

Environmental Monitoring Report

Reporting Period: July-December 2022
April 2023

Pakistan: Balakot Hydropower Development Project

Prepared by Project Implementation Unit, Pakhtunkhwa Energy Development Organization, and Energy and Power Department, Government of Khyber Pakhtunkhwa, for the Asian Development Bank.

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ABBREVIATIONS

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
CM	Construction Manager
CSSP	Construction Safety and Security Plan
EE	Environment Expert
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPC	Engineer, Procure and Construct
ERT	Emergency Response Team
GOP	Government of Pakistan
HSE	Health, Safety and Environment
IRRE	Institute for Research on River Ecology
km	Kilometer
KPK	Khyber Pakhtunkhwa
L/S	Left Side
NEQS	National Environmental Quality Standards
NOC	No Objection Certificate
OHS	Occupational Health and Safety
PD	Project Director
PEDO	Pakhtunkhwa Energy Development Organization
PIU	Project Implementation Unit
PM	Project Manager
PMC	Project Management Consultants
R/S	Right Side
ROW	Right of Way
SOPs	Standard Operating Procedures
SSEMP	Site Specific Environmental Management Plan
WHO	World Health Organization
WMO	Watershed Management Organization

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1. INTRODUCTION

1.1. Preamble

1. This is the 3rd Semi-Annual Environmental Monitoring Report (SAEMR) for the Balakot Hydropower Project (300 MW).

1.2. Headline Information

2. During the reporting period, the project Basic Engineering Design, land acquisition, and temporary preparatory works remained in progress while, on December 12, 2022, the Project Management Consultant (PMC) recommended the EPC Contractor's Site Specific Environmental Management Plan (SSEMP) for grant of the Employer's approval under the conditions of the EPC Contract.

3. On December 30, 2022, the Employer granted approval to the SSEMP, to which effect, and in pursuance of the conditions of contract, the PMC issued No Object Certificate (NOC) to the EPC Contractor on January 02, 2023.

4. Commencement of permanent Works could not be initiated at Site due to delay in completion of the project Basic Engineering Design.

5. On December 28, 2022, the Employer granted sectional possession of Site to the EPC Contractor, of the project facilities falling in Ghanool and Sangar maozas. Copy of the possession letter is provided as **Annexure-01** to the SAEMR.

6. During the months of August and September 2022, the Deputy Director Health, Safety & Environment (HSE) and Gender of the PIU, and the Environmental Expert (EE) of the PMC held consultation meetings with the stakeholders (prospective financiers) of the Basin-wide Biodiversity Action Plan (BAP). The consultation meetings proceedings, and the proposed way forward were compiled in the form of a Basin-wide Consultation Report which was subsequently submitted to the ADB for review, record, and consent.

7. Detailed justifications, furnished by the Fisheries and Wildlife departments of the Government of Khyber Pakhtunkhwa, in respect of their proposed changes in the project specific BAP institutional arrangement, and composition of the BAP Management Committee, were submitted to the ADB on November 27, 2022, for information, record, and consent.

8. Baseline instrumental environmental monitoring of air quality, noise level, water quality, and soil analysis was carried out in the project reach during the month of December 2022.

2. PROJECT DESCRIPTION AND CURRENT ACTIVITIES

2.1. Project Description

9. Balakot Hydropower Project (300 MW) is run-of-the river scheme to be constructed on the Kunhar River in its 12 kilometer (km) stretch from Paras to Sangar village in District Mansehra of the Khyber Pakhtunkhwa province. Upon completion, 1143 Giga Watt hour (GWh) of clean energy will be delivered to the National Grid on yearly basis.

10. The project dam site is located at Paras village, around 2 km downstream of the Sukki Kinari Hydropower Project (870 MW) tailrace while the powerhouse site is proposed at Ghanool village of Balakot. The 9.1 km long headrace tunnel of 8 meters (m) diameter will divert 154 m³/sec design flow of the Kunhar River water to the powerhouse to generate 300 Mega Watt (MW) of electricity. The project residential colony is identified in Sangar village.

11. Access road to the dam and power intake is proposed to off-take from National Highway (N-15) on the left side of the Kunhar River in Paras village.

12. Project brief salient features are given in **Table 2.1** followed by location map and project setting in **Figures 2.1 to 2.4**.

Table 2.1: Brief Salient Features

Hydrology and Design Flows	
River	Kunhar
Catchment area at dam site (km ²)	1939
Design Discharge (m ³ /s)	154
Design Flood (m ³ /s) T= 10 000 years	3500
Probable Maximum Flood (m ³ /s)	5000
Reservoir	
Normal Operation Level (NOL)	1288.0
Minimum Operation Level (MOL)	1283.0
Surface area (at MOL) (km ²)	0.28
Length of Reservoir (at NOL) (km)	2.20
Gross storage capacity (at NOL) (x10 ⁶ m ³)	3.56
Live storage (at NOL) (x10 ⁶ m ³)	1.20
Dam Structure	
Type	Concrete Gravity Arch
Dam crest elevation (masl)	1292.0
Maximum height above river bed (m)	35.0
Maximum height above foundation (m)	58.0
Crest length (m)	130.0
Spillways and Low Level Outlets / Flushing Sluices	
Spillway type	Upper Gated Ogee Crest Spillway + low level Gated Spillway
Upper spillway crest elevation (masl)	1278.0

Upper spillway gates No. and type	3 (radial gates)
Upper spillway gates size (W x H) (m)	11 x 10
Low level spillway invert elevation (masl)	1258.0
Low level spillway gates no. and type	2 (sluice gates)
Low level spillway size (WxH) (m)	6 x 8
Sediment Management	
Sediment Bypass Tunnel type	Gated Intake followed by Archway Tunnel
Intake size (WxH)(m)	7.5 x 4.5
Inlet invert elevation (masl)	1261.0
Tunnel cross section (W x H) (m)	archway (7.5 x 8.0)
Tunnel length (m)	650
Tunnel slope (%)	1.5
Outlet invert elevation (masl)	1248.0
Submerged guiding structure crest elevation (masl)	1272.0
Submerged weir/guiding structure height (m)	21 (estimated maximum above foundation)
River Diversion	
Construction Flood (T= 20 years) (m ³ /s)	900
Diversion type	Openings left in the dam body for the low level spillway and a left bank diversion tunnel.
Upstream Cofferdam type	Concrete gravity solution (which will be further converted to guiding structure)
Upstream Cofferdam crest elevation (masl)	1272.0
Downstream Cofferdam type	Concrete gravity solution
Downstream Cofferdam crest elevation (masl)	1252.5
Diversion tunnel type	Archway (concrete lined)
Diversion tunnel no. (-)	1
Diversion tunnel size (WxH) (m)	Archway (7.5 x 8.0)
Diversion tunnel length (m)	650
Diversion tunnel slope (%)	1.5
Diversion tunnel inlet invert El. (masl)	1261.0
Diversion tunnel outlet invert El. (masl)	1248.0
Power Intake Structure	
Intake type	Horizontal intake
Trash rack No.	4
Trash rack size (W x H) (m)	8 x 10
Service gates No.	2
Service gates size (W x H) (m)	4 x 8
Intake crest elevation (masl).	1271
Headrace Tunnel	

Tunnel section	Circular concrete lined (8.0 m inner diameter)
Length up to surge tank (m)	9137
Tunnel slope (%)	0.56%
Upstream Surge Shaft	
Type	Concrete lined circular surge shaft
Internal diameter (m)	14.5
Surge shaft height (m)	122
Surge shaft bottom elevation (masl)	1220.0
Pressure Tunnel/Shaft and Penstock	
Pressure tunnel/shaft main section type and size	Steel lined circular cross section (5.6 m internal diameter)
Pressure tunnel/shaft length (m)	152
Penstock length (m)	88
Branch Section Type	Manifold (3 branches)
Size of each branch (m)	3.2 m internal diameter conduits
Max. Length of branch (m)	~30
Powerhouse and Substation	
Powerhouse type	Conventional underground cavern
Main cavern general dimensions (LxWxH) (m)	71 x 20 x 34
Turbine type	Francis
No. of units	3
Turbine axis elevation (masl)	1054.0
No. of generators	3
Transformer / Substation type	Underground cavern (adjacent to the main powerhouse cavern)
Transformer cavern general dimensions (LxWxH) (m)	88 x 14 x 20
Downstream Surge Shaft	
Type	Concrete lined circular surge shaft
Internal diameter (m)	3
Surge shaft height (m)	244
Surge shaft bottom elevation (masl)	1055.0
Tailrace	
Type	Circular tunnel with transition to an archway section at the final length and Outlet portal
Tunnel section	Circular concrete lined (8.0 m diameter)
Length up to the final transition section (m)	1515
Tunnel slope up to the final transition section (%)	0.23% (ascending slope)
Tunnel final section	Archway concrete lined section (8.0 W x 8.0 H)
Length from transition to outlet (m)	50
Tunnel slope up to the outlet portal (%)	15% (ascending slope)
Power and Energy	

Gross Head (m)	229.0
Design Net Head (m)	217.6
Installed plant capacity (MW)	300 (at the generator)
Mean annual energy (GWh)	1143 (average of 55 years)
Project Access Facilities	
Access road to dam and related structures (length)	550 m (Off taking from National Highway N-15 at the left side of Kunhar River, near Paras village)
Access road to by-pass tunnel (length)	440 m

Figure 2.1: Project Location in District Mansehra

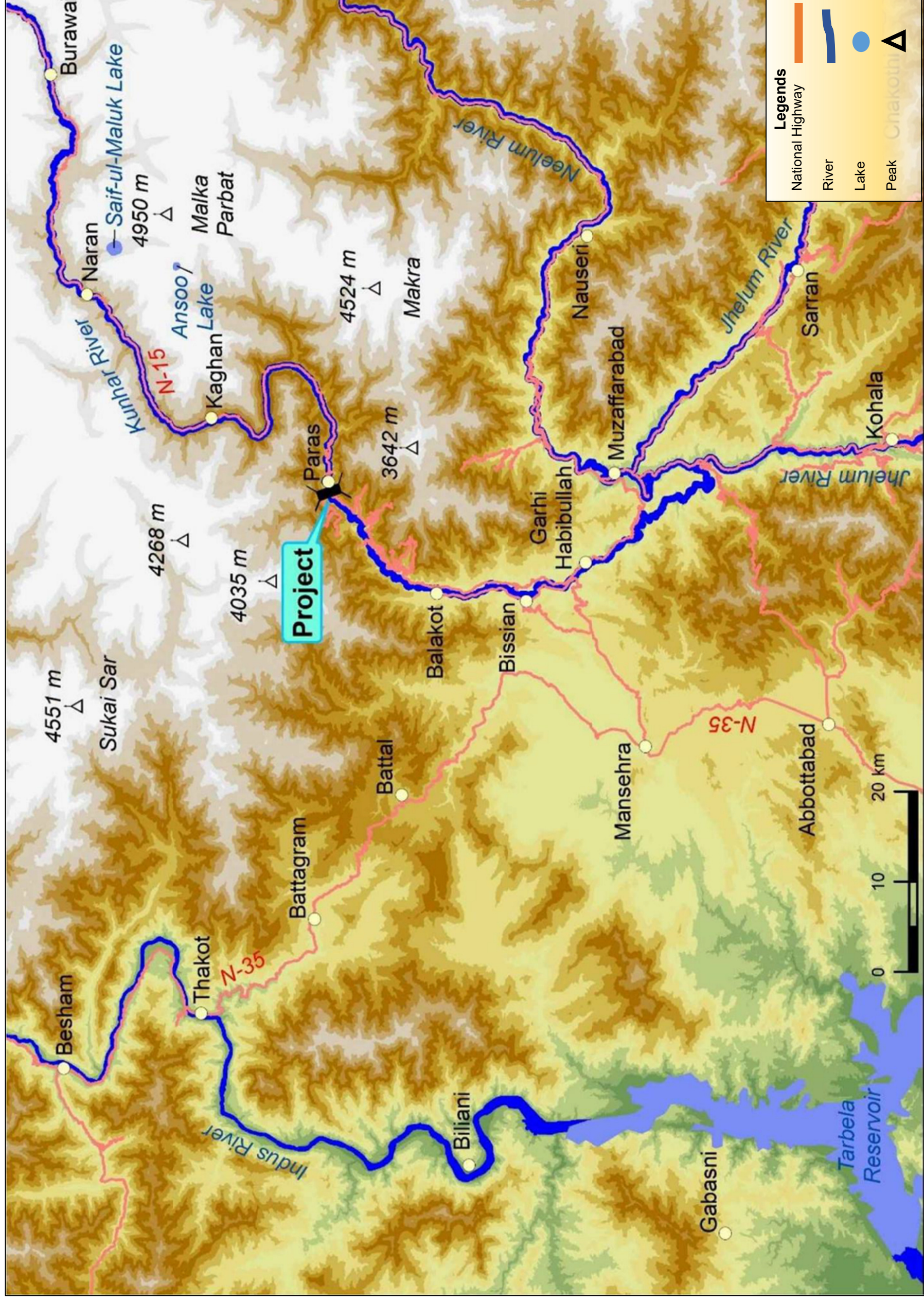


Figure 2.2: Project Layout Map

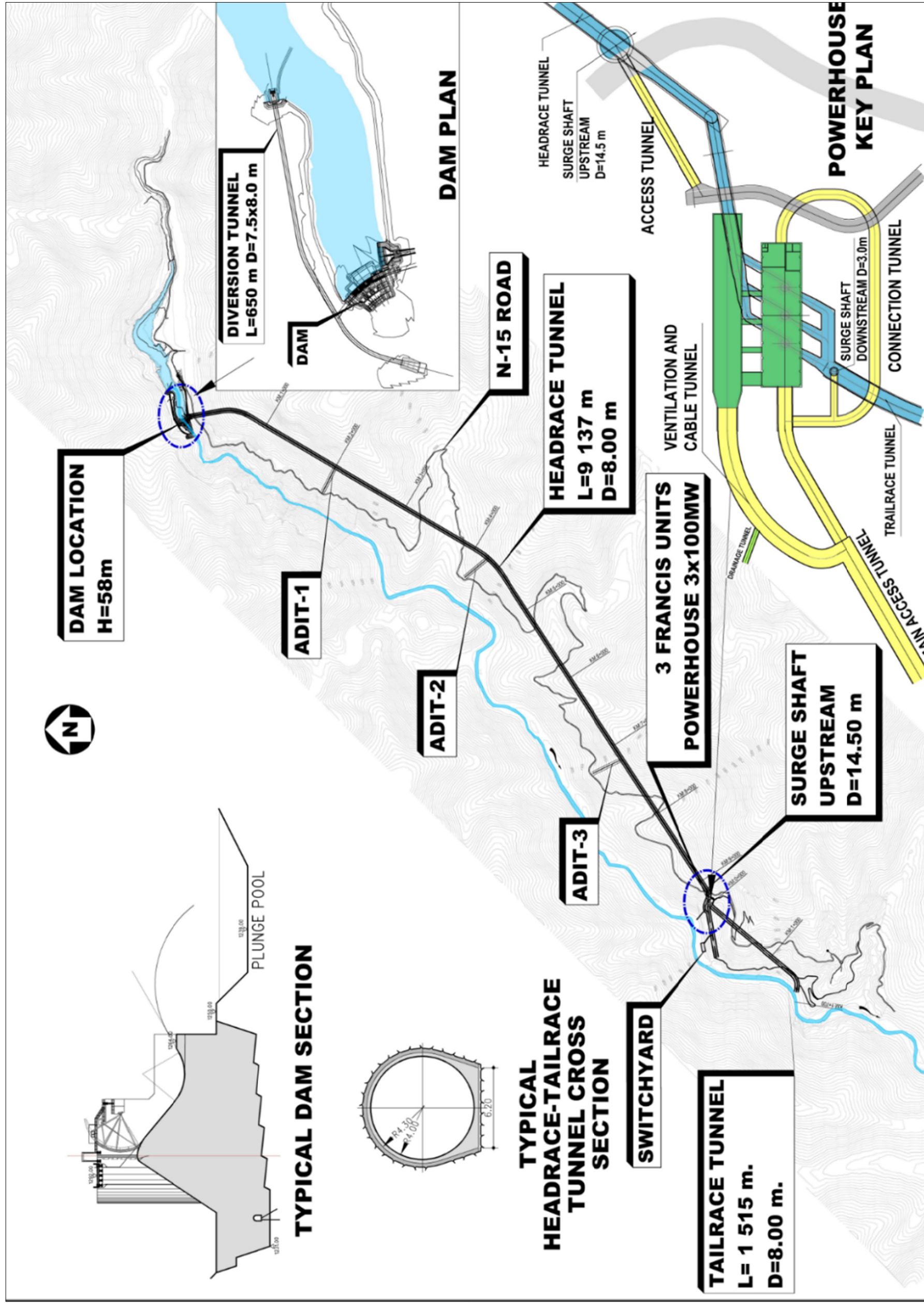


Figure 2.3: Project Setting-Dam site

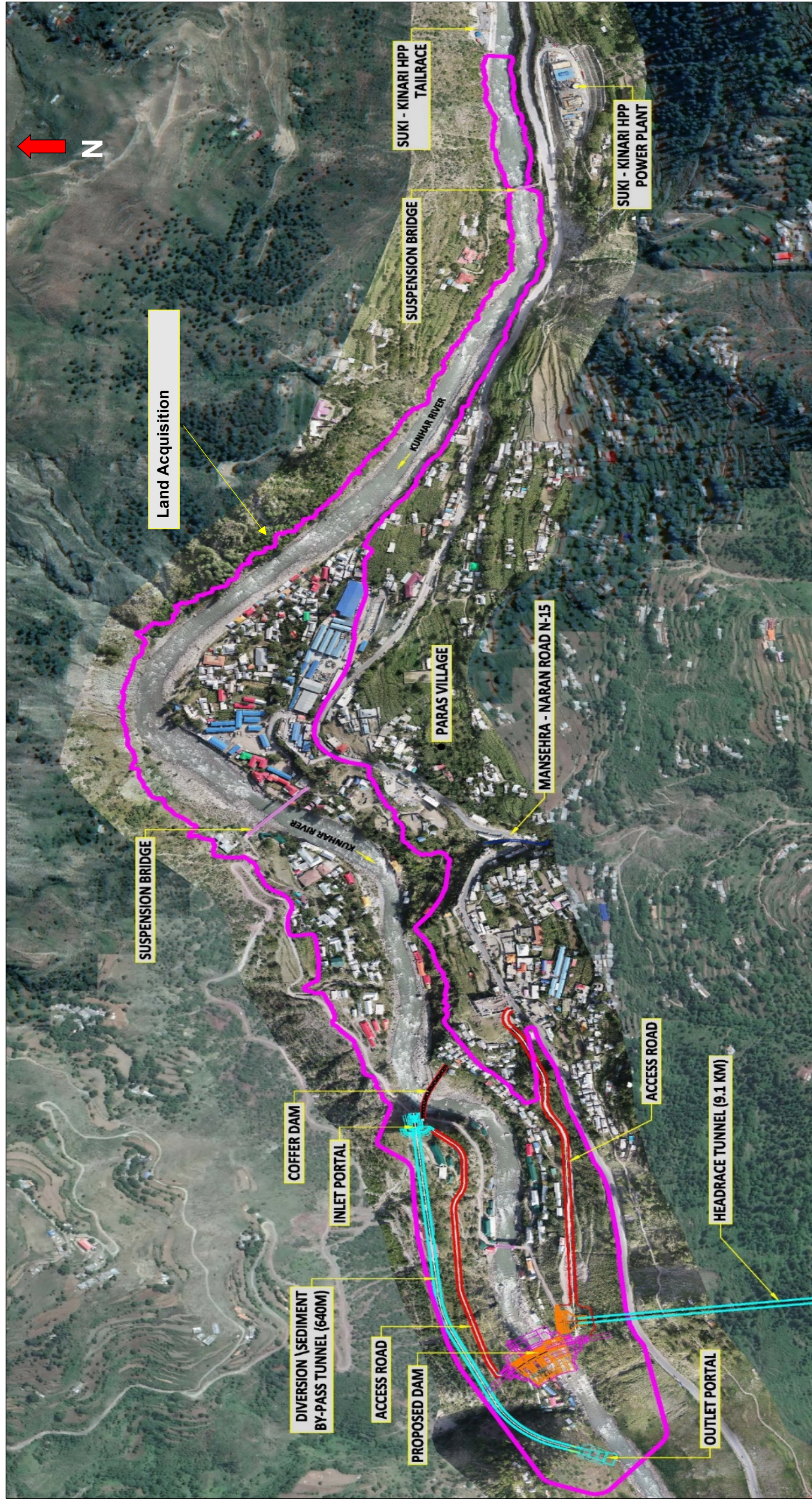
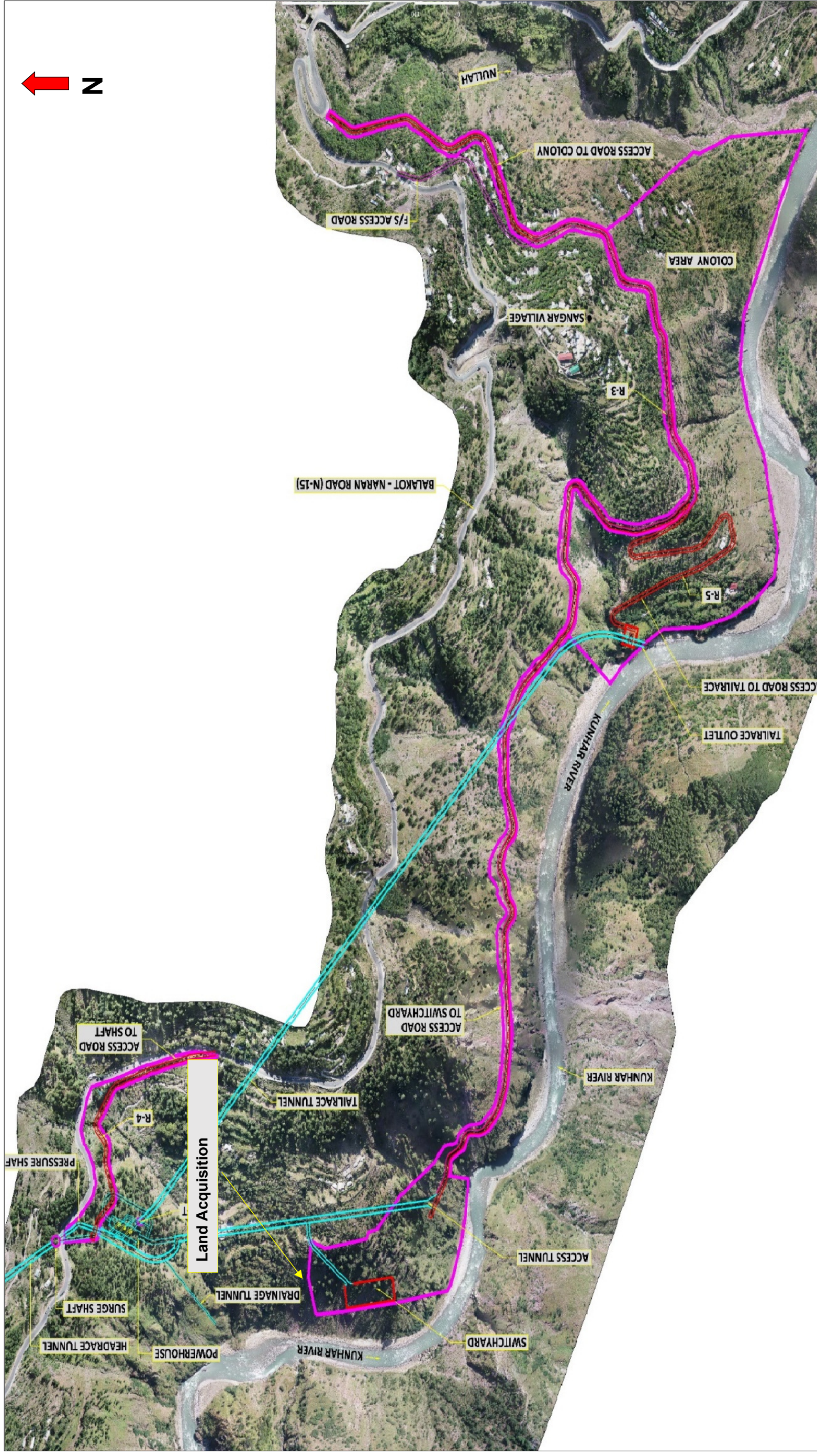


Figure 2.4: Project Setting-Powerhouse and Colony sites



2.2. Project Contracts and Management

2.2.1. Project Implementation Arrangement

13. Balakot Hydropower Project (300 MW) is being implemented through the arrangement as elucidated in the table below.

Table 2.2: Project Implementation Arrangement

Arrangement	Organization/Agency
Funding Sources	<ul style="list-style-type: none"> Asian Development Bank (ADB) and Asian Infrastructure Investment Bank (AIIB) through a loan to the Government of Pakistan (Loan No: 4057/8397 (AIIB)-PAK) Government of Khyber Pakhtunkhwa
Executing Agency	Energy and Power Department, Government of Khyber Pakhtunkhwa
Implementing Agency	Pakhtunkhwa Energy Development Organization (PEDO), Government of Khyber Pakhtunkhwa
Project Management Consultants	Joint Venture of: <ul style="list-style-type: none"> DOLSAR Engineering Inc. Co. (Turkey) Lead Firm AGES Consultants BAK Consulting Engineers CivTech Associates Electra Consultants Techno Legal Consultants (Pvt.) Limited from Pakistan
EPC Contractor	Joint Venture of China Gezhouba Group Company (CGGC), China & Ghulam Rasool and Company Pvt. Ltd (GRC), Pakistan

14. For the project development, the Government of Khyber Pakhtunkhwa signed a loan agreement with the Asian Development Bank (ADB) on May 21, 2021 which became effective on July 7, 2021.

15. As Asian Infrastructure Investment Bank (AIIB) is the co-financier of the project, therefore, loan agreement was also signed with the AIIB which is effective since October 25, 2021.



Consultancy Services Contract Award (2020)



Construction Contract Award (2021)

16. Brief details of the Project Implementation Unit, the Project Management Consultant (PMC) and the EPC Contractor are given as hereunder.

A. Project Implementation Unit (PIU)

17. The Project Implementation Unit (PIU) of Balakot HPP (300 MW), responsible for procurement and supervision of the project, is currently under establishment by the Implementing Agency (IA) i.e. Pakhtunkhwa Energy Development Organization (PEDO).

