

# **Environmental Management Plan**

**For**

**6 x 50 m Span Double Lane Trussed Girder Bridge at Trenz Sheikhpora over Rambiarā Nallah in Shopian District (J&K)**



**Prepared and Submitted by:**

**J&K Projects Construction Corporation Ltd.**

**(Jhelum and Tawi Flood Recovery Project)  
(JTFRP)**

### Table of Contents

Section	Particulars	Page Nos
<b>1.0</b>	<b>Introduction</b>	<b>1</b>
1.1	Background	1
1.2	Environmental Permission Required for the Proposed Bridge	4
<b>2.0</b>	<b>Project Description</b>	<b>8</b>
2.1	Proposed Bridge Details	8
2.2	Hydrology at Rambiara Nallah	8
2.3	Geotechnical Details	8
2.4	Right of Way for the Bridge at Trenz	8
2.5	Project Cost	9
2.6	Time of Schedule for Completion	9
<b>3.0</b>	<b>Description of Environment</b>	<b>11</b>
3.1	Topography and Physiography	11
3.2	Geology	12
3.3	Seismicity of The Area	12
3.4	Soil	13
3.5	Hydrology of Rambiara Nallah	14
3.6	Climate & Rainfall	14
3.7	Ambient Air Quality	14
3.8	Ambient Noise Levels	14
3.9	Ecology	14
3.10	Socio-economic Conditions	15
<b>4.0</b>	<b>Anticipated Environmental Impacts</b>	<b>15</b>
4.1	Consideration of Environmental Impacts During Design of Proposed Bridge	15
4.1.1	Hydrological Study	16
4.1.2	Erosion at Bridge Abutments during Floods/Rains	16
4.1.3	Sliding of Backfilling with Abutments	16
4.1.4	Seismic Factor in Design Bridge	16
4.1.5	Snow fall on Proposed Bridge Site	16
4.2	Anticipated Impacts During Construction and Operation Phases	17
4.2.1	Impact on Physiography and Topography	17
4.2.2	Impact on Soil	17
4.2.3	Impact on Water Resources	17
4.2.4	Degradation of Water Quality	18
4.2.5	Impact on Ambient Air Quality	18
4.2.6	Impact on Noise and Vibration	20
4.2.7	Management of Spills and Wastes	20
4.2.8	Impact on Flora, Fauna and Ecosystem	20
4.2.9	Impact on Socio-economic Environment	20

<b>5.0</b>	<b>Public Consultation</b>	<b>22</b>
5.1	Issues Discussed During Public Consultation	22
5.2	Feedback Received During Public Consultation	23
<b>6.0</b>	<b>Environmental Management Plan</b>	<b>25</b>
6.1	Introduction	25
6.2	Objectives of Environmental Management Plan (EMP)	25
6.3	Environmental Management Measures for Design stage	26
6.3.1	Hydrological Study for Design of Proposed Bridge	26
6.3.2	Erosion at Bridge Abutments during Flood	26
6.3.3	Sliding of Backfilling and Prevent Uplift Pressure at Abutments	27
6.3.4	Seismic Factor in Design Bridge	27
6.3.5	Snow Accumulation on the Proposed Bridge	27
6.3.6	Approaches for Bridge	27
6.3.7	Safety Signage for Bridge	27
6.4	Environmental Management Plan	28
6.5	Environmental Monitoring Plan	42
6.6	Institutional Arrangements for Implementation of EMP	42
6.7	Reporting System	44
6.8	Clause for Nonconformity to EMP - Protection of the Environment	45
6.9	Budgetary Provisions for Implementation of EMP	45
6.9.1	Budget for EMP Implementation	45

#### **List of Tables**

<b>Table No</b>	<b>Title of Table</b>	<b>Page Nos</b>
Table 1.1	List of Environmental Regulations Applicable to Proposed Bridge	4
Table 2.1	Right of Way for the Bridge at Trenz	9
Table 6.1	Environmental Management Plan For Proposed Bridge on Rambiara Nallah at Trenz	29
Table 6.2	Environmental Monitoring Indicators	42
Table 6.3	Institutional Arrangement for Proposed Bridge	43
Table 6.4	Reporting System	44
Table 6.5	Budget for Implementation of Environmental Management Plan	47

#### **List of Figure**

<b>Figure No</b>	<b>Title of Figure</b>	<b>Page Nos</b>
Figure 1.1	Location of Proposed Bridge Site on the Satellite Image	2
Figure 1.2	Location of Proposed Bridge Site on the Google Map	3

Figure 2.1	General Arrangement Drawing for Proposed Bridge at Trenz	10
Figure 3.1	Photographs of Topography & Physiography of the Site	11
Figure 3.2	Seismic Hazard Map of Jammu & Kashmir	13
Figure 5.1	<b>Photographs of Public Consultation</b>	24

Annexure 1: Environment and Social Screening Checklist

Annexure 2: Signature Sheets for Participants in Public Consultation

## **1.0 Introduction**

### **1.1 Background**

The Sheikhpora Trenz road connects vast areas of Pulwama, Shopian and Kulgam and connects tens of villages like Trenz, Mohanpora, Dangerpora, Imam sahib, sheikh pora, Arihal, Ahagam, Peerpora, Arigam etc. The area is presently cut off due to the damaged causeway which has been washed away due to flash floods of September 2014 and the locals are facing severe hardships. The area being rich in Horticulture products like apples, wall nuts and it involves a lot of labour in carrying the produce up to road sides first and then to market places in absence of a motorable bridge.

To provide all weather connectivity and to connect the unconnected areas, the bridge has been identified for construction at Trenz Sheikhpora by J&K Projects Construction Corporation Ltd., under Jhelum and Tawi Flood Recovery Project (JTFRP) assisted by the World Bank

The proposal bridge on Rambiara Nallah at Trenz Sheikhpora has two lane carriageways of 6 x 50.00 meters of overall length and width 13.60 meters carriage way of 7.5 meters & 1.5 meter footpath on either side is being adapted. The Bridge is of 6 spans and will rest on side abutments of open trench foundation and at Centre on piers of open trench foundation

The location of the proposed bridge on GIS map and Google map are shown in Figure 1.1 and 1.2, respectively.

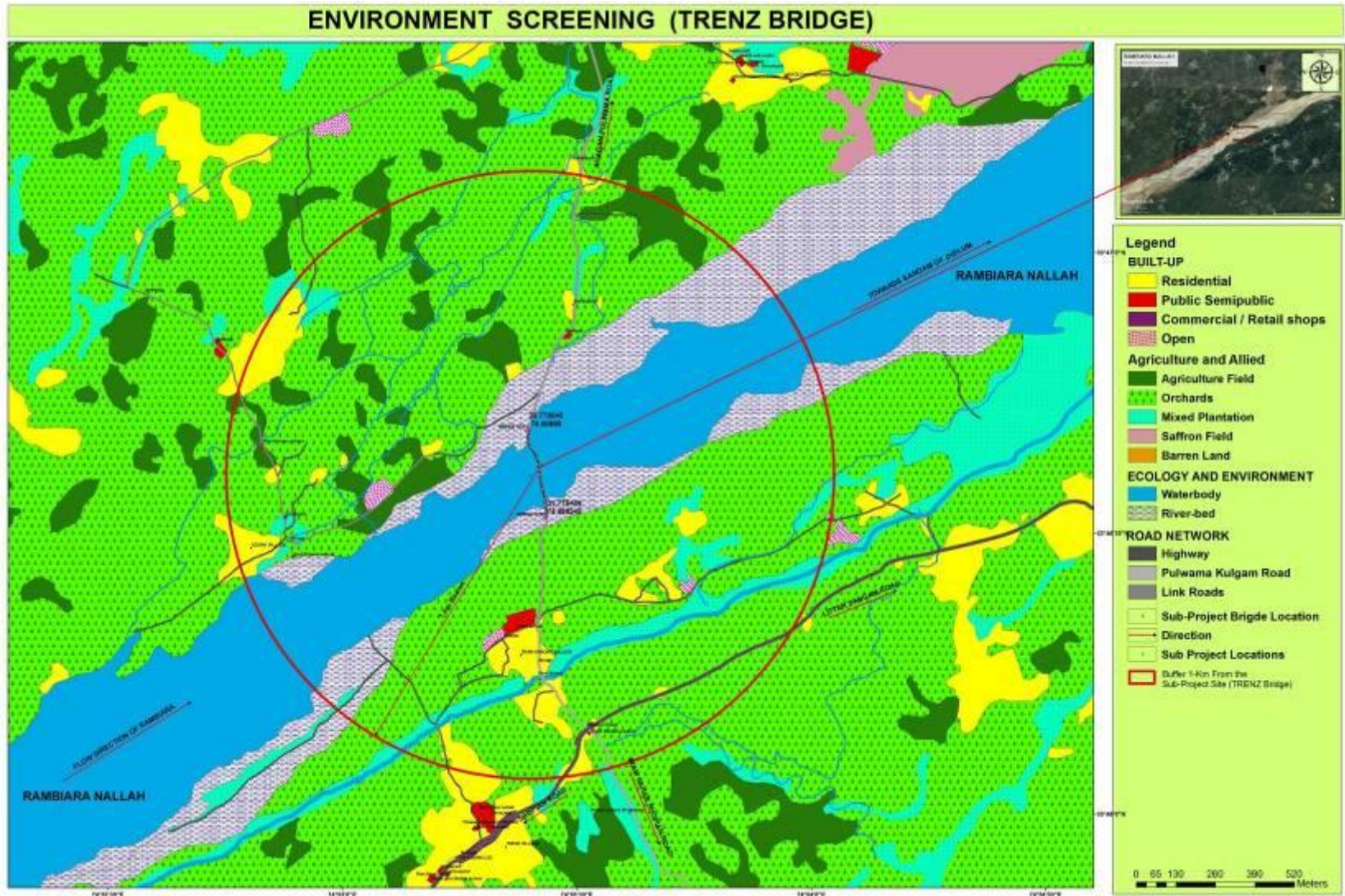


Figure 1.1: Location of Proposed Bridge Site on the GIS Map



**Figure 1.2: Location of Proposed Bridge Site on the Google Map**

## 1.2 Environmental Permission Required for the Proposed Bridge

The proposed bridge is not scheduled activity under the EIA Notification 2006. Therefore, environmental clearance is not required for proposed bridge. As tree cutting and forest land are also not involved in the proposed bridge, therefore, tree cutting permission and forest clearance are also not required. For installation and operation of batching plant, Consent to Establish (CTE) and Consent to Operate (CTO) will be obtained by the contractor from J&K State Pollution Control Board. During construction phase, labour's safety, health and welfare measures will need to be taken by the contractor as per Building & other construction workers (Regulation of Employment and condition of service) Act 1996. The list of environmental regulations applicable to the proposed bridge is as given in **Table 1.1**:

**Table 1.1. List of Environmental Regulations Applicable to Proposed Bridge**

Sl. No	Type of Clearance	Applicability	Project Stage	Responsibility
1.	EIA Notification, 2006 under the Environment (Protection) Act, 1986	Not Applicable	Not Applicable	Not Applicable
2.	Jammu and Kashmir Preservation of Specified Trees Act of 1969 and Rules of 1969. Tree felling permission	Not required as no tree cutting is required.	Not required	Not required
3.	Forest Clearance	Not required as no forest land is involved.	Not required	Not required
4.	The Wildlife Conservation Act, 1972, as amended, J&K Wildlife (protection) Act 1978, as amended provide for protection	Not applicable as no wild life issue is involved.	Not Applicable	Not Applicable



<b>Sl. No</b>	<b>Type of Clearance</b>	<b>Applicability</b>	<b>Project Stage</b>	<b>Responsibility</b>
	& management of Protected Areas Wildlife Clearance			
5.	The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959 provide guidance for carrying out activities, including conservation, construction and reuse in and around the protected monuments.	Not required as the area does not fall within or is situated close to any such site of archaeological importance	Not Applicable	Not Applicable
6.	Water (Prevention and control of pollution) Act, 1974 as amended Air (prevention and control of pollution) Act, 1981, as amended	Applicable for hot Batching Plant to be obtained from J&K State Pollution Control Board	Construction (Prior to work initiation)	Contractor
6.	Hazardous Waste Authorization for disposal of hazardous waste like used oil, paint wastes, etc	Applicable and to be obtained from J&K State Pollution Control Board	Construction (Prior to work initiation)	Contractor
7.	NOC for crusher, if crusher is installed for aggregate	Applicable and to be obtained from J&K State Pollution Control Board	(Prior to work initiation)	Contractor
8.	Environmental Clearance for stone	Applicable and to be obtained from	(Prior to operation)	Contractor

<b>Sl. No</b>	<b>Type of Clearance</b>	<b>Applicability</b>	<b>Project Stage</b>	<b>Responsibility</b>
	quarry (if new quarry is opened by the contractor for boulders/stone)	State Environmental Impact Assessment Authority/ District Level Environmental Impact Assessment Authority.	quarry)	
9.	Building and Other Construction Workers (Regulation of Employment and Conditions of service) Act of 1996 and Rules 1998 provide for regulation of employment and conditions of service of the building and other construction workers as also their safety, health and welfare measures in every establishment which employs ten or more workers.	Applicable for Labour's Safety, health and Welfare. Registration of each establishment within a period of sixty days from the commencement of work and registration of building workers as beneficiaries under this Act. Compliance to provisions of health and safety measures for the construction workers in conformity with ILO convention No.167 concerning safety and health in construction	Construction Phase	Contractor
10.	Certificate of	Applicable for	Construction	Contractor

<b>Sl. No</b>	<b>Type of Clearance</b>	<b>Applicability</b>	<b>Project Stage</b>	<b>Responsibility</b>
	Pollution Under Control for Vehicles	vehicle engaged in construction activities	Phase	

## **2.0 Project Description**

### **2.1 Proposed Bridge Details**

The proposal for proposed bridge for two lane carriageway of 6 x 50.00meters of overall length and width 13.60 meters carriage way of 7.5 meters & 1.5 meter footpath on either side is being adapted. The Bridge is of 6 spans and will rest on side abutments of open trench foundation and at Centre on piers of open trench foundation.

General arrangement drawing (GAD) for the proposed bridge at Trenz is shown in **Figure 2.1**.

### **2.2 Hydrology at Rambiara Nallah**

Hydrological details of Rambiara Nallah are given below:

Discharge	=	4500 Cumes
Highest Flood level (HFL)	=	98.980 m
Bed Slope	=	1.49
Scour Depth	=	2.57 m

### **2.3 Geotechnical Details**

Subsoil Investigations have been carried out by Quality Contol Lab at Pampore. The composition of 3M depth examined for 3 nos. trial pits comprise of Boulder, Gravel & Coarse Sand up to 2Mtrs, beyond 2Mtrs Silty sand with fine sand is observed. As per IS classifications subsoil is granular non-plastic in nature. The soil report recommends 17T/sqm bearing Capacity 2.0M below NSL. As proposed foundation are deeper than the above for the design of foundations for Piers SBC of 30 T/sqm and for abutment SBC of 25 T/sqm is adopted.

### **2.4 Right of Way for Bridge at Trenz**

The right of way for the proposed bridge at Trenz is given in **Table 2.1**.

**Table 2.1: Right of Way for the Bridge at Trenz**

S. No.	Chainage (Km)	Government Land from Centre Line of Road (m)		Proposed Road Base Width/ Bridge Width (m)		Additional Land Requirement (m)	
		Left	Right	Left	Right	Left	Right
1.	0.000	6.80	6.80	6.80	6.80	Nil	Nil
2.	0.100	6.80	6.80	6.80	6.80	Nil	Nil
3.	0.200	6.80	6.80	6.80	6.80	Nil	Nil
4.	0.300	6.80	6.80	6.80	6.80	Nil	Nil
5.	0.400	6.80	6.80	6.80	6.80	Nil	Nil
6.	0.500	6.80	6.80	6.80	6.80	Nil	Nil
7.	0.550	6.80	6.80	6.80	6.80	Nil	Nil

## 2.5 Project Cost

The total cost of the proposed bridge works out to be Rs. **3125** Lakhs.

## 2.6 Time of Schedule for Completion

The proposed bridge will be completed in three working seasons.

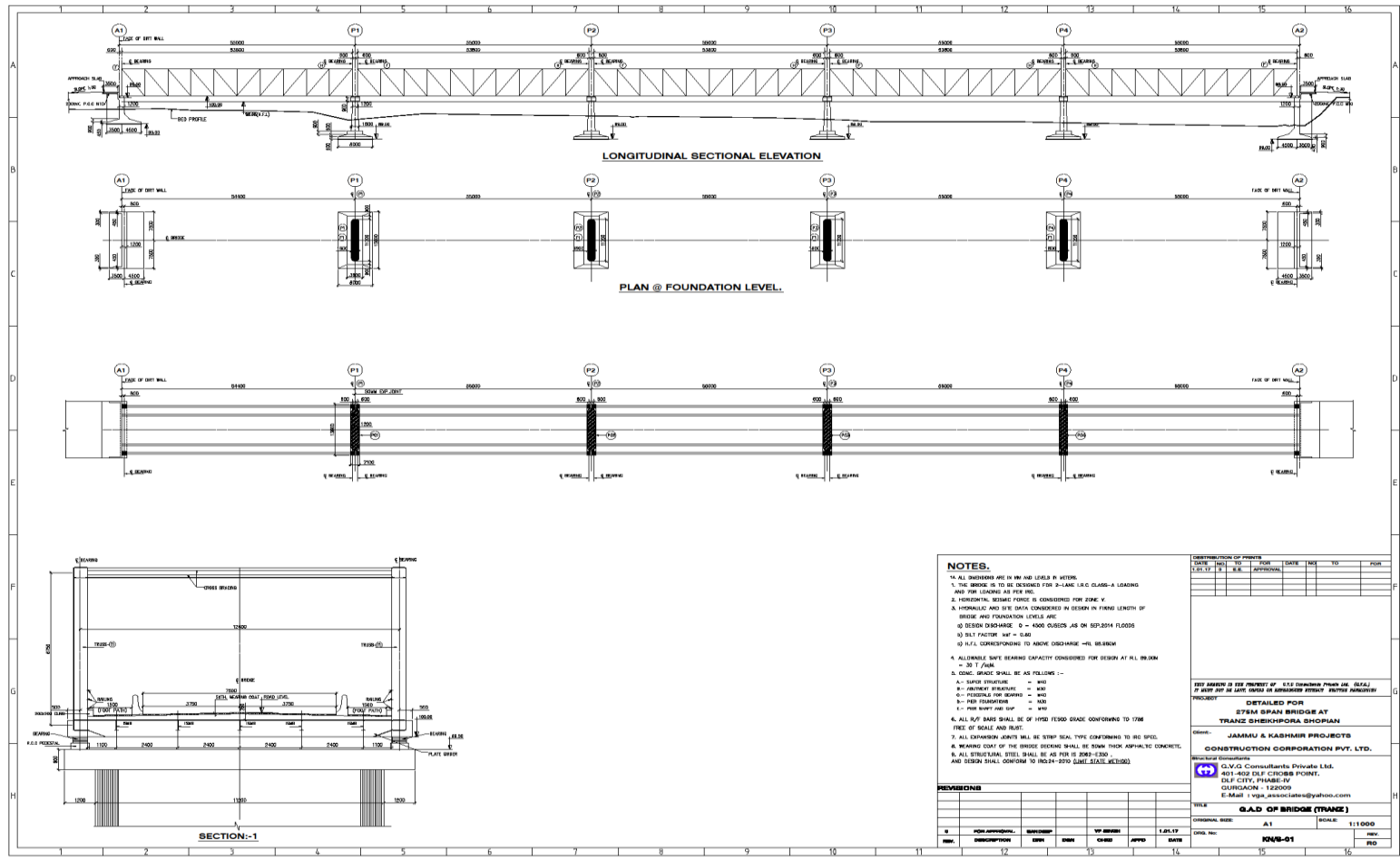


Figure 2.1: General Arrangement Drawing (GAD) for Proposed Bridge at Trenz

### **3.0 Description of Environment**

The collection of baseline information on bio-physical and social aspects of the project area is the most important reference for environmental screening and conducting Environmental Assessment (EIA) study. Based on the existing environmental scenario, potential environmental impacts of the proposed bridge will be identified and accordingly environmental management plan will be prepared. The existing environmental conditions at and around the proposed bridge site, have been obtained by the site visits and secondary data collection from published source and various government agencies.

