ENVIRONMENTAL IMPACT ASSESSMENT

(E I A R E P O R T)

FOR THE PROJECT

COAL MINING LEASE BY M/S MUNAWAR MINING COMPANY

Located at

NEAR VILLAGE BHAL, ABOUT 3 KM SOUTH OF NURPUR, TEHSIL AND DISTRICT CHAKWAL, PUNJAB

PROJECT PROPONENT:

Sheikh Muhammad Ramzan

PREPARED BY

ZOOM CONSULTANCY & SERVICES
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TABLE OF CONTENTS

EXECUTIVE SUMMARY **5**

CHAPTER 1: INTRODUCTION **8**

1.1 General 8

1.2 The Project 8

1.3 The Proponent and the Consultant 9

1.4 Study Team 9

1.5 Objectives of the EIA 9

1.6 Purpose of the Report 10

1.7 Scope and Methodology 10

1.8 Components of the Report 10

CHAPTER 2: STATUTORY REQUIREMENTS & STANDARDS **11**

2.1 General 11

2.2 Existing Legislation and Legal Framework 11

2.3 Institutional Setup 13

2.4 Relevant Legal / Institutional Framework 13

CHAPTER 3: DESCRIPTION OF THE PROJECT **14**

3.1 – 3.6 Objectives, Background, Alternatives, Lease Boundary 14

3.7 Description of the Mining Process 15

3.8 – 3.23 Infrastructure, Manpower, Schedule 16

CHAPTER 4: DESCRIPTION OF ENVIRONMENT (BASELINE) **18**

4.2 Physical Environment 18

4.3 Biological Environment 20

4.4 Socio-Economic Environment 21

CHAPTER 5: PUBLIC CONSULTATION 22

CHAPTER 6: ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES 23

6.3 Impact Due to Project Location 23

6.5 Impacts of Ongoing Surface Development Activity 24

6.6 Impacts Associated with Continued Operation 24

6.8 Summary of the Environmental Impacts 26

CHAPTER 7: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN 27

7.6 Environmental Management Plan 28

7.7 Environmental Monitoring 28

7.11 Mine Closure and Reclamation Planning 29

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS 30

8.3 Recommendations 31

8.4 Final Conclusion 32

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LIST OF ABBREVIATIONS

Abbreviation	Description
AMD	Acid Mine Drainage
AMSL	Above Mean Sea Level
CH4	Methane
CO2	Carbon Dioxide
dB(A)	Decibel (Unit of Noise)
DGMM	Directorate General of Mines & Minerals
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ETP	Effluent Treatment Plant
HSE	Health, Safety & Environment
IEE	Initial Environmental Examination
NEQS	National Environmental Quality Standards
NOC	No Objection Certificate
PEQS	Punjab Environmental Quality Standards
PEPA 1997	Punjab Environmental Protection Act, 1997
PM	Particulate Matter
PMCR 2002	Punjab Mining Concession Rules, 2002

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Abbreviation	Description
PPE	Personal Protective Equipment
RPM	Respirable Particulate Matter
ROM	Run-of-Mine (raw coal)
SOP	Standard Operating Procedure
TMA	Tehsil Municipal Administration
WAPDA	Water and Power Development Authority

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EXECUTIVE SUMMARY

1. Introduction

This Executive Summary presents the principal findings of the Environmental Impact Assessment (EIA) prepared for the Continuation of Coal Mining Operations at Bhal Coal Mine, by M/s Munawar Mining Company, situated near village Bhal, about 3 KM south of Nurpur, Tehsil and District Chakwal, Punjab. The mining lease, originally allotted on 05.08.1991, was renewed by the Directorate General of Mines & Minerals, Punjab vide Notification dated 11.03.2010 for a further period of twenty (20) years, with effect from 05.05.2011 to 04.05.2031, over a sanctioned area of 453.74 acres.

Coal extraction in the Punjab Salt Range plays an important role in the regional energy and brick-kiln fuel supply chain, but underground coal mining, if not properly planned and managed, can give rise to adverse environmental and occupational effects. Environmental protection in Pakistan is governed under the Pakistan Environmental Protection Act, 1997 and the Punjab Environmental Protection Act, 1997 (as amended in 2012), read together with the Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022 and the Punjab Mining Concession Rules, 2002. This EIA has accordingly been prepared to document baseline environmental conditions, assess the likely impacts of continued mining, and prescribe mitigation and monitoring measures to keep the mine's environmental and occupational performance within acceptable limits.

2. Salient Features of the Project

Parameter	Detail
Proponent	M/s Munawar Mining Company, 58-A Shah Jamal Colony, Lahore
Mineral	Coal
Area	453.74 Acres
Location	Near village Bhal, 3 KM south of Nurpur, District Chakwal
Toposheet	Sheet No. 43-D/10 (Grids 67°–70° Long., 20°–29° Lat.)
Lease Period (renewed)	05.05.2011 to 04.05.2031 (20 years)
Original Allotment	05.08.1991

Parameter	Detail
Mining Method	Underground (board-and-pillar), consistent with Salt Range coal-seam geometry
Access	Shingled road connecting the leased area to Chakwal and Nurpur
Source of Power	WAPDA supply supplemented by standby diesel generation
Source of Water	Tube well / mine dewatering, for domestic and dust-suppression use

3. Project Objectives

The continued operation of Bhal Coal Mine aims to sustain an existing, licensed source of indigenous coal supply for regional brick-kiln and industrial fuel demand, to secure the livelihoods of the local mining workforce, and to bring the mine's environmental and occupational safety management into full alignment with the Punjab Environmental Protection Act and applicable mine-safety legislation for the balance of the renewed lease term.

4. Purpose of the Report

This report is prepared to fulfil the requirement under Section 12 of the Punjab Environmental Protection Act, 1997, and to support the mining lease-holder's compliance obligations under the Punjab Mining Concession Rules, 2002, by documenting the environmental baseline, screening and evaluating potential impacts of continued underground coal extraction, and setting out an Environmental Management Plan (EMP) to guide environmentally and occupationally sound operation of the mine for the remainder of the lease period.

5. Major Impacts and Recommended Mitigation Measures

The principal environmental concerns associated with continued operation of an underground coal mine of this nature are: fugitive coal dust at the pit-head, screening and loading points; mine-water discharge and its potential acidity/sedimentation; disposal of overburden and reject/discard material; land subsidence risk over worked-out panels; noise and vibration from haulage and ancillary machinery; and, most significantly, underground occupational hazards including mine gas (methane) accumulation, ventilation adequacy, and respirable coal dust exposure of the workforce. These will be addressed through covered coal stacking and water-spray dust suppression, a settling-pond based mine-water management system prior to any discharge, engineered overburden/discard dumps with retaining bunds and progressive vegetative cover, subsidence monitoring over worked panels, forced/auxiliary mine ventilation with regular gas testing, and a structured occupational health and

safety programme including PPE and periodic medical examination of underground workers. With these measures in place, the impacts of continued mining are assessed as localized, manageable and of low-to-moderate significance, with the exception of underground occupational safety, which requires sustained, high-priority management attention.

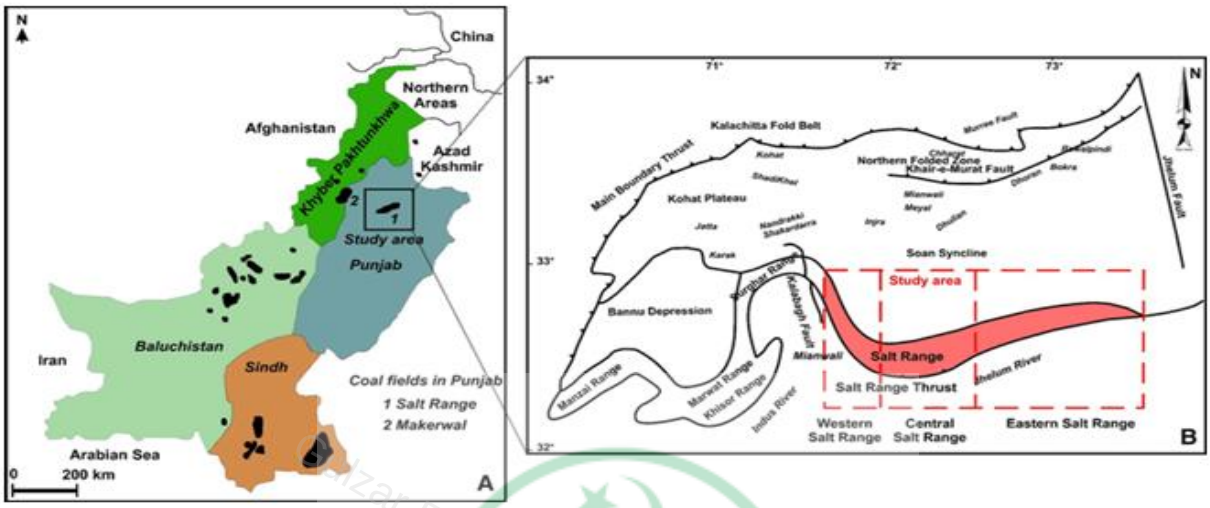


Figure 1: reserves of coal in Punjab

6. Environmental Management & Monitoring Plans

An Environmental Management Plan (EMP) has been developed covering surface operations, underground workings, and mine-closure planning, defining responsibilities, mitigation actions and an Environmental Monitoring Plan specifying parameters, frequency and locations for air quality, noise, mine-water quality, subsidence, and underground mine-gas/ventilation monitoring. A designated Environmental & Mine Safety Officer will oversee day-to-day implementation and reporting, with the proponent retaining overall responsibility for EMP compliance and for reporting to EPA Punjab and the Chief Inspector of Mines.

7. Conclusion

Based on the assessment presented in this report, continuation of coal mining operations at Bhal Coal Mine for the balance of the renewed lease term is judged to be environmentally manageable, provided the mitigation measures and EMP set out herein are implemented in full, with particular emphasis on mine-gas monitoring, ventilation adequacy and occupational dust control. No environmentally sensitive receptors, protected areas or involuntary displacement of communities are involved, and the mine continues to provide direct and indirect socio-economic benefit to village Bhal and the surrounding Chakwal area.

CHAPTER 1: INTRODUCTION

1.1 General

Under Section 12 of the Punjab Environmental Protection (Amendment) Act, 2012, no proponent may commence or continue a development project in the Punjab without prior Environmental Approval from the Environmental Protection Agency (EPA), Punjab, obtained through the filing of an Initial Environmental Examination (IEE) or, for projects of greater scale and complexity, an Environmental Impact Assessment (EIA), as classified under the Punjab Environmental Protection (Review of IEE/EIA) Regulations, 2022. This report presents the EIA for the Continuation of Coal Mining Operations at Bhal Coal Mine, held by M/s Munawar Mining Company, situated near village Bhal, Tehsil and District Chakwal, Punjab.

The mine has been in operation since the original allotment of the lease on 05.08.1991 and was renewed by the Directorate General of Mines & Minerals, Punjab for a further period of 20 years, with effect from 05.05.2011 to 04.05.2031, over the sanctioned leased area of 453.74 acres. Coal is extracted from the site by underground methods consistent with the steeply-dipping, discontinuous seam geometry typical of the Salt Range coal measures, and is supplied primarily to the regional brick-kiln and small-industry fuel market.

To support continued compliance with Punjab's environmental regulatory framework for the remainder of the lease term, the proponent has engaged expert environmental consultants to conduct this EIA. The report has been prepared through a critical examination of the environmental factors associated with ongoing mining, haulage, coal handling and ancillary surface operations at the site, and sets out practical mitigation measures and a comprehensive Environmental Management Plan (EMP) to guide continued, environmentally sound operation of the mine.

1.2 The Project

M/s Munawar Mining Company is an existing, licensed underground coal mine operating over a leased area of 453.74 acres near village Bhal, approximately 3 KM south of Nurpur, District Chakwal. The leased area is connected to Chakwal and Nurpur by a shingled access road and falls within Survey of Pakistan toposheet No. 43-D/10 (Grids 67° to 70° longitude and 20° to 29° latitude). The lease boundary is defined by twelve survey points (A through L), the coordinates of which are given in Section 3.6 below.