18. **Figure 2.5** shows the proposed organogram of the PIU wherein, as exhibited in **Table 2.3**, the Project Director, Deputy Directors and Assistant Directors along with some of the support staff are already onboard while procurement of the remaining personnel is in progress.

Figure 2.5: PIU Organogram

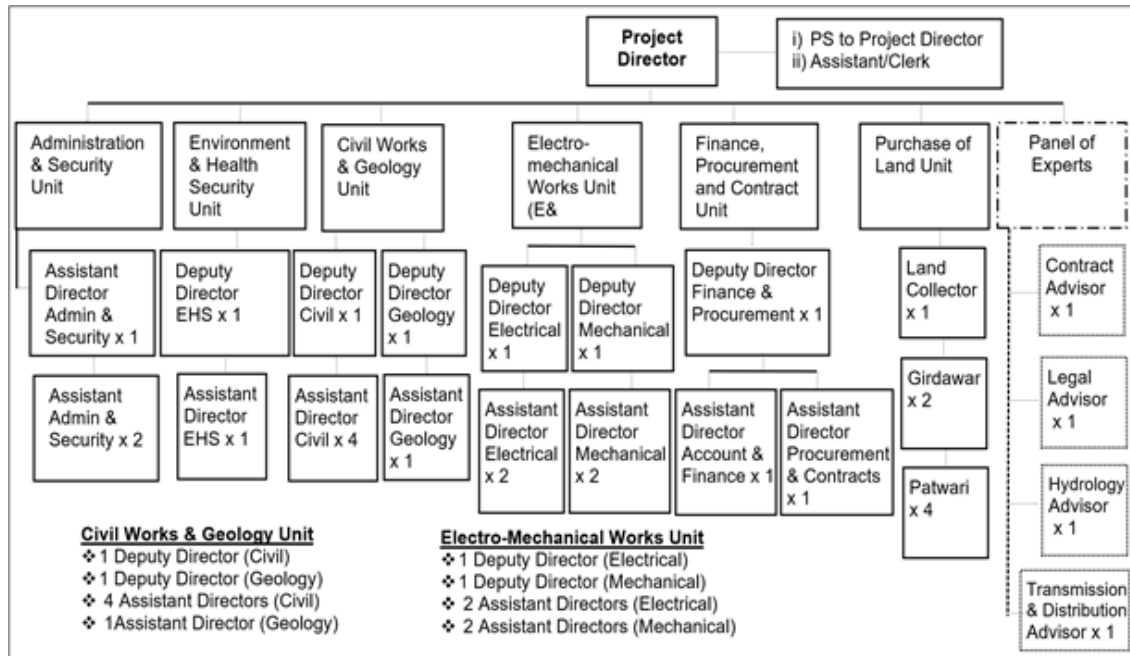


Table 2.3: PIU Staff Deployed During the Reporting Period

Staff Designation	Male/Female	No
Project Director	M	1
Deputy Director (Civil)	M	2
Deputy Director (Social & Resettlement)	M	1
Deputy Director (Environment Health, Safety & Gender)	F	1
Deputy Director (Finance)	M	1
Deputy Director (Geology)	M	1
Assistant Director (Finance)	M	1
Assistant Director (Civil)	M	1
Assistant Director (Electrical)	M	3
Account Assistant	M	1
Land Patwari	M	1
Assistant Director (Social & Resettlement)	F	1

19. As evident from the table above, PIU is headed by the Project Director with whom the overall responsibility of environmental management and environmental monitoring rests. He will be assisted by the Environment & Health Security Unit, in matters pertaining to the environmental, health and security aspect of the project. In this regard, Ms. Ibtesam Zaima, the Deputy Director Health, Safety & Environment (HSE) and Gender is onboard since March 2022, with full time project inputs and can be reached via:

Phone No: +92-3319844851

Email ID: ibtesamz@gmail.com

20. The Deputy Director Health, Safety & Environment (HSE) and Gender of the PIU, will be assisted by an Assistant Director (Social) who joined PIU in the last week of December 2022.

21. Under the provisions of the EPC Contract, the PIU project office has been established at Site at the address given below, and is operational since June 2022.

PIU Balakot HPP (300 MW) Site Office

County Hotel, Shohal Najaf Khan

Kaghan Road Balakot

District Mansehra

Khyber Pakhtunkhwa, Pakistan

Phone No. 0997-360003

B. Project Management Consultant (PMC)

22. On September 03, 2020, PEDO entered into Management Consultancy Service Agreement for Balakot Hydropower Project (300 MW) with a Joint Venture (JV) of DOLSAR Engineering Inc. Co. (Turkey), AGES Consultants, BAK Consulting Engineers, CivTech Associates, Electra Consultants, and Techno Legal Consultants (Pvt.) Limited from Pakistan. The JV is led by DOLSAR Engineering Inc. Co. (Turkey).

23. Consultancy services are effective for the duration of 84 months since Commencement of Services on September 11, 2020. During this period, the JV will provide services specified in the consultancy contract as Project Management Consultant (PMC) and will act on behalf of PEDO as the "Project Manager/Engineer".

24. Table below shows chronological order of the procurement of consultancy services.

Table 2.4: PMC Procurement Milestones

S/No	Description	Date
1	Expression of Interest (EOI)	July 29, 2019
2	Technical & Financial Proposals	November 29, 2019
3	Opening of Financial Proposals	May 19, 2020
4	Contract Negotiation Meetings	August 06 and 07, 2020
5	ADB Comments on / Concurrence to Negotiated Contract	August 25, 2020
6	Signing of Contract for Consultancy Services	September 03, 2020
7	Commencement of Services	September 11, 2020

25. Following table exhibits details of the PMC's personnel deployed to the Balakot Hydropower Project (300 MW), during the reporting period.

Table 2.5: PMC's Personnel Deployed to the Project

S/No	Designation	Input
Expatriate Key Staff		
1	Project Manager / Team Leader	Intermittent
2	Procurement Expert	Intermittent
3	Contract Manager	Intermittent
4	Geotechnical Expert	Intermittent
5	Hydraulics Expert	Intermittent
6	Sediment Management Expert	Intermittent
7	Hydro-mechanical Expert	Intermittent
8	Electrical Expert	Intermittent
Local Experts		
1	Resident Engineer/Deputy Team Leader	Full Time
2	Environmental Expert	Intermittent
3	Health and Safety Monitor	Full Time
4	Structures Engineer	Intermittent
5	Resettlement Expert	Intermittent
6	Transmission Line Engineer	Intermittent
7	Assistant Resettlement Expert	Full Time
8	Contract Specialist	Intermittent
9	Cost / Time Controller	Full Time
10	Manager Administration	Full Time
11	Manager Finance	Full Time

26. Engineer Assad Ali Khan, the PMC Environmental Expert (EE) for Balakot Hydropower Project (300 MW), is onboard with intermittent inputs since commencement of the services. The EE can be approached through:

Phone No: +92-3369555505

PMC official email ID: dtlbalakothpp@yahoo.com

27. Also, the Health and Safety Monitor, Mr. Fawad Ali Shah, who joined PMC on December 27, 2022, can be reached via:

Phone No: +92- 3331162119

PMC official email ID: dtlbalakothpp@yahoo.com

28. The PMC office, established at Site at the address given below, is operational since June 2022.

PMC Balakot HPP (300 MW) Site Office

Four Seasons Hotel, Near PTCL Exchange

Kaghan Road Balakot

District Mansehra

Khyber Pakhtunkhwa, Pakistan

Phone No: +92-997-360155

C. EPC Contractor

29. The construction contract of Balakot Hydropower Project (300 MW) was awarded to a Joint Venture of China Gezhouba Group Company (CGGC), China & Ghulam Rasool and Company Pvt. Ltd (GRC), Pakistan on Mach 09, 2021.

30. Consequent upon fulfillment of the requisite conditions of the EPC Contract, the Implementing Agency (IA) notified September 27, 2021 as an Effective Date for the EPC Contract.

31. Various milestones achieved during procurement process of the EPC Contractor are tabulated below.

Table 2.6: EPC Contractor Procurement Milestones

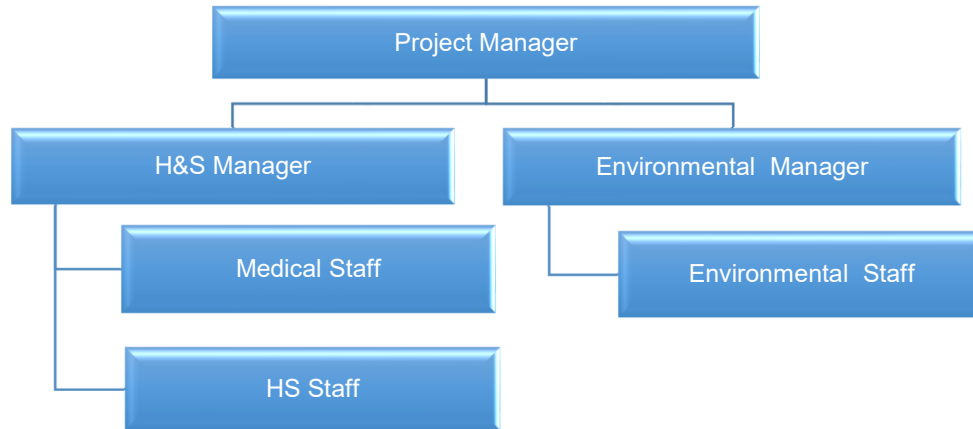
S/No	Description	Date
1	Invitation for Bids	November 23, 2019
2	Site visit to Bidders	December 10, 2019
3	Pre-Bid Meeting	December 13, 2019
4	Bids Submission	June 15, 2020
5	Technical Bid Opening	June 15, 2020
6	Financial Bid Opening	December 15, 2020
7	Notification of Award	February 10, 2021
8	Contract Signing	March 09, 2020
9	Effective Date	September 27, 2021

32. The EPC Contractor's environmental obligations are mainly specified in Volume-01 of 07 (Appendix-9) and Volume-03 of 07 (GCC & SCC) of the EPC Contract Document.

33. Under the provisions of the conditions of contract, preparation of the Site Specific Environmental Management Plan (SSEMP) is one of the EPC Contractor's contractual obligations. Although, SSEMP will primarily be based on the essence of the approved EIA report and Site requirements however, due preference will also be given to the SPS 2009 guidelines and conditions contained in the "Environmental Approval" granted by the Khyber Pakhtunkhwa Environmental Protection Agency on July 06, 2021.

34. During all three phases of the project i.e. pre-construction, construction and Defect Liability Period, the EPC Contractor will take care of the HSE portfolio through implementation of measures proposed in the SSEMP, good practices and through compliance of instructions issued or gaps identified in the monitoring report(s) during currency of the contract.

35. **Figure 2.6** exhibits the EPC Contractor's HSE organogram followed by table showing details of the HSE team onboard so far.

Figure 2.6: EPC Contractor' HSE Team Organogram**Table 2.7: EPC Contractor's HSE Team¹**

S/No	Name	Designation	Contact Number
1	Qi Xiu Feng	H & S Manager	03471149921
2	Ashfaq Nazir	Environmental Manager	03465550594

2.2.1.1. Project HSE Safeguard Team

36. From the details given under Sub-heads A,B, and C above, the Balakot HPP (300 MW) HSE personnel responsible for the HSE safeguards are detailed in the table given below.

Table 2.8: Details of Balakot HPP (300 MW) HSE Personnel

Organization Name	Job Title	Name	Contact Details
Asian Development Bank (ADB)	Environmental Specialist - Country Environment Focal Person	Syed Asim Ali Sabzwari	asabzwari@adb.org
	Environmental Specialist - RETA Consultant	Abdul Basit Khan	abkhan.consultant@adb.org
Project Implementation Unit (PIU) of Balakot HPP (300 MW)	Deputy Director Health, Safety & Environment (HSE) and Gender	Ibtesaam Zaima	ibtesaamz@gmail.com
Project Management Consultant (PMC)	Environmental Expert	Assad Ali Khan	dtlbalakothpp@yahoo.com
	Health and Safety Monitor	Fawad Ali Shah	
EPC Contractor	H & S Manager	Qi Xiu Feng	453680735@qq.com
	Environmental Manager	Ashfaq Nazir	ashfaqajkepa@gmail.com

2.2.2. Summary of Contract and Progress

37. The EPC Contractor has not initiated any permanent construction activities at Site as under the provision of conditions of contract, and as provided in the Program of Works, such

¹ Remaining HSE staff will be hired upon initiation of construction works at Site.

activities are conditional with the grant of possession of Site, which was awarded on December 28, 2022, while approval of the project Basic Engineering Design is yet to be granted.

38. The following table shows, summary of Works under the EPC contract, and the progress achieved so far.

Table 2.9: Summary of Contract and Progress

EPC Contractor	Contract Scope ²	Contract Signing Date	SSEMP ³ Approval Date	Name of Personnel		Civil Work ⁴		Progress as of ⁵	
				Environmental Manager	H & S Manager	Start Date	End Date	June 30, 2022	December 31, 2022
Joint Venture of China Gezhouba Group Company (CGGC), China & Ghulam Rasool and Company Pvt. Ltd (GRC), Pakistan	Design, Supply and Installation, Testing and Commissioning of Balakot Hydropower Project (300 MW) Including the Related Civil Works for River Diversion	March 09, 2020	December 30, 2022	Ashfaq Nazir	Qi Xiu Feng	September 28, 2022	January 01, 2027	No construction of permanent Works initiated during the reporting period.	

² The contract scope mainly consists of: (i) Basic Engineering Design; (ii) Detail Design; (iii) Construction Works; and (iv) Commissioning and Testing.

³ The SSEMP, approved by the Employer, contained Emergency Response Plan and COVID-19 safeguard provisions.

⁴ The start and end dates of the Civil Works are those contained in the last approved Program of Work (Work Schedule).

⁵ During the current and previous reporting period, the project Basic Engineering Design remained in progress. Till end of the reporting period, about 80% Basic Engineering Design of the project had been completed.

2.3. Activities During Current Reporting Period

39. As expounded above, due to delay in finalization of the project Basic Design by the EPC Contractor, the construction of permanent Works could not be initiated during the month of September 2022, as per approved schedule. Nevertheless, geotechnical investigations, preparation of SSEMP, temporary Works like access roads, camps, magazines etc., and consultation for Basin-wide and project specific BAPs remained in progress during the reporting period. Also, baseline instrumental environmental monitoring of air quality, noise level, water quality (both drinking and river water), and soil analysis, was carried out during the month of December 2022.

40. A brief trail of the project environmental portfolio activities, carried out till end of the reporting period are detailed as hereunder.

2.3.1. Basin-wide BAP Consultation Meetings

41. Basin-wide BAP has geographical coverage of the entire Jhelum Basin whereby hydropower operators in the Basin, namely Neelum Jhelum, Azad Pattan, Mahal, Kohala, Karot, and those in the Kunhar River Basin i.e. from Batta Kundi to Patrind HPPs, have been identified in the project approved EIA report as prospective financiers of the Basin-wide BAP. Other primary stakeholders include environmental agencies of the Government of Azad Jammu and Kashmir (AJ&K), Federal Government of Pakistan, Khyber Pakhtunkhwa and Punjab provinces as well as their respective Wildlife and Fisheries departments.

42. During the reporting period, consultation meetings, with the prospective financiers of the Basin-wide BAP, were held as per schedule exhibited in **Table 2.10**, below.

Table 2.10: Basin-wide BAP Consultation Meetings Schedule

Date	Organization/Department Consulted	Meeting Venue	Participants
August 16, 2022	Wildlife and Fisheries, Govt. of AJ &K	Office of the Director Wildlife and Fisheries, Govt. of AJ &K	Director Wildlife & Fisheries and his team
	Environmental Protection Agency Govt. of AJ&K	Office of the Director EPA, Govt. of AJ &K	Director EPA and his team
August 18, 2022	Neelum Jhelum Hydropower Company (Private) Limited	Head Office of NJHPC* at Islamabad	Chief Executive Officer, NJHPC and his team
August 23, 2022	Azad Pattan HPP (701 MW)	CGGC office at EOBI Building Islamabad	Assistant Manager Project Development, Azad Pattan HPP (701 MW)
August 26, 2022	Kohala, Mahal and Karot HPPs	Main office at Serena Business Complex Islamabad	Socio-Environmental Team of the three projects namely Kohala, Mahal and Karot HPPs
September 15, 2022	Patrind HPP (150 MW)	Star Hydropower office, Islamabad	Senior Manager E&S Patrind HPP (150 MW)

*NJHPC = Neelum Jhelum Hydropower Company (Private) Limited

43. Subsequent to the detailed consultation meetings, a Basin-wide BAP Consultation report⁶ was prepared and submitted to the ADB on September 30, 2022, for information, record and consent on the way forward proposed therein.

44. Findings of the foregoing consultation meetings, are synopsized as hereunder.

- i. Although, participants of the consultation meetings had awareness of the project specific BAP interventions in the Area of Management, however, no such awareness was witnessed in context of the Basin-wide BAP.
- ii. As apprised by the meeting participants, there exist provision of the Basin-wide BAP in some of the projects like Kohala, Azad Pattan, Karot HPPs etc. however, so far, no step has been taken by any of the project proponent towards process initiation, mainly due to uncertainty of cost compensation.
- iii. Also, there are operational projects in the Jhelum Basin where no BAP obligations exist. Neelum Jhelum and Patrind HPPs are the two projects in the instant case.
- iv. Though, with the active support of Wildlife and Fisheries department, Govt. of AJ&K, the project specific BAP interventions in the Area of Management are currently being undertaken in Gulpur and Karot HPPs, still, the Basin-wide BAP felt to be quite new for participants of the consultation meetings.
- v. In spite of the fact that the Basin-wide BAP arrangement and its objectives were openly appreciated by most of the participants, however, due to uncertainty of cost compensation, lack of commitment and enthusiasm felt when it come to the monetary contributions by the stakeholders
- vi. Apparently, unless IRRE and WMO establishment and associated recurring costs compensation are not guaranteed in the COD tariff, monetary contributions by the Jhelum Basin hydropower developers appear obscure.
- vii. In the absence of policy guidelines, collective efforts, and the leading role of the federal or the provincial government relevant ministry, materialization of the Basin-wide BAP appears to be an uphill task for an individual project/developer



Consultation meeting with the Kohala, Mahal and Karot HPPs team (August 26, 2022)

⁶ Consultation meetings details have been given in the Basin-wide BAP Consultation Report

45. Based on the above findings, following were recommended as “Way Forward” for the ADB consent.

- i. PEDO is currently in process of hiring essential staff to establish core Environmental and Social section by mid-2023. Thus, with full support of the PIU, this section will take lead role in efforts towards materialization of the Basin-wide BAP. Through such arrangement, PEDO will ensure its long term commitment to BAP provisions and establishment of IRRE and WMO.
- ii. In this regard, estimated budget for the Basin-wide BAP, contained in the approved EIA report, shall remain part of the Project PC-1 and shall be reflected in the project Tariff Petition enabling PEDO to utilize it as part of its contribution for establishment and operation of the aforementioned institutions.

46. Till end of the reporting period, the consultation report remained in correspondences with the ADB for addressing their review comments and providence of necessary clarifications in the revised submission.

2.3.2. Project Specific BAP (in the Area of Management)

47. In continuation to the Project Specific BAP consultation with the Wildlife and Fisheries departments of the government of Khyber Pakhtunkhwa, a joint meeting of the aforesaid departments, PIU and PMC was held at PEDO House Peshawar on July 05, 2022, wherein the departments provided their viewpoints regarding proposed changes in the BAP institutional arrangement and composition of BAP Management Committee. Legal constraints, active presences of both the departments in the project area, experience in implementation of protection and management measures, and their linkages with the community were some of the points set forth in support of the proposed changes in BAP implementation arrangement.

48. The departments viewpoints were shared with the ADB via email dated August 05, 2022, for necessary guidance and consent. The ADB conveyed their response in the matter vide email dated August 25, 2022, for providence of firm justifications in support of the proposed changes and plan to achieve the set objectives after incorporation of the proposed changes in the BAP implementation.

49. While addressing the ADB review comments, and as result of several meetings held thereon, both the departments provided their written justifications in support of the proposed changes. The justifications, primarily focused on the points noted under para 47, were transmitted to the ADB for their further consent. The ADB response, received via email dated December 19, 2022, for providence of the proposed revised BAP implementation arrangement remained in consultation and preparation till end of the reporting period, and is expected to be submitted till January 10, 2023.



Meeting with the Director Fisheries on justifications and plan in support of the proposed changes in the project specific BAP implementation (September 15, 2022)

2.3.3. Presentation to ADB Review Mission

50. On September 09, 2022, the Project Management Consultant's (PMC) Environmental Expert (EE) presented the environmental portfolio progress to the ADB Review Mission at PEDO House Peshawar wherein the updated status of the EPC Contractor's Site Specific Environmental Management Plan (SSEMP) and BAP Consultation meetings were discussed in detail.

51. During the meeting, the ADB environmental team advised that the EPC Contractor's SSEMP should be shared with the Bank for parallel review and comments.



Presentation to ADB Review Mission (September 09, 2022)

2.3.4. Review of Site Specific Environmental Management Plan (SSEMP)

52. The EPC Contractor's SSEMP, submitted on October 05, 2022, was reviewed by the PMC and relevant quarters at ADB. Review comments were subsequently transmitted to the EPC Contractor for revision and resubmission of the SSEMP.

53. On November 14, 2022, the EPC Contractor resubmitted revised and updated SSEMP for the PMC review. Consequent upon detailed review, meetings held with the EPC Contractor's team, and Site visits conducted for confirmation of the information provided, the

PMC recommended SSEMP for the PIU review and thereafter the Employer approval under the provisions of conditions of the EPC Contract.

54. The Employer granted approval to the EPC Contractor's SSEMP on December 30, 2022. Copy of the approval letter is attached as **Annexure-02**.

55. As the SSEMP is under review by the relevant quarters at ADB and AIIB, hence their review comments will subsequently be incorporated in the final version of SSEMP.



**Visit to Temporary Access Road (Adit 3) in connection with the SSEMP review
(November 11, 2022)**



Discussion with the EPC Contractor's team on SSEMP (November 23, 2022)

2.3.5. Instrumental Environmental Monitoring

56. As instrumental environmental monitoring was initially carried out in 2017 as part of the project EIA studies therefore, it was felt necessary to conduct updated instrumental environmental monitoring to record baseline conditions of the environmental constituents i.e. air quality, noise level, water quality and soil analysis. In this regard, the EPC Contractor hired services of the Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) certified laboratory namely Integrated Environment Laboratory (IEL), which conducted baseline environmental monitoring at Site during the period from December 07 to 14, 2022.

57. Details of instrumental environmental monitoring and the results obtained thereof have been given under Sub-head 5 of the current SAEMR.



**Baseline Environmental Monitoring at the EPC Contractor's proposed Thobi Camp
(December 08, 2022)**

2.3.6. Proceedings and Approval of Fish Ladder Waive-off Request

58. As reported in the second SAEMR, for the period from January to June 2022, the Project Director of Balakot HPP (300 MW) vide his letter No. 419-24/PEDO/PD Balakot HPP dated May 26, 2022, submitted a waive-off request to the Director General (DG) KPKEPA, with justifications contained therein, in respect of the Fish ladder part of condition (hh) of the "Environmental Approval".

59. In this regard, a joint meeting of the PIU, PMC, Fisheries department and KPKEPA was held under the chair of the Director General (KPKEPA) on July 29, 2022. The PMC Environmental Expert (EE) apprised participants regarding basis of non-provision of Fish ladder in the KPKEPA approved EIA report. In support of the PIU waive-off request, the Director (HQ) Fisheries department suggested that instead of constructing Fish ladder, the project proponent should construct a fish hatchery at Kaghan to offset impact(s) on fish fauna of the River. The Director General (KPKEPA) however, suggested that experts of the PIU, PMC, Fisheries department and KPKEPA shall hold detail deliberations in next meeting to formulate a workable way out, beneficial for aquatic resources of the Kunhar River.

60. In light of the Director General suggestion, a follow up joint meeting of the forgoing stakeholders was held under the chair of the DG (KPKEPA) on August 25, 2022, at his office wherein the PMC's EE delivered a detailed presentation on the Balakot HPP (300 MW) setting and its potential environmental impacts along with the proposed mitigation measures. Towards end of the meeting, the Director General (KPKEPA) asked Fisheries department representative to prepare and submit a comprehensive case on the matter enabling Review Committee of the Agency to take informed decision on the issue.

61. The Fisheries department accordingly submitted the requested case vide letter No. 1324/DFG/R-3 dated August 02, 2022, for the KPKEPA consideration. In the meantime, the KPKEPA also asked PIU for submission of detailed case in support of the waive-off request.

62. With the PMC assistance, the PIU prepared a detailed case in support of the waive-off request and submitted to DG KPKEPA for further necessary action and early settlement of the matter to avoid any impact on the basic engineering design of the project dam and appurtenant structures.

63. In response to the PIU foregoing detailed case, and recommendations of the Fisheries department, the Director General KPKEPA, vide his letter No. EPA/EIA/HPP/300 MW/Balakot /Mansehra/21/350-51 dated December 13,2022, permitted deletion of Fish ladder part of the condition “hh” of the “Environmental Approval”.

64. Copies of the aforementioned letters are attached as **Annexure-03** to the SAEMR.

65. It is worthwhile to mention here that, as reported by the Agency, this is the first ever instance whereby KPKEPA honored waive-off request through permitting amendment in the “Environmental Approval”.



Presentation to KPKEPA Review Committee in connection with the Fish ladder waive-off request (August 25, 2022)

2.4. Description of any Changes to Project Design

66. So far, as part of the design optimization, the EPC Contractor has proposed some changes in the intended function of the bypass tunnel, and placement of spillways in the dam body as given below.

- i. The bypass tunnel, originally conceived for the Kunhar River diversion during construction phase, and sediment exclusion during operation phase of the project, has now been proposed to be used as diversion tunnel only, whereas for sediment flushing, additional bottom out let will be provided in the dam body.
- ii. A combination of three spillways, which in the tender document were placed at the left side of the dam body, have now been optimized to two spillways, placed at the left and right side of the dam body.

67. The PMC and PIU have principally been agreed with the EPC Contractor's proposal however, approval to the effect is yet to be granted as the proposed changes are part of the project Basic Engineering Design which is still in the process of approval.

68. Although, the above changes proposed as part of the design optimization within the Right of Way (RoW), and without affecting the project footprint or posing any environmental risk, still the EIA report will be updated to reflect changes occurred in the project tendered design.

