# 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 augmentation**

Rehabilitation and augmentation shall include Two-Laning with paved Shoulder and strengthening of project highway and construction of new two lane Traffic Tunnel at Chisopani of the Project Highway as 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.

**4** As per Government of Sikkim Gazette Notification, **Blasting** is not allowed for road formation widening work. In case of any special situation, controlled blasting can be resorted with the prior permission of the concerned District Administration after taking all necessary safety measures.

# Annex -I

(Schedule –B)

## Construction of Two Lane "Chisopani Traffic Tunnel" of Length 250 m including approaches from Km 67+080 to Km 67+500 on NH-10 in East District of Sikkim State on EPC mode.

**1. Widening of the Existing Highway**

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

(ii) Width of Carriageway

(a) Two-Laning with paved shoulders shall be undertaken. The paved carriageway shall be 7 (seven) m along with paved shoulder wide in accordance with the typical cross sections drawings in the Manual.

Provided that in the built-up areas the width of the carriageway shall be as specified in the following table:

| Sl. No. | Built-up stretch (Township) | Location in m | | Width (m) | Typical cross section (Ref. to Manual) |
|---|---|---|---|---|---|
| | | From | To | | |
| Nil | | | | | |

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

**2. Geometric Design and General Features**

(i) General

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

(ii) Design speed

The design speed shall be the minimum design speed of 40 km per hr for Hilly terrain.

(iii) Improvement of the existing road geometrics

The hilly gradients shall be corrected in such a way so as to attain a limiting gradient of 6% in order to achieve longitudinal drainage. Also vertical curves shall be improved / introduced so that the vertical curves meet IRC: SP-73 - 2015 standards.

The horizontal alignment of the Project Highway shall be improved as per the standards set out in IRC-SP: 48:1998.

In the following sections, where improvement of the existing road geometrics to

the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided:

| Sl. No. | Stretch (from km to km) | Type of deficiency | Remarks |
|---|---|---|---|
| Nil | | | |

(iv) Right of Way

Details of the Right of Way are given in Annex II of Schedule-A.

(v) Type of shoulders

(a) In built-up sections, footpaths/fully paved shoulders shall be provided in the following stretches:

| Sl. No. | Stretch (from km to km) | Fully paved shoulders/ footpaths | Reference to cross section |
|---|---|---|---|
| Nil | | | |

(b) In open country, paved shoulders of 1.5 m width shall be provided and balance 1.0m width shall be covered with 150 mm thick compacted layer of granular material.

(c) Design and specifications of paved shoulders and granular material shall conform to the requirements specified in paragraphs 5.10 of the Manual.

(vi) Lateral and vertical clearances at underpasses

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

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

| Sl. No | Location (Chainage) (from km to km) | Span/ opening (m) | Remarks |
|---|---|---|---|
| Nil | | | |

(vii) Lateral and vertical clearances at overpasses

(a) Lateral and vertical clearances at overpasses shall be as per paragraph 2.11 of the Manual.

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

| Sl. No. | Location (Chainage) (from km to km) | Span/ opening (m) | Remarks |
|---|---|---|---|
| Nil | | | |

(viii) Service roads

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

| Sl. No. | Location of service | Right hand side | Length (km) of |
|---|---|---|---|

| | road (from km to km) | (RHS)/Left hand side (LHS)/ or Both sides | service road |
|---|---|---|---|
| Nil | | | |

(ix) Grade separated structures

a. Grade separated structures shall be provided as per paragraph 2.13 of the Manual. The requisite particulars are given below:

| Sl. No. | Location of structure | Length (m) | Number and length of spans | Approach gradient | Remarks, if any |
|---|---|---|---|---|---|
| Nil | | | | | |

b. 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:

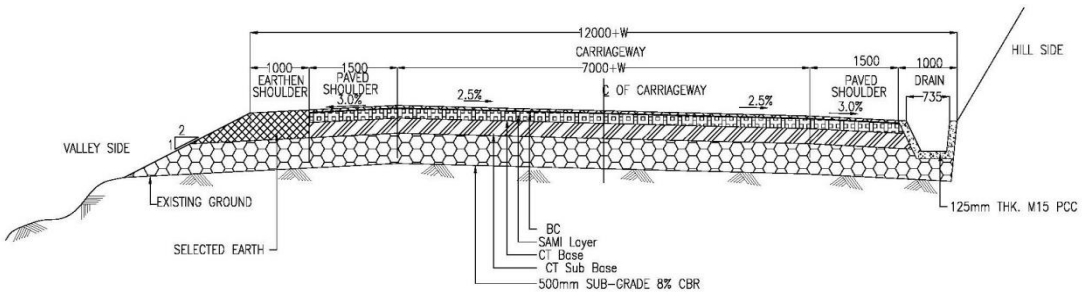
| Sl. No. | Location | Type of structure Length (m) | Cross road at | | | Remarks, if any |
|---|---|---|---|---|---|---|
| | | | Existing Level | Raised Level | Lowered Level | |
| Nil | | | | | | |

(x) Cattle and pedestrian underpass /overpass

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

| Sl. No. | Location | Type of crossing |
|---|---|---|
| Nil | | |

(xi) Typical cross-sections of the Project Highway




**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 tables below:

(i) At-grade intersections

| Sl. No. | Location of intersection | Type of intersection | Other features |
|---|---|---|---|
| Nil | | | |

(ii) Grade separated intersection with/without ramps

| Sl. No. | Location | Salient features | Minimum length of viaduct to be provided | Road to be carried over/under the structures |
|---|---|---|---|---|
| Nil | | | | |

**4. Road Embankment and Cut Section**

(i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/cuttings shall conform to the Specifications and Standards given in Section 4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.

(ii) Raising of the existing road

The existing road shall be raised in the following sections:

| Sl. No. | Section (from km to km) | Length | Extent of raising [Top of finished road level] |
|---|---|---|---|
| Nil | | | |

**5. Pavement Design**

(i) Pavement design shall be carried out in accordance with Section 5 of the Manual.

(ii) Type of pavement- Flexible (both side approach road to tunnel) & Rigid Payment (inside tunnel)

(iii) Design requirements

(a) Design Period and strategy

As per clause 5.4.1, 5.9 & 5.10 of IRC : SP: 73- 2015

(b) Design Traffic

As per clause 5.4.1, 5.9 & 5.10 of IRC: SP: 73- 2015

(iv) Reconstruction of stretches

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

| Sr.No. | Stretch in Km | | Remarks |
|---|---|---|---|
| | From | To | |
| 1 | 67+040 | 67+460 | Construction of new pavement |

**6. Roadside Drainage**

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual.

The improvements in the drainage and the slope erosion shall be made as per the following norms:

**6.1. Road side Drainage Measures**

Following measures shall be adopted:

Open side trapezoidal lined cross section drain shall be provided on hill sides of the project highway in order to intercept surface water from the carriageway, shoulders and hill slopes. The drains outfall into the natural water courses i.e. either in culverts or bridges. Table below gives the location of lined drains.

These are guidelines for minimum provisions. However, contractor has to design as per requirement of road in accordance with manual.

| Sr.No. | Chainage in m | | Length | Remarks |
|---|---|---|---|---|
| | From | To | | |
| 1 | 67+040 | 67+460 | 170 | Trapezoidal Drain line drain excluding Tunnel portion |

## 7. Design of Structures

(i) General

(a) 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.

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

| Sr.No. | Bridge at Km | Width of carriageway and cross-sectional features* |
|---|---|---|
| Nil | | |

(c) The following structures shall be provided with footpaths:

| Sr.No. | Location at Km | Remarks |
|---|---|---|
| Nil | | |

(d) All bridges shall be high-level bridges.-Nil

(e) The following structures shall be designed to carry utility services specified in table below:

| Sr.No. | Bridge at Km | Utility services to be carried | Remarks |
|---|---|---|---|
| Nil | | | |

(f) Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in section 7 of the Manual.