The environmental screening for the proposed bridge is given in **Annexure 1**. The baseline environmental conditions of the area are as given below:

### **3.1 Topography and Physiography**

Topography around the proposed bridge over Rambiarra Nallah at Trenz is mostly plain valley with mild undulating. The site is located in Shopian district. Agriculture and orchids are observed in the area around the proposed bridge. The elevation at the bridge construction site is 1589 m above mean sea level. The area is flood prone and in September 2014 divested flood was experienced in the Rambiarra Nallah. The photographs of topography and physiography of the site are given in **Figure 3.1**.



**Figure 3.1: Photographs of Topography & Physiography of the Site**

### 3.2 Geology

To the south and west of the Kashmir valley there are karewa formations which are lake-laid clays and shales. These are lacustrine deposits and appear like flat mounds on the margin of high mountains. Below these karewas is spread the alluvium of the Jehlum. The highest karewa is near the Pir Panjal. It is 3800 meters above sea level and more than 2100 metres above the level of the Jhelum. The rock formations in Shopian District range from Cambrian to Quaternary.

The brief generalized geological succession of the district is given below:

Stratigraphic Unit	Lithology	Thickness (m)	App. Age
Alluvium	Clay, Silt and sand	15	Recent
Upper Karewas	Alternate greenish sandy and grey clay bed layers with calcareous Laminae	750	Plio-Pleistocene
	<i>Second fluvio-glacial boulder bed</i>	130	
Lower Karewa	Clay (bluish grey) & Conglomerates with coarse to fine sand (greenish in colour) alternate with grey sandy clays. <i>Lignite and peat material</i>	2000	<i>Plio-Pleistocene</i>
	<i>First fluvio-glacial Boulder bed</i>	200	
Panjal Trap	Agglomeratic slates, grits and effusive rocks		Permo Carboniferous
Zewan beds	Shale, slates with quartzite and limestone		Cambro-Silurian

Zewan beds, Panjal traps forming hilly and mountainous terrain of the district with hard formations of igneous and metamorphic rocks. The Karewas and alluvium of Quaternary and Tertiary age (Plio-Pleistocene) underlie the valley area and consists of alternate bands of sand, silt, gravel & clay, interspersed at two to three levels locally by glacial boulder beds. This formation is important from ground water point of view and sustains the water supply system in the area. This formation of Plio-Pleistocene age lies disconformably over the older rocks ranging in age from Cambrian to Triassic.

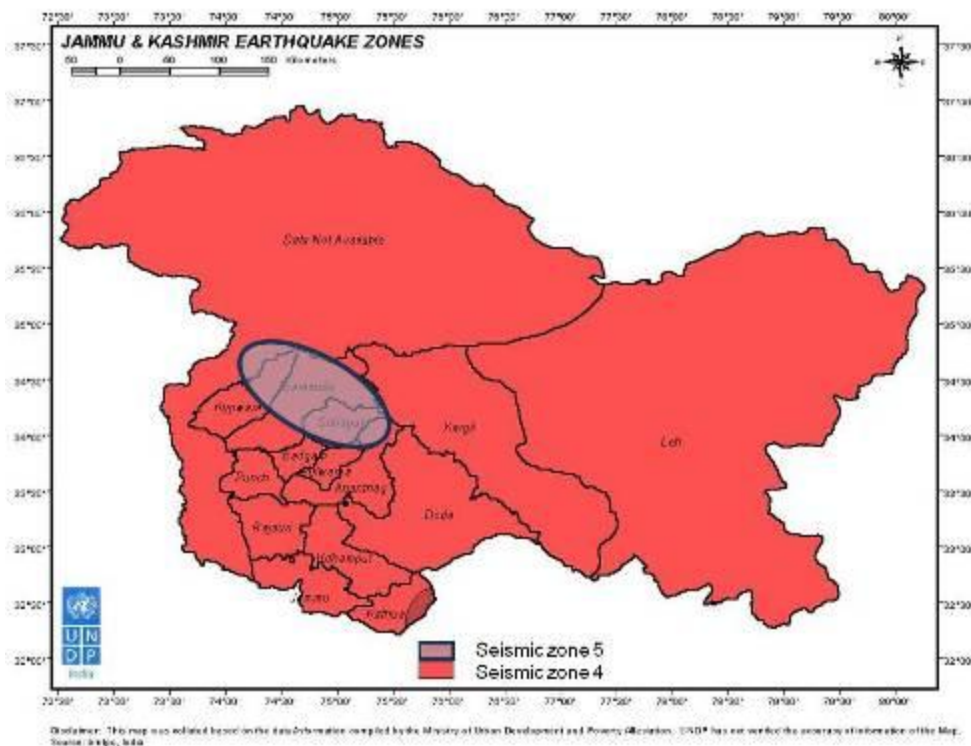
### 3.3 Seismicity of the Area

The project area is located the highest earthquake prone seismic zone V. Among the most notable are the Northwest Kashmir earthquake of 2005 (Mw 7.6) & 2002 (Mw 6.4), Pattan earthquake of 1974 (Mw 7.4), Kangra



earthquake of 1905 (Mw 7.8) & in 1885 (Mw 7.5). According to the seismic zonation map for India, the region falls in seismic zone V. Most of the earthquakes are generated by the fault movements and in Jammu & Kashmir region, there are parallel faults trending northwest to south east.

Seismic hazard map for Jammu & Kashmir State is shown in **Figure 3.2**



**Figure 3.2: Seismic Hazard Map of Jammu & Kashmir**

### 3.4 Soil

Shopian district is hilly and mountainous towards the northeast and southwest with broad intermountain valley. The altitude of the hill ranges upto 3700 m amsl. The valley area in the central part of the district has flat to mildly undulating topography with its elevation about 1600 m amsl. The master slope in the area is towards north- west.

The district forms part of the Jhelum sub basin of Indus basin. River Jhelum is the major rivers with its tributaries draining the area. Three major tributaries of River Jhelum viz., Sasara, Rembaira and Rambhara rivers drains the sloping land in the southwest and have wide channels.

Soil found on plains is clay loam in nature and are dark brown in colour with good fertility.

### **3.5 Hydrology of Rambiar Nallah**

The proposed bridge will be constructed over Rambiar Nallah near Trenz village. The hydrological details of Rambiar Nallah are given below:

Water Discharge	=	4500 Cumes
Highest Flood level (HFL)	=	98.980 m.
Velocity of Water	=	0.19m/sec
Corresponding Gauge	=	6.70 m at Nayina
Bed Slope	=	1.49
Scour Depth	=	2.57 m

### **3.6 Climate & Rainfall**

The climate of the area is Temperate cum Mediterranean type. In the higher reaches temperature remains cold through out the year. Average minimum and maximum temperature varies from  $-5^{\circ}\text{C}$  to  $32^{\circ}\text{C}$ . The winter season starts from the middle of the November and severe winter conditions continues till the middle of March. The area receives an average annual precipitation of about 557 mm in the form of rain and snow for about 60 days.

### **3.7 Air Quality**

The Trenz village is located at distance of about 1 km from bridge construction site. As there is no residential, commercial, and industrial activity near the bridge construction site, therefore is no significant source of air pollution. Ambient air quality at the proposed bridge construction site appears reasonably good.

### **3.8 Noise Levels**

As there is no residential, commercial and industrial activity near the proposed bridge construction site within about 1 km distance, noise levels at the proposed bridge construction site are reasonably low.

### **3.9 Ecology**

There is no tree or shrubs in the alignment of the proposed bridge over Rambiar Nallah. Therefore, cutting of tree will not be required for construction of the proposed bridge. In the area around the proposed bridge

commonly observed trees species *Abies pindrow*, *Celtis australis*, *Crataegus songaric*, *Euonymus hamiltonianus*, *Euonymus fimbriatus*, *Fraxinus hookeri*, *Juglans regia*, *Morus alba*, *Parrotiopsis jacquimontiana*, *Pinus excelsa*, *Platanus orientalis*, *Populus caspica*, *Prunus cerasifera*, *Prunus cornuta*, *Pyrus malus*, *Quercus robur*, *Rubinia pseudoacacia*, *Salix alba*, *Salix babylonica*, *Salix wallichiana*, *Taxus wallichiana*, *Ulmus lavigata*, *Ulmus wallichiana planchon*, etc.

There is no ecological sensitive location like wildlife sanctuary, national park or bio reserve within 10 km distance from the proposed bridge construction site.