2.5. Description of any Changes to Agreed Construction Methods

69. The EPC Contractor has not yet submitted construction methodologies as the project is still in the Basic Engineering Design phase whereby layout and setting of various structures are under review and approval process.

70. Subsequent to the project Basic Engineering Design approval, the EPC Contractor will submit detailed construction methodologies for major works, or as directed by the PMC, for review and approval.

3. ENVIRONMENTAL SAFEGUARD ACTIVITIES

3.1. General Description of Environmental Safeguard Activities

71. As reported in the introductory paras, construction of the project permanent Works could not be initiated as scheduled, primarily due to delay in completion of the project Basic Engineering Design, and grant of possession of Site to the EPC Contractor.

72. During the reporting period, the project Basic Engineering Design, surveys, geotechnical investigations, construction of temporary roads, identification of sites for the EPC Contractor's camps, batching plant, workshops, and identification/acquisition of muck disposal areas were some of the major activities undertaken by the EPC Contractor at Site.

73. As expounded under Sub-head 2.3, the review of SSEMP, BAP consultation meetings and due-diligence of the sites identified for muck disposal, camps etc. were some of the major activities undertaken by the PMC during the reporting period.

3.2. Site Audit

74. As exhibited under **Table 3.1** below, in connection with the SSEMP review, the PIU, PMC, and the EPC Contractor's environmental staff jointly undertook several visits to the sites identified for camps, workshops, batching plant and muck disposal areas etc.

75. During these visits, construction of temporary access roads leading to various adits, geotechnical investigation sites and the EPC Contractor's temporary camps were also visited to assess the HSE aspects of the temporary Works.

Table 3.1: Site Visits Conducted During the Monitoring Period

Visit Date	Auditor (Title and Name)		Purpose of Audit	Summary of Findings
	Title	Name		
August 04, 2022	PMC: Environmental Expert	Assad Ali Khan	Due diligence of the sites identified for muck disposal	<ul style="list-style-type: none"> i. Due to some social issues, associated with land acquisition, out of the three sites identified for muck disposal, only one could be visited. ii. Keeping in view narrowness of the Kunhar River valley and other constraints at fore, the muck disposal site identified at Kholia was found reasonable. iii. The EPC Contractor was however asked to provide following information for this and every other identified muck disposal site. <ul style="list-style-type: none"> • Spoil area location with coordinates and other details, either on survey map or on google imagery. • Baseline conditions (flora/fauna/built-up property, infrastructure, utilities, land use, springs etc.) of the area under impact. • Proposed compensation measures against impacts. • Disposal area capacity and estimated quantum of spoil to be disposed of. • Protection measures to prevent entry of spoil materials in the Kunhar River or any other water body. • Proposed area reclamation measures, upon completion of spoil disposal operation. iv. Non provision and usage of PPE by the workers involved in the construction of temporary access road to Adit 3, against which PMC issued written instructions.
	EPC Contractor: i. Incharge QHSE ii. QAQC	i. Wang He ii. Ali Husnain		
August 17, 2022	PIU: Deputy Director HSE and Gender	Ibtesaam Zaima	Due diligence of sites identified for the EPC Contractor's camps, batching plant and	<ul style="list-style-type: none"> • The locations, identified for installation of batching and aggregate plants at Thobi camp, were found appropriate. • The EPC Contractor's sub-camp location and the camp layout at the project residential colony site were also found appropriate.
	PMC: Environmental Expert EPC Contractor: iii. Incharge QHSE iv. QAQC	Assad Ali Khan i. Wang He ii. Ali Husnain		

Visit Date	Auditor (Title and Name)		Purpose of Audit	Summary of Findings
	Title	Name		
December 08, 2022	PMC: Environmental Expert EPC Contractor: v. Incharge QHSE vi. QAQC	Assad Ali Khan i. Wang He ii. Ali Husnain	aggregate plant etc. <ul style="list-style-type: none"> Monitoring of health and safety aspects of the temporary access roads and the colony site camp. Inspection of the instrumental environmental monitoring	<ul style="list-style-type: none"> As per instructions of the KPKEPA, the EPC Contractor has obtained "Environmental Approval" (attached as Annexure-04) for the installation of Thobi camp aggregate plant. As evident from the pictures, labour engaged in construction of temporary access roads had complied with the PMC's instructions previously given for usage of PPE. Recording of baseline air quality and noise level at the Thobi camp site was continued. EPC Contractor was directed to ensure 24 hours air and noise monitoring at all identified sites.



Kholia muck disposal site visit (August 04, 2022)



The EPC Contractor's site identified for installation of aggregate plant at Thobi camp site (August 17, 2022)



Non-compliance - Work without PPE on temporary access road to Adit 3 (August 04, 2022)



Compliance of instructions given for usage of PPE

76. The sites identified for camps aggregate and batching plants were mostly suitable however, the EPC Contractor was asked to share layout of the camps for review and approval of the PMC.

77. Before finalization of the muck disposal site, the EPC Contractor was asked to provide detailed information/data, as mentioned under **Table No. 3.1** above, for review of the PMC.

78. Initially, the EPC Contractor's workforce, involved in construction of temporary access roads, were not using PPE however, subsequent to the PMC instructions, substantial usage of PPE was observed.

3.3. Unanticipated Environmental Impacts or Risks

79. No unanticipated environmental impacts or risks were observed during the reporting period. As expounded above, due to delay in the project Basic Engineering Design, limited preparatory or temporary construction activities were executed at sites during the reporting period.

4. STATUS OF COMPLIANCE WITH COVENANTS

80. **Table 4.1** below, exhibit compliance status of the environmental related safeguard covenants contained in the Loan Agreement signed on May 21, 2020, between the Asian Development Bank, and the Khyber Pakhtunkhwa Province and Pakhtunkhwa Energy Development Organization (PEDO).

Table 4.1: Compliance Status with Covenants⁷

Covenant	Reference in Loan Agreement	Compliance Status
<p><u>Procurement</u> PEDO shall not, award any Works contracts which involves environmental impacts until:</p> <ol style="list-style-type: none"> Khyber Pakhtunkhwa Environmental Protection Agency has granted the final approval of the EIA; and the Borrower has, or has ensured that PEDO has, incorporated the relevant provisions from the EMP and BAP into the Works contract 	Para. 3 Page No. 8	<p>Complied</p> <ol style="list-style-type: none"> The Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) has granted “Environmental Approval” to the project EIA report on July 06, 2021. The environment, health and safety safeguard related provisions have mainly been incorporated in: <ol style="list-style-type: none"> Volume-01 of 07 (Appendix-9); and Volume-03 of 07 (GCC and SCC) of the EPC Construction Contract.
<p><u>Environment</u> Khyber Pakhtunkhwa and PEDO shall ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with</p> <ol style="list-style-type: none"> all applicable laws and regulations of the Borrower and Khyber Pakhtunkhwa relating to environment, health and safety; the Environmental Safeguards; and all measures and requirements set forth in the EIA, the EMP, the BAP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report. 	Para. 5 Page No. 9	<p>Compliance to the covenant in progress</p> <ol style="list-style-type: none"> The Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) has granted “Environmental Approval” to the project EIA report on July 06, 2021. Requisite NOCs, from Forest, Fisheries, Wildlife and Mining & Mineral departments of the government of Khyber Pakhtunkhwa, have been obtained. SSEMP, based on the EMP, site data and the project requirement, has been approved by the Employer on December 30, 2022. Consultation for Basin-wide and project specific BAPs conducted and reported to the ADB in the form of BAP Consultation reports.
<p><u>Human and Financial Resources to Implement Safeguards Requirements</u> Khyber Pakhtunkhwa and PEDO shall make available necessary budgetary and human resources to fully implement the EMP, the BAP and the RP.</p>	Para. 9 Page No. 10	<p>Complied</p> <p>The requisite human and financial resources are available with the PIU, PMC and the EPC Contractor.</p> <p>For BAP implementation, budgetary provision exists in the project PC-1 whereas for the EMP implementation, the EPC Contractor has allocated lump sum amount in his bid which is also reflected in the EPC Contract.</p>
<p><u>Safeguards – Related Provisions in Bidding Documents and Works Contracts</u> PEDO shall ensure that all bidding documents and contracts for Works</p>	Para. 10 Page No. 10	<p>Compliance in progress</p> <p>The environment, health and safety safeguard related provisions have mainly been incorporated in (i) Volume-01 of 07 (Appendix-</p>

⁷ Project Agreement for Loan 4057-Pak: Balakot Hydropower Development Project (<https://www.adb.org/sites/default/files/project-documents/49055/49055-007-pra-en.pdf>)

Covenant	Reference in Loan Agreement	Compliance Status
<p>contain provisions that require contractors to:</p> <ul style="list-style-type: none"> (a) comply with the measures relevant to the contractor set forth in the EIA, the EMP, the BAP and the RP (to the extent they concern impacts on affected people during construction), and any corrective or preventative actions set forth in a Safeguards Monitoring Report; (b) make available a budget for all such environmental and social measures; (c) provide the Borrower, Khyber Pakhtunkhwa and PEDO with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the EIA, the BAP, EMP and the RP; (d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and (e) reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction. 		<p>9); and (ii) Volume-03 of 07 (GCC and SCC) of the EPC Construction Contract.</p> <ul style="list-style-type: none"> a) The EPC Contractor has prepared SSEMP for implementation of measures proposed therein for the protection of environment, and health and safety of the construction crew, community etc. b) Budgetary provision exists in the EPC Contract for implementation of HSE related mitigation/preventive measures proposed in the SSEMP, EMP, BAP or those which may be identified Safeguards Monitoring Reports. c) So far, no unanticipated risk(s) have been identified, nevertheless, provisions of the covenant, SSEMP, and conditions of contract will be taken care of, and will strictly be followed if any unforeseen risk identified. d) Construction activities will mostly be undertaken within the permanent acquired land. In pursuance of the EPC Contract provisions, any damage to the private/public property or utilities, due to the EPC Contractor's Works, will be reinstated/compensated at the EPC Contractor's cost. Nevertheless, the covenant will be taken care of before initiation of permanent work at Site. e) The temporary land, acquired by the EPC Contractor for his facilities, will be reinstated under the conditions of temporary lease contract(s) and in full compliance with the requirements of the EPC Contract. In this regard, copies of the lease agreements have been made part of the SSEMP.
<p><u>Safeguards Monitoring and Reporting</u> PEDO shall:</p> <ul style="list-style-type: none"> a) submit semi-annual Safeguards Monitoring Reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission; b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the EIA, the EMP, the BAP and the RP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and 	<p>Para. 11 Page No. 10&11</p>	<p>Compliance in progress.</p> <ul style="list-style-type: none"> a) This is the third SAEMR in compliance with the mentioned loan covenant. Previous two reports have been disclosed on the ADB website. b) Till reporting period, no unanticipated environmental risks have been identified so far. c) External environmental monitor is onboard since September 2022. d) External experts, as specified in the PAM, are onboard in compliance with the covenant provisions. e) No breach to the compliance has occurred so far.

Covenant	Reference in Loan Agreement	Compliance Status
<p>proposed corrective action plan;</p> <p>c) no later than the commencement of works by the Works contractor, engage qualified and experienced external experts under a selection process and terms of reference acceptable to ADB, to verify information produced through the Project monitoring process, and facilitate the carrying out of any verification activities by such external experts;</p> <p>d) no later than the commencement of works by the Works contractor, engage external experts to monitor and report upon Project implementation, and facilitate the carrying out of any monitoring activities by such external experts; and</p> <p>e) report any actual or potential breach of compliance with the measures and requirements set forth in the EMP, the BAP or the RP promptly after becoming aware of the breach.</p>		
<p><u>Prohibited List of Investments</u> Khyber Pakhtunkhwa and PEDO to ensure, that no proceeds of the Loan are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of the SPS.</p>	<p>Para. 12 Page No. 11</p>	<p>Complied. Loan proceeds are solely being used for the development of the Balakot HPP (300 MW).</p>
<p><u>Grievance Redress Mechanism</u> (12) Khyber Pakhtunkhwa and PEDO shall ensure that a joint safeguards grievance redress mechanism acceptable to ADB is established and functional in accordance with the provisions of the EIA, the EMP, the BAP and the RP no later than the date of award of the Works contract to consider safeguards complaints.</p> <p>(14) The safeguards grievance redress mechanism referred to in paragraph 13 above will function to</p> <p>a) review and document eligible complaints of project stakeholders;</p> <p>b) proactively address grievances;</p> <p>c) provide the complainants with notice of the chosen</p>	<p>Para. 13 & 14 Page No. 11</p>	<p>(13) Complied: PEDO has notified Grievance Redress Mechanism (GRM), contained in the approved EIA for the Balakot HPP (300 MW), which is operational since September 2022.</p> <p>(14) Complied: No environment, health and safety complaints received during the reporting period.</p>

Covenant	Reference in Loan Agreement	Compliance Status
mechanism and/or action; and d) prepare and make available to ADB upon request periodic reports to summarize (i) the number of complaints received and resolved; (ii) chosen actions; and (iii) final outcomes of the grievances.		
<p><u>Labor Standards, Health and Safety</u> Khyber Pakhtunkhwa and PEDO shall ensure that the core labor standards and the Borrower's applicable laws and regulations are complied with during Project implementation. Khyber Pakhtunkhwa and PEDO shall include specific provisions in the bidding documents and contracts financed by ADB under the Project requiring that the contractors, among other things:</p> <ul style="list-style-type: none"> a) comply with the Borrower's applicable labor law and regulations and incorporate applicable workplace occupational safety norms; b) do not use child labor; c) do not discriminate workers in respect of employment and occupation; d) do not use forced labor; e) allow freedom of association and effectively recognize the right to collective bargaining; and f) disseminate, or engage appropriate service providers to disseminate, information on the risks of sexually transmitted diseases, including HIV/AIDS, to the employees of contractors engaged under the Project and to members of the local communities surrounding the Project area, particularly women. 	Para. 15 Page No. 11	<p>Compliance in progress Provisions from Law of the land dealing with labors have appropriately been made part of the EIA report and EPC Contract.</p>

81. Consequent upon securing NOCs from the relevant departments, under the directions of the KPKEPA and holding of Public Hearing event, the Director General KPKEPA issued "Environmental Approval" on July 06, 2021 in respect of the EIA report submitted to the Agency by PEDO in November, 2019. Copy of the "Environmental Approval" is attached as **Annexure-05**.

82. Following are some of the major conditions contained in the "Environmental Approval" to the EIA report.

- LARP implementation before initiation of construction.
- Treatment for tunnel effluent.
- E-Flow of 6.1 cumecs shall be maintained.
- Sharing of muck disposal locations with the KPKEPA.
- Implementation of BAP.
- Pre- construction Environmental Monitoring through KPKEPA certified lab.
- Separate approval for crush plant, asphalt plant etc. shall be obtained from the KPKEPA.
- Implementation of tree plantation plan.
- Clearance from Mine and Mineral department of the government of KPK.
- Regular submission of compliance reports (Quarterly) to KPK EPA.
- Construction of fish hatchery and fish ladder.

83. As expounded under **Sub-head 2.3.6** above, the KPKEPA has waived- off part of the condition (hh) of the “Environmental Approval” pertain to the construction of Fish ladder. Also, as construction of Fish Hatchery was not part of the EPC Contract hence, PEDO, with the consent of the Fisheries department, has to construct such hatchery either through amendment in the current EPC Contract or through a separate contract to offset the project execution impacts on the Kunhar River fish fauna. Rest of the conditions contained in the “Environmental Approval” have either been complied, or made part of the SSEMP, or compliance is in progress or will be complied at appropriate time.

5. RESULTS OF ENVIRONMENTAL MONITORING

5.1. Overview of Monitoring Conducted during Current Period

84. The prime objectives of environmental monitoring are to:
- i monitor project impacts on physical, biological and socio-economic indicators, and to assess adequacy of the EMP/SSEMP in identifying and mitigating the project adverse impacts;
 - ii recommend mitigation measures for any unforeseen impact or where the impact level exceeds from those anticipated in EMP/SSEMP; and
 - iii ensure legal compliance including safety of workforce and community.
85. During the project execution, two types of monitoring will be undertaken.
- i **Compliance Monitoring:** To ensure that mitigation/preventive measures proposed in EMP/SSEMP are adhered to; and
 - ii **Effect Monitoring:** To monitor the effect of construction activities on various components of the environment such as air, water, noise and soil etc.
86. As permanent Works construction activities have not been initiated under the conditions of contract hence, as expounded under **Sub-head 3.1**, only HSE aspect of the preparatory Works was monitored during the reporting period.
87. The baseline instrumental environmental monitoring carried out during the reporting period is detailed in the succeeding paras.

5.2. Instrumental Environmental Monitoring

88. As highlighted under **Sub-head 2.3.5**, instrumental environmental monitoring under the Balakot HPP (300 MW) was initially carried out in 2017 as part of the project EIA studies therefore, it was felt necessary to conduct updated monitoring to record the baseline conditions of the environmental constituents i.e. air quality, noise level, water quality and soil analysis. In this regard, the EPC Contractor hired services of the Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) certified laboratory namely Integrated Environment Laboratory (IEL) which conducted baseline environmental monitoring at Site during the period from December 07 to 14, 2022.
89. The instrumental environmental monitoring points and the monitoring plan are exhibited under **Figure 5.1** and **Table 5.1** respectively.

Figure 5.1: Instrumental Monitoring Points

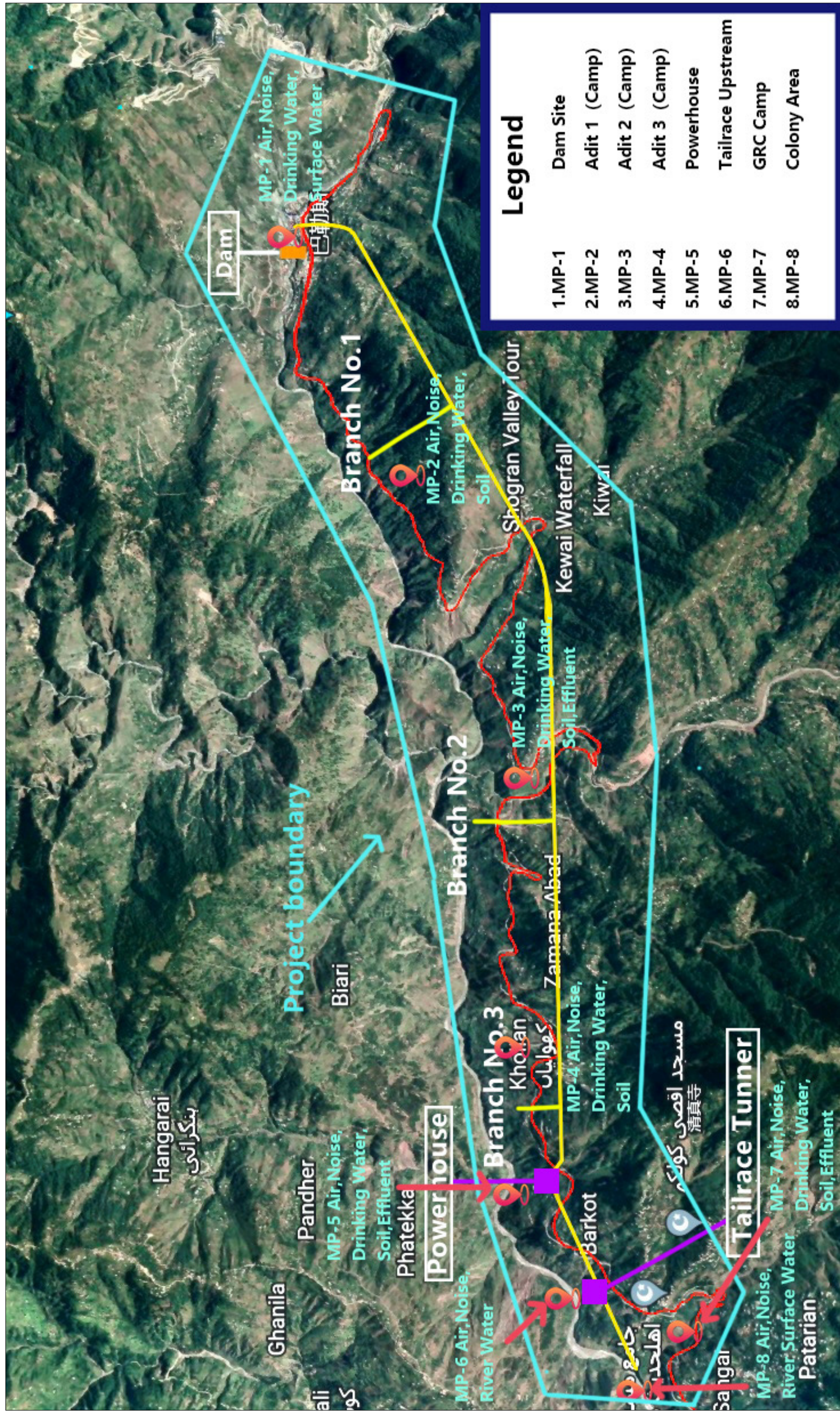


Table 5.1: Instrumental Environmental Monitoring Plan

Environmental Quality	Parameters	Standards/Guidelines	Location	Monitoring period/ Frequency/Sampling No/Year	Responsibility	
					Implementation	Monitoring
Pre-Construction Phase						
Air Quality, Noise Level, Water Quality (drinking, and surface water of the Kunhar River), Soil and Effluent	Same as given for construction phase	Same as given for construction phase	Same as shown on map	Once	EPC Contractor	PIU & PMC
Construction Phase						
Air Quality	SO ₂ , NO _x , CO, O ₃ , SPM, PM ₁₀ , PM _{2.5} , Humidity, Wind direction, Wind speed, Temperature etc.	Air quality standards by NEQS, WHO	Same as shown on map	Quarterly (24 Hours Duration)	EPC Contractor	PIU & PMC
Dust	Dust control	Air quality standards by NEQS, WHO		Quarterly (24 Hours Duration)	EPC Contractor	PIU & PMC
Noise Level	dB(A)	Noise pollution Control NEQS, WHO,		Quarterly (24 Hours Duration)	EPC Contractor	PIU & PMC
Water Quality	Surface water, Temperature, Turbidity, pH, TDS, EC, TSS, DO, COD, BOD ₅	Water quality standards by NEQS, WHO	Same as shown on map	Quarterly	EPC Contractor	PIU & PMC
	Ground Water: Color, Odor, Taste, Temperature, Turbidity, pH, TDS, EC, TSS, CaCO ₃ , Hardness, Potassium, Nitrate, Nitrite (as NO ₂), Phosphate, Arsenic, COD, DO, TSS, Total <i>Coliform</i> , <i>Faecal coliform</i> and <i>E. Coli</i>	Water quality standard by NEQS, WHO		Quarterly	EPC Contractor	PIU & PMC
Soil Pollution	Soil texture, pH, EC, Available Phosphorus and SAR.	NEQS, Government of Pakistan		Twice a year	EPC Contractor	PIU & PMC

90. Synopsis of the results obtained is exhibited below while signed copies are attached to the report as **Annexure-06**.

5.3. Monitoring of Air, Noise, Water and Soil analysis

5.3.1. Ambient Air Monitoring

a. Particulate Matter Monitoring

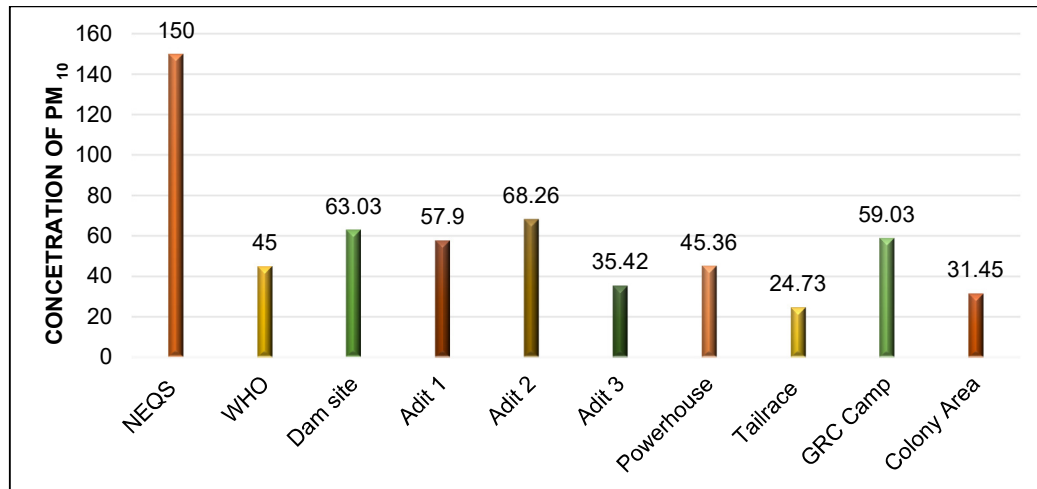
i. Methodology and Instrument Used

91. Ambient particulate matter monitoring was carried out for the assessment of PM₁₀ & PM_{2.5} concentrations at the pre-identified locations within the project reach. The Air Quality Monitoring System (AQMS-65), employed for PM₁₀ & PM_{2.5}, is a fully integrated air monitoring station that delivers 'near reference levels' of performance parameters. With a size of large suitcase, it can measure up to 20 different gaseous, particulate pollutants, and environmental parameters simultaneously. The AQMS-65 offers optimal balance between performance and measuring criteria pollutants.

ii. Test Results and Discussion

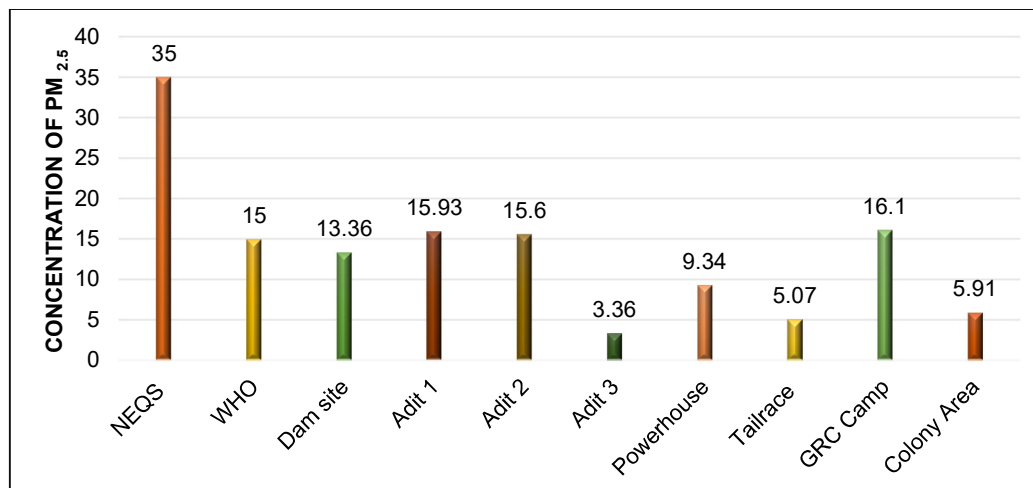
92. Ambient particulate matter (PM₁₀ & 2.5) were monitored for twenty-four (24) hours at the pre-identified locations as given in **Figure 5.1** above. Graphical presentation of the results obtained is exhibited below.