1.3 Nature of Project

The project comprises the continuation of an existing underground coal mining operation, together with its associated surface infrastructure pit-head coal stacking and screening area, overburden/discard dump, mine-water settling ponds, access roads, workshop, stores and staff facilities. No new greenfield surface construction of significant scale is involved; the assessment instead addresses the ongoing and remaining-life impacts of mining, coal handling and haulage for the balance of the renewed lease period.

1.4 Size of Project

The leased area is 453.74 acres. The mine operates on a room-and-pillar / board-and-pillar underground extraction pattern typical of Salt Range coal seams, with actual worked-out panels comprising a fraction of the total leased area at any given time.

1.5 Location of Project

The project is located near village Bhal, about 3 KM south of Nurpur, Tehsil and District Chakwal, Punjab, within Survey of Pakistan Sheet No. 43-D/10, Grids 67°–70° longitude and 20°–29° latitude.

1.6 Coordinates:

32°38'55.8"N 72°34'02.3"E

1.7 Area of Project

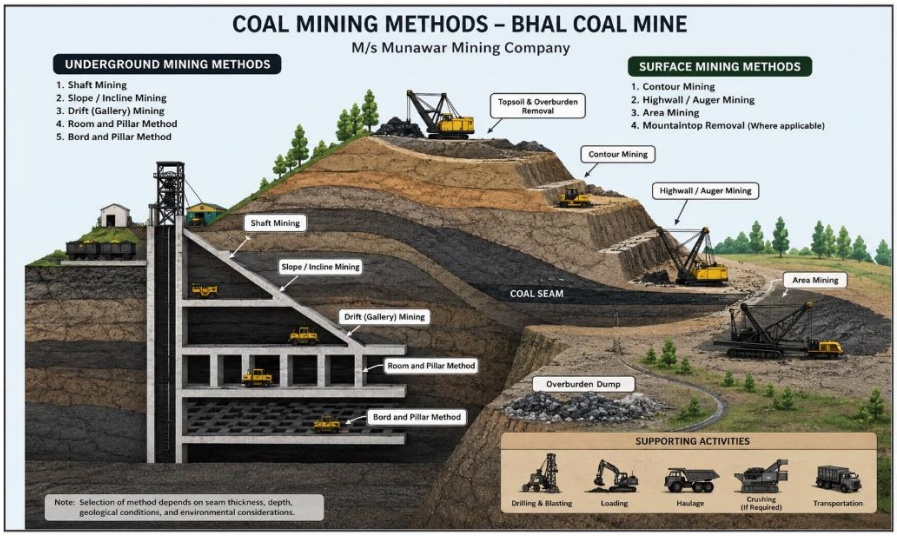
Total Area: 453.74 Acres.

1.8 Cost of project

Project cost is 150 million

1.9 Capacity

150 ton/day



1.3 The Proponent and the Consultant

- Proponent: M/s Munawar Mining Company, 58-A Shah Jamal Colony, Lahore.
- The Company is represented for the purposes of this EIA and the coal mining by Sheikh Muhammad Ramzan S/o Sheikh Abdul Latif (CNIC 35202-9898257-3).
- Consultant: Zoom Consultancy & Services, Lahore.
- The Consultant has been engaged by the Proponent to carry out the environmental baseline survey, impact assessment, public consultation and preparation of this EIA report, and to support the proponent through the EPA Punjab approval process.

1.4 Study Team

The study was executed by a multi-disciplinary team comprising an environmental team lead responsible for technical quality, regulatory alignment and overall project integration; a mining/environmental engineer specializing in underground-mine impact assessment, ventilation and subsidence issues; a social and public-consultation specialist responsible for stakeholder engagement and baseline socio-economic profiling; and field surveyors who conducted baseline data collection and coordinated on-site air, noise and water sampling.

1.5 Objectives of the EIA

- Establish the physical, biological and socio-economic baseline of the mine area and its surroundings.
- Identify the activities associated with continued underground mining, coal handling and haulage, and their potential environmental and occupational impacts.
- Assist the proponent in managing and, where required, upgrading operations to minimize adverse impacts while sustaining project benefits.
- Recommend practical mitigation and monitoring measures, including underground mine-safety measures.
- Provide an opportunity for stakeholder and public input into continued mine operation.
- Prepare a report suitable for submission to EPA Punjab for Environmental Approval.

1.6 Purpose of the Report

Continued underground coal mining at the site may give rise to minor-to-moderate impacts relating to overburden/discard disposal, mine-water management, fugitive dust, noise, land subsidence and, most significantly, underground occupational safety (mine gas, ventilation and respirable dust). An environmental study is therefore required to establish baseline conditions, evaluate likely impacts and devise appropriate mitigation. Under Section 12 of PEPA and the Review of IEE/EIA Regulations, 2022, coal mining projects of this scale fall under Schedule-II, requiring a full EIA-level study, as confirmed in the screening and scoping assessment in Chapter 3 of this report.

1.7 Scope and Methodology

The scope of this study covers description of the project and mining method; description of the physical, biological and socio-economic environment; identification and evaluation of potential impacts of continued mining and associated surface activities; public consultation with affected and interested stakeholders; and preparation of an Environmental Management and Monitoring Plan. The methodology combined site reconnaissance of the pit-head and surface facilities, review of secondary data and mine records held by the Directorate General of Mines & Minerals, field sampling of air, noise and mine-water quality by an EPA-certified laboratory, and structured household-level social surveys in village Bhal and adjoining settlements.

1.8 Components of the Report

This EIA Report presents the screening and detailed assessment of potential environmental impacts associated with continued mining, discussing necessary mitigation measures, institutional requirements, monitoring frameworks, and an actionable Environmental Management Plan (EMP). The report is organized into eight chapters:

- Chapter 1: Introduction — proponent, project context, background, scope and methodology.
- Chapter 2: Statutory Requirements & Standards — regulatory and legal framework applicable to coal mining in Punjab.
- Chapter 3: Description of the Project — mining method, layout, lease boundary, inputs/outputs and schedule.
- Chapter 4: Description of the Environment — physical, biological and socio-economic baseline.
- Chapter 5: Public Consultation — stakeholder engagement and community concerns.
- Chapter 6: Environmental Impacts and Mitigation Measures — construction/development and operational-phase impacts.
- Chapter 7: Environmental Management Plan (EMP) — implementation and monitoring framework.
- Chapter 8: Conclusion and Recommendations — key findings and recommended course of action.

CHAPTER 2: STATUTORY REQUIREMENTS & STANDARDS

2.1 General

Underground coal mining and its associated surface operations can give rise to environmental and occupational impacts throughout the remaining life of a mining lease. To ensure that such operations remain ecologically sustainable, socially acceptable and occupationally safe, the Government of Pakistan and the Provincial Government of Punjab have enacted comprehensive legal, regulatory and policy frameworks specific to both environmental protection and mine safety.

This chapter outlines the statutory requirements, legislative mandates, institutional arrangements and standards governing continued operation of Bhal Coal Mine, including national and provincial environmental legislation and Punjab's dedicated mining-sector regulations.

2.2 Existing Legislation and Legal Framework

- Pakistan Environmental Protection Act, 1997
- Punjab Environmental Protection Act, 1997 (as amended in 2012)
- Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022
- Punjab Mining Concession Rules, 2002
- Mines Act, 1923, and Coal Mines Regulations made thereunder
- National Environmental Quality Standards (NEQS) for ambient air, noise, and municipal/liquid industrial effluent
- Punjab Environmental Quality Standards (PEQS)
- Provincial Occupational Health and Safety guidelines and labour laws
- Local government / TMA by-laws applicable to solid-waste and effluent discharge

2.2.1 National Climate Change Policy, 2012

The National Climate Change Policy provides a framework for addressing climate change through adaptation and mitigation, emphasizing efficient resource management and reduced greenhouse-gas emissions from industrial and extractive activities. For coal mining, the policy is particularly relevant to methane management in

underground workings, energy efficiency of mine ventilation and haulage equipment, and progressive land reclamation of worked-out and dump areas.

2.2.2 National Environmental Policy, 2005

The National Environmental Policy (NEP) aims to protect, conserve and restore Pakistan's environment to improve quality of life through sustainable development. Objectives applicable to this project include prevention and control of air, water and soil pollution from mining activity; safe management and disposal of mine waste and overburden; and integration of environmental and occupational safety considerations into mine planning and operation.

2.2.3 Pakistan Environmental Protection Act (PEPA), 1997

PEPA 1997 is the umbrella federal legislation governing environmental protection, establishing the Pakistan Environmental Protection Council and the Pakistan Environmental Protection Agency, and requiring environmental impact assessment for projects with potentially significant impacts. Following the 18th Constitutional Amendment (2010), the subject of Environment and Ecology was devolved to the provinces, resulting in the Punjab Environmental Protection Act.

2.2.4 Punjab Environmental Protection Act, 1997 (Amended in 2012)

This Act is the primary statutory legislation governing environmental management within Punjab. Provisions of particular relevance to continued coal mining at Bhal include:

- Section 11 — Prohibition of Certain Discharges and Emissions: no proponent shall discharge or emit pollutants, including mine-water discharge or coal dust, in violation of PEQS/NEQS.
- Section 12 — IEE and EIA: prohibits continuation of a project's operational phase without a filed IEE/EIA and Environmental Approval (NOC) from EPA Punjab.
- Section 13 — Licensing for Hazardous Substances: relevant to storage/handling of fuels, lubricants and any blasting materials used in mine operation.
- Section 14 — Handling of Industrial and Solid Waste: requires proper management of overburden, discard/reject coal and other mine waste to prevent soil and groundwater contamination.
- Section 16 — Environmental Protection Orders (EPO): empowers EPA Punjab to issue stop-work orders or remedial directives for non-compliant operations.

- Section 17 — Penalties and Enforcement: provides for fines and proceedings before Environmental Tribunals for non-compliance.

2.2.5 Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022

These regulations define the administrative and technical procedures for filing, reviewing and approving environmental assessment reports, and classify projects into Schedule-I (IEE) and Schedule-II (EIA) categories according to scale and potential impact. Mineral extraction and mining projects, including underground coal mining of the scale operated at Bhal, fall under Schedule-II, requiring a full Environmental Impact Assessment, as confirmed in the screening exercise at Section 3.2 of this report.

2.2.6 Punjab Mining Concession Rules, 2002

The Punjab Mining Concession Rules, 2002 govern the grant, renewal, and terms and conditions of mineral concessions, including mining leases, in the Punjab. Rule 112 provides for renewal of mining leases, under which the subject lease (No. ML.CKL.I.COAL(140)) was renewed by the Licensing Authority for a further period of 20 years, from 05.05.2011 to 04.05.2031, vide Notification dated 11.03.2010, on the terms and conditions of the original allotment letter dated 05.08.1991. Rule 134 similarly governs the terms attaching to such renewal. Continued compliance with these Rules, including payment of dead rent/royalty and submission of periodic production returns to the Directorate General of Mines & Minerals, remains a condition of the lease.

2.2.7 Mines Act, 1923 and Coal Mines Regulations

The Mines Act, 1923 and the Coal Mines Regulations made thereunder govern the safety of persons employed in mines, including provisions on ventilation, gas testing, shoring and support, use of safety lamps in gassy seams, restrictions on smoking and open flame underground, emergency egress, and the duties of a certified Mine Manager. These provisions are directly applicable to the underground workings at Bhal Coal Mine and are administered by the Chief Inspector of Mines.

2.2.8 The Punjab Local Government Ordinance, 2001

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. Local councils are authorized to restrict activities causing pollution of air, water or land within their jurisdiction and may initiate schemes for environmental improvement relevant to the Chakwal area.

