Due Diligence Study for Green field Mining Projects

Comprehensive, expert-level Due Diligence Study Framework for a Greenfield Mining Project, structured systematically to meet professional mining investment and technical evaluation standards.

🧭 1. Introduction and Objectives

Purpose

To evaluate the technical, financial, environmental, legal, and social viability of the proposed mining project before investment or acquisition.

The due diligence ensures that:

All geological, operational, financial, and legal risks are identified.

The project's assumptions are realistic and based on sound data.

The economic feasibility is reliable for decision-making.

⚒️ 2. Project Overview

Aspect	Description
Project Type	Greenfield (exploration-stage or early development)
Commodity	(e.g., Manganese, Iron Ore, Copper, Coal, etc.)
Location	Country, State/Province, GPS coordinates
Ownership	Legal entity, JV details, rights, permits
Stage	Concept → Exploration → Feasibility → Development
Strategic Importance	Market demand, resource security, regional infrastructure

🪨 3. Geological Due Diligence

Objectives

Assess the quality and reliability of geological data, resource estimation, and exploration results.

Key Steps

1. Data Verification

Review all exploration data: drilling logs, assays, core photos, QA/QC procedures.

Check compliance with JORC, NI 43-101, or UNFC reporting standards

2. Deposit Evaluation

Geological model review (lithology, structure, alteration, mineralization).

Resource classification (Measured, Indicated, Inferred).

Sampling density and representativeness

3. Exploration Upside

Evaluate potential extensions and untested targets.

4. Independent Validation

Third-party verification of geological interpretations and resource models.

⛏️ 4. Mining Technical Due Diligence

Objectives

Assess mine design, extraction methods, and production assumptions.

Key Areas

1. Mine Design & Method

Open pit vs. underground feasibility.

Slope design, pit optimization, cut-off grades.

2. Mine Scheduling

Production ramp-up, life of mine (LOM), stripping ratio.

3. Equipment Selection

Appropriateness of HEMM (haul trucks, shovels, drills).

4. Operating Parameters

Ore recovery, dilution, cycle times, equipment productivity.

5. Infrastructure

Roads, power, water, workshops, camps.

6. Benchmarking

Compare production rates and costs to similar mines.

 5. Mineral Processing & Metallurgical Due Diligence

1. Process Testing

Sample representativeness and test work adequacy.

2. Flowsheet Development

Crushing, grinding, beneficiation, and recovery stages.

3. Recovery Efficiency

Expected grade and recovery consistency.

4. Reagent and Water Balance

Chemical requirements and recycling possibilities.

5. Tailings & Waste Management

TSF design, environmental and geotechnical safety.

 6. Financial and Economic Due Diligence

Key Deliverables

1. Capital Cost Estimation

Pre-production, plant, infrastructure, contingency.

2. Operating Costs

Mining, processing, logistics, G&A, power, water, labor.

3. Revenue Forecast

Grade, recovery, production rate, price assumptions.

4. Financial Modeling

DCF analysis, NPV, IRR, payback period.

5. Sensitivity Analysis

Impact of ±10–20% variations in prices, recovery, opex, capex.

6. Scenario Analysis

Base case, optimistic, pessimistic outcomes.

7. Funding Structure

Debt/equity ratio, repayment profile, cash flow adequacy.

⚖️ 7. Legal Due Diligence

1. Ownership & Tenure

Validity of licenses, leases, mining rights, and surface rights.

2. Permits & Approvals

Environmental clearance, forest clearance, water permits.

3. Contracts

JV agreements, royalty arrangements, off-take contracts.

4. Encumbrances

Liens, litigations, pending disputes.

5. Regulatory Compliance

Mining Act, Mineral Conservation Rules, labor laws, taxation.

🌍 8. Environmental & Social Due Diligence

Environmental

Baseline studies (air, water, soil, flora, fauna).

EIA/EMP documentation.

Waste & tailings management.

Mine closure plan and rehabilitation.

Climate impact and carbon footprint evaluation.

Social

Land acquisition & resettlement (R&R) status.

Stakeholder consultation.

CSR obligations and community development plans.

Grievance redressal mechanism.

🚧 9. Infrastructure and Logistics Due Diligence

Transport Routes: Road, rail, port proximity.

Power Supply: Grid access, captive generation.

Water Source: Availability and permits.

Communications: Connectivity and workforce access.

Supply Chain: Critical spares, fuel, and logistics partners.

👨‍💻 10. Management, Team, and Governance Review

Qualifications and track record of management.

Experience of operational team in similar deposits.

Board structure, decision-making transparency.

Corporate governance and ESG framework.

🧾 11. Risk Assessment Matrix

Risk Type	Description	Impact	Probability	Mitigation
Geological	Resource uncertainty	High	Medium	Independent audit
Environmental	Permit delays	Medium	High	Early engagement with regulators
Technical	Equipment underperformance	Medium	Medium	OEM guarantee & testing
Financial	Cost overruns	High	Medium	Contingency & phased development
Market	Price fluctuations	High	High	Hedging strategy
Social	Land disputes	Medium	High	R&R and stakeholder dialogue

📊 12. Valuation and Investment Decision

Valuation Methods: DCF, Comparable Transactions, Multiples (EV/Resource).

Key Metrics: NPV (at discount rate 8–12%), IRR, Payback, EBITDA margin.

Decision Gate:

✅ Proceed to Feasibility / Financing

⚙️ Redesign or Reassess certain parameters

❌ Do not proceed (unviable or high-risk)

📋 13. Summary of Findings & Recommendations

Consolidated findings from each due diligence domain.

Highlight of red flags and unresolved issues.

Recommendations for risk mitigation, further studies, or negotiation points.

📚 14. Appendices

Geological maps, drill hole data, assay certificates.

Resource estimation report (block model summary).

EIA report summaries.

Financial model (Excel or software output).

Legal documentation (licenses, lease copies, MOUs).

✅ Deliverable Output Format

Section	Deliverable	Format
Technical DD	Detailed report with maps, figures	PDF
Financial Model	Cash flow model, sensitivity	Excel
Risk Register	Impact-probability matrix	Excel
Executive Summary	Key conclusions 2–3 page brief	
Presentation	For board or investor use	PowerPoint

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