Figure 5.2: Results obtained for Particulate Matter (PM₁₀) µg/m³



93. As evident from the results exhibited above, the PM₁₀ concentration at most of the sampling points are in excess to the WHO guiding values but fall well below the NEQS. Same scenario was recorded in March-April, 2017, when instrumental monitoring was undertaken in the project area as part of the EIA study⁸. The results obtained at that time are however, quite above the current monitoring results which may primarily be attributed to the monitoring period. During the month of April, there occurs vivid increase in the traffic on roads, and other construction activities in the project area as compared to the activities during the month of December i.e. current baseline monitoring period.

⁸ For the 2017 monitoring results, refer to page No.4-59 of the "Volume A- Main Report" of the approved EIA report.

Figure 5.3: Results obtained for Particulate Matter (PM_{2.5}) µg/m³

94. The baseline results obtained for PM_{2.5} shows compliance with the NEQS however, in excess to the WHO guideline values at some locations. The sharp variation at some monitoring points may be due to the sampling locations. For example, the concentration at Adit 3 is quite less as compare to the GRC Camp location since the latter is in close proximity of the N-15 road while the former is in the valley, well below from the road level.

95. Although, the current PM_{2.5} results fall within the NEQS however, the results recorded at all sampling points in the project area in 2017, are in excess to the NEQS. Again, the contrasting results may be attributed to the monitoring period.

b. Gases Monitoring

i. Methodology and Instrument Used

96. The ambient gaseous monitoring was carried out for assessment of Carbon monoxide (CO), Sulphur dioxide (SO₂) and oxides of Nitrogen (NO_x) at the pre-determined locations. Air Quality Monitoring System (AQMS-65), employed for monitoring, is a fully integrated air monitoring station which delivers 'near reference levels' of performance parameters. With a size of large suitcase, it can measure up to 20 different gaseous, particulate pollutants and environmental parameters simultaneously.

ii. Test Results and Discussion

97. The twenty-four (24) hours ambient gaseous monitoring for the foregoing gases was carried out during the month of December 2022, at the pre-identified locations in the project area. The results obtained are presented as hereunder.

Figure 5.4: Results obtained for Carbon Monoxide (CO) (mg/m³)

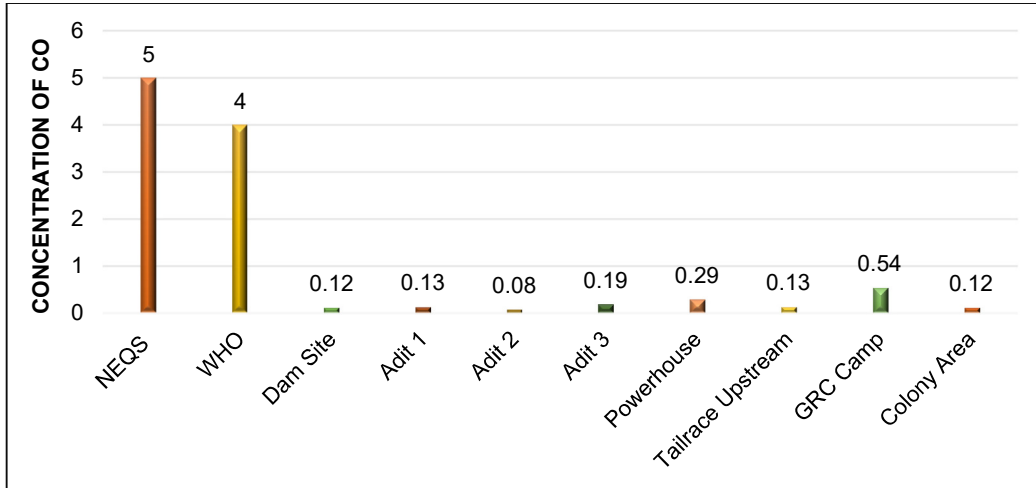


Figure 5.5: Results obtained for Nitrogen Oxide (NO) (mg/m³)

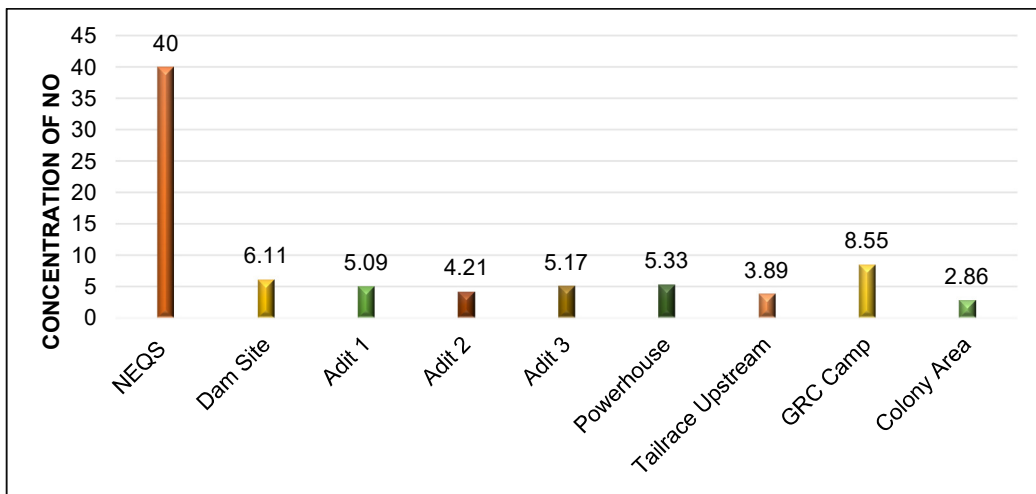


Figure 5.6: Results obtained for Nitrogen Dioxide (NO₂) (µg/m³)

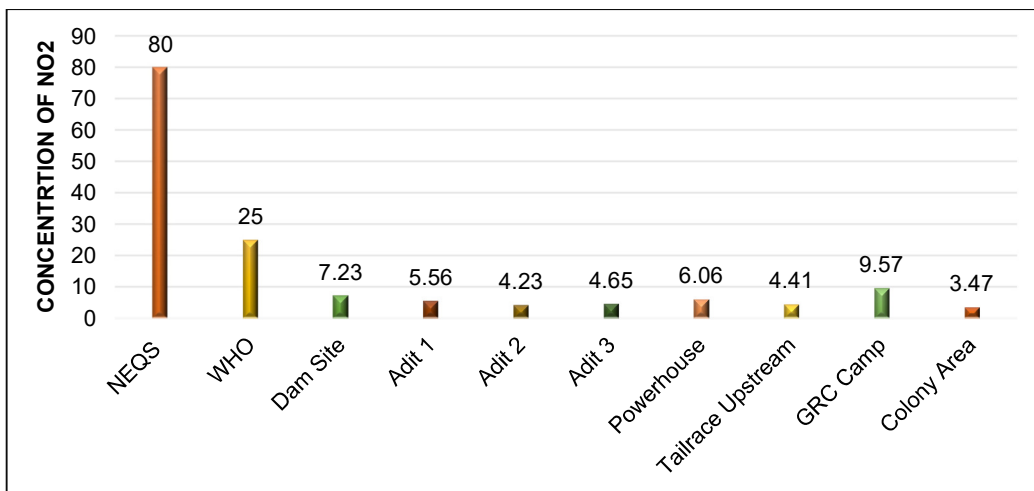
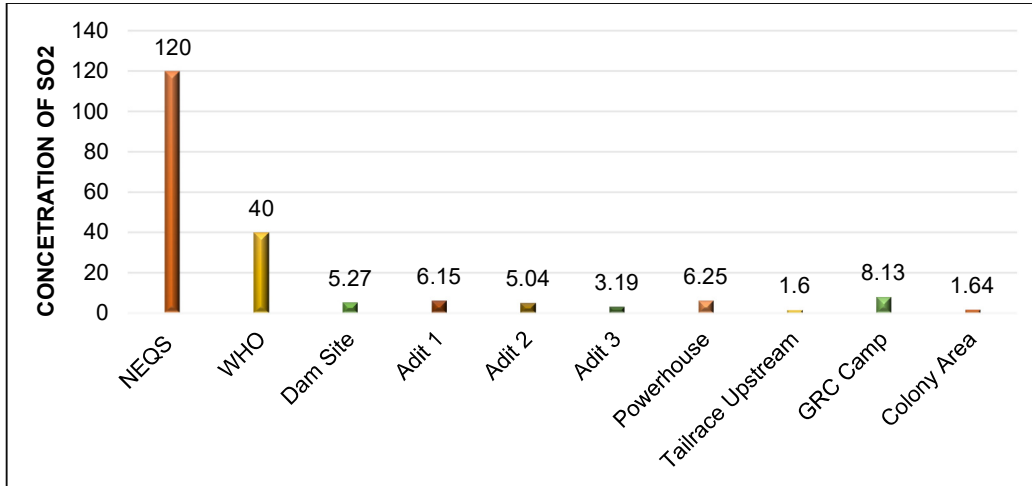


Figure 5.7: Results obtained for Sulfur Dioxide (SO₂) (µg/m³)

98. As clear from the gaseous emission results presented above, all principal pollutants fall within the NEQS and WHO guideline values. More or less, similar trend was recorded during the 2017 instrumental monitoring carried out in the project reach.

5.3.2. Noise Monitoring

i. Methodology

99. The twenty-four (24) hours noise level monitoring was carried out at the pre-identified locations as shown under **Figure 5.1** above.

100. Digital Sound level meter with the following specifications was employed during the noise monitoring.

- HME® 9011 Sound Levels Meter
- IEC651 Type 2 & ANISI.4TYPE2 (Japan)

ii. Features of the Equipment

- Accuracy: ± 1.5 dB (under reference condition)
- Frequency range: 31.5 Hz to 8.5K Hz
- Linearity range: 50 dB
- Measuring level: 30 – 130 dB(A), 35 – 130 dB(C)
- Digital display: 4 digits
- Resolution: 0.1 dB
- Display: 0.5 secretary
- Bar graph: 50 dB scale at 1 dB step for monitoring current sound pressure level display period: 50 mS

iii. Test Results and Discussion

101. Following tables shows noise level monitoring results, obtained during the instrumental environmental monitoring carried out in the month of December 2022.

Table 5.2: Ambient Noise Monitoring Results

S/No	Monitoring Time	Unit	Sampling Points							
			Dam Site	Adit 1	Adit 2	Adit 3	Powerhouse Results (Leg)	Tailrace Upstream	GRC Camp	Colony Area
1.	09:00 AM	dB(A)	46.70	49.60	48.10	48.00	43.80	48.10	61.00	42.50
2.	10:00 AM		46.50	49.40	47.90	47.80	43.60	47.90	60.80	43.60
3.	11:00 AM		46.30	49.20	47.70	47.60	43.40	47.70	60.50	40.90
4.	12:00 PM		46.10	49.00	47.50	47.40	43.20	47.50	60.30	41.70
5.	01:00 PM		45.80	48.70	47.20	47.10	42.90	47.20	60.10	45.30
6.	02:00 PM		45.60	48.50	47.00	46.90	42.70	47.00	59.90	44.20
7.	03:00 PM		45.40	48.30	46.80	46.70	42.50	46.80	59.70	40.90
8.	04:00 PM		45.20	48.10	46.60	46.50	42.30	46.60	59.50	43.20
9.	05:00 PM		45.00	47.90	46.40	46.30	42.10	46.40	59.20	46.40
10.	06:00 PM		44.80	47.70	46.20	46.10	41.90	46.20	59.00	45.40
11.	07:00 PM		44.50	47.40	45.90	45.80	41.60	45.90	58.80	48.70
12.	08:00 PM		44.30	47.20	45.70	45.60	41.40	45.70	58.60	42.40
13.	09:00 PM		44.10	47.00	45.50	45.40	41.20	45.50	58.40	40.20
14.	10:00 PM		43.90	46.80	45.30	45.20	41.00	45.30	58.20	44.70
15.	11:00 PM		43.70	46.60	45.10	45.00	40.80	45.10	57.90	42.10
16.	12:00 AM		43.40	46.30	44.80	44.70	40.50	44.80	57.70	44.00
17.	01:00 AM		43.20	46.10	44.60	44.50	40.30	44.60	57.50	46.20
18.	02:00 AM		43.00	45.90	44.40	44.30	40.10	44.40	57.30	41.70
19.	03:00 AM		42.80	45.70	44.20	44.10	39.90	44.20	57.10	44.10
20.	04:00 AM		42.60	45.40	44.00	43.80	39.70	44.00	56.90	42.90
21.	05:00 AM		42.30	45.20	43.70	43.60	39.40	43.70	56.60	41.00
22.	06:00 AM		42.10	45.00	43.50	43.40	39.20	43.50	56.40	40.40
23.	07:00 AM		41.90	44.80	43.30	43.20	39.00	43.30	56.20	44.30
24.	08:00 AM		41.70	44.60	43.10	43.00	38.80	43.10	56.00	43.30
NEQS limit: 45-55⁹ dB										
WHO limit: 70 dB										

NEQS: National Environmental Quality Standards
WHO: World Health Organization
Leg: Log Equivalent Continuous Sound Level

⁹ 45 dB for night time and 55 dB for day time as per NEQS

102. The twenty-four (24) hours results for ambient noise level monitoring show that the recorded noise levels at GRC Camp is in excess to the NEQS guideline value of 55 dB. As the camp is located adjacent to the N-15, hence, exceedance in noise levels is primarily attributed to the vehicular traffic on N-15 because, apparently, there are no other stationary sources that may cause noise pollution.

103. The noise level monitoring results recorded during the current monitoring period exhibit more or less the same trend as recorded during the instrumental monitoring carried out in May, 2017.

5.3.3. Water Monitoring

A. Drinking Water

i. Methodology

104. During the reporting period, the drinking water quality tests were conducted at the sample points identified on the map given under **Figure 5.1** above.

105. APHA standard methods used for the sampling, and preservation of water whereas the following standards methods were used for analysis.

- American Water Works Association (AWWA) and
- American Public Health Association (**APHA**)

ii. Comparison of Drinking Water Test Results and Discussion

106. The baseline drinking water monitoring results of the sample points (source) are given under **Table 5.3** below.

Table 5.3: Drinking Water Monitoring Results

S/No	Parameters	Standard Method	Units	WHO	NSDWQ	Sampling Points					
						Dam Site	Adit 1	Adit 2	Adit 3	Powerhouse	GRC Camp
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.4	7.7	7.3	7.7	7.5	7.7
2.	Temperature	---	°C	---	----	7	6	8	8	7	7
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable	Non Objectionable	Non Objectionable	Non Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4	6	5	6	10	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3	4	4	4	4	3
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	< 1000	<1000	359	381	363	377	402	384
7.	Total Hardness as CaCO ₃	APHA-2340 C	mg/l	-----	<500	294	217	261	258	316	347
8.	Nitrate (NO ₃)	APHA-4500NO ₃ B	mg/l	50	≤50	2.2	1.9	1.03	1.06	1.2	1.46
9.	Nitrite (NO ₂)	APHA-4500NO ₂ B	mg/l	3	≤3	0.04	0.06	0.07	0.08	0.37	0.58
10.	Arsenic (As)	APHA-3500As B	mg/l	0.01	≤0.05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/l	0.02	≤0.02	0.001	0.003	0.005	0.008	0.009	0.006
12.	Antimony (Sb)	APHA-3500Sb B	mg/l	0.005	<0.005	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/l	250	<250	128	131	138	129	105	117
14.	Chlorine	APHA-4500 CL	mg/l		0.5-1.5	0.2	0.09	0.1	0.03	0.1	0.05
15.	Lead (Pb)	APHA-3500 Pb-B	mg/l	0.01	≤0.05	0.006	0.001	0.004	0.005	0.003	N.D
16.	Fluoride	APHA-4500F- C	mg/l	1.5	≤1.5	0.73	0.58	0.86	0.75	0.91	0.64
17.	Aluminium	APHA-3500 Al	mg/l	≤ 0.2	≤0.2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/l	0.5	≤0.5	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/l	0.003	0.01	N.D	N.D.	N.D.	N.D.	N.D.	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/l	0.3	0.7	0.16	0.08	0.12	0.16	0.11	0.2
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/l	0.001	≤0.001	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

S/No	Parameters	Standard Method	Units	WHO	NSDWQ	Sampling Points					
						Dam Site	Adit 1	Adit 2	Adit 3	Powerhouse	GRC Camp
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/l	2	2	0.03	0.07	0.04	N.D.	0.06	0.05
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/l	3	5	1.01	1.06	1.1	1.3	1.08	1.06
24.	Boron (B)	APHA 4500 B- C	mg/l	0.3	0.3	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/l	0.05	≤0.05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/l	0.01	0.01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/l	0.07	≤0.05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
28.	E-Coli	APHA:9222 D	Number/ 100 mL	Must not be detectable in any 100 ml sample	0 Number/100 ml	7	0	0	0	0	0
29.	Total Coliform	APHA:9222 B	Number/ 100 ml	Must not be detectable in any 100 ml sample	0 Number/100 ml	13	0	0	0	0	0

NSDWQ: National Standards for Drinking Water Quality

WHO: World Health Organization

ND: Not Detected

107. As evident from the baseline results of the drinking water sources in the project area, almost all the monitored parameters fall within the permissible limits of WHO and NSDWQ.

108. Almost, similar trend of the results was recorded during the February 2017 drinking water monitoring whereby only microbiological contamination was observed in some instances.

B. Surface Water of the Kunhar River

109. For the Kunhar River water monitoring, samples were collected from three locations i.e. Dam site (upstream of temporary diversion dam, just downstream of the Sukki Kinari HPP tailrace), Tailrace upstream (Barkot), and downstream side of the project residential colony area. The purpose of Kunhar River water monitoring is to know the river water quality at the undisturbed location, baseline impact of the contributing streams on the river water quality, and the overall impact of the project construction.

110. Due to non-availability of the surface water parameters under NEQS, the Kunhar River water was compared against the NEQS effluent parameters. The results obtained will be compared with the construction phase monitoring to assess the impact of project construction activities on the Kunhar River water quality.

111. The results obtained during the December 2022 instrumental environmental monitoring, are presented under **Table 5.4** below.

Table 5.4: Kunhar River Water Monitoring Results

S/No	Parameters	Standard Method	Units	NEQS	Sampling Points		
					Dam Site	Tailrace	Colony Area
1.	Temperature	----	°C	40	5	6	4
2.	pH	APHA-4500H+ B	--	6-9	8.3	7.9	8.1
3.	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	113	108	86
4.	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	62.8	54.7	42
5.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2637	2492	1864
6.	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	129	108	117
7.	Total Hardness	APHA-2340 C	mg/l	--	164	157	161
8.	Oil & Grease	Separation Method	mg/l	10	2.8	2	1.3
9.	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.61	0.55	0.41
10.	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.8	3.2	2.6
11.	Chloride	APHA-4500Cl- B	mg/l	1000	256	234	209
12.	Flouride	APHA-4500F- C	mg/l	10	2.4	1.8	1.1
13.	Ammonia	ASTM-D1426-15	mg/l	40	4.9	3.7	2.9
14.	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0.01	0.008	0.006
15.	Lead	APHA-3500-Pb B	mg/l	0.5	0.08	0.03	0.01
16.	Arsenic	APHA-3500As B	mg/l	1.0	N D	N D	N D
17.	Copper	APHA-3500Cu B	mg/l	1.0	0.27	N D	N D
18.	Barium	APHA-3500Ba B	mg/l	1.5	0.07	0.04	0.03
19.	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D	N.D	N D
20.	Silver	APHA-3500Ag-B	mg/l	1.0	N.D	N.D	N D
21.	Manganese	APHA-3500-Mn B	mg/l	1.5	0.33	0.28	0.26
22.	Zinc	APHA-3500-Zn B	mg/l	5.0	0.58	0.37	0.31

S/No	Parameters	Standard Method	Units	NEQS	Sampling Points		
					Dam Site	Tailrace	Colony Area
					Results		
23.	Nickel	ASTM E3047-16	mg/l	1.0	0.15	0.11	0.08
24.	Boron	APHA-4500B-C	mg/l	6.0	N.D	N.D	N.D
25.	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D	N.D	N.D
26.	Sulphide (S ²⁻)	APHA-4500 S ₂	mg/l	1.0	0.35	0.31	0.29
27.	Sulphate (SO ₄)	APHA-4500-SO ₄ C	mg/l	600	429	354	349
28.	An Ionic Detergent (as MBAS)	----	mg/l	20	1.1	0.9	0.4
29.	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.06	0.02	0.01
30.	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D	N.D	N.D
31.	E-Coli	APHA:9222 D	Number/100 ml	---	Uncountable	Uncountable	Uncountable
32.	Total Coliform	APHA:9222 B	Number/100 ml	---	Uncountable	Uncountable	Uncountable

NEQS: National Environmental Quality Standards

ND: Not Detected

5.3.4. Soil Analysis

112. During the course of December 2022 instrumental environmental monitoring, the soil analysis of camps and workshop areas was also carried out with the purpose to record the baseline conditions of the soil at the sites, and track changes that may occur as consequent of the construction activities so as to obligate the EPC Contractor to restore the soil of the facilities to original conditions upon completion of the project or handing over the site back to the owner(s).

113. The soil analysis results obtained are exhibited in **Table 5.5** below.

Table 5.5: Soil Analysis Results

S/No	Parameters		Sampling Points and Results				
			Adit 1	Adit 2	Adit 3	GRC Camp	Powerhouse
1	Soil Texture	Sand %	14	08	17	16	12
		Silt%	57	58	49	43	61
		Clay %	29	34	34	41	37
		Texture Class	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam
2	pH		8.1	8.1	8.0	8.0	8.1
3	Electrical Conductivity EC (μSm^{-1})		238	238	231	231	229
4	Phosphorus (mgkg^{-1})		2.01	2.01	3.2	3.2	2.9
5	Sodium Absorption Ratio		4.07	4.07	3.54	3.54	3.37

μSm^{-1} : Micro siemens/meter
 mgkg^{-1} : milligram per Kilogram

114. As stated above, the results obtained will be compared with the construction phase results against the soil analysis sampled from the same locations.



Air quality, Noise level and the Kunhar River water sampling

5.4. Summary of Monitoring Outcomes

115. Since, during the reporting period, no permanent Works construction activities were undertaken by the EPC Contractor hence, the permanent construction related EMP part of the approved EIA report has not been made part of the current SAEMR. In fact, such status of

compliance will be reported during the upcoming SAEMR for the period from January to June, 2023, as sectional possession of Site has been given to the EPC Contractor by the PIU on December 28, 2022. Nevertheless, the HSE aspect of the preparatory works was supervised whereby non usage of PPE by the labour was observed which, upon the PMC instructions as stated under **Table No. 2.9** above, was rectified by the EPC Contractor.

116. The results, recorded during the baseline instrumental monitoring conducted in December 2022, generally shows similar trend to that conducted in 2017, except for some minor variations, which may primarily be attributed to the monitoring period of the year and change in the location of the sample points.

117. The table given below, shows implementation status of the pre-construction phase EMP requirements contained in the disclosed EIA report of the project.

Table 5.6: Implementation Status of EMP during Pre-construction (Design) Phase

S/No	Impact	EMP Requirements		Compliance Attained	Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
		Mitigation Measures				
1	Terrestrial habitat loss caused by construction related activities	Minimize disturbance to, or movement of, soil and vegetation	Yes			
		Minimize project footprint.	Yes			
		Retain as much natural vegetation as possible.	Yes			
		Locate construction facilities based on a knowledge of the soil.	Yes			
2	Decline in abundance and diversity of terrestrial flora and fauna caused by construction related activities	slope and vegetation cover of the area to avoid disturbance to the natural environment	Yes			
		Locate vehicle yards away from open soils and top soil stockyard	Yes			
		Maximize use of locally-sourced aggregate and borrow material	Yes			
		Minimize contact of non-local aggregate and borrow material with native soil.	Yes			
3	Blasting may pose a health hazard due to flying debris	Minimize disturbance to, or movement of, soil and vegetation.	Yes			
		A minimum buffer of 500 m should be provided between the settlements and point of blasting.	Yes			
4	Construction activities may be cause alterations to groundwater flow patterns	Record location of the springs especially those in areas proximal to where the underground headrace tunnel will be closer to the ground level	Partial	During the reporting period, the EPC Contractor has not conducted full survey of the headrace/adit tunnels alignment to record the springs situated above the tunnel alignment or in the immediate vicinity. Nevertheless, the streams in the temporary acquired land or which the EPC Contractor	Upon approval of the project Basic Engineering Design but not later than February 13, 2023.	

