CHAPTER – 1
EXECUTIVE SUMMARY

1.0 PROJECT BACKGROUND

National Highways and Infrastructure Development Corporation (NHIDCL) is a fully owned company of the Ministry of Road Transport & Highways (MoRT&H), Government of India. The company promotes, surveys, establishes, design, build, operate, maintain and upgrade National Highways and Strategic Roads including interconnecting roads in parts of the country which share international boundaries with neighboring countries. The regional connectivity so enhanced would promote cross border trade and commerce and help safeguard India's international borders. This would lead to the formation of a more integrated and economically consolidated South and South East Asia. In addition, there would be overall economic benefits for the local population and help integrate the peripheral areas with the mainstream in a more robust manner.

The National Highways and Infrastructure Development Corporation Ltd. (NHIDCL) has been entrusted with the assignment of consultancy Services for preparation of DPR for development of Economic Corridors, Inter Corridors and Feeder Routes to improve the efficiency of freight movement in India under Bharatmala Pariyojana.

NHIDCL will be the employer and executing agency for the consultancy services and the standards of output required from the appointed consultants are of international level both in terms of quality and adherence to the agreed time schedule. The consultancy firm will solely be responsible for submission of quality work in stipulated period.

After evaluation of Technical and Financial proposal National Highways & Infrastructure Development Corporation Limited (NHIDCL), MoRT&H, New Delhi has appointed C.E. Testing Company Pvt. Ltd. (CETEST) as consultant to prepare the Detailed Project Report for the below road stretches vide LOA No. NHIDCL/Bharatmala/DPR/Phase-I/Lot-1/Package 1A/2017/60 dated 13.03.2018.

The Project Road starts near Chirakuta and ends at Jalukbari interchange in Guwahati. The total length of the existing road stretch is 209.998km (As per Topographic survey).

The Starting co-ordinate of the project road is 26°14'55.27"N and 90°14'39.88"E and the ending co-ordinate is 26°6'56.30"N and 91°42'31.91"E

The entire road comes under Dhubri, Bongaigaon, Goalpara, Kamrup Rural & Kamrup Metropolitan district of Assam. The project road Passes through village / localities namely Chirakuthi, Sonamukhi, Koliarkhal, Tilapara, MohishBathan, Salkocha, Hatipota, Dhirghat, Arayarjhar, KharidaGossaigaon, Chapar, Bahalpur, Nitya Bazar, KayetPipeara, Talguri, Salbari, Besimari, Boitamari, Borkhata (Nolbari), Khagarpur, Uttar Salmara, Tulungia (junction with NH-117), Deohati, Choutaki, Singimari, Nalipara, Kherkabari, Katashbari, Khoragaon, Garaimari, Chalantapara, KabaitaryTinali, Oudubi, Jogighopa, Kharbhuja, Makri, Dakurivitha, Hadalpara, Kalyanpur, Solmari, Gendra, Balijan, Budhipara, Agia, Ulupara, AgiaPaharkata, KalpaniChandmari, Bolbolla, Phaphanga,

Godhar Bari, TukuraBormahara, Bhimajuli, Paikan, Krishnai, Jyoti Nagar, MolanDubi, Beki Paul, Salpara, Darapara, Dabli, Letheng, Lela, Mondal gram, Makhipara, Dudhnoi, Fafal, Puranibitha, Amjonga, Kachadal, Darangiri, Dosimapara, Rangjuli, Dhanubhanga, Deoshila, Gathiapara, Kothakuthi, Dhupdhara, Sakite, Hakite, Bandapara, Kukurmara, Rajapara, Dhupguri, Chukunai Para, Burgrui, Singra, BokoNagopara, ChakBaho, BokoJarapara, BokoDakhurpara, Boko, Barpara, Turukpur, Turukpara, AguckaBoko, lampara, Bripara, Bongaon market, Bamunigaon, Khabibe, Gobardhan, Kumi, Chhaygaon, Champak Nagar, Kharavanga, Kukurmara, Bartezpur, Surutezpur, Rampur, Bhagabatipara, Rajapokubi, Batarhat, Haligaon, Bijoynagar, Uparhali, Sarpara, Mirza, Barkuchi, Sontola, Bongara, Khuikuchi, Bullapara, VIP chok, Kahikuchi, Azara, Lankeswarandends at Jalukbari Interchange in Guwahati in the state of Assam.

The Package-2 of the of Bilasipura - Guwahati Road starts near Mowatari (before Chapar Bypass) and ends near Tulungia (Junction with NH-117) (Ex.Ch.25.633km to Ex.Ch.52.470km). The existing length of Package-2 is 26.837km (As per Topographic Survey). The Design length of the package-2 is 26.820km (Design Ch.21.850km to Ch.48.670km). The Package-2 is coming under Dhubri & Bongaigaon districts of Assam. The Project Road passes through plain terrain.

