	Scouring and/or cavitation	15 (fifteen) days
	Piers, abutments, return walls and wing walls	
(i)	Cracks and damages including settlement and tilting, spalling, scaling	30 (thirty) days
	Bearings (metallic) of bridges	
(i)	Deformation, damages, tilting or shifting of bearings	15 (fifteen) days Greasing of metallic bearings once in a year
	Joints	
(i)	Malfunctioning of joints	15 (fifteen) days
(f)	**Other items**	
(i)	Deforming of pads in elastomeric 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 deterioration in kerbs, parapets, handrails and crash 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

Nature of Defect or deficiency		**Time limit for repair/ rectification**
(vi)	Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds	30 (thirty) days
(vii)	Growth of vegetation affecting the structure or obstructing the waterway	15 (fifteen) days
(g)	**Hill Roads**	
(i)	Snow requiring clearance	24 (twenty four) hours
(h)	**Protection Works And Drainage**	
(i)	Landslides requiring clearance	12 (twelve) hours
(ii)	Damage to breast wall / Toe wall/Retaining wall	7 (seven) days
(iii)	Damage to facia of protection	7 days
(iv)	Desilting / removal of debris from longitudinal surface drains	12 hours
(v)	Damage repair of drains	3 days
(vi)	Removal of debris / boulders from rock fall barrier	12 hours
(vii)	Damage repair of rock fall barrier	7 days
(viii)	Defects in Instruments of Monitoring	7 days

The failure to address above measures for any of the defects/deficiency may attract reduction in payment as per schedule M

Schedule-F

(See Clause 3.1.5(a))

APPLICABLE PERMITS

1. **Applicable Permits**

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 Panchayat and Pollution Control Board for installation of crushers;

(c) License for use of explosives;

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

(e) License 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, clearances or approvals required under Applicable Laws.

1.2 Applicable permits, as required, relating to environmental protection and conservation shall have been produced by the Authority in accordance with the provisions of this Agreement

Schedule-G

(See Clause 7.1.1, 7.5.3 and 19.2)

FORM OF BANK GUARANTEE

Annex-I

(See Clause 7.1.1)

PERFORMANCE SECURITY

The Managing Director,
NHIDCL,
3rd Floor, PTI Building, Sansad Marg,
New Delhi

WHEREAS:

(A) _____ [name and address of contractor] (hereinafter called "the Contractor") and [**NHIDCL, Government of India**], (**"the Authority"**) have entered into an agreement (the **"Agreement"**) for "Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhandthrough Engineering, Procurement & Construction (EPC) Basis Contract", subject to and in accordance with the provisions of the Agreement.

(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 and Defects Liability Period (as defined in the Agreement) in a sum of Rs. …. Crore (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 Performance Security.

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 and 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 sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of [Executive Engineer, CGPWD], that the Contractor has committed default in the due and faithful performance of all or any of its obligations 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 Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any difference 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 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 Agreement or to extend the time or period for the compliance with, fulfillment 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 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 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 Agreement or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

7. Notwithstanding 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 Performance Security shall cease to be in force and effect upto 90 (ninety) days after the end of the Defects Liability Period as set forth in Clauses 17.1 of EPC 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 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 authorized 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 proving 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 of the Authority that the envelope was so posted shall be conclusive.

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

Signed and sealed this …….. day of ……. 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.

Annex-II

(Schedule-G)

(See Clause 7.5.3)

Form for Guarantee for Withdrawal of Retention Money

The Managing Director,
NHIDCL,
3rd Floor, PTI Building, Sansad Marg,
New Delhi

WHEREAS:

[Name and address of contractor] (hereinafter called "**the Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [**NHIDCL, Government of India**], (hereinafter called "**the Authority**") for the ""Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhand through Engineering, Procurement & Construction (EPC) Basis Contract", subject to and in accordance with the provisions of the Agreement.

a. in accordance with the Clause 7.5.3 of the Agreement, whenever the amount of the retention money (hereinafter called "Retention Money") held by the Authority exceeds 1% (one per cent) of the Contract Price, the Contractor may, at its option, withdraw the Retention Money after furnishing to the Authority a bank guarantee for an amount equal to the proposed withdrawal.

b. We, ……..through our branch at ……. (the "Bank") have agreed to furnish this bank guarantee (hereinafter called the "Guarantee") for the amount of Rs. ……. (……. in words) (the "**Guarantee Amount"**).