S/No	EMP Requirements		Compliance Attained	Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures			
5	Use of local water resources for construction activities may reduce the water availability for the local communities.	<p>Prepare a Water Sourcing and Abstraction Plan specifying the source, owner, total yield, current usage, allowable quantity and the duration for which water can be obtained.</p> <p>To the extent possible avoid, and where unavoidable, minimize the use of water from local sources (springs) for the Project where local abstraction is unavoidable</p> <p>Undertake an assessment of the local source identifying its total yield and current usage. If the abstraction from a single source extends three months, the assessment shall be repeated</p> <p>Fix the allowable quantity to not more than 50% of the available yield (total yield minus current usage)</p> <p>Enter into a formal agreement with the owner for the water source (or government if it is a public source)</p> <p>Use visual alarms in preference to audible alarms.</p> <p>Locate noisy equipment behind parking lots, parks or behind sound barriers or sound absorbers – for example, gravel stockpiles or constructed barriers. and away from potential sources of conflict</p>	Yes	<p>intend to use for camp etc. have been identified.</p> <ul style="list-style-type: none"> The EPC Contractor has not fully finalized the water sources for his main and sub-camps yet. As water sources for Thobi camp and GRC camp have been finalized hence, their agreements are attached as Annexure-07. 	The EPC Contractor will submit complete Water Source and Abstraction Plan by February 28, 2023.
6	Increase in ambient noise levels due to operation of construction equipment, movement of construction traffic and blasting may create nuisance for nearby	<p>Use visual alarms in preference to audible alarms.</p> <p>Locate noisy equipment behind parking lots, parks or behind sound barriers or sound absorbers – for example, gravel stockpiles or constructed barriers. and away from potential sources of conflict</p>	Yes		

S/No	EMP Requirements		Compliance Attained	Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures			
	communities and visiting tourists.	Using vibratory piling instead of impact piling. Erect earth mounds around the site boundary can provide acoustic as well as visual screening	Yes Yes		
7	Failure of spoil dumping sites resulting in increased erosion and sediment load entering river	Dumping sites should have a flood prevention design for a 20- year flood	Partial	The EPC Contractor has identified sites for muck disposal however, the detail methodology showing protection works are yet to be submitted to the PMC for review and approval hence, the activity termed as partially complied.	The EPC Contractor will submit the required methodologies by February 24, 2023
		Preparation of spoil management plan	Yes		
		Develop and implement a Site Rehabilitation and Landscaping Plan	Yes		
	Permanent impact in aesthetics due to proposed developments	Use colors that better integrate with the landscape Disguise elements with vegetation where possible Retain as much natural vegetation as possible	Yes Yes Yes		
9	Improved accessibility due to construction of Project internal roads	Consult communities during final design and location of site access roads	Yes		
		Make roundabouts for the congestion points.	Yes		
10	Increase in congestion, due to increased traffic volume will cause delays	Retain as much natural vegetation as possible to reduce the impact of smoke due to vehicles.	Yes		

S/No	EMP Requirements		Compliance Attained	Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures			
11	Loss of assets and livelihood as a result of land acquired for the Project	Consult National Highway Authority for implementation of the above measures LARP implementation	Partial	LARP implementation is in progress.	By end of February 2023
12	Submergence of the graveyard	Plaster the graves with mud or cement. If relocation of the graveyard cannot be avoided, it shall be managed through the local religious authorities.	No	<ul style="list-style-type: none"> LARP implementation is in progress. District Revenue office has not yet handed over Site to PEDO/PIU. 	With the participation of the affected community, the graves will be shifted, by the District Administration office to the new area by the end of March, 2023. Same as above
13	Impact of climate change in possible enhancing of flood impacts such as during possible overtopping of spillway	Ensure minimal damage to dam structure from small amount of overtopping of spillway through design	Yes		

5.5. Training

118. No trainings were scheduled during the reporting period. In fact, as outlined in the SSEMP, HSE related trainings will be initiated during the upcoming reporting period.

5.6. Complaints

119. During the reporting period, no environment related complaint received, neither to the EPC Contractor nor to the PIU or PMC.

6. SUMMARY AND RECOMMENDATIONS

6.1. Summary

120. As expounded in the introductory paras, during the reporting period, mostly the project Basic Engineering Design, LARP implementation, SSEMP preparation and temporary preparatory works remained in progress.

121. In start of the preparatory works, due to non-availability of the EPC Contractor's HSE designated team, there were instances of non-compliances, particularly non usage of PPE by the labour at Site however, status of compliance significantly improved after deployment of the EPC Contractor's HSE team at Site.

122. During the reporting period, the targeted progress on project specific BAP could not be achieved, due to delay in materialization of changes proposed in the BAP implementation arrangements. Also, the review comments on Basin-wide BAP Consultation report remained in correspondences with the ADB.

123. Following table shows accomplishment status of the targets set in previous SAEMR for the current reporting period.

Table 6.1: Status of Activities Planned for July-December 2022

S/No	Activity	Target Date	Status at the end of Reporting Period	Reason(s) of delay/non-achievement
1	BAP Joint consultation meeting with Wildlife and Fisheries departments	July 05, 2022	Accomplished on time	
2	Finalization of SSEMP preparation and review	August 08, 2022	SSEMP approved by the Employer on December 30, 2022	Non achievement of the set target is primarily attributed to the delayed submission of SSEMP for review and approval. EPC Contractor submitted SSEMP on November 14, 2022, for review.
3	Consultation meetings with stakeholders for basin-wide BAP	August 16-19, 2022	Accomplished on time	
4	Submission of Basin-wide BAP Consultation Report to ADB	August 30, 2022	Accomplished on September 30, 2022	Due to request of the stakeholders, last face to face consultation meeting was held on September 16, 2022 while virtual consultation meeting with Sukki Kinari HPP was held on September 28, 2022 which caused delay in submission of the consultation report.
5	Pre-construction Instrumental Monitoring of air, noise, water, soil etc. at Site	September 5-10, 2022	Accomplished in December 2022	The schedule date was affected by the EPC Contractor's delay in procurement of services of the KPKEPA approved laboratory.

S/No	Activity	Target Date	Status at the end of Reporting Period	Reason(s) of delay/non-achievement
6	Signing of BAP Contract with Fisheries and Wildlife departments	October 04, 2022	Pending	The proposed changes in BAP implementation couldn't be materialized during the reporting period
7	Supervision of HSE aspect of the permanent construction Works	October 2022 onward.	Not initiated	Sectional Possession of Site granted to the EPC Contractor on December 28,2022. No permanent Works initiated during the reporting period.
8	Quarterly Instrumental Monitoring of air quality, noise level, water quality, and soil etc. at Site	December 20-25, 2022	Not initiated	No permanent Works initiated during the reporting period. Construction phase instrumental environmental monitoring will be initiated in the First quarter of 2023.

124. The Corrective Action Plan given below shows pending issues and those identified during the monitoring period.

Table 6.2: Corrective Action Plan against issues identified during the Monitoring Period

S/No	Issue	Required Action	Responsibility	Timing (Target Dates)
Pending issues from the previous report(s)				
1	Finalization of project specific BAP implementation arrangement	Furnishing of report containing the proposed changes in the project specific BAP implementation arrangement and securing the ADB/AIIB approval/consent thereof.	PIU- Balakot HPP (300 MW)	January 30, 2023
Issues identified during the current monitoring period				
1	Signing of BAP Contract with Fisheries and Wildlife departments	Approval of the proposed changes in the project specific BAP implementation arrangement and signing of implementation contract with Wildlife and Fisheries department.	PIU- Balakot HPP (300 MW)	March 30, 2023

6.2. Recommendations

125. As construction activities under Balakot HPP (300 MW) are to be simultaneously undertaken in relatively narrow sections of the Kunhar River valley, stretching from Paras to Sangar village, therefore, the construction related HSE aspect need to be vigorously supervised to eliminate occurrences of non-compliance events. Also, due to limitations of available spaces for the EPC Contractor's temporary facilities including batching plants, material storage facilities, and scanty spaces for muck disposal etc. the construction activities need to be supervised on daily basis to minimize damages to the local flora/fauna and other constituents of the environment. In this regard, it is recommended that PMC may be permitted to deploy full time Environmental Officer to provide regular support to the Environmental Expert who has intermittent inputs for the currency of contract.

126. As mentioned in the Basin-wide BAP Consultation report, PEDO is currently in process of hiring essential staff to establish core Environmental and Social section by mid-2023. Thus, with full support of the PIU, this section will take lead role in efforts towards materialization of the Basin-wide BAP. Through such arrangement, PEDO will ensure its long term commitment to BAP provisions and establishment of IRRE and WMO. In this regard, PEDO will submit Action Plan to the ADB and AIIB for review, exhibiting time line for hiring essential staff for Environmental and Social section, along with the Basin-wide BAP implementation schedule.

127. Upon approval of the changes proposed in the project specific BAP implementation, there should be a joint meeting of the financier's, the PIU, PMC, and the Wildlife and Fisheries departments with the aim to accelerate BAP implementation process.

ANNEXURES

**Annexure-01: Sectional Possession of Site (Sangar and
Ghanool Mozas)**



P E D O
PAKHTUNKHWA ENERGY DEVELOPMENT ORGANIZATION
 Government of Khyber Pakhtunkhwa Peshawar



No. 1249-1253/PEDO/PD Balakot
 HPP/ Dated Peshawar the 28/12/2022

Mr. Wang Yanwei,
 Authorized Representative,
 CGGC-GRC JV.

Project: Design, Supply and Installation, Testing and Commissioning of Balakot Hydropower Project (300MW), Including the Related Civil Works for River Diversion.

SUBJECT: RIGHT OF ACCESS TO PROJECT SITE AT MOUZA SANGAR AND GHANOOL VILLAGES

Dear Sir,

This is notice to the Contractor pursuant to Sub-Clause 10.2 of the General Conditions of Contract by the Employer for acquiring and providing legal and physical possession of the Site and access thereto, related to the Project Sites of "Access Road to Shaft", "Switchyard", "Access Road to Switchyard", "Colony with Tailrace Outlet", "Access to Powerhouse" and "Access Road to Colony" within the villages of Mouza Sangar & Ghanool. Related Land Acquisition Layout Plan is attached herewith.

Please note that the Contractor submitted its General Works Schedule (Schedule) vide letter ref. No. CGGC/PAK/2022/Balakot HPP/PMC/No. 152 dated April 17 2022, under Sub-Clause 18.2 of the General Conditions of Contract, which was accepted by PMC under letter ref. No. 1018/319 dated 19th April 2022. However, the Contractor failed to comply with this Schedule and its first milestone of 'Basic Design Approval', due on 27th September 2022 could not be achieved till date. This delay significantly impacted the subsequent activities/ milestones.

Please find attached Handing -Over Certificate for the Contractor's signing/ stamping.

Regards,

/

Project Director
 Balakot HPP, PEDO

CC:

1. Secretary Energy and Power, Government of KPK.
2. The CEO, PEDO.
3. The Team Leader, PMC, Balakot HPP
4. The Deputy Team Leader, PMC, Balakot HPP


 Project Director
 Balakot HPP, PEDO



P E D O
PAKHTUNKHWA ENERGY DEVELOPMENT ORGANIZATION
 Government of Khyber Pakhtunkhwa Peshawar



HANDING-OVER CERTIFICATE

Project Name: Design, Supply and Installation, Testing and Commissioning of Balakot Hydropower Project (300MW), Including the Related Civil Works for River Diversion.

Ref: 1249-1253/PEDO/PD Balakot

Date: 28/12/2022

Pursuant to Sub-Clause 10.2 of the General Conditions of Contract, the Employer has provided/ handed over the legal and physical possession and access to the Project-Sites of "Access Road to Shaft", "Switchyard", "Access Road to Switchyard", "Colony with Tailrace Outlet", "Access to Powerhouse" and "Access Road to Colony" within the villages of Mouza Sangar & Ghanool, related to Design, Supply and Installation, Testing and Commissioning of Balakot Hydropower Project (300MW), Including the Related Civil Works for River Diversion to the Contractor.

The Contractor, accordingly, has acquired/ taken over the possession and access of the above referred Project-Sites.

Under this formal Handing-Over Certificate, the Contractor warrants and confirms that it has acquired/ taken over the above referred Project-Sites under the Contract and shall abide by all contractual obligations related to the land acquisition.

On behalf of the Employer

Signature of Authorized Signatory

Balakot HPP, PEDO

Name:

Date: 28/12/2022

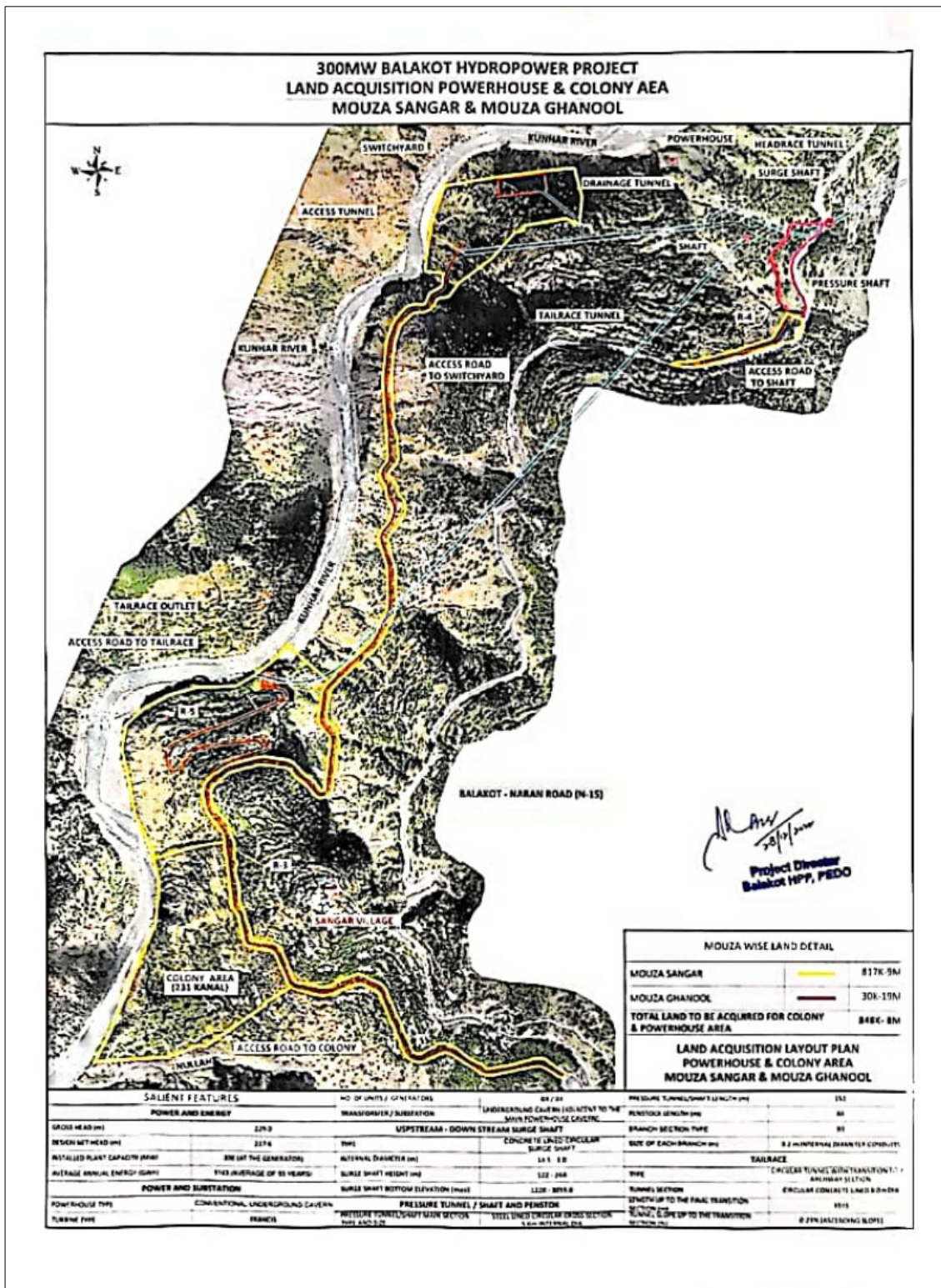
On behalf of the Contractor

Signature of Authorized Signatory

Name:

Date: 28.12.22

108-PEDO House, 38 B-2, Phase-V, Hayatabad, Peshawar. Tel: 091-9217463, Fax: 091-9217464



Annexure-02: SSEMP Approval



P E D O
PAKHTUNKHWA ENERGY DEVELOPMENT ORGANIZATION
Government of Khyber Pakhtunkhwa Peshawar
Energy & Power Department



No.1269-70/PEDO/PD Balakot HPP/
Dated: 30th December, 2022

To
The Deputy Team Leader,
PMC, Balakot HPP.

**Subject: - APPROVAL OF SITE SPECIFIC ENVIRONMENTAL
MANAGEMENT PLAN (SSEMP), SUBMITTED BY EPC
CONTRACTOR AND RECOMMENDED BY PMC FOR
APPROVAL OF THE EMPLOYER**

Dear Mr. Hussain,


With reference to your recommendation for approval of the EPC Contractor's SSEMP conveyed vide email dated December 12th 2022, it is stated that the subject plan has been approved by the CEO PEDO, based on your recommendations.

The above is submitted for your record and further necessary action under the provision of the EPC Contract.


Project Director, 30/12/2022
Balakot HPP, PEDO.



Copy to:

1. The Chief Engineer (Dev), PEDO, Peshawar.
2. PS to CEO, PEDO, Peshawar.
3. The Team Leader, PMC.


Project Director,
Balakot HPP, PEDO.

Page 1 of 1

**Annexure-03: Fish Ladder Waive-off Request
Correspondences**

	<p style="text-align: center;">www.fisheries.kp.gov.pk DIRECTORATE GENERAL OF FISHERIES 2-SHAMI ROAD PESHAWAR</p> <p>091-9212096 kpkfisheries@yahoo.com www.facebook.com/dgfisherieskpk https://twitter.com/fisherieskpk</p> <p>No. 1324 /DGF/ R-3 Dated 02/08/2022</p>	
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To

The Director General,
Environmental Protection Agency
Khyber Pakhtunkhwa.

Subject: - Recommendation on Condition (hh) of the Environmental Approval of Balakot HPP (300MW).

With reference to the joint meeting of Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA), Fisheries department, Pakhtunkhwa Energy Development Organization (PEDO) and Project Management Consultant (PMC) on the subject noted above on dated 25/8/2022 wherein the Chair (Director General KPKEPA) suggested that Fisheries Department Khyber Pakhtunkhwa to submit recommendation regarding installation of Fish ladder to enable the review committee of the aforementioned Agency to proceed further in the matter.

In this regard, as evident from the study of the EIA report, prepared by HaglerBailly Pakistan in 2017-19 and available on the ADB Website, various aspects of Fish ladder and its efficiency was extensively studied with respect to fish fauna of the Kunhar River, their migration pattern and height of the proposed dam. The report justifications for non-providence of Fish ladder are reproduced from the EIA report as hereunder.

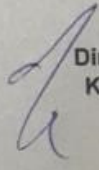
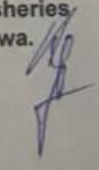
1. In the approved EIA report, it is envisaged that the project impact on the Kunhar River fish fauna will be offset through array of measures proposed in the Biodiversity Action Plan (BAP), to be implemented in the 45 kilometer stretch of the River (referred in the EIA report as Area of Management).
2. On Page No.6-32 of Volume A "Main Report" of the EIA report, the construction of Fish ladder in Balakot HPP (300MW) has technically been found unfeasible option due to the reason that there exists no Fish ladder in the upstream SukkiKinari HPP (870 MW) and the downstream Patrind HPP (150MW), therefore, provision of such structure in the Balakot HPP (300MW) would be of no avail to the long distance migratory fish of the Kunhar River.

In view of the foregoing, this department is principally agreed with the provisions and recommendations of the EIA report, nevertheless, the project impacts on aquatic fauna will be mitigated and offset through various proposed measures including but not limited to:

- construction of Fish hatchery at Naran where captive fish breeding activities will be under taken for stocking fish in the Kunhar River at selected locations;
- proposed construction of Fish Conservation center at Balakot city;
- implementation of protections measures through watch and ward arrangements, to be financed by the Project under BAP in the Area of Management in the Kunhar River basin; and

- the Project contributions towards establishment of Institute of Research on River Ecology (IRRE) and Watershed Management Organization (WMO) as envisaged in the EIA report.
- In order to establish a sustainable fish population in affected water bodies, Fisheries Department will carry out Fish replenishment activities through stocking of fish seed. The proponent is required to allocate an ample amount annually and put at the disposal of this department for this purpose.

Above submitted for your appropriate action please.

 **Director General Fisheries,
Khyber Pakhtunkhwa.
Peshawar** 



Environmental Protection Agency
Forestry, Environment & Wildlife Department
Govt. of Khyber Pakhtunkhwa

No. EPA/EIA/HPP/300MW/Balakot/Manshra/21/550-51

Dated 13-12-2022



To

✓ The Project Director,
Balakot HPP, PEDO, Peshawar.
Contact No. 091-9217463

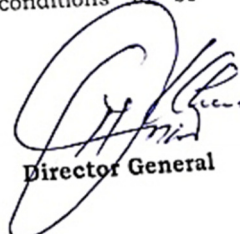
SUBJECT: **MINUTES OF THE MEETING ON CONDITION (hh) OF THE ENVIRONMENTAL APPROVAL OF 300 MW BALAKOT HYDRO POWER PROJECT**

Kindly refer to your letter No. 419-24/PEDO/PD/Balakot-HPP, dated 26/05/2022, wherein it was requested to waive off the condition no. "hh" regarding the construction of fish ladder from the constructional approval. The same was followed by consultative meetings with PEDO and fisheries department held on 29-07-2022 and 25-08-2022, wherein the main stakeholder, the fisheries department agreed upon the PEDO request regarding waiving off the mentioned condition of the constructional approval subject to implementation of certain mitigation measures.

In continuation of the same, the case was placed before the review committee on 07-11-2022, wherein the forum decided to waive off the condition "hh" of the constructional approval subject to incorporation/addition of the following points in the constructional approval:

1. PEDO shall revise the role of EPA in BAP as monitoring of river bed mining and pollution abatement is the mandate of EPA. Reasonable funds shall be allocated under BAP for this reason which may be transferred to the Environmental Improvement Fund (EIF) or the Agency may be well equipped for this purpose.
2. Fish hatcheries shall be established on the same river for protection of the fish species habituated in the river. The same shall be executed in consultation with concerned Fisheries Department.
3. The additional mitigation measures suggested by Fisheries Department shall be implemented.

Hence, your request for waiving off the condition "hh" has been accepted with the above-mentioned additions. You are further directed to submit a bond/undertaking of the above-mentioned conditions to be implemented accordingly, please.


Director General

Copy forwarded for information and necessary action to the:

1. Director General, Fisheries Department, 02- Shami Road, Peshawar.

D:\EIA Section 2011\Sectors\Hydro Power Projects\300MW Balakot HPP District Manshra

3rd Floor, SDU Building, Khyber Road, Peshawar Cantt
Telephone: 92 (91) 9210263, Fax: 92 (91) 9210280

Annexure-04: Environmental Approval for Crush Plant



EPA NORTHERN DIRECTORATE, ABBOTTABAD,
Forestry, Environment & Wildlife Department
Govt. of Khyber Pakhtunkhwa

No.EPA/ND/ATD/ 483

Dated: 26th May, 2022



To

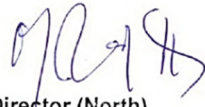
✓ Mr. Ghulam Rasool (Owner)

Ghulam Rasool construction company

GRC Site camp Thobi village Kiwai Tehsil Balakot Disarict Mansehra

Subject: PLANT DESIGN PROCUREMENT AND CONSTRUCTION OF BALAKOT HYDROPOWER PROJECT SUBMISSION OF LAYOUT PALN AND X-SECTIONS OF TEMPORARY SITE CAMP FOR BALAKOT HYDRO POWER PROJECT.

Reference to your application No GRC.JV/BKHPP/EPA/0001 dated 25/01/2022 on the subject cited above and to state that Environmental approval for Batching plant is not mandatory under Khyber Pakhtunkhwa Environmental Assessment Rules,2021 and IEE/EIA Regulation-2000, as the subject project is not included in any category of Schedule-II,III & IV of Khyber Pakhtunkhwa Environmental Assessment Rules,2021.


Director (North)

House No.CB-1118/1, Ghost Market Supply Abbottabad. Phone No. 0992-9310472



EPA NORTHERN DIRECTORATE, ABBOTTABAD,
Forestry, Environment & Wildlife Department
Govt. of Khyber Pakhtunkhwa



No. EPA/ND/ATD/CP/GRC/BIHP/ 686
Dated: 1st August, 2022

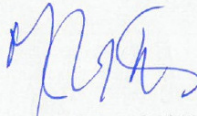
To

✓ Mr. Ghulam Rasool & Company, Village Thobi,
Kiwai, Tehsil Balakot, District Mansehra.

Subject: SUBMISSION OF IEE REPORT FOR THE INSTALLATION OF
CRUSH PLANT AT GRC THOBI CAMP LOCATION (BALAKOT
HYDROPOWER PROJECT)

I am directed to refer to the subject cited above and to enclose herewith Environmental Approval/decision note on IEE Report of GRC Crush Plant at Village Thobi, Kiwai, Tehsil Balakot, District Mansehra for your information and further implementation.

Moreover, schedule X must be submitted to this Agency within a month on stamp paper as an undertaking for the compliance of term and condition as mentioned in the Environmental Approval as well as mitigation measure proposed in the IEE report. (Copy enclosed).