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Package No	Design Chainage (km)			Survey Chainage (Km), Starting Chainage of Bilasipura KM 0.000			Package Start point	Package end point
	From	To	Length (km)	From	To	Length (km)		
Pkg-2	21.850	48.670	26.820	25.633	52.470	26.837	Near Mowatari, (before Chapar Bypass)	Near Tulungia (Junction with NH-117)

Status of Various Sections

Pkg	Name of Stretch	Length (km)	Project Status
	Spur to Connect NH17 to East West Corridor (NH27)		
HT	Hapachara to Tulungia road	14.660	Work in Progress
	Total Length	**14.660**	
	Tulungia – Guwahati Section		
5	Tulungia to Jogighopa (before Naranarayan Setu)	18.901	Work in Progress
6	Panchratna to Nichinta	12.300	Work in Progress
7	Nichinta to Paikan	11.900	Work in Progress
8	Paikan to Dhupdhara Sahar	43.750	Work in Progress
9	Dhupdhara Sahar to Milmila R.F	33.684	Work in Progress
10	Milmila R.F to Approach of Airport Junction VIP Chowk	27.316	Work in Progress

Pkg	Name of Stretch	Length (km)	Project Status
	Total Length	**147.851**	
	Bilasipura - Tulungia Section		
1	Chirakuta to Mowatari, before Chapar Bypass)	17.468	DPR in Progress
2	Mowatari, before Chapar Bypass to Tulungia (Junction with NH 117)	26.820	Instant Package
	Total Length	**44.288**	

1.1 OBJECTIVES

The main objective of the Consultancy Services is to establish Detailed Project Reports for rehabilitation and up-gradation of the existing two to four lane **Bilasipura – Chapar – Tulungia – Jogighopa – Gendera – Paikan – Dudhnoi - Guwahati Road (Length 225.000 km) to 4-Lane with paved shoulder of National Highway configuration**.

The viability of the project shall be established taking into account the requirements with regard to rehabilitation, upgrading and improvement based on highway design, pavement design, provision of service roads wherever necessary, type of intersections, rehabilitation and widening of existing and/or construction of new bridges and structures, road safety features, quantities of various items of works and cost estimates and economic analysis.

The Detailed Project Report would inter-alia include detailed highway design, design of pavement and overlay with options for flexible or rigid pavements, design of bridges and cross drainage structures and grade separated structures, design of service roads, quantities of various items, detailed drawings, detailed cost estimates, economic and financial viability analyses, environmental and social feasibility, social and environmental action plans as appropriate and documents required for tendering the project on commercial basis for international / local competitive bidding.

1.2 PROJECT STAGES

- ✓ **STAGE 1**: Inception Report
- ✓ **STAGE 2**: Feasibility Report
- ✓ **STAGE 3**: LA & Clearances I Report
- ✓ **STAGE 4**: Detailed Project Report (DPR)
- ✓ **STAGE 5**: Technical Schedules
- ✓ **STAGE 6**: LA & Clearances II Report
- ✓ **STAGE 7:** Award Determination
- ✓ **STAGE 8:** Land Possession

1.3 STRUCTURE OF FINALDETAILED PROJECT REPORT

Final Detailed Project Report consists of the following volume.

Volume – I: Main Report

- Chapter -1: Executive Summary
- Chapter -2: Overview of NHIDCL
- Chapter -3: Project Background
- Chapter -4: Engineering Surveys, Investigation and Analysis
- Chapter -5: Socio- Economic Profile
- Chapter -6: Indicative Design Standards
- Chapter -7: Traffic Surveys & Analysis
- Chapter -8: Social Analysis
- Chapter -9: Environmental Impact Assessment Report
- Chapter -10: Cost-Estimate
- Chapter -11: Economic and Financial Analysis
- Chapter -12: Road Safety Audit
- Chapter -13: Conclusions & Recommendations

Volume – IA: Appendix to Main Report

- Appendix-3.1 : Road Inventory Survey
- Appendix-3.2 : Pavement Condition Survey
- Appendix-3.3 : Culvert Inventory Survey
- Appendix-3.4 : Bridge Inventory Survey
- Appendix-3.5 : List of TBM & GPS Point
- Appendix-3.6 : Trial Pit Data
- Appendix-3.7 : Soil Report
- Appendix-3.8 : Hydraulic Calculation of Bridges
- Appendix-3.9 : Geotechnical Investigation
- Appendix-3.10 :Benkelman Beam Deflection Analysis
- Appendix-7.1 : Origin-Destination survey and analysis
- Appendix-7.2 : Classified traffic volume count survey and analysis
- Appendix-7.3 : Axle load survey and analysis