### **3.10 Socio-economic Conditions**

According to the 2011 census, the Shopian district has a population of 265,960, roughly equal to that of the nation of Barbados. This gives the Shopian district a ranking of 577th in India (out of a total of 640). The district has a population density of 852 inhabitants per square Kilometer (2,210/sq mi). Its population growth rate over the 2001–2011 decade was 25.85% Shopian has a sex ratio of 951 females for every 1000 males, and a literacy rate of 62.49%.

## **4.0 Anticipated Environmental Impacts**

The anticipated environmental impacts due to the proposed bridge can be direct as well as indirect. The direct area of influence includes quarry, crusher, camp, batching plant and construction site for the proposed bridge. The anticipated impacts on various environmental components can occur during design, pre-construction, construction and operation stages.

The description and magnitude of anticipated environmental impacts due to proposed bridge on the various environmental components are presented in the following sub- sections

### **4.1 Consideration of Environmental Impacts during Design of Proposed Bridge**

The important environmental impacts for consideration during design of the proposed bridge are given below:

#### **4.1.1 Hydrological Study**

The existing bridge has observed devastating floods in September 2014 and damaged bridge completely. Therefore, hydrological study and runoff calculations for extreme flood/rains under the climate change scenarios must be carried out and considered for designing of the proposed bridge with excess runoff flow/flood safeguard.

#### **4.1.2 Erosion at Bridge Abutments during Floods/Rains**

Rambiarā Nallah experiences flooding conditions frequently. To withstand extreme flooding condition at Rambiarā Nallah, protection around both sides of bridge abutments walls needs to be designed using appropriate protection techniques, which can withstand devastating floods. For bridge protection, simple stone pitching may not be durable and may result in deformation and collapse during heavy rains and flood.

#### **4.1.3 Sliding of Backfilling with Abutments**

Backfilling with abutments of the proposed bridge may slide due to uplift pressure of percolated rain water. Therefore, while designing of abutments, weep holes (80 mm to 100 mm dia) with minimum 600 mm filter media for draining of rain water may be considered to prevent sliding of backfilling and uplift pressure at abutments.

#### **4.1.4 Seismic Factor in Design Bridge**

The proposed bridge site over Rambiarā Nallah at Trenz is located in Seismic zone V and prone to high intensity earthquakes. While designing of bridge components, suitable seismic load factor must be taken into consideration. Anti dislocation device for slabs/spans should also be considered in bridge design/construction to withstand horizontal force during high intensity earthquakes.

#### **4.1.5 Snow fall on Proposed Bridge Site**

At the proposed bridge site over Rambiarā Nallah at Trenz, snow fall occurs during extreme winter. Therefore, while designing the proposed bridge, snow fall load over bridge should be taken into consideration.

## **4.2 Anticipated Impacts During Construction and Operation Phases**

Anticipated impacts on various environmental components during construction and operation phases of the proposed bridge are described below:

### **4.2.1 Impact on Physiography and Topography**

Since the proposed bridge will be constructed in place of existing bridge without any land acquisition, impact on the topography and physiography of the area would be negligible during construction and operation phases of the proposed bridge.

### **4.2.2 Impact on Soil**

Soil is one of the most important components of the physical environment. During construction of the proposed bridge, the potential impacts on soil are discussed as given below:

#### ***Construction Phase***

During construction of the proposed bridge, the contamination of the soil is anticipated due to improper disposal of oily wastes, pile slurry water, solid wastes, spillage of fuel oil at camps site, open defecation by construction workers, raw sewage disposal from camp site, etc. Improper disposal of used oil generated from maintenance of vehicles, construction equipment and DG sets at the camp site/batching plant may also result in soil contamination.

#### **Operation Phase**

No impact is anticipated on soil during the operation phase of the proposed bridge.

### **4.2.3 Impact on Water Resources**

#### ***Construction Phase***

The proposed 6 spans bridge will be constructed in the length of 300 m on the Rambhara Nallah. Existing damaged bridge is lying on the course of the Nallah. Demolition wastes of existing bridge may also affect flow pattern and surface water hydrology of Nallah, if not collected from the course and

disposed properly. The pier foundation excavation debris/slurry water and construction wastes on course of nallah may also affect surface water hydrology and flow. However, extent of such impact will be minor as course of Nallah is wide.

### **Operation Phase**

During the operation phase, drainage pattern or hydrology of the Nallah will not be affected. Therefore, no impact is anticipated during operation phase.

## **4.2.4 Degradation of Water Quality**

### **Construction Phase**

The surface and ground water quality due to the proposed bridge may be degraded mainly in following ways:

- a) by improper disposal of solid wastes, pile slurry water, oily wastes, used oil waste, etc.
- b) by raw sewage generated from camp, batching plant and bridge construction site,
- c) open defecation by workers on the course of Rambiar Nallah.

During construction phase, debris and construction wastes, if not cleared, may deteriorate surface water quality of the Rambiar Nallah.

### **Operation Stage**

During the operation stage, there is no probability of degradation of water quality during normal operations of the proposed bridge.

## **4.2.5 Impact on Ambient Air Quality**

### **Construction Phase**

During construction phase, there will be two main sources of air emissions *i.e.* mobile sources and fixed sources. Mobile sources are mostly vehicles involve in construction activities of the proposed bridge while emissions from fixed sources include diesel generator set, construction equipment and excavation activities, those produce dust emissions.

Certain amount of dust and gaseous emissions will also be generated during the construction phase from the batching plant. The pollutants of primary concern include Fine Particulate Matter (PM<sub>2.5</sub>) and Respirable Particulate Matter (PM<sub>10</sub>). However, suspended dust particles may be coarse and will be settled within a short distance of the construction site. Therefore, impact on ambient air quality will be temporary and restricted within the closed vicinity of the construction activities for the proposed bridge and batching plant.

Considerable amount of exhaust emissions of carbon monoxide (CO), unburned hydrocarbon, sulphur di-oxide, particulate matters, nitrogen dioxide (NO<sub>2</sub>), etc, will be generated from the DG set, construction equipment and batching plant. Batching plant should be located away from the populated areas and be fitted with the air pollution control equipment and emission shall meet National Emissions Standards/J&K State Pollution Control Board standards. Further, the batching plant must be sited at least 250 m in the downwind direction from the nearest human settlement.

Ambient air quality monitoring should be carried out during construction phase. If monitored parameters are above the prescribed limited, suitable control measures must be taken.

### ***Operation Phase***

No adverse impact is anticipated on ambient air quality during operation phase. Traffic movement on the bridge will result in vehicular emissions, which will be mingled with the ambient air within 500 m from the bridge.

#### **4.2.6 Impact on Noise**

##### ***Construction Phase***

The proposed bridge construction will be confined to the Rambiarra Nallah. During the construction phase, noise will be generated from the batching plant, operation of construction equipment at bridge construction site, operation of DG sets and vehicles transporting construction materials. During the construction phase, the noise levels are expected to be increased between 10 - 20 %. However, these noise levels will be temporary and intermittent in nature mostly during works in day time only.

##### ***Operation Phase***

During the operation phase, noise will be generated through the vehicles movement on the bridge.

#### **4.2.7 Management of Spills and Wastes**

During the construction of the proposed bridge, demolition wastes, excavated earth from foundation, construction derbies, used oil from maintenance of DG set and construction equipment, lube oil containers, solid waste, etc will be generated. Such wastes may cause deterioration of soil quality and surface water/runoff flow in Rambiarra Nallah. These wastes must be collected and disposed off appropriately.

#### **4.2.8 Impact on Flora, Fauna and Ecosystem**

During the construction and operation phases of the proposed bridge, no adverse impact is anticipated on the flora and fauna of the area as no cutting of trees and clearing of vegetation is required.

#### **4.2.9 Impact on Socio-economic Environment**

There is no land acquisition required for the proposed bridge construction. The construction and operation phases of the proposed bridge will have some beneficial impact on social environment. Some increase in income of local people is expected as some local unskilled, semiskilled and skilled persons may gain direct or indirect employment during construction phase of the



proposed bridge. Since the immigration of work force during construction phase is likely to be very small, the social impacts on literacy, health care, transport facilities and cultural aspect are expected to be insignificant.

### **Construction stage**

Although the construction contractor is likely to use unskilled labour drawn from local communities, use of specialized construction equipment will require trained personnel not likely to be found locally. It is anticipated that the construction labour inputs for the construction works will be in the order of about 30 persons per day. However, this number will fluctuate, and the number on any particular day may be higher or lower.

### **Operation Stage**

During operation phase, proposed bridge will provide safe movement of traffic and reduce the travel time. The proposed bridge will also facilitate shortest road for the people of Shopian, Kulgam, Pulwama and Anantnag to reach different areas. In addition proposed bridge is more essential as the road is vital in reaching to agriculture fields, orchids and is also nearest connectivity with the National Highway (NH-44). Therefore, positive impact is anticipated on the socio-economic environment during operation phase.

## **5.0 Public Consultation**

Public's consultations and participation have been viewed as a continuous two way process, involving, promoting of public understanding of the processes and mechanisms through which developmental problems and needs are investigated and solved. The public consultation, as an integral part of environmental screening and assessment process throughout the project preparation stage not only minimizes the risks and unwanted political propaganda against the project but also abridges the gap between the community and the project formulators, which leads to timely completion of the project and making the project people friendly.

During environmental screening and impact assessment, public consultations were carried and issues related proposed bridge was raised during project specific consultations. During the consultation on 04/05/2017 at Trenz, the following issues were discussed. Photographs of public consultation are given in **Figure 5.1**. The signatures of participants, who participated in the public consultation, are documented in **Annexure 2**.