DIRECTOR (NORTH)

House No. CB-1118/1, Goshl Market, Supply, Abbottabad. Phone No. 0992-9310472



**EPA NORTHERN DIRECTORATE, ABBOTTABAD,
Forestry, Environment & Wildlife Department**
Govt. of Khyber Pakhtunkhwa

No.EPA/ND/ATD/IEE/CP/GRC/ 686

Dated: 1st August, 2022



SCHEDULE-VIII

Decision on IEE

1. **Name, address of proponent:** Mr. Ghulam Rasool & Company, Village Thobi, Kiwai, Tehsil Balakot, Dsitric Mansehra.
2. **Description of project:** The proposed crush plant namely GRC Crush Plant is proposed to be installed at Village Thobi, Kiwai, Tehsil Balakot, Dsitric Mansehra. Total Capacity of the project is 50 Tons/hour. A 3500 KW generator will be installed to operate the proposed crush plant. 400 KVA transformers will be installed to fulfill the need of energy. About 15 labor and Technicians will work during construction phase, whereas 20 Staff will work for the operation of the project.
3. **Location of the project:** Village Thobi Kiwai, Tehsil Balakot, District Mansehra.
(GPS N: 34.636349, E: 73.428441)
4. **Date of filling of IEE:** 19/01/2022
EPA, Northern Directorate (Dairy No.513)
5. After careful review of IEE report and field visit report carried out by official of this Agency on 03-03-2022, the Environmental Protection Agency, Northern Directorate, Abbottabad, Govt. of Khyber Pakhtunkhwa has decided to accord approval of the Initial Environmental Examination of **GRC Crush Plant at Village Thobi Kiwai, Tehsil Balakot, District Mansehra**, of Khyber Pakhtunkhwa in line with the Khyber Pakhtunkhwa Environmental Assessment Rules 2021 subject to the following terms & conditions:

House No.CB-1118/1, Gosht Market, Supply, Abbottabad. Phone No. 0992-9310472 ~ 1 ~



**EPA NORTHERN DIRECTORATE, ABBOTTABAD,
Forestry, Environment & Wildlife Department
Govt. of Khyber Pakhtunkhwa**

No. EPA/ND/ATD/IEE/CP/GRC/ 686

Dated: 1st August, 2022



- The proponent will adopt all precautionary and mitigation measures identified in IEE report as well as any unanticipated impacts during the construction and operation phase of project.
- The proposed crush plant must be constructed as per the Rule-6 of Khyber Pakhtunkhwa Powers Crushers (Installation, Operation and Registration) 2020".
- Employment should be provided to local people particularly for unskilled jobs.
- Carry sprays twice a day i.e 9:00 AM and 3:00 PM on non-metal roads during construction and operation phase in order to minimize dust during delivery.
- The proponent should cover the delivery vehicles properly.
- Health & Safety equipments (mask, helmet, glasses, gloves, shoes, air plugs, etc) should be provided to the workers.
- The proponent shall plant Chinar & Walnut plants in available space around the crush plant.
- Water spray should be carried out on material through a water pump connected with pipelines and water spraying nozzles.
- The proponent will install Air/Dust Control System as per SOPs of stone crush plant: Specification and drawing of Dust/Air Pollution Control System is given as below):

M. Khan



House No. CB-1118/1, Gosht Market, Supply, Abbottabad. Phone No. 0992-9310472

~ 2 ~



**EPA NORTHERN DIRECTORATE, ABBOTTABAD,
Forestry, Environment & Wildlife Department**
Govt. of Khyber Pakhtunkhwa



No. EPA/ND/ATD/IEE/CP/GRC/ 686

Dated: 1st August, 2022

- (k) The proponent should submit undertaking on stamp paper regarding protection of rainy water stream/Nullah and avoid throwing/dumping of waste material (Khaka) into the stream.
6. The proponent shall be liable for replacement/upgradation of the Air/Dust Pollution Control System, if the above Air/Dust Pollution Control System failed to bring the dust emission within National Environmental Quality Standards (NEQS).
7. Environmental Management Plan must be strictly followed.
8. The proponent shall be liable for correctness and validity of the information supplied by the environmental consultant.
9. The proponent shall be liable for compliance of section 15 (1), 18, 19 and 20 of Khyber Pakhtunkhwa Environmental Assessment Rules 2021, regarding approval, written confirmation of compliance, entry, inspection and monitoring.
10. This approval is accorded only for the "CONSTRUCTION PHASE" of project.
11. The proponent will obtain approval for "OPERATION OF THE PROJECT" in accordance with the section 15 (1) and 20 of the Khyber Pakhtunkhwa Environmental Assessment Rules 2021.
12. Any change in the approved project shall be communicated to EPA, Northern Directorate, Abbottabad, Khyber Pakhtunkhwa and shall be commenced after obtaining the approval.
13. This approval does not absolve the proponent of the duty to obtain any other approval or clearance that may be required under any law in force.
14. There is no legal case pending in the courts against the project.
16. In exercise of the power under Section 14 of the Khyber Pakhtunkhwa Environmental Protection Act, 2014 and The Delegation of Powers Vide letter No. EPA/050/01/93/Peshawar, dated the May 19, 2017, the undersigned is pleased to approve the IEE Report

House No. CB-1118/1, Gosht Market, Supply, Abbottabad. Phone No. 0992-9310472 ~ 3 ~



**EPA NORTHERN DIRECTORATE, ABBOTTABAD,
Forestry, Environment & Wildlife Department**
Govt. of Khyber Pakhtunkhwa



No. EPA/ND/ATD/IEE/CP/GRC/ 686

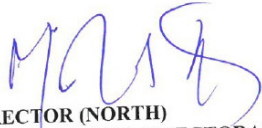
Dated: 1st August, 2022

GRC Crush Plant at Village Thobi Kiwai, Tehsil Balakot, District Mansehra, with the above mentioned terms and conditions.

17. This approval shall be treated as null and void if all or any of the conditions mentioned above is/are not complied with.

Dated: Abbottabad 1st August, 2022

Tracking/ File. No. EPA/ND/IEE/CP/GRC/BHHP/ 686


DIRECTOR (NORTH)
EPA, NORTHERN DIRECTORATE
CB-1118/1, GOSHT MARKET, SUPPLY,
ABBOTTABAD.

CC:

1. Director General, Environmental Protection Agency, Peshawar.
2. Deputy Commissioner, District Mansehra

House No. CB-1118/1, Gosht Market, Supply, Abbottabad. Phone No. 0992-9310472 ~ 4 ~

Annexure-05: Environmental Approval to the EIA Report



**Environmental Protection Agency
Forestry, Environment & Wildlife Department
Govt. of Khyber Pakhtunkhwa**

No. EPA/EIA/HPP/300MW/Balakot/21/980

Dated 06 / 07 / 2021



To,

The Project Director,
Balakot HPP, PEDO, Peshawar.
Contact No. 091-9217463

**SUBJECT: DECISION ON ENVIRONMENTAL IMPACT ASSESSMENT
(EIA) REPORT OF 300MW BALAKOT HYDRO POWER
PROJECT FOR ENVIRONMENTAL APPROVAL**

Kindly refer to the subject cited above and to enclose herewith Environmental Approval/Decision Note (in original) on EIA Report of the subject project for your information and further implementation.

Moreover, Schedule-VII must be submitted to this Agency within a month on Stamp Paper (Copy enclosed). The same shall be submitted as an undertaking for the compliance of terms and conditions as mentioned in the Environmental Approval as well as mitigation measures proposed in the EIA Report, please.


Director General

Copy for information to the;

1. Secretary, Forestry, Environment and Wildlife Department, Govt. of Khyber Pakhtunkhwa, Peshawar.
2. Commissioner, Hazara Division, Govt. of Khyber Pakhtunkhwa.
3. Secretary, Mines & Mineral Development Department Govt. of Khyber Pakhtunkhwa.
4. Chief Conservator, Forest Department, Govt. of Khyber Pakhtunkhwa.
5. Director General, Fisheries Department, Govt. of Khyber Pakhtunkhwa.
6. *Chief Conservator*, Wildlife Department, Govt. of Khyber Pakhtunkhwa.
7. The Director North, EPA Regional Directorate, Abbottabad.

D:\EIA Section 2011\Sectors\Hydro Power Projects\300MW Balakot HPP District Mansehra

**3rd Floor, SDU Building, Khyber Road, Peshawar Cantt
Telephone: 92 (91) 9210263, Fax: 92 (91) 9210280**

SCHEDULE-VI
Decision on EIA

- 1. Name, address of proponent:** The Project Director, Balakot HPP,
PEDO, Plot No. 38-B2, PEDO House,
Phase-V, Haytabad, Peshawar.
Contact No. 091-9217463
- 2. Description of project.** M/S 300 MW Balakot Hydropower
Development Project located at 18.6km
upstream of the town of Balakot, District
Mansehra. The Dam will be a concrete
gravity dam with a maximum height of 35m
from the river bed and dam crest length of
130m. The top elevation will be 1292m
above mean sea level (amsl). The dam will
create a reservoir that will operate between
with a maximum level of 1288m and the
minimum operating water level of 1283m.
The reservoir volumes corresponding to the
maximum and minimum operating levels
are 3.6million cubic meter and 2.4 million
cubic meter, respectively. The surface area
of the reservoir will be approximately 28
hectares and it will extend 2.2 km
upstream of the dam. A headrace tunnel
extending 9.1km will divert water from the
reservoir created by the dam to the
powerhouse. The powerhouse will be
underground cavern-type powerhouse. A
1.565km long tailrace tunnel will discharge
the water back to the Kunhar River. The
total distance between the dam and the
outfall of the tailrace tunnel will be about
13.4km. The total installed capacity will be
300MW. The average annual energy
generation will be 1143 Gigawatt-hour
(GWh).
- 3. Location of project.** District Mansehra.

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GPS Coordinates:

S.No	Type	Latitude	Longitude	S.No.	Type	Latitude	Longitude
1	Weir	34.659454°	73.449015°	8	Tunnel	34.603045°	73.381508°
2	Tunnel	34.659567°	73.449193°	9	Tunnel	34.603295°	73.380966°
3	Tunnel	34.654372°	73.451447°	10	Tunnel	34.594936°	73.371572°
4	Tunnel	34.653311°	73.451488°	11	Tunnel	34.594429°	73.370584°
5	Tunnel	34.652587°	73.451374°	12	Tunnel	34.594230°	73.369587°
6	Tunnel	34.628207°	73.430871°	13	Tunnel	34.594324°	73.368471°
7	Tunnel	34.627600°	73.429977°	14	Tunnel	34.594638°	73.367308°
-	-	-	-	15	Powerhouse	34.604418°	73.380401°



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4. **Date of filing of EIA.** 03/09/2019 (Ref: EPA Diary No.798)
5. After careful review, the Environmental Protection Agency, Govt. of Khyber Pakhtunkhwa has decided to accord Construction Environmental Approval of the Environmental Impact Assessment (EIA) Report of **"300MW Balakot Hydro Power Project, District Mansehra"** in line with the Khyber Pakhtunkhwa Environmental Protection Act, 2014 and the Review of IEE/EIA Regulations, 2000, subject to the following Terms & Conditions;
 - a) The proponent shall adopt all precautionary and mitigation measures recommended in the EIA Report as well as replies of the proponent submitted to this Agency and any un-anticipated impacts arising during the Construction and Operation phase of the project.
 - b) Arrangement for compensation to the affectees, in case of loss of land, Crops, property, Schools, Water Springs, Water Supply Schemes, Hotels and Masjids will be finalized before the start of construction. Any money

involved in compensation will be deposited with District Govt./Revenue Department for disbursement among the affectees. A committee shall be constituted ensuring fair representation of locals with properly documented grievance procedure. As far as possible recommendations of a committee comprising of land/house owners and tenants shall be taken into consideration during finalizing the compensation package. All conflicting issues regarding compensation, etc. should be settled before executing/commencing of the project activities and a certificate in this regard should be submitted to EPA;

- c) The Land Acquisition & Resettlement Plan (LARP) shall be properly implemented before execution of construction work. The proponent shall submit verified land acquisition and compensation documents prior commencement of construction activities. A certificate of payment to the locals shall be generated from the concerned Revenue Department and must be submitted to this Agency before commencement of the construction activity;
- d) In light of the LARP, in addition to other compensation measures, at least one male & one female from every affected household will be eligible for employment/labor or training or loan based on their willingness, based on the project requirement;
- e) The existing natural water springs, the water supply scheme/spring affected from the Project shall be properly compensated and alternate water supply for the affectees shall be ensured, Detail of the same shall shared with the Agency before commencement of the construction activity;
- f) The spring channels disturbed during tunnel excavation shall be connected to pipes and shall be used as source of drinking water for the locals of the area;
- g) Detail of steps/mitigation measures shall be taken to mitigate impacts of the project on River Kunhar/natural water streams;
- h) The Right of Way (RoW) of the River Kunhar shall be protected. Moreover, the River shall be also protected from all type of pollution from project related activities;
- i) The natural rainwater water sheds RoW shall not be disturbed;
- j) The contaminated waste water of the tunnels shall be retained in confined pits of proper size ensuring proper treatment, complying NEQS parameters before final disposal;
- k) The existing RoW of the nearby villages shall not be affected or alternate routes shall be provided to the villagers;
- l) The affected existing Houses, Bridges, BHU, School, Dispensaries, Electric Poles, Mosque and other structures shall be relocated &

Jmll 06/07/2021

- compensated to other appropriate area before start of construction work;
- m) A Committee shall be constituted under the supervision of District Administration comprising representatives of the affected villages i.e. Bela Balsehri, Nihan, Dhab, Rehtar, Sangar & Kappi Gali. The Committee will look into issues arising from the Project;
 - n) In order to avoid the traffic congestion issues, the management of the project shall formulate Traffic Management Plan and be submitted to this Agency before commencement of Construction activity;
 - o) The existing Graveyard shall be properly protected and not be disturbed by the project activity, however, unless allowed by elders of the area/local committee by mutual agreement;
 - p) Proper mitigation plan shall be formulated and implemented to avoid soil erosion and land sliding before commencement of Construction activity;
 - q) As per Section Officer (Tech) letter No. SO (Tech)/FE&WD/V-427/2021/PC dated 06/07/2021, after report submitted by Chief Conservator of Forest-II, there is no chance of disturbance to any vegetation & soil cover of the land and issuance of NOC from Forest Department is irrelevant. However, the management shall make no deviation in the project design and designated forest/trees shall not be disturbed;
 - r) Minimum environmental flow of 6.1 Cumecs, with 10% extra provision, if required, shall be maintained in the downstream. In light of the submitted EIA Report, the project management shall made maximum efforts to operate the dam on preferable option of base load high protection operation mode;
 - s) The muck/debris generated from the project shall be properly quantified, dumping sites for the same shall be properly identified & selected and this Agency shall be informed prior commencement of the construction activities. The proponent shall ensure to avoid dumping of debris into down slope or near River Kunhar Right of Way (RoW) or water bodies. The same shall be stabilized by proper plantation, bio engineering and engineering techniques. Retention walls of proper size shall be erected along the muck disposal material/site;
 - t) The biodiversity action plan shall be implemented. Moreover, Wildlife, Forest Department and EPA shall be consulted in improvement of the Biodiversity Action Plan to mitigate the impact of the project on aquatic life, fauna, flora and Environment;
 - u) Safety zone/adequate engineering measures should be provided to overcome fears of the residents regarding project activities to their houses;

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- v) The construction/installations shall be carried out keeping in view seismicity of the project area & ensuring implementation of updated building by-laws/codes;
- w) Proper Flood Management Plan shall be identified for the project site & site specific mitigation measures shall be implemented during floods;
- x) Primary baseline data comprising analysis reports of surface water (River Kunhar/water bodies), Soil, ambient air, noise etc of the project area & shall be carried out from KP-EPA certified Lab before commencement of the construction activity. Moreover, the analysis reports shall be submitted to EPA on quarterly basis;
- y) A sedimentation load study shall be carried out along with mitigation measures for the control of sedimentation from upstream of the reservoir;
- z) Road/Highway Submerged/damaged due to project activity should be reconstructed/repared/rehabilitated to another suitable place in consultation with concerned Govt. Department;
- aa) The effluents generated during tunnel blasting/excavating activities shall not be disposed to any surface water before NEQS compliance. The effluents generated shall be treated in a properly design facility;
- bb) In case, the blasting is inevitable, the controlled techniques, in accordance with Pakistan Explosive Act should be adopted in sliding and perspective sliding prone areas;
- cc) The camp site, asphalt plants, crush plants & batching plants shall be at least 500 m away from residential area/villages;
- dd) The proponent shall ensure the strict and efficient health and safety measures for the protection of workers and passersby backed by a comprehensive emergency response plan;
- ee) A comprehensive CSR policy shall be formulated keeping in view, the demands/needs of the locals and quantum of the project activity. The detail of the same shall be shared with this Agency before commencement of the construction activity;
- ff) Non-technical jobs shall be provided to local community/villages. Employment record for all positions shall be provided to EPA-Khyber Pakhtunkhwa and priority should also be given to locals in technical jobs. Regular trainings shall be arranged for the locals regarding acquiring knowledge of technical jobs;
- gg) Separate approval shall be obtained for establishment of Crushing Plant, Town/Colony, Asphalt plant, etc. under Khyber Pakhtunkhwa Environmental Protection Act, 2014 & the prevailing Rules/Regulations in-vogue; For temporary colony, proper treatment plant shall be constructed for municipal effluents treatment and bringing within the NEQS parameters before final discharge;

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- hh) Fish ladder of proper efficiency shall be constructed for fish movement. Moreover, the conditions suggested by Fisheries Department with his letter No. 2084 dated 16/06/2021, shall be implemented to ensure survival of aquatic life. Furthermore, a Fish Hatchery shall be established in consultation with Fishery Department;
- ii) A comprehensive plantation plan, in consultation with Forest Department, shall be submitted to this Agency along with GPS Coordinates of the plantation sites. Moreover, a nursery shall be established in consultation with Forest Deptt. & a forester along with other supporting staff shall be hired for the same;
- jj) Proper mitigation measures shall be adopted for control of land sliding, soil erosion and sedimentation to the nearby river/water channel;
- kk) An Environmentalist along with team shall be hired for the environmental issues redressel.
- ll) Copy of approval from Mines & Mineral Department shall be shared with this Agency prior commencement of construction activities.
- mm) The cultural values & social norms of the area shall be followed strictly;
- nn) The proponent shall adopt the mitigations measures as mentioned in the Wildlife Department letter No.4233/WI-M dated 24/06/2021 for fauna protection;
- oo) Refer to Mines & Mineral Department vide letter No. 7082/MDW/MA/Misc (01)/2021 dated 30/06/2021, clearance shall be taken from Mines& Mineral Department before commencement of construction activity;
- pp) This Agency shall suggest any additional mitigation measures/updated technology for the control of Environmental Pollution/degradation at any stage (construction & operational phase) of the project;
- qq) No extension would be permitted in the future in the existing hydropower project without prior approval of the EPA/Govt. of Khyber Pakhtunkhwa;
- rr) The proponent shall provide the copy of this approval and EIA Report to the contractor for information and compliance.
6. The Proponent shall be liable for correctness and validity of the information supplied by the environmental consultant.
7. There shall be no legal case pending in the courts against the project
8. The proponent shall be liable for compliance of Regulation 13, 14, 16, 17 and 18 of the IEE/EIA Regulations, 2000, regarding approval, confirmation of compliance, entry, inspections and monitoring.
9. This approval is accorded only for the installation/construction phase of the project. The Proponent will obtain approval for operation of the hydro


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power project in accordance with the Regulation 13 (2) (b) and Regulation 18 of the IEE/EIA Regulations, 2000.

10. Any change in the approved project shall be communicated to EPA, Khyber Pakhtunkhwa and shall be commenced after obtaining the approval.
11. This approval shall be treated as null and void if all or any of the conditions mentioned above is/are not complied with.
12. This approval does not absolve the proponent of the duty to obtain any other approval or clearance that may be required under any law in force.
13. The quarterly progress/compliance report of the above conditions shall be submitted to EPA.
14. In exercise of the power under Section-13 of the Khyber Pakhtunkhwa Environmental Protection Act, 2014, the undersigned is pleased to approve the EIA Report of "**300MW Balakot Hydro Power Project, District Mansehra**" for construction phase of the project with above mentioned terms and conditions.

Dated: Peshawar 08/07 /2021

Tracking/File.No. EPA/EIA/HPP/300MW-Balakot/21/980


**DIRECTOR GENERAL,
EPA, Khyber Pakhtunkhwa,
3rd Floor, SDU Building,
Khyber Road, Peshawar Cantt.**

**Annexure-06: Instrumental Environmental Monitoring
Results**

Ambient Air Monitoring Results-Particulate Matters



AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Dam Site (Paras Valley)
Monitoring Date:	07-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.660470, 73.455497		

Sr. No	Time Hours of Monitoring	Parameters		Results (Average 24 Hrs)	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
		Units			
		(µg/m ³)	(µg/m ³)		
1.	09:00 A.M	19.63	70.97	13.36 (µg/m ³)	63.03 (µg/m ³)
2.	10:00 A.M	17.36	71.84		
3.	11:00 A.M	15.44	70.29		
4.	12:00 P.M	14.69	73.58		
5.	01:00 P.M	14.72	72.03		
6.	02:00 P.M	15.08	71.32		
7.	03:00 P.M	15.02	68.79		
8.	04:00 P.M	14.62	67.57		
9.	05:00 P.M	13.52	64.35		
10.	06:00 P.M	12.29	62.83		
11.	07:00 P.M	11.52	61.1		
12.	08:00 P.M	11.92	62.58		
13.	09:00 P.M	12.42	59.86		
14.	10:00 P.M	12.79	59.13		
15.	11:00 P.M	10.53	58.61		
16.	12:00 A.M	12.41	55.88		
17.	01:00 A.M	11.55	55.35		
18.	02:00 A.M	13.12	56.64		
19.	03:00 A.M	12.42	57.07		
20.	04:00 A.M	12	55.38		
21.	05:00 A.M	11.59	56.23		
22.	06:00 A.M	10.72	58.51		
23.	07:00 A.M	12.4	59.42		
24.	08:00 A.M	12.92	63.41		
NEQSAA				35(µg/m ³)	150(µg/m ³)
WHO				15 (µg/m ³)	45 (µg/m ³)

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization
 Note:

- Selected measurement units were µg/m³ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

[Signature]
 Signature of Analyst:

[Signature]
 Signature of Chief Chemist



FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

Creative House, 3rd Floor, Office # 302, Phase III Chowk, Hayatabad, Peshawar, Pakistan
 Tel: 091-5852913 Cell: +92 302 8462412 Email: inenvconsultants@yahoo.com www. iec-consultants.com www. inenvlab.com
 Environmental Protection Agency (EPA-KPK) Certified



AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-1 (Thobi)
Monitoring Date:	08-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.636125, 73.428597		

Sr. No	Time Hours of Monitoring	Parameters		Results (Average 24 Hrs)	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
		Units			
		(µg/m ³)	(µg/m ³)		
1.	09:00 A.M	22.2	65.84	15.93 (µg/m ³)	57.90 (µg/m ³)
2.	10:00 A.M	19.93	66.71		
3.	11:00 A.M	18.01	65.16		
4.	12:00 P.M	17.26	68.45		
5.	01:00 P.M	17.29	66.9		
6.	02:00 P.M	17.65	66.19		
7.	03:00 P.M	17.59	63.66		
8.	04:00 P.M	17.19	62.44		
9.	05:00 P.M	16.09	59.22		
10.	06:00 P.M	14.86	57.7		
11.	07:00 P.M	14.09	55.97		
12.	08:00 P.M	14.49	57.45		
13.	09:00 P.M	14.99	54.73		
14.	10:00 P.M	15.36	54		
15.	11:00 P.M	13.1	53.48		
16.	12:00 A.M	14.98	50.75		
17.	01:00 A.M	14.12	50.22		
18.	02:00 A.M	15.69	51.51		
19.	03:00 A.M	14.99	51.94		
20.	04:00 A.M	14.57	50.25		
21.	05:00 A.M	14.16	51.1		
22.	06:00 A.M	13.29	53.38		
23.	07:00 A.M	14.97	54.29		
24.	08:00 A.M	15.49	58.28		
NEQSAA				35(µg/m³)	150(µg/m³)
WHO				15 (µg/m³)	45 (µg/m³)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

- Selected measurement units were µg/m³ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist



FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

Creative House, 3rd Floor, Office # 302, Phase III Chowk, Hayatabad, Peshawar, Pakistan
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Environmental Protection Agency (EPA-KPK) Certified



AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-2 (Ghanool)
Monitoring Date:	09-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.619787, 73.417525		

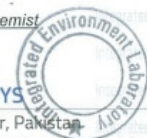
Sr. No	Time Hours of Monitoring	Parameters		Results (Average 24 Hrs)	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
		Units			
		(µg/m ³)	(µg/m ³)		
1.	09:00 A.M	21.87	76.2	15.6 (µg/m ³)	68.26 (µg/m ³)
2.	10:00 A.M	19.6	77.07		
3.	11:00 A.M	17.68	75.52		
4.	12:00 P.M	16.93	78.81		
5.	01:00 P.M	16.96	77.26		
6.	02:00 P.M	17.32	76.55		
7.	03:00 P.M	17.26	74.02		
8.	04:00 P.M	16.86	72.8		
9.	05:00 P.M	15.76	69.58		
10.	06:00 P.M	14.53	68.06		
11.	07:00 P.M	13.76	66.33		
12.	08:00 P.M	14.16	67.81		
13.	09:00 P.M	14.66	65.09		
14.	10:00 P.M	15.03	64.36		
15.	11:00 P.M	12.77	63.84		
16.	12:00 A.M	14.65	61.11		
17.	01:00 A.M	13.79	60.58		
18.	02:00 A.M	15.36	61.87		
19.	03:00 A.M	14.66	62.3		
20.	04:00 A.M	14.24	60.61		
21.	05:00 A.M	13.83	61.46		
22.	06:00 A.M	12.96	63.74		
23.	07:00 A.M	14.64	64.65		
24.	08:00 A.M	15.16	68.64		
NEQSAA				35 (µg/m ³)	150(µg/m ³)
WHO				15 (µg/m ³)	45 (µg/m ³)

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization
 Note:

- Selected measurement units were µg/m³ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

[Signature]
 Signature of Analyst:

[Signature]
 Signature of Chief Chemist



FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

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Environmental Protection Agency (EPA-KPK) Certified



AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Co., Ltd. (CGGC) Group
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-3 (Kholian)
Monitoring Date:	10-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.610253,73.389367		

Sr. No	Time Hours of Monitoring	Parameters		Results (Average 24 Hrs)	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
		Units			
		(µg/m ³)	(µg/m ³)		
1.	09:00 A.M	9.63	43.36	3.36 (µg/m ³)	35.42 (µg/m ³)
2.	10:00 A.M	7.36	44.23		
3.	11:00 A.M	5.44	42.68		
4.	12:00 P.M	4.69	45.97		
5.	01:00 P.M	4.72	44.42		
6.	02:00 P.M	5.08	43.71		
7.	03:00 P.M	5.02	41.18		
8.	04:00 P.M	4.62	39.96		
9.	05:00 P.M	3.52	36.74		
10.	06:00 P.M	2.29	35.22		
11.	07:00 P.M	1.52	33.49		
12.	08:00 P.M	1.92	34.97		
13.	09:00 P.M	2.42	32.25		
14.	10:00 P.M	2.79	31.52		
15.	11:00 P.M	0.53	31		
16.	12:00 A.M	2.41	28.27		
17.	01:00 A.M	1.55	27.74		
18.	02:00 A.M	3.12	29.03		
19.	03:00 A.M	2.42	29.46		
20.	04:00 A.M	2	27.77		
21.	05:00 A.M	1.59	28.62		
22.	06:00 A.M	0.72	30.9		
23.	07:00 A.M	2.4	31.81		
24.	08:00 A.M	2.92	35.8		
NEQSAA				35 (µg/m ³)	150(µg/m ³)
WHO				15 (µg/m ³)	45 (µg/m ³)

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization
 Note:

- Selected measurement units were µg/m³ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist



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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Powerhouse (Barkot)
Monitoring Date:	11-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.601812, 73.377145		