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

1. The Bank hereby unconditionally and irrevocably 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 sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of [Executive Engineer, CGPWD], that the Contractor has committed default in the due and faithful performance of all or any of its obligations 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 Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any difference 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 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 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 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. Notwithstanding 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 end of the Defects Liability Period specified in Clauses 17.1 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 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 authorized 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 proving such notice, when given by post, it shall be sufficient to prove that theenvelope containing 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 remain in force and effect for up to the date specified in para 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this …….. day of ……. 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.

Annex-III

(Schedule-G)

(See Clause 19.2)

Form for Guarantee for Advance Payment

The Managing Director,
NHIDCL,
3rd Floor, PTI Building, Sansad Marg,
New Delhi

WHEREAS:

(A) [name and address of contractor] (hereinafter called "**the Contractor**") has executed an agreement (hereinafter called the "Agreement") with the [**MoRT&H, Government of India**], (hereinafter called "**the Authority**") for the "Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhand through Engineering, Procurement & Construction (EPC) Basis Contract", subject to and in accordance with the provisions of the Agreement.

(B) in accordance with the Clause 19.2 of the Agreement the Authority shall make to the Contractor advance payment (hereinafter called "Advance Payment") equal to 10% (ten per cent) of the contract price for mobilization expenses and acquisition of equipment; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equal to the amount of each installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement; and the amount of (first/second) installment of the Advance Payment is 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") for the Guarantee Amount.

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 repayment on time of the aforesaid installment of the Advance Payment 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 sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of [Executive Director, NHIDCL], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the installment 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 Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any difference 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 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 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 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 Advance Payment.

7. Notwithstanding 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 end of the one year from the date of payment of the installment of the Advance Payment, as set forth in Clause 19.2 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 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 authorized 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 proving 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 of the Authority that the envelope was so posted shall be conclusive.

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

12. Notwithstanding anything contained herein before, our liability under this Bank Guarantee is restricted to Rs. _____(Rs. _____in words) and the bank guarantee shall remain valid till _____. Unless a claim or a demand in writing is served upon us on or before _____ all our liability under this Bank Guarantee shall cease.

13. This guarantee shall also be operable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof 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.

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

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

Schedule-H

(See Clause 19.3)

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs (…….)

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

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage to Particular item(col:2)
1	**2**	**3**	**4**
Road works including culverts, minor bridges, Underpasses, overpasses, approaches to ROB/RUB/ Major Bridges/ Structures (but excluding service roads)	18.85%	A- <u>Widening and strengthening of existing road</u> (1) Earthwork up to top of the sub-grade (2) Granular work (sub-base, base, shoulders) (3) Bituminous work (4) Widening and repair of culverts (5) Widening and repair of Minor bridges B- <u>New 2 lane realignment for Bridge approaches</u> (1) Earthwork up to top of the sub-grade (2) Granular work (sub-base, base, shoulders) (3) Bituminous work (4) Toe wall/Protection Work (5) Widening and repair of Minor bridges C- <u>New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:</u>	 19.63% 13.52% 5.30% - - - - - - - -

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage to Particular item(col:2)
1	2	3	4
		(1) Culverts (2) Minor bridges (a) Temporary bridge for diversion (b) Construction of New Bridge (3) Cattle/Pedestrian underpasses (4) Pedestrian overpasses (5) Grade separated structures (a) Underpasses (b) Overpass	 5.33% 11.27% 44.95% - - - - -
Major Bridge works	0%	A-<u>Widening and repairs of major bridges</u> (1)Foundation (2)Sub-structure (3)Super-structure (including crash barriers etc. complete) B-<u>Widening and repair of</u> (a) ROB (b) RUB C-<u>New major bridges</u> (1) Foundation (2) Sub-structure (3) Super-structure (including crash barriers etc. complete) D-<u>New rail-road bridges</u> (a) ROB (b) RUB	 - - - - - - - - -
Structures (elevated sections,	0.0%	(1) Foundation (2) Sub-structure (3) Super-structure (including crash	- -