### **5.1 Issues Discussed During Public Consultation**

The issues discussed during public consultation for the proposed bridge are given below:

- About proposed project, source of assistance and its implementation/ execution etc.
- Information on perceived benefits from the proposed bridge including travel time, fuel cost, noise and air pollution.
- Information of the impacts from the proposed bridge during construction stage in terms of inconvenience to public, air and noise pollution, etc.
- Occurrence of disaster like floods and cloud burst in past.
- Whether construction activities will cause any type of health hazard or not?, then and mitigation measures.
- Discussions among public for sharing of information related to the proposed bridge, environment policy of World Bank, direct and indirect impacts of improvement/construction work on environment.
- Any loss of land/structure/business or other community property due to proposed bridge?

- Any damage to historical or cultural monuments due to the proposed bridge?
- Any impact on trees and measures to be taken for saving scheduled trees (Chinar, Mulberry, Walnut) in close vicinity of the proposed bridge site.
- Any possible problem to be faced by the local people in their daily activities due to the proposed bridge construction work.

## **5.2 Feedback Received During Public Consultation**

The feedback received from local people during public consultation for the proposed bridge is given below:

1. During consultation regarding the proposed bridge, people have shown keen interest.
2. Some of the local people are aware about the upcoming bridge work.
3. People in general were very enthusiastic about the benefits of the proposed bridge in terms of reduction in travel time, fuel consumption and also an improvement in the air quality and a reduction in the noise levels.
4. The major problems faced by people are related to non availability of traffic due to absence of bridge.
5. People are ready to extend all types of support during execution of the bridge as their major difficulties will overcome after completion of the proposed bridge.
6. JKPCCE ensured that the requisite environmental management measures shall be incorporated in EMP and public consultation shall be a regular process during all stages of the sub-project to solve any issues arising out of the proposed bridge works.



**Figure 5.1: Photographs of Public Consultation at Bridge Site**

## **6.0 Environmental Management Plan**

### **6.1 Introduction**

Jammu & Kashmir Projects Construction Corporation Ltd has planned for construction of proposed 6 spans bridge at Rambiarra with two lane carriageway of 6 x 50 m of overall length width 13.60 meters carriage way of 7.5 meters & 1.5 meter footpath on either side is being adapted.

The proposed bridge may result as adverse environmental impacts specifically during design, pre-construction, construction and demobilisation stages due to various project activities. To mitigate such anticipated environmental impacts, environmental management plan (EMP) has been prepared for design, pre-construction, construction and demobilisation. The EMP will be integral part of bid document and contract agreement.

Environmental Management Plan (EMP) deals with the implementation of the mitigation measures recommended to avoid, minimize and mitigate environmental impacts due to the proposed bridge.

### **6.2 Objectives of Environmental Management Plan (EMP)**

The objectives of the Environmental Management Plan (EMP) for the proposed bridge are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential environmental impacts to minimal or insignificant levels.
- To identify measures that could optimize beneficial impacts.
- To create management structures that addresses the concerns and complaints of all the stakeholders with regards to the development.
- To establish a method of monitoring and auditing environmental management practices during construction and operation phases.
- Describe the practical mitigation measures that should be implemented on bridge construction works to prevent or mitigate any negative environmental impacts and to enhance the positive issues.
- Detail of specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the environment and safety measures are complied with.
- Propose mechanisms for monitoring compliance with the EMP and reporting thereon.

- Establish the roles and responsibilities of Contractor and PIU in the implementation of environmental measures.

### **6.3 Environmental Management Measures for Design stage**

#### **6.3.1 Hydrological Study for Design of Proposed Bridge**

During devastating floods in September 2014, the existing bridge on Rambhara Nallah at Trenz got fully damaged and could not withstand high flood. Therefore, it is essential that hydrological study should be carried out for designing of the proposed bridge with excess runoff flow/flood safeguard.

#### **6.3.2 Erosion at Bridge Abutments during Flood**

The existing bridge experienced devastating floods in past. Therefore, protection around both sides of abutment walls of the bridge needs to be provided using appropriate protection techniques, which can withstand devastating floods. Suitable slopes and combination of gabion baskets and/or mattresses may be good for bridge protection. Simple stone pitching for bridge protection may not be sufficient for long time as stone pitching may deform and collapse during heavy rains and flood.

### **6.3.3 Sliding of Backfilling and Prevent Uplift Pressure at Abutments**

In both abutments of the proposed bridge, weep holes (80 mm to 100 mm dia) should be provided with minimum 600 mm this filter media for draining of rain water to prevent sliding of backfilling and to avoid any uplift pressure.

### **6.3.4 Seismic Factor in Design Bridge**

The proposed bridge is located in Seismic zone V and prone to high intensity earthquakes. Therefore, it is imperative that seismic load factor must be taken into consideration while designing of bridge components.

As bridge is located in highest seismic risks zone, therefore, seismic arresters should be provided in the bridge as anti dislocation device for slabs/spans to withstand horizontal force during earthquake.

### **6.3.5 Snow Accumulation on the Proposed Bridge**

The proposed bridge site observes snow fall during extreme winter. Accumulation of snow on the bridge may put additional load on the proposed bridge. Therefore, snow fall load should be considered while designing the proposed bridge.

### **6.3.6 Approaches for Bridge**

The approach/approach slab provides a transition between road pavement and the bridge. The approach/approach slab acts as an intermediate bridge to span the portion of embankment directly behind the abutment which was excavated to construct the abutment. Therefore, approach slab as per IRC guidelines and well designed approaches to connect bridge with the existing road should be ensured during the design of bridge.

### **6.3.7 Safety Signage for Bridge**

For safety of road users and bridge, necessary road safety signage, hazard signage and warning signage with reflective tapes need to be provided before and at the proposed bridge as per IRC guidelines.

## **6.4 Environmental Management Plan**

The Environmental Management Plan (EMP) for the proposed bridge at Trenz has been prepared in tabular form for design, pre-construction, construction and demobilisation phases of the proposed bridge. In proposed bridge, trees cutting, utility shifting or relocation of religious and cultural properties etc are not required.

The details of various environmental mitigation measures are presented in **Table 6.1:**



**Table 6.1: Environmental Management Plan For Proposed Bridge on Rambhara Nallah at Trenz**

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
<b>A. Design Stage</b>			
A.1 Hydrological Study for designing of Bridge	Existing bridge could not with stand high floods in past. Therefore, it is essential that hydrological study should be carried out for designing of the proposed bridge with flood safeguard.	Design Team	PIU
A.2 Erosion at bridge abutments during flood	Bridge protection works around both sides of abutment walls will be provided with proper slopes and may use a combination of gabion baskets and/or mattresses for slope protection. Simple stone pitching for bridge protection may not be durable for long time. Stone pitching may deform and collapse during heavy rains and flood.	Design Team	PIU
A.3 Sliding of backfilling and uplift pressure at Abutments	In both abutments of the proposed bridge weep holes (80 mm to 100 mm dia) will be provided with minimum 600 mm filter Media for draining of water to prevent sliding of backfilling and to avoid any uplift pressure.	Design Team	PIU
A.4 Impact of earth quake on bridge	The proposed bridge is located in Seismic zone V and prone to high intensity earthquake. Therefore, it is imperative that seismic load factor must be taken into consideration while designing of bridge components.	Design Team	PIU
A.5 Dislocation of span of during earth quake	As bridge is located in high seismic risks zone. Therefore, seismic arresters should be provided to withstand horizontal force during earthquake and as anti dislocation device for slabs/spans.	Design Team	PIU

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
A.6 Snow Accumulation on the proposed bridge	The project is located in snow fall area. Accumulation of snow on the bridge may affect integrity of the proposed bridge. Snow load should be considered while designing of the proposed bridge.	Design Team	PIU
A.7 Approaches for Bridge	Approach slab as per IRC guidelines and well designed approaches to connect bridge with the existing road both sides should be ensured during the design of the proposed bridge.	Design Team	PIU
A.8 Safety of proposed Bridge and its users	For safety of road users and bridge, necessary road safety signage, hazard signage and warning signage with reflective tapes need to be provided before and at the proposed bridge as per IRC guidelines.	Design Team	PIU
<b>B. Pre-Construction Stage</b>			
<b>i. Pre-construction Activities By the Contractor</b>			
B.1 Dismantling of existing damaged bridge	Existing damaged bridge, will be demolished completely. Demolition wastes will be collected and disposed as per provision of Construction and Demolition Waste Rule 2016.	Contractor	PIU
B.2 Appointment of Environment & Safety Officer	The contract will appoint qualified and experienced Environment & Safety Officer (ESO), who will dedicatedly work and ensure implementation of EMP including Occupational health and safety of workers issues at the camp, watching plant and bridge construction work site.	Contractor	PIU

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
B.3 Arrangements for temporary land requirement for camp and batch mix plant	The contractor as per prevalent rules will carry out negotiations with the landowner for obtaining their consent for temporary use of land for construction camp etc.	Contractor	PIU
B.4 Location of Batching Plant	<ul style="list-style-type: none"> <li>• Batching plant will be sited sufficiently away from settlements. Such plant will be located at least 250 m away from the nearest settlement preferably in the downwind direction.</li> <li>• Consent to Establish and Consent to Operate will be obtained from J&amp;K State Pollution Control Board (as required) before establishment and operation of batching plant.</li> </ul>	Contractor	PIU
B.5 Other Construction Vehicles, Equipment and Machinery	<ul style="list-style-type: none"> <li>• All vehicles, equipment and machinery to be procured for construction of bridge will confirm to the relevant Bureau of Indian Standard (BIS) norms/Central Pollution Control Board (CPCB) standards. The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 1988 will be strictly adhered to.</li> <li>• The silent/quiet equipment like DG set as per regulations will be used at the bridge construction site.</li> <li>• The contractor will maintain records of Pollution under Control (PUC) certificates for all vehicles used during the contract period, which will be produced to PIU for verification whenever required.</li> </ul>	Contractor	PIU