(ii) Culverts

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

(b) Reconstruction of existing culverts:

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

| Sl.No. | Culvert location | Span/Openings(m) | Remarks, if any |
|---|---|---|---|
| Nil | | | |

(c) Widening of existing culverts:

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

| Sl. No | Culvert location | Type,span,height and width of existing culvert | Repairs to be carried out |
|---|---|---|---|
| Nil | | | |

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

| Sl.No. | Culvert Location | Span/Opening (m) |
|---|---|---|
| **Nil** | | |

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

| Sl.No. | Location at Km | Type of repair required |
|---|---|---|
| **Nil** | | |

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

(iii) Bridges

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

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

| Sl. No. | Bridge Location(Km) | Salient details of existing bridge | Adequacy or otherwise of the existing waterway, vertical clearance, etc | Remarks |
|---|---|---|---|---|
| Nil | | | | |

(ii) The following narrow bridges shall be widened:

| Sl. No. | Location (km) | Existing width (m) | Extent of widening (m) | Cross-section at deck level for widening @ |
|---|---|---|---|---|
| **Nil** | | | | |

(b) Additional new bridges

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

| S/N | Location in m | Super structure | Foundation | Remarks | Span Arrangement | Remarks |
|---|---|---|---|---|---|---|
| Nil | | | | | | |

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

| Sl. No. | Location at Km | Remarks, if any |
|---|---|---|
| Nil | | |

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

| Sl. No. | Location at Km | Remarks, if any |
|---|---|---|
| Nil | | |

(e) Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.20 of the Manual-Nil

(f) Structures in marine environment

Nil

(iv) Rail-road bridges

(a) Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual.

**NIL**

(b) Road over-bridges

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

| Sl. No. | Location of Level crossing (Chainage Km) | Length of bridge (m) |
|---|---|---|
| Nil | | |

(c) Road under-bridges

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

| Sl. No. | Location of Level crossing (Chainage Km) | Number and length of span (m) |
|---|---|---|
| Nil | | |

(v) Grade separated structures

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

(vi) Repairs and strengthening of bridges and structures

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

(a) Bridges

| Sl. No. | Location of bridge (km) | Nature and extent of repairs /strengthening to be carried out |
|---|---|---|
| Nil | | |

(b) ROB/RUB

| Sl. No. | Location of ROB/RUB (km) | Nature and extent of repairs /strengthening to be carried out |
|---|---|---|
| Nil | | |

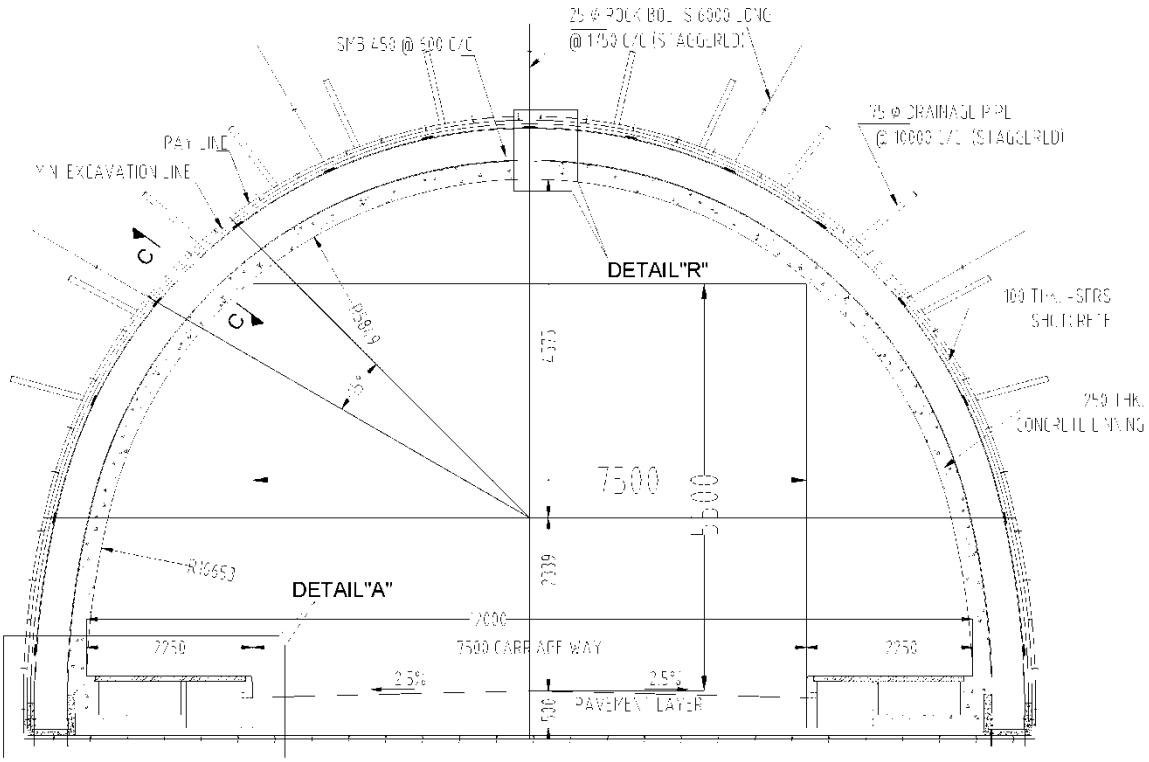
(c) Overpasses/Underpasses and other structures

