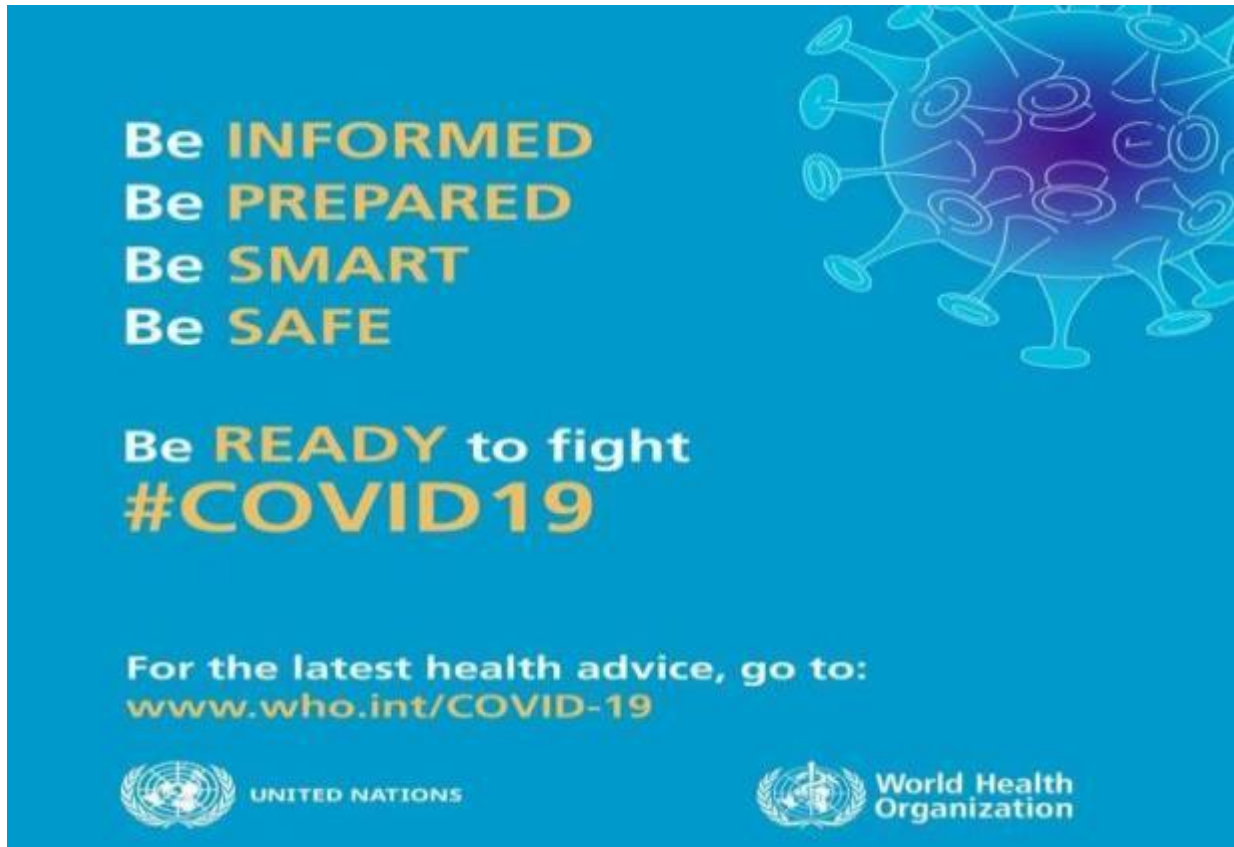


# ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

Design and Construction of 1x45 meter Trussed Girder Bridge Over Rambhara Nallah at Wachi, including Construction of Approach Roads and Nallah Training Works in District Shopian, J&K.



EIA Cover Page Showing WHO's Social Infographics of Covid-19 as "Mass Awareness from Point Zero To Fight Against Coronavirus Pandemics by Following Government's COVID-19 Standard Operational Procedures (SOPs)" and Guidelines of WHO/ ILO et al.

**Jhelum Tawi Flood Recovery Project- The World Bank Financed Project**

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Prepared By: Akhter R. Bhat (Senior Environmental Consultant) for M/s Khanday Infrastructure Pvt. Ltd.

# Environmental Impact Assessment (EIA) Report

August 2020

Jhelum Tawi Flood Recovery Project

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## Table of Contents

### *Executive Summary*

<b>1.</b>	<b>INTRODUCTION</b> .....	<b>1</b>
1.1	Project Background.....	1
1.2.	Description of the Project .....	2
1.3	Scope for conducting the EIA Study .....	3
1.4	Need and Benefits of the Proposed Bridge.....	3
1.5	Need of the Environmental Assessment.....	4
1.6	Environmental Screening and Scoping.....	4
1.7	Environmental Assessment.....	4
1.8	Environmental Management Plan .....	4
1.9	Study Approach.....	5
1.10	Structure of Environmental Assessment Report.....	6
<b>2.</b>	<b>APPROACH AND METHODOLOGY</b> .....	<b>7</b>
2.1	Reconnaissance Survey .....	7
2.2	Project Impact and Project Influence Area.....	7
2.3	Screening Methodology .....	7
2.2	Detailed Baseline Environmental Surveys .....	7
2.5	Collection of Data .....	8
2.6	Environmental Monitoring Data.....	8
2.7	Assessment of Alternatives.....	8
2.8	Stakeholder Consultation and Participation .....	9
<b>3.</b>	<b>PROJECT DESCRIPTION</b> .....	<b>10</b>
3.1	Project Area .....	10
3.2	Project Location and Outline .....	13
3.3	Technical description of the Wachi Bridge.....	14
<b>4.</b>	<b>POLICY, LEGAL AND ADMINSTRATIVE FRAMEWORK</b> .....	<b>26</b>
4.1	Legal Framework .....	26
4.2	Applicable National & State Regulations .....	26
4.3	World Bank Safeguard Policies .....	30
4.4	MoRTH & IRC Specifications .....	31
4.5	Applicability of International Conventions .....	31
4.6	Indian road Congress (IRC) Code of Practices for the Project.....	31
4.7	Environmental Standards .....	32
<b>5</b>	<b>ENVIRONMENTAL BASELINE DATA</b> .....	<b>35</b>
5.1	General.....	35
5.2	Study Area.....	37
5.3	Topography and Physiography .....	38
5.4	Geology and Soil of the Area .....	39
5.5	Natural Hazards .....	42
5.6	Air Environment.....	47
5.7	Noise Environment.....	50
5.8	Water Environment .....	50
5.9	Biological Environment.....	52
5.10	Socio-Economic Profile .....	55

5.10	Recreation Resources.....	59
5.11	Archaeological, Historical, Heritage, Religious, Cultural Sites.....	59
5.12	Sensitive Environmental Receptors .....	60
5.13	Covid-19 (Coronavirus-) A Pandemic Health Hazard - Overview.....	60
<b>6</b>	<b>POTENTIAL ENVIRONMENTAL IMPACTS .....</b>	<b>65</b>
6.1	Project Impact & Issues .....	65
6.2	Consideration of Environmental Impacts During Design Stage.....	69
6.3	Anticipated Impacts During Construction & Operation Stages .....	72
6.3.1	Impact on Topography and Physiography .....	72
6.3.2	Impact on Soil .....	73
6.3.3	Impact on Water Resources.....	73
6.3.4	Degradation of Water Quality.....	73
6.3.5	Impact on Ambient Air Quality.....	74
6.3.6	Impact on Noise .....	74
6.3.7	Impact on Management of Spill and Wastes .....	76
6.3.8	Impact on Flora, Fauna and Ecosystem .....	76
6.3.9	Impact of Socioeconomic Environment.....	78
6.3.10	Economic Impacts.....	79
6.3.11	Impacts on Religious Structures and Cultural Properties .....	79
6.3.12	Impacts on Impacts Relating to Human Health and Safety .....	79
6.3.13	Safety Aspects .....	80
6.3.14	Impact of Pandemic Disease Covid-19.....	80
<b>7</b>	<b>ANALYSIS OF ALTERNATIVES .....</b>	<b>81</b>
7.1	With and Without Project Alternatives.....	82
<b>8</b>	<b>PUBLIC CONSULTATION AND DISCLOSURE.....</b>	<b>83</b>
8.1	Introduction .....	83
8.2	Identification of Stakeholders .....	83
8.3	Consultation with Stakeholders.....	84
8.4	Objective of Consultation .....	84
8.5	Issues Discussed during Public Consultation .....	85
8.6	Outcome and Feedback Received .....	85
<b>9</b>	<b>ENVIRONMENTAL MANAGEMENT PLAN (EMP) .....</b>	<b>87</b>
9.1	Introduction.....	87
9.2	Proposed Works of Bridge Project at Wachi .....	87
9.3	Outline of and its Implementation Strategy .....	87
9.4	Environmental Management Measures for Design Stage .....	88
9.5	Environmental Management Plan (EMP).....	89
9.6	Clause for Non-Conformity to EMP.....	110
9.7	Environmental Monitoring Plan .....	110
9.8	Performance Monitoring Indicators .....	114
9.9	Monitoring Plans for Environment Conditions.....	115
9.10	Reporting System.....	116
9.11	Budgetary Provision for EMP .....	116
9.12	Formats for Reporting .....	119
9.13	Environmental Compliance Report .....	119

**Annexures**

I. Environmental and Social Screening Report ( Data Sheets-Wachi Bridge) ..... 120  
 II. Photographs of the Bridge Site at Wachi Shopian ..... 127  
 III. Public Consultation/ Meeting Photographs ..... 131  
 IV. List of consulted participants and their signatures during the consultation..... 133  
 V. GIS/ LULC Map of the Proposed Bridge at Wachi in Shopian District ..... 136  
 VI. Guidelines For Siting, Management And Redevelopment of Labour Camp ..... 137  
 VII. Guidelines to Ensure Worker’s Safety During Construction ..... 142  
 VIII. Reporting Format for Camp Site ..... 149  
 IX. Format For Register of Complaints (Grievance) and it’s Reporting ..... 150  
 X. Checklist For Monitoring of Labour Camp Management ..... 151  
 XI. Check List For Monitoring of Redevelopment of Labour Camp Site ..... 153  
 XII. Format For Occupational, Health and Safety Measures ..... 154  
 XIII. Format For Register of Accidents and It’s Reporting..... 157  
 XIV. Reporting Format For Environmental Pollution Monitoring..... 159  
 XV. Guidelines on Preventive Measures to Contain Spread of Covid-19 (MoHFW)..... 160  
 XVI. Detail Question and Answers on COVID-19 for General Public ..... 166  
 (Issued through National Health Mission)

**Acronyms & Abbreviations**

AAQ	:	Ambient Air Quality
ASI	:	Archaeological Survey of India
BIS	:	Bureau of Indian Standards
CPCB	:	Central Pollution Control Board
CPR	:	Common Property Resources
COVID 19	:	Coronavirus Disease of 2019
DPR	:	Detailed Project Report
DO	:	Dissolved Oxygen
EA	:	Environmental Assessment
EIA	:	Environmental impact Assessment
EMP	:	Environmental Management Plan
EPC	:	Engineering, Procurement and Construction
ERA	:	Economic Reconstruction Agency
GC	:	General Conditions
GoI	:	Government of India
ILO	:	International Labour Organization
IS	:	Indian Standard
J&K	:	Jammu and Kashmir
JTFRP	:	Jhelum Tawi Flood Recovery Project
MoEF&CC	:	Ministry of Environment, Forest and Climate Change
NAAQS	:	National Ambient Air Quality Standards
NOC	:	No Objection Certificate
OP	:	Operational Policy
PAP	:	Project Affected Persons
PIU	:	Project Implementation unit
PIA	:	Project Influence Area
PMU	:	Project Management Unit
PPE	:	Personal Protective Equipment
PUC	:	Pollution Under Control
PWD	:	Public Works Department
RoW	:	Right of Way
R&B	:	Roads & Building
SPCB	:	State Pollution Control Board
TAQAC	:	Technical Assistance and Quality Audit Consultants
WB	:	World Bank

## EXECUTIVE SUMMARY

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A catastrophic deluge of September 2014 shows negative impact on economic aspects of the State and massive infrastructure damages in which capital city Srinagar was most affected and a trail of siltation in most of the water bodies as environmental degradation which is always synonymous with major floods. In connection to a devastating flood, a mission of the World Bank visited the State during February 1-6, 2015 on request of Government of India to review and assess the damages to produce a rapid multi-sectoral assessment report of the damages and needs. The Rapid Damage and Needs Analysis (RDNA) estimates the total damages and loss caused by floods at about INR 2 11,975 million (US\$ 3,550.45), most of it to housing, livelihoods, and roads and bridges, which combined represent more than 70% of the damages in terms of value. Public service infrastructure and equipment of hospitals and education centres were also severely damaged and are still not fully operational. Based on the RDNA results, restoration works underway, and discussions with the GoJ&K, "Jhelum and Tawi Flood Disaster Recovery Project (JTFRP)" will focus on restoring critical infrastructure using international best practice on resilient infrastructure.

The objective of component 2 "Reconstruction of Roads and Bridges" is to restore and improve the connectivity disrupted due to the disaster through the reconstruction of damaged roads and bridges. The infrastructure will be designed to withstand earthquake and flood forces as per the latest official design guidelines. The affected areas will benefit from the restored access to the markets thereby increasing the economic growth in these areas and timely access to health and education services. Restoration of roads will also serve as supply/rescue lines in the event of a disaster.

The environmental assessment scope includes screening and scoping, environmental assessment and devising of environmental management plan (EMP) for each bridge subprojects under component-2 of Jhelum Tawi Flood Recovery Project. The objective of Environment screening is to identify the potentially significant environmental issues of the sub-projects at an early stage for Assessment.

Under this component, one of the identified subprojects is "Design and Construction of 1x45 meter Trussed Girder Bridge over Rambiara Nallah at Kumar Mohalla Wachi including Construction of Approach Roads and Nallah Training Works in District Shopian, J&K".

As per the EIA notification 2006 and subsequent amendments, this bridge does not require EIA clearance. The subproject shall require to obtain Consent to Establish and Consent to Operate under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981) and authorization under Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 from J&K PCB for establishing and operation of Hot Mix Plant, WMM Plant and RMC plant for the subprojects. No Objection Certificate (NOC) is also required from the Irrigation and Flood Control department for the construction of Wachi Bridge on Rambiara Nallah.

World Bank safeguard policies are designed to prevent and mitigate undue harm to people and their environment in the development process. The layout requirements that must be



complied with for all Bank-funded projects (refer to World Bank's Website on Safeguard Policies). Environmental Policies – OP/BP 4.01 Environmental Assessment and OP/BP 4.11 Physical Cultural Resources are triggered in the project.

### Project Location

The proposed construction of the 1x45 meter trussed girder bridge is located in Wachi village in District Shopian of Jammu & Kashmir. The bridge will be constructed on Rambiarā Nallah.

Name of the Project Road	Project Location with Coordinates
Construction of 1x45 meter Single Lane Trussed Girder Bridge over Rambiarā Nallah including Construction of Approach Roads and Nallah Training Works in District Shopian, J&K	Kumar Mohalla in Wachi village of Zainpora Block in District Shopian  <i>Geo-Coordinates:</i> Latitudes of 33°48'10.28"N Longitude of 75°02'10.67"E.

### Screening and Environmental Assessment

Sub-projects under “Jhelum and Tawi Flood Recovery Project” commonly known as JTFRP have a prior requirement of screening which is based on three categories; viz., nature of the project, size of the project and location of the project that is sensitive area criteria. The objective of the Environment and Social screening is to identify the potentially significant environmental and social issues of the sub-project at an early stage for detailed Environmental/ Social impacts. The Environmental Assessment for the bridge subproject includes establishing an environmental baseline in the study area, identify the range of environmental impacts, specify the measures to avoid, minimize, and mitigate negative impacts and maximize positive impacts and integrate possible environmental enhancement measures. The proposed measures will be formulated in the form of an environmental management plan with the necessary budget and institutional roles for effective implementation. The EMP developed shall form the part of EPC contract for its implementation.

### Policy and Legal Regulatory Instruments

#### National and State Laws

- EIA Notification, 14th Sept 2006 and Subsequent amendments
- Jammu and Kashmir Forest (Conservation) Act, 1997
- Jammu and Kashmir Wildlife (Protection) Act, 1978
- Air (Prevention and Control of Pollution) Act, 1981
- Water Prevention and Control of Pollution) Act, 1974
- Noise Pollution (Regulation and Control Act), 2000
- Construction & Demolition Waste Management Rules, 2016

- e-waste (Management) Rules, 2015
- Public Liability and Insurance Act of 1991
- Central Motor Vehicle Act 1988 and the Central Motor Vehicle Rules 2019
- Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996/ Jammu and Kashmir Building and Other Construction Workers (Regulation of Employment and Condition of Services) Rules, 2006
- Jammu and Kashmir Electricity Act, 2010 and amendments thereof and BIS 1255;1983 and amendments thereof
- Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules,2008 and amendments thereof
- Solid Waste Management Rules, 2016
- The Jammu and Kashmir Preservation of Specified Trees Act, 1969
- Wetland (Conservation and Management) Rules, 2017

### World Bank Operational Policies

- OP/BP 4.01 Environmental Assessment
- OP/BP 4.04 Natural Habitats
- OP/BP 4.36 Forests
- OP/BP 4.11 Physical Cultural Resources
- OP/BP 4.12 Involuntary Resettlement

### Project Description

The proposed subproject is Engineering, Procurement and Construction (EPC) mode contract for “Design and Construction of 1x45 meter Trussed Girder Bridge over Rambiarā Nallah at Kumar Mohalla Wachi including Construction of Approach Roads and Nallah Training Works in District Shopian, Jammu & Kashmir and environmental enhancement measures etc as per the best engineering practices, in compliance to the World Bank policies and in synchronization with project environmental management strategies.

### Scope of the Work

The scope of works for the proposed bridge project will include design and construction of 1x45 meter Trussed Girder Bridge over Rambiarā Nallah at Kumar Mohalla Wachi including Construction of Approach Roads and Nallah Training Works.

### Public Consultation

One of the important components of this study is the dissemination of project information by way of “Consultation with stakeholders and the general public”, which was conducted on 12/09/2018, 19/03/2019 and 11/07/2020 with residents/ stakeholders in the project area of Kumar Mohalla Wachi village during reconnaissance and EIA survey of the project as part of the study. During the consultation process of the proposed sub-project, people have expressed keen interest in the consultation process and were aware of the proposed bridge project in Wachi village. During consultation by construction of the Wachi bridge over Rambiarā nallah and the benefits are direct connectivity of Kumar Mohalla, Dablepora, Wachi with rest of the adjoining areas/ villages with district headquarter of Shopian.



Some of the responses with suggestions and support received from the residents and stakeholders during the consultation are abridged as i) some of the land required for the proposed sub-project will be donated by the villagers as decided by the Central Aquaf Committee in the public meeting on 19.03.2019. ii) landscaping beautification process/ programme along the bund roads/ green turfing, the introduction of ornamental plants in open space and to make roads better Further the locals ensured full cooperation and support for the successful execution of the project; iii) residents who are related to the construction industry may be engaged with the proposed bridge works; iv) to ensure the shifting of the utility like Irrigation pipe from the proposed approach road construction at Kumar Mohalla side. .

### **Assessment of Impacts**

The environmental assessment study carried out at the proposed site for Wachi Bridge and its approaches and nallah training works in terms of the potential environmental impacts that may occur as a result of the implementation of the project. Based on the findings during survey, there are no significant environmental impacts in sub-project area. No approach road from the Kumar Mohalla side (left side approach) exist and hence new approach road proposed to be constructed with a formation width of 5.5 meter of approach on left bank of the proposed bridge. There are more than 500 trees (non-scheduled trees) growing in the flood plain area on both sides of the approach. Nearly, 60 trees (non-scheduled trees) mainly comprise of Poplar, Willow, Elm and Ailanthus For tree cutting proper procedure for cutting of non-scheduled trees shall be followed. Number of trees cut will be remunerated by way of compensatory plantation at 1:3 ratio or greater. The anticipated environment impacts identified during the construction phase which comprise of transitory/ insignificant increase in air and noise pollution, soil erosion, change in water quality or contamination and these impacts are temporary and site and time-specific in nature. The major impacts of temporary in nature of the project are expected to be during the construction phase leading to air and noise quality deterioration, occupational, health and safety impacts to the works and local communities, utility shifting, generation of construction debris and disposal of waste material respectively.

The proposed construction of 1x45 meter bridge at Kumar Mohalla Wachi will have significant positive impacts and to address the problem of connectivity and high-quality motorable access to the adjoining areas through improved design and environmental enhancement measures. The construction of this bridge will also uplift the area as accessibility with the adjoining areas town and district headquarter of Shopian.

The project mitigation measures have been developed for evading, reducing and regulating the adverse impacts on the environment impacts induced by the project proposed. The policy, legal and institutional framework under the ambit of which the EIA was undertaken, is also detailed out in environmental assessment report. The comprehensive Environmental Management Plan (EMP) for the proposed bridge at Wachi has been developed, which elaborates on the mitigation measures, means of implementation for the proposed measures, monitoring strategy and the budgets about the implementation of the proposed mitigation measures.

## 1. INTRODUCTION

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### 1.1. Project Background

In September 2014, Jammu & Kashmir experienced torrential monsoon rains in the region causing major flooding and landslides. The continuous spell of rains from September 2 to 6, 2014, caused Jhelum and Chenab Rivers as well as many other streams/tributaries to flow above the danger mark. The Jhelum River also breached its banks flooding many low-lying areas in Kashmir, including the capital. In many districts, the rainfall exceeded the normal by over 600%. The Indian Meteorological Department (IMD) records precipitation above 244.4 mm as extremely heavy rainfall, and J&K received 558mm of rain in the June-September period, as against the normal 477.4 mm. The district of Qazigund recorded over 550 mm of rainfall in 6 days as against a historic normal of 6.2 mm over the same period.

Due to the unprecedented heavy rainfall, the catchment areas particularly the low lying areas were flooded for more than two weeks. Some areas in urban Srinagar stayed flooded for 28 days. Water levels were as high as 27 feet in many parts of Srinagar city. The areas from the main tributaries of river Jhelum vis-à-vis Bringi nallah, Vishav nallah, Lider nallah and Sandran nallah started overflowing due to the heavy rainfall causing water levels in Jhelum river to rise.

Based on the **Rapid Damage Needs Assessment (RDNA)** results, restoration works underway, and discussions with the GoJ&K, the project will focus on restoring critical infrastructure using international best practices on resilient infrastructure. Given the state's vulnerability to both floods and earthquakes, the infrastructure will be designed with upgraded resilient features and will include contingency planning for future disaster events. Therefore, the project aims at both restoring essential services disrupted by the floods and improving the design standard and practices in the state to increase resilience.

The Project Development Objective (PDO) is to support the recovery and increase disaster resilience in targeted areas of the State and increase the capacity of the State entities to respond promptly and effectively to an eligible crisis or emergency.

The project comprises of the following seven components:

1. Reconstruction and strengthening of critical infrastructure (US\$60 million)
- 2. Reconstruction of roads and bridges (US\$80 million)**
3. *Restoration of urban flood management infrastructure (US\$50 million)*
4. Strengthening and restoration of livelihoods (US\$15 million)
5. Strengthening disaster risk management capacity (US\$25 million)
6. Contingent Emergency Response (US\$0 million)
7. Implementation Support (US\$20 million)

Under Jhelum Tawi Flood Recovery Project (JTFRP), the component-2 aims at Construction of 5 bridges in Kashmir Region under Engineering, Procurement and Construction (EPC) mode contract as listed in Table 1.1 below. These bridge subprojects

were selected based on the flood damages incurred during September 2014 floods and history of submergence and findings of environment and social screening exercise.

One of the bridge subproject, “Design and Construction of 1x45 meter single Lane trussed girder bridge on Rambiarā Nallah at Wachi, including construction of approach roads and nallah training works in District Shopian, J&K has been awarded to M/s Khanday Infrastructure Pvt. Ltd. One of the prime requirement of the bridge project is to conduct Environmental Impact Assessment (EIA) study and preparation of the report as per the World Bank guidelines. The M/s Khanday Infrastructure Pvt. Ltd. has entered into a contract agreement on 25<sup>th</sup> June 2020 with Mr Akhter R. Bhat as an Independent Environmental Consultant for conducting of EIA study and preparation of this assignment.

**Table 1.1: List of the Bridge Projects (EPC Mode) under Component-2 of JTFRP in Jammu & Kashmir**

S. No.	Project Type	Subprojects	Span/ Length (in meters)	District
<b>Design and Construction of:</b>				
<b>Kashmir Region</b>				
1.	EPC Mode	1x110.7m span 2 lane through type steel arch bridge on Sindh nallah at Wayil in District Ganderbal, J&K	1X110.7= <b>110.7</b>	Ganderbal, J&K
2.	EPC Mode	1x25 meter span single lane plate girder bridge on Raine nallah at Kaliban in District Shopian	1X25= <b>25</b>	Shopian, J&K
3.	EPC Mode	1x45 meter span tressed Girder Bridge on Rambiarā Nallah at Village Wachi in District Shopian	1x45= <b>45</b>	Shopian, J&K
4.	EPC Mode	1x110 m. span steel truss girder bridge on Bringi Nallah at Sadora- Asajipora Kamad Road in District Anantnag.	3x30= <b>90</b>	Anantnag, J&K
5.	EPC Mode	2 Lane bridge on Vaishav Nallah at Chamgund in District Kulgam	<b>400</b>	Kulgam, J&K

### 1.2. Description of the Project

Shopain is situated at a distance of 51 Km from Srinagar and 20 Km from Pulwama. The district is located in the south and South-west extremity of Kashmir valley, Shopian is lying in the close proximity of Pir Panjal mountain range. The total area of the district is 30,742 hectares out of which 19692.5 hectares are of cultivable nature, the grazing lands are of the order of 2948 hectares and 260.5 are forest land. The district is located between 33.43 °North to 74.49 °East of latitude & longitude respectively. Presently the District Shopian having two Assembly Constituencies consists of one Tehsil, One CD Block Shopian and a part of Block Keller.

Wachi village is located in Shopian Tehsil of Shopian district in Jammu & Kashmir. The village code of the Wachi is 003327. It is situated 20km away from Shopian, which is both district & sub-district headquarter of Wachi village. The total geographical area of village is 533.4 hectares. Wachi has a total population of 3,943 peoples. There are about 705 houses

in Wachi village. Bejjbehara is nearest town to Wachi which is approximately 8km away. The nearby villages of Wachi are Aglar Charat, Shermal, Heff, Kashwah, Reshipora, Malawrah Safanagri, Zainapora, Babapora, Durajpora, Awnera etc.

The main occupation of the people is agriculture activities. The proposed bridge is to connect Kumar Mohalla and other areas of village Wachi to other Mohalla and adjoining villages. There is also one motorable bridge at 300 m upstream from proposed bridge. The existing bridge is motorable and is connecting different areas. To connect Kumar Mohalla Wachi to other part, it is proposed to construct 1x45 mtr trussed Girder Bridge with deck over Rambiar Nallah.

### 1.3. Scope for Conducting of the EIA study

Environmental study of the bridge project to identify and evaluate impacts on the environment due to the various stage of project implementation and provide inputs to project road design team to incorporate necessary measures in design to minimise such impacts through suitable engineering interventions. The approach road Hence, an Environmental Management Framework has been designed for baseline environmental study, identifying impacts, mitigation measures to avoid, minimize and mitigate anticipated negative impacts within the project impact zone and project influence area. Accordingly, to minimize negative impacts during the entire project cycle environmental management plan has been developed with roles and responsibility for sound construction management during the project implementation. Furthermore, the report covers major finding of existing environmental, legal and administrative framework, monitoring programme, the cost for environmental management and evaluation of potential environmental impacts due to the proposed construction of 1x45 meter span bridge over Rambiar Nallah in Wachi village in District Shopia including construction both approaches and nallah training works in Kashmir region of J&K.

In general, the broad scope of the Environmental Assessment study includes following but not limited to:

- collect any additional data relevant to the study area;
- undertake environmental monitoring to establish the baseline environmental status of the study area;
- assess the impacts on environmental attributes due to the construction and operation of bridge project;
- prepare an Environmental Management Plan (EMP) outlining the measures for improving the environmental quality and budgetary cost estimation for implementation;
- identify critical environmental attributes required to be monitored after the implementation of the proposed subproject

### 1.4. Need and Benefits of The Proposed Bridge

The proposed bridge project at Kumar Mohalla is located in Wachi village of district Shopian. To redress the demand of the public for the better and improved connectivity with the Shopian district head quarter, it was proposed to construct 1x45 meter trussed

girder bridge with deck over Rambiarā Nallah including the construction of Approaches and Nallah training works.

### **1.5. The need for the Environmental Assessment**

The EIA for the subproject includes establishing the environmental baseline conditions in the study area, identify the range of anticipated environmental impacts during design, pre-construction, operation and maintenance phases of the project, specifying the measures to avoid, minimize, and mitigate negative impacts and maximize positive impacts and integrate possible mitigation measures, environmental management plan (EMP) and environmental enhancement measures.

The proposed mitigation measures will be formulated in the form of an environmental management plan with necessary budget and institutional roles for effective implementation of EMP for the “Construction of 1x45 meter bridge on Rambiarā Nallah at Wachi village in district Shopian under Jhelum and Tawi Flood Recovery Project (JTFRP) and integration of the same into project implementation agreements, including construction contract documents.

### **1.6. Environmental Screening and Scoping**

Environmental screening exercise of the proposed subproject projects was undertaken to facilitate inputs on environmental, social and economic considerations for current and prospects. Further, this report also provides scoping inputs in determining the major environmental issues and defines the scope of work for conducting an environmental assessment. As per the findings and recommendations of the Environmental Screening report, Environmental Assessment has been carried out for the subproject. The scoping exercise defines geographical boundaries for the subproject for impact assessment as well as defining the project influence area to assess the impacts due to project activities.

### **1.7. Environmental Assessment (EIA)**

The EIA for the proposed Wachi bridge project includes establishing an environmental baseline in the study area, identify the anticipated environmental impacts, specify the measures to avoid, minimize, and mitigate negative impacts and maximize positive impacts and integrate necessary mitigation measures, environmental management plan and environmental enhancement measures as required. The proposed measures formulated in the form of an environmental management plan with necessary budget provisions and institutional roles for effective implementation during various stages of the project. The EMP developed shall form the part of the construction contract document.

### **1.8. Environmental Management Plan (EMP)**

An Environmental Management Plan designed for the implementation of the Wachi bridge project shall consist of an overall framework which will be a guiding document providing environmental planning and design criteria for the current subprojects, generic environmental management measures, institutional mechanism for implementation, capacity building and training process, and resource materials to function adequately to

mainstream the environmental management and implementation of environmental management and monitoring plan.

### **1.9. Study Approach**

To accomplish the above objectives, an assessment study was made in line with the guidelines stipulated by the World Bank and ESMF of JTFRP for environmental assessment.

#### **a) Field Reconnaissance Survey**

The approach to the entire study was formulated based on a detailed field reconnaissance survey and a thorough understanding of the proposed project. The reconnaissance survey was carried out for the project road to understand the salient environmental features of the project area, sensitive areas with regards to the proposed project activities, and a general understanding of the proposed subproject.

Based on the above an environmental profile of the project area, primary and secondary data requirements for carrying out further activities of the study, environmental surveys necessary for assessing the project impacts, and the project influence area were identified.

#### **b) Review and Assessment of Applicable Environmental Regulations**

Discussions with different stakeholders and review of the various regulations and guidelines for EIA were conducted to assess the sampling and analysis requirements for the project and the procedural requirements for conducting an Environment Assessment. This primarily comprised of reviewing all relevant documents available for the project area at Wachi in District Shopian.

#### **c) Delineation of Study Area for Assessment**

The above tasks identified the survey and analysis requirements for baseline data collection required for assessing the anticipated impacts of the proposed subproject activities. Based on which, the study area that is critical for assessing the project impacts was identified and delineated. The project influence area also considered those areas that are directly or indirectly influenced by the project activities during pre-construction, construction or operation of the proposed bridge works at Wachi..

#### **d) Baseline Environmental Conditions**

This activity comprised of field surveys for assessing the baseline environmental conditions and collecting primary and secondary information regarding physical, biological and socio-economic conditions of the study area. Besides, existing environmental quality of the study area was assessed based on the field of environmental monitoring. For monitoring the air, noise, and water quality, monitoring was carried and samples were collected and analyzed for relevant parameters.



**e) Prediction/Assessment of Potential Impacts**

The activity identified the likely impacts through changes in the physical, biological or socio-economic environment based on the analysis of the baseline environmental data collected. The assessment considered both positive and negative impacts due to the subproject activities and also due to the construction, and operation of the project corridor.

**f) Environment Management Plan**

The major components of the environment management plan comprised preparation of mitigation plans for all the negative impacts identified during study and to avoid, minimize or compensate the impacts, and the post-project monitoring plan for the measures suggested in the management plan to ensure that the impacts of the project are within the regulatory standards

**1.9. Structure of Environmental ial Assessment (EIA) Report**

The structure of the EIA report has been categorized in the following Chapters:

Executive Summary

1. Introduction
2. Approach & Methodology.
3. Project Description
4. Policy, Legal and Administrative Framework
5. Environmental Baseline Data
6. Potential Environmental Impacts
7. Analysis of Alternatives
8. Public Consultation and Disclosure
9. Environmental Management Plan (EMP)

Annexures

## **2. APPROACH & METHODOLOGY**

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### **2.1. Reconnaissance Survey**

The reconnaissance survey was conducted on 11 September 2018, 19 March 2019 and 11 July 2020 for the proposed bridge project at Wachi village. The site visits and the initial assessment have become the key elements of the schedule of preparation as a part of the screening exercise and EIA report. In addition to field investigations and observations, consultations/ field visits were held jointly with the stakeholders, consultants and project proponents, and available environmental documentation was assembled for review.

### **2.2. Project Impact and Project Influence Area**

To conduct an environmental assessment study of the proposed “Construction of 1x45 meter span trussed girder bridge at Kumar Mohalla in Wachi of Shopian district in J&K, it is imperative to define the area for environmental impacts/ project influence area are being considered. The project will support infrastructure and the proposed construction of the Wachi Bridge over Rambiarā nallah.

The project impact area has been considered as Right of Way (ROW) of the project corridor and project influence area has been measured as 500 meters from the centre line of the bridge on both sides.

### **2.3. Screening Methodology**

The screening exercise was done through reconnaissance survey. Public consultation meetings were arranged with the local community and conducted in Kumar Mohalla and Doble Mohalla area near the proposed bridge site with locals, officials, consultants and community. Field survey and data collection were carried out as per the screening checklist provided in ESMF of the project. The information has been gathered through primary as well as secondary sources, with the support of Contractor/PMU/PIU team members. The objective behind the environmental screening was to delineate affected environmental features and issue like soil erosion, slope stability/ embankment measures, scheduled trees protection, sensitive receptors- schools/ religious places and residential area, human settlements, water, natural resources etc. in the project area, to define impacts and to minimize the adverse environmental impacts by suggesting best engineering solutions/options at optimal costs.

The positive actions not only to avoid adverse impacts but to capitalize on opportunities to correct environmental degradation or improve environmental conditions were determined.

### **2.4. Detailed Baseline Environmental Surveys**

A comprehensive survey was conducted for environmental impact and screening studies. For this purpose, a data-sheet was devised to collect quantitative and qualitative environmental data together with local subproject specific consultations. This will be the basis for further investigations for future studies. Information collection, literature survey and analysis of data published and other recorded data e.g. on flora and fauna, climate,

pollution along with socio-economic, demographic, land-use pattern, land ownership details etc. of the subprojects were also studied and reviewed. National and state environmental guidelines were also reviewed before carrying out baseline studies. A detailed survey has been carried out by the consultant who is responsible for the documentation of the environmental investigations and issues, to evaluate the existing environmental setting and conditions of the proposed project area. Potential significant impacts were identified based on an analytical review of project activities, baseline data, land use, environmental factors, socioeconomic conditions and review of the assessment of potential impacts identified in previous similar kind of projects. A participatory process was adopted while performing screening of the sub-project. The information has been gathered through primary as well as secondary sources of information, with the support of PMU and PIU team members.

### **2.5. Collection of Data**

The construction of 1x45 m trussed girder bridge at Kumar Mohalla Wachi, many activities have been undertaken like specific literature reviews and surveys were carried out referring publication & using the internet and useful information about the project impact and influence area was collected. This includes both published and unpublished environmental data. Literature searches were undertaken and relevant agencies were contacted and apprised of the proposed subproject. The following data were collected for the road projects during environmental screening/ assessment study:

- Geo reference maps.
- Socio-economic data from the Planning Department and Census records.
- Geological data from the Geological Survey of India.
- Meteorological data from India Meteorology Department, Govt. of India.
- District Profile from District Statistics Department.
- Forestry and Wildlife Data from the Forest Department.
- Flora and fauna from various sources, including the State Forests Department and Wildlife Department.

Readily available data were reviewed with the initial reconnaissance investigations, and the need for primary data collection in some instances was determined.

### **2.6. Environmental Monitoring Data**

Environmental monitoring (Air, Noise and Water quality) of the proposed “Construction of 1x45 meter span trussed girder bridge over Raiambaira Nallah at Wachi will be conducted during pre-construction stage (that is before the execution of works) to generate the latest baseline data so that it can be correlated for the comparative analysis with the monitoring data during the construction/ operation stages of the project.

### **2.7. Assessment of Alternatives**

Analysis of alternatives is an analytical comparison of the operational effectiveness, costs and environmental risks of proposed development options. This helps to analyze the options critically with its impacts on all physical, social and biological environments. The ‘no

action option' is to be considered among various options available. The process will ultimately help to determine which option is comparatively better than the other various options. For this project, alternative analysis has been made for three considerations, *i.e.* strategic, planning and technology consideration. A 1x50 m steel girder bridge with carriageway of 5.5 m is located 500 meter away from the site location of Kumar Mohalla and adjoining areas. They have to cross an approx. distance of 1.3km to reach the existing old bridge. By constructing the proposed new bridge the people have to travel only <500 mtr. to reach the Wachi. Moreover, the proposed construction of a bridge does not involve any land acquisition/ displacement/ rehabilitation. The bridge shall provide connectivity between twin districts of Pulwama & Shopian via Wachi-Zainapora Road. The bridge is vital to boost the economic activity of the area as it provides nearest link to the National Highway Passing at Sangam-Bijbehara. Since the village gets disconnected with other habitations and people of the area especially students, patients, and elderly face lot of difficulties due to the non-availability of bridge connectivity as they cross the nallah which usually remain with the lean flow and inaccessible during episodes of precipitation. Based on this assessment the present option of construction of new bridge having a span of 1x45 meter on Rambiara Nallah at Wachi in District Shopian is the best applicable solution and socio-economically viable option.

### **2.8. Stakeholder Consultation and Participation**

Stakeholder's view and perception were assessed through informal and formal public consultation meetings. The different stakeholder's *viz.* government officials, local people were contacted and consulted during the study. Stakeholders were informed about the subproject components and likely environmental and social impacts before seeking their views. Consultation has been carried out for the project in two stages. First stage consultation was undertaken during the impact assessment process to identify the concerns of people, which were duly addressed through appropriate mitigation measures. Second stage consultation was undertaken as part of the preparation of the EIA report to assess the adequacy and acceptability of the proposed mitigation measures and management plan. Public consultations ensured the involvement of the public, experts in the project's pre-planning stage itself and redressal of their concerns and expectations from the subproject. The community members, government officials members opined that the proposed subproject would contribute to the social and economic development of the area. The proposed project would contribute to increased employment opportunities for the local people during and after subproject implementation. The communities welcomed the subproject and all were in favour of the project. Issues raised by stakeholders were analysed for practical and scientific basis, and for developing an appropriate mitigation, management and monitoring plan, depending on its importance and practicality.

EIA Report for the construction of 1x45 meter span trussed girder bridge over Rambiara Nallah at Kumar Mohalla Wachi in District Shopian and its executive summary shall be disclosed at JTFRP/PIU website as per provisions of World Bank disclosure policies.

### 3. PROJECT DESCRIPTION

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#### 3.1. Project Area

Shopain district is situated at a distance of 51 Km from Srinagar and 20 Km from Pulwama. The district is located in the south and South-west extremity of Kashmir valley, Shopian is lying in the close proximity of Pir Panjal mountain range. The total area of the district is 30,742 hectares out of which 19692.5 hectares are of cultivable nature, the grazing lands are of the order of 2948 hectares and 260.5 are forest land. The district is located between 33.43° North to 74.49° East of latitude & longitude respectively. Presently the District Shopian having two Assembly Constituencies consists of one Tehsil, One CD Block Shopian and a part of Block Keller.

Wachi village is located in Shopian Tehsil of Shopian district in Jammu & Kashmir. The village code of the Wachi is 003327. It is situated 20km away from Shopian, which is both district & sub-district headquarter of Wachi village. The total geographical area of village is 533.4 hectares. Wachi has a total population of 3,943 peoples. There are about 705 houses in Wachi village. Bejjbehara is nearest town to Wachi which is approximately 8km away. The nearby villages of Wachi are Aglar Charat, Shermal, Heff, Kashwah, Reshipora, Malawrah Safanagri, Zainapora, Babapora, Durajpora, Awnera etc.

The proposed bridge site is located at Kumar Mohalla of Wachi in Shopian Block in Shopian District of Jammu & Kashmir, India. The proposed bridge is 7 Km towards East from District head quarters Shopian and 46 Km from State capital Srinagar. Wachi is surrounded by Kulgam Block towards East, Pulwama Block towards North, Devsar Block towards East, Qaimoh Block towards East. The bridge shall provide connectivity between twin districts of Pulwama & Shopian via Wachi-Zainapora Road. The bridge is vital to boost the economic activity of the area as it provides nearest link to the National Highway Passing at Sangam, Bijbehara.