- Appendix-7.4 : Turning moment count survey and analysis
- Appendix-7.5 : Pedestrian count survey and analysis

Volume – II: Design Report
Volume – III: Material Report
Volume – IV: EIA &SIA
Volume – V: Technical Specification
Volume – VI: Rate analysis
Volume – VII: Cost-Estimate
Volume – VIII: Bill of Quantities
Volume – IX: Drawing Volume (Roads & Structure)

1.4 DEFICIENCIES AND ISSUES

The following major deficiencies have been identified and addressed in terms of traffic operation, safety, road conditions and maintenance. A few other issues which contribute to operational deficiencies and safety concerns and which prevent the optimum utilization of the highway capacity to a desirable level of service, e.g. driving discipline and compliance, traffic surveillance, corridor security and management, level of regular road maintenance, maintenance and its road worthiness etc. are beyond the scope of this study.

a) Operation

- ✓ No access control
- ✓ Conflicts between fast moving vehicles with slow moving vehicles
- ✓ Deficiency in the Geometry of existing road alignment

b) Safety

- ✓ Shoulder drop-off at places
- ✓ Inadequate traffic signs
- ✓ Sub Standard Curve on the project road

1.5 SALIENT FEATURES

This relates to the most suitable alignment for 4-laning of road sections and for optimum upgrading of existing road based on field data and detail study involving traffic, geo-technical, topographic, pavement and road condition and socio-economic aspects. Special attention has been given for augmentation of capacity for intended level of service in design period. Appropriate design applications have been considered for operational efficiency and road safety.

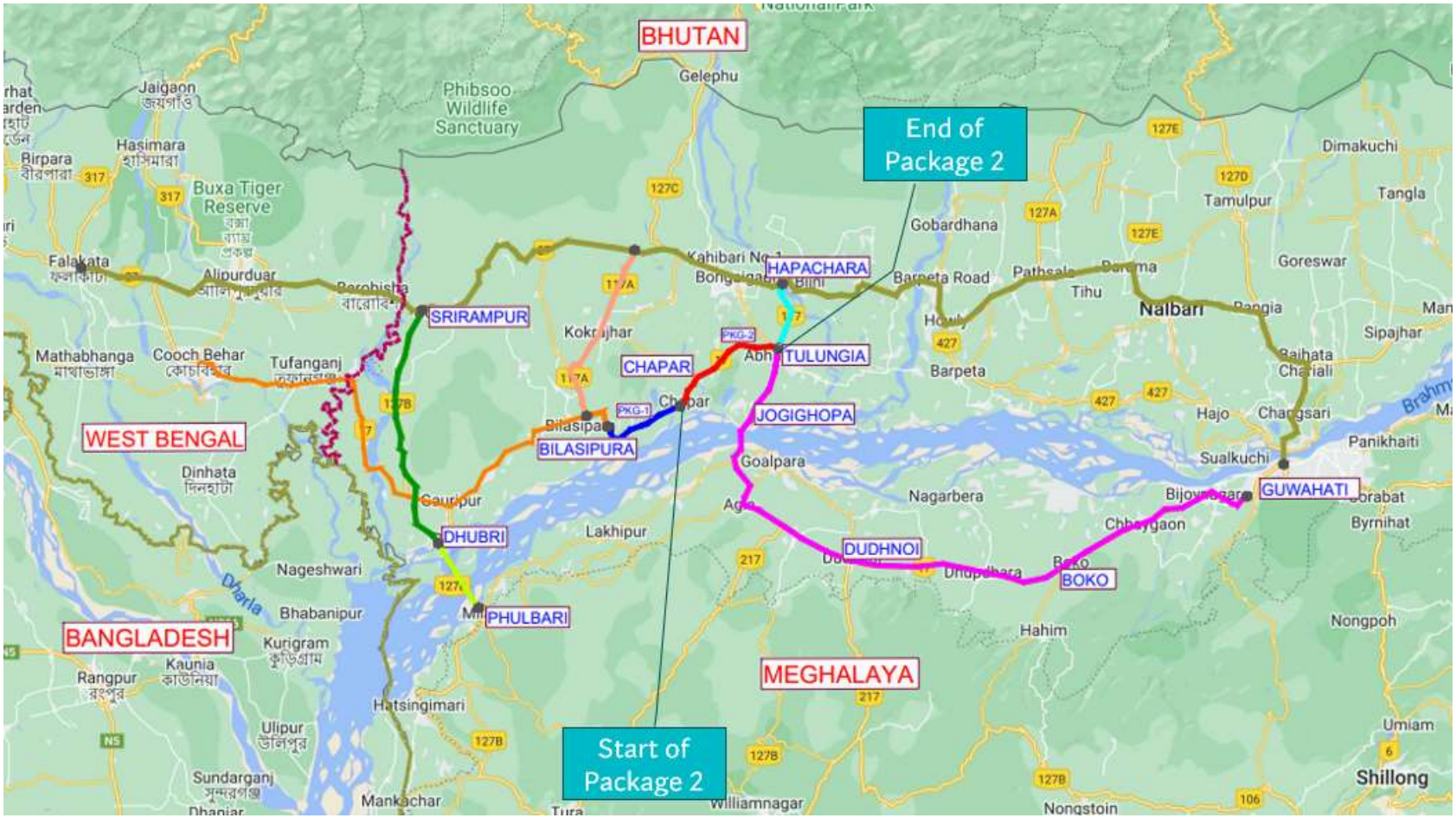
BHUTAN
Gelephu
Phibsoo Wildlife Sanctuary
End of Package 2
Start of Package 2
Jaigaon
Hasimara
Birpara
Buxa Tiger Reserve
Falakata
Alipurduar
Mathabhanga
Cooch Behar
Tufanganj
WEST BENGAL
Dinhata
BANGLADESH
Rangpur
Kaunia
Nageshwari
Bhabanipur
Kurigram
Ulipur
Sundarganj
Mankachar
Hatsingimari
Dharla
SRIRAMPUR
HAPACHARA
CHAPAR
TULUNGIA
JOGIGHOPA
BILASIPURA
DHUBRI
PHULBARI
DUDHNOI
BOKO
GUWAHATI
MEGHALAYA
Hahim
Williamnagar
Nongstoin
Shillong
Umiam
Nongpoh
Goalpara
Nagarbera
Lakhipur
Barpeta Road
Barpeta
Gobardhana
Tamulpur
Nalbari
Tihu
Pathsala
Goreswar
Dimakuchi
Tangla
Sipajhar
Hajo
Changsari
Sualkuchi
Panikhaiti
Byrnihat
Chhaygaon
Baihata Chariali
Brahm