2.2.9 Pakistan Penal Code, 1860

Sections 268, 272 and 273 of the Code address public nuisance, including noise and the fouling of water, and are relevant to complaints that may arise from mine-water discharge or noise from mining machinery.

2.2.10 Factories Act, 1934, and Labour Laws

Provisions concerning the health, safety and welfare of workers, and disposal of waste and effluent, apply to the mine's surface workshop and processing facilities. Employers are required to ensure that both direct employees and contractors' labour follow applicable labour and occupational-safety laws.

2.3 Institutional Setup

The Environmental Protection Agency (EPA), Punjab, operating under the Environment Protection and Climate Change Department, Government of the Punjab, is the primary regulator responsible for reviewing and approving IEE/EIA reports, issuing Environmental Approvals/NOCs, and monitoring compliance. The Directorate General of Mines & Minerals, Punjab is the licensing authority for the mining lease itself, and the Chief Inspector of Mines is responsible for mine-safety oversight. Other relevant institutions include the Deputy Director/Assistant Director Mines & Minerals, Chakwal; the District Coordination Officer, Chakwal; the Federal Bureau of Statistics (Energy & Mining Statistics Section); and the Tehsil Municipal Administration.

2.4 Relevant Legal / Institutional Framework

Section 12 of the Punjab Environmental Protection Act, 1997 requires that no proponent commence or continue the operational phase of a project without first filing an IEE or EIA with EPA Punjab and obtaining approval. The Review of IEE and EIA Regulations, 2022 classify mineral extraction/mining projects of this scale under Schedule-II (full EIA). Compliance with NEQS for mine-water discharge and ambient air/noise, and with PEQS where applicable, is mandatory throughout the remaining operational life of the mine, in parallel with the proponent's continuing obligations to the Directorate General of Mines & Minerals under the Punjab Mining Concession Rules, 2002 and to the Chief Inspector of Mines under the Mines Act, 1923.

CHAPTER 3: DESCRIPTION OF THE PROJECT

3.1 General

This chapter describes the mine and its associated surface operations in detail, including project objectives, alternatives considered, location and lease boundary, mining method, infrastructure, manpower and implementation/monitoring schedule for the balance of the lease term.

3.2 Type and Category of the Project

The project is a mineral extraction (underground coal mining) operation, categorized as a Schedule-II project under the Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022, requiring an EIA-level study to support continued Environmental Approval.

3.3 Project Objectives

- Sustain licensed, indigenous coal production from the Bhal lease for the balance of the renewed term (to 04.05.2031).
- Operate underground workings and surface facilities in compliance with the Mines Act, 1923 and Coal Mines Regulations.
- Manage overburden, discard coal, mine-water and fugitive dust to acceptable environmental standards.
- Sustain direct and indirect employment for the local workforce of village Bhal and surrounding settlements.
- Operate in full compliance with PEQS/NEQS and EPA Punjab requirements.

3.4 Background

The Salt Range of northern Punjab, including the Chakwal district, hosts sub-bituminous coal seams that have been worked by small and medium-scale leaseholders for over a century, supplying fuel primarily to the brick-kiln and small-industry sector. The Bhal lease has been held and worked by M/s Munawar Mining Company since the original allotment in 1991 and was renewed in 2010 for a further 20-year term. The seams in this part of the

Salt Range are typically steeply dipping and discontinuous, necessitating underground, labour-intensive board-and-pillar or similar extraction methods rather than open-cast working.

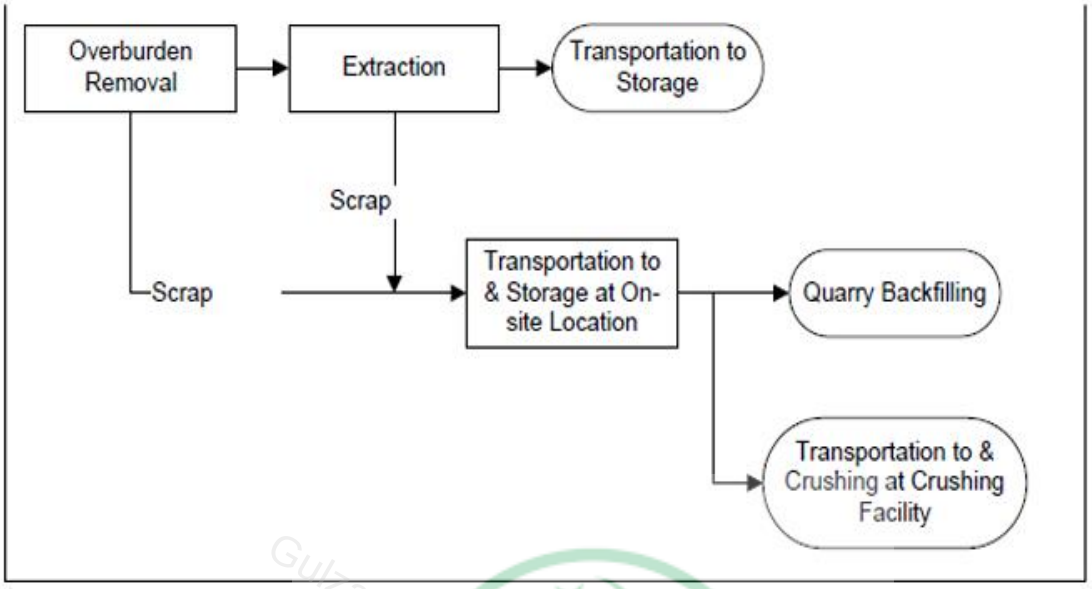


Figure 2: process of flow of Mining

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3.5 Project Alternatives

No-Project Alternative

Discontinuing mining at the lease would end an existing, licensed source of local employment and regional coal supply without commensurate environmental benefit, since the environmental risks associated with continued, properly managed operation are assessed as manageable. Given the lease's remaining validity to 2031 and the availability of practical mitigation measures, the No-Project alternative is not considered favourable at this stage; it remains relevant to eventual mine-closure planning near the end of the lease term.

Method Alternatives

Given the steeply dipping, discontinuous nature of the Salt Range coal seams at this location, underground board-and-pillar extraction remains the appropriate and least environmentally disruptive method, avoiding the large-scale land disturbance associated with open-cast working. The project will continue to apply improved ventilation, haulage and dust-control practice as a technological alternative to older, less controlled underground methods.

3.6 Location and Lease Boundary

The leased area is situated near village Bhal, Tehsil and District Chakwal, about 3 KM south of Nurpur, and is connected to Chakwal and Nurpur by a shingled road. The area falls within Survey of Pakistan Sheet No. 43-D/10, within Grids 67° to 70° longitude and 20° to 29° latitude. The sanctioned lease boundary, totalling 453.74 acres, is defined by twelve survey points (A–L) as follows:

Point	Easting (Yds.)	Northing (Yds.)
A	69,451	27,228
B	69,494.06	27,260
C	69,436.49	28,360
D	69,200	28,360
E	69,000	28,500
F	69,000	29,000
G	67,000	29,000
H	68,000	27,320
I	68,100	27,320
J	68,246	27,429
K	68,209	28,000
L	69,429	28,000

Total Sanctioned Area: 453.74 Acres, as confirmed in the Directorate General of Mines & Minerals renewal Notification dated 11.03.2010.



Figure 3: Google Map of site project

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3.7 Description of the Project / Mining Process

Coal is extracted from the leased area using underground development and extraction workings, with the following broad activity stages:

3.7.1 Access and Development

Mine access is maintained through existing drifts/inclines developed within the lease area, with roadways supported as required by ground conditions in accordance with the approved mine plan and the Mines Act, 1923.

3.7.2 Extraction

Coal is worked by a board-and-pillar (or equivalent) method suited to the seam thickness and dip, using manual and mechanized cutting/loading as applicable, with pillars left to support the overlying strata and control subsidence.

3.7.3 Haulage

Run-of-mine (ROM) coal is hauled from the working faces to the pit-head via underground haulage roads and surface tramway/vehicle haulage to the stacking and screening area.

3.7.4 Screening and Stacking

ROM coal is screened at the pit-head to separate saleable coal from discard/reject material, with saleable coal stacked in a designated, bunded stacking area pending dispatch.

3.7.5 Overburden / Discard Disposal

Discard material and any surface overburden from development workings are placed in a designated, engineered dump area within the lease boundary, away from natural drainage lines, with retaining bunds and progressive vegetative cover.

3.7.6 Mine-Water Management

Water entering underground workings is pumped to the surface and directed to settling ponds for sediment removal prior to any controlled discharge or reuse for dust suppression, in compliance with NEQS.

3.7.7 Dispatch

Screened coal is dispatched by road transport (covered where practicable) via the shingled access road to Chakwal/Nurpur and onward to the brick-kiln and industrial fuel market.

3.8 Market for the Product

The primary market for coal from Bhal Coal Mine is the regional brick-kiln sector and small industrial fuel users in and around Chakwal, Punjab, which relies on locally sourced Salt Range coal as an affordable fuel input.

3.9 Basic Infrastructure and Facilities

The site is served by the existing shingled access road connecting to Chakwal and Nurpur, WAPDA electricity supply supplemented by standby diesel generation for underground ventilation fans and pumps, a tube well/mine-water source for domestic and dust-suppression use, a surface workshop and stores, and staff welfare facilities including washrooms, a rest area and a first-aid/HSE station.

3.10 Labour Availability

Skilled and unskilled mining labour is drawn substantially from village Bhal and surrounding settlements in Chakwal district, consistent with the mine's long operating history at this location; preference continues to be given to local hiring.

3.11 Size / Magnitude of the Operation

Parameter	Detail
Leased Area	453.74 Acres
Mining Method	Underground (board-and-pillar / equivalent)
Remaining Lease Term	To 04.05.2031
Workforce (approx.)	Underground and surface mining staff, contractors and haulage labour

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3.12 Energy

Electrical power for ventilation fans, pumps and surface facilities is sourced from WAPDA, supplemented by standby diesel generation to ensure continuity of mine ventilation and dewatering. Energy-efficient motors and LED lighting are adopted at surface facilities where feasible.

3.13 Availability of Water

Water for domestic use and dust suppression is sourced from a combination of a tube well and treated mine-water pumped from underground workings, with reuse of settled mine-water for dust suppression adopted as a conservation measure.

3.14 Mine-Water Discharge & Treatment

Mine-water pumped from underground workings and surface washdown water is directed to settling ponds for removal of suspended solids before any controlled release, with discharge quality maintained within NEQS limits; no direct discharge of untreated mine-water to natural drainage is permitted.

3.15 Ventilation

Underground workings are ventilated by a forced/auxiliary ventilation system in accordance with the Mines Act, 1923 and Coal Mines Regulations, with regular testing for methane and other mine gases and maintenance of adequate air quantity and quality at all working faces.

3.16 Firefighting and Emergency Plans

Fire extinguishers, an emergency assembly area, and trained personnel for fire and mine-emergency response are maintained at the surface facilities and pit-head; underground fire-risk areas (e.g., near electrical installations and conveyor drives) are equipped with appropriate suppression measures, and an underground emergency evacuation and rescue procedure is maintained in line with Mines Act requirements.

3.17 Air Emissions & Noise

The principal surface air-quality consideration is fugitive coal dust from screening, stacking and haulage, to be controlled through water-spray suppression and covered stacking/transport. Noise sources include haulage vehicles, ventilation fans, pumps and the standby generator, to be controlled through equipment maintenance, silencers and, where practicable, enclosure.

3.18 Operational Arrangements

The mine operates under a certified Mine Manager as required under the Mines Act, 1923, supported by a designated Environmental & Mine Safety Officer responsible for day-to-day environmental and occupational-safety compliance, reporting to the Proponent.

3.19 Land Ownership

The leased area is held under Mining Lease No. ML.CKL.I.COAL(140), renewed in favour of M/s Munawar Mining Company, with no existing disputes or third-party occupation affecting continued mining operations within the sanctioned boundary.