The proposed subproject is an Engineering, Procurement and Construction (EPC) mode contract for "Design and Construction of 1x45 meter Trussed Girder Bridge over Rambiara Nallah at Kumar Mohalla Wachi including Construction of Approach Roads and Nallah Training Works in District Shopian, Jammu & Kashmir



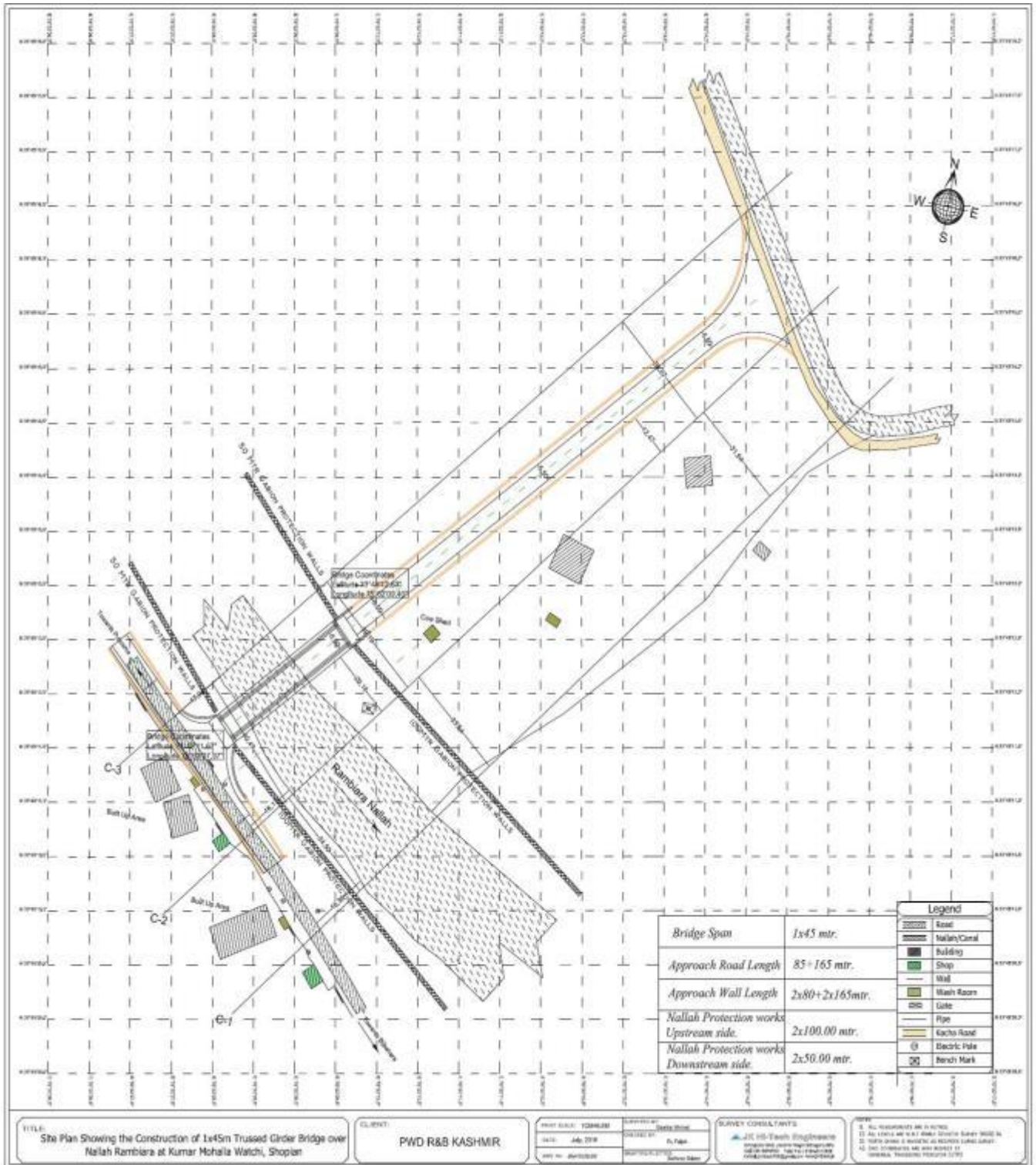
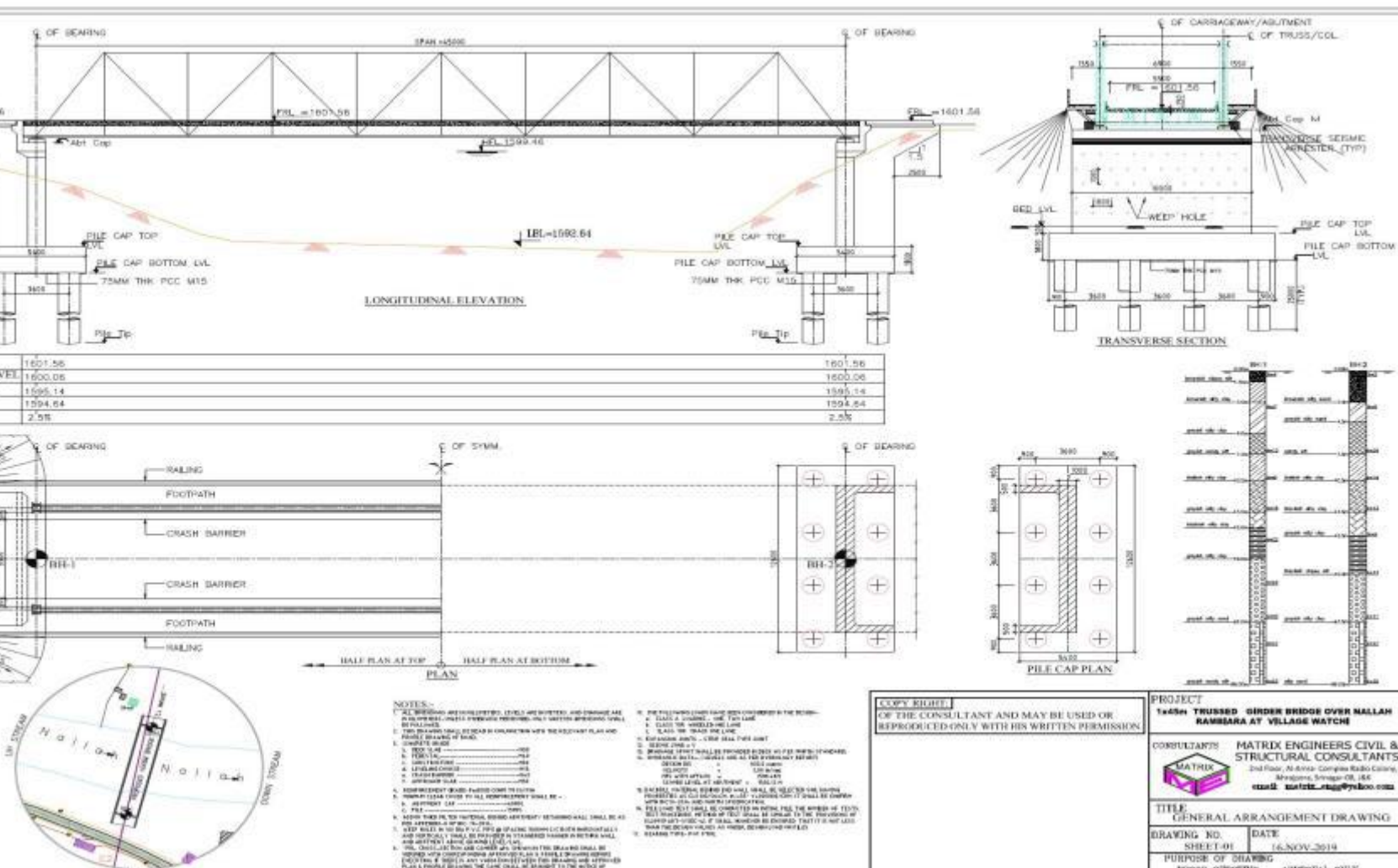


Figure 3.1: Plan and Profile of the Wachi Bridge and its Approach Roads on both sides.





# Jhelum Tawi Flood Recovery Project (JTFRP)



**Figure 3.2: General Arrangement Drawing (GAD) of the Proposed Construction 1x45 meter Bridge on Rambiara Nallah at Kumar Mohalla Wachi in District Shopian**

### **3.2. Project Location and Outline**

The project is located in Kumar Mohalla of Wachi Village in District Shopian. The project lies between the latitudes of 33°48'10.28"N and Longitude of 75°02'10.67"E. The bridge site is located at Wachi in Shopian Block in Shopian District of Jammu & Kashmir State, India. The proposed bridge is 7 Km towards East from District head quarters Shopian and 46 Km from State capital Srinagar. Wachi is surrounded by Kulgam Block towards East, Pulwama Block towards North, Devsar Block towards East, Qaimoh Block towards East.

The Wachi bridge is of single span high level minor bridge of 45 mts span on Rambiaranallah in Shopian District of J&K. The bridge has the span configuration of 1x45mts mts with open web girder superstructure laden with RCC composite deck slab. The bridge has a clear carriageway of 7.50 mts and a provision of 1.50m wide Footpath on both side of the bridge along with the provision to accommodate utilities especially PHE Pipes. The bridge is resting on both sides on RCC wall type abutment supported on pile foundations. There are eight no. RCC bored cast in situ piles at each abutment location having length of 25mts & 1.2 mts of dia. The pile cap thickness is 1.80 mts. The lattice girder has the arrangement of warren with verticals having 6 mts height from centre of top chord to centre of bottom chord. The load transfer from superstructure to substructure has been ensured through Pot/PTFE of designed load capacity.

#### **Following components of Substructure and foundation are designed :**

- a) Design of Pile Foundation for Abutment
- b) Design of Abutment Shaft
- c) Design of Abutment Cap
- d) Design of Dirt Wall
- e) Design of Return Wall
- f) Design of Bearing Pedestal
- g) Design of Seismic Stopper

#### **Codes and specifications used**

- IRC: 5-2015: Standard Specifications and Code of Practice for Road Bridges, Section I – General Features of Design (Eighth Revision)
- IRC: SP: 13-2004: Guidelines for the Design of Small Bridges and Culverts (First Revision)
- MORT&H: Pocketbook for Bridge Engineers, 2000 (First Revision)
- IRC: 6-2017: Standard Specifications and Code of Practice for Road Bridges, Section-II Loads and Load Combinations (Seventh Revision)
- IRC: 22-2015: Standard Specifications and Code of Practice for Road Bridges, Section VI – Composite Construction (Limit States Design) (Third Revision)
- IRC: SP:120-2018: Explanatory Handbook to IRC: 22-2015 Standard Specifications and Code of Practice for Road Bridges, Section VI-Composite Construction
- IRC: 24-2010: Standard Specifications and Code of Practice for Road Bridges, Steel Road Bridges (Limit State Method) Third Revision)

- IRC: 78-2014: Standard Specifications and Code of Practice for Road Bridges, Section VII- Foundations and Substructures (Revised Edition)
- IRC: 112-2019: Code of Practice for Concrete Road Bridge
- IRC: SP-105-2015: Explanatory Handbook to IRC:112-2011: Code Practice for Concrete Roads Bridges
- IRC: SP: 114-2018: Guidelines for Seismic Design of Road Bridges

**3.3. Technical Description of the Wachi Bridge Project**

**Table 3.1: Salient Features of the Wachi Bridge**

S.No.	Item	Description
01.	Span arrangement	1x45mtr c/c of bearings with overall length of 46.20 mts end to end.
02.	No. of Spans	Single Span
03.	Type of Bridge	High Level Motorable Minor Bridge
04.	Substructure	RCC Column type Abutments with pile foundations
05.	Superstructure	Steel Truss Girder with RCC Deck Slab compositely constructed
06.	Carriageway	Intermediate lane CW of 5.50 mts width
07.	Footpaths	1.50 mts Footpath on either side of CW.
08.	Bearings	POT/PTFE Bearings as per Design Load capacity
09.	Nallah	Rambiara Nallah tributary of River Jhelum
10.	Flood Discharge	Calculated from Area-Velocity Method = 570.63 Cumecs
11.	Silt Factor	Adopted value of 1.25 from geotech report
12.	Scour Depth	10.23 mts from HFL & 3.41 mts from bed level
13.	Pile Foundation	➤ 1200mm dia RCC piles of 25 mtr length ➤ Eight No. pile group for each abutment
14.	Design load on Pile	➤ 185.0 Tonnes vertical Design load expected on pile ➤ 30.0 Tonnes Horizontal Design load expected on pile ➤ Pile capacity to be verified from test pile at site.
15.	Approaches	➤ A total of 160 mts approaches on both to be constructed with RCC approach wall in grade of around 5%. ➤ Single lane Bund Road 640 mts along canal to be upgraded. ➤ Pavement works in approaches as per NIT
16.	Nallah training Works	Wire crated nallah protection works in several tiers both on U/S for 100 mts & D/S for 50 mts of the bridge as per NIT.

3.3.1. Hydrological Data of Rambiara Nallah at Wachi

Flood Discharge from X-sectional Area and observed Velocity

HFL_100	1599.46								
Offset	Bed Level	Natural HFL	Min. Channel B.L.	Distance	h	Avg h	Diff in h	Area	Perimeter
(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
0.00	1600.6119	1599.46	1592.64	0.000	0.000	0.000	0.000	0.000	0.000
0.71	1600.9610	1599.46	1592.64	0.710	0.000	0.000	0.000	0.000	0.000
1.63	1601.0426	1599.46	1592.64	0.920	0.000	0.000	0.000	0.000	0.000
3.38	1601.0979	1599.46	1592.64	1.750	0.000	0.000	0.000	0.000	0.000
5.48	1601.0058	1599.46	1592.64	2.100	0.000	0.000	0.000	0.000	0.000
6.95	1600.9049	1599.46	1592.64	1.470	0.000	0.000	0.000	0.000	0.000
8.79	1601.1846	1599.46	1592.64	1.840	0.000	0.000	0.000	0.000	0.000
13.12	1601.0876	1599.46	1592.64	4.330	0.000	0.000	0.000	0.000	0.000
15.23	1600.6691	1599.46	1592.64	2.110	0.000	0.000	0.000	0.000	0.000
18.53	1598.2419	1599.46	1592.64	3.300	1.218	0.609	1.218	2.010	3.518
22.79	1597.0846	1599.46	1592.64	4.260	2.375	1.797	1.157	7.654	4.414
26.16	1595.4767	1599.46	1592.64	3.370	3.983	3.179	1.608	10.714	3.734
29.61	1593.8806	1599.46	1592.64	3.450	5.579	4.781	1.596	16.496	3.801
30.38	1593.6784	1599.46	1592.64	0.770	5.782	5.681	0.202	4.374	0.796
31.46	1593.3822	1599.46	1592.64	1.080	6.078	5.930	0.296	6.404	1.120
58.38	1592.6396	1599.46	1592.64	26.920	6.820	6.449	0.743	173.610	26.930
58.81	1593.8310	1599.46	1592.64	0.430	5.629	6.225	1.191	2.677	1.267
60.36	1594.8237	1599.46	1592.64	1.550	4.636	5.133	0.993	7.956	1.841
63.35	1597.4044	1599.46	1592.64	2.990	2.056	3.346	2.581	10.004	3.950
66.42	1599.1396	1599.46	1592.64	3.070	0.320	1.188	1.735	3.647	3.526
69.38	1600.9121	1599.46	1592.64	2.960	0.000	0.160	0.320	0.474	2.977
76.6	1600.9673	1599.46	1592.64	7.220	0.000	0.000	0.000	0.000	0.000
99.77	1600.6622	1599.46	1592.64	23.170	0.000	0.000	0.000	0.000	0.000
Sum =								246.02	57.874
Wetted perimeter R = A/P								R	4.251
Manning's Value								n	0.040
Channel slope								S	0.001
Velocity in channel (m/s) K = (1/n) x A x R^(2/3) Calc.								V	2
discharge (Cumec) Max.								Keq	16139.88
depth below HFL (m)								Q	570.63
								Dd (max)	6.820

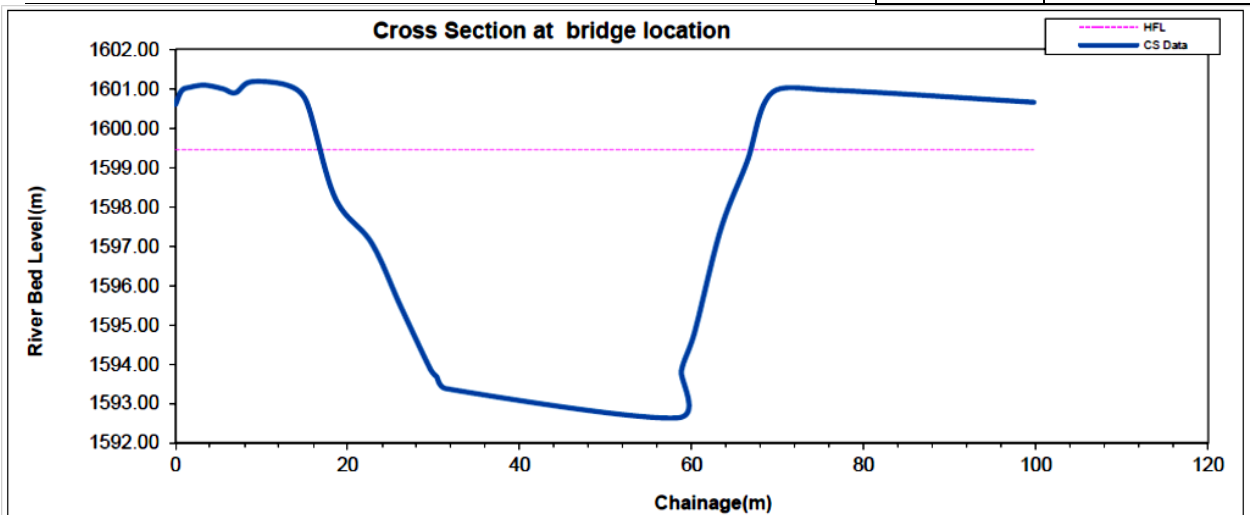




Table 3.2: Peak Flood Discharge Data of Rambiara Nallah I&FC Department

↑ Max. Flood Discharge Data I&FC Dept. ↓

Statement showing peak Flood discharges with corresponding gauges observed during the flood of September -2014 and Max.Flood discharge recorded till date of the below mentioned Nallahs

S.No	Name of Nallah G/D Site	Station Code	Peak Flood Discharge Observed During Sept-2014			Max. Flood Discharge Recorded till -date		
			Date	Gauge in Meter	Peak Flood Discharge in Cusecs	Date	Gauge in Meter	Max. Discharge in Cusecs
b)	Vethvethroo at Akran ✓	T-7(b)	6-9-14	4.50	3468.00	6-9-14	4.50	5468.00
8	Vishow Tail at Arwani ✓	T-12(b)	6-9-14	8.50	30574.00	6-9-14	8.50	30574.00
9	Romshi Taail at Pahoo	T-14(b)	4-9-14	7.10	3882.00	27-4-75	G.U.W	4284.00
10	Rambiar Tail at Niayana	T-15(b)	5-9-14	6.70	4500.00	10-9-92	G.U.W	12569.00
11	Watal Ara Tail at churoos	T-16(b)	5-9-14	3.68	531.00	12-8-73	4.40	2400.00
12	Aripal Tail at Kadal bal	T-19(a)	4-9-14	6.58	2762.00	9-8-73	Over flow	6220.00
13 a)	Sukhnag Head Arizal	T-19(a)	3-9-14	3.30	10238.00	3-9-14	3.30	10238.00
b)	Suknang at Kawoosa	T-19(b)	5-9-14	4.60	7819.00	5-9-14	4.60	7819.00
c)	Suknang at Mirgund	T-19(c)	13-9-14	2.80	648.00	24-6-96	4.50	5090.00
d)	Suknang Tail at Trikulbal	T-19(d)	5-9-14	4.10	2065.00	8-8-76	3.28	3708.00
14 a)	Ferozpura Head at Drung	T-20(a)	5-9-14	1.46	5933.00	5-9-14	1.46	5933.00
b)	Ferozpura at Teran	T-20(b)	4-9-14	1.56	3262.00	4-9-14	1.56	3262.00
c)	Ferozpura Tail Trikulbal	T-20(c)	5-9-14	3.10	1266.00	9-8-73	2.64	5800.00
16	Shaliganga at Raithan	T-21	4-9-14	1.50	1490.00	26-8-73	3.00	2822.00
16 a)	Doodhganga Head Brenwar	T-22(a)	4-9-14	1.80	9504.00	4-9-14	1.80	9504.00

**Note:**

- The peak flood discharges observed during the Sep 2014 floods do not contain the quantum of water that passed
  - through the breaches, if any
  - Over the embankments, if any.
- G.U.W means "Gauge under water"

Note:- Maximum discharges recorded at -  
 - St.No. 8 Vishow Tail at Arwani and -  
 - St.No. 10 Rambiara Tail at Niayana found -  
 - correct after checking with original records

Assistant Executive Engineer  
 (P&D) Data Collection  
 Suo Division, Sgr.

**3.3.2. Scour Depth Calculations for Bridge Abutment at Wachi**

1	Design Discharge Q	570.631 m <sup>3</sup> /s
2	HFL Calculated	1599.460 m
3	Lowest bed level at bridge	1592.640 m
4	Mean diameter of particles dm )approx..	0.50 mm
5	Ksf	1.250
6	Effective waterway L	45.0 m
7	Increase in design discharge by 30% (Q)	741.8 m <sup>3</sup> /s
8	Db = Q/L	16.485 Cumec/m
9	Mean Scour Depth dsm	8.057 m
10	Maximum scour depth= 27 x dsm	10.233 m
11	Max. scour level (wrt to lowest bed level)	1589.227 m
12	Scour depth w.r.t bed level	3.413 m

**3.3.3. Silt Factor Calculations**

S No.	IS Sieve	Mass of the Soil Retained	Percentage Mass Retained
1	4.75	0	0
2	2	1.626	2.15
3	0.425	7.542	20.82
4	0.075	24.635	66.20
5	Pan	66.20	10.82

S. No.	Sieve Size (mm)	Average Size	Percentage of Weight Retained	Weighted mean diameter dm
1	4.75 to 2.00	3.375	2.15	dm= 0.494 say 0.50
2	2 to 0.425	1.212	20.82	
3	0.425 to 0.075	0.25	66.20	
4	0.075 below	0.0375	10.82	

Silt factor =  $1.76 \sqrt{dm}$  = 1.25

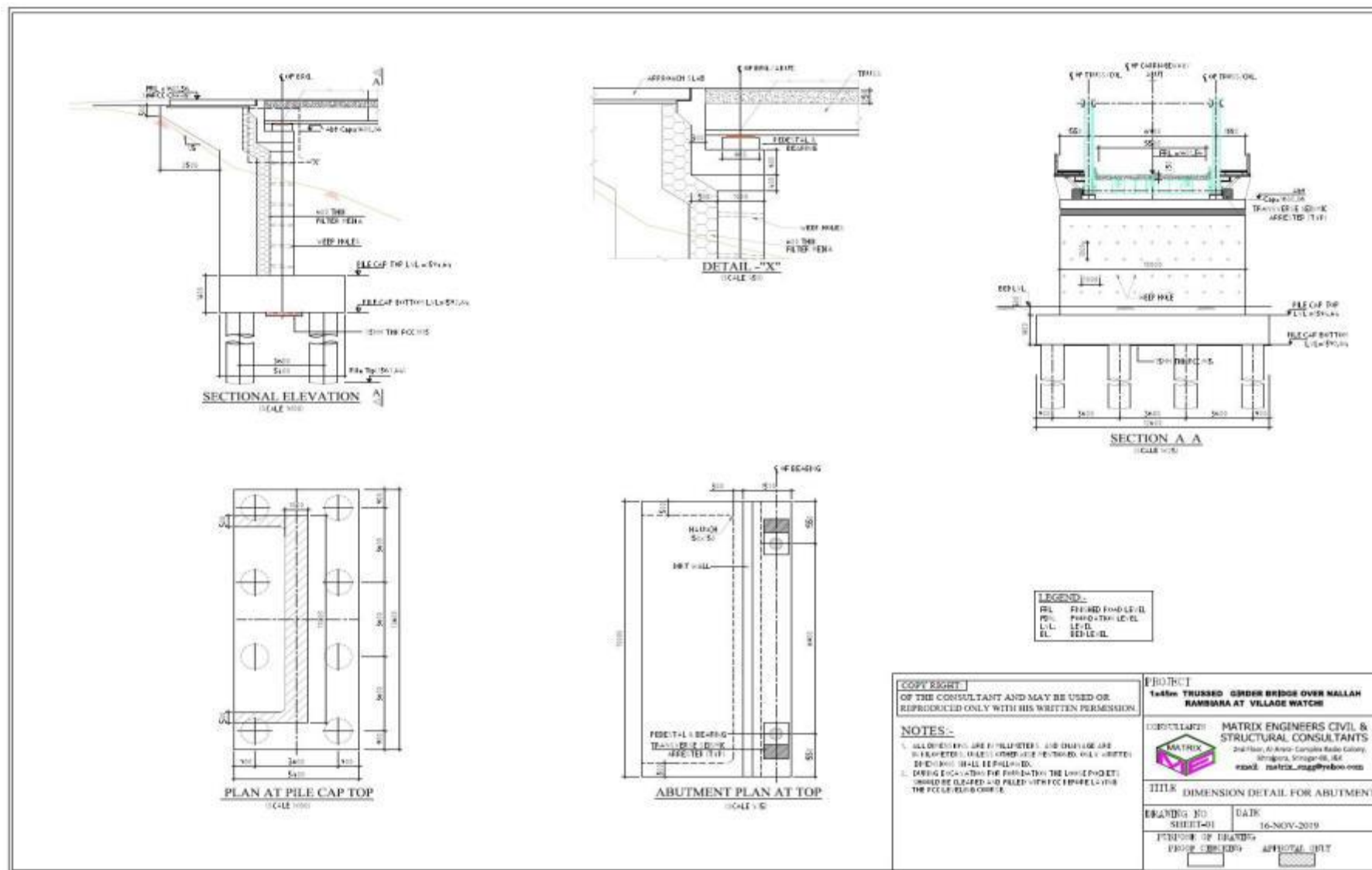


Figure 3.3: Details of the Abutment Dimensions



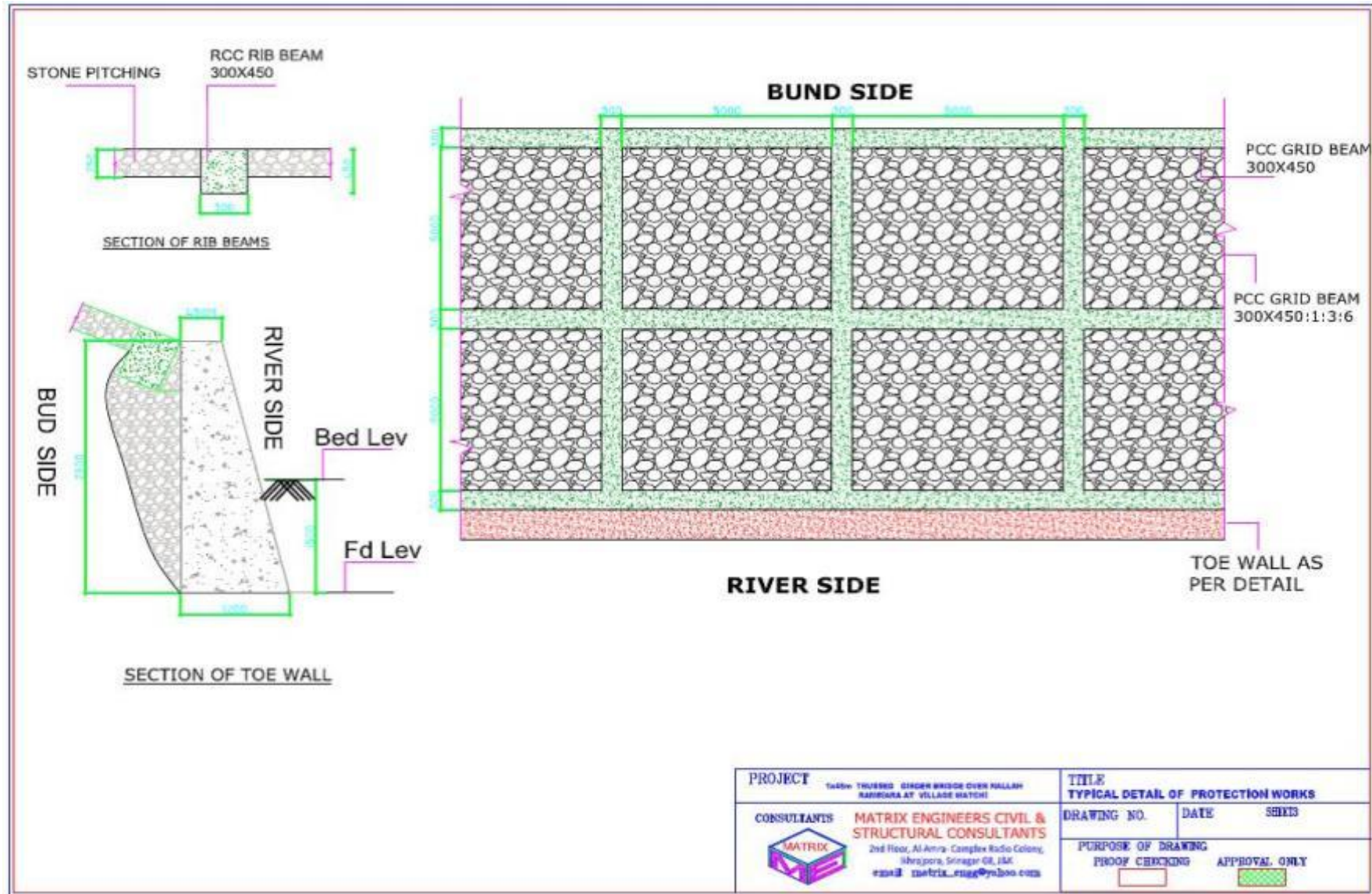


Figure 3.4: Typical details of the Protection Works

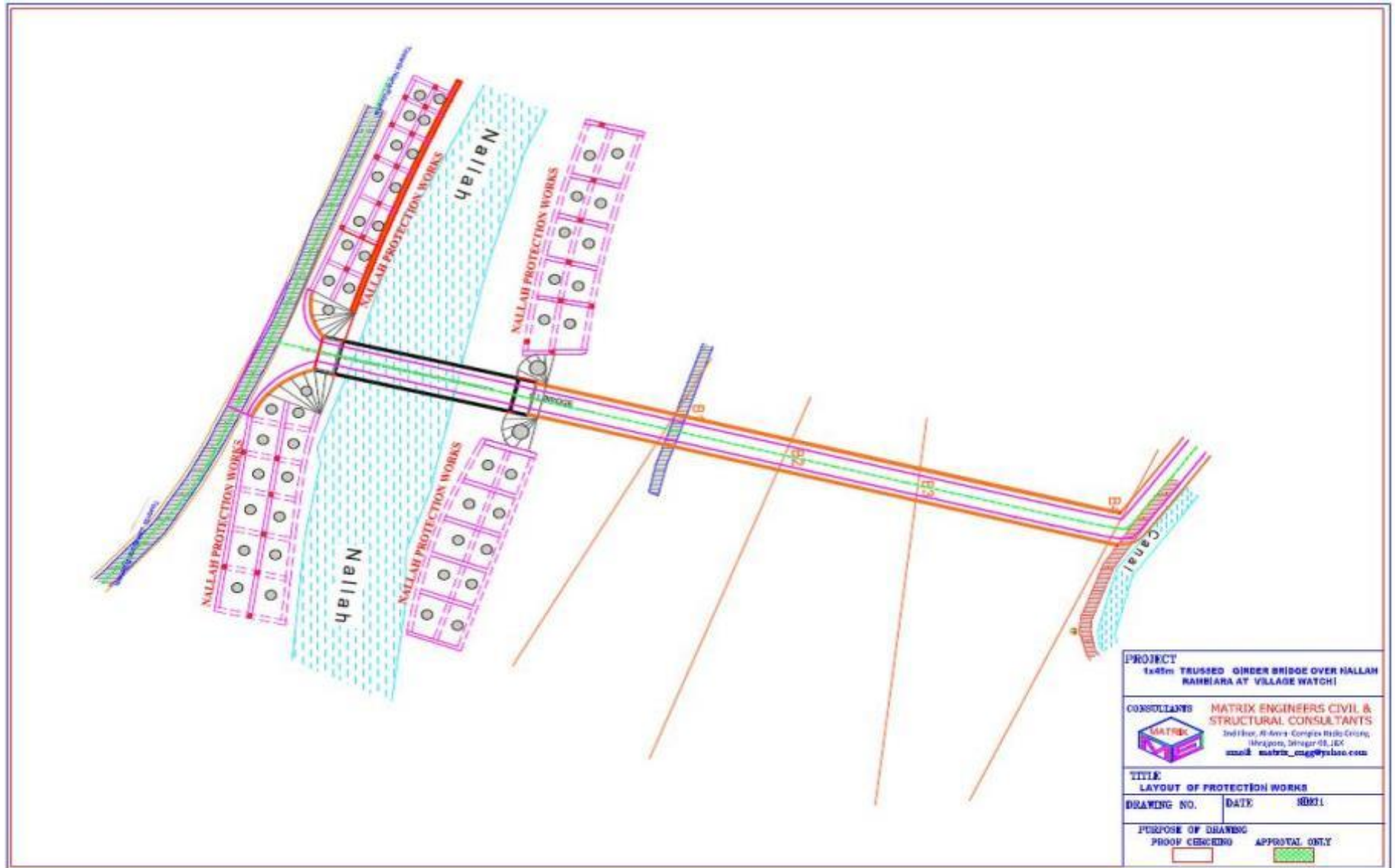


Figure 3.5: Drawing showing Nallah Protection Works on both sides of the Wachi Bridge.

### 3.3.4. Geotechnical Assessment-Recommendations

The sub strata comprises of clayey Silt/Silty Clay is classified as Fine Grained as per IS System of Classification and is of Soft to Hard consistency in nature upto 22.0m and Course grained from 22.0m onwards. Ground water table has been observed at an average of 2.50 m below existing ground Level. Pile foundation is recommended because of loose strata in upper depths. Permanent liner shall be used upto scour depth. For 1000 mm dia Pile having basic length of 25mtr we recommend an Axial Load Capacity of 150 tons.

The load carrying capacity of pile shall be confirmed by conducting initial Pile Load Test. For a pile dia of 1200mm and basic length of 25m axial load capacity workout to be 210tons and lateral load capacity work out to be 15 tons for fixed head conditions. Silt factor for a representative sample of bad material obtained upto anticipated deepest scour of 6m work out to be 0.84.



Table 3.3: Test results of the Soil Investigation of Bore Hole-1

Depth of sample below NSL (m)	Type of sample	Soil Classification	Grain Size Analysis Sieve / Hydrometer			Natural moisture content %	Bulk Density $\gamma$ g/cc	Natural dry density $\gamma_d$ gm/cc	Consistency Limits			Direct Shear / Triaxial Shear Test		U.C. Test $q_u$ (Kg/cm <sup>2</sup> )	Consolidation		Specific gravity	Remarks
			%Gravel	% sand	% silt + Clay				Liquid limit (%)	Plastic Limit (%)	Plasticity (PI)	Cohesion $c$ Kg/cm <sup>2</sup>	Angle of repose $\phi$ (Deg)		$e_c$	$e_o$		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1.5	SPT	CL-ML	0	21.32	78.68				27	21	6							
3.0	UDS	CL-CI	0	9.00	91.00	31	1.98	1.51	35	23	12	0.21	13	0.762				
4.50	SPT	CI	0	3.50	96.50				38	24	14							
6.0	UDS	CL	0	4.67	95.33	24	1.95	1.57	32	20	12	0.32	8	0.649	0.19	0.82		
7.50	SPT	CL-ML	0	49.51	50.49				25	18	7							
9.0	UDS											0.13	12					
10.50	SPT	MH	0	4.53	95.47				53	40	13							
12.0	UDS	MI	0	4.28	95.72	40	1.68	1.20	44	32	12			0.523				
13.50	SPT	MI	0	6.81	93.19				36	25	11							
15.0	UDS	MI	0	3.30	96.70	39	1.66	1.19	44	31	13			0.448				
16.50	SPT	ML-MI	0	5.55	94.45				35	25	10							
18.0	UDS																	
19.5	SPT	CL	0	6.34	93.66				34	23	11							
21.0	UDS	SM-ML	0	49.95	50.05	24	1.88	1.51	NP									
22.50	SPT																	
25.50	SPT	SM	0	79.57	20.43				NP									
28.5	SPT	SM	0	71.05	28.95				NP									
30.0																		

Table 3.3: Test results of the Soil Investigation of Bore Hole-2

Depth of sample below NSL (m)	Type of sample	Soil Classification	Grain Size Analysis Sieve / Hydrometer			Natural moisture content %	Bulk Density $\gamma$ g/cc	Natural dry density $\gamma_d$ gm/cc	Consistency Limits			Direct Shear / Triaxial Shear Test		U.C. Test $q_u$ (Kg/cm <sup>2</sup> )	Consolidation		Specific gravity	Remarks	
			%Gravel	% sand	% silt + Clay				Liquid Limit (%)	Plastic Limit (%)	Plasticity (PI)	Cohesion $c^*$ Kg/cm <sup>2</sup>	Angle of repose $\phi$ (Deg)		$e_c$	$e_o$			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1.5	SPT	ML	0	36.43	63.57				NP										
3.0	UDS					26	1.84	1.46				0.09	26						
4.50	SPT	SP	0	99.45	0.55				NP										
6.0	UDS					29	2.00	1.55				0.06	28						
7.50	SPT	SM	0	76.18	23.82				NP										
9.0	SPT	ML	0	33.30	66.70				NP										
10.50	SPT	CI	0	1.99	98.01				37	24	13								
12.0	SPT	ML	0	38.69	61.31				NP										
13.50	SPT	MI	0	2.86	97.14				36	27	9								
15.0	UDS	ML	0	4.76	95.24				28	23	5	0.15	16	0.524					
16.50	SPT	ML-MI	0	2.16	97.84				35	26	9								
18.0	UDS	MI							40	27	13			0.689					
19.5	SPT		0	2.87	97.13														
22.0	SPT	MI	0	1.34	98.66				36	25	11								
23.5	SPT		0	4.26	95.74														
25.0	SPT		0	2.01	97.99														
26.0	SPT																		

Depth of sample (m)	Overburden pressure (t/m <sup>2</sup> )	Overburden correction factor	Observed SPT N value	Corrected SPT (N')value for Overburden	Final corrected value after dilatency correction (N'')	
1.5	1.47	1.67	4	6.68	7	BH1
4.5	4.41	1.3	7	9.1	9	
7.5	7.20	1.1	13	14.3	14	
10.5	10.08	1	9	9	9	
13.5	11.75	0.95	19	18.05	17	
16.5	13.37	0.9	22	19.8	17	
19.5	15.80	0.85	23	19.55	21	
22.5	18.68	0.81	50	40.5	28	
25.5	21.17	0.78	47	36.66	26	
28.5	23.66	0.72	53	38.16	27	

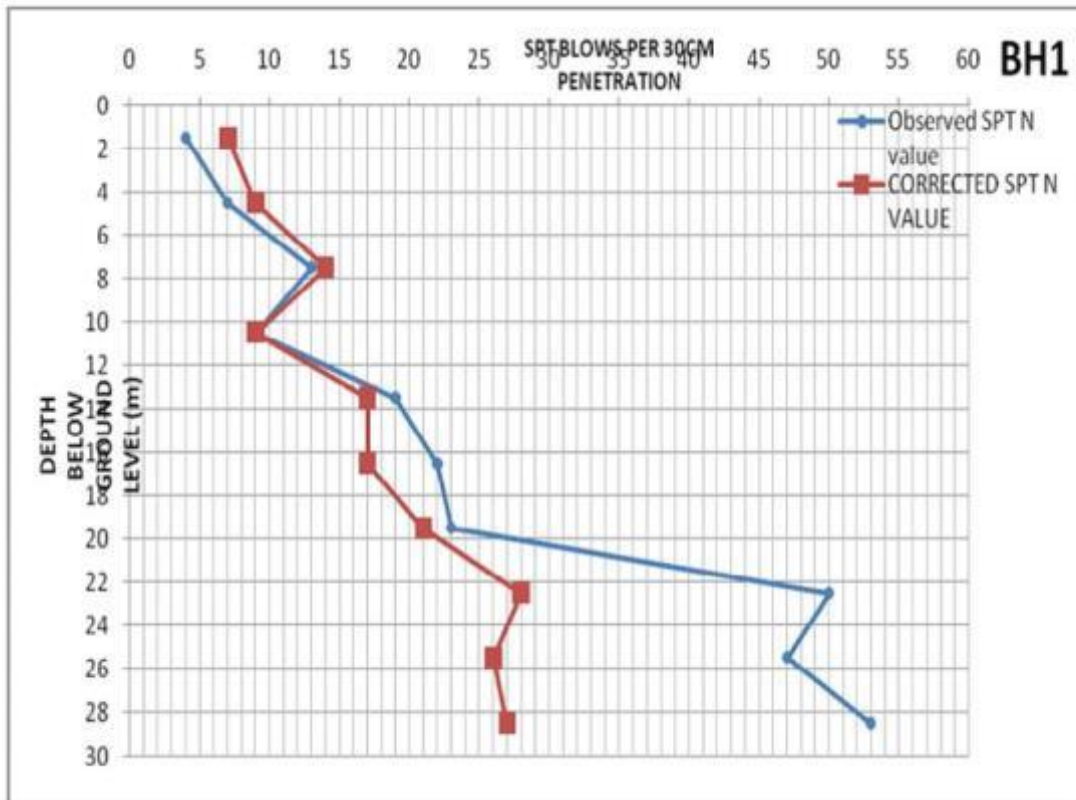


Figure 3.6: N-graph of Bore Hole-1 at Wachi Bridge site

Depth of sample (m)	Overburden pressure (t/m <sup>2</sup> )	Overburden correction factor	Observed SPT N value	Corrected SPT (N')value for Overburden	Final corrected value after dilatency correction (N'')	
1.5	1.26	1.7	2	3.4	3	BH2
4.5	3.78	1.35	6	8.1	8	
7.5	6.9	1.14	24	27.36	21	
9.0	8.28	1.08	14	15.12	15	
10.5	9.66	1.02	11	11.22	11	
12.0	11.04	0.96	13	12.48	12	
13.5	12.42	0.91	10	9.1	9	
16.5	15.18	0.88	9	7.92	8	
19.5	17.94	0.81	13	10.53	11	
22.0	20.24	0.79	7	5.53	6	
23.5	21.62	0.77	11	8.47	8	
25.0	23	0.73	14	10.22	10	
26.0	23.92	0.71	35	24.85	20	

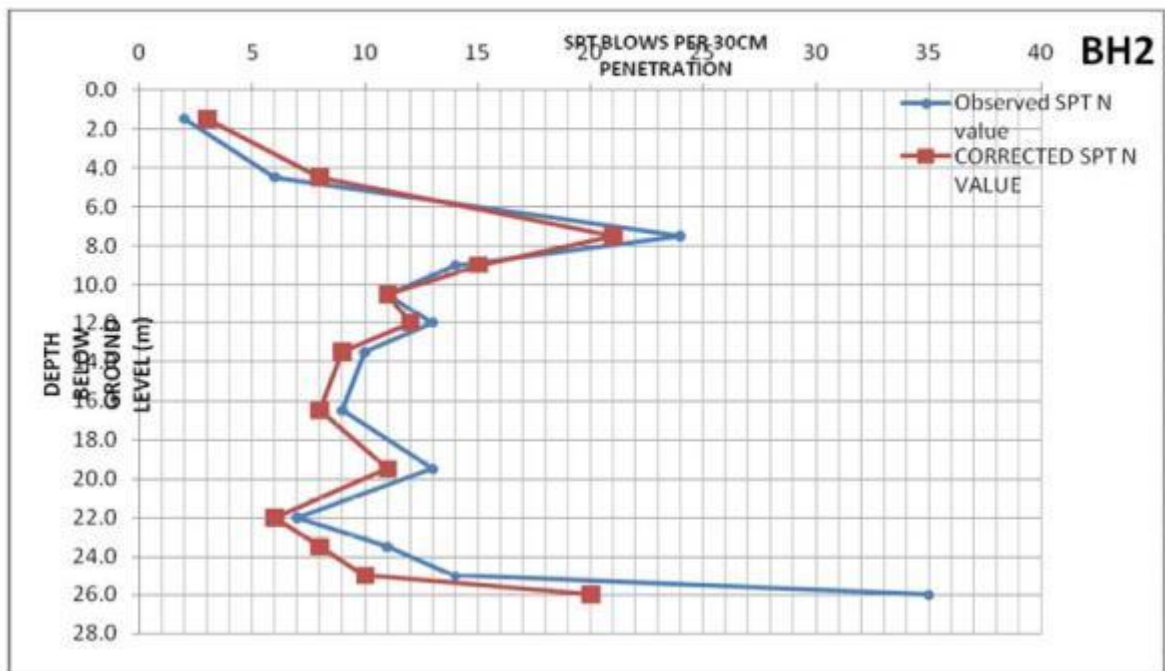


Figure 3.6: N-graph of Bore Hole-2 at Wachi Bridge site



## 4. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This chapter presents the national and local environmental legislation and regulations; and the World Bank policies, which applies to the proposed bridge project in Kashmir region entitled as “Construction of 1x45 meter span trussed girder bridge over Rambiarā Nallah at Kumar Mohalla in Wachi of District Shopian”. The various principles are applicable and regulatory clearances required for the proposed construction of Wachi bridge project has also been incorporated in this section.

### 4.1. Legal Framework

The Government of India has laid out various policy guidelines, acts and regulations of the environment. The Environment (Protection) Act, 1986 provides umbrella legislation for the protection of the environment. As per this Act, the responsibility to administer, the legislation has been jointly entrusted to the Ministry of Environment, Forests and Climate Change (MoEF & CC) at National level, whereas Jammu & Kashmir Pollution Control Board (J&KPCB) at the local level in the present context to the proposed Wachi bridge project at Kumar Mohalla in Wachi of District Shopian.