Table 1.1: Salient Features of the Proposed Road (Package - 2)

Sl	Descriptions	Existing	Proposed
1	**Start Point**	Near Mowatari, before Chapar Bypass) (Ex.Ch.25.633 Km)	Near Mowatari, before Chapar Bypass) (Design Ch.21.850 Km)
2	**End Point**	Near Tulungia (Junction with NH-117) (Ex.Ch.52.470Km)	Near Tulungia (Junction with NH-117) (Design Ch.48.670Km)
3	**Length**	Existing Length = 26.837Km (As per topographic survey)	Proposed Length =26.820 Km (As per Design)
4	**Terrain**	Plain Terrain	Plain Terrain
5	**Alignment**	Two Lane	Up-gradation of whole alignment in 4-lane configuration
6	**Design Speed**	Avg. 30-40 Kmph	Ruling = 100 Kmph, Limiting = 80 Kmph
7	**Cross-Sectional Parameters**	Two Lane	TCS-1C: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (RECONSTRUCTION OVER EXISTING PAVEMENT WITH FULL GRANULAR LAYER SCARIFICATION AND RECOMPACTION OF EXISTING SUBGRADE) Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness=2 x 0.5m Median = 1.5 m **Roadway Width=24.5m** TCS-1D: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA (RECONSTRUCTION OVER EXISTING PAVEMENT WITH FULL EXISTING GRANULAR LAYER SCARIFICATION WITH

Sl	Descriptions	Existing	Proposed
			NEW SUBGRADE) Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness=2 x 0.5m Median = 1.5 m **Roadway Width=24.5m** TCS-1E: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA AT BRIDGE APPROACH Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness=2 x 0.5m Median = 1.5 m **Roadway Width=24.5m** TCS-1N: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN RURAL AREA Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness=2 x 0.5m Median = 1.5 m **Roadway Width=24.5m** TCS-1O: 4 LANE DIVIDED CARRIAGEWAY WITH BOTH SIDE DRAIN IN BUILT-UP AREA(RECONSTRUCTION OVER EXISTING PAVEMENT WITH FULL

Sl	Descriptions	Existing	Proposed
			GRANULAR LAYER SCARIFICATION WITH NEW SUBGRADE Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Railing = 2 x 0.25m Cover Drain = 2 x 2.0m Kerb Shyness=2 x 0.5m Median = 1.5 m **Roadway Width=26.0m** TCS-2: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN BYPASS STRETCH Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness=2 x 0.5m Median = 4.0 m **Roadway Width=27.0m** TCS-2A: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN BYPASS STRETCH WITH BOTH SIDE RETAINING WALL AND STONE PITCHING ALONG THE BERM Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness=2 x 0.5m Median = 4.0 m **Roadway Width=27.0m**