3.20 Land Use on Site

The leased area comprises hilly, largely uncultivated Salt Range terrain historically designated for mineral extraction under the mining lease, together with limited surface infrastructure (pit-head, stacking area, dump, workshop and access tracks). No settlements exist within the sanctioned lease boundary requiring relocation.

3.21 Man Power

The mine continues to provide direct employment for underground miners, surface screening/stacking labour, haulage drivers, mechanical/electrical staff and supervisory personnel, together with indirect employment through transport, supply and maintenance services, with a continuing preference for local hiring from village Bhal and surrounding areas.

3.22 Vegetation Feature of the Project Site

The leased area carries the sparse, drought-tolerant vegetation typical of the Salt Range hills scattered phulai, sanatha and wild olive on undisturbed slopes with existing surface disturbance limited to the pit-head, dump and access-track areas. Any unavoidable further clearing for surface facilities will be offset through compensatory plantation, and progressive vegetative cover will be established on stabilized overburden/discard dump slopes.

3.23 Implementation and Monitoring Schedule

As an ongoing operation, the project does not follow a construction-phase schedule; instead, the schedule below sets out the priority actions and monitoring cadence for bringing the mine's environmental and safety management fully into line with this EIA and the EMP in Chapter 7, for the remaining lease term to 04.05.2031.

Sr. No.	Activity	Timeframe
01	Constitute/confirm Environmental & Mine Safety Officer role	Within 1 month of Approval
02	Engineer/upgrade overburden-discard dump bunding and drainage	Within 3 months
03	Commission mine-water settling ponds (if not already in place)	Within 3 months
04	Install/verify underground gas-testing and ventilation monitoring	Within 3 months
05	Commence quarterly EMP compliance monitoring (Chapter 7)	Ongoing, quarterly
06	Boundary/dump greenbelt and compensatory plantation	Within 6 months, then ongoing
07	Baseline occupational health screening of underground workforce	Within 6 months, then annual
08	Progressive mine-closure and reclamation planning review	By year 15 of renewed term

CHAPTER 4: DESCRIPTION OF ENVIRONMENT

4.1 General

This chapter presents the baseline environmental conditions of the Bhal Coal Mine lease area and its surroundings, drawing on published geological literature on the Salt Range coal measures, District Chakwal government records, and first-hand site reconnaissance and field measurements. It covers physical, biological and socio-economic/quality-of-life conditions within the area of influence, which serve as the benchmark against which potential impacts of continued mining are evaluated in Chapter 6.

4.2 Physical Environment

4.2.1 Geological Formation and Seismicity

Regional and Local Geology: The leased area lies within the Punjab Salt Range, a prominent fold-and-thrust belt of northern Punjab in which coal-bearing strata occur within the Paleocene-age Patala Formation, interbedded with shales, sandstones and limestones. The Salt Range coal seams are typically thin, steeply dipping and structurally disturbed by regional folding and faulting, which accounts for the underground, board-and-pillar style of working adopted at this lease rather than open-cast extraction.

Seismicity: According to the Seismic Zoning Map of Pakistan incorporated in the Building Code of Pakistan (BCP 2007/2021), District Chakwal falls within Seismic Zone 2B, reflecting the Salt Range's position within an active fold-and-thrust belt, with Peak Horizontal Ground Acceleration (PGA) values generally in the 0.16g to 0.24g range. While the leased area is not situated on a mapped active surface fault trace, underground roof/pillar support design, surface structures and the overburden/discard dump must incorporate appropriate seismic-resistance and stability measures for Zone 2B conditions.

4.2.2 Topography and Physiography

The terrain of the Salt Range around Bhal and Nurpur is hilly to undulating, with elevations in the broader Chakwal district ranging from approximately 350 to over 900 metres above Mean Sea Level (AMSL), considerably more rugged than the alluvial plains of central Punjab. The leased area itself displays the characteristic dissected hill-and-valley topography of the Salt Range, with natural drainage lines running toward local seasonal streams (nullahs).

4.2.3 Temperature and Rainfall

The climate of Chakwal district is classified as semi-arid, with four distinct seasons: hot summer (April–June), monsoon (July–September), autumn (October–November) and cool winter (December–March).

Temperature Profiles: Summers are hot, with daily maximum temperatures frequently exceeding 38°C to 41°C during May and June. Winters are cool, with minimum temperatures dropping to 4°C to 7°C in January, and are generally cooler than the central Punjab plains owing to elevation.

Rainfall Patterns: The region receives average annual precipitation of approximately 500 mm to 650 mm, historically the highest rain-fed (barani) agricultural zone in Punjab. The majority of rainfall occurs during the monsoon months of July and August, with the drier period extending from October to December.

Month	Avg. Max Temp (°C)	Avg. Min Temp (°C)	Mean Rainfall (mm)	Seasonal Characteristics
January	17.5	4.0	30	Cool, dry, occasional fog
February	20.5	7.0	35	Mild, dry
March	26.0	12.5	45	Pleasant spring transition
April	33.0	18.0	20	Dry, warming
May	39.0	24.0	15	Hot, high thermal stress
June	41.5	27.0	30	Peak summer heat
July	36.0	26.0	160	Hot, humid, monsoon peak
August	34.5	25.0	150	Humid, monsoon downpours
September	34.0	22.5	40	Post-monsoon transition
October	31.0	16.0	10	Mild, clear skies
November	25.0	9.5	6	Cool, dry
December	19.0	5.5	20	Cool, dry

4.2.4 Wind and Meteorological Dynamics

Wind direction shows notable seasonal variation, with prevailing winds during the summer and monsoon months generally from the south-west to north-east, shifting to a north-westerly to south-easterly pattern in winter. Average wind speeds range between 5 and 14 km/h, with gustier conditions during pre-monsoon dust events. Prevailing wind patterns are relevant to assessing dispersion of fugitive coal dust from the pit-head and stacking area toward downwind receptors.

4.2.5 Hydrology and Water Resources

Surface Water Resources: The leased area drains toward local seasonal nullahs typical of the Salt Range, which in turn feed into the broader Chakwal drainage network; no perennial river passes through the immediate lease area. Proper safeguards are required to ensure that mine-water and dump run-off do not degrade these seasonal drainage lines.

Groundwater Hydrology: Groundwater occurrence in the Salt Range is structurally controlled and generally less prolific and more variable in depth than in the alluvial plains, occurring within fractured limestone and sandstone horizons. Local supply is drawn primarily from dug wells, springs and tube wells; depth to groundwater in the vicinity of the lease is variable owing to the hilly terrain, and is influenced by underground mine dewatering.

4.2.6 Ambient Air Quality

Baseline ambient air quality in the vicinity of the mine reflects a rural, hilly setting with limited industrial activity, the principal existing sources being vehicular emissions on the Chakwal–Nurpur access road, dust from unpaved tracks, and fugitive coal dust from existing pit-head screening and stacking operations.

4.2.7 Ambient Noise Levels

Noise sources in the vicinity include haulage vehicles, the existing ventilation fans/pumps and standby generator at the mine, and general rural/agricultural activity. Baseline noise monitoring indicates ambient levels in nearby settlements generally within PEQS limits for Rural/Residential areas during day-time (55–65 dB[A]) and night-time (45–55 dB[A]), with localized elevation near the pit-head and along the access road during haulage activity.

4.2.8 Water Quality Assessment

Baseline water-quality samples were drawn from mine-water settling points and nearby community water sources and tested by an EPA-certified laboratory for physical, chemical and microbiological parameters:

- pH: generally within the PEQS range of 6.5–8.5, with periodic monitoring recommended given the potential for elevated acidity in mine-water contacting pyritic material associated with coal seams.
- Total Dissolved Solids (TDS): within typical PEQS limits for surface discharge (<1500–3500 mg/L, effluent category), subject to ongoing monitoring.
- Suspended Solids: elevated at the point of mine-water pumping prior to settling, confirming the need for the settling-pond treatment described in Section 3.14.

- Heavy Metals: within background levels at sampled points, with periodic monitoring recommended as a precaution given potential trace-metal association with coal seams.

4.3 Biological Environment

The leased area lies within the Salt Range hill ecosystem, a semi-arid to sub-humid environment distinct from the surrounding alluvial agricultural plains, and characterized by scrub and dry-broadleaf vegetation adapted to shallow, rocky soils.

4.3.1 Flora

Vegetation in the undisturbed portions of the lease and surrounding hills is dominated by drought-tolerant scrub and scattered trees typical of the Salt Range:

- Phulai (Acacia modesta) — dominant native tree of the Salt Range hills.
- Sanatha (Dodonaea viscosa) — common hillside shrub.
- Wild Olive / Kahu (Olea ferruginea) — native to rocky Salt Range slopes.
- Kikar / Babul (Acacia nilotica) — found in lower, less rocky terrain.
- Vaeny (Salvadora oleoides) and various grasses — on open, grazed slopes.

Adjacent lower-lying and valley areas support limited rain-fed (barani) cultivation of wheat, gram and fodder crops where soil depth permits.

4.3.2 Fauna

Avifauna (Birds): Common resident species observed in the hilly terrain and surrounding cultivated valleys include the House Sparrow (Passer domesticus), House Crow (Corvus splendens), Common Myna (Acridotheres tristis), Black Kite (Milvus migrans), Chukar Partridge (Alectoris chukar) and Grey Francolin (Francolinus pondicerianus), both characteristic of Salt Range scrub habitat.

Mammalian Wildlife: Given long-standing human and mining activity, larger wildlife is limited; commonly observed smaller mammals include the Indian Grey Mongoose (Herpestes edwardsi), Asiatic Jackal (Canis aureus), Indian Hare (Lepus nigricollis), and various rodents, together with grazing livestock (goats, sheep) typical of Salt Range pastoral land use.

Reptiles: Common garden lizards (Calotes versicolor), geckos (Hemidactylus spp.) and occasional non-venomous snake species typical of rocky Salt Range terrain.

4.3.3 Protected Areas and Critical Habitats

A review of ecological reserves confirms that no national park, wildlife sanctuary, game reserve or designated wetland is located within the immediate lease area; the Salt Range does host protected areas elsewhere in the province, but none coincide with or lie immediately adjacent to this lease. No species listed as endangered or threatened under the IUCN Red List or the Punjab Wildlife Protection Act have been recorded within the mine's immediate area of influence.

4.4 Socio-Economic Environment

4.4.1 Demography and Settlement Patterns

Village Bhal and the surrounding rural settlements in Tehsil Chakwal exhibit a typical Salt Range pastoral-agricultural settlement pattern, with households engaged in a combination of rain-fed farming, livestock grazing, and reflecting the long history of mining in this part of Chakwal mine labour and related services. Household sizes and extended-family structures are broadly consistent with rural Chakwal district norms.

4.4.2 Economic Infrastructure and Local Land Use

- Agriculture & Livestock: Barani (rain-fed) cultivation of wheat, gram and fodder, together with goat and sheep grazing on hillside common land, provide primary livelihoods for many local households.
- Mining Employment: The Bhal lease and neighbouring Salt Range coal workings provide a long-established source of direct mining employment and indirect income (transport, supply, small trade) for village Bhal and surrounding settlements.

4.4.3 Transportation and Public Utilities

- Road Access: The leased area is connected to Chakwal and Nurpur by a shingled road, used for both coal haulage and general local traffic.
- Electricity & Energy: Electrical power is supplied via the WAPDA network, backed by standby diesel generation at the mine for ventilation and dewatering continuity.
- Water & Sanitation: Local domestic water supply relies on a combination of dug wells, springs and tube wells; the mine's own domestic and process water needs are met from a tube well and treated mine-water.

4.4.4 Health, Education and Quality of Life

Basic health needs in the vicinity are served by Basic Health Units (BHUs) and private clinics in Nurpur and nearby settlements, with major hospital facilities available in Chakwal city. Primary and middle schools operate in surrounding villages. No schools or healthcare facilities are situated immediately adjacent to the lease boundary or pit-head area. The local population belongs to traditional Salt Range agrarian and pastoral communities, with Punjabi as the primary spoken language and Urdu used for official communication; social organization centres on local mosque committees and rural social networks, and public consultation confirms continued local support for mine operations that sustain employment, provided dust, noise and water-quality concerns are properly managed.