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
B.6 Procurement of aggregate	<ul style="list-style-type: none"> <li>The contractor will finalize the approved quarry/crusher for procurement of aggregate for the proposed bridge construction after assessment of the availability of sufficient materials, quality and other logistic arrangements.</li> <li>The Contractor will also work-out road network and report to PIU, which will be inspected before approval.</li> </ul>	Contractor	PIU
B.7 Labour Requirement	The contractor preferably will use unskilled/semiskilled labour from local area to give the maximum benefit to the local community.	Contractor	PIU
<b>ii. Pre-construction Activities By the PIU</b>			
B.8 Trees Cutting	As per screening, no tree cutting is required for the proposed construction of bridge and approaches. In case any tree cutting is required during construction, prior permission for cutting of tree will be obtained.	PIU	PIU
<b>C. Construction Stage</b>			
<b>Water Pollution</b>			

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
C1. Impact on Water Resource during construction of bridge	<p>The following mitigation measures are suggested during construction of the proposed bridge at Trenz:</p> <ul style="list-style-type: none"> <li>• Construction of bridge should be done during least flow or no flow area.</li> <li>• Curtain should be provided over the flowing water to avoid the falling of construction material in water.</li> <li>• Construction wastes should be collected and disposed in environmentally sound manner as soon as construction is over.</li> <li>• The construction of bridge should not affect existing flow pattern and drainage system around the proposed bridge at Trenz.</li> <li>• Flowing water will be diverted with guide bunds and coffer dams at pier locations</li> </ul>	Contractor	PIU
C.2 Water Pollution from Wastes	<ul style="list-style-type: none"> <li>• The contractor will take all precautionary measures to collect and dispose construction wastes generated from the proposed bridge construction site (if any).</li> <li>• No solid or hazardous wastes (oil contaminated waste) from camp site will be dumped on Nallah or in open areas. Such wastes will be collected and disposed in environmentally sound manner as per environmental regulations</li> </ul>	Contractor	PIU

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
C.3 Waste Water from Labour Camp	<ul style="list-style-type: none"> <li>Waste water generated from the sanitary facilities of labour camp will be treated in septic tank followed by soak pit.</li> <li>Workers will not be allowed for open defecation. Proper toilets fitted with septic tank will be provided at camp, batching plant and bridge construction site.</li> </ul>	Contractor	PIU
<b>Air Pollution</b>			
C.4 Dust and Gaseous Pollution	<ul style="list-style-type: none"> <li>The contractor will take every precaution to reduce the level of dust and gaseous pollution from batching plant and bridge construction site.</li> <li>The contractor will procure the batching plant and construction machinery, which will conform to the pollution control norms specified by the MoEF&amp;CC/CPCB/J&amp;KSPCB.</li> <li>The excavated materials at the bridge construction site will be collected and disposed properly so that it does not generate fugitive dust emissions.</li> <li>Regular maintenance of machinery and equipment will be carried and vehicular pollution check will be made mandatory.</li> <li>LPG shall be used as fuel for cooking of food at construction labour camp instead of fuel wood.</li> <li>Personal Protective equipment (PPE) should be provided as a mandatory effort to the construction workers at the batching plant.</li> </ul>	Contractor	PIU

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
C.5 Emissions from Construction Vehicles, Equipment & Machineries (like DG set)	<ul style="list-style-type: none"> <li>The contractor will ensure that all vehicles, equipment and machinery used for construction works are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of CPCB and/Motor Vehicles Rules. The contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the construction of bridge.</li> <li>DG set will be provided with chimney of appropriate height as per CPCB guidelines (Height of stack in meter = Height of the building + 0.2 <math>\sqrt{\text{kVA}}</math>).</li> </ul>	Contractor	PIU
<b>Noise Pollution</b>			
C.6 Noise Pollution: Noise Levels from Vehicles, Plant and Equipments	<p>The contractor will confirm the following:</p> <ul style="list-style-type: none"> <li>All construction plant and equipment used for construction will strictly confirm to the MoEF&amp;CC/CPCB noise standards.</li> <li>All vehicles and equipment used in construction works will be fitted with exhaust silencers/mufflers.</li> <li>Maintenance and servicing of all construction vehicles and machineries will be done regularly.</li> <li>Only acoustic enclosures fitted DG set will be allowed at the bridge construction site and batching plant/camp site.</li> </ul>	Contractor	PIU
<b>Personal Safety</b>			

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
C.7 Personal Safety Measures for Labours and Staff	The contractor will take necessary measures for personal safety during the bridge construction:	Contractor	PIU
	<ul style="list-style-type: none"> <li>• Protective footwear, protective goggles and nose masks (as required) will be provided to the workers employed in batching plant and concrete works at bridge construction site, painting etc.</li> <li>• Welder's protective eye-shields will be provided to workers who are engaged in welding works (as required).</li> <li>• Earplugs will be provided to the workers exposed to high noise levels.</li> <li>• Safety vests will be used by workers when on bridge site.</li> <li>• The contractor will comply with all the precautions as required for ensuring the safety of the workmen.</li> </ul>	Contractor	PIU
	<ul style="list-style-type: none"> <li>• The Contractor will make sure that during the construction work all relevant provisions of the Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to.</li> <li>• The Contractor will not employ any person below the age of 14 years for any work.</li> </ul>	Contractor	PIU



Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
C.8 Emergency Management	<ul style="list-style-type: none"> <li>• Emergency numbers will be displayed at the camp, batching plant and bridge construction site,</li> <li>• First boxes will be made available at camp, batching plant and construction site,</li> <li>• Designated vehicles, which can be used as ambulance, will be available at camp site as per requirement.</li> </ul>	Contractor	PIU
C.9 Risk Force Measure	<ul style="list-style-type: none"> <li>• The contractor will make required arrangements so that in case of any mishap on the bridge construction site, all necessary steps can be taken for prompt first aid treatment.</li> <li>• Construction Safety Plan prepared by the Contractor will identify necessary actions in the event of an emergency.</li> </ul>	Contractor	PIU
C.10 First Aid	<p>The contractor will arrange for :</p> <ul style="list-style-type: none"> <li>• A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in construction work zone.</li> <li>• Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital.</li> </ul>	Contractor	PIU
<b>Labour Camp Management</b>			

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
C.11 Accommodation for workers	<ul style="list-style-type: none"> <li>• Contractor will follow all relevant provisions of the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp.</li> <li>• The location, layout and basic facility provision of labour camp will be submitted to PIU prior to their construction.</li> <li>• The Contractor will maintain necessary living accommodation and ancillary facilities in functional and hygienic manner.</li> <li>• Proper ventilation will provided in labour accommodation rooms.</li> <li>• Regular cleaning and sweeping will be ensured at the labour camp site.</li> </ul>	Contractor	PIU
	<ul style="list-style-type: none"> <li>• Fuel wood will not be allowed for cooking at labour camps. LPG cylinders will be provided at labour camp by the contractor.</li> </ul>	Contractor	PIU
C.12 HIV/AIDS Prevention Measures	<ul style="list-style-type: none"> <li>• Necessary HIV/AIDS prevention measures will be taken at construction &amp; labour camp</li> <li>• HIV/AIDS awareness programme will be organized by the contractor's Environment &amp; Safety officer.</li> </ul>	Contractor	PIU

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
C.13 Potable Water for Workers	<p>The contractor will construct and maintain labour accommodation in such a fashion that uncontaminated clean water is available for drinking, cooking, bathing and washing. The Contractor will also provide potable water facilities at bridge construction site in an accessible place, as per the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.</p> <p>Environmental Expert of PIU will be required to inspect the labour camp once in a week to ensure the compliance of the EMP.</p>	Contractor	PIU
C.15 Sanitation and Sewage System at Labour Camp	<p>The contractor will ensure that :</p> <ul style="list-style-type: none"> <li>• The sewage disposal system for the camp will be designed, built and operated in such a fashion that no health hazard occurs and no pollution to the air, surface &amp; ground water or adjacent water courses take place,</li> <li>• Separate toilets/bathrooms, required, will be provided for men and women (if deployed), marked in vernacular language,</li> <li>• Toilets will be provided with septic tank followed by soak pit.</li> </ul>	Contractor	PIU
	<ul style="list-style-type: none"> <li>• Adequate water supply is to be provided in all toilets and urinals,</li> </ul>	Contractor	PIU

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
C.16 Wastes Disposal	<ul style="list-style-type: none"> <li>• The contractor will provide garbage bins in the camp, batching plant and bridge construction site and it will be ensured that these are regularly emptied and disposed off in a hygienic manner as per Solid Waste Rule 2016.</li> <li>• Burning of wastes will not be allowed.</li> <li>• Solid waste generated at the bridge construction site, batching plant &amp; camp site, will be collected in covered waste bins and segregated as biodegradable (food waste, paper, etc) and non-biodegradable (plastic, polyethylene bag, etc) wastes. Polyethylene/plastic wastes will be stored in empty cement bags and to be sent for recycling through scrap dealer. Biodegradable (food waste, paper, etc) solid waste will be disposed in compost pit.</li> <li>• Construction wastes generated from bridge construction site will be collected and disposed as per Construction &amp; Demolition Wastes Rule 2016.</li> <li>• Used oil generated from the maintenance of DG set and construction equipment will stored in containers and handed over to authorised used oil recyclers.</li> </ul>	Contractor	PIU
<b>D. Contractor's Demobilization</b>			
D.1 Clean-up, Restoration and Rehabilitation	<ul style="list-style-type: none"> <li>• On completion of construction of bridge, the contractor will prepare site restoration and demobilization plan, which will be approved by the Environmental Expert of PIU. The clean-up and restoration operation are to be implemented by the contractor prior to demobilization.</li> </ul>	Contractor	PIU

Environmental Issue/ Component	Remedial Measures	Institutional Responsibility	
		Implementation	Supervision
	<ul style="list-style-type: none"> <li>• The Contractor will clear all temporary structures; dispose all garbage, night soils and POL (Petroleum, Oil and Lubricants) wastes in environmental sound manner.</li> <li>• Disposal pits or trenches will be filled in and effectively sealed off.</li> <li>• Construction area including camp, and any other area used/affected due to the bridge construction work will be left clean and tidy at the contractor's expense to the entire satisfaction to the land owner/Environmental Expert of PIU.</li> </ul>	Contractor	PIU
<b>E. Operation State</b>			
<b>E.1 Activities to be Carried Out by the J&amp;KPCC</b>			
Monitoring of Bridge Protection Work	During rains regular monitoring will be carried for bridge protection work and scour protection work. In case any indication of erosion, deformation and collapse of protection, necessary measures will be taken to control such issues.	JKPCC	JKPCC

## 6.5 Environmental Monitoring Plan

The environmental monitoring plan for the proposed bridge has been prepared based on the environmental monitoring indicators as shown in **Table 6.2**.