### 4.2. Applicable National and Local Regulations

The key environmental and other regulations relevant to the proposed “Construction of 1x45 meter Truss Girder Bridge over Rambiarā Nallah at Kumar Mohalla in Wachi Village of District Shopian in Kashmir region is presented in Table 4.1

**Table 4.1: Environmental Regulations Relevant to Construction of Bridge at Kumar Mohalla in Wachi Village is presented under;**

S. No.	Environmental and Other Regulations	Relevance to the Proposed Bridge Project	Regulatory Clearances Required, if any	Authority
1.	EIA Notification, 14th Sept 2006 and subsequent amendments	The subproject is not covered in the ambit of the EIA Notification 2006 as this is not covered under Category of the notification. As a result, the categorization, and the subsequent environmental assessment and clearance requirements, either from the state or the Government is not triggered.	The project road is not covered under the preview of EIA Notification 2006 and subsequent amendments.  However, for the opening of new borrow areas and stone quarry, prior environmental clearance will be required from SEIAA/DEIAA, which is to be obtained by the contractor.	MoEF & CC, Gol and SEIAA/DEIAA, GoJ&K

2.	Jammu and Kashmir Forest (Conservation) Act, 1997	This Act is NOT applicable as the proposed construction of Wachi Bridge in Shopian District does not require diversion of forest land.	NONE	Principal Chief Conservator of Forests, J&K Forest Department, Government of J&K
3.	Jammu and Kashmir Wildlife (Protection) Act, 1978 as amended, J&K Wildlife (Protection) Act 1978, as amended provide for protection & management of Protected Areas	This act is NOT applicable as the proposed construction of Wachi Bridge in Shopian District is not passing through any National Parks and Wild Sanctuary.	NONE	Chief Wildlife Warden, Government of J&K
4.	Air (Prevention and Control of Pollution) Act, 1981	This act is applicable for the construction phase to manage ambient air quality at the project site and ancillary sites like camp, crusher plant, hot mix plant, concrete batch mix plant, DG Set etc, for the construction of Wachi Bridge in Shopian District  The NAAQ standards (CPCB) for Ambient Air Quality have been promulgated by the MoEF&CC for various land uses.	YES Consent to Establish (CTE) and Consent to Operation (CTO) from the JKSPCB for setting up of hot mix plant, wet mix plant, stone crusher and diesel generators. To be obtained by the Contractor, before construction works.	J&KSPCB, Government of J&K
5.	Water Prevention and Control of Pollution) Act,1974	This act is applicable for the construction of Wachi Bridge in Shopian District to manage liquid waste discharges from a work camp, concrete batch mix plant, etc. This act will be applicable for control of water pollution from project activity. during the construction phase	YES Consent to Establish (CTE) and Consent to Operation (CTO) from the JKSPCB for setting up of hot mix plant, wet mix plant and stone crusher. To be obtained by the Contractor, before construction works.	J&KSPCB, Government of J&K
6.	Noise Pollution (Regulation and Control Act),2000	This act will be applicable for all construction equipment/ plant and machinery including vehicles deployed for implementation of the proposed construction of Wachi Bridge in Shopian District regulate ambient noise levels	Noise levels are to be controlled during construction works for the proposed construction of Wachi Bridge in Shopian District in conformity with	J&KSPCB, Government of J&K



		The standards for noise for day & night have been promulgated by the MoEF&CC for various land uses. This act will be applicable to regulate noise nuisance during the construction phase	permissible standards	
7.	Construction & Demolition Waste Management Rules, 2016	This rule shall apply to the generation of wastes resulting from the demolition of bridge and culvert structures and scarifying of the surface of the existing road and from road construction activities. This will be mitigated within the ambit of this rule. (However, the proposed site does not involve demoloition of any bridge/ culverts).	Construction and Demolition Waste Management Plan shall be prepared and implemented by the contractor, before the commencement of works	Municipal Corporation
8.	Wetland (Conservation and Management) Rules, 2017	This rule prohibits a range of activities in wetlands like settling up and expansion of industries, waste dumping, effluent discharge.	No wetland is located near or within the project influence area. Not Applicable	State Wetland Authority
8.	Public Liability and Insurance Act of 1991	To protect damage to the public life and/or property as a result of negligence/accidents during the construction of Wachi Bridge in Shopian District.	Project operations are to be insured by the contractor to cover damage to the public life and/or property due to accidents/negligence during the construction of the proposed bridge.	State Labour Department
10.	Central Motor Vehicle Act 1988 and Central Motor Vehicle Rules 2019	This act will be applicable for all construction equipment/plant and machinery including vehicles deployed during construction of Wachi Bridge in Shopian District	Vehicular emissions are to be regulated by project proponent in conformity with permissible levels/ emissions  PUC to be obtained by the contractor.	J&K Motor Vehicles Department
11.	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996/	To ensure safety and welfare measures for workers employed at construction sites. Compliance to provisions of health and safety measures for the construction workers in conformity with BOCW rule	Safety and welfare measures for workforce employed at construction sites are to be regulated by the contractor in conformity with the	Labour and Employment Department, Govt. of J&K

	Jammu and Kashmir Building and Other Construction Workers (Regulation of Employment and Condition of Services) Rules, 2006	concerning safety and health in construction. These regulations to be complied with during the construction of Wachi Bridge in Shopian District	Jammu and Kashmir Building and Other Construction Workers (Regulation of Employment and Condition of Services) Rules, 2006	
12.	Hazardous and Other Waste (Management, and Transboundary Movement) Rules, 2016	The rules will apply to used oil generated from construction equipment/ machinery during construction works on a Wachi Bridge. The rule includes storage, handling, transportation procedures and requirements for safe disposal of hazardous wastes.	Hazardous Waste Authorisation with CTE and CTO by the contractor.	J&KSPCB
13.	Solid Waste Management Rules, 2016	This rule applies to all forms/types of solid waste generated at construction activities, campsite, plant sites, etc..	Solid Waste Management Plan shall be prepared and implemented by the contractor, before the commencement of works	Municipal Corporation
14	The Jammu and Kashmir Preservation of Specified Trees Act, 1969	The act preserves specified trees and for cutting of such trees, permission will be required from Forest Department.	No scheduled trees are coming within the proposed bridge project.	J&K Forest Department
15	The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959 guide for carrying out activities, including conservation, construction and reuse in and around the protected monuments.	Applicable only for chance finds.	For chance finds the provisions laid out in the act will be applicable.	ASI Archaeological Survey of India

### 4.3. World Bank Safeguard Policies

World Bank safeguard policies are designed to prevent and mitigate undue harm to people and their environment in the development process. The layout requirements that must be complied with for all Bank-funded projects (refer to World Bank’s Website on Safeguard Policies). The safeguard policies of the World Bank relevant to the Construction of 1x45 meter Wachi Bridge in District Shopian are given in **Table 4.3**.

**Table 4.2: Relevant and Applicability of WB Safeguard Policies for Construction of 1x45 meter Wachi Bridge in District Shopian.**

S. No.	World Bank Safeguard Policy	Key Features	Policy Applicability to Sub Project	Policy Triggered Or Not
1.	OP/BP 4.01 Environmental Assessment	An overall governing policy intended to ensure Bank-financed projects are environmentally sound and sustainable	All potential impacts due to the construction of 1x45 meter Wachi Bridge over Rambiara Nallah in District Shopian is to be assessed and necessary mitigation measures are to be incorporated accordingly.	Triggered
2.	OP/BP 4.04 Natural Habitats	The policy is intended to prohibit Bank financing of projects that degrade or convert critical habitats and supports projects that affect non-critical habitats only if no alternatives are available and if acceptable mitigation measures are in place.	The site for construction of 1x45 meter Wachi Bridge over Rambiara Nallah in District Shopian is not located in any forest area/ national park or wild sanctuary.	Not Triggered
3.	OP/BP 4.36 Forests	The policy is intended to support sustainable and conservation-oriented forest management, harness potential of forests to reduce poverty sustainably, integrate forests into sustainable economic development and protect vital local and global environmental services and values of forests.	The project site for construction of 1x45 meter Wachi Bridge over Rambiara Nallah in District Shopian is not located in any forest area.	Not Triggered
4..	OP/BP 4.11 Physical Cultural Resources	The policy is intended to ensure that projects identify and inventory cultural resources that are potentially affected by the project. Projects should include mitigation measures when there are adverse impacts on physical cultural resources.	The proposed bridge site along with the approaches at Wachi village does not have any cultural property resources (CPR) and therefore does NOT warrant shifting or affect CPRs. However, there may be a direct or indirect impact on nearby cultural properties	-

**4.4. MoRTH & IRC Specifications**

Section 111	Precautions for safeguarding the environment
Clause 201.2	Preservation of Property/Amenities during clearing and grubbing
Clause 301.3.2	Stripping and storing of topsoil for reuse during excavation for roadway and drains
Clause 302.4	Restriction on timings for blasting operations
Clause 304.3.6	Public safety near towns/villages where excavation is carried out
Clause 305.2.2.2	Locations of borrowing and relevant regulations
Clause 305.3.3	Stripping and storing of topsoil at borrow locations
Section 306	Soil erosion and sedimentation control
Clause 407.4.2	Provisions for turfing on median and islands
Clause 701.2.1	Use of geotextiles (Jute or Coir ) for control of soil erosion
Section 810	Use of Metal beam crash barriers for safety, relevant regulations and specifications

**4.5. Applicability of International Conventions**

**4.5.1. Ramsar Convention on Wetlands of International Importance, 1971 (Not Applicable for the proposed Wachi Bridge project)**

The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands i.e. to stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value.

According to the Ramsar List of Wetlands of International Importance, there are 25 designated wetlands in the country which are required to be protected. Activities undertaken in the proximity of these wetlands should follow the guidelines of the convention.

**4.5.2. International Union for Conservation of Nature (IUCN) (Not Applicable for the proposed Wachi Bridge Project)**

The International Union for Conservation of Nature (IUCN) is a membership Union uniquely composed of both government and civil society organizations. IUCN has evolved into the world’s largest and most diverse environmental network. IUCN is the global authority on the status of the natural world and the measures needed to safeguard it.

IUCN produces the IUCN Red List of Threatened Species and the IUCN Red List of Ecosystems. The IUCN Red List of Ecosystems is applicable at local, national, regional and global levels. IUCN’ stated goal is to expand the global network of national parks and other protected areas and promote good management of such areas. In particular, it focuses on greater protection of the oceans and marine habitats.

**4.6. Indian Road Congress (IRC) Code of Practices applicable for the proposed Wachi Bridge**

Key Indian Road Congress (IRC) Code of Practices applicable for the Wachi bridge concerning the environment are given below:

**Table 4.3: Indian Road Congress Code of Practices for Project Road**

S. No.	IRC Code Theme	Year	Purpose	Applicability
1.	Recommendations for Road Construction in Areas Affected by Water Logging, Flooding and/or Salts Infestation	IRC:34-2011	Construction in waterlogged areas	Yes
2.	Recommended Practice for Construction of Earth Embankments and Sub-Grade for Road Works	IRC:36-2010	Issues relating to Borrow pits	Yes
3.	Guidelines for Pedestrian Facilities	IRC: 103 -1988	Safety of pedestrians	Yes
4.	Guidelines for Use of Construction and Demolition Waste in Road Sector	IRC:121-2017	Use of Construction and Demolition Waste in Road Sector	Yes
5.	Guidelines on Landscaping and Tree Plantation	IRC:SP:21-2009	Landscaping and Tree Plantation along of the road	Yes
6.	Guidelines on Road Drainage	IRC: SP: 42-1994	Drainage	Yes
7.	Highway Safety Code	IRC: SP: 44-1994	Highways safety	Yes
8.	Guidelines for Use of Geotextiles in Road Pavements and Associated Works	IRC:SP:59-2002	Use of Geotextiles in Road Pavements and Associated Works	Yes
9.	Guidelines for Soil and Granular Material Stabilization Using Cement Lime and Fly Ash	IRC:SP-89-2010	Soil and Granular Material Stabilization Using Cement Lime and Fly Ash	Yes
10.	Guidelines on Requirements for Environmental Clearance for Road Projects	IRC:SP-93-2017	Requirements for Environmental Clearance for Road Projects	Yes
11.	Use of Cold Mix Technology in Construction and Maintenance of Roads Using Bitumen Emulsion	IRC:SP-100-2014	Use of Cold Mix Technology in Construction and Maintenance of Roads Using Bitumen Emulsion	To be considered
12.	Guidelines on Preparation and Implementation of Environment Management Plan	IRC:SP-108-2015	Preparation and Implementation of Environment Management Plan	Yes

#### 4.7. Environmental Standards

Various environmental standards like National Ambient Air Quality Standards, Ambient Noise Standards, Drinking Water Standards applicable to the construction of 1x45m span trussed girder bridge over Rambiara Nallah at Kumar Mohalla (Wachi) in District Shopian are reflected in Environmental Monitoring section of this report.

Environmental standards applicable to this subproject are given below:

- National Ambient Air Quality Standards, 2009
- Ambient Noise Standards
- Drinking-Water Quality Standards-IS:10500:2012
- CPCB Standards for Surface Water Use
- Stack Gas Discharge Standards for Hot Mix Plant

**Table 4.4: National Ambient Air Quality Standards**

Pollutant	Time Weighted Average	Concentration in Ambient Air	
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Area (notified by Central Government)
Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	Annual*	50	20
	24 hours**	80	80
Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>	Annual*	40	30
	24 hours**	80	80
Particulate Matter (size less than 10 µm) or PM <sub>10</sub> µg/m <sup>3</sup>	Annual*	60	60
	24 hours**	100	100
Particulate Matter (size less than 2.5 µm) or PM <sub>2.5</sub> µg/m <sup>3</sup>	Annual*	40	40
	24 hours**	60	60
Ozone (O <sub>3</sub> ) µg/m <sup>3</sup>	8 hours*	100	100
	1 hour**	180	180
Lead (Pb) µg/m <sup>3</sup>	Annual*	0.50	0.50
	24 hours**	1.0	1.0
Carbon Monoxide (CO) mg/m <sup>3</sup>	8 hours*	02	02
	1 hour**	04	04
Ammonia (NH <sub>3</sub> ) µg/m <sup>3</sup>	Annual*	100	100
	24 hours**	400	400
Benzene (C <sub>6</sub> H <sub>6</sub> ) µg/m <sup>3</sup>	Annual*	5	5
Benzo(a)Pyrene (BaP)-particulate phase only, ng/m <sup>3</sup>	Annual*	1	1
Arsenic(As), ng/m <sup>3</sup>	Annual*	6	60
Nickel (Ni), ng/m <sup>3</sup>	Annual*	20	20

\* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

\*\* 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time; they may exceed the limits but not on two consecutive days of monitoring.

Source: National Ambient Air Quality Standards, Central Pollution Control Board Notification in the Gazette of India, Extraordinary, New Delhi, 18th November 2009



**Table 4.5: National Ambient Noise Level Standards**

Area Code	Category of Area	Limits in dB (A) Leq.	
		Daytime	Night time
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silence	50	40

**Source:** Central Pollution Control Board, New Delhi.

**Note-1** Day time is reckoned in between 6 AM to 10 PM

**Note-2** Night time is reckoned in between 10 PM to 6 AM

**Note-3** Silence zone is defined as areas up to 100 meters around such as premises as hospitals, educational institutions and courts. The silence zones are to be declared by the Competent Authority

**Note-4** Mixed categories of areas should be declared as one of the four above mentioned categories, by the Competent Authority and the corresponding standard shall apply.

**Table 4.6: Surface Water Quality**

S. No	Parameters	IS:2296 (Class C)	Method Adopted
1	pH	6.5-8.5	pH meter
2	BOD (3 day, 27 <sup>0</sup> C)	3.0	DO-Azide modification of Wrinkler's method
3	Temperature ( <sup>0</sup> C)	NS	Thermometer
4	Dissolved oxygen	≥4	Azide modification of Wrinkler's method
5	Color (Hazen)	300	Visual Comparison method
7	Chloride (Cl)	600	Argentometric Titration
8	Total Dissolved Solids	1500	Gravimetric Analysis
9	Sulphates (SO <sub>4</sub> )	400	Barium Chloride method
10	Oil and Grease	0.1	Partition -Gravimetric method
11	Nitrates	50	Chromotropic acid
12	Total Coliform (MPN/100 ml)	5000	Multiple Tube Fermentation Technique

NS: Not specified. All the values in mg/l if otherwise mentioned

## 5. BASELINE ENVIRONMENTAL CONDITIONS

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### 5.1. General

Shopian district is situated at a distance of 51 Km from Srinagar and 20 Km from Pulwama. The district is Located in the south and South-west extremity of Kashmir valley, Shopian is lying in the close proximity of Pir Panjal mountain range. The total area of the district is 30,742 heccts out of which 19692.5 heccts are of cultivable nature, the grazing lands are of the order of 2948 hecctrs and 260.5 are forest land. The district is located between 33.43 °North to 74.49 °East of latitude & longitude respectively. Presently the District Shopian having two Assembly Constituencies consists of one Tehsil, One CD Block Shopian and a part of Block Keller. South-west extremity of Kashmir valley, Shopian is lying in the close proximity of Pir Panjal mountain range. It is bounded by District Kulgam on its east and District Budgam on its northwest. It is flanked by District Pulwama in the north and the Districts of Rajouri and Poonch on its south and south-west respectively. In view of its location coupled with trade and transit activities, Shopian was having one of the Wazarat Headquarters out of the six Wazarats of the time in Kashmir from 1872-1892 A.D. Consequent upon the reduction in the administrative divisions of Kashmir three Wazarats including Shopian ceased to exist.

The main occupation of the people is agriculture activities. The proposed bridge is to connect Kumar Mohalla and other areas of village Wachi to other Mohalla and adjoining villages. There is also one motorable bridge at 300 m upstream from proposed bridge. The existing bridge is motorable and is connecting different areas. To connect Kumar Mohalla Wachi to other part, it is proposed to construct 1x45 mtr trussed Girder Bridge with deck over Rambiarra Nallah.

Wachi village is located in Shopian Tehsil of Shopian district in Jammu & Kashmir. The village code of the Wachi is 003327. It is situated 20km away from Shopian, which is both district & sub-district headquarter of Wachi village. The total geographical area of village is 533.4 hectares. Wachi has a total population of 3,943 peoples. There are about 705 houses in Wachi village. Bejjbehara is nearest town to Wachi which is approximately 8km away. The nearby villages of Wachi are Aglar Charat, Shermal, Heff, Kashwah, Reshipora, Malawrah Safanagri, Zainapora, Babapora, Durajpora, Awnera etc.

The proposed subproject is Engineering, Procurement and Construction (EPC) mode contract for "Design and Construction of 1x45 meter Trussed Girder Bridge over Rambiarra Nallah at Kumar Mohalla Wachi including Construction of Approach Roads and Nallah Training Works in District Shopian, Jammu & Kashmir.

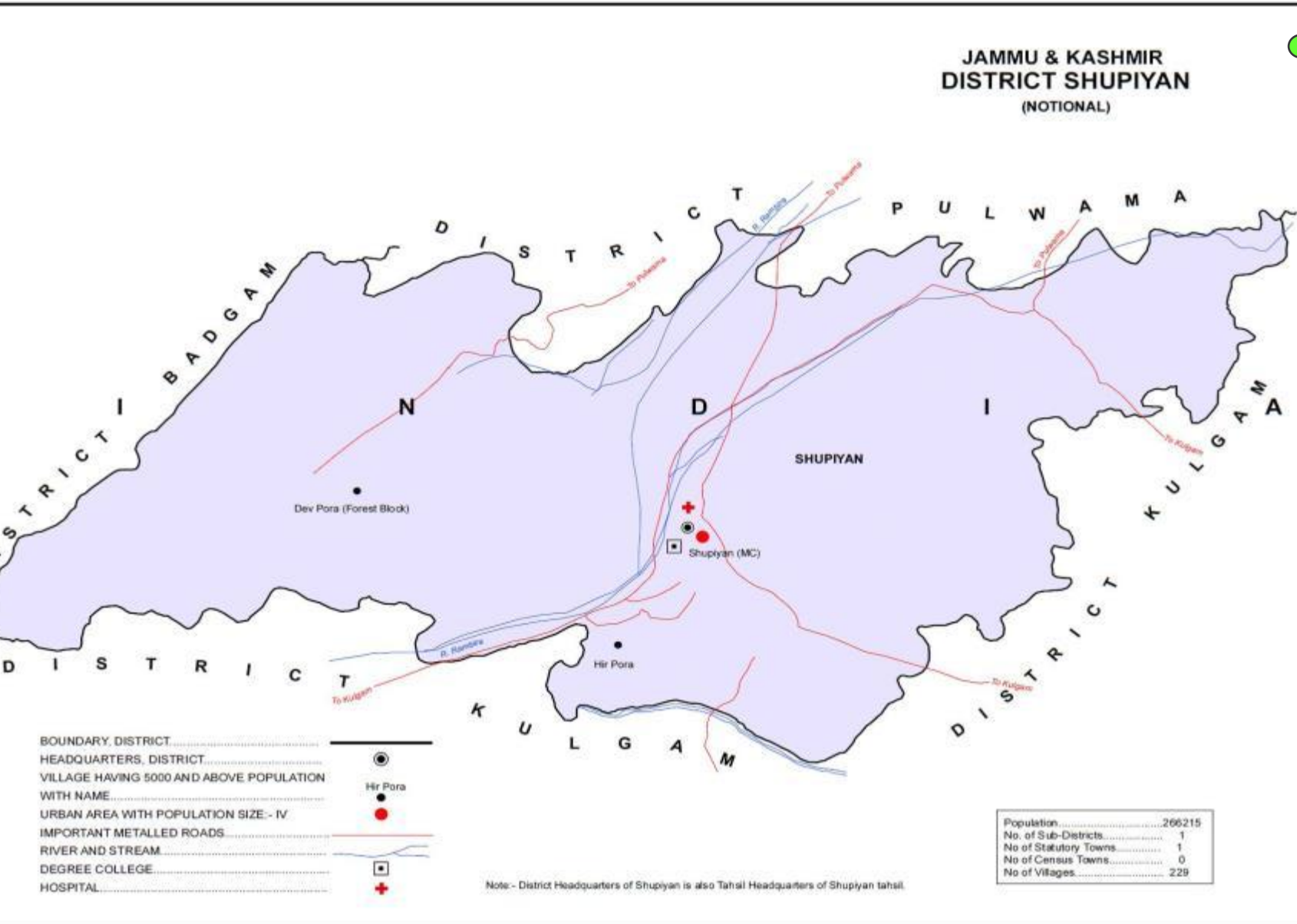


Figure 5.1: Map of District Shopian showing proposed Wachi Bridge site (Green dot for site reference)

## 5.2. Study Area

The proposed Wachi bridge is of single span high level minor bridge of 45 mts span on Rambiaranallah in Shopian District of J&K. The project is located in Kumar Mohalla of Wachi Village in District Shopian. The project lies between the latitudes of 33°48'10.28"N and Longitude of 75°02'10.67"E. The bridge site is located at Wachi in Shopian Block in Shopian District of Jammu & Kashmir State, India. The proposed bridge is 7 Km towards East from District head quarters Shopian and 46 Km from State capital Srinagar. Wachi is surrounded by Kulgam Block towards East, Pulwama Block towards North, Devsar Block towards East, Qaimoh Block towards East. Wachi village is located in Shopian Tehsil of Shopian district in Jammu & Kashmir. The village code of the Wachi is 003327. It is situated 20km away from Shopian, which is both district & sub-district headquarter of Wachi village. The total geographical area of village is 533.4 hectares. Wachi has a total population of 3,943 peoples. There are about 705 houses in Wachi village. Beijbehara is nearest town to Wachi which is approximately 8km away. The nearby villages of Wachi are Aglar Charat, Shermal, Heff, Kashwah, Reshipora, Malawrah Safanagri, Zainapora, Babapora, Durajpora, Awnera etc.

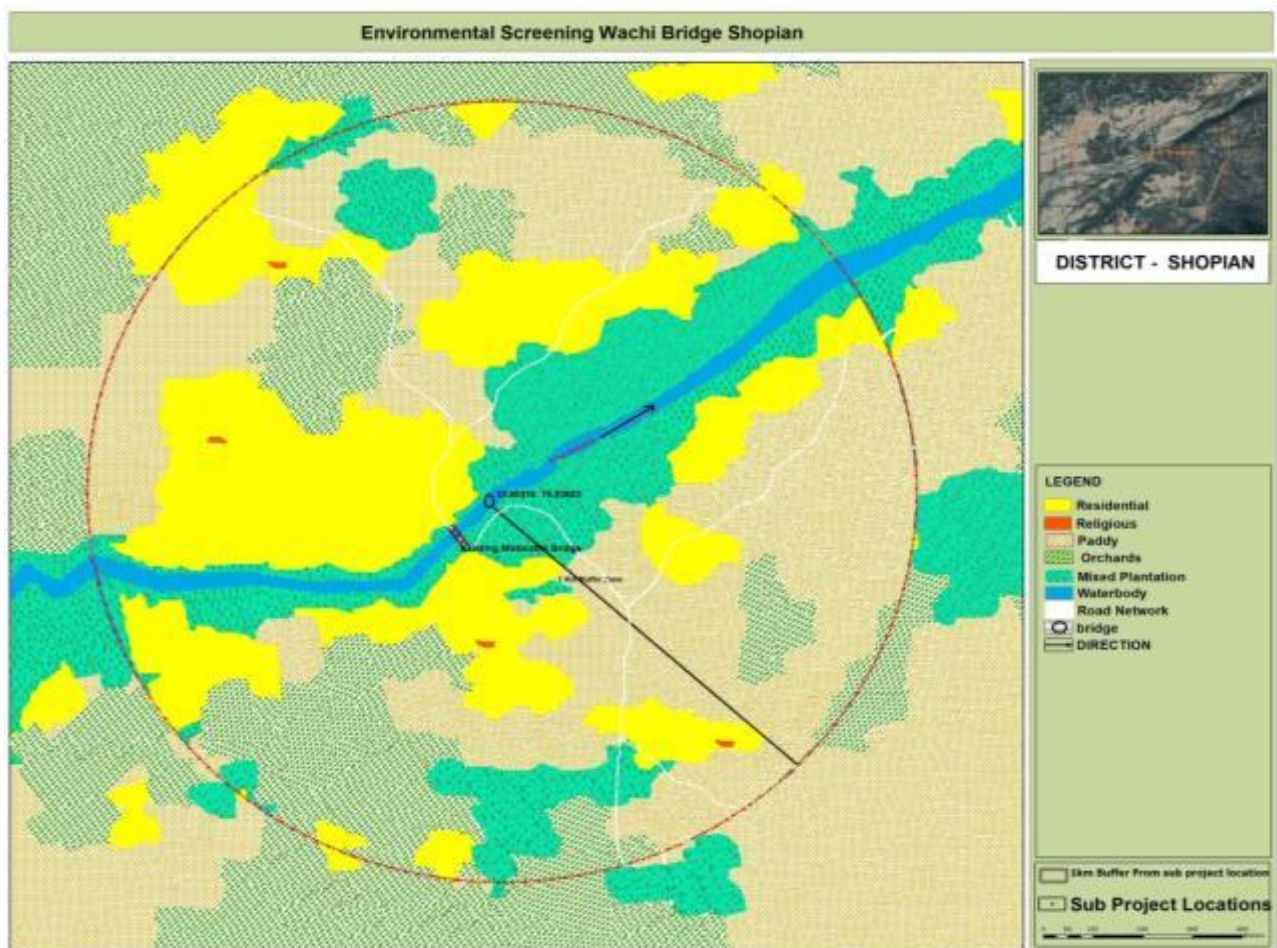


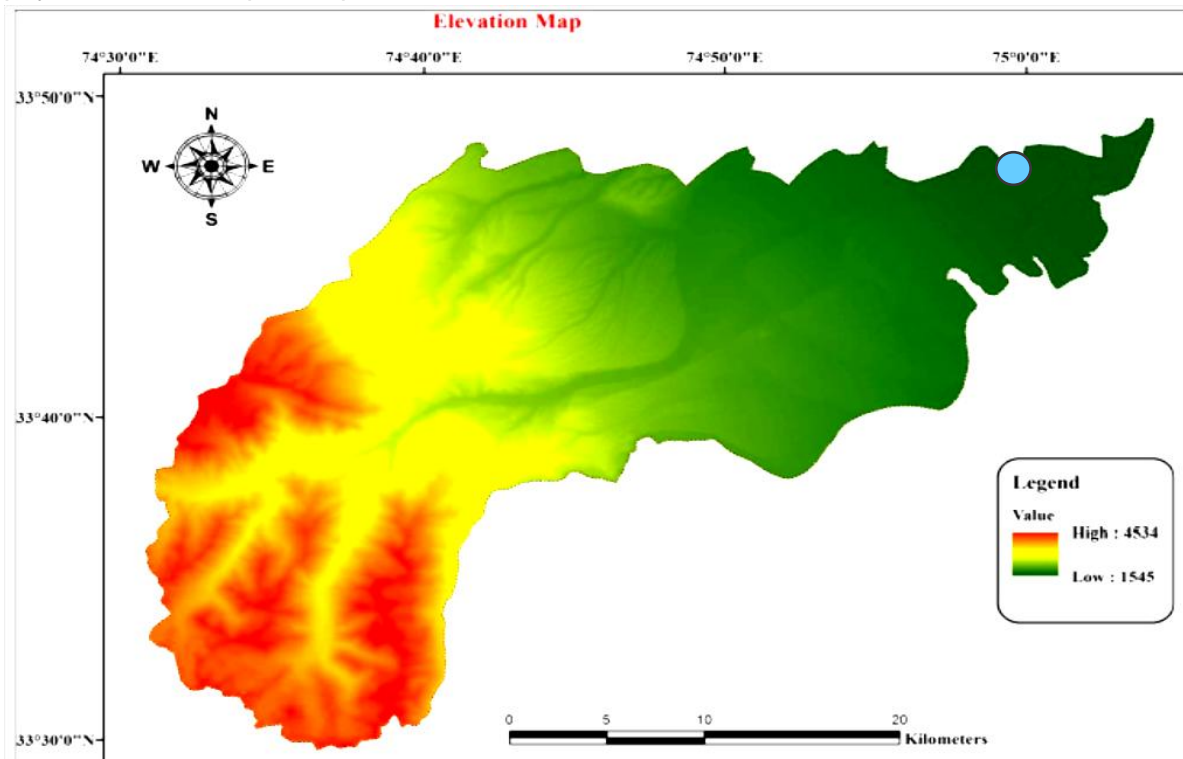
Figure 5.2: GIS/ LULC Map of Project Influence Area (PIA) of proposed bridge at Wachi.



### 5.3. Topography and Physiography

Shopian district is located at a distance of 51 Km from Srinagar and 20 Km from Pulwama. The district is Located in the south and South-west extremity of Kashmir valley, Shopian is lying in the close proximity of Pir Panjal mountain range. The total area of the district is 30,742 heccts out of which 19692.5 heccts are of cultivable nature, the grazing lands are of the order of 2948 hecctrs and 260.5 are forest land. The district is located between 33.43 °North to 74.49 °East of latitude & longitude respectively. Presently the District Shopian having two Assembly Constituencies consists of one Tehsil, One CD Block Shopian and a part of Block Keller.

The Shopian District is situated in the laps of foot Hills of PirPanchal range and most of its area is Hilly Terrain. The district is distinctly marked by magnificent forests and mighty mountains, streams, ponds, orchards, luscious orchards dotted beautifully by apples of different kinds, nuts, saffron, honey and almonds. , the features which contribute to the making of the district as a heaven on earth. The general aspect of the district is that of a basin, surrounded on every side by range of lofty mountains.. With it is an extensive tract of alluvial soil watered by the Jhelum and its numerous tributaries which flow down from mountains and fed by the heavy snow and rain falling in the elevated areas. The district resembles a gem set in the casket of the everlasting Himalayas. The Grandeur of its mountainous barriers and its own intrinsic loveliness make it an 'emerald set in pearls'. The physiography of Kashmir can be studied with three major physical divisions; plains, plateau and maintains.

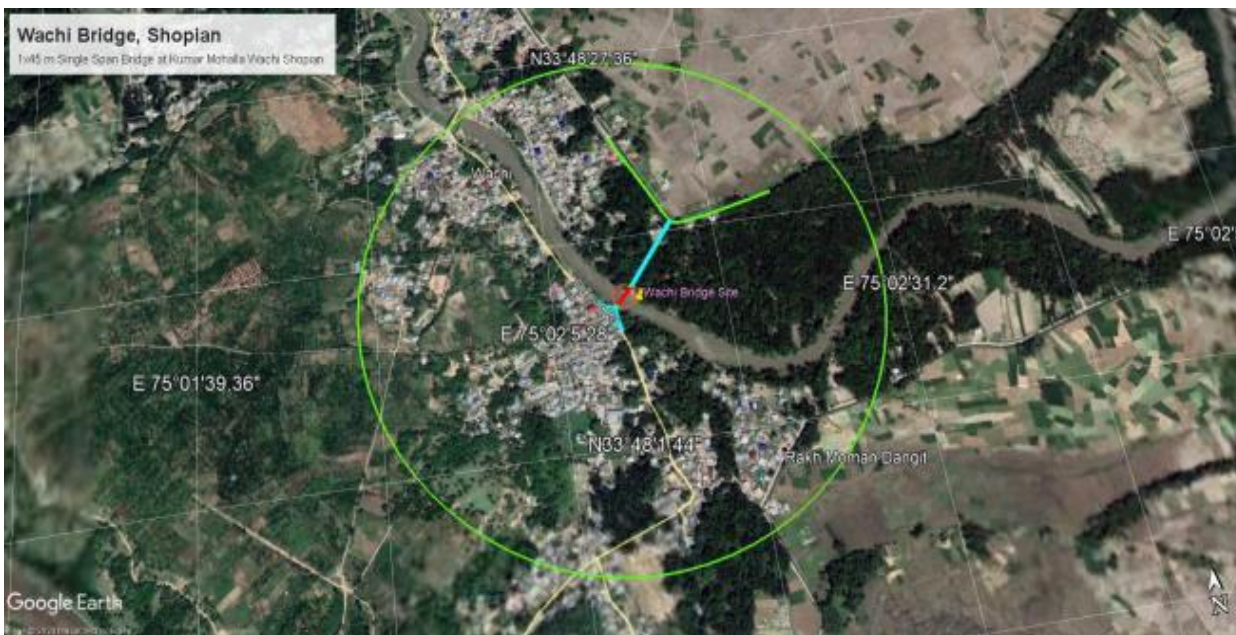


**Figure 5.3: Elevation profile of the Shopian District (Blue dot showing proposed Wachi bridge site in flatter terrain of the floodplain)**



With the gradual ascending slope from its north and north-eastern sides and Pir Panjal mountain range falling on its south and south-west periphery, Shopian has most of its areas of hilly character. On account of hilly terrain with conducive agroclimatic conditions, large areas of Shopian are covered by orchards especially apple and walnut which contribute to the socio-economic scenario of its rural community. Presence of nearby hilly tracts and pastures provide a lot of potential for development of its livestock population. The total area of Sub-Division is 30,742 ha, out of which 19,692.5 Hects are of cultivable nature. The grazing lands are of the order of 2,948 ha and 260.5 Hects are forest land. Remaining 7,841 ha of land are the lands of other nature. The disreict is located between 33.43 N to 74.49 degree east of latitude & Longitude respectively

The proposed bridge is constructed in Kumar Mohalla of Wachi Village in Shopian block over Rambiarra Nallah. The proposed site lies on a flatter terrain in a flood plain area of River Jhelum and its tributary of Rambiarra Nallah. The surrounding localities in project influence area is Wachi village which connects rest of the adjoining areas like The land-use/ land-cover are mainly agricultural/ horticultural activity, residential set-up in pockets, fruit orchards- Apples, Pears, etc. Large Rice/Paddy fields are main agricultural activity in Wachi area especially in Kumar Mohalla from Canal road side.



**Figure 5.4: Google Map showing general Land-use/ Land-cover Pattern of the proposed Bridge project at Wachi, District Shopian. (Green circle shows project influence area of 1km, red line is proposed bridge and approach roads in blue line )**

### 5.4. Geology & Soil Type

District Shupain forms the southern part of Kashmir basin wherein Proterozoic to Quaternary rocks of diverse origin are exposed. The main Geological Formations constituting the bed rock and the surrounding mountains include the Salkhala, Panjal Volcanics and the Triassic Limestone covered by Quaternary Karewas and Alluvium deposits. The stratigraphic sequence of the geological Formations with general lithology of District Shopian is given in Table-5.1. The

geological map of the region is shown at Fig.5.5. The lithological description and areal extent of the different Formations are summarized below:

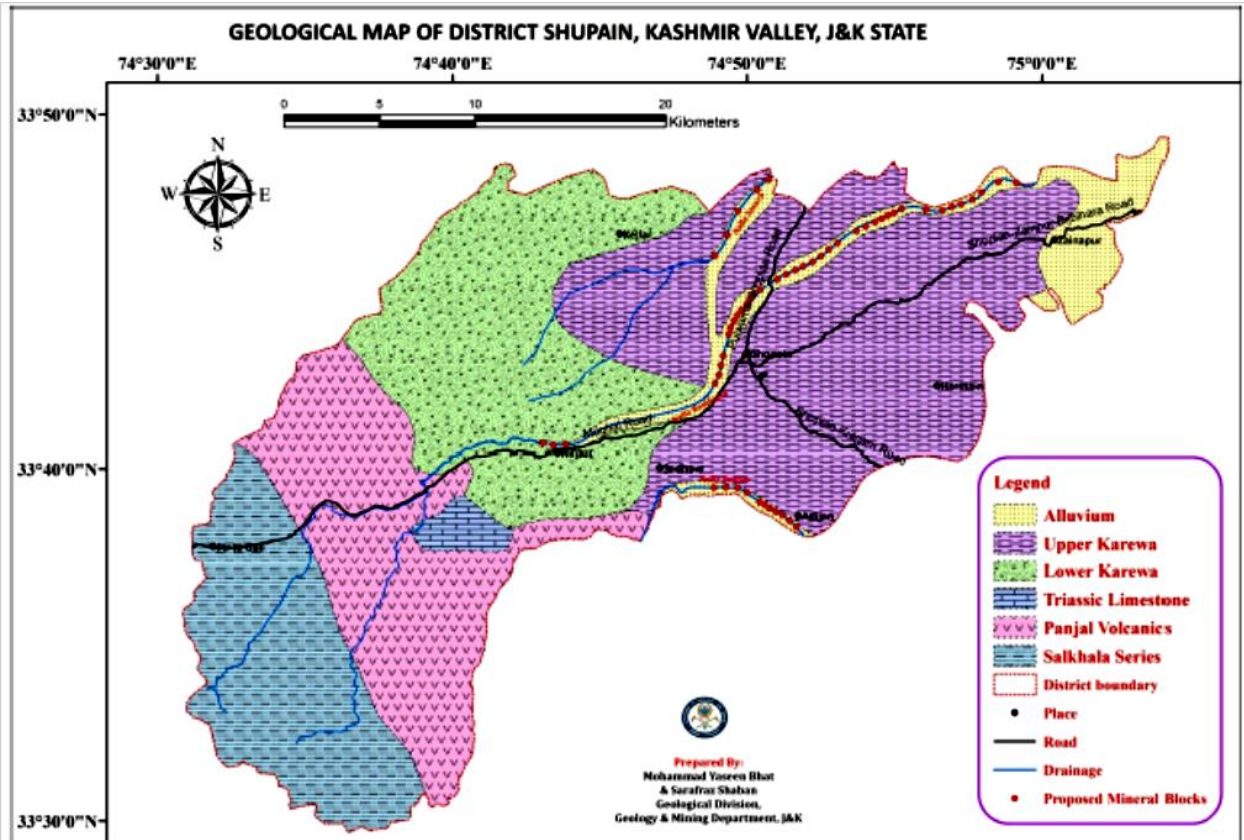


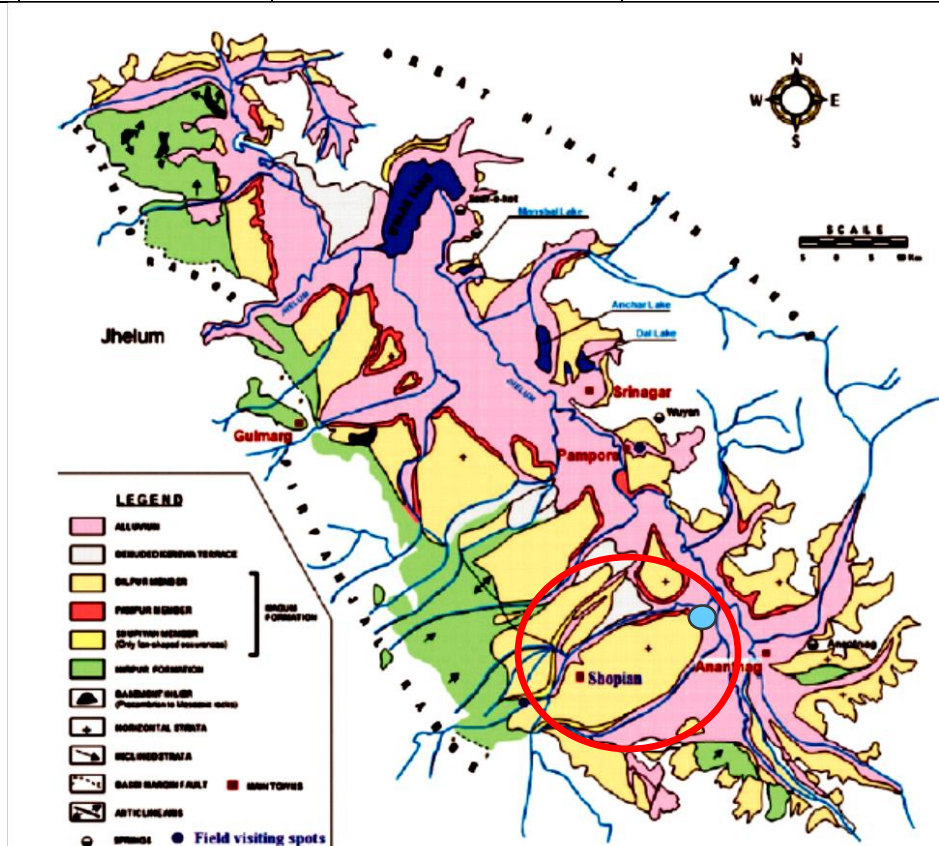
Figure 5.5: Geological map of the Shopian District

The sequence of un-consolidated clay, and conglomerate, with lignite of Pliocene to quarternary age in the Kashmir valley, overlying the pre-cambrian to Mesozoic basement rocks and overlain, in turn, by the more recent river alluvia is defined lithostrati-graphically as the Karewa group. The soft, un-consolidated sand–clay–conglomerate rocks of Karewa group characterize the Kashmir valley and occupy nearly half of the Kashmir valley floor. The karewa deposits represent a sequence of fluvial, lacustrine and Aeolian sediments that were deposited initially in the framework of a large lake which once covered the whole of Kashmir valley floor and that the karewa succession is invariably topped by subaerial brown silts that were generated later when the draining out / desiccation of the lake had set in. The major lithological constituents of karewa group are plastic, gray to bluish–gray clay, light–gray sandy clay, fine to coarse, green to purple sand, conglomerate, lignite and lignitic clay in the lower part (i.e. Hirpur formation), fine to coarse greenish sand, gray and ochre sandy clay, ochre and cream coloured marl and marklekor and gravel in the middle part (i.e. Nagum formation) and brown silt in the upper part (i.e. Dilpur formation).

The brief generalized geological succession in the Shopian district is given below:

**Table 5.1: Regional Stratigraphy of the Shopian District**

S. No.	Stratigraphic Unit	Age	Lithology
1	Alluvium	Halocene	Unconsolidated clay, silt, sand
2	Upper Karewa Formation	Pleistocene	Gravel, sand, clay, marl, and loess, paleosols
3	Lower Karewa Formation	<i>Pliocene</i>	Gravel, sandy clay, clay, carbonaceous clay and lignite
4	Triassic Limestone	Triassic	Limestone interbedded with shales
5	Panjal Volcanics	Carboniferous to late Triassic	Andesitic and basaltic lava flows
6	Salkhala Series	Pre-Cambrian	Phyllite, schist, quartzite, carbonaceous slates, and graphitic phyllites, limestone, marble, calcareous slate and calcareous schist.



**Figure 5.6:** <sup>1</sup>Geomorphological features of the Kashmir Basin and District Shopian and Project Site at Wachi.

<sup>1</sup>Encircled (red circle) area of the map is Shopian district showing proposed bridge site at Wachi in Blue Dot. The Yellow depicts Upper Karewa formation and project site is a Alluvium formation-Pink colour (flood plain area of the Rambhara nallah and River Jhelum) (Map source: 9<sup>th</sup> International Conference for Geomorphology 6-11 Nov 2017 (Geomorphological Field Guide Book on Kashmir Himalaya) 2017



### Soil Type

The soils in J&K are loamy and there is little clay content in them. Poor in lime but with a high content of Magnesia, the soil is treated with chemical fertilizers and enriched with green manure and legume before cultivation. There are sufficient organic matter and nitrogen content in the alluvium of the Kashmir valley as a result of plant residue, crops stubble, natural vegetation and animal excretion. The valley of Kashmir has many types of soils like Gurti (clay), Bahil (Loam), Sekil (Sandy), Nambaal (Peats), Surzamin, Lemb, Floating garden soils and Karewa soils. No wonder, in Kashmir, the soil is virtually worshipped as a miracle of divinity as it is a source of wealth of the land. The soils of the Kashmir Valley are of two types *viz*, Hapludalfs and Ochraqualfs.

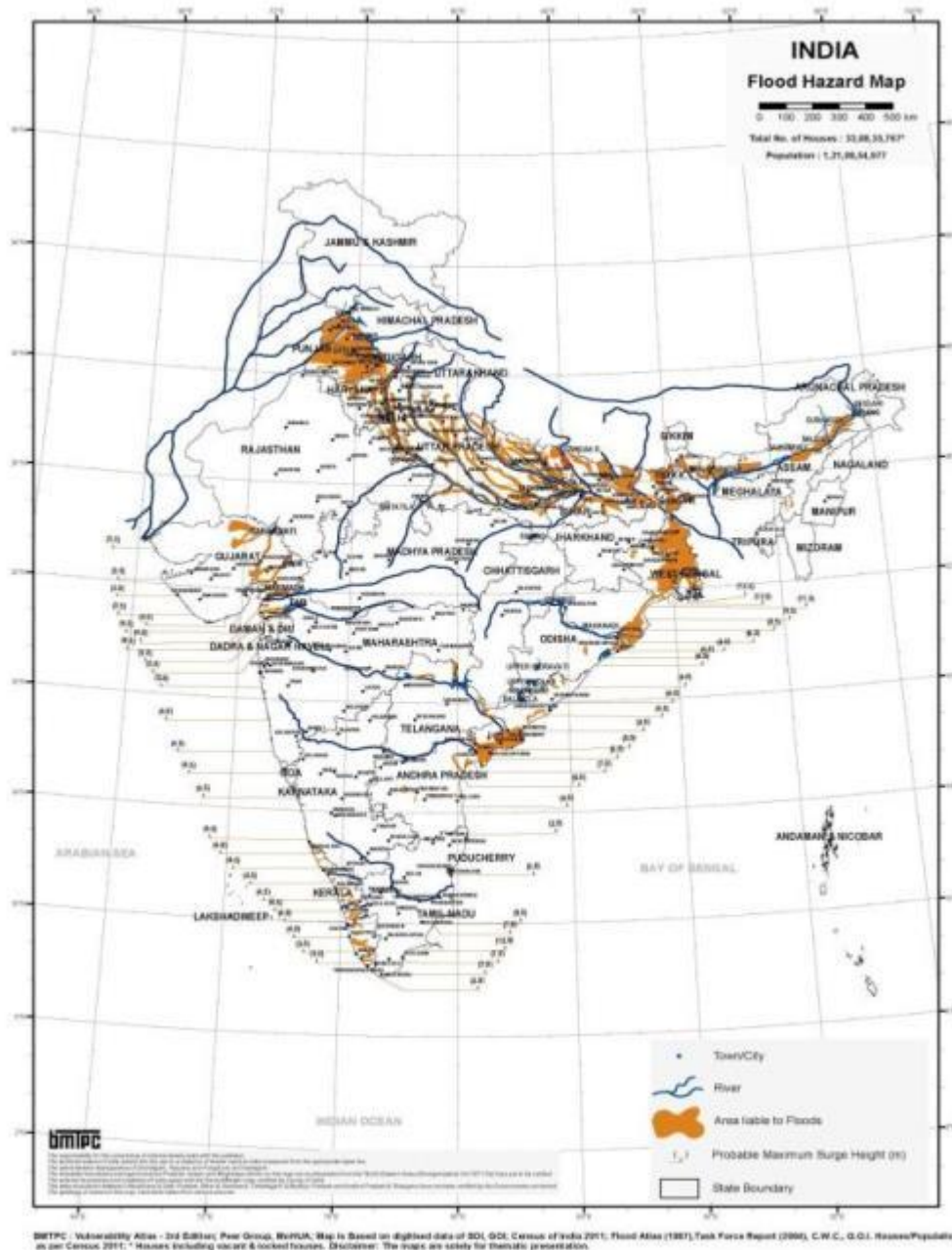
The proposed bridge site at Wachi comprised of alluvium type soil. Alluvium is the unconsolidated soil or sediments, which has been eroded, reshaped by water in some form, and re-deposited in a non-marine setting. Alluvium is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel. These deposits include alluvial tracts, flood plains, river terraces, and talus and scree fans. In District Shupain, alluvium is mainly found along the terraces, flood plains and courses of Rambiarā Stream/Nallah etc.