CHAPTER 5: STAKEHOLDER CONSULTATION AND ENGAGEMENT

5.1 General

Public consultation refers to the process by which the concerns of local affected persons and others who have a plausible stake in the environmental and social impacts of continued mining are ascertained, with a view to reflecting all material concerns in the ongoing management of Bhal Coal Mine. Under the Punjab IEE/EIA Regulations, 2022, public consultation is mandatory for any socio-environmental study. Impact assessment surveys and public consultation sessions were accordingly held with the different stakeholder groups affected by, or having an interest in, continued operation of the mine by M/s Munawar Mining Company. The consultation process was carried out in accordance with the guidelines laid down by EPA Punjab. The objectives of this process were to:

- Share information with stakeholders on continued mine operation and the remaining lease term.
- Assess impacts on the physical, biological and socio-economic environment of village Bhal and surrounding settlements.
- Understand stakeholder concerns regarding various aspects of the project, particularly dust, mine-water discharge, haulage traffic and underground mine safety.
- Understand the perceptions and social-impact assessment of communities in the mine's area of influence.
- Determine the level of awareness of, and acceptability regarding, continued operation, and identify any issues requiring resolution.
- Invite people to express their views on the positive and negative impacts of the mine on their lifestyles and environment.

This chapter records the comments received and how they have been taken into account in the environmental management approach for the mine. The public consultation proforma is attached as an Annexure to this EIA Report.

5.2 Objectives of Consultation

Public consultation plays a vital role in understanding the impacts of continued mining on stakeholders and in its successful ongoing management. It provides an opportunity to exchange knowledge with all stakeholders. Given that the project concerns environmental assessment, involvement of the public is all the more essential, as it leads to better and more acceptable decision-making. The overall objective of consultation with stakeholders is to help verify the environmental and social issues, besides the technical ones, that have been presumed to arise, and to identify those which are not otherwise known or are specific to Bhal Coal Mine. Discourse with residents and workers who have long observed site conditions, given the mine's operating history, goes a long way in updating the understanding on which this EIA is based.

5.3 Identification of Stakeholders

All persons directly or indirectly affected by, or concerned with, continued operation of Bhal Coal Mine are considered stakeholders. Besides the resident population of village Bhal and surrounding settlements, other stakeholders were identified and contacted, including landholders, local traders and shopkeepers, transporters, mine labour and their households, and relevant public offices. Both published material and the views and concerns expressed by these stakeholders were recorded. Project-affected persons (PAPs) are of two types:

5.3.1 Direct

Direct stakeholders are those benefited directly by the project, principally through employment and income. No displacement or physical disturbance to the local community is foreseen from continued operation of the mine within the existing lease boundary.

5.3.2 Indirect

Indirect impact accrues to those living or doing business within the mine's area of influence but not directly employed by it. Indirect stakeholders include:

- Government agencies responsible for matters related to the project, including EPA Punjab and the Directorate General of Mines & Minerals.

- Government agencies directly, indirectly or more broadly involved in the execution and monitoring of the project, including the office of the Chief Inspector of Mines and the Tehsil Municipal Administration.
- Representatives of community, cultural and social bodies in village Bhal and surrounding settlements, directly or indirectly related to the project.

5.4 Public Disclosure

Public disclosure is the outcome of activities in which the public is involved, at minimum, in the information-sharing process. As an integral part of that process, this disclosure has been shared appropriately among stakeholders. It remains the responsibility of the Proponent and the consultants to display the public disclosure document at prominent places to which the community has easy access.

5.5 Consultation Process

Information disclosure, public consultation and discussion regarding various aspects of continued mining with the people of the area are necessary and were intensified during the EIA study, with separate rounds of consultation held. Surveys were carried out to investigate physical, biological and socio-economic resources within the mine's immediate area of influence. Primary data collection included:

- Collection of data regarding the socio-economic condition of village Bhal and surrounding settlements.
- Pre-testing of socio-economic survey tools in the field.
- Consultation with local residents for information on the biological environment.

Meetings with stakeholders were held with the following objectives:

- Share information with stakeholders on continued mine operation and its expected impacts on the community in the vicinity of the project.
- Understand stakeholders' concerns regarding various aspects of the project, including existing conditions and the likely impact of ongoing surface and underground activities.
- Provide an opportunity for the public to influence management measures in a positive manner.

- Obtain local and traditional knowledge relevant to decision-making.
- Increase public confidence in the Proponent, reviewers and decision-makers.
- Reduce conflict through early identification of contentious issues, and work through them toward acceptable solutions.
- Disseminate information through discussion, education and liaison.
- Document information narrated by stakeholders and mitigation measures they proposed.
- Incorporate public concerns, and the response to them, into the EIA, together with stakeholder comments and feedback.

5.5.1 Consultation Methodology

5.5.1.1 Consultation Material

The main document used for distribution to stakeholders during consultation was a Social Impact Assessment interview form. The filled survey forms of stakeholders are annexed to this report.

5.5.1.2 Consultation Mechanism

Primary stakeholders were consulted during informal and formal meetings held in the project area. The consultation process was carried out in Urdu. During these meetings a simple, non-technical description of continued mine operation was given, together with an overview of its likely human and environmental impact. This was followed by open discussion allowing participants to voice their concerns and opinions. Feedback was documented during primary stakeholder consultation, and issues and suggestions raised were recorded in field notes for analysis and interpretation.

By reaching a wide segment of the population and using communication tools such as participatory needs assessment, community consultation meetings, focus group discussions, in-depth interviews and participatory rural appraisal, the EIA process involved the community in active decision-making. This process is intended to continue after submission of this EIA, using similar tools to build consensus among stakeholders on specific environmental and social issues arising over the remaining lease term.

Secondary stakeholder consultations were more formal, involving government representatives and local organizations consulted through face-to-face meetings. They were briefed on the EIA process, mine

operations, and the potential negative and positive impacts on the area's environment and communities. Care was taken not to raise community expectations unnecessarily or unrealistically during consultation, in order to avoid undue conflict with community leaders or local administrators. Issues recorded during the consultation process were examined, validated and addressed in this EIA report.

5.5.2 Primary Stakeholders Consultation

Community consultations were conducted with residents of village Bhal and surrounding settlements outside their homes, in open, accessible locations, to encourage and facilitate their participation.

5.6 Socioeconomic Survey and Public Consultation

To ascertain the perceptions of different stakeholders regarding continued mine operation, meetings were held with them in an open atmosphere in which participants expressed their views freely. Informal group discussions were also held as an additional tool for assessing stakeholder perceptions.

Methods of Public Consultation

Public consultation was carried out over three days. The following methods were used with project stakeholders to ascertain their stake in continued mine operation:

- Focused Group Discussions
- Scoping Sessions
- Formal Group Meetings
- Informal Group Meetings

Stakeholder Representatives Consulted

Table 5-1: Categories of Stakeholders Consulted

Stakeholder Category	Representative(s) Consulted
Village Administration	Numberdar / village representative, village Bhal
Community Elders	Elders and household heads, village Bhal and adjoining settlements
Mine Labour	Underground and surface labour representatives, Bhal Coal Mine
Local Landholders	Landholders adjacent to the lease boundary
Local Business	Shopkeepers and transporters serving the mine access road
Government Departments	Representatives of EPA Punjab and the Directorate General of Mines & Minerals

Awareness Regarding Continued Mine Operation

Of the total respondents surveyed, approximately 82% were already aware of the mine's operations and the scope of the current lease, reflecting its long operating history in the area since 1991; the remaining respondents had limited awareness of specific operational or environmental details.

Acceptability of Continued Mine Operation

The majority of respondents, approximately 94%, favoured continuation of mining operations, citing sustained local employment and economic activity as the primary reason for their support.

Concerns and Solutions

Table 5-2: Stakeholder Concerns and Solutions

Main Theme	Concerns	Solutions
Employment	Continued preference for hiring mine labour from village Bhal.	Priority given to labour sourced from the local community for both underground and surface work.
Dust & Air Quality	Concern over coal dust from the screening/stacking area affecting nearby fields and homes.	Water-spray suppression at screening/stacking points; covered coal stacking and haulage.
Mine-Water & Drainage	Concern that mine-water discharge could affect seasonal nullahs and local wells.	Settling-pond treatment prior to any controlled discharge; monitoring against NEQS.
Overburden / Discard Dump	Requested proper containment of discard material to prevent slope wash-off.	Engineered dump with retaining bunds, drainage control and progressive plantation.
Road Safety	Concern over coal-haulage traffic on the shared shingled access road.	Speed limits, covered loads and scheduling of heavy haulage to avoid peak local traffic times.
Mine Safety	Awareness of underground mining risk to local workers.	Reinforced ventilation, gas monitoring, PPE provision and occupational health screening.
Social Support	Requests for support to local schools and community facilities.	M/s Munawar Mining Company will consider such support as part of its corporate social responsibility.

CHAPTER 6: ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 General

This chapter identifies and evaluates the potential environmental and occupational impacts associated with continued coal mining operations at Bhal Coal Mine, Salt Range, District Khushab, held under lease by M/s Munawar Mining Company. The assessment covers impacts due to project location and design, impacts associated with ongoing surface development activity, and impacts associated with continued underground and surface coal-mining operation, together with the corresponding mitigation measures required to keep residual impacts within acceptable limits for the balance of the lease term.

6.2 Objectives

The objectives of screening the potential impacts of continued mining and identifying their mitigation measures are:

- To identify feasible alternatives and safer ways of carrying out ongoing mining activities.
- To enhance the environmental, occupational-safety and socio-economic benefits of the project.
- To avoid, minimize and remediate adverse impacts, particularly those associated with underground coal extraction.
- To ensure that residual adverse impacts, after mitigation, are kept within acceptable limits.

6.3 Impact Assessment Methodology

Screening of Potential Impacts

Impacts have been screened and evaluated on the basis of site visits, review of mine records, discussions with the Mine Manager and workforce, and reference to the nature (direct/indirect/cumulative), magnitude, spatial extent, duration (temporary/permanent) and reversibility of each impact, consistent with standard EIA screening practice under the Punjab IEE/EIA Regulations, 2022, with particular attention to the occupational hazards specific to underground coal mining.

Identification of Mitigation Measures

Following screening, mitigation measures have been identified and classified according to the standard mitigation hierarchy, applied in descending order of preference:

- Avoid — eliminate the potential impact at source, e.g. through mine design and panel layout.
- Minimize — reduce the spatial or temporal scale of the impact during planning and operation.
- Rectify — apply rehabilitation measures after the impact has occurred, e.g. dump revegetation.
- Compensate — offset residual impact where avoidance or minimization is not fully possible.
- Enhance — apply measures that create positive benefits beyond simple mitigation, e.g. local employment.

Evaluation of Residual Impacts

Incorporation of the mitigation measures described in this chapter is expected to reduce the magnitude of most impacts; however, for underground coal mining, certain impacts most notably subsidence risk and occupational exposure to mine gas and respirable dust cannot be fully eliminated and require sustained monitoring and management for the remaining lease term.

Identification of Monitoring Requirements

The scope and frequency of monitoring required has been set according to the significance of the residual impact, with the highest frequency (every shift) applied to underground ventilation and gas parameters, which carry direct life-safety consequences. The monitoring framework is detailed in Chapter 7.

Criteria for Significance

The following criteria, consistent with the methodology above, have been used to rate impact significance as Negligible, Low, Moderate or Severe:

- Negligible / No Impact — unapparent or negligible influence on the natural or socio-economic environment.
- Low Adverse Impact — a slight influence on the natural or socio-economic environment.
- Moderate Adverse Impact — an impact that can be fully eliminated or brought within acceptable limits after applying the identified mitigation measures.
- Severe Adverse Impact — an impact that can only be partially, not fully, mitigated by the identified measures (applicable in this EIA principally to underground occupational safety hazards prior to mitigation).
- Positive / Beneficial Impact — an impact that improves or enhances the natural or socio-economic environment.

