

EXECUTIVE SUMMARY

0.1 Objective

Public Works Department, Government of Tripura has decided to take up the development of newly declared NH-208 section from Kailashahar to Teliamura to two lane NH Standards under NH (O), accordingly proposes to procure the services of a Technical Consultants for carrying out suitable feasibility Study and DPR and render consultancy services for proper structuring and implementation of following project on EPC Mode. To meet the requirement PWD, Tripura appointed C.E. Testing Company Pvt. Ltd. (CETEST) as consultant to prepare the Detailed Project Report for the proposed improvement and up-gradation of the road vide NH-Division, PWD, Agartala Letter No. F.1 (Works)/EE/NH-DIV/AGT/441-48 dated 29th August, 2015.

After obtaining the Letter of Acceptance, the Consultant team has done preliminary discussions with the Executive Engineer, PWD (NH), Kumarghat Division at his office on 9th September, 2015 and conducted a joint site visit on 9th September in presence of the Assistant Engineer, PWD (NH), Kumarghat Division. The Consultant team also met with the Superintending Engineer, PWD NH Circle, Gurkhabasti on 10th September, 2015 and also carried out a Reconnaissance Survey of the project stretch. After completing detailed field survey the Consultant team has prepared horizontal alignment plan as per IRC guidelines. The designed alignment drawing has been verified by the concerned PWD officials and some modifications have been made in the alignment. After finalizing alignment in consultation with PWD (NH), a detailed presentation on the alignment has been made on 05.12.2016 at State Secretariat in presence of the Hon'ble PWD Minister, Principal Secretary, Chief Engineers, Public Representatives of the project affected areas and other Government officials. Later on, it has been decided by the MoRT&H and the State Government that the project will be implemented by the NHIDCL and accordingly a tripartite supplementary Agreement has been signed on 24th January, 2019 between NHIDCL, CETEST and PWD (NH), Govt. of Tripura.

0.2 Project Road Description

The start point of the project road is Kirtanthali (near Kailashahar town) at Km 21+100 (Design Ch. 21+100 km) and ends at Km 139+453 (Design Ch. 127+319 km) at NH-08 at Teliamura. The existing length of the road is 118.353 Km. However, after design the proposed length comes out to be 106.219 km. The project road has been divided into six packages considering various factors like project clearance issues, participation of local/regional entrepreneur etc.