### 5.5. Natural Hazards

The state is a multi-hazard prone region with natural disasters like earthquakes, floods, landslides, avalanches, high-velocity winds, snowstorms, cloud bursts, besides manmade disasters including road accidents and fires etc. occurring in various parts of the state. The project site of Wachi (Shopian) comes under flood hazard, earthquakes (under Zone-V classification), and man-made disasters including road accidents and fires which is synonymous with the roads in Kashmir due to lack of road safety.

#### 5.5.1. Floods

Although flooding is a major hazard to lives and infrastructure the world over, mechanism and trends in flood hazards are poorly understood. Normally, the prolonged and high-intensity rainfall is the trigger for floods, however, the geomorphic setup and nature of the socio-economic development in the river basin would either ameliorate or exacerbate the flooding under various scenarios. Recently, the frequency of extreme rainfall events and floods has increased worldwide including the NW Himalayas. The extreme rainfall event, as evident from the 7-day antecedent rainfall data observed in the Jhelum basin, turned into one of the worst disasters in the flood history of the Jhelum compounded by the existence of the injudicious socioeconomic structures and massive land system changes in the floodplains that interfered with the hydraulic and hydrological processes during the flooding. The scenario was further worsened due to the dilapidated flood control structures and the institutional failure on managing the enormity of the extreme flooding.



**Figure 5.7: Flood Hazard Map of India**

The 2014 flood was very devastating killing more than 100 people and causing colossal loss to the infrastructure to the tune of INR 1 Trillion (World Bank 2015). The Jhelum waters, that used to be the provider of life and sustenance, suddenly became a monstrously destructive force against human life and the infrastructure that cohabit its backyards since millennia. The high discharge levels of the Jhelum persisted for more than a week, flooding the vast low lying areas of the valley. The scene was frightening making the people fear for a high human loss and destruction of the capital city, Srinagar. Even though there is a tremendous advancement in the flood hazard prediction globally during the last few decades, but there is insignificant

progress in translating the benefits of the scientific advancements for the flood risk reduction of the society as was evident from the high loss of life and property during the 2014 Kashmir flooding. Dilapidated flood control infrastructure, shrinking of the wetlands, deforestation, high rate of the urbanization of Jhelum floodplains and siltation of the watercourses witnessed in the Kashmir valley during the last few decades has degraded the ability of the environment to absorb the excess rainwater in Jhelum basin and thus, increased the vulnerability of the basin to flooding which is manifest in the frequent flash floods and recurrent water logging observed in the floodplains of Jhelum

The Wachi Village and adjoining areas lies in a flatter terrain of the flood plain areas of the Rambiarra Nallah and River Jhelum and hence are prone to the floods. The whole area was affected with the September 2014 floods. The construction of this bridge will provide direct connectivity with the district headquarter and adjoining areas. The proposed Wachi Bridge will be a major/vital connecting link between various villages and District headquarter Shopian and Pulwama. The bridge will also serve indirectly to thousands of other souls of the adjoining areas as it links these areas with their Apple orchards and other agricultural fields etc.



**Figure 5.8: Google Map of proposed bridge area at Wachi showing floods dated 18 September 2014**



### **5.5.2. Earthquakes- History and Seismic Zonation**

The Indian subcontinent has a history of devastating earthquakes. The major reason for the high frequency and intensity of the earthquakes is that India is driving into Asia at a rate of approximately 47 mm/year. Geographical statistics of India show that almost 54% of the land is vulnerable to earthquakes. The latest version of seismic zoning map of India given in the earthquake-resistant design code of India [IS 1893 (Part 1) 2002] assigns four levels of seismicity for India in terms of zone factors. In other words, the earthquake zoning map of India divides India into 4 seismic zones (Zone 2, 3, 4 and 5), unlike its previous version which consisted of five or six zones for the country. According to the present zoning map, Zone 5 expects the highest level of seismicity whereas Zone 2 is associated with the lowest level of seismicity.

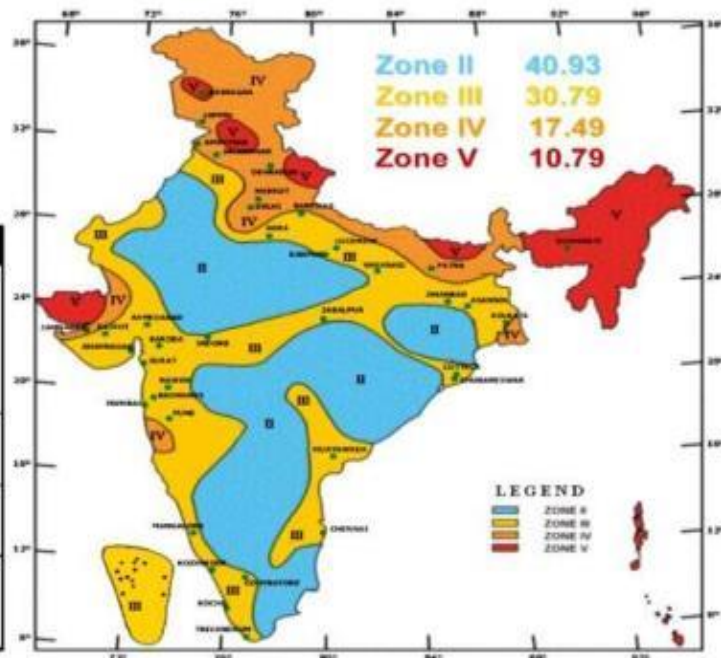
The Jammu & Kashmir region is the westernmost extension of the Himalayan mountain range in India. Here it comprises of the Pir Panjal, Zaskar, Karakoram and Ladakh ranges. The Main Boundary Thrust (MBT) underlies the Pir Panjal Range and is known as the Panjal Thrust in the region. The Zaskar ranges which are part of the Great Himalayan range are underlain by the Zaskar Thrust. The Kashmir Valley lies between the Pir Panjal and the Zaskar thrusts, making it very vulnerable to earthquakes. Other northern parts of Jammu & Kashmir are heavily faulted. Along the Zaskar and the Ladakh ranges run a North West (NW) – South East (SE) trending strike-slip fault, the longest in the Jammu & Kashmir area. Apart from the routine small tremors, moderate to large earthquakes have hit nearly all parts of the state. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to areas located farther away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes. There are at least four regions of the Himalaya where earthquakes of magnitude 8 or above are likely to occur in the near future. 2005 earthquake of MW 7.6 has released the only 1/10<sup>th</sup> of the stress generated within the region and remaining has to go in future great earthquakes. The damage occurred in Uri, Kupwara and Shopian districts in Kashmir province and the Poonch town and its surrounding areas are along the line of control. This earthquake was the strongest in over 120 years in the area. Efforts at all levels need to be taken to ensure whatever new structures are built can withstand future major earthquakes.

The proposed construction of the Wachi Bridge in District Shopian falls in a seismically active part (Zone-V) of Kashmir Valley. The design parameters for the 1x45 meter span bridge at Kumar Mohalla of Wachi village should conform with the BIS Code of Practice. Keeping in view the maximum credible earthquake magnitudes in the region, the site area is classified in Zone-V as per the Bureau of Indian Standards (BIS) code of Practice (IS-1893-2002). These maximum credible earthquake magnitudes represent the largest earthquakes that could occur on the given fault, based on the current understanding of the regional Geo-tectonics. The earthquake zonation map of Jammu and Kashmir is given below:

**Seismic Zone  
Map of India: -2002**

About **59 percent** of the land area of India is liable to seismic hazard damage

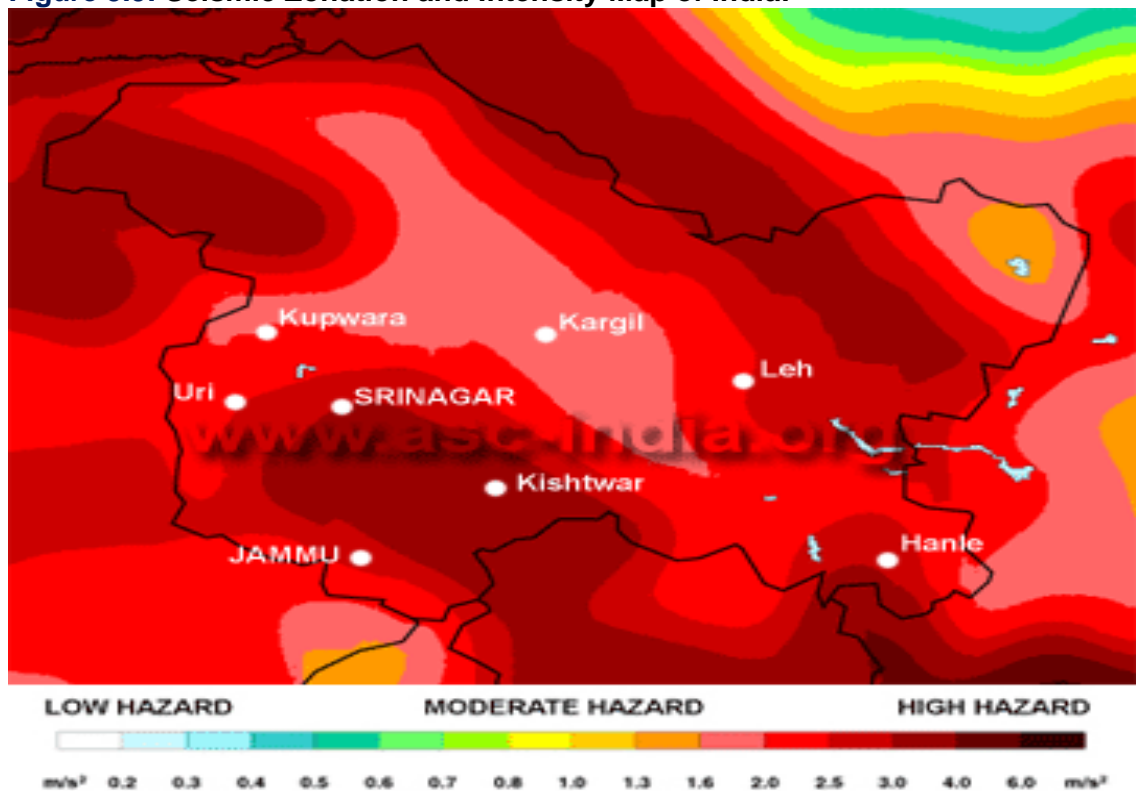
Zone	Intensity
Zone V	<b>Very High Risk Zone</b> Area liable to shaking Intensity IX (and above)
Zone IV	<b>High Risk Zone</b> Intensity VIII
Zone III	<b>Moderate Risk Zone</b> Intensity VII
Zone II	<b>Low Risk Zone</b> VI (and lower)



**Seismic zonation and intensity map of India**

Source: National Institute of Disaster Management, Ministry of Home Affairs, Govt of India

**Figure 5.9: Seismic Zonation and Intensity Map of India.**



**Figure 5.10: Map of Jammu and Kashmir showing earthquake zonation.**

**5.6. Air Environment**

**5.6.1. Meteorology and Climatology**

Shopian district is characterized with moderate type of climate largely defined by its geographic location and is generally described as cool in the spring and autumn, mild in the summer and cold in the winter. July is the hottest month with an average temperature of 30°C while January is the coldest month with an average temperature of -2° C. The mean temperature of district is about 14° C and the average humidity is 69%.

There is no meteorological observatory in the district hence the meteorological parameters recorded at Qazigund observatory at an elevation of approximately 1690 m in the neighbouring Kulgam district may be taken as representative for this district. The average annual rainfall in the district is 818.8 mm. The rainfall in southwest monsoon season (June to September) is about 32% of the annual normal rainfall, while the rainfall in pre-monsoon months (March to May) accounts for 40% of the annual, April being the month with the highest rainfall with an average of 121.4 mm. The winter months (December to February) contribute the rainfall of about 20% of the annual normal rainfall. In the district especially in high altitudinal areas, considerable amount of precipitation is received in the form of snow during winter. On an average there are 60 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. The details of rainfall at Qazigund station which is representative for the Shopian district as a whole are given in Table 5.2 below;

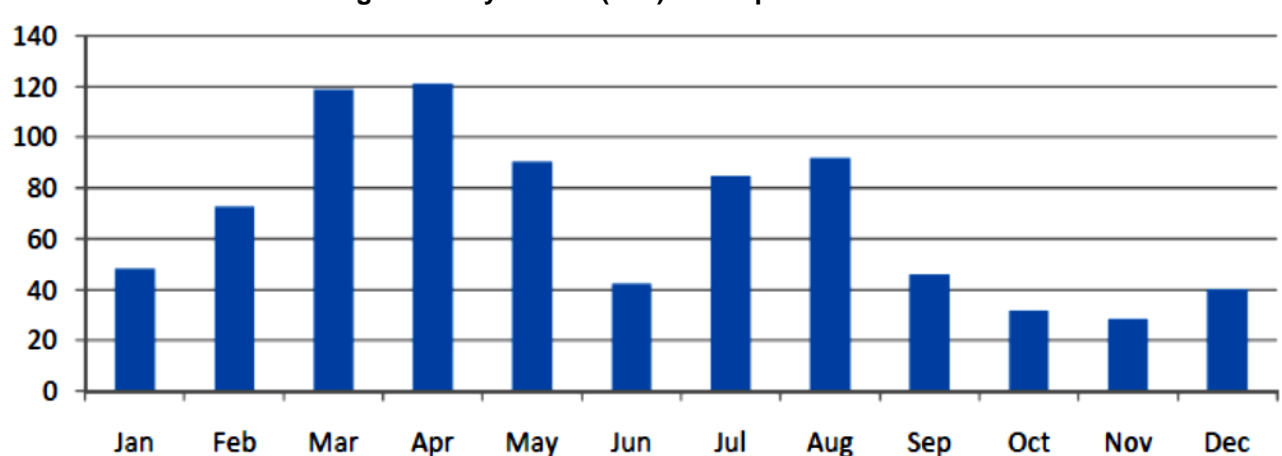
**Table 5.2: Monthwise Rainfall Statistics of District Shopian**

Rainfall Data (Normal rainfall/ Average number of rainy days in mm)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
A	48.4	72.8	119.0	121.4	90.7	42.6	84.9	92.0	46.2	31.9	28.8	40.1	818.8
B	3.8	4.3	7.8	8.5	7.5	4.0	6.3	6.5	3.4	2.4	2.5	2.8	59.8

A: Normal rainfall in mm

B: Average number of rainy days (i.e. days with rainfall of 2.5 mm or more)

**Average monthly rainfall (mm) in Shopian District**



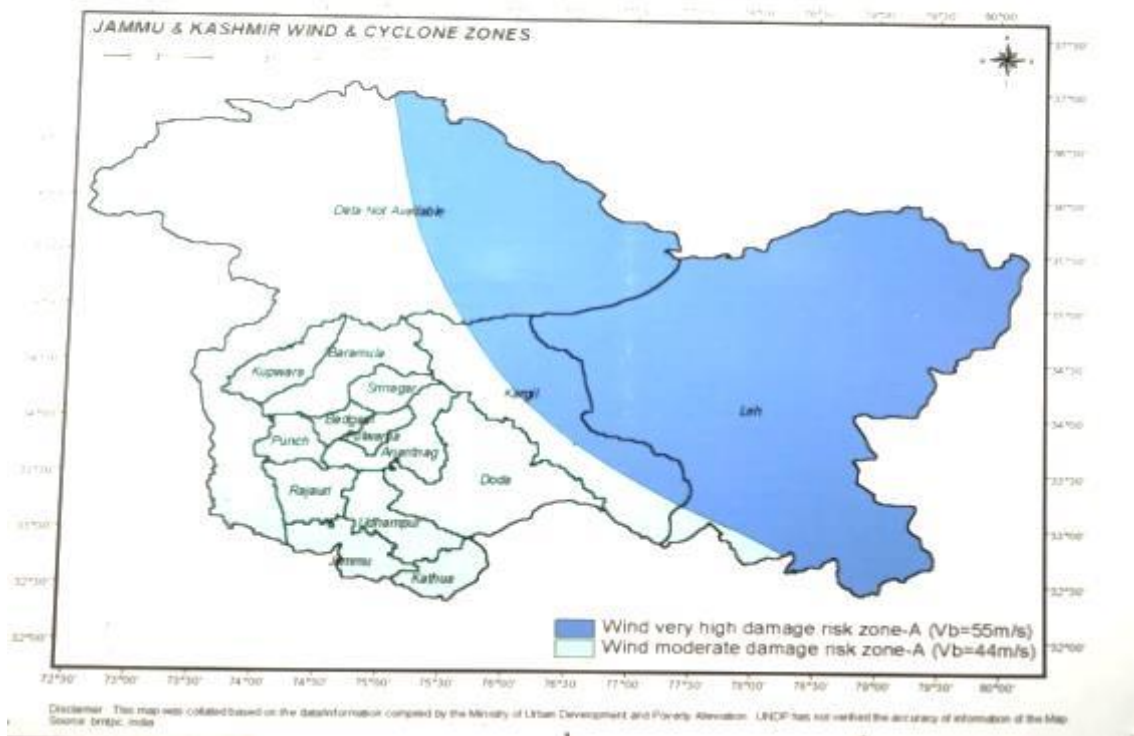
**Figure 5.11: Monthly Average Rainfall Data of the District Shopian (Source: District Survey report of Minor Minerals, Directorate of Geology & Mining, October 2017)**

**5.6.2. Wind**

Wind speed and wind directions have a significant role in the dispersion of atmospheric pollutants and therefore, it affects the ambient air quality of the area. Ground-level concentrations for the pollutants are inversely proportional to the wind speed in the downwind direction, while in the upwind direction no effect is observed and in crosswind directions, a partial effect due to emission sources is observed. Winds are generally light but do gain some strength during the late summer and early part of the monsoon season. In the southwest monsoon season winds from easterly and south-easterly directions are more common with north-westerly blowing on some days. In the post-monsoon and winter seasons, the predominant wind direction is northwesterly. In the summer, winds are generally from the north-westerly direction but on some day they blow from the southeast.

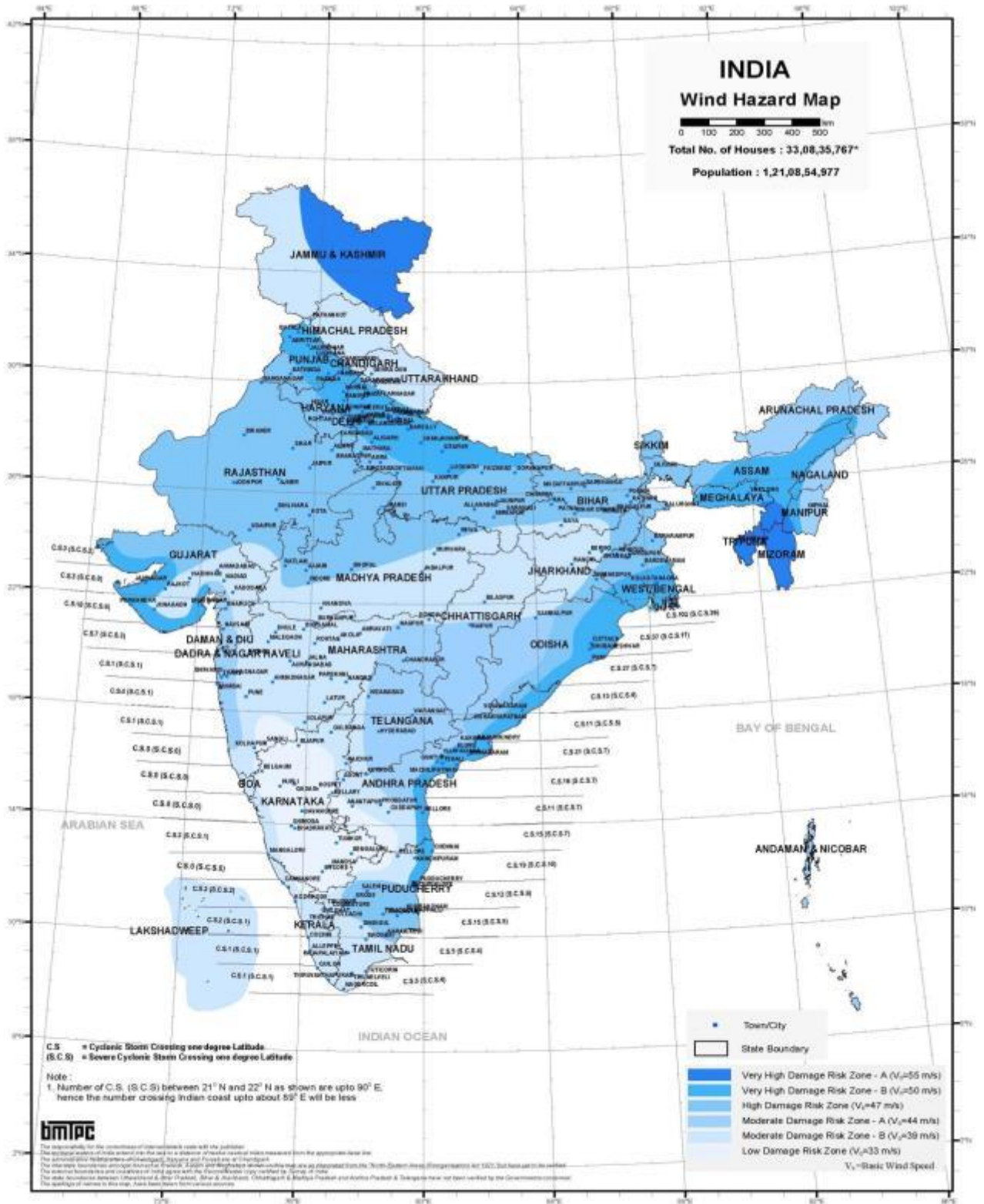
March to July are the windiest month, whereas the October and November months are the calmest months with low wind speed conditions. Most predominant wind direction is north-west from March to May.

# Wind & Cyclone Vulnerability Map of J&K



**Figure 5.12: Vulnerability Map of J&K (Source: BMTPC)**





BMPTC : Vulnerability Atlas- 3rd Edition; Peer Group; MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code: 2016; Cyclone Data, 1891-2015, IMD; GOI; Houses/Population as per Census 2011; \*Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Figure 5.13: Wind Hazard map of India (Source: BMPTC)

### 5.7. Noise Environment

Noise is perceived as one of the most undesirable consequences of road development. Though the level of discomfort caused by noise is subjective, there is a definite increase in discomfort with an increase in noise levels. The most commonly reported impacts of increased noise levels are interference in oral communication and disturbance in sleep. The main source of noise at the proposed Wachi bridge site will be from the operation of machinery during the construction stage. The impact on noise quality due to the project will be of significance in both construction as well as operation stages.

### 5.8. Water Environment

#### Box 5.1: <sup>2</sup>Rambiara Stream/ Nallah

##### Description – Surface Water Body (Rambiara Nallah- Tributary of River Jhelum)

The proposed bridge having a total span of 45 meter will be constructed over Rambiara Stream/ Nallah in Wachi village in Shopian District. The Rambiara nallah is the most important stream/ nallah of the Shopian District and an important tributary of River Jhelum which confluence with Vaishav nallah at Niyana Batapora and River Jhelum at Sangam near National Highway (NH-44). It is formed by the union of small streamlets originating in Pir Panjal mountains. It is fed by snow melt waters of glaciers and various lakes like Nandan Sar, Chandan Sar, Bhag Sar and Dhaklar Sar housed in the Pir Panjal Range.

The drainage pattern of this catchment is not uniform. The upper portion of the catchment shows dendritic drainage pattern while as lower portion shows more or less parallel drainage pattern. It flows in north-easterly direction for about 58 km in the district upto village Heff-Shirmal and enters into Pulwom district and then joins nalla Veshav. From its origin to Hirpur village, the course of the nallah is very narrow and becomes wide beyond Hirpur. The total catchment area of Rambiara in the district is about 360 Sq. kms. Lar canal irrigating some parts of northern side of the district has been channelized from Rambiara Nallah. Rambiara nallah due to its huge basin area and discharge weathers the host rocks, transports and deposits the sediments as river bed material and represents the main source of minor minerals of the district in the form of boulders, aggregate (bajri) and sand.

<sup>2</sup> Rambiara Nallah flowing from Pir Panjal range to downstream Wachi village (bridge project site) and confluence with Vaishav Nallah and joins River Jhelum at Sangam point.



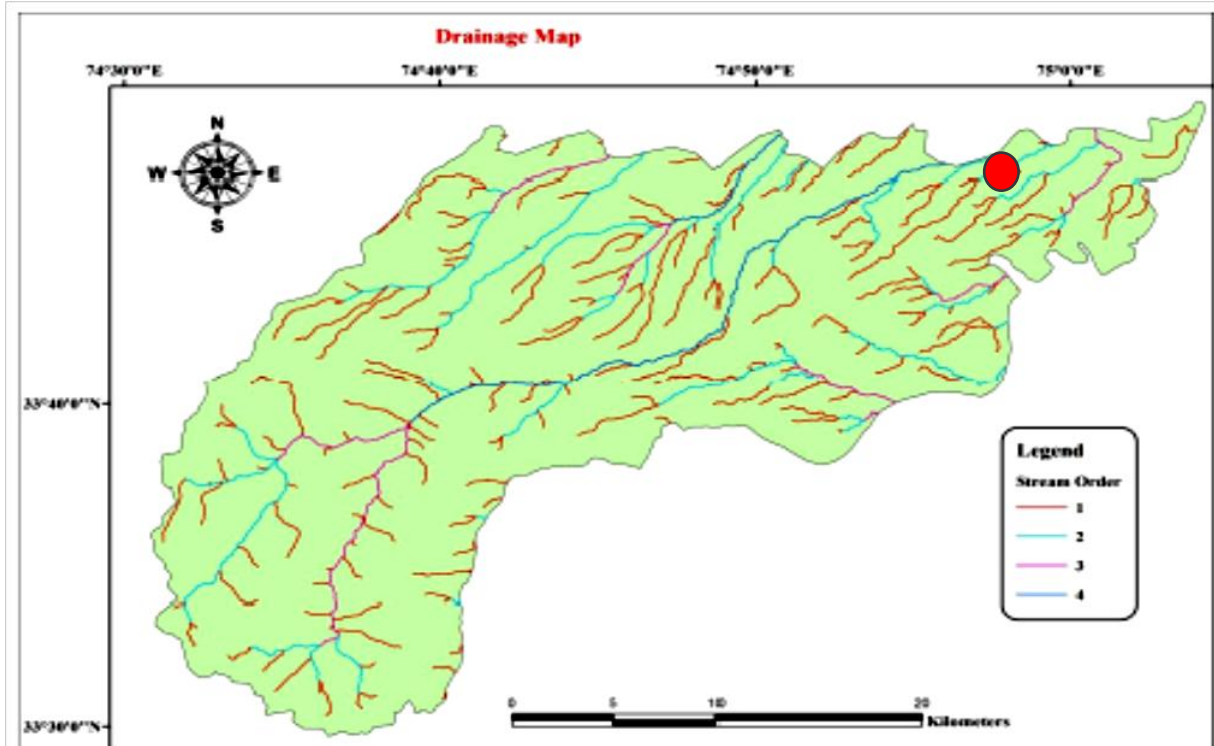


Figure 5.14: Drainage Pattern of Shopian District (Red Dot showing proposed Bridge site at Wachi village).

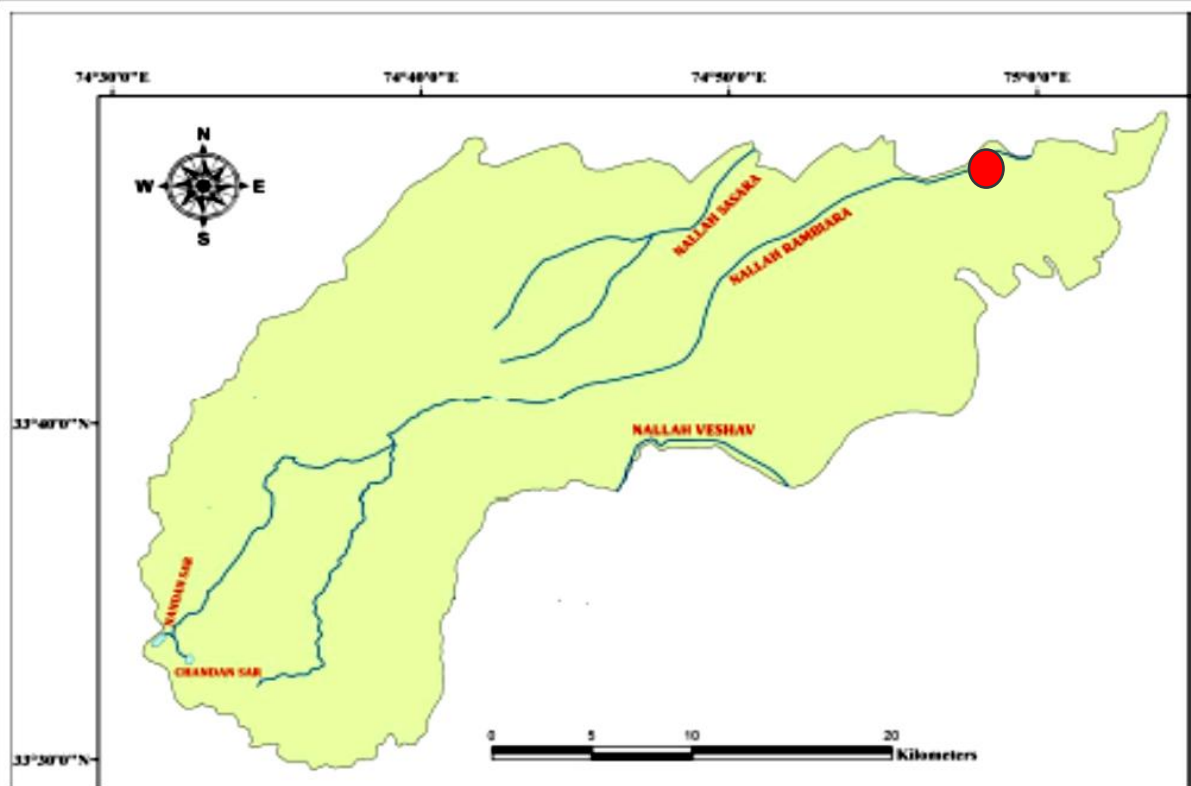


Figure 5.15 Map of Rambhara Nallah flowing in Upper Shopian to Wachi village

## 5.9. Biological Environment

Plant and animal communities are indicators of the environment. They respond not only to one environmental factor but also an interacting group of factors. The plant and animal communities integrate these influences and react sensitively to changes in the balance of environmental stresses. Vegetation is usually the most readily recognized component of ecosystems. Plant communities followed by used often to identify and biological balance through biotic or abiotic pressure or direct interference by man are readily recognized by changes in the physiognomy, structure and species composition of the flora and fauna. Since the ecological integrity is one of the fundamental factors towards attaining a sustainable ecosystem, following biological status survey in the study area (Project Influence Area) of Wachi bridge site was undertaken.

### 5.9.1. Forests

The Shopian district is having a 260.5 hectares of forest land and 2948 hectares of grazing lands. These forest area mainly falls in upper Karewa of hilly range. The proposed construction is located in the Kumar Mohalla of Wachi village which lies in the flood plain of Rambiarra nallah. There is no natural forest area like Reserved Forest, Protected Forest or natural heritage sites of national and international importance within the one km of project influence area.

### 5.9.2. Flora

During the field inspection of the Wachi bridge site, the predominant standing vegetative species observed in the direct project corridor/ area of influence in the study area. The local flora in the study area usually denotes trees coming in the new approach road from Kumar Mohalla side and Doble mohalla on right bank side of Rambiarra Nallah and in general in project influence area. The commonly observed trees are Willow, Poplar, Elm, Ailanthus, Acacia, Mulberry, Walnuts, Plum, Apple, Pear etc spread in the area. No rare or endangered plant species were observed. The dominant species observed and documented during the field study is present below;

**Table 5.3: List of Flora ((Commonly found) in the Project Influence Area of bridge project at Wachi**

S.No	Common Name	Scientific Name	Remarks
A	Scheduled Trees		
1	Walnut	<i>Juglans regia</i>	PIA, One small tree near new approach road
B	Indigenous Trees		
2	Willow	<i>Salix alba</i>	Coming in Approach road side, PIA
3	Poplar	<i>Populus alba, Populus nigra</i>	Coming in Approach road side, PIA
4	Ailanthus	<i>Ailanthus altissima</i>	Coming in Approach road side, PIA
5	Acacia (Kikar)	<i>Robinia pseudo-acacia</i>	Coming in Approach road side, PIA

6	Elm (Brenn)	<i>Ulmus sp.</i>	Coming in Approach road side, PIA
C	Fruit Trees		
7	Apple Trees		
8	Plum trees		
9	Pomegranate	<i>Pinica granatum</i>	
C	<b>Grasses</b>		
10	Grass (Bermuda Grass, Doob)	<i>Cynodon dactylon</i>	UD
11	Grass (Bakung)	<i>Poa annua</i>	UD
12	Grass	<i>Stipa sibirica</i>	UD
13	Grass (Bairan Ghaasé)	<i>Chrysopogon gryllus</i>	UD
14	Herb/ Shrub (Camomile / Scented Mayweed/ & false Chamomile Phake Ghas)	<i>Matricaria chamomilla</i> <i>Anthemis cotula</i>	UD
15	Herb (Batak Nyoor)	<i>Trifolium repense</i>	UD
16	Shrub (Goola)	<i>Plantago lanceolata</i>	UD
17	Charas	<i>Cannabis sativa or indica</i>	UD

PIA- Project Influence Area; UD- Universal Distribution

#### 5.9.2.1. Protected (Scheduled) Trees of the J&K State.

As per the Jammu & Kashmir Preservation of Specified Trees Act, 1969, Chinar (*Platanus orientalis*), Mulberry (*Morus sp.*) and Walnut (*Juglans regia*) are scheduled and protected trees of Jammu & Kashmir. None of the scheduled are located within the approach roads of the Wachi bridge. However, a small Walnut tree is coming near new approach road side (from Kumar Mohalla side on RHS) and approximately at 10 meters distance.

**Table 5.7: List of Protected (Scheduled) Trees located close to approaches of Bridge at Kumar Mohalla in Wachi Village, District Shopian**

S.No	Name of the Scheduled Tree	Girth Class (in meters)	Location	Chainage	Alignment (LHS/RHS)
1	Walnut	10 M	KUMAR Mohalla side side	Ch 0+0450 meter from bridge side	RHS

As per site assessment, 5 Willow Trees (*Salix sp.*) and 1 Poplar Tree (*Populus nigra*) are required to be cut down as they come within or may protrude towards road pavement of approaches.. These may possess the visibility and safety issues for the traffic movement.

**Table 5.8: List of the trees with Girth Class coming in the Approach Road**

S.No	Name of the Trees to be cut	Number of trees	Girth Class (in cm)	Location	Alignment (LHS/RHS)
<b>A. Kumar Mohalla Side (LHS of bridge)</b>					
1	Poplar	20	25–240 cm	Approach road (LHS)	Within new approach road
2	Wilows	7	25-110 cm	Approach road (LHS)	Within new approach road
3	Elm (Bren)	12	50-210 cm	Approach road (LHS)	Within new approach road
4	Ailanthus	2	25–100 cm	Approach road (LHS)	Within new approach road
5	Acacia	2	40-130 cm	Approach road (LHS)	Within new approach road
Total trees		43			
<b>B. Dablepora</b>					
6	Poplar	2	45-115 cm	Approach road (RHS)	\LHS
7	Wilows	1	75 cm	Approach road (RHS)	LHS
8	Elm (Bren)	9	70–190 cm	Approach road (RHS)	LHS
9	Ailanthus	3	40–80 cm	Approach road (RHS)	LHS
10	Acacia	3	45–95 cm	Approach road (RHS)	LHS
Total Trees		18			
<b>Total number of trees to be cut (Approx. 61 trees)</b>					

Loss of trees will be compensated by 1:3 ratio (i.e. for loss of 1 tree 3 trees will be planted) or greater and transplantation of the smaller trees shall be carried out wherever applicable. The total number of trees to be planted under compensatory plantation is 183 trees comprised mainly of Willow, Bren and other trees as well. These trees will be planted along the banks of the Rambiarā nallah as an environmental enhancement/ bank strengthening and protection measures.

### 5.9.3. Fauna

No forest is present at the project site or in project influence area; the terrestrial fauna is common domestic animals/ livestock. There are no Schedule-I terrestrial mammals" species observed near the site. Animals were mainly observed are domesticated livestock like cows, goats, sheep, Poultry farms, etc. and stray dogs and cats.

### 5.9.4. Wetlands

There is no wetlands site within one km radius of the proposed Wachi bridge site.

### 5.9.5. Ecological Sensitive Areas

The proposed Wachi bridge site or its project influence area does not fall in any Biosphere Reserve, National Park, Wildlife Sanctuaries and ecologically sensitive areas.

## 5.10. Socio-Economic Profile of the Project Area

### 5.10.1. History

The District Shopian derives its name from its Town Shopian, about which Frederic Drew, while justifying the basis of its nomenclature, states that it is the distortion of word "SHAHPAYAN", i.e., Royal Stay. Shopian has been an ancient Town of Kashmir, which among other factors has a certain historical importance since it is situated on the ancient imperial route commonly known as Mughal Road which connects Lahore & Srinagar. Currently under construction Mughal Road links District Shopian with the districts of Rajouri & Poonch.

Shopian is a historical town, and has gained importance from the time of Mughal rulers. It was previously known as 'Sheen-e-van' meaning 'forest of snow'. Shopian was one out of six Wazarat Headquarters in Kashmir from 1872-1892 A.D. Shopian has been an ancient Town of Kashmir, which among other factors in the past has historical importance, since it is situated on the ancient imperial road commonly known as Mughal Road. Shopian has the honour to had Imam Shahi Hamadan entered via it into the Kashmir valley to spread the message of Islam. The district has the privilege of having the "Holy Relic" of Prophet Mohammad (SAW) at Khankah. The Jamia Masjid in Shopian is one of the famous historical monuments built during the Mughal reign resembling that of Jamia masjid Srinagar

### 5.10.2. Economy

The district is known as Apple Bowl of the state as it is famous for Horticulture Sector. The district possesses tremendous scope for expansion of fruit industry under different schemes which can boost the economy not only of this district but the whole state. In floodplains of the lower Shopian, rice cultivation is the main activity. The District with lush green forests especially in the areas like Sedow, Hirpora & Keller is rich in scenic beauty. Development of these villages/areas as tourist villages will boost the tourism in the District for economic development of the people. Shopian district has many places with tourism potential: the waterfalls of Aharbhal, Kounsernag, Kongiwatan, Arshi Pora Lahanthour, Sedow, Herpora etc.

The mineral activity is also one of the important components of the Shopian economy. Nalla bajri, nalla muck, boulders, sand and brick earth are the main minor minerals found in District Shopian. The district does not possess any established major mineral, besides quarry development for building stones. The available minor minerals occur as river bed material in nallah Rambiar, Veshav and Sasara and are utilized as construction material and road metal. Karewa and alluvium soils are consumed as brick earth for the manufacturing of bricks.

crusher units and 3 brick units are sustaining on the locally available minor minerals. About 96,150 metric tonnes of minor minerals were produced in the financial year 2015-16 and an amount of Rs 15.16 lac was realized as royalty on account of minor mineral extraction in the district. The locally available mineral resources of the district have played a significant role in the developmental activities of the region, source of employment for the local populace, raised the socio- economic profile of the region and revenue generation for the state exchequer.

The district has a good potential of production the different kinds of fish. Dozens of nallahs, fresh water stream, springs, and ponds have a high potential for fish production. Some of the commercially important varieties of fish found in the district are Kashir Gad (Kashmiri origin fish), Punjab Gad( Punjabi origin fish) and Trout fish(Rainbow Strain). About fourteen species of fish are found in fresh water of river, springs, streams, ponds etc. of this district.

**5.10.3. Administrative Set-up**

Shopian Town, District Headquarter is situated at a distance of 51 kilometers (32 mi) from Srinagar and 20 kilometers (12 mi) from Pulwama at an elevation of 2146 meters (7041 ft) above the sea level and is located in the south and South-west extremity of Kashmir valley. Shopian is lying in the close proximity of Pir Panjal mountain range. The district is located between 33. 43 N to 74.49 degree east of latitude & Longitude respectively. It has decades old road connectivity with Anantnag as well as Kulgam. Shopian was one out of six Wazarat Headquarters in Kashmir from 1872-1892 A.D. It has decades-old road connectivity with Anantnag as well as Kulgam.

Presently the District Shopian is having two Assembly Constituencies, 2 Tehsils, 9 CD Blocks, One Municipal Committee with 13 wards, 43 Patwari Halqas and 231 villages out of which 226 are inhabited and 3 are uninhabited.

**Table 5.9: Details of the Shopian District**

S. No.	District	Shopian			
1	Tehsils	Shopian	Barbugh	Hermain	Keegam
		Chitragam	Zainpora	Keller	
2	Blocks	Shopian	Harman	Imamsahib	Kanji Ullar
		Kaprin	Keller	Ramnagri	Chitragam
		Zainpora			
3	Town	Shopian			
4	Villages	231			

Source: Official Website of Shopian District. [www.shopian.nic.in](http://www.shopian.nic.in) (Website Accessed- 18/07/2020)

The Primary Census Abstract which is an important publication of 2011 Census gives basic information on Area, Total Number of Households, Total Population, Scheduled Castes, Scheduled Tribes Population, Population in the age group 0-6, Literates, Main Workers and Marginal Workers classified by the four broad industrial categories, namely, (i) Cultivators, (ii) Agricultural Labourers, (iii) Household Industry Workers, and (iv) Other Workers and also Non-Workers. The characteristics of the Total Population include Scheduled Castes,



Scheduled Tribes, Institutional and Houseless Population and are presented by sex and rural-urban residence

**Table 5.10: Primary Census Abstract (Census 2011) of project area along subproject Roads**

Location Code Number	District/Block/Town/ Village	Area of Village (in hectares)	Particulars	Total	Male	Female
0087	Shopian District	23840.84	Total No. of Houses	31488	-	-
			Population	190636	96810	93826
			Child (0-6)	29991	15963	14028
			Scheduled Caste	5	5	-
			Scheduled Tribe	11918	6227	5691
			Literates	97562	56650	40912
			Illiterates	93074	40160	52914
			Total Workers	62998	44815	18183
			Main Worker	38447	34641	3806
003327	Wachi (Shopian Block)	533.40	Total No. of Houses	705	-	-
			Population	3943	1931	2012
			Child (0-6)	484	239	245
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	2304	1317	987
			Illiterates	1639	614	1025
			Total Workers	1727	1077	650
			Main Worker	769	709	60
003326	Aglar Charat	380.80	Total No. of Houses	522	-	-
			Population	2864	1422	1442
			Child (0-6)	434	224	210
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	1571	930	641
			Illiterates	1293	492	801
			Total Workers	1412	857	555
			Main Worker	771	555	216
003328	Malawrah	309.60	Total No. of Houses	485	-	-
			Population	3247	1677	1570
			Child (0-6)	577	311	266
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	1622	977	645

			Illiterates	1625	700	925
			Total Workers	1539	819	720
			Main Worker	276	258	18
<b>003325</b>	Shermal	242.80	Total No. of Houses	145	-	-
			Population	979	502	477
			Child (0-6)	182	97	85
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	494	288	206
			Illiterates	485	214	271
			Total Workers	557	296	261
			Main Worker	115	110	5
<b>003329</b>	Safanagri	230.70	Total No. of Houses	266	-	-
			Population	1461	750	711
			Child (0-6)	157	91	66
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	850	510	340
			Illiterates	611	240	371
			Total Workers	627	363	264
			Main Worker	294	283	11
<b>003330</b>	Zaina Pora	351.30	Total No. of Houses	331	-	-
			Population	1739	887	852
			Child (0-6)	205	115	90
			Scheduled Caste	-	-	-
			Scheduled Tribe	12	7	5
			Literates	1074	631	443
			Illiterates	665	256	409
			Total Workers	998	527	471
			Main Worker	541	409	132
<b>003331</b>	Babapora	228.60	Total No. of Houses	304	-	-
			Population	1840	926	914
			Child (0-6)	235	118	117
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	1032	607	425
			Illiterates	808	319	489
			Total Workers	862	466	396

			Main Worker	475	381	94
<b>003332</b>	Durah Pora	267.90	Total No. of Houses	138	-	-
			Population	839	427	412
			Child (0-6)	98	60	38
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	407	236	171
			Illiterates	432	191	241
			Total Workers	361	232	129
			Main Worker	194	185	9
<b>003333</b>	Awnera	302.70	Total No. of Houses	138	-	-
			Population	839	427	412
			Child (0-6)	98	60	38
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	1765	1018	747
			Illiterates	1239	461	778
			Total Workers	1178	780	398
			Main Worker	740	650	90
<b>003322</b>	Heff	413.60	Total No. of Houses	413.60	-	-
			Population	2125	1050	1075
			Child (0-6)	336	184	152
			Scheduled Caste	-	-	-
			Scheduled Tribe	-	-	-
			Literates	1211	657	554
			Illiterates	914	393	521
			Total Workers	865	522	343
			Main Worker	490	423	67

The highlighted Green section (Row) of Wachi of Shopian Block reflects the main project area.  
Source: Primary Census Abstract 2011

### 5.11. Recreation Resources

The recreational sites include Amusement Park, centre for musical & cultural activities. There is none of any recreational sites nearby of the proposed Wachi bridge project at Kumar Mohalla within project influence area..