6.4 Anticipated Potential Environmental Impacts (Surface Development & Underground Operation Phase)

Characterization of impacts is based on their significance, probability and prevalence in the environment surrounding Bhal Coal Mine. Anticipated impacts have been categorized as direct, indirect and induced, and are further classified according to their nature into:

- Positive and negative impacts;
- Minor, moderate and major impacts;
- Local and widespread impacts;
- Temporary and permanent impacts;
- Short-term and long-term impacts; and
- Reversible and irreversible impacts (notably subsidence over worked-out underground panels, which is effectively irreversible once it occurs).

6.5 Impacts Associated with Project Location

The Bhal Coal Mine lease occupies hilly, largely uncultivated Salt Range terrain historically dedicated to mining. There are no settlements within the lease boundary, no productive agricultural land use is displaced, and no ecologically sensitive, protected, archaeological, religious or culturally significant sites exist within or adjacent to the lease. The application of sound siting an existing, licensed mining lease rather than a greenfield site is itself the first and most effective strategy for minimizing the environmental and social impact of continued coal extraction.

6.6 Impacts Associated with Design

The board-and-pillar underground mining method, together with engineered surface facilities (bunded overburden/discard dump, settling ponds, covered coal stacking), has been adopted specifically to minimize environmental impact at source relative to more disruptive extraction methods, and to keep subsidence, mine-water and dust impacts within manageable bounds. No further design-stage impact on land, soil, topography or groundwater is anticipated; the Proponent will continue to review the extraction plan and surface layout to ensure it remains the most environmentally feasible option for the balance of the lease term.

6.7 Impacts Associated with Mining

The principal environmental and occupational impacts associated with continued mining at Bhal Coal Mine are:

- Land Subsidence
- Mine-Water Discharge and Quality
- Overburden / Discard (Solid Waste) Management
- Air Quality / Fugitive Coal Dust
- Noise from Plant, Ventilation and Haulage
- Underground Occupational Safety — Mine Gas, Ventilation and Respirable Dust
- Vegetation Loss and Wildlife Disturbance
- Socio-Economic and Community Impacts

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6.7.1 Impacts on Physical Environment

6.7.1.1 Land Subsidence

Potential Impacts

Progressive extraction of coal beneath worked panels carries an inherent risk of surface subsidence, which may affect slope stability and, where relevant, surface land use above old workings. This is the principal land-related concern for underground mining and is rated Direct, Medium-to-High significance, Long-term.

Impact Assessment

Because the lease area is uninhabited hilly terrain with no structures or agricultural land above active or historic workings, the practical consequence of subsidence is currently limited to slope stability and future land-use restriction rather than damage to existing property; however, the hazard to any personnel or infrastructure near subsidence-prone ground remains significant if left unmanaged.

Mitigation Measures

- Strict adherence to the approved board-and-pillar extraction plan with adequate pillar dimensions to prevent roof collapse and surface movement.
- Periodic subsidence and ground-movement monitoring over worked-out panels.
- Restriction of any new surface construction over identified subsidence-risk zones.
- Progressive backfilling or stowing of worked-out areas where practicable.

Residual Impact

With the above measures implemented and monitored, residual subsidence risk is reduced to Low-to-Medium significance; it cannot be eliminated entirely for as long as underground extraction continues.

6.7.1.2 Mine-Water Management and Quality

Potential Impacts

Water pumped from underground workings may carry elevated suspended solids and, given contact with pyritic material commonly associated with coal seams, a risk of lowered pH (acid mine drainage) if discharged without treatment. Uncontrolled discharge could contaminate surface water and soil in the vicinity of the mine.

Impact Assessment

The quantity of mine water requiring management is directly related to the extent of active underground workings; the principal risk is acidification and elevated total dissolved solids/suspended solids rather than large-volume contamination, given the limited surface drainage network in the Salt Range terrain.

Mitigation Measures

- Routing all mine water through settling ponds prior to any release.
- Periodic pH, TDS and suspended-solids monitoring of pumped mine water.
- Liming or other pH-correction measures where monitoring indicates acidification.
- Controlled discharge only in compliance with NEQS, with reuse of settled water for dust suppression preferred over discharge.

Residual Impact

With settling-pond treatment and routine monitoring in place, no significant residual impact on surrounding soil or water resources is anticipated.

6.7.1.3 Overburden / Discard (Solid Waste) Management

Potential Impacts

Continued generation of discard/reject material from coal screening requires ongoing, controlled disposal. Uncontrolled dumping could result in slope wash-off, sedimentation of drainage lines, and visual/landscape degradation.

Impact Assessment

Provided disposal remains confined to the designated dump area, the impact is assessed as Direct, Medium significance, Long-term, and manageable through engineering controls.

Mitigation Measures

- Placement of all discard in the designated, engineered and bunded dump area, sited away from natural drainage lines and seasonal nullahs.
- Progressive vegetative cover of stabilized dump slopes.
- Strict prohibition of dumping outside the designated area.
- Maintenance of a waste-tracking register recording discard/overburden quantities.

Residual Impact

No significant residual impact is anticipated provided the designated dump area and progressive rehabilitation programme are maintained.

6.7.1.4 Air Quality / Fugitive Coal Dust

Potential Impacts

Coal dust generated at the pit-head, screening plant, stacking area and along haul roads is the principal ongoing air-quality concern. Particulate matter smaller than 10 microns (PM10) is respirable and poses the main health hazard to workers and, to a lesser extent, nearby communities.

Impact Assessment

A significant effect would be interpreted if visible dust extends beyond the designated work areas or results in community complaints; given the distance of the nearest settlements from the pit-head and stacking areas,

community exposure is expected to be limited, while occupational exposure at the screening plant and stockpiles remains the primary concern.

Mitigation Measures

- Water-spray dust suppression at screening and transfer points, capable of reducing total dust emission by up to 75%.
- Covered coal stacks and covered haulage vehicles.
- Regular watering and compaction of unpaved haul roads and site tracks.
- Provision of dust respirators to equipment operators and screening-plant workers.
- Boundary and dump-area greenbelt to assist dust settlement.

Monitoring Requirements

Dust emission will be visually monitored on a routine basis, and ambient PM10/PM2.5 levels will be checked quarterly at the screening/stacking area and along the haul road, as detailed in Chapter 7.

6.7.1.5 Noise

Potential Impacts

Continuous operation of ventilation fans, pumps, the standby generator and haulage vehicles, together with periodic upgrading of surface facilities, generates ongoing and intermittent noise that may affect workers and, where haul roads pass near settlements, nearby communities.

Impact Assessment

The potential sources of significant noise are trucks, loaders, the generator, ventilation fans and pumps; impact is rated Low-to-Medium, Long-term for continuous plant noise and Low, Temporary for intermittent surface-upgrade works.

Mitigation Measures

- Equipment maintenance and use of silencers/mufflers on machinery and vehicles.
- Enclosure of stationary plant where practicable.
- Restriction of surface-upgrade works to daytime hours.

- Haulage scheduling to avoid night-time vehicle movement through nearby settlements.
- Provision of hearing-protection PPE to workers in high-noise areas.

Residual Impact

With the above measures, noise levels are expected to remain within NEQS limits at the site boundary; no significant residual impact on surrounding communities is anticipated.

6.7.2 Impacts on Biological Environment

6.7.2.1 Vegetation Loss

Vegetation loss is limited to the existing pit-head, dump and access-track footprint within the already-disturbed Salt Range lease area; no further large-scale clearing is anticipated for continued operation. The Proponent has planned a compensatory plantation programme, at a ratio of at least 3:1 relative to any vegetation removed, covering the lease boundary and stabilized dump slopes.

6.7.2.2 Wildlife and Habitat

Human activity associated with continued surface and underground operation may cause limited disturbance to wildlife in the vicinity of the lease; however, wildlife presence in the immediate mine area is limited and no ecologically sensitive habitat exists within or adjacent to the lease boundary.

Mitigation Measures

- A strict 'no-hunting, no-trapping, no-harassment' policy will be enforced for all project personnel.
- Trading of wild animals or birds by project personnel will be prohibited.
- Off-road driving will be minimized to avoid accidental disturbance to fauna.
- Wildlife-protection rules will be included in site conduct rules for workers and contractors.

6.7.3 Underground Occupational Safety — Mine Gas, Ventilation and Respirable Dust

Potential Impacts

Underground coal workings carry an inherent risk of methane and other gas accumulation, inadequate ventilation, roof/rib failure, and chronic worker exposure to respirable coal dust — a recognized cause of pneumoconiosis. This is assessed as Direct, High significance, Long-term, and is the most significant impact

category associated with continued underground coal mining; prior to mitigation it is rated a Severe Adverse Impact, since gas and roof-fall hazards can only be partially eliminated by design and depend critically on consistent operational discipline.

Impact Assessment

The severity of this hazard is a function of seam gas content, ventilation adequacy, and the rigour with which gas testing, support standards and permitted-equipment rules are enforced at each working face; consequences of failure range from acute injury to fatality and long-term occupational disease.

Mitigation Measures

- Maintenance of adequate forced/auxiliary ventilation throughout all active working areas.
- Regular, documented gas testing (methane, oxygen, carbon monoxide) by trained personnel prior to and during each shift.
- Strict enforcement of Mines Act, 1923 and Coal Mines Regulations requirements on roof/rib support, use of permitted lighting and equipment in gassy areas, and prohibition of open flame.
- Provision and mandatory use of respiratory PPE, hard hats and other protective equipment.
- Periodic occupational medical examination of underground workers, including respiratory health screening, with records maintained by the Environmental & Mine Safety Officer.
- Break/rotation of workers away from the working face during any blasting or gas-testing exceedance.
- Emergency call service, first-aid provision, and trained mine-rescue response capability at the site.

Residual Impact

Full elimination of underground safety hazards is not achievable in coal mining; with consistent implementation of the above measures, residual risk is reduced but remains the highest-priority item in the EMP (Chapter 7) for the balance of the lease term.

6.7.4 Socio-Cultural Impacts

6.7.4.1 Possible Displacement

No residential structures or settlements exist within the lease boundary, and surrounding communities are at a safe distance from active workings. No displacement or resettlement is required for continued operation.

6.7.4.2 Land Use

The lease area is hilly, largely uncultivated Salt Range terrain historically dedicated to mining; continued operation does not displace any productive agricultural or residential land use.

6.7.4.3 Induction of Labour

Continued mining sustains direct and indirect employment for unskilled, semi-skilled and skilled labour from village Bhal and surrounding settlements. Employment not distributed equitably between local communities could, however, give rise to grievance or conflict.

Mitigation Measures

- Continued preference for local hiring, particularly for unskilled and semi-skilled positions.
- Clear communication of the employment policy and the number of local positions available.
- Preference to residents of villages closest to, and most directly affected by, mine operations.

6.7.4.4 Community Health

Workers undergo medical examination prior to hiring and periodic screening thereafter, including for respiratory health given underground exposure. Given the limited contact between the underground workforce and surrounding communities, and the distance of settlements from active workings, the project is unlikely to pose a significant communicable-disease or health risk to the local population.

Mitigation Measures

- Pre-employment medical examination and periodic occupational health screening of all underground workers.
- Provision of a regular medical practitioner for employee health checks.
- Continued dust and water-quality control to minimize any off-site nuisance or exposure.

6.7.4.5 Worker and Community Safety

Safety remains a primary concern for both underground and surface operations, as well as for traffic movement associated with haulage and site access.

Mitigation Measures

- Speed limits and warning signage on the site access road.
- A documented public safety plan, displayed at site, together with a community complaint register.
- Controlled entry to the lease area; unrelated persons not permitted inside without authorization.
- No machinery left unattended, particularly in running condition.
- Restriction of night-time driving of project vehicles.
- Driver training on safe, low-speed operation and compliance with traffic rules.