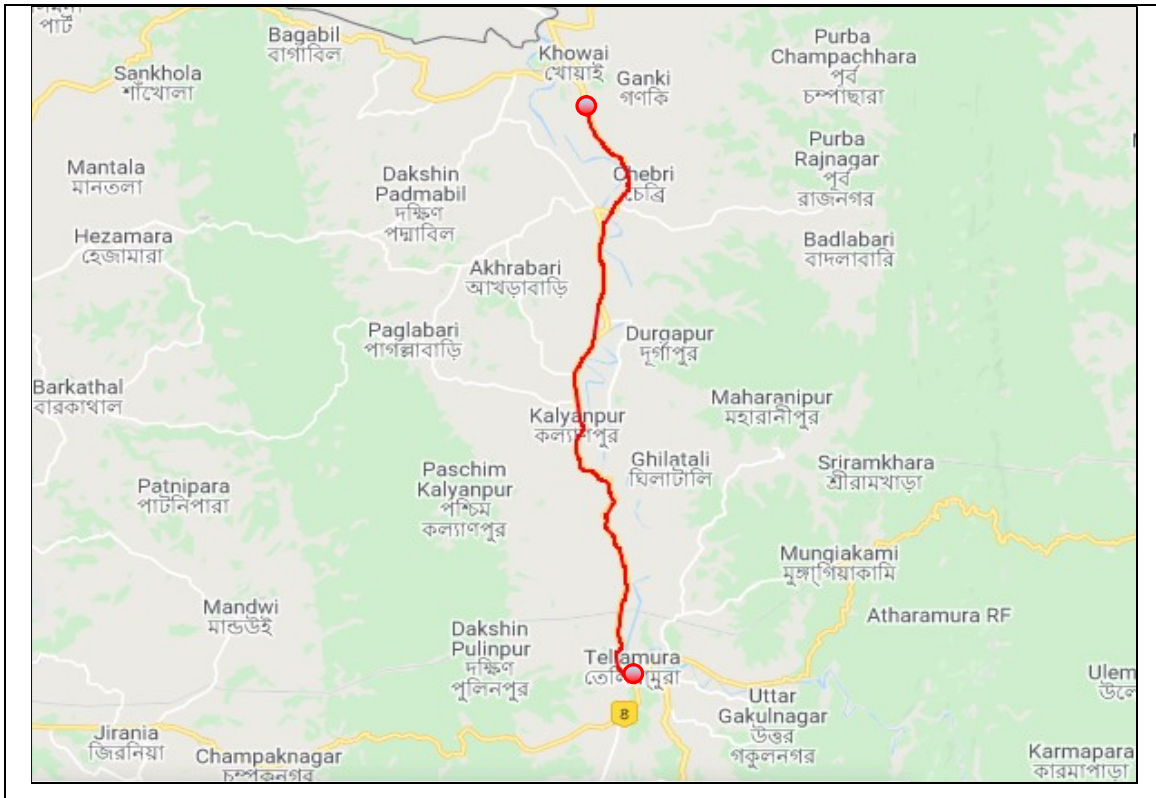
It has been decided by the Union Government that Package-I to Package-V i.e. Kailashahar to Khowai section of the above project would be funded by the JICA under North East Road Network Connectivity Improvement Project (Phase-4). The package-VI (new package-I) i.e. Khowai to Teliamura section would be funded in JICA ODA loan Phase-6 together with end section (Teliamura – Harina via Amarpur) of NH-208.

Construction activities of Package - I to Package- V i.e. Kailashahar - Khowai section of NH-208 (Chainage from Km 21+100 to Km 101+300) of the above project road is in progress.

The sixth package (new Package -1) starts from Design Chainage km 101+300 (Existing Ch: 111+288 km) and ends at Design Chainage km 127+319 (Existing Ch: 139+453 km), covering a total design length 26.019 km.

The project road runs through Khowai District of Tripura. The project road passes through village / localities namely Ganki, Sonatala, Chebri, Ramchandraghat, Baganbazar, Kalyanpur, Totabari, Kamalnagar, Moharcherra, Trishabari, and Teliamura.

Google Map Showing proposed alignment of Khowai–Teliamura section of NH-208



The existing features of the project road is listed below in **Table 0.1**

Table 0.1: Existing Features

Sl. No.	Item	Description
1	Project Stretch	From 111+288 km to 139+453 km
2	Connectivity	Through start point : Agartala, Kamalpur, Kailashahar, Dharmanagar and Kumarghat Through end point : Agartala, Amarpur and Ambassa
3	Important Settlements	Ganki, Sonatala, Chebri, Ramchandraghat, Baganbazar, Kalyanpur, Totabari, Kamalnagar, Moharcherra, Trishabari, Teliamura.
4	Terrain	The project road passes through Plain & Rolling
5	Land use pattern	The land use of the road stretch is agricultural or a mixture of agricultural, open and residential/commercial. A considerable part of the road passes through settlement areas.
6	Horizontal Geometry	Horizontal geometry is found to be poor with sharp turns causing discomfort to the drivers in most of the

