Supplementary File S1. PRISMA 2020 Checklist

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This checklist identifies where PRISMA 2020 reporting elements are addressed in the revised engineering review manuscript. Because the manuscript is a surface-mining engineering review rather than a health-intervention review, some PRISMA items are not applicable in the same way as in clinical systematic reviews; where this applies, the limitation is stated explicitly.

PRISMA item	Location in manuscript	Response / notes
1. Title	Title page	The title identifies the manuscript as a review focused on surface mine planning adaptations for AHS integration.
2. Abstract	Abstract	The abstract summarizes the rationale, review method, major findings, planning implications, and future research needs.
3. Rationale	Introduction; Review Objectives	The manuscript explains why AHS requires mine-planning analysis beyond operational safety and system architecture.
4. Objectives	Review Objectives; Research Questions	The revised research questions define the scope of the review and include a scope clarification for topics that could not be resolved from the available evidence.
5. Eligibility criteria	Methodology; Inclusion and Exclusion Criteria	Eligibility criteria are described for surface mining, AHS relevance, mine planning, road design, scheduling, safety, economics, and implementation constraints.
6. Information sources	Search Strategy; Figure 2	The manuscript describes database screening and separately reports supplementary sources added through citation checking, expert recommendation, and targeted engineering references.
7. Search strategy	Search Strategy	Keyword combinations, screening denominator, time range, mining relevance, language, and publication-type filters are described.
8. Selection process	Screening, Extraction, and Quality Appraisal; Figure 2	The manuscript reports identification, screening, eligibility, inclusion, and supplementary-source accounting.
9. Data collection process	Screening, Extraction, and Quality Appraisal	A structured extraction matrix was used to record operation type, region, AHS maturity, planning variable, evidence type, reported outcomes, constraints, and source type.
10. Data items	Screening, Extraction, and Quality Appraisal; Findings	Data items were grouped by mine-planning variable, benefit domain, implementation constraint, and evidence source category.
11. Study risk-of-bias/source appraisal	Source Appraisal table	The review uses an author-defined source-appraisal approach for mixed engineering evidence; clinical risk-of-bias tools were not used as formal scoring instruments.
12. Effect measures	Limitations	No common quantitative effect measure was used because the evidence base combines design guidance, simulations, case reports, standards, and implementation literature.
13. Synthesis methods	Findings; Discussion	The synthesis is qualitative and organized by planning variable, with implications interpreted for haul-road design, fleet selection, scheduling, infrastructure, economics, and workforce planning.
14. Reporting-bias assessment	Source Appraisal; Limitations	Formal reporting-bias analysis was not conducted; evidence-source limitations and triangulation boundaries are stated.

PRISMA 2020 Checklist (continued)

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15. Certainty assessment	Source Appraisal; Limitations	A formal GRADE certainty assessment was not applied because the review is not a clinical intervention meta-analysis; source strength is discussed qualitatively.
16. Study selection	Figure 2; Search Strategy	The revised manuscript reports 3,046 records identified, 256 records after initial filtering, 74 reports assessed for eligibility, 29 full-text exclusions, 45 database-screened studies included, and 6 supplementary sources.
17. Full-text exclusion reasons	Search Strategy	The 29 full-text exclusions are categorized as wrong population/setting (n = 8), wrong concept (n = 7), wrong outcome (n = 6), wrong source type/detail (n = 5), and insufficient full-text information (n = 3).
18. Study characteristics	Findings	Study characteristics are synthesized by AHS benefit domain, planning variable, geographic evidence base, and implementation constraint.
19. Results of individual sources	Findings subsections	Individual sources are discussed within thematic findings rather than listed as an annotated bibliography.
20. Results of syntheses	Findings tables; Discussion	The revised manuscript consolidates planning-variable effects and discusses optimization, scheduling, economic, and implementation implications.
21. Reporting biases	Limitations	The limitations section discusses evidence concentration, methodological heterogeneity, lack of common quantitative outcomes, and transferability limits.
22. Certainty of evidence	Limitations; Conclusions	The conclusions emphasize site-specific validation and avoid universal design claims where evidence remains limited.
23. Discussion	Discussion; Future Work; Conclusions	The discussion interprets findings, identifies planning implications, acknowledges limitations, and specifies future research needs.
24. Registration and protocol	Limitations	The protocol was not prospectively registered; this is acknowledged as a limitation.
25. Support	Funding statement	Funding support is reported in the manuscript back matter.
26. Competing interests	Conflicts of Interest statement	Conflicts of interest are reported in the manuscript back matter.
27. Availability of data, code, and materials	Data Availability Statement; References	No new experimental dataset was generated; the manuscript synthesizes published literature and cited supporting sources.