6.7.4.6 Use of Explosives (where applicable)

Where blasting is used to assist coal or overburden breakage, safety impacts are typically related to accidental explosion or poor coordination of blasting activities. Recommended management practices include:

- Handling, storing and transporting explosives in accordance with national explosives-safety regulations.
- Assigning only certified blasters/explosives experts to conduct blasting.
- Adoption of consistent, pre-notified blasting schedules.
- Use of warning devices (horn signals, flashing lights) before each blast, with traffic limitation where required.
- Post-blast inspection by qualified personnel for misfires or unexploded charges prior to resumption of work.
- Blasting-permit procedures for all personnel involved in handling, transport, storage or destruction of explosives.

6.7.4.7 Security Risks

The presence of a mine workforce and associated activity may present a limited increase in security risk to the surrounding area.

Mitigation Measures

- Provision of adequate site security.
- Security personnel stationed at all entry and exit points.

6.7.4.8 Emergency Response

Incidents may occur unexpectedly despite mitigation measures, particularly underground.

Mitigation Measures

- Blasting and gas-testing activities conducted only under supervision of the Mine Manager/qualified officer.
- Adequate, documented training of all workers in emergency response.
- Emergency call service and first-aid provision available at all times.
- Workers withdrawn from the face during blasting or any adverse gas reading.
- Trained mine-rescue capability and liaison arrangements with the Chief Inspector of Mines' office.

6.7.4.9 Socio-Economic Impacts

Overall, continued mining is assessed as a Positive, Long-term, Significant socio-economic impact: it sustains direct and indirect employment and income for village Bhal and surrounding settlements and continues to support the regional coal-fuel supply chain.

6.8 Potential Environmental Enhancement Measures

- Continued preference for local hiring and skill development in mining and mine-safety practice.
- Progressive vegetative rehabilitation of stabilized overburden/discard dump slopes and disturbed surface areas.
- Boundary and dump-area greenbelt development, using native Salt Range species, to assist dust control and visual/landscape improvement.
- Early-stage mine-closure and progressive reclamation planning ahead of lease expiry.
- Community engagement and a functioning complaint-response mechanism throughout the remaining lease term.

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6.9 Summary of the Environmental Impacts

The overall risk profile of continued operation at Bhal Coal Mine, before and after implementation of the mitigation measures described above, is summarized in Table 6-1.

Environmental Parameter	Risk (Before Mitigation)	Risk (After Mitigation)	Recommended Mitigation
Location	+1 (P)	+2 (P)	Established, licensed lease site; no ecologically sensitive or protected areas within lease boundary.
Land / Subsidence	-2 (P)	-1 (P)	Board-and-pillar design, subsidence monitoring over worked panels, restricted surface use over active workings.
Overburden / Discard	-2 (P)	-1 (P)	Engineered, bunded dump with drainage control and progressive plantation.
Mine-Water Quality	-2 (P)	-1 (P)	Settling-pond treatment; periodic pH/TDS monitoring; controlled discharge per NEQS.
Air Quality / Dust	-1 (P)	-1 (P)	Water-spray suppression, covered stacking and haulage.
Noise	-1 (T)	-1 (T)	Equipment maintenance, silencers, haulage scheduling.
Underground Occupational Safety	-3 (P)	-1 (P)	Ventilation, gas monitoring, PPE, training, medical surveillance — highest-priority mitigation.
Flora	-1 (P)	+1 (P)	Compensatory plantation and dump-slope revegetation.
Fauna	0	0	No significant impact anticipated; limited wildlife presence.
Employment	+2 (P)	+2 (P)	Continued preference for local labour hiring.
Aesthetics / Land Disturbance	-1 (P)	+1 (P)	Dump landscaping and boundary plantation improve visual quality over time.

Table 6-1: Summary of Environmental Impacts — Bhal Coal Mine (+) = beneficial, (–) = adverse; 1 = Low, 2 = Medium, 3 = High significance; (T) = Temporary, (P) = Permanent

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CHAPTER 7: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

7.1 General

This chapter presents the Environmental Management Plan (EMP) for continued surface and underground operation of Bhal Coal Mine, together with the associated Environmental Monitoring Plan, to ensure that the mitigation measures identified in Chapter 6 are implemented effectively and verifiably for the balance of the renewed lease term. As per environmental legislation in Pakistan, this EMP, together with other supporting documents, is to be submitted to the Environmental Protection Agency, Punjab, in support of continued Environmental Approval. Even after implementation of the mitigation measures identified, certain impacts particularly underground occupational-safety hazards may remain significant and require sustained monitoring; this chapter sets out the monitoring framework for both surface and underground activity to verify compliance and enable timely corrective action.

7.2 Objectives of the Environmental Management Plan

- Facilitate effective implementation of the mitigation measures identified in this EIA.
- Define the responsibilities of the Proponent, Mine Manager, contractors and operational staff, and provide a means of effective communication between them.
- Identify monitoring parameters to verify the effectiveness of mitigation measures, including underground mine-safety parameters.
- Provide a mechanism for timely response to unanticipated environmental or safety issues.
- Identify training requirements for project staff at all levels.
- Ensure ongoing compliance with the Punjab Environmental Protection Act, NEQS/PEQS, the Punjab Mining Concession Rules 2002 and the Mines Act 1923.

7.3 Management Approach

The organizational roles and responsibilities of the key parties are summarized below:

- M/s Munawar Mining Company (represented by Sheikh Muhammad Ramzan): holds overall responsibility for EMP compliance and reporting to EPA Punjab and the Directorate General of Mines & Minerals.
- Mine Manager (certified under the Mines Act, 1923): responsible for day-to-day underground operations, extraction planning, ventilation, gas testing and mine-safety compliance.
- Environmental & Mine Safety Officer: responsible for day-to-day environmental monitoring, record-keeping and reporting to the Proponent and Mine Manager.
- Contractors: responsible for implementation of surface-facility upgrade and haulage mitigation measures, and are contractually bound to environmental and safety requirements.

7.4 Components of the EMP

The EMP consists of the following components:

- Management Plan
- Monitoring Plan
- Communication and Documentation
- Institutional Capacity
- Environmental and Safety Training

7.5 Environmental Management Plan

Table 7-1 lists the mitigation measures identified in Chapter 6 together with the associated project activity, potential impact, extent/magnitude, and the responsible implementing and supervisory party for continued surface and underground operation of Bhal Coal Mine.

Table 7-1: Environmental Management Plan

Project Activity	Potential Impact	Extent / Magnitude	Mitigation Measures	Implementing Body	Supervision
Surface Facility Upgrades (dump bunding, settling ponds, access tracks)	Dust, noise, minor soil disturbance	Site level / Local	Water sprinkling on unpaved surfaces; daytime working hours; regular machinery maintenance; designated storage areas.	Contractor	Environmental & Mine Safety Officer / Proponent
Underground Extraction (board-and-pillar)	Subsidence, roof/rib failure, mine-gas hazard	Lease area / Long-term	Approved pillar-design compliance; periodic subsidence monitoring; restricted surface use over worked-out panels; progressive backfilling where	Mine Manager	Chief Inspector of Mines / Proponent

Project Activity	Potential Impact	Extent / Magnitude	Mitigation Measures	Implementing Body	Supervision
			practicable; support standards per Mines Act.		
Underground Ventilation & Gas Management	Methane/CO accumulation, inadequate ventilation, respirable dust	Underground / Every shift	Adequate forced/auxiliary ventilation; shift-wise documented gas testing (CH4, O2, CO); prohibition of open flame and non-permitted equipment in gassy areas; mandatory respiratory PPE.	Mine Manager	Chief Inspector of Mines / Proponent
Screening & Coal Stacking	Fugitive coal dust	Local	Water-spray suppression at screening/transfer points; covered coal stacks.	Surface Supervisor	Environmental & Mine Safety Officer
Haulage / Transport	Dust, noise, road-safety risk	Access road	Covered loads; low speed limits; restricted night-time movement;	Transport Contractor	Proponent

Project Activity	Potential Impact	Extent / Magnitude	Mitigation Measures	Implementing Body	Supervision
			scheduled timing near settlements.		
Overburden / Discard Dump Management	Slope wash-off, drainage/sedimentation impact	Local	Engineered, bunded dump away from drainage lines; progressive vegetative cover; waste-tracking register.	Mine Manager	Environmental & Mine Safety Officer
Mine-Water Management	Sedimentation, potential acidity (acid mine drainage)	Local	Routing through settling ponds; periodic pH/TDS/TSS monitoring; liming where required; controlled discharge per NEQS; reuse for dust suppression preferred.	Mine Manager	Environmental & Mine Safety Officer
Occupational Health (Underground & Surface)	Respirable dust exposure, pneumoconiosis risk, injury	Site-wide	Mandatory PPE; periodic occupational medical	Mine Manager	Chief Inspector of Mines / Proponent /

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Project Activity	Potential Impact	Extent / Magnitude	Mitigation Measures	Implementing Body	Supervision
			examination and respiratory screening; safety training; accident/incident recording.		Medical Officer
Vehicle & Machinery Operation	Emissions, noise, vibration, fuel spillage	Site level	Periodic maintenance and inspection; functioning silencers; no unattended running machinery; spill-prevention measures at fuelling/maintenance areas.	Contractor	Proponent
Use of Explosives (where applicable)	Accidental explosion, misfire, community/worker safety	Local	Certified blasters only; consistent pre-notified schedules; warning signals; post-blast inspection; blasting permits and	Mine Manager	Proponent

Project Activity	Potential Impact	Extent / Magnitude	Mitigation Measures	Implementing Body	Supervision
			audited procedures.		
Use of Local Manpower	Employment generation; risk of intertribal/local conflict if inequitable	Local / Adjacent villages	Preference to local unskilled/semi-skilled hiring; transparent communication of employment policy.	Contractor	Proponent

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7.6 Environmental Monitoring Plan

Environmental monitoring is the mechanism through which the effectiveness of the EMP is measured. It confirms whether operations are being carried out in conformity with the EMP, identifies impacts exceeding significance criteria, and documents actual project impacts to allow refinement of mitigation measures. Table 7-2 sets out the monitoring parameters, frequency, locations and responsible party, with particular emphasis on underground mine-gas and ventilation monitoring given its direct life-safety significance.

Table 7-2: Environmental Monitoring Plan

Component	Objective	Parameters Monitored	Frequency	Location	Responsibility
Mine Ventilation & Gas	Worker safety, ventilation adequacy	CH4, O2, CO levels; air velocity	Every shift	All active underground working faces	Mine Manager / Gas Testing Officer
Subsidence	Ground stability over worked-out panels	Visible surface movement, cracking	Quarterly	Worked-out panel areas	Mine Manager
Noise Levels	Effectiveness of noise-control measures	Noise level, dB(A)	Quarterly	Site boundary and near pit-head plant	Environmental & Mine Safety Officer
Air Quality (Dust)	Effectiveness of dust-control measures	PM10, PM2.5, visible dust	Quarterly	Screening/stacking area and haul road	Environmental & Mine Safety Officer
Mine-Water Quality	NEQS compliance of any discharge	pH, TDS, TSS, heavy metals	Quarterly	Settling-pond outlet / discharge point	Environmental & Mine Safety Officer
Overburden / Discard Dump	Stability and containment	Visual inspection, drainage condition	Monthly	Dump area	Environmental & Mine Safety Officer
Worker Health	Effectiveness of occupational health programme	Respiratory screening, accidents/injuries, PPE compliance	Annual (screening);	Entire site	Environmental & Mine Safety Officer /

Component	Objective	Parameters Monitored	Frequency	Location	Responsibility
			Daily (incidents)		Medical Officer
Water Conservation	Effectiveness of water-use practices	Leakages, spills, wastage	Monthly	All points of use	Environmental & Mine Safety Officer

The following records will be maintained by the Environmental & Mine Safety Officer and made available to EPA Punjab and the Chief Inspector of Mines upon request:

- Shift-wise gas-testing logs and ventilation inspection records.
- Subsidence and ground-movement inspection reports.
- Waste-tracking register for discard/overburden quantities disposed, recycled or reused.
- Mine-water quality laboratory reports.
- Occupational health screening and incident/injury records.
- Periodic inspection and audit reports of the site.
- Records of community complaints and the measures taken to address them.