### 5.12. Archaeological, Historical, Heritage Sites and Religious/ Cultural Sites

No Archaeologic monuments under ASI's listing are located in the proposed bridge site at Wachi within 1 km of project influence area.

**5.13. Sensitive Environmental Receptors**

The proposed bridge at Kumar Mohalla Wachi does not have any sensitive receptors like Schools, religious places, community centres etc. However, from the Dablepora mohalla side 1 Mosque and 2 schools exit within the interiors of the village at approx. distance of 180 meters from the bridge site. I&FC shed/ pump house is located 25-30 meter from the LHS of bridge site. This pump house is being used to pump water from Rambiarā nallah and fed to irrigation channel/canal at end point of approach road from Kumar Mohalla side. No other sensitive receptors were observed.

**Table 5.11: Sensitive Environmental Receptors near Proposed Bridge at Wachi, Shopian.**

S. No	Sensitive Feature	Location	Chainage	Alignment (RHS/LHS) <sup>3</sup>	Distance in meters (m) from the central alignment of the approach road
1	Jamia Mosque	RHS of Bridge, Dablepora	Bridge Site	LHS	185 meter from approach road
2	Hamdania High School	RHS of Bridge, Dablepora	Bridge Site	RHS	155 meter from the bridge approach
3.	Al Saba School	RHS of Bridge, Dablepora	Bridge Site	Main	520 meter (outside project influence area).
4	I&FC Shed (with Irrigation pipe of 200 dia.)	LHS near proposed bridge , Kumar Mohalla	Bridge Site	RHS (from an edge of the proposed bridge)	12-15 meter

**5.14. <sup>4</sup>COVID -19 (CORONAVIRUS) A PANDEMIC HEALTH HAZARD**

**Overview**

The **COVID-19 pandemic**, also known as the **coronavirus pandemic**, is an ongoing global pandemic of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The outbreak was first identified in Wuhan, China, in December 2019. The World Health Organization declared the outbreak a Public Health Emergency of International Concern on 30 January 2020 and a pandemic on 11 March. As of 11 August 2020, more than 20 million cases of COVID-19 have been reported in more than 188 countries and territories, resulting in more than 734,755 deaths; more than 12.2 million people have recovered

<sup>3</sup> LHS-Left Hand Side RHS-Right Hand Side

<sup>4</sup> Covid-19 Pandemic disease informative section is included in this report in order to provide information, guidelines (SOP) and awareness at project level in managing highly communicable disease.

In India, as on 11 August 2020 more than 2.26 million people have been reported for the Covid-19 (Coronavirus) Pandemic with the unfortunate death of more than 45250 people with a recovery of more than 1.58 million people. Government of India is taking all necessary steps to ensure that we are prepared well to face the challenge and threat posed by the growing pandemic of COVID-19 the Corona Virus. With the active support of the people of India, we have been able to contain the spread of the virus in our country. The most important factor in preventing the spread of the Virus locally is to empower the citizens with the right information and taking precautions as per the advisories being issued by the Ministry of Health & Family Welfare.

In Jammu & Kashmir, more than 25367 people have been reported for the positive cases, of which 17375 people have recovered and 478 deaths as on 11 July 2020. Whereas, the report Coronavirus positive cases in Shopian District is 1568 as of 10 August 2020.

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

The best way to prevent and slow down transmission is to be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol-based rub frequently and not touching your face. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow).

At this time, there are no specific vaccines or treatments for COVID-19. However, many ongoing clinical trials are evaluating potential treatments. WHO will continue to provide updated information as soon as clinical findings become available.

### **Prevention**

To prevent infection and to slow transmission of COVID-19, do the following:

- Wash your hands regularly with soap and water, or clean them with alcohol-based hand rub.
- Maintain at least 1-metre distance between you and people coughing or sneezing.
- Avoid touching your face.
- Cover your mouth and nose when coughing or sneezing.
- Stay home if you feel unwell.
- Refrain from smoking and other activities that weaken the lungs.
- Practice physical distancing by avoiding unnecessary travel and staying away from large groups of people.

## **Symptoms**

COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.

Most common symptoms:

- fever.
- dry cough.
- tiredness.

Less common symptoms:

- aches and pains.
- sore throat.
- diarrhoea.
- conjunctivitis.
- headache.
- loss of taste or smell.
- a rash on the skin, or discolouration of fingers or toes.

Serious symptoms:

- difficulty breathing or shortness of breath.
- chest pain or pressure.
- loss of speech or movement.

Seek immediate medical attention if you have serious symptoms. Always call before visiting your doctor or health facility. People with mild symptoms who are otherwise healthy should manage their symptoms at home. On average it takes 5–6 days from when someone is infected with the virus for symptoms to show, however it can take up to 14 days.

***Covid-19 (Coronavirus) Public Awareness through Info-Graphics Posters  
World Health Organization (WHO) COVID-19 Info-graphics Social Safety Message***



“Protect yourself and others from getting sick”

No. Regularly washing your bare hands offers more protection against catching COVID-19 than wearing rubber gloves.

You can still pick up COVID-19 contamination on rubber gloves. If you then touch your face, the contamination goes from your glove to your face and can infect you.

Is wearing rubber gloves while out in public effective in preventing the new coronavirus infection?



World Health Organization

#Coronavirus #COVID19

9 March 2020

Yes. Respiratory viruses can be passed by shaking hands and touching your eyes, nose and mouth.

Greet people with a wave, a nod or a bow instead.














Should I avoid shaking hands because of the new coronavirus?



World Health Organization

#Coronavirus #COVID19

9 March 2020

<p>Protect yourself and others from getting sick</p> <h3>Wash your hands</h3> <ul style="list-style-type: none"> <li>• after coughing or sneezing</li> <li>• when caring for the sick</li> <li>• before, during and after you prepare food</li> <li>• before eating</li> <li>• after toilet use</li> <li>• when hands are visibly dirty</li> <li>• after handling animals or animal waste</li> </ul>  	<p>Protect yourself and others from getting sick</p> <h3>Wash your hands</h3> <ul style="list-style-type: none"> <li>• after coughing or sneezing</li> <li>• when caring for the sick</li> <li>• before, during and after you prepare food</li> <li>• before eating</li> <li>• after toilet use</li> <li>• when hands are visibly dirty</li> <li>• after handling animals or animal waste</li> </ul>  
<h3>Wash your hands</h3> <p>Wash your hands with soap and running water when hands are visibly dirty</p>  <p>If your hands are not visibly dirty, frequently clean them by using alcohol-based hand rub or soap and water</p>  	 <p>Be <b>SUPPORTIVE</b> Be <b>CAREFUL</b> Be <b>ALERT</b> Be <b>KIND</b></p> <p>Be <b>READY</b> to fight <b>#COVID19</b></p> <p>For the latest health advice, go to: <a href="http://www.who.int/COVID-19">www.who.int/COVID-19</a></p>  
 <p>Be <b>INFORMED</b> Be <b>PREPARED</b> Be <b>SMART</b> Be <b>SAFE</b></p> <p>Be <b>READY</b> to fight <b>#COVID19</b></p> <p>For the latest health advice, go to: <a href="http://www.who.int/COVID-19">www.who.int/COVID-19</a></p>  	

## 6. POTENTIAL ENVIRONMENTAL IMPACTS

### 6.1. Project Impacts & Issues

This section presents identification and evaluation of anticipated impacts during pre-construction, construction and operation phases of the proposed construction of 1x45 meter span trussed girder bridge over Rambaira Nallah at Kumar Mohalla Wachi in District Shopian. The planning of proposed project intervention points towards the impacts in the pre-construction, the construction stages and the operation stages. The subsequent sections deal with the prediction of impacts due to the bridge project on the physical, biological environment and socio-cultural environment. Tables 6.1 & 6.2 below presents the general environmental impacts expected due to the construction of the proposed bridge. Impacts have been assessed based on the information collected from the project activities as per design parameters/ drawings collected from the EPC contractor which is awarded to M/s Khanday Infrastructure Pvt. Ltd., screening & scoping of environmental attributes, and baseline data collected during the EIA study. The quantum of all the impacts on physical & biological and socio-economic environment has been discussed in details in subsequent paragraphs.

The impact matrix for the project road is given below in Table 6.1;

**Table 6.1: Impact Matrix for Project**

S. No.	Parameters	Const. of 1x45m trussed girder bridge at Wachi, Shopian District.
	<b>Negative Impacts</b>	
1.	Hand Pumps	Nil
2.	Pond Area	Nil
3.	Relocation Religious Properties	Nil
4.	Transfer of Agriculture Land (ha)	Nil
5.	Nos of trees to be felled	61 Trees (Non-scheduled Type) Self grown trees in floodplain of Rambiara Nallah (Poplar, Willow, Elm, Ailanthus, Acacia)
	<b>Positive Impact</b>	
1.	Enhancement Sites (Nos.)	Plantation and beautification of median and incidental spaces.
A.	Cultural/Religious Properties (Nos.)	Nil
B.	Silt and debris/waste traps at the outfall of drains	-
C.	Safe Access/traffic calming at Educational Institutes, hospitals etc (Nos.)	-
D.	Trees Saving (Nos)	>70-80
E.	Wastes Reuse	-
F.	Proposed Plantation	Yes (Willow Plantation mainly along with Pine saplings)
G.	Proposed Compensatory Plantation (if tree cutting requirement arises)	Total 61 trees to be cut. Compensatory plantation will be carried @ 3:1 ratio (that is for cutting of each tree 3 trees will be planted)

		along the nallah banks to strengthen the banks, erosion control, open spaces etc. Further, an initiative to transplant small trees to the proposed areas for plantation.
<b>3.</b>	<b>Bridge/ Approach Road Safety Measures</b>	
A.	Intersection/Access Improvement	2
B.	Signage Boards (Nos.)	As per IRC Guidelines
C.	Sidewalk	Available (1.5m both sides)
D.	Traffic Calming Measures Locations	1 (from RHS of bridge at Dablepora)
C.	Other Measures	Installation of View Cutters( approx.. 50-70 meters) at fences of three residential houses.

Anticipated environmental impacts on the physical, biological and socio-economic environment have been discussed in details in subsequent paragraphs.

**Table 6.2 : Anticipated Impacts on Physical & Biological Environment**

Project Activity	Planning and Design Phase	Pre-construction Phase		Construction Phase					Bridge/ Road Operation
		Removal of Old Structures	Removal of trees and vegetation	Earth works including and borrow area	Laying of pavement	Vehicle & Machine operation & maintenance	Asphalt & crusher plants	Sanitation & Waste (labour campus)	Vehicle operation
Air		Dust generation during dismantling	Reduced buffering of air pollution, Hotter, drier microclimate in the project area	Dust generation	Asphalt odour and emissions	Dust, Pollution	Soot, Odour, Gaseous Dust, Pollution	Odour / Smoke from Cooking of food	dust, vehicular emissions
Land	Impact on productive land if land acquisition required	Generation of debris	Erosion and loss of topsoil	Erosion and loss of topsoil	Land contamination due to improper disposal of bitumen waste/ solid wastes	Contamination by fuel and lubricants and compaction	Contamination and compaction of soil at camp & Plants	Contamination from Wastes and sewage	--
Water	Impact on Water Sources/ Surface Water Body	Siltation due to loose earth	Siltation due to loose earth	Alteration of drainage, Break-in continuity of ditches Siltation, Stagnant water pools in quarries and borrow area.	Reduction of groundwater recharge area	Contamination by fuel and lubricants	Contamination by asphalt leakage or fuel	Contamination from wastes and untreated sewage disposal	Spill Contamination by fuel, lubricants and washing of vehicles
Noise		Noise Pollution	High Noise due to machinery	Noise Pollution	Noise pollution	Noise pollution	Noise Pollution	--	Noise from traffic movement
Flora	Tree cutting		Loss of Biomass and vegetation cover due to Removal of vegetation	Lowered productivity loss of ground for vegetation	--		Lower productivity Use as fuel wood	Felling trees for fuel	Compensatory plantation and nallah bank protection measures



**Table 6.3: Anticipated Impact on Social and Cultural Environment**

Project Activity	Planning and Design Phase	Pre Construction Phase			Construction Phase					Operation	
		Land acquisition	Removal of Structures	Removal of trees & vegetation	Earth works including quarrying	Laying of Pavement	Vehicle & machine operation & maintenance	Asphalt and crusher plants	Labour Camps	Direct	Indirect Induced development
Env. Component Affected	Design decisions & Implementation policies	Land acquisition	Removal of Structures	Removal of trees & vegetation	Earth works including quarrying	Laying of Pavement	Vehicle & machine operation & maintenance	Asphalt and crusher plants	Labour Camps	Vehicle operation	-
Agricultural land	-	Change in land prices	Change in land economic value	Loss of standing crops	Loss of productive land	-	-	Dust on agricultural land reduce n productivity	-	-	Conversion of Agricultural Land
Buildings and built structures in Approach ROW	-	-	Loss of structures, Debris generation, Noise and Air pollution	-	Dust Deposition on structures	-	Noise, vibration may cause damage to structures near to the road	Dust accumulation on building and structure	-	Vibration and noise	Change in building use and characteristics
People and Community	Impact on nearby community structure,	-	Impact on people and loss of livelihood	Loss of shade & community tree.	Health hazard to people	Odour and dust	Noise and Air pollution and discomfort	Air and noise pollution and discomfort	Community clashes with migrant labour	Risk of an accident due to an increase in speed on the smooth carriageway	Induced pollution and an increase in the accident rate
Cultural Assets	-	Impact on access to cultural structure	Displacement loss of structure from RoW	--.	--	-	--	Dust accumulation	-	Damage from vibration & air pollution	-
Utilities and Amenities	-	-	Interruption in supply	-	-	-	Damage to utility and amenities	Dust accumulation on water bodies	Pressure on existing amenities		-
Labour's Health & Safety	-	-	-	-	Stagnation of water and disease	Asphalt odour and dust	Accident and injuries to labour/public	Impact on health due to inhale of dust	Health hazard from raw sewage disposal /wastes	Road safety issues	-

## 6.2. Consideration of Environmental Impacts During the Design Stage of the Bridge Project

### 6.2.1. Hydrological Study

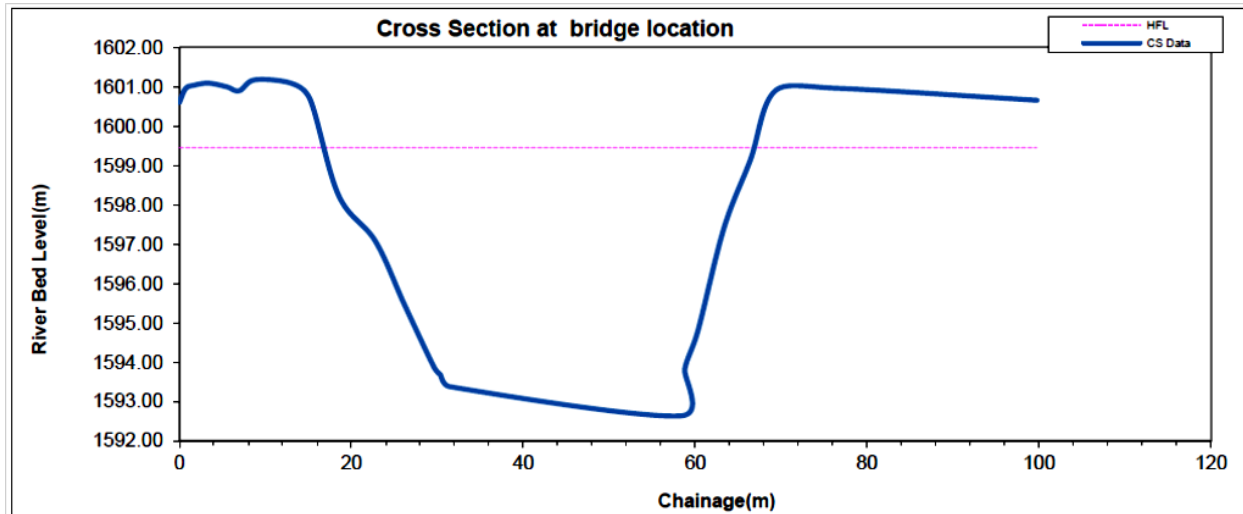
The proposed bridge is proposed to be constructed over Rambiarā nallah at Wachi village. The Rambiarā nallah is a main tributary from the District Shopian and carries high discharge during episodes of precipitation into River Jhelum. Rambiarā nallah crosses its banks during high discharge which results into flooding of the low lying areas including project site and whole area was affected with the devastating floods of September 2014. Therefore, based on this assessment hydrological study and runoff calculations for extreme flood/rains under the climate change scenarios is important for the proposed construction of the bridge and same study has been carried out and considered for designing of the proposed 1x45 meter bridge at Kumar Mohalla in Wachi with excess runoff flow/flood safeguard.

**Table 6.4: Hydrological Data of Rambiarā Nallah at Wachi (Flood Discharge from X-sectional Area and observed Velocity)**

HFL 100	1599.46								
Offset	Bed Level	Natural HFL	Min. Channel B.L.	Distance	h	Avg h	Diff in h	Area	Perimeter
(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
0.00	1600.6119	1599.46	1592.64	0.000	0.000	0.000	0.000	0.000	0.000
0.71	1600.9610	1599.46	1592.64	0.710	0.000	0.000	0.000	0.000	0.000
1.63	1601.0426	1599.46	1592.64	0.920	0.000	0.000	0.000	0.000	0.000
3.38	1601.0979	1599.46	1592.64	1.750	0.000	0.000	0.000	0.000	0.000
5.48	1601.0058	1599.46	1592.64	2.100	0.000	0.000	0.000	0.000	0.000
6.95	1600.9049	1599.46	1592.64	1.470	0.000	0.000	0.000	0.000	0.000
8.79	1601.1846	1599.46	1592.64	1.840	0.000	0.000	0.000	0.000	0.000
13.12	1601.0876	1599.46	1592.64	4.330	0.000	0.000	0.000	0.000	0.000
15.23	1600.6691	1599.46	1592.64	2.110	0.000	0.000	0.000	0.000	0.000
18.53	1598.2419	1599.46	1592.64	3.300	1.218	0.609	1.218	2.010	3.518
22.79	1597.0846	1599.46	1592.64	4.260	2.375	1.797	1.157	7.654	4.414
26.16	1595.4767	1599.46	1592.64	3.370	3.983	3.179	1.608	10.714	3.734
29.61	1593.8806	1599.46	1592.64	3.450	5.579	4.781	1.596	16.496	3.801
30.38	1593.6784	1599.46	1592.64	0.770	5.782	5.681	0.202	4.374	0.796
31.46	1593.3822	1599.46	1592.64	1.080	6.078	5.930	0.296	6.404	1.120
58.38	1592.6396	1599.46	1592.64	26.920	6.820	6.449	0.743	173.610	26.930
58.81	1593.8310	1599.46	1592.64	0.430	5.629	6.225	1.191	2.677	1.267
60.36	1594.8237	1599.46	1592.64	1.550	4.636	5.133	0.993	7.956	1.841
63.35	1597.4044	1599.46	1592.64	2.990	2.056	3.346	2.581	10.004	3.950
66.42	1599.1396	1599.46	1592.64	3.070	0.320	1.188	1.735	3.647	3.526
69.38	1600.9121	1599.46	1592.64	2.960	0.000	0.160	0.320	0.474	2.977
76.6	1600.9673	1599.46	1592.64	7.220	0.000	0.000	0.000	0.000	0.000
99.77	1600.6622	1599.46	1592.64	23.170	0.000	0.000	0.000	0.000	0.000
							Sum =	246.02	57.874
							Wetted perimeter R = A/P	R	4.251
							Manning's Value	n	0.040
							Channel slope	S	0.001

Velocity in channel (m/s)  $K = (1/n) \times A \times R^{(2/3)}$  Calc.  
 discharge (Cume) Max.  
 depth below HFL (m)

V	2
Keq	16139.88
Q	570.63
Dd (max)	6.820



**Table 6.5: Maximum Flood Discharge Data of Rambiarā Nallah.**

<sup>5</sup>Peak Flood Discharge with Corresponding Gauges Observed During the Flood of September 2014 and Maximum Flood discharges recorded till date for the Rambiarā Nallah

S. No.	Name of the Nallah (G/D Site)	Station Code	Peak Flood Discharge Observed During September-2014			Max. Flood Discharge Recorded till date		
			Date	Gauge in Meter	Peak Flood Discharge in Cusecs	Date	Gauge in Meter	Peak Flood Discharge in Cusecs
1.	Rambiarā Nallah- Tail at Naiyana	T-15B	05-09-2014	6.70	4500.00	10-09-92	G.U.W	12569.00

Source: I&FC Department, J&K

**Table 6.6: Scour Depth Calculations for Bridge Abutment at Wachi**

1	Design Discharge Q	570.631 m <sup>3</sup> /s
2	HFL Calculated	1599.460 m
3	Lowest bed level at bridge	1592.640 m
4	Mean diameter of particles dm )approx..	0.50 mm
5	Ksf	1.250

<sup>5</sup> -The peak flood discharge observed during the September 2014 floods do not contain the quantum of water that passed a) through the breaches, if any b) Over the embankments, if any.  
 -G.U.W means "Gauge under water".

6	Effective waterway L	45.0 m
7	Increase in design discharge by 30% (Q)	741.8 m <sup>3</sup> /s
8	Db = Q/L	16.485 Cumec/m
9	Mean Scour Depth dsm	8.057 m
10	Maximum scour depth= 27 x dsm	10.233 m
11	Max. scour level (wrt to lowest bed level)	1589.227 m
12	Scour depth w.r.t bed level	3.413 m

### 6.2.2. Erosion at Bridge Abutments during Floods/Rains

The Rambiarā Nallah at Wachi, which is one of the main tributary of River Jhelum experienced flooding with high discharge in September 2014 resulting into flooding of project site and adjoining areas. The total catchment area of Rambiarā in the district is about 360 Sq. kms. Rambiarā nallah due to its huge basin area and discharge weathers the host rocks, transports and deposits the sediments as river bed material.

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.

### 6.2.3. Sliding of Backfilling with Abutments

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

### 6.2.4. Seismic Factor in Design Bridge

The proposed bridge site at Wachi on Rambiarā Nallah in Shopian District 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 devise for slabs/spans should also be considered in bridge design/construction to withstand horizontal force during high-intensity earthquakes.

### 6.2.5. Snow Load on Proposed Bridge Site

The proposed bridge is located at Wachi in District Shopian which receives heavy snowfall which normally occurs during extreme winter. The design team of the contractor has to consider the design parameters based on the snow load.

#### **6.2.6. Embankment Slopes and Spoils**

Erosion problems may occur on exposed slopes of the nallah bank, newly constructed slopes and earth fills depending on soil type, angle of slope, the height of slope and climatic factors like the wind (direction, speed and frequency) and rain (intensity and duration). Soil erosion will add siltation to the runoff during the Rainy/ monsoon season.

#### **6.2.7. Excavation Activity of Nallah Beds (Foundation Wells)**

Construction of bridges involves the excavation of water channels bed and banks for the construction of the foundation and piers. If the residual spoil is not properly disposed of, increased sedimentation in downstream of the bridge may take place during the rainy season/ monsoon. Also, the bridge-end fills require armouring to ensure minimum gullying and slumping.

During the construction period, some amount of drainage alteration and downstream erosion/siltation is anticipated. Some of these alterations maybe because of the construction of temporary traffic detours/diversion. Except for these temporary works, in almost all cases there should be an improvement in the drainage characteristics of the surrounding area due to improved design and added culvert/ditch capacity.

#### **6.2.8. Quarries and Borrow Areas**

The excavation of quarries and borrow pits used for obtaining aggregate materials and soil for approach road construction can cause direct, and indirect long-term major adverse impacts on the environment. While the loss of productive soil is the most direct negative impact from borrow areas, other significant indirect negative impacts can also occur. Since most of the construction materials would be available from existing quarries nearby, relatively few new borrow areas may be required. One of the long-term residual adverse impacts of borrow pits not reclaimed, is the spread of mosquitos. Mosquitoes breeding and multiplying in stagnant water that collects in these pits can affect human health in villages in close vicinity.

### **6.3. Anticipated Impacts During Construction and Operation Stages**

Anticipated impacts on various environmental components during construction and operation phases of the proposed bridge at Wachi in Shopian District are described below:

#### **6.3.1. Impact on Topography and Physiography**

The proposed 1x45 span truss girder bridge at Wachi in Shopian District will be constructed in Kumar Mohalla. The approach road lies in a low lying floodplain area of Rambhara Nallah with self grown trees (comprising of Poplar, Willow, Ailanthus) which is synonymous with any flood plain area in Kashmir region. The land is non cultivable type as no crops of any type is observed and usually gets inundated during floods. Approach road from the Kumar Mohalla side having a 5.5 meter intermediate road will be constructed. The impact on the surrounding



topography and physiography of the area would be negligible during construction and operation phases of the proposed bridge.

### **6.3.2. Impact on Soil**

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

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

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

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

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

### **6.3.3. Impact on Water Resources**

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

The proposed construction of 45 meter span bridge at Kumar Mohalla Wachi village will be constructed over Rambiarra Nallah. The foundation excavation debris and construction wastes on the course of nallah may also affect surface water hydrology and flow. Excavation of slurry from the foundation wells may result in contamination and turbidity issue of the Rambiarra nallah. Proper management of excavation of foundation wells and disposal of the slurry.

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

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

### **6.3.4. Degradation of Water Quality**

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

The surface and groundwater quality due to the proposed bridge at Kumar Mohalla Wachi may be degraded mainly in the following ways:

- (i) by improper disposal of solid wastes, slurry during the excavation of foundation wells, oily wastes, used oil waste, etc.
- (ii) by raw sewage generated from camp, batching plant and bridge construction site,
- (iii) open defecation/ urination by workers on the course of Rambiarra Nallah.

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

#### **Operation Phase**

During the operation phase, there is no probability of degradation of water quality during normal operations of the proposed bridge at Rambiara Nallah.

### **6.3.5. Impact on Ambient Air Quality**

#### **Construction Phase**

During the 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.

A 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, the 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.

A considerable amount of exhaust emissions of carbon monoxide (CO), unburned hydrocarbon, sulphur dioxide (SO<sub>2</sub>), 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 the 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 the 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.

### **6.3.6. Impact on Noise**

#### **Construction Phase**

The proposed construction of the bridge at Wachi in Shopian District will be confined to the Rambiara Nallah as per design criteria and within the given geo-coordinates. During the

construction phase, the noise will be generated from the batching plant, operation of construction equipment's at a 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 mostly during works in day time only.

**Table 6.7: Source of Noise Pollution and Impact Categorization.**

S.No.	Phase	Source of Noise pollution	Impact categorization
1.	Pre-construction	<ul style="list-style-type: none"> <li>• Man, material &amp; machinery movements</li> <li>• establishment of labour camps, onsite offices, stockyards and construction plants</li> </ul>	<ul style="list-style-type: none"> <li>• all activities will last for a short duration and also shall be localized in nature</li> </ul>
2.	Construction Phase	<ul style="list-style-type: none"> <li>• Plant Site                             <ul style="list-style-type: none"> <li>- stone crushing, asphalt production plant and batching plants, diesel generators etc</li> </ul> </li> <li>• Work zones                             <ul style="list-style-type: none"> <li>- Community residing near to the work zones</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Plant Site: Impact will be significant within 250m.</li> <li>• Work zones: Such impacts again will be temporary as the construction site will go on changing with the progress of the works.</li> </ul>

**Construction - Related Noise**

In connection to noise-related impacts, the construction phase is a difficult stage. During this period noise impacts will be high due to operation of construction machinery and the conflict with the regular traffic (through access road to the bridge construction site) requiring more honking of vehicle horns and more stop and go (acceleration and deceleration process).

All temporary noise-related impacts near the project will occur during the construction activities. This will occur along the construction zone as well as construction camps, hot mix plants, WMM plants, crusher and quarry sites (if required).

Typical noise levels associated with the construction is given in **Table 7.7**. The magnitude of the impact will depend upon the specific types of equipment to be used, the construction methods employed and the scheduling of the work.

**Table 6.8: Typical Noise Levels Associated with Highway Construction**

S.N.	Activity Noise Levels	(d(B)A)
1.	Grading & Clearing	84
2.	Excavation	89
3.	Foundations	88
4.	Finishing of Road	84

**Operation Phase**

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

### 6.3.7. Impact on Management of Spills and Wastes

During the construction of the proposed bridge at Wachi, demolition/ material wastes and excavated earth/ slurry from the foundation, construction derbies, used oil from the 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 Raine Nallah. These wastes must be collected and disposed of appropriately

### 6.3.8. Impact on Flora, Fauna and Ecosystem

The approach road lies in a low lying floodplain area of Rambiarā Nallah with self grown trees (comprising of Poplar, Willow, Ailanthus) which is synonymous with any flood plain area in Kashmir region. These trees can grow profusely with dense growth. More recently the J&K Govt. has issued an order for cutting of the Poplar trees as it shed pollen in the form of cotton puff balls resulting into a health hazard (respiratory issues and other allergies). The land is non cultivable type as no crops of any type is observed. For the development of bridge approach roads, 61 trees of indigenous trees of Poplar, Willows, Ailanthus, Elm are required to be cut down for the construction of approach roads. Cutting of these trees will be compensated with Compensatory Plantation measures @ 3:1 ratio that is >183 comprising of indigenous type and Pine saplings will be planted as reflected in the EMP.

During the construction and operation phases of the proposed bridge at Wachi no adverse impact is anticipated on terrestrial fauna.

However, the aquatic which is associated with the Rambiarā nallah comprised fish fauna of *Shizothorex sps (Kashmiri fish)*. & Common carps and benthic invertebrates and zooplankton/ phytoplankton communities representative of riverine ecology of Kashmir rivers. No aquatic mammals or bigger animals reported from the Rambiarā.

#### General Bridge Structure Design consideration

Guidelines for Bridge Construction or Maintenance to Accommodate Fish Movement and Passage, Arizona Game & fish Department, Habiāt Brnach, Nov 2008

In general, bridge size depends on:

- Area of drainage upstream from bridge (i.e. larger drainage areas will likely require larger bridge spans)
- Volume and flow of peak run-off
- Average stream width, depth, and gradient (slope) at the crossing site
- Amount of debris loading or scouring
- Size and species of fish expected to utilize the bridge for passage

Bridge design and materials should not degrade water quality or repel animals and fish. Therefore when constructing, make sure that materials used within the stream are clean, not prone to erosion, and non-toxic to aquatic life.

Bridges should be long enough to exceed the floodplain width, allowing flood flows expand onto the floodplain to minimize scour, erosion, and flooding. Give preference to bridge locations where streambed and banks are composed of firm, cohesive soils to minimize erosion.

Maintain a natural substrate underneath the bridge. If concrete is necessary to prevent scour, then it is recommended to cover the concrete with a natural substrate.

Rip Rap is difficult for ungulates and amphibians to traverse and should not be placed in front of or on the slopes adjacent to a passageway. If rip rap is required, then it should be buried, back-filled with topsoil, and planted with native vegetation.

### **Construction Considerations:**

- Construct during periods of low flow to minimize impacts to fish and wildlife and their habitat.
- During construction, minimize disturbance to the length of the natural stream channel and the natural flow of the water.
- Remove temporary fills and structures when construction is complete.

Some general recommendations for the sizes of bridge openings suitable for the fish. Keep in mind that the most suitable design will differ depending on the species that require passage.

To be conducive as passage for use by fish, bridges must:

- Maintain a constant grade along the length of the bridge, and avoid large drops above or below the structure. Alternatively, if a new bridge is proposed in an area where the Department has determined a barrier to fish movement might be desirable, construction options could be explored.
- Accommodate both juvenile and adult fish.
- Maintain water depth through the bridge openings similar to those in the natural stream.
- Minimize turbulence and flow contraction because turbulence inhibits or prevents animal passage.
- Allow upstream fish passage.

### **Structure Placement:**

Bridge crossings alignment should be similar to that of the natural nallah/ stream. In-channel deposition and bank scour may lead to stream degradation. Drops greater than 2-4 inches or scour pools will obstruct upstream and downstream fish passage.



### **Internal Habitat:**

Ensure water depths are sufficient to allow passage of fish and other aquatic organisms during all seasons, unless otherwise desired based on coordination with the Department. Construct bridge bottoms with natural stream substrates and design a channel under the bridge to provide fish passage during low water periods.

### **Operation Phase**

- Monitor structures to ensure they are clear of obstructions such as detritus or silt blockages that impede movement.
- Monitor and evaluate effectiveness as a fish and make appropriate adjustments if necessary (e.g. Retrofit fencing or other modifications), and coordinate and report findings to fish and wildlife management agencies.
- Evaluate bridge impacts on erosion and riparian areas to ensure habitat integrity

### **6.3.9. Impact on Socio-economic Environment**

As per the screening study and site assessment, there is no approach on the left side of bridge (Kumar Mohalla side). The land coming in the approach corridor is of Government lad / Shamilat Deh land type (community land). However if any land acquisition is envisaged for the proposed approach road, the villagers will donate the same land. This was agreed in a public meeting held on 19.03.2019 with Central Aquaf Committee Ziyarat Shahi-Hamdan Mir Syed Ali Hamdani, Wachi Shopian (Declaration Letter of Villagers Committee Attached as *Annexure-XVIII*) in which people of the area participated and assured that one marla of land shall be donated by the villagers for the construction of the proposed bridge (approach road) and in case additional land is required same will also be donated for the cause.

The construction and operation phases of the proposed bridge will have a beneficial impact on the social environment and direct connectivity with the adjoining villages and District Head Quarters. Increase in income of local people is expected as some of local unskilled, semi-skilled and skilled persons may gain direct or indirect employment during the construction phase of the proposed bridge. Since the immigration of the workforce during the 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***

#### **6.3.9.1. The influx of Construction Workers**

Although the construction contractors are likely to use un-skilled labour drawn from local communities, use of specialized road construction equipment will require trained personnel not likely to be found locally. Sudden and relatively short-lived influxes of construction workers to communities in the project area will have the potential to 'skew' certain demographic variables and the traditional social coherence.

It is anticipated that the construction labour inputs for the construction of the proposed bridge at Wachi will be in the order of about 50-60 persons per day. However, this number will fluctuate and the number in any particular activities will be lower.

### **6.3.10. Economic Impacts**

The relatively short-lived economic impacts of the construction phase are likely to be experienced in local communities for the duration of construction, as workers will make everyday purchases from local traders. Few shopkeepers exist near Dablepora side (RHS of the bridge) near approach road, due to the construction activities these shops will also get benefitted as well. This is likely to give a short-lived stimulus to these traders that will disappear as soon as the construction is complete. Wider, flow-on economic impacts will be experienced in other sectors of the economy as a result of the purchase of construction materials and the payment of wages and salaries.

#### ***Operation Stage***

During the operation phase, the proposed bridge at Wachi will provide safe movement of traffic and reduce the travel time of these communities. The proposed bridge will also facilitate the movement of people and vehicles and ease of access due to the construction of Wachi Bridge. The agricultural produce in these communities Wachi and adjoining areas will be easily procured and delivered to the main town and city centre. Also, the proposed bridge is more essential as the road is vital in reaching to agriculture fields and direct connectivity with the Shopian. Therefore, a positive impact is anticipated on the socio-economic environment during the operation phase.

### **6.3.11. Impact on Religious Structures and Cultural Properties**

No religious place is located near the bridge site at Kumar Mohalla, Wachi. One mosque is located approx. 155 meters from bridge site anear Dablepora

#### **6.3.11.1. Common Property Resources**

Adverse socio-economic impacts include all disruptions on the social and economic interactions of communities due to the project. This involves an effect on both the adjacent communities (mostly direct) as well as the nearby communities (mostly indirect).

### **6.3.12. Impacts Relating To Human Health & Safety**

Poor sanitation arrangement and improper methods used for collection and disposal of solid wastes and effluent, accommodation without ventilation, unhygienic food, electrical safety, the risk from mosquito and reptile etc at the construction workers camp will impact human health and safety.

### **6.3.13. Safety Aspects**

Increase of incidence of accidents is anticipated due to disruptions of traffics movements in the construction work zones and access road.

#### **Safety for workers at the worksite and health problems at Labour camps**

- Occupational health and safety risks to workers due to inadequate housekeeping and unsafe work practices at work sites.
- Health problems to workers due to inadequate sanitation and un-healthy environment at labour camps/plant sites.

### **6.3.14. Impact of Pandemic Disease Covid-19 (Coronavirus)**

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

In the workplace of construction sites, labour campsites, site offices etc., the best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. To protect yourself and others from infection by strictly following the COVID-19 Standard Operational Procedures (SOP's) of the Government protocol and guidelines from World Health Organization (WHO), International Labour law (ILO) and other agencies.

## **7. ANALYSIS OF ALTERNATIVES**

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This chapter presents a comparative analysis of various alternatives considered to avoid or minimize impacts that would be inevitable if technically (based on design and geometrics) best-fit alignment is followed. The component 2 of Jhelum and Tawi Flood Disaster Recovery Project" is 'to restore and improve the connectivity disrupted due to the disaster (deluge of September 2014) through the reconstruction of damaged infrastructure like bridges. The infrastructure will be designed to withstand earthquake and flood forces as per the latest official design guidelines. The affected areas will benefit from the restored access to the markets thereby increasing the economic growth in these areas and timely access to health and education services. Based on the above assessment, bridge design parameters have been adopted as per the latest official design guidelines mandated for the seismic Zone-V as per BIS standards for the construction of the proposed bridge at Kumar Mohalla Wachi in District Shopian. The synoptic description of the design parameters is presented in Chapter 2 and are flexible in design to avoid most of the impacts. An analysis of various alternatives is attempted to arrive at the technically and environmentally and socially best-fit alternative.

The analysis of alternative is a documented illustration/evidence to show and ensure that final decisions taken are;

- Following the project objectives.
- In compliance with the country laws, policies and legal requirements.
- To confirm that the project is actually needed and not imposed and not to lead any major loss or destruction to natural resources either directly or indirectly.
- To confirm that the implementation of the project will not lead to any major crisis or conflict in the community during implementation.
- To confirm that the Public/Government financial resources are not wasted for wrong projects/infrastructural works without the consideration of views of the stakeholders.
- To confirm that no individual and biased approach (for example implementation of a personal ambition using public money in a secretive manner) from the responsible implementing official/s has taken place.
- In accordance with the actual requirements of the local people.
- Following the World Bank policies and procedures.
- To create climate-resilient and flood-proof road infrastructure.

These were also an integral part of the analysis of alternatives throughout the project preparation.

As per environmental and social screening exercise and assessment survey/ database, the vital bridge connectivity is missing between the Kumar Mohalla and adjoining areas with the Wachi other habitations/ villages due to the lack of a bridge.

There are few settlements, as seen in the baseline environmental scenario along the project road, where there is narrow RoW and sometimes traffic is leading to congestion as well as various environmental impacts. Several alternatives are analyzed for avoiding localized environmental impacts & arriving at the best-fit alignment.

### 7.1. With or Without Project Scenario

The 'with' and 'without' project scenarios are analyzed for the development of the state by the back-drop of the requirement of reliable quality infrastructure for sustained growth economy and consequent well-being of local people.

Providing better connectivity will ensure that goods and people from areas covered by the bridge construction can move in and out of the areas quicker and save time. Increased trade and commerce activity are expected as agriculture are the main activity for growth. By construction of bridge, climate-resilient and flood-proof infrastructure. The project road has been designed to connect the various settlements with better access.

If the bridge project is not constructed, there is every likelihood that the people of the project area will continue to suffer and quality of life will be deteriorated and impacted by flood further. As a present scenario of no bridge exists, people will continue to suffer due to the lack of any connectivity. The residents and villagers have travel approx. 2 km via canal road to Malawarah to reach Shopian road at other end of the proposed bridge. An during floods it becomes very difficult to move to these areas. In the absence of the project, the J&K Govt may find it difficult to generate resources for such a bridge infrastructure which is required and for the benefits of the people at large. Increased air pollution, is anticipated mainly attributed to the movement of construction vehicles which is temporary and site-specific. Noise levels will rise due to the operation of machinery and construction vehicles as well.

Therefore, the "with" project scenario, with its minor adverse impacts is more acceptable than the "without" project scenario which would mean an aggravation of the existing problems. Potential benefits of the construction of the bridge project at Kumar Mohalla Wachi are substantial and far-reaching both in terms of the geographical spread and time saving. Hence, it is clear that the implementation of the project will have definite advantage to the area in order to create climate resilient and flood proof Bridge.



## 8. PUBLIC CONSULTATION AND DISCLOSURE

### 8.1. Introduction

Public consultation/meeting was conducted in Kumar Mohalla and Dablepora of Wachi village in September 2018 and July 2020 for the proposed “Construction of 1x45 meter Single Span Truss Girder Bridge over Rambiarā Nallah in District Shopian. Consultation has been followed in accordance with the World Bank’s ESMF-JTFRP protocol which is the pre-requisite for the environmental screening process and environmental & social assessment. The purpose and objective of this consultation is the involvement of residents/ stakeholders and to make them cognizant about the proposed road up-gradation activity of the subproject. Consultation with the stakeholders/ participants were conducted and participated based on the procedural guidelines of reaching public required for the preliminary baseline characteristics of environmental and social screening. Details of the consultation are captured in Table 9.1 below;

**Table 8.1: Public consultation details**

S. No.	Name of the Subproject Road	Location of Consultation	Date of Consultation	Geo-coordinates of Location
1.	Construction of 1x45m Truss Girder Bridge on Rambiarā Nallah at Kumar Mohalla Wachi.	Kumar Mohalla/ Dablepora in village Wachi of Zainpora Block in District Shopian	11-09-2018 19-03-2019 11-07-2020	Lat: 33° 48’ 15.04” Long: 75° 02’ 14.70”

A reconnaissance survey was also conducted for the proposed bridge project in Wachi Village. Baseline information was also collected from the adjoining areas in close proximity within the Project Influence Area (PIA) in September 2018 and July 2020. Formal and informal consultations were undertaken with the project stakeholders to take the views and propositions about the project activities.

The following section highlights the level of consultative procedure adopted at various stages, strategies to participatory and continued consultation and specific inputs from the stakeholder's consultation in project planning.

### 8.2. Identification of Stakeholders

Consultations were conducted with both primary and secondary stakeholders in the project area. The primary stakeholders consulted are usually (i) Local community having their permanent or temporary residences (ii) Roadside shop owners (iii) Road users and (iv) Community Leaders. While the secondary stakeholders are mostly the project officials, village representatives and social activists

**Table 8.2: Identification of Stakeholders**

1	Primary Stakeholders (Main stakeholders)	<ul style="list-style-type: none"> <li>• Potential PAPs, stakeholders and Community leaders</li> </ul>
2	Secondary Stakeholders (Other Stakeholders)	<ul style="list-style-type: none"> <li>• Groups of affected persons;</li> <li>• Village representatives- like Sarpanch and members, PRI's, Village Level health workers, Patwaris</li> <li>• Local voluntary organizations like NGOs etc</li> <li>• Field level Engineers, Assistant Engineers, Junior Engineers), PIU/ PWD (R&amp;B, Government of J&amp;K.</li> <li>• Other project stakeholders such as official of line Department</li> </ul>

### 8.3. Consultations with Stakeholders

Consultation with the community was carried out at Kumar Mohalla and Dablepora in Wachi Village (refer Table 9.1) of the project to inform and educate the Project-Affected-People (PAP's) and other stakeholders about the proposed action before the finalization of design to include their inputs. The consultation was also carried out to identify the problems associated with the proposed project and the needs and values of the population likely to be impacted by the project. Locations were selected which represent the predominant land uses of the project area and also included all sections of people in the project region -from agricultural labourers to landowners, employee and business community and shop keepers. In each of these consultations, the villagers were briefed about the proposed bridge project and its approach road alignments and the potential benefits of the project.