Sl. No.	Item	Description
		stretch of the alignment
7	Vertical Geometry	Vertical geometry is fair mostly except at few locations with poor sight distance
8	Pavement Condition	Generally Fair to poor, also good condition is found at few stretches of the project road.
9	Existing Carriageway	Surface Type: Bituminous: Width: 5.5m -7.5m
10	Existing Shoulder	Type: Earthen; Width: 1.0m-2.0m (Both side).Brick; Width: 1.0m (Both side at few stretches of the project road).
11	Existing ROW	Varying from 12m to 22m
12	Bridges	15 nos. Minor, 1 no Major
13	Culverts	49nos.
14	ROB	Nil
15	Existing Bypass	Nil
16	Submergence Stretch	Nil
17	Major Intersections (1nos.)	Teliamura (3-legged, at km 139+425)
18	Minor intersections	34nos.
19	Existing Utilities	HT & LT line, Electric poles, Transformer, OFC and Water Pipe Lines,Telephone line,BSNL and AIRTEL net cable line, Telephone pole,Tube well etc.
20	Existing railway crossing	1 no.at existing chainage km 136+350

0.3 Traffic

To establish the traffic characteristics along the project road, Consultants have carried out 7 days Classified Traffic Volume Counts, Intersection Turning Movement Survey, Origin Destination survey, Axle Load survey, Speed and Delay survey, Pedestrian Crossing survey.

The Average Annual Daily Traffic (AADT) in the base year 2015 at one traffic survey count location is presented in **Table 0.2**.

Table 0.2: Estimates of AADT (September 2015)

Vehicle Type	In Number	In PCU
Two-Wheeler	1898	949
Car/Jeep/Van/Taxi/Auto	1856	1856
Mini-Bus	14	21
Standard Bus	31	92
LCV	216	323
2-Axle	53	160
3-Axle	4	12
Multi-Axle	17	77

Vehicle Type	In Number	In PCU
Tractor with Trailer	0	2
Tractor Without Trailer	0	0
Cycle	1694	847
Cycle Rickshaw	82	163
Hand Cart	16	49
Bullock Cart	0	0
Horse Cart	0	0
Total Vehicles (Number)AADT	5882	-
Total Motorized Vehicles (Number)	4089	-
Total Non-Motorized Vehicles	1792	-
Total Motorized Vehicles (PCU)	-	3490
Total Non-Motorized Vehicles (PCU)	-	1062
Total Commercial Vehicle per day in	335	-
Total PCU per day	-	4552

Considering 5% traffic growth rate as per IRC:37, the projected traffic is estimated below:

Table 0.4: Projected Traffic

Year	Homogeneous Section (KM 111.288-KM 139.453)	
	Length- 28.165 km	
	No	PCU
2015	5882	4552
2018	6809	5269
2022	8276	6405
2025	9581	7415
2033	14155	10955
2043	23058	17844

The project road will be safely operated with Level of service B if it is widened and upgraded with two-lane configuration with 1.5m paved shoulder on both side.

0.4 Design of New Flexible Pavement Thickness

In **Innovative design method**, as per IRC: 37-2018, for adopted **Design Traffic =20 msa** and **design CBR =8%** calculated pavement thickness comes out to be:

BC (mm)	BSM (mm)	CTSB (mm)
40	100	200

0.5 Flexible Pavement Thickness in Reconstruction Stretch

Reconstruction of existing pavement is required due to proposed cutting and filling after finalization of vertical profile. Also in poor pavement surface stretch where extensive cracking, raveling, rutting, potholes etc. were visible at the pavement surface, reconstruction is recommended. Hence, a new pavement thickness for **Innovative design method** BC=40mm, BSM=100mm and CTSB=200 mm shall be provided on existing portion after removal of existing pavement layer up to a required depth based on the profile design with exposed pavement layer treated as sub-grade course after compaction.

0.6 Project Description

This relates to the most suitable alignment for 2-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. A few appropriate design applications have been considered for operational efficiency and road safety.

Road side religious structures, graveyards, missionaries etc. have been mostly avoided by adjusting the alignment suitably and/or by eccentric widening. All major and minor junctions/intersections have been analysed with respect to vehicular movements and vehicular turning movements based on traffic study for providing appropriate grade for cross / turning traffic.

Salient features of the improvement proposal in comparison to the existing conditions are mentioned below.