Sr. No	Time Hours of Monitoring	Parameters		Results (Average 24 Hrs)	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
		Units			
		(µg/m ³)	(µg/m ³)		
1.	09:00 A.M	15.61	53.3	9.34 (µg/m ³)	45.36 (µg/m ³)
2.	10:00 A.M	13.34	54.17		
3.	11:00 A.M	11.42	52.62		
4.	12:00 P.M	10.67	55.91		
5.	01:00 P.M	10.7	54.36		
6.	02:00 P.M	11.06	53.65		
7.	03:00 P.M	11	51.12		
8.	04:00 P.M	10.6	49.9		
9.	05:00 P.M	9.5	46.68		
10.	06:00 P.M	8.27	45.16		
11.	07:00 P.M	7.5	43.43		
12.	08:00 P.M	7.9	44.91		
13.	09:00 P.M	8.4	42.19		
14.	10:00 P.M	8.77	41.46		
15.	11:00 P.M	6.51	40.94		
16.	12:00 A.M	8.39	38.21		
17.	01:00 A.M	7.53	37.68		
18.	02:00 A.M	9.1	38.97		
19.	03:00 A.M	8.4	39.4		
20.	04:00 A.M	7.98	37.71		
21.	05:00 A.M	7.57	38.56		
22.	06:00 A.M	6.7	40.84		
23.	07:00 A.M	8.38	41.75		
24.	08:00 A.M	8.9	45.74		
NEQSAA				35 (µg/m ³)	150(µg/m ³)
WHO				15 (µg/m ³)	45 (µg/m ³)

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization
 Note:

- Selected measurement units were µg/m³ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist



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Integrated Environment Laboratory



AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Tailrace (Barkot) Upstream
Monitoring Date:	12-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.596088, 73.374512		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
		Units			
	Hours of Monitoring	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)		
1.	09:00 A.M	11.34	32.67	5.07 ($\mu\text{g}/\text{m}^3$)	24.73 ($\mu\text{g}/\text{m}^3$)
2.	10:00 A.M	9.07	33.54		
3.	11:00 A.M	7.15	31.99		
4.	12:00 P.M	6.4	35.28		
5.	01:00 P.M	6.43	33.73		
6.	02:00 P.M	6.79	33.02		
7.	03:00 P.M	6.73	30.49		
8.	04:00 P.M	6.33	29.27		
9.	05:00 P.M	5.23	26.05		
10.	06:00 P.M	4	24.53		
11.	07:00 P.M	3.23	22.8		
12.	08:00 P.M	3.63	24.28		
13.	09:00 P.M	4.13	21.56		
14.	10:00 P.M	4.5	20.83		
15.	11:00 P.M	2.24	20.31		
16.	12:00 A.M	4.12	17.58		
17.	01:00 A.M	3.26	17.05		
18.	02:00 A.M	4.83	18.34		
19.	03:00 A.M	4.13	18.77		
20.	04:00 A.M	3.71	17.08		
21.	05:00 A.M	3.3	17.93		
22.	06:00 A.M	2.43	20.21		
23.	07:00 A.M	4.11	21.12		
24.	08:00 A.M	4.63	25.11		
NEQSAA				35 ($\mu\text{g}/\text{m}^3$)	150 ($\mu\text{g}/\text{m}^3$)
WHO				15 ($\mu\text{g}/\text{m}^3$)	45 ($\mu\text{g}/\text{m}^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

Note:

- Selected measurement units were $\mu\text{g}/\text{m}^3$ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist



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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	GRC Camp Office (Sanghar)
Monitoring Date:	13-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.584562, 73.373878		

Sr. No	Time Hours of Monitoring	Parameters		Results (Average 24 Hrs)	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
		Units			
		($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)		
1.	09:00 A.M	22.37	66.97	16.1 ($\mu\text{g}/\text{m}^3$)	59.03 ($\mu\text{g}/\text{m}^3$)
2.	10:00 A.M	20.1	67.84		
3.	11:00 A.M	18.18	66.29		
4.	12:00 P.M	17.43	69.58		
5.	01:00 P.M	17.46	68.03		
6.	02:00 P.M	17.82	67.32		
7.	03:00 P.M	17.76	64.79		
8.	04:00 P.M	17.36	63.57		
9.	05:00 P.M	16.26	60.35		
10.	06:00 P.M	15.03	58.83		
11.	07:00 P.M	14.26	57.1		
12.	08:00 P.M	14.66	58.58		
13.	09:00 P.M	15.16	55.86		
14.	10:00 P.M	15.53	55.13		
15.	11:00 P.M	13.27	54.61		
16.	12:00 A.M	15.15	51.88		
17.	01:00 A.M	14.29	51.35		
18.	02:00 A.M	15.86	52.64		
19.	03:00 A.M	15.16	53.07		
20.	04:00 A.M	14.74	51.38		
21.	05:00 A.M	14.33	52.23		
22.	06:00 A.M	13.46	54.51		
23.	07:00 A.M	15.14	55.42		
24.	08:00 A.M	15.66	59.41		
NEQSAA				35 ($\mu\text{g}/\text{m}^3$)	150 ($\mu\text{g}/\text{m}^3$)
WHO				15 ($\mu\text{g}/\text{m}^3$)	45 ($\mu\text{g}/\text{m}^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air

WHO: World Health Organization

Note:

- Selected measurement units were $\mu\text{g}/\text{m}^3$ otherwise stated.
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Signature of Analyst:

Signature of Chief Chemist

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Colony Area (Sanghar)
Monitoring Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.587775, 73.366225		

Sr. No	Time Hours of Monitoring	Parameters		Results (Average 24 Hrs)	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
		Units			
		($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)		
1.	09:00 A.M	10.85	39.39	5.91 ($\mu\text{g}/\text{m}^3$)	31.45 ($\mu\text{g}/\text{m}^3$)
2.	10:00 A.M	9.97	40.26		
3.	11:00 A.M	8.05	38.71		
4.	12:00 P.M	7.3	42		
5.	01:00 P.M	7.33	40.45		
6.	02:00 P.M	7.69	39.74		
7.	03:00 P.M	7.63	37.21		
8.	04:00 P.M	7.23	35.99		
9.	05:00 P.M	6.13	32.77		
10.	06:00 P.M	4.9	31.25		
11.	07:00 P.M	4.13	29.52		
12.	08:00 P.M	4.53	31		
13.	09:00 P.M	5.03	28.28		
14.	10:00 P.M	5.4	27.55		
15.	11:00 P.M	3.14	27.03		
16.	12:00 A.M	5.02	24.3		
17.	01:00 A.M	4.16	23.77		
18.	02:00 A.M	5.73	25.06		
19.	03:00 A.M	5.03	25.49		
20.	04:00 A.M	4.61	23.8		
21.	05:00 A.M	4.2	24.65		
22.	06:00 A.M	3.33	26.93		
23.	07:00 A.M	5.01	27.84		
24.	08:00 A.M	5.53	31.83		
NEQSAA				35 ($\mu\text{g}/\text{m}^3$)	150 ($\mu\text{g}/\text{m}^3$)
WHO				15 ($\mu\text{g}/\text{m}^3$)	45 ($\mu\text{g}/\text{m}^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air

WHO: World Health Organization

Note:

- Selected measurement units were $\mu\text{g}/\text{m}^3$ otherwise stated.
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Signature of Analyst:

Signature of Chief Chemist

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Ambient Gaseous Monitoring Results



AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Dam Site (Paras Valley)
Monitoring Date:	07-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air Gases	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.660470, 73.455497		

Sr. No	Time	Parameters			
		CO	NO	NO ₂	SO ₂
		Units			
	Hours	(mg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
1.	09:00 A.M	0.18	5.31	7.76	5.95
2.	10:00 A.M	0.23	6.16	7.94	5.82
3.	11:00 A.M	0.15	6.23	8.21	5.09
4.	12:00 P.M	0.26	6.98	7.12	5.22
5.	01:00 P.M	0.29	6.38	6.99	5.37
6.	02:00 P.M	0.18	6.56	7.1	4.45
7.	03:00 P.M	0.16	7.1	7.46	5.07
8.	04:00 P.M	0.11	6.24	7.61	6.26
9.	05:00 P.M	0.07	5.4	7.13	4.09
10.	06:00 P.M	0.13	5.17	7.25	4.58
11.	07:00 P.M	0.09	5.95	7.83	6.01
12.	08:00 P.M	0.05	6.28	6.94	5.68
13.	09:00 P.M	0.01	7.09	7.37	5.25
14.	10:00 P.M	0.06	5.37	7.22	4.91
15.	11:00 P.M	0.04	4.94	8.05	5.76
16.	12:00 A.M	0.11	6.12	7.3	6.04
17.	01:00 A.M	0.08	6.19	6.84	4.97
18.	02:00 A.M	0.06	5.44	7	4.78
19.	03:00 A.M	0.07	7.23	6.88	4.56
20.	04:00 A.M	0.08	6.44	6.51	4.87
21.	05:00 A.M	0.13	6.2	5.94	5.24
22.	06:00 A.M	0.11	5.73	6.8	5.4
23.	07:00 A.M	0.13	6.48	7.09	5.69
24.	08:00 A.M	0.16	5.72	7.19	5.56
Average Concentration		0.12	6.11	7.23	5.27
NEQSAA		05	40	80	120
WHO		04	---	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

Note:

- Selected measurement units were µg/m³ & mg/m³ otherwise stated.
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[Signature]
 Signature of Analyst:

[Signature]
 Signature of Chief Chemist

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-1 (Thobi)
Monitoring Date:	08-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air Gases	Monitoring Instrument:	AOOMS 65, Serial # 1310
GPS Coordinates:	34.636125, 73.428597		

Sr. No	Time	Parameters			
		CO	NO	NO ₂	SO ₂
		Units			
	Hours	(mg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
1.	09:00 A.M	0.2	4.29	6.09	6.83
2.	10:00 A.M	0.25	5.14	6.27	6.7
3.	11:00 A.M	0.17	5.21	6.54	5.97
4.	12:00 P.M	0.28	5.96	5.45	6.1
5.	01:00 P.M	0.31	5.36	5.32	6.25
6.	02:00 P.M	0.2	5.54	5.43	5.33
7.	03:00 P.M	0.18	6.08	5.79	5.95
8.	04:00 P.M	0.13	5.22	5.94	7.14
9.	05:00 P.M	0.09	4.38	5.46	4.97
10.	06:00 P.M	0.15	4.15	5.58	5.46
11.	07:00 P.M	0.01	4.93	6.16	6.89
12.	08:00 P.M	0.07	5.26	5.27	6.56
13.	09:00 P.M	0.03	6.07	5.7	6.13
14.	10:00 P.M	0.08	4.35	5.55	5.79
15.	11:00 P.M	0.01	3.92	6.38	6.64
16.	12:00 A.M	0.13	5.1	5.63	6.92
17.	01:00 A.M	0.1	5.17	5.17	5.85
18.	02:00 A.M	0.11	4.42	5.33	5.66
19.	03:00 A.M	0.09	6.21	5.21	5.44
20.	04:00 A.M	0.1	5.42	4.84	5.75
21.	05:00 A.M	0.15	5.18	4.27	6.12
22.	06:00 A.M	0.13	4.71	5.13	6.28
23.	07:00 A.M	0.15	5.46	5.42	6.57
24.	08:00 A.M	0.18	4.7	5.52	6.44
Average Concentration		0.13	5.09	5.56	6.15
NEQSAA		05	40	80	120
WHO		04	--	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

Note:

- Selected measurement units were µg/m³ & mg/m³ otherwise stated.
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[Signature]
 Signature of Analyst

[Signature]
 Signature of Chief Chemist



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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-2 (Ghanool)
Monitoring Date:	09-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air Gases	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.619787, 73.417525		

Sr. No	Time	Parameters			
		CO	NO	NO ₂	SO ₂
		Units			
Hours	(mg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)	
1.	09:00 A.M	0.13	3.41	4.76	5.72
2.	10:00 A.M	0.18	4.26	4.94	5.59
3.	11:00 A.M	0.1	4.33	5.21	4.86
4.	12:00 P.M	0.21	5.08	4.12	4.99
5.	01:00 P.M	0.24	4.48	3.99	5.14
6.	02:00 P.M	0.13	4.66	4.1	4.22
7.	03:00 P.M	0.11	5.2	4.46	4.84
8.	04:00 P.M	0.06	4.34	4.61	6.03
9.	05:00 P.M	0.02	3.5	4.13	3.86
10.	06:00 P.M	0.08	3.27	4.25	4.35
11.	07:00 P.M	0.06	4.05	4.83	5.78
12.	08:00 P.M	0.04	4.38	3.94	5.45
13.	09:00 P.M	0.05	5.19	4.37	5.02
14.	10:00 P.M	0.03	3.47	4.22	4.68
15.	11:00 P.M	0.04	3.04	5.05	5.53
16.	12:00 A.M	0.06	4.22	4.3	5.81
17.	01:00 A.M	0.03	4.29	3.84	4.74
18.	02:00 A.M	0.02	3.54	4	4.55
19.	03:00 A.M	0.02	5.33	3.88	4.33
20.	04:00 A.M	0.03	4.54	3.51	4.64
21.	05:00 A.M	0.08	4.3	2.94	5.01
22.	06:00 A.M	0.06	3.83	3.8	5.17
23.	07:00 A.M	0.08	4.58	4.09	5.46
24.	08:00 A.M	0.11	3.82	4.19	5.33
Average Concentration		0.08	4.21	4.23	5.04
NEQSAA		05	40	80	120
WHO		04	---	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

Note:

- Selected measurement units were µg/m³ & mg/m³ otherwise stated.
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[Signature]
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[Signature]
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-3 (Kholian)
Monitoring Date:	10-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air Gases	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.610253,73.389367		

Sr. No	Time	Parameters			
		CO	NO	NO ₂	SO ₂
		Units			
	Hours	(mg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
1.	09:00 A.M	0.26	4.37	5.18	3.87
2.	10:00 A.M	0.31	5.22	5.36	3.74
3.	11:00 A.M	0.23	5.29	5.63	3.01
4.	12:00 P.M	0.34	6.04	4.54	3.14
5.	01:00 P.M	0.37	5.44	4.41	3.29
6.	02:00 P.M	0.26	5.62	4.52	2.37
7.	03:00 P.M	0.24	6.16	4.88	2.99
8.	04:00 P.M	0.19	5.3	5.03	4.18
9.	05:00 P.M	0.15	4.46	4.55	2.01
10.	06:00 P.M	0.21	4.23	4.67	2.5
11.	07:00 P.M	0.07	5.01	5.25	3.93
12.	08:00 P.M	0.13	5.34	4.36	3.6
13.	09:00 P.M	0.09	6.15	4.79	3.17
14.	10:00 P.M	0.14	4.43	4.64	2.83
15.	11:00 P.M	0.07	4	5.47	3.68
16.	12:00 A.M	0.19	5.18	4.72	3.96
17.	01:00 A.M	0.16	5.25	4.26	2.89
18.	02:00 A.M	0.03	4.5	4.42	2.7
19.	03:00 A.M	0.15	6.29	4.3	2.48
20.	04:00 A.M	0.16	5.5	3.93	2.79
21.	05:00 A.M	0.21	5.26	3.36	3.16
22.	06:00 A.M	0.19	4.79	4.22	3.32
23.	07:00 A.M	0.21	5.54	4.51	3.61
24.	08:00 A.M	0.24	4.78	4.61	3.48
Average Concentration		0.19	5.17	4.65	3.19
NEQSAA		05	40	80	120
WHO		04	---	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

Note:

- Selected measurement units were µg/m³ & mg/m³ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist



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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Powerhouse (Barkot)
Monitoring Date:	11-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air Gases	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.601812, 73.377145		

Sr. No	Time	Parameters			
		CO	NO	NO ₂	SO ₂
		Units			
	Hours	(mg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
1.	09:00 A.M	0.36	4.53	6.59	6.93
2.	10:00 A.M	0.41	5.38	6.77	6.8
3.	11:00 A.M	0.33	5.45	7.04	6.07
4.	12:00 P.M	0.44	6.2	5.95	6.2
5.	01:00 P.M	0.47	5.6	5.82	6.35
6.	02:00 P.M	0.36	5.78	5.93	5.43
7.	03:00 P.M	0.34	6.32	6.29	6.05
8.	04:00 P.M	0.29	5.46	6.44	7.24
9.	05:00 P.M	0.25	4.62	5.96	5.07
10.	06:00 P.M	0.31	4.39	6.08	5.58
11.	07:00 P.M	0.17	5.17	6.66	6.99
12.	08:00 P.M	0.23	5.5	5.77	6.66
13.	09:00 P.M	0.19	6.31	6.2	6.23
14.	10:00 P.M	0.24	4.59	6.05	5.89
15.	11:00 P.M	0.17	4.16	6.88	6.74
16.	12:00 A.M	0.29	5.34	6.13	7.02
17.	01:00 A.M	0.26	5.41	5.67	5.95
18.	02:00 A.M	0.13	4.66	5.83	5.76
19.	03:00 A.M	0.25	6.45	5.71	5.54
20.	04:00 A.M	0.26	5.66	5.34	5.85
21.	05:00 A.M	0.31	5.42	4.77	6.22
22.	06:00 A.M	0.29	4.95	5.63	6.38
23.	07:00 A.M	0.31	5.7	5.92	6.67
24.	08:00 A.M	0.34	4.94	6.02	6.54
Average Concentration		0.29	5.33	6.06	6.25
NEQSAA		05	40	80	120
WHO		04	---	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

- Note:
- Selected measurement units were µg/m³ & mg/m³ otherwise stated.
 - The client is responsible lawful usage of reported data in future.
 - The report is not valid for court.

[Signature]
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[Signature]
 Signature of Chief Chemist:



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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Tailrace (Barkot) Upstream
Monitoring Date:	12-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air Gases	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.596088, 73.374512		

Sr. No	Time	Parameters			
		CO	NO	NO ₂	SO ₂
		Units			
	Hours	(mg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
1.	09:00 A.M	0.14	3.51	5.18	4.73
2.	10:00 A.M	0.16	4.07	5.54	2.62
3.	11:00 A.M	0.18	4.47	6.19	1.97
4.	12:00 P.M	0.13	3.78	6.54	2.93
5.	01:00 P.M	0.15	5.26	7.02	0.99
6.	02:00 P.M	0.14	5.04	7.19	2.37
7.	03:00 P.M	0.16	4.8	5.99	0.77
8.	04:00 P.M	0.17	4.75	6.23	1.62
9.	05:00 P.M	0.13	4.27	3.52	1.67
10.	06:00 P.M	0.14	3.58	3.87	1.62
11.	07:00 P.M	0.15	3.39	4.54	1.7
12.	08:00 P.M	0.16	4.07	4.3	1.4
13.	09:00 P.M	0.13	3.08	3.29	2.06
14.	10:00 P.M	0.12	2.95	3.27	1.66
15.	11:00 P.M	0.14	3.27	3.52	1.38
16.	12:00 A.M	0.15	3.05	3.78	0.97
17.	01:00 A.M	0.16	3.31	3.55	1.37
18.	02:00 A.M	0.13	4.39	3.3	1.62
19.	03:00 A.M	0.12	4.27	3.59	0.77
20.	04:00 A.M	0.11	4.17	3.1	1.1
21.	05:00 A.M	0.12	4.61	3.3	0.4
22.	06:00 A.M	0.1	3.38	3.16	0.56
23.	07:00 A.M	0.11	3.8	2.84	0.77
24.	08:00 A.M	0.12	2.27	3.2	1.51
Average Concentration		0.13	3.89	4.41	1.60
NEQSAA		05	40	80	120
WHO		04	---	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

Note:

- Selected measurement units were µg/m³ & mg/m³ otherwise stated.
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[Signature]
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	GRC Camp Office (Sanghar)
Monitoring Date:	13-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air Gases	Monitoring Instrument:	AQMS 65, Serial # 1310
GPS Coordinates:	34.584562, 73.373878		

Sr. No	Time	Parameters			
		CO	NO	NO ₂	SO ₂
		Units			
	Hours	(mg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
1.	09:00 A.M	0.55	8.17	10.34	11.26
2.	10:00 A.M	0.57	8.73	10.7	9.15
3.	11:00 A.M	0.59	9.13	11.35	8.5
4.	12:00 P.M	0.54	8.44	11.7	9.46
5.	01:00 P.M	0.56	9.92	12.18	7.52
6.	02:00 P.M	0.55	9.7	12.35	8.9
7.	03:00 P.M	0.57	9.46	11.15	7.3
8.	04:00 P.M	0.58	9.41	11.39	8.15
9.	05:00 P.M	0.54	8.93	8.68	8.2
10.	06:00 P.M	0.55	8.24	9.03	8.15
11.	07:00 P.M	0.56	8.05	9.7	8.23
12.	08:00 P.M	0.57	8.73	9.46	7.93
13.	09:00 P.M	0.54	7.74	8.45	8.59
14.	10:00 P.M	0.53	7.61	8.43	8.19
15.	11:00 P.M	0.55	7.93	8.68	7.91
16.	12:00 A.M	0.56	7.71	8.94	7.5
17.	01:00 A.M	0.57	7.97	8.71	7.9
18.	02:00 A.M	0.54	9.05	8.46	8.15
19.	03:00 A.M	0.53	8.93	8.75	7.3
20.	04:00 A.M	0.52	8.83	8.26	7.63
21.	05:00 A.M	0.53	9.27	8.46	6.93
22.	06:00 A.M	0.51	8.04	8.32	7.09
23.	07:00 A.M	0.52	8.46	8	7.3
24.	08:00 A.M	0.53	6.93	8.36	8.04
Average Concentration		0.54	8.55	9.57	8.13
NEQSAA		05	40	80	120
WHO		04	---	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

Note:

- Selected measurement units were µg/m³ & mg/m³ otherwise stated.
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[Signature]
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[Signature]
 Signature of Chief Chemist



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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Colony Area (Snaghar)
Monitoring Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Air Gases	Monitoring Instrument:	AOMS 65, Serial # 1310
GPS Coordinates:	34.587775, 73.366225		

Sr. No	Time	Parameters			
		CO	NO	NO ₂	SO ₂
		Units			
	Hours	(mg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
1.	09:00 A.M	0.13	2.48	4.24	4.77
2.	10:00 A.M	0.15	3.04	4.6	2.66
3.	11:00 A.M	0.17	3.44	5.25	2.01
4.	12:00 P.M	0.12	2.75	5.6	2.97
5.	01:00 P.M	0.14	4.23	6.08	1.03
6.	02:00 P.M	0.13	4.01	6.25	2.41
7.	03:00 P.M	0.15	3.77	5.05	0.81
8.	04:00 P.M	0.16	3.72	5.29	1.66
9.	05:00 P.M	0.12	3.24	2.58	1.71
10.	06:00 P.M	0.13	2.55	2.93	1.66
11.	07:00 P.M	0.14	2.53	3.6	1.74
12.	08:00 P.M	0.15	3.01	3.36	1.44
13.	09:00 P.M	0.12	2.65	2.35	2.1
14.	10:00 P.M	0.11	1.2	2.33	1.7
15.	11:00 P.M	0.13	2.21	2.58	1.42
16.	12:00 A.M	0.14	2.2	2.84	1.01
17.	01:00 A.M	0.15	2.28	2.61	1.41
18.	02:00 A.M	0.12	3.03	2.36	1.66
19.	03:00 A.M	0.11	3.24	2.65	0.81
20.	04:00 A.M	0.1	3.14	2.16	1.14
21.	05:00 A.M	0.11	3.58	2.36	0.44
22.	06:00 A.M	0.09	2.35	2.22	0.6
23.	07:00 A.M	0.1	2.77	1.9	0.81
24.	08:00 A.M	0.11	1.24	2.26	1.55
Average Concentration		0.12	2.86	3.47	1.64
NEQSAA		05	40	80	120
WHO		04	---	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
 WHO: World Health Organization

Note:

- Selected measurement units were µg/m³ & mg/m³ otherwise stated.
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[Signature]
 Signature of Analyst:

[Signature]
 Signature of Chief Chemist



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Ambient Noise Level Monitoring Results



AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Dam Site (Paras Valley)
Monitoring Date:	07-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.660470, 73.455497		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	59.1	61.7	60.4
2.	10:00 A.M		58.9	61.4	60.15
3.	11:00 A.M		58.6	61.2	59.9
4.	12:00 P.M		58.4	61	59.7
5.	01:00 P.M		58.2	60.8	59.5
6.	02:00 P.M		58	60.6	59.3
7.	03:00 P.M		57.8	60.4	59.1
8.	04:00 P.M		57.6	60.1	58.85
9.	05:00 P.M		57.3	59.9	58.6
10.	06:00 P.M		57.1	59.7	58.4
11.	07:00 P.M		56.9	59.5	58.2
12.	08:00 P.M		56.7	59.3	58
13.	09:00 P.M		56.5	59.1	57.8
14.	10:00 P.M		56.3	58.8	57.55
15.	11:00 P.M		56	58.6	57.3
16.	12:00 A.M		55.8	58.4	57.1
17.	01:00 A.M		55.6	58.2	56.9
18.	02:00 A.M		55.4	58	56.7
19.	03:00 A.M		55.2	57.8	56.5
20.	04:00 A.M		55	57.5	56.25
21.	05:00 A.M		54.7	57.3	56
22.	06:00 A.M		54.5	57.1	55.8
23.	07:00 A.M		54.3	56.9	55.6
24.	08:00 A.M		54.1	56.7	55.4

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

[Handwritten Signature]
Signature of Analyst:

[Handwritten Signature]
Signature of Chief Chemist



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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-1 (Thobi)
Monitoring Date:	08-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter IEC651 Type-2
GPS Coordinates:	34.636125, 73.428597		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	50.4	53.3	51.9
2.	10:00 A.M		50.2	53.1	51.6
3.	11:00 A.M		50	52.9	51.4
4.	12:00 P.M		49.8	52.7	51.2
5.	01:00 P.M		49.6	52.4	51
6.	02:00 P.M		49.3	52.2	50.8
7.	03:00 P.M		49.1	52	50.6
8.	04:00 P.M		48.9	51.8	50.4
9.	05:00 P.M		48.7	51.6	50.1
10.	06:00 P.M		48.5	51.4	49.9
11.	07:00 P.M		48.3	51.1	49.7
12.	08:00 P.M		48	50.9	49.5
13.	09:00 P.M		47.8	50.7	49.3
14.	10:00 P.M		47.6	50.5	49.1
15.	11:00 P.M		47.4	50.3	48.8
16.	12:00 A.M		47.2	50.1	48.6
17.	01:00 A.M		47	49.9	48.4
18.	02:00 A.M		46.8	49.7	48.2
19.	03:00 A.M		46.6	49.5	48
20.	04:00 A.M		46.4	49.2	47.8
21.	05:00 A.M		46.1	49	47.5
22.	06:00 A.M		45.9	48.8	47.3
23.	07:00 A.M		45.7	48.6	47.1
24.	08:00 A.M		45.5	48.4	46.9

NEQS limit : 45-55 dB


WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
 Leq: Log Equivalent Continuous Sound Level

Note:

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-2 (Ghanool)
Monitoring Date:	09-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.619787, 73.417525		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	60.6	63.5	62
2.	10:00 A.M		60.4	63.2	61.8
3.	11:00 A.M		60.1	63	61.5
4.	12:00 P.M		59.9	62.8	61.3
5.	01:00 P.M		59.7	62.6	61.1
6.	02:00 P.M		59.5	62.4	60.9
7.	03:00 P.M		59.3	62.2	60.7
8.	04:00 P.M		59.1	61.9	60.5
9.	05:00 P.M		58.8	61.7	60.2
10.	06:00 P.M		58.6	61.5	60
11.	07:00 P.M		58.4	61.3	59.8
12.	08:00 P.M		58.2	61.1	59.6
13.	09:00 P.M		58	60.9	59.4
14.	10:00 P.M		57.8	60.6	59.2
15.	11:00 P.M		47.7	50.6	49.1
16.	12:00 A.M		47.4	50.3	48.9
17.	01:00 A.M		47.2	50.1	48.7
18.	02:00 A.M		47	49.9	48.5
19.	03:00 A.M		46.8	49.7	48.3
20.	04:00 A.M		46.6	49.4	48
21.	05:00 A.M		46.3	49.2	47.8
22.	06:00 A.M		46.1	49	47.6
23.	07:00 A.M		45.9	48.8	47.4
24.	08:00 A.M		45.7	48.6	47.2

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-3 (Kholian)
Monitoring Date:	10-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.610253,73.389367		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	46.6	49.4	48
2.	10:00 A.M		46.4	49.2	47.8
3.	11:00 A.M		46.2	49	47.6
4.	12:00 P.M		46	48.8	47.4
5.	01:00 P.M		45.7	48.5	47.1
6.	02:00 P.M		45.5	48.3	46.9
7.	03:00 P.M		45.3	48.1	46.7
8.	04:00 P.M		45.1	47.9	46.5
9.	05:00 P.M		44.9	47.7	46.3
10.	06:00 P.M		44.7	47.5	46.1
11.	07:00 P.M		44.4	47.2	45.8
12.	08:00 P.M		44.2	47	45.6
13.	09:00 P.M		44	46.8	45.4
14.	10:00 P.M		43.8	46.6	45.2
15.	11:00 P.M		43.6	46.4	45
16.	12:00 A.M		43.3	46.1	44.7
17.	01:00 A.M		43.1	45.9	44.5
18.	02:00 A.M		42.9	45.7	44.3
19.	03:00 A.M		42.7	45.5	44.1
20.	04:00 A.M		42.5	45.2	43.8
21.	05:00 A.M		42.2	45	43.6
22.	06:00 A.M		42	44.8	43.4
23.	07:00 A.M		41.8	44.6	43.2
24.	08:00 A.M		41.6	44.4	43

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

[Handwritten Signature]
Signature of Analyst:

[Handwritten Signature]
Signature of Chief Chemist

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Powerhouse (Barkot)
Monitoring Date:	11-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.601812, 73.377145		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	42.4	45.3	43.8
2.	10:00 A.M		42.2	45.1	43.6
3.	11:00 A.M		42	44.9	43.4
4.	12:00 P.M		41.8	44.7	43.2
5.	01:00 P.M		41.5	44.4	42.9
6.	02:00 P.M		41.3	44.2	42.7
7.	03:00 P.M		41.1	44	42.5
8.	04:00 P.M		40.9	43.8	42.3
9.	05:00 P.M		40.7	43.6	42.1
10.	06:00 P.M		40.5	43.4	41.9
11.	07:00 P.M		40.2	43.1	41.6
12.	08:00 P.M		40	42.9	41.4
13.	09:00 P.M		39.8	42.7	41.2
14.	10:00 P.M		39.6	42.5	41
15.	11:00 P.M		39.4	42.3	40.8
16.	12:00 A.M		39.1	42	40.5
17.	01:00 A.M		38.9	41.8	40.3
18.	02:00 A.M		38.7	41.6	40.1
19.	03:00 A.M		38.5	41.4	39.9
20.	04:00 A.M		38.3	41.1	39.7
21.	05:00 A.M		38	40.9	39.4
22.	06:00 A.M		37.8	40.7	39.2
23.	07:00 A.M		37.6	40.5	39
24.	08:00 A.M		37.4	40.3	38.8

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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- The report is not valid for court.

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Tailrace Upstream (Barkot)
Monitoring Date:	12-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.596088, 73.374512		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	46.7	49.6	48.1
2.	10:00 A.M		46.5	49.4	47.9
3.	11:00 A.M		46.3	49.2	47.7
4.	12:00 P.M		46.1	49	47.5
5.	01:00 P.M		45.8	48.7	47.2
6.	02:00 P.M		45.6	48.5	47
7.	03:00 P.M		45.4	48.3	46.8
8.	04:00 P.M		45.2	48.1	46.6
9.	05:00 P.M		45	47.9	46.4
10.	06:00 P.M		44.8	47.7	46.2
11.	07:00 P.M		44.5	47.4	45.9
12.	08:00 P.M		44.3	47.2	45.7
13.	09:00 P.M		44.1	47	45.5
14.	10:00 P.M		43.9	46.8	45.3
15.	11:00 P.M		43.7	46.6	45.1
16.	12:00 A.M		43.4	46.3	44.8
17.	01:00 A.M		43.2	46.1	44.6
18.	02:00 A.M		43	45.9	44.4
19.	03:00 A.M		42.8	45.7	44.2
20.	04:00 A.M		42.6	45.4	44
21.	05:00 A.M		42.3	45.2	43.7
22.	06:00 A.M		42.1	45	43.5
23.	07:00 A.M		41.9	44.8	43.3
24.	08:00 A.M		41.7	44.6	43.1

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	GRC Camp Office (Sanghar)
Monitoring Date:	13-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.584562, 73.373878		

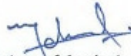
Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	59.6	62.5	61
2.	10:00 A.M		59.4	62.2	60.8
3.	11:00 A.M		59.1	62	60.5
4.	12:00 P.M		58.9	61.8	60.3
5.	01:00 P.M		58.7	61.6	60.1
6.	02:00 P.M		58.5	61.4	59.9
7.	03:00 P.M		58.3	61.2	59.7
8.	04:00 P.M		58.1	60.9	59.5
9.	05:00 P.M		57.8	60.7	59.2
10.	06:00 P.M		57.6	60.5	59
11.	07:00 P.M		57.4	60.3	58.8
12.	08:00 P.M		57.2	60.1	58.6
13.	09:00 P.M		57	59.9	58.4
14.	10:00 P.M		56.8	59.6	58.2
15.	11:00 P.M		56.5	59.4	57.9
16.	12:00 A.M		56.3	59.2	57.7
17.	01:00 A.M		56.1	59	57.5
18.	02:00 A.M		55.9	58.8	57.3
19.	03:00 A.M		55.7	58.6	57.1
20.	04:00 A.M		55.5	58.3	56.9
21.	05:00 A.M		55.2	58.1	56.6
22.	06:00 A.M		55	57.9	56.4
23.	07:00 A.M		54.8	57.7	56.2
24.	08:00 A.M		54.6	57.5	56

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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Signature of Analyst:


Signature of Chief Chemist

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Colony Area (Sanghar)
Monitoring Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Ambient Noise	Monitoring Instrument:	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.587775, 73.366225		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	41.4	43.7	42.5
2.	10:00 A.M		42.5	44.7	43.6
3.	11:00 A.M		40.5	41.3	40.9
4.	12:00 P.M		40.4	43	41.7
5.	01:00 P.M		43.9	46.8	45.3
6.	02:00 P.M		43.9	44.6	44.2
7.	03:00 P.M		40.3	41.5	40.9
8.	04:00 P.M		43	43.4	43.2
9.	05:00 P.M		45.3	47.5	46.4
10.	06:00 P.M		45	45.9	45.4
11.	07:00 P.M		47.5	49.9	48.7
12.	08:00 P.M		41.5	43.4	42.4
13.	09:00 P.M		39.5	41	40.2
14.	10:00 P.M		43.8	45.6	44.7
15.	11:00 P.M		41.5	42.7	42.1
16.	12:00 A.M		43.8	44.3	44
17.	01:00 A.M		45.5	46.9	46.2
18.	02:00 A.M		41	42.4	41.7
19.	03:00 A.M		43.4	44.9	44.1
20.	04:00 A.M		41.7	44.1	42.9
21.	05:00 A.M		40.5	41.5	41
22.	06:00 A.M		40	40.9	40.4
23.	07:00 A.M		43.8	44.9	44.3
24.	08:00 A.M		43.8	42.8	43.3

NEQS limit : 45-55 dB

WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
 Leq: Log Equivalent Continuous Sound Level

Note:

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Drinking Water Monitoring Results



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Integrated Environment Laboratory




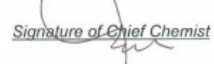
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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	Dam Site (Paras Valley)
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Spring Water	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates;	34.653167, 73.445678		

Sr.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.4
2	Temperature	---	°C	---	---	7
3	Taste & Odor	In-house	--	Non-Objectionable	Non-Objectionable	Non-Objectionable
4	Color	APHA-2120 B/C	TCU	≤ 15	<15	4
5	Turbidity	APHA-2130 B	NTU	<5	<5	3
6	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	359
7	Total Hardness as CaCO ₃	APHA-2340 C	mg/L	-----	<500	294
8	Nitrate (NO ₃)	APHA-4500NO3 B	mg/L	50	≤50	2.2
9	Nitrite (NO ₂)	APHA-4500NO2 B	mg/L	3	≤3	0.04
10	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.001
12	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	128
14	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.2
15	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.006
16	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.73
17	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.16
21	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.03
23	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.01
24	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	7
29	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	13

NDWQS National Drinking Water Quality Standards WHO World Health Organization
 N D Not Detected

Signature of Analyst:  Signature of Chief Chemist: 

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	Adit-1 (Thobi)
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Spring Water	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates:	34.636125, 73.428597		

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.7
2.	Temperature	---	°C	---	---	6
3.	Taste & Odor	In-house	--	Non-Objectionable	Non-Objectionable	Non-Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	4
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	381
7.	Total Hardness as CaCO ₃	APHA-2340 C	mg/L	-----	<500	217
8.	Nitrate (NO ₃)	APHA-4500NO3 B	mg/L	50	≤50	1.9
9.	Nitrite (NO ₂)	APHA-4500NO2 B	mg/L	3	≤3	0.06
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.003
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	131
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.09
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.001
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.58
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.08
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.07
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.06
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO
N D Not Detected

World Health Organization

Signature of Analyst:

Signature of Chief Chemist

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	Adit-2 (Ghanol)
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Spring Water	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates;	34.619367, 73.417288		

Sr No	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1	ph _i	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.3
2	Temperature	---	°C	---	---	8
3	Taste & Odor	In-house	--	Non-Objectionable	Non-Objectionable	Non-Objectionable
4	Color	APHA-2120 B/C	TCU	≤ 15	<15	5
5	Turbidity	APHA-2130 B	NTU	<5	<5	4
6	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	363
7	Total Hardness as CaCO ₃	APHA-2340 C	mg/L	-----	<500	261
8	Nitrate (NO ₃)	APHA-4500NO3 B	mg/L	50	≤50	1.03
9	Nitrite (NO ₂)	APHA-4500NO2 B	mg/L	3	≤3	0.07
10	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.005
12	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	138
14	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.1
15	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.004
16	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.86
17	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.12
21	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.04
23	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.1
24	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO World Health Organization
 N D Not Detected

Signature of Analyst

Signature of Chief Chemist



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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	Adit-3 (Kholian)
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Spring Water	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates;	34.605195, 73.394487		

Sl. No	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.7
2	Temperature	---	°C	---	---	8
3	Taste & Odor	In-house	--	Non-Objectionable	Non-Objectionable	Non-Objectionable
4	Color	APHA-2120 B/C	TCU	≤ 15	<15	6
5	Turbidity	APHA-2130 B	NTU	<5	<5	4
6	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	377
7	Total Hardness as CaCO ₃	APHA-2340 C	mg/L	-----	<500	258
8	Nitrate (NO ₃)	APHA-4500NO3 B	mg/L	50	≤50	1.06
9	Nitrite (NO ₂)	APHA-4500NO2 B	mg/L	3	≤3	0.08
10	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.008
12	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	
13	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	129
14	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.03
15	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.005
16	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.75
17	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.16
21	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	N.D.
23	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.3
24	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO

World Health Organization

N D
Signature of Analyst

Signature of Chief Chemist



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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhoubu Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	Powerhouse (Barkot)
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Spring Water (Sanduri)	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates;	34.603747, 73.379525		

Sr	Parameters	Standard Methods	Units	WHO	NDWQS	Results
30	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.5
31	Temperature	---	°C	---	---	7
32	Taste & Odor	In-house	--	Non-Objectionable	Non-Objectionable	Non-Objectionable
33	Color	APHA-2120 B/C	TCU	≤ 15	<15	10
34	Turbidity	APHA-2130 B	NTU	<5	<5	4
35	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	402
36	Total Hardness as CaCO ₃	APHA-2340 C	mg/L	-----	<500	316
37	Nitrate (NO ₃)	APHA-4500NO3 B	mg/L	50	≤50	1.2
38	Nitrite (NO ₂)	APHA-4500NO2 B	mg/L	3	≤3	0.37
39	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	
40	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.009
41	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	
42	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	105
43	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.1
44	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.003
45	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.91
46	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
47	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
48	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
49	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.11
50	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
51	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.06
52	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.08
53	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
54	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
55	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
56	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
57	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
58	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO

World Health Organization

N D
Not Detected
Signature of Analyst

Signature of Chief Chemist

SURFACE WATER ANALYSIS REPORT

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	GRC Camp Office (Sanghar)
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Spring Water	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates;	34.584928, 73.376913		

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.7
2.	Temperature	---	°C	---	---	7
3.	Taste & Odor	In-house	--	Non-Objectionable	Non-Objectionable	Non-Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	384
7.	Total Hardness as CaCO ₃	APHA-2340 C	mg/L	-----	<500	347
8.	Nitrate (NO ₃)	APHA-4500NO3 B	mg/L	50	≤50	1.46
9.	Nitrite (NO ₂)	APHA-4500NO2 B	mg/L	3	≤3	0.58
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	0.006
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.006
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	0.006
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	117
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.05
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.64
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.2
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.05
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.06
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO World Health Organization

N D Not Detected
Signature of Analyst:

Signature of Chief Chemist



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Surface Water Monitoring Results (Kunhar River Water)



SURFACE WATER ANALYSIS REPORT



Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	Dam Site (Paras Valley)
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Kunhar River	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates	34.660247, 73.451592		

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	----	°C	40	5
2)	pH	APHA-4500H+ B	--	6-9	8.3
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	113
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	62.8
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2637
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	129
7)	Total Hardness	APHA-2340 C	mg/l	--	164
8)	Oil & Grease	Separation Method	mg/l	10	2.8
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.61
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.8
11)	Chloride	APHA-4500Cl- B	mg/l	1000	256
12)	Flouride	APHA-4500F- C	mg/l	10	2.4
13)	Ammonia	ASTM-D1426-15	mg/l	40	4.9
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0.01
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.08
16)	Arsenic	APHA-3500As B	mg/l	1.0	N.D
17)	Copper	APHA-3500Cu B	mg/l	1.0	0.27
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.07
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.0	0.33
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.58
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.15
24)	Boron	APHA-4500B-C	mg/l	0.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S ²⁻)	APHA-4500 S ₂	mg/l	1.0	0.35
27)	Sulphate (SO ₄)	APHA-4500-SO ₄ C	mg/l	600	429
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	1.1
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.06
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents N.D: Not Detected

Signature of Analyst:

Signature of Chief Chemist

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	Tailrace (Barkot) Upstream
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Kunhar River	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates	34.5971541, 73.3700751		

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	----	°C	40	6
2)	pH	APHA-4500H+ B	--	6-9	7.9
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	108
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	54.7
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2492
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	108
7)	Total Hardness	APHA-2340 C	mg/l	--	157
8)	Oil & Grease	Separation Method	mg/l	10	2
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.55
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.2
11)	Chloride	APHA-4500Cl- B	mg/l	1000	234
12)	Flouride	APHA-4500F- C	mg/l	10	1.8
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.7
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0.008
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.03
16)	Arsenic	APHA-3500As B	mg/l	1.0	N D
17)	Copper	APHA-3500Cu B	mg/l	1.0	N D
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.04
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.28
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.37
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.11
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S ²⁻)	APHA-4500 S ₂	mg/l	1.0	0.31
27)	Sulphate (SO ₄)	APHA-4500-SO ₄ C	mg/l	600	354
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	0.9
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.02
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents N.D: Not Detected

Signature of Analyst:

Signature of Chief Chemist

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location:	Colony Area (Sanghar)
Sampling Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Kunhar River	Analysis Method	APHA/USEPA Standard Methods
GPS Coordinates	34.586503, 73.363695		

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	----	°C	40	4
2)	pH	APHA-4500H+ B	--	6-9	8.1
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	86
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	42
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	1864
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	117
7)	Total Hardness	APHA-2340 C	mg/l	--	161
8)	Oil & Grease	Separation Method	mg/l	10	1.3
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.41
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	2.6
11)	Chloride	APHA-4500Cl- B	mg/l	100 0	209
12)	Flouride	APHA-4500F- C	mg/l	10	1.1
13)	Ammonia	ASTM-D1426-15	mg/l	40	2.9
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0.006
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.01
16)	Arsenic	APHA-3500As B	mg/l	1.0	N D
17)	Copper	APHA-3500Cu B	mg/l	1.0	N D
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.03
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.26
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.31
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.08
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N D
26)	Sulphide (S ²⁻)	APHA-4500 S ₂	mg/l	1.0	0.29
27)	Sulphate (SO ₄)	APHA-4500-SO ₄ C	mg/l	600	349
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	0.4
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.01
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents N.D:

Not Detected

Signature of Analyst

Signature of Chief Chemist

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Soil Analysis Results



SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location :	Adit-1 (Thobi)
Monitoring Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Soil Sample		

Sr. No.	Parameters	Results	
1	Soil Texture	Sand %	14
		Silt%	57
		Clay %	29
		Texture Class	Silty Clay Loam
2	pH	8.1	
3	Electrical Conductivity EC (μSm^{-1})	238	
4	Phosphorus (mgkg^{-1})	2.01	
5	Sodium Absorption Ratio	4.07	

μSm^{-1} : Micro siemens/meter

mgkg^{-1} : milligram per Kilogram

[Signature]
Signature of Analyst:

[Signature]
Signature of Chief Chemist

FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

Creative House, 3rd Floor, Office # 302, Phase III Chowk, Hayatabad, Peshawar, Pakistan
Tel: 091-5852913 Cell: +92 302 8462412 Email: inenvconsultants@yahoo.com www. iec-consultants.com www. inenvlab.com

Environmental Protection Agency (EPA-KPK) Certified





SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location :	Adit-2 (Ghanol)
Monitoring Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Soil Sample		

Sr. No.	Parameters	Results	
1	Soil Texture	Sand %	08
		Silt%	58
		Clay %	34
		Texture Class	Silty Clay Loam
2	pH	8.1	
3	Electrical Conductivity EC (μSm^{-1})	238	
4	Phosphorus (mgkg^{-1})	2.01	
5	Sodium Absorption Ratio	4.07	

μSm^{-1} : micro siemens/meter

mgkg^{-1} : milligram per Kilogram

[Handwritten Signature]
Signature of Analyst:

[Handwritten Signature]
Signature of Chief Chemist

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location :	Adit-3 (Kholian)
Monitoring Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Soil Sample		

Sr. No.	Parameters	Results	
1	Soil Texture	Sand %	17
		Silt%	49
		Clay %	34
		Texture Class	Silty Clay Loam
2	pH	8.0	
3	Electrical Conductivity EC (μSm^{-1})	231	
4	Phosphorus (mgkg^{-1})	3.2	
5	Sodium Absorption Ratio	3.54	

μSm^{-1} : micro siemens/meter

mgkg^{-1} : milligram per Kilogram

[Signature]
Signature of Analyst

[Signature]
Signature of Chief Chemist

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	China Gezhouba Group Co., Ltd. (CGGC)
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location :	Powerhouse (Barkot)
Monitoring Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Soil Sample		

Sr. No.	Parameters	Results	
1	Soil Texture	Sand %	12
		Silt%	61
		Clay %	37
		Texture Class	Silty Clay Loam
2	pH	8.1	
3	Electrical Conductivity EC (μSm^{-1})	229	
4	Phosphorus (mgkg^{-1})	2.9	
5	Sodium Absorption Ratio	3.37	

μSm^{-1} : micro siemens/meter

mgkg^{-1} : milligram per Kilogram

[Handwritten Signature]
Signature of Analyst:

[Handwritten Signature]
Signature of Chief Chemist

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/223-2022	Client Name	Ghulam Rasool & Company Pvt. Ltd.
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location :	GRC Camp Office (Sanghar)
Monitoring Date:	14-12-2022	Reporting Date:	21-12-2022
Source:	Soil Sample		

Sr. No.	Parameters	Results	
1	Soil Texture	Sand %	16
		Silt%	43
		Clay %	41
		Texture Class	Silty Clay Loam
2	pH	8.0	
3	Electrical Conductivity EC (μSm^{-1})	231	
4	Phosphorus (mgkg^{-1})	3.2	
5	Sodium Absorption Ratio	3.54	

μSm^{-1} : Micro siemens/meter

mgkg^{-1} : milligram per Kilogram

[Signature]
Signature of Analyst:

[Signature]
Signature of Chief Chemist

FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

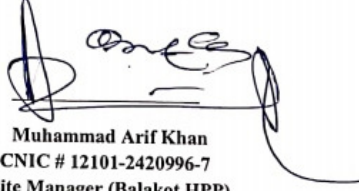
Creative House, 3rd Floor, Office # 302, Phase III Chowk, Hayatabad, Peshawar, Pakistan
 Tel: 091-5852913 Cell: +92 302 8462412 Email: inenvconsultants@yahoo.com www.iec-consultants.com www.inenvlab.com
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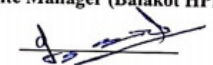
Annexure-07: Copies of Water Source Agreements


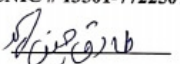
Copy of Water Source Agreement (Thobi Camp and Adit 1)

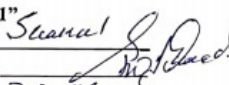
پانی کی فراہمی کے لیے این او سی

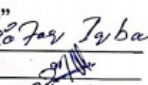
ما لکان کو جی آر سی تھوبی کیمپ اور ایڈٹ ٹنل نمبر 1 پر پانی کی فراہمی کے لیے چشمہ سے پائپ لائن لگانے پر کوئی اعتراض نہیں۔ اس پائپ لائن سے پانی صرف بالاکوٹ ہائیڈرو پاور پروجیکٹ کے لیے استعمال ہو گا اور بالاکوٹ ہائیڈرو پاور پروجیکٹ کے اختتام پر اس پائپ لائن کو ہٹانا یا نہ ہٹانے کا فیصلہ ما لکان کے مشاورت سے ہو گا۔

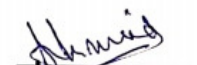

Muhammad Arif Khan
CNIC # 12101-2420996-7
Site Manager (Balakot HPP)

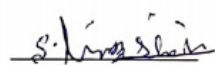

Syed Asad Ul Haq Shah
CNIC # 13501-1330321-9



Syed Amjad Ali Shah
CNIC # 13501-7722507-5

Tariq Hussain Shah
CNIC # 13501-7722507-5

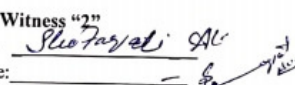
Witness "1"
Name: Suana
Signature: 
Address: D-7 - Khan

Witness "3"
Name: Zo Far Jybal
Signature: 
Address: Blankan


Mr. Ahmed Ali Shah
CNIC # 13501-1295053-9


Mr. Riaz Hussain Shah
CNIC # 13501-5863067-1


Mr. Mukhtiar Ahmad Shah
CNIC #

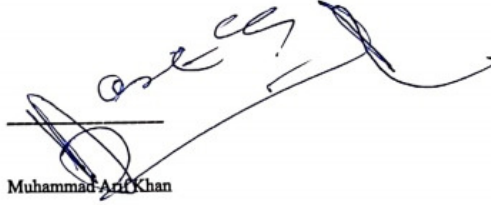
Witness "2"
Name: Sho Far Jybal
Signature: 
Address: Sangher

Witness "4"
Name: _____
Signature: _____
Address: _____

Copy of Water Source Agreement (GRC Camp)

پانی کی فراہمی کے لئے این اوسی

مالکان کو جی آر سی سنگر کیمپ پر پانی کی فراہمی کے لئے چشمہ سے پائپ لائن لگانے پر کوئی اعتراض نہیں۔
اس پائپ لائن سے پانی صرف بالا کوٹ ہائیڈرو پاور پراجیکٹ کے لئے استعمال ہوگا اور بالا کوٹ
ہائیڈرو پاور پراجیکٹ کے اختتام پر اس پائپ لائن کو ہٹانے یا نہ ہٹانے کا فیصلہ مالکان کے مشاورت سے
ہوگا۔


Muhammad Arif Khan

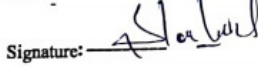
CNIC# 12101-2420996-7

Project Manager (Balakot HPP)


Malik Muhammad Akram Khan

CNIC# 13501-2934739-5

Witness -1


Name: Shahid KhanSignature: Address: Dera Ismail Khan

Witness -2

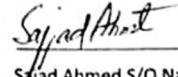
Name: M. Zubair KhanSignature: Address: Charsadda

پانی کی فراہمی کے لئے این اوس

مالکان کو چاہیے گیزو باگروپ کارپوریشن کیپ اور ایٹمکس 2 پر پانی کی فراہمی کے لئے ٹیسٹ سے چھپ اٹن لگانے پر کوئی اعتراض نہیں ہے۔ اس پائپ لائن سے پانی صرف بالاکوٹ ہائیڈرو پاور پراجیکٹ کے لئے استعمال ہو گا اور بالاکوٹ ہائیڈرو پاور پراجیکٹ کے اختتام پر اس پائپ لائن کو ہٹانا یا نہ ہٹانے کا فیصلہ مالکان کی مشاورت سے ہو گا۔

 02-Jan-2023

Syed Imran Raouf
Land Acquisition Manager
CGGC Balakot Hydropower Project



Sajad Ahmed S/O Nazir Husain
CNIC # 13501-0968242-1

Witness 1"

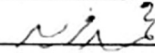
Name: Muhammad Khalid

Signature: 

Address: Khati Ghanool

Witness 2"

Name: Muhammad Fareed

Signature: 

Address: Khati Ghanool