Sl	Descriptions	Existing	Proposed
			TCS-2B: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN BYPASS STRETCH WITH BOTH SIDE RETAINING WALL AND STONE PITCHING Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness=2 x 0.5m Median = 4.0 m **Roadway Width=27.0m** TCS-2C: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN BYPASS STRETCH WITH BOTH SIDE RETAINING WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness=2 x 0.5m Median = 4.0 m **Roadway Width=27.0m** TCS-3: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN SVUP APPROACHES WITH BOTH SIDE SERVICE ROAD WITH RETAINING WALL Carriageway = 2 x 7.0m Median =4.0m Paved Shoulder = 2 x 1.5m Kerb Shyness = 4 x 0.5m Crash Barrier = 2 x 0.5m **Roadway Width=24.0m**

Sl	Descriptions	Existing	Proposed
			Crash Barrier = 2 x 0.5m Service Road = 2 x 7.5m Earthen Shoulder = 2 x1.5m TCS-4E: 4 LANE CARRIAGEWAY WITH BOTH SIDE SERVICE ROAD IN BUILT-UP AREA(RECONSTUCTION OVER EXISTING PAVEMENT WITH FULL GRANULAR LAYER SCARIFICATION WITH NEW SUBGRADE) Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Kerb Shyness=2 x 0.5m Railing = 2 x 0.25m Median = 1.5m Service Road = 2 x 5.5m Cover Drain = 2 x 1.0m **Roadway Width=35.00m** TCS-4F: 4 LANE CARRIAGEWAY WITH BOTH SIDE SERVICE ROAD IN BUILT-UP AREA (RECONSTUCTION OVER EXISTING PAVEMENT WITH FULL GRANULAR LAYER SCARIFICATION AND RECOMPACTION OF EXISTING SUBGRADE) Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Kerb Shyness=2 x 0.5m Railing = 2 x 0.25m Median = 1.5m Service Road = 2 x 5.5m

Sl	Descriptions	Existing	Proposed
			Cover Drain = 2 x 1.0m **Roadway Width=35.00m** TCS-4G: 4 LANE CARRIAGEWAY WITH BOTH SIDE SERVICE ROAD IN BUILT-UP AREA (RECONSTUCTION OVER EXISTING PAVEMENT WITH FULL GRANULAR LAYER SCARIFICATION WITH NEW SUBGRADE) Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Kerb Shyness=2 x 0.5m Separater = 2 x 0.5m Median = 1.5m Service Road = 2 x 7.5m Cover Drain = 2 x 1.5m **Roadway Width=40.50m** TCS-5D: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH REALIGNMENT LOCATION WITH BOTH SIDE R.C.C RETAINING WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m **Roadway Width=24.5m** TCS-5E: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH (RECONSTRUCTION OVER EXISTING PAVEMENT WITH FULL

Sl	Descriptions	Existing	Proposed
			EXISTING GRANULAR LAYER SCARIFICATION WITH NEW SUBGRADE) WITH ONE SIDE BREAST WALL AND ONE SIDE RETAINING WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m **Roadway Width=24.5m** TCS-5F: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH (RECONSTRUCTION OVER EXISTING PAVEMENT WITH FULL EXISTING GRANULAR LAYER SCARIFICATION WITH NEW SUBGRADE) WITH BOTH SIDE BREAST WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m **Roadway Width=24.5m** TCS-5G: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH REALIGNMENT LOCATION WITH ONE SIDE BREAST WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m

Sl	Descriptions	Existing	Proposed
			Roadway Width=24.5m TCS-5H: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH REALIGNMENT LOCATION WITH ONE SIDE R.C.C RETAINING WALL AND ONE SIDE BREAST WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m **Roadway Width=24.5m** TCS-5I: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH REALIGNMENT LOCATION WITH ONE SIDE R.C.C RETAINING WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m **Roadway Width=24.5m** TCS-5J: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH REALIGNMENT LOCATION WITH ONE SIDE TOE WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m

Sl	Descriptions	Existing	Proposed
			Roadway Width=24.5m TCS-5K: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH (RECONSTRUCTION OVER EXISTING PAVEMENT WITH FULL EXISTING GRANULAR LAYER SCARIFICATION WITH NEW SUBGRADE) WITH ONE SIDE R.C.C RETAINING WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m **Roadway Width=24.5m** TCS-5L: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN FOREST STRETCH (RECONSTRUCTION OVER EXISTING PAVEMENT WITH FULL EXISTING GRANULAR LAYER SCARIFICATION WITH NEW SUBGRADE) WITH ONE SIDE BREAST WALL Carriageway = 2 x 7.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Median =1.5m **Roadway Width=24.5m** TCS-6A: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN VUP APPROACHES WITH BOTH SIDE SERVICE ROAD IN BUILT UP/RURAL AREA FOLLOWS EXISTING 2-LANE ROAD(CONCENTRIC WIDENING) Carriageway = 2 x 7.0m