**Table 6.2: Environmental Monitoring Indicators**

Sr. No	Indicator	Details	Frequency	Responsibility
<b>I. Construction Phase</b>				
1.	Ambient Air Quality	24 hourly Ambient Air Quality monitoring for PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>2</sub> and CO at Batching Plant	Once in six months	Contractor by engaging approved/reputed Environmental Laboratory
2.	Noise Levels	Noise levels (dB) and 24 hourly Leq (dB) at Batching Plant and Bridge construction site	Once in six months	Contractor by engaging approved/reputed Environmental Laboratory
3.	Occupational Health & Safety	Occupational health & Safety of workers engaged in construction activities	Daily	Environment & Safety Officer of the Contractor
<b>II. Operation Phase</b>				
4.	Bridge Protection Work and Scour Protection	Monitoring of Bridge Protection and Scour Protection	During rains	Concern Engineer from JKPC

## 6.6 Institutional Arrangements for Implementation of EMP

During implementation of the proposed bridge, PIU (R&B) and Contractor will be responsible for ensuring that the environmental management measures as given EMP are implemented and regulatory requirements are met. The bridge construction contractor will undertake implantation of EMP, which will be part of bid and contract agreement. The institutional arrangement mechanism for the proposed bridge construction is presented in **Table 6.3**.

**Table 6.3: Institutional Arrangement for Proposed Bridge**

<b>Implementing/ Monitoring Agency</b>	<b>Designation</b>	<b>Responsibilities</b>
Project Implementation Unit	Project Director	<ul style="list-style-type: none"> <li>• Overall responsible for EMP implementation</li> <li>• Reporting to various stakeholders (World Bank) on status of EMP implementation</li> <li>• Review of the progress made by contractors</li> <li>• Conducting periodic field inspection to insure EMP implementation</li> <li>• Maintaining progress reports on EMP implementation</li> </ul>
	Environmental Expert of PIU	<ul style="list-style-type: none"> <li>• Assist the PIU in the implementation of the EMP provisions</li> <li>• Provide guidance to the PIU/contractor on implementation of EMP provisions</li> <li>• Carry out periodic field visits and ensure compliance with the EMP provisions</li> <li>• Assist the PIU in the compilation of the monitoring reports and progress reports on EMP implementation</li> </ul>
Contractor	Environment & Safety Officer	<ul style="list-style-type: none"> <li>• Responsible for ensuring the implementation of mitigation measures as per provision in the EMP document.</li> <li>• Obtaining consents and permission for Batching Plant, etc.</li> <li>• Monthly reporting to PIU.</li> <li>• Discussing various environmental &amp; safety issues and environmental mitigation and monitoring actions with all concerned directly or indirectly.</li> <li>• Conducting periodic environmental and safety training for contractor's supervisors and workers along with sensitization on environmental &amp; safety issues that may be arising during the construction stage of the bridge.</li> <li>• To carry out environmental monitoring and control activities including pollution monitoring.</li> </ul>

Implementing/ Monitoring Agency	Designation	Responsibilities
		<ul style="list-style-type: none"> <li>• Conducting awareness campaign for all construction personnel (including labourers, supervisors and engineers) about HIV/AIDS in the construction and labour camps.</li> <li>• Preparing and submitting monthly reports to PIU on status of implementation safeguard measures</li> </ul>

## 6.7 Reporting System

The contractor will follow the reporting system for environmental management measures and environmental management indicators as given in **Table 6.4**. The Contractor will report to the PIU on the progress and status of the implementation of environmental management measures as per the EMP. EMP implementation report will comprise photographic evidences (with date, time and geo reference) for implemented mitigation measures, monitoring reports, etc .

**Table 6.4: Reporting System**

S.No	Item	Stage	Contractor	PIU
			Implementation & Reporting to PIU	Supervise /Field Compliance Monitoring
1.	Identification of disposal location for demolition wastes from existing bridge	Construction	One Time	One Time
2.	Monthly EMP Implementation Report	Construction	Monthly	Monthly
3.	Pollution Monitoring	Construction	Six Monthly	Six Monthly
4.	Cleaning and Restoration	On completion of construction of bridge	One Time	One Time

The contractor will take all reasonable steps to protect the environment on and off the bridge construction site and to avoid damage or nuisance to



person or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

## **6.8 Clause for Nonconformity to EMP - Protection of the Environment**

The Contractor shall implement necessary mitigation measures as given EMP for which responsibility is assigned to him as stipulated in the EMP. Any lapse in implementing the same will attract the damage clause as detailed below:

- Any complaints of public, within the scope of the Contractor, formally registered with the PIU and communicated to the Contractor, which is not properly addressed within the time period intimated by the PIU shall be treated as a major lapse.
- Non-conformity to any of the mitigation measures stipulated in the EMP Report (other than stated above) shall be considered as a minor lapse.
- On observing any lapses, PIU shall issue a notice to the Contractor, to rectify the same.
- Any minor lapse for which notice was issued and not rectified, first and second reminders shall be given after ten days from the original notice date and first reminder date respectively. Any minor lapse, which is not rectified, shall be treated as a major lapse from the date of issuing the second reminder.
- If a major lapse is not rectified upon receiving the notice PIU shall invoke reduction, in the subsequent interim payment certificate.
- For major lapses, 10% of the interim payment certificate will be withheld, subject to a maximum limit of about 0.5% of the contract value.
- If the lapse is not rectified within one month after withholding the payment, the amount withheld shall be forfeited.

## **6.9 Budgetary Provisions for Implementation of EMP**

The EMP shall be integrated part of the bid/construction contract in the form of technical specifications and environmental performance requirements. The costs to be incurred on implementation of EMP, shall be incidental to the civil works and therefore, no separate environment budget will be provided to the contractor. The contractor will ensure effective implementation of EMP during pre-construction, construction and demobilization phases.

### **6.9.1 Budget for EMP Implementation**

The environmental budget for the various environmental management measures anticipated for pre construction, construction and operation of the proposed bridge is detailed in Table 6.5. There are several other

environmental issues that have been addressed as part of good engineering practices, the costs for which have been accounted for in the engineering cost. The budget for EMP is given in **Table 6.5**.

**Table 6.5 - Budget for Implementation of Environmental Management Plan**

<b>Component</b>	<b>Stage</b>	<b>Items</b>	<b>Unit</b>	<b>Unit Cost</b>	<b>Quantity</b>	<b>Total Cost</b>
Demolition of devastated bridge	Construction Phase	Demolition of devastated bridge and disposal of demolition wastes	Lumpsum	-	-	400000
Erosion at Bridge	Construction Phase	Bridge Protection Work at both Abutments	Cost to be included in DPR			0
Safety of Bridge	Operation Phase	Safety Signage at and before bridge as per IRC Guidelines	Cost to be included in DPR			0
Horizontal Seismic Force	Construction Phase	Seismic arrester to be provided to prevent dislocation of spans/slabs of bridge	Cost to be included in DPR			0
Approaches	Construction Phase	Approaches to connect Bridge with existing road	Cost to be included in DPR			0
Air	Construction	Tarpaulin Covers for vehicles transporting, construction material to bridge construction site	Lumpsum	25000/-	-	25000
Water	Construction	Oil Interceptors at workshop at camp site	Nos	50000/-	1	50000
		Sanitary facilities at construction camp	Nos	40000/-	5	200000
		Diversion of flowing water with guide bunds and coffer dams at pier locations	Cost included in DPR/BOQ			0
Personal Protective Equipment	Construction	Personal Protective Equipment like vest, helmet, safety shoe, hand gloves, gumboots, earplug, etc	Lumpsum	-	-	100000

<b>Component</b>	<b>Stage</b>	<b>Items</b>	<b>Unit</b>	<b>Unit Cost</b>	<b>Quantity</b>	<b>Total Cost</b>
Solid Waste Management	Construction Phase	Solid Wastes collection, segregation and disposal from road construction site and camp	Lumpsum	-	-	40000
Hazardous Waste Disposal	Construction Phase	Collection and disposal of used oil from maintenance of DG set and construction equipment	Nos	10000/-	2	20000
First Aid Boxes	Construction Phase	First Aide boxes at the construction site, camp and batching plant	Lumpsum	2000/-	5	10000
Monitoring	Construction Phase	Monitoring of air quality and noise level, water quality	Lumpsum	-	-	200000
		<b>Total</b>				<b>1045000</b>