The various forms of public consultations (consultation through ad-hoc discussions on site-along project corridor) have been used to discuss the sub-project and involve the community in planning the design and mitigation measures. The signatures/photographs of participants in the public consultation are given in **Annexures**.

### 8.4. Objective of the Public Consultation

The process of public participation/consultations was taken up as an integral part of the sub-project in accordance with World Bank guidelines and the following objectives:

- To educate the general public, especially potentially impacted or benefited communities/individuals and stakeholders about the proposed sub-project activities;
- To familiarize the people with technical and environmental issues of subproject for better understanding;
- Dissemination of information to local communities through the public consultation by briefing the project including its benefits.
- Informal by group consultations in the sub-project vicinity at field level.
- The environmental concerns and suggestions made by the participants were listed out, discussed and suggestions were accordingly incorporated in the EMP.

### **8.5. Issues Discussed during Public Consultation**

The issues discussed during public consultation for the proposed bridge project at Kumar Mohalla in Wachi Village of District Shopian are given below:

- About the proposed bridge project, source of assistance and its implementation/execution etc.
- Information on perceived benefits from the proposed Wachi bridge project including travel time, fuel cost, noise and air pollution.
- People were updated about the Covid-19 Pandemic crisis happening throughout the world and its increased spread at National and State level. People were apprised about the importance of Social Distancing, wearing of masks, sanitization/ frequent washing. People were also informed that the construction works will not start unless the Contractor for this project will implement stringent measures/ Guidelines as devised/ recommended by the World Health Organization/ Ministry of Health, Govt. of India/ International Labour Organization and Local Administration guidelines.
- People were also informed that Covid-19 Marshal/ Officer will be also appointed and mobilized by the contractor during the commencement of the works until the completion of the project. This exercise will ensure that the stringent Govt. protocol and international guidelines are strictly followed.
- Covid-19 WHO/ ILO guidelines Government protocol will form the part of the EIA/ EMP report for its effective implementation in this project.
- Information on the impacts from the proposed Wachi bridge project during construction stage in terms of inconvenience to the public, air and noise pollution, etc. The occurrence of a disaster like floods and cloud bursting in past.
- Whether construction activities will cause any type of health hazard or not?
- Discussions among the public for sharing of information related to the proposed Wachi bridge project, environment policy of World Bank, direct and indirect impacts of improvement/construction work on the environment.
- Any loss of land/structure/business or other community property due to the proposed Wachi bridge project.
- Presence of any historical or cultural monuments near the project area and any impact is seen due to the proposed Wachi bridge project?
- Any impact on trees and protective measures to be taken for the safeguarding of scheduled trees (1 Walnut near approach from Kumar Mohalla side) in close vicinity of the proposed site.
- Any possible problems to be faced by the local people in their daily activities due to the proposed construction of Wachi bridge project.

### **8.6. Outcome and Feedback received from the Public Consultation**

At Kumar/ Dablepora, Wachi local people participated in the consultation process, and both inhouse meetings and people were also consulted at project site. The participants were mainly farmers, students, businessman etc. People, in general, were very enthusiastic

about the benefits of the sub-project as it will provide direct connectivity with the rest of the habitations with the project site at Wachi. The major problems faced by concerned people are difficulties being faced by them in the absence of bridge. As per present scenario of no bridge exists, people will continue to suffer due to the lack of any connectivity. The residents and villagers have to travel approx. 2 km via canal road to Malawarah to reach Shopian road at other end of the proposed bridge and during floods it becomes very difficult to move out from these areas. People are ready to extend all support during the execution of the sub-project and for successful completion of the project..

PIU (R&B) ensured that the requisite environmental and social management measures shall be incorporated in EMP and public consultation shall be a regular process during all stages of the sub-project execution to solve any issues arising out of proposed works.

The valuable feedback received from the consultation conducted in project area with the residents are summarized below;

- It was informed by the locals of Kumar Mohalla and Dablepora that the number of surveys have taken up for the proposed bridge and yet no construction have started. Local villagers requested for the priority based approach in early commencement of works.
- Poor local people from Kumar/ Dablepora shall be preferred for employment in the project activity. As enough labourers are available in the area which will be beneficial for the contractor.
- Since the land coming in the approach corridor from Kumar Mohalla side is of Government land and the Shamilat Deh land type (community land). In a public meeting on 19.03.2019 with Central Aquaf Committee Ziyarat Shahi-Hamdani Mir Syed Ali Hamdani, in which people of the area participated in public consultation. And in a meeting it was decided by the villagers committee that one marla of land will be donated by the villagers for the construction of the proposed bridge (approach road). In a meeting it was further decided that if more land is required for the construction of the bridge (approach road), the same will be provided/donated and requested the department concerned to start the construction work immediately and in case additional land is required same will also be donated for the cause. Refer annexure VI (Declaration Letter of the Villagers of Wachi)
- Noise generating activities should be scheduled only during working hours (Day time).
- People suggested that the construction zone must be properly barricaded to avoid the local kids for swimming purpose which may possess safety issues during well-foundation. Contractor to ensure that safety marshals/ safety officer in place will not allow any person especially kids to enter into open trenches or excavated area
- Proper and timely disposal of construction wastes shall be ensured.

## 9. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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### 9.1. Introduction

Environmental Management Plan (EMP) has been prepared which mainly centred on the understanding of the interactions between the environmental and social setting and the project activities and the assessment of the likely impacts. Mitigation measures for anticipated environmental and social impacts have been elaborated as specific actions which would have to be implemented during the project implementation. The EMP would help the contractor and PIU to implement the project in an environmentally sustainable manner and where EPC contractor for this bridge project, understand the potential environmental and social impacts arising from the proposed construction of Wachi bridge over Rambiara Nallah. EPC contractor have to take appropriate actions/ mitigation measures to properly mitigate/manage such environmental impacts. EMP can thus be considered to be an overview document for the EPC contractor engaged for this bridge project that will guide EMP of all anticipated impacts. This EMP may also be considered as flexible and will be further developed by the EPC Contractor in the Contractor's Environment Management Plan (EMP).

### 9.2. Proposed Works of Wachi Bridge Project

The proposed components of construction of Wachi bridge project consist of the following works:

1. Construction of 1x45 meter single-span Truss Girder Bridge
2. Construction of Approaches on both sides (160 meters on bothe sides)
3. Nallah training Works etc.

### 9.3. Outline of EMP and its Implementation Strategy

The EMP is a guiding tool which discusses the potential environmental and social impacts and specific mitigation/management measures for the proposed construction of 1x45 meter trussed girder bridge at Kumar Mohalla in Wachi Village Shopian. It refers to the responsibilities ensuring commitment for implementation and means of verifying/ supervision whether the same has been implemented properly. The timing and frequency of monitoring along with the supervision responsibility and reporting requirements are also provided in the Environmental & Social Management Plan. As a part of the EMP, the EPC Contractor will commit to the identification of the environmental and social impacts at the project site. In case of any future changes in the bridge project design, the EMP will need to be updated to reflect the new scope of the activities. Such revisions will be finalized in consultation with the World Bank.

The PIU (R&B) will be responsible to ensure implementation of EMP for the performance of all by the EPC Contractor of this bridge project with the overall accountability resting with the JTFRP-PMU. Whereas, the TAQAC will ensure periodic quality audit/ guidance to the PIU and Contractor and by imparting regular training, monitoring, and ensuring that all EMP provisions



and requirements are translated into contract document and that these requirements are implemented to their full intent and extent.

Overall responsibility will be of EPC Contractor for effective implementation of EMP and adherence to all the mitigation measures as outlined in this EMP associated with their respective activities. The EPC Contractor will be required to comply with the provisions of the EMP.

### **9.4. Environmental Management Measures for the Design stage**

#### **9.4.1. Hydrological Study for Design of Proposed Bridge**

The proposed Wachi bridge is proposed to be constructed over Rambiarā nallah at Wachi village with a geo-coordinates between the latitudes of 33°48'10.28"N and Longitude of 75°02'10.67"E. The Rambiarā nallah is a main tributary from the District Shopian and carries high discharge during episodes of precipitation into River Jhelum. Rambiarā nallah crosses its banks during high discharge which results into flooding of the low lying areas including project site and whole area was affected with the devastating floods of September 2014. Therefore, based on this assessment hydrological study and runoff calculations for extreme flood/rains under the climate change scenarios is important for the proposed construction of the bridge and same study has been carried out and considered for designing of the proposed 1x45 meter bridge at Kumar Mohalla in Wachi with excess runoff flow/flood safeguard.

#### **9.4.2. Sliding of Backfilling and Prevent Uplift Pressure at Abutments**

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

#### **9.4.3. Seismic Factor in Design of Bridge**

The proposed trussed girder bridge at Kumar Mohalla Wachi in District Shopian is located in Seismic Zone V and susceptible to high-intensity earthquakes. Therefore, seismic load factor must be taken into consideration while designing of bridge components.

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

#### **9.4.4. Snow Accumulation on the Proposed Bridge**

The proposed trussed girder bridge at Kumar Mohalla Wachi in Shopian District observes heavy snowfall during extreme winter. Accumulation of snow on the bridge may put additional load on the proposed bridge. Therefore, the snowfall load should be considered while designing the proposed bridge.

#### 9.4.5. Approaches for Bridge

The approach/approach slab provides a transition between the 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 the bridge with the existing road should be ensured during the design of the bridge.

#### 9.4.6. Safety Signage for Bridge

For the 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.

### 9.5. Environmental Management Plan (EMP)

The Environmental Management Plan (EMP) will guide the environmentally-sound construction of the 1x45 meter Trussed Girder Bridge over Rambiarā Nallah at Wachi in District Shopian and ensure efficient lines of communication/ coordination between the PIU, EPC Contractor, PMU and TAQAC. The EMP has been prepared for three stages of bridge project construction activities as (i) Pre-construction Stage; (ii) Construction Stage; and (iii) Demobilization/ Operation Stage. EMP for the above bridge project has been prepared and presented in **(Table 9.1)**. A different set of guidelines, checklists, strip mapping plan and reporting formats for implementation of EMP are given as Annexures in this EIA Report of bridge project at Kumar Mohalla Wachi

The purpose of the EMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of:

- (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental & social performance on-site;
- (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject;
- (iii) detail specific actions deemed necessary to assist in mitigating the environmental impacts of the subprojects; and
- (iv) ensure that safety recommendations are complied with.

Budgetary provisions for the implementation of EMP shall be integrated with part of the 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/cost will be provided to the contractor for implementation of EMP. The contractor will ensure effective implementation of EMP during pre-construction, construction and demobilization/ operation stages. EMP for operation stage will be implemented by PIU/PMU.

The EPC Contractor is deemed not to have complied with the EMP if; i), within the boundaries of the project site/ ancillary sites, site extensions and haul/ access roads there is evidence of a

contravention of clauses, if environmental damage ensues due to negligence, the EPC contractor fails to comply with corrective action measures or other instructions issued by the PIU / JTFRP-PMU within a specified timeframe and the EPC Contractor fails to respond adequately to complaints from the public.

**Table 9.1: Environmental Management Plan (EMP) of Construction of 1x45 Meter Single Span Trussed Girder Bridge over Rambiarra Nallah at Kumar Mohalla Wachi in District Shopian.**

S. No.	Environmental Issues	Environmental Mitigation Measures	Responsibilities	
			Implementation	Supervision/ Monitoring
<b>A.</b>	<b>Design Phase</b>			
A.1	Hydrological Study for designing of Bridge	The Rambiarra nallah is a main tributary of the River Jhelum and carries high discharge during episodes of precipitation into River Jhelum. Rambiarra nallah crosses its banks during high discharge which results into flooding of the low lying areas including project site and whole area was affected during devastating floods of September 2014. Therefore, based on this assessment hydrological study and runoff calculations for extreme flood/rains under the climate change scenarios is important for the proposed construction of the the bridge and same study has been carried out and considered for designing of the proposed 1x45 meter bridge at Kumar Mohalla in Wachi with excess runoff flow/flood safeguard.	Design Team	PIU
A.2	Erosion at Bridge Abutments During Floods/ High Discharge	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 a 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 Seismic Activity/ Earthquake on Bridge	The proposed bridge is located in Seismic Zone V and prone to high-intensity earthquake. Therefore, seismic load factor must be taken into consideration while designing of bridge components.	Design Team	PIU
A.5	Dislocation of Span of During Seismic Activity/ Earthquake	As the bridge is located in high Seismic Risk Zone V. Therefore, Seismic Arresters should be provided to withstand horizontal force during the earthquake and as an anti-dislocation device for slabs/spans.	Design Team	PIU
A.6	Snow Accumulation on the Proposed Bridge	The project is located in snowfall area. Accumulation of snow on the bridge may affect the integrity of the proposed bridge. Snow load should be considered while designing the proposed bridge.	Design Team	PIU

A.7	Approaches for Bridge	Approach slab as per IRC guidelines and well-designed approaches to connect the 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 Uses	For the 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>B 1 Pre-construction Activities By the Contractor</b>				
B 1.1	Appointment and Mobilization of Environment & Safety Officer	<ul style="list-style-type: none"> <li>The contractor will appoint qualified and experienced Environment &amp; Safety Officer (ESOs) who will work dedicatedly and ensure implementation of EMP including Occupational, Health and Safety of workers issues at the camp, batching plant and bridge construction work site.</li> <li>Contractor to inform the PIU for the appointment and mobilization of Environmental Safeguard Officer (ESO).</li> </ul>	Contractor	PIU TAQAC
B 1.2	Appointment and Mobilization of Covid-19 "Marshal"	<ul style="list-style-type: none"> <li>The contractor will appoint and mobilize Covid-19 "Marshal" for effective implementation of the Covid-19 protocol/ guidelines issued by the Government and World Health Organization (WHO) at Workplace/ construction sites.</li> </ul>	Contractor	PIU, TAQAC
B 1.3	Regulatory Approvals	<ul style="list-style-type: none"> <li>Permission from Irrigation &amp; Flood Control Department for construction of the bridge on Rambiara Nallah and other related works like approach roads and nallah training works</li> <li>Labour license from the Department of Labour.</li> <li>If contractors open new stone quarry or borrow areas, prior Environmental Clearance will be obtained from SEIAA/DEIAA.</li> <li>For set-up of Stone Crusher Plant and Batching Plant, D.G Sets- Consent to Establish and Consent to Operate will be obtained from J&amp;K State Pollution Control Board (J&amp;KSPCB) or if contractor intends to procure construction materials from local authorized third party agencies then the contractor will collect and submit necessary clearance/approval from authorized third party agencies.</li> </ul>	Contractor	PIU
B 1.4	Arrangements for Temporary Land Requirement for Camp	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, TAQAC



B 1.5	Location of Batching Plant	<p>The 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.</p> <p>Consent to Establish and Consent to Operate will be obtained from J&amp;K State Pollution Control Board (as required) before the establishment and operation of batching plant.</p>	Contractor	PIU, TAQAC
B 1.6	Other Construction Vehicles, Equipment and Machinery	<p>All vehicles, equipment and machinery to be procured for construction of the bridge will conform 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.</p> <p>The silent/quiet equipment like DG set as per regulations will be used at the bridge construction site.</p> <p>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.</p>	Contractor	PIU, TAQAC
B 1.7	Procurement of Aggregate	<p>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.</p> <p>The Contractor will also work-out road network and report to PIU, which will be inspected before approval.</p>	Contractor	PIU, TAQAC
B 1.8	Labour Requirement	<p>The contractor preferably will use unskilled/semiskilled labour from the local area to give the maximum benefit to the local community. Contractor to be followed strictly the Covid-19 protocol (SOP) while mobilizing the labourers from the local community or outside</p>	Contractor	PIU, TAQAC
B 1.9	Construction Vehicles, Equipment and Machinery	<ul style="list-style-type: none"> <li>All vehicles and equipment to be procured for the proposed bridge work at Kumar Mohalla Wachi, Shopian will conform to the relevant Bureau of Indian Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 2019 will be strictly adhered to.</li> <li>The silent/quiet equipment like DG set as per regulations will be used at the construction site or labour camp.</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 Monitoring and whenever required.</li> </ul>	Contractor	PIU, TAQAC

B.2 Pre-Construction Activities By The PIU																																																																																																																					
B.2.1	Tree cutting	<ul style="list-style-type: none"> <li>As per site assessment, about 61 trees (non- scheduled trees) will be affected comprising mainly of Poplar, Willow, Elm, Ailanthus, Acacia trees. <i>These trees will be cut down as they come within or may protrude towards approach road pavement and result critical safety hazard.</i></li> <li>Loss of trees will be compensated by 1:3 ratio (i.e. for loss of 1 tree 3 trees will be planted) or greater and transplantation of the small trees may be envisaged wherever applicable.</li> </ul>	Contractor	PIU																																																																																																																	
		<table border="1"> <thead> <tr> <th>S. No</th> <th>Name of the Trees to be cut</th> <th>Number of trees</th> <th>Girth Class (in cm)</th> <th>Location</th> <th>Alignment from bridge (LHS/RHS)</th> <th>from abutment</th> </tr> </thead> <tbody> <tr> <td colspan="7"><b>A. Kumar Mohalla Side (LHS of bridge)</b></td> </tr> <tr> <td>1</td> <td>Poplar</td> <td>20</td> <td>25–240 cm</td> <td>Kumar Mohalla</td> <td>RHS</td> <td></td> </tr> <tr> <td>2</td> <td>Wilows</td> <td>7</td> <td>25-110 cm</td> <td>Kumar Mohalla</td> <td>RHS</td> <td></td> </tr> <tr> <td>3</td> <td>Elm (Bren)</td> <td>12</td> <td>50-210 cm</td> <td>Kumar Mohalla</td> <td>RHS</td> <td></td> </tr> <tr> <td>4</td> <td>Ailanthus</td> <td>2</td> <td>25–100 cm</td> <td>Kumar Mohalla</td> <td>RHS</td> <td></td> </tr> <tr> <td>5</td> <td>Acacia</td> <td>2</td> <td>40-130 cm</td> <td>Kumar Mohalla</td> <td>RHS</td> <td></td> </tr> <tr> <td colspan="2">Total trees</td> <td>43</td> <td colspan="4"></td> </tr> <tr> <td colspan="7"><b>B. Dablepora side (RHS of bridge)</b></td> </tr> <tr> <td>6</td> <td>Poplar</td> <td>2</td> <td>45-115 cm</td> <td>Dablepora</td> <td>LHS</td> <td></td> </tr> <tr> <td>7</td> <td>Wilows</td> <td>1</td> <td>75 cm</td> <td>Dablepora</td> <td>LHS</td> <td></td> </tr> <tr> <td>8</td> <td>Elm (Bren)</td> <td>9</td> <td>70–190 cm</td> <td>Dablepora</td> <td>LHS</td> <td></td> </tr> <tr> <td>9</td> <td>Ailanthus</td> <td>3</td> <td>40–80 cm</td> <td>Dablepora</td> <td>LHS</td> <td></td> </tr> <tr> <td>10</td> <td>Acacia</td> <td>3</td> <td>45–95 cm</td> <td>Dablepora</td> <td>LHS</td> <td></td> </tr> <tr> <td colspan="2">Total Trees</td> <td>18</td> <td colspan="4"></td> </tr> <tr> <td colspan="2"><b>Total number of trees non-sheduled to be cut (Approx. 61 trees)</b></td> <td colspan="5"></td> </tr> </tbody> </table>	S. No	Name of the Trees to be cut	Number of trees	Girth Class (in cm)	Location	Alignment from bridge (LHS/RHS)	from abutment	<b>A. Kumar Mohalla Side (LHS of bridge)</b>							1	Poplar	20	25–240 cm	Kumar Mohalla	RHS		2	Wilows	7	25-110 cm	Kumar Mohalla	RHS		3	Elm (Bren)	12	50-210 cm	Kumar Mohalla	RHS		4	Ailanthus	2	25–100 cm	Kumar Mohalla	RHS		5	Acacia	2	40-130 cm	Kumar Mohalla	RHS		Total trees		43					<b>B. Dablepora side (RHS of bridge)</b>							6	Poplar	2	45-115 cm	Dablepora	LHS		7	Wilows	1	75 cm	Dablepora	LHS		8	Elm (Bren)	9	70–190 cm	Dablepora	LHS		9	Ailanthus	3	40–80 cm	Dablepora	LHS		10	Acacia	3	45–95 cm	Dablepora	LHS		Total Trees		18					<b>Total number of trees non-sheduled to be cut (Approx. 61 trees)</b>									
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B.2.2	Environmental Monitoring-Baseline Data	Ambient air quality, noise levels and water quality monitoring on the six-monthly basis as per environmental monitoring plan and following the instruction of Environmental Specialist of PMU.	PIU	PMU, TAQAC																																																																																																																	

B.2.3	Information Dissemination and Communication Activities	<ul style="list-style-type: none"> <li>• Before construction activity, information dissemination will be undertaken by the contractor at the project site. The wider dissemination of information to the public will be undertaken by PMU through the disclosure of EIA / EMP reports on the website of PMU-JTFRP.</li> <li>• Project information Board showing the name of work, project cost, duration, date of commencement, date of completion, executing agency and contact details (including telephone numbers) shall be at approach roads.</li> <li>• Information boards will also be set up at the sites of construction camps and labour camps, plants and stockyard site. Details of Nodal officer with telephone numbers will be displayed for registering complaint/grievances by stakeholder/general public</li> </ul>	Contractor	PIU, TAQAC
B.2.4	Utility Relocation	<ul style="list-style-type: none"> <li>• Before commencement of works, a joint field Monitoring will be conducted by the Contactor, TAQAC, PIU to map out the alignments, to check utility (irrigation pipeline &amp; PDD electric poles) is being impacted due to the construction works.</li> <li>• An irrigation pipe (DI type) of 200 dia is required to be shifted/ realigned from the proposed approach corridor from the Kumar Mohalla side.</li> <li>• Contractor to ensure early shifting/ realigning of the I&amp;FC pipeline to the LHS of the proposed approach road in consultation with the I&amp;FC and as per instruction of PIU.</li> <li>• Few electric poles are also coming in the approach corridor and shall be shifted accordingly in consultation with PIU and concerned agency.</li> </ul>	Contractor	PIU, TAQAC
<b>C.</b>	<b>Construction Stage</b>			
<b>C.1</b>	<b>Protection of Trees</b>			
C.1.1	Safeguarding of Trees and Plantation	<ul style="list-style-type: none"> <li>• 1 Walnut trees near the approach road from Kumar Mohalla side (LHS of bridge site). Walnut is a scheduled tree (protective tree) of the J&amp;K.</li> <li>• Walnut tree will be marked with horizontal reflective strip and covered/ wrapped with protective green mesh fibre cloth around the base tree trunk area by 6 feet in height before the commencement of works.</li> <li>• No stockpiling of any construction will be allowed around or close to scheduled trees.</li> <li>• Make-shift steel barricading will be provided around each tree in an active work zone where foundation/ excavation takes place.</li> <li>• Any other trees within the area close to proposed approach road during construction stage will be marked with same horizontal reflective strips and green mesh as per the above measures.</li> </ul>	Contractor	PIU, TAQAC

<b>C.2</b>	<b>Site Clearance (Clearing and Grubbing)</b>			
C 2.1	Clearing, grubbing and Levelling	<ul style="list-style-type: none"> <li>• If required vegetation will be removed from the construction zone (approaches) before the commencement of construction.</li> <li>• All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval of PIU.</li> <li>• The Contractor, under any circumstances, will not cut or damage trees.</li> <li>• Trees identified under the project will be cut only after receiving clearance from the Forest Dept (as applicable). Vegetation with a girth size of over 30 cm will be considered as trees and shall be compensated.</li> </ul>	Contractor	PIU, TAQAC
<b>C 3.</b>	<b>Water Pollution</b>			
C 3.1	Impact on Water Resource during the construction of the bridge	<p>The following mitigation measures are recommended during the construction of the proposed bridge at Wachi, Shopian:</p> <ul style="list-style-type: none"> <li>• Construction of Wachi bridge should be done during lean flow and high discharge/ precipitation episodes to be avoided..</li> <li>• Curtains 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 of in an environmentally sound manner as soon as construction is over.</li> <li>• The construction of the bridge should not affect existing flow pattern and drainage system around the proposed bridge at Wachi, Shopian.</li> <li>• Flowing water will be diverted with guide bunds and cofferdams at pier locations</li> </ul>	Contractor	PIU, TAQAC
C.3.2	Water Pollution from construction material	<ul style="list-style-type: none"> <li>• The contractor will take all precautionary measures to prevent entering of wastewater into water bodies or the irrigation channel (near end of approach road- Kumar Mohalla) ring construction. The contractor will avoid construction works close to the streams or water bodies during rainy season/ later effect of monsoon.</li> <li>• Contractor shall not wash his vehicles in river water and shall not enter riverbed for that purpose.</li> <li>• Any type of construction wastes will not be disposed of in Rambiara Nallah or water bodies near by.</li> </ul>	Contractor	PIU, TAQAC

C 3.3	Water Pollution from Fuel and Lubricants	<ul style="list-style-type: none"> <li>• The Contractor will ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites will be located at least 250 m away from rivers and irrigation canal/ponds. The Contractor will submit all locations and layout plans of such sites before their establishment and will be approved by the Environmental Specialist of PIU. The contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refuelling areas will be treated in an oil interceptor before discharging into on land or into surface water bodies or other treatment systems.</li> <li>• In all, fuel storage and refuelling areas, if located on areas supporting vegetation, the topsoil will be stripped, stockpiled and returned after cessation of such storage.</li> <li>• The contractor will arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites</li> <li>• All oil spills used oil will be disposed off following J&amp;K State Pollution Control Board (JKSPCB) guidelines.</li> </ul>	Contractor	PIU, TAQAC
C 3.4	Water Pollution from wastes	<ul style="list-style-type: none"> <li>• The contractor will take all precautionary measures to collect and dispose of construction wastes generated from the proposed bridge construction site (if any).</li> <li>• No solid or hazardous wastes (oil contaminated waste) from the campsite will be dumped on nallah or in open areas. Such wastes will be collected and disposed of in an environmentally sound manner as per environmental regulations.</li> <li>• At the bridge construction site, portable wet/dry toilets (bio-digestion type) shall be provided for workers.</li> </ul>	Contractor	PIU, TAQAC
C 3.5	Waste Water from Labour Camp	<ul style="list-style-type: none"> <li>• Wastewater generated from the sanitary facilities at labour camp will be treated in septic tank followed by soak pit.</li> <li>• No untreated raw sewage/wastewater will be discharged into any water body.</li> <li>• Workers will not be allowed for open defecation. Proper toilets fitted with a septic tank and soak pit will be provided for workers at the camp site.</li> </ul>	Contractor	PIU, TAQAC

C 4		Air Pollution		
C 4.1	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 the 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;KPCB. The excavated materials at the bridge construction site will be collected and disposed of properly so that it does not generate fugitive dust emissions.</li> <li>LPG shall be used as fuel for cooking of food at construction labour camp instead of fuelwood.</li> <li>Personal Protective Equipment (PPE) should be provided as a mandatory effort to the construction workers at the batching plant.</li> <li>Regular maintenance of vehicles (project vehicles and material transportation) and equipment's will be carried and vehicular pollution check should be made mandatory.</li> <li>Mask and other PPE should be provided as a mandatory effort to the construction workers in dust prone areas.</li> </ul>	Contractor	PIU, TAQAC
C 4.2	Emission from Construction Vehicles, Equipment and Machinery	<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 conform that pollution emission levels and comply with the requirements of CPCB and/Motor Vehicles Rules. The contractor will submit Pollution Under Control (PUC) certificates for all vehicles for the project.</li> <li>DG set will be provided with the chimney of adequate 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, TAQAC
C 5		Noise Pollution		
C 5.1	Noise Levels from Construction Vehicles and Equipment's	<p>The contractor will confirm the following:</p> <ul style="list-style-type: none"> <li>All construction equipment used in excavation, concreting, etc, will strictly conform to the MoEF&amp;CC/CPCB/J&amp;KSPCB 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 machinery will be done regularly.</li> <li>Only acoustic enclosures fitted DG sets will be allowed at the construction site and labour camp.</li> <li>Noise monitoring shall be carried out in construction areas through the approved monitoring agency.</li> </ul>	Contractor	PIU, TAQAC



C. 6 Procurement of Construction Materials			
C 6.1	Procurement for Aggregate and other construction materials	<ul style="list-style-type: none"> <li>No borrow area will be opened without permission of the Environmental Specialist and without obtaining necessary regulatory permission. The location, shape and size of the designated borrow areas will be as approved by the Environmental Specialist and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10: 1961). The borrowing operations will be carried out as specified in the guidelines for siting and operation of borrow areas.</li> <li>The unpaved surfaces used for the haulage of borrow materials, if passing through the settlement areas or habitations; will be maintained dust-free by the Contractor. A sprinkling of water will be carried out twice a day to control dust along such roads during their period of use.</li> <li>During dry seasons, frequency of water sprinkling will be increased in the settlement areas like both approach sides and especially Dablepora side and PIU will decide the sprinkling time depending on the local requirements.</li> <li>The contractor will rehabilitate the borrow areas (if any) as soon as the borrowing of soil is over from a particular borrow area following the approved borrow area Redevelopment Plan.</li> </ul>	Contractor  PIU, TAQAC
C 6.2	Transporting Construction Materials	<ul style="list-style-type: none"> <li>All vehicles delivering fine materials like aggregate, cement, earth, sand, etc, to the bridge site at Wachi will be covered by Tarpaulin to avoid spillage of materials. Contractor to ensure no material will be</li> <li>The existing road used by vehicles of the contractor or any of his subcontractor or suppliers of materials will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles.</li> <li>The contractor will make an effort to transport materials to the site in non- peak hours</li> </ul>	Contractor  PIU, TAQAC
C 6.3	Quarry Operations & Crushers	The Contractor shall obtain materials from approved quarries. The crushers will be operated after obtaining consent to establish and consent to operate from J&KSPCB.	Contractor  PIU, TAQAC

C.7		Construction Works		
C 7.1	Slope Protection and Control of Soil Erosion	<ul style="list-style-type: none"> <li>• The Contractor will construct slope protection works as per design parameters, to control soil erosion and sedimentation through use of methods like dykes, sedimentation chambers, basins, fibber mats, mulches, grasses, slope, drains and other devices.</li> <li>• All temporary sedimentation, pollution control works and the maintenance thereof will be deemed as incidental to the earthwork or other items of work and as such no separate payment will be made for them.</li> <li>• The contractor will ensure the following aspects:                             <ul style="list-style-type: none"> <li>- After construction protective works, the side slopes will be covered with grass and shrubs as per design specifications.</li> <li>- Turfing works will be taken up as soon as possible provided the season is favourable for the establishment of grass sods. Other measures of slope stabilization will include mulching netting and seeding of batters and drain immediately on completion of earthworks.</li> <li>- In borrow pits, the depth shall be so regulated that the sides of the excavation will have a slope not steeper than 1 vertical to 2 horizontal, from the edge of the final section of the bank.</li> <li>-</li> </ul> </li> </ul>	Contractor	PIU TAQAC
C 7.2	Handling of Cement Bags	<ul style="list-style-type: none"> <li>• Cement bags will be stored and emptied in a covered area to control fugitive dust emissions.</li> <li>• While handling and emptying cement bags, workers will wear masks, hand gloves and protective goggles.</li> <li>• Manual transferring of cement bags from one place to another place will not be allowed. For this purpose, the trolley will be used.</li> </ul>	Contractor	PIU, TAQAC

C 7.3	Work-zone safety Management	<ul style="list-style-type: none"> <li>• The Contractor shall prepare the bridge construction/ work zone safety plan as per provisions under the IRC 67-2001, SP-55 for safe work zone to be duly approved by the environmental specialist of PIU/PMU before the start of bridge works at Wachi.</li> <li>• Both sides of the bridge to be barricaded and to delineate construction zone as well as material stacking areas. The bridge construction site at (Rambiara Nallah) shall be appropriately barricaded to prevent entry and accidental tress passing of workers, staff and others into the const. site.</li> <li>• Contractor to take necessary safety measures at the bridge construction work zone during events of torrential rains or in rainy season. Rambiara nallah have a peak high discharge from the upper catchment area during high precipitation.</li> <li>• Public/ local entry to the construction will be highly restricted especially Children. No child will be allowed to enter site for the swimming/ bathing or other purposes. Contracto to erect sign boads for restriction for swimming/ bathing or other activites.</li> <li>• All operational areas shall be access controlled. Watch and ward facilities at all times shall be provided by the contractor.</li> <li>• Proper retro-reflective warning signage will be installed on the access road next to the construction site about the movement of construction machinery and vehicles.</li> <li>• There shall be adequate lighting arrangement at night to prevent mishaps after construction activity ceases for the day.</li> <li>• All the retro safety signage as per IRC 55 will be erected at the construction site on Rambiara Nallah (especially during excavation/ well foundation works) for generating awareness among the local community</li> </ul>	Contractor	PIU, TAQAC
C 7.4	Occupational Health and Safety of Workers	<ul style="list-style-type: none"> <li>• The contractor will prepare and follow the Occupational , Health and Saefy (OHS) plan, including provisions for an emergency response plan.</li> <li>• All workers will be provided with required personal protective equipment</li> <li>• Emergency Telephone Numbers shall be displayed at camp and plant site.</li> <li>• Medical facilities shall be provided for workers at the Labour camp and plant site.</li> </ul>	Contractor	PIU, TAQAC

<b>C 8 Archaeological Resources and Cultural properties</b>				
C 8.1	Chance Found Archaeological Property	<ul style="list-style-type: none"> <li>All fossils, coins, articles of the the value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.</li> <li>The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaintss the PIU of such discovery and carry out the PIU instructions for dealing with the same, waiting which all work shall be stopped.</li> <li>The PIU will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.</li> </ul>	Contractor	PIU, PMU TAQAC
C 8..2	Impacts on Cultural Properties	<ul style="list-style-type: none"> <li>All necessary and adequate care shall be taken to minimize the impact on cultural properties which includes cultural sites and remains, places of worship including mosques, temples, shrines, etc., graveyards, monuments and any other important structures as identified during design stage.</li> <li>Relocation and enhancement measures shall be taken up as per design and in consultation with the local community. Access to such properties from the road shall be maintained clear and clean.</li> </ul>	Contractor	PIU, TAQAC
<b>C 9 Personal Safety</b>				
C 9.1	Personal Safety Measures for Labours and Staff	<p>The contractor will take necessary measures for the personal safety of all workers during the construction of 1x45 meter span Trussed Girder Bridge at Wachi;</p> <ul style="list-style-type: none"> <li>Protective safety shoes, gumboots, hand gloves, protective goggles, etc (as required) will be provided to the workers employed in foundation/excavation, steel rebaring, and bending concrete works, etc.</li> <li>Contractor to ensure availability(24x7) of Life Jackets at the bridge site of Rambaira Nallah. Contractor to further install emergency phone nos. og Disaster Management cell for immediate response in case of any drowning situation.</li> <li>Welder's protective eye-shields will be provided to workers who are engaged in welding works.</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 a construction site.</li> <li>The Contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. The contractor will make sure that during the construction work all relevant provisions of 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, TAQAC

C 9.2	Traffic and Safety	<ul style="list-style-type: none"> <li>The Contractor will take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as proposed in the traffic control plan/drawings and as required by the Environmental Expert for the information and protection of traffic approaching or passing through the section of any existing crossroads.</li> <li>The Contractor will ensure that all signs, barricades, pavement markings are provided as per the MoRTH specifications.</li> <li>Before taking up of construction, a Traffic Control Plan will be devised and implemented to the satisfaction of the Environmental Expert of PIU.</li> </ul>	Contractor	PIU TAQAC
C 9.3	Emergency Management	<ul style="list-style-type: none"> <li>Emergency numbers will be displayed at the construction sites and campsite,</li> <li>First boxes will be made available at the construction site and campsite,</li> <li>Fire extinguishers for petroleum oil fire and electrical fire will be made available at the camp site, fuel storage site, construction site etc.</li> <li>Designated vehicles, which can be used as an ambulance will be available at the construction site at all the time.</li> </ul>	Contractor	PIU, TAQAC
C 9.4	Risk Measure Force	<ul style="list-style-type: none"> <li>The contractor will make required arrangements so that in case of any mishap during, operation of machinery/ construction vehicles, dismantling, excavation, concrete pouring, hot asphalt handling and erection of pumps, all necessary steps can be taken for prompt first aid treatment.</li> <li>Construction Safety Plan for the all the road stretches, embankment development, protection works, works road longitudinal drains, ancillary sites to be prepared by the contractor and will identify necessary actions in the event of an emergency.</li> </ul>	Contractor	PIU, TAQAC
C 9.5	First Aid Facility	<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, burn ointment and appliances as per the state Factories Rules will be maintained all the time by the contractor.</li> <li>Availability of first aid trained persons will be ensured at the project site during the construction phase.</li> <li>Availability of suitable transport will be ensured at all times to take an injured or sick person(s) to the hospital.</li> </ul>	Contractor	PIU, TAQAC
C 9.6	Informatory Signs and Hoardings	<p>The Contractor will provide, erect and maintain informatory/safety signs, hoardings written in English and local language, wherever required or as suggested by the Environmental Specialist of PIU.</p>	Contractor	PIU TAQAC

C 10		Labour Camp and Project Site Management		
C 10.1	Accommodation for Labourers	<ul style="list-style-type: none"> <li>The 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 each labour camp will be submitted to PIU before their construction.</li> <li>The contractor will maintain necessary well ventilated living accommodation, toilets, bathrooms and ancillary facilities functionally and hygienically.</li> <li>Proper ventilation along with standard exhaust fans will be provided in labour accommodation rooms.</li> <li>Regular cleaning and sweeping will be ensured at the labour campsite.</li> <li>Systematic waste collection management at labour camp to be managed as per SWM Rules 2016.</li> <li>Standard First Aid Kits/units including an adequate of sterilized dressing materials.</li> </ul>	Contractor	PIU, TAQAC
C 10.2	HIV/AIDS Prevention Measures	<ul style="list-style-type: none"> <li>Necessary HIV/AIDS prevention measures will be taken at the labour camp</li> <li>HIV/AIDS awareness program will be organized by the contractor's Environment &amp; Safety Officer.</li> </ul>	Contractor	PIU, TAQAC
C 10.3	Potable Water for Workers	<ul style="list-style-type: none"> <li>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 within the precincts of workplace/pump stations in an accessible place, as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.</li> <li>The contractor will also provide the following:                             <ol style="list-style-type: none"> <li>Supply of sufficient quantity of potable water (as per IS) at construction site/labour camp (site at suitable and easily accessible places and regular maintenance of such facilities).</li> <li>If any water storage tank is provided that will be kept such that the bottom of the tank at least 1 meter above the surrounding ground level.</li> <li>If water is drawn from any existing well/ hand pump, which is within 30 meters proximity of any toilet, drain or other sources of pollution, the well will be disinfected before water is used for the drinking.</li> </ol> </li> <li>PIU will be required to inspect the labour camp once in a week to ensure the compliance of the EMP.</li> </ul>	Contractor	PIU, TAQAC



C 10.4	Sanitation and Sewage System at Labour Camp	<p>The contractor will ensure that :</p> <ul style="list-style-type: none"> <li>• The sewage 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, groundwater or adjacent watercourses take place,</li> <li>• Separate toilets/bathrooms, as required, will be provided for men and women, marked in vernacular language,</li> <li>• Toilets will e provided with septic tank followed by soak pit.</li> <li>• Adequate water supply will be provided in all toilets and urinals,</li> <li>• Night soil can be disposed of with the help of municipality or disposed of by putting a layer of it at the bottom of a permanent pit prepared for the purpose and covered with 15 cm layer of waste or refuse and then covered with a layer of earth for a fortnight.</li> </ul>	Contractor	PIU, TAQAC
C 10.5	Waste Disposal	<ul style="list-style-type: none"> <li>• The contractor will provide garbage bins in the camp &amp; construction site and ensure that these are regularly emptied and disposed off hygienically according to Solid Waste Management Plan as per Solid Waste Management Rule 2016.</li> <li>• Burning of wastes at the construction site, labour camp and roadside will not be allowed.</li> <li>• The solid waste generated at the construction site &amp; labour camp will be collected in covered waste bins and segregated as biodegradable (food waste, paper, etc) and non-biodegradable (plastic, polyethene bag, etc) wastes. Polyethene/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 of in the compost pit.</li> </ul>	Contractor	PIU, TAQAC
<b>C 11</b>	<b>Environmental Monitoring</b>			
C 11.1	Environmental Monitoring- Construction Stage	<ul style="list-style-type: none"> <li>• The PIU will carry out environmental monitoring for Ambient Air Quality, Noise levels and Water Quality on the six-monthly basis as per environmental monitoring plan and in accordance with the instruction of Environmental Specialist of PMU.</li> </ul>	PIU	PMU, TAQAC

C 11.2	Compensatory Plantation	<ul style="list-style-type: none"> <li>• 22 Poplar, 8 Willows, 21 Bren (Ulmus sp), 5 Ailanthus sp, 5 Acacia are coming in approach of umar Mohalla side and Dablepora side. These trees are required to be cut down as they come close or protrude towards the approach of road pavement and may possess critical safety hazard.</li> <li>• Loss of trees will be compensated by 1:3 ratio (i.e. for loss of 1 tree 3 trees will be planted) or greater and transplantation of the small trees (if applicable) may be envisaged wherever applicable. As per compensatory plantation, 183 trees will be planted in open spaces near nallah banks on both sides.</li> <li>• Plantation of Indeginous tree saplings will be plnated near nallah banks and Pine sapling shall be planted under landscape management/ beautification at fringe area (intersection points) at Dablepora side . This can be achieved in coordination and in association with the Social Forestry Department.</li> </ul>	PIU	PMU, TAQAC
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C 11.3	<p><b>COVID-19</b> (Corona-Virus) Pandemic Protocol Compliance at Workplace and Labour Camp</p>	<p><sup>6</sup> <b>COVID-19 Guidance for the Construction Workforce-</b> When working in the construction industry, the following tips can help reduce the risk of exposure to the coronavirus:</p> <ul style="list-style-type: none"> <li>• Encourage workers to stay home if they are sick.</li> <li>• Allow workers to wear masks over their nose and mouth to prevent them from spreading the virus.</li> <li>• Continue to use other normal control measures, including personal protective equipment (PPE), necessary to protect workers from other job hazards associated with construction activities.</li> <li>• Advise workers to avoid physical contact with others and direct employees/contractors/visitors to increase personal space to at least six feet, where possible. Where work trailers are used, all workers should maintain social distancing while inside the trailers.</li> <li>• Train workers how to properly put on, use/wear, and take off protective clothing and equipment.</li> <li>• Encourage respiratory etiquette, including covering coughs and sneezes.</li> <li>• Promote personal hygiene. If workers do not have immediate access to soap and water for handwashing, provide alcohol-based hand rubs containing at least 60 per cent alcohol.</li> <li>• Use Environmental Protection Agency-approved cleaning chemicals from List N or that have label claims against the coronavirus.</li> <li>• To the extent tools or equipment must be shared, provide and instruct workers to use alcohol-based wipes to clean tools before and after use. When cleaning tools and equipment, workers should consult manufacturer recommendations for proper cleaning techniques and restrictions.</li> <li>• Keep in-person meetings (including toolbox talks and safety meetings) as short as possible, limit the number of workers in attendance, and use social distancing practices.</li> <li>• Clean and disinfect portable Jobsite toilets regularly. Hand sanitizer dispensers should be filled regularly. Frequently-touched items (i.e., door pulls and toilet seats) should be disinfected.</li> <li>• Encourage workers to report any safety and health concerns.</li> </ul>	Contractor	PIU, TAQAC
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<sup>6</sup> OSHA- Occupational,Safety and Health Adminintration , OSHA: COVID 19 Guidelines [www.osha.gov/coronavirus](http://www.osha.gov/coronavirus)

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<b>D</b>	<b>Contractor's Demobilization</b>			
D.1.1	Clean-up Operations, Restoration and Rehabilitation	<ul style="list-style-type: none"> <li>The contractor will prepare the project and labour campsite restoration plan, which will be approved by the PIU-Environmental Expert. The clean-up and restoration operations are to be implemented by the contractor before demobilization from the construction site and labour camp. The contractor will clear all temporary structures, debris, construction wastes, garbage, night soils, etc in an environmentally sound manner.</li> <li>All disposal pits or trenches will be filled in and effectively sealed off.</li> <li>Construction places including camps and any other area used/affected due to the project operations will be left clean and tidy at the contractor's expense to the entire satisfaction to the PIU.</li> </ul>	Contractor	PIU, TAQAC
D.1.2	Land Rehabilitation	<ul style="list-style-type: none"> <li>All surfaces hardened due to construction activities will be ripped &amp; imported materials thereon removed.</li> <li>All rubbles to be removed from the site to an approved disposal site. Burying of rubble on-site is prohibited.</li> <li>Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the PIU.</li> <li>All embankments are to be trimmed, shaped and replanted to the satisfaction of the PIU.</li> <li>Borrow pits are to be closed and rehabilitated following the pre-approved management plan for each borrow pit. The Contractor shall liaise with the PIU regarding these requirements.</li> </ul>	Contractor	PIU, TAQAC
<b>E</b>	<b>Post Construction (Operation) Stage</b>			
<b>E 1</b>	<b>Activities to be Carried out by the PIU</b>			
E.1.1	Environmental Monitoring- Post Construction Stage	<ul style="list-style-type: none"> <li>The Environmental Monitoring Laboratory of JTFRP-PMU will carry out environmental monitoring for Ambient Air Quality, Noise levels and Water Quality on the six-monthly basis as per environmental monitoring plan and in accordance to the instruction of Environmental Specialist of PMU.</li> </ul>	PIU	PMU
E.1.2	Slope/ Protection Monitoring	During rains/ snowfall, regular monitoring will be carried for bridge protection worka and scour protection work/ slope management. In case any indication of erosion, deformation and collapse of protection, necessary measures will be taken to control such issues.	Contractor, PIU	PMU

E.1.3	Monitoring of Compensatory Plantation and Landscape areas	Continuous watch and monitoring of plantation carried out under compensatory plantation implemented and for its performance and survival rate. The plantation will be properly guarded by watch and ward personnel. Provision will be made for manure application and watering on schedule. The compensatory plantation comprise of +183 saplings of Willow/Elms (to be planted along Rambiara bund side) and Pine/ <i>Populus nigra</i> (at Dablepora approach side “V” shaped landscaping) under landscape management/ beautification of the bridge environs.	PIU	PMU
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### 9.6. Environmental Management Plan (EMP) - Protection of Clause for Non-conformity to EMP

The Contractor will implement necessary mitigation measures 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 like unsafe conditions, non-collection of excavated material (during the laying of drainage pipes) regularly and other unattended Health, Safety & Environment (HSE) issues, as 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 immediately.**

### 9.7. Environmental Monitoring Plan

The monitoring programme consists of performance indicators, reporting formats and necessary budgetary provisions. The Contractor's monitoring plan should be following the



baseline environmental monitoring, locations provided in the Environmental impact assessment report.