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage to Particular item(col:2)
1	2	3	4
reinforced earth)		barriers etc. complete) (4) Reinforced Earth	- -
Other works	81.15%	(i)Service roads/Slip Roads (ii)Toll Plaza (iii)Road side drains (iv)Road signs, markings, km stones, Boundary stones, safety devices etc. (v) Project facilities a) Bus bye b) Bus shelter c) Truck lay bye d) Others (Instrumentation) e) Utility Duct (vi)Repairs to bridges/ structures a) Providing wearing cost b) Replacement of bearings, joints c) Providing Metal Beam crash barriers (vii) Dismantling of existing bridge (to be taken up after completion of temporary bridge) and other structures like culvert, retaining wall etc. (viii) Protection works a) Metal beam crash barrier b) Land slide Protection works c) Breast Wall	- - 0.29% 0.22% - - - - 0.92% 0.98% - - - 0.10% 0.69% 94.92% 1.88%

* The above list is illustrative and may require modification as per the scope of the work.

1.3 Procedure of estimating the value of work done.

1.3.1 Road works including approaches to minor bridges, Major Bridges and Structures (excluding service roads).

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 up to top of the sub-grade	19.63%	Unit of measurement is in linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in length of not less than 50% of the total length. @
(2) Granular work (sub-base, base, shoulders)	13.52%	Unit of measurement is in linear length. Payment of each stage shall be made on pro rata basis on completion of a stage in length of not less than 50% of the total length.@
(3) Bituminous work	5.3%	Payment shall be made on single stage on completion
(4) Widening and repair of culverts	-	N/A
(5) Widening and repair of minor bridges	-	N/A

B- <u>New 2 lane alignment for Bridge approaches</u> (1) Earthwork up to top of the sub-grade (2) Granular work (sub-base, base, shoulders) (3) Bituminous work (4) CC Pavement (5) Toe wall and Protection work	- - -	N/A.
C-<u>New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:</u> (1) Culverts	5.33%	Unit of measurement is in number. Payment shall be made on single stage on completion.
(2) Minor bridges (a) Temporary bridge for diversion	11.27%	Unit of measurement is in number. Payment shall be made on single stage on completion.
(b) Construction of New Bridge	44.95%	Unit of measurement is in number. Payment shall be made on single stage on completion.
(3) Cattle/Pedestrian underpasses	-	N/A.
(4) Pedestrian Overpasses	-	
(5) Grade separated structures (a) Underpasses (b) Overpasses	- -	

@ 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 stages (1), (2) and (4) above shall be worked out.

1.3.2 Major Bridge works

Procedure for estimating the value of Major Bridge works shall be as stated in table 1.3.2:

Table 1.3.2

Stage of Payment	**Weightage**	**Payment Procedure**
A - Widening and repairs of Major Bridges		
(1) Foundation: On completion of the foundation work including foundations for wing and return walls	-	NA
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap	-	
(3) Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, wing walls, return walls, guide bunds, if any, tests on completion etc., bridge complete in all respects and fit for use.	-	
B - Widening and repairs of		
(a) ROB	-	NA
(b) RUB	-	
C - New Major Bridges		
(1) Foundation: On completion of the foundation work	-	N/A

Stage of Payment	Weightage	Payment Procedure
including foundations for wing and return walls.		
(2) Sub-structure: On completion of abutments5piers up to the abutment/pier cap	-	
(3) Super-structure: On completion of the super structure in all respects including hand rails/crash barriers, wing walls, return walls, guide bunds, if any, tests on completion etc., complete in all respects and fit for use	-	
D - <u>New Rail-road bridges</u> (a) ROB (b) RUB	- -	NA

1.3.3 Structures

Procedure for estimating the value of structure work shall be as stated in table 1.3.3:

Table 1.3.3

Stage of payment	**Weightage**	**Payment procedure**
(1) Foundation: On completion of the foundation works including foundations for wing and return walls	-	NA
(2) Sub-structure: On completion of abutments, piers up to the abutment/pier cap	-	
(3) Super-structure: On completion of the Structure along with super structure, including hand rails/crash barriers,	-	