Sl	Descriptions	Existing	Proposed
			Median =4.0m Paved Shoulder = 2 x 1.5m Kerb Shyness = 4 x 0.5m Crash Barrier = 2 x 0.5m **Roadway Width=24.0m** Crash Barrier = 2 x 0.5m Service Road = 2 x 7.5 m Drain = 2 x1.5m TCS-6G: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN ROB APPROACHES WITH BOTH SIDE SERVICE ROAD Carriageway = 2 x 7.0m Median =4.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m Varying Service Road = 2 x 7.25m TCS-6H: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN ROB APPROACHES WITH BOTH SIDE SERVICE ROAD Carriageway = 2 x 7.0m Median =4m Paved Shoulder = 2 x 2.5m Kerb Shyness = 4 x 0.5m Crash Barrier = 2 x 0.5m **Roadway Width=26m** Crash Barrier = 2 x 0.5m Service Road = 2 x 7.5m Earthen Shoulder = 2 x1.5m

Sl	Descriptions	Existing	Proposed
			TCS-6I: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN ROB APPROACHES Carriageway = 2 x 7.0m Median =4.0m Paved Shoulder = 2 x 2.5m Earthen Shoulder = 2 x1.5m Kerb Shyness = 2 x 0.5m **Roadway Width=27m** TCS-6X: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDER IN VUP APPROACHES WITH BOTH SIDE SERVICE ROAD IN BUILT UP AREA FOLLOWS EXISTING 2 LANE ROAD Carriageway = 2 x 7.0m Median =1.5m Paved Shoulder = 2 x 1.5m Kerb Shyness = 4 x 0.5m Crash Barrier = 2 x 0.5m **Roadway Width=21.5m** Crash Barrier = 2 x 0.5m Service Road = 2 x 7.5 m Drain = 2 x1.5m TCS-7A: VIADUCT PORTION WITH BOTH SIDE SERVICE ROAD WITH RETAINING WALL Carriageway = 2 x 9.5m Crash Barrier = 4 x 0.5m

Sl	Descriptions	Existing	Proposed
			Footpath = 2 x 1.5m Median =3.0m **Roadway Width=28.00m** TCS-7B: 4 LANE DIVIDED CARRIAGEWAY WITH PAVED SHOULDERIN VUP APPROACHES WITH BOTH SIDE SERVICE ROAD WITH RETAINING WALL Carriageway = 2 x 7.0m Median =4.0m Paved Shoulder = 2 x 1.5m Kerb Shyness = 4 x 0.5m Crash Barrier = 4 x 0.5m Footpath = 2 x 1.5m **Roadway Width=28.0m** Crash Barrier = 2 x 1.0m Service Road = 2 x 7.5 m Earthen Shoulder = 2 x1.5m TCS-9: TYPICAL CROSS SECTION OF PROPOSED 2-LANE ROB Carriageway = 1 x 10.5m Crash Barrier = 2 x 0.45m Crash Barrier = 1 x 0.4m Footpath = 1 x 1.5m **Roadway Width=13.50m**

Sl	Descriptions	Existing	Proposed
8	**Traffic**	Base year traffic (2019) ➢ **Ch. 31.000 km near Bahalpur** • Fast moving vehicle =6617nos. • Slow moving vehicle = 889nos. • AADT in no = 7506 nos. • AADT in PCU = 8957PCU Total Commercial vehicle per day= 1767 nos.	➢ **Ch. 31.000 km near Bahalpur** Projected traffic, Year 2023 • Total Vehicle in no = 11546 nos. • Total Vehicle in PCU =10888 PCU Projected traffic, Year 2046 • Total Vehicle in no = 28024 nos. • Total Vehicle in PCU =33441 PCU
9	**Traffic Growth Rate**	-	5%
10	**Pavement Design Life**	-	20 Years for flexible pavement
11	**Design MSA**	-	Adopted MSA = 44 MSA
12	**CBR Considered**	-	5%