7.7 Institutional Capacity

7.7.1 Primary Responsibility

Overall responsibility for implementation of the EMP within the company rests with the Proponent, M/s Munawar Mining Company, represented by Sheikh Muhammad Ramzan.

7.7.2 Operational Management and Control

Conducting underground and surface operations in an environmentally and occupationally sound manner is the responsibility of the certified Mine Manager, who will be trained and supported accordingly.

7.7.3 Supervision and Monitoring

The Environmental & Mine Safety Officer is responsible for day-to-day environmental and occupational-safety monitoring and for verifying implementation of the EMP, reporting to the Proponent and, on mine-safety matters, to the Chief Inspector of Mines.

7.8 Communications and Documentation

The Environmental & Mine Safety Officer will maintain a project environmental and safety file including monitoring records, training logs, incident reports and correspondence with EPA Punjab and the Directorate General of Mines & Minerals, and will submit periodic compliance reports as required by the Environmental Approval conditions and the mining lease. Two categories of environmental/safety meetings will be held:

- Kick-off meetings — to present the EMP to project staff, discuss its implementation, and review lessons from any environmental or safety incident in the industry.
- Weekly meetings — to discuss ongoing operations and environmental/safety issues, recorded in a weekly environmental and safety report.

A change-record register will be maintained at the site to document any changes in mine design or extraction plan, handled through the change-management mechanism.

7.9 Environmental and Safety Training

The Proponent will designate a dedicated Environmental & Mine Safety Officer and ensure that the Mine Manager, contractors and operational staff receive induction and periodic refresher training covering:

- Dust, noise and mine-water management measures.
- Subsidence recognition and reporting procedures.
- Gas testing, ventilation checks and permitted equipment use underground.
- Occupational health and safety, including PPE use and respiratory protection.
- Emergency response, fire safety and underground mine-rescue procedures.

A comprehensive annual training calendar will be maintained and made available to all employees, consistent with the company's documented Health, Safety and Environment SOPs.

7.10 Rehabilitation and Tree Plantation

A greenbelt of native Salt Range species (phulai, kikar, wild olive) will be developed along the lease boundary and on stabilized overburden/discard dump slopes, at a compensatory ratio of at least 3:1 relative to any vegetation removed, to assist dust control, slope stabilization and visual improvement.

7.11 Mine Closure and Reclamation Planning

Given the finite remaining term of the renewed lease (to 04.05.2031), the Proponent will initiate progressive mine-closure and land-reclamation planning in the latter part of the lease term, covering final stabilization and revegetation of the overburden/discard dump, sealing/securing of underground access points, and restoration of surface disturbance to the extent practicable, in consultation with EPA Punjab and the Directorate General of Mines & Minerals.

7.12 Equipment Maintenance

Equipment of adequate efficiency, condition and reliability will be maintained by the Proponent, with formal maintenance of surface and underground machinery carried out at least twice yearly, and more frequently for ventilation fans, pumps and gas-testing equipment given their direct safety function.

7.13 Environmental Budget

An amount of approximately PKR 2.0–3.0 million per annum has been earmarked for implementation of environmental and occupational-safety mitigation measures, monitoring, greenbelt/rehabilitation development and staff training for the remaining life of Bhal Coal Mine.

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CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

This report presents the Environmental Impact Assessment (EIA) for the Continuation of Coal Mining Operations at Bhal Coal Mine, held under Mining Lease No. ML.CKL.I.COAL(140) by M/s Munawar Mining Company, located near village Bhal, Tehsil and District Chakwal. The mine has operated since the original lease allotment in 1991 and continues under a renewal granted by the Directorate General of Mines & Minerals, Punjab for the period 05.05.2011 to 04.05.2031, over a sanctioned area of 453.74 acres.

As an established, long-operating coal mine supplying the regional brick-kiln and industrial fuel market, continuation of operations at Bhal offers direct socio-economic benefit to village Bhal and the wider Chakwal area by sustaining direct and indirect employment, local supply-chain activity and household income, while requiring focused, sustained environmental and occupational-safety management for the remainder of the lease term.

The overall objective of this EIA is to assess potential environmental, biological, socio-economic and occupational-safety impacts of continued mining and to establish actionable mitigation measures to reduce adverse effects to acceptable levels. The conclusions below are based on the baseline survey findings, technical assessment and public consultations conducted in accordance with the statutory requirements of the Environmental Protection Agency (EPA), Punjab, and in coordination with the requirements of the Directorate General of Mines & Minerals and the Mines Act, 1923.

Accordingly, it is recommended that Environmental Approval (NOC) for continued operation of Bhal Coal Mine be issued by EPA Punjab under Section 12 of the Punjab Environmental Protection (Amendment) Act, 2012, subject to compliance with the Environmental Management Plan (EMP) set out in Chapter 7 and payment of the mandatory statutory scrutiny fee by the proponent.

8.1 Main Issues and Concerns

Field surveys and technical appraisal identified the principal operational concerns for continued mining at Bhal as: land subsidence over worked-out underground panels; management of overburden/discard material; mine-water sedimentation and potential acidity; fugitive coal dust from surface handling; and, most significantly, underground occupational safety relating to mine gas, ventilation adequacy and respirable dust exposure of the workforce. None of the identified impacts involve environmentally sensitive receptors, physical displacement of local populations, or irreversible large-scale ecological degradation. The summary matrix below presents the predicted impacts of continued operation.

Table 8.1: Summary Matrix of Environmental Impacts

Environmental & Social Resource	Envisaged Impact	Development/Upgrade Activity	Assessed Significance
Land / Subsidence over Worked Panels	Underground extraction risk	N/A (ongoing operation)	Minor–Moderate Negative (Mitigated by pillar design & monitoring)
Overburden / Discard Disposal	Dump slope wash-off, drainage	N/A	Minor Negative (Mitigated by engineered, bunded dump)
Surface & Groundwater Quality	Mine-water sedimentation / acidity risk	N/A	Minor–Moderate Negative (Mitigated by settling ponds & monitoring)
Air Pollution / Coal Dust	Pit-head, screening & haul-road dust	N/A	Moderate Negative (Mitigated via water-spray suppression, covered haulage)
Noise and Vibration	Ventilation fans, pumps, haulage	N/A	Minor Negative (Mitigated via maintenance, silencers, scheduling)

Environmental & Social Resource	Envisaged Impact	Development/Upgrade Activity	Assessed Significance
Underground Occupational Safety	Mine gas, ventilation, respirable dust, roof/rib failure	N/A	Moderate–High Negative (Mitigated via ventilation, gas testing, PPE, medical surveillance — priority focus)
Loss of Natural Vegetation	Limited clearing at pit-head/dump footprint	N/A	Minor Negative (Offset by 3:1 compensatory plantation)
Fauna & Wildlife Habitat	Limited wildlife presence in disturbed hill terrain	N/A	No Significant Impact
Traffic & Road Safety	Coal-haulage traffic on shared access road	N/A	Minor Negative (Mitigated by covered loads, speed limits, scheduling)
Economic Activity & Employment	Direct/indirect labour, local supply and services	N/A	Major Positive (Sustained long-term local economic benefit)

8.2 Summary of Operational Environmental and Safety Risks

Underground Operation

- Land Subsidence: risk of ground movement over worked-out panels, to be managed through approved pillar design and periodic subsidence monitoring.
- Mine Gas and Ventilation: methane and other mine-gas accumulation risk requires rigorous, shift-wise gas testing and maintenance of adequate forced/auxiliary ventilation at all working faces.
- Respirable Dust and Occupational Health: chronic exposure risk for underground workers requires PPE, dust suppression and periodic respiratory health screening.

Surface Operation

- Coal Dust: from screening, stacking and haul roads, requiring water-spray suppression and covered handling.
- Mine-Water Management: requiring settling-pond treatment and periodic quality monitoring prior to any controlled discharge.
- Overburden / Discard Disposal: requiring an engineered, bunded dump with drainage control and progressive revegetation.

All identified impacts can be managed through the established engineering solutions, operational controls and monitoring protocols set out in the project's Environmental Management Plan (EMP), Chapter 7.

8.3 Recommendations

Based on the EIA evaluation, the following recommendations are made to ensure environmentally and occupationally sound continuation of coal mining operations at Bhal Coal Mine:

- 1. Prioritizing EMP Implementation: The proponent must give top operational priority to executing the Environmental Management Plan (EMP), assigning a dedicated Environmental & Mine Safety Officer and allocating sufficient financial resources for ongoing mitigation, monitoring and reporting.
- 2. Underground Ventilation and Gas Safety: Forced/auxiliary ventilation must be maintained at all active working faces, with shift-wise gas testing (methane, oxygen, carbon monoxide) conducted and documented by trained personnel in accordance with the Mines Act, 1923 and Coal Mines Regulations.
- 3. Subsidence Monitoring: Periodic inspection and monitoring of ground conditions over worked-out panels must be carried out, with restrictions on new surface construction over identified subsidence-risk zones.
- 4. Coal Dust and Air Emission Control: Water-spray suppression at screening/stacking points, covered coal stacks, and covered/sheeted haulage vehicles must be maintained and routinely inspected.
- 5. Mine-Water Treatment and Discharge Compliance: All mine-water must be routed through settling ponds, with periodic pH, TDS and suspended-solids monitoring, and any discharge maintained within NEQS limits; direct discharge of untreated mine-water is strictly prohibited.
- 6. Overburden / Discard Management: Discard material must be confined to the designated, engineered and bunded dump area, with progressive vegetative stabilization of dump slopes and prohibition of dumping into natural drainage lines.
- 7. Occupational Health and Safety (OSH): A comprehensive OSH programme must be enforced, including mandatory PPE (respirators, hard hats, safety boots, gloves, hearing protection), routine health checks with respiratory screening for underground workers, safety training, and site firefighting/emergency-response systems.
- 8. Traffic Management: Coal-haulage movement along the shared shingled access road must be scheduled to minimize conflict with local traffic, with covered loads and speed restrictions enforced.

- 9. Boundary and Dump-Area Greenbelt: Native Salt Range species must be planted and maintained along the lease boundary and on stabilized dump slopes to assist dust control and visual/landscape improvement.
- 10. Progressive Mine-Closure Planning: The proponent should begin progressive mine-closure and reclamation planning well ahead of lease expiry (04.05.2031), in consultation with EPA Punjab and the Directorate General of Mines & Minerals.
- 11. Periodic Environmental and Safety Monitoring: Routine monitoring of ambient air, mine-water discharge, noise levels, subsidence and underground mine-gas/ventilation must be carried out in accordance with the EMP schedule (Chapter 7), through an EPA-certified laboratory where applicable, with compliance reports submitted to EPA Punjab and the Chief Inspector of Mines.

8.4 Final Conclusion

This Environmental Impact Assessment (EIA) demonstrates that continuation of coal mining operations at Bhal Coal Mine, for the remaining term of the renewed lease to 04.05.2031, will not cause significant or unmanageable adverse environmental impacts on the surrounding Salt Range landscape or local community, provided the mitigation measures and EMP set out in this report with particular and sustained priority given to underground ventilation, gas safety and occupational health are systematically implemented.

The project continues to offer significant socio-economic benefit to village Bhal and the wider Chakwal district by sustaining direct and indirect mining employment and supporting the regional coal-fuel supply chain. Overall, continuation of the project is assessed as environmentally manageable, technically sound and socially beneficial. It is recommended that EPA Punjab grant the requisite Environmental Approval (NOC) for continued operation, subject to the standard terms and conditions prescribed under the Punjab Environmental Protection Act, 1997 and the EMP set out in this report.