The monitoring plan has the following objectives:

- To ensure effective implementation of EMP
- To evaluate the performance of mitigation measures proposed in the EMP
- To comply with all applicable environmental, safety, labour and local legislation
- To ensure that public opinions and obligations are taken into account and respected to the required satisfaction level
- To modify the mitigation measures or implementing additional measures, if required

The environmental monitoring plan is discussed below:

### **Ambient Air Quality Monitoring (AAQM)**

The ambient air quality parameters viz: Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Carbon Monoxide (CO), Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>), shall be monitored six monthly at identified locations from the start of the construction activity. The ambient air quality parameters shall be monitored following the National Ambient Air Quality Standards. The duration and the pollution parameters to be monitored and the responsible institutional arrangements are detailed out in the Environmental Monitoring Plan.

### **Noise Quality Monitoring**

The noise levels shall be monitored at designated locations following the Ambient Noise Quality standards. The duration and the noise pollution parameters to be monitored and the responsible institutional arrangements are detailed in the Environmental Monitoring Plan.

### **Surface Water Quality Monitoring**

Surface Water quality parameters such as pH, BOD, COD, DO coliform count, total suspended solids, total dissolved solids, Hardness, Conductivity etc. shall be monitored at all identified locations during the construction stage as per standards prescribed by Central Pollution Control Board. The duration and the pollution parameters to be monitored and the responsible institutional arrangements are detailed out in the Environmental Monitoring Plan

The monitoring requirement for the different environmental components have been prepared is presented in Table 9.2 below;

**Table 9.2: Environmental Monitoring Plan**

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
Air	Pre-Consuction, Construction & Operation Stage	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , CO	Use method specified in National Ambient Air Quality Standards (NAAQM).	National Ambient Air Quality Standards (NAAQM).	Six Monthly (Summer and Post Monsoon Seasons)	24 hours of Sampling	Along the road corridor, Batching Plant, Workers Campsite, Project Office Site	PIU through Environmental Monitoring Laboratory
Surface Water	Pre-Construction, Construction & Operation Stage	pH, BOD, COD, Oil & Grease, Total Suspended Solid (TSS), Total Dissolved Solid (TDS)	Grab sample collected from source and Analyses as per standard Methods for Examination of Water and Wastewater	Indian Standards: for Inland Surface Water (IS: 2296, 1962)	Six Monthly (Summer and Post Monsoon Seasons)	Grab Sampling	Along with the road Surface water sources	PIU through Environmental Monitoring Laboratory
Noise	Pre-Consuction, Construction & Operation Stage	Hourly Level Equivalent (Leq) on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at it a distance of 1 m from the edge of the pavement	MoEF Noise Rules. 2000	Quarterly (Summer and Post Monsoon Seasons)	Leq in dB(A) of daytime and night time	Along the road corridor, Batching and HMP Plant, Workers Campsite,	PIU through Environmental Monitoring Laboratory

Borrow Area	Construction Phase	As per Guidelines	Visual Observations	-	Before opening at least once in a month during operation, Post Rehabilitation.	-	Borrow area Location	Contractor/PIU, TAQAC
Tree Cutting	Pre-Construction	Only identified/ marked trees	EMP/ Inspection	EMP	After getting approval/ permission of Walnut tree.	Once	Identified trees	Contractor/ PIU
Tree Plantation	Operation Phase	Survival Rate	Plantation of tall saplings	National Green Highways policy and IRC guidelines (IRC : SP:21-2019)	Quarterly to two years post plantation	-	Areas where the plantation is being done	Contractor/PIU TAQAC

### 9.8. Performance Monitoring Indicators

Physical, biological and environmental management components identified as of particular significance in affecting the environment at critical locations have been suggested as Performance Indicators (PIs). The Performance Indicators shall be evaluated under three heads as:

- Environmental condition Indicators to determine the efficacy of environmental management measures in the control of air, noise, water and soil pollution;
- Environmental management indicators to determine compliance with the suggested environmental management measures
- Operational performance indicators have also been devised to determine the efficacy and utility of the proposed mitigation measures

The performance indicators of the proposed bridge at Wachi is provided in Table 9.3 below;

**Table 9.3: The Environmental Performance Indicators for Project Implementation**

S.No.	Indicator	Details	Stage	Responsibility
<b>A</b>	<b>Environmental Condition Indicators and Monitoring Plan</b>			
1	Air Quality	The parameters to be monitored, frequency and duration of monitoring, as well as the locations to be monitored, will be six monthly summer and post-monsoon seasons	Baseline (pre-construction) Construction Post-construction	PMU, PIU Environmental Monitoring Laboratory of PMU through TAQAC
2	Noise Levels	Quarterly, Hourly Level equivalent (Leq).	Baseline (pre-construction) Construction Post Construction	PMU, PIU Environmental Monitoring Laboratory of PMU through TAQAC
3	Water Quality	Nearby rivers, surface water body, six-monthly summer and post-monsoon seasons	Baseline (pre-construction) Construction Post Construction	PMU, PIU Environmental Monitoring Laboratory of PMU through TAQAC agency
<b>B</b>	<b>Environmental Management Indicators and Monitoring Plan</b>			
1	Construction Camp	Locations of construction camps have to be identified and parameters indicative of the environment in the area has to be reported.	Pre Construction	PIU/Contractor
2	Borrow Areas	Locations of borrow areas have to be identified and parameters indicative of the environment in the area has to be reported	Pre Construction	PIU/Contractor

3	Tree Protection	Protective Measures of Scheduled Trees	Pre Construction/ Construction	Contractor/PIU
3	Tree Cutting	Progress of Tree removal marked for cutting is to be reported	Pre Construction	PIU/Contractor to Forest Department
4	Tree Plantation	Progress of measures suggested as part of the strategy is to be reported	By end of the Construction	PIU/Forest Department
	Occupational Health & Safety Measures	Occupational, Health & Safety of workers engaged in construction activities	Daily	Environment & Safety Officer of the Contractor.
5	Bridge Protection Work and Scour Protection	Monitoring of Bridge Protection and Scour Protection	During rains	PIU/ TAQAC

**9.9. Monitoring Plans for Environment Conditions**

For each of the environmental components, the environmental monitoring plan specifies the parameters to be monitored; location of the monitoring sites and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities. The monitoring plan for the various environmental condition indicators of the project in construction stages is already presented in **Table 9.2**. Monitoring plan does not include the requirement of arising out of regulation provision such as obtaining NOC/Consent for plant site operation.

Furthermore, periodical site monitoring should be carried out by the Environmental Expert of PIU for surveillance & monitoring of road safety during the road construction. The brief description of measures has been given in **Table 9.4** below:

**Table 9.4: Brief Description of Measures**

Sl. No.	Locations of Work Site	Bridge Site Safety Measures
1	Construction Sites	Barricading, Caution boards, Safety Cones, Delineators, Life Jackets, etc.
2	Deep Cutting	The construction zone should be barricaded with applicable safe G.I Sheet or arrangement to be made as per the plan approved by the PIU / PMU. [Provide Safety Sign Boards and Safety Barriers marked with reflective tapes]
3	Temporary Diversion (if any)	Diversion Board, Barricading [Provide 'Diversion Ahead' boards at 50m, 100m and 150m ahead of diversions with reflective tape for illumination at night at the all diverted locations]
4	Safety for the Workers	Helmets, Safety-Shoes, Goggles, Dusk mask, Life Jackets etc

### 9.10. Reporting System

The contractor will follow the reporting system for the implementation of the environmental management plan and its indicators. The Contractor will report the PIU on corrective measures and implementation status of mitigation measures as per the environmental management plan. The EMP compliance report will comprise the photographic evidence (with date, time and geo-reference) for implemented mitigation measures in the monitoring reports.

**Table 9.5: The Reporting System and Requirements**

S.No	Item	Stage	Contractor	PIU/ TAQAC
			Implementation & Reporting to PIU	Supervise/ Field Compliance Monitoring
1.	Setting up of construction Camp	Pre-Construction	One Time	One Time
2.	Identification of disposal locations for constructional & other wastes from Bridge Project	Pre-Construction	One Time	One Time
3.	Tree cutting	Pre-Construction	One Time	One Time
4.	Top Soil Preservations	Pre-Construction	One Time	
5.	EMP Implementation Report	Construction	Monthly	Monthly
7.	Pollution Monitoring	Construction	Six Monthly	Six Monthly
8	Cleaning and Restoration on Demobilization	On completion of construction of Bridge at Kumar Mohalla Wachi	One Time	One Time

The contractor will take all reasonable steps to protect the environment on & off the project site and to avoid, minimize and mitigate impacts due to the proposed bridge work activities creating pollution to environment and other causes as a consequence of methods of operations.

### 9.11. Budgetary Provision for EMP

Mitigation measures proposed in the EMP will be implemented by the Contractor and under the supervision/ monitoring by the PIU/TAQAC. The works to be undertaken by the contractor have been quantified and the quantities included in the respective BOQ items. The essentials of environmental health and safety and effective implementation of COVID-19 Standard Operating Procedures (SOP) as per Govt. guidelines/ measures to be followed by the contractor have been included in the Chapter 5 and Annexures XV & XVI of this EIA report.

The indicative split up of capital and recurring cost for the environmental management for the project is presented in following **Table 9.8**;



**Table 9.8: Budgetary Allocation- Indicative Cost for EMP Implementation for the “Construction of 1x45 meter Trussed Girder Bridge in District Shopian.**

S. No.	Component	Item	Unit	Unit Cost (INR)	Quantity	Total Cost	Responsibility
<b>A Pre-Construction Stage</b>							
1	Air	Baseline Monitoring Ambient Air Quality at 1 location especially near sensitive receptors/ Settlements.	No.	7000	24 hr sample, One time monitoring 1 Location (PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>2</sub> )	7000	PMU
2	Water	Surface Water Quality sample from Raine Nallah location	No.	5000	Grab Sample from Raine Nallah Location (pH, TSS, TDS, BOD, COD, Oil & Grease, Turbidity)	5000	PMU
3	Noise	Noise Measurements at 1 location near sensitive receptors/ Settlement	No.	4000	Hourly measurements for 24 hours.	4000	PMU
<b>B. Construction Stage</b>							
4	COVID-19 “Standard Operating Procedure” as per Govt. Guidelines for Construction site/ Workplace/ Campsite	Masks, Sanitizer Equipments (sensor-based/ dispenser based), appointment of Covid-19 “Marshal for SOP implementation”	Lump Sum			300000	PMU
5	Protection/ Safety-Scheduled Species of Trees	Reflective strips for safety. About 1 tree	No.	1000	Reflective strips on the tree (1 Walnut)	1000	PMU/ Contractor
6	Tree Cutting	Trees (about 61 trees)	No.	Cost is part of the civil works			PIU/ Contractor
7	Air	Ambient Air Quality at 1 bridge location within the construction zone and operational plant sites. (3 times in a year except for monsoon)	No.	7000	24 hr sample, One-time monitoring 3 Locations (Six monthly) (PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>2</sub> )	21000	PMU
8	Water	Surface Water Quality at 1 location (six monthly)	No.	5000	Grab Samples at 1 Location at Rambiarā	15000	PMU

S. No.	Component	Item	Unit	Unit Cost (INR)	Quantity	Total Cost	Responsibility	
		1 Ground Water/ Public Water Source (six monthly)		7000	Nallah (pH, TSS, TDS, BOD, COD, Oil & Grease, Turbidity)  Parameters as per IS 10500:2012	21000	PMU	
9	Noise	Noise measurements at 1 location near sensitive receptors/ Settlements within the construction zone (Quarterly)	No.	3000	Hourly measurements for 24 hours.	18000	PMU	
10	Air Pollution	Dust Suppression Measures	Cost part of the civil works.					
11	Labour camp and Ancillary Facilities	Labour Camp and all associated facilities as per EMP	Cost part of the civil works.					
12	First Aid Kits	First Aid Kits at the construction site, camp and ancillary sites	Cost part of the civil works.					
13	Compensatory Plantation	Replantation of Trees 1:3)	No.	4000	183	332000	PMU	
<b>Project Enhancement by PMU-JTFRP</b>								
14	Embankment Protection/ Slope Stability	Plantation/ Grass engraining with indigenous shrubs	Lump Sum			50000	PMU	
15	Median Plantation	Median Tree Plantation (Pine/ Indeginous Trees)	Lump Sum			50000	PMU	
<b>C. Operation Stage (Post Construction Monitoring)</b>								
17	Air	Ambient Air Quality at 1 location near the sensitive receptor	No.	7000	24 hourly sample, one-time monitoring (Post Construction-Evaluation)	7000	PMU	
18	Noise	Noise Levels at 1 location near sensitive receptor	No.	4000	One time monitoring (Post Construction-Evaluation)	4000	PMU	

S. No.	Component	Item	Unit	Unit Cost (INR)	Quantity	Total Cost	Responsibility
19	Water	Surface Water Quality at 1 location	No.	5000	One time monitoring (Post Construction-Evaluation)	5000	PMU
<b>Total Budget</b>						<b>8,39,000</b>	
<b>(Rupees Eight Lakh Thirty Nine Thousand only)</b>							

### 10.13. Formats For Reporting

Formats for reporting/monitoring the progress/parameters achieved will be finalized by PIU/TAQAC in consultation with the Contractor.

### 10.14. Environmental Compliance Report

The contractor shall submit a monthly progress report as per the reporting format approved by the PIU on the status of the implementation of the EMP. Environmental Compliance report will systematically contain a copy of regulatory permissions/consents/clearance, geo-referenced photographs with date and time for EMP/mitigation measures implementation, environmental monitoring report, accidents report, grievance redressal etc.

**ANNEXURE-I: Environment and Social Screening Data Sheets**

**Part A: General Information**

<b>1. Name of the sub-project</b>	<b>Construction of 1x45 meter Single Lane Trussed Girder Bridge over Rambaira Nallah at Wachi in District Shopian</b>	
<b>2. Type of proposed activity (tick the applicable option and provide details)</b>		
▪ Road		-
▪ Bridge		√
▪ Fire Station		-
▪ Hospital/Health Facility		-
▪ Educational Institute		-
▪ Building for Livelihoods		-
▪ Flood Infrastructure Related		-
▪ Other Public Building		-.
▪ Any Other (Please Specify)		-
<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	Zainpora	
▪ Name of the Settlement	Kumar Mohalla Wachi	
▪ Latitude	33°48'10.28"N	
▪ Longitude	75°02'10.67"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)	1x 45.00 mts Through Type Truss Girder Bridge
<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	Roads & Buildings Department
▪ Name of the contact person	Er. Javaid Ahmad Bukhari
▪ Designation	Executive Engineer (Xen)
▪ Contact Number	+91-9419006437
▪ E-mail Id	
<b>7. Screening Exercise Details</b>	
▪ Date on which it was carried out	12/09/2018
▪ 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	Yes		1x45 m trussed girder bridge is proposed to be constructed over Rambiara Nallah (tributary of river Jhelum)



Question	Yes	No	Details
o. Swamps/Mudflats		No	
p. Zoological Park		No	
q. Botanical Garden		No	
<b>4. Is the sub-project located in whole or part within 500m 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	Yes		A small irrigational water channel is running close at the end point of the approach road towards Kumar Mohalla.
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?	1673.50 mts wrt MSL		

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
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	Yes, permission from Irrigation & flood control department is required.-
7	Any other clearance/permission required	Only Statutory clearances and NOC's / PUC's for establishment or operation of stone crushers, Hot Mix plants, generators, vehicles etc shall be required to be obtained by the Contractor during execution stage.

**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 (sqmts/hac.)		Nil
	Govt. Land (sqmts/hac.)		Yes
	Forest Land (sqmts/hac.)		Nil
<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		Nil	
Number of common property resources (such as religious/cultural/drinking water/wells/etc.)		Nil	
Number of private structures (located on private or public land)		Nil	
<b>3. Does the proposed project activity result in loss of crops/trees?</b>			
Yes	✓ (61 Poplar, Elm, Willow, Ailanthus, Acacia Trees)	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	NA
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)	No ARAP 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)	No SIA required

**Overall Screening Outcome:**

The screening exercise does not envisaged any adverse Environment or Social impact. Besides, no diversion of forest land, destruction of ecological resources, displacement of people, demolition/removal of existing structures not involved and no major environmental threat/risk associated with the proposed sub-project.

**Statutory Clearances/ No Objection Certificate:**

Only Statutory clearances and NOC's / PUC's for establishment or operation of stone crushers, hot mix plants, generators, vehicles etc shall be required to be obtained by the Contractor during execution stage.

NOC is also required from I&FC department and same will be acquired by the PIU(R&B) before commencement of the works.

ANNEXURE-II: Photographs of the Bridge Location at Wachi Shopian



View of Proposed Bridge Site at Wachi from RHS side (Dablepora)



Upstream of the Rambiar Nallah at proposed site



Downstream view of Rambiar Nallah at the proposed site



Downstream of Rambiar Nallah from Kumar Mohalla side



Upstream View from Kumar Mohalla Side





During field survey/ assessment with project engineer of Wachi (Kumar Mohalla) near bridge site.





I&FC Pump House near LHS of proposed bridge at an approx. distance of 12-15 meter. This pump is being used to pump water from Rambiarra Nallah to Irrigation channel (158m from bridge site) via 200mm dia pipe



I&FC pipe of 200mm dia is passing through the proposed approach corridor from Kumar Mohalla side for an approx.length of 50-60 meters. 2-3 electric poles are also located in proposed corridor. Both I&FC pipe and electric poles shall be suitably realigned in consultation with PIU and concerned agencies before commencement of the works.





Taking girth class of the trees coming in approach corridor on both the sides



Left and Right Approach from the Dablepora side. Above 2 -3 houses stands at 90° with 35-40m distance from bridge approach road side. Proper installation of translucent view cutters (with standard height) at these points.



**ANNEXURE-III: Public Consultation/ Meeting Photographs at Wachi Bridge Site.**



**Consultation with the local people at Dablepora Wachi**



Meeting at Auqaf office Wachi dated 19/03/2019 with Central Aquaf Committee Ziyarat Shahi-Hamdan Mir Syed Ali Hamdani, Wachi Shopian pertaining to the donation of Land for the purpose of bridge construction works (approach from Kumar Mohallas side)





Public consultation with the local residents of the Wachi (Kumar Mohalla side/Dablepora side) dated 11/07/2020. Public consultation gathering was avoided due to the Covid-19 Pandemic spread. Consultation was conducted at Kumar Mohalla Wachi.



ANNEXURE-IV: List of consulted participants and their signatures during consultation

Jhelum Tawi Flood Recovery Project (JTFRP)-The World Bank Financed Project

LIST OF PARTICIPANTS IN PUBLIC CONSULTATION WITH SIGNATURES

SUB-PROJECT NAME: Design and Construction (Complete Job) of 1x45 Mtr Trussed Girder Bridge over Nallah Rambiarā at Kumar Mohalla Wachi District Shopian, J&K.

LOCATION OF MEETING/ CONSULTATION: Dabla / Kumar Mohalla (Halli)

DATE AND TIME: 11/09/2020 - 4:00 pm Public Consultation Conducted by: A. A. Bhat

S. No	Name	Age/ Sex	Occupation	Address	Signature
1.	Mohd Shafi Bhat	65/M	Farmer	Doube Mohalla	
2.	Nasir Ahmad	45/M	Shopkeeper	Doube pona	
3.	Yasir Ahmad wai	18/M	Student	Doube pona	
4.	Khalid Ahmad	35/M	Student	Doube pona	
5.	A. K. Bhat	41/M	Gov. consultant	-	
6.	Waseeq Ahmad	32/M	Project engineer	M/S Waseeq Ahmad	
7.	Showkat Dh Bhat	33/M	Shopkeeper	Doube pona	
8.	Mohd Rafiq Bhat	40/M	Carpenter	- do -	
9.	Abdul Kabir wai	65/M	Carpenter	- do -	
10.	Ghulam Mohd Bhat	60/M	Carpenter	- do -	
11.	Farooq Dh. wani	55/M	Farmer	- do -	
12.	Abdul Rashid Bhat	55/M	Farmer	- do -	
13.	G. Nabi Bhat	64/M	Business	Doube pona	
14.					
15.					
16.					

List of participants of Public Consultation

Name of the Subproject: Construction of 1x45m Trussed Girdler Bridge over Rambiarra Nallah at Wachi in District Shopian

S. No.	Date	Name of	Address	Occupation	Contact no.	Signature
1.	11/09/20	Mr. Ahmad Kunal	Kunze Nallah	Farmer	9622757911	/
2.		Gulzar M. Bhat	Dablipora	Carpenter	9906643200	Ajji
3.		Misraal M. Wani	Kunze Nallah	Farmer	9089627250	(Signature)
4.		Istiyaz Gulzar	Kunze Nallah	Student	9622079533	(Signature)
5.		Istiyaz M. Kunal	- do -	Govt. Service	-	(Signature)
6.		Talib M. Kunal	- do -	Maharaj	-	-
7.		Ali M. Kunal	- do -	Farmer	-	/
8.		Mubarak M. Wani	- do -	Govt. Service	-	/
9.		Gulzar M. Wani	- do -	Govt. Service	-	(Signature)
10.		Mr. Sultan Wani	- do -	Farmer	-	-
11.		Rajesh M. Wani	- do -	Tarlar	-	-
12.		Rajesh M. Wani	- do -	Tarlar	-	-
13.		Sagar M. Wani	- do -	labour	-	-
14.		Farooq Kunal	- do -	labour	-	-

MSL 1626-83



**Public Consultation for JTFRP  
Jammu & Kashmir**

Subproject Name: Wachi Bridge Location: Wachi Date: 19.03.2019

**Information of Participants**

Sl. No.	Name	Gender	Category (SC/ST/OBC/Gen/BPL)	Address	Occupation	Mobile number	Signature
1	Nazir Ahmad Rishi	M	GEN	Wachi	Ang of Chairman	9652556653	[Signature]
2	Mohammad Shaban Khan	M	"	"	Ang of Other	9622620607	[Signature]
3	Mohammad Abdulaziz Bhat	M	"	"	Zimmer	9797126861	[Signature]
4	Abdul Gani Mu	M	"	"	Redd. Head Master	95965552869	[Signature]
5	Gh. Mohammad Hu	M	"	"	Cont. Servant	9906763459	[Signature]
6	Mohammad Amir Shah	M	"	"	Teacher	9797840297	[Signature]
7	Gh. Rasool Rishi	M	"	"	Govt Servant	9797974140	[Signature]
8	Mohd. Ramban Lone	M	"	"	Govt Servant	9906866866	[Signature]
9	Ab. Rashid Bhat (JE)	M	"	(R+B) Zamapora	Jr Engineer	9906523324	[Signature]
10	Gh. Nisar Durrani	M	"	R+B Zamapora (Durrani shop)	Jr Engineer	8491826722	[Signature]

1 | Page

**Public Consultation for JTFRP  
Jammu & Kashmir**

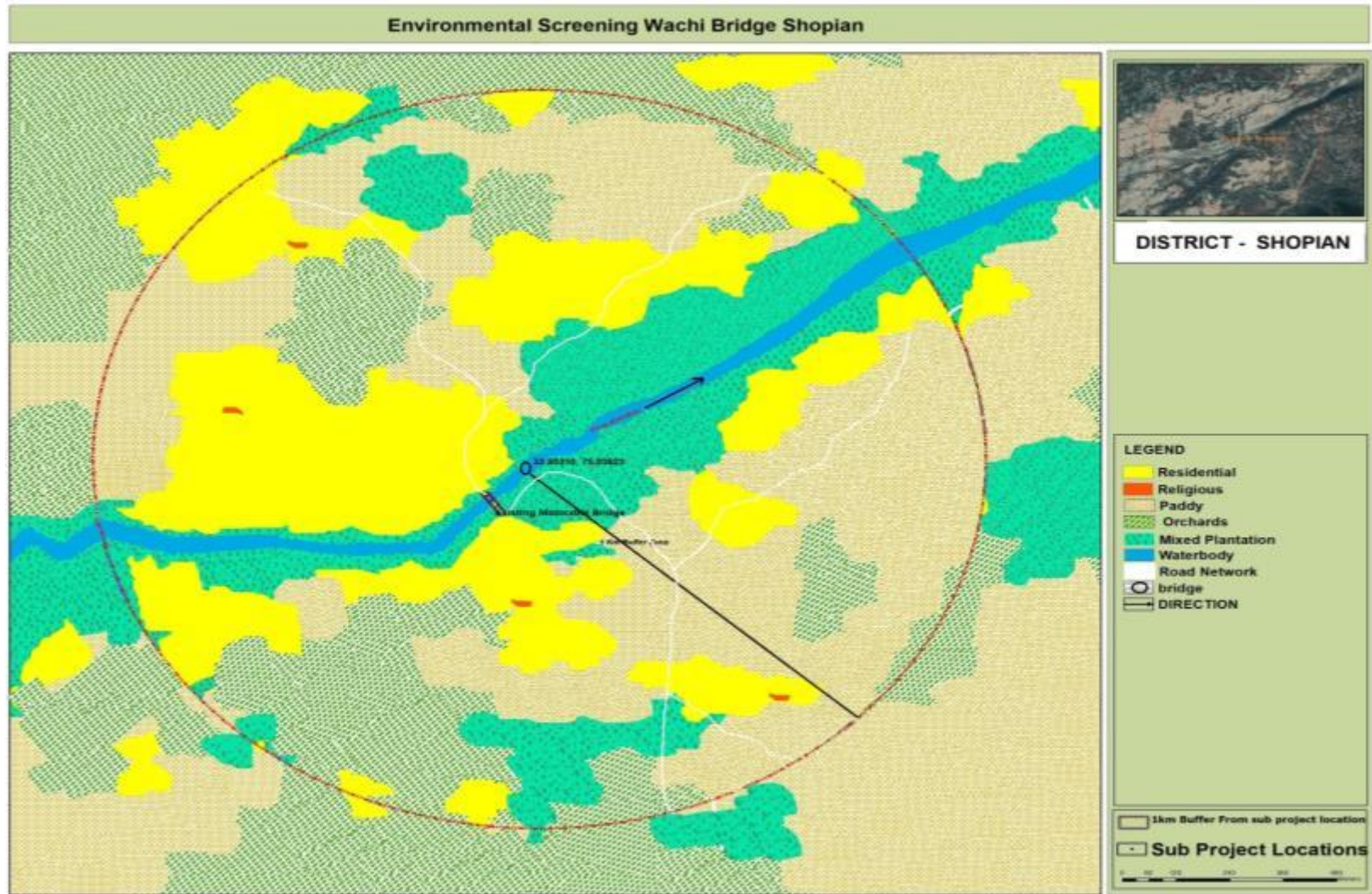
Subproject Name: Wachi Bridge Location: Wachi Date: 19.03.2019

**Information of Participants**

Sl. No.	Name	Gender	Category (SC/ST/OBC/Gen/BPL)	Address	Occupation	Mobile number	Signature
11	Bashir Ah mir	Male	GEN	Wachi	Carpenter		[Signature]
12	Ajay Ah. Naku	M	"	R+B	w/supervisor	9622761164	[Signature]
13	Ab Rashid mir	M	"	Wachi			[Signature]
14	M. Ashraf Khannas	M	"	"	Student	9622923910	[Signature]
15	Bashir Ah	M	"	"			[Signature]
16	Ab. Rashid-shah	"	"	"		9797777034	[Signature]
17	Gulla Ashraf Shah	"	"	"		94444366	[Signature]
18	Master Gh. Mohd.	"	"	"	Master	9622477428	[Signature]
19	Farooq Ah. Naku	"	"	"	"	9906686434	[Signature]
20	Molvi M. AMIN	"	"	"	Molvi	9906440293	[Signature]

1 | Page

ANNEXURE-V: GIS/ LULC Map of the Proposed Bridge at Wachi in Shopian District.



## ANNEXURE-VI: Guidelines For Siting, Management And Redevelopment of Labour Camp

### A. Overview

Labour camp include accommodation for workers/labourers along with other basic amenities such as kitchen, potable water supply, sanitation (toilets, bathrooms, washing areas and water supply for such needs), first aid room as well as garbage collection and disposal facility. The guidelines outlined here aims to facilitate the contractor in implementing the measures in the EMP there by reducing the impact on the environment.

### B. Criteria for Locating the Site

To the extent possible, fertile lands shall be avoided for locating camp site.

### C. Finalization of Selected Site

After identification of the site, the Contractor should fill up the prescribed reporting format provided in EMP as annexure and submit the same for approval to the Environmental Expert of PIU. The selected site shall be approved by Environmental Expert of PIU, after considering the compliance. No agreements or payments shall be made to the land owner/s prior to receipt of a written approval from the Environmental Expert of PIU. Any consequence of rejection prior to the approval shall be the responsibility of the Contractor and shall be restored at his own cost. After obtaining a written approval from the Environmental Expert of PIU for the selected site, the Contractor has to enter into an agreement with the landowner to obtain his/her consent before commencing any operation/activities in the land. The agreement should also mention its type, duration, amount and mode of payment as well as the preferences of the owner regarding site maintenance and redevelopment.

### D. Designing And Setting Up of Labour Camp

The following facilities should be provided in a labour camp to ensure safe, clean and hygienic accommodation for the workers.

- (i) **Site preparation:** The site should be graded and rendered free from depressions such that the water does not get stagnant anywhere. Fencing should be constructed all around the camp to prevent the trespassing of humans and animals. The approved layout plan should be strictly adhered to while setting up the camp.
- (ii) **Accommodation:** 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. The height of the worker's and labour accommodation shall not be less than 3m from floor level to the lowest part of the roof. The camp shall be floored with concrete, shall be kept clean, with proper cross ventilation, and the space provided shall be on the basis of one sqm per head or as per the relevant regulation, whichever is higher. Fire and electrical safety pre-cautions shall be adhered to. Cooking, sanitation and washing areas shall be provided separately. The contractor will maintain necessary living accommodation and ancillary facilities (including provision of clean fuel to prevent damage to forests and to prevent fuel wood cutting and burning by labour) in functional and hygienic manner. The site must be graded and rendered free from depressions such that water does not get stagnant



anywhere. The entire boundary of the site should be fenced all around with barbed wire so as to prevent the trespassing of humans and animals.

- (iii) **Drinking Water:** The Contractor should provide potable water within the precincts of every workplace in a cool and shaded area, which is easily accessible as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996. All potable water storage facilities will be on a safely raised platform that is at least 1m above the surrounding ground level. Such facilities shall be regularly maintained from health and hygiene point of view. If necessary, water purifier unit shall be installed for providing potable water.
- (iv) **Sanitation Facilities:** Adequate nos. of toilets shall be provided separately for males and females (depending on their strength), with markings for identification in vernacular language. All such facilities must have adequate water supply with proper drainage and disposal facility. They shall be maintained, cleaned and disinfected daily using proper disinfectants. Location and design of soak pit should be in such a way that it doesn't pollute the ground water. Drains and ditches should be treated with bleaching powder on a regular basis. The sewage system for the camp must be properly designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place.

Portable toilets may be brought to use at construction site and the night soil from such units has to be disposed through designated septic tanks so as to prevent pollution of the surrounding areas. In the main camp, no night soil or sewerage shall be disposed of at any place other than the septic tanks constructed at the site. All these facilities shall be inspected on a weekly basis to check the hygiene standards.

- (v) **Waste Disposal:** The Contractor should provide garbage bins in the camp and ensure that these are regularly emptied and disposed off in a hygienic manner. No incineration or burning of wastes shall be carried out by the Contractor. Separate bins shall be provided for biodegradable and non-biodegradable wastes. The disposal of kitchen waste and other biodegradable matter shall be carried out in pits covered with a layer of earth within the camp site. Discarded plastic bags, paper and paper products, bottles, packaging material, gunny bags, hessian, metal containers, strips and scraps of metal, PVC pipe scrubber and poly urethane foam, auto mobile spares, tubes, tires, belts, filters, waste oil, drums and other such materials shall be either reused or sold /given out for recycling.
- (vi) **Day Crèche Facility:** At construction site, provision of a day crèche shall be made so as to enable women to leave behind their children while going to work. At least one attendant shall be provided to take care of the children at the crèche. At construction site where 20 or more women are employed, there shall be at least one shelter for use of children under the age of 6 years belonging to such women.

Shelters shall not be constructed to a standard lower than that of thatched roof, mud walls and floor with wooden planks spread over mud floor and covered with matting. Such areas shall be safely barricaded (no sharp sheets or barbed wires that may injure a child) from rest of the camp for the safety of children. Shelters shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision to keep the place clean. The size of a crèche may vary according to the number of children on a camp site.

**(vii) Mess and Kitchen Facilities:** The Contractor shall adhere to the sanitary/hygiene requirements of local medical, health and municipal authorities at all times. Adoption of such precautions as may be necessary to prevent soil and water pollution at the site while operating mess or kitchen facilities.

**(viii) First Aid Facilities:** At every workplace, a readily available first-aid unit including an adequate supply of sterilized dressing materials and appliances should be provided. Suitable transport should be provided to facilitate taking injured and ill persons to the nearest hospital. Adequate personal protective equipments and fire fighting equipments as detailed out in EMP should be made available in the camp and provided to the staff / workers.

**(ix) Health Care Facilities:** Health problems of the workers should be taken care of by providing basic health care facilities. If there is no hospital or clinic, which can be accessed in half an hour's time, then a temporary health center should be set up for the construction camp. The health centre should have at least a doctor and a nurse, duty staff, medicines and minimum medical facilities to tackle first aid requirements or minor accidental cases, linkage with nearest higher order hospital to refer patients of major illnesses or critical cases.

The health centre should carryout quarterly awareness programme of HIV – AIDS with the help of AIDS control society as well as about community living and hygiene practices in day to day living. Posters should be exhibited in the health care clinic.

## **E. Operation of Labour Camp**

Throughout the functioning period of the camp, hygienic environment must be ensured by (i) provision of safe drinking water, (ii) proper maintenance of toilets including daily cleaning and disinfection using proper disinfectants, (iii) regular cleaning of drains by removing the silt and solid waste, (if any) and (iv) appropriate waste management practices. While it is of utmost importance to ensure that fire-fighting equipments like fire extinguishers are in working condition, it should also be monitored that construction workers use the personal protective equipments provided to them and they are replaced when necessary. All these facilities should be inspected on a weekly basis to achieve the desired levels of safety and hygiene standards.

## **F. Preparation of Labour Camp Management And Re-development Plan**

After the site for the labour camp has been finalized and approved by Environmental Expert of PIU, the Contractor should prepare a labour camp management and redevelopment plan to be submitted to PIU for approval prior to setting up of the camp and it should comprise the following details:

- Section-1:** Details of site: Copy of approved site identification report along with location plan, showing the site, its survey no., access road, project stretch, distance form the project stretch, surrounding features and land use like residences, water bodies etc., photograph of the site showing the topography and other existing features.
- Section-2:** Site preparation: Activities that should be undertaken for preparing the site based on EMP and this guideline.
- Section-3:** Arrangements/ facilities within the camp: List of facilities to be provided along with its details like area, no of people to be accommodated and a layout plan showing the plan of the site with all the facilities planned like quarters, labour camp, mess, common facilities, toilet facilities, etc.



- Section-4:** Mitigation measures that should be undertaken as per the EMP and this guideline while setting up of the camp and operation of the camp should be separately listed out here.
- Sectoin-5:** Other details: Any other relevant detail like list of awareness camp to be provided to workers, details of information dissemination etc. should be included.
- Section 6:** Re-development plan, which should indicate following points: (i) List of structures to be demolished and list of the clean-up activities that needs to be undertaken, (ii) Proposed use of the land in the post construction phase, if it is a public property, (iii) Presence of existing facilities that could be put in use by the land owner if it is a leased out private land or by the community in case of a public property.
- Section-7:** Annexure-(a) Working drawings: Electrical plan showing the electrical network planned for the site, location of generators, master switch boards etc. and plumbing drawing showing the network of water supply lines, water tank, drainage facilities etc. (b) Copy of permissions obtained from local governing body / community etc. as applicable, (c) Copy of agreement entered with site owner, in case of leased out site.

All the drawings should have north direction marked in it along with prevailing wind direction. Necessary dimensions and specifications should be provided where ever necessary. The labour camp management plan should be submitted to the Environmental Expert of PIU for a written approval before any physical work is undertaken on a particular site. The Environmental Expert of PIU will carefully examine the proposals in light of the various EMP and regulatory provisions and provide suggestions, as necessary to the Contractor who shall incorporate it in the management plan. Contractor shall be responsible for satisfactory and timely implementation of these EMP requirements.

#### **G. Re-development of The Labour Camp**

The Contractor should clear all temporary structures; dispose all building debris, garbage, night soils and any other waste as per the approved debris management plan. All disposal pits or trenches should be filled in, disinfected and effectively sealed off. Entire camp area should be left clean and tidy, in a manner keeping the adjacent lands neat and clear, at the Contractor's expense, to the entire satisfaction of landowner and the Environmental Expert of PIU.

These activities should be completed by the Contractor prior to demobilization. Once the Contractor finishes his job, he needs to obtain a certificate from the owner, stating that the site has been re-developed to his/her satisfaction and in tune with the agreement. Then following documents needs to be submitted to the Environmental Expert of PIU by the

- Copy of approved site identification report
- Photographs of the concerned site 'before' and 'after' setting up the camp.
- Certificate from the owner stating his/her satisfaction about status of re-development of the site.

Engineer-in-charge/Environmental Specialist of PIU (ERA) shall ensure, through site verification that all clean-up and restoration operations are completed satisfactorily and a written approval should be given to the Contractor mentioning the same before the 'works completion' certificate is issued/recommended. The PIU (ERA) shall ensure through site

inspection that the Contractor has restored the site properly & completely. The site can then be handed over to the concerned owner or local bodies or for local communities as the case may be. Certification/documentation pertaining to approval for clean-up and restoration operations and thereafter handing-over to the owner shall be properly maintained by the Contractor.

## ANNEXURE-VII: Guidelines to Ensure Worker's Safety During Construction

In order to ensure worker's safety while undertaking various operations/stages of construction many safety measures needs to be followed, which are listed down below:

### A. Labour Camp/ Site Office

- Install perimeter fencing.
- Ensure good visibility and safe access at site entrances.
- Provide adequate warning signs at the entrance and exit, as necessary.
- Provide adequate space/area for loading and unloading, storage of materials, equipment and machineries.
- Display emergency procedure and statutory notices at conspicuous locations.
- Provide areas for collecting garbage and other waste material, and also arrange for their regular/periodic disposal.
- Arrange appropriate storage, transportation and use of fuel, other flammable materials and explosives in line with the license requirements obtained from concerned authorities.
- Provide defined access roads and movement areas within the site.
- Ensure availability of first aid facilities and display notices at various work places showing the location of first aid facilities and emergency contact numbers. Provide and enforce use of PPE at construction sites.

### B. House Keeping Practices

- Provide proper slope in kitchen, canteens, washrooms, toilets and bathrooms for easy and immediate draining of water.
- Keep all walkways and circulation areas clear and unobstructed at all times.
- Ensure that spillages of oil and grease are avoided and in case of accidental spills, these are immediately collected.
- Use metal bins for collection of oily and greasy rags.
- Do not leave tools on the floor or in any location where they can be easily dislodged.
- Keep windows and light fittings clean.
- Maintain the workplace floors dry and in a non-slippery condition
- Provide and maintain proper drainage system to prevent water logging and unhygienic conditions.
- Ensure that protruding nails in boards or walls are moved or bent over or removed so that they do not constitute a hazard to people.
- Store all flammable materials like HSD in appropriate container with proper cover and labels – as required for various products.
- Display 'no smoking' signs in areas with high risks of fire, (eg. near fuelling areas, diesel/oils/lubricant/paint storage area, hessians, rubber, wood and plastic etc.) in and around working area.

### C. Safety During Excavation

- During excavation of foundations, necessary safety measures will be taken by the contractor.

- Excavation of 1.5 meters deep or greater require a sides protection unless the excavation is made entirely in stable rock
- Safe access and egress will be require including ladders, steps, ramps, or other safe means of exit of workers in excavated depth of 4 feet (1.22 meters) or deeper
- Excavated earth will be collected and disposed in pre-identified site with the approval of PIU.
- To ensure elimination of excavation hazards, excavation will be carried in the presence of competent person.
- Suitable barricading will be provided

### **D. Handling of Cement Bags**

- Cement bags will be stored and emptied in covered area to control fugitive dust emissions.
- While handling and emptying cement bags, workers will wear mask and goggle and hand gloves.
- Manual transferring of cement bags from one place to another place will not be allowed. For this purpose, trolley will be used.

### **E. Steel Bars Reinforcement for Foundation and Roof**

- Manual cutting of steel bars for reinforcement will be discouraged
- Only skilled workers will be deployed by the contractor for steel bar bending and rebaring reinforced structures.
- Correct hand and power tools will be used to tie and cut steel bars.
- Workers engaged in steel bar bending and reinforcement will be provided helmet, suitably strong and flexible leather gloves and safety shoes.
- Workers will take extra caution and attention when walking on steel bar mattes and areas that contain exposed steel bar.
- First aid facilities will be provided at the site to provide first aid incase of cuts or injuries to workers. After providing first aid, injured worker will be taken to hospital for further treatment.

### **F. Operation of Trucks And Dumpers**

- Ensure that only trained, authorized and licensed drivers operate the vehicles.
- Enlist help of another worker before reversing the vehicle.
- Switch-off the engine when not in use to save fuel, prevent accidents and unnecessary noise and air pollution.
- Lower the tipping bodies when the machine is unattended, but if it is necessary to leave them in the raised position they should be blocked to prevent their fall by fixing a sturdy support below.
- Carryout periodic servicing as per the manufacturer's requirements. All records of maintenance and repairs should be in writing and available for verification.
- Keep the vehicle tidy and the cabin free from clumsy utilities, which might obstruct the controls and create hazards.

- Avoid carrying additional passengers in the cabin or on the body of the dumper, while in field operation other than the connected workers.
- Provide stop blocks when the vehicle is tipping into or running alongside excavations or when it is parked.
- Do not overload the vehicle.
- Carry only well secured loads and use proper covers and fasteners.

### **G. Manual Handling and Lifting**

- Avoid manual handling of heavy materials.
- Pre-assess the actual requirement of manpower in case of emergency situations.
- All concerned persons shall be trained in proper methods of lifting and carrying.
- In all manual operations where groups of workers are involved, a team leader with necessary training to handle the entire work force in unison has to be provided for.
- Watch and ward to control/supervise/guide movement of equipments and machineries, loading and unloading operations, stability of the stockpiled materials and irregularly shaped objects have to be provided for safety and security of workers.
- Carriageway used by the workers must be free from objects.
- Loading and unloading from vehicles shall be under strict supervision.

### **H. Electrical Hazards**

- Statutory warning leaflets/posters are to be distributed/displayed by the Contractor in the vicinity of work site for the benefit of all workers, officers and supervisors as well as the public, indicating the do's and don'ts and warning related to electrical hazards associated with operations to be executed/in progress.
- All wires shall be treated as live wires.
- Report about dangling wires to the site-in-charge and do not touch them.
- Only a qualified electrician should attempt electrical repairs.
- Train all workers about electrical safety.
- Shut down the equipment that is sparking or getting over heated or emitting smoke at the time of operation, if it is not the normal way of working of such machines.
- Inform technical person/s for required maintenance.
- Never use damaged wires for electrical connection.

### **I. Use And Storage of Flammable Gas**

- Store filled gas/LPG cylinder in a secure area – mark this as a no smoking area.
- Transport, store, use and secure cylinders in upright position.
- Ensure proper ventilation at the ground level in locations where LPG is in use.
- Avoid physical damage to the cylinders.
- Never weld near the cylinder.
- Store empty cylinders secured and upright.
- Make sure that the cylinder is closed immediately after use.
- Investigate immediately if there is the smell of LPG or gas.
- Never use destenched gas/LPG on site.



- Make sure that there is no other unrelated fire in the vicinity of the cylinder.