Sl	Descriptions	Existing	Proposed
13	**Design Pavement Thickness**	Pavement thickness varies from-350mm to 500 mm	**<u>Main Carriageway</u>** **For Widening/RE Wall portion/ Reconstruction/New Construction** BC -40 mm DBM -60 mm Aggregate Layer - 100 mm CT Base-100 mm CT Sub-Base- 200 mm Total -500 mm **<u>Service Road</u>** BC -40 mm Aggregate Layer - 100 mm CT Base-100 mm CT Sub-Base- 200 mm Total -440 mm
14	**Major Bridge**	Major Bridge = 1 no. (Over Champabati River)	**2 nos.** **New Bridge at Bypass Location** Des. Ch. km 28+027 across River Champabati; Span: 10x50m (PSC Box Girder) Des. Ch. Km 32+610 across River Tuniya; Span: 2x30m (PSC T Girder)
15	**Minor Bridges**	**20 Nos.**	**16 Nos.** Reconstruction = 5 nos. Retained with widening and Additional 2 Lane = 6 nos. Retained and Additional 2 Lane = 2 nos.

Sl	Descriptions	Existing	Proposed
			New Construction= 3 nos. Bypassed=7 nos
16	**Viaduct**	Nil	Approaches of Major Bridge (Design Ch. 28.027Km) Ch. 27.612 km, PSC T Girder, span (11 x 30m) Ch. 28.399 km, PSC T Girder + RCC T Girder + RCC Slab + PSC T Girder, span (6 x 30m + 1 x 24m + 1 x 10m + 1 x 30m) Ch. 28.749 km, PSC T Girder + RCC Slab + PSC T Girder, span (1 x 30m + 1 x 10m + 11 x 30m) Approaches of Major Bridge (Design Ch. 32.610Km) Ch. 32.318 km, PSC T Girder, span (3 x 30m + 1 x 27m) Ch. 32.500 km, RCC Slab + PSC T Girder, span (1 x 10m + 5 x 30m) Ch. 32.670 km, PSC T Girder, span (2 x 30m)
17	**Culverts**	Culvert = 32 nos.	Reconstruction= 16 Nos. New Construction = 73 Nos. Total no. of RCC Box Culverts = 89 Nos. Bypassed =15 nos. Realignment=1 no
18	**Railway Crossings/ RUB/ROB**	1 No. 2-Lane ROB existing (18m + 36m + 18m)	Additional 2-Lane is being proposed beside of existing ROB 1 No. 2-Lane ROB (18m + 36m + 18m)
19	**VUP**	Nil	4Nos.
20	**SVUP**	Nil	8Nos.

<table>
<tr><th>Sl</th><th>Descriptions</th><th>Existing</th><th>Proposed</th></tr>
<tr><td>21</td><td>FOOT OVER BRIDGE(FOB)</td><td>Nil</td><td>Foot over bridge has been proposed at 4 locations.
<table>
<tr><th>Sl.No</th><th>Design Ch.(km)</th><th>Location</th></tr>
<tr><td>1</td><td>22.000</td><td>Mowatari</td></tr>
<tr><td>2</td><td>42.003</td><td>Khagarpur</td></tr>
<tr><td>3</td><td>42.683</td><td>Khagarpur</td></tr>
<tr><td>4</td><td>47.784</td><td>North Salmara</td></tr>
</table></td></tr>
<tr><td>22</td><td>RE WALL</td><td>Nil</td><td>Length of RE Wall=3799m</td></tr>
<tr><td>23</td><td>RETAINING WALL</td><td>Nil</td><td>Length of Retaining Wall=16949 m</td></tr>
<tr><td>24</td><td>TOE WALL</td><td>Nil</td><td>Length of Toe Wall=200m</td></tr>
<tr><td>25</td><td>BREAST WALL</td><td>Nil</td><td>1040m</td></tr>
<tr><td>25</td><td>LINED DRAINS</td><td>Drain length = 1660m</td><td>Length of RCC Cover Drain = 11400m
Chute Drain = 2285m</td></tr>
<tr><td>26</td><td>SERVICE ROAD</td><td>Nil</td><td>15790m</td></tr>
<tr><td>27</td><td>MAJOR INTERSECTION</td><td>4 Nos.</td><td>8 Nos. (4 nos. at-grade with junction development and 4 nos. with VUP)</td></tr>
<tr><td>28</td><td>MINOR INTERSECTION</td><td>36 Nos.</td><td>36 Nos. with junction development</td></tr>
<tr><td>29</td><td>BUS BAY WITH PASSENGER SHELTER</td><td>Nil</td><td>➢ Bus-bay with passenger shelter = 2 Locations (Both Side
<table>
<tr><th>Sl no</th><th>Design Chainage (km)</th><th>Side</th><th>Location</th><th>Remarks</th></tr>
</table></td></tr>
</table>