Stage of payment	**Weightage**	**Payment procedure**
wing walls, return walls, tests on completion etc., elevated structure complete in all respects and fit for use.		
(4) Reinforced Earth work	-	

1.3.4 Other engineering works.

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

Table 1.3.4

Stage of Payment	**Weightage**	**Payment Procedure**
(i) Service Roads/Slip Roads	-	N/A
(ii) Toll plaza	-	N/A
(i) Road side drains	0.29%	Unit of measurement is in linear meter. Payment shall be made on single stage on completion.
(iv) Road signs, markings, km stones, Boundary Stones, safety devices etc.	0.22%	Unit of measurement is in linear meter. Payment shall be made on single stage on completion.
(v) Project Facilities a) Bus bays b) Bus shelter c) Truck lay bye	 - - -	NA

Stage of Payment	Weightage	Payment Procedure
d) Instrumentation	0.92%	Unit of measurement is in number. Payment shall be made as under: a) On procurement and supply of approved instruments to site along with original invoices: 75% of the cost of the instruments. b) On Installation of instruments: 15% of Instrumentation charges. c) On completion of performance test: Balance amount of Instrumentation charges.
e) Utility Duct	0.98%	Unit of measurement is in linear meter. Payment shall be made on single stage on completion.
(vi) Repairs to existing bridges/structures		NA
a) Providing wearing coat	-	
b) Replacement of bearing, joints	-	
c) Providing crash barriers	-	
(i) Roadside plantation	-	
(ii) Dismantling of existing bridge (to be taken up after completion of temporary bridge) and other structures like culvert, retaining wall etc	0.10%	Unit of measurement is in number. Payment shall be made on single stage on completion.
(iii)Protection Works a) Metal Beam Crash barrier	0.69%	Unit of measurement is in linear meter. Payment shall be made on single stage on completion.
b) Landslide Protection works	94.92%	Unit of measurement is linear length in meter. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 10% (ten percent) of

Stage of Payment	Weightage	Payment Procedure
		the total length.
c) Breast Wall	1.88%	Unit of measurement is in linear meter. Payment shall be made on single stage on completion.

2. Procedure for payment for Maintenance

2.1 The cost for maintenance shall be as stated in Clause 14.1.1.

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

Schedule-I

(See Clause 10.2)

DRAWINGS

1. Drawings

In compliance of the obligations set forth in Clause 10.2 of this Agreement, the Contractor shall 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

Alignment Plan and longitudinal Section are enclosed in digital form in CD marked as Annex-I

[Note: The Authority shall describe in this Annex-I, all the Drawings that the Contractor is required to furnish under Clause 10.2.]

- Horizontal and Vertical Alignment (with plan & profile) with details of reference pillars. Horizontal Intersection Point, Vertical Intersection Points, elements of curves, and sight distances.
- Cross-section at 50m interval along the alignment within ROW.
- Typical Cross-section with details of pavement structures.
- Detailed drawings of individual Bridges/Structures/ROB.
- Detailed drawing for individual culverts.
- Detailed layout drawings for intersections and interchanges.
- Drawings for Road sign, Markings.
- Traffic Management drawings for safety in construction zones.
- Detailed drawings of guide bunds and protection works and retaining structures.
- Detailed drawings of Drainage including Masonry drains and other drains.

Schedule-J

(See Clause 10.3.2)

PROJECT COMPLETION SCHEDULE

1. Project Completion Schedule

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 of each Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

2. Project Milestone-I

2.1 Project Milestone-I shall occur on the date falling on the 150th (one hundred and fiftieth)day from the Appointed Date (the "**Project Milestone-I"**).

2.2 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 completion schedule in reference to Schedule-H Items, Stages and Sub-stages payment statements for an amount not less than 20% (twenty per cent) of the Contract Price.

3. Project Milestone-II

3.1 Project Milestone-II shall occur on the date falling on the 365th (three hundred sixty-fifth)day from the Appointment Date (the **"Project Milestone-II**").

Prior to the occurrence of Project Milestone-II, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements completion schedule in reference to Schedule-H Items, Stages and Sub-stages payment statements for an amount not less than 50% (fifty percent) of the Contract Price.