**Annexure 1**

**Environment and Social Screening Form**

**Part A: General Information**

<b>1. Name of the sub-project</b>	Construction of Double Lane Trussed Girder Bridge at Sheikhpora (275m) on Rambiar Nallah	
<b>2. Type of proposed activity</b> (tick the applicable option and provide details)		
▪ Road	<input type="checkbox"/>	-
▪ Bridge	<input checked="" type="checkbox"/>	Double Lane Trussed Girder
▪ Fire Station	<input type="checkbox"/>	-
▪ Hospital/Health Facility	<input type="checkbox"/>	-
▪ Educational Institute	<input type="checkbox"/>	-
▪ Building for Livelihoods	<input type="checkbox"/>	-
▪ Flood Infrastructure Related	<input type="checkbox"/>	-
▪ Other Public Building	<input type="checkbox"/>	-
▪ Any Other (Please Specify)	<input type="checkbox"/>	-
<b>3. Location of the proposed sub-project</b>		
▪ Name of the Region	Kashmir (J&K State)	
▪ Name of the District	Shopian	
▪ Name of the Block	Shopian	
▪ Name of the Settlement	Trenz Sheikhpora	
▪ Latitude	33 <sup>0</sup> 46'34.61"N	

▪ Longitude	74 <sup>0</sup> 53'25.23"E
<b>4a. Proposed Nature of Work</b> (tick the applicable options)	
▪ Minor Repairs	-
▪ Major Repairs/Rehabilitation	-
▪ Upgrading/Major Improvement	-
▪ Expansion of the facility	-
▪ New Construction	√
▪ Any Other	-
<b>4b. Size of the sub-project</b> (approx. area in sq. mt/hac or length in mt/km, as relevant)	275 m
<b>5. Land Requirement</b> (in hac./sq.mt.)	
▪ Total Requirement	Nil
▪ Private Land	Nil
▪ Govt. Land	Nil
▪ Forest Land	Nil
<b>6. Implementing Agency Details (sub-project level)</b>	
▪ Name of the Department/Agency	J&K Projects Construction Corporation Ltd. (JKPCC)
▪ Name of the contact person	Er. Gh. Hussain Dar
▪ Designation	Deputy General Manager (DGM)
▪ Contact Number	+91-9419013160
▪ E-mail Id	erhussain@gmail.com
<b>7. Screening Exercise Details</b>	
▪ Date on which it was carried out	04/05/2017
▪ Name of the Person	Yadullah Shah

▪ Contact Number	+91-9622672672
▪ E-mail Id	yaadshah@gmail.com

**Part B (1): Environment Screening**

Question	Yes	No	Details
<b>1. Is the sub-project located in whole or part within 1 km of the following environmentally sensitive areas?</b>			
a. Biosphere Reserve		No	
b. National Park		No	
c. Wildlife/Bird Sanctuary		No	
d. Wildlife/Bird Reserve		No	
e. Important Bird Areas (IBAs)		No	
f. Habitat of migratory birds (outside protected areas)		No	
g. Breeding/Foraging/Migratory route of Wild Animals (outside protected areas)		No	
h. Area with threatened/rare/endangered fauna (outside protected areas)		No	
i. Area with threatened/rare/endangered flora (outside protected areas)		No	
j. Reserved/Protected Forest		No	
k. Other category of Forest		No	
l. Wetland		No	

m. Natural Lakes		No	
n. Rivers/Streams		No	The proposed bridge will be constructed on Rambiarā Nallah at Trenz Shopian.
<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>Details</b>
o. Swamps/Mudflats		No	
p. Zoological Park		No	
q. Botanical Garden		No	
<b>4. Is the sub-project located in whole or part within 500 mts. of any of the following sensitive features?</b>			
a. World Heritage Sites		No	
b. Archaeological monuments/sites (under ASI's central/state list)		No	
c. Historic Places/Monuments/Buildings/Other Assets (not listed under ASI list but considered locally important or carry a sentimental value)		No	
d. Religious Places (regionally or locally important)		No	
e. Reservoirs/Dams		No	
f. Canals		No	
g. Public Water Supply Areas from Rivers/Surface Water Bodies/Ground Water Sources		No	
4. What is the High Flood Level in the sub-project area?	98.98 (m)		



5. Is any scheduled/protected tree like Chinar, Mulberry or Deodar likely to be affected/ cut due to the project?		No	
6. Is the sub-project located in a landslide/heavy erosion prone area or affected by such a problem?		No	
7. Is sub-project located in an area that faces water paucity or water quality issues?		No	

**Part B (2) : Result/Outcome of Environmental Screening Exercise**

1.	Environment Impact Assessment Required	No, However, Environmental Management will be required
2.	Environment Clearance Required	No
3.	Forest land Clearance/Diversion Required	No
4.	Tree Cutting Permission Required	No
5.	ASI (Centre/State) Permission Required	No
6.	Permission from ULB/Local Body/Department Required	No
		-
7.	Any other clearance/permission required	Yes
		Consent to Establish (CTE) and Consent to Operate (CTO) from J&KSPCB will be required for batching plant, stone crushers, PUC's and other fitness certificates of equipments etc as required on site. If contract opens new stone quarry, Environmental Clearance will be required

**Part C (1): Social Screening**

<b>1. Does the sub-project activity require acquisition of land?</b>			
Yes		No	√
Give the following details:	Private Land (sq mts/hac.)		-
	Govt. Land (sq mts/hac.)		-
	Forest Land (sq mts/hac.)		-
<b>2. Does the proposed sub-project activity result in demolition/removal of existing structures?</b>			
Yes		No	√
If so, give the following details:			
▪ Number of public structures/buildings			-
▪ Number of common property resources (such as religious/cultural/drinking water/wells/etc.)			-
▪ Number of private structures (located on private or public land)			-
<b>3. Does the proposed project activity result in loss of crops/trees?</b>			
Yes		No	√
<b>4. Does the proposed Project activity result in loss of direct livelihood/employment?</b>			
Yes		No	√

<b>5. Does the proposed activity result in loss of community forest/pastures on which nearby residents/local population are dependent?</b>			
Yes		No	√
If yes, give the details of the extent of area to be lost (in acres/hac).		-	
<b>6. Does the proposed Project activity affect scheduled tribe/caste communities?</b>			
Yes		No	√

**Part C (2): Result/Outcome of Social Screening Exercise**

S.No.	Result/Outcome	Outcome
1.	Answer to all the questions is 'No' and only forest land is being acquired	No SIA/RAP required
2.	Answer to any question is 'Yes' and the sub-project does not affect more than 200 people (i.e. either complete or partial loss of assets and/or livelihood)	Abbreviated RAP is required
3.	Answer to any question is 'Yes' and the sub-project affects more than 200 people (i.e. either complete or partial loss of assets and/or livelihood)	SIA/RAP Required

**Outcome:** No Environment Assessment /Social Assessment are required. However, Environmental Management Plan will be prepared for the proposed bridge.

Annexure-2

Name of the Sub Project: Construction of Double Lane Trussed Girder Bridge

Location: at at Treuz-Shiekhpora Shopian (Span 300M)

Date:

Time:

S.No	Name	Address	Occupation	Signature	Phone No.
1	Mohd Akbar Shah	Treuz Shopian	Numbardar	[Signature]	9858969936
2	Imran Ah Dar	Treuz Shopia	Self Employed	[Signature]	8803925789
3	Muhtaba Parwar	Moola Treuz	Govt Teacher	[Signature]	9858419327
4	Mr. Yusuf Wani	Moola Dangepora	Govt Employee	[Signature]	9850060278
5	M. Shafi Thoker	Odoora Treuz	Farmer	[Signature]	-
6	Naseem Ah Dar	Amhal Shiekhpora	Driver	[Signature]	9697077630
7	M. Akbar Dar	Treuz Shopian	Self Business	[Signature]	8802473120
8	Ajib Gulzar	Treuz Gornelpor	Tractor Driver	[Signature]	9596998590
9	Yawar Mushtaq	Treuz Gornelpor	Self Employed	[Signature]	959601023
10	Gh Mohd Thoker	Treuz	Farmer	[Signature]	949602799
11	Mr. Ahsan Pal	Moola	Farmer	[Signature]	9506564117
12	Rayees Ah. Pal	Moola	Farmer/Business	[Signature]	9858533903
13	Sheekh Zulfikar Shery	Treuz Babakindar	Law officer (Sect)	[Signature]	985006501
14	Ab. Gayoom Mir	Babakindar Treuz	Farmer	[Signature]	7298932561
15	Sallem Yousef	Babakhidar	Student	[Signature]	9697969428
16	Naseem Ah Sheekh	Babakindar	Student	[Signature]	9797057055
17	Raja Mudasi	Baba Khidar	Student	[Signature]	9469393668
18	Ali Mohd Mir	Mohampore Treuz	Business (Fruit)	[Signature]	9858436702
19	Murtaza Shabir	Tumlihal Shiekhpora	Student	[Signature]	9086612109
20	Muzaff Ah Bhat	Moola Treuz	Print Business	[Signature]	8444089293
21	Tajamul Ah. Bhat	Treuz Shopian	self employ.	[Signature]	7596038053
22	Showkat Ah Sheekh	Babakindar Treuz	Fruit Business	[Signature]	9858393325
23	Ali Mohd Mir	Babakindar Treuz	Zamindar	[Signature]	7298932561
24	M. Shafi Mulla	Treuz Babakhida	Fruit Business	[Signature]	9858776531
25	Ah Rashid Bhat	Treuz	Fruit Business	[Signature]	9697674647

by [Signature]