## **J. Gas Welding**

The welders and welding unit should follow all the basic principles of welding for safety and security:

- Use face shield to protect the eyes.
- Use goggles, particularly when chipping slag and cutting strips.
- Use gloves long enough to protect wrists and forearms against heat, sparks, molten metal and radiation hazards.
- Use high-top boots/gum boots to prevent sparks, splinters, sharp edges of metal and hot welded strips, welding rods, electric cables etc. from injuring the legs.
- Avoid inhaling the noxious fumes and gasses from burning electrodes by using gas masks and screen of the work area to prevent the glair moving outside it.
- Keep the key hung from the regulator control for split seconds operations to stop the valve in case of any accidental damage or leakage to supply pipeline that may catch fire and cause accidents in case Acetylene or LPG cylinder.
- The welding area should have sufficient openings with fixed exhaust ventilators or adequate air flow openings to remove poisonous fumes and gases.
- Take precautions of wearing hard hats or fiber helmets to prevent injury due to fall of any object and accidental injury from projections while welding.
- Welders operating above ground should have adequate safety belt secured to stable platform to prevent accidental fall or injury from the scaffold. All electrical and gas connection lines up to the welder should be sufficiently insulated and protected from sharp edges and sharp objects. These shall not come into contact with hot metal.
- Do not use gas cylinders for supporting work or as rollers.
- While using LPG cylinders for welding, follow all safety precautions as has been prescribed by the supplier company.
- Avoid fire hazards and accidents by posting safety supervisors to oversee the activities of workers.
- Do not store explosives, high inflammable materials, loose hanging overhead objects, hot welded strips etc. near gas cylinders.
- Close all valves, switches and circuits while leaving the work place under proper lock and key. In case of mobile units, proper carriage procedures have to be followed for safety and security of men and materials.

## **K. Fire Safety Practices**

- Store flammable material in proper areas having adequate fire protection systems.
- Display sufficient warning signs.
- Install fire alarm wherever required and test regularly.
- Inspect fire extinguishers regularly and replace as necessary.
- Train selected personal on use of fire extinguishers
- Fire escape route should be kept clear at all times and clearly indicated
- Display escape route maps prominently on each side.

- Provide sufficient exit signs at prominent locations for directing people to the escape staircases and routes.
- Train workers about the escape route and assembly point/s.
- Carryout fire drill periodically.

#### **L. Noise Hazards And its Control**

- Plan camp lay-out in a manner that ensures barriers/buffers between residential/ office units and high noise generating zones.
- Use sound meters to measure the level of noise and if it exceeds 75 dB(A), then ensure preventive measures.
- Make personnel aware of noisy areas by using suitable warning signs and insist on use of ear protectors/ear plugs to prevent excess noise affecting the workmen.
- Reduce noise at source by: use of improved equipments; regular and proper maintenance of the machinery as per the manufacturer's manual; by replacing rickety and noisy equipments and machineries. Screening locations with noise absorbing material; making changes in the process/equipment; controlling machine speeds; ensuring that two noise-generating machines are not running at the same time close to each other at same location; using cutting oils and hydraulic noise breakers; providing vibration and noise absorbing platform and firm embedding of equipments with fasteners.
- Appoint a competent person to: carryout a detailed noise assessment of the site; designate ear protection zone/s; give training/instructions on the necessary precautionary measures to be observed by site personnel including using suitable type of ear protection equipments.

#### **M. Personal Protective Equipment**

##### **General**

- Provision of personal protective equipment has to be made over and above all measures taken for removing or controlling safety hazards on a work site.
- Ensure that sufficient personal protective equipments are provided and that they are readily available for every person who may need to use them.
- The Contractor's Project Manager shall ensure that all persons make full and proper use of the personal protective equipment provided.
- Provide instruction/s and training for the proper use and care of personal protective equipment.
- Ensure that the personal protective equipments are in good condition.
- Train workers to report unintentional damages for replacement and to always keep the personal protective equipment clean.
- PPE includes, but may not be limited to, hard hats, goggles, ear plugs, gloves, air filters/masks, boots, ropes etc.

##### **Head Protection**

- Hard hats are compulsory for all workers, supervisors and managers/officials while working and/or inspecting a work site.

- Hard hat areas shall be demarcated clearly.

### Hearing Protection

- Provide ear plugs or ear muffs to the workers and to those who need to get in and out of a high noise area frequently. Use re-usable earplugs when the reduction required (15-25 dBA) is not excessive. Use earmuffs where a large attenuation of upto 40 dBA is demanded.
- Do not use dry cotton wool for hearing protection because it doesn't provide any such protection.
- Provide disposable ear plugs for infrequent visitors and ensure that these are never re-used.
- Replenish ear plugs from time to time for those who need to work continuously for a long period in a high noise area/s.
- Use ear muffs with replaceable ear cushions because they deteriorate with age or may be damaged in use.
- Avoid wearing spectacles with ear muffs.
- Use soap and water or the recommended solvent for cleaning ear muffs.

### Respiratory (Protective) Equipment

- Wear suitable mask for protection when there is a potential for small particles entering the lungs, e.g. emptying of cement bags, etc.
- Provide training to all persons using the masks/respirators for their correct fitting, use, limitations and symptoms of exposure.
- Clean and inspect all respirators before and after use.
- Store respirators properly when not in use.

### Safety Footwear

- Wear suitable footwear for work
- Use safety footwear on site or in other dangerous areas.
- Wear suitable safety shoes or ankle boots when working anywhere where there is high risk of foot injuries from slippery or uneven ground, sharp objects, falling objects etc.
- All safety footwear, including safety shoes, ankle boots and rubber boots, should be fitted with steel toecaps.
- Avoid wearing flip flops, high heeled shoes, slippers, light sport shoes in situations where there is a risk of foot injury.
- Keep shoelace knots tight.

### Hand Protection

- Wear suitable gloves for selected activities such as welding, bending steel bars, cutting and manual handling of materials and equipment.
- Do not wear gloves where there is a risk of them becoming entangled in moving parts of machinery.

- Wash hands properly with disinfectant soap and clean water before drinking or eating.
- Wash hands immediately after each operation on site when the situation warrants.

**N. First Aid**

- Provide first aid boxes at every work site in a cool and shaded place.
- Ensure that training on the use of the first aid box is provided to at least every supervisor on the site.
- Display the list of persons along with their contact numbers who are trained on providing first aid.
- Ensure that every first aid box is marked "First Aid" in English and in local language.
- Check for expiry dates and replace the contents, as necessary.
- Maintain a register on health records including injuries/accidents.

**O. Reporting of Accident and Investigations**

- Any accident at the site will be reported.
- Carryout the investigation as quickly as possible.
- Investigation should be carried out both internally as well as through third party.
- Conduct interviews with as many witnesses as necessary including the affected persons and supervising officials.
- Do not rely on any one/limited source of evidence.
- Check all the log books, stock registers, issue registers, movement registers on site
- After completion of the investigation/enquiry, a summary of the facts recorded, sequence of happenings, persons-in-charge, persons examined, equipments and machineries tested, follow-up of action as per legal requirements, copy of station diary entry, hospital entry, safety regulations etc. to be prepared with a comparative analysis for proper assessment.

**ANNEXURE-VIII: Reporting Format for Camp Site**

Project Details		Date of reporting	
1.	Name of project		
2.	Name and address of the Contractor		
3.	Contract date and duration		
<b>B Site Details</b>			
1.	Place Name	Landmark	
2.	Area of site	Current land use	
3.	Ownership of the land	Owned / leased	Survey no.
4.	If leased / rented, name, address and contact details of owner		
5.	Distance from construction site		
6.	Distance from Water Body, Forest (if any)		
7.	Distance from the Populated Area		
8.	No of trees with girth > 0.3m on the site		
9.	No of trees to be cut		
10.	Is top soil conservation required (Yes/ No)		
<b>List of enclosures:</b>	(a) Location map		
	(b) Layout plan		
	(c) Photographs of the site		
	(d) List of machinery, equipments and vehicles to be used		
	(e) List of schools and hospitals with in 200 m distance from the boundary of the camp		
<b>C. Submission Details</b>	Submitted by (Environment & Safety Officer of Contractor)		<b>Approved / Rejected by (Environmental Officer of PIU)</b>
<b>Signature &amp; date</b>			
<b>Name</b>			
<b>Designation</b>			
<b>Remarks by Environmental Expert of PIU</b>			
<p><b>* All distances are to be measured from the boundary of the site.</b>                      Note: Contractor has to fill and submit this format to the Environmental Expert of PIU upon identification of labour camp site. Subsequently, the Environmental Expert of PIU has to visit the site and approve / reject the site with reasons. The Environmental Expert of PIU has to give a copy of this format to the contractor after his approval / rejection with remarks. On approval of a site, the Contractor has to prepare the Management and Redevelopment Plan for this site as per the Guidelines given in EMP and submit to Environmental Expert of PIU for approval</p>			



**ANNEXURE IX: Format For Register of Complaints (Grievance) and it's Reporting**

<b>A</b>		<b>Project Details</b>		<b>Information</b>	
1.	Name of project				
2.	Name and address of the Contractor				
3.	Contract date and duration				
<b>B</b>	Details of Complaint Received			Site Name	
<b>Sl. No.</b>	Date of Complaint	Name and address of person with contact details	Complaint	Action taken with date	<b>Signature of ESO of Contractor</b>
1					
2					
3					
<p>A register in this format shall be maintained at each site office of the contractor. This same format shall be used to compile and report the details of complaints received at all site to the Environmental Expert of PIU along with the Monthly Report of the Contractor. The Environmental Expert of PIU has to give instruction to the Contractor, if any further action has to be taken on any complaint.</p>					

**ANNEXURE X: Checklist For Monitoring of Labour Camp Management**

<b>A Project Details</b>		<b>Date of Monitoring:</b>			
1.	Name of project.				
2.	Name and address of the Contractor				
3.	Contract date and duration				
4.	Name of Labour Camp				
<b>B Monitoring Details</b>					
<b>Sl. No.</b>	<b>Environmental Management Measures</b>	<b>Environmental Expert's observation (Yes / No / Not Applicable)</b>	<b>Corrective Proposed</b>	<b>Actions</b>	<b>Remarks</b>
1.	Whether the camp are floored with concrete?				
2.	Are all the first aid facilities provided in the camp?				
3.	Whether the camp is located in such a way that there are no residences, public institutions or biosensitive area with in a radius of 500 m from the camp?				
4.	Whether the vehicle movement in and out of the camp is in a controlled manner?				
5.	Whether LPG for cooking is provided?				
6.	Whether safe drinking water is provided?				
7.	Whether all the drains and channels are covered?				
8.	Whether a green belt is provided along the periphery of camp?				
9.	Whether day care centres are provided with in the camp?				
10.	Whether sanitation facilities are provided separately for male and female?				
11.	Whether separate garbage bins are provided to collect the garbage?				
12.	Whether septic tanks with soak pits are provided?				
13.	Whether the location of soak pit is in such a away that it does not pollute the ground water?				

14.	Whether a qualified safety officer is appointed for ensuring safety?			
15.	Whether proper fencing of the camp is done?			
16.	Whether the workers are well aware of cleanliness, hygiene, community livings, AIDS etc.?			
17.	Whether all applicable clearances are obtained and valid till date?			
<b>Signature of Environment and Safety Officer (ESO) of the Contractor with date</b>			<b>Signature of Environmental Expert of PIU with date</b>	
<p><b>Note: The Environmental Expert of PIU has to use this format to monitor the implementation of Environmental Management Measures for each Labour Camp Quarterly. Corrective actions with specific timeframe should be proposed for each Environmental Management Measure, which is not implemented satisfactorily. A copy of the filled up format should be given to the ESO of the Contractor. Environmental Expert of PIU has to attach this format to the Quarterly Report, with details of corrective action taken by the Contractor.</b></p>				



**ANNEXURE XI: Check List For Monitoring of Redevelopment of Labour Camp Site**

<b>A Project Details</b>		<b>Date of Monitoring:</b>		
1.	Name of project			
2.	Name and address of the Contractor			
3.	Contract date and duration			
4.	Name of Labour Camp			
<b>B Monitoring Details</b>				
<b>Sl. No.</b>	<b>Environmental Management Measures</b>	<b>Environmental Expert's observation (Yes / No / Not Applicable)</b>	<b>Corrective Actions Proposed</b>	<b>Remarks</b>
1.	Are all the temporary structures cleared as per the list in the redevelopment plan?			
2.	Are all building debris, garbage, night soils and POL waste disposed off safely?			
3.	Are all disposal pits or trenches filled, disinfected and effectively sealed off?			
4.	Are the facilities that could be put to re-use maintained well?			
5.	Are all the spills within the camp site effectively disposed off from the site?			
6.	All the area within the camp site is leveled and spread over with stored top soil.			
7.	Has the residual top soil been utilized effectively?			
8.	Has the entire camp area been made clean and tidy without disturbing the adjacent lands?			
9.	Are the 'before' and 'after' scenarios of the site documented through photographs and submitted to PIU?			
10.	Are the conditions mentioned by the owner in the agreement adhered to?			
11.	If not, mention the details of the conditions that are not			

	adhered to and further steps to be taken.			
12.	Can 'works completion' certificate be issued to this site?			
Signature of Environment and Safety Officer (ESO) of the Contractor with date			Signature of Environmental Expert of PIU with date	
<p><b>Note: The Environmental Expert of PIU has to use this format to monitor the implementation of Environmental Management Measures for the redevelopment of each Labour Camp Site as and when it is closed. Corrective actions with specific timeframe should be proposed for each Environmental Management Measure, which is not implemented satisfactorily. A copy of the filled up format should be given to the ESO of the Contractor. Environmental Expert of PIU has to attach this format to the Quarterly Report, with details of corrective action taken by the Contractor.</b></p>				



**ANNEXURE XII: Reporting Format for Occupational Health And Safety Measures**

A Project Details		Date of Reporting:	
1.	Name of project.		
2.	Name and address of the Contractor		
3.	Contract date and duration		
<b>B</b>	Implementation Status of Health and Safety Measures		
Sl. No.	Health and Safety Measures	Implementation Status (Yes / No)	Remarks
1	Appointment of qualified Environment and Safety Officer		
2	Approval for Construction Safety Management Plan by the Environmental Expert of PIU.		
3	Provision for flags and warning lights for potential hazards		
4	Provision of adequate staging, form work and access (ladders with handrail) for works at a height of more than 3.0 m		
5	Provision of adequate shoring / bracing / barricading / lighting for all deep excavations of more than 3.0 m depth.		
6	Provision for sufficient lighting especially for night time work		
7	Construction Workers safety – Provision of personnel protective equipment's		
	A. Helmets		
	B. Safety Shoe		
	C. Gumboot		
	D. Dust masks		
	E. Hand Gloves		
	F. Safety Belts		
	G. Reflective Jackets		
	H. Earplugs for labour		
8	Workers engaged in welding work shall be provided with welder protective shields		
9	All vehicles are provided with reverse horns.		

10	All scaffolds, ladders and other safety devices shall be maintained in as safe and sound condition		
11	Regular health checkup for labour/ Contractor's personnel		
12	Ensuring the sanitary conditions and all waste disposal procedures & methods in the camp.		
13	Provision for insurance coverage to the workers		
C.	Submission Details		
	Submitted by (Environment & Safety Officer of Contractor)	Approved by (Environmental Officer of PIU)	
<b>Signature &amp; date</b>			
<b>Name</b>			
<b>Designation</b>			
<b>Remarks by Environmental Expert of PIU</b>			
<p><b>Note: Contractor has to fill and submit this format to the Environmental Expert of PIU along with the Monthly Report. The Environmental Expert of PIU has to visit the site and verify the details. Further mitigation measures, if required, can be suggested by the Environmental Expert of PIU. The Environmental Expert of PIU has to give back a copy of this format to the contractor after his approval with remarks.</b></p>			

**ANNEXURE-XIII: Format For Register of Accidents and It's Reporting**

A Project Details		Date of Reporting:	
1.	Name of project		
2.	Name and address of the Contractor		
3.	Contract date and duration		
<b>B Details of Accident and People Involved in Accident</b>			
	Name of site where accident happened		
	Name and address of people involved in the accident		
	Whether Contractor's personnel or General public		
	Details of Injury		
	Details of treatment given		
	Details of compensation given		
<b>C Type of Accident (√)</b>			
	Fall of person from a height		Expl osion
	Slip, trip or fall on same level		Fire
	Struck against fixed objects		Contact with hot or corrosive substance
	Struck by flying or falling objects		Contact with poisonous gas or toxic substances.
	Struck by moving objects		Contact with poisonous gas or toxic substances
	Struck / caught by cable		Hand tool accident
	Stepping on nail etc.		Vehicle / Mobile plant accident
	Handling without machinery		Machinery operation accident
	Crushing / burying		Other (please specify)
	Drowning or asphyxiation		
<b>D Agent Involved in Accident (√)</b>			
	Machinery		Stair edge
	Portable power appliance		Excavation
	Vehicle or associated equipment /machinery		Ladder
	Material being handled, used or stored		Scaffolding
	Gas, vapor, dust, fume or oxygen		Construction formwork, shuttering and false work.
	Hand tools		Electricity supply cable, wiring switchboard and associated equipment
	Floor edge		Nail or chipping
	Floor opening		Other (Please specify)
	Left shaft		
<b>E Unsafe Action Relevant to the Accident (√)</b>			
	Operating without authority		Failure to use proper footwear
	Failure to secure objects		Failure to use eye protector
	Making safety devices inoperative		Failure to use respirator

	Working on moving or dangerous equipment		<b>Failure to use proper clothing</b>
	Using un-safety equipment		<b>Failure to use warn others or given proper signals</b>
	Adopting unsafe position or posture		<b>Horseplay</b>
	Operating or working at unsafe speed		<b>No unsafe action</b>
	Unsafe loading, Placing, mixing et		<b>Others (please specify)</b>
	Failure to use helmet		
<b>F</b>	<b>Lack of Safety Measures Relevant to the Accident (√)</b>		
	No protective gear		<b>Unsafe layout of job, etc.</b>
	Defective protective gear		<b>Unsafe process of job methods</b>
	Improper dress / footwear		<b>Poor housekeeping</b>
	Improper guarding		<b>Lack of warning system</b>
	Improper ventilation		<b>Defective tool, machinery or materials</b>
	Improper illumination		<b>No unsafe condition</b>
	Improper procedure		<b>Others (please specify)</b>
<b>G</b>	<b>Personal Factor Relevant to the Accident (√)</b>		
	Incorrect attitude /motive		<b>No unsafe personal factor.</b>
	Unsafe act by another person		<b>Other (please specify)</b>
<b>H</b>	<b>Details of Corrective and Preventive action taken</b>		
	1		
	2		
	3		
	4		
<b>I</b>	<b>Submission Details</b>		
	Submitted by (Environment & Safety Officer of Contractor)	<b>Approved by (Environmental Officer of PIU)</b>	
<b>Signature &amp; date</b>			
<b>Name</b>			
<b>Designation</b>			
<b>Remarks by Environmental Expert of PIU</b>			
<p>Note: Contractor has to fill this format as and when an accident happens and submit to the PIU along with the Monthly Report. The Environmental Expert of PIU has to visit the site and verify the details. Additional safety measures, if required, can be suggested by the PIU. The Environmental Expert of PIU has to give back a copy of this format to the contractor after his approval with remarks.</p>			

**ANNEXURE-XIV: Reporting Format For Environmental Pollution Monitoring**

A		Project Details			Date of Reporting:		
1.	Name of project						
2.	Name and address of the Contractor						
3.	Contract date and duration						
B Environmental Monitoring Details							
Sl. No	Details of Monitoring Location	Period of Monitoring	Details of values exceeding the relevant standards	Reasons for pollution	Details of Corrective actions taken	Remarks	
a. Ambient Air Monitoring							
1.							
2.							
b. Water Monitoring							
1.							
2.							
c. Noise Monitoring*							
1.							
2.							
C Submission Details							
		Submitted by (Environment & Safety Officer of Contractor)			Approved by (Environmental Officer of PIU)		
Signature & date							
Name							
Designation							
Remarks by PIU							
<p>* Noise monitoring at the site will be done by the PIU (ERA), using the Noise Meter. The PIU has to give the monitoring results to the Contractor for corrective actions, if any, required and including in this report.</p> <p>Note: The Contractor has to conduct Environmental Monitoring through a NABL approved Laboratory as per the Environmental Monitoring Plan given in the EMP, fill this format and submit to the PIU along with the Monthly Report, if monitoring was due in that month. A copy of the monitoring report given by the Laboratory has to be attached to this format. The PIU has to visit the site and verify the details. Additional mitigation measures, if required, can be suggested by the PIU. The Environmental Expert of PIU has to give back a copy of this format to the contractor after his approval with remarks.</p>							



**ANEXURE XV: GUIDELINES ON PREVENTIVE MEASURES TO CONTAIN THE SPREAD OF COVID-19 IN WORKPLACE SETTINGS (Ministry of Health & Family Welfare-MoHFW)**

18<sup>th</sup> May, 2020

Government of India  
Ministry of Health & Family Welfare  
Directorate General of Health Services  
(EMR Division)

**Guidelines on preventive measures to contain spread of COVID-19 in workplace settings**

**1. Background**

Offices and other workplaces are relatively close setting, with shared spaces like (corridors, elevators & stairs, parking places, cafeteria, meeting rooms and conference halls etc.) and thus COVID-19 infection can spread relatively fast among officials, staffs and visitors.

Thus there is a need to prevent importation of infection in workplace settings and to respond in a timely and effective manner in case suspect case of COVID-19 is detected in these settings, so as to limit the spread of infection.

**2. Scope**

This document outlines the preventive and response measures to be observed to contain the spread of COVID-19 in workplace settings. The document is divided into the following sub-sections

- (i) basic preventive measures to be followed at all times
- (ii) measures specific to offices
- (iii) measures to be taken on occurrence of case(s)
- (iv) disinfection procedures to be implemented in case of occurrence of suspect/confirmed case.

**3. Basic preventive measures**

The basic preventive measures include simple public health measures that are to be followed to reduce the risk of infection with COVID-19. These measures need to be observed by all (employees and visitors) at all times. These include:

- i. Physical distancing of at least one meter to be followed at all times.
- ii. Use of face covers/masks to be mandatory.
- iii. Practice frequent hand washing (for at least 40-60 seconds) even when hands are not visibly dirty and use of alcohol based hand sanitizers (for at least 20 seconds).
- iv. Respiratory etiquettes to be strictly followed. This involves strict practice of covering one's mouth and nose while coughing/sneezing with a tissue/handkerchief/flexed elbow and disposing off used tissues properly.
- v. Self-monitoring of health by all and reporting any illness at the earliest

**4. Preventive measures for offices:**

Guidelines with respect to preventive measures specific to offices have been issued by DoPT. These guidelines are available at:

<https://www.mohfw.gov.in/pdf/PreventivemeasuresDOPT.pdf>.

Any staff reportedly suffering from flu-like illness should not attend office and seek medical advice from local health authorities [e.g. CGHS wellness center, medical attendance under CS (MA) etc.]. Such persons, if diagnosed as a suspect/confirmed case of COVID-19 should immediately inform the office authorities.

Any staff requesting home quarantine based on the containment zone activities in their residential areas should be permitted to work from home.

DoPT guidelines with respect to organizing meetings, coordinating visitors shall be scrupulously followed.

**5. Measures to be taken on occurrence of case(s):**

Despite taking the above measures, the occurrence of cases among the employees working in the office cannot be ruled out. The following measures will be taken in such circumstances:

**5.1. When one or few person(s) who share a room/close office space is/are found to be suffering from symptoms suggestive of COVID-19:**

- 5.1.1. Place the ill person in a room or area where they are isolated from others at the workplace. Provide a mask/face cover till such time he/she is examined by a doctor.
- 5.1.2. Report to concerned central/state health authorities. Helpline 1075 will be immediately informed.
- 5.1.3. A risk assessment will be undertaken by the designated public health authority (district RRT/treating physician) and accordingly further advice shall be made regarding management of case, his/her contacts and need for disinfection.
- 5.1.4. The suspect case if reporting very mild / mild symptoms on assessment by the health authorities would be placed under home isolation, subject to fulfilment of criteria laid down in MoHFW guidelines (available at: <https://www.mohfw.gov.in/pdf/RevisedguidelinesforHomeIsolationofverymildpresymptomaticCOVID19cases10May2020.pdf>)
- 5.1.5. Suspect case, if assessed by health authorities as moderate to severe, he/she will follow guidelines at:



<https://www.mohfw.gov.in/pdf/FinalGuidanceonMangaementofCovidcasesversion2.pdf>

- 5.1.6. The rapid response team of the concerned district shall be requisitioned and will undertake the listing of contacts.
- 5.1.7. The necessary actions for contact tracing and disinfection of work place will start once the report of the patient is received as positive. The report will be expedited for this purpose.

5.2. If there are large numbers of contacts from a pre-symptomatic/asymptomatic case, there could be a possibility of a cluster emerging in workplace setting. Due to the close environment in workplace settings this could even be a large cluster (>15 cases). The essential principles of risk assessment, isolation, and quarantine of contacts, case referral and management will remain the same. However, the scale of arrangements will be higher.

### 5.3. Management of contacts:

The contacts will be categorised into high and low risk contacts by the District RRT as detailed in the Annexure I.

The high risk exposure contacts shall be quarantined for 14 days. They will follow the guidelines on home quarantine (available on:

<https://www.mohfw.gov.in/pdf/Guidelinesforhomequarantine.pdf>).

These persons shall undergo testing as per ICMR protocol (available at: <https://www.mohfw.gov.in/pdf/Revisedtestingguidelines.pdf>).

The low risk exposure contacts shall continue to work and closely monitor their health for next 14 days.

## 6. Closure of workplace

If there are one or two cases reported, the disinfection procedure will be limited to places/areas visited by the patient in past 48 hrs. **There is no need to close the entire office building/halt work in other areas of the office** and work can be resumed after disinfection as per laid down protocol (see para 7).

However, if there is a larger outbreak, the entire building will have to be closed for 48 hours after thorough disinfection. All the staff will work from home, till the building is adequately disinfected and is declared fit for re-occupation.

## 7. Disinfection Procedures in Offices

Detailed guidelines on the disinfection procedures in offices have already been issued by the MOHFW and are available on:

<https://www.mohfw.gov.in/pdf/Guidelinesondisinfectionofcommonpublicplacesincludingoffices.pdf>

### Annexure I

#### **Risk profiling of contacts**

Contacts are persons who have been exposed to a confirmed case anytime between 2 days prior to onset of symptoms (in the positive case) and the date of isolation (or maximum 14 days after the symptom onset in the case).

#### High-risk contact

- Touched body fluids of the patient (respiratory tract secretions, blood, vomit, saliva, urine, faeces; e.g. being coughed on, touching used paper tissues with a bare hand)
- Had direct physical contact with the body of the patient including physical examination without PPE
- Touched or cleaned the linens, clothes, or dishes of the patient.
- Lives in the same household as the patient.
- Anyone in close proximity (within 1 meter) of the confirmed case without precautions.
- Passengers in close proximity (within 1 meter) in a conveyance with a symptomatic person who later tested positive for COVID-19 for more than 6 hours.

#### Low-risk contact

- Shared the same space (worked in same room/similar) but not having a high-risk exposure to confirmed case of COVID-19.
- Travelled in same environment (bus/train/flight/any mode of transit) but not having a high-risk exposure.

**Figure 1: Management of the case(s) and contacts**

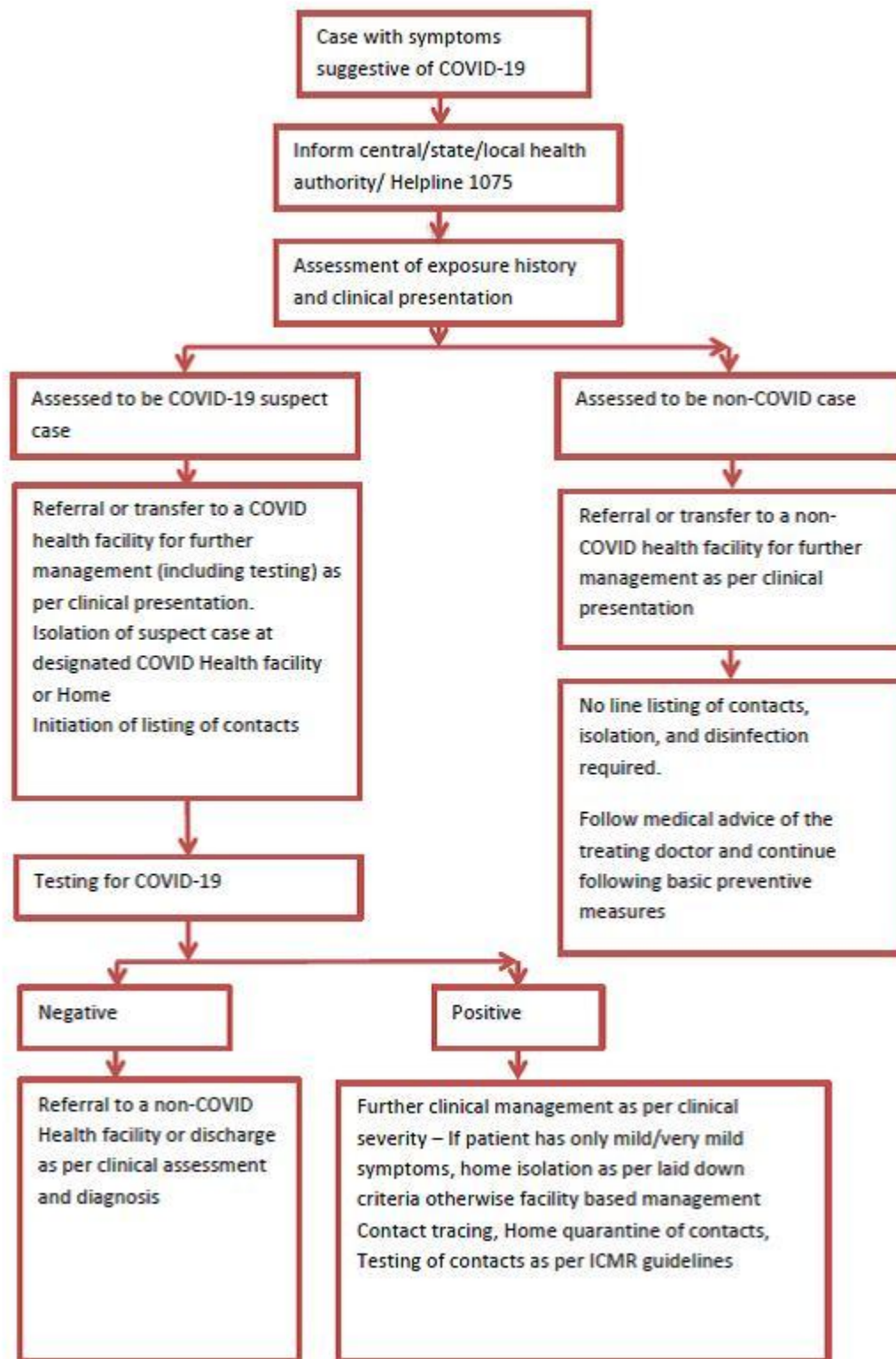
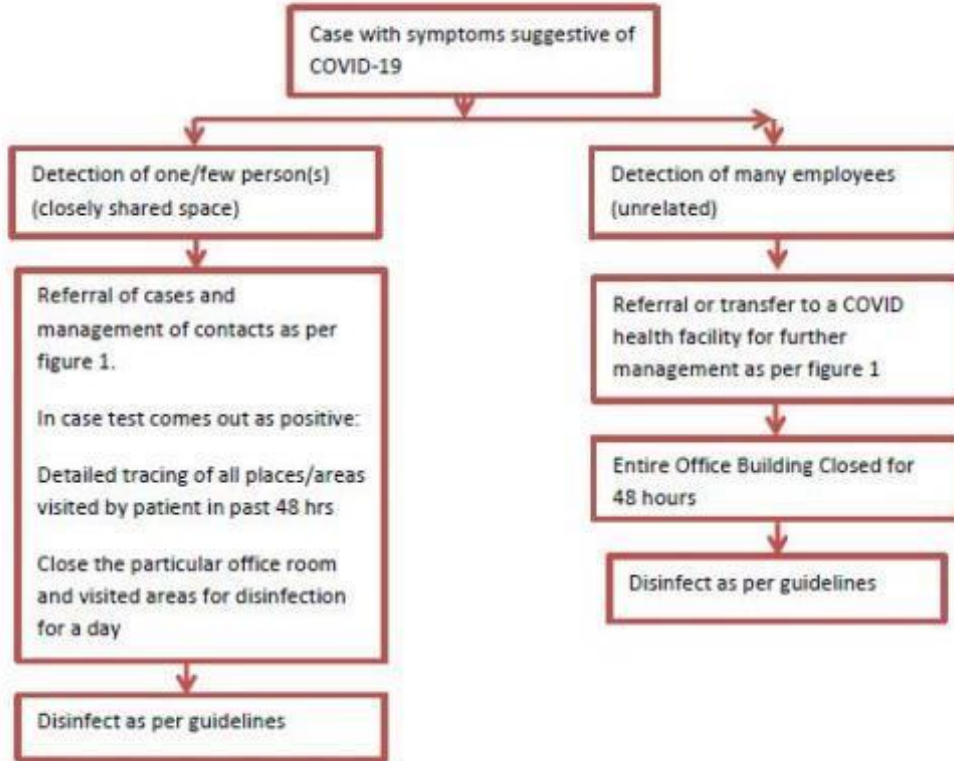




Fig-2: Disinfection of workplace



**ANNEXURE XVI: COVID FAQs- Detail Question and Answers on COVID-19 for General Public -Workers, Staff, etc. ( Issued through National Health Mission)**

**1. What is Coronavirus?**

Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered coronavirus causes coronavirus disease COVID-19.

**2. What is COVID-19**

COVID-19 is an infectious disease caused by the most recently discovered coronavirus. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019.

**3. What are the symptoms of COVID-19**

The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, sore throat or diarrhoea. These symptoms are

usually mild and begin gradually. Some people become infected but don't develop any symptoms and don't feel unwell. Most people (about 80%) recover from the disease without needing special treatment. Around 1 out of every 6 people who gets COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and those with underlying medical problems like high blood pressure, heart problems or diabetes, are more likely to develop serious illness. People with fever, cough and difficulty breathing should seek medical attention.

**4. How does COVID-19 spread**

People can catch COVID-19 from others who have the virus. The disease can spread from person to person through small droplets from the nose or mouth which are spread when a person with COVID-19 coughs or exhales. These droplets land on objects and surfaces around the person. Other people then catch COVID-19 by touching these objects or surfaces, then touching their eyes, nose or mouth. People can also catch COVID-19 if they breathe in droplets from a person with COVID-19 who coughs out or exhales droplets. This is why it is important to stay more than 1 meter (3 feet) away from a person who is sick.

**5. Can the virus that causes COVID-19 be transmitted through the air?**

Studies to date suggest that the virus that causes COVID-19 is mainly transmitted through contact with respiratory droplets rather than through the air. See previous answer on "How does COVID-19 spread?"

**6. Can CoVID-19 be caught from a person who has no symptoms?**

The main way the disease spreads is through respiratory droplets expelled by someone who is coughing. The risk of catching COVID-19 from someone with no symptoms at all is very low. However, many people with COVID-19 experience only mild symptoms. This is particularly true at the early stages of the disease. It is therefore possible to catch COVID-19 from someone who has, for example, just a mild cough and does not feel ill.

**7. Can I catch COVID-19 from the feces of someone with the disease?**

The risk of catching COVID-19 from the feces of an infected person appears to be low. While initial investigations suggest the virus may be present in feces in some cases, spread through this route is not a main feature of the outbreak. The ongoing research on the ways COVID-19 is spread and will continue to share new findings. Because this is a risk, however, it is another reason to clean hands regularly, after using the bathroom and before eating.

**8. What can I do to protect myself and prevent the spread of disease Protection measures for everyone**

Stay aware of the latest information on the COVID-19 outbreak, available on the national, state and local public health authority. Many countries around the world have seen cases of COVID-19 and several have seen outbreaks. Authorities in China and some other countries have succeeded in slowing or stopping their outbreaks. However, the situation is unpredictable so check regularly for the latest news. You can reduce your chances of being infected or spreading COVID-19 by taking some simple precautions:

- Regularly and thoroughly clean your hands with an alcohol based hand rub or wash them with soap and water. Why? Washing your hands with soap and water or using alcohol-based hand rub kills viruses that may be on your hands.
- Maintain at least 1 metre (3 feet) distance between yourself and anyone who is coughing or sneezing. Why? When someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. If you are too close, you can breathe in the droplets, including the COVID-19 virus if the person coughing has the disease.
- Avoid touching eyes, nose and mouth. Why? Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and can make you sick.
- Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately. Why? Droplets spread virus. By following good respiratory hygiene you protect the people around you from viruses such as cold, flu and COVID-19.
- Stay home if you feel unwell. If you have a fever, cough and difficulty breathing, seek medical attention and call in advance. Follow the directions of your local health authority. Why? National and local authorities will have the most up to date information on the situation in your area. Calling in advance will allow your health care provider to quickly direct you to the

right health facility. This will also protect you and help prevent spread of viruses and other infections.

- Keep up to date on the latest COVID-19 hotspots (cities or local areas where COVID-19 is spreading widely). If possible, avoid traveling to places – especially if you are an older person or have diabetes, heart or lung disease. Why? You have a higher chance of catching COVID-19 in one of these areas.

### **Protection measures for persons who are in or have recently visited (past 14 days) areas where COVID-19 is spreading**

- Follow the guidance outlined above (Protection measures for everyone)
- Self-isolate by staying at home if you begin to feel unwell, even with mild symptoms such as headache, low grade fever (37.3 C or above) and slight runny nose, until you recover. If it is essential for you to have someone bring you supplies or to go out, e.g. to buy food, then wear a mask to avoid infecting other people. Why? Avoiding contact with others and visits to medical facilities will allow these facilities to operate more effectively and help protect you and others from possible COVID-19 and other viruses.
- If you develop fever, cough and difficulty breathing, seek medical advice promptly as this may be due to a respiratory infection or other serious condition. Call in advance and tell your provider of any recent travel or contact with travellers. Why? Calling in advance will allow your health care provider to quickly direct you to the right health facility. This will also help to prevent the possible spread of COVID-19 and other viruses.

### **9. How likely am I to catch COVID-19?**

The risk depends on where you are - and more specifically, whether there is a COVID-19 outbreak unfolding there. For most people in most locations, the risk of catching COVID-19 is still low. However, there are now places around the world (cities or areas) where the disease is spreading. For people living in, or visiting, these areas the risk of catching COVID-19 is higher. Governments and health authorities are taking vigorous action every time a new case of COVID-19 is identified. Be sure to comply with any local restrictions on travel, movement or large gatherings. Cooperating with disease control efforts will reduce your risk of catching or spreading COVID-19. COVID-19 outbreaks can be contained and transmission stopped, as has been shown in China and some other countries. Unfortunately, new outbreaks can emerge rapidly. It's important to be aware of the situation where you are or intend to go.

### **10. Should I worry about COVID-19?**

Illness due to COVID-19 infection is generally mild, especially for children and young adults. However, it can cause serious illness: about 1 in every 5 people who catch it need hospital care. It is therefore quite normal for people to worry about how the COVID-19 outbreak will affect them and their loved ones. We can channel our concerns into actions to protect ourselves, our loved ones and our communities. First and foremost among these actions is regular and thorough hand-washing and good respiratory hygiene. Secondly, keep informed and follow the advice of the local health authorities including any restrictions put in place on travel, movement and gatherings.

### **11. Who is at risk of developing severe illness?**

While we are still learning about how COVID-2019 affects people, older persons and persons with pre-existing medical conditions (such as high blood pressure, heart disease, lung disease, cancer or diabetes) appear to develop serious illness more often than others.

**12. Are antibiotics effective in preventing or treating the COVID-19?**

No. Antibiotics do not work against viruses, they only work on bacterial infections. COVID-19 is caused by a virus, so antibiotics do not work. Antibiotics should not be used as a means of prevention or treatment of COVID-19. They should only be used as directed by a physician to treat a bacterial infection.

**13. Are there any medicines or therapies that can prevent or cure COVID-19**

While some western, traditional or home remedies may provide comfort and alleviate symptoms of COVID-19, there is no evidence that current medicine can prevent or cure the disease. Doctors do not recommend self-medication with any medicines, including antibiotics, as a prevention or cure for COVID-19. However, several on-going clinical trials include both western and traditional medicines. We will continue to provide updated information as soon as clinical findings are available.

**14. Is there a vaccine drug or treatment for COVID-19**

Not yet. To date, there is no vaccine and no specific antiviral medicine to prevent or treat COVID-2019. However, those affected should receive care to relieve symptoms. People with serious illness should be hospitalized. Most patients recover thanks to supportive care. Possible vaccines and some specific drug treatments are under investigation. They are being tested through clinical trials. The most effective ways to protect yourself and others against COVID-19 are to frequently clean your hands, cover your cough with the bend of elbow or tissue, and maintain a distance of at least 1 meter (3 feet) from people who are coughing or sneezing

**15. Is COVID-19 the same as SARS?**

No. The virus that causes COVID-19 and the one that caused the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003 are related to each other genetically, but the diseases they cause are quite different. SARS was more deadly but much less infectious than COVID-19. There have been no outbreaks of SARS anywhere in the world since 2003.

**16. Should I wear mask to protect myself**

Only wear a mask if you are ill with COVID-19 symptoms (especially coughing) or looking after someone who may have COVID-19. Disposable face mask can only be used once. If you are not ill or looking after someone who is ill then you are wasting a mask. There is a world-wide shortage of masks, so We urge people to use masks wisely. We advises rational use of medical masks to



avoid unnecessary wastage of precious resources and mis-use of masks. The most effective ways to protect yourself and others against COVID-19 are to frequently clean your hands, cover your cough with the bend of elbow or tissue and maintain a distance of at least 1 meter (3 feet) from people who are coughing or sneezing.

**17. How to put on use take off and dispose of a mask?**

- (i) Remember, a mask should only be used by health workers, care takers, and individuals with respiratory symptoms, such as fever and cough.
- (ii) Before touching the mask, clean hands with an alcohol-based hand rub or soap and water.
- (iii) Take the mask and inspect it for tears or holes.
- (iv) Orient which side is the top side (where the metal strip is).
- (v) Ensure the proper side of the mask faces outwards (the coloured side).
- (vi) Place the mask to your face. Pinch the metal strip or stiff edge of
- (vii) the mask so it moulds to the shape of your nose.
- (viii) Pull down the mask's bottom so it covers your mouth and your chin.
- (ix) After use, take off the mask; remove the elastic loops from behind the ears while keeping the mask away from your face and clothes, to avoid touching potentially contaminated surfaces of the mask.
- (x) Discard the mask in a closed bin immediately after use.
- (xi) Perform hand hygiene after touching or discarding the mask – Use alcohol-based hand rub or, if visibly soiled, wash your hands with soap and water.

**18. How long is the incubation period for COVID-19?**

The “incubation period” means the time between catching the virus and beginning to have symptoms of the disease. Most estimates of the incubation period for COVID-19 range from 1-14 days, most commonly around five days. These estimates will be updated as more data become available.

**19. Can humans become infected with the COVID-19 from an animal source?**

Coronaviruses are a large family of viruses that are common in animals. Occasionally, people get infected with these viruses which may then spread to other people. For example, SARS-CoV was associated with civet cats and MERS-CoV is transmitted by dromedary camels. Possible animal sources of COVID-19 have not yet been confirmed. To protect yourself, such as when visiting live animal markets, avoid direct contact with animals and surfaces in contact with animals. Ensure good food safety practices at all times. Handle raw meat, milk or animal organs with care to avoid contamination of uncooked foods and avoid consuming raw or undercooked animal products.

**20. Can I catch COVID-19 from my pet?**

While there has been one instance of a dog being infected in Hong Kong, to date, there is no evidence that a dog, cat or any pet can transmit COVID-19. COVID-19 is mainly spread through droplets produced when an infected person coughs, sneezes, or speaks. To protect yourself,

clean your hands frequently and thoroughly. We continue to monitor the latest research on this and other COVID- 19 topics and will update as new findings are available.

**21. How long does the virus survive on surfaces?**

It is not certain how long the virus that causes COVID-19 survives on surfaces, but it seems to behave like other coronaviruses. Studies suggest that coronaviruses (including preliminary information on the COVID-19 virus) may persist on surfaces for a few hours or up to several days. This may vary under different conditions (e.g. type of surface, temperature or humidity of the environment). If you think a surface may be infected, clean it with simple disinfectant to kill the virus and protect yourself and others. Clean your hands with an alcohol-based hand rub or wash them with soap and water. Avoid touching your eyes, mouth, or nose.

**22. Is it safe to receive a package from any area where COVID-19 has been reported?**

Yes. The likelihood of an infected person contaminating commercial goods is low and the risk of catching the virus that causes COVID-19 from a package that has been moved, travelled, and exposed to different conditions and temperature is also low.

**23. Is there anything I should not do?**

The following measures **ARE NOT** effective against COVID-2019 and can be harmful:

- Smoking
- Wearing multiple masks
- Taking antibiotics (See question 10 "*Are there any medicines of therapies that can prevent or cure COVID-19?*")

**24. In any case, if you have fever, cough and difficulty breathing seek medical care early** to reduce the risk of developing a more severe infection and be sure to share your recent travel history with your health care provider.