4. Project Milestone-III

4.1 Project Milestone-III shall occur on the date falling on the 545th(five hundred forty-fifth) day from the Appointed Date (the "**Project Milestone-III"**).

4.2 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 payment Statements for an amount not less than 80% (seventy per cent) of the Contract Price.

5 Schedule Completion Date

5.1 The Schedule Completion Date shall occur on the 730th(seven hundred and thirtieth) day from the Appointed Date.

5.2 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 12.1.2)

Tests on Completion

1. Schedule for Tests

1.1 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.

1.2 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 thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule K.

2 Tests

2.1 Visual and physical test: The Authority's Engineer shall conduct a visual and physical 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: all the tests specified in IRC code, manual and MORTH specifications for the road and Bridge works, 5th revision, 2013.

2.2 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 [2,000 (two thousand)] mm for each kilometer.

2.3 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 Research Board 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) meters or more shall also be subjected to load testing.

2.4 Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and Standards.

2.5 Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.

2.6 Safety Audit: The Authority's Engineer shall carry out or cause to be carried out, a 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.

Schedule-L

(See Clause 12.2 and 12.4)

PROVISIONAL CERTIFICATE

1. I, …….. (Name of the Authority's Engineer), acting as Authority's Engineer, under and in accordance with the Agreement dated …….. (the "**Agreement**"), for **Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhand on EPC Mode** through Engineering, Procurement & Construction (EPC) Basis Contract through ……. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been undertaken to determine compliance of the Project Highway with the provisions of the Agreement.

2. Construction Works that are incomplete on account of Time Extension have been specified in the Punch List appended hereto, and the Contractor has agreed and accepted that it shall complete all such works in the time and manner set forth in the Agreement. In addition, certain minor works are incomplete and these are not likely to cause material inconvenience to the users of the Project Highway or other their safety. The contractor has agreed and accepted that as a condition of this Provisional Certificate, it shall complete such minor works within 30 (thirty) days hereof. These minor works have also been specified in the aforesaid punch list.

3. In view of the foregoing, I am satisfied that that Project Highway can be safety and reliably placed in service of the users thereof, and in terms of the Agreement, the Project Highway is hereby provisionally declared fit for entry into operation on this the ……day of …….20 …..

ACCEPTED, SIGNED, SEALED AND DELIVERED

For and on behalf of

CONTRACTOR by

(Signature)

SIGNED, SEALED AND DELIVERED

For and on behalf of

Authority's Engineer by:

(Signature)

COMPLETION CERTIFICATE

1. I, …….. (Name of the Authority's Engineer), acting as Authority's Engineer, under and in accordance with the Agreement dated …….. (the "**Agreement**"), for construction of the "Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhand on EPC Mode through Engineering, Procurement & Construction (EPC) Basis Contract through ……. (Name of 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 can be safety and reliably placed in 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 ……..day of ……..20 …..

SIGNED, SEALED AND DELIVERED

For and on behalf of

Authority's Engineer by:

(Signature)

(Name)

(Designation)

(Address)

Schedule-M

(See Clauses 14.6., 15.2 and 19.7)

PAYMENT REDUCTION FOR NON-COMPLIANCE

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

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

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

1.3 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 Paragraph 2.

2. Percentage reductions in lump sum payments

2.1 The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Carriageway/Pavement**	
(i)	Potholes, cracks, other surface defects	10%
(ii)	Repairs of Edges, Rutting	-
(b)	**Road, Embankment, Cuttings, Shoulders**	
(i)	Edge drop, inadequate cross fall, undulations, settlement, potholes, ponding, obstructions	-
(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, wearing course, footpaths, any damage to foundations	2%
(ii)	Any Defects in superstructures, bearings and sub-structures	3%

S. No.	Item/Defect/Deficiency	Percentage
(iii)	Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers	3%
(d)	**Roadside Drains**	
(i)	Cleaning and repair of drains	2%
(e)	**Road Furniture**	
(i)	Cleaning, painting, replacement of road signs, delineators, road markings, 200 m stone	-
(f)	**Miscellaneous Items**	
(i)	Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane	3%
(ii)	Any other Defects in accordance with paragraph 1.	2%
(g)	Defects in Protection works	70%

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

R=P/100 * M * L1/L

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

M = Monthly lump-sum payment in accordance with the Bid

L1 = Non-complying length

L = Total length of the road,

R = Reduction (the amount to be deducted for noncompliance 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 noncompliance.