| Sl. No. | Location of structure (km) | Nature and extent of repairs /strengthening to be carried out |
|---|---|---|
| 1 | Existing tunnel at km 67.211 of Sevoke-Gangtok Section of NH-10 | Overlay of the existing pavement, repairing of existing tunnel lining and shortcreting as required for rehabilitation of the tunnel. |

(vii) List of Major Bridges and Structures

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

| Sl.No. | Location | Span arrangement | Remarks |
|---|---|---|---|
| 1 | 67+150 to 67+400 | 10 m inlet portal +230 m Tunnel +10 m outlet portal | New alignment Tunnel having inner width 12.0 m. The width of the carriage way of 7.5m width and both side walkways with cover drain 2.25m and a clearance profile with a height of 5.5 m over the carriageway. |




SECTION OF TUNNEL IN VERY POOR ROCK

## 8. Traffic Control Devices and Road Safety Works

(i) Traffic control devices and road safety works shall be provided in accordance with

Section 9 of the Manual.

(ii) Specifications of the reflective sheeting.

The minimum quantity of Traffic signages and pavement marking are tabulated here

| Sr.No. | Traffic Signages, Road Marking and other appurtenances | unit | Quantity |
|---|---|---|---|
| 1 | 60 cm circular | each | 2 |
| 2 | Road Marking with Hot Applied Thermoplastic Compound with Reflectorising Glass | Sqm | 105 |
| 3 | Direction and Place Identification signs upto 0.9 sqm size board | Sqm | 2 |

9. **Roadside Furniture**

(i) Roadside furniture shall be provided in accordance with the provisions of Section 11 of the Manual.

(ii) Overhead traffic signs: location and size-Nil

10. **Compulsory Afforestation**

**Nil**

**11. Hazardous Locations**

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

| Sl.No. | Location stretch from (Km) to (Km) | LHS/RHS |
|---|---|---|
| Nil | | |

**12. Special Requirement for Hill Roads**

As the project involves cutting of the hill slopes, it's imperative that slopes are stabilized for ensuring longevity of the slopes and the road. Slope stability, erosion control and landslide correction shall be accomplished in accordance with IRC: SP 48:1998. Reference may be drawn from IRC:56-2011.

Describing the technical capability of the bidders related to execution of slope protection works for proper execution on ground has been incorporated as under:

The minimum quantity of protection works may be taken as below

| S.N | Side | Length in m | Height in m | Type of structure | Proposal |
|---|---|---|---|---|---|
| 1 | From 67+050 to 67+140 | 90.0 | 3.0 | RRM Breast Wall | New |
| 2 | From 67+400 to 67+460 | 60.0 | 3.0 | RRM Breast Wall | New |

Note: The wall length is indicative and shall be estimated by the EPC contractor.

## 13. Change of Scope

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