Salient Features of the Proposed Road

Descriptions	Existing	Proposed
Terrain	: Plain & Rolling	Plain & Rolling
Length	: Existing Length = 28.165km (from 111+288 km to 139+453 km)	Proposed Length = 26.019km (from 101+300 km to 127+319 km)
Alignment	: The geometrics of existing Alignment is poor with very sharp turns and reverse “S” curves are found at many locations.	All geometric deficiencies have been identified with respect to design speed proposed for the project road and necessary corrective measures have been proposed according to the relevant Horizontal Alignment Design standards. Total Length of Re-Alignment-6.820km
Design Speed	: Plain / Rolling: 40-60kmph	Plain : Ruling 100 kmph , Min 80kmph Rolling: Ruling 80 kmph , Min 65kmph
Cross-Section	: Surface Type: Bituminous: Width: 5.5m -7.5m, though at few stretches carriageway 12.1m and 9m width is found.	<u>2 Lane with Paved Shoulder in Rural Area for Plain/Rolling Terrain(Reconstruction):</u> Carriageway = 7.0m Paved Shoulder = 2 x 1.5m = 3.0m Earthen Shoulder = 2 x 1.0m = 2.0m Roadway Width= 12.0m

Descriptions	Existing	Proposed
		<p><u>2 Lane with Paved Shoulder at Realignment/Bypass Stretches for Plain/Rolling Terrain (Newconstruction):</u></p> <p>Carriageway = 7.0m Paved Shoulder = 2 x 1.5m = 3.0m Footpath = 2 x 1.0m = 2.0m Roadway Width = 12.0m</p> <p><u>2 Lane with Paved Shoulder at Built-up Area(Reconstruction)</u></p> <p>Carriageway = 7.0m Paved Shoulder = 2 x 2.5m = 5.0m Footpath cum Drain = 2x2.0m Roadway Width = 16.0m</p> <p><u>2 lane carriageway in ROB Approach with both side service road</u></p> <p>Carriageway width=10.0m Crash barrier with friction slab=2x1m Roadway Width = 12.0m Carriageway width (Service road) = 5.5m (Both side) Shoulder width = 2x 1.5m (Both side)</p>
CBR Considered	: -	8%
Pavement Design Life	: Nil	Flexible Pavement-15 Years
Design msa	: Nil	7msa Adopted MSA= 20msa
Pavement Condition	: Generally Fair to poor, also good condition is found at few stretches of the project road.	Proposed pavement Crust As per Innovative Design For 20 msa design traffic & 8% Design CBR Value, thickness of the flexible pavement (as per IRC:37-2018) as follows BC=40 mm, BSM=100 mm, CTSB=200mm Total Thickness=340mm.
Bridges	: Major Bridge =1 no. Minor Bridge = 15 nos.	Major Bridge (reconstruction)= 1 no. Minor Bridge (reconstruction)= 13 nos. Minor Bridge (retained) = 1 no. (Good Condition) Minor Bridge = 1 nos. not required due to realignment
Culverts	: Total Culvert = 49 nos. (23 HP culverts, 25 nos. slab culvert& 1 culvert not visible)	Total Culvert = 52 Nos. Reconstruction (Box culvert 36 nos.) New proposal (Box culvert 16 nos.)

Descriptions		Existing	Proposed
Protection Work	:	Nil	Nil
Longitudinal Drains		Total Masonry Drain = 6272m	2.0m Width RCC Covered Drain = 1847m 1.0m Width RCC Covered Drain for Service Road = 2154 m
Bus – Bay	:	Nil	4 Locations (bothside)
Truck Lay Bye	:	Nil	Nil
Refuge Area/Passing place	:	Nil	Nil
ROW	:	About 12m to 22m	Proposed ROW has been considered 20m in Built up Sections 30m in Rural Area. 40m in ROB Approaches
Major Intersection	:	1nos	2nos
Minor Intersection	:	34nos	34nos
ROBs	:	Nil	1 no
Service Road	:	Nil	length= 2.5 km (on Both Sides)
Land Details	:	30.30 Ha (available within proposed ROW)	38.11 Ha (Govt-5.51 Ha, Pvt-32.60 Ha)