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

Schedule-N

(See Clause 18.1.1)

SELECTION OF AUTHORITY'S ENGINEER

1 Selection of Authority's Engineer

1.1 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.

1.2 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

Notwithstanding 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 appointment as Authority's Engineer.

Annex – I

(Schedule - N)

TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

1. Scope

1.1 These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the Ministry of Road Transport and Highways (the "**Authority**") and ..... (the "**Contractor**") for "**Construction of Road, Bridge and Slope Protection Works of Landslide at Bareti (Ex. Km 100.300 to Km 101.060 of NH-34) in the State of Uttrakhand** through Engineering, Procurement & Construction (EPC) Contract, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

1.2 The TOR shall apply to construction and maintenance of the Project Highway.

2. Definitions and interpretation

2.1 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.

2.2 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 this TOR.

2.3 The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, *mutatis mutandis*, to this TOR.

3. General

3.1 The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

3.2 The Authority's Engineer shall perform the duties and exercise the authority in accordance 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) Any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding Rs. 5,000,000 (Rs. fifty lakh).

3.2 The Authority's Engineer shall submit regular periodic reports, at least once every month, 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.

3.4 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.

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

3.6 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 a reasoned written statement relying on good industry practice and authentic literature.

4 Construction Period

4.1 During the Construction Period, the Authority's Engineer shall review 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 10.1.6. The Authority's Engineer shall complete such review 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.

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

4.3 The Authority's Engineer shall review the Quality Assurance Plan submitted 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.

4.4 The Authority's Engineer shall complete the review 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.

4.5 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) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.

4.6 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.

4.7 The Authority's Engineer shall inspect the Construction Works and the Project Highway 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.

4.8 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.

4.9 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 at such 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 4.9, 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 Good Industry Practice for quality assurance.

4.10 The Authority's Engineer shall test check at least 20 (twenty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

4.11 The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance 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.

4.12 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.

4.13 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 event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

4.14 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 forthwith.

4.15 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 12.4.

4.16 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 Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.

4.17 In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to 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.

4.18 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 or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5. Maintenance Period

5.1 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.

5.2 The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

5.3 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 this behalf.

5.4 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 and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

5.5 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 shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of 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 Clause 14.5.

6 Determination of costs and time

6.1 The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

6.2 The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.

6.3 The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

7. Payments

7.1 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 10.2.4 (d).

7.2 Authority's Engineer shall -

(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 Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate

certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.

7.3 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.

7.4 The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

8. Other duties and functions

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

9 Miscellaneous

9.1 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 forthwith.

9.2 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 them in its safe custody.

9.3 Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film 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 setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

9.4 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 Dispute between the Parties.

9.5 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

(See Clauses 19.4.1, 19.6.1, and 19.8.1)

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 Clause 19.3.1 subsequent to the last claim;

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

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

(d) Amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3 (a);

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

(f) Deductions:

  (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

  (ii) Any amount towards deduction of taxes; and

  (iii) Total of (i) and (ii) above.

(g) Net claim: (e) – (f) (iii);

(h) The amounts received by the Contractor upto 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 admissible in accordance with the provisions of the agreement;

(b) the deductions for maintenance work not done;

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

(d) amounts reflecting adjustments in price under Clause 19.12; and

(e) amount towards deduction of taxes

3. Contractor's claim for Damages

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

Schedule-P

(See Clause 20.1)

INSURANCE

1. Insurance during Construction Period

1.1. The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the last Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:

(a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent 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 the Site.

1.2 The insurance under paragraph 1.1 (a) and (b) above shall cover the authority and the Contractor against all loss or damage from whatsoever cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

The Contractor shall effect and maintain insurance cover 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 arises from a cuase occurring prior to the issue of 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

3.1. The Contractor shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Paragraph l and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this agreement and occurring before the issue of the Performance Certificate. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences.

The insurance cover shall be as per the applicable laws of government and procedure in vogue.

3.2 The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:

(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 and unavoidable result of the Contractor's obligations to execute the Works.

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.