<table>
<tr><th>Sl</th><th>Descriptions</th><th>Existing</th><th>Proposed</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>1</td><td>33.470</td><td>Both</td><td>Near Salbari</td><td>Bus Bay with Passenger Shelter</td></tr>
<tr><td>2</td><td>42.971</td><td>Both</td><td>Near Khagarpur</td><td>Bus Bay with Passenger Shelter</td></tr>
</table>
</td></tr>
<tr><td>30</td><td>TRUCK LAY BAY</td><td>Nil</td><td>Nil</td></tr>
<tr><td>31</td><td>TOLL PLAZA</td><td>Nil</td><td>Nil</td></tr>
<tr><td>32</td><td>ROW</td><td>Varying from 11m-50m</td><td>• Rural area: 35m/40m
• Built up area: 35m/45m
• Bypass location: 45m
• Forest area: 35m/40m</td></tr>
<tr><td>33</td><td>LAND DETAILS</td><td>Available land 33.081Ha</td><td>Land to be acquired 85.099Ha</td></tr>
<tr><td>34</td><td>FOREST STRETCH</td><td>The project road stretch Passes through Bhairab Hill RF, Nakkati RF, Khakarpur PRF
• The affected length of forest stretch=4.232Km</td><td>The project road stretch Passes through Bhairab Hill RF, Nakkati RF, Khakarpur PRF
• The affected length of forest stretch=4.232Km</td></tr>
<tr><td>35</td><td>CIVIL COST (Rs.)</td><td>-</td><td>Rs. 796.69 Cr. (Rs.29.71 Cr./Km)</td></tr>
</table>

1.6 COST ESTIMATES

For Rate Analysis, Schedule of Rate- Public Work Department (NH), 2020-21, Assam. has been adopted.

Table 1.2: Abstract of Cost

GENERAL ABSTRACT OF COST Bilasipara - Jalukbari Road (PKG-2: Km 21.850 to Km 48.670)				
	Length of Road (km)	**:**		**26.820**
	Length of CD & Bridge works (km)	**:**		**2.632**
	Length of Pavement excluding CD works (km)	**:**		**24.188**
Sl No	**DESCRIPTION OF WORKS**	**TOTAL COST (IN Cr.)**	**COST PER KM. OF TOTAL ROAD LENGTH (IN Cr.)**	**% of Total Civil Works Cost**
A.	**ROAD WORKS**			
1	Site Clearance	3.53	0.13	0.44%
2	Earthwork, Erosion Control	59.92	2.23	7.52%
3	Sub-Base & Base Courses	78.57	2.93	9.86%
4	Bituminous surface	59.02	2.20	7.41%
5	Traffic signs, Road marking & other road appurtenances	16.89	0.63	2.12%
6	Drainage & Protection Works			
a)	RCC Cover Drain	11.58	0.43	1.45%
b)	RE WALL	51.84	1.93	6.51%
b)	Breast Wall	6.91	0.26	0.87%
c)	Retaining Wall	39.88	1.49	5.01%
d)	Toe Wall	0.33	0.01	0.04%
e)	Protection Work	13.92	0.52	1.75%
f)	Ground Improvement	17.92	0.67	2.25%
7	Project Facilities		0.00	0.00%
a)	Bus Bay with passenger shelter	1.50	0.06	0.19%
8	Junction	6.75	0.25	0.85%
9	Service Road	39.95	1.49	5.01%
	Total for Road Works=	**408.51**	**15.23**	**51.28%**
B.	**BRIDGES, CULVERTS & ROB**			
10	Minor Bridges	45.17	1.68	5.67%
11	Minor Bridges(Widening)	3.57	0.13	0.45%
12	VUP	29.02	1.08	3.64%
13	ROB	14.31	0.53	1.80%
14	Major Bridge	59.88	2.23	7.52%
15	SVUP	14.97	0.56	1.88%

GENERAL ABSTRACT OF COST
Bilasipara - Jalukbari Road (PKG-2: Km 21.850 to Km 48.670)

	Length of Road (km)	**:**		**26.820**
	Length of CD & Bridge works (km)	**:**		**2.632**
	Length of Pavement excluding CD works (km)	**:**		**24.188**
Sl No	**DESCRIPTION OF WORKS**	**TOTAL COST (IN Cr.)**	**COST PER KM. OF TOTAL ROAD LENGTH (IN Cr.)**	**% of Total Civil Works Cost**
16	Viaduct	164.39	6.13	20.63%
17	Culvert	46.45	1.73	5.83%
18	Repairing & Rehabilitation of Minor Bridges	0.44	0.02	0.06%
19	Foot Over Bridge (FOB)	9.98	0.37	1.25%
	Total for Structure Works=	**388.18**	**14.47**	**48.72%**
C.	**Cost of Civil Works**	**796.